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The Wireless World

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THE PRACTICAL RADIO JOURNAL

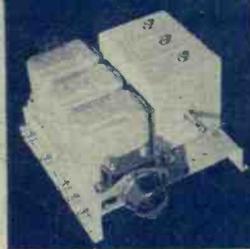
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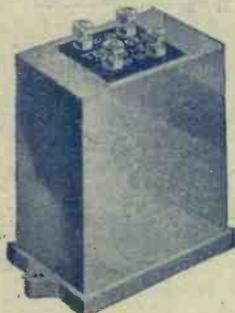
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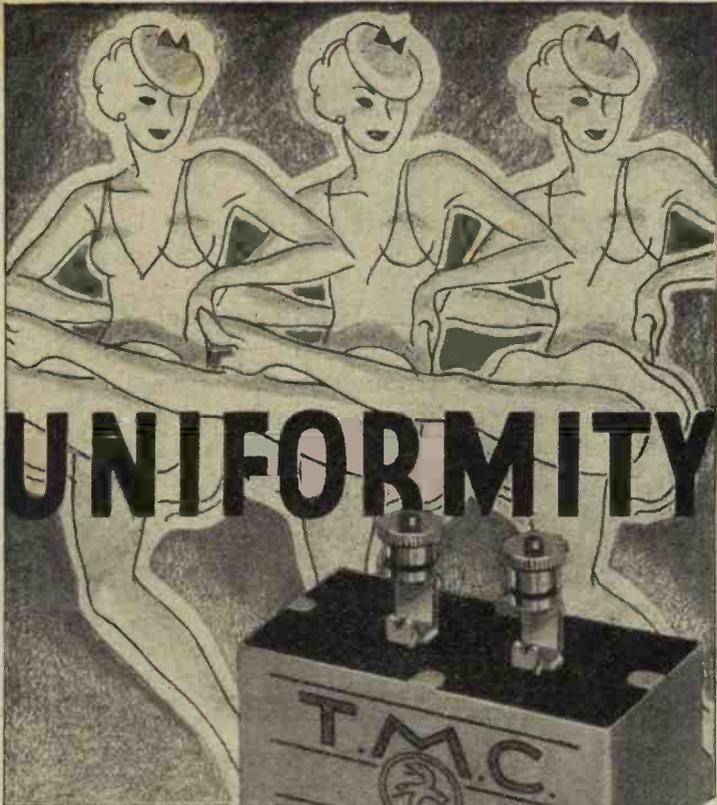
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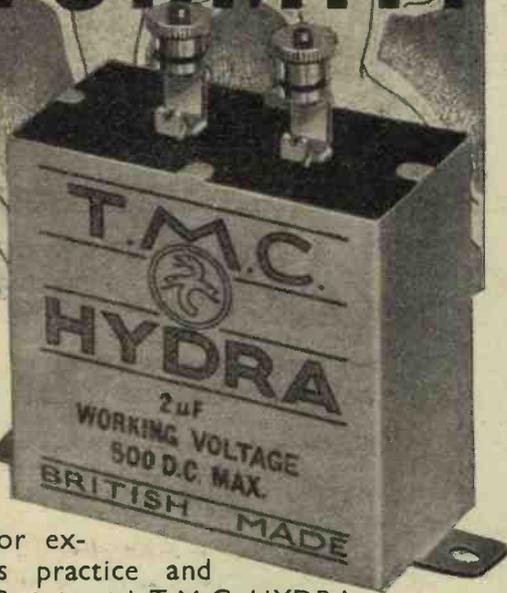


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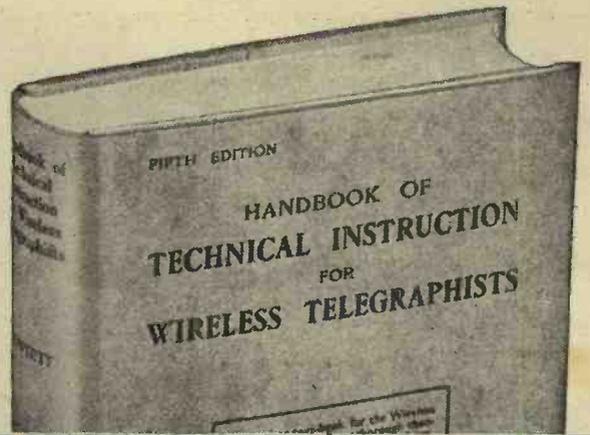


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MURPHY

In a recent public advertisement Mr. Murphy drew attention to the difficulties of the buyer in coming to a wise decision in the choice of a wireless set.

The fact is that only a comparatively small section of the general public have sufficient knowledge of the technique of broadcast reception to follow the whys and wherefores of many of the things that we do in our sets. We feel that it would be a good thing for all of us if our theories and the reasoning behind our practices were more widely known, and a series of talks in *The Wireless World* will, we hope, assist along this route.

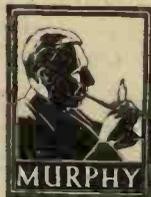
The first few will deal with the subject of reproduction, the improvement of which, as you may know, is one of our chief aims in the making of Murphy sets.

Now to do justice to a good loudspeaker, great care must be exercised in the design of its mounting.

The first decision to be arrived at is the size of baffle area to give the bass response considered necessary for good reproduction. With the loudspeaker used an area about three foot square was indicated.

In designing a cabinet equivalent to this three foot square baffle two causes of distortion had to be closely watched. The first was the enclosure of a volume of air which would have an undesirable resonance in the audio range, and the second a direct vibration of the material used in the construction of the cabinet. These have been called "box" resonance and "wood" resonance respectively.

We had long been convinced that "box" resonance was not the most important factor with the usual wireless cabinets of approximately ten inches depth back to front. That it must exist to some degree is certain, but it would be difficult to claim it as a serious defect in a cabinet



say 16in. x 14in. x 10in. deep after precautions have been taken to remove distortion caused by other defects in the mounting. The nature of the problem makes the use of measuring instruments very difficult and unreliable, and since in any case we had decided to carry out the first experiments under ordinary listening conditions, a loudspeaker was mounted in a hole cut through the brick wall dividing two living rooms. This substantially avoided distortion caused by box and wood resonances and formed a convenient standard of comparison to judge aurally the effect of other loudspeaker mountings. In comparison with this standard a similar loudspeaker mounted in a wood baffle three foot square and one inch thick exhibited very marked distortion which could only be due to the wood resonance. As, of course, it is not reasonable to demand that the public should mount the speaker in a brick wall, experiments were made to find a form of small baffle which would give as near as possible the same results.

It was found that with wood alone a satisfactory result was not obtained until the thickness had been increased to three inches. This route was hardly possible because a cabinet so constructed would be too heavy, cumbersome and expensive. Other experiments were carried out using sound absorbing material alone and then in combination with wood, until finally a very satisfactory result was obtained by using wood about five-eighths of an inch thick with an inch layer of sound absorbing material. This gave an excellent compromise between weight, expense and acoustical efficiency.

In a fortnight's time we shall continue the series with a description of further experiments and how they decided the shape and construction of the cabinets of our Console, and the Radio-gramophone which will be announced shortly.

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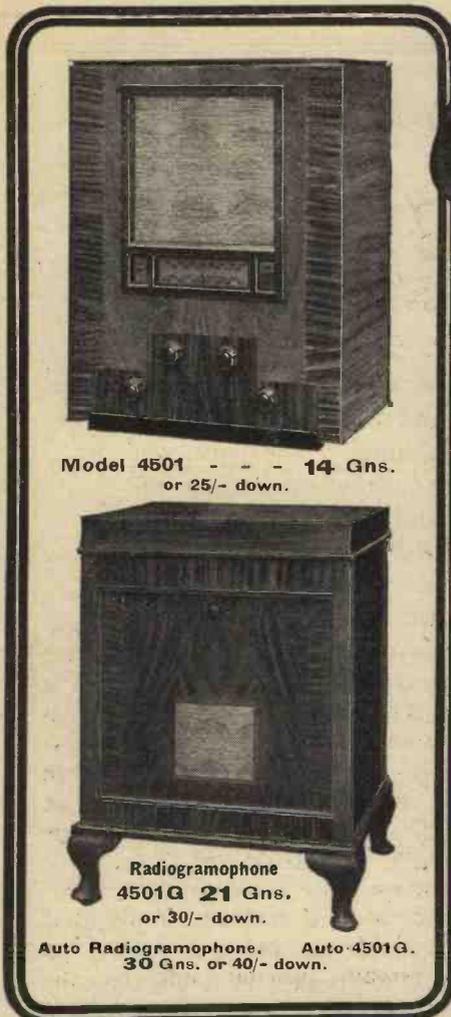
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As many of the circuits and apparatus described in these
pages are covered by patents, readers are advised, before
making use of them, to satisfy themselves that they would
not be infringing patents.

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EDITORIAL COMMENT

Radio Shows

Some Critical Observations

THE Radio Show at Olympia has been a great success and the Glasgow and Manchester Shows may also be expected to be equally satisfactory in the results which they will bring to the exhibitors. It would, however, be idle to suppose that to a wireless-minded public these shows are a great attraction. Much energy and expenditure is put into the exhibition which has little or nothing to do with wireless or broadcasting, and one is tempted to wonder whether the same efforts devoted to enhancing the attractiveness of the shows from a purely wireless point of view, would not be worth while. There was little, if anything, at Olympia to impress upon the visitor either the attractiveness of broadcasting or the benefits to be derived from the use of an up-to-date receiver.

The B.B.C. theatre performances, as we have previously remarked, had very little in common with broadcasting; even the shows themselves were not typical of microphone performances. In the Main Hall the reproduction from loud speakers and sets on the stands, coming as it did from a common sound amplifier, served very little purpose other than to produce musical reproduction which could much better have been obtained by other means in the Hall. If it is intended that this reproduction should give the public an idea of the performance of individual sets, it does nothing of the kind; on the contrary, it misleads the public because the reproduction is independent of the receivers themselves and would, in some cases, therefore, sound better than the actual set, whilst in the case of receivers of very high fidelity the method of supply adopted is unsuitable.

Some means should be derived for

enabling the public to make a comparative test at the show between one type of set and another, but, if this is not possible, then the idea of a common supply to every stand should be abandoned and some other form of musical reproduction introduced, or an orchestra installed instead to provide the musical entertainment.

We know that a criticism of this kind will be met with the reply that the aim of the exhibitors is to get the utmost possible publicity and that the methods that they have adopted have succeeded to this end, but we are by no means satisfied that an equivalent expenditure of money and effort could not achieve the same result, whilst making the exhibition more attractive to the general visitor and more in keeping with the broader aims of the radio industry.

Service and Compactness

Importance of Accessibility

THE servicing of wireless receivers is by no means an easy task, more especially for the reason that, unless it is a job which necessitates return to the works or to a repair shop, the service has generally to be carried out under conditions far from ideal.

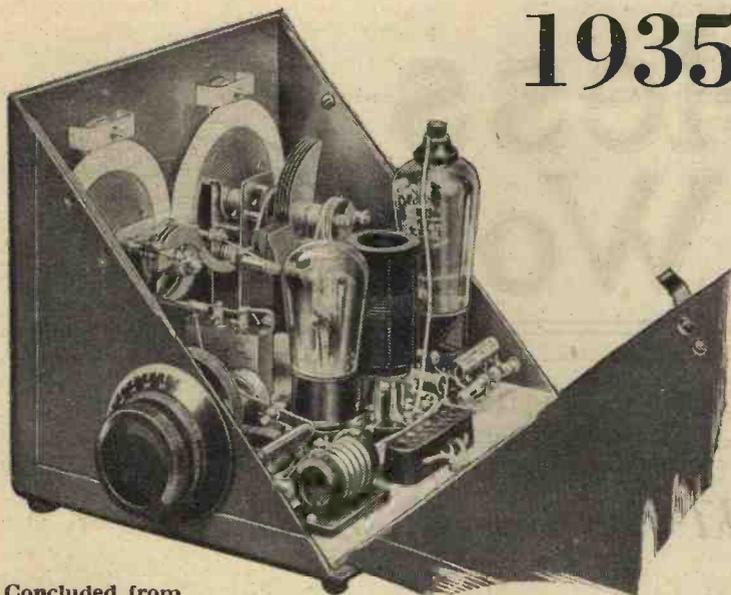
This being so, it is worth while to consider whether everything possible is being done to facilitate servicing.

For some years now there has been a tendency to reduce the size of sets. This has been desirable up to a point, but there are serious objections to compactness from the point of view of accessibility, and especially is it foolish to squeeze a set into the smallest possible chassis only to find that the chassis is to be housed in a large cabinet in order, apparently, to make it look more imposing.

1935 A.C. Short-wave Receiver

Construction and Operation of the New 12-70 Metre Set

By "MEGACYCLE"



Concluded from page 194 of last week's issue.

A MINIMUM amount of wiring and a compact coil assembly avoid the cramping often associated with short-wave sets. The construction of the metal case simplifies the wiring up of the whole receiver in the box. The original receiver has picked up stations all over the world on an indoor aerial 12 feet long. C.W. stations on all Continents gave loud speaker results

THE layout of components in a short-wave receiver has always presented some difficulty. One has to compromise between the undesirable effects of long leads and the equally undesirable effects of the "cramping" of components when short wiring has been achieved.

In the case of this receiver the wiring has been cut down to a minimum, and, thanks largely to the very compact coil assembly, plenty of space remains. The metal box in which the H.F. and detector are housed helps the "earth-return" problem considerably, such components as the variable condensers looking after themselves automatically in this respect! The coils are reasonably clear of the box itself and the larger metal components, and plug into a six-pin base of the same size as a normal valve-holder. They are only 1 1/2 in. in diameter.

Layout Should be Followed

There is, indeed, hardly any possibility of departing from the layout shown, because the first valve, coil-holder, and second valve are all mounted in line towards the back of the case, and apart from the condensers and the H.F. chokes, most of the other components are mounted directly on the wiring at the most convenient points.

A wooden baseboard has, of course, been used, but owing to the ingenious way in which the metal case has been arranged to open "diagonally," there is no difficulty in wiring up the whole receiver in the box.

The two-speed slow-motion dials, which, incidentally, make operating a very pleasant business, are provided with templates, and the drilling is an easier matter than usual, thanks to the circular openings for the escutcheons. The box is made of an alloy which is quite easy to drill, despite the fact that it appears to be made of thick armour-plate!

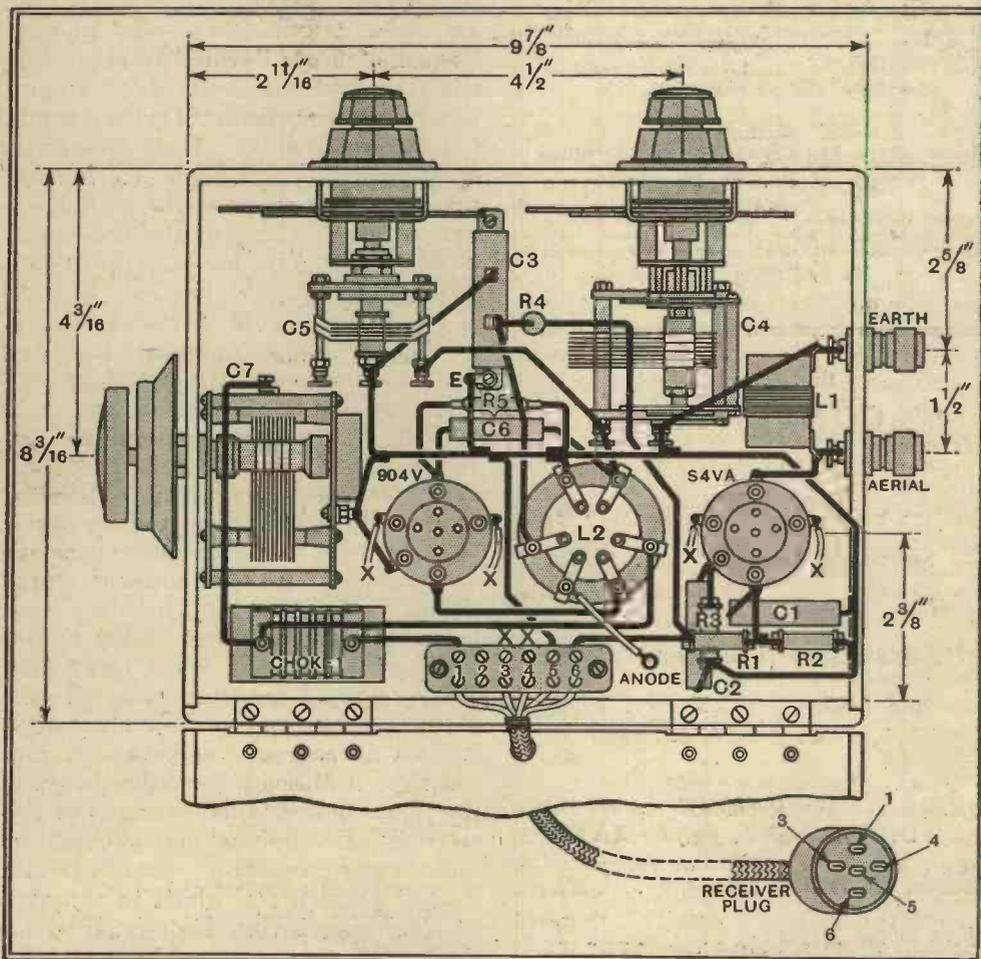
The power-pack chassis is even more

straightforward than the receiver itself, and may be passed over without comment except for the fact that the "Plymax" baseboard is essential and is responsible in no small degree for the absence of mains hum in the finished receiver.

No output device is provided for the pentode, as it is intended that a moving-coil speaker with a suitable self-contained transformer should be employed. A two-pin plug on the side of the chassis is provided for the connections to the speaker.

When checking over connections and voltages prior to the first test of the receiver, it should be ascertained that the anode potential of the output valve (measured between anode and chassis) is about 260 V. The H.F. valve has been given rather less, and the detector (which is fed through the "Transfeeda" unit) receives about 150 V.

The maker's leaflet with the short-wave coils gives the wavelength ranges covered with a tuning condenser of 150



Wiring connections for the receiver unit. All contacts are made above the baseboard.

1935 A.C. Short-wave Receiver—
 $\mu\mu\text{F}$. As the maximum capacity across
 the coils in this receiver is $115 \mu\mu\text{F}$ these

found at 38° (with the band-spread con-
 denser set at 50°). The amateur 40-metre
 band will be found at the bottom of the

One of the best Americans, however,
 is W3XL, Bound Brook, on 46.69 metres,
 some few degrees away from the rest of
 them. In any case, it is advisable to cover
 the whole dial carefully, listening to every-
 thing that one hears, until sufficient
 numbers of stations have been identified
 to make calibration possible.

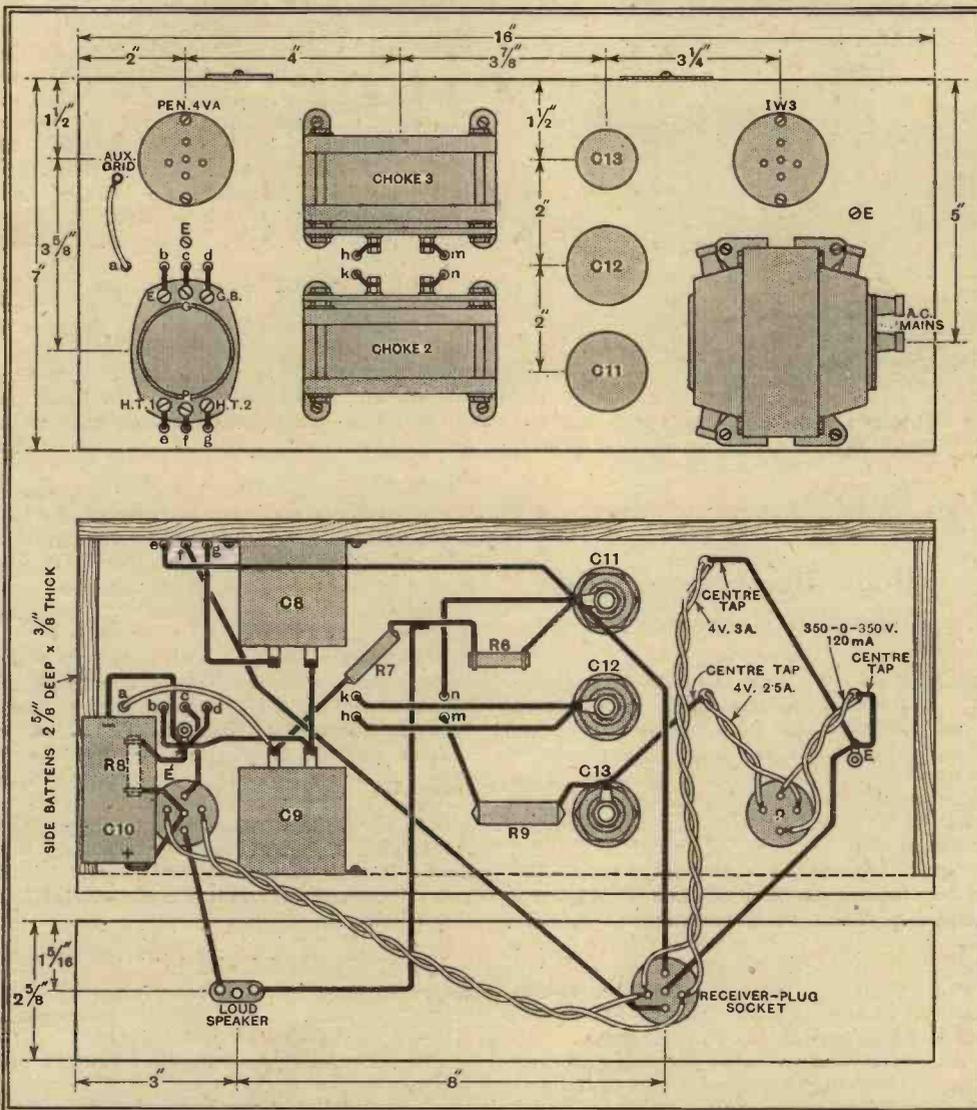
Digressing for a moment, the writer
 would like to say that it is difficult to over-
 estimate the usefulness of a calibration
 curve for each coil when a receiver of this
 type is concerned. One has to listen such
 a very long time for identifying announce-
 ments on short-wave transmissions. Such
 a curve is best drawn up with the $15 \mu\mu\text{F}$
 band-spreading condenser set at 50° all
 the time; then, when a station has been
 found, the last hair-breadth tuning opera-
 tion may be carried out with the small
 condenser.

The Best Wavelengths

The Yellow-Spot coil covers a very in-
 teresting band of wavelengths. Starting
 at the top with the 40-metre amateur band,
 one finds the 36-metre shipping at about
 80° , the 31-metre broadcast band at about
 63° , the 25-metre broadcast band at
 28° , and the 20-metre amateur band at
 the bottom end.

Some actual loggings while the receiver
 was on test included FYA, Pontoise, on
 27.5° ; W8XK, Pittsburgh, on 27.8° ;
 Daventry, GSE, on 28° ; Wayne, W2XE,
 on 29° ; and Winnipeg, VE9JR, on about
 30° .

If it happens that the whole of the
 amateur 20-metre band does not come in
 at the bottom of the condenser, it does



Some components of the power unit are housed underneath the baseboard where practically the whole of the wiring connections are made.

ranges are naturally reduced, but the
 three bands still overlap sufficiently to
 give continuous tuning over the range.

The Blue-Spot coil covers roughly 12.5-
 23 metres, the Yellow-Spot 22-42
 metres, and the Red-Spot 41-70 metres.

Since there is no component in the re-
 ceiver that requires "setting," one has
 only to switch on, wait for the valves to
 warm up, and listen! Set the $15 \mu\mu\text{F}$
 condenser at 50° , the reaction condenser
 at zero, and rotate the dial of the $100 \mu\mu\text{F}$
 condenser slowly. Probably all that will
 be heard in this condition is a confused
 jumble of high-power Morse transmissions.
 The best coil with which to start is the
 largest—the "Red-Spot."

Tuning-in Stations

Some dial-readings logged on the
 original set will probably help readers to
 find something of interest. Rotate the
 reaction control until the set goes into
 oscillation, which it should do with a gentle
 hiss, devoid of "plop," "threshold
 howl," or other undesirable symptom.

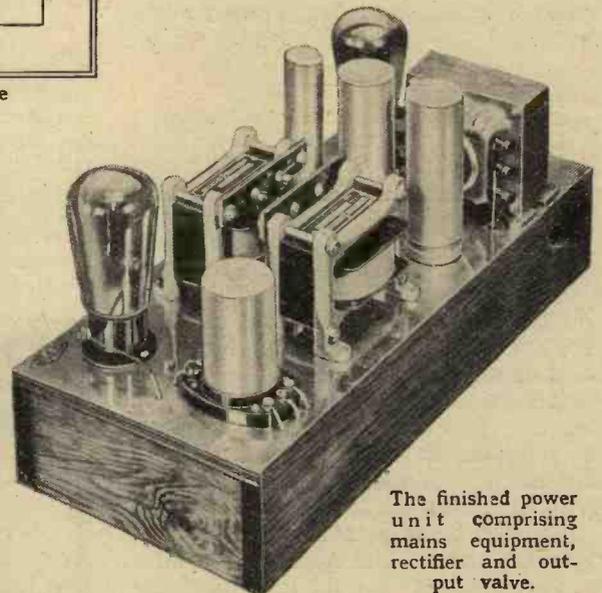
Zeesen, DJC, on 49.83 metres, was

dial; in fact, by setting the $100 \mu\mu\text{F}$
 condenser at zero, it will be
 covered completely by the small condenser.

Aircraft stations working be-
 tween 60 and 70 metres will be
 found from 80° upwards, if they
 happen to be working at the time.
 If the test is carried out late in
 the evening, and Zeesen, DJC, is
 found, the $100 \mu\mu\text{F}$ condenser
 should be left at that setting, and
 tuning carried out with the other
 control. At least four American
 stations, under favourable condi-
 tions, should be found just below
 Zeesen's setting.

The following were logged in one even-
 ing, between 23.00 and midnight:
 W1XAL, Boston, on 49.67 metres;
 W8XAL, Mason, on 49.5 metres;
 W3XAL, Bound Brook, on 49.18 metres;
 and W8XK, Pittsburgh, on 48.86 metres.

A full-size blue print of the combined wiring
 diagrams is available from the Publishers,
 Dorset House, Stamford Street, London, S.E.1.
 Price 1s. 6d. post free.



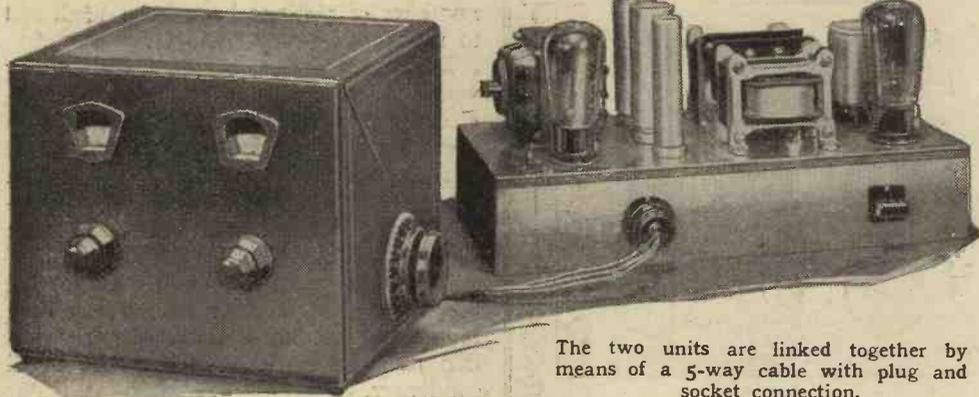
The finished power unit comprising mains equipment, rectifier and out-put valve.

not matter, because it is very conveni-
 ently placed on the smallest coil, and the
 larger amount of parallel capacity neces-
 sary makes for improved selectivity.

This Blue-Spot coil gives the amateur
 band at about 85° , the 19-metre broadcast
 band (which includes W2XAD, W8XK,
 and W2XE) at about 65° , and the
 16-metre broadcast band with W3XAL
 and W3XL at about 45° .

1935 A.C. Short-wave Receiver—

One point that has not been touched upon is the aerial. Throughout the first "run-through" with the set, a fairly large outdoor aerial (about 60 feet long and



The two units are linked together by means of a 5-way cable with plug and socket connection.

45 feet high) was used. On subsequent tests an indoor aerial 12 feet long was substituted, with surprisingly little difference to signal-strength, and considerable improvement of signal-noise ratio.

There is not much point in using a large aerial unless conditions are quiet and one really does want the greatest possible volume from the set. It is safe to say that "readability" will not be improved, as a rule.

As regards the actual handling of the receiver, very little need be said, since it is so absolutely straightforward. The reaction control needs delicate handling, certainly, but it is provided with slow-motion and presents no great difficulty. It is possible, as a matter of fact, to forget that one is using a short-wave receiver, until one is forcibly reminded of that fact by the appearance of a high-power Morse signal.

A specimen receiver built to the specification described in this article is available for inspection by readers at 116, Fleet Street, E.C.4.

Tune to the middle of one of the broadcast bands on the main condenser and then "look round" on the smaller one, and the absence of Morse will certainly give the idea of the medium broadcast band on a quiet evening!

As a guide to the kind of performance that may be expected from the receiver, the following is a summary of a list of stations heard during rather less than a fortnight, all on the loud speaker:—

49-metre broadcast: Moscow, Zeesen, Daventry, seven U.S.A. stations, three South Americans, Nairobi, and Johannesburg.

31-metre broadcast: Skamlebaek, Daventry, Sydney, Rio de Janeiro, two U.S.A. stations.

25-metre broadcast: Funchal, Pontoise, Zeesen, Daventry, three U.S.A. stations, Moscow, and Rome.

19-metre broadcast: Pontoise, Daventry, and three U.S.A. stations.

16-metre broadcast: Daventry and two U.S.A. stations.

Amateur 20- and 40-metre bands: All six continents on C.W., four continents on telephony. Best stations heard, New Zealand and Australia on C.W., Pacific Coast, U.S.A., on telephony.

(inaudible at the first place) is quite good. At the writer's own home in South London GSA is fairly reliable, but GSG is nearly always spoilt by rapid fading.

Incidentally, it is most distinctly noticeable that short-wave conditions are better on the coast than they are inland. It does not follow that reception from every part of the world is better—indeed, there are several cases of "blank spots." Readers in East Yorkshire state most definitely that they have never heard signals from the west coast of America. The general level of reliability on DX signals, however, is higher.

Improved Conditions

The old bugbear of 600-metre shipping is largely removed owing to the modern equipment now used by most land stations and ships. There was a time when the amateur 90- and 45-metre bands were completely filled with stray harmonics of 600- and 450-metre spark!

Conditions since the closing of the Radio Show have been quite good on the whole. The most reliable bands still seem to be the 19- and 16-metre groups, atmospherics being rather trying on 49 and 31 metres. 25 metres, that "half-way house," is very indifferent.

W2XAD and W8XX, both in the 19-metre band, form a curious pair of transmissions on account of the way in which they "change places." This change is not a matter of frequency, but of precedence! On occasions "XAD" is strong, with "XK" as a weak little noise just above him. On other occasions one hears the strong signal, and almost instinctively looks above for the weak one, only to find that the strong one is "XK," and "XAD" is down below.

The Germans and French seem to be extremely powerful lately, the various waves used by Zeesen all producing very strong signals. Pontoise is sometimes stronger, but definitely more erratic.

It is interesting to note that sunspot observers tell us that we are definitely past the "trough" of the eleven-year cycle, and we may therefore expect short-wave conditions to improve steadily from now onwards.

Unfortunately, an "improvement" in atmospherics is also expected! Modern receivers, however, with their high selectivity, do not seem to be so badly worried on short waves by genuine atmospherics as by real radio interference by stations working off-wave. MEGACYCLE.

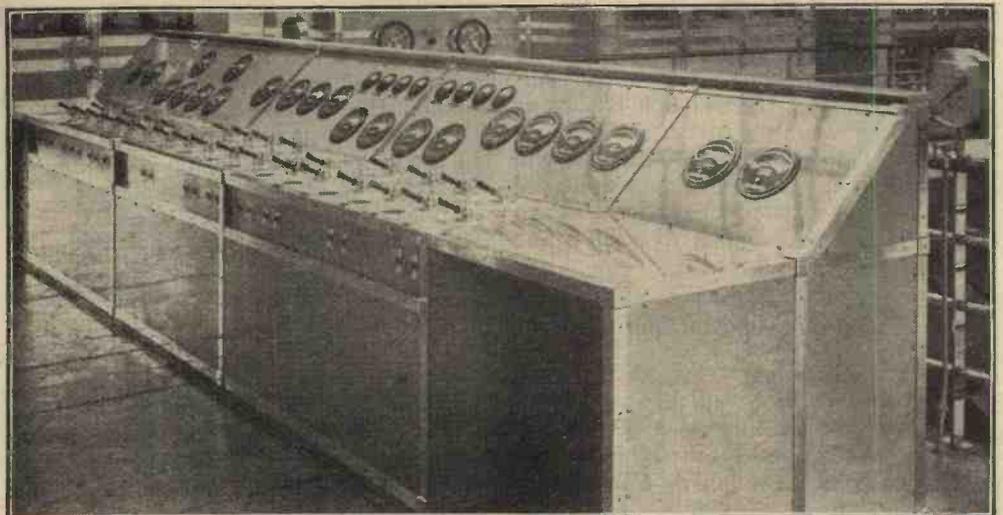
The Short-Wave World**Home Reception of the Empire Programmes**

QUITE a number of letters recently received from readers in South Africa criticise the transmissions from the Empire Station on the score of unreliability compared with the other Europeans. On the other hand, an almost equal number point out that some of the other short-wave stations only transmit at the times of day when conditions are known to be good.

The chief engineer of the B.B.C. has issued a statement concerning the future, and hopes that when 5XX is removed from Daventry the "outposts of Empire" will notice a great difference. Needless to say, the masts now associated with 5XX will be left behind, and probably put to some use.

In connection with the Empire station it has recently been the writer's lot to listen to the various transmissions in several different spots along the South Coast, and there really is quite a remarkable diversity of results. In one place GSA (49.6 metres) is so thoroughly reliable that most of the short-wave enthusiasts in the town listen to him in preference to the long or medium-wave transmissions.

In another spot, less than twenty miles away, GSA is rarely heard at all, but GSG



The nerve centre of the B.B.C.'s new giant transmitter. An array of meters on the main control panel enable the engineers at Droitwich to regulate the transmissions.

My Home Set—II.

A High-Fidelity Radio-Gramophone Equipment

By W. BAGGALLY, M.I.W.T.

THIS is the second of what it is hoped will form a series in which regular contributors will describe the receivers that they themselves use—receivers that are of especial technical interest because they are designed to satisfy individual requirements under specific conditions, and are entirely different from the average general-purpose set.

BEING dissatisfied with the audio-frequency performance of broadcast receivers at present on the market the writer set himself to design one which should give a good overall frequency-response up to 10,000 cycles per second without noticeable harmonic distortion. This instrument is here described, together with some account of the performance that has been attained.

For purposes of description the apparatus may be divided into the following sections, which will be dealt with separately and described in order:—

1. The receiver and its associated equalising networks for compensating the loss of high frequencies due to side-band cut-off in the tuned circuits.

2. A panel containing the subsidiary apparatus for switching from radio to gramophone, including the equalising network for the gramophone pick-up, a 1,000-c/s oscillator—the purpose of which will be described later—and the first stage of the audio-frequency amplifying chain.

3. The main amplifier, including the subsidiary amplifier for harmonic cancellation, and also the output valves.

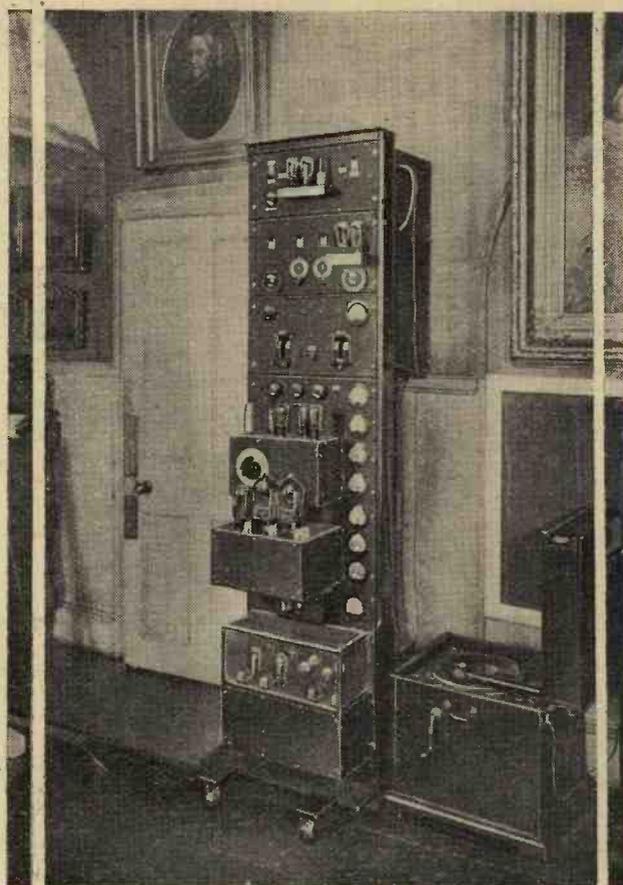
4. The loud speakers and their associated electrical networks.

The receiver comprises two variable-mu screened pentodes, with iron-cored aerial and intervalve coupling coils, the output from this radio-frequency amplifier being fed through a high-frequency transformer with tuned primary and secondary, to a pair of diode valves in phase opposition, the audio-frequency output from this rectifying system passing into a valve with a six-stage low-pass filter in its anode circuit, the purpose of which is to keep radio-frequency energy out of the audio-frequency amplifier. The tuned circuits for the long waveband are provided with series damping resistances so arranged that the amount of side-band cutting is the same on both long and medium waves for the same setting of the tuning condensers.

The audio-frequency loss at 10,000 cycles per second varies from 20 decibels

with the tuning condensers at minimum to 56 decibels with the condensers set at maximum. Since it be required to reproduce without frequency discrimination up to 10,000 cycles per second, this is the amount of loss which must be corrected by the equalising network. The equaliser is, therefore, made adjustable by means of a dial, which is calibrated to synchronise with the tuning condensers, and in operation this dial is set to the same reading as the condenser dials.

Fig. 1 is a diagram of the receiver. The



A photograph of the complete equipment.

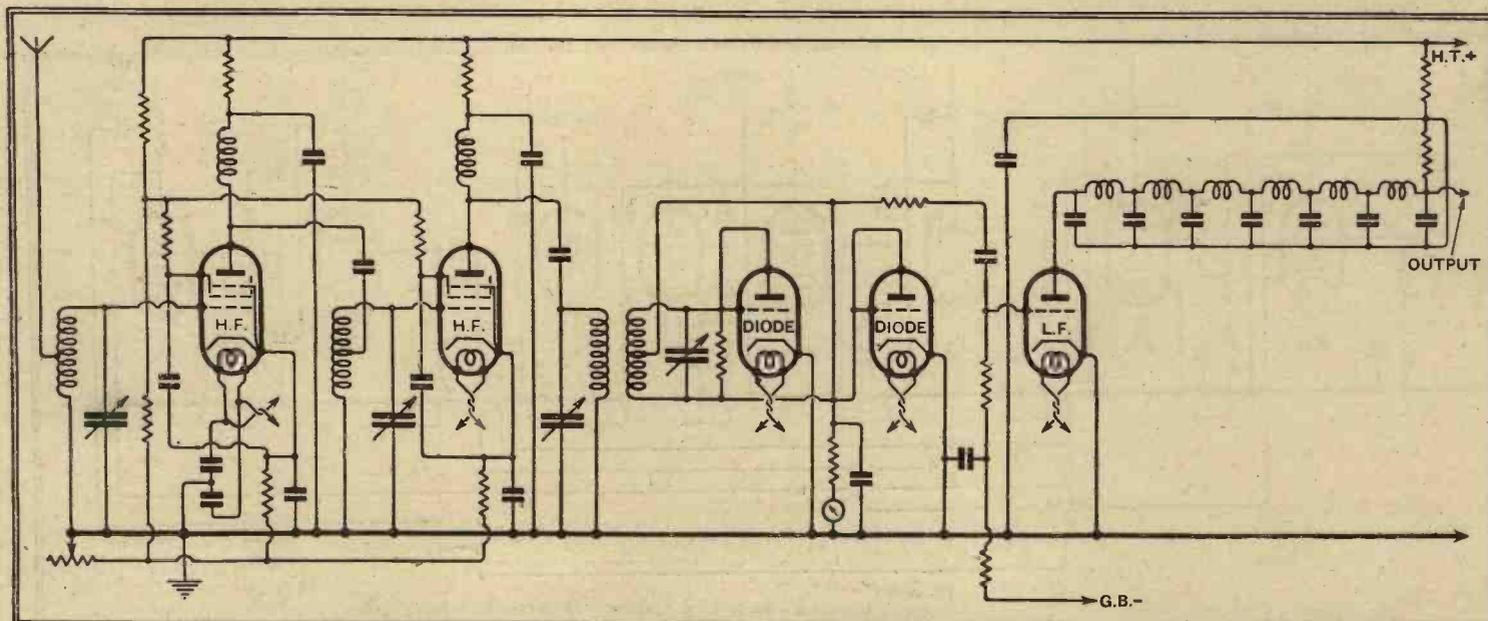


Fig. 1.—The receiver unit, comprising H.F. amplifier and detector.

My Home Set—II—

only point to be noticed here is that the output voltage from the rectifier is reduced by means of a potential divider before being applied to the audio-frequency am-

plifier, a diagram of which is given in Fig. 4, from which it will be seen that the amplifier is entirely resistance-capacity coupled, and consists of four stages, the last three of which are compensated for harmonic distortion by a method which was described by the writer in the *Wireless Engineer* for August, 1933.

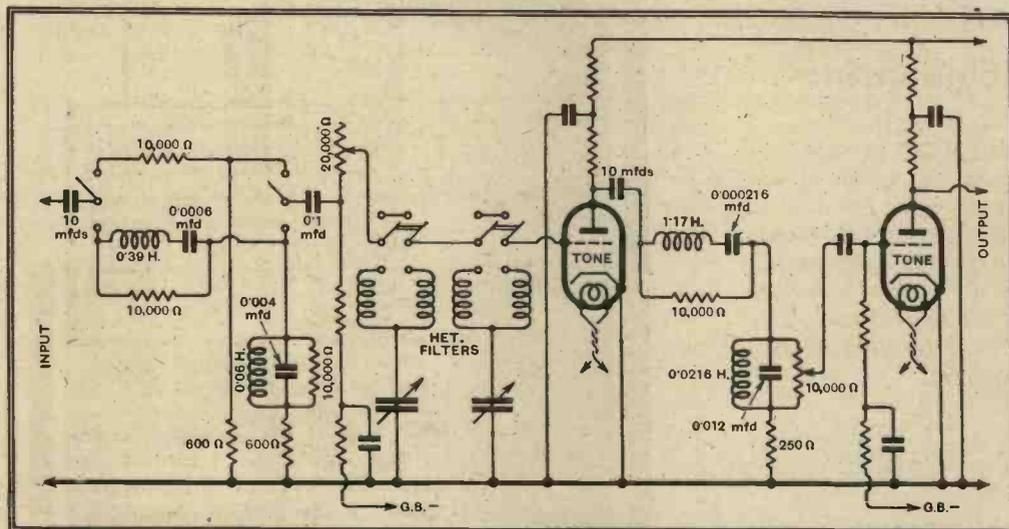


Fig. 2.—Unit No. 2, which succeeds the receiver, is for equalising, tone correction, and whistle suppression.

plifying valve, in order that there shall be no possibility of the latter being overloaded at any time.

Fig. 2 shows the arrangement of the equalising networks, and it will be seen that two stages are used in order to get the required amount of correction without an excessive loss of volume level, the first stage producing a fixed amount of correction of 20 decibels at 10,000 cycles, the second network being adjustable between the limits of 0 and 36 decibels by means of the variable resistance, which is operated by the dial previously referred to.

Whistle Suppression

It will also be seen from Fig. 2 that the heterodyne filters are incorporated in the equalising panel. The variable resistance in series with the input of the filters is for the purpose of altering the band width of the latter, so that a certain amount of side-

consequent improvement in the quality of reproduction. The overall response of this receiver with its equalising network is shown in Fig. 3 for the medium and long waveband, with the tuning condensers set to the wavelength shown on the graph.

The heterodyne filters attenuate strongly at one frequency corresponding to that of the heterodyne whistle without serious attenuation of frequencies lying on either side of the whistle frequency, which makes it possible to eliminate a heterodyne whistle without very serious mutilation of the quality of reproduction. For a full description of the action and construction of these filters, the reader is referred to a paper by the present writer, in the *Wireless Engineer* for July, 1932.

We next come to the audio-frequency

amplifier, a diagram of which is given in Fig. 4, from which it will be seen that the amplifier is entirely resistance-capacity coupled, and consists of four stages, the last three of which are compensated for harmonic distortion by a method which was described by the writer in the *Wireless Engineer* for August, 1933.

Output Valves

The output stage consists of two Marconi D.A.60 valves in parallel, with 500 volts on the plates, a peak voltage of about 140 being required for full loading of the grids, the penultimate valve being a Mazda P.P.5/400, with 400 volts on the plate, which, when due allowance has been made for the voltage drop in the anode and decoupling resistance, involves the use of 1,000 volts H.T. supply to the penultimate valve. The 1,000-volt supply is used also for the first two stages, although these valves require only 200 volts on the anodes, consequently, the decoupling of the first two stages can be very complete.

The departure from linearity of response of this amplifier over the range of 35 to 10,000 cycles per second is too small to measure, and the total harmonic content of the output when delivering 20

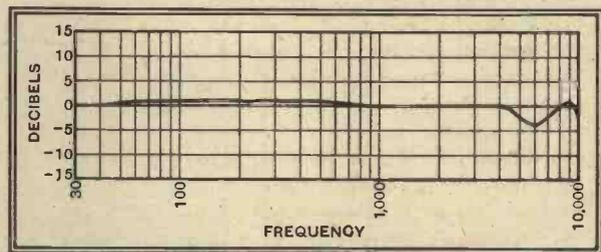


Fig. 3.—Overall response of receiver plus equalising network.

watts at 1,000 cycles into a resistive load is about one-half of one per cent., so that for all practical purposes we may say that the amplifier is completely free from distortion.

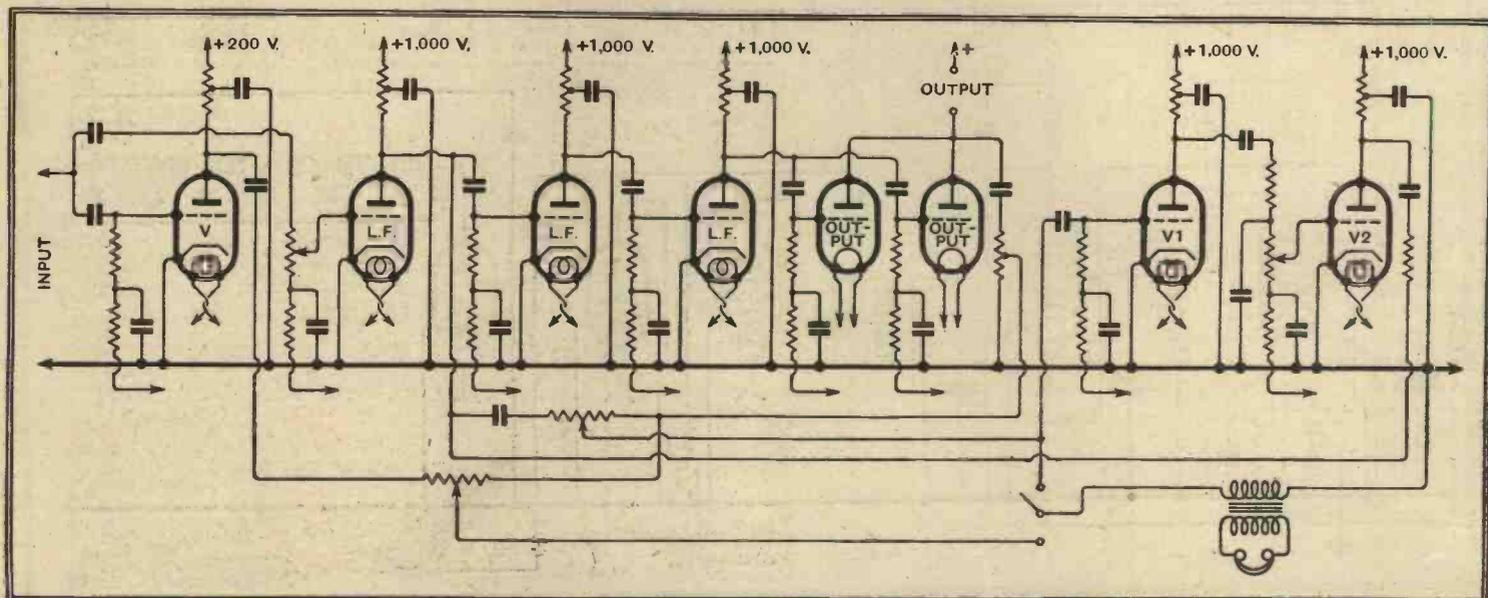


Fig. 4.—The L.F. amplifier, which includes compensation for harmonic distortion.

My Home Set—II—

To adjust the amplifier for harmonic cancellation, such, for example, as after replacing valves, the 1,000-cycle oscillator is switched on and the amplifier adjusted according to the method described in the paper referred to above, the valve V being merely used as a phase reversal valve in order to cancel out the fundamental frequency when listening for the harmonics.

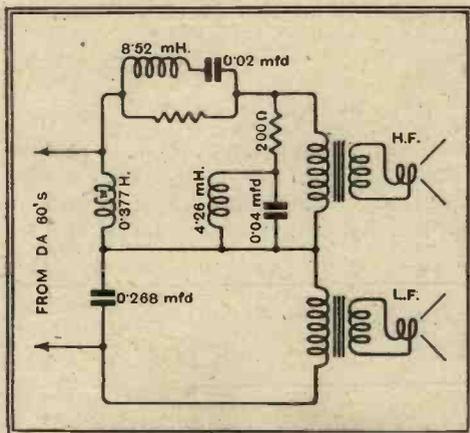


Fig. 5.—Method of feeding the twin high- and low-note loud speakers.

Coming now to the loud speakers and their associated circuits, the Voigt twin-diaphragm speaker is used for reproducing frequencies from 500 cycles upwards, while the speaker for the low frequencies is a large 14in. instrument made by Hartley Turner.

Each loud speaker is provided with its own transformer to match its impedance to the optimum load of the output stage, the two transformer primaries being connected in series; an inductance of 0.377H being shunted across the primary of the transformer feeding the high-frequency speaker, and a condenser of 0.268 mfd. being similarly shunted across the primary of the low-frequency transformer. For a network of this type it is shown readily that when $L/C=R^2$, where R is the resistance of either loud speaker referred to its transformer primary, the impedance of the entire network is a resistance R, which is independent of the frequency.

Matching the Loud Speakers

Since the electro-acoustical efficiency of the high-frequency speaker is some ten times greater than that of the low-frequency speaker, it is necessary to attenuate the input to the high-frequency speaker about 10 decibels; but, since the response curve of the Voigt speaker begins to fall above 8,000 cycles per second, it is advantageous, from the point of view of linearity of response, to remove the attenuation of 10 decibels above this frequency, and for this reason the network shown in the diagram Fig. 5 is employed, the attenuation disappearing at 10,000 cycles per second.

This completes the description of the voice circuits.

The mounting of the loud speakers is effected by cutting away the wall between

two rooms in the house, so that we obtain practically the effect of an infinite baffle. Fig. 6 shows the overall performance of the audio-frequency chain, including the loud speakers, the curve being obtained by means of a condenser microphone mounted in the room which is used for listening, the effect of standing waves being eliminated by the use of a "warble" tone instead of a steady note when taking the calibration; it will be seen that the response is linear within plus or minus 7 decibels between the frequencies 35 and 10,000 cycles per second, which may be considered satisfactory.

The power supply arrangements and their switching call for a little comment. There are four distinct rectifying and smoothing units, which are:—

1. A 250-volt supply to the receiver and auxiliary valves.
2. A 150-volt supply to a potential divider delivering grid bias at different voltages to all stages of the equipment.
3. A 1,000-volt supply for the main amplifier up to and including the penultimate stage.
4. The 500-volt supply for the output valves.

The grid bias supply has its own independent power transformer, other supplies being derived from windings on the main power transformer.

In series with the grid bias potential divider is a relay which closes the primary circuit of the main transformer, thereby switching on the rest of the equipment as soon as the grid bias rectifying valve has warmed up. Also, in case of failure of the grid bias supply, the entire equipment is switched off automatically. The 1,000-volt and 500-volt supplies are controlled by thermal-delay switches, there being a resistance in series with the filament of the delay switch associated with the 500-volt supply, so that this is the last to be switched on. It will thus be seen that as soon as the apparatus is connected to the mains the grid bias valve begins to warm up, and as soon as the

correct current is established in the potential divider the relay closes, thus switching on the main power transformer. When the valves have warmed up in the main amplifier the 1,000-volt supply is applied to this part of the circuit, and, finally—and not until everything else

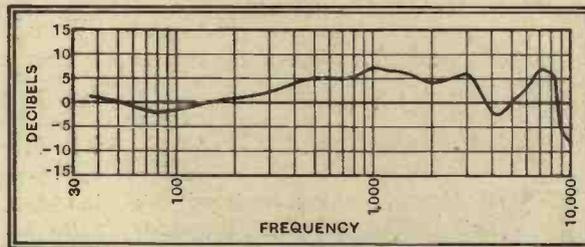
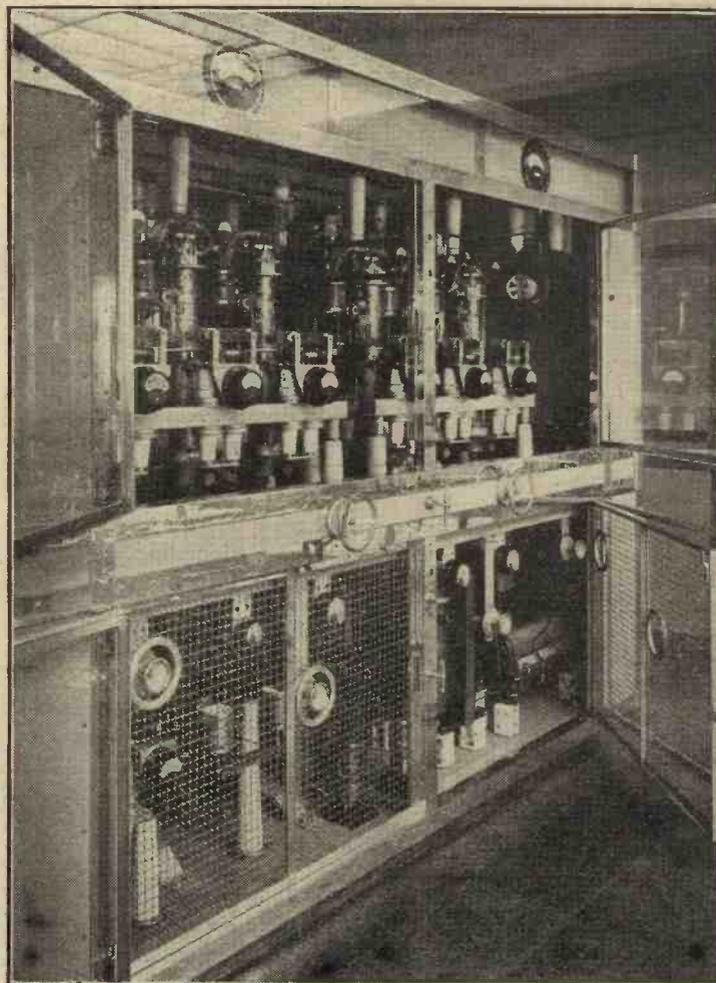


Fig. 6.—Overall L.F. performance, including the loud speakers

has settled down—the anode supply to the output valves is switched on. This arrangement avoids violent surges being applied to the output valves and loud speakers.

With the exception of the loud speakers and their associated apparatus, the whole of the equipment is mounted on a standard 19in. relay rack 6ft. 6in. high, which it fills completely; the general appearance of the whole equipment being as shown in the photograph included as a title picture on the first page of the article.

(The first article under the title "My Home Set" appeared in the issue of June 29th.



Where the "big noise" comes from. One of the amplifier units that help to develop the large signal output from Droitwich.

Berlin Radio Show

The Trend of Wireless Progress in Germany

COMING so soon after our own National Exhibition at Olympia, readers will find added interest in this review of wireless progress in Germany. Four pages were devoted to the first part of this illustrated report which appeared in last week's issue.

Concluded from page 199 of last week's issue

By A BERLIN CORRESPONDENT

THE four-valve superheterodynes (five valves including the duo-diode) are particularly interesting, and the circuit essentials of the Ideal 4W6 are shown in Fig. 13. A differential condenser is used as an input volume control, and the incoming signal is taken through an image-interference trap to the first tuned circuit, which feeds the fading-mixing hexode. Certain electrodes of this valve are used for generating the local oscillations which are passed to the mixing electrode assembly by electronic coupling, the control grid of this system being biased from the A.V.C. circuit. The fading-mixing hexode feeds the second valve, a fading hexode, through a band-pass filter tuned to the intermediate frequency, and the amplification of this stage is also controlled by the

the second electrode system inside the same valve, which mixes them with the signal frequency, and is controlled for A.V.C. The fading-mixing valve passes the intermediate frequency to a three-circuit band filter, through which it travels to the fading hexode used for the I.F. stage. This feeds the duo-diode detector and A.V.C. valve through a second I.F. band filter, also composed of three low-loss circuits. The L.F. output of the duo-diode is coupled to

shown in Fig. 15, includes a wave trap tuned to the frequency of the local station in order to prevent overloading of the automatic volume control system and to suppress harmonics of the local station.

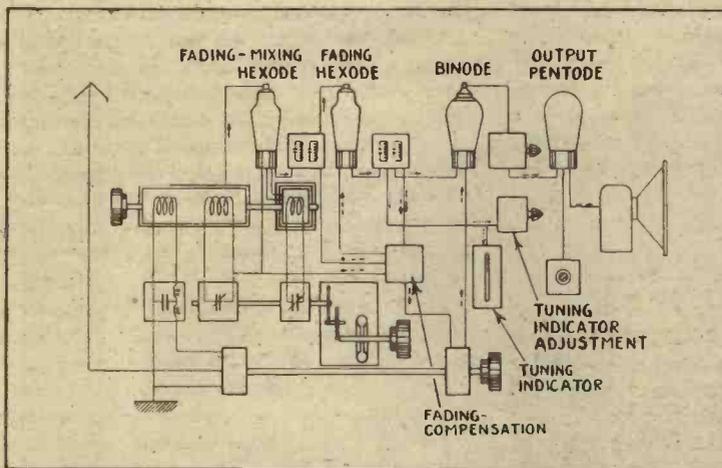


Fig. 13.—The four-valve Ideal 4W6 superheterodyne.

A.V.C. system. The output of the I.F. valve is fed through another band-pass filter to the diode incorporated in the binode (single-diode-tetrode) valve. This diode acts as a detector, and also provides the A.V.C. bias; the L.F. output is led through an adjustable potentiometer to the tetrode system of the binode, which acts as L.F. amplifier, and thence through the tone control to the output pentode.

The circuit of Fig. 14, the Ideal 4W9, is also interesting. In the input circuit there is again a differential condenser for controlling the incoming signal, which is fed to a band filter, and by a special type of coupling a high degree of second channel suppression is secured. The following valve, the fading-mixing valve, generates the heterodyning oscillations and simultaneously transfers them to

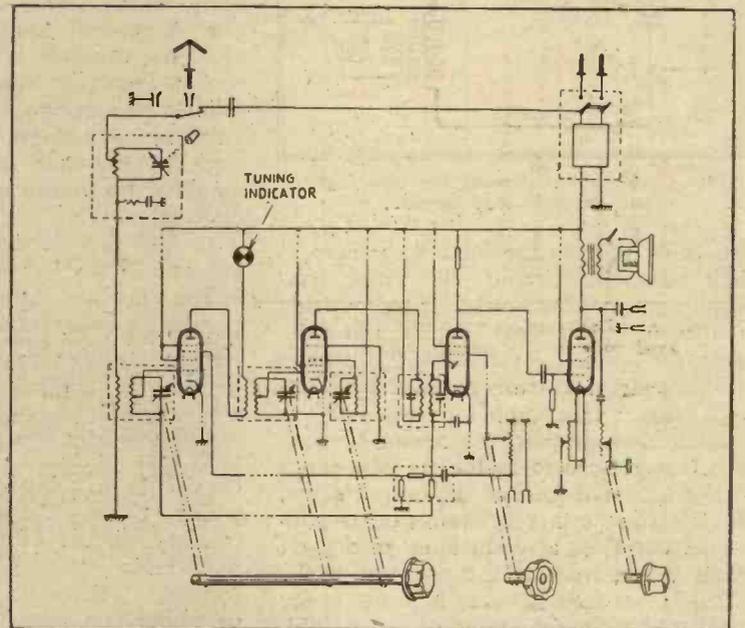


Fig. 15.—The A.E.G. Super-Geadem 34 with no I.F. stage.

the L.F. pentode by means of a volume control potentiometer and a tone control system, and the output is coupled to the output pentode.

The aerial circuit of the A.E.G. Super-Geadem 34, the circuit of which is

In this receiver the first valve is a signal-frequency amplifier and it feeds the frequency-changer, for which a fading-mixing hexode is used, through a tuned circuit. The I.F. passes through a band filter to the diode system of the third valve, a binode, in which it is rectified. The binode amplifies the audio-frequency and passes it to the output pentode. The D.C. voltage of the diode is also taken to

the first and third grid of the fading hexode (the H.F. stage) for fading regulation.

Coming now to a consideration of the construction and the design of component parts, the high standard of performance, particularly in regard to selec-

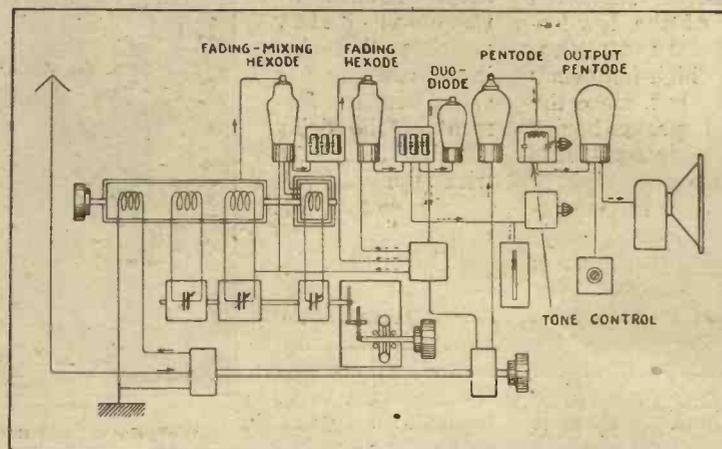


Fig. 14.—The Ideal 4W9 superheterodyne with three-section band filters.

Berlin Radio Show—

tivity, of this year's German broadcast receivers is largely to be attributed to the fact that all the losses in the H.F. oscillat-

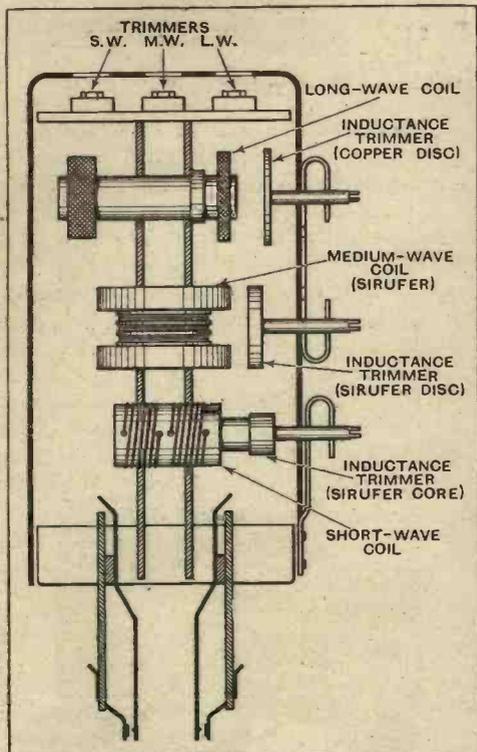


Fig. 16.—The construction of the triple wave-band coils used in Siemens receivers.

ing circuits have been reduced as much as possible. This applies to the coils, the connections and the condensers.

This year we find for the first time in Germany widespread use of iron-cored coils, which last year were seen only in a few models such as those of the Stassfurt Company. Even now the iron-cored coils are almost entirely confined to the broadcast band, and large-diameter wire with an air-cored construction is used for the short waveband. The long-wave coils are wound with Litz wire, and in all cases very high-quality insulating material is employed for the formers. On short waves the losses in the iron are too great for it to be used satisfactorily, while with long-wave coils the increase in efficiency to be obtained by the use of iron cores is not great enough to induce most designers to employ them. Some firms, however, do make use of them for the long-wave band.

The following iron-cored coils are used: Ferrocart coils (Goerler), Sirufer coils (Siemens), H-coils (Telefunken), and Dralperm coils (Dralowid). Also, some special

coils of the Stassfurt Company, while the firm Meggo, of Munich, produce an iron core which can be moulded like beeswax into any desired shape.

In general, all these iron cores have iron particles of some 5-20-thousandths of a millimetre diameter, and they are impregnated in some special medium so that the particles are well insulated one from another. The core material has to be made proof against temperature and moisture, and must be capable of being shaped as desired. The Sirufer, H, and Ferrocart C cores are composite cores which are pressed into the required shape when in the state of sticky dough. Ferrocart B material is made as follows: the iron is ground into small particles, which are made into a jelly with an insulating lacquer. This jelly is spread in a thin layer on a paper band, and the whole left to dry, after which an adhesive is applied, and the whole band rolled up. The Dralperm core is made like the others.

Why Iron Cores are Popular

Why is the iron core becoming so popular? Since its permeability is about eight times that of air, and the inductance is proportional to the permeability, far fewer turns are required to produce a given value of inductance. This means a lower self-capacity and also a smaller length of wire, and consequently a smaller copper loss. Moreover, the smaller dimensions mean a smaller stray field, which brings the addi-

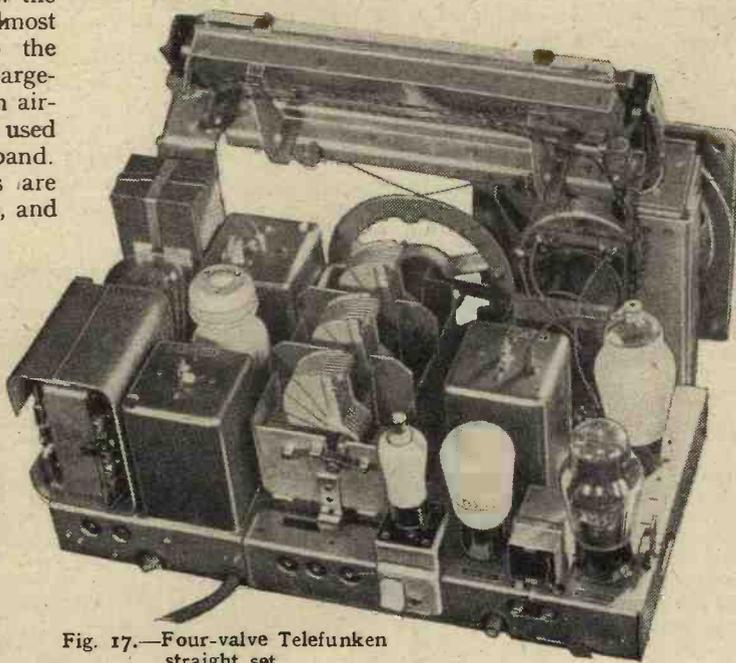


Fig. 17.—Four-valve Telefunken straight set.

tional advantage that with the same size of screening can there is a great reduction in eddy-current losses. Another point in favour of the iron cores is that the inductance of a coil in the band filter or tuning circuit can be "trimmed" to the correct

value. One of numerous examples of this is shown in Fig. 16. The same trimming action is performed for air-cored coils in the long-wave band by means of a copper disc.

The wire connecting leads, particularly those of the coils, have had their H.F. losses reduced by the use of an especially low-loss paper as insulating material. By

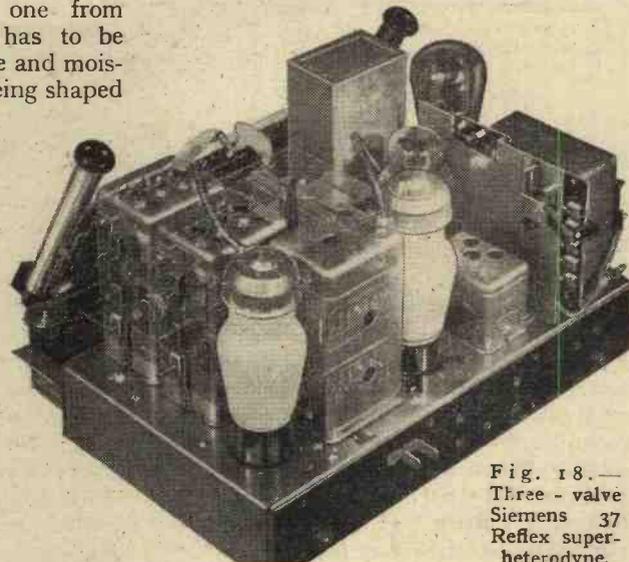


Fig. 18.—Three-valve Siemens 37 Reflex super-heterodyne.

no means negligible losses are liable to occur in valve sockets, and already a low-loss material is used for these, but still better material will soon be employed.

Coil formers and condenser dielectrics are now made of Trolitul, and particularly the new material Amenit (Goerler). For Amenit the value of $\tan d$ (practically equal to the power factor) is only 8.11×10^{-4} , while the dielectric constant is 3.5. The most complicated parts can be made of it, down to thicknesses of 0.3 mm., and metal parts can be pressed into them. The bending strength is about 500 kg/cm², while the low value of $\tan d$ applies even to short waves down to 20 metres. Of great importance, also, are the new insulating materials of Hescho (Hermsdorf, Schomburger Insulator Works), such as Ultra-Calan. With this the value of $\tan d$ down to the shortest wavelength is not above 1.1×10^{-4} , while the dielectric constant is 7.1. The insulation resistance, moreover, is extraordinarily high, being 2.5×10^{11} ohms/cm. at 400° C., while the bending strength is around 1,600 kg/cm². To-day the Ultra-Calan is used not only for coil formers and for insulating the metal parts of variable condensers, but also for block condensers, which are kept air-tight by enclosure in little boxes of the material. Block condensers, incidentally, have been improved as regards the vitally important point of reliability under service; they are made with silver fused on to mica.

Of great importance in the construction of condensers are, in particular, two quite new materials, Kerafar (Dralowid) and Condensa C (Hescho). With these new materials dielectric constants of 40 and 80 are attained, with extremely low losses. Thus the value of $\tan d$ for Condensa and Condensa C is only $10-20 \times 10^{-4}$, while Condensa has a dielectric constant of 40 and Condensa C one of 80. Kera-

Berlin Radio Show—

far and Condensa have the same base, which contains titanium.

These new materials can be ground to remarkably thin sheets, and in this way condensers of large capacity can be made in quite small sizes. The crushing

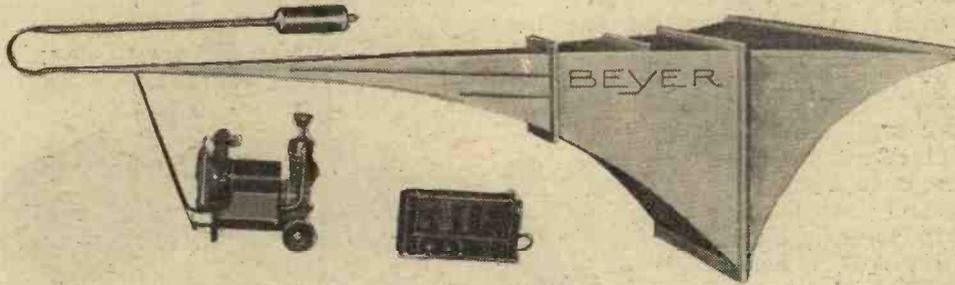


Fig. 20.—The Eugen Beyer pneumatic loud speaker.

strength of Condensa is about 3,000 kg/cm² and the bending strength 900 kg/cm², so that condensers of all manner of types are now being made with these materials. One extremely important quality is the absolute constancy of the capacity, so that these condensers are especially valuable as trimmers in tuning circuits and band filters.

The German radio industry, with a view to making the adjustment of the new receivers more and more convenient, has developed new tuning scales, many of which are very original. In the old scales all the stations were arranged side by side, or one below the other, in the order of

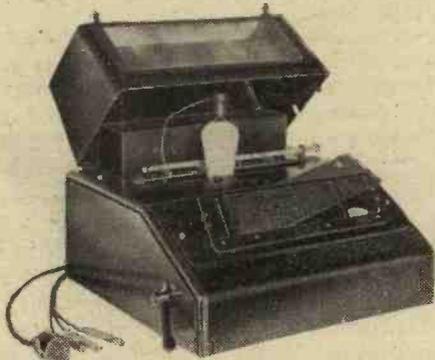


Fig. 19.—Telefunken valve testing equipment.

wavelengths. Consequently, the station names were often very congested, making them difficult to read, and also, for the unpractised user, difficult to pick out, since they did not come in alphabetical or any other order.

This year the distribution of station names is either alphabetical or by countries, the scales being thus referred to either as ABC scales or Land (or National) scales. In many cases the wavelengths have been completely separated from the station names and allotted a separate part of the scale-face. A luminous pointer is provided for the names and another for the wavelengths, the two pointers working together and giving the scale the name "Synchronous scale." The pointer is usually a luminous line or a spot of light, and in the latter case the scale has small holes at the various tuning points. With the former arrangement it has slits, close to the station names, which are illumin-

ated by means of a slotted drum revolving behind the scale and containing the source of light.

A completely illuminated scale with a pointer (like that of an electrical meter) moving across it is now a rarity, but when it is employed the scale is often of glass

and is "floodlit" from behind by total reflection from lamps at the two sides.

Two scales are of particular interest. In one of these, the "Kinoscale," there is an internal glass disc rotating synchronously with the pointer of the main tuning scale. This disc carries about 100 station names, and a strong light throws these, one by one, through a lens system on to a small ground-glass window above the ordinary tuning scale, so that the name of the station tuned in appears by itself at this window. With the second scale (an "Ideal" product) the station names are arranged in a vertical column, at the side of which a small illuminated ball moves up and down in a vertical glass tube. This ball is moved magnetically as the tuning knob is turned, so as to be level with the right station name. The knob is also geared to a flywheel (termed a "gyroscope" by the makers), with the result that in tuning to a required station the tuning knob need not be turned continuously: a little impulse given to the flywheel by the tuning knob is all that is required.

Components and Accessories

Among prominent accessories were the valve-testing apparatus of Neuberger, Pfeiffer and Weitnauer, of Telefunken (Fig. 19), and that of Funkpraxis, Bres-

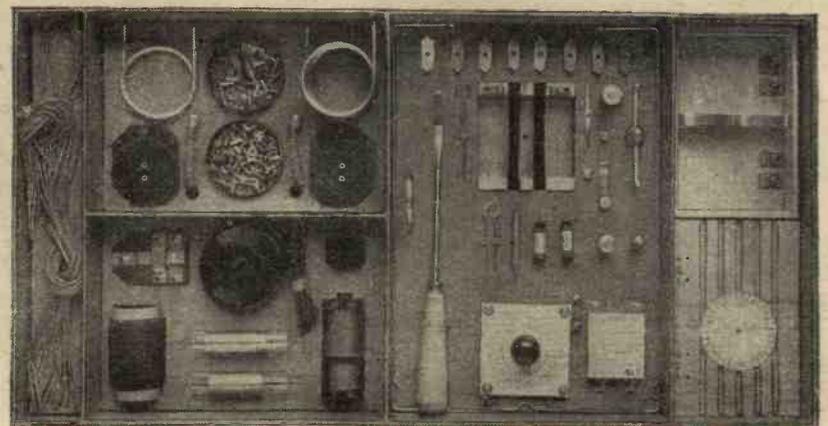


Fig. 21.—The Siemens-Halske Radio Experimenter's Kit Set containing a useful quantity of small parts and commonly employed tools.

lau. The latter firm showed last year an error-proof testing set in which a set of templates, placed one at a time over the

instrument's socket board, exposed only the holes necessary for the particular valve to be tested. This year the instrument is improved so as to be almost completely automatic, for the templates are abolished and there is a big scale, with a pointer giving the names of all the principal types of valve. The user merely sets the pointer to the correct valve type and reads off the proper position of the switch; a measuring instrument then automatically indicates any faults in the valve under test.

Among loud speakers, a large number of permanent-magnet moving-coil speakers were in evidence, with specially high efficiencies owing to the use of very highly permeable Oerstit steel. There was also a new long-range loud speaker (Fig. 20, Eugen Bayer) of the horn type which is driven by compressed air. This requires an input of only 3 watts and has a range up to 6 km. In the type at present made the frequency range extends to 6,000

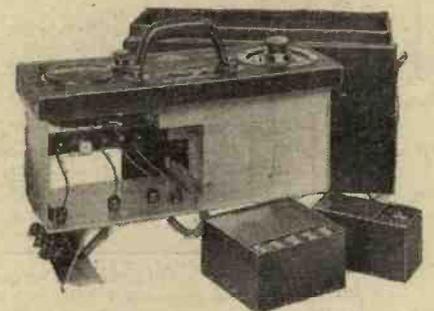


Fig. 22.—Siemens equipment for tracking "man-made static."

cycles. Another acoustic exhibit was the electrical Harmonium of Vierling, with a little glow-discharge lamp for each note.

The new condensers of various types, making use of new insulating materials (Kerafar or Condensa C) or silver-on-mica, have already been mentioned. As regards coils, various firms have produced high-quality coil units (some with iron cores) for octodes and mixing hexodes, but otherwise few new components were to be found. This applies also to the gramophone field, where only some improvements of no great importance can be noticed. The very interesting Siemens "Radio Experimenter's Kit Set" (Fig.

21) may be mentioned, and the same firm's interference-tracing equipment (Fig. 22) and interference-measuring set.

Notes AND News

By Our Special Correspondent

Droitwich

DROITWICH radiated its first transmission intended for reception by the public yesterday (September 6th). The first programme was radiated during my visit to the station with representatives of the Press at the invitation of the B.B.C.

To-day, September 7th, the new station radiates the morning National programme from 10.15 to 11.55 a.m., and also the late dance music, and it will continue to do this each week-day until it takes over the full service of the National programme. Droitwich will then replace Daventry 5XX entirely, using the same wavelength, namely, 1,500 metres (200 kc/s). There will be no need, therefore, for listeners to make any change whatsoever in the tuning of their receivers if they have previously been in the habit of listening to Daventry.

There has been a good deal of speculation as to how far the new station will upset listeners with unselective sets. By the time this note appears experience will have taken the place of speculation. Listeners will know the worst.

Good News for the West Country

IF listeners in the West Country will be patient for a little longer, I believe that they will have satisfaction from broadcasting, as I am told that the B.B.C. intend to rebuild the Plymouth broadcasting station in the not-far-distant future.

Guess Who It Is!

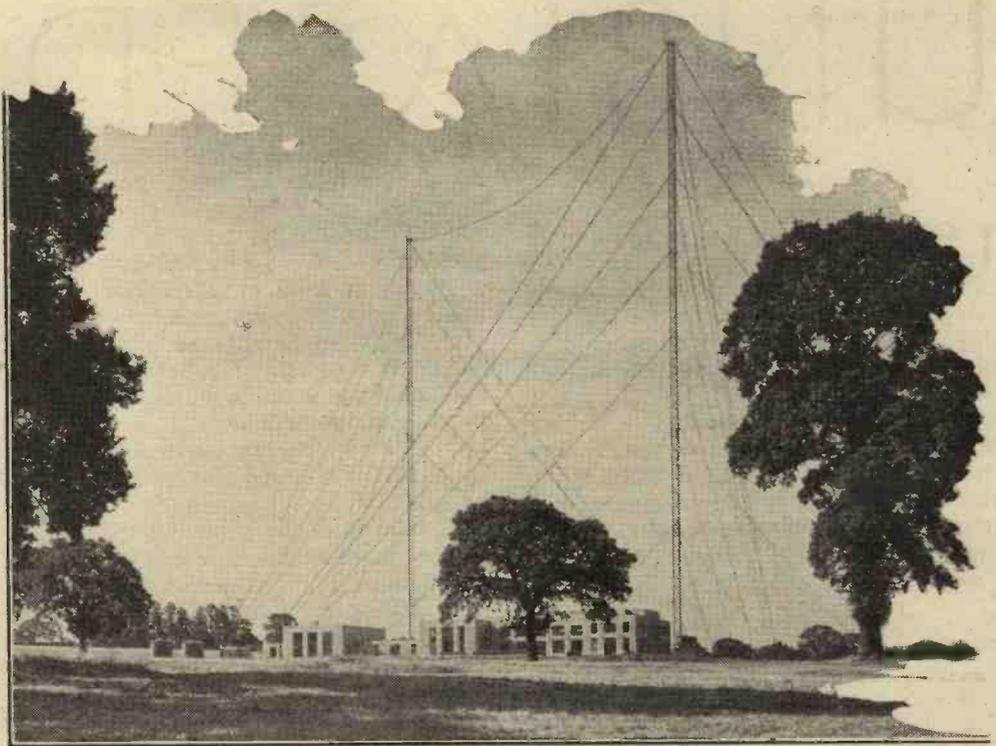
ON Saturday, September 8th, at 8.40 p.m., an "anonymous" wireless programme will be broadcast in the National programme, in which turns will be given by well-known and less well-known radio artists, but their names will be announced after they have broadcast instead of before. The programme is entitled "Guess Who It Is!" and will be compered by John Watt, with the orchestra under the direction of Kneale Kelley.

News from Maida Vale

IT is just a year since *The Wireless World* startled listeners with the first news of the Maida Vale skating rink. Now I learn that this converted studio is to be opened by the B.B.C. in October with a gala performance by one of the big orchestral combinations.

The Delay—and Why

The delay in completing this small edition of Broadcasting House has been due to a variety of causes, including (a) the absence of the Ecclesiastical Commissioners (the landlords) on holiday; (b) ambiguity as to the regulations regarding public entertainments, and (c) B.B.C. unwillingness to appoint an architect until legal matters had been thoroughly cleared up.



THE NEW NATIONAL TRANSMITTER. Although our readers are familiar from previously published pictures with the appearance of the Droitwich long-wave station, which commenced its duties yesterday, this photograph, taken from a more artistic viewpoint, conveys a good impression of the type of country which surrounds the transmitting buildings.

The new studio promises to be the most up-to-date in European broadcasting, and I hope very soon to be able to give full details.

More Shakespeare

SHAKESPEARE is still the leading radio dramatist. Val Gielgud, the B.B.C. dramatic chief, has arranged for one Shakespearean drama a month until the end of the year. "Measure for Measure" will be given in October, "Hamlet" in November, and "Cymbeline" in December.

A Toscanini Story

TOSCANINI who, as already stated, is visiting London next May to conduct four concerts for the B.B.C. in the London Music Festival, has perhaps the most remarkable memory of any musician to-day. He invariably conducts without a score.

A Feat of Memory

It is said that one day a bassoon player approached the famous conductor with a tale of woe. He had broken a key which would prevent him from playing a certain note in the symphony which was about to be performed. Toscanini, whose memory is of the visual kind, shut his eyes and passed a hand over his brow.

"You do not play that note," he said, "until the 127th bar, and there you share it with the clarinet. Leave it to him. In the second movement the note occurs in the 104th bar. You must ask the clarinet to play it for you."

Interesting S.O.S. Figures

DURING the second quarter of 1934, 149 S O S and police messages were broadcast Nationally and 28 from provincial stations.

In the case of those given Nationally, 107 were in respect of illness, 71 of which were successful, 33 unsuccessful, and 3 result unknown. The percentages were 66.36, 30.84,

and 2.8 respectively. Forty messages called for witnesses of accidents, 23, or 57.5 per cent., of which were successful, and 17, or 42.5 per cent., unsuccessful. Two were special or crime messages, neither of which met with success.

Of 28 broadcasts from provincial stations, 12 were in respect of illnesses, 4, or 33.33 per cent., being successful, and 8, or 66.67 per cent. unsuccessful. For witnesses of accidents there were 10 messages, half of which were successful. Six crime or special messages were broadcast, three being successful.

Talk from Geneva

ATALK by Mr. Anthony Eden will be relayed from Geneva on Saturday, September 8th, in the second general news bulletin, on the occasion of the opening of the fifteenth ordinary session of the League of Nations.

Broadcasting for India

CONFERENCES have been held at Simla for some time to discuss ways of carrying out the broadcasting development plan of the Government of India, sponsored by the Viceroy, the Earl of Willingdon.

A five-year contract will probably be given to an experienced B.B.C. official to act in an advisory capacity to the Government.

It is expected that a new broadcasting centre at Delhi will be erected, and that this will be followed by stations all over the provinces, which will broadcast principally in the local languages.

"Five-metre" Field Day

THE Golders Green and Hendon Radio Scientific Society are holding another 5-metre field day on Sunday, September 16th, at Ivinghoe Beacon, meeting at Hendon Central at 10 a.m. Any interested reader will be welcomed. The hon. secretary, Mr. F. P. Hillier, of 8, Denehurst Gardens, N.W.4, will send particulars on request.

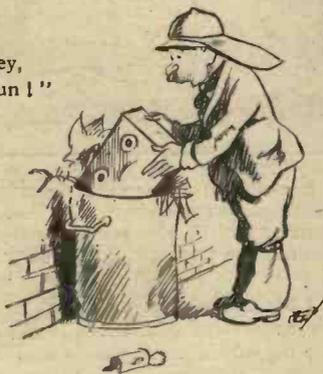
UNBIASED

Ask the Dustman

I AM penning these few notes from the discomforts of an hotel situated within the proverbial stone's throw of Glasgolympia where I have spent the past few days. Much of the stuff exhibited I have, of course, seen already at the London Show.

There is, however, quite a sprinkling of things which have not previously seen the light of day, and I am sorry to say that in certain cases I am of opinion that it is a pity that they have been dragged out of their obscurity. Indeed, in the case

"Blimey,
anuvver wun!"



of one particular set which, for obvious reasons, must remain nameless, I think that its sponsors might do worse than paraphrase the advertising slogan of a well-known firm and "ask the dustman what he thinks of the new — radio"; for, as far as I can see, the dustman is likely to be the person most qualified by experience to give advice concerning it as the result of the number which he will find on his rounds.

Static on Tap

IT has always been said, and rightly so, in my opinion, that it is difficult to find anyone who can beat the Scots at overcoming difficulties; and, if further proof were needed, one has only to point to their prowess in attaining all the best positions in life, in spite of the handicap of their race.

Such a remarkable instance of the ingenuity of this great race was brought home to me at Glasgow that I cannot refrain from passing it on to you. It so happened that I had fallen into conversation with a group of fellow enthusiasts over a cup of the national beverage. The talk turned to the subject of unusual instances of man-made static and the methods taken to combat it. In particular, we had been discussing the manner in which interference arising in certain houses was distributed far and wide by being carried along by the electric light mains. Various conventional methods of cure, involving the use of H.F. chokes in series with the

mains were being discussed, when a quiet man, who had not hitherto joined in the general conversation, asked us if we could guess at a method he had adopted to cure a particular kind of interference which had been spoiling his reception.

He lived, so he explained, in an old-fashioned type of terrace-house in which the water mains ran from house to house through the walls, and for some time had been sorely afflicted by interference, which the G.P.O. authorities had finally found to be emanating from an electric "face-lifting" machine which a wretched Sassenach woman had installed a few houses away. Emanations from this devilish contraption were getting on to the water pipes and being distributed to all the houses on each side. The offender had proved impervious to all the blandishments of the G.P.O., and resolutely declined to adopt any measures to allay the interference at the source. Earthing the water pipes at the "receiving end" had proved partially effective, but it was clear that, to cure it completely, some definite "stopper," such as an H.F. choke, was needed; and, as it was obviously impossible to put such a device in series with a water pipe, the G.P.O. engineer had washed his hands of the whole affair and taken his departure.

The latter gentleman, however, had reckoned without the native resourcefulness of the Scottish race, which does not number the word "impossible" among the strong and uncouth expressions to be found in its national dictionary. Our friend, imbued and fortified by the spirit of Burns, not to mention that of Dewar, had put on his thinking cap, and, after a few hours' reflection, had sallied forth to consult the local plumber. The result was that, after a few hours' strenuous work on the part of the latter gentleman, H.F. chokes were included in series with



"... in series
with each pipe."

each pipe, and the water caused to pass through them, in spite of the dogmatic pooh-poohing of the learned technician of the G.P.O.

The remedy proved entirely effective, and when I heard about it, it seemed to me to be so obvious that I cannot for the life of me think why I did not think of it myself. Whether or no this will start a new fashion in the design of spiral

girders for steel-frame buildings I cannot say, but it certainly seems likely, as it has been quite definitely shown in America that these structures are responsible for the spreading of a very great deal of interference.

Big Business

NOW that the exhibition season is in full swing I notice that we are getting the usual crop of seemingly wild statements in the daily Press concerning the enormous amount of business done at Radiolympia and the provincial shows.

By FREE GRID

As usual, we learn that leading manufacturers have sold out the whole of their factory output for several years ahead, this being done in most cases before the exhibition was an hour old. Acres of land are being purchased, while building contractors are feverishly working day and night to put up the necessary new factories.

A new cry this year, however, is that there are not enough radio workers to fill the factories and offices, and according to one paragraph (which I have read in several different papers) "nobody with the slightest knowledge of radio need fear for a job." Yet another paragraph tells the world that "workers are so scarce that fabulous salaries are being offered and refused."

I have not the slightest hesitation in describing these vapourings as pure unadulterated tripe and I cannot help thinking that the R.M.A. has some responsibility in the matter, as the similarity of the statements suggests that they originate from a common source and if official statements are being misquoted then the R.M.A. has a duty to perform in immediately contradicting these misleading imaginings as they appear in the Press.

In the unlikely event of these statements being true, then all I can say is that, whether they are responsible for them or not, the R.M.A. are very much behind the times in not making more of them than they do. Not only should I expect them to be blazoned from the house tops and circulated to every journal in Europe, but I should expect to see the dear old "wireless colleges" booming again in all their glory, as, obviously, training schools for radio factory operatives will be needed all over the country.

I for one shall enrol as a pupil, for I have no objection at all to accepting a thousand a year for sitting at a bench all day doping loud speaker cones.

The Wireless World

FOREIGN PROGRAMME SUPPLEMENT



SUNDAY

SEPTEMBER THE NINTH

ATHLONE

565 kc/s, 531 metres; 60 kW. Relayed by Dublin, 1,348 kc/s, 222.6 metres; and Cork, 1,240 kc/s, 241.9 metres.—1.0 to 3.0 p.m., Records. 8.30, Time. 8.31, Recital by the Dublin Choristers. 9.10, Alice Feeley (Violin). 9.25, The End of the Dance—presented by H. Fraser and Company. 10.5, Sports Talk by Sean O'Ceallachain. 10.20, Recital by Annie Fagan (Harp) and Chrissie Fagan (Cello). 10.30, H. Valentine (Tenor). 10.45, Harp and Cello Recital (cont'd.). 11.0, Time; News; Weather; Close Down.

BARCELONA

795 kc/s, 377.4 metres; 5 kW.—8.15 a.m., News; Records. 9.0, Chimes; Gym.; Records. 9.20, News; Records. 10.0, Obituary. 12 Noon, Chimes; Weather. 1.0 p.m., Records. 2.0, Records. 2.30, Theatre Notes; Amusement Guide; Records. 3.0, Film Review; Sextet Concert: March (Souza); Selection from Das Fürstkind (Lehár); Evocación y zambra (Arquelladas); Pavane (Penella); Danzas montañesas (Gorostiaga); Selection from La Torre del Oro (Jiménez). 4.0, Programme for Hospitals. 5.0, Interval. 6.30, Broadcast for Farmers; Records. 7.0, Concert by the Station Orchestra: March (Hume); Selection from Enseñanza libre (Jiménez); Waltz (Greenbank); Romance (Rechtenwald); Prelude (Kark). 7.30, Song Recital by Cavalliere (Tenor). 8.0, Orchestral Concert; Conductor, Alier. 9.0, Dance Music, relayed from the Hollywood Bar. 10.0, Chimes; Records. 10.45, Chess Lesson.

BASLE.—Relays Beromünster.

BERLIN

DEUTSCHLANDSENDER, 191 kc/s, 1,571 metres; 60 kW.—6.10 a.m., Motto. 6.15, See Hamburg. 8.0, Programme for Farmers. 8.55, Talk: The German Reich. 9.35, Interval. 10.5, Weather. 10.10, Interval. 11.0, Herbert Moleнар recites his own Poems. 11.10, Weather. 11.30 to 5.0 p.m., See Munich. 5.0, Report: The International Football Match Germany v. Poland. 5.40, Records. Overture, Die Fledermaus (Joh. Strauss); Air from The Gipsy Baron (Strauss); Ach, ich hab', sie ja nur auf die Schulter geküsst from Der Bettelstudent (Müllöcker); Traumwälder from Der Feldprediger (Müllöcker); Gipsy Song from The Gipsy Baron (Strauss); Er soll dein Herr sein, from Gasparone (Müllöcker); Extract from The Bird Fancier (Zeller); Sei gepriesen, du lauschige Nacht, from Die Landstreicher (Ziehrer); Komm herab, o Madonna Theresa, from Don Cesar (Dellinger); Wo sie war, die Müllerin, from Der Obersteiger (Zeller); Air from The Gipsy Baron (Strauss); Waltz from Wiener Blut (Strauss). 6.0, Report (on Records): The International Football Match, Germany v. Poland. 6.30, Records. 7.0, See Stuttgart. 7.30 to 10.0, See Munich. 10.0, News; Sports Notes. 10.20, Report (on Records): The European Light Athletic Championships at Turin. 10.45, Weather. 11.0, Dance Music from Hamburg. 12.30 a.m. (Monday), Close Down.

BERLIN

FUNKSTUNDE, 841 kc/s, 356.7 metres; 100 kW.—5.0 a.m., Gym. 6.15 to 8.15, See Hamburg. 8.25, Hymn. 8.30, Talk. 8.55, Chimes. 9.0, Service from Potsdam Garrison Church. 10.0, Cathedral Chimes. 10.5, Weather. 11.30 to 5.0 p.m., See Munich. 5.0, Concert by the Small Station Orchestra; Conductor, Steiner. 7.30 to 10.0, See Munich. 10.0, Concert by the Small Station Orchestra; Conductor, Steiner; Soloists, Grundmann (Accordion); Polka, Tritsch-Tratsch (Joh. Strauss); Humoresque (Meyer-Marco); Accordion Solo: Fischertanz (Kletsch); Die launische Spieluhr (Kark); Tanz auf der Dorfsee (Ailburt). 10.20, News; Sports Notes. 10.50, Light Music and Dance Music by Fred Bird-Leumann's Band; Soloist, Max Mensing (Songs). 1.0 a.m. (Monday), Close Down.

BERNE.—Relays Beromünster.

BEROMUNSTER

556 kc/s, 539.6 metres; 60 kW.—9.45 a.m., Protestant Address. 10.20 to 2.0 p.m., See Sottens. 4.0, Songs to the Lute by Elsy Lüscher and Claire Ludin. 4.30, Reading. 4.50, Concert by the Basle Music Society. 6.0 till Close Down. See Sottens. 10.15 (approx.), Close Down.

BODEN.—Relays Stockholm. BODO.—Relays Oslo.

BRATISLAVA

1,004 kc/s, 298.8 metres; 13.5 kW.—6.30 a.m., See Prague. 8.30, See Brno. 9.0, Protestant Service. 10.15, Records. 10.25, See Prague. 11.0, Military Band Concert, relayed from Trencanske Teplice; Conductor, Margold; Czechoslovak Army March (Oberthor); Overture, Marinarella (Fucik); Waltz (Kasper); Selection from La Traviata (Verdi); Elegy and Krakowiak from Polenbult (Nedbal); Potpourri of Russian Songs; March from The Bartered Bride (Smetana). 12 Noon, See Prague. 1.30, Talk for Farmers. 1.45 to 1.50, Water Level. 4.0 p.m., Military Band Concert from Trencanske Teplice; Conductor, Margold. 5.0, See Prague. 5.30, Concert by the Station Orchestra; Conductor, Schimpl: Symphony No. 1 in C, Op. 21 (Beethoven); German Dances (Mozart). 6.15, Reading of Hungarian Folklore. 6.55, See Prague. 7.5, See Brno. 7.45, See Prague. 8.45, Talk. 9.0, See Prague. 10.20, News and Sports Notes in Hungarian. 10.30; See Prague. 11.30 (approx.), Close Down.

BREMEN.—Relays Hamburg.

BRESLAU

950 kc/s, 315.8 metres; 60 kW. Relayed by Gleiwitz, 1,231 kc/s, 243.7 metres.—5.0 a.m., Hymn; Gym. 5.10, Records. 6.10, Time; Weather. 6.15, See Hamburg. 8.15, Motto. 8.25, Concert by the Wratislavia Choir; Conductor, Kupfermann. 9.0, Chimes. 9.5, Divine Service. 10.0, Famous Dialogues: Extracts from Schiller, Goethe and Kleist. 10.50, Pianoforte Quintet, Op. 23 (Pfitzner), by the Liegnitz Chamber Music Society. 11.30 to 5.0 p.m., See Munich. 5.0, Orchestral Concert from Oels; Conductor, Topitz; Soloist, Magda Krause (Violin): March, An' treue Kameradschaft (Blankenburg); Overture, Mignon (Thomas); Selection from Aida (Verdi); Waltz, Gebirgskinder (Ziehrer); Perpetuum mobile (Joh. Strauss); Overture, Fatinitza (Suppé); Sonatina (Schubert); Minuet (Mozart); Traume (Wagner); Prize Song from The Mastersingers (Wagner); Allegro (Vioco). 6.30, Report on the International Football Match, Germany v. Poland, at Warsaw. 7.0, Weekly Review. 7.30 to 10.0, See Munich. 10.0, Report on the European Light Athletic Championships at Turin. 10.20, News. 10.45, Dance Music from Oels; Conductor, Iigner. 1.0 a.m. (Monday), Close Down.

BRNO

922 kc/s, 325.4 metres; 32 kW.—6.30 a.m., See Prague. 8.30, Organ Recital by V. Blazek. 9.0, See Prague. 10.0, Song Recital by Bozena Snopková. 10.20, Record. 10.25, See Prague. 11.0, See Bratislava. 12 Noon, See Prague. 1.30 p.m., Talk for Farmers. 1.45, Records. 2.20 to 2.50, Discussion for German Farmers. 4.0, See Moravská Ostrava. 5.0, See Prague. 5.30, Records. 5.40, Talk. 5.55 to 6.55, German Transmission. 5.55, Economics Review. 6.10, Orchestral Concert of Suites by Brno Composers:

Suite from Much Ado about Nothing (Korngold); Suite (Mracek); Suite, Op. 3 (Janáček). 6.55, See Prague. 7.5, Slovak Songs. 7.45 to 11.30, See Prague. 11.30 (approx.), Close Down.

BRUSSELS (No. 1)

620 kc/s, 483.9 metres; 15 kW.—10.0 a.m., Orchestral Concert, with Songs. 11.0, Records. 11.55, Weather. 12 Noon, Concert by the Max Alexys Orchestra. 12.30 p.m., Monologues. 12.40, Concert by the Max Alexys Orchestra. 1.0, News. 1.10, Orchestral Concert; Soloists, Béthune (Violin), Mlle. Heymans (Songs): Overture, Zampa (Hérold); Andante and Finale from Violin Concerto (Wieniawsky); Histoires (Ibert); Songs, (a) Aria from Céphale et Procris (Grétry), (b) Ephemère amour (Raway), (c) Song (Kips), (d) Les Cloches du Soir (Frank); Ballet Music from Carmen (Bizet); Selection from Monsieur Beaucaire (Messager); Hungarian Dances Nos. 7 and 8 (Brahms). 2.0, Interval. 5.0, Dance Records. 6.15, Orchestral Concert; Soloist, Dorion Bornstein (Songs): Florentine March (Fucik); Waltz (Scassola); Overture, Morning, Noon and Night (Suppé); Jungle Drums (Ketybey); Selection from Miss Decima (Audran); Songs, (a) Aria from Les Huguenots (Meyerbeer), (b) Primavera (Tirrenelli), (c) Aria from Tosca (Puccini); Potpourri (Salabert); Waltz, Très jolie (Waldteufel). 7.15, Religious Address. 7.30, News. 8.0, Concert of Military Music. 9.0, Scenes from Le Mariage de Mlle. Beulemans—Comedy (Fonson-Wichelert) (on Records). 9.20, Military Band Concert (cont'd.). 10.0, News. 10.10, Concert by the José Schnyders Orchestra, from the Ancienne Belgique. 12 Midnight, Close Down.

BRUSSELS (No. 2)

932 kc/s, 321.9 metres; 15 kW. Programme in Flemish.—10.0 a.m., Records. 11.0, Orchestral Concert of Waltzes: Military Waltz, La housarde (Ganne); Waltz, Loin du pays (Berger); Viennese Waltz, Künstlerleben (Strauss); Waltz, Dans l'azur (Paradis); Waltz, The Cuckoo (Jonasson). 11.57, Weather. 12 Noon, Orchestral Concert; Soloists, Méthune (Violin) and Blanche Lambert (Songs): Prelude (Rachmaninov); Ballet Music from Hérodiade (Massenet); Romance for Violin and Orchestra (D'Haeyer); Songs: (a) Heidekind (Peeters), (b) Doornjooise (Mortelmans), (c) Liedes Lente (Van der Linden); Selection from Tosca (Puccini); Waltz, Wienerblut (Strauss); Two Symphonic Rhapsodies (Coates); Paysages flamands (De Taeye). 1.0 p.m., News. 1.10, Concert by the Max Alexys Orchestra. 2.0, Interval. 5.0, Records. In an interval, Sports Talk. 6.0, Pianoforte Recital by Jean Brennet: Theme with Variations, Op. 5 (Chevallard); Triana (Albeniz); Scherzo in E flat (De Boeck); Lesghinka (Liapunov). 6.30, Records. 6.45, Cello Recital by Théo Van Hamburg: Sonate ancienne (Porpora); Chant russe (Lalo); Arab Melody (Glazunov); Schubert Potpourri (Jacob); Nana (de Falla); Papillon (Fauré). 7.15, Religious Address. 7.30, News. 7.55, Music Notes. 8.0, Orchestral Concert; Soloists, Daisy Grace and Harry Collin (Songs): Drifting in China (Gyldmark); Valse des Félits (Lauwerijns); Offenbachiana (Conradi); Songs; Overture, The Bohemian Girl (Balfe); Selection, The Flower of Hawaii (Abraham); Songs; Overture, The Daughter of the Regiment (Donizetti); Danses

villageoises (Cools); The Crown of India (Elgar); Rustic Suite No. 2 (Gilson); Songs; La féria (Lacôme). In the interval at 8.45, Interviews with Listeners. 10.0, News. 10.10, See Brussels No. 1. 12 Midnight, Close Down.

BUCHAREST

823 kc/s, 364.5 metres; 12 kW.—10.30 a.m., Religious Notes. 10.45, Sacred Music. 11.0, Concert by the Station Orchestra: Overture, The Siege of Corinth (Rossini); Ballet from Faust (Gounod); Selection from Fatinitza (Suppé); Dorfschwalben aus Oesterreich (Jos. Strauss); Potpourri of Romanian Songs (Paschill); Le bûcher (Rosey). 12 Noon, Records. 12.45 p.m., Recitations. 1.15, Time; Weather; News. 1.40, Records. 4.0, Programme for Country People. 5.0, Light Music by the Sibiceanu Orchestra. 6.0, Time; Weather; News. 6.20, Light Music (cont'd.). 7.0, Educational Programme. 7.15, Records. 7.45, Talk. 8.0, Concert of Italian Opera Music by the Station Orchestra: Overture, The Secret Marriage (Cimarosa); Selection from La Gioconda (Ponchielli); Selection from Otello (Verdi). 9.0, Sports Results. 9.10, Concert of Operetta Selections by the Station Orchestra: Selections from (a) The Little Dutch Girl (Kálmán), (b) La Fille de Madame Angot (Lecocq), (c) Tip-Toes (Gershwin). 10.0, News.

BUDAPEST

546 kc/s, 549.5 metres; 120 kW.—9.15 a.m., News. 10.0, Protestant Service. 11.0, Roman Catholic Service. 12.20 p.m., Weather. 12.30, Concert by the Opera House Orchestra. Conductor: Rajter. Overture, The Hebrides (Mendelssohn); The Unfinished Symphony in B minor (Schubert); Tankred (Pohl); La Boite a Jouioux (Debussy); Dances (Glazunov). 2.0, Sound Film Music. 3.0, Programme for Farmers. 3.45, Concert by the Jenő Farkas Cigány Orchestra. 4.30, Talk. 5.0, Light Music by Mándits Orchestra. 6.0, Talk. 6.30, Lehár and Kálmán Operetta Concert by the Budapest Concert Orchestra. Conductor: Polgár. Soloists: Lujza Szabo and Miklos Szedő. 8.0, Sports Notes. 8.20, Violin Recital by László Szentgyörgyi. Sonata in A (Handel); Concerto in E minor (Mendelssohn). 9.0, Programme by Sándor Goth and Ella Kortész. 9.50, News. 10.10, Concert by the Veres Cigány Orchestra. 11.0, Dance Music. 12 Midnight, Concert by the Veres Cigány Orchestra.

CASSEL.—Relays Frankfurt.

COLOGNE

658 kc/s, 455.9 metres; 60 kW.—6.15 a.m., See Hamburg. 8.0, Time; News. 8.10, Talk: Weaving in the Elfer District. 8.30 to 9.0, Divine Service. 9.15, Surprise Programme. 10.15, Talk on Music. 10.45, German Folk Songs and Dances—a Sequence of Talks with Records. 11.15, Organ Recital by Anton Novakowski. 11.30 to 5.0 p.m., See Munich. 5.0, Records. 5.40, Talk. 6.40, See Frankfurt. 7.0, Country Fair—Songs of the Nations—Talk with Records. 7.30 to 10.0, See Munich. 10.0, Time; News. 10.20, See Berlin (Deutschlandsender). 10.50, See Berlin (Funkstunde). 12 Midnight, Close Down.

COPENHAGEN.—Relays Kalundborg. CORK.—Relays Athlone. DANZIG.—Relays Königsberg. DRESDEN.—Relays Leipzig.

FECAMP

1,456 kc/s, 206 metres; 10 kW.—10.0 a.m. to 12 Noon, Programme in English by the International Broadcasting Company of London. 10.0, Marches from Here and There. 10.30, Musical Comedy Memories. 11.0, Sacred Music. 11.15, French Programme of Sacred Music. 11.30, Gramophone Records. 12 Noon to 2.0 p.m., Programme in French. 2.0 to 6.30, Programme in English by the I.B.C. 2.0, Dance Music. 2.30, Instrumental Solos. 3.0, I.B.C. Members' Request Programme. An Irish Exile's Memories of Home. 3.30, Hungarian Tourist Bureau Broadcast; Orchestral Music. 4.0, Orchestral Concert. 4.15,

SEPT. 9th

SUNDAY continued

The Thought of the Week; The Rev. James Wall, M.A., Precentor of Durham Cathedral; Orchestral Concert (cont'd.). 4.30, The I.B.C. Nursery Corner, with Flossie and the Uncles. 4.45, Tunes from Walt Disney's Cartoons. 5.0, Mandoline Band. 5.30, Orchestral Music. 5.45, Sea Shanties. 6.0, Gramophone Records. 6.30 to 9.30, Programme in French. 9.30 to 1.0 a.m. (Monday), Programme in English by the I.B.C. 9.30, Celebrity Concert of Gramophone Records. 10.0, Old Favorites. 10.15, Orchestral Music. 10.30, Light Music. 11.0, Request Programme. 11.30, Dance Music. 12 Midnight, Club Concert for Lancaster Listeners; Part 1, Dance Music by Jack Payne and his Band (Gramophone Records). 12.30 a.m. (Monday), Time Signal. 12.31, Part 2, Dance Music. 1.0, I.B.C. Good-night Melody and Close Down.

FLENSBURG.—Relays Hamburg. **FLOR- ENCE.**—Relays Milan.

FRANKFURT

1,195 kc/s, 251 metres; 17 kW.—6.15 a.m., See Hamburg. 8.15, Time; News. 8.25, Gym. 8.45, Wind Instrument Music. 9.0, Roman Catholic Service. 9.45, Records. 10.15, Concert by the Arion Male Voice Choir; Conductor, Winkel. 10.45, Heinrich Mohr reads from his own Works, relayed from Freiburg. 11.0, Concert of Old Music by the Station Choir and Orchestra; Conductor, Belker; Soloists, Helma Kolbe (Soprano), Henny Schmitt (Contralto), and Ilse Kuhlmann (Harpichord and Clavichord). 11.30 to 5.0, See Munich. 5.0, See Königsberg. 6.15, Humorous Report. 6.40, Programme for Farmers. 7.0, See Stuttgart. 7.30, to 10.0, See Munich. 10.0, Report of the European Light Athletic Championships at Turin. 10.20, Time; News. 10.40, Sports Notes. 11.0, Dance Music from Hamburg. 12 Mid- night, Classical Records: Quintet in A (Mozart); Songs (Brahms): (a) All meine Herzgedanken, (b) Dein Herzlein mild, (c) Bei nächtlicher Weile, (d) Waldesnacht; Siegfried Idyll (Wagner); Songs (Brahms): (a) Schindler Tod, (b) In stiller Nacht, (c) Ich fahr dahin; Symphony No. 1 in B flat, Op. 38 (Schumann); Overture, Rosamunde (Schubert). 2.0 a.m. (Monday), Close Down.

FREDRIKSSTAD.—Relays Oslo. **FREI- BURG.**—Relays Stuttgart. **GENEVA.**—Relays Sottens. **GENOA.**—Relays Milan. **GLEIWITZ.**—Relays Breslau. **GÖTEBORG.**—Relays Stockholm. **GRAZ.**—Relays Vienna. **HAMAR.**—Relays Oslo.

HAMBURG

904 kc/s, 331.9 metres; 100 kW. Relayed by Bremen, Flensburg, and Hanover, 1,330 kc/s, 225.6 metres.—6.15 a.m., Harbour Concert. 8.15, Time; News. 8.30, Gym. 8.45, Wireless Notes. 9.0, Art Notes. 9.30 (from Hanover), Roman Catholic Service. 11.0, Talk: Cuxhaven. 11.30, See Munich. 5.0, See Berlin (Deutschlandsender). 5.40, Records. 6.0 (from Hanover), The Heath—Concert by the Chamber Orchestra, Vocal Quartet, and Genger (Pianoforte). Conductor: von Sosen. Paraphrase on the Song, Warnung (Hanns Löhr); Double Quartet: Heideblüte (von Sosen); Talk: The Heath; Songs (Dreyling): (a) Am Hüenegrab, (b) Heidemittag; Heidezauber (von Sosen); Two Songs for Quartet (Dreyling): (a) Heidemorgen, (b) Heideabend; Das Grab auf der Heide (Heiser); Talk: Indian Summer; Pianoforte Solos (Kaun): (a) Einsam im Walde, (b) Mümmelmann; Quartet: Die Schneegans zieht (Dreyling); Double Quartet: Ueber die Heide (Schenk). 7.0 (from Flensburg), Song and Organ Recital by Agnes Vollerling-Niendorf and Erwin Zilinger. Talk: The Organ; Allein Gott in der Höh sei Ehr (Böhm); Ciaccona in D minor (Pachelbel); Lobgesang (Schütz); Präludium and Fugue in E (Lübeck). 7.30 to 10.0, See Munich. 10.0, News. 10.20, See Berlin (Deutschlandsender). 10.40, Dance Music by the Station Dance Band. Conductor: Bolt. 12.30 a.m. (Monday), Close Down.

HANOVER.—Relays Hamburg.

HILVERSUM

160 kc/s, 1,875 metres; 7 kW. (until 3.40 p.m.). Transmitted on Kootwijk, 50 kW., from 3.40 p.m.—8.10 to 11.40 a.m., Programme of the Workers' Radio Society (V.A.R.A.). 8.10, Records. 8.15, Talk for Gardeners. 8.45, Announcements. 8.47, Organ Recital by Jong. 9.10, Recitations by Janny van Oogen and Nienhuys, with Records. 9.40, Concert by the V.A.R.A. Orchestra. Conductor: de Groot. 10.10, Records. 10.25, Orchestral Concert (cont'd.). 10.55, Talk. 11.10, Orchestral Concert (cont'd.). 11.40 to 4.40 p.m., Programme of the General Broadcasting Society (A.V.R.O.). 11.40, Time. 11.41, Concert of Light Music by the A.V.R.O. Orchestra. Conductor: Treep. In the interval at 12.20, Talk on Art. 1.10 p.m., Concert by the Plumstead Salvation Army Band. Conductor: Dockerill. 1.40, Book Talk. 2.10, Records. 2.40, Concert by the Residentie Orchestra, relayed from the Kurhaus, Scheveningen. Conductor: Ignaz Neumark. Soloist: Victoria Binnendijk (Contralto). 4.10, Records. 4.25, Sports Notes; Records. 4.40 to 5.40, V.A.R.A. Programme. 4.40, Light Music by the V.A.R.A. Orchestra. Conductor: de Groot. Les filles d'Amérique (Duganne); Selection from Paganini (Lehár); Piece (Gilbert); Das waren noch Zeiten (Kálmán);

Dividenden (Morena). 5.0, Sports Talk. 5.40 to 7.40, Programme of the Liberal Protestant Radio Society (V.P.R.O.). 5.40, Reading. 6.25, Studio Service. 7.40 till Close Down, A.V.R.O. Programme. 7.40, Time; News. 7.55, Light Music by the Kovacs Lajos Orchestra. 8.40, News. 8.55, Concert by the A.V.R.O. Orchestra. Conductor: Treep. Soloists: Geriárd Hüsch (Baritone) and Rosa Spier (Harp). 10.10, Military Tattoo relayed from Rotterdam. Combined Military and Naval Bands. Conductor: Captain Walther Boer. 10.40, Light Music by the Kovacs Lajos Orchestra. 11.40, Close Down.

HORBY.—Relays Stockholm.

HUIZEN

995 kc/s, 301.5 metres; 7 kW. (until 6.40 p.m.), 20 kW. from 6.40 p.m.—8.10 a.m., Religious Programme of the Christian Radio Society (N.C.R.V.). 9.10 to 4.40 p.m., Programme of the Catholic Radio Society (K.R.O.). 9.10, Records. 9.40, High Mass 11.10, Records. 11.40, Concert by the K.R.O. Boys; Conductor, Lustenhouwer. 12.40 p.m., Legal Talk. 1.10, Concert (cont'd.). 1.50, Literary Talk. 2.10, Concert by the St. Gregorius de Groot Orchestra; Conductor, Bonte; Boys' Choir. Conductor, van Elteren; Overture, Rienzi (Wagner-Mastio); Chorus, Der Wanderer in der Sägemühle (Oluck); Jan de Bruin z'n motor; Koeliedje (Martin-Zijdenlaan); Angelus (Massenet-Parès); Inno Pontificio (Hallmayer). 2.40, Records. 3.55, Programme for Invalids. 4.40 to 7.25, N.C.R.V. Programme. 4.40, Religious Music. 5.0, Organ Recital. 5.10, Protestant Service; Records. 7.25 until Close Down, K.R.O. Programme. 7.25, Records. 7.30, Talk. 7.55, Concert by the K.R.O. Orchestra; Conductor, Gerritsen; Soloist, Willy Vos Mendes (Tenor); Overture, The Gipsy Baron (Strauss); Selection from Gelbe Lilien blühen (Krasznay-Krauss); Selection from The Dollar Princess (Fall); Selection from The Merry Widow (Lehár). 8.40, News. 8.45, Recitation. 9.5, Records. 9.10, Concert (cont'd.): Overture, Der lustige Krieg (Strauss); Selection from Katherina (Stefan); Selection from Gluditta (Lehár); Selection from Countess Maritza (Kálmán); Selection from The Tales of Hoffmann (Offenbach); Jockey Polka (Strauss). 9.55, News. 10.0, Concert (cont'd.): Overture, Orpheus in the Underworld (Offenbach); Potpourri, La fille de Madame Anzot (Lecocq); 10.20, Epilogue by the Small K.R.O. Choir; Conductor, Pickkers. 10.40 (approx.), Close Down.

INNSBRUCK.—Relays Vienna.

KALUNDBORG

238 kc/s, 1,261 metres; 75 kW. Relayed by Copenhagen, 1,176 kc/s, 255.1 metres; and Skamlehaek, 49.5 metres.—7.57 a.m., Weather. 8.0, Gym. 9.0 to 9.30, Talk. 10.0, Divine Service, relayed from the Garrison Church. 11.30, Weather; News. 12 Noon, Chimes; Weather. 12.2 p.m., Concert by Carl Rydahl's Instrumental Ensemble. 1.0, Talk in English: The Grand Tour of Scotland. 1.20, Talk in German: German Dialects. 1.40, Talk in French: Flowers and Fruits. 2.0, Records. 2.30, Programme for Children. 3.0, Concert of Viennese Music by the Radio Orchestra; Conductor, Mahler; Soloist, Stühr (Songs to the Lute); Overture, Doktor und Apotheker (Dittersdorf); Divertimento No. 11 in D (Mozart); Waltz, Die Romantiker (Lanner); Overture in B flat (Schubert); Songs from Frida's Bok (Sjöberg); Overture, Morning, Noon and Night (Suppé); March (Jos. Strauss); Waltz from the Arabian Nights (Joh. Strauss); March, Wien bleibt Wien (Schrammel); Russian Dance from Tatjana (Lehár); Overture, Rund um die Liebe (O. Straus). 5.0, Divine Service, relayed from the Christiansborg Castle Church. 6.20, Talk. 6.50, Weather. 7.0, News. 7.15, Time. 7.30, Talk: Holberg. 8.0, Time. 8.1, The Hansen Family—Sketch (Locher). 8.15, Concert of Danish Music by the Radio Orchestra; Conductor, Grøndahl; Overture, Nachklänge aus Ossian (Gade); Dance and March from The Valkyrie (Hartmann); Selection from (a) Syvsoverdag (Hartmann), (b) King and Marshal (Heise), (c) Kalmann (Horneman); Tarantella from Fête galante (Schierbeck). 9.15, A Microphone Visit. 9.45, Old Folk Dance Music (arr. Grøndahl). 10.0, News. 10.10, The Danish Harvest—Songs and Recitations by Anna Hagen and Tavs Neiliendam. 10.50, Dance Music by the Teddy Petersen Band, relayed from the Wivex Restaurant. In the interval, at 12 Midnight, Time; Chimes. 12.30 a.m. (Monday), Close Down.

KIEL.—Relays Hamburg. **KLAGENFURT.**—Relays Vienna.

KONIGSBERG

1,031 kc/s, 291 metres; 60 kW. Relayed by Danzig, 1,303 kc/s, 230.2 metres.—6.15 to 8.15 a.m., See Hamburg. 9.0, Service. 10.40, Talk: Children and the Nation. 10.50, Weather; Programme Notes. 11.0, Records: Herbert Ernst Groh (Tenor); Lachender

Herbst (Knauer). Elizabeth Schumann: Der Vogel im Walde (Taubert). Herbert Ernst Groh and Gerhard Hüsch: Duet from The Force of Destiny (Verdi). Gerhard Hüsch: Aria from La Traviata (Verdi). Elizabeth Schumann: Was ich hab' (Bohm); Marcel Wittrisch: Mahnung (Herrmann). Galli-Curci: La Capinera (Robrecht). Marcel Wittrisch: Hitter-Hymne (Schenkendorf). 11.30 to 5.0 p.m. See Munich. 5.0, Concert by the Königsberg Opera House Orchestra. 6.15, Der Narr von Ulm—Play for Young People (Maruschak). 6.55, Schubert Pianoforte Recital by Ernst Rudolph: Sonata in A minor; Impromptu in B flat. 7.30 to 10.0, See Munich. 10.0, News. 10.20, See Berlin (Deutschlandsender). 10.40, See Hamburg. 12.30 a.m. (Monday), Close Down.

KOSICE.—Relays Prague.

LAHTI

166 kc/s, 1,807 metres; 40 kW. Relayed by Helsinki, 895 kc/s, 335.2 metres.—9.0 a.m., Service in Finnish. 10.45, News. 11.0, Recital on Two Pianofortes by Blomstedt and Kuusisto: Andante and Variations (Schumann); Fantasia Nos. 3 and 4 Op. 5 (Bachmaninov). 11.30, Recitations. 11.55, Weather. 12 Noon, Time Signal. 12.3 p.m., Service in Swedish. 1.30, Concert by the Municipal Band. 3.0, Service for Children. 4.0, Records. 5.40, Talk. 5.55, Song Recital by Lehtonen. 5.59, Time Signal; Weather. 6.10, Concert by the Station Orchestra; Conductor, Linko; Overture, The Bartered Bride (Smetana); Melody from Die loten Augen (D'Albert); Slav Dance (Dvorák). 6.40, Talk. 7.0, Time Signal; Trio in B, Op. 8 (Brahms) by Herhard, Arno and Arto Granroth (Pianoforte, Violin and Cello). 7.35, Talk. 8.0, Concert of Popular Music by the Station Orchestra. 8.45, News in Finnish. 9.0, Sports Talk.

LAUSANNE.—Relays Sottens.

LEIPZIG

785 kc/s, 382.2 metres; 120 kW. Relayed by Dresden, 1,285 kc/s, 233.5 metres.—6.15 a.m., See Hamburg. 8.15, Organ Recital of Schroeder Music by Georg Trexler. 8.40, Divine Service. 9.15 to 9.45, Programme Notes. 10.0 to 10.30, Talk: The German Reich. 11.30 to 5.0, See Munich. 5.0 p.m. (from Dresden), Variety Programme. 6.0, Horse-racing Report: The Leipzig Endowment Prize. 6.10, Concert by the Leipzig Symphony Orchestra. Conductor: Wünschmann. Overture, The Water-Carrier (Cherubini); Concert Suite from Idomeneo (Mozart-Busoni); Twelve Contredanses (Beethoven); Overture, Mein Heim (Dvorák); Tarantella from Venezia e Napoli (Liszt); Concert Waltz (Glazunov); Overture, Eine Nacht in Venedig (Joh. Strauss). 7.30 to 10.0, See Munich. 10.0, Report: The International Football Match, Germany v. Poland. 10.20, News; Sports Notes. 10.50, Report: The European Light Athletics Championships at Turin. 11.10, Light Music and Dance Music from Berlin (Funkstunde). 1.0 a.m. (Monday), Close Down.

LINZ.—Relays Vienna.

LUXEMBOURG

230 kc/s, 1,304 metres; 120 kW.—7.45 a.m., Records, 8.0, News in French; Record; News in German; Record; Pigeon Flying Notes. 11.30, Record; Religious Address; Record. 11.50, News in French and German. 12.30 to 1.0 p.m., Programme in English arranged by the I.B.C. (Ireland), Ltd. Dance Music. 1.0, Dance Music. 2.0 to 3.0, Programme in English arranged by the I.B.C. of London. 2.0, Dance Music. 2.30, Variety Concert (on Records). 4.0, Variety Programme. 8.0, Dance Music and Sound Film Music. 8.30, Racing Results; News in French and German. 9.0, Variety Programme. 10.0, Concert of Light Music. 10.30, Dance Music.

MADRID

EAJ7, 1,095 kc/s, 274 metres; 7 kW.—9.0 a.m., News. 10.0, Announcements. 10.30, Interval. 2.0 p.m., Chimes; Time; Light Music; Talk. 2.30, Sextet Concert: Selection from Prometheus (Beethoven); Barcarolle (Arensky); Mazurka (Scriabin); Berceuse (Ilynsky); Indian Lament (Dvorák); In the Steppes of Central Asia (Borodin). 3.0, Announcements; Light Music. 3.30, Sextet Concert: Petite Suite (Debussy); Selection from Hamlet (Thomas). 4.0, Light Music. 4.30, Sextet Concert: Gavotte (Giménez); Intermezzo (Gabriel-Marie); Selection from Molinos de viento (Luna). 5.0, Interval. 6.0, Chimes; Light Music. 7.0, Concert: Part I, Musical Comedy Selections; Part II, Pianoforte Recital; Part III, Orchestral Music. 8.30, Literary Review; Light Music. 10.0, Chimes; Time; Sextet Concert; Talk. Song Recital by Francisco Latorre (Baritone): Scene and Aria from A Masked Ball (Verdi); Cavatina from The Barber of Seville (Rossini); Romance (Torner); Romance (Cantos); Ay, ay, ay (Freire). 11.30, Concert by the Municipal Band from the Rosales; Conductor, Villa. 1.0 a.m. (Monday), Chimes. 2.0 till Close Down, Programme in English, arranged

by the International Broadcasting Company of London: Dance Music. 3.0, I.B.C. Good-night Melody and Close Down.

MADRID

EAQ, 10,000 kc/s, 30 metres; 20 kW.—11.15 p.m., News. 11.30, Programme from Madrid (EAJ7); News. 12 Midnight to 12.30 a.m. (Monday), Programme in English, arranged by the International Broadcasting Company of London: Concert of Light Music. 12.30, I.B.C. Good-night Melody and Close Down.

MALMO.—Relays Stockholm.

MILAN

814 kc/s, 368.6 metres; 50 kW. Relayed by Turin, 1,140 kc/s, 263.2 metres; Genoa, 986 kc/s, 304.3 metres; and Florence, 610 kc/s, 491.3 metres.—9.40 a.m., News. 10.0, See Rome. 11.0, Mass from the Church of the Annunciation, Florence. 12 Noon, Bible Reading. 12.30 p.m., Records. 1.0, Time; News. 1.5, Request Records. 1.30 to 2.15, Records. 4.15, Records; Sports Notes. 5.15, Light Music. 6.15, Weather. 6.20, Sports Notes. 7.30, Time; Dopplavoro Notes; Records. 8.0, Announcements; Records. 8.45, Military Band Concert; Conductor, Antonio D'Elia: March in E flat (D'Elia); Overture, Olympia (Spontini); Sonata quasi una fantasia (Beethoven); Scene-Abuzzi—Suite No. 1 (De Nardis); Selection from Turandot (Puccini-D'Elia); Overture, Sicilian Vespers (Verdi). In the interval, Talk. 10.15, Light Music; News.

MONTE CENERI

1,167 kc/s, 257.1 metres; 15 kW.—9.15 a.m., Announcements; Bible Reading. 9.40, Running Commentary on the International Cycling Tour for Amateurs, in the intervals—Music and News. 3.0 p.m., Interval. 5.0, Clarinet Recital by Prof. Rubino; Fantasia in Concerto Form on La Sonnambula (Bellini-Cavallini); Aria from The Force of Destiny (Verdi); Selection from La Favorita (Donizetti-Bassi); Aria from The Barber of Seville (Rossini). 5.30, Concert; in the interval, Announcements of the Prize Winners of the Guessing Competition. 6.0, Programme for Children. 6.30, Sports Notes; Talk for Boys. 6.45, Concert of Marches: Fata bianca (Malfetti); Fano (Marini); Paderno (Viglioli); Scampagnata (Eusebiotti); Brisetout (Monet); I Granatieri (Montanari). 7.15, Records of Popular Italian Songs. 7.45, News. 7.55, Sports Notes. 8.0, Hungaria—Potpourri of Hungarian Songs (Leopold) by the Widor Quartet. 8.30, Talk. 8.45, Concert by the Radio Orchestra. 9.45, Jazz Records. 10.0, Announcements of the Results of the International Cycling Tour for Amateurs. 10.5, March and Sports Notes.

MORAVSKA-OSTRAVA

1,158 kc/s, 259.1 metres; 11.2 kW.—6.30 a.m., See Prague. 8.30, See Brno. 9.0, See Prague. 10.0, See Brno. 10.25, See Prague. 11.0, See Bratislava. 12 Noon, See Prague. 1.45 to 2.50 p.m., See Brno. 4.0, Concert by the Station Orchestra; Conductor, Musil. 5.0, See Prague. 5.30, See Brno. 5.55, German Transmission: Silesian Folk Play. 6.55, See Prague. 7.5, See Brno. 7.45, Reading. 8.0, Pianoforte Recital by Singer 8.25, Saxophone Recital by Kreiner. 8.45 till Close Down, See Prague. 11.30 (approx.), Close Down.

MOTALA.—Relays Stockholm. **MUHLACKER.**—See Stuttgart.

MUNICH

740 kc/s, 405.4 metres; 100 kW. Relayed by Augsburg and Nürnberg, 1,267 kc/s, 236.8 metres; and Kaiserslautern, 1,195 kc/s, 251 metres.—6.15 a.m., See Hamburg. 8.15, Wireless Notes. 8.45, Choral Concert. 9.30, Service. 10.10, Chimes. 10.15, Reading. 10.40, Music by the Trapp Chamber Orchestra; Soloist, Kloth (Harpichord) Concerto in D minor (P. E. Bach); Concerto grosso No. 1 (Corelli). 11.30 to 5.0 p.m. (from Nürnberg), Commentaries on Hitler's Inspection of the National Socialist Troops in the Luitpold-Arena and of the March past Hitler. 5.0, Concert by the Munich Schrammel Quartet. 5.30, Report of the Fifteenth Rhön Gliding Contest. 5.50, Recital by Losse (Baritone), Wirsing (Violin) and von Bose (Pianoforte); Two Lieder (Brahms): (a) O, Komm, holde Sommernacht, (b) Wie ist doch die Erde so schön; Two Lieder (Wolf): (a) Sommerabend, (b) Wiegenlied im Sommer; Dorfkirche in Sommer (Zilcher); Heimgang in der Frühe (Mattiesen); Sonata in C minor for Violin and Pianoforte Op. 24 (von Boss). 6.30, Im Aufstragsbübel—Folk Play in Four Acts (Schmidt-Neuert); Music by Horak. 7.30, Report on Hitler's Inspection of the National Socialist Troops in the Luitpold-Arena (on Records). 9.0 (from Nürnberg), Concert by the N.S. Symphony Orchestra; Conductor, Adam. 10.0, News. 10.30, Report on the Second Half of the International Football Match: Germany v. Poland (on Records). 11.20, Light Music and Dance Music from Berlin (Funkstunde).

NAPLES.—Relays Rome. **NOTODDEN.**—Relays Oslo.

OSLO

260 kc/s, 1,154 metres; 60 kW. Relayed by Hamar, 519 kc/s, 578 metres; and Jeløy, 6,990 kc/s, 42.92 metres.—5.0 p.m., Records. 5.40, Talk. 6.0, Chamber Music, relayed from Bergen, 850 kc/s, 352.9 metres; Hulda Frisk

SEPT. 9th **SUNDAY** continued

Gran (Songs), Ilonka Kopsland (Pianoforte), Jim Johannessen (Violin) and Karl Johannessen (Cello). 6.30, Recitations (Sigmund Bresteson). 7.0, Sacred Song Recital by Ragna Groven. 7.15, News. 7.30, Time. 7.31, Concert by the Station Orchestra; Conductor, Kramm; Overture, Lohengrin (Wagner); Scènes alsaciennes (Massenet); Hindu Song (Rimsky-Korsakov); Furiant (Weinberger); Le Cygne (Saint-Saëns); Russian Fantasia, Wolgagaister (Leuschner); Piece (Olsen). 8.40, Talk, relayed from Bergen. 9.10, Violin Recital. 9.40, Weather. 9.45, News. 10.0, Topical Talk. 10.15, Sports Notes. 10.30, Old Dance Music. 11.0, Dance Records. 12 Midnight, Close Down.

OSTERSUND.—Relays Stockholm.

PALERMO

565 kc/s, 531 metres; 4 kW.—10.0 to 11.0 a.m., Programme for Farmers. 12 Noon, Bible Reading. 12.15 p.m., Mass from the Church of St. Francis of Assisi. 12.45, News. 1.0 to 2.0, Concert of Light Music. In the interval, at 1.30, Time; News. 5.30 to 6.30, Concert. 8.0, News. 8.20, Records. 8.25, Sports Notes. 8.30, Time; News; Records. 8.45, Concert of Opera Music; Conductor, Martinez; Soloists, Silvia De List (Soprano), Oliva (Bass) and Salvatore Pollicino (Tenor). In the interval, Talk. 11.0, News.

PARIS

POSTE PARISIEN, 959 kc/s, 312.8 metres; 100 kW.—10.0 a.m., Press Review. 10.20, Announcements. 10.25, Records. 10.50, Records. 12 Noon, Interval. 12.5 p.m., Programme with Kito the Clown. 12.15, Records. 12.45, News. 12.50, Records of Paul Weill. 1.20, Interval. 1.30, Concert. 2.0, Interval. 5.30 to 6.30, Programme in English arranged by the International Broadcasting Company of London. 5.30, Dance Music. 6.0, Out of the Shows. 6.50, Roman Catholic Address. 7.20, News. 7.25, Sports Notes. 7.30, Overture, William Tell (Rossini), on Records. 7.50, Records. 8.0, Interval. 8.10, Orchestral Concert of Light Music; Conductor, Balay. 10.20, News. 10.30 till Close Down, Programme in English by the I.B.C. 10.30, Light Music. 11.0, Old Favourites. 11.30, I.B.C. Goodnight Melody and Close Down.

PARIS

RADIO-PARIS, 182 kc/s, 1,648 metres; 75 kW.—7.0 a.m., Records. 7.15, Press Review; Weather. 7.45, Gym. 8.0, Records. 10.15, Concert from Vichy. 11.30, Organ Recital by Pierre Revel, relayed from the Cavaille-Colle. 12 Noon, Religious Address. 12.20 p.m., Sacred Music on Records. 12.30, Bilboquet as Basket-maker. 12.45, Records. 1.0, Concert

by the Victor Pascal Orchestra. 3.0, Music and Comedy for Children. 4.0, Records. 5.0, L'Amiral—Comedy. 6.0, Concert by the Locatelli Orchestra. 7.0, Radio-Paris Guignol—Le Testament de Riffanchard (Crozière). 7.30, Topical Talk. 8.0, Variety Programme; Part 1, Popular Italian Airs by Robert Marino (Songs) and Mme. Scivittaro (Mandoline); Marechiaré (Tosti); Cara Piccina (Lama); Souvenirs de Naples (Leonardi); Rappelle toi (Montanari); Maria-Mari (di Capua); Serenade (Silvestri); Eveille toi (Montanari); Mandolinata Napule (Tagliaferri); Capriccio (Arienzo). 8.30, Press Review; Weather. 8.45, Variety Programme (contd.); Part 2: (a) Three Sketches (Reboux and Borchard); The Chinese Chirpologist—The Hairdresser—The Masseur; (b) Songs (Nadaud), by M. Fabert. Part 3, Songs by Marcelle Denya; Two Songs (Delmet): (a) La petite église, (b) Ohé! les amoureux; Three Songs (Busser): (a) Retour de vèpres, (b) Chanson, (c) Accourez, jeune chromis. 9.15, News; Sports Results. 9.30, Variety Programme (contd.); Part 4, Poems (Rictus) by Mme. Beriza: (a) Là jasant de la vieille, (b) Les baraqués. Part 5, Songs by Mario Ramella; Olfraude (Hahn); Paysage (Hahn); Une jeune fille (Perez); Mandolinata a Napoli. Part 6, Concert of Russian Music by a Balalaika Orchestra. 10.30, Dance Music by the Adison Band.

PITTSBURGH

KDKA, 980 kc/s, 306 metres; 50 kW. Relayed by **W8XK** on 48.86 metres and 25.27 metres.—3.0 p.m., Southernaires. 3.30, Samovar Serenade. 4.0, Calvary Episcopal Church. 5.15, Gould and Shefter. 5.30, Radio City Concert. 6.30, Highlights of the Bible. 7.0, South Sea Islanders. 7.30, Concert Artists. 8.0, Organ Recital. 8.30, Temple of Song. 9.30, Vespers—Shadyside Church. 10.0, Roses and Drums. 10.30, Radio Explorers' Club. 10.45, Mildred Dilling (Harp). 11.0, Those Three Girls. 11.15, Baseball Résumé. 11.30, Baltimore Municipal Band. 12 Midnight, Silken Strings. 12.30 a.m. (Monday), Musical Art Programme. 1.0 to 6.0, Popular Programme.

PORSGRUND.—Relays Oslo.

POZNAN

863 kc/s, 345.6 metres; 16 kW.—9.0 a.m. to 12.35 p.m., See Warsaw. 12.35, Programme

for Children. 12.45, See Warsaw. 2.0, Records. 3.0, Talk for Farmers, from Lwow, 795 kc/s, 377.4 metres. 3.15, Records. 3.25, See Warsaw. 3.35, Records. 3.45, Talk for Farmers. 4.0, See Warsaw. 4.45, Programme for Children, relayed from Cracow, 986 kc/s, 304.3 metres. 5.0, See Warsaw. 5.45, Programme Announcements. 7.50, See Warsaw. 9.0, Variety Programme from Lwow, 795 kc/s, 374 metres. 9.45, See Warsaw. 10.0, Talk. 10.15, Announcements; Records. 10.30, See Warsaw.

PRAGUE

638 kc/s, 470.2 metres; 120 kW.—6.30 a.m., Gym; Music; News. 7.0, Promenade Concert relayed from Karlsbad; The Karlsbad Municipal Orchestra; Choral; Overture (Kostál); Romance (Renée); Waltz Intermezzo: Rosen im Schnee (Siede); Selection from Jacobin (Dvorák); Waltz (Rudolf); Song from Paganini (Lehár); Selection from the Circus Princess (Kálmán); Gallop (Konopka). 8.30, See Brno. 9.0, Talk. 9.15, Concerto in B flat for Pianoforte and Clarinet (Mozart) by Ervin Schulhoff, V. Riha and the Station Philharmonic Orchestra. 9.45, Talk for Workers. 10.0, Pianoforte Duets—Recital by Dr. Reiner and A. Strizek: Sonata in B flat Op. 28 (Fibich); At Sunset—two Nocturnes, Op. 25 (Foerster); My May (Novak). 10.25, Talk. 10.30, Talk: The Slovak Element in Neruda's Poems. 11.0, See Bratislava. 12 Noon, Chimes; News. 12.15 p.m., Military Band Concert; Conductor, Uhlir; Festival March (Oberthor); Overture, Vanda (Krenek); Polonaise (Suk); Selection from the Queen of Spades (Tchaikovsky); March (Uhlir); Dances (Nedbal); Polka (Smetana); Potpourri of Soldier Songs (Leopold); Slav Dance No. 1 (Dvorák); Festival March (Kaspárek). 1.30, Programme for Farmers. 1.45 to 1.55, Social News. 4.0, See Moravská-Ostrava. 5.0, Jaroslav Vrchlický Commemoration Programme—Talk by Prof. Prazek and Concert by the Hlahol Choral Society; Conductor, Herle. 5.30, Records. 5.40, Talk: Czech Historical Novels. 5.55, See Brno. 6.55, News in German. 7.0, News. 7.5, See Brno. 7.45, Talk: The Psychoanalysts Congress. 8.0, Band Concert. 8.45, Reading. 9.0, Time. 9.1, Concert by the Station Orchestra. 10.0, News. 10.20, Record.

10.25, News in German. 10.30, Dance Music by Jaroslav Cech and his Band. 11.30 (approx.), Close Down.

REYKJAVIK

208 kc/s, 1,442 metres; 16 kW.—12.40 p.m., Weather. 1.0, Service. 5.0, Popular Programme. 8.45, Programme for Children. 9.10, Weather. 9.25, Musical Programme. 9.50, Announcements. 10.0, Time Signal. 10.2 (approx.), Records: Concert-Paraphrase on Verdi's Rigoletto (Liszt); Waltz from Faust (Gounod); Impromptu No. 3 in B flat (Schubert). 10.30, Reading. 11.0, News. 11.30, Dance Music. 2.0 a.m. (Monday), Close Down.

RJUKAN.—Relays Oslo.

ROME

Call **1RO**, 713 kc/s, 420.8 metres; 50 kW. Relayed by Naples, 1,104 kc/s, 271.7 metres; Milan (No. 2), 1,348 kc/s, 222.6 metres; Turin (No. 2), 1,357 kc/s, 221.1 metres; and **2RO**, 11,810 kc/s, 25.4 metres.—9.40 a.m., Announcements. 10.0, Programme for Farmers. 11.0, See Milan. 12 Noon to 12.15 p.m., Bible Reading. 12.30, Records. 1.5, See Milan. 1.30 to 1.45, Records. 2.0, Time; Announcements. 4.15, Talk. 4.30, Records; Sports Notes. 5.0, Vocal and Instrumental Concert. 6.15, Weather. 7.30, Sports Notes; Announcements. 8.0, Time; News; Records. 8.45, Dance of The Dragonflies—Operetta (Lehár). 10.15, Dance Music.

RUYSSELEDE

10,330 kc/s, 29.04 metres; 8 kW.—7.45 p.m., News in French. 8.0, See Brussels No. 1. 9.0, News in Flemish. 9.15 (approx.), Close Down.

SALZBURG.—Relays Vienna.

SCHENECTADY

WGY, 790 kc/s, 379.5 metres, 50 kW. Relayed at intervals by **W2XAF** on 31.48 metres, and by **W2XAD** on 19.56 metres.—7.0 p.m., Talkie Picture Time—Sketch. 7.30, Dancing Shadows Orchestra; Conductor, Max Dolin. 11.45, Fitch Programme; Irene Beasley. 12 Midnight, Chase and Sanborn Hour; Jimmy Durante. 1.0 to 4.30 a.m. (Monday), Popular Programme.

SOTTENS

677 kc/s, 443.1 metres; 25 kW.; and Geneva, 401 kc/s, 748 metres.—9.45 a.m., See Beromünster. 10.20, Protestant Service. 11.0, Accordion Concert, relayed from La Chaux-de-Fonds. 12.30 p.m., News in French. 12.37, News in German. 12.45 (from Geneva), Records. 1.0 (from Geneva), Exchange. 1.3 to 2.0 (from Geneva), Records. 4.0 to 6.0, See Beromünster. 6.0, Records. 7.0, Roman

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Catholic Address. 7.30, Pianoforte Recital by Yvonne Gamboni: Theme with Variations (Opinski); Suite, In the Land of the Redskins (Templeton Strong). 7.55, Sports Notes. 7.57, Interlude. 8.0, Literary Programme. 8.30, Concert by the Station Orchestra; Conductor, Echenard; Overture, Die schöne Galathee (Suppé); Four Old French Airs; Three Dances from Tom Jones (German); Valse triste (Sibelius); Parade de Pêche (Lalo); Selection from The Rose of Stamboul (Fall). In the interval at 9.15, News, and at 9.22, News in German. 10.0, Sports Notes. 10.15 (approx.), Close Down.

STOCKHOLM

704 kc/s, 426.1 metres; 55 kW. Relayed by Boden and Ostersund, 413.5 kc/s, 726 metres; Göteborg, 941 kc/s, 318.8 metres; Hörby, 1,131 kc/s, 265.3 metres; Motala, 216 kc/s, 1,389 metres; and Sundsvall, 601 kc/s, 499.2 metres.—9.0 a.m., Talk for Farmers. 9.30, Records. 10.0, Dialogue. 11.0, Divine Service. 12.45 p.m., Weather. 3.0, Records. 4.0, Talk. 4.30, Choral Concert; Conductor, Kyander. 5.5, Programme for Children, from Karlstad. 5.30, Pianoforte Recital by de Frumerie; Sonata in E flat, Op. 27 (Beethoven); Toccata and Fugue in D minor (Bach-Taussig). 6.0, Evensong. 7.35, Reading. 8.0, Trio in B, Op. 8, for Pianoforte, Violin and Cello (Brahms). 8.30, Play (Wallen). 10.0, Concert of Light Music: Overture, The Nuremberg Doll (Adam); Potpourri (Randel); Three Pieces (Pick-Mangiagalli); Réverie (Debussy); Rosen-Menuetten (Lilja); Folk Melody (Ek); Havannaise (Chaminade); Spanish Rondo (Cassado); Piece (Grieg). 11.0 (approx.), Close Down.

STRASBOURG

859 kc/s, 349.2 metres; 15 kW.—9.30 a.m., Protestant Service in German from St. Thomas's Church. 10.30, Records. 11.30, Roman Catholic Service. 12 Noon, Records; Announcements. 12.15 to 12.45 p.m., Concert by the Station Orchestra. Conductor: de Villers. Soloist, Roskam ('Cello): Carnival Overture (Dvorák); Ballet Music from The Queen of Sheba (Gounod); 'Cello Solo: Russian Songs (Lalo); Suite from L'Enfant prodige (Debussy); Selection from Mignon (Thomas); Extracts from Sylvia (Delibes); Dynamidenwalzer (Joh. Strauss); Entry March of the Gladiators (Fueck). 1.0, Time; News. 1.15, Programme from Paris (Ecole Supérieure). 2.0 to 3.0, Records. 3.30, Concert from the Casino Park, Vichy. Conductor, Brouillac. 4.45, Interval. 5.0, Orchestral Concert. Conductor, Roskam. Soloist, Briqueteur (Viola): Marche Tartare (Game); Viola Solos: Prelude and Dance from Das Pensionat (Suppé); Selection from Madame Butterfly (Puccini); Melody

(Rubinstein); Toréador et Andalouse (Rubinstein); Suite variée (Pierné); Selection from Flup (Szulc); March (Rosey). 6.0, Medical Talk. 6.15, Sports Talk. 6.30, Two One-Act Operettas: (a) Les leçons imprévues (Colin), (b) Poste à Galène (Gavelet and Coils). 7.30, Time. 7.31, News. 7.45, Records. 8.0, Press Review in German; Lottery Results; Announcements. 8.30, Boën ou la Possession des Biens—Play (Jules Romains), from Paris (Ecole Supérieure). 10.30 (approx.), Press Review. 10.15, Dance Music from the Caveau de l'Aubette. 12 Midnight (approx.), Close Down.

STUTTART

MUHLACKER, 574 kc/s, 522.6 metres; 100 kW.—6.15 a.m., See Hamburg. 8.15, Time; News. 8.25, Gym. 8.40, Announcements. 9.0, Roman Catholic Service, from Karlsruhe. 9.45, Interval. 10.10, Schumann Pianoforte Recital by Günther Homann: Kinderszenen; Sonata in G minor, Op. 22. 10.40, The Wander Fever—a Sequence of Recitations, Stories and Songs. 11.30 to 5.0 p.m., See Munich. 5.0, Concert by the Station Orchestra. 6.0, Report (on Records): The International Football Match, Germany v. Poland. 6.40, Accordion Concert: March, Fürs Vaterland (Bestgen); Sehnsuchtswalzer (Hermann); Polka (Süßli); March (Haller); Frohes Leben (Ackermann); Jubiläumsmarsch (Bär). 7.0, A Sequence for Germans Abroad (Klingenfuss and Stocklger), with Introductory Talk. 7.30 to 10.0, See Munich. 10.0, Report: The European Light Athletics Championships at Turin. 10.20, Time; News; Sports Report. 11.0, Dance Music from Hamburg. 12 Midnight. See Frankfurt. 2.0 a.m. (Monday), Close Down.

SUNDSVALL.—Relays Stockholm.

TOULOUSE

913 kc/s, 328.6 metres; 10 kW.—11.0 a.m., Dance Refrains. 11.30, Operetta Arias. 11.45, Opera Music: Selection from Cavalleria rusticana (Mascagni); Overture, Lakmé (Delibes); Prelude to Werther (Massenet); Minuet from Manon (Massenet). 12.0 Noon, Songs. 12.15 p.m., Orchestral Music. 12.30, Roman Catholic Service. 12.45, Opera Arias. 1.0, News. 1.5, Dance Music. 1.15, Sound Film Music. 1.30 Orchestral Music. 1.45, Protestant Service. 2.0, News; Amusement Guide. 6.0, News. 6.15, Opera

SEPT. 9th **SUNDAY** continued

Music: Aria from Romeo and Juliet (Gounod); Duet from Manon (Massenet); Arias from La Bohème (Puccini) and Sappho (Massenet). 6.30, Military Music. 6.45, Sound Film Music. 7.0, Accordion Solos. 7.15, Chansonnettes. 7.30, News. 7.45, Concert by an Argentine Band. 8.15, Operetta Music: Selection from Countess Maritza (Kálmán); Strauss Operetta Potpourri. 8.30, Songs. 9.0, Concert Version of Hérodiade—Opera (Massenet). 10.0, Orchestral Music. 10.15, News. 10.30, Operetta Arias; Arias from Le renard chez les poules (Tiarco); White Horse Inn (Stolz-Benatzky); Un soir de réveil (Moretti); Enlevez-moi (Gabaroché); Les aventures du roi Pausole (Honegger), and La péricole (Offenbach). 11.0, Soloist Programme. 11.15, Light Music. 11.30, Sound Film Music. 11.50, Hawaiian Guitar Music. 12.0, Midnight, News. 12.5 a.m. (Monday), Au caveau de minuit—a Radio Fantasy. 12.15, Orchestral Music. 12.30 (approx.), Close Down.

TRONDHEIM.—Relays Oslo. TURIN.—Relays Milan.

VIENNA

592 kc/s, 506.8 metres; 120 kW.—Relayed by Graz, 886 kc/s metres; Innsbruck, 519 kc/s, 578 metres; Klagenfurt, Linz and Salzburg, 1,294 kc/s, 231.8 metres.—8.15 a.m., Hymn; Time; Weather. 8.20, Gym. 8.40, Hints for the Week. 8.55, Service. 10.5, Reading: Camille Maucclair. 10.25, Report of the Unveiling of the Austrian Heroes' Monument from the Heidenplatz. 11.45, Concert by the Vienna Symphony Orchestra; Conductor, Nilius; Soloist, Sturzenegger ('Cello): 'Cello Concerto in D (Haydn); Extracts from Notre Dame (Schmidt); 'Cello Concerto in B minor, Op. 104 (Dvorák). 12.55 p.m., Concert by the Vienna Symphony Orchestra; Conductor, Schönherr: March (Killer); Overture, The Nürnberg Doll (Adam); Waltz, Die Lebenswecker (Joh. Strauss); Scènes pittoresques (Massenet); Two Pieces (Klose); (a) Regen, (b) Die Jagd. Waltz (Eysler); Three Pieces (Dolph-Heckel): (a) Pizzikato polka, (b) Gallop, (c) Hungarian March. 3.0, Announcements. 3.10, Talk for Farmers. 3.30, Book Review. 3.55, String Quartet in F, Op. 77, No. 2 (Haydn), by the Mihatsch Quartet. 4.30, Report of the Austrian Boy Scouts' Camp Festival from the Schwarzenberg

Park. 5.30, Wind Instrument Concert. 6.0, Talk: South America. 6.20, Talk: Freistadt. 6.45, Alois Ulrich Reads. 7.15, Announcements. 7.30, German and English Songs on Two Pianofortes—Doddy Delisson and Peter Igelhoff Sing and Play. 8.0, Motto. 8.5, Lieder and Arias by Zdenka Zika (Soprano); Arias from L'enfant prodige (Debussy); La Jive (Haley); Mondnacht (Schumann); Ueber Nacht (Wolf); Hat dich die Liebe berührt (Marx); Arias from The Bartered Bride (Smetana); Armida (Dvorák). 8.40, Report of the Finals of the Mitropa Football Cup in Bologna. 8.45, Strauss and Lanner Concert by the Vienna Symphony Orchestra; Conductor, Holzer. 10.0, Announcements. 10.20, Dance Music by the Frank Fox Jazz Band. 12 Midnight, See Budapest.

WARSAW

223 kc/s, 1,345 metres; 120 kW.—9.0 a.m., Hymn. 9.3, Records. 9.13, Gym. 9.23, Records. 9.30, News. 9.40, Records. 9.50, Hints for Housewives. 9.55, Announcements. 10.5, Records. 10.30, Divine Service for the Closing of the Eucharistic Congress from Chelm. 12.30 p.m., Weather. 12.35, Theatre Review. 12.45, Records: Selection from L'Arlesienne (Bizet). 1.0, Talk: Iceland. 1.15, Concert by the Symphony Orchestra; Conductor, Oziminski; Soloist, Rose Bezendorff (Pianoforte); Leonora Overture (Beethoven); Pianoforte Concerto in E flat (Mozart). 2.0, Records: Light Music. 3.0, Talk for Farmers from Lwów, 795 kc/s, 377.4 metres. 3.15, Records. 3.25, Market Prices. 3.35, Choral Records. 3.45, Talk: Fruit-growing. 4.0, Readings. 4.20, Recital of Polish Songs by Hennert (Soprano). 4.45, Programme for Children, relayed from Cracow, 986 kc/s, 304.3 metres. 5.0, Dance Music. 5.50, Book and Science Review. 6.0, Dramatic Programme. 6.45, Talk. 7.0, Concert of Light Music by the Station Orchestra; Conductor, Nawrot; Soloist, Olga Kamienska (Songs): Overture, Wiener Frauen (Lehár); Songs; Waltz (Strauss); Un soir de fête à la Havane (Filippucci); Songs; Russian Dance (Bullerian); March (von Blon). 7.45, Announcements. 7.50, Reading. 8.0, Concert by the Station Symphony Orchestra; Conductor, Oziminski; Soloist, Wilkomirski ('Cello): Overture, Iphigenia in Aulis (Gluck-Wagner); 'Cello Concerto in B flat (Bocherini); Three Spanish Dances (Moszkowsky); March from Aida (Verdi). 8.45, News. 8.55, Talk. 9.0, Variety Programme from Lwów, 795 kc/s, 377.4 metres. 9.45, Sports Notes. 10.0, Letter Box. 10.15, Light Music. 10.30, Dance Music from the Gastronomja Café. In the interval, Weather.

ZURICH.—Relays Beromünster.



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AIRCRAFT ENGINEER
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MONDAY

SEPTEMBER THE TENTH

ATHLONE

565 kc/s, 531 metres; 60 kW. Relayed by Dublin, 1,348 kc/s, 222.6 metres; and Cork, 1,240 kc/s, 241.9 metres.—1.30 to 2.30 p.m., Time; Weather; Exchange; Records. 6.0, Programme for Children. 6.45, News. 7.0, Irish Lesson. 7.15, Val Vouden (Entertainer). 7.30, Time. 7.31, Concert by the Station Orchestra. 8.0, John Lynskey (Baritone). 8.15, Joy—Play (Winifred Letts), presented by The Studio Players. 8.30, Concert by the Station Orchestra. 9.0, Mme. A. Heffernan (Soprano). 9.15, Talk by Lord French; Munchukuo. 9.30, F. O'Higgins (Tradition Fiddle). 9.45, Sean Dempsey (Pipes) 10.0, Variety Programme. 10.30, Time; News; Weather. 10.40, Talk by J. Hanly: National Culture. 10.50, Records. 11.0 (approx.), Close Down.

BARCELONA

795 kc/s, 377.4 metres; 5 kW.—12 Noon, Chimes; Weather. 1.0 p.m., Programme for Women. 2.0, Records. 2.30, Theatre Notes; Amusement Guide; Records. 3.0, Film Review; Sextet Concert: Selection, La-Haut (Yvain); Japanese Dance (Holmes); Prelude (Torroba); Piece (Wilson); Zorzico (Albéniz); Selection from El barberillo de Lavapiés (Barbieri). 4.0, Programme for Hospitals. 5.0, Interval. 7.0, Violin and Piano-forte Recital by Julio Jarque and Rosaura Coma: Sicilienne (Bach); Caprice (Rossi); Romance (Honegger); Gavotte (Popy); Serenade (Drda); Czardas (Hubay). In the interval, at 7.30, News. 8.0, Request Records. 8.20, Sports Notes. 8.30, Exchange. 9.10, Aviation Notes. 9.20, Records. 9.45, Press Review. 10.0, Chimes; Weather. 10.5, Announcements. 10.10, Humorous Weekly Review. 10.20, Sardanas, by the Cobia Barcelona. 11.0, Concert by the Station Orchestra: Overture, The Merry Wives of Windsor (Nicolaï); Overture, Light Cavalry (Suppé); Overture, El Guarany (Gomez). 11.30, Topical Talk. 12 Midnight, Dance Music, relayed from the Shanghai Bar. 1.0 a.m. (Tuesday), News; Close Down.

BASLE.—Relays Beromünster.

BERLIN

DEUTSCHLANDSENDER, 191 kc/s, 1,571 metres; 60 kW.—5.45 a.m., Weather. 5.50, News. 6.0, Gym. 6.15, Motto. 6.20, See Hamburg. In the interval at 7.0, News. 8.0, Interval. 8.45, Gym. 9.0, Interval. 9.40, Talk: First Aid. 10.0, News. 10.10, Peter Nosegger, an Austrian Poet-Sequence. 10.50, Sports for Schools. 11.15 to 11.30, Weather. 11.55, Weather. 12 Noon, See Breslau. 12.55 p.m., Water Level. 1.0, Records. 1.45, News. 2.0, Interval. 2.45, Greetings; Announcements. 3.0, Weather; Exchange. 3.15, Health Talk. 3.40, Talk: Herballists. 4.0, See Stuttgart. 5.30, Book Review. 5.45, Discussion on Sports. 6.0, See Munich. 7.0, See Breslau. 8.0, Motto: Weather; Announcements. 8.15, Variety Programme. 9.0, Die Opernprobe—Comic Opera in One Act (Lortzing). The Station Orchestra, Choirs and Soloists. Conductor, Görner. 10.0, News; Sports Notes. 10.30, Talk: The World Cycling Championship. 10.45, Weather. 11.0, Records. 12 Midnight, Close Down.

BERLIN

FUNKSTUNDE, 841 kc/s, 356.7 metres; 100 kW.—6.0 a.m., Gym. 6.15, Weather; Prayer. 6.20, See Hamburg. In the interval at 7.0, News. 8.0 to 8.20, Gym. 8.30, Records; Announcements. 9.45, Cookery Hints. 10.0, News. 10.10 to 10.25, Market Prices. 11.25 to 11.30, Exchange. 12 Noon, Announcements. 12.25, Concert from Hamburg. In the interval, Weather. 1.0 p.m., News. 1.15, Extracts from Berlin Opera Productions on Records. 2.0, News. 2.15, Records; Light Music. 3.0 to 3.20, Exchange. 4.10, See Königsberg. 5.50, Announcements. 6.0, See Munich. 7.0, Concert by the Station Orchestra. Conductor, Otto Frickhofer. Soloists, Carl Steiner and Franz von Szpanowski (Violins): Overture, Oberon (Weber); Romance in G for Violin and Orchestra, Op. 40 (Beethoven); Scherzo (Pfitzner); Violin Concerto in A Minor, No. 8 (Spohr); Academic Festival Overture, Op. 80 (Brahms). 8.0, News. 8.15, Symphony No. 3 in D Flat (Büttner) by the Station Orchestra. Conductor, Frickhofer. 9.10, The Pastor of Cleversulzbach—Hörke Memorial Sequence (Eduard Reinacher). 10.0, Records: South German Folk Music. 10.20, News. 10.50, Encounters and Portraits—Topical Dialogues (Joachim Günther) by Hella Weiss and Georg Schnell. After the Programme, Beethoven, Schubert, Schumann and Reger Chamber Music by Rudolf Metz-macher ('Cello) and Karl-Heinz Taubert (Piano-forte). 12 Midnight, Close Down.

BERNE.—Relays Beromünster.

BEROMUNSTER

556 kc/s, 539.6 metres; 60 kW.—6.0 to 6.15 a.m., Gym. 12.29 p.m., Time from Neuchâtel Observatory. 12.30, News in French and German. 12.45 to 2.0, See Sottens. 3.59, Time from Neuchâtel Observatory. 4.0, Concert by the Radio Quartet: Soloist, Hans Ackermann (Saxophone). 5.0, Recital of Haydn Music by Josef Hunstiger (Baritone) and Erny Lamadin (Piano-forte). 6.0, Pro-

gramme for Children. 6.30, Records. 7.0, Time; Weather. 7.2, Talk: Language and Music. 7.30, See Sottens. 10.15 (approx.), Close Down.

BODEN.—Relays Stockholm. BODO.—Relays Oslo.

BRATISLAVA

1,004 kc/s, 298.3 metres; 13.5 kW.—6.0 to 7.15 a.m., See Prague. 9.45, Announcements. 9.50, See Prague. 10.10, News in Hungarian. 10.15, Broadcast for Schools. 10.40, Records. 11.0, Water Level. 11.5, See Moravská-Ostrava. 12 Noon, See Prague. 12.5 p.m., Talk and Market Prices for Farmers. 12.10, News in Slovak. 12.15, Record. 12.20, See Prague. 12.30, Concert by the Station Orchestra; Conductor, Schimpl: Introduction and Song from Cavalleria rusticana (Mascagni); Selection from La Bohème (Puccini); Oriental Dance (Procházka); Waltz (Fucik); Scandinavian Suite (Juel-Fredrik-ken); Dance (Tichy); March (Mozes). 1.30, See Prague. 1.40, News and Weather in German and Hungarian. 1.50, See Prague. 2.0 to 2.5, Market Prices. 3.15, See Moravská-Ostrava. 4.15 to 4.20, See Prague. 5.40, See Prague. 5.50, Talk. 6.5, Record. 6.10, Hints for Housewives. 6.15, Hungarian Transmission: Reading; Piano-forte Recital by Reisz. 6.55, See Prague. 7.10, Variety Programme. 8.0, Political Talk: Russia and the Carpathians. 8.15, Piano-forte Recital by Sylvia and Rudolf Macudzinska. 8.45, Sketch (Zavcenko). 9.0, Song Recital by Lily Kolosova: Two Songs from Don Giovanni (Mozart); Two Arias from Der Freischütz (Weber). 9.25, See Prague. 10.45, News in Hungarian. 11.0 (approx.), Close Down.

BREMEN.—Relays Hamburg.

BRNO

922 kc/s, 325.4 metres; 32 kW.—6.0 a.m. to 7.15, See Prague. 9.50, See Prague. 11.0, See Moravská-Ostrava. 12 Noon, See Prague. 12.30 p.m., See Bratislava. 1.30, Labour Market Report. 1.40, See Prague. 2.0 to 2.5, Report for Farmers. 3.15, See Moravská-Ostrava. 4.15 to 4.20, See Prague. 5.40, See Prague. 5.50 to 6.25, German Transmission. 5.50, Talk: The South Pole. 6.10, Talk. 6.25, Notes for Housewives. 6.30, Records. 6.45, Talk for Workers. 6.55, See Prague. 7.10, Concert of Popular Music. 7.55, See Prague. 8.55, Flute Recital by O. Slavicek. 9.10, Talk: Children and Music. 9.25 to 11.0, See Prague. 11.0 (approx.), Close Down.

BRUSSELS (No. 1)

620 kc/s, 483.9 metres; 15 kW.—11.55 a.m., Weather. 12 Noon, Records. 1.0 p.m., News. 1.10, Orchestral Concert: Overture, Isabella (Suppé); Waltz (Paradis); La Ronde des Taxes (Closet); Selection from La Périochole (Offenbach); Arias from Carmen (Bizet) and Samson et Délila (Saint Saëns); Waltz Potpourri (Robrecht). 2.0, Interval. 4.55, Announcements. 5.0, Records. 6.0, Talk: Books for Children. 6.15, Orchestral Concert; Soloist, Mme. Nohat (Songs): Egyptian March (Strauss); Overture, La Vie joyeuse (Hirschman); Waltz from Die geschiedene Frau (Fall); Selection from Lakmé (Delibes); Songs: (a)

(Benoit); Fantasia on Old Flemish Songs (Van Nieuwenhove); A la marcia (Gillon); Fête populaire (de Bourguignon). 10.0, News. 10.10, Dance Records. 11.0 (approx.), Close Down.

BUCHAREST

823 kc/s, 364.5 metres; 12 kW.—12 Noon, Water Level; Records. 1.15 p.m., Time; Weather; News. 1.40, Records. 5.0, Concert by the Station Orchestra: Overture, Iphigénie en Aulide (Gluck); Waltz Intermezzo (Siede); Venetian Suite (Travaglia); Selection from La juive (Halévy). 6.0, Time; Weather; News. 6.20, Concert by the Station Orchestra: Tchaikovsky Potpourri (Urbach); Andante (Clemus); Berceuse (Friml); Spanish Serenade (Eilenberg); Ein Schilfenfahrt (Jessel). 7.0, Educational Programme. 7.15, Records. 7.45, Talk. 8.0, Chamber Music by the Theodorescu Quartet. 8.30, Talk. 8.45, Song Recital by Mile. Emilie Gutziannu. 9.15, Recital of Romanian Music by Silvestri. 9.45, News. 10.15, Light Music from a Restaurant.

BUDAPEST

546 kc/s, 549.5 metres; 120 kW.—6.45 a.m., Gym. 9.45, News. 10.0, Talk. 10.40, Talk. 11.10, Water-Level. 12 Noon, Chimes from the University Chapel. 12.5 p.m., Concert by the Nyári Cigány Orchestra. 1.30, Concert. 2.40, Cookery Hints. 4.0, Programme for Students. 5.0, Hints for Women. 5.35, Orchestral Concert from Margaret Island. 6.40, Talk. 7.10, Records. 8.10, Talk. 8.40, Concert by the Lakatos Cigány Orchestra. 10.0, Concert by the Opera House Orchestra. Conductor: Rajter. Soloist: Lili Herz (Piano-forte). Overture, The Magic Flute (Mozart); Piano-forte Concerto in C minor (Beethoven); Symphony in G (Haydn). 11.15, Dance Music by the Len Baker Jazz Band.

CASSEL.—Relays Frankfurt.

COLOGNE

658 kc/s, 455.9 metres; 60 kW.—5.30 a.m., Greetings; Records. 6.5, Gym. 6.25, Concert by the Duisburg Orchestra, relayed from Solbad Raffelberg. In the interval at 6.50, Greetings; Time; News. 8.0, Time; Weather. 8.5, Gym. 8.20 to 8.30, Cookery Notes. 10.0, Time; News. 10.10, Recital by Hans Remagen (Baritone) and Willi Krewinkel (Piano-forte). 10.30, Two Topical Talks. 11.30, Post Office Propaganda; Records. 12 Noon, Sound Film Records. 12.45 p.m., News; Greetings. 1.0, Concert by the Small Station Orchestra. In the interval at 1.45, News. 3.5, Talk for Gardeners. 3.15, Talk: Workers' Training. 3.30, Exchange. 3.50, Topical Talk. 4.0, Concert by the Station Orchestra; Conductor, Otto Kühn: Prelude to Der Rubin (d'Albert); Pictures from the South (Nicodé); Liebeshied (Kämpf); Wanderlied (Kämpf); Zeller Waltz Potpourri (Tiele); Polonaise (Liadow). 5.0, Reading. 5.15, Sonata in B minor, Op. 58 (Chopin), by Alfred Cortot (on Records). 5.40, Talk: The New German Culture. 6.0, See Munich. 7.0, Folk Music: The Six Merry Singers and a Village Band; Soloists, Friedrich Engels (Tenor) and Rolf Hartmann (Piano-forte). 8.0, News. 8.15, Concert by the Station Chamber Orchestra. 10.0, Time; News. 10.30, Concert by the Erich Herse Orchestra, relayed from the Café Europa, Bielefeld. 12 Midnight, Close Down.

COPENHAGEN.—Relays Kalundborg. CORK.—Relays Athlone. DANZIG.—Relays Königsberg. DRESDEN.—Relays Leipzig.

FECAMP

1,456 kc/s, 206 metres; 10 kW.—11.30 a.m., to 12 Noon, Programme in English by the International Broadcasting Company of London. 11.30, Orchestral Music. 12 Noon to 4.30 p.m., Programme in French. 4.30 to 6.0, Programme in English by the I.B.C. 4.30, Dance Music. 5.0, Chichester, Bognor, Hastings and Eastbourne Concert: Ghosts and Witches in Music. 5.30, Southend Concert: Military Band Music. 6.0 to 11.0, Programme in French. 11.0 to 1.0 a.m. (Tuesday), Programme in English by the I.B.C. 11.0, Talkie Time: Tunes from the Talkies and Shows. 11.30, In the Club this Week. 12 Midnight, Club Concert for Blackpool Listeners: Dance Music. 12.30 a.m., I.B.C. Time Signal. 12.31, Dance Music. 1.0, I.B.C. Goodnight Melody and Close Down.

FLENSBURG.—Relays Hamburg. FLOR- ENCE.—Relays Milan.

FRANKFURT

1,195 kc/s, 251 metres; 17 kW.—5.45 a.m., Hymn; Time; Weather. 5.50, Gym. 6.40, Time; Announcements. 6.55, Orchestral Concert. 8.10, Announcements. 8.15 to 8.35, Gym. 10.0, News. 11.0, Announcements; Records. 11.30, Announcements; Exchange; Weather. 11.45, Social Notes. 12 Noon, See Breslau. 1.0 p.m., Time; News. 1.20, See Stuttgart. 1.50, Time; News. 2.0, See Stuttgart. 2.30, Industrial Review. 2.45, Time; Exchange; Weather. 3.15, Fritz Michel reads from his own works. 3.25, Book Review. 3.35, Talk: Housework as Physical Exercise. 4.0, See Stuttgart. 5.30, Talk: The Germanic Races in the Writings of Tacitus. 5.45, Sound Film Recital by Ripperger (Tenor) and Kullmann (Piano-forte). 6.0, See Munich. 7.0, Records. 7.30, Local Review. 7.45, Social Report. 8.0, Time;



Grete Molinaar and Walter Holten, two of the most popular radio stars of southern Germany, who are often before the microphone at the Munich studio.

BRESLAU

950 kc/s, 315.8 metres; 60 kW. Relayed by Gleiwitz, 1,231 kc/s, 243.7 metres.—5.0 a.m., Hymn; Motto. 5.10, Records. In the interval, Time; Weather. 6.0, Time; Weather; Gym. 6.25, See Cologne. In the interval at 7.0, Time; News. 8.0, Cookery Hints. 8.10, Records: Hitler Suite (Hanfstaengl). 8.40, Gym. 9.0, Time; News. 10.10 to 10.40, War Play for Schools. 11.30, Time; News. 12 Noon, Concert by the Silesian Symphony Orchestra. Conductor, Mundry. 1.30 p.m., Time; News. 1.45, Concert of Light Music by the Silesian Symphony Orchestra. Conductor, Mundry. March (Siede); Overture, The Barber of Seville (Rossini); March Potpourri (Eggert); Waltz, Mon rêve (Waldteufel). 2.20, Exchange. 2.25, Records; Announcements. 2.50, Market Prices. 3.10 (from Gleiwitz), The Silesian Peasant at Home—Sequence. 4.0, See Stuttgart. 5.30, Weather; Market Prices. 5.35, Readings (Alwin Dressler). 6.0, See Munich. 7.0, Fairy Tales—Concert by the Station Orchestra. Conductor, Topitz. Overture, Rubezahl (Weber); Ballet, The Sleeping Beauty (Tchaikovsky); Selection from Peterchens Mondfahrt (Schmalstich); Selection from Hanneles Himmelfahrt (Graener); Waltz from Hansel and Gretel (Humperdinck); March of the Dwarfs (Grieg). 8.0, News. 8.10, In Praise of Wine—Talk with Records.

Chanson des Rêves (Botrel), (b) Marinette (Dalcroze), (c) Les Vieilles de chez nous (Levadé), (d) Aria from Figaro (Mozart); Vison d'Orient (Florendas), Terpsichore (Ganne). 7.15, Records. 7.30, Theatre Review; Film Review. 8.0, Etudes pittoresques; Cerdana (de Séverac); Gabrielle Tambusier (Piano-forte). 8.30, Records. 8.45, Concert from the Casino, Vichy. After the Concert, News.

BRUSSELS (No. 2)

932 kc/s, 321.9 metres; 15 kW. Programme in Flemish.—11.57 a.m., Weather. 12 Noon, Orchestral Concert of Modern Operetta Music. 1.0 p.m., News. 1.10, Records. 2.0, Interval. 4.55, Announcements. 5.0, Orchestral Concert: Overture, Véronique (Messager); Selection from Le Grand Mogol (Audran); Le Petit Faust (Hervé); and La belle Hélène (Offenbach). 5.45, Programme for Children. 6.30, Ravel Records; Le tombeau de Couperin; Spanish Rhapsody; Selection from Daphnis et Chloé. 7.15, Technical Talk. 7.30, Art Review. 8.0, Orchestral Concert: L'Isola disabitata (Haydn); The Jupiter Symphony (Mozart); Ballet Music from Prometheus (Beethoven); Danses villageoise (Grétry). 8.45, Gardening Talk. 9.0, Orchestral Concert; Soloist, Jef Alpaerts (Piano-forte); Feestklanken (Verheyden); Symphonic Poem for Piano-forte and Orchestra

News. 8.15, Programme to be announced. 9.0, Carl Loewe Ballad Recital, by Strienz (Bass) and Braun (Pianoforte). 9.45, Rhine and Main Bridges—Sequence. 10.20, Time; News. 10.35, See Stuttgart. 10.45, News. 11.0, Dance Music from Königsberg. 12 Midnight, See Stuttgart. 1.0 a.m. (Tuesday), Close Down.

FREDRIKSSTAD.—Relays Oslo. **FREIBURG.**—Relays Stuttgart. **GENEVA.**—Relays Sottens. **GENOA.**—Relays Milan. **GLEIWITZ.**—Relays Breslau. **GÖTEBORC.**—Relays Stockholm. **GRAZ.**—Relays Vienna. **HAMAR.**—Relays Oslo.

HAMBURG

904 kc/s, 331.9 metres; 100 kW. Relayed by Bremen, Flensburg, and Hanover, 1,330 kc/s, 225.6 metres.—5.45 a.m., Time; Weather; Report for Farmers. 6.0, Gym. 6.15, Time; Weather. 6.20 (from Bremen), Concert by the Fredo Niemann Wind Instrument Orchestra. In the interval at 7.0, Time; News; Talk. 8.0, Weather; Hints for Housewives. 8.10, Announcements; Records. 10.50, News. 11.0, Harvest Folk Songs. 11.30 (from Hanover), Concert by the Lower Saxony Symphony Orchestra, relayed from Hanover Castle. Conductor: Otto v. Sosen. In the interval at 12 Noon, Announcements; Talk for Farmers. 1.0 p.m., Exchange. 1.15, Weather. 1.20, Light Music. 2.15, News. 2.30, Ballet Records. 3.0, Exchange. 3.40, Shipping and Aviation Notes. 4.0, See Stuttgart. 5.30, Programme for Young People. 6.0, See Munich. 7.0, Weather. 7.5 (from Flensburg), Concert of Old Love Songs, by the Flensburg Chamber Choir. Conductor: Johannes Röder. Soloists: Gertrud Treunkrog (Harpisichord), Funk and Wiese (Violins), and Süder (Flute). Choir: (a) Herzlich tut mich erfreuen, (b) Mein Herz hat sich gesellet, (c) Es flog ein kleines Waldvögelin; Harpischord Solos: (a) The King's Hunting Jig (John Bull), (b) Song with Variations (Murschhäuser), (c) Die Fröhliche (Nichelmann), (d) Die Zärtliche (Nichelmann); Choir: (a) Jetzt gang i ans Brünnele, (b) Ich weiss mir ein Maidle, (c) O Hansel, dein Getreidein; Harpischord Solos: (a) Allegro (Kirnberger), (b) Two Pieces (Marpurg), (c) Rondo (P. E. Bach); Choir: (a) Ach Gott, wem soll ich klagen, (b) Rosestock, Holderblüh, (c) Feinsliebchen, du sollst mir nicht barfuß gehn, (d) Wenn ich ein Vögelin wär. 7.45, Programme to be announced. 8.0, News. 8.10, Matthias Kappel—Play (Elbertzhagen). 9.0, See Berlin (Deutschlandsender). 10.0, News. 10.20, Light Music. 11.0 (from Flensburg), Concert by the Flensburg Orchestra. Conductor: Johannes Röder. Overture, Idomeneo (Mozart); A Wedding Day on Trolldagen (Grieg); Ballet égyptien (Luigini); Polonaise from Norwegian Artists' Carnival (Svendsen); Waltz, Liebesträume (Ertl); Serenade (Lacombe); March (Blon). 12 Midnight, Close Down.

HANOVER.—Relays Hamburg.

HILVERSUM

160 kc/s, 1,875 metres; 7 kW. (until 3.40 p.m.). Transmitted on Kootwijk, 50 kW., from 3.40 p.m. Programme of the General Broadcasting Society (A.V.R.O.).—7.40 a.m., Time. 7.41, Records. 9.40, Time; Service. 9.55, Records: Sacred Music. 10.10, Recitation. 10.40, Organ and Cello Recital by Piet van Egmond, Jr., and Henk van Wezel. 11.40, Time. 11.41, Concert of Light Music by the Kovacs Lajos Orchestra. In the intervals, Records. 1.55 p.m., Records. 2.10, Recitation. 2.40, Records. 3.40, Interval. 3.55, Records. 4.10, Violin Recital by Tillama: Sonata in F, Op. 57 (Dvorák); Spring (Milhaud); Nocturne (Boullanger); Rondalla (Manén). 4.40, Concert of Light Music by the Select Chamber Orchestra. Conductor: Tak. 6.25, Pianoforte Recital by Anatole Kitain. 6.55, Records: French Music. 7.25, Talk: The Utrecht Industries Fair. 7.40, Time; News. 7.45, Concert by the A.V.R.O. Orchestra. Conductor: Gerharz. Soloist: Boris Lensky (Violin). 8.40, Talk with Records: French Opera. 9.25, Pianoforte Concerto in A minor, Op. 16 (Grieg); by Hans Schouwman and the A.V.R.O. Orchestra. 9.55, Records. 10.10, Concert by the A.V.R.O. Orchestra. Conductor: Gerharz. Dance Suite in Old Style (Gerharz); Spanish Dance, Andalus (Granados); Polish Dance (Scharwenka); Slav Dance No. 8 (Dvorák). 10.40, News. 10.50, Dance Music by the Ramblers from The Hague. 11.40 (approx.), Close Down.

HORBY.—Relays Stockholm.

HUIZEN

995 kc/s, 301.5 metres; 7 kW (until 6.40 p.m.); 20 kW from 6.40 p.m.—Programme of the Christian Radio Society (N.C.R.V.). 7.40, Bible Reading; Meditation. 7.55, Records. 9.10, Interval. 10.10, Religious Transmission. 10.40, Religious Reading. 11.10, Records. 11.40, Announcements. 11.55, Records. 12.10 p.m., Concert by a Children's Choir; Conductor, Wolff; in the interval, Records. 1.40, Programme for Schools. 2.15, Records. 2.25, Cookery Hints. 2.55, Records. 3.25, Interval. 3.40, Bible Reading; Sacred Songs. 4.40, Organ Recital by Visser: Introduction and Choral; Prelude, Fantasia; Toccata, Improvisation on Hymns; Jerusalem, from St. Paul (Mendelssohn); Sel stille den Herrn from Elijah (Mendelssohn); Postlude on Dank, dank nur allen Gott. 5.40, Records. 6.10, Letter Box. 6.40, Announcements. 6.55, Letter Box. 7.25, Relay of Addresses from the Maramatha Conference

SEPT. 10th **MONDAY** continued

at Zeist. 8.55, Concert by the Small N.C.R.V. Orchestra; Conductor, Hurk: Marche religieuse (Gluck); Air from the Concerto grosso No. 23 (Handel); Andante from the Sixth Symphony (Haydn); Romance (Schumann); Sérénade en forme de Canon (Henschel); Adagietto from the Fifth Symphony (Mahler); March (Glas); Overture, Neerlandia (Wesly); Intermezzo (Heykens); Potpourri (Geiger); Czardas (Monti); Selection from Czar and Carpenter (Lortzing); in the interval, at 9.40, News. 10.40, Records. 11.10, Close Down.

INNSBRUCK.—Relays Vienna.

KALUNDBORG

238 kc/s, 1,261 metres; 75 kW. Relayed by Copenhagen, 1,176 kc/s, 255.1 metres; and Skamlebaek, 49.5 metres.—7.0 a.m., Gym. 8.30, Divine Service from Copenhagen Cathedral. 9.0, Missionary Address from Nyborg. 10.0, Interval. 11.0, Weather. 11.10, Fish Prices. 12 Noon, Chimes; Weather. 12.2 p.m., Concert by the Beudix String Ensemble, relayed from the Wivex Restaurant. 2.0, Interval. 3.20, Talk for Housewives. 3.30, Concert by the Radio Orchestra; Conductor, Gröndahl; Soloist, Else Ammentorp (Songs): Overture (Kuhlaue); Six Dances (Mozart); Meditation from Thais (Massenet); Pieces (Schumann): (a) Schlummerlied, (b) Melody, (c) March; Waltz from Et Folkesang (Gade); Overture, The Maid of Orleans (Söderman); Songs (Franck): (a) Song, (b) Le vase brisé, (c) Le mariage des roses; Songs: (a) Les berceaux (Fauré), (b) Nuit d'étoiles (Debussy), (c) Mandoline (Debussy); Norwegian Rhapsody No. 2 (Svendsen); Suite, Scènes napolitaines (Massenet); Serbian Folk Music (arranged Nielsen); Polka (Lumbye); Serenade for Flute and French Horn (Titl); Entry March of the Boyards (Halvorsen). 5.30, Exchange; Fish Market Prices. 6.42, A Poem. 5.45, Talk. 6.15, Elementary English Lesson. 6.45, Weather; Announcements. 7.0, News. 7.15, Time. 7.30, Political Review. 8.0, Time. 8.1, Songs about Denmark. 8.15, Reading from Don Juan (Byron). 8.45, Recital by Gunder (Viola) and Jensen (Pianoforte): Sonata (Eccles); Sonata (Nardini). 9.5, The Ironing Club—Play (Nielsen). 9.55, News. 10.10, Concert of Operetta Music by the Radio Orchestra; Conductor, Resen: Overture, Ten Maids and No Man (Suppé); Selection from The Geisha (Jones); Waltz from Prince Conti (Leococ); Overture, Les Saltimbanques (Ganne); Selection from Die geschiedene Frau (Fall); March from Der liebe Augustin (Fall). 11.0, Dance Music by the Richard Johansen Band, relayed from the Lodberg Restaurant. In the interval at 12 Midnight, Chimes. 12.30 a.m. (Tuesday), Close Down.

KAUNAS

155 kc/s, 1,935 metres; 7 kW.—12 Noon, Time; News. 5.30, Concert. 6.0, Letter Box. 6.20, Talk. 6.40, News. 7.0, Time; News. 7.30, Concert. 8.50, Talk. 9.10, String Quartet in A minor (Schubert). 9.40, Programme to be announced. 10.5, Sports Notes. 10.10, Concert. 10.30 (approx.), Close Down.

KIEL.—Relays Hamburg. **KLACENFURT.**—Relays Vienna.

KONIGSBERG

1,031 kc/s, 291 metres; 60 kW. Relayed by Danzig, 1,303 kc/s, 230.2 metres.—5.0 a.m., Records. 5.50, Weather. 6.0, Gym. 6.20, See Hamburg; in the interval at 7.0, News. 8.0, Prayers. 8.30, Gym. for Women. 9.5, Talk: German Influence in Old and New Turkey. 10.10 (from Danzig), Folk Song Programme for Schools. 10.40, News. 11.30, See Hamburg. 1.15 p.m., Records; in the intervals, News. 2.30 (from Danzig), Exchange. 3.0, Market Prices. 3.10, Book Review. 3.20, Recital by Edmund Olzewski (Baritone); Liebes Mädchen, hör mir zu (Haydn); Seinsucht nach dem Frühling (Mozart); Das Blüchlein wunderhold (Beethoven); Songs (Schubert): (a) Heidenröslein, (b) Minnelied, (c) An die Laute. 3.45, Talk: Photography. 4.10, Concert by the Small Station Orchestra; Conductor, Wilcken; in the interval, Reading of Lyrics. 6.0, See Munich. 7.0, Concert by the Small Station Orchestra; Conductor, Wilcken. 7.50 (approx.), Talk in Dialect. 8.0, News. 8.10, Cabaret Records. 9.0, Ten German Songs (Zillinger); Cycle for Tenor, Mixed Choir and Pianoforte (Zillinger); The Station Choir and Soloists; Conductor, Firchow. 10.0, News. 10.30, Dance Music by the Börschel Band. 12 Midnight, Close Down.

KOSICE.—Relays Prague.

LAHTI

166 kc/s, 1,807 metres; 40 kW. Relayed by Helsinki, 895 kc/s, 335.2 metres.—7.5 to 7.20 a.m., Service in Swedish. 7.30 to 7.45, Service in Finnish. 11.0, Exchange. 11.5, Musical Programme. 11.30, Exchange. 11.45, News in Finnish and Swedish. 11.59, Time Signal; Weather. 4.0 p.m., Concert of Light Music; Conductor, Essen. 5.0, Talk. 5.25,

News. 5.40, Talk for Farmers. 5.50, News in Finnish. 5.59, Time Signal; Weather. 6.10, News in Swedish. 6.15, Concert by the Station Orchestra; Conductor, Linko: Overture, The Thieving Magpie (Rossini); Waltz (Strauss); Extracts from I promessi Sposi and Gioconda (Ponchielli). 7.0, Talk. 7.25, Violin Recital by Arjava: Sonata in E (Handel); Romance (Wagner-Wilhelm); Minuet No. 7, Op. 82 (Mozart); Scherzo No. 2, Op. 3 (Madetjoja). 7.50, Talk. 8.10, Concert by the Station Orchestra: Orchestral Suite (Bizet); Ballet Music from Coppelia (Delibes); Piece (Rubinstein). 8.45, News in Finnish. 9.0, News in Swedish.

LAUSANNE.—Relays Sottens.

LEIPZIG

785 kc/s, 382.2 metres; 120 kW. Relayed by Dresden, 1,285 kc/s, 233.5 metres.—5.50 a.m., Report for Farmers. 6.0, Gym. 6.25, See Cologne. In the interval at 7.0, News. 8.0, Gym. 8.20, Records. 9.0, Interval. 9.40, Exchange. 9.45, Announcements; Weather. 10.10 to 10.40, English for Schools: Up the Thames. 11.0, Records; Announcements. 11.30, News; Time. 11.40, Weather. 11.45, Notes for Farmers. 12 Noon, Announcements. 12.25 p.m., Concert from Hamburg. 1.0, News; Exchange. 1.10, Opera Records. 2.0, News. 2.15 (approx.), Records. 2.45, Art Review. 3.0, Talk: Amateur Photography. 3.20, Brandenburg Fairy Tales. 3.40, Exchange. 4.0, See Cologne. 5.0, Talk: Prehistoric Altars. 5.20, Songs of Munich Composers by Hans-Heinz Hamer (Baritone). Three Songs (Schmid): (a) Grab-schrift, (b) Ich wandre, (c) Unter blühenden Bäumen; Three Songs (Reuss): (a) Im Nachen, (b) Schlaflos, (c) Ein Lied Chasterlards; Three Songs (Jos. Haas): (a) Graue Tage, (b) Regenwetterlied, (c) Ich möchte still; Three Songs (Bartels): (a) Die Stadt, (b) Birken, (c) Schatten. 5.50, Exchange; Weather; Time. 6.0, See Munich. 7.0, Light Music by the Station Orchestra. 7.35, Close of the Leipzig Fair. 8.0, News. 8.15, Concert by the Station Orchestra. Conductor: Weber. Overture, Des Teufels Lustschloss (Schubert); Six German Dances (Haydn); Ballet Music from Undine (Lortzing); Selection from Il Trovatore (Verdi). 9.0, The Leipzig Fair in the Eighteenth Century—Sequence from Old Chronicles. 10.20, News. 10.50, Chamber Symphony in B flat, Op. 27, for String Quartet, Oboe, Clarinet, Bassoon, Horn and Pianoforte (Juon). 11.35, Music of the Nations on Records. 12.30 a.m. (Tuesday), Close Down.

LINZ.—Relays Vienna.

LUXEMBOURG

230 kc/s, 1,304 metres; 120 kW.—7.45 a.m., Records. 8.0, News in French; Record; News in German; Record. 12 Noon, Concert by the Station Orchestra. Conductor, Pensis: Overture, Martha (Flotow); Crépiscule d'Été (Maeght); Selection from I Pagliacci (Leoncavallo); Piece (Rasse); Melody (Czibulka). 12.30 p.m., News in French and German. 12.40, Concert (contd.): Suite from Sleeping Beauty (Tchaikovsky); Aria (Rimsky-Korsakov). 1.0, Exchange. 1.5, Concert (contd.): Selection from The Desert Song (Romberg). 1.15, Records. 1.30, Exchange. 1.35, Records. 2.0, Exchange. 3.45, Exchange. 6.30 till Close Down, Polish Evening. 6.30, Variety Programme. 7.30, Racing Results. 7.35, Records of Polish Music. 8.0, News in French and German. 8.20, Concert of Polish Music by the Station Orchestra. Conductor, Pensis. Selection from Halka (Moniuszko); Melody and Minuet (Paderewsky); Gavotte caprice (Bortkiewicz); Chopin Potpourri (Fétras). In the interval at 8.35, Exchange. 9.10, Records of Polish Music. 9.30, Symphony Concert by the Station Orchestra. Conductor, Pensis. Soloist, Blochmann (Pianoforte). Pianoforte Concerto (Beethoven); Piece (Noskowski). 10.20, Dance Records.

MADRID

10,000 kc/s, 30 metres; 20 kW.—11.15 p.m., News. 11.30, Spanish Music; News. 12 Midnight, Catalan Programme. 1.0 a.m. (approx.) (Tuesday), Close Down.

MADRID

EAJ7, 1,095 kc/s, 274 metres; 7 kW.—2.0 p.m., Chimes; Time; Weather; Announcements; Light Music; Talk. 2.30, Sextet Concert; Overture, Iphigenia in Aulis (Gluck-Wagner); Minuet (Mozart); Selection from Manon (Massenet). 3.0, Amusement Guide; Exchange; Light Music. 3.30, Sextet Concert; Barcarolle from The Tales of Hoffmann (Offenbach); Aria from Boris Godunov (Mussorgsky); Canzonetta (Mendelssohn) Caprice viennois (Kreisler); Entre flores (Pacheco). 4.0, Light Music. 4.30, Sextet Concert. 5.0, Interval. 6.0, Chimes; Light Music. 7.0, Announcements; Choral Concert. 7.30, Exchange; Orchestral Concert. 8.0 (approx.), Song Recital. 8.30, News; Sextet Concert. 9.15, Sports Report; Bullfighting Notes; Sextet Concert (contd.). 10.0, Chimes; Time; The Valkyrie—Opera (Wagner), on Records. In the interval at 11.0, News. 12.45 a.m. (Tuesday), News. 1.0 a.m., Chimes; Close Down.

MALMO.—Relays Stockholm.

MILAN

814 kc/s, 368.6 metres; 50 kW. Relayed by Turin, 1,140 kc/s, 263.2 metres; Genoa, 986 kc/s, 304.3 metres; and Florence, 610 kc/s, 491.8 metres.—7.30 a.m., Gym. 7.45, Time; News. 8.0, Interval. 11.30, Records of Popular Music. 12.30 p.m., Records. 12.45, News. 1.0, Time; News. 1.5, Concert by the Chesi-Zanardelli-Cassone Trio. 1.30, Records; Exchange. 1.45, Concert (contd.). 2.15 to 2.25, Exchange. 4.35, News. 4.45, Programme for Children. 5.10, Dance Music. 5.55, Weather. 6.0 to 6.10, Notes for Farmers. 7.0, Announcements. 7.15, News in Foreign Languages. 8.0, Time; News; Weather; Records. 8.30, Government Notes. 8.45, Request Music. 9.45, Talk. 10.0, Mozart and Schumann Quartets. 11.0, News.

MONTE CENERI

1,167 kc/s, 257.1 metres; 15 kW.—12 Noon, Records. 12.29 p.m., Time; Weather. 12.33, Records of Folk Dances. 12.56, News. 1.5, Jazz Records. 1.15, Cookery Hints. 1.30, Interval. 3.59, Time Signal. 4.0 to 6.0, See Berömunster. 6.0, Interval. 7.45, News. 8.0, See Sottens. 9.15, Reading. 9.30, See Sottens. 10.15 (approx.), Close Down.

MORAVSKA-OSTRAVA

1,158 kc/s, 259.1 metres; 11.2 kW.—5.0 a.m., See Prague. 7.15, Interval. 9.50, See Prague. 11.0, Record. 11.5, Military Band Concert. 12 Noon, See Prague. 12.30 p.m., See Bratislava. 1.30, See Prague. 2.0, Interval. 3.15, Concert by the Station Orchestra; Conductor, Divis. 4.15 to 4.20, See Prague. 5.40, See Prague. 5.50, Talk. 6.0, News. 6.5, Talk: The Land of the Fjords. 6.20, German Transmission: Talk for Workers; Chess Lesson; Records. 6.55, See Prague. 8.55, Records. 9.10, Reading. 9.25, See Prague. 10.45, Records. 11.0 (approx.), Close Down.

MOSCOW (No. 1)

174 kc/s, 1,724 metres; 500 kW.—5.0 a.m., News. 5.15, Fanfare. 5.45, Gym. 6.15, Musical Programme. 8.15, Programme for Children. 9.0, Musical Programme. 10.15, Military Band Concert. 11.15, Technical Talk for Farm Workers. 3.0, Programme Announcements. 3.15, Programme for Children. 3.58, Time. 4.0, News. 4.30, Communist Party Programme. 5.30, Red Army Programme. 6.30, Talks; Vocal Ensemble Concert; Records. 8.0, Tchekhov Programme. 9.0, Talk in German: Hefedity and Development. 9.55, Chimes. 10.5, Literary Programme and Letterbox in English. 11.5, Talk in Hungarian: Five-Year Plan Economics.

MOTALA.—Relays Stockholm. **MUHLACKER.**—See Stuttgart.

MUNICH

740 kc/s, 405.4 metres; 100 kW. Relayed by Augsburg and Nürnberg, 1,267 kc/s, 236.8 metres; and Kaiserslautern, 1,195 kc/s, 251 metres.—6.30 a.m., Gym. 6.45, Motto; Records. 7.15, Time; News. 7.25, Quartet Concert. 9.50, Gym. for Women. 10.10, Fairy Play for Schools, with Music by Franz Fuchs. 11.5, Market Prices. 11.15, Time; News. 11.30, Notes for Farmers. 12 Noon, Records. 1.15 p.m., Time; News. 1.25, Concert by the Small Station Orchestra; Conductor, Kloss. 2.0, News. 2.20, Gardening Talk. 2.50, Programme for Children. 3.10, Guitar Music by Fritz Engel: Prelude and Sarabande (Bach); Variations on a Mozart Theme (Sor); Etude brillante (Engel); Spanish Serenade (Thomé). 3.30 (from Nürnberg), Reading. 3.50, Announcements. 4.0, Concert by the Small Station Orchestra; Conductor, Kloss; Soloist, Machoi (Xylophone); Overture, The Princess in the Golden Slippers (Rust); Intermezzo and Waltz (Friedl); Selection from Lucia di Lammermoor (Donizetti); Waltz, Nordsee-Bilder (Joh. Strauss); Romantic Suite (Lüling); Xylophone Solos: (a) Sternengefunkel (Bode), (b) Kunstreitergaloop (Ortel). 5.20, Talk: Animal Language. 5.40, Sonata in G (Mozart), by Gertrud-Ilse Tilsen (Violin) and Richard Staab (Pianoforte). 6.0 (from Nürnberg), Close of the National Socialist Party Congress; Address by Herr Hitler. 7.0, Folk Music by a Zither and Mandoline Orchestra. 8.0, News. 8.15, Concert by the Station Orchestra; Conductor, Hans Winter; Soloists, Elisabeth Hallstein (Coloratura-Soprano), Maria Kieff (Soprano), Karl Ficknitz (Baritone), Willy Schluffauth (Violin), Josef Köhler ('Cello Piccolo) and Richard Staab (Pianoforte); Overture, Euryanthe (Weber); Aria for Soprano and Orchestra, Ach was verbrach ich (Mozart); Konzertstück in F minor for Pianoforte and Orchestra (Weber); Ballet Music (Gluck) from Iphigenia in Aulis, Orpheus and Arimide; Two Duets for Soprano and Baritone (Mozart) from: (a) Figaro, (b) The Magic Flute; Adagio for 'Cello, Piccolo and Orchestra (Boccherini); Adele's Aria from Le billet de loterie (Isouard); Gipsy Air for Violin and Orchestra (Sarasate); Fantasia on Two Russian Folk Melodies, Kamarinskaja (Glinka); Overture, Rienzi (Wagner). 10.0, Time; News. 10.20, Programme to be announced. 11.0 (from Nürnberg), Chamber Music by the Franken Quartet: String Quartet in B flat (Beethoven); String Quartet in F (Dvorák). 12 Midnight, Close Down.

NAPLES.—Relays Rome. **NOTODDEN.**—Relays Oslo.

SEPT. 10th **MONDAY** continued

OSLO

260 kc/s, 1,154 metres; 60 kW. Relayed by Hamar, 519 kc/s, 578 metres, and Jeløy, 6,990 kc/s, 42.92 metres.—11.15 a.m., Service. 11.50, Exchange. 12.55 p.m., Time. 1.0 to 2.0, Records. In the intervals at 1.15, Weather; Report for Farmers; and at 1.45, Exchange. 5.30, Concert relayed from Stavanger, 1,276 kc/s, 235.1 metres. 6.30, Reading. 7.0, Book Review. 7.15, News. 7.30, Time. 7.31, Soprano Song Recital by Mme. Eugenia Triguez. 8.0, Talk. 8.30, Song and Oboe Recital by Arne Haugen (Baritone) and Kees Lahnstein. 9.10, Talk: Foreign Politics. 9.40, Weather. 9.45, News. 10.0, Topical Talk. 10.15, Concert relayed from Bergen, 850 kc/s, 352.9 metres.

OSTERSUND.—Relays Stockholm.

PALERMO

565 kc/s, 531 metres; 4 kW.—12.45 p.m., News. 1.0 to 2.0, Concert. In the interval at 1.30, Time; News. 5.30, Records. 6.0 to 6.30, Ballila Programme. 8.0, Announcements; News. 8.20, Records. 8.30, Time; Records. 8.45, Chamber Music by Giuseppe Caminiti ('Cello), Gabriella Scala (Pianoforte), and Silvia Delisi (Soprano); 'Cello Concerto in E minor (Vivaldi-Gentili); Soprano Solos: (a) Imitazione (Caminiti), (b) A se stesso (Caminiti); Pianoforte Solos: (a) Nocturne (Chopin), (b) Presto (Mendelssohn); Soprano Solos: (a) Ninnanna (Mule), (b) I pastori (Pizzetti); Adagio with Variations for 'Cello and Pianoforte (Respighi); After the Concert, Records. 11.0, News.

PARIS

POSTE PARISIEN, 959 kc/s, 312.8 metres; 100 kW.—7.10, Fanfare; 7.15, Records. In the intervals at 7.20 and 8.20, News. 8.45, Cookery Hints. 12 Noon, Exchange. 12.5 p.m., Concert by the Station Orchestra: Overture, Poet and Peasant (Suppé); Andante (Tchaikovsky); Spanish Dance No. 8 (Sarasate); Violin Solos: Extracts from Le Bal Costumé (Rubinstein); Waltzes Nos. 1 and 5 (Dvorák); Invocation à la nuit (Charentier); Selection from Carmen (Bizet); Près du berceau (Moszkowsky); The Rose (Myddleton); Selection from Die Fledermaus (Joh. Strauss); Gavotte and Minuet (Masse); La source (Waldteufel). In the intervals at 12.25, News, and 1.5, Exchange. 2.0, Exchange. 3.15, Exchange. 3.45, Exchange. 4.50, Exchange. 6.45, Exchange. 6.49, Iberia (Albeniz) on Records. 7.10, News. 7.30, Offenbach Records. 7.50, Concert. 8.0, Interval. 8.10, Humorous Programme with Max Régnier. 8.40, Exchange. 8.50, Les Joyeuses Parodies—Humorous Sketch (Valmy-Baysse). 9.30, Interval. 9.40, Jazz Records. 10.20, News; Exchange. 10.30 till Close Down, Programme in English arranged by the International Broadcasting Company of London. 10.30, Orchestral Concert. 10.45, Light Music. 11.0, I.B.C. Good-night Melody and Close Down.

PARIS

RADIO-PARIS, 182 kc/s, 1,648 metres; 75 kW.—6.45 a.m., Gym. 7.0, Records. 7.15, Press Review; Weather. 7.45, Gym. 8.0 to 8.30, Records. 10.15 to 11.30, Concert relayed from Vichy. 12 Noon, Concert by the Victor Pascal Orchestra: Serenade (Chaminade); Fox-trot (Abraham); Femmes, que vous êtes jolies! (Codoni); Waltz (Strauss); Pianoforte Solo; Fox-trot (Stolz); Melody (Tosti); Piece (Lehar); Le pas des fleurs (Delibes); 'Cello Solo; Funiculi-Funicula (Denza); Goyescas (Granados); Waltz (Coward); March (Ménge); Violin Solos; Water Lily (Montred); Nueva España (Laynez); Nahe des Geliebten (Beethoven); Dusk in the Orient (Micheli); Serenade (Micheli); Campfire (Siede); Waltz, Gold and Silver (Lehar). In the interval at 1.20 p.m., Exchange. 2.0, Interval. 3.45 to 3.50, Exchange. 6.20, Weather; Notes for Farmers; Racing Results. 6.50, Book Review. 7.15, Film Review. 7.30, Topical Talk. 8.0, Humorous Literary and Musical Programme. In the intervals at 8.30, Press Review; Weather; and at 9.15, News; Sports Results; Report. 10.30, Dance Music by the Cadets de France Orchestra.

PITTSBURGH

KDKA, 980 kc/s, 306 metres; 50 kW. Relayed by W8XK on 48.86 metres and 25.27 metres.—3.0 p.m., Harvest of Song. 3.15, Sammy Fuller. 3.30, Today's Children. 3.45, News; Cooking School. 4.0, Uncle Tom and Betty. 4.15, Platt and Nierman. 4.30, Melody Mixers. 5.0, Field and Hall. 5.15, Charles Sears (Tenor). 5.30, Vic and Sade. 5.45, Hotel William Penn Orchestra. 6.0, Market Reports. 6.15, Hon. Archie and Frank. 6.30, Farm and Home Hour. 7.30, KDKA Home Forum. 8.0, Radio Guild. 9.0, Betty and Bob. 9.15, Gale Page. 9.30, Market Reports. 9.45, Chicago Symphony Orchestra. 10.15, KDKA Kiddies' Klub. 10.30, The Singing Lady. 10.45, Orphan Annie. 11.0, Dan and Sylvia. 11.14, Baseball Résumé. 11.30, Comedy Stars of Hollywood. 11.45, Lowell Thomas. 12 Midnight, Music; News; Drama. 12.5 a.m. (Tuesday), Victor Merry-makers. 12.30, Nancy Martin. 12.45, Frank Buck. 1.0 to 6.0, Popular Programme.

PORSGRUND.—Relays Oslo.

POZNAN

868 kc/s, 345.6 metres; 16 kW.—6.45 a.m., See Warsaw. 7.50, Announcements; Records. 11.57, See Warsaw. 1.5, Records. 3.50, See Warsaw. 3.35, Exchange; Programme for Farmers; News. 3.45, See Warsaw. 5.25, Letter Box. 5.35, See Warsaw. 6.0, Programme for Farmers. 6.10, News. 6.15, See Warsaw. 7.25, Naval and Colonial Report. 7.30, Programme to be announced. 7.55, Sports Notes. 8.0, Song Recital from Wilno, 536 kc/s (559.7 metres). 8.30, Records. 8.45, See Warsaw. 10.0, Announcements; Records. 10.15, See Warsaw.

PRAGUE

638 kc/s, 470.2 metres; 120 kW.—6.0 to 7.15 a.m., Chimes; Gym.; Music; News. 9.50, News. 10.5, News in German. 10.10, Records. 10.15, Broadcast for Schools. 10.40, Records. 11.0, See Moravská-Ostrava. 12 Noon, Time. 12.1 p.m., Market Prices; Weather. 12.5, Programme for Farmers. 12.10, Records. 12.20, News. 12.30, See Bratislava. In the interval at 1.0, Time. 1.30, Labour Exchange. 1.40, Records. 1.50, Exchange. 1.55 to 2.0, Exchange; Weather in German. 3.15, See Moravská-Ostrava. 4.15 to 4.20, Exchange; Weather. 5.40, Talk: Homework. 5.50, Records. 6.0, Talk for Housewives. 6.5, Programme for Farmers. 6.10, Record. 6.20, German Transmission: Talk: Death-dealing Rays and Social Talk. 6.55, News in German. 7.0, Time; News. 7.10, Village Wakes—Play (Maly), after the Novel by Komzak, with Incidental Music. 7.55, Indian and Negro Songs by Stella Marek-Cushing. 8.20, The Fascinating Foundling—Play in One Act (G. B. Shaw). 8.55, Records. 9.0, Time. 9.1, Records. 9.10, Talk: At the Court of the Indian Maharajas. 9.25, String Quartet in A minor. No. 2, Op. 51 (Brahms), by the Ondricek Quartet. 10.0, Time; News. 10.15, Records. 10.45, Talk in German: Young German Composers of Czechoslovakia. 11.0 (approx.), Close Down.

REYKJAVIK

208 kc/s, 1,442 metres; 16 kW.—12 Noon, Weather. 2.15 p.m., Variety Programme. 5.0, Weather. 9.10, Weather. 9.25, Musical Programme. 9.50, Announcements. 10.0, Time Signal. 10.2 (approx.), Concert of Folk Music by the Station Orchestra. 10.30, Reading. 11.0, News. 11.30, Song Recital.

RJUKAN.—Relays Oslo.

ROME

Call 1R0, 713 kc/s, 420.8 metres; 50 kW. Relayed by Naples, 1,104 kc/s, 271.7 metres; Milan (No. 2), 1,348 kc/s, 222.6 metres; Turin (No. 2), 1,357 kc/s, 221.1 metres; and 2R0, 11,810 kc/s, 25.4 metres.—7.30 a.m., Gym. 7.45, Time; News. 8.0, Interval. 12.30 p.m., Records. 1.5, See Milan. 1.30, News; Exchange. 1.45, See Milan. 2.15, Interval. 4.30, Children's Radio Review. 4.50, News; Exchange. 5.0, Vocal and Instrumental Concert by Biondi (Violin), Antonelli (Bass) and Maria Huder (Soprano); Violin Solos: Largo (Mule-Serato); Rondo (Mozart-Kreisler); Bass Arias from Salvatore Rosa (Gomez) and Meffstorte (Boito); Violin Solos: Andantino (Martini-Kreisler); Sarabande and Tambourin (Leclair); Soprano Solos: (a) Aria from Marcella (Giordano), (b) Mística (Tirindelli), (c) Il pastorello (Pergolesi). 5.55, Weather; Corn Prices. 6.10, Interval. 7.0, Announcements. 7.15, News in Foreign Languages. 8.0, Time; News. 8.10, Records. 8.30, Government Notes. 8.45, See Milan. 9.45, Talk. 10.0, Concert.

RUYSSELEDE

10,330 kc/s, 29.04 metres; 8 kW.—7.45, News in French. 8.0, See Brussels (No. 1). 8.30, Records. 9.0, News in Flemish. 9.15 (approx.), Close Down.

SALZBURG.—Relays Vienna.

SAN SEBASTIAN

1,258 kc/s, 238.5 metres; 3 kW.—2.0 to 3.0 a.m. (Tuesday), Programme in English arranged by the International Broadcasting Company of London. 2.0, Orchestral Music. 2.30, Novelty Orchestra. 3.0 a.m., I.B.C. Goodnight Melody and Close Down.

SCHENECTADY

WGY, 790 kc/s, 379.5 metres; 50 kW. Relayed at intervals by W2XAF on 31.48 metres and on 19.56 metres.—7.0 p.m., Dreams Come True; Barry McKinley (Songs). 7.15, Health Hunters. 7.30, Women's Radio Review; Talks; Orchestra. 11.55, Exchange. 12 Midnight, Topical Talk. 12.30 a.m. (Tuesday), Voice of Firestone Garden Concert. 1.0 to 3.0 a.m., Popular Programme.

SOTTENS

677 kc/s, 443.1 metres; 25 kW. and Geneva, 401 kc/s, 748 metres.—6.0 to 6.15 a.m., Gym. 12.29 p.m., Time Signal from Neuchâtel Observatory. 12.30, News. 12.37, News in German. 12.45, Concert by the Radio Lausanne Orchestra; Conductor, Moser. 1.0,

Exchange. 1.3 to 2.0, Concert (contd.). 3.59, Time Signal from Neuchâtel Observatory. 4.0 to 7.0, See Beromünster. 7.0, Weather. 7.2, See Beromünster. 7.30, Concert by the Radio Lausanne Orchestra. 7.57, Interlude. 7.59, Weather. 8.0, Song Recital by Gustave Dutoit: Song (Handel); The Two Grenadiers (Schumann); Song (Bohm); Sans toi (d'Hardelot); Calumny Aria from The Barber of Seville (Rossini). 8.30, Talk: Costumes. 8.50, Cabaret Programme. 9.15, News. 9.22, News in German. 9.30, Cabaret Programme (contd.). 10.15, Talk: The League of Nations. 10.35 (approx.), Close Down.

STOCKHOLM

704 kc/s, 426.1 metres; 55 kW. Relayed by Boden, and Ostersund, 413.5 kc/s, 726 metres; Göteborg, 941 kc/s, 318.8 metres; Hörby, 1,131 kc/s, 265.3 metres; Motala, 216 kc/s, 1,389 metres; and Sundsvall, 601 kc/s, 499.2 metres.—7.20 a.m., Gym. 7.45, Service. 8.0, Weather. 12.30 p.m., Weather. 12.45, Exchange. 12.55, Time Signal. 1.0, Talk: Broadcasts for Schools. 1.10, Broadcast for Schools. 1.30, Records. 2.0, Reading. 2.30, Trio Concert: Air (P. E. Bach arr. Zipoli); Gavotte (Martini); Arietta (Fasalo); Piece (Stenhammar); Song (Sandbye); Cornish Boat Song (Scott); Kleiner Wienermarsch (Kreisler). 5.0, Weather. 5.5, Accordion Recital from Ostersund. 5.45, Records. 6.45, Talk: Swedish Politics from 1860 to 1890. 7.15, Weather; News. 7.30, Report. 7.45, Orchestral Concert; Conductor, Grevillius; Soloist, Nielsen (Violin): Carnival Overture (Glazunov); Ballet Music from Tales of Hoffman (Offenbach-Grevillius); Violin: Havanaise (Saint-Saëns); Tasso (Liszt); Ballade (Debussy); Sérénade mélancolique (Tchaikovsky); Overture, 1312 (Tchaikovsky). 9.15, Talk. 9.45, Weather; News. 10.0, Recital by Jern (Songs) and Witkowsky (Pianoforte). 11.0 (approx.), Close Down.

STRASBOURG

859 kc/s, 349.2 metres; 15 kW.—10.30 a.m., Orchestral Concert. Conductor, de Villers. Soloist, Roskam ('Cello). Overture, A Midsummer Night's Dream (Thomas); Suite gaie (Gabriel-Marie); Italian Caprice (Tchaikovsky); 'Cello Solo, Le cygne (Saint-Saëns); Suite from Le Roi s'amuse (Delibes); Selection from Monsieur de Pourceaugnac (Bastide); Waltz, Etoile Polaire (Waldteufel). 12 Noon, Records. 12.45 p.m., News. 1.0, Time; Exchange. 1.15 to 2.0, Concert from Paris (Ecole Supérieure). 3.30, Concert from Vichy. 5.0, Orchestral Concert from Rennes (P.T.T.), 1,040 kc/s, 288.5 metres. 6.0, Literary Talk. 6.15, Reading in German. 6.30, Concert of Light Music by the Station Orchestra. Conductor, Roskam. Soloist, Grégoire (Violin). Spanish Rhapsody (Richardy); Fox-trot (Hamy). In the Mystic Land of Egypt (Ketebeby); Selection from The Merry Peasant (Fall); Tango (German); Idylle arabe (Chaminade); La Chaise à Porteurs (Chaminade); Waltz (Grothe); Violin Solo; Slow Fox-trot (Coslow, Conrad and Dubin); De fil en aiguille (Gille); Waltz, The Wedding of the Winds (Hall). 7.30, Time; News. 7.45, Records. 8.0, Press Review in German; Lottery Results; Announcements. 8.30, Records. 8.45, Gala Concert from Vichy. Conductor, Emile Cooper. La Mer (Debussy); Adagio for Strings and Harp (Mahler); Mephisto-Walzer (Liszt); Prélude Chorégraphique (Delvincourt); Nuit (Zamazeuilh); Suite from The Fire-Bird (Stravinsky). 11.15 (approx.), Press Review.

STUTTGART

MUHLACKER, 574 kc/s, 522.6 metres; 100 kW.—5.45 a.m., Hymn; Time; Weather. 5.50, Gym. 6.15, Records. 6.40, Time; News. 6.55, Records. 7.25, See Munich. 8.10, Weather. 8.15 to 8.35, Gym. 9.0 to 9.15, Programme for Women. 10.0, News. 10.10, Broadcast for Schools: The Frog King—Play after Grimm (Ludwig Hofmeier). 10.30, Max Reger Recital by Maria Geiger (Soprano), Anton Knoll (Tenor), Willy Esterl ('Cello) and Arthur Haagen (Pianoforte). 11.0, Stimmungsbilder Op. 17 arranged for Concert Organ (Strässer) by Wilhelm Locks, relayed from the Palast Lichtspielen. 11.25, Post Office Concert; Announcements. 11.55, Weather. 12 Noon, See Breslau. 1.0 p.m., Time; Local News. 1.5, News. 1.20, With a Rucksack—Records. 1.50, Time; News. 2.0 to 2.30, Records; Concert Waltzes. 3.30, Bach Pianoforte Recital by Bruno Maischhofer: Toccata in E minor; Preludes and Fugues in C sharp and F sharp minor; Capriccio in B flat. 4.0, Concert of Light Music by the Philharmonic Orchestra; Conductor, Fritz Holzwart. 6.0, See Munich. 7.0, Records; Wagner Opera Music. 7.30, Local Review. 7.40, Time; Weather; Programme for Farmers. 8.0, News. 8.10, Programme to be announced. 9.0, Festival Concert relayed from the Liederhalle; The Station Orchestra; Conductor, Ferdinand Drost; Soloist, Gertrude Fitzinger (Mezzo-Soprano); Two Songs with Orchestra (Pfitzner); Extracts from Faust (Liszt). 10.20, Time; News. 10.35, Talk. 10.45, News. 11.0, Dance Music by the Waldmann-

Gietmann Band relayed from Baden-Baden, 12 Midnight, Concert. 1.0 a.m. (Tuesday), Close Down.

SUNDSVALL.—Relays Stockholm.

TOULOUSE

913 kc/s, 328.6 metres; 10 kW.—8.0 a.m., Dance Refrains. 8.30, News. 8.35, Chansonnettes; Orchestral Music. 12 Noon, Orchestral Music. 12.15 p.m., Opera Arias. 12.30, News. 12.45, Request Music. 1.0, News. 1.5, Sound Film Music. 1.15, Military Music. 1.30, Songs. 1.45, Operetta Music. 2.0, News; Amusement Guide. 6.0, News. 6.15, Orchestral Music. 6.30, Chansonnettes. 6.45, Orchestral Music. 7.0, Operetta Arias. 7.30, News. 7.45, Opera Music. 8.15, Orchestral Music: Symphonic Poem, Mazeppa (Liszt); Overture, A Midsummer Night's Dream (Mendelssohn). 8.30, Songs. 9.0, Opera Music: March from Tannhäuser (Wagner); Chorus from Carmen (Bizet); Waltz from Faust (Gounod); Aria from Cavalleria rusticana (Mascagni); Chorus from Aida (Verdi); Chorus from Mirella (Gounod); Prologue to Boris Godunov (Mussorgsky). 9.30, Soloist Programme. 10.0, Sound Film Music. 10.15, News. 10.30, Concert: Allegretto from the Quartet in E minor (Beethoven); Sonata (Partos); Minuet from the Quartet in D minor (Mozart); Allegro vivace from Trio No. 1 in B flat (Schubert). 11.0, Economic and Social Notes. 11.5, Request Music. 11.15, Orchestral Music. 11.30, Operetta Arias. 11.50, Hawaiian Guitar Music. 12 Midnight, News. 12.5 a.m. (Tuesday), Au caveau de minuit—Fantasy. 12.15, Opera Music: Selection from La Bohème (Puccini); Overture, Banditenstreicher (Suppé). 12.30 (approx.), Close Down.

TRONDHEIM.—Relays Oslo. **TURIN**.—Relays Milan.

VATICAN CITY

15,120 kc/s, 19.84 metres; 10 kW. (Morning); 5,970 kc/s, 50.26 metres (Evening).—11.0 to 11.15 a.m., Religious Information in Italian. 8.0 to 8.15 p.m., Religious Information in Italian.

VIENNA

592 kc/s, 506.8 metres; 120 kW. Relayed by Graz, 886 kc/s, 338.6 metres; Innsbruck, 519 kc/s, 578 metres; Klagenfurt, Linz and Salzburg, 1,294 kc/s, 231.8 metres.—9.0 a.m., News. 9.20, Market Prices. 9.30, Weather. 10.50, Water Level. 11.30, Records: Folk Music. 11.55, Weather. 12 Noon, Records. 1.0 p.m., Time; Weather; News. 1.10, Records. 2.0, Announcements. 3.30, Time; Weather; Exchange. 3.50, Programme for Women. 4.10, News. 4.15, Reading: Marcus von Aviano. 4.40, Recital by Felicitas Reich-Stubenrauch (Pianoforte) and Mario Haindorff (Tenor): Operetta Songs from (a) The Gipsy Baron (Strauss), (b) Giuditia (Lehar), (c) Prinz von Schiras (Beer), (d) Gasparone (Millöcker); Three Pianoforte Pieces Op. 15 (Vladigerov): (a) Prelude, (b) Herbstelegie, (c) Humoresque. 5.10, Music Talk. 5.30, Technical Talk. 5.40, Records: Symphony Music. 6.30, Talk: A Stroll through Vienna—Triumphs of Engineering. 6.50, Reference Books for the Week's Talks. 6.55, Talk: Climbing Mount Olympus. 7.15, Time; News. 7.35, Folk Music by the Vienna Symphony Orchestra; Conductor, Holzer; The Absam Band; Conductor, Fintl; and a Tyrolese Vocal Quartet. 8.20, Variety Items. 8.30, Folk Music (contd.). 9.20, Programme to be announced. 9.55, Pianoforte Quintet in E minor Op. 34 (Brahms) by the Sedlak-Winkler Quartet. 10.30, News. 10.50, Dance Music by the Kremserberger Jazz Band; Soloist, Edl Woday (Song Refrains). 12.15 a.m. (Tuesday), Records of the Oscar Joost Orchestra. 1.0, Close Down.

WARSAW

223 kc/s, 1,345 metres; 120 kW.—6.45 a.m., Hymn; Records. 6.58, Gym. 7.8, Records. 7.15, News. 7.25, Records. 7.40, Household Hints; Programme Announcements. 7.50, Announcements; Music. 8.0, Interval. 11.57, Time. 12 Noon, Fanfare from St. Mary's Church, Cracow. 12.3 p.m., Weather; Press Review. 12.10, Concert relayed from Lwów, 795 kc/s, 377.4 metres. 1.0, News. 1.5, Records of Neapolitan Songs. 1.30, Interval. 3.30, News. 3.35, Exchange. 3.45, Orchestral Concert of Popular Polish Music; Soloist, Bolko (Songs). 4.45, Elementary German Lesson. 5.0, Pianoforte Recital of Contemporary Music by Bar: Sonatina (Ravel); Seville (Albeniz); Danza graziosa (Medtner); Prelude in D minor (Rachmaninov); Capriccio (Dohnanyi). 5.25, Letter Box. 5.35, Les Préludes (Liszt) on Records. 5.50, Talk. 6.0, The Farmers' Letter Box. 6.10, Art Notes. 6.15, Recital by Szaleski (Viola) and Rosenbaum (Pianoforte); Sonata in A (Gawronski); Suite (Rogowski). 6.45, Talk for Children. 7.0, Rifle Club Notes. 8.0, Song Recital relayed from Wilno, 536 kc/s, 559.7 metres. 8.30, Sound Film Records. 8.45, News. 8.55, Talk: Work in Poland. 9.0, Concert by the Symphony Orchestra; Conductor, Oziminski; Soloist, Tisserant (Mezzo-Soprano); Suite from Coppélia (Delibes); Songs: (a) Zulejka (Szymanowski), (b) Langueur (Rozycy), (c) Des prairies et des champs (Zelenski), (d) Venise (Rozycy); Piece (Moniuszko-Nowkowski); Waltz, Badner Mad'n (Komzak). 9.45, Science Talk. 10.0, Announcements; Music. 10.15, Dance Music relayed from the Adria Café. 11.0, Weather. 11.5, Dance Music (contd.).

ZURICH.—Relays Beromünster.

ATHLONE

565 kc/s, 531 metres; 60 kW. Relayed by Dublin, 1,348 kc/s, 222.6 metres; and Cork, 1,240 kc/s, 241.9 metres.—1.30 to 2.30 p.m., Time; Weather; Exchange; Records. 6.0, Programme for Children. 6.45, News. 7.0, Irish Talk. 7.15, The Ancient Mariner (Coleridge) by the Rev. A. H. Macpherson. 7.30, Time. 7.31, Violin Duets by the Misses Ellard. 7.55, Kitty Fagan (Soprano). 8.15, Concert by the Station Orchestra. 8.45, A Drama—presented by Ian Priestly Mitchell and Company. 9.15, J. C. Browner (Bass). 9.30, Irish Music by the Station Orchestra. 9.40, Recital by T. D. Breen (Piccolo) and C. Byrne (Pianoforte). 10.0, Variety Programme. 10.30, Time; News; Weather. 10.40, Talk by Art McGann: National Athleticism. 10.50, Records. 11.0 (approx.), Close Down.

BARCELONA

795 kc/s, 377.4 metres; 5 kW.—8.15 a.m., News; Records. 9.0, Chimes; Gym.; Records. 9.20, News Records. 10.0, Obituary. 12 Noon, Chimes; Weather; Eleventh of September National Festival Programme. 2.0 p.m., Records. 2.30, Theatre Notes; Amusement Guide; Records. 3.0, Film Review; Sextet Concert; Exchange. 4.0, Programme for Hospitals. 5.0, News; Exchange; Interval. 7.0, Concert by the Station Orchestra. 7.30, Recital of Catalan Songs by Pilar Ruff. 8.0, Concert by the Santa Cecilia Vocal Quartet, and the Station Orchestra. 9.0, Dance Music from the Hollywood Bar. 10.0, Chimes; Weather; Request Records. 1.0 a.m. (Wednesday), News; Close Down.

BASLE.—Relays Beromünster.

BERLIN

DEUTSCHLANDSENDER, 191 kc/s, 1,571 metres; 60 kW.—5.45 a.m., Weather. 5.50, News. 6.0, Gym. 6.15, Motto. 6.25, See Leipzig. 7.0, News. 7.15 (approx.), See Leipzig. 8.0, Interval. 8.45, Gym. for Women. 9.0, Interval. 10.0, News. 10.10, The Endless Street—Historical Scenes (on Records). 10.50, Programme for Children. 11.15, Weather. 11.30, Talk: German Harvest Thanksgiving Preparations. 11.55, Weather. 12 Noon, See Leipzig. 12.55 p.m., Time. 1.0, Instrumental Records; Weather. 1.45, News. 2.0, Interval. 2.45, Greetings; Announcements. 3.0, Weather; Exchange. 3.15, Reading for Women. 3.40, Discussion on Education. 4.0, See Königsberg. In the interval at 5.0 to 5.10, Talk; Announcements. 5.30, Sports for Young People. 5.50, A Visit to an Institute for Cancer Research. 6.15, Troubadour Songs by Rolf Ghatberg (Musical Monologues) and Wegener (Pianoforte): Three Songs (Brehme): (a) Wein und Wasser, (b) Gegen die Schlemmer, (c) Trinklied; Two Songs (Sohanski): (a) Die elf Schatzgräber zu Biesenthal, (b) Senenlied: Der Mond als Liebespostillon (Nahrath); Lied eines fahrenden Schülers (Wendland). 6.40, A Sequence for Young People. 7.0, Recital by Schroeder (Violin); Berckmann ('Cello): Trio in B Flat (Mozart); Trio in A Minor (Stürmer). 7.35, Topical Talk. 8.0, Motto; Weather; News. 8.10, Records of Peasant Music. 8.45, Hockewanzel, A Folk Play (Kaergel); Introductory Talk: Radio Plays for the coming Winter. 10.0, News. 10.45, Weather. 11.0, See Frankfurt. 12 Midnight (approx.), Close Down.

BERLIN

FUNKSTUNDE, 841 kc/s, 356.7 metres; 100 kW.—6.0 a.m., Hymn; Gym. 6.15, Weather; Meditation. 6.20, Orchestral Concert; Conductor, Schneidewind. 7.0, News. 7.10, Concert (contd.). 8.0 to 8.20, Gym. 8.30, Announcements; Records. 9.30, Talk for Housewives. 9.45, Programme for Children. 10.0, News. 10.10 to 10.25, Market Prices. 11.25 to 11.30, Exchange. 12 Noon, See Leipzig; in the interval at 12.30 p.m., Weather. 1.0, News. 1.15, Records of Old Masters. 2.0, News. 2.15, Records of Georges Boulanger and Marcel Witttrisch. 3.0 to 3.20, Exchange. 4.0, Concert by the Small Station Orchestra; Conductor, Steiner (Violin); Soloist, Maria Dahnen (Soprano); March (Schmidt); Two Waltzes (Dvorák); Berceuse (Gretschaniow); Overture, The Italian Girl in Algiers (Rossini); Nur ein Hauch Parfum (Barth-Bartholdy); Peasant Suite (Ailbott); Hungarian Dances, Nos. 1 and 3 (Brahms); Intermezzo (Schillings); Czardas for Violin (Monti); Bagatelle (Sköld); Waltz, Leuchtende Sterne (Robrecht); Serenade (Schmidt); Spieluhrphantasie (Kick-Schmidt); Six Songs (Bohm); Waltz (Waldteufel); Russian Dance (Tchaikovsky); in the interval, Talk: Photographing Wild and Tame Animals. 6.0, Topical Talk. 6.5, A Surprise Trip for Young People (on Records). 6.30, A Germanic Village—Report on Excavation Work. 6.45, Sonata in F sharp minor for Pianoforte, Op. 11 (Schumann) by Hilde Sander. 7.15, Two Explorers exchange Experiences. 7.40, Echoes of the Day. 8.0, News. 8.15, Hugo Kaun Concert by the Station Choir; Conductor, Weigel; Soloists, Elisabeth Trappé (Contralto) and Ecklebe (Pianoforte); Der Tag ist nun vergangen for Mixed a cappella Choir; Five Pieces for Women's Choir and Pianoforte, Op. 122: (a) Zum Schlafen, (b) Der Igel, (c) Maria am Rosenstrauch, (d) Wellen, (e) Die Sonn ist aufgegangen. 8.40, Black and White—Two short Plays (Irmitrath Hugin) with Music by Heidenhausen. 9.40, Symphony No. 1 in D, Op. 60 (Dvorák) by the

Station Orchestra; Conductor, Steiner. 10.20, News. 10.50, Cabaret on Records. 1.0 a.m. (Wednesday), Close Down.

BERNE.—Relays Beromünster.

BEROMUNSTER

556 kc/s, 539.6 metres; 60 kW.—6.0 a.m., Gym. 6.15, Interval. 12.29 p.m., Time; News. 12.45 to 2.0, See Sottens. 2.0, Interval. 4.0 to 7.30, See Sottens. 7.30, Records of Opera Music. 8.0, Das Lied von der Glocke (Schiller) with Epilogue by Goethe. 8.30, Recorder Recital. 9.15, News in French and German. 9.30, Recital of Old English, Scottish and Irish Songs by Hans Merz. 10.15 (approx.), Close Down.

BODEN.—Relays Stockholm. BODO.—Relays Oslo.

BRATISLAVA

1,004 kc/s, 298.8 metres, 13.5 kW.—6.0 to 7.15 a.m., See Prague. 9.45, Announcements. 9.50, See Prague. 10.10, News in Hungarian. 10.15, See Prague. 11.0, Water Level. 11.5, See Prague. 12.10 p.m., News in Slovak. 12.15, Record. 12.20, See Prague. 12.30, See Brno. 1.30, See Prague. 1.40, News and Weather in German and Hungarian. 1.50 to 2.0, See Prague. 3.15 to 4.20, See Prague. 5.40, Records. 5.50, See Prague. 6.0, Talk: Inventors. 6.10, Hints for Housewives. 6.15, Hungarian Transmission: Recitations; Talks. 6.55, See Prague. 7.10, See Brno. 7.25, See Prague. 10.30 (approx.), Concert from Brno. 10.45, News in Hungarian. 11.0 (approx.), Close Down.

BREMEN.—Relays Hamburg.

BRESLAU

950 kc/s, 315.8 metres; 60 kW. Relayed by Gleiwitz, 1,231 kc/s, 243.7 metres.—5.0 a.m., Hymn; Motto. 6.10, Records. In the interval: Notes for Farmers. 6.0, Time; Weather; Gym. 6.25, See Leipzig. 7.0, News. 7.15, See Leipzig. 8.0, Cookery Hints. 8.10, Records. 9.0, News. 10.10 to 10.40, German Literature for Schools. 11.15, Time; Weather; News. 11.30, See Berlin (Deutschlandsender). 12 Noon (from Gleiwitz), Orchestral Concert; Conductor, Peter: March (Siede); Overture, Czar and Carpenter (Lortzing); Waltz, Marienklänge (Jos. Strauss); Ein Stelldichein mit Colombine (Heykens); In the Mystic Land of Egypt (Ketelbey); Extracts from Der Freischütz (Weber); Intermezzo (Bece); Strauss Operetta Potpourri (Schlögel); Frühling am Mühlbach (Zimmer). In the interval at 12.30 p.m., Notes for Farmers. 1.30, News. 1.45 (from Gleiwitz), Orchestral Concert; Conductor, Peter: Overture, Tancred (Rossini); Mosaïque (Zimmer); March (Blon). 2.20, Exchange. 2.25, Announcements; Records. 2.50, Market Prices. 3.10, Ballads and Lieder by Alfred Otto (Baritone); Five Lieder (Herrman): (a) Jungdiethelm, (b) Drei Wanderer, (c) Erstes Begegnen, (d) Kirschblüten, (e) Alte Reiterserenade; Three Lieder (R. Strauss): (a) Liebeshymnus, (b) Die Nacht, (c) Wenn. 3.40, Talk. 4.0, Light Orchestral Music; Conductor, Gielnik: Overture, Die schöne Müllerin (Michiels); Fantasy (Casavola); The Dance of Pan (Juel Frederiksen); Waltz (Scorra); Gavotte (Papaky); Indian Scene (Lindemann); Old Historical Folk Festival (Dreyer); Schuhert Potpourri (Ralf); Jeux d'amour (Fourdrain); Waltz (Rust); Tarantella (Heller-Fassung). 5.30, Notes for Farmers. 5.35, Talk for Women: Sea Fish. 5.55, Radio Report from a Carpet Factory. 6.15, 'Cello Recital by Richard Uhlig: Adagio cantabile (Tartini); At the Well (Davidov); Two Pieces (Becker): (a) Minuet, (b) Berceuse; Scherzo (Goens). 6.50, Announcements; Notes for Farmers. 7.0, Girls' Songs by Anneliese Kupper (Soprano); Commentary by Hanna Erhardt; Klären's Lieder from Egmont (Beethoven); Two Lieder (Schubert): (a) Des Mädchens Klage, (b) Gretchen am Spinnrad; Mignon Lieder (Wolf); Four Lieder (Brahms): (a) Mädchenlied, (b) Klage, (c) Mädchenlied, (d) Das Mädchen. 7.25, Report of the Building of the Great Silesian Motor Road. 8.0, To-day's News. 8.10, Gri-Gri—Operetta (Lincke); The Station Choir and Orchestra; Conductor, The Composer. 10.10, Wireless Notes. 10.20, News. 10.45, Paul Lincke Concert by the Station Orchestra; Conductor, The Composer. 12 Midnight (approx.), Close Down.

BRNO

922 kc/s, 325.4 metres; 32 kW.—6.0 a.m. to 7.15, See Prague. 9.50, See Prague. 12 Noon, Talk for Farmers. 12.10 p.m., See Prague. 12.30, Concert by the Station Orchestra; Conductor, Bakala: Overture, Indra (Flotow); Suite (Siede); Intermezzo (Königsberger); Polonaise (Sebor); Waltz (Nedbal); Moravian Songs (Vackár); Gavotte (Mach); March (Volánek). 1.30, Talk. 1.40 to 2.0, See Prague. 3.15 to 4.20, See Prague. 5.40, Notes for Housewives. 5.45, Talk: The Garden in Autumn. 5.55, Records. 6.0, Accordion Recital by Kopecky. 6.20, German

TUESDAY

SEPTEMBER THE ELEVENTH

Transmission: Social Notes; Talk for Workers; Report for Farmers. 6.55, See Prague. 7.10, Talk. 7.25, See Prague. 10.15 (approx.), Concert by the Station Schrammel Quintet. 10.45, See Prague. 11.0 (approx.), Close Down.

BRUSSELS (No. 1)

620 kc/s, 483.9 metres; 15 kW.—11.55 a.m., Weather. 12 Noon, Records. 12.30 p.m., Song and 'Cello Recital by Magda Fonteyne and Alfred Nélis. 1.0, News. 1.10, Orchestral Concert of French Music. 2.0, Interval. 4.55, Announcements. 5.0, Symphony Concert: Symphony (Houdret); Recitative and Finale (Schoemaker). 5.30, Programme for Children. 6.5, Catholic Review. 6.15, Records: Duet in G Flat for Violin and Viola (Mozart). 6.30, Sacred Music on Records: Commentary by Rev. Father Chantredelsdahl. 7.0, Chopin Pianoforte Recital by Jean Louthe: Fantasia in F, Op. 49; Etude in C Minor, Op. 10. 7.15, Talk for Workers. 7.30, Art Review; Talk for Women. 8.0, Orchestral Concert: Soloist: Dora Kuznitsky (Songs). 9.0, Talk. 9.15, Orchestral Concert of Marches and Waltzes; Alla turca (Beethoven); Dorfschwalben aus Osterreich (Jos. Strauss); March, Op. 108 (Mendelssohn); Love Song (Drda); Marche de fêtes (Busser); Waltz from Naïla (Delibes); Danish March (Thomas); Waltz from The Sleeping Beauty (Tchaikovsky). 10.0, News. 10.10, Request Records. 10.55, Christus Vincit (Liszt). 11.0, Close Down.

BRUSSELS (No. 2)

932 kc/s, 321.9 metres; 15 kW. Programme in Flemish.—11.57 a.m., Weather. 12 Noon, Light Music. 1.0 p.m., News. 1.10, Records. 2.0, Interval. 4.55, Announcements. 5.0, Records: Die Fledermaus (Joh. Strauss). 5.45, Programme for Children. 6.30, Orchestral Concert: Chinese Rhapsody (Gabriel-Marie); Potpourri (Urbach); Légende (Wieniawsky); Gruss an Wien (Dostal); Suite provençale (Jongen); Two Dances for Pianoforte (Granados); Spanish Dances (Moszkovsky). 7.30, Talk for Women. 8.0, Orchestral Concert of Spanish Music; Soloists, Anita Cazals and M. Crahé (Songs). In the interval at 8.45, Talk. 10.0, News. 10.10, Light Music on Records. 11.0 (approx.), Close Down.

BUCHAREST

823 kc/s, 364.5 metres; 12kW.—12 Noon, Water Level; Records. 12.45 p.m., Amusement Guide; Exchange; Records. 1.15, Time; Weather; News. 1.40, Records. 5.0, Light Music by the Gica Ionescu Orchestra. 6.0, Time; Weather; News. 6.20, Light Music by the Ionescu Orchestra. 7.0, Educational Programme. 7.15, Records. 7.45, Talk. 8.0, Symphony Concert by the Station Orchestra; Conductor, Otescu: Overture, The Flying Dutchman (Wagner); Spanish Rhapsody (Chabrier); Symphonic Poem, Marsyas (Castaldi). 9.0, Talk. 9.15, Symphony Concert (contd.); Symphony No. 3 The Eroica (Beethoven). 10.0, News.

BUDAPEST

546 kc/s, 549.5 metres; 120 kW.—6.45 a.m., Gym. 9.45, News. 10.0, Talk. 10.40, Talk. 11.10, Water-Level. 12 Noon, Chimes from the University Chapel. 12.4 p.m., Concert of Chamber Music. 1.30, Military Band Concert. 2.40, Cookery Hints. 4.0, Programme for Women. 5.0, Talk. 5.30, Concert by the Horváth Cigány Orchestra. 6.30, Medical Talk. 7.0, Concert by the Budapest Choir. 7.50, A Play (Labiche). 9.55, Harp, Flute and Oboe Recital: Sonata (Handel); Sonata (Krumpholtz); Variations on a Theme by Chopin (Domersmann). 11.0, Records.

CASSEL.—Relays Frankfurt.

COLOGNE

658 kc/s, 455.9 metres; 60 kW.—5.30 a.m., Hymn; Records. 6.50, Gym. 6.25, See Leipzig. In the interval, News. 8.0, Time; Weather; Water-Level. 8.5 to 8.20, Gym. for Women. 10.0, News. 10.10, A Trip Up the Rhine—Humorous Sequence (Lodenstein). 11.10, Talk: East Prussian Navy. 11.30, Announcements; Records. 12 Noon, Concert by the Station Schrammel Quartet; Schneider (Baritone) and Liesenfeld (Xylophone); March (Kronegger); Ländler (Meyer); Das Lied vom süßen Mädel (Reinhardt); Waltz, Weaner Madl (Ziehrer); Xylophone Solo; Ländler (Raasch); Song, Es war einmal (Lincke); March (Meyer); Polka (Lorenz); Song, Es wird schön Maderln geben (Gruber); Waltz from Der Opernball (Heuberger); Xylophone Solo; Ländler (Jansen); March (Jurek). 12.45 p.m., Announcements; Greetings. 1.0, Orchestral Concert of Light Music; Conductor, Kühn: Overture, Raymond (Thomas); Oriental Impression (Amadel); Extract from The Bartered Bride (Smetana); Extracts from Der Tenor der Herzogin (Künneke); Overture, Cagliostro in Wien (Strauss); Little Viennese Sketches (Reinl); Chinese Serenade (Fliege); Caucasian Sketches (Ip-

polltov-Ivanov); Sound Film Sequence (Buder). In the interval at 1.45, Announcements. 2.45, Interval. 3.10, Talk. 3.30, Exchange. 3.45, Talk for Women. 4.0, Records of Russian Opera Music. 5.0, Poetry Reading. 5.10, 'Cello Recital by Kühne: Toccata (Frescobaldi-Cassado); Gipsy Dance (Jeral); Hungarian Rhapsody (Popper). 5.40, An Archaeological Discussion. 6.0, Harvest Songs and Customs—A Sequence for Girls. 6.20, Talk: Electricity. 6.40, Topical Talk. 6.50, Exchange; Sports Notes. 7.0, With the Microphone in Siegerland (Records). 7.30, Light Music by the Station Chamber Quintet: Concert Piece (Blon); Gallantry (Ketelbey); The Tyrol in Song and Dance (Fetras); Serenade (de Micheli); Spanish Serenade (Mitra). 8.0, News. 8.10, See Hamburg. 10.0, News. 10.20, Chess Lesson. 10.30 (approx.), Close Down.

COPENHAGEN.—Relays Katundborg. CORK.—Relays Athlone. DANZIG.—Relays Königsberg. DRESDEN.—Relays Leipzig.

FECAMP

1,456 kc/s, 206 metres; 10 kW.—11.30 a.m. to 12 Noon, Programme in English by the International Broadcasting Company of London. 11.30, Dance Music. 12 to 4.30 p.m., Programme in French. 4.30 to 6.0, Programme in English by the I.B.C. 4.30, Torquay, Exeter, Plymouth and Devonport Concert: Part 1—The Music Shop. 5.0, Part 2—Dance Music. 5.30, Part 3—Introducing Layton and Johnstone (Gramophone Records). 5.45, Part 4—Dance Music. 6.0 to 11, Programme in French. 11.0 till Close Down, Programme in English by the I.B.C. 11.0, Concert of Gramophone Records. 11.30, Concert, arranged by the I.B.C. (Ireland), Ltd., Light Music. 12 Midnight, Club Concert for Blackburn Listeners; Dance Music. 12.30 a.m. (Wednesday), I.B.C. Time Signal. 12.31, Dance Music (contd.). 1.0, I.B.C. Goodnight Melody and Close Down.

FLENSBURG.—Relays Hamburg. FLORENCE.—Relays Milan.

FRANKFURT

1,195 kc/s, 251 metres; 17 kW.—5.45 a.m., Hymn; Time; Weather. 5.50, Gym. 6.40, Time; Announcements. 6.50, Weather. 6.55, See Stuttgart. 8.10, Water Level; Weather. 8.15 to 8.35, Gym. 10.0, News. 10.45, Hints for Housewives. 11.0, Announcements; Records. 11.30, Announcements; Exchange; Weather. 11.45, Social Notes. 12 Noon, See Stuttgart. 1.0 p.m., Time; News. 1.10, Local News. 1.20, See Stuttgart. 1.50, Time; News. 2.0, See Stuttgart. 2.30, Economic Review. 2.45, Time; Exchange. 2.55, Weather. 3.10, Talk for Women. 3.25, Radio Report from the Rhone District. 3.50, Art Notes. 4.0, Orchestral Concert from Bad Bertrich; Conductor, Schulze: March (Waldchen); Overture, Banditenstreich (Suppe); Hungarian Comedy Overture (Kéler-Béla); Waltz, Wiener Bürger (Ziehrer); Paraphrase on Ach, wie ist's möglich dann (Esterl); Extracts from The Gipsy Baron (Joh. Strauss); Czardas (Kampner); Waltz, Marienklänge (Joh. Strauss); Mazurka and Minuet (Rust); Character Piece (Collin); Intermezzo (Kockert); March (Blankenburg); Gallop (Blon). 5.30, Talk: Forests. 5.45, Recital by Susanna Uhlemann ('Cello) and Hermy Fischer-van Dorp (Pianoforte). 6.0, Report of the 1933 German Trade Results. 6.15, Industrial Review. 6.25, Italian Lesson. 6.45, Weather; Exchange; Announcements. 6.50, Reading (Woike). 7.0, Orchestral Concert from Cassel; Conductor, Schmitz: Tragic Symphony (Locatelli); Concerto grosso (Corelli); Suite in the Old Style (Bettingen). 7.45, Topical Talk. 8.0, Time; News. 8.10, Concert by the Station Orchestra; Conductor, Czernik: Overture, Der lustige Krieg (Joh. Strauss); Persian March (Joh. Strauss); Operetta Songs; Rumanian Dances (Alfano); Operetta Songs; March (Lehár); March (Roland); Selection from Firenze Ridente (Raffaelli); Operetta Songs; Waltz (Richardt); March (Lincke). In the interval at 9.0, A Sketch. 10.20, Time; News. 10.35, Humorous Sketch. 10.45, News. 11.0, Dance Music. 12 Midnight; Edward Elgar Records. 1.0 a.m. (Wednesday), Close Down.

FREDRIKSSTAD.—Relays Oslo. FRIEBURG.—Relays Stuttgart. GENEVA.—Relays Sottens. GENOA.—Relays Milan. GLEWITZ.—Relays Breslau. GÖTEBORG.—Relays Stockholm. GRAZ.—Relays Vienna. HAMAR.—Relays Oslo.

HAMBURG

904 kc/s, 331.9 metres; 100 kW. Relayed by Bremen, Flensburg, and Hanover, 1,330 kc/s, 225.6 metres.—5.45 a.m., Time; Weather; Notes for Farmers. 6.0, Gym. 6.15, Time; Weather. 6.20, See Berlin (Funkstunde). 7.0, News. 7.10, See Berlin (Funkstunde). 8.0, Weather; Notes for Housewives. 8.10, Announcements; Records. 10.50, News. 11.0, Musical Lecture-Recital for Schools. 11.30, See Berlin (Deutschlandsender). 12 Noon, Hints for Housewives. 12.5 p.m., News. 12.15, Concert from Leipzig. 1.0, Exchange. 1.15, Weather. 1.20, Light Music. 2.15, News. 2.30, Records. 3.0, Exchange. 3.40, Shipping and Aviation Notes. 4.0, See Munich. 5.30, Reading for Women. 6.10, Topical Talks. 6.45, Exchange. 6.55, Weather. 7.0, Musical Programme for Young People. 7.45, Talk: The Return to Allodial Tenure. 8.0, Announcements. 8.10,

SEPT. 11th **TUESDAY** -continued

Wind Instruments and Strings—A Musical Sequence by Hertzfeld. The Station Orchestra, Soloists and Speakers. Conductor: Maass. 10.0, News. 10.20, Light Music. 11.0, Orchestral Concert from Kiel. Conductor: Döring. Overture, Das Nachtlager in Granada (Kreutzer); Selection from Lakmé (Delibes); In the Temple of the Bells (Yoshitomo); Selection from Light Cavalry (Suppé); Waltz, In lauschiger Nacht (Ziehrer); March, Elbtalgrüsse (Fucik). 12 Midnight (approx.), Close Down.

HANOVER.—Relays Hamburg.

HILVERSUM

160 kc/s, 1,875 metres; 7 kW. (until 3.40 p.m.). Transmitted on Kootwijk, 50 kW., from 3.40 p.m.—7.40 to 10.40 a.m., Programme of the General Broadcasting Society (A.V.R.O.). 7.40, Time; Records. 9.40, Divine Service. 9.55, Records of Sacred Music. 10.10, Violin Recital by Boris Lensky. 10.40, Talk by the R.V.U. 11.10 to 5.10 p.m., A.V.R.O. Programme. 11.10, Concert of Light Music by the Rentmeester Ensemble, with Records in the Intervals. 1.40 p.m., Recitations by Marie Meunier-Nagtegaal. 2.10, Song Recital by Mary Snijders. 2.40, Concert of Light Music by the Kovacs Lajos Orchestra. 3.40, Interval. 3.55, Records. 4.10, Concert by a Children's Choir. Conductor: Hamel. 4.40, Programme for Children. 5.10, Religious Address by the Liberal Protestant Radio Society (V.P.R.O.). 5.40, A.V.R.O. Programme: Concert of Light Music by the Kovacs Lajos Orchestra. 6.10, Talk by the R.V.U. 6.40 till Close Down, A.V.R.O. Programme. 6.40, Concert of Light Music by the Kovacs Lajos Orchestra. 7.20, Talk: Aerial Defence. 7.40, Time; News. 7.45, Records. 8.20, Programme by Louis Noiret. 8.40, Concert of Opera Music by the A.V.R.O. Orchestra. Conductor: Nico Treep. Soloists: Hélène Cals and Sophie Haase-Pieneman (Soprano). 9.40, Records. 9.55, Concert by the A.V.R.O. Orchestra. Conductor: Nico Treep. March (Marks); Ein Walzertrausch (Lincke); The Three Bears (Coates); Nidia (Siede); Spanish Waltz, Santiago (Corbin); Offenbach Potpourri (Conradi). 10.40, News. 10.50, Records. 11.40, Time; Close Down.

HORBY.—Relays Stockholm.

HUIZEN

995 kc/s, 301.5 metres; 7 kW. (until 6.40 p.m.); 20 kW. from 6.40 p.m. Programme of the Catholic Radio Society (K.R.O.). 7.40 a.m., Records. 8.55, Interval. 9.40, Records. 10.10, Concert for Workers. 10.40, Records. 11.10, Religious Address. 11.40, Police Announcements. 11.55, Concert by the K.R.O. Boys; Conductor, Lustenhower. In the intervals, Records. 1.25 p.m., Interval. 1.40, Programme for Women. 2.40, Concert by the Cachet Trio. 3.25, Recitations. 3.40, Trio Concert (cont'd.): Une fête au Trianon (Popy); Réverie (Regis); Sous bois (Staub); Piece (Codini); Andalusia (Popy); Serenade (Filipucci); Tin Kivolako (Sumkay). 4.10, Recitations. 4.25, Records. 4.40, Concert by the K.R.O. Boys; Conductor, Lustenhower. 5.40, Recital by Mary Fuchs (Soprano) and Boshart (Pianoforte). 6.40, Police Notes. 6.55, Topical Talk. 7.15, Records. 7.25, Concert by the K.R.O. Orchestra; Conductor, Gerritsen: Overture, Donna Diana (Reznicek); Selection from Le tribut de Zamora (Gounod); Suite from Der Rosenkavalier (R. Strauss). 8.0, Talk. 8.10, News. 8.15, Orchestral Concert (cont'd.): Selection from A Midsummer Night's Dream (Mendelssohn). 8.55, The Emigrant—Play (Gielgud), translated by Horst. 9.40, Orchestral Concert (cont'd.): Selection from I Pagliacci (Leoncavallo) and Madame Butterfly (Puccini); Three Dances (German). 10.10, News. 10.15, Records. 11.40 (approx.), Close Down.

INNSBRUCK.—Relays Vienna.

KALUNDBORG

238 kc/s, 1,261 metres; 75 kW. Relayed by Copenhagen, 1,176 kc/s, 255.1 metres; and Skamlebaek, 49.5 metres.—7.0 a.m., Gym. 8.30, Divine Service from Copenhagen Cathedral. 10.15 to 10.45, Hygiene Talk for Schools. 11.0, Weather. 11.10, Fish Prices. 12 Noon, Chimes; Weather. 12.2 p.m., Concert by Harold Andersen's String Ensemble, relayed from the Bellevue Strand Hotel. 2.0, Interval. 3.0, Concert by Arnold Nielsen's String Ensemble, relayed from the Ritz. 5.0, Reading for Children from The Pickwick Papers (Charles Dickens). 5.30, Exchange; Fish Prices. 5.42, A Poem. 5.45, Talk. 6.15, Elementary German Lesson. 6.45, Weather. 6.54, Announcements. 7.0, News. 7.15, Time. 7.30, Talk: Economics. 8.0, Time. 8.1, Hungarian Rhapsody (Popper) on Records by Feuermann. 8.10, Concert by the Westminster Choir of Princetown; Conductor: Dr. John Finley Williamson. 10.0, News. 10.15, Pianoforte Recital by Alexander Borovskiy; Sonata in a minor (Mozart); Gigue (Lœfflet); Turkish March from the Ruins of Athens (Beethoven); Melody (Gluck-Sgambat). 10.45, Tourist Talk: Salzburg. 11.0, Dance Music by the Aage Juhl-Thomsen Dance Band, relayed from the National Scala. In the interval at 12 Mid-

night, Time; Chimes. 12.30 a.m. (Wednesday), Close Down.

KIEL.—Relays Hamburg. KLAGENFURT.—Relays Vienna.

KONIGSBERG

1,031 kc/s, 291 metres; 60 kW. Relayed by Danzig, 1,303 kc/s, 230.2 metres.—5.0 a.m., Records. 5.50, Weather. 6.0, Gym. 6.20, See Berlin (Funkstunde). 7.0, News. 7.10, See Berlin (Funkstunde). 8.0, Prayers. 8.30, Gym. for Women. 9.0, Interval. 10.40, News. 10.55, Weather. 11.5 (from Danzig), Programme for Farmers. 11.30, Records. 12 Noon, See Berlin (Funkstunde). In the interval at 12.30, News. 1.1, Time; Weather. 1.5, Records of Light Music. In the intervals at 1.20 and 2.0, News. 2.30, Post Office Announcements; Records. 3.0, Market Prices. 3.20, Book Review: The Correspondence between Cosima Wagner and Houston Stewart Chamberlain. 3.35 (from Danzig), Talk: East Prussia during the Seven Years' War. 4.0, Concert by the Small Station Orchestra; Conductor, Wilcken. In the interval, Talk for Women. 5.45, Talk: The Wines of Rhineland. 6.15, Market Prices. 6.25 (from Danzig), Programme for Young People. 6.55, Weather. 7.0, Choral Concert by the Marienwerder Oratorio Society. 7.30, Talk: The German Knights Templars. 8.0, News. 8.10 (from Danzig), Rhineland Humour. 8.40 (from Danzig), Concert by the State Theatre Orchestra; Conductor, Kallipke: Overture, Ilka (Doppler); Scènes napolitaines (Massenet); Italian Serenade (Wolf); Auf Capri (Blon); Mazurka (Jos. Strauss); Sang und Klang aus dem Osten (Eberle); Lyric Suite (Grieg); Caprice-Tarantella (Lack); Waltz (Fetras); Selection from Aida (Verdi); Suite from Coppélia (Delibes); Overture, The Barber of Seville (Rossini). 10.0, News. 10.20, Report of the Boxing Tournament, Italian Fascisti versus German Storm Troops, in Rome. 10.45, See Brestlau. 12 Midnight (approx.), Close Down.

KOSICE.—Relays Prague.

LAHTI

166 kc/s, 1,807 metres; 40 kW. Relayed by Helsinki, 895 kc/s, 335.2 metres.—7.5 to 7.20 a.m., Service in Swedish. 7.30 to 7.45, Service in Finnish. 11.0, Exchange. 11.5, Musical Programme. 11.30, Exchange. 11.45, News in Finnish and Swedish. 11.59, Time Signal; Weather. 4.0 p.m., Recital by Viljo Westermäen (Accordion). Helge Pahlman (Banjo and Guitar). 4.40, Recitations. 5.0, Talk. 5.25, Song Recital by Heimonen. 5.50, News in Finnish. 5.59, Time Signal; Weather. 6.10, News in Swedish. 6.15, Talk. 6.40, Cello Recital by Ilmari Haapalainen: Piece (Tchaikovsky); Humoresque (Haapalainen); Two Pieces (Pauri); Serenade (Popper). 7.5, Talk. 7.25, Concert by the Station Orchestra. Conductor, Haapanen. Soloist, Cronvall (Violin): Finnish Suite (Palmgren); Andante (Linnala); Piece (Huttunen); Adagio (Diethe); Ballet Music from The Nutcracker Suite (Tchaikovsky); Trümmerei (Wagner); Romanian Fantasy (Dimitriescu). 8.45, News in Finnish. 9.0, News in Swedish.

LAUSANNE.—Relays Sottens.

LEIPZIG

785 kc/s, 382.2 metres; 120 kW. Relayed by Dresden, 1,285 kc/s, 233.5 metres.—5.50 a.m., Notes for Farmers. 6.0, Gym. 6.25, Orchestral Concert from Zwickau. Conductor: Engelmann. 7.0, News. 7.15, Concert (cont'd.). 8.0, Gym. 8.20, Records. 9.0 to 9.20, Programme for Women. 9.40, Exchange. 9.45, Announcements. 10.10, Gutenberg and his Work—Sketch for Schools (Herse). 10.50, Announcement; Records. 11.30, News; Time. 11.40, Weather. 11.45, Notes for Farmers. 12 Noon, Concert by the Leipzig Instrumental Quartet from the Capitol Cinema. Soloist: Neumann (Cinema Organ). 1.0 p.m., News. 1.10, Old and New Dance Records. 2.0, News; Exchange; Weather. 2.15, Records of Alpine Music. 2.45, Interval. 2.50 (from Dresden), Recital by Petronella Hofmann (Contralto), Hofmann-Stirl (Viola), and Kunad (Pianoforte): Two Songs (Tchaikovsky); Two Songs for Contralto, Viola, and Pianoforte (Jos. Marx): (a) Durch Einsamkeiten, (b) Du bist der Garten; Two Rhapsodies for Pianoforte in G minor and E flat (Brahms); Two Songs for Contralto, Viola, and Pianoforte (Brahms): (a) Gestillte Sehnsucht, (b) Geistliches Wiegenlied, Three Lons Lieder (Graener): (a) Der König, (b) Verspruch, (c) Königin. 3.40, Exchange. 4.0, See Munich. 5.10, Report from the Fair at Steinbach, Hallenberg. 5.30, Talk. 5.50, Exchange; Weather; Time. 6.0, Talk: Prince Blücher of Wahlstatt. 6.20, Heinz Fritzsche Recital by Ruth Meister (Violin), Blumer (Pianoforte), and Sammler (Harpischord): Sonata in G for Violin and Harpischord, Op. 6, No. 1; Sonata in A minor for Violin and Pianoforte, Op. 6, No. 2. 6.50, Folk Music by the EnDe Orchestra and a Peasant Band. Conductor: Werle. Soloists: Edith Hasselmann (Soprano), Irngard Fritzsche (Mezzo-Soprano), Ulbricht (Tenor), Göpelt

(Baritone), and Götze (Guitar). 7.35, Talk. 8.0, News. 8.10, Cabaret. 9.10, Concert by the Leipzig Symphony Orchestra. Conductor: Rosbaud. 10.20, News. 10.40, Report of the Boxing Tournament, Italian Fascisti versus German Storm Troops, in Rome. 11.0, See Frankfurt. 12 Midnight (approx.), Close Down.

LINZ.—Relays Vienna.

LJUBLJANA

527 kc/s, 569.3 metres; 5 kW.—12.15 p.m., Records. 12.50, News. 1.0, Weather; Records. 6.0, Talk. 6.30, Records for Children. 7.0, Programme for Children. 7.30, Records. 7.50, Weather; Cookery Hints. 8.0, Talk. 8.20, Concert by the Station Orchestra with songs. 9.40, Weather; News. 10.30 to 11.0 p.m., Programme in English arranged by the International Broadcasting Company of London; Concert.

LUXEMBOURG

230 kc/s, 1,304 metres 120 kW.—7.45 a.m., Records. 8.0, News in French; Record; News in German; Record. 12 Noon, Concert by the Station Orchestra; Conductor, Pensis: Overture, Les quatre fils d'Aymon (Balfe); Selection from The Pearl Fishers (Bizet); Meditation (Gounod); Serenade (Widor). 12.30 p.m., News in French and German. 12.40, Concert (cont'd.): Ballet Music from La Juive (Halévy); Czardas (Grossmann); Barques au Clair de Lune (Févet); Selection from The Circus Princess (Kálmán); in the interval at 1.0, Exchange. 1.15, Records. 1.30, Exchange. 1.35, Records. 2.0, Exchange. 3.45, Exchange. 6.30, till Close Down, Belgian Evening. 6.30, Variety Programme. 7.30, Racing Results. 7.35, Talk: Luxembourg as a Tourist Country. 7.40, Violin Sonata in D, Op. 12, No. 1 (Beethoven) on Records. 8.0, News in French and German. 8.20, Pianoforte Recital. 8.35, Exchange. 8.40, Concert by the Station Orchestra; Conductor, Pensis: Overture (Rogister); Valse triste (de Taeye); Minuet (Demary); Quelques Fleurs (Vreuls); Humoresque (Demare) Intermezzo, No. 1 (Kalkmann); Esquisses flammande (Brussemans). 9.25, Symphony Concert by the Station Orchestra; Conductor, Pensis; Soloist, Liftmann (Cello); Concerto (Haydn); Carnaval Overture (Glazunov). 10.5, Song Recital by Madeleine Farrère. 10.30, Dance Music by the Station Dance Band; Conductor, Ferry Jusa.

MADRID

EAJ7, 1,095 kc/s, 274 metres; 7 kW.—9.0 a.m., News. 10.0, Announcements. 10.30, Interval. 2.0 p.m., Chimes; Time; Weather; Light Music; Talk. 2.30, Sextet Concert. 3.0, Amusement Guide; Exchange; Light Music. 3.30, Sextet Concert. 4.0, Light Music. 4.15, Sextet Concert: Suite, Andalusian Scenes (Bretón). 4.40, News. 5.0, Interval. 6.0, Chimes; Light Music. 7.0, Announcements. 7.30, Exchange; Band Concert. 8.0 (approx.), Opera Music: Selection from Mignon (Thomas), La Favorita (Donizetti), Werther (Massenet), Lakmé (Delibes), La Bohème (Puccini), Aida (Verdi), and I Pagliacci (Leoncavallo). 8.15, Hunting and Fishing Notes. 8.30, News. 8.40 (approx.), Concert: Part 1, Chopin Pianoforte Recital; Part 2, Orchestral Music: Selection from The Czarevitch (Lehár); Selection from Tales of Hoffmann (Offenbach); Waltz Potpourri (Robrecht); Spanish Potpourri (Planás). 9.50, Sports Report; Bullfighting Notes. 10.0, Chimes; Time; Guitar Recital. 10.30, Talk: Madrid. 11.0, News; Sextet Concert; Programme of Spanish Poetry; Flamenco Songs. 12.45 a.m. (Wednesday), News. 1.0, Chimes. 2.0 till Close Down, Programme in English by the International Broadcasting Company of London: Dance Music. 3.0, I.B.C. Goodnight Melody and Close Down.

MADRID

10,000 kc/s, 30 metres; 20 kW.—11.15 p.m., News. 11.30, Spanish Music. 11.45, News. 12 Midnight, Concert of Light Spanish Music. 12.45 a.m. (Wednesday), Light Music. 1.0 to 1.30 a.m., Programme in English arranged by the International Broadcasting Company of London; Music of Russia. 1.30, I.B.C. Goodnight Melody and Close Down.

MALMO.—Relays Stockholm.

MILAN

814 kc/s, 368.6 metres; 50kW. Relayed by Turin, 1,140 kc/s, 263.2 metres; Genoa, 986 kc/s, 304.3 metres; and Florence, 610 kc/s, 491.8 metres.—7.30 a.m., Gym. 7.45, News. 8.0, Interval. 11.30, Concert by the Malatesta Chamber Orchestra. 12.30 p.m., Records. 12.45, News. 1.0, Time; News. 1.5, Popular Music. 1.30, Records; Exchange. 1.45, Popular Music. 2.15 to 2.25, Exchange. 4.35, News. 4.45, Programme for Children. 5.10, Concert by the Doreno Orchestra. 5.55, Weather. 6.0 to 6.10, Notes for Farmers. 7.0, Announcements. 7.15, News in Foreign Languages. 8.0, Time; News; Weather; Re-

ords. 8.30, Government Notes. 8.45, The Bayadere—Operetta in Three Acts (Kálmán); Conductor, Petralia. After the Operetta, Dance Music. 11.0, News.

MONTE CENERI

1,167 kc/s, 257.1 metres; 15 kW.—12 Noon, Announcements. 12.5 p.m., Orchestral Concert: Overture, Il Seraglio (Mozart); Waltz, Frühlingsstimmen (Strauss); Hymn to the Sun from Iris (Mascagni); Cello Solo, Musette (Offenbach). 12.29, Time; Weather. 12.33, Orchestral Concert (cont'd.): Selection from Le Postillon de Longjumeau (Adam); Song (Tchaikovsky); Jota Navarra (Sarasate). 12.55, News. 1.5, Records. 1.30, Interval. 3.59, Time Signal. 4.0, See Sottens. 6.0, Interval. 7.45, News. 8.0, Mephistopheles—Opera in Four Acts (Boito) on Records; The Choir and Orchestra of the Scala, Milan. In the Interval at 9.30, Talk. 10.55 (approx.), Close Down.

MORAVSKA-OSTRAVA

1,158 kc/s, 259.1 metres; 11.2 kW.—6.0 a.m., See Prague. 7.15, Interval. 9.50, See Prague. 12 Noon, Talk for Farmers. 12.10 p.m., See Prague. 12.30, See Brno. 1.30, See Prague. 2.0, Interval. 3.15, See Prague. 5.40, Records. 5.50, Talk: Smetana as a Pianist. 6.0, News. 6.5, Talk. 6.15, Record. 6.20, See Brno. 6.55, See Prague. 7.10, See Brno. 7.25, See Prague. 10.30 (approx.), Concert from Brno. 10.45, Records. 11.0 (approx.), Close Down.

MOSCOW (No. 1)

174 kc/s, 1,724 metres; 500 kW.—5.0 a.m., News. 5.15, Fanfare. 5.45, Gym. 6.15, Musical Programme. 8.15, Programme for Children. 9.0, Musical Programme. 9.58, Time. 10.0, News. 10.15, Talk: Symphonic Music. 11.15, Technical Talk for Farm Workers. 3.0, Programme Announcements. 3.15, Lecture-Recital: Mozart. 3.58, Time. 4.0, News. 4.15, Book Review. 4.30, Communist Party Programme. 5.30, Dance Music; Records. 9.0, Literary Programme in German. 9.55, Chimes. 10.5, Talk in French: Women in Management. 11.5, Talk in Dutch: The Children's Museum.

MOTALA.—Relays Stockholm. MUM-LACKER.—See Stuttgart.

MUNICH

740 kc/s, 405.4 metres; 100 kW. Relayed by Augsburg and Nürnberg, 1,267 kc/s, 236.3 metres; and Kaiserslautern, 1,195 kc/s, 251 metres.—6.30 a.m., Gym. 6.45, Motto; Records. 7.15, News. 7.25, Concert from Stuttgart. 9.50, Talk. 10.10, English for Schools. 10.55, Market Prices. 11.5, Notes for Farmers. 11.15, News. 11.30, Announcements. Records. 12 Noon, Concert by the Small Station Orchestra; Conductor, Kloss; Soloist, Reker (Violin). 1.15 p.m., News. 1.25, Records. 2.0, News; Exchange. 2.20, Heinrich Kaspar Schmid Anniversary Recital by Fanny Trunk-Echter (Soprano), Haase (Baritone), Uli Schmid (Violin), Rosal Schmid (Pianoforte). 2.50, Programme for Women. 3.30, Discussion. 3.50, Weather; Notes for Farmers. 4.0, Concert by the Small Station Orchestra; Conductor, Kloss. 5.30, Talk. 5.50, Recital of Songs by Dresden Composers by Klewitz (Baritone). 6.10, Review of Beumelburg's Book, Das ehernen Gesetz. 6.30, Records. 6.50, Time; Weather; Notes for Farmers. 7.0, Pianoforte Recital by Staab. 7.25, Talk on the following Transmission. 7.35, La Bohème—Opera (Puccini), from the Staatstheater. In the interval at 8.35, News. 10.0, News; Sports Notes. 10.20, News. 10.40, Programme to be announced. 11.0, Concert by the Symphony Orchestra; Conductor, Spallart. 12 Midnight (approx.), Close Down.

NAPLES.—Relays Rome. NOTODDEN.—Relays Oslo.

OSLO

260 kc/s, 1,154 metres; 60 kW. Relayed by Hamar, 519 kc/s, 578 metres; and Jøløy, 6,990 kc/s, 42.92 metres.—11.15 a.m., Service. 11.50, Exchange. 12.55 p.m., Time. 1.0 to 2.0, Records. In the intervals at 1.15, Weather; Report for Farmers, and at 1.45, Exchange. 5.40, Hunting Stories. 6.0, Concert by a Saxophone Quintet. 6.30, Talk for Women. 7.0, Book Review. 7.15, Weather; News. 7.30, Time. 7.31, Concert. 8.0, Talk. 8.30, Concert by the Station Orchestra; Conductor, Kramm; Soloists, Edwin Fischer and Jan Hansen (Pianofortes); Concerto grosso in F Minor (Scarlatti); Concerto for Two Pianoforte and Orchestra (Bach); Ballet Suite (Gluck-Mottl). 9.20, Talk. 9.40, Weather. 9.45, News. 10.0, Topical Talk. 10.15, Concert by the Station Orchestra; Conductor, Kramm; Overture, Kakadu (Offenbach); Extract from The Bird Fancier (Zeller); Arab Fantasia (Naggiar); Marche joyeuse (Chabrier).

OSTERSUND.—Relays Stockholm.

PALERMO

565 kc/s, 531 metres; 4 kW.—12.45 p.m., News. 1.0 to 2.0, Concert of Light Music. In the interval at 1.30, Time; News. 5.30, Programme for Women. 5.40, Records. 6.10 to 6.30, Ballata Programme. 8.0, Announcements; Programme for Farmers; News. 8.20, Records. 8.30, Time; News; Records. 8.45, Crispiuo e la comare—

SEPT. 11th **TUESDAY** continued

Opera in Three Acts (Ricci) on Records. In the intervals, Talk; Announcements. 11.0, News.

PARIS

POSTE PARISIEN, 959 kc/s, 312.8 metres; 100 kW.—7.15 a.m., Fanfare. 7.20, Records. In the intervals at 7.30 and 8.20, News. 8.45, Cookery Hints. 12 Noon, Exchange. 12.5 p.m., Song Records. 12.25, News. 12.35, Records. 1.5, Exchange. 1.15, Records of Emma Boynet and Yvonne Curti. 1.35, Records. 2.0, Exchange. 3.15, Exchange. 3.45, Exchange. 4.50, Exchange. 6.25, Protestant Address. 6.45, Exchange. 6.49, Overture and Aubade from Le Roi d'Ys (Lalo) on Records. 7.10, News. 7.30, Records of Gino Bordin's Orchestra. 8.0, Interval. 8.10, Recital by the Eupen Male Voice Quartet. 8.25, Song Recital by Bourgade. 8.40, Exchange. 8.55, Quartet No. 2 (Fauré). 9.30, Interval. 9.40, Dance Music. 10.20, News; Exchange. 10.30 till Close Down, Programme in English, arranged by the International Broadcasting Company of London. 10.30, Records. 11.0, I.B.C. Good-night Melody and Close Down.

PARIS

RADIO-PARIS, 182 kc/s, 1,648 metres; 75 kW.—6.45 a.m., Gym. 7.0, Records. 7.15, Press Review; Weather. 7.45, Gym. 8.0 to 8.30, Records. 12 to 2.0 p.m., Symphony Concert; Conductor, Letombe. In the Interval at 1.20, Exchange. 3.45 to 3.50, Exchange. 6.20, Weather; Notes for Farmers; Talk; Exchange; Racing Results. 6.45, Records. 7.0, Talk; Paris. 7.30, Topical Talk. 8.0, Concert of Chamber Music: Soloists, Mme. Doniau-Blanc (Songs), Mme. Yvette Andreyor (Recitations), and Jean Doyen (Pianoforte); Quartet in F minor (Mendelssohn); Four Songs: Air (Caldara); Pastoral (Purcell); Ein Traum (Grieg); Die Prinzessin (Grieg); Recitations; Three Pieces for Pianoforte (Canal); Five Songs Nocturne (Chausson); Cigale (Chausson); Chanson (de la Presle); Pastourelle (Rabaud); Quintet (Cras). In the intervals at 8.30, Press Review; Weather; and at 9.15, News; Sports Notes. 10.30, Dance Music by the Victor Pascal Orchestra.

PITTSBURGH

KDKA, 980 kc/s, 306 metres; 50 kW. Relayed by W8ZK on 48.86 metres 25.27 metres. 3.0 p.m., Edward MacHugh. 3.15, Castles of Romance. 3.30, To-day's Children. 3.45, News; Cooking School. 4.0, Honeymooners. 4.15, Platt and Nierman. 4.30, Melody Mixers. 5.0, Field and Hall. 5.15, Merry Maes. 5.30, Vic and Sade. 5.45, Hotel William Penn Orchestra. 6.0, Market Reports. 6.15, Hou. Archie and Frank. 6.30, Farm and Home Hour. 7.30, KDKA Home Forum. 8.0, Sammy Fuller. 8.15, Congress of Clubs. 8.30, Jos. Gallicchio and Orchestra. 9.0, Betty and Bob. 9.15, Singing Stranger. 9.30, Market Reports. 9.45, Chicago Symphony Orchestra. 10.15, KDKA Kiddies' Klub. 10.30, The Singing Lady. 10.45, Orphan Annie. 11.0, Dan and Sylvia. 11.14, Baseball Resumé. 11.30, Twenty Fingers of Harmony. 11.45, Lowell Thomas. 12 Midnight, Stanley Metcalfe; News. 12.15 a.m. (Wednesday), Pittsburgh Varieties. 12.45, Frank Buck. 1.0 to 6.0, Popular Programme.

PORSGRUND.—Relays Oslo.

PONTOISE

RADIO COLONIAL, 15,244 kc/s, 19.68 metres; 15 kW. (1.30 to 5.30 p.m.); 11,905 kc/s, 25.20 metres (5.15 to 12 Midnight); and 11,705 kc/s, 25.63 metres (12.15 a.m. Wednesday to 6.0).—4.0 p.m., Orchestral Concert. Conductor: Clergue. Piece (d'Indy); La Nursery (Inghelbrecht); Spanish Dance (Fallá); Selection from Romeo and Juliet (Gounod); Abendlied (Schmitt); La housarde (Ganne); Selection from O Kay (Gershwin). 5.0, Interval. 6.30, Dramatic Programme. 8.0, Interval. 8.30, Programme from Paris (Ecole Supérieure). 5.0 to 6.0 a.m. (Wednesday), Pianoforte and Baritone Recital by Mile. Leroy and Zennaro.

POZNAN

868 kc/s, 345.6 metres; 16 kW.—6.45 a.m., See Warsaw. 7.50, Announcements; Records. 11.57, See Warsaw. 12.10 p.m., Records. 12.45 to 1.30, See Warsaw. 3.30, See Warsaw. 3.35, Market Prices; News. 3.45, See Warsaw. 5.25, Talk relayed from Łódź, 1,345 kc/s, 222.6 metres. 5.35, See Warsaw. 6.0, Programme for Farmers. 6.10, News. 6.15, See Warsaw. 7.30, Records. 7.45, Programme Announcements. 7.50, Programme to be announced. 7.55, Sports Notes. 8.0, Musical Letter Box. 8.15, Literary Programme relayed from Łwów, 795 kc/s, 377.5 metres. 8.45, See Warsaw. 10.0, Announcements; Records. 10.15, See Warsaw. 10.45, Talk. 11.0, See Warsaw. 11.30 (approx.), Close Down.

PRAGUE

638 kc/s, 470.2 metres; 120 kW.—6.0 to 7.15 a.m., Time; Gym.; Music; News. 9.50, News. 10.5, News in German. 10.10, Record. 10.15, Broadcast for German Schools. Motto; Talk; Folk Songs. 10.55, Records.

11.5, Concert by The Muzik Quartet. 11.55, Report for Farmers; Weather. 12 Noon, Time; Talk for Farmers. 12.10 p.m., Records. 12.20, News. 12.30, See Brno. 1.30, Industrial Review. 1.40, Records. 1.50, Exchange. 1.55, Exchange; Weather in German. 2.0, Interval. 3.15, Concert by the Station Orchestra: Conductor: Parik; Suite from Der Rosenkavalier (R. Strauss); Suite (Haba); Suite mignonne (Nedbal). 4.15, Exchange; Weather. 5.40, Records. 5.45, Household Hints. 5.50, Report for Farmers. 6.0, Record. 6.5, Talk for Workers. 6.15, Record. 6.20 to 6.55, German Transmission: Economic Notes; Chamber Music: Duet for Violin and Cello (Ravel); Sonata in D Minor for Violin and Pianoforte (Hindemith). 6.55, News in German. 7.0, Time: News. 7.10, See Brno. 7.25, Introductory Talk to the following Transmission. 7.30, The Dog Heads—Opera in Three Acts (Kovarovic), relayed from the Opera House; Conductor: Ostreil. 10.30, News; Sports Notes. 10.45, News in English. 11.0 (approx.), Close Down.

RJUKAN.—Relays Oslo.

ROME

Call IRO, 713 kc/s, 420.8 metres; 50 kW. Relayed by Naples, 1,104 kc/s, 271.7 metres; Milan (No. 2), 1,348 kc/s, 222.6 metres; Turin (No. 2), 1,357 kc/s, 221.1 metres; and 2RO, 11,810 kc/s, 25.4 metres.—7.30 a.m., Gym. 7.45, Time; News. 8.0, Interval. 12.30 p.m., Records. 1.5, See Milan. 1.30, Time; News; Exchange. 1.45, See Milan. 2.15, Interval. 4.30, Children's Radio Review. 4.55, News; Exchange. 5.5, Recitations. 5.15, Concert from Milan. 5.55, Weather. 6.0, Corn Prices. 6.10 to 6.15, Atmospheric Signals. 7.0, Announcements. 7.15, News in Foreign Languages. 8.0, News. 8.10, Records. 8.30, Government Notes. 8.45, Orchestral Concert: Overture, Le Baruffe Chiozzotte (Sinigaglia); Extracts from Helen of Egypt (R. Strauss); Rugby (Honegger); Intermezzo from The Jewels of the Madonna (Wolf-Ferrari); Petite Suite (Debussy). 9.0, Tosca—Opera (Puccini). 11.0, News.

RUYSSELEDE

10,330 kc/s, 29.04 metres; 8 kW.—7.45 p.m., News in French. 8.0, Records. 9.0, News in Flemish. 9.15 (approx.), Close Down.

SALZBURG.—Relays Vienna.

SCHENECTADY

WGY, 790 kc/s, 379.5 metres; 50 kW. Relayed at intervals by W2XAF on 31.48 metres; and on 19.56 metres.—7.0 p.m., Paul Whiteman and his Orchestra. 7.15, WGY Matinee Players. 7.30, Women's Radio Review; Talks; Records. 11.35, Exchange. 12 Midnight, Leo Reisman's Orchestra, with Phil Dwy. 12.30 a.m. (Wednesday), Wayne King and his Orchestra. 1.0 to 3.0 a.m., Popular Programme.

SOTTENS

677 kc/s, 443.1 metres; 25 kW.; and Geneva, 401 kc/s, 748 metres.—6.0 to 6.15 a.m., Gym. 12.29 p.m., Time from Neuchâtel Observatory. 12.30, News in French and German. 12.45 (from Geneva), Records. 1.0, Exchange. 1.3, Records. 2.0, Interval. 3.59, Time from Neuchâtel Observatory. 4.0, Concert by the Small Radio Lausanne Orchestra: Conductor: Moser; Overture, Boccaccio (Suppé); Waltz (Ziehrer); Potpourri (Dostal); Selection from Frederica (Lehár). 4.30, Jazz Music. 4.50, Records. 5.10, Concert by the Small Radio Lausanne Orchestra; Molly on the Shore (Grainger); Suite (de Micheli); Old Refrain (Kreiser); Selection from The Girl of the Golden West (Puccini); Russian Mazurka (Glinka). 5.45, Dance Music. 6.0 (from Geneva), Programme for Women. 6.30 (from Geneva), Talk. 7.0 (from Geneva), Talk: Mountaineering. 7.30, See Beromünster. 9.15, News in French and German. 9.30, See Beromünster. 10.15 (from Geneva), Talk: The Work of the League of Nations. 10.35 (approx.), Close Down.

STOCKHOLM

704 kc/s, 426.1 metres; 55 kW. Relayed by Boden and Östersund, 413.5 kc/s, 726 metres; Göteborg, 941 kc/s, 318.8 metres; Hörby, 1,131 kc/s, 265.3 metres; Motala, 216 kc/s, 1,389 metres; and Sundsvall, 601 kc/s, 499.2 metres.—7.20 a.m., Gym. 7.45, Service. 8.0, Weather. 12.30 p.m., Weather. 12.45, Exchange. 12.55, Time Signal. 1.0, Concert, relayed from Kalundborg. 2.0, Talk. 2.20, Concert of Light Music for Violin, Harmonium and Pianoforte. 2.45, Broadcast for Schools. 5.0, Weather. 5.5, Programme for Children. 5.30, Recital by Ella Dyberg-Heiberg (Songs) and Fischer (Pianoforte). 5.55, Reading. 6.15, Records. 7.15, Weather; News. 7.30, Discussion on Politics. 9.30, Kreisler Records. 9.45, Weather; News. 10.0, Discussion (cont'd.). 11.0 (approx.), Close Down.

STRASBOURG

859 kc/s, 349.2 metres; 15 kW.—10.30 a.m., Concert delayed from Toulouse PTT, 776 kc/s, 286.6 metres. 12 Noon, Records. 12.45 p.m., News. 1.0, Time; Exchange. 1.5 to 2.0, Orchestral Concert; Conductor, de Villers; Soloist, Grégoire (Violin); Overture, Boccaccio (Suppé); Selection from Les Dragons de Villars (Maillart); Waltz, Dreams on the Ocean (Gungl); Violin Solo: Czardas No. 2 (Monti); Ballet Music from Isoline (Messager); March (Pischeck). 4.45, Talk: Algeria. 5.0, Orchestral Concert relayed from Grenoble, 958 kc/s, 309.9 metres. 6.0, Legal Talk in German. 6.15, Topical Talk. 6.30, Orchestral Concert; Conductor, de Villers; Soloist: Caron (Oboe); Marche héroïque (Saint-Saëns); Suite, Musiques Foraines (Schmitt); Elegy for Oboe and Orchestra (Pillipucci) Pieces (Mussorgsky): (a) Scherzo, (b) Intermezzo, (c) Turkish March. 7.30, Time; News. 7.45, Announcements. 8.0, Press Review in German; Lottery Results; Announcements. 8.30, See Paris (Ecole Supérieure). 10.30 (approx.), Press Review.

STUTTGART

MUHLACKER, 574 kc/s 522.6 metres; 100 kW.—5.35 a.m., Notes for Farmers. 5.45, Hymn; Time; Weather. 5.50, Gym. 6.15, Concert by the Philharmonic Orchestra from Karlsruhe; Conductor, Zehn. 6.40, Announcements. 6.55, Concert (cont'd.). 8.10, Weather; Water-Level. 8.15, Gym. 8.35, Announcements; Records. 9.5, Interval. 10.0, News. 10.10, French for Schools. 10.35, Liszt Pianoforte Recital by Hans Barth. 11.0, Paul Halm Concert by a String Quartet; Soloists, Brunhild Mökesch (Soprano), Rothweiler (Pianoforte), and Hubl (Violin); Prelude and Fugue: Three Songs; Sonata for Violin and String Quartet. 11.30, See Berlin (Deutschlandsender). 11.55, Weather. 12 Noon, Orchestral Concert: Conductor, Barthelmeus; Radetzky March (Joh. Strauss); Song, O schöne Zeit, o selige Zeit (Götze); Selection from Die Puppenfee (Bayer); Waltz, Wiener Madln (Ziehrer); Ständchen (Heykens); Overture, Maritana (Wallace); March (Schmeling). 1.0 p.m., Time; Local News. 1.5, News; Weather. 1.20, Records of Light Music. 1.50, Time; News. 2.0 to 2.30, Records. 3.30, Talk: Flowers. 4.0, See Munich. 5.30, Poems to Music. 5.50, Records of Franz Völker. 6.0, Travel Talk: From the Golden Horn to Calcutta. 6.15 to 6.45, See Frankfurt. 6.45, Neapolitan Folk Tunes by Lingor (Tenor), Hantz (Mandoline) and Ladewig (Pianoforte). 7.15, Rosen im Tal—Mädchen im Saal—Sequence (Kühnert). 7.45, Time; Weather; Notes for Farmers. 8.0, News. 8.10, Opera and Operetta Music by the Station Orchestra; Conductor, Hahn: Overture, The Merry Wives of Windsor (Nicolai); Selection from The Gipsy Baron (Joh. Strauss); Ballet Music from Undine (Lortzing); Overture, Die schöne Galathee (Suppé); Overture, Abu Hassan (Weber); Extracts from Die Drei Pintos (Weber); Waltz from Wiener Blut (Joh. Strauss); Overture, Il Seraglio (Mozart); Waltz from Der Opernball (Heuberger); Overture, The Barber of Bagdad (Cornelius); March from The Gipsy Baron (Joh. Strauss). 9.40, Reinald und Armida—Play (Reinacher), with Incidental Music by Rudolph; The Station Orchestra and Soloists; Conductor, Seyfert. 10.20, Time; News. 10.35, News. 10.45, Dance Records. 11.30, In the Mountains—Musical Sequence (Schoeck) by Rieth (Bass) and Haagen (Pianoforte). 12 Midnight, Concert from Frankfurt. 1.0 a.m. (Wednesday), Close Down.

TOULOUSE

913 kc/s, 328.6 metres; 10 kW.—8.0 a.m., Dance Refraus. 8.30, News. 8.35, Operetta Arias; Orchestral Music. 12 Noon, Opera Arias. 12.15 p.m., Orchestral Music. 12.30, News. 12.45, Request Music. 1.0, News. 1.5, Songs. 1.15, Military Music. 1.30, Sound Film Music. 1.45, Accordion Solos. 2.0, News; Amusement Guide. 6.0, News. 6.15, Opera Music: Selection from Samson and Delilah (Saint-Saëns); Adagio from L'Arlesienne (Bizet); Ballet Music from Lakmé (Delibes); Prelude to Act IV, Werther (Massenet). 6.30, Chansonettes. 6.45, Orchestral Music: March (Messier); Symphonic Waltz Suite (Melichar); Jealousy (Gade); The Mill in the Black Forest (Eilenberg). 7.0, Operetta Arias. 7.15, Orchestral Music. 7.30, News. 7.45, Opera Music: Arias from Les Brigands (Offenbach), Martha (Flotow), and I Pagliacci (Leoncavallo); Duet from Werther (Massenet). 8.15, Cello Recital: Air from Fortunio (Messager); Trümerle (Schumann); Abendlied (Schumann); Andalusia (Granados); Sonata (Benedetto); Prelude (Corelli). 8.30, Songs. 9.0, Concert Version of The Merry Widow—Operetta (Lehár). 9.30, Military Music. 10.0, Sound Film Music. 10.15, News. 10.30, Light Music. 11.0, Cinema Organ Solos. 11.15, Humorous Sketches. 11.30, Orchestral

Music. 11.50, Choral Music. 12 Midnight, News. 12.5 a.m. (Wednesday), Au caveau de minuit—Radio Fantasy. 12.15, Operetta Music: Selection from Enlevez-moi (Gaba-roche); Overture, Orpheus in the Underworld (Offenbach). 12.30 (approx.), Close Down.

TRONDHEIM.—Relays Oslo. **TURIN**.—Relays Milan.

VATICAN CITY

15,120 kc/s, 19.84 metres; 10 kW. (Morning); 5,970 kc/s, 50.26 metres (Evening).—11.0 to 11.15 a.m., Religious Information in English. 8.0 to 8.15 p.m., Religious Information in Italian.

VIENNA

592 kc/s, 506.8 metres; 120 kW. Relayed by Graz, 886 kc/s, 338.6 metres; Innsbruck, 519 kc/s, 578 metres; Klagenfurt, Linz and Salzburg, 1,294 kc/s, 231.8 metres.—9.0 a.m., News. 9.20, Market Prices. 9.30, Weather. 10.50, Water Level. 11.30, Records of Folk Dances. 11.55, Weather. 12 Noon, Concert by the Vienna Symphony Orchestra; Conductor, Holzer; Soloist, Rosner (Violin); Overture, Der Lebewand (Grünfeld); Serenade (Buchbinder); Am Springbrunnen (Ast); Joh. Strauss Potpourri (Morena); Mémoire (Byford); Spanish Dances (Moszkowski); Selection from Opernball (Heuberger). 1.0 p.m., Time; Weather; Announcements. 1.10, Concert (cont'd.): March (Benedikt); Waltz, Rosenblätter (Wacek); Viennese Song (Flemming); Overture, Eva (Lehár); Concert Ländler (Lange); Marching Song (Gray); Selection from Der Obersteiger (Zeller). 2.0, Announcements. 3.30, Time; Weather; Exchange. 3.50, Programme for Women. 4.10, News. 4.15, Pianoforte Recital for Young People by Marianne Kuranda: Song and Fanfare (Couperin); Die Jagd (L. Mozart); Contredanse (Beethoven); Novellette (Schumann). 4.40, Recital by Hedwig Krauszler (Violin), König (Cello) and Miller (Pianoforte); Duet in D for Violin and Cello (Haydn); Suite in the Old Style, Op. 19 (Sieg); Five Pianoforte Pieces (Brahms): (a) Intermezzo, Op. 118, No. 1, (b) Rhapsody, Op. 78, No. 2, (c) Intermezzo, Op. 119, No. 1, (d) Romance, Op. 118, No. 5, (e) Intermezzo, Op. 119, No. 3. 5.25, Talk: Early Days of Steam Engines in England. 5.50, Records of Light Music. 6.50, Talk: Magna Mater Austriae. 7.15, Announcements. 7.35, Time; News. 7.45, Verdi and Puccini Concert by the Vienna Symphony Orchestra; Conductor, Audereth; Soloists, Rose Merker (Soprano), Skriwanek (Tenor), and Staeren (Baritone); Commentary by Ernst Decsey: Overture and Duet from The Force of Destiny (Verdi); Two Arias from A Masked Ball (Verdi); Aria and Duet from Tosca (Puccini); Extracts from Madame Butterfly (Puccini), Manon Lescaut (Puccini), Il Trovatore (Verdi), Luisa Miller (Verdi). 9.30, The Viennese Woods—Sequence. 10.30, News. 10.50, Concert by the Viennese Chamber Orchestra: Conductor, Jascha: Overture, Egmont (Beethoven); Selection from Hansel and Gretel (Humperdinck); Four Pieces from Pierrette's Veil (Dohnányi); Kaiser-Walzer (Joh. Strauss); Song and Tango (Jascha); Selection from The Count of Luxembourg (Lehár); Marching Song, Unter der lachenden Sonne (Eisele). 12 Midnight, Light Music by the Wichart Quartet; Soloist, Forst (Songs). 1.0 a.m. (Wednesday), Close Down.

WARSAW

223 kc/s, 1,345 metres; 120 kW.—6.45 a.m., Hymn; Records. 6.58, Gym. 7.8, Records. 7.15, News. 7.25, Records. 7.35, Hints for Housewives. 7.40, Programme Announcements. 7.50 to 8.0, Announcements; Concert. 11.57, Time. 12 Noon, Fanfare from St. Mary's Church, Cracow; Weather; News. 12.10 p.m., Extracts from Sound Films. 12.45, Musical Programme for Children. 1.0, News. 1.5, Symphony No. 2 in D (Beethoven) on Records. 1.30, Interval. 3.30, Announcement; Exchange. 3.45, Concert of Chamber Music by the Adamska-Grossmanova Ensemble; Suite (Knämlann); May Song (Armandola); Air de Ballet (Massenet); Romantic Waltz (Lanner); Serenade (Tosti); Viennese Dance (Friedman-Gärtner); Hungarian Rhapsody (Popper). 4.45, Savings Bank Letter Box. 5.0, Symphonic Etudes Op. 13 (Schumann) by Irene Kaszowska (Pianoforte). 5.25, Sociological Talk relayed from Łódź, 1,348 kc/s, 222.6 metres. 5.35, Lithuanian Rhapsody (Karłowicz) on Records. 5.50, Wireless Notes. 6.0, Talk for Farmers. 6.15, String Quartet in G minor Op. 10 (Debussy), by the Warsaw Kaminski Quartet. 6.45, War Reminiscences (Janowski). 7.0, Song Recital by Berta Graginska. 7.20, Topical Talk. 7.30, Records. 7.45, Programme Announcements; Sports Notes. 8.0, Music Letter Box. 8.15, Literary Programme relayed from Łwów, 795 kc/s, 377.4 metres. 8.45, News. 8.55, Talk: Work in Poland. 9.0, Talk with Music: The Charm of Java. 10.0, Concert. 10.15, Dance Music relayed from Le Paradis, Warsaw. 10.45, Talk in a Foreign Language. 11.0, Weather Notes for Aviation. 11.5, Dance Music (cont'd.).

ZURICH.—Relays Beromünster.

WEDNESDAY
SEPTEMBER THE TWELFTH

ATHLONE

565 kc/s, 531 metres; 60 kW. Relayed by Dublin, 1,348 kc/s, 222.6 metres; and Cork, 1,240 kc/s, 241.9 metres.—1.30 to 2.30 p.m., Time; Weather; Exchange; Records. 6.0, Programme for Children. 6.45, News. 7.0, Irish Lesson. 7.15, German Lesson. 7.30, Time. 7.31, Concert by the Station Orchestra. 8.0, T. J. Walsh (Tenor). 8.15, Piano-forte Recital by F. M. May. 8.30, The Travellers—presented by Mary O'Hea and Company. 9.0, Recital by Dorothy Tresder (Piano-forte) and S. Jameson (Songs). 9.30, Irish Music by the Station Orchestra. 10.0, Variety Programme. 10.30, Time; News; Weather. 10.40, Variety Programme by Earls and Thornton. 11.0 (approx.), Close Down.

BARCELONA

795 kc/s, 377.4 metres; 5 kW.—8.15 a.m., News; Records. 9.0, Chimes; Gym.; Records. 9.20, News; Records. 10.0, Obituary. 12 Noon, Chimes; Weather. 1.0 p.m., Programme for Women. 2.0, Records. 2.30, Theatre Notes; Amusement Guide; Records. 3.0, Sextet Concert. In the Interval, Topical Talk. 4.0, Programme for Hospitals. 5.0, News; Exchange; Interval. 7.0, Violin and Piano-forte Recital by Jarque and Coma; Indian Lament (Dvorak-Kreisler); Mazurka (Wieniawski); Berceuse (Faure); Serenata (Ferret); Le dernier sommeil de la vierge (Massenet); Theme with Variations (Paganini). In the Interval at 7.30, News. 8.0, Request Records. 8.30, Exchange. 9.0, Talk. 9.10, Request Records. 9.45, Press Review. 10.0, Chimes; Weather. 10.5, Announcements; Exchange. 10.10, Concert by the Station Orchestra: March (Elliott); Selection from Xuanon (Moreno-Torralba); Waltz (Lincke); Ecos del Cantabrico (Fernandez); Serenata (Palau); Oriental (Cui). 11.0, Two One-Act Comedies (Solier). 1.0 a.m. (Thursday), News. 2.0 to 3.0 a.m., Programme in English arranged by the International Broadcasting Company of London. 2.0, Mandoline Band. 2.15, Fifteen Minutes with Gracie Fields. 2.30, In a Clock Store. 3.0, I.B.C., Goodnight Melody and Close Down.

BASLE.—Relays Beromünster.

BERLIN

DEUTSCHLANDSENDER, 191 kc/s, 1,571 metres; 60 kW.—5.45 a.m., Weather; News. 6.0, Gym. 6.15, Motto. 6.20 to 8.0, See Königsberg. In the interval at 7.0, News. 8.45, Gym. for Women. 9.0, Interval. 9.40, Gym. for Children. 10.0, News. 10.10, See Stuttgart. 10.50, Programme for Children. 11.15 to 11.30, Weather. 11.55, Weather. 12 Noon, See Leipzig. 12.55 p.m., Time. 1.0, Selection from Cavalleria rusticana (Mascagni), on Records. 1.45, Weather; News. 2.0, Interval. 2.45, Greetings; Announcements. 3.0, Weather; Exchange. 3.15, Children's Songs. 3.40, Wurlitz Organ Records: Piece (Thomson); Ninetta (Maud); Estrellita (Ponce); Chant sans Paroles (Tchaikovsky); Simple aveu (Thomé); Japanese Puppet Play (Yoshitomo). 4.0, See Königsberg. In the interval at 5.0, Topical Talk. 6.0, Talk: Recent Excavations. 6.20, Symphonic Poem. The Moldau (Smetana), on Records. 6.40, Discussion: The German National Theatre, 1934-35. 7.0, Concert by the Station String Quartet and Ernst Schauss (Harmonium): Adagio and Rondo (Mozart); Adagio and Rondo (Weber). 7.30, Elementary Italian Lesson. 8.0, News. 8.10, See Frankfurt. 8.35, German Calendar—September. 9.35, Programme for Young People (on Records)—The Peasantry. 10.0, News; Sports Notes. 10.30, Wireless Notes. 10.45, Weather. 11.0, Dance Music, relayed from Leipzig. 12.30 a.m. (Thursday), Close Down.

BERLIN

FUNKSTUNDE, 841 kc/s, 356.7 metres; 100 kW.—6.0 a.m., Hymn; Gym. 6.15, Weather; Meditation. 6.20, See Königsberg. In the interval at 7.0, News. 8.0, Gym. 8.20 to 8.35, Physical Culture. 9.0 to 9.40, The Mark District Moors—Sequence. 9.50, News. 10.0, Market Prices. 10.10, See Stuttgart. 10.50, Records; Announcements. 11.25 to 11.30, Exchange. 12 Noon, Concert by the Andrae Orchestra. In the interval at 12.30 p.m., Weather. 1.0, News. 1.15, Records. 2.0, News. 2.15, Schumann and Chopin Records. 3.0 to 3.20, Exchange. 4.0, Military Band Concert, relayed from the Spreegarten, Treptow; Conductor, Jolli. In the interval, Talk: A Woman's Experience as Cabin Boy. 5.40, Across the Desert—Report by a Sports Instructor. 6.0, Announcements. 6.5, Women Workers at the Microphone. 6.30, Leopold and Wolfgang Mozart Concert; The Station Orchestra; Conductor, Frickhoffer; Divertimento militaire (Leopold Mozart); Symphony in E flat (Mozart). 7.20, Folk Songs. 7.40, Echoes of the Day. 8.0, News. 8.10, See Frankfurt. 8.35, See Berlin (Deutschlandsender). 9.0, Concert by the Berlin Landesorchester; Conductor, Havemann; Soloist, Zernick (Violin): Prelude (Höfer); Symphonic Poem, Münchenhausen (Wedding); Violin Concerto No. 7 in E minor (Spohr); Variations and Fugue on a Theme of Beethoven, Op. 86 (Reger). 10.20, News; Sports Notes. 10.50, Concert by the Small Station Orchestra; Conductor, Steiner; March (Olias); Overture, Jocosia (Clemens); Ballet Suite from Girolle - Girolfa (Leococ); Bagatelle (Sköld); Waltz, Nordseebilder (Strauss); Indian Suite (Lilling); Hymn to

the Sun (Kick-Schmidt); Aus einem Märchenbuch (Kark); Tanzklänge aus Berchtesgaden (Pachernegg); Intermezzo (Kodaly); Tánalei (Sommer). 12 Midnight, Dance Records. 1.0 a.m. (Thursday), Close Down.

BERNE.—Relays Beromünster.

BEROMUNSTER

556 kc/s, 539.6 metres; 60 kW.—6.0 a.m. till Close Down, Programme from Sottens.

BODEN.—Relays Stockholm. **BODO.**—Relays Oslo.

BRATISLAVA

1,604 kc/s, 298.8 metres; 13.5 kW.—6.0 to 7.15 a.m., See Prague. 9.45, Announcements. 9.50, See Prague. 10.10, News in Hungarian. 10.15, See Prague. 10.30, See Moravská-Ostrava. 11.0, Water Level. 11.5, Concert by the Station Orchestra; Conductor, Dyk: Overture, Eva (Lehár); Selection from The Dollar Princess (Fall); Waltz (Provaznik); The Corsair (Vojacek). 12 Noon, See Prague. 12.5 p.m., Literary Programme for Farmers. 12.10, News in Slovak. 12.15, Record. 12.20, See Prague. 1.20, Records. 1.30, See Prague. 1.40, News and Weather in German and Hungarian. 1.50 to 2.0, See Prague. 3.15, See Moravská-Ostrava. 4.15 to 4.20, See Prague. 4.40, See Prague. 5.40, Records. 5.50, Reading. 6.5, Record. 6.15, Hungarian Transmission: Talk; Song Recital by Paranyi; History Talk. 6.55, See Prague. 7.10, Recitations. 7.20, Concert by the Orpheus Mandoline Orchestra. 7.55, See Prague. 8.10, Piano-forte Recital by Pistekák. 8.30, Play (Karl). 9.0, Concert by the Station Quartet: String Quartet in D Minor (Stacek); String Quartet in E, Op. 80 (Dvorák). 10.0, See Prague. 10.45, News in Hungarian. 11.0 (approx.), Close Down.

BREMEN.—Relays Hamburg.

BRESLAU

950 kc/s, 315.8 metres; 60 kW. Relayed by Gleiwitz, 1,231 kc/s, 243.7 metres.—5.0 a.m., Hymn; Motto. 5.10, Records. In the interval at 5.40, Time; Weather. 6.0, Time; Weather; Gym. 6.25, Orchestral Concert. In the intervals at 7.0, Time; News; and at 8.0, Cookery Hints. 8.40, Gym. for Women. 9.0, Time; News. 10.10 to 10.50, See Stuttgart. 11.30, Time; News. 11.45, Talk for Farmers. 12 Noon, Orchestral Concert; Conductor, Weisshaupt: March, Weltenstürmer (Blankenburg); Overture, The Merry Wives of Windsor (Nicolaï); Sword Dance (Poldini); Ballet Music from La Gioconda (Ponchielli); Overture, Sempiramis (Rossini); Caucasian Sketches (Ippolitov-Ivanov); Waltz from The Arabian Nights (Joh. Strauss); March, Rudolfsklänge (Herzer). In the interval at 12.30 p.m., Time; Weather. 1.30, Time; News. 1.45, Orchestral Concert (contd.): Overture, Die schöne Galathee (Suppe); Waltz, Etincelles (Waldteufel); Marmelades Luftchen (Jensen); Ein Jahrfest im Dorfe (Hruby); Selection from Ihre Hoheit die Tänzerin (Goetze). 2.20, Exchange. 2.25, Announcements; Records. 2.50, Market Prices. 3.10, Book Review. 3.30, Handwork Programme for Children. 4.0, See Hamburg. 5.30, Announcements. 5.35, Talk. 5.55, Talk: Germany's Rivers and Lakes. 6.20, Humorous Tales in Dialect. 6.35, Programme to be announced. 6.50, Announcements. 7.0, New Records. 8.0, News. 8.10, See Frankfurt. 8.35, See Berlin (Deutschlandsender). 9.0, Hutten's letzte Tage—Cantata for Baritone and Orchestra (Reuter); Station Orchestra; Conductor, Prade; Soloist, Gerhard Berbermann (Baritone). 10.0, Reading from Die Wanderung des Herrn Ulrich von Hutten (Will Vesper). 10.20, Time; News. 10.45, Dance Music by the Station Band; Conductor, Ilgner. 12 Midnight, Close Down.

BRNO

922 kc/s, 325.4 metres; 32 kW.—6.0 a.m. to 7.15, See Prague. 9.50, See Prague. 10.30, See Moravská-Ostrava. 11.0, Record. 11.5, See Bratislava. 12 Noon, See Prague. 12.5 p.m., Report for Farmers. 12.10, See Prague. 1.20, Records. 1.30, Labour Exchange. 1.40, Records. 1.50, See Prague. 2.0 to 2.5, Report for Farmers. 3.15, See Moravská-Ostrava. 4.15 to 4.20, See Prague. 5.40, Notes for Housewives. 5.45 to 6.20, German Transmission. 5.45, Talk: Carpathian Russia. 6.5, Talk. 6.20, Records. 6.45, Talk for Workers. 6.55, See Prague. 8.10, Serenade in D, Op. 25, for Flute, Violin and Viola (Beethoven). 8.30, Recital by the Brno Speaking Choir. 9.0, Concert by the Station Orchestra: Overture, Im Herbst (Grieg); Second Movement from the Pastoral Symphony in F, No. 6 (Beethoven); Slav Dance No. 9 (Dvorák); Piece (Jindrich); Moravia (Dvorák-Leopold); Waltz, Tales from the Vienna Woods (Joh. Strauss). 10.0 to 11.0, See Prague. 11.0 (approx.), Close Down.

BRUSSELS (No. 1)

620 kc/s, 483.9 metres; 15 kW.—11.55 a.m., Weather. 12 Noon, Orchestral Concert; Soloist, Mme. Condé (Songs); Suite from La Cigale (Massenet); Divertissement flamand (Widor); Selection from Flower of Hawaii (Abraham); Songs: (a) L'invitation au Voyage (Duparc); (b) Chanson perpétuelle (Chausson); In Fairyland (Tapp); Suite, Old China (Niemann); Selection from Coups de roulie (Messager); Paysages wallons (De Taeye). 1.0 p.m., News. 1.10, Records. 2.0, Interval. 4.55, Announcements. 5.0, Records. 6.0, Talk: The Wars. 6.15, Orchestral Concert; Soloist, Jenny Sossat (Songs): Finnish Potpourri (Herrmann); Humorous Piece (Sibéius); Popular Czech Airs (Leopold); Songs: (a) Autonne (Faure); (b) Le Temps des lilas (Chausson); (c) Song (Frings); (d) Neige (Devauw); (e) Two Songs (Georges); Selection from Sadko (Rimsky-Korsakov); Ukrainian Potpourri (Leopold); International Suite (Tchaikovsky). 7.15, Records. 7.30, Medical Review; Week-end Review. 8.0, Records. 8.15, King Leopold II of Belgium—Sequence (Theo Fleischmannafter, the Book by Daye). 9.35, Records. 10.0, News. 10.10, Dance Records. 11.0, Close Down.

BRUSSELS (No. 2)

932 kc/s, 321.9 metres; 15 kW.—Programme in Flemish.—11.57 a.m., Weather. 12 Noon, Records. 1.0 p.m., News. 1.10, Concert by the Station Orchestra; Soloist, Feremans (Songs): Italian March (Rousseau); Selection from Sunny (Kern) and Phlyrnyé (Saint-Saens); Three Songs (Feremans); Gavotte (Maly); Parade of the Tin Soldiers (Jessel); Sérénade florentine (Godard); Selection from Madame Butterfly (Puccini). 2.0, Interval. 4.55, Announcements. 5.0, Violin Recital by Walter Weyler: Concerto in C (Vivaldi-Kreisler); The Fountain of Arethusa (Szymanovsky); Spanish Dance (Falla-Kreisler). 5.30, Acts 1 and 3 of Siegfried—Opera (Wagner) on Records. 7.30, Football in Belgium—an Interview with M. Goetinck, Trainer of the Belgian Team. 8.0, Orchestral Concert; Soloist, Van Roy (Piano-forte); Overture. Oberon (Weber); Piano-forte Concerto in E flat (Liszt); Variations (Brahms). 8.45, Recitations. 9.0, Orchestral Concert of Czech Music. Part I—Dvorák. Carnival Overture; Humoresque; Four Popular Dances. Part II—Smetana. Ballet Music from The Bartered Bride; Symphonic Poem, The Moldau; Ballet Music from The Two Widows. 10.0, News. 10.10, Dance Records. 11.0 (approx.), Close Down.

BUCHAREST

823 kc/s, 364.5 metres; 12 kW.—12 Noon, Water Level; Records. 12.45 p.m., Amusement Guide; Exchange; Records. 1.15, Time; Weather; News. 1.40, Records. 5.0, Concert by the Station Orchestra: Overture, Die Felsenmühle (Reissiger); Ein Abend in St. Petersburg (Meyer-Helmund); Selection from I Pagliacci (Leoncavallo); Potpourri (Morena). 6.0, Time; Weather; News. 6.20, Concert (contd.): Selection from The Circus Princess (Kálmán); Delirium-Walzer (Jos. Strauss); Gavotte in D minor (Bach); March (Stelzger). 7.0, Educational Programme. 7.15, Records. 7.45, Talk. 8.0, Chopin Recital by Midle. Madeleine Cocorascu (Piano-forte): Sonata No. 2 in B flat minor, Op. 35; Polonaise in A flat, Op. 53. 8.13, Talk. 8.45, Song Recital by Georges Folescu. 9.15, 'Cello Recital by Georges Cocea: Sicilienne (Pergoleso); Adagio and Allegro (Schumann); Grave (Tartini); Berceuse (Faure); Tarantella (Popper). 9.45, News. 10.15, Light Music relayed from a Restaurant.

BUDAPEST

546 kc/s, 549.5 metres; 120 kW.—6.45 a.m., Gym. 9.45, News. 10.0, Talk. 10.40, Talk. 11.10, Water Level. 12 Noon, Chimes. 12.5 p.m., Balalaika Concert. 1.30, Orchestral Concert. 2.40, Market Prices; Cookery Hints. 4.0, Programme for Students. 5.0, Talk. 5.35, Concert by the Kalmar Balazs Quintet. 6.30, Talk. 7.5, Piano-forte Recital by Ornella Puliti. 7.50, Notas Kapilany—Operetta in Three Acts (Farkas). Conductor, Franz Kiss. 10.15, Concert by the Lajos Kiss Cigány Band. 10.45, Concert by the Opera House Orchestra. Conductor, Otto Berg.

CASSEL.—Relays Frankfurt.

COLOGNE

658 kc/s, 455.9 metres; 60 kW.—5.30 a.m., Gym.; Records. 6.5, Gym. 6.25, See Breslau. In the interval at 6.50, Time; News. 8.0, Time; Announcements. 8.5, Gym. for Women. 8.20 to 8.30, Talk for Women. 10.0, Time; News. 10.10, See Stuttgart. 10.50, Song and Piano-forte Recital. 11.10, Talk: Laws of Inheritance. 11.30, Announcements. 12 Noon, Records. 12.45 p.m., Announcements; Greetings. 1.0, Concert by the Small Station Orchestra; Conductor, Eysoldt.

In the interval at 1.45, News. 3.0, Gym. for Young People. 3.30, Exchange. 3.50, Topical Talk. 4.0, See Königsberg. 5.0, Book Review. 5.15, Hermann Möskes Recital for his Seventy-fifth Birthday; Johanna Marie Unkel (Contralto), Hans Haass (Piano-forte), and Gerda Schüler-Rehm (Soprano): Contralto Songs: (a) In meiner Seele lebt ein Lied, (b) Die Träne, (c) Trübnerei, (d) Jedemal wenn ich dich sehe, (e) Gute Nacht; Piano-forte Solos: (a) Capriccio in Waltz Form, (b) Elfenspiel; Soprano Songs: (a) Mein Engel, (b) Es fiel das letzte Blatt vom Baum, (c) O, dann vergib. 5.45, Talk: The Advances of Science. 6.0, Talk: Economics. 6.20, Two Fables (Gurk). 6.40, Topical Talk. 6.50, Announcements. 7.0, Dance Music by the Station Chamber Orchestra; Conductor, Hartmann. 8.0, News. 8.10, See Frankfurt. 8.35, See Berlin (Deutschlandsender). 9.0, Concert by the Station Orchestra. 10.0, Time; News. 10.20, Records. 11.0, Old German Love Poems and Songs—Sequence (Anne von Werden). 12 Midnight, Close Down.

COPENHAGEN.—Relays Kalundborg. **GORK.**—Relays Athlone. **DANZIG.**—Relays Königsberg. **DRESDEN.**—Relays Leipzig.

FECAMP

1,456 kc/s, 206 metres; 10 kW.—11.30 a.m. to 12 Noon, Programme in English arranged by the International Broadcasting Company of London. 11.30, Request Programme. 12 Noon to 4.30 p.m., Programme in French. 4.30 to 6.0, Programme in English by the I.B.C. 4.30, Isle of Wight, Portsmouth and Southsea Concert: Part 1—Favourite Extracts from Verdi's Operas. 5.0, Part 2—Dance Music. 5.30, Part 3—Light Orchestral Music. 6.0 to 11.0, Programme in French. 11.0 till Close Down, Programme in English by the I.B.C. 11.0, Talkie Time: Tunes from the Talkies and Shows. 11.30, Dance Music. 12 Midnight, Club Concert for Manchester Listeners: Part 1—Variety (Gramophone Records). 12.30 a.m., I.B.C., Time Signal. 12.31, Part 2—Dance Music. 1.0, I.B.C. Goodnight Melody and Close Down.

FLENSBURG.—Relays Hamburg. **FLOR-ENGE.**—Relays Milan.

FRANKFURT

1,195 kc/s, 261 metres; 17 kW.—5.45 a.m., Hymn; Time; Weather. 5.50, Gym. 6.40, Time; Announcements. 6.55, Military Band Concert from Cassel. 8.10, Announcements. 8.15 to 8.35, Gym. 10.0, News. 10.10, See Stuttgart. 10.50, Household Hints. 11.0, Concert. 11.30, Announcements. 11.45, Social Notes. 12 Noon, See Stuttgart. 1.0 p.m., Time; News. 1.20, Lincke Concert; Conductor, Wilde; March, Kwang Ili; Overture, Lysistrata; Waltz, Deutsche Grösse; Ballet Music from Frau Luna. 1.50, Time; News. 2.0, Lincke Concert (contd.). Overture, Gri-Gri; Siamesische Wachtparade; Intermezzo, Fraunreuther Porzellan; Waltz, La Gran Via; March, Vater Rhein. 2.30, Economic Review. 2.45, Time; Exchange. 2.55, Weather. 3.10, Freiburg-Kaiserslautern-Cassel Inter-Relay Programme; Alsatian Humorous Programme from Freiburg; Sonata in A (Franck) by Alphonse Hoffmann, from Kaiserslautern; Hessian Programme from Cassel. 4.0, See Stuttgart. 5.30, Choral Play for Young People. 6.30, Discussion: State Railways. 6.45, Announcements. 6.50, Concert by the Station Orchestra; Conductor, Caspar. 7.45, Topical Talk. 8.0, News. 8.10, Local Notes. 8.35, See Berlin (Deutschlandsender). 9.0, See Breslau. 10.0, Choral Concert of Alsatian Folk Songs. 10.20, Time; News. 10.35, See Stuttgart. 10.45, News. 11.0, Tchaikovsky Concert; The Station Orchestra and Soloists; Conductor, Rosbald. 12 Midnight, See Stuttgart. 1.0 a.m. (Thursday), Close Down.

FREDRIKSSTAD.—Relays Oslo. **FREIBURG.**—Relays Stuttgart. **GENEVA.**—Relays Sottens. **GENOA.**—Relays Milan. **GLEIWITZ.**—Relays Breslau. **GÖTEBORG.**—Relays Stockholm. **GRAZ.**—Relays Vienna. **HAMAR.**—Relays Oslo.

HAMBURG

904 kc/s, 331.9 metres; 100 kW. Relayed by Bremen, Flensburg, and Hanover, 1,330 kc/s, 225.6 metres.—5.45 a.m., Time; Announcements. 6.0, Gym. 6.15, Time; Weather. 6.20, See Königsberg. In the interval at 7.0, Time; News. 8.0, Weather; Talk for Housewives. 8.10, Announcements; Records. 10.50, News. 11.0 (from Bremen), English Broadcast for Schools—Exciting Tales about Animals. 11.30, Schubert Records. 12 Noon, Household Hints. 12.5 p.m., Time; Weather; Shipping. 12.15, Concert relayed from Berlin (Funkstunde). 1.0, Exchange; Market Prices. 1.15, Weather. 1.20, Popular Music. 2.15, News. 2.30, Records. 3.0, Exchange. 3.40, Shipping; Aviation. 4.0, Concert by the Station Symphony Orchestra. Conductor: Eibenschütz. Overture, Undine (Lortzing); Extract from the Suite, Von der Nordsee (Koch); Und wenn die Welt voll Teufel wär' (S. Wagner); Norwegian Rhapsody (Reidarson); Overture, Der lustige Krieg (Joh. Strauss); Rocco Serenade (Meyer-Helmund); Extracts from the Märchenland Suite (Wibeorn); Waltz, Paysage d'automne (Waldteufel). 5.30, Cookery Talk: Fish Recipes. 5.50, Concert of Old Mecklenburg Folk Songs by a Students' Choir. Soloists: Brinckmann and Rusch (Fiddles). 6.30, Records. 6.45, Ex-

change; Weather. 7.0 (from Kiel), Military Band Concert. Conductor: Schierhorn. 8.0, News. 8.10, See Frankfurt. 8.35, See Berlin (Deutschlandsender). 9.0, The Fond Relations—Comedy (Benedix), arranged for Radio by Hans Weissbach. The Station Choir. Conductor: Gregor. 10.0, News. 10.20, Light Music. 11.0, Concert by the Zebisch Orchestra: Overture, Masaniello (Auber); Schnerbert Potpourri (Urbach); Waltz Rhapsody, Pusztta-Legenden (Lindsay-Thermer); Joh. Strauss Operetta Potpourri (Schlögel); Egerländer-Marsch (Wagnitz). 12 Midnight, Close Down.

HANOVER.—Relays Hamburg.

HILVERSUM

160 kc/s, 1,875 metres; 7 kW. (until 3.40 p.m.). Transmitted on Kootwijk, 50 kW. from 3.40 p.m. to 9.40 a.m., Programme of the Workers' Radio Society (V.A.R.A.). 7.40, Records. 9.10, Cookery Hints. 9.40, Religious Programme of the Liberal Protestant Radio Society (V.P.R.O.). 9.55 till Close Down. V.A.R.A. Programme. 9.55, Variety Programme for Night Workers. 11.40, Concert by the V.A.R.A. Ensemble: Extase (Bizet); Extase (Ganne); Love Song (Albéniz); Love Song (Zarzycki); Au printemps (Gonod); To Spring (Grieg); Records; Adoration (Borowski); Adoration (La Gelle); Abendstücken (Eilenberg); Evening Bells (Williams); Mandoline Serenade (Désormes); Mandoline Serenade (Eilenberg). 12.40 p.m., Orchestral Concert. Conductor: Van der Horst. 1.25, Interval. 1.40, Programme for Women. 1.55, Orchestral Concert. Conductor: Wins. March (Oscheit); Waltz, Mon rêve (Waldteufel); Song (Barbrolli); Tatjana (Bece); Selection from Les millions d'Arlequin (Drigo); The Cockchafers' Tea Party (Noack); Piece (Mascheroni); Czardas (Dauber); Argentine Tango (Bianco); Griserie (Crémieux); Marie Louise (Meisel); Es geht auch ohne Auto (Kollo). 2.40, Programme for Children. 5.10, Organ Recital by Stejn: I wanna know all about you (Jerome); I don't know why; Somebody stole my Gal (Wood); The Old Spinning-Wheel (Hill); The Man on the Flying Trapeze (Lee); Why do I dream those Dreams (Warren); Lover, come back to me (Romberg). 5.40, Records. 5.55, Concert by the V.A.R.A. Orchestra. Conductor: de Groot. Overture, Kathia (Brusselmann); A Summer Day in Norway (Willmers); Waltzes (Brahms); Reiseskizzen (Noack); Hungarian Rhapsody (Vilmos). 6.40, Sports Notes. 7.0, Orchestral Concert (cont'd.): Puppenspiel-Ouverture (Weinberger); African Suite (Coleridge-Taylor); Liebeswalzer (Ziehrer). 7.20, Talk. 7.40, S.O.S. Announcements. 7.43, Orchestral Concert (cont'd.): Overture, Tantalusquälen (Suppé); Jungherrtentzen (Gungl); Selection from Die Puppenfee (Bayer); Vindobona (Komzak). 8.10, Records. 8.25, Orchestral Concert (cont'd.): Les fables de La Fontaine (Monton); Le jardin du Cupido (Eugène); To you (Elliott); Overture, The Bohemian Girl (Balfe). 8.55, News; Variety Items. 9.10, A Revue (Boer). Orchestra and Soloists. Conductor: de la Fuente. 10.40, Records. 11.40 (approx.), Close Down.

HORBY.—Relays Stockholm.

HUIZEN

995 kc/s, 301.5 metres; 7 kW. (until 6.40 p.m.); 20 kW. from 6.40 p.m.—Programme of the Christian Radio Society (N.C.R.V.). 7.40 a.m., Bible Reading and Prayer. 7.55, Records. 9.10, Interval. 10.10, Religious Programme. 10.40, Baritone Recital by Pielstroom: Songs (Schubert): (a) Ständchen, (b) An die Musik, (c) Du bist die Ruh!; Records; Songs (Tosti): (a) Sogno, (b) Ninon, (c) Ideale; Records; In den vreedende (Verhulst); Mijne Moedertaal (Brandts-Buys); Hij, die geen hiedje zingen kan (Hullebroek). 11.40, Police Announcements; Records. 12.10 p.m., Quintet Concert: Andante (Mozart); Psalm; Chaconne (Gluck); The Harmonious Blacksmith (Handel); Three Pieces (Mendelssohn); Beethoven Potpourri (Urbach); Records; Overture, Raymond (Thomas); Selection from Tosca (Puccini); and Isoline (Messager). 1.40, Records. 2.10, Talk for Young Stamp Collectors. 2.40, Violin Recital by Felderhof. 3.25, Interval. 3.40, Concert by the Crescendo Mixed Choir; Conductor, Notermans. In the intervals, Records. 4.40, Programme for Children. 5.40, Talk for Farmers. 6.10, Programme to be announced. 6.40, Announcements. 6.55, Records. 7.10, Talk. 7.40, Concert by the Con Amore Choir and the Hemo Orchestra. 8.5, Programme to be announced. 8.15, Choral and Orchestral Concert (cont'd.). 8.40, Recitations. 9.10, Choral and Orchestral Concert (cont'd.). 9.40, News. 9.50, Records. 11.10 (approx.), Close Down.

INNSBRUCK.—Relays Vienna.

KALUNDBORG

238 kc/s, 1,261 metres; 75 kW. Relayed by Copenhagen, 1,176 kc/s, 255.1 metres, and Skamlebaek, 49.5 metres.—7.0 a.m., Gym. 7.27, Weather. 8.30, Service from Copenhagen Cathedral. 10.15, Talk for Schools. 11.0, Weather. 11.10, Fish Prices. 12 Noon, Chimes; Weather. 12.5 p.m., Concert by the Bendix String Ensemble, relayed from the Wivex Restaurant. 2.0, Interval. 3.0, Records. 3.30, Concert by the Radio Orchestra; Conductor, Reesen: Overture, Marco Spada (Auber); Arabesque No. 2 in G (De-

SEPT. 12th WEDNESDAY continued

bussy); Molly on the Shore (Grainger); Shepherd's Hey (Grainger); Moeck Morris (Grainger); Barcarolle (Rubinstein); Nielsen Potpourri (Reesen). 4.15 (approx.), Talk for Women. 4.45 (approx.), Concert (cont'd.): Overture in D (Boccherini); Two Swedish Dances: No. 3 in A minor and No. 4 in D (Aulin); Variations on a Bach Prelude (Gonod); Gavotte from Manon (Massenet); Overture, William Tell (Rossini). 5.30, Exchange; Fish Prices. 5.45, Talk. 6.15, French Lesson. 6.45, Weather. 6.54, Announcements. 7.0, News. 7.15, Time. 7.30, Talk for Farmers. 8.0, News. 8.2, String Quartet in C, Op. 50, No. 3 (Beethoven), by the Breuning-Bache Quartet. 8.30, Talk. 9.0, Dance Music by Louis Freil's Band. Refrains by Helge Rungwald. In the interval at 9.55, News. 11.15, Dance Music by Jack Hylton's Band, relayed from London. 12 Midnight, Chimes from Big Ben. 12.1 a.m. (Thursday), Dance Music from the Lodger Restaurant. 1.0, Dance Music, relayed from the Nimb Restaurant. 2.0, Close Down.

KIEL.—Relays Hamburg. **KLAGENFURT.**—Relays Vienna.

KONIGSBERG

1,031 kc/s, 291 metres; 60 kW. Relayed by Danzig, 1,303 kc/s, 230.2 metres.—5.0 a.m., Records. 5.50, Weather. 6.0, Gym. 6.20 (from Danzig), Military Band Concert. In the interval at 7.0, News. 8.0, Prayers. 8.30, Gym. for Women. 9.0, Interval. 10.10, See Stuttgart. 10.40, News. 11.30, Records. 12 Noon, See Berlin (Funkstunde). In the interval, News. 1.5 p.m., Records. In the intervals, News. 2.30, Announcements; Records. 3.0, Exchange. 3.20, Household Hints. 3.30, Programme for Children. 4.0 (from Danzig), Concert by the Danzig Municipal Theatre Orchestra; Conductor, Kallipke: Overture, The Kiss (Smetana); Selection from Der Evangelmann (Kienzl); Waltz from Der Rosenkavalier (R. Strauss); In the Steppes of Central Asia (Borodin); Two Pieces from Romeo and Juliet (Berlioz); Delibes Potpourri (Fetras); Selection from Boris Godunov (Musorgsky); Waltz, Die Schönbirner (Lanner); March, Soldatenblut (Blon). In the interval at 5.0, Reading (Seidl). 5.50 (from Danzig), Talk: The Younger Generation's Share in Future History. 6.15, Market Prices. 6.25 (from Danzig), Flute Recital. 6.55, Weather. 7.0, Talk: Mushrooms. 7.10, Hand Work Programme for Young People. 7.35, Talk: Heinrich Lersch. 8.0 News. 8.10, See Frankfurt. 8.35, See Berlin (Deutschlandsender). 9.0, Recital of Arias by Burchard Kaiser, with a String Quartet: Aria from the Dettinger Te Deum (Handel); Three Songs (Bach). 9.30, The Small Station Orchestra. 10.0, News. 10.30, Dance Music. 12.30 a.m. (Thursday), Close Down.

KOSICE.—Relays Prague. **LAUSANNE.**—Relays Sottens.

LEIPZIG

785 kc/s, 382.2 metres; 120 kW. Relayed by Dresden, 1,285 kc/s, 233.5 metres.—5.50 a.m., Notes for Farmers. 6.0, Gym. 6.25, See Breslau. In the interval at 7.0, News. 8.0, Gym. 8.20, Records. 9.0, Interval. 9.40, Exchange. 9.45, Announcements. 10.10, See Stuttgart. 10.50, Interval. 11.0, Announcements; Records. 11.30, News; Time. 11.40, Weather. 11.45, Notes for Farmers. 12 Noon to 2.30 p.m., Concert by the Leipzig Symphony Orchestra; Conductor: Weber. In the intervals at 1.0 and 2.0, News. 2.30, Art Report. 2.50, Pilot—An Aviation Sketch for Boys. 3.10, Recital by Lothar Scurla (Bass) and Blumer (Pianoforte). 3.40, Exchange. 4.0, Programme for Young People. 4.40, Records. 5.20 (from Dresden), Records of Herbert Wisthoff (Pianoforte): Rondo in E flat, Op. 16 (Chopin); Sonata, Op. 30 (Scriabin); Waltz in A flat, Op. 38 (Scriabin). 5.50, Exchange; Announcements. 6.0, Talk: Germany's Economic Relations with Bulgaria. 6.20, Talk: The German Pre-War Cavalry. 6.35, Thuringian Folk Music. 7.35, Talk: Art and History. 8.0, News. 8.10, See Frankfurt. 8.35, See Berlin (Deutschlandsender). 9.0, Concert by the Leipzig Symphony Orchestra and the Station Chamber Choir. Conductor: Blumer. Soloists: Hermann and Sammler (Pianofortes); Waltz, Dorfschwalben aus Österreich (Jos. Strauss); Liebeslieder-Walzer for Pianoforte Duet and Four-Part Choir (Brahms); Man lebt nur einmal (Joh. Strauss); Wine, Woman and Song, for Mixed Choir and Orchestra (Joh. Strauss); Waltzes, Op. 39, for Pianoforte Duet (Brahms); Liebespiegel, for Mixed Choir, Wind Instruments and Pianoforte Duet (Jochum); Waltz from the Fifth Symphony (Tchaikovsky); Waltz, In lauslicher Nacht (Ziehrer); Am Wörther See, for Mixed Choir and Orchestra. 10.20, News. 10.50, Dance Music by the Emdé Orchestra. 12.30 a.m. (Thursday), Close Down.

LINZ.—Relays Vienna.

LUXEMBOURG

230 kc/s, 1,304 metres; 120 kW.—7.45 a.m., Records. 8.0, News in French; Record;

News in German; Record. 12 Noon, Concert by the Station Orchestra; Conductor, Pensis: Overture, The Water-Carrier (Cherubini); Waltz (Komzak); Liast Potpourri (Urbach). 12.30 p.m., News in French and German. 12.40, Concert (cont'd.): The Match Parade (Wehle); Serenade for Trio (Oelschlegel); Norwegian Rhapsody (Svendsen); Moulin Fleuri (Gillet); Selection from The Mikado (Sullivan); in the interval, at 4.0, Exchange. 1.15, Records. 1.30, Exchange. 1.35, Records. 2.0, Exchange. 3.45, Exchange. 6.30 till Close Down, Swiss Evening. 6.30, Variety Programme. 7.30, Racing Results. 7.35, Brahms and R. Strauss Song Recital by Else Oster. 8.0, News in French and German. 8.20, Concert by the Station Orchestra; Conductor, Pensis; Symphonic Poem, Helvetia (Scassola); Chaconne (Honegger); Danse des Enfants (Honegger); Suite printanière (Nevin); Two Pieces (Honegger); in the interval, at 8.35, Exchange. 9.10, Concert of Pre-war French Songs and Airs. 9.30, Pianoforte Recital by René Delporte. 9.45, Concert by the Station Orchestra; Conductor, Pensis: Overture, Le Roi Pa dit (Delibes); Norwegian Dances (Grieg); Serenade (Waldau); Waltz (Blon); Selection from Zazi (Leoncavallo). 10.35, Dance Records.

MADRID

EAJ7, 1,095 kc/s, 274 metres; 7 kW.—9.0 a.m., News. 10.0, Exchange; Announcements. 10.30, Interval. 2.0 p.m., Chimes; Time; Weather; Light Music; Talk. 2.30, Sextet Concert. 3.0, Amusement Guide; Exchange; Light Music. 3.30, Sextet Concert. 4.0, Light Music. 4.15, Sextet Concert: Spanish Caprice (Rimsky-Korsakov). 4.40, News. 5.0, Interval. 6.0, Chimes; Light Music. 7.0, Announcements; Flamenco Songs. 7.30, Exchange; Musical Comedy Music; Turina Concert. 8.30, News. 8.45 (approx.), Trio No. 7 in B flat (Beethoven). 9.0 (approx.), Orchestral Concert: Prelude to Marnxa (Vives); The Butterflies (Steinke); Navarra (Albéniz); Petite Suite (Debussy); Waltz, The Blue Danube (Strauss); March from The Prophet (Meyerbeer). 9.50, Sports Report; Bullfighting Notes. 10.0, Chimes; Time; Talk. 11.0, News; Sextet Concert. In the interval, Talk. 12.45 a.m. (Thursday), News. 4.0, Chimes; Close Down.

MADRID

10,000 kc/s, 30 metres; 20 kW.—11.15 p.m., News. 11.30, Spanish Music. 11.45, News. 12 Midnight, Orchestral Concert of Spanish Music. 12.45 a.m. (Thursday), Light Music. 1.0 a.m. (approx.), Close Down.

MALMO.—Relays Stockholm.

MILAN

314 kc/s, 368.6 metres; 50 kW. Relayed by Turin, 1,140 kc/s, 263.2 metres; Genoa, 986 kc/s, 304.3 metres; and Florence, 610 kc/s, 491.8 metres.—7.30 a.m., Gym. 7.45, Time; News. 11.30, Popular Music. 12.30 p.m., Records. 12.45, News. 1.0, Time; Announcements. 1.5, Concert by the Malatesta Chamber Orchestra. In the interval at 1.30, Records; Exchange. 2.15 to 2.25, Exchange. 4.35, News. 4.45, Programme for Children. 5.10, Concert of Chamber Music. Moriotti (Oboe), Agostino Girard (Viola), and Italo Vallora (Violin). Viola Solos (Cuperin-Kreisler): (a) Louis XIII Song, (b) Pavane; Oboe Concerto (Marcello); Melody; Viola Solos: (a) Paghiera (Martini), (b) Vivace (Bach); Oboe Solo: Maggioletta (Collino). 5.55, Weather. 6.0 to 6.10, Corn Prices. 7.0, News. 7.15, News in Foreign Languages. 8.0, Time; News; Records. 8.30, Government Notes. 8.45, See Rome. 11.0, News.

MONTE CENERI

1,167 kc/s, 257.1 metres; 15 kW.—12 Noon, Announcements. 12.5 p.m., Concert by the Radio Orchestra: March (Avolo); Waltz, Estrella (Ohlsen); Overture, The Siege of Corinth (Rossini); Serenata sul lago (Ranzato). 12.29, Time; Weather. 12.33, Concert by the Radio Orchestra (cont'd.): Valse lente (Schütt); Trot de cavalerie (Rubinstein). 12.55, News. 1.5, Records. 1.30, Interval. 3.59, Time Signal. 4.0, See Sottens. 6.0, Interval. 7.45, News. 8.0, Market Report. 8.15, Ponchielli Concert by the Radio Orchestra; Conductor, Casella: Overture, I Promessi Sposi; Introduction, Chorus, and Dances from Il fighiuol prodigo; Overture, I Lituani; Selection from La Gioconda. 9.0, Talk. 9.15, Recital by Romea Missorini (Harp) and Prof. Adolfo Fantini (Cello); Duets for Cello and Harp: (a) Caprice (Scharwenka), (b) Melody (Gluck), (c) Scherzo (van Goens), (d) Malaguena (Albéniz); Harp Solos: (a) Etude impromptu (Tedeschi), (b) Vers la source dans le bois (Tournier), (c) Pattuglia spagnola (Tedeschi); Duets: (a) Adagio (Tartini-Corti), (b) Minuet (Becker), (c) Après un rêve (Faure), (d) Chant hindou (Rimsky-Korsakov). 10.15 (approx.), Close Down.

MORAVSKA-OSTRAVA

1,158 kc/s, 259.1 metres; 11.2 kW.—6.0 a.m., See Prague. 7.15, Interval. 9.50, See Prague. 10.30, Concert by the Station Band. 11.0, Records. 11.5, See Bratislava. 12 Noon, See Prague. 1.20 p.m., Records. 1.30, See Prague. 1.40, Records. 1.50, See Prague. 2.0, Interval. 3.15, Concert by the Station Orchestra; Conductor, Musil. 4.15 to 4.20, See Prague. 4.40, See Prague. 5.40, Records. 5.50, Talk. 6.0, Local News. 6.5, Talk: The Czech Mind. 6.15, Song Recital by Ella Holesová. 6.35, Cello Recital by Danyi. 6.55, See Prague. 8.10, See Brno. 8.30, A Play. 9.0, See Brno. 10.0, See Prague. 10.45, Records. 11.0 (approx.), Close Down.

MOSCOW (No. 1)

174 kc/s, 1,724 metres; 500 kW.—5.0 a.m., News. 5.15, Fanfare. 5.45, Gym. 6.15, Musical Programme. 8.15, Programme for Children. 9.0, Musical Programme. 9.58, Time. 10.0, News. 10.15, Dramatic Programme. 11.15, Records. 12.15 p.m., Military Talks; Concert by a Wood Wind Quartet. 1.15, Concert. 2.0, Dramatic Programme. 3.0, Programme Announcements. 3.15, Programme for Children. 3.58, Time. 4.0, News. 4.30, Concert; Literary Programme. 5.30, Red Army Programme. 6.30, Authors at the Microphone; Musical Programme. 7.30, Concert. 9.0, Letterbox in Czech. 9.55, Chimes. 10.5, Talk in English: The Soviet States Tax System. 11.5, Talk in German: Changing Russia.

MOTALA.—Relays Stockholm. **MUHLACKER.**—See Stuttgart.

MUNICH

740 kc/s, 405.4 metres; 100 kW. Relayed by Augsburg and Nürnberg, 1,267 kc/s, 236.8 metres; and Kaiserslautern, 1,195 kc/s, 251 metres.—6.30 a.m., Gym. 6.45, Motto. 6.50, Italian Lesson. 7.15, Time; News. 7.25, Orchestral Concert. 9.50, Gym. for Women. 10.10, See Stuttgart. 10.55, Market Prices. 11.5, Notes for Farmers. 11.15, Time; News. 11.30, Announcements; Records. 12 Noon, Records. 1.15 p.m., Time; News. 1.25, Grimm Concert by the Small Station Orchestra; Conductor, Kloss. 2.0, News. 2.20, Recital by Ellen Schmid-Erhard (Soprano), Maria Simmerlein (Violin) and Scheitz (Pianoforte). 2.50 (from Nürnberg), Talk: Old Nürnberg Trees. 3.10, Pianoforte Lesson. 3.30, Reading (Hauher). 3.50, Announcements. 4.0 (from Nürnberg), Variety Programme. 5.30, Programme for Children. 6.10, Programme for Young People. 6.50, Time; Announcements. 7.0 (from Nürnberg), Die Heide blüht im Frankland—A Sequence. 8.0, News. 8.10, See Frankfurt. 8.35, See Berlin (Deutschlandsender). 9.0, Concert of Dance Music by the Station Dance Band with Commentary by Heli Finkenzeller and Rolf Thillmar. 10.0, Time; News. 10.20, Programme to be announced. 11.0, Concert by the Small Station Orchestra; Conductor, Kloss.

NAPLES.—Relays Rome. **NOTODDEN.**—Relays Oslo.

OSLO

260 kc/s, 1,154 metres; 60 kW. Relayed by Hamar, 195 kc/s, 578 metres; and Jeløy, 6,990 kc/s, 42.92 metres.—11.15 a.m., Service. 11.50, Exchange. 12.55 p.m., Time. 1.0 to 2.0, Records. In the intervals at 1.15, Weather; Report for Farmers; and at 1.45, Exchange. 5.0, Concert of Light Music. 6.0, Talk. 6.30, Talk for Boys. 7.0, Book Review. 7.15, Weather; News. 7.30, Time. 7.40, Talk. 8.0, Concert by the Station Orchestra; Conductor, Kramm; Norwegian Rhapsody No. 1 (Halvorsen); Three Norwegian Melodies (Grieg); Two Norwegian Dances (Borch); Aus aller Herren Länder (Moszkowsky); Cherry Ripe (Scott); Prelude in G minor (Rachmaninov); Kaiser-Walzer (Strauss). In the interval at 8.30, Talk. 9.40, Weather. 9.45, News. 10.0, Talk. 10.15, Recital of Sea Shanties by Magnus Samelsen.

OSTERSUND.—Relays Stockholm.

PARIS

POSTE PARISIEN, 959 kc/s, 312.8 metres; 100 kW.—7.10 a.m., Fanfare. 7.15, Records. In the interval at 7.20, News. 8.0, Concert. 8.30, News. 8.45, Cookery Hints. 12 Noon, Exchange. 12.5 p.m., Massenet Records: Scenes pittoresques; Ouvre tes jolis yeux; Aria from Manon. 12.25, News. 12.35, Records. 1.5, Exchange. 1.15, Song Records. 1.35, Sound Film Records. 2.0, Exchange. 3.15, Exchange. 3.45, Exchange. 4.50, Exchange. 6.5, Exchange. 6.25, Hebrew Programme. 6.45, Exchange. 6.49, Records: Danses villageoises (Grétry); Minuet from Le bourgeois gentilhomme (R. Strauss). 7.10, News. 7.30, Topical Talk. 7.45, Records. 8.0, Interval. 8.40, Exchange. 8.45, Variety Concert; Conductor, Vaissen. 12 Midnight, Close Down.

PARIS

RADIO PARIS, 182 kc/s, 1,648 metres; 75 kW.—6.45 a.m., Gym. 7.0, Records. 7.15, Press Review; Weather. 7.45, Gym. 8.0 to 8.30, Records. 10.15 to 11.30, Concert, relayed from Vichy. 12 Noon, Educational Talk. 12.15 p.m., Dance Music by the Lucien Goldy Band. In the interval at 1.20, Exchange. 2.0, Interval. 3.45 to 3.50, Exchange. 6.20, Weather; Notes for Farmers;

SEPT. 12th **WEDNESDAY** continued

Racing Results. 6.45, Medical Talk. 7.0, Records. 7.15, Anglo-Saxon Press Review. 7.30, Topical Talk. 8.0, Reading. 8.30, Press Review; Weather. 8.45, Symphony Concert by the National Orchestra; Conductor, Désormière; Soloists, Jean Doyen (Pianoforte) and Mme. Suzanne Bertin (Sings); Meeresstille und glückliche Fahrt (Mendelssohn); Pianoforte Concerto in D (Mozart); Four Songs for Voice and Orchestra: (a) Theme and Variations (Proch), (b) Canzonetta (Haydn), (c) Song of the Butterfly (Campra), and (d) The Barber of Seville (Rossini); Suite Française (Roger-Ducasse); Reflets d'Allemagne (Schmitt); Scotch March (Debussy). In the interval at 9.15, News; Fashion Report. 10.30, Dance Music by the Golyd Band.

PITTSBURGH

KDKA, 980 kc/s, 306 metres; 50 kW. Relayed by W8XX on 48.86 metres and 25.27 metres.—3.0 p.m., Harvest of Song. 3.15, Sammy Fuller. 3.30, To-day's Children. 3.45, News; Cooking School. 4.0, Uncle Tom and Betty. 4.15, Merry Macs. 4.30, U.S. Army Band. 5.0, Field and Hall. 5.15, Charles Sears (Tenor). 5.30, Vic and Sade. 5.45, Hotel William Penn Orchestra. 6.0, Business News and Markets. 6.15, Hon. Archie and Frank. 6.30, Farm and Home Hour. 7.30, KDKA Home Forum. 8.0, Shakespearean Play. 8.45, Human Values. 9.0, Betty and Bob. 9.15, Dorothy Page. 9.30, Market Reports. 9.45, Chicago Symphony Orchestra. 10.15, KDKA Kiddies' Klub. 10.30, The Singing Lady. 10.45, Little Orphan Annie. 11.0, Dan and Sylvia. 11.14, Baseball Résumé—Goodrich. 11.30, Comedy Stars of Hollywood. 11.45, Lowell Thomas. 12 Midnight, Music; News; Drama. 12.15 a.m. (Thursday), Johnny Johnson's Orchestra. 12.30, Irene Rich. 12.45, Frank Buck. 1.0 to 6.0, Popular Programme.

PORSGRUND.—Relays Oslo.

PRAGUE

638 kc/s, 470.2 metres; 120 kW.—6.0 to 7.15 a.m., Gym.; Music; News. 9.50, News. 10.5, News in German. 10.10, Records. 10.30, See Moravská-Ostrava. 11.0, Record. 11.5, See Bratislava. 12 Noon, Programme for Farmers; Exchange; Weather. 12.5 p.m., Talk for Farmers. 12.10, Records. 12.20, News. 12.30, Concert by the Erno Kostal Chamber Orchestra: March (Vackar); Wedding Waltz (Leopold); Overture (Titl); The Monastery of St. Honarat (Kostal); Potpourri of Slovak Songs (Matysovitch); The Gondoliers (Tichy); Potpourri of Weber Music (Urbach); March, Entry of the Gladiators (Fucik). 1.20, Talk: Intellectualists and their aims. 1.30, Labour Exchange. 1.40, Labour Exchange in German. 1.50, Exchange. 1.55 to 2.0, Announcements in German. 3.15, See Moravská-Ostrava. 4.15 to 4.20, Exchange; Weather. 4.40, Dance Music by the Osten Jazz Band. 5.40, Record. 5.45, Talk: Preserving. 5.55, Records. 6.5, Talk for Housewives. 6.10, Programme for Workers. 6.15, Record. 6.20, German Transmission; Topical Talk; Talk for Workers; Social Notes. 6.55, News in German. 7.0, News. 7.10, Dramatic Programme. 7.55, Talk: Beethoven. 8.10, See Brno. 10.0, News. 10.15, Records. 10.45, News in French. 11.0 (approx.), Close Down.

RJUKAN.—Relays Oslo.

ROME

Call 1R0, 713 kc/s, 420.8 metres; 50 kW. Relayed by Naples, 1,104 kc/s, 271.7 metres; Milan No. 2, 1,348 kc/s, 222.6 metres; Turin No. 2, 1,357 kc/s, 221.1 metres; and 2R0, 1,140 kc/s, 25.4 metres.—7.30 a.m., Gym. 7.45, Time; News. 8.0, Interval. 12.30 p.m., Records. 1.5, See Milan. In the interval at 1.30, Time; News; Exchange. 2.15, Interval. 4.30, Programme for Children. 4.55, News; Exchange. 5.10, See Milan. 5.55, Weather. 6.0 to 6.10, Corn Prices. 7.0, News; Report of the Royal Geographical Society. 7.15, News in Foreign Languages. 8.0, Time; Announcements. 8.10, Records. 8.30, Government Notes. 9.30, Mass (Verdi). In the interval, Literary and Art Review. 11.0, News.

RUYSSELEDE

10,330 kc/s, 29.04 metres; 8 kW.—7.45 p.m., News in French. 8.0, See Brussels (No. 2). 8.45, Records. 9.0, News in Flemish. 9.15 (approx.), Close Down.

SALZBURG.—Relays Vienna.

SCHENECTADY

WGY, 790 kc/s, 379.5 metres; 50 kW. Relayed at intervals by W2XAF on 31.48 metres and on 19.56 metres.—7.0 p.m., Dreams Come True; Barry McKinley (Songs). 7.15, The Wise Man—Dramatic Programme. 7.30, Woman's Radio Review; Talks; Orchestra. 11.35, Exchange. 12 Midnight, IGE Programme; Orchestra; Williams. 12.30 a.m. (Thursday), Wayne King and his Orchestra. 1.0 to 3.0, Popular Programme.

SOTTENS

677 kc/s, 443.1 metres; 25 kW; and Geneva, 401 kc/s, 748 metres.—6.0 to 6.15 a.m., Gym. 12.29 p.m., Time from Neuchâtel Observatory. 12.30, News in French and German. 12.45 (from Geneva), Records. 1.0, (from Geneva), Exchange; Records. 2.0, Interval. 3.59, Time from Neuchâtel Observatory. 4.0 (from Geneva), Concert by the Station

Orchestra; Conductor, Echenard: Overture, Martha (Flotow); Second Suite (de Micheli); Schubmann Potpourri (Schreiner); Selection from La belle Hélène (Offenbach); Records; Norwegian Rhapsody (Lalo); Ballet égyptien (Luigini); Malagueña (Moszkowsky); Drinking Song Potpourri (Morena). 6.0 (from Geneva), Programme for Children. 7.0, Concert of Light Music by the Small Radio Lausanne Orchestra. 7.30, Talk for Farmers. 7.59, Weather. 8.0, Violin Recital by André Loew. 8.30, Après-News—One-Act Play (André Mycho). 9.15, News in French and German. 9.30, Jazz Music by the Radio Lausanne Jazz Band; Soloist, Katia Karina (Soprano). 10.15 (from Geneva), Talk: The Work of the League of Nations. 10.35 (approx.), Close Down.

STOCKHOLM

704 kc/s, 426.1 metres; 55 kW. Relayed by Boden and Ostersund, 413.5 kc/s, 726 metres; Göteborg, 941 kc/s, 318.8 metres; Hörby, 1,131 kc/s, 265.3 metres; Motala, 216 kc/s; 1,389 metres; and Sundsvall, 601 kc/s, 499.2 metres.—7.20 a.m., Gym. 7.45, Service. 8.0, Weather. 12.30 p.m., Weather. 12.45, Exchange. 12.55, Time Signal. 1.0, Broadcast for Schools from Falun, 1,086 kc/s, 276.2 metres. 1.30, Concert of Light Music relayed from Malmö, 1,312 kc/s, 228.7 metres. 2.30, Reading. 5.0, Weather. 5.5 (from Göteborg), Songs to the Lute by Arleman. 5.20, Talk. 5.45, Records. 6.45, Report. 7.15, Weather; News. 7.30, Talk. 8.0, Military Band Concert; Conductor, Widner: Symphonic

(Schwab), (c) Un conte à dormir debout (Poncin); The Station Orchestra and Soloists; Conductor, de Villers; in the interval at 9.30, Press Review. 10.30, Dance Music from the Caveau de l'Aubette. 12 Midnight (approx.), Close Down.

STUTT GART

MUHLACKER, 574 kc/s, 522.6 metres; 100 kW.—5.35 a.m., Notes for Farmers. 5.45, Hymn; Time; Weather. 5.50, Gym. 6.15, Records. 6.40, Time; Announcements. 6.55, Records. 7.25, See Munich. 8.10, Announcements. 8.15 to 8.35, Gym. 10.0, News. 10.10, Transmission for all German Stations: Broadcast for Schools—Schiller's Youth. 10.50, Talk for Parents. 11.25, Announcements; Records. 11.55, Weather. 12 Noon, Records: Roses, Sea and Sun in Music. 1.0 p.m., Time; News. 1.20, See Frankfurt. 1.50, Time; News. 2.0, See Frankfurt. 2.30, Interval. 3.25, Violin and Pianoforte Recital: Sonata in G minor for Violin and Pianoforte (Tartini); Improvisation on a Gluck Gavotte for Two Pianofortes (Reinecke). 4.0, Concert of American Music by the Philharmonic Orchestra relayed from Karlsruhe; Conductor, Frölich: The Star-Spangled Banner (Sousa); Piece (arr. Sanford); Down South (Myddleton); Indian Love Call (Friml); American Patrol (Meacham); Selection from Robin Hood (Koven); American Fantasia (Herbert); The Captain (Sousa). 5.30, Legal Talk. 5.45, Songs to the Lute by Heinz Eschwege. 6.0, An Interview with the Artist Reder in his Studio. 6.25, Orches-

—Fantasy. 9.30, Military Music. 10.0, Au caveau de minuit—A Radio Fantasy. 10.15, News. 10.30, Oprettta Arias: Arias from Les noces de Jeannette (Masse); Nina-Rosa (Romberg); The Merry Widow (Lehár); La Basoche (Messager); Enlevez-moi (Gaba-roche); Un soir de réveillon (Moretti); and Frasquita (Lehár). 11.0, Request Music. 11.15, Soloist Programme. 11.30, Duets. 11.50, Oprettta Music. 12 Midnight, News. 12.5 a.m. (Thursday), Opera Music: Finale from Act II, Carmen (Bizet); Duet from Romeo and Juliet (Gounod). 12.15, Orchestral Music. 12.30 (approx.), Close Down.

TRONDHEIM.—Relays Oslo. TURIN.—Relays Milan.

VATICAN CITY

15,120 kc/s, 19.84 metres; 10 kW. (Morning), 5,970 kc/s, 50.26 metres (Evening).—11.0 to 11.15 a.m., Religious Information in Spanish. 8.0 to 8.15 p.m., Religious Information in Italian.

VIENNA

592 kc/s, 506.8 metres; 120 kW. Relayed by Graz, 886 kc/s, 338.6 metres; Innsbruck, 519 kc/s, 578 metres; Klagenfurt, Linz, and Salzburg, 1,294 kc/s, 231.8 metres.—9.0 a.m., News. 9.20, Market Prices. 9.30, Weather. 9.40, Memorial Programme for Marcus von Aviano and Dr. Dollfuss, relayed from Neuen Markt; addresses by Wilhelm Miklas and Richard Schmitz. 10.50, Water Level. 11.30, Programme for Women. 11.55, Weather. 12 Noon, Concert by the Vienna Symphony Orchestra; Conductor, Holzer; in the interval at 1.0 p.m., Time; News. 2.0, Announcements. 2.10 to 2.30, Records of Famous Artists. 3.30, Time; Announcements. 3.50, Programme for Children. 4.10, News. 4.15, Talk: The Austrian Fire Brigade. 4.40, Records. 5.30, Talk for Mountaineers. 6.0, Arnold Schönberg Concert for the Composer's Sixtieth Birthday; The Rothschild Quartet; Soloists: Jella Braun-Fernwald (Contralto) and Peter Stadler (Pianoforte); Three Pianoforte Pieces, Op. 11; Songs: (a) Lied der Waldtaube, (b) Traumleben, (c) Hochzeitslied; Six Short Pianoforte Pieces, Op. 19; String Sextet; Verkürzte Nacht in D minor, Op. 4. 6.45, Talk: West African Sects. 7.10, Time; News. 7.25, Concert by the Don Cossacks Choir and Soloists; Conductor, Maxim Orloff. 8.0, Memorial Concert for Marcus von Aviano and Dr. Dollfuss, relayed from the Konzert-hausaal; The Vienna Symphony Orchestra; Conductor, Kabasta; Soloists, Enid Szanthe (Contralto) and Karl Walter (Organ); Address by Dr. Kurt Schuschnigg; Improvisation on Songs of the Fatherland (Walter); Song, Die Allmacht, Op. 79, No. 2 (Schubert); Variation and Fugue on the Austrian National Hymn (Tittel). 9.45, Concert by the Vienna Symphony Orchestra; Conductor, Holzer; Soloist, Rosner (Violin); Hungarian March Potpourri (Pesti); Song (Flemming); Overture, Josefina Galmeyer (Knepler); Moonlight Serenade (R. Gluck); Selection from Das kleine Café (Benatzky); Waltz, Der Himmel voller Geigen (Ziehrer). 10.30, News. 10.50, Orchestral Concert (contd.); Song, Geh' ma hutschen (Eysler); Violin Solo, Lullaby (Cesek); Fantasia, Im russischen Dorfe (Joh. Strauss); Die Brenner Stadtmusikanten (Krome); Walt (Jovanovic); Potpourri, An alle! (Uhl). 11.30, Dance Music by the Jaritz Jazz Band; Soloist, Emil Petroff (Songs). 1.0 a.m., (Thursday), Close Down.

WARSAW

223 kc/s, 1,345 metres; 120 kW.—6.45 a.m., Hymn; Records. 6.58, Gym. 7.8, Records. 7.15, News. 7.25, Records. 7.35, Hints for Housewives. 7.40, Announcements. 7.50, Announcements; Music. 8.0, Interval. 11.57, Time. 12 Noon, Fanfare from St. Mary's Church. Cracow. 12.3 p.m., Weather. 12.5, Press Review. 12.10, Concert of Czechoslovakian Folk Music from Cracow, 986 kc/s, 304.3 metres, 1.0, News. 1.5, Records of Russian Singers. 1.30, Interval. 3.30, Announcements. 3.35, Exchange. 3.45, Dramatic Programme. 4.0, Light Music. 4.45, Programme for Children from Lwow, 795 kc/s, 377.4 metres. 5.0 to 5.20, Song Recital by Liljana Zamorska: Aria from Prince Igor (Borodin); Tu es toujours seul (Lefeld); Allons ensemble (Lipski); Two Songs (Rachmaninov); A toi (Bembery). 5.25, Talk for Women. 5.35, Dances Symphoniques (Debussy), on Records. 5.50, Sports Notes. 6.0, Farmers' Letterbox. 6.10, Art Notes. 6.15, Violin Recital of Kreisler Arrangements by Popowski; Variations on a Corelli Theme (Tartini); Siciliana and Rigaudon (Francoeur); Song without Words (Mendelssohn); Pale Moon (Logan); Plainte d'amour (Kreisler); Poupée valsante (Poldini); Mazurka in A minor. 6.45, Talk: Economics. 7.0, Light Music. 7.20, Topical Talk. 7.30, Light Music. 7.45, Announcements; Sports Notes. 8.0, Records of Light Music. 8.45, News. 8.55, Talk: Work in Poland. 9.0, Chopin Pianoforte Recital by Turczynski: Polonaise in C sharp minor, Op. 26; Impromptu in A flat, Op. 29; Three Waltzes from Op. 64; Scherzo in A flat. 9.30, Talk in a Foreign Language. 9.40, Song Recital from Poznan, 868 kc/s, 345.6 metres. 10.0, Announcements; Music. 10.15, Dance Music from the Adria. 11.0, Weather; Aviation Notes. 11.5, Dance Music.

ZURICH.—Relays Beromünster.



Folk dancing and country festivals are an endless source of programme material at Budapest. This photograph was taken during a recent broadcast.

March (Alterio); Selection from Salvador Rosa (Gomez); Overture, Nebuchadnezzar (Verdi); Waltz (Joyce); Selection from The Gipsy Baron (Joh. Strauss); Spanish Rhapsody (Richard); Murch (Olson). 9.0, Bureau de Change—Play (Dunsany). 9.45, Weather; News. 10.0, Songs by the Vienna Trio: Göring (Pianoforte); Ständchen (Schubert); Heldenröslein (Schubert); Song from Lilac Time (Schubert-Berté); Pianoforte Solos: Wagon Wheels (Rose); Songs from Carioca (Youmans); In a Swallow Tail Coat (Miller); Love Everlasting (Abraham). 10.30, Dance Music by Jack Hylton and his Band from London. 11.30 (approx.), Close Down.

STRASBOURG

859 kc/s, 349.2 metres; 15 kW.—10.30 a.m., Orchestral Concert from Lyons (la Doua). 12 Noon, Records. 12.45 p.m., News. 1.0, Time; Exchange. 1.5, Records. 1.15 to 2.0, Orchestral Concert from Marseilles, 749 kc/s, 400.5 metres. 3.30, Concert from Vichy. 4.45, Talk in German: Electricity. 5.0, Concert of Light Music; Conductor, Roskam; Soloist: Jean Weber (Saxophone); March (Santengini); Waltz, Roses from the South (Joh. Strauss); Overture, Lysistrata (Lincke); Saxophone Solo, Les Violons de M. Conti for String Quintet (Wormser); Vous, qu'avez-vous tous fait de mon amour (Tibor); Selection from Le petit Duc (Lecocq); Let's fall in Love (Koehler and Arlen); Dorüröschens Brautfahrt (Rhode); Slow Foxtrot (Vacek); Waltz (Strauss-May). 6.0, Talk: Morocco. 6.15, Talk. 6.30, Concert from Paris (Radio Colonial), 11,880 kc/s, 25.25 metres. 7.30, Time; News. 7.45, Records. 8.0, Press Review in German; Lottery Results; Announcements. 8.30, Three One-Act Operettas: (a) Ca c'est l' bouquet (Zucca), (b) La méprise romanesque

tral Concert relayed from Baden-Baden; Conductor, Albert. Part I, Operetta Music; Prelude to the Queen's Kerchief (Joh. Strauss); Kaiser-Walzer (Joh. Strauss); Mazurka, Die Libelle (Jos. Strauss); Musikalischer Scherz (Joh. Strauss); Radezky March (Joh. Strauss). Part II: Mozart Music; Three German Dances: (a) Der Leiermann, (b) Kanarienvogel, (c) Schlittenfahrt; Musikalischer Spass; Overture, Figaro. 7.45, Time; Announcements. 8.0, News. 8.10, See Frankfurt. 8.35, See Berlin (Deutschlandsender). 9.0, Die Mädele von Biberach Singspiel (Müller); The Station Orchestra; Conductor, Görlich. 10.20, Time; News. 10.35, Announcements. 10.45, Local News. 11.0, Pianoforte Sonata in G minor, Op. 22 (Schumann), by Luise Gmeiner. 11.30, Dance Records. 12 Midnight, Serenade. 1.0 a.m. (Thursday), Close Down.

SUNDSVALL.—Relays Stockholm.

TOULOUSE

913 kc/s, 328.6 metres; 10 kW.—8.0 a.m., Dance Refrains. 8.30, News. 8.35, Orchestral Music; Songs. 12 Noon, Opera Music. 12.15 p.m., Orchestral Music. 12.30, News. 12.45, Request Music. 1.0, News. 1.5, Sound Film Music. 1.15, Orchestral Music. 1.30, Songs. 1.45, Military Music. 2.0, News; Amusement Guide. 6.0, News. 6.15, Orchestral Music: Torch March (Meyerbeer); German Dance No. 3 (Mozart); Hungarian Dance No. 1 (Brahms); Ballet Music from Rosamunde (Schubert). 6.30, Songs. 6.45, Orchestral Music. 7.0, Sound Film Music. 7.15, Hawaiian Guitar Music. 7.30, News. 7.45, Hunting Horn Music. 7.50, Talk. 8.15, Medical Talk. 8.30, Concert by the Symphony Orchestra: Overture, Patrie (Bizet); First Movement from Scheherazade (Rimsky-Korsakov). 9.0, For our Grandmothers

ATHLONE

565 kc/s, 531 metres; 60 kW. Relayed by Dublin, 1,348 kc/s, 222.6 metres; and Cork, 1,240 kc/s, 241.9 metres.—1.30 to 2.30 p.m., Time; Weather; Exchange; Records. 6.0, Programme for Children. 6.45, News. 7.0, French Lesson. 7.15, Talk by R. O'Garachain. 7.30, Time. 7.31, Music by the Station Orchestra. 7.50, Lily Kelly (Mezzo-Soprano). 8.5, Concert by the Station Orchestra. 8.30, Edward Selwyn (Oboe). 8.45, Noreen O'Connor (Violin). 9.0, Music by the Station Orchestra. 9.15, Irish Choral Music by the Sgoil Ceitrona Choir. 9.35, Irish Music by the Station Orchestra. 9.45, Recital of Old Scottish Songs by Pearl O'Donnell. 10.0, Variety Programme. 10.30, Time; News; Weather. 10.40, M. J. Morris (Traditional Fiddle). 11.0 (approx.), Close Down.

BARCELONA

795 kc/s, 377.4 metres; 5 kW.—8.15 a.m., News; Records. 9.0, Chimes; Gym.; Records. 9.20, News; Records. 10.0, Obituary. 12 Noon, Chimes; Weather. 1.0 p.m., Programme for Women. 2.0, Records. 2.30, Theatre Notes; Amusement Guide; Records. 3.0, Film Review; Setext Concert. Ballet Music from Coppélia (Delibes); Rondalla aragonesa (Granados); Ecos del harém (Villa); Gavotte (Jiménez); Selection from Los picaros estudiantes (Mediavilla); Two-Stop (Jaque-Garcés); Exchange. 4.0, Programme for Hospitals. 5.0, News; Interval. 7.0, Violin and Pianoforte Recital by Jaque and Rosaura Coma. 7.30, News; Violin and Pianoforte Recital (contd.). 8.0, Talk. 8.30, Request Records. 9.0, Talk. 9.10, Talk in Catalan. 9.20, Request Records. 9.45, Press Review. 10.0, Chimes; Weather. 10.5, Announcements; Exchange. 10.10, Concert by the Station Orchestra: March (Buys); Juegos favoritos (Frigola); Waltz (Bozi). 10.30, Programme by Pilar Arcos. 11.0, Reading. 11.10, Song Recital by Ramón Forés (Tenor); Arias from The Pearl Fishers (Bizet), I Pagliacci (Leoncavallo), and The Mastersingers (Wagner). 11.40, Concert by the Station Orchestra. Gavotte (Translatour); Intermezzo (Arbambarri); Piece (A. Wagner). 1.0 a.m. (Friday), News; Close Down.

BASLE.—Relays Beromünster.

BERLIN

DEUTSCHLANDSENDER, 191 kc/s, 1,571 metres; 60 kW.—5.45 a.m., Weather. 5.50, News. 6.0, Gym. 6.15, Motto. 6.20, See Berlin (Funkstunde). 7.0, News. 7.10 (approx.), See Berlin (Funkstunde). 8.0, Interval. 9.40, Hints for Housewives. 10.0, News. 10.10, Bach's Children—Musical Sketch (Leitzen). 10.50, Physical Culture. 11.15, Weather. 11.30, Reading: Agrarian Policy. 11.55, Weather. 12 Noon, See Breslau. 12.55 p.m., Time. 1.0, Records; Weather. 1.45, News. 2.0, Interval. 2.45, Greetings; Programme Notes. 3.0, Weather; Exchange. 3.15, Animal Talk for Children. 3.25, Riddles for Children. 3.40, Folk Music Records. 4.0, See Munich. 5.30, Talk: Ice Age Art. 5.45, Recital of Old French and Italian Songs by Milli Engelmann-Gillrath. 6.15, Reading from Aitah (Thoma). 6.45, Talk: The German National Theatre 1934-5. 7.0, Topical Talk. 7.15, Chamber Music by the Reitz Quartet; Quartet in F Minor (Trenkner); Quartet No. 1 in F, Op. 18 (Beethoven). 8.0, Motto. 8.10 to 9.30, See Stuttgart. 9.30, See Frankfurt. 10.0, News; Sports Notes. 10.30, Talk: The International Championships, Turin. 10.45, Weather. 11.0, Concert from Breslau. 12 Midnight (approx.), Close Down.

BERLIN

FUNKSTUNDE, 841 kc/s, 356.7 metres; 100 kW.—6.0 a.m., Hymn; Gym. 6.15, Weather; Meditation. 6.20, Orchestral Concert. 7.0, News. 7.10 (approx.), Concert (contd.). 8.0 to 8.20, Gym. 9.45, Songs for Children. 10.0, Weather; News. 10.10, Market Prices. 10.30, Records; Announcements. 11.25, Exchange. 11.30, Interval. 12 Noon, Concert from Königsberg. In the Interval at 12.30 p.m., Weather. 1.0, News. 1.15, Records. 2.0, News; Water Level. 2.15, Records. 3.0 to 3.20, Exchange. 4.0, See Cologne. 6.0, Announcements. 6.5, Play for Young People. 6.30, Music Talk: The Günther School. 6.50, String Quartet in E Flat, Op. 109 (Berg) by the Mildner Quartet. 7.40, Echoes of the Day. 8.0, News. 8.10, The Huntsman—German Forestry Report. 8.40, In Love—Sequence of Light Music and Dance Music (Else Pfaff); The Small Station Orchestra; Conductor, Steiner; Soloists, Lotte Luckwald (Soprano) and Albrecht (Tenor). 10.20, News; Sports Notes. 10.50, See Munich. 1.0 a.m. (Friday), Close Down.

BERNE.—Relays Beromünster.

BEROMUNSTER

555 kc/s, 539.6 metres; 60 kW.—6.0 a.m., Gym. 6.15, Interval. 12.29 p.m., Time Signal from Neuchâtel Observatory. 12.30, News. 12.45, See Sottens. 2.0, Interval. 3.59, Time Signal from Neuchâtel Observatory. 4.0, Accordion Recital by Walter Franz. 4.30, Records. 5.0, Violin Recital by Karl Schwaller. 5.30, Czech Song Recital by Nikolaus Goldschmidt. 6.0, Records of Light Music. 6.20, Talk: Adalbert Stifter. 6.40, Records; Choral Music. 7.0, Time; Weather; Traffic Report. 7.5, Records. 7.30 to 10.30

(approx.). See Sottens. 10.30 (approx.), Announcements for Swiss Nationals Abroad. 10.45 (approx.), Close Down.

BODEN.—Relays Stockholm. BODO.—Relays Oslo.

BRATISLAVA

1,004 kc/s, 298.8 metres; 13.5 kW.—6.0 to 7.15 a.m., See Prague. 9.45, Announcements. 9.50, See Prague. 10.10, News in Hungarian. 10.15, See Prague. 11.0, Water Level. 11.5, See Brno. 12 Noon, See Prague. 12.5 p.m., Report and Market Prices for Farmers. 12.10, News in Slovak. 12.15, Record. 12.20, See Prague. 1.40, News and Weather in German and Hungarian. 1.50, See Prague. 2.0 to 2.5, Programme for Farmers. 3.15, See Brno. 4.15 to 4.20, See Prague. 5.40, Talk. 5.55, Records. 6.10, Hints for Housewives. 6.15, Hungarian Transmission: Talks. 6.55, See Prague. 7.35, Talk. 7.50, Records. 8.10, Medical Talk. 8.25, See Prague. 9.15, Pianoforte Duets. 10.0, See Prague. 10.45, News in Hungarian. 11.0 (approx.), Close Down.

BREMEN.—Relays Hamburg.

BRESLAU

950 kc/s, 315.8 metres; 60 kW. Relayed by Gleiwitz, 1,231 kc/s, 243.7 metres.—5.0 a.m., Hymn; Motto. 5.10, Records. 6.0, Time; Weather; Gym. 6.25, Orchestral Concert, relayed from Dortmund; Conductor, Bunk. 7.0, Time; News. 7.10, Concert (contd.). 8.0, Cookery Hints. 8.10, Records. 9.0, Time; Weather; News; Local News. 10.10 to 10.40 (from Gleiwitz), Discussion for Schools. 11.30, Time; News; Water Level; Shipping Notes. 11.45, Talk for Farmers. 12 Noon, Concert by the Small Station Orchestra; Conductor, Rischka: Overture, Nachklänge von Ossian (Gade); Nordie Suite (Torjussen); Serenade (Prochaska); Selection from Iolanthe (Tchaikovsky); Turkish March (Beethoven); Swabian Rhapsody (Kämpfert); Idyll (Kann). 1.30 p.m., Time; News. 1.45, Concert by the Small Station Orchestra; Conductor, Rischka: Overture, The Bohemian Girl (Balfe); Masquerade (Sullivan); Waltz from The Arabian Nights (Joh. Strauss). 2.20, Exchange. 2.25, Post Office Propaganda; Records. 2.50, Market Prices. 3.10, Silesian Dialect Sequence. 3.30, Fairy Tales for Children. 4.0, Orchestral Concert, relayed from Bad Altheide; Conductor, Eschrich; Soloist, Reuter (Bassoon): March, Germania (Keil); Overture, Banditenstreiche (Suppé); String Quartet: Welthergessen (Aletter); Selection from Die Fledermaus (Humperdinck); Selection from Die Fledermaus (Joh. Strauss); Paraphrase on Das war eine köstliche Zeit (Lortzing); Concert Polka, My Teddy Bear (Gaugberger); Selection from The Merry Wives of Windsor (Nicola); Waltz (Pohl); Polka (Blise). 5.30, Weather; Market Prices. 5.35, Talk: Remedial Exercises. 5.55, Heinrich Zillich reads from his own work. 6.30, Announcements. 6.50, Programme Announcements; Weather. 7.0, Variety Programme on Records. 8.0, News. 8.10, Startbefehl—Play (Rossmann). 9.20, Introductory Talk to the Following Transmission. 9.35, Beethoven Sonatas; Recital by Dohon (Pianoforte): Sonata No. 1 in F Minor, Op. 2; Sonata No. 3 in D, Op. 10. 10.20, Time; News; Local News; Sports Notes. 10.45, Concert by the Station Orchestra; Conductor, Topitz: Overture, Masaniello (Aubert); Minuet (Mozart); March (Joh. Strauss); Selection from Der Waffenschmid (Lortzing); Suite, At the Circus (Annandola); Josef Strauss Potpourri (Fétas); Gallop (Blot). 12 Midnight (approx.), Close Down.

BRNO

922 kc/s, 325.4 metres; 32 kW.—6.0 to 7.15 a.m., See Prague. 9.50, See Prague. 11.0, Record. 11.5, Orchestral Concert: Conductor, Hanousek; March (Petzny); Waltz Intermezzo (Petzny); Waltz (Waldteufel); Overture, Poet and Peasant (Suppé); Piece (Komzak); Intermezzo (Siede). 12 Noon, See Prague. 1.30 p.m., Records. 1.40, See Prague. 2.0 to 2.10, Labour Exchange in German. 3.15, Concert by the Station Orchestra; Conductor, Janota: Concert Overture (Hrimaly); Suite (Vendler); Symphony in B (Sebor). 4.15 to 4.20, See Prague. 5.40, Notes for Housewives. 5.45, Records. 5.55, Notes for Scouts. 6.5, Violin and Harp Recital by K. Hanousek and T. Králová: Romance (Prfhoda); Wiegeliend (Brahms); Fantasy (Saint-Saëns). 6.20, German Transmission: Talk; Talk: Moravia in the Bronze Age. 6.55, See Prague. 7.50, See Moravská-Ostrava. 8.25, See Prague. 9.15, See Bratislava. 10.0 to 11.0, See Prague. 11.0 (approx.), Close Down.

BRUSSELS (No. 1)

620 kc/s, 483.9 metres; 15 kW.—11.55 a.m., Weather. 12 Noon, Records. 1.0 p.m., News. 1.10, Orchestral Concert: Wien beim Wien (Schrammel); Waltz, Gold and Silver (Lehár); Overture, Die Fledermaus

(Strauss); Selection from Eva (Lehár); Morgenblätter (Strauss). 2.0, Interval. 4.55, Announcements. 5.0, Records. 5.30, Programme for Children. 6.0, Talk: Public Schools. 6.15, Orchestral Concert: Marche des Marionnettes (Hallebroeck); Invitation to the Waltz (Weber); Delibes Potpourri (Urbach); Sonny Boy (de Sylva-Brown); Intermezzo. A Midsummer Night's Dream (Lautenschlager); Mon Bébé (Bosch); Ballet Music from The Queen of Sheba (Gounod). 7.15, Workers' Report. 7.30, Sports Talk; Colonial Review. 8.0, Orchestral Concert; Soloist, Delcour (Pianoforte): Overture, Benvenuto Cellini (Berlioz); Pianoforte Concerto (Chopin); First Suite from Peer Gynt (Grieg); La Féria (Lacôme). 9.0, Talk. 9.15, Records. 10.0, News. 10.10, Request Records. 11.0, Close Down.

BRUSSELS (No. 2)

932 kc/s, 321.9 metres; 15 kW.—Programme in Flemish.—11.57 a.m., Weather. 12 Noon, Orchestral Concert: Parade des allumettes (Wehl); Waltz (Lehár); Perruche et perroquet (Corbin); A deux (Desormes); Piece (Gervasio); Humorous Interlude by Bert Bel. L'âne blanc (Hüs); The Canary (Pollak); Selection from The Chocolate Soldier (O. Strauss); Pluk et Floek (Vandersmissen); Drinking Song (Grete). 1.0 p.m., News. 1.40, Orchestral Concert: Potpourri of Sound Film Music (Borchert); The Kitten on the Keys (Confrey); Flappermäulchen (Eilenberg); The Little Teddy Bear (Bratton); Humorous Interlude by Bert Bel. March, En avant (Ciere); Sérénade badine (Gabriel-Marie); The Woman in the Shoe (Brown). 2.0, Interval. 4.55, Announcements. 5.0, Orchestral Concert: Overture, The Flying Dutchman (Wagner); Symphony Op. 79 (Reinecke); Suite from Le Roi malgré lui (Chabrier). 5.45, Programme for Children. 6.30, V.J.V.K.A. Programme. 7.15, Talk. 7.30, Tourist Report. 8.0, Students' Programme. 8.45, Talk: The Brussels Exhibition. 9.0, Orchestral Concert: Prelude to Ingwelde (Schillings); Finlandia (Sibelius); Three Songs (Mahler); Aebud im Hoehgebirge (Grieg); An der Wiege (Grieg). 9.50, Evening Prayer. 10.0, News. 10.10, Selection from Carmen (Bizet) on Records. 11.0 (approx.), Close Down.

BUCHAREST

823 kc/s, 364.5 metres; 12 kW.—12 Noon, Water Level; Records. 12.45 p.m., Amusement Guide; Exchange; Records. 1.15, Time; Weather; News. 1.40, Records. 5.0, Concert of Romanian Music by the Fânica Luca Orchestra. 6.0, Time; Weather; News. 6.15, Concert (contd.). 7.0, Educational Programme. 7.15, Talk. 7.30, Faust—Opera in Five Acts (Gounod), on Records. After the Opera, News.

BUDAPEST

546 kc/s, 549.5 metres; 120 kW.—6.45 a.m., Gym. 9.45, News. 10.0, Talk. 10.40, Talk. 11.0, Water Level. 12 Noon, Chimes. 12.5 p.m., Concert by the Station Orchestra. 1.30, Concert by the Virány Chamber Orchestra. 2.40, Hints for Housewives. 4.0, Programme for Children. 5.0, Concert by Unemployed Musicians. Conductor: Béla Melles. 6.15, Talk in English: Hungary. 6.50, Concert by the Sírny Cigány Band. 7.55, Talk. 8.30, See Vienna. 8.0, Weather. 10.20, Quartet No. 3 (Schumann), by the Melles String Quartet. 11.0, Talk in French. 11.20, Dance Music.

CASSEL.—Relays Frankfurt.

COLOGNE

658 kc/s, 455.9 metres; 60 kW.—5.30 a.m., Hymn; Records. 6.5, Gym. 6.25, Orchestral Concert from Dortmund; Conductor, Bunk. 7.0 (approx.), News. 7.10 (approx.), Concert (contd.). 8.0, Time; Weather; Water Level. 8.5 to 8.20, Gym. for Women. 10.0, Time; News; Water Level. 10.10, Concert by Margarete Socher (Soprano) Löhe (Violin), and Schmidt ('Cello): Violin Sonata in F (Handel); Three Songs (Brahms): (a) Die Sonne scheidet nicht mehr. (b) Da unten im Tal, (c) Feinsliebchen du sollst nicht barfuß gehn; Andante for 'Cello (Mozart); Paganini Variations (Liszt); Heimweh (Liszt). 11.0, Out of his Apprenticeship—Play (Müller). 11.30, Post Office Propaganda; Records. 12 Noon, Military Band Concert. 12.45 p.m., Announcements; Greetings. 1.0, Song Records. 1.45, Announcements. 2.0, Chamber Music by the Station Quintet; Soloist, Grimberg (Bass): Stelldichein mit Colombine (Heyken); Waltz (Krome); Two Bass Songs; Für lustige Leut' (Komzák); Leggenda d'amore (Beccé); Two Schlus Songs; Serenade (Czibulka); Quellengeister (Heyer). 3.10, Dialect Reading. 3.30, Exchange. 3.50, Topical Talk. 4.0, Orchestral Concert relayed from Düsseldorf; Conductor, Artz: Prelude, Der Beherrscher der Geister (Weber); Mozart Potpourri; German Dances (Schubert); German Dances (Reger); Prelude to Don Sancho (Liszt); Hungariau

Dances Nos. 3 and 7 (Brahms); Selection from Fidelio (Beethoven); Prelude to Manfred (Schumann). 5.0, Travel Talk: Ibiza, Balearic Islands. 5.15, Clara Schumann Memorial Concert, relayed from Düsseldorf; Introductory Talk by Dr. Hilde Selbach; Soloists, Trude Fischer (Pianoforte), Jenny Stangeland (Songs); Pianoforte Concerto; Four Songs: (a) Die stille Lotosblume, (b) Sie liebten sich beide, (c) Liebeszauber, (d) Er ist gekommen. 6.0, Play for Young People. 6.20, Talk: Village Fair Customs. 6.40, News. 6.50, Exchange; Sports Notes. 7.0, Recital of Old German Ballads by Ingrid Fernolt. 7.30, Light Music by the Station Quintet: Waltz, Marienklänge (Jos. Strauss); Rusticanello (Cortopassi); Hungarian Dances 5 and 6 (Brahms); Keler Bela Potpourri (Rhode); Polonaise (Chopin). 8.0, News. 8.10, Talk: The New Peasantry. 8.30, Concert of Light Music; Schreiber ('Cello), Schäfer (Bassoon), and Rummel (Pianoforte): Minuet for 'Cello (Becker); Aubade d'un fou (Ravel); Romance for 'Cello (Ramath); Variations on Der Carneval von Venedig (Neukirchner). 9.0, The Day's End—Play in Verse (Schaaf), with Music by Kaufmann; Conductor, The Composer. 9.30, See Frankfurt. 10.0, Time; News; Weekly Review. 10.30, See Berlin (Deutschlandsender). 10.45, Concert from Munich. 12 Midnight (approx.), Close Down.

COPENHAGEN.—Relays Kalundborg. CORK.—Relays Athlone. DANZIG.—Relays Königsberg. DRESDEN.—Relays Leipzig.

FECAMP

1,456 kc/s, 206 metres; 10 kW.—11.0 to 11.30 a.m., Programme in English, arranged by the International Broadcasting Company of London. 11.0, Military Band Music. 11.30 to 4.30 p.m., Programme in French. 4.30 to 6.0, Programme in English by the I.B.C. 4.30, Worthing, Littlehampton, Brighton and Hove Concert. Part 1, New York and Paris. 5.0, Part 2, Dance Music. 5.30, Part 3, Gramophone Records. 6.0 to 11.0, Programme in French. 11.0 till Close Down, Programme in English, arranged by the I.B.C. 11.0, Light Music. 11.30, Concert, arranged by the I.B.C. (Ireland), Ltd. Tunes from the Talks and Shows. 12 Midnight, Club Concert for Bolton Listeners. Dance Music. 12.30 a.m. (Friday), I.B.C. Time Signal. 12.31, Dance Music (contd.). 1.0, I.B.C. Goodnight Melody and Close Down.

FLENSBURG.—Relays Hamburg. FLORENCE.—Relays Milan.

FRANKFURT

1,195 kc/s, 251 metres; 17 kW.—5.45 a.m., Hymn; Time; Weather. 5.50, Gym. 6.40, Time; Announcements. 6.50, Weather. 6.55, See Stuttgart. 8.10, Water Level; Weather. 8.15 to 8.35, Gym. 10.0, News. 10.45, Hints for Housewives. 11.0, Announcements; Records. 11.30, Programme Announcements; Exchange; Weather. 11.45, Social Notes. 12 Noon, See Stuttgart. 1.0 p.m., Time; Local Notes; News. 1.20, Orchestral Concert; Conductor, Schmittbeucher. 1.50, Time; News. 2.0, Concert (contd.). 2.30, Economic Review. 2.45, Time; Announcements. 2.55, Weather. 3.10, Max und Moritz—Play (Hansen) for Children. 4.0, Concert by the Municipal Orchestra, relayed from Wiesbaden; Conductor, Thierfelder. 5.30, Discussion: The Upper Classes and Socialism. 5.50, Topical Talk. 6.45 to 6.45, See Stuttgart. 6.45, Weather; Exchange; Programme Announcements; Time. 6.50, Children's Songs: Palatinat Folk Songs arranged as Duets for Baritone and Soprano: Sonata for Oboe, Flute and Bassoon (Kocher-Klein). 7.30, Local Review. 7.45, Social Notes. 8.0, Time; News; Announcements. 8.10, Concert of Danish Music by the Station Orchestra; Conductor, Rosbaud; Soloists, Telmányi (Violin), Tötcher (Oboe). In the interval, Reading: Carl Nielsen's Childhood. 9.30, Dialogue: German Engineering. 10.0, Variety Programme from Kaiserslautern. 10.20, Time; News. 10.30, See Berlin (Deutschlandsender). 10.45, News; Sports Notes. 11.0, See Stuttgart. 1.0 a.m. (Friday), Close Down.

FREDRIKSSTAD.—Relays Oslo. FREEBURG.—Relays Stuttgart. GENEVA.—Relays Sottens. GENOA.—Relays Milan. GLEIWITZ.—Relays Breslau. GÖTEBORG.—Relays Stockholm. GRAZ.—Relays Vienna. HAMAR.—Relays Oslo.

HAMBURG

904 kc/s, 331.9 metres; 100 kW. Relayed by Bremen, Flensburg, and Hanover, 1,330 kc/s, 225.6 metres.—5.45 a.m., Time; Weather; Notes for Farmers. 6.0, Gym. 6.15, Time; Weather. 6.20, See Berlin (Funkstunde). 7.0, Time; News. 7.10, See Berlin (Funkstunde). 8.0, Weather; Health Talk. 8.10, Announcements; Records. 10.50, News. 11.0 (from Hanover), The Villagers—Three Sketches (Heunenmann). 11.30, See Königsberg. 12 Noon, For Housewives. 12.5 p.m., Weather. 12.15 (approx.), Concert from Königsberg. 1.0, Exchange. 1.15, Weather. 1.20, Musical Interlude. 2.15, News. 2.30, Records: Rocooco Music. 3.0, Exchange. 3.40, Shipping and Aviation Notes. 4.0, See Munich. 5.30, Reading; Zarathustra in Spanien (Meingast). 5.45, Historical Sketches (Braunmüller). 6.0, Topical Talks. 6.25, War Experiences. 6.45, Exchange. 6.55, Weather. 7.0, A Journey to Spandau in 1631—Play in Three Scenes (Grund). 8.0, News. 8.10, Dance Music by the Station

SEPT. 13th **THURSDAY** continued

Band and Soloists. Conductor: Bolt. 10.0, News. 10.20, Dance Music (contd.). 11.0, Norwegian Folk Melodies and Songs by Brodal (Tenor) on Records. 11.30, String Quartet No. 2 in D, Op. 20 (Haydn), by the Station Quartet. 12 Midnight, Dance Music of the Nations by the Station Band. Conductor: Maasz. 1.0 a.m. (Friday), Close Down.

HANOVER—Relays Hamburg.

HILVERSUM

160 kc/s, 1,875 metres; 7 kW. (until 3.40 p.m.). Transmitted on Kootwijk, 50 kW., from 3.40 p.m. Programme of the General Broadcasting Society (A.V.R.O.).—7.40 a.m., Time. 7.41, Records. 9.40, Time. 9.41, Service. 9.55, Records. 10.10, Quartet in F, Op. 77, No. 2 (Haydn), by the Diligentia Quartet. 10.40, Reading. 11.10, Quartet in C (Mozart), by the Diligentia Quartet. 11.40, Time. 11.41, Concert of Light Music by The Minstrels. In the interval, Records. 2.10 p.m., Reading. 2.40, Records. 3.25, Interval. 3.40, Programme for Hospitals. 4.10, Records. 4.25, A Radio Play for Children. 5.10, Concert of Light Music by Kovacs Lajos and his Orchestra. 6.10, Talk on Sports. 6.40, Records. 7.5, The Dumky Trio (Dvorak) by the Budapest Trio. 7.40, Time. 7.41, News. 7.45, Bröderlein fein—Operetta in One Act (Fall). The A.V.R.O. Orchestra. Conductor: van Raalte. 8.40, Programme to be announced. 9.0, Concert by the A.V.R.O. Orchestra. Conductor: van Raalte. Soloist: Zepparoni (Violin). 9.40, Records. 9.55, Concert of Light Music by Kovacs Lajos and his Orchestra. 10.40, News. 10.50, Records. 11.40 (approx.), Close Down.

HORBY—Relays Stockholm.

HUIZEN

995 kc/s, 301.5 metres; 7 kW. (until 6.40 p.m.); 20 kW. from 6.40 p.m.—7.40 to 8.55 a.m., Programme of the Catholic Radio Society (K.R.O.); Records. 9.40 to 10.40, Programme of the Christian Radio Society (N.C.R.V.). 9.40, Records. 9.55, Religious Address. 10.25, Records. 10.40 to 1.40 p.m., K.R.O. Programme. 10.40, Records. 11.16, Religious Address. 11.40, Police Notes. 11.55, Concert by the K.R.O. Orchestra; Conductor, van 't Woud; Hail to the Spirit of Liberty (Sousa); Au Printemps de la vie (Mouton); Selection from The Gipsy Baron (Strauss); Wiener Kinder (Strauss); Erinnerung an Luzern (Blon); De Rotterdamse Vlag (Verrallen); Records; Hoch Heidecksburg (Herzer); Selection from Potentill (Nedbal); Roses from the South (Strauss); Bei Lied und Wein (Armandola); The Gladiators' Farewell (Fucik). 1.40 till Close Down, N.C.R.V. Programme. 1.40, Handwork. 2.40, Pianoforte Recital by Mlle. H. de Boek: Scherzi (Schubert); Three Pieces (Debussy): (a) Réverie, (b) Danseuses de Delphes, (c) La cathédrale engloutie; Records: Dance from El Amor Brujo (Fallá); Pieces (Schönberg); Three Chinese Pieces (Sjeng Feng). 3.35, Interval. 3.40, Bible Reading; Baritone and Organ Recital. 4.40, Handicrafts for Young People. 5.10, Records. 5.40, Recital by Borkent (Tenor) and Veelo (Pianoforte); Tenor Solos: (a) O, del mio dolce ardor (Gluck), (b) Ch'io mai vi possa (Handel); Pianoforte Solos: (a) Sonata No. 3 (Arne), (b) Prelude and Fugue (Bach); Tenor Solos: (a) Der Musesohn (Schubert), (b) Ganymed (Schubert), (c) Sind es Schmerzen (Brahms), (d) So willst du des Armen (Brahms); Pianoforte Solos: Prelude and Chorale (Franck); Two Songs (Rennet); Song (Valerius); Holland (Andriessen). 6.40, Police Notes. 6.55, Religious Address. 7.10, Weekly Press Review. 7.40, Concert by the N.C.R.V. Orchestra; Conductor, v.d. Hurk; Soloist, Blaauw (Organ); Overture, King Midas (Ellenberg); Accelerationenwalzer (Strauss); Potpourri (Waldeufel); Barcarole (Meyer-Helmund); Delibes Potpourri (Fétras); Serenade (Drigo); Polka (Doppler); Souvenir (Drda). 8.40, Talk. 9.10, Concert by the N.C.R.V. Orchestra; Conductor, v.d. Hurk: March (Allier); Overture (Bulson); Gallop (Popy); Viennese Melody (Ziehrer); Selection from Les Erynnies (Massenet); Triumphant March from Aida (Verdi); Records; A Musical Medley. 10.40, Records. 11.10, Close Down.

INNSBRUCK—Relays Vienna.

KALUNDBORG

238 kc/s, 1,261 metres; 75 kW. Relayed by Copenhagen, 1,176 kc/s, 255.1 metres; and Skamlebaek, 49.5 metres.—7.0 a.m., Gym. 8.30, Service. 11.0, Weather. 11.10, Fish Prices. 11.15 to 11.45, French for Schools. 12 Noon, Time; Chimes. 12.5 p.m., Harald Andersen's String Ensemble, from the Bellevue Strand Hotel. 2.0, Interval. 3.0, Concert by Teddy Petersen's Orchestra, from the Wivex Restaurant. 4.0, The inauguration of the North Jutland Smallholders' Gardens Show for their Fifty Years' Jubilee; Community Singing; Speeches; Songs. 4.45, Talks for Boys. 5.30, Exchange. 5.42, A Poem. 5.45, Talk: Water Supplies. 6.15, English Lesson. 6.45, Weather. 6.54, Announcements. 7.0, News. 7.15, Time. 7.16, Talk: The Book of Psalms. 7.45, Talk: Spoken and Written Danish. 8.10, Concert by the Radio Symphony Orchestra and

Soloists; Conductor, Nikolai Malko: Symphony No. 1 (Schoelostkovich); Concerto in D Minor for Two Violins (Bach); Interval; Extracts from The Rhinegold and The Flying Dutchman (Wagner). 10.15, News. 10.30, Dance Music by Donde's Band, from the Lorry. In the interval at 12 Midnight, Time; Chimes. 12.30 a.m. (Friday), Close Down.

KIEL—Relays Hamburg. **KLAGENFURT**—Relays Vienna.

KONIGSBERG

1,031 kc/s, 291 metres; 60 kW. Relayed by Danzig, 1,303 kc/s, 230.2 metres.—5.0 a.m., Records. 5.50, Weather. 6.0, Gym. 6.20, See Berlin (Funkstunde). 7.0, News. 7.10 (approx.), See Berlin (Funkstunde). 8.0, Service. 8.30 to 9.0, Gym. for Women. 9.5, Travel Talk: Brazil. 9.35, Hints for Housewives. 9.50, Gym. for Children. 10.40, News. 10.55, Weather. 11.30, Concert by the Small Station Orchestra; Conductor, Wilken: Romantic Overture (Keler Bela); Liebestanz (Clemus); Serenade (Bruch); Rhapsody No. 5 (Liszt); Eismalmen (Leuschner); Waltz, Nachtfalter (Joh. Strauss); Suite, An den Ufern des Nils (Platen); Scènes poétiques (Godard); Overture, Tantalusqualen (Suppé). In the interval at 12 Noon, Weather. 1.0 p.m., Time; Weather. 1.5 to 2.30 (from Danzig), Records. In the intervals at 1.20 and at 2.0, News. 2.30, Exchange; Market Prices. 3.0, Market Prices. 3.15, Book Review. 3.30, Eurhythmics. 4.0, Concert by the Small Station Orchestra; Conductor, Wilken: Part I, Slav Music; Overture, The Secret (Smetana); Slav Dances Nos. 12 and 16 (Dvorak); Selection from Haika (Moniuszko); Melody (Rachmaninov); Serenade (Rachmaninov); Selection from The Sleeping Beauty (Tchaikovsky); Part II, Light Music; Overture, Casanova (Lincke); Alt-Wiener Menuett (Voigt); Ständchen (Voigt); Kaiserwalzer (Joh. Strauss); Selection from Boccaccio (Suppé); Overture, Gasparone (Müllöcker). In the interval at 5.0, Reading. 5.55, Funny Stories. 6.15, Market Prices. 6.25, Gardening Talk. 6.55, Weather. 7.0, Scheidt and Praetorius Organ Recital by Schütz, with Introductory Talk by Müller Blattau. 7.30, Folk Songs by a Boys' Choir. 8.0, News. 8.10, See Stuttgart. 9.30, See Frankfurt. 10.0, News; Sports Notes. 10.30, Records. 11.0, See Stuttgart. 12 Midnight (approx.), Close Down.

KOSICE—Relays Prague.

LAHTI

166 kc/s, 1,807 metres; 40 kW. Relayed by Helsinki, 895 kc/s, 335.2 metres.—7.5 a.m. to 7.20, Service in Swedish. 7.30 to 7.45, Service in Finnish. 11.0, Exchange. 11.5, Music. 11.30, Exchange. 11.45, News in Finnish and Swedish. 11.59, Time; Weather. 4.0 p.m., Concert by Austrian Students. 5.0, Recitations. 5.25, 'Cello Recital by Vilho Koponen. 5.50, News in Finnish. 5.59, Time; Weather. 6.10, News in Swedish. 6.15, Talk. 6.40, Pianoforte Recital by Kerstin Karstén: Three Sonatas (Scarlatti); Etude (Liszt). 7.5, Talk. 7.30, Song Recital by Aino Elenius. 7.55, Concert by the Station Orchestra; Conductor, Erkki Linko: Overture, The Crown Diamonds (Auber); Die Sage (Haapalainen); Selection from La Bohème (Puccini); Waltz (Strauss); Two Songs (Klami); Mit Bomben und Granaten (Bilse). 8.45, News in Finnish. 9.0, News in Swedish.

LAUSANNE—Relays Sottens.

LEIPZIG

785 kc/s, 382.2 metres; 120 kW. Relayed by Dresden, 1,285 kc/s, 233.6 metres.—5.50 a.m., Notes for Farmers. 6.0, Gym. 6.25, See Cologne. 7.0, News. 7.10 (approx.), See Cologne. 8.0, Gym. 8.20 to 9.0, Records. 9.40, Exchange. 9.45, Programme Announcements. 9.55, Weather; Water Level. 10.10 to 10.40, Travel Sequence: The Erzgebirge. 11.0, Post Office Propaganda: Records. 11.30, News; Time. 11.40, Weather. 11.45, Talk for Farmers. 12 Noon, Concert from Königsberg. 1.0 p.m., News; Time. 1.10 to 2.30 (from Dresden), Soloist Concert. In the interval at 2.0, News; Exchange. 3.0, Literary Talk: Carl Lange. 3.25, Programme for Young People. 3.40, Economic Notes. 4.0 (from Dresden), Concert by the Dresden Philharmonic Orchestra. Conductor: Curt Jahn. Overture, The Gipsy Baron (Joh. Strauss); Selection from Boccaccio (Suppé); Intermezzo from The Arabian Nights (Joh. Strauss); Waltz from Nakiri's Hochzeit (Lincke); Selection from Der Obersterzer (Zeller); Overture, Der Bettelstudent (Müllöcker). 5.0, Nordic Lyric Sequence, with Music. Conductor: Krahe. 5.30 (from Dresden), Sonata No. 2 in G, Op. 13 (Grieg), by Leni Reitz (Viola). 6.0, Economic Notes; Weather; Time. 6.10, Talk: von Treitschke, the Historian. 6.30, Concert of Light Music by the Station Orchestra. Conductor: Luh. Overture, Fatinitza (Suppé); Two Gipsy Dances (Heidingsfeld); Libellenreigen (Seide); March (Krüger). 6.50, Festival Programme of Songs and Dances (Bergmann), by the Station Orchestra and Chamber Choir; Conductor, Luh; Soloists,

Eva Anschutz (Soprano), Ulbricht (Tenor), and Nagel (Bass). 7.35, Talk: Thuringian Glass. 8.0, News. 8.10 to 10.20, See Berlin (Funkstunde). 10.20, News; Sports Notes. 11.0, See Stuttgart. 12 Midnight (approx.), Close Down.

LINZ—Relays Vienna.

LUXEMBOURG

230 kc/s, 1,304 metres; 120 kW.—7.45 a.m., Records. 8.0, News in French; Record; News in German; Record. 12 Noon, Concert by the Station Orchestra; Conductor, Pensis: March (Clemus); Waltz, Les Fleurs (Waldeufel); Overture, Massaniello (Auber); Potpourri (Lincke). 12.30 p.m., News in French and German. 12.40, Concert (contd.): Lehar Potpourri (Murzilli); African Suite (Ring); Piece (Walleit); Piece (Schoemaker). 1.0, Exchange. 1.5, Concert (contd.): Finlandia (Sibelius); Ballata degli amanti (Micheli). 1.15, Records. 1.30, Exchange. 1.35, Records. 2.0, Exchange. 3.45, Exchange. 6.30 till Close Down, German Evening. 6.30, Variety Concert. 7.30, Racing Results. 7.35, Records. 8.0, News in French and German. 8.20, Concert by the Station Orchestra; Conductor, Pensis: Overture, The Italian Girl in Algiers (Rossini). 8.30, Exchange. 8.35, Concert (contd.): Mozart Potpourri (Urback); Waltz, Oh Frühling, wie bist du so schön (Lincke); Leggenda d'amore (Bece); Popular Song (Komzak); Berceuse (Godard); Ein Cocktail in der Wunder-Bar (Katscher). 9.30, German Concert by the Station Orchestra; Conductor, Pensis; Suite, A Midsummer Night's Dream (Mendelssohn); Pictures from the Orient (Unger); The Blue Bird (Spies); Prelude, The Master-singers (Wagner). 9.25, Dance Records.

MADRID

EAJ7, 1,095 kc/s, 274 metres; 7 kW.—9.0 a.m., News. 10.0, Exchange; Announcements. 10.30, Interval. 2.0 p.m., Chimes; Weather; Talk; Music. 2.30, Concert by the Station Sextet: Overture, Martha (Flotow); Slav Rhapsody (Volpatti); Selection from La viejeita (Caballero). 3.0, Amusement Guide; Exchange; Light Music. 3.30, Concert by the Station Sextet. 4.0, Light Music. 4.15, Concert by the Station Sextet. 4.50, News. 5.0, Interval. 6.0, Chimes; Light Music. 7.0, Announcements. 7.5 (approx.), Ballet Music from Operas: Orpheus (Gluck); Manon (Massenet); Samson et Delila (Saint-Saens); The Golden Cockerel (Rimsky-Korsakov); Las Golondrinas (Usandizaga); Khovanschina (Mussorgsky). 7.30, Exchange. 7.40, Vocal and Orchestral Concert: Songs: (a) Der Doppelgänger (Schubert), (b) Death and the Maiden (Schubert), (c) Aria from Don Giovanni (Mozart), (d) Serestas (Villalobos). (e) The Prophet (Rimsky-Korsakov). (d) Song of the Volga Boatmen; Selection from El tambor de granaderos (Chapi); Serenade (Schubert); Dance (Chaminade); Ballet Music from Hamlet (Thomas); March from Prince Igor (Borodin). 8.30, News; Programme for Children. 9.50, Announcements. 10.0, Chimes; Concert by the Station Sextet. 10.30, Literary Review. 11.0, News; Concert by the Station Sextet. 11.30, Concert by the Municipal Band; Conductor, Ricardo Villa. 12.45 a.m. (Friday), News. 1.0, Chimes. 2.0 to 3.0, Programme in English arranged by the International Broadcasting Company of London. 2.0, Dance Music. 3.0, I.B.C. Goodnight Melody and Close Down.

MADRID

EAQ, 10,000 kc/s, 30 metres; 20 kW.—11.15 p.m., News. 11.30, Programme from Madrid (EAJ7); News. 1.0 to 1.30 a.m. (Friday), Programme in English arranged by the International Broadcasting Company of London: Orchestral Music. 1.30, I.B.C. Goodnight Melody and Close Down.

MALMO—Relays Stockholm.

MILAN

814 kc/s, 368.6 metres; 50 kW. Relayed by Turin, 1,140 kc/s, 263.2 metres; Genoa, 986 kc/s, 304.3 metres, and Florence, 610 kc/s, 491.8 metres.—7.30 a.m., Gym. 7.45 to 8.0, Time. 8.15, 11.30 to 12.30 p.m., Chesiz-Zanardelli-Cassone Trio. 12.30, Records. 12.45, News. 1.0, Time; Announcements. 1.45, Fashion Notes. 1.10, Concert by the Doreno Orchestra. 1.30, Records; Exchange. 1.45, Concert (contd.). 2.15 to 2.25, Exchange. 4.35, News. 4.45, Programme for Children. 5.10, Light Music. 5.55, Weather. 6.0, Notes for Farmers; Corn Prices. 7.0, Tourist Report; Announcements. 7.15, News in Foreign Languages. 8.0, Time; Announcements; News; Records. 8.30, Government Notes. 8.45, Programme to be announced. In the intervals, Talk; Art Notes. After the Programme, News.

MONTE CENERI

1,167 kc/s, 257.1 metres; 15 kW.—12 Noon, Announcements. 12.5 p.m., Concert by the Station Orchestra: Suite, Un giorno in Venezia (Nevin); Waldesruhe (Dvorak);

Prelude to Act I of Asrael (Franchetti); Lullaby (Karganov); Selection from Tannhäuser (Wagner); Canonetta (Martucco); Hungarian March (Liszt). In the interval at 12.29, Time Signal from Neuchâtel Observatory. 12.55, News. 1.5 p.m., Sports Notes. 1.15, Records. 1.30, Interval. 3.59, Time Signal from Neuchâtel Observatory. 4.0, See Sottens. 6.0, Interval. 7.45, News. 8.0, Introductory Talk to the following Transmission. 8.15, Concert of French Music by the Station Orchestra; Conductor, Casella. 8.55, Anecdotes about French Composers. 9.5, Concert of French Opera Music: Overture, Raymond (Thomas); Duet from Faust (Gounod); Prelude to L'Arlésienne (Bizet). 9.35, Light French Music. 10.0 (approx.), Close Down.

MORAVSKA-OSTRAVA

1,158 kc/s, 259.1 metres; 11.2 kW.—6.0 a.m., See Prague. 7.15, Interval. 9.50, See Prague. 11.0, See Brno. 12 Noon, See Prague. 2.0 to 2.10 p.m., See Brno. 3.15, See Brno. 4.15 to 4.20, See Prague. 6.0, Records. 5.50, Music Review. 6.0, Local News. 6.5, Book Review. 6.15, Record. 6.20, German Transmission: Topical Programme in Prose and Song. 6.55, See Prague. 7.50, Dance Music by the Station Band. 8.25, See Prague. 9.15, Musical Programme. 9.55, Serenade in E flat, Op. 32, No. 1 (Muskovsky), by the Station Orchestra; Conductor, Divis. 10.0 till Close Down, see Prague. 11.0 (approx.), Close Down.

MOSCOW (No. 1)

174 kc/s, 1,724 metres; 500 kW.—5.0 a.m., News. 5.15, Fanfare. 5.45, Gym. 6.15, Musical Programme. 8.15, Programme for Children. 9.0, Musical Programme. 9.58, Time. 10.0, News. 10.15, Spain fu Song and Dance—Music of Bizet, Rubinstein, Moszkovsky, Dargomizky, Cui, Tchaikovsky, and Dessauer: A Donra Sextet and Choir; Conductor, Kouvykiac. 11.15, Technical Talk for Farmers. 3.0, Programme Announcements. 3.15, Programme for Children. 3.58, Time. 4.0, News. 4.30, Communist Party Programme. 5.30, Red Army Programme. 6.30, Choral Concert; Conductor, Svechnikov. 8.0, Records. 9.0, German Programme: Haus Schmidt at the Microphone; Letter-box. 9.55, Chimes. 10.5, Talk in French: The Soviet States Tax System. 11.5, Talk in Spanish: The Soviet States Tax System.

MOTALA—Relays Stockholm. **MUH-LACKER**—See Stuttgart.

MUNICH

740 kc/s, 405.4 metres; 100 kW. Relayed by Augsburg, and Nürnberg, 1,267 kc/s, 236.8 metres, and Kaiserlautern, 1,195 kc/s, 251 metres.—6.30 a.m., Gym. 6.45, Motto; Records. 7.15, Time; News. 7.25, Concert from Stuttgart. 9.30, Hints for Housewives. 10.10, Programme for Schools. 10.40, Notes for Farmers. 10.50, Market Prices. 11.0, Talk. 11.20, Time; News. 11.30, Post Office Propaganda; Records. 12 Noon, Records. 1.15 p.m., Time; News. 1.25, Orchestral Concert; Conductor, Hegel; Overture, La battaglia di Lagnano (Verdi); Selection from Mephistopheles (Boito); Spanerl-Walzer (Alwe); Intermezzo, Am Kai von Venedig (Dreyer). 2.0, News; Programme Announcements; Exchange. 2.20, Concert of Chamber Music by the Bernhard Walther Quartet; Soloists, Bauer (Monologues); Weiler (Organ); Selection from Das Buch der hängenden Gärten (George); Prelude and Fugue for Violin and Organ (Kaminski). 3.0, Reading. 3.30, Der schwarze Kasimir—Story for Mothers (Seidel). 3.50, Weather; Notes for Farmers. 4.0, Concert by the Small Station Orchestra; Conductor, Kloss; Soloist, Wittich (Trumpet); Overture, Queen for a Day (Adam); Selection from Der Trompeter von Sickingen (Nessler); Verdi Potpourri (Schreiner); Waldteufel Potpourri (Weninger); Erzählung und Tanz (Gretschaninov); Oriental Suite, Aziyade (Ryssen); Waltz (Fétras); Indigo-Marsch (Strauss). 5.30, Reading (Eisele). 5.45, Animals in Music—Sequence (Kusche), with Verse by Althaus: Ila Kosak (Monologues) and Kusche (Pianoforte). 6.30, Talk: Superstitions. 6.50, Time; Weather; Notes for Farmers. 7.0, Concert by a Wind Instrument Band; Conductor, Lange: German Hymn (Fesca); Overture, Hunyadi Laszlo (Erkel); Selection from Cavalleria rusticana (Mascagni); Waltz (Fuefk); Rhapsody (Fesca); March, In Treue fest (Teike). 8.0, News. 8.10, Songs from Operettas by Julia Prosel (Soprano) and Nömer and König (Tenors); The Station Orchestra; Conductor, Kloss. 9.0, Pianoforte Sketches, Op. 26 (Zilcher), by Leonhardt. 9.10, Der Bauer und die Windsbraut—Play (Billinger), with Incidental Music (List); The Station Orchestra and Choir; Conductor, The Composer. 10.0, Time; News; Exchange; Sports Notes. 10.20 (from Nürnberg), Serenade by the Josef Schwarz'sche Orchestra; Soloists, Sophie Kömpel (Soprano); Wittstatt (Tenor), Oertel and Günther (Two Pianofortes). 1.0 a.m. (Friday), Close Down.

NAPLES—Relays Rome. **NOTODDEN**—Relays Oslo. **OSLO** 260 kc/s, 1,154 metres; 60 kW. Relayed by Hamar, 519 kc/s, 578 metres; and Jekøy, 6,990 kc/s, 42.92 metres.—10 a.m., Egg Market Prices. 11.15, Service. 11.50, Exchange.

SEPT. 13th THURSDAY continued

PRAGUE

638 kc/s, 470.2 metres; 120 kW.—6.0 a.m., Time; Gym; Music; News. 7.15, Interval. 9.50, News. 10.5, News in German. 10.10, Record. 10.15, Concert by the Muzik Quartet. 11.0, See Brno. 12.0, Time; Notes for Farmers; Weather. 12.5 p.m., Records. 12.20, News. 12.30, Dance Music by Harry Osten's Band. 1.30, Industrial Review. 1.40, Records. 1.50, Exchange. 1.55, Exchange and Weather in German. 2.0, Interval. 3.15, See Brno. 4.15 to 4.20, Exchange; Weather. 5.40, Notes for Housewives. 5.45, Talk for Farmers. 5.55, Record. 6.0, Political Talk. 6.10, German Transmission: Book Review; Notes for Farmers; Market Prices; Talk. 6.55, News and Weather in German. 7.0, Time; News. 7.10, Concert of Modern Music for Children. 7.35, Talk. 7.50, See Moravská-Ostrava. 8.25, A One-Act Play. 9.15, Croatian Song Recital by Marja Halynska. 9.35, See Moravská-Ostrava. 10.0, Time; News. 10.15, Concert by the Prague Chamber Orchestra; Conductor, Hertl. Hungarian March (Leopold); Overture, the Barber of Seville (Rossini); Romance (Glinka); Waltz (Kovarovic); Selection from Rose-Marie (Primi); Intermezzo (Hrubes); March (Vackar). 11.0 (approx.), Close Down.

REYKJAVIK

208 kc/s, 1,442 metres; 16 kW.—12 Noon, Weather. 2.15 p.m., Popular Programme. 5.0, Weather. 9.10, Weather. 9.25, Musical Programme. 9.50, Announcements. 10.0, Time Signal; Concert by the Station Orchestra. 10.30, Reading. 11.0, News. 11.30, Humorous Programme on Records; Dance Music. 12.30 a.m. (Friday), Close Down.

RJUKAN.—Relays Oslo.

ROME

Call 1RD, 713 kc/s, 420.8 metres; 50 kW. Relayed by Naples, 1,104 kc/s, 271.7 metres; Milan (No. 2), 1,348 kc/s, 222.6 metres; Turin (No. 2), 1,357 kc/s, 221.1 metres, and 2RD, 11,810 kc/s, 25.4 metres.—7.30 a.m., Gym. 7.45 to 8.0, Time; News; Weather. 12.30 p.m., Records. 1.5 to 1.30, See Milan. 1.30, Time; News; Exchange. 1.45 to 2.15, See Milan. 4.30, Children's Radio Review. 4.55, News; Exchange. 5.0, Vocal and Instrumental Concert; Soloists, Rondini (Violin), Cavagnis (Tenor), Maria Luisa Malpassuti (Soprano) and Lilia Salomone (Pianoforte); Violin Sonata in B minor (J. S. Bach); Three Tenor Arias: (a) Posate, dormite (Bassani), (b) La procession (Frank), (c) Aria from Lucia di Lammermoor (Donizetti); Two Violin Solos: (a) Sirventese (Plek-Mangiagalli), (b) Il Capitano Fracassa (Castelnuovo-Tedesco); Four Italian Songs for Soprano: (a) La perla (Bianchini), (b) Ninna-Nanna, and (c) Canzone pisana (Prabella), (d) Canzone di nozze valdostana (Confalonieri). 5.55, Weather. 6.0, Corn Prices. 7.0, Tourist Report; Announcements. 7.15, News in Foreign Languages. 8.0, Time; News; Sports Notes. 8.10, Records. 8.30, Government Notes. 8.45, Aida—Opera (Verdi). 10.0 (approx.), Dance Music relayed from the Albergo del Quirinale. 11.0, News.

RUYSSELEDE

10,330 kc/s, 29.04 metres; 8 kW.—7.45 p.m., News in French. 8.0, Records. 9.0, News in Flemish. 9.15 (approx.), Close Down.

SALZBURG.—Relays Vienna.

SCHENECTADY

WGY, 790 kc/s, 379.5 metres; 50 kW. Relayed at intervals by W2XAF at 31.48 metres and on 19.56 metres.—7.0 p.m., Dreams Come True; Barry McKinley (Songs). 7.15, International Broadcast from Austria. 7.30, Woman's Radio Review; Talks; Orchestra. 11.35, Exchange. 12 Midnight, Fleischmann Hour; Rudy Vallee and his Orchestra. 1.0 to 3.0 a.m. (Friday), Popular Programme.

SOTTENS

677 kc/s, 443.1 metres; 25 kW. and Geneva, 601 kc/s, 748 metres.—5.0 a.m., Gym. 6.15, Interval. 12.29 p.m., Time. 12.30, News in French and German. 12.45 (from Geneva), Records. 1.0 (from Geneva), Exchange. 1.5, (from Geneva), Records. 1.45, Programme for the Chamber of Commerce Festival: Addresses and Concert. 3.30, Interval. 3.59, Time. 4.0 to 7.0, See Beromünster. 7.0, Weather. 7.5, (from Geneva), Talk: The Work of the League of Nations. 7.30 (from Geneva), Wireless Notes. 7.59, Weather. 8.0, (from Geneva), Talk: Stendhal at Geneva. 8.20 (from Geneva), The Barber of Seville—Opera in Two Acts (Rossini). In the Interval at 9.15, News in French and German. 10.0 (from Geneva), Talk: The Work of the League of Nations. 10.30, Close Down.

STOCKHOLM

704 kc/s, 426.1 metres; 55 kW. Relayed by Boden and Östersund, 413.5 kc/s, 726 metres; Göteborg, 941 kc/s, 318.8 metres; Hörby,

1,131 kc/s, 265.3 metres; Motala, 216 kc/s, 1,389 metres; and Sundsvall, 601 kc/s, 499.2 metres.—7.20 a.m., Gym. 7.45, Service. 8.0, Weather. 12.30 p.m., Weather. 12.45, Exchange. 12.55, Time. 1.0, Singing Lesson for Schools. 1.20, Orchestral Concert of Opera Music. 2.20, Talk. 2.40, Cello Recital by Alex Bergkvist. Adagio and Allegro (Boccherini); Amoroso (Caporale); Minuet (F. E. Bach); Sicilienne (W. Friedemann-Bach). 3.0, Interval. 5.0, Weather. 5.5, Religious Address. 5.30, Sacred Song Recital by Erik Algård. 5.45, Programme for Children. 6.0 (from Göteborg), Orchestral Concert of Light Music. 7.0, Cookery Talk. 7.15, Weather; News. 7.30, Talk. 7.50, Concert by the Station Orchestra and Soloists. Conductor, Örevillius. 9.15, Talk. 9.45, Weather; News. 10.0 (from Göteborg), Records. 11.0 (approx.), Close Down.

STRASBOURG

859 kc/s, 349.2 metres; 15 kW.—10.15 a.m., Concert of Light Music relayed from the Square de l'Hôpital, Vichy; Conductor, Dorstène. 11.30, Records. 12.45 p.m., News. 1.0, Time; Exchange. 1.5, Records. 1.15, Orchestral Concert relayed from Lille, 1,213 kc/s, 247.3 metres. 2.0, Programme for Children. 3.30, Orchestral Concert relayed from the Casino, Vichy; Conductor, Brouillac. 5.0, Orchestral Concert; Conductor, Koskam; Overture, Les cent Vierges (Leacock); Italian Serenade (Manfred); Arab March (Manfred); Waltz (Witz); Selection from Monsieur Beaucaire (Messager); Cello Solos: (a) Serenade (Toselli), (b) Grossmütterchen erzählt (Langer); Waltz from The Rose of France (Romberg); Premiers songs (Pellood); Gipsy March (Razigade). 6.0, Talk in German: French-speaking Canada. 6.15, History Talk: The Press under Louis-Philippe. 6.30, Chabrier Orchestral Concert; Conductor, de Villers: Fête polonaise; Overture, Gwendoline; Rhapsody, España; Bourrée fantasque; Scherzo Waltz; Village Dance; Overture, Une éducation manquée; Joyeuse marche. 7.30, Time; News. 7.45, Local News. 8.0, Press Review in German; Lottery Results. 8.30, Military Band Concert relayed from Metz; Conductor, Massinot; March (Mouchard); Overture, Ramuntcho (Pierné); Flute Concertino (Chaminade); First Movement from Symphony No. 2 (Borodin); Souhaits à la France (Pessard); Marche héroïque (Salnt-Saëns); Nocturne in E (Chopin); Zigeunerweisen (Sarasate); Violin Solo; Selection from Romeo and Juliet (Berlioz); Overture, Le roi d'Ys (Lalo); Oboe Solo; Horn Solo; Clarinet Solo; March (Loterie). In the interval at 9.30, Press Review. 10.30 (approx.), Close Down.

STUTTGART

MUHLACKER, 574 kc/s, 522.6 metres; 100 kW.—5.35 a.m., Notes for Farmers. 5.45, Hymn; Time; Weather. 5.50, Gym. 6.15, Orchestral Concert, relayed from Mannheim. 6.40, Time; Announcements; Weather. 6.55, Concert (contd.). 8.40, Weather; Water Level. 8.15, Gym. 8.35, Interval. 9.0 to 9.15, Programme for Women. 10.0, News. 10.10, Dialect Talks for Schools. 10.40, Three Preludes on Gregorian Themes (Respighi) by Otto Sonnen (Pianoforte). 11.10, Gavottes and Minuets, on Records. 11.25, Post Office Propaganda; Records. 11.40, Talk for Farmers. 11.55, Weather. 12 Noon, Concert by the Spa Symphony Orchestra, relayed from Baden-Baden; Conductor, Assmus; March (Blankenburg); Prelude to Melusine (Grammann); Eine kleine Nachtmusik (Mozart); Hymn to St. Cecilia (Gounod); Selection from La Bohème (Puccini); Waltz, Wiener Blut (Joh. Strauss). 1.0 p.m., Time; Local News; News. 1.20, See Frankfurt. 1.50, Time; News. 2.0 to 2.30, See Frankfurt. 3.15, Animal Talk for Children. 4.0, See Frankfurt. 5.30, Musical Glasses. 5.45, History Talk: Nördlingen. 6.15, Vodeling on Records. 6.25, Spanish Lesson. 6.45, Concert by the Station Orchestra; Conductor, Görlich; Soloist, Baumann (Tenor): March (Lincke); Overture, Flotte Bursche (Suppé); Three Student Songs; Waltz, Nachtschwärmer (Ziehrer); Two Songs; Potpourri, Bei Lied und Wein (Armandola). 7.30, See Frankfurt. 7.40, Time; Weather; Notes for Farmers. 8.0, News. 8.10, A Microphone Visit to Böckingen. 8.40, Waltz Tunes—Sequence (Ganss); The Station Orchestra; Conductor, Görlich. 9.30, See Frankfurt. 10.0, Dance Records. 10.20, Time; News. 10.30, See Berlin (Deutschlandsender). 10.45, News; Sports Notes. 11.0, Erwins Dom—Musical Sequence (Schmitt), by the Station Orchestra. 12 Midnight, Serenade. 1.0 a.m. (Friday), Close Down.

SUNDSVALL.—Relays Stockholm.

TOULOUSE

913 kc/s, 328.6 metres; 10 kW.—8.0 a.m., Dance Refrains. 8.30, News. 8.35, Sound Film Music; Orchestral Music. 12 Noon, Songs. 12.15 p.m., Orchestral Music. 12.30, News. 12.45, Request Music. 1.0, News. 1.5,

12.55 p.m., Time. 1.0 to 2.0, Records. In the Intervals at 1.15, Weather; Report for Farmers; and at 1.45, Exchange. 5.30, Concert of Light Music; Records. 6.30, Talk relayed from Stavanger, 1,276 kc/s (235.1 metres). 7.0, Announcements. 7.15, News. 7.30, Time; Light Music. 8.0, Talk for Farmers. 8.30, Concerto for Flute, Viola and Harp (Debussy). 9.10, Stein Balstat reads from his own Works. 9.40, News. 10.0, Topical Talk. 10.15, Records.

OSTERSUND.—Relays Stockholm.

PALERMO

565 kc/s, 531 metres; 4 kW.—12.45 p.m., News. 1.0 to 2.0, Concert. In the Interval at 1.30, Time; News. 5.30, Records. 6.0 to 6.30, Ballata Programme. 8.0, Announcements; Notes for Farmers. 8.20, Records. 8.30, Time; News; Records. 8.45, Orchestral Concert: Suite, Old Airs and Dances (Respighi); L'estate (Vivaldi-Molinari); Piano-forte and Orchestra: Suite, I canti della stagione alta (Pizzetti); Persian Dances from Khovanstchina (Mussorgsky). In the Interval, Talk: After the Concert, Records. 11.0, News.

PARIS

POSTE PARISIEN, 959 kc/s, 312.8 metres; 100 kW.—7.10 a.m., Fanfare. 7.15, Records. In the intervals at 7.30 and 8.30, News. 8.45, Cookery Hints. 12 Noon, Exchange. 12.5 p.m., Hungarian Dances Nos. 5 and 6 (Brahms) on Records. 12.15, Variety Items. 12.25, News. 12.35, French Military Music on Records. 1.5, Exchange. 1.15, Operetta Records. 2.0, Exchange. 3.15, Exchange. 3.45, Exchange. 4.50, Exchange. 6.45, Exchange. 6.49, Records: Sonata No. 42 (Mozart); Guitare (Moskowsky). 7.10, News. 7.30, Programme for Children. 8.0, Interval. 8.10, Duets. 8.40, Exchange. 8.55, Concert by Georges Léoni's Cigány Band. 9.30, Interval. 9.40, Breton Song Recital by Suscinio and Wilhelmine Coudray. 10.20, News and Exchange. 10.30 till Close Down, Programme in English arranged by the International Broadcasting Company of London. 10.30, Tunes from the Talks and Shows. 10.45, Organ Recital. 11.0, I.B.C. Goodnight Melody and Close Down.

PARIS

RADIO-PARIS, 182 kc/s, 1,648 metres; 75 kW.—6.45 a.m., Gym. 7.0, Records. 7.15, Press Review; Weather. 7.45, Gym. 8.0 to 8.30, Records. 10.15 to 11.30, Concert from Vichy. 12 Noon, Religious Address. 12.30 p.m., Concert by the Victor Pascal Orchestra: Badinage nocturne (Yerri); Selection from The Gipsy Princess (Kálmán); L'orgue de Barbarie (Candiolo); Kobomoko (Reaves); Violin Solo, Piece (Reisfeld); Pour un Baiser (Tosti); La Paloma (Yradler); Spanish Miniature (Badenes); Piano-forte Solo; March (Smet); Melody (Jolson); Malaguena (Albeniz); Waltz (Luidemann); Cello Recital; Czardas (Barch); Ay! Ay! Ay! (Perez); Humoresque (Tchaikovsky); Envoi de fleurs (Delmat); Im Schönen Tal der Isar (Hans Löhr). In the interval at 1.20, Exchange. 2.0, Interval. 3.45 to 3.50, Exchange. 6.20, Weather; Notes for Farmers; Exchange; Racing Results. 6.45, Records. 7.0, Dialogue. 7.20, German Press Review. 7.30, Topical Talk. 8.0, Song Recital by Mmes. Yvonne Guillet, Marie Richard, and Pierre Varenne. In the intervals at 8.30, Press Review; Weather; and at 9.15, News; Report. 10.30, Dance Music by the Adison Orchestra.

PITTSBURGH

KDKA, 980 kc/s, 306 metres; 50 kW. Relayed by W8XK on 48.86 metres and 25.27 metres.—3.0 p.m., Edward MacHugh. 3.15, Castles of Romance. 3.30, To-day's Children. 3.45, News; Cooking School. 4.0, U.S. Navy Band. 4.30, Hazel Arth (Contralto). 4.45, Al and Lee Reiser. 5.0, Soloist. 5.15, Fields and Hall. 5.30, Vic and Sade. 5.45, Hotel William Penn Orchestra. 6.0, Market Reports. 6.15, Hon. Archie and Frank. 6.30, Farm and Home Hour. 7.30, KDKA Home Forum. 8.0, Musical Keys. 8.30, Roy Shield's Orchestra. 8.45, State Federation Pa. Women. 9.0, Betty and Bob. 9.15, Dorothy Page. 9.30, Business News and Markets. 9.45, Chicago Symphony Orchestra. 10.15, KDKA Kiddies' Klub. 10.30, Singing Lady. 10.45, Orphan Annie. 11.0, Dan and Sylvia. 11.14, Baseball Résumé. 11.30, Kings and Queens and Sport. 11.45, Lowell Thomas. 12 Midnight, Stanley Metcalfe; News. 12.15 a.m. (Friday), Lois Miller (Organ). 12.30, Ed. Lowery. 12.45, Frank Buck. 1.0 to 6.0, Popular Programme.

PORSGRUND.—Relays Oslo.

POZNAN

868 kc/s, 345.6 metres; 16 kW.—6.45 a.m., See Warsaw. 7.50 to 8.0, Announcements; Records. 11.57, See Warsaw. 12.30 p.m., Light Music, relayed from Wilno, 536 kc/s, 559.7 metres. 1.0, See Warsaw. 1.5, News. 1.10, Records. 3.30, See Warsaw. 3.35, Exchange. 3.45, See Warsaw. 5.50, Talk. 6.0, Programme for Farmers. 6.15, See Warsaw. 7.0, Choral Concert, relayed from Cracow, 986 kc/s, 304.3 metres. 7.45, Programme Announcements. 7.55, Sports Notes. 8.0, See Warsaw. 9.45, Talk, relayed from Cracow. 10.0, Announcements; Records. 10.15, Request Records. 10.45, Talk. 11.0, See Warsaw. 11.5, Request Records (contd.).

Il faut manger pour vivre—Fantasy. 1.15, Orchestral Music: Air from Scènes alsaciennes (Massenet); Air from Sylvia (Delibes); Three Pieces (Satie); Mazurka from Coppélia (Delibes). 1.30, Opera Arias. 1.45, Sound Film Music. 2.0, News; Amusement Guide. 6.0, News. 6.15, Chansonnettes. 6.30, Orchestral Music; Waltz, Les sirènes (Waldteufel); Glow-worm Idyll (Lincke); The Whistler and his Dog (Pryor); Selection from Il Trovatore (Verdi). 6.45, Opera Arias. 7.0, Military Music. 7.15, Songs. 7.30, News. 7.45, Orchestral Music. 8.15, Piano-forte Recital of Debussy Music: Masques; La soirée dans Grenade; La cathédrale engloutie; Mazurka. 8.30, Orchestral Music. 9.0, Hamlet—Tragedy (Shakespeare—Abridged Version). 10.0, Sound Film Music. 10.15, News. 10.30, Opera Music: Wedding Scene from Lohengrin (Wagner); Bacchanal from Samson and Delilah (Saint-Saëns); Selection from L'Africaine (Meyerbeer). 11.0, Operetta Arias. 11.15, Argentine Band Music. 11.30, Chansonnettes. 11.50, Hunting-Horn Music. 12 Midnight, News. 12.5 a.m. (Friday), Au caveau de minuit—Fantasy. 12.15, Orchestral Music. 12.30 (approx.), Close Down.

TRONDHEIM.—Relays Oslo. TURIN.—Relays Milan.

VATICAN CITY

15,120 kc/s, 19.84 metres; 10 kW. (Morning); 5,970 kc/s, 50.26 metres (Evening)—11.0 to 11.15 a.m., Religious Information in French. 8.0 to 8.15 p.m., Religious Information in Italian.

VIENNA

592 kc/s, 506.8 metres; 120 kW. Relayed by Graz, 886 kc/s, 338.6 metres; Innsbruck, 519 kc/s, 578 metres; Klagenfurt, Linz and Salzburg, 1,294 kc/s, 231.8 metres.—9.0 a.m., News. 9.20, Market Prices. 9.30, Weather. 10.50, Water Level. 11.30, Talk: Austria. 11.55, Weather. 12 Noon, Records. 1.0 p.m., Time; Weather; News; Programme Announcements. 1.10, Records. 2.0, Announcements. 2.10 to 2.30, Records; Famous Artists. 3.0, Time; Weather; Exchange; Market Prices. 3.50, Talk for Unemployed Youth. 4.10, News. 4.15, Talk: Icelandic Flowers. 4.40, Request Records. 5.20, Talk: Water Gardens. 5.30, Talk: Iron Ore Mining. 5.50, Viola Recital by Lotte Hammer-schlag; Sonata in C (Bach); Sonata in G minor (Eccles). 6.20, Lecture Recital with Records: Folk Songs. 6.50, Talk: Twenty Years Ago. 7.10, Time; News; Programme Announcements; Weather. 7.30, Weekly Review. 7.55, Piano-forte Recital by Dr. Ebenstein: Variations and Fugue on a Bach Theme (Regar); Rondo in E flat, Op. 16 (Chopin). 8.30, Concert by the Station Symphony Orchestra and the Bohème Quartet; Conductor, Schönherr; Radetzky March (Joh. Strauss); Wiener Jubel-Ouverture (Suppé); Waltz, Bei uns zu Haus (Joh. Strauss); Mehlspies (Benatzky); Bei der honden Kathrein (Leux); String Quartet: Innen zu Liebe (Benatzky); Four Josef Strauss Dances: (a) Polka, Feuerfest, (b) Polka, Aus der Ferne, (c) Polka, Moulinet, (d) Waltz, Dynamiden; Quartet: Die Luft von Wien (Mosner); Ja, unser Gasserl ist klein (Geiger); Potpourri from Ein Tag im Paradies (Eysler); Waltz, Pikanterien (Lehár); Nechledil March (Lehár); Dance Song (Whiting); Dance Song (Churchill); Who's Afraid of the Big Bad Wolf? (Berlin); Overture, Die geschiedene Frau (Fall). 10.0, Song and Aria Recital by Eva Hadrabova (Soprano). 10.40, News. 11.0, Dance Music by the Mathé Jazz Band, relayed from the Café Palmhof. Refrains by Sternau.

WARSAW

223 kc/s, 1,345 metres; 120 kW.—6.45 a.m., Hymn. 6.48, Records. 6.58, Gym. 7.8, Records. 7.15, News. 7.25, Records. 7.35, Household Hints. 7.40, Programme Announcements. 7.50, Announcements; Music. 8.0, Interval. 11.57, Time. 12 Noon, Fanfare from St. Mary's Church, Cracow. 12.3 p.m., Weather; Press Review. 12.40, Musical Programme for Children. 12.50, Light Music relayed from Wilno, 536 kc/s, 559.7 metres. 1.0, News. 1.5, Labour Market. 1.10, Records. 1.45, Interval. 3.30, News. 3.35, Exchange. 3.45, Concert by a Jazz Band; Conductor, Wilkosz; Soloist, Nina Grudzinska (Songs). 4.45, French Lesson. 5.0, Play (Stepowski). 5.50, Letter Box. 6.0, Talk for Farmers. 6.15, Piano-forte Recital by Dygat: Toccata and Fugue (Bach-Tausig); Melody (Gluck-Sgamhati); Pavane pour une Infante défunte (Ravel); L'isle joyeuse (Debussy). 6.45, Book Review. 7.0, Choral Concert relayed from Cracow, 986 kc/s, 304.3 metres. In the interval at 7.20, Topical Talk. 7.45, Announcements. 8.0, Orchestral Concert of Light Music; Conductor, Nawrot; Soloist, Zynski (Piano-forte). 8.45, News. 8.55, Topical Talk. 9.0, Concert by the Station Orchestra; Conductor, Oziminski; Soloist, Maryla Kryzwick (Songs); Overture, Rienzi (Wagner); Desdemona's Prayer from Othello (Verdi); Ballet Music from William Tell (Rossini); Aria (Joteyko); Aria from The Countess (Moniuszko); Suite from Carmen (Bizet). 9.45, Talk relayed from Cracow. 10.0, Light Music. 10.10, Dance Music from the Bristol Hotel. 10.45, Talk in a Foreign Language. 11.0, Weather. 11.5, Dance Music (contd.).

ZURICH.—Relays Beromünster.

ATHLONE

565 kc/s, 531 metres; 60 kW. Relayed by Dublin, 1,348 kc/s, 222.6 metres, and Cork, 1,240 kc/s, 241.9 metres.—1.30 to 2.30 p.m., Time; Weather; Exchange; Records. 6.0, Programme for Children. 6.45, News. 7.0, Talk by G. O. Sherrard: Gardening. 7.15, Teresa Brayton reads from her own Poems. 7.30, Time. 7.31, Concert by the Station Orchestra. 8.0, H. J. McCormick (Bass). 8.15, Eleanor Reddy (Violin). 8.30, Mrs. M. B. Collins (Soprano). 8.45, Concert by the Station Orchestra. 9.10, Leo Rowsome (Pipes). 9.25, M. Ni Dhuilleabhain (Songs). 10.0, Variety Programme. 10.30, Time; News; Weather. 10.40, Talk by P. O'Keefe, Secretary of the Gaelic Athletic Association: Youth and the National Games. 10.50, Records. 11.0 (approx.), Close Down.

BARCELONA

795 kc/s, 377.4 metres; 5 kW.—8.15 a.m., News; Records. 9.0, Chimes; Gym; Records. 9.20, News; Records. 10.0, Obituary. 12 Noon, Chimes; Weather. 1.0 p.m., Programme for Women. 2.0, Records. 2.30, Theatre Notes; Amusement Guide; Records. 3.0, Sextet Concert. Part I—Sound Film Music. Part II—Farandole from L'Arlésienne (Bizet); Selection from Countess Maritza (Kálmán); Oriental Scene (Armandola); Military March (Granados); De Triana (Just-Martra); Selection from Alma de Dios (Serrano). In the interval, Talk for Tourists. 3.50 (approx.), Exchange. 4.0, Programme for Hospitals. 5.0, News; Interval. 7.0, Violin and Pianoforte Recital by Jarque and Coma. In the interval at 7.30, News. 8.0, Request Records. 8.30, Exchange; Request Records. 9.0, Educational Talk. 9.10, Request Records. 9.45, Press Review. 10.0, Chimes; Weather. 10.5, Social Notes; Announcements; Exchange. 10.10, Concert by the Station Orchestra: March (Blokland); Waltz (Waldteufel); Serenata (Cattolica); Tarantella (D'Ambrósio). 10.30, Song Recital. 11.0, Orchestral Concert: Piece; Capriccio arabe (Tarrega); Träumerei (Schumann); In a Persian Market (Ketyelbey); Selection from Cuvallera rusticana (Masagni); Piece (Giner); Andalusian Dance (Turina); March (Arnedillo). 12 Midnight, Dance Music by the Melody Boys, from the Shanghai Bar; Conductor, Udina. 1.0 a.m. (Saturday), News; Close Down.

BASLE.—Relays Beromünster.

BERLIN

DEUTSCHLANDSENDER, 791 kc/s, 1,571 metres; 60 kW.—5.45 a.m., Weather. 5.50, News. 6.0, Gym. 6.15, Motto. 6.20, See Hamburg. In the interval at 7.0, News. 8.0, Interval. 8.45, Gym for Women. 9.0, Folk Songs. 9.40, Reading. 10.0, News. 10.10, Jan Finken—Play (Karl Liebscher). 10.50, Gym for Schools. 11.15, Weather. 11.30 to 11.45, Talk for Women. 11.55, Weather. 12 Noon, See Munich. 12.55 p.m., Time. 1.0, Records; Weather. 1.45, News. 2.0, Interval. 2.45, Greetings; Announcements. 3.0, Weather; Exchange. 3.15, Records: Ballads and Songs. 3.40, Reading. 4.0, See Leipzig. 5.30, Records. 6.0, Heinrich von Treitschke Programme for the Centenary of his Birth. 6.30, Records: American Music. 7.0, Recital of Russian, Italian and Spanish Music by Meta Hagedorn (Pianoforte); Prelude (Schriabin); Gavotte (Sgambati); Two Spanish Dances (Granados); Serenade from the Spanish Suite (Albeniz). 7.30, Book of the Month Guessing Competition. 8.0, Motto; News. 8.15, See Stuttgart. 8.45, Haydn and Mozart Concert (on Records), by the Station Orchestra and Male Voice Choir; Conductor, Görner; Soloist, Susanne Fischer (Pianoforte). Part I—Symphony in D, No. 10 (Haydn). Part II—Mozart Music: Chorus of the Priests from The Magic Flute; Overture to The Magic Flute; Pianoforte Concerto in E flat. 10.0, News; Sports Notes. 10.30, Talk by Erich Maak: Rowing Championship Experiences and Prospects. 10.45, Weather. 11.0, See Hamburg. 12 Midnight (approx.), Close Down.

BERLIN

FUNKSTUNDE, 841 kc/s, 356.7 metres; 100 kW.—6.0 a.m., Hymn; Gym. 6.15, Weather; Meditation. 6.20 to 8.0, See Hamburg; in the interval, at 7.0, News. 8.0, Gym. 8.20, Records; Announcements. 9.0, See Berlin (Deutschlandsender). 9.40, Talk for Housewives. 10.0, News. 10.10 to 10.25, Market Prices. 11.25, Exchange. 12 Noon, Concert from Hamburg; in the interval, Weather. 1.0, News. 1.5, Records. 2.0, News; Water Level. 2.15, Recital by Irene Müller-Gärtner and Marianne Thalan (Songs) and Heinz Hoefs (Flute). 3.0 to 3.20, Exchange. 4.0, Concert by the Small Station Orchestra; Conductor, Steiner; in the interval, Travel Talk. 6.0, Announcements. 6.5, Book Review. 6.30, Schubert and Wolf Song Recital by Werner Drosihn (Baritone); Four Songs (Schubert): (a) Der Wanderer an den Mond, (b) Am Strome, (c) Der Jüngling an der Quelle, (d) Der Jüngling und der Tod; Five Songs (Wolf): (a) Biterolf, (b) Anakreons Grab, (c) Phänomen, (d) Verschwiegene Liebe, (e) Der Freund. 7.0, Legal Talk. 7.40, Readings. 7.25, Echoes of the Day. 7.45, Political Report. 8.0, News. 8.15, See Stuttgart. 8.45, Concert of Operetta Music by the Small Station Orchestra; Conductor, Steiner; Soloist, Else Kochhan (Soprano). 9.50, Dicke Luft—Play (Felix Riemkasten).

FRIDAY

SEPTEMBER THE FOURTEENTH

10.20, News; Sports Notes. 10.50, Concert by the Station Orchestra; Conductor, Merten: Overture, Rodrigo (Handel); Extracts from Mathis, der Maler (Hindemith). 11.30, Literary Programme: Heinrich von Treitschke. 12.10 a.m. (Saturday), Close Down.

BERNE.—Relays Beromünster.

BEROMUNSTER

556 kc/s, 539.6 metres; 60 kW.—6.0 a.m., Gym. 6.15, Interval. 12.29 p.m., Time Signal from Neuchâtel Observatory. 12.30, News. 12.45 to 2.0, See Sottens. 2.0, Interval. 4.0 to 7.30, See Sottens. 7.30, Records: Cabaret, Sound Film and Jazz Music. 8.0, Market Prices; Sports Notes; Tourist Report. 8.20, Pianoforte Duets. 9.15, News. 9.30, Concert of Viennese Music. 10.15 (approx.), Close Down.

BODEN.—Relays Stockholm. **BODO.**—Relays Oslo.

BRATISLAVA

1,004 kc/s, 298.8 metres; 13.5 kW.—6.0 to 7.15 a.m., See Prague. 9.45, Announcements. 9.50, See Prague. 10.10, News in Hungarian. 10.15, See Prague. 10.40, See Brno. 10.50, Broadcast for Schools. 11.0, Water Level. 11.5, See Prague. 12.10 p.m., News in Slovak. 12.15, Record. 12.20, See Prague. 12.30, See Brno. 1.30, See Prague. 1.40, News and Weather in German and Hungarian. 1.50 to 2.0, See Prague. 3.15, Concert by the Station Orchestra. 4.15 to 4.20, See Prague. 5.40, Sports Report. 5.50, See Brno. 6.0, Records. 6.10, Hints for Housewives. 6.15, Hungarian Transmission: Topical Talk; Records; Talk. 6.55, See Prague. 8.10, Reading. 8.25, See Brno. 8.45, Literary Programme relayed from Kosice, 1,113 kc/s, 259.1 metres. 9.15, Concert by the Station Orchestra; Conductor, Dyk. 10.0, See Prague. 10.45, News in Hungarian. 11.0 (approx.), Close Down.

BREMEN.—Relays Hamburg.

BRESLAU

950 kc/s, 315.8 metres; 60 kW. Relayed by Gleiwitz, 1,231 kc/s, 243.7 metres.—5.0 a.m., Hymn; Motto. 5.10, Records. 6.0, Time; Weather; Gym. 6.25, See Leipzig. 7.0, News; Weather. 7.15, See Leipzig. 8.0, Cookery Hints. 8.10, Records. 8.40, Gym for Women. 9.0, Time; Weather; News; Local News. 10.10 to 10.40, Talk: South American Life in Literature. 11.30, Time; Weather; News; Water Level. 12 Noon, Concert by the Bunzlau Municipal Orchestra; Conductor, Arndt. 1.30 p.m., Time; Weather; News. 1.45, Concert by the Bunzlau Municipal Orchestra; Conductor, Arndt: Selection from Il giuramento (Mercadente); Waltz, Grubenlichter (Zeller); Overture (Yoshimoto); Selection from Die Puppenfee (Bayer); Army March. 2.20, Exchange. 2.25, Post Office Propaganda; Records. 2.50, Market Prices. 3.10, Lecture-Recital: Emotions or Intelligence in Music? 3.40, Reading (Gräf). 4.0, Concert by the Station Orchestra; Conductor, Rischka; Soloist, Friedrich Wagner (Oboe). 5.30, Market Prices; Weather. 5.35, Reading of Paul Behnisch and Joachim Lange Poems. 6.0, Programme for Young People; Junge Gefolgschaft—Choral Play with Address. 6.50, Programme Notes; Weather; Market Prices. 7.0, Concert of Overtures and Waltzes by the Station Orchestra; Conductor, Topitz: Overture, La dame blanche (Boieldieu); Waltz, The Wedding of the Winds (Hall); Overture, Carnival in Rome (Joh. Strauss); Waltz, Orangeblüten (Fahrbach); Overture, Poet and Peasant (Suppé). 7.45, See Berlin (Funkstunde). 8.15, See Stuttgart. 8.45, Heinrich von Treitschke—Sensation (Wienicke). 9.30, Violin Recital by Hans Garvens: Songs without Words (Tchaikovsky); Nocturne, Op. 1 (Tchaikovsky); Waltz, Op. 39, No. 15 (Brahms); Tango (Albeniz-Dushkin); Romance in E (Wilhelmj); La capricciosa (Ries); The Flight of the Bumble Bee (Rinsky-Korsakov); La campanella (Paganini-Liszt); Scherzo, Op. 42 (Tchaikovsky). 10.20, News; Sports Notes. 10.45, Dance Music by the Station Dance Band; Conductor, Ilgner. 12.30 a.m. (Saturday), Close Down.

BRNO

922 kc/s, 325.4 metres; 23 kW.—6.0 to 7.15 a.m., See Prague. 9.50, See Prague. 10.40, Programme for Schools. 10.50, See Bratislava. 11.0, See Prague. 12.30 p.m., Concert by the Station Orchestra; Conductor, Bakala: Overture (Adam); Suite (Pierné); Sielienne (Chausson); Saltarello (Pesse); Potpourri of Slovak Songs (Mozyses); Waltz (Fucik); Piece (Mach); March (Pestal). 1.30, Labour Exchange. 1.40, See Prague. 2.10 to 2.5, Programme for Farmers. 5.40, Notes for Housewives. 5.45, Record. 5.50, Talk: Motor Racing. 6.0, Records. 6.20, German Transmission: A Tourist Guide—Comedy (Günther and Heckel). 6.55, See Prague. 8.10, See Bratislava. 8.25, Recital of Czech Love Songs by Kocerek. 8.45, See

Prague. 9.15, See Bratislava. 10.0 to 11.0, See Prague. 11.0 (approx.), Close Down.

BRUSSELS (No. 1)

620 kc/s, 483.9 metres; 15 kW.—11.55 a.m., Weather. 12 Noon, Orchestral Concert; Soloist, René Durand (Tenor): Overture, Sérénade (Rossini); Waltz, Pomona (Waldteufel); Le lac d'amour (Layze); Selection from The Desert Song (Romberg); May-time (Sykes); Danseuse de Kerlouan (Daneau); Demoiselle chic (Fletcher); Si les femmes étaient soldats (Florendas). 1.0 p.m., News. 1.10, Records; Songs in the interval. 2.0, Interval. 4.55, Announcements. 5.0, Orchestral Concert. 6.0, Talk. 6.15, Request Records. 6.30, Pianoforte Recital of Waltzes by Maria Boon; Invitation to the Waltz (Weber); Valse brillante (Moszkowsky); Valse triste (Sibelius); Valse chromatique (Delcroix). 7.0, Medical Talk. 7.15, Sonata for 'Cello and Pianoforte (R. Strauss) by De Ruisseau and Wilmet. 7.30, Legal Talk; Literary Review. 8.0, Military Band Concert; Conductor, De Ceuninck; Soloist, Mme. Naus (Songs). 9.0, Talk for Officers and News for Soldiers and Ex-Servicemen. 9.15, Military Band Concert (cont'd.): Hungarian Rhapsody (Liszt); Minuet (Boccherini); Aria from Louise (Charpentier); The Blue Danube (Strauss); March (Bender). 10.0, News. 10.10, Request Records. 10.25, Dance Records. 11.0, La Brabançonne.

BRUSSELS (No. 2)

932 kc/s, 321.9 metres; 15 kW. Programme in Flemish.—11.57 a.m., Weather. 12 Noon, Records. 1.0 p.m., News. 1.10, Orchestral Concert; Soloist, Mlle. Derville (Songs): Rubens-Marche (Benoit); Waltz (Krome); Overture, The Bohemian Girl (Balfe); Piece (Ketyelbey); Extracts from Rose-Marie (Friml); March funèbre d'un hanneton (Dubois); Songs; Gallop (Joh. Strauss). 2.0, Interval. 4.55, Announcements. 5.0, Records. 6.0, Lecture-Recital: Gershwin's Concerto in F. 6.45, Records. 7.30, Wireless Review. 8.0, Soloist Concert: Gras (Pianoforte), Mlle. Flour (Harp), Brenders (Pianoforte) and Misson (Violin); Pianoforte: Rhapsody in Blue (Gershwin); Rhapsody No. 2 for Harp and Two Pianofortes (Friedemann); Violin Solos: (a) Die Biene (Schubert), (b) Etude (Marchot); Prelude (Bach). 8.30, A Theatre Scandal in Paris—Play (Lustwig-Weiss). 9.30, Orchestral Concert of Viennese Music; Soloist, Bethune (Violin); Radetzky March (Joh. Strauss); Moto perpetuo (Joh. Strauss); Violin Solo: Caprice viennois (Kreisler); Waltz Potpourri No. 3 (Robrecht). 10.0, News. 10.10, Dance Records. 11.0 (approx.), Close Down.

BUCHAREST

823 kc/s, 364.5 metres; 12 kW.—12 Noon, Water Level; Records. 12.45 p.m., Amusement Guide; Exchange; Records. 1.15, Time; Weather; News. 1.40, Records. 5.0, Concert by the Station Orchestra: Overture, Der Erlenhügel (Kuhlauf); Cockney Suite (Ketyelbey); Operetta Potpourri (Cornelius). 6.0, Time; Weather; News. 6.20, Concert (cont'd.): Selection from Die goldne Meisterin (Eysler); Waltz (Jos. Strauss); Folk Music Potpourri (Dinicu); By the Blue Hawaiian Waters (Ketyelbey); March (Souza). 7.0, Educational Programme. 7.15, Records. 7.45, Talk. 8.0, Pianoforte Recital by Mme. Elisabeth Cotrus: Choral and Fugue (Bach); Melody and Cracovienne (Paderevski); Two Pieces (Golestan); Etude (Liadov). 8.30, Talk. 8.45, Song Recital by Mihail Nasta. 9.15, Flute Recital by Mihail Theodorescu: Suite, Op. 116 (Godard); Romance (Bruneau). 9.45, News.

BUDAPEST

546 kc/s, 549.5 metres; 60 kW.—6.45 a.m., Gym. 9.45, News. 10.0, Talk. 10.40, Talk. 11.10, Water Level. 12 Noon, Chimes. 12.5 p.m., Jazz on Two Pianofortes. 1.30, Concert by the Mursi Cigany Band. 2.40, Notes for Housewives. 4.0, Programme for Students. 5.0, Programme to be announced. 5.40, Recital by János Tmesváry. 6.20, Talk. 6.55, Concert by the Bertha Chamber Orchestra. 8.0, Sports Report. 8.15, Humorous Talk. 8.45, Concert by the Lektatos Cigany Band. 9.45, Review of Foreign Affairs. 10.0, News. 10.20, Recital by Zsigmond Pilinszky. 11.0, Dance Music by the Pataky Jazz Band.

CASSEL.—Relays Frankfurt.

COLOGNE

658 kc/s, 455.9 metres; 60 kW.—5.30 a.m., Hymn; Records. 6.5, Gym. 6.25, Talk for Farmers. 6.40, Request Records. In the interval at 6.50 to 7.5, Hymn; Time; News. 8.0, Time; Weather; Water Level. 8.5 to 8.20, Gym for Women. 10.0, Time; News. 10.10, Sonata in E flat for Harpsichord and Flute (Bach) by Josef Bachem and Albert Enders. 10.30, Topical Talks. 11.30, Post Office Propaganda; Records. 12 Noon, Records. 12.45 p.m., Announcements; Greetings. 1.0 to 2.45, Concert by the Small

Station Orchestra. In the interval at 1.45, Announcements. 3.0, Report: The National Teachers' Day in Frankfurt. 3.30, Exchange. 3.45, Talk for Women. 4.0, See Berlin (Funkstunde). 5.0, Reading. 5.20, Recital of Swedish Music by Emma Lampart (Soprano) and Hans Lampart (Pianoforte). Three Songs: (a) Im Traum oist du mir nahe (Sjögren), (b) Minnelied (Rangström), (c) En speleman (Körling). Pianoforte Solos: (a) Autumn Ballad in C minor (Atterberg), (b) Im Zwieltich (Petersen-Berger). 5.45, Travel Talk: Rhineland and Westphalia. 6.0, Report from the Lippe Valley. 6.20, English Conversation. 6.40, Topical Talk. 6.50, Exchange; Sports Report. 7.0, Concert by the Small Station Orchestra. 7.45, See Berlin (Funkstunde). 8.0, News. 8.15, See Stuttgart. 9.0, Beethoven Programme. The Station Orchestra; Conductor, Buschköttler; Rudolf Rieth (Monologue); Part I: Heiligenstädter Testament; Part II: Symphony No. 3—The Eroica. 10.0, Time; News. 10.20, Theatre Review. 11.0, Dance Music by the Roland Alexander Orchestra from the Tabaris Café, Düsseldorf. 12 Midnight (approx.), Close Down.

COPENHAGEN.—Relays Kafundborg. **CORK.**—Relays Athlone. **DANZIG.**—Relays Königsberg. **DRESDEN.**—Relays Leipzig.

FECAMP

1,456 kc/s, 206 metres; 10 kW.—11.30 to 12 Noon, Programme in English arranged by the International Broadcasting Company of London. 11.30 a.m., Light Music. 12 to 4.30 p.m., Programme in French. 4.30 to 6.0, Programme in English by the I.B.C. 4.30, Dance Music. 5.0, Bournemouth, Weymouth and Winchester Concert. Part 1: Variety. 5.30, Part 2: Military Band Music. 6.0 to 11.0, Programme in French. 11.0 till Close Down, Programme in English by the I.B.C. 11.0, Talkie Time: Tunes from the Talkies and Shows. 11.30, I.B.C. Member's Request Programme: Rhapsody in Blue. 12 Midnight, Club Concert for Oldham Listeners; Dance Music. 12.30 a.m. (Saturday), I.B.C. Time Signal. 12.31, Dance Music (cont'd.). 1.0, I.B.C. Goodnight Melody and Close Down.

FLensburg.—Relays Hamburg. **FLOR.**—Relays Milan.

FRANKFURT

1,195 kc/s, 251 metres; 17 kW.—5.45 a.m., Hymn; Time; Weather. 5.50, Gym. 6.15, Gym. 6.40, Time; Announcements. 6.55, Records. 8.10, Water Level; Weather. 8.15 to 8.35, Gym. 10.0, News. 10.45, Cookery Talk. 11.0, Announcements; Records. 11.30, Announcements; Exchange; Weather. 11.45, Social Notes. 12 Noon, See Stuttgart. 1.0 p.m., Time; News. 1.10, Local News. 1.20, See Stuttgart. In the interval at 1.50, Time; News. 2.30, Economic Notes. 2.45, Time; Exchange. 2.55, Weather. 3.10, Programme for Women. 4.0, Concert; Part 1—Beethoven Music; The Station Orchestra; Conductor, Becker; Soloist, Else Blatt (Pianoforte); Leonora Overture No. 1; Pianoforte Concerto No. 1 in C, Op. 15. Part 2—Lieder by Eugen Schmidt-Carlen (Baritone) and Heinz Schröter (Pianoforte). Part 3—Old Dance Music; Conductor, Caspar; Soloist, Fritz Mühlhölzl (Guitar and Zither). 5.30, Dialogue: River Fish. 6.45, Schubert Lieder Recital by Lena Stülpnagel (Contralto). 6.0, Programme for Young People. 6.25, Dialogue: Thieves Latin. 6.45, Weather; Exchange; Announcements; Time. 6.50, Concert by the Freiburg Municipal Theatre Orchestra; Conductor, Franzen; Symphonic Prelude (Husadel); Elfesreigen (Klose); Poissonaie in E (Liszt); Prelude to Act III, Lohengrin (Wagner); German Dances (Schubert); Egyptian March (Strauss). 7.45, See Berlin (Funkstunde). 8.0, News. 8.15, See Stuttgart. 8.45, Instrumental Cabaret by the Station Orchestra and Soloists; Conductor, Rosbaud. 10.20, Time; News. 10.35, Local News; Weather; Sports Report. 10.40, Sports Review. 11.0, Part Relay of the Concert from Berlin (Funkstunde). 11.30, Kerwe in der Pfalz—Humorous Sequence. 12 Midnight, Schumann Concert by the Station Orchestra; Conductor, Rosbaud; Soloist, Therese Pott (Pianoforte); Pianoforte Concerto in A Minor, Op. 54; Symphony No. 4 in D Minor, Op. 120. 1.0 a.m. (Saturday), Close Down.

FREDRIKSTAD.—Relays Oslo. **FREI.**—Relays Stuttgart. **GENEVA.**—Relays Sottens. **GENOA.**—Relays Milan. **GLEIWITZ.**—Relays Breslau. **GÖTEBORG.**—Relays Stockholm. **GRAZ.**—Relays Vienna. **HAMAR.**—Relays Oslo.

HAMBURG

904 kc/s, 331.9 metres; 100 kW. Relayed by Bremen, Flensburg, and Manover, 1,330 kc/s, 225.6 metres.—5.45 a.m., Time; Weather; Notes for Farmers. 6.0, Gym. 6.15, Time; Weather. 6.20, (from Kiel), Orchestral Concert; Conductor, Döring. In the interval at 7.0, Time; News. 8.0, Weather; Talk for Housewives. 8.10, Announcements; Records. 10.50, News. 11.0, History Sequence for Schools. 11.30 (from Bremen), Concert by Fredo Niemann's Wind Instrument-Orchestra from the Town Hall; Entry of the Guests into the Wartburg from Tannhäuser (Wagner); Overture; Oberon (Weber); Waltz: Dreams on the Ocean (Gungi); Ave Maria (Schubert); Selection from Der Trompeter von Säckingen

SEPT. 14th **FRIDAY** continued

(Nessler); March (Nowowiecki); Blumengrüner (von Blon); Potpourri, Heimatklänge (Krome); Dornröschens Brautfahrt (Rhode); March (Teike). In the Interval at 12 Noon; Report for Housewives; Time; Announcements. 1.0 p.m., Exchange; Market Prices. 1.15, Weather. 1.20, Musical Programme. 2.15, News. 2.30, Records: Opera Duets. 3.0, Exchange. 3.40, Shipping and Aviation Notes. 4.0, See Leipzig. 5.30, Talk: Hamburg Family Names. 5.45 (from Bremen), Talk for Young People. 6.0, Humour from the Archives—Sequence. 6.45, Exchange. 6.55, Weather. 7.0, Concert of Light Music by the Station Orchestra; Conductor, Eibenschütz; Heitere Musik Op. 43 (Müller); Piece (Kodaly). 7.45, See Berlin (Funkstunde). 8.0, News. 8.15, See Stuttgart. 8.45, See Königsberg. 10.0, News. 10.20, Musical Programme. 11.0 (from Hanover), Concert of Light Music; Conductor, von Sosen; Soloists, Otto Seifart (Oboe); Ernst Mühlendorfer (Clarinet) and Willy Witting (Xylophone). 12 Midnight (approx.), Close Down.

HANOVER.—Relays Hamburg.

HILVERSUM

160 kc/s, 1,875 metres; 7 kW (until 3.40 p.m.). Transmitted on Kootwijk, 50 kW. from 3.40 p.m.—7.40 a.m., Programme of the Workers Radio Society (V.A.R.A.): Records 9.40, Religious Programme of the Liberal Protestant Radio Society (V.P.R.O.). 9.55 to 11.40, V.A.R.A. Programme. 9.55, Recitations. 10.10, Organ Recital by Jong. 10.40, Recitations. 10.55, Records. 11.40 to 3.40 p.m., Programme of the General Broadcasting Society (A.V.R.O.). 11.40, Time; Records. 12.10, Concert of Light Music by the Kovacs Lajos Orchestra. 2.10, Reading. 2.40, Records. 3.40, Interval. 3.35 to 7.40, V.A.R.A. Programme. 3.55, Records. 4.10, Programme for Children. 4.40, Concert of Light Music by the V.A.R.A. Orchestra; Conductor, de Groot; Christmas Overture (Coleridge-Taylor); Selection from Faust (Gounod); Waltz (Blone-Lachau); Happy Days in Dixie (Mills); Canzonetta (Boccherini); Records: In a Chinese Temple Garden (Kotelbey); Selection from Madame Sherry (Hoschna); Waltz (Heinecke); Selection from The Gipsy Baron (Strauss); March (Urbach). 6.10, Talk. 6.30, Records. 6.40, Variety Programme. 7.38, S.O.S. Messages. 7.40, V.P.R.O. Programme; Discussion. 8.10, A.V.R.O. Programme; Concert by the Residence Orchestra relayed from the Kurhaus, Scheveningen; Conductor, Carl Schuricht. In the interval at 8.40, Talk by the V.P.R.O. 10.0, V.P.R.O. Programme; Announcements; Talk. 10.40 till Close Down, V.A.R.A. Programme. 10.40, Concert by Carlquist (Hawaiian Guitar); Chanson (Songs); Mulder (Clarinet) and Vogel (Pianoforte and Organ); Selection from Countess Maritza (Kálmán); Piece (Adams); Blue Shore (Stern); Variations (Baerman); Faint Harmony (Ellis); Hawaiian Dreams (Patterson); Lausch ich mit sehndem Herzen (Semjonov); Keep Young and Beautiful (Warren). 11.10, Records. 11.40, Close Down.

HORBY.—Relays Stockholm.

HUIZEN

995 kc/s, 3015 metres; 7 kW. (until 6.40 p.m.), 20 kW. from 6.40 p.m. Programme of the Christian Radio Society (N.C.R.V.).—7.40 a.m., Bible Reading; Prayers. 7.55 to 9.10, Records. 10.10, Religious Address. 10.40, Organ Recital by Snijders. 11.40, Police Notes; Records. 12.10 p.m., Concert by the Dutch Harp Quartet. 12.55 Records of Weber Music. 1.25, Concert by the Dutch Harp Quartet (contd.): Piece de Concert (Swoer); Hebrew Melody (Granville Bantock); Andante (Mendelssohn); Forest Calm (Dvorák); Humoresque (Sinigaglia); Caprice (Gillman); Nocturne (Pillney). 2.10, Reading. 2.40, Song Recital by Mile. Hagenbeck (Soprano): Nacht und Träume (Schubert); Lied der Mignon (Schubert); Der Wachtelschlag (Schubert); Four Songs (Brahms): (a) Wiegenlied, (b) Der Jäger, (c) Meine Liebe ist grün, (d) Das Mädchen spricht; Two Songs (Reger): (a) Wenn die Linde blüht, (b) Des Kindes Gebet; Records; Four Pieces: (a) Minuet (Martini); (b) Lison dormait, (c) Philis et Coridon. (d) La Musette; Dutch Songs. 3.25, Interval. 3.40, Records. 4.10, Concert by the Van der Horst Ensemble. 6.10, Talk on Horticulture. 6.40, Police Notes; Religious News. 6.55, Records. 7.10, Literary Talk. 7.40, Wireless Notes. 7.55, Records. 8.40, Talk. 9.10, Recital by Bakker (Trumpet) and Klock (Organ): Cortège solennel (Benolt); Ich sende diese Blumen dir (Wagner); An der Weser (Pressel); Nocturne No. 37 (van der Kruijs); Chanson (Götze); Wiegenlied (Brahms); Dutch Song; Leise fehen meine Lieder (Schubert); Dutch Song. 9.55, News. 10.5, Concert by the Dutch Chamber Orchestra; Conductor, van Loon; Serenade in D (Mozart); Symphony in E Flat (Stamitz); Serenade in C (Haydn); Records; Concert dans le gout théâtral (Couperin); Concerto in E (Bach). 11.25, Records. 11.40 (approx.), Close Down.

INNSBRUCK.—Relays Vienna.

KALUNDBORG

238 kc/s, 1,261 metres; 75 kW. Relayed by Copenhagen, 1,176 kc/s, 255.1 metres; and Skamlebaek, 49.5 metres.—7.0 a.m., Gym. 8.30, Cathedral Service. 11.0, Weather.

11.10, Fish Prices. 11.15 to 11.45, Lecture-Recital for Schools: Danish Music. 12 Noon, Chimes; Weather. 12.5, Concert by the Bendix Strig Ensemble from the Wivex Restaurant. 2.0 p.m., Interval. 3.0, Concert by the Radio Orchestra; Conductor, Gröndahl; Soloist, Kai Fossing (Songs): March (Desormes); Overture, Fernando Cortez (Spontini); Selection from Ernani (Verdi); Waltz (Svendsen); Rhapsody (Kaski); Gavotte (Saint-Saëns); Scandinavian Songs; March from Idomeno (Mozart); Four Old English Melodies (arr. Gröndahl): (a) Blow, blow, thou Winter Wind, (b) O, Willow, Willow, (c) It was a Lover and his Lass, (d) Sigh no more Ladies; Hungarian March (Schubert); Träumerei (Schumann); Ballet Music from Le Pavillon d'Armide (Tcherepnin). 5.0, Reading in Dialect. 5.30, Exchange. 5.45, Talk: Ludwig Feilberg's Reminiscences. 6.15, German Lesson. 6.45, Announcements. 7.0, News. 7.15, Time. 7.16, Address from the University. 8.0, Chimes. 8.1, Review by Per Knutson. 8.10, Lynggaard and Co.—Play in Four Acts (Bergström). 10.10, News. 10.25, Ballet Music by the Radio Orchestra; Conductor, Reesen; Extracts from Coppélia (Delibes); Selection from La Boutique Fantasque (Rossini-Respighi); Trepak and Chinese Dance from The Nutcracker Suite (Tchaikovsky); Ballet Music from Prince Igor (Borodin). 11.5, Dance Music by Borge Christiansen's Dance Band, from the Ritz Restaurant. In the Interval at 12 Midnight, Chimes. 12.30 a.m. (Saturday), Close Down.

KIEL.—Relays Hamburg. KLAGENFURT.—Relays Vienna.

KONIGSBERG

1,031 kc/s, 291 metres; 60 kW. Relayed by Danzig, 1,303 kc/s, 230.2 metres.—5.0 a.m., Records. 5.50, Weather. 6.0, Gym. 6.20 to 8.0, See Hamburg. In the Interval at 7.0, News. 8.0, Prayers. 8.30, Gym. for Women. 9.0 (from Danzig), French Lesson for Schools. 10.40, News. 11.30 to 1.0 p.m., See Hamburg. In the Interval at 12 Noon, Weather. 1.1 p.m., Time; Weather. 1.5 to 2.30, Records. In the Intervals at 1.20 and 2.0, News. 2.30, Post Office Propaganda; Records. 3.0, Exchange. 3.15, Handwork for Children. 3.40, Programme for Women. 4.0, Concert by the Small Station Orchestra; Conductor, Wilken; Military March in D (Schubert); Selection from Manon Lescaut (Pheicini); Suite (Mouton); Overture, Der Waffenschmied (Lortzing); Acceleration-walzer (Joh. Strauss); Songe d'amour (Cui); Berceuse (Cui); Selection from La Favorita (Donizetti). In the Interval, Talk from Danzig. 5.30, Hanns Klaus Langner Songs by Hanna Sattler (Contralto); Regennacht; September; Im Kahn; Alle Sünden tat ich ab; Sternenfunkeln fallen; Lass mich bei Dir sein; Geheimes; Beherzigung. 5.50, Talk: Elbing. 6.15, Market Prices. 6.25, Programme for Young People. 6.55, Weather. 7.0, Concert by the Small Station Orchestra; Conductor, Wilken; Selection from Die Schneider von Schönau (Brandts-Buys); Dance Suite (Mracek); Two Songs (Richard Strauss): (a) Morgen, (b) Ständchen; Der Eremit (Schmalstich). 7.45 to 8.15, See Berlin (Funkstunde). 8.15, See Stuttgart. 8.45, Fiesco—Tragedy (Schiller). 10.0, News; Sports Notes. 10.30, Topical Report. 11.0, Dance Music from Breslau. 12 Midnight, Close Down.

KOSICE.—Relays Prague. LAUSANNE.—Relays Sottens.

LEIPZIG

785 kc/s, 382.2 metres; 120 kW. Relayed by Dresden, 1,285 kc/s, 233.5 metres.—5.50 a.m., Report for Farmers. 6.0, Gym. 6.25 (from Dresden), Concert by the Philharmonic Orchestra. In the interval at 7.0, News. 8.0, Gym. 8.20, Records. 9.0, See Berlin (Deutschlandsender). 9.40, Exchange. 9.45, Announcements. 9.55, Weather; Water Level. 11.0, Post Office Propaganda; Records. 11.30, News. 11.40, Weather. 11.45, Programme for Farmers. 12 Noon, Records. 1.0 p.m., News. 1.10, Concert by the Symphony Orchestra; Conductor, Blumer; Overture, Anacreon (Cherubini); Ballet Music from Rosamund (Schubert); Waltz, Hofballtänze (Lanner); Extracts from the Suite, In Tanzform (Kienzl); Selection from The Jewels of the Madonna (Wolf-Ferrari); Scènes pittoresques (Massenet); Gilda-Walzer (Müllöcker); Egyptian March (Joh. Strauss); Banditen-Galopp (Joh. Strauss). In the interval at 2.0, Exchange; Weather. 2.30, Talk: Krupp's Mother. 3.20, Talk: Modern Magic. 3.35, Economic Notes. 4.0, Concert by the Station Orchestra; Conductor, Hilmar Weber; Soloists, Häcker-Schoder and Jörg Retzmann (Pianoforte); Overture, Le Maçon (Auber); Three Waltzes for Two Pianofortes (Chabrier); Concert Waltz Op. 25 (Fuchs); Three Pieces (Nicodé): (a) Andalusiennne, (b) Provencaliches Märchen, (c) In der Taberna; Duettino concertante for Two Pianofortes (Mozart-Busoni); Waltz, Seid umschlungen, Millionen (Joh. Strauss); Rhapsody No. 2 in minor (Friedmann); Brautmarsch (Hamerik).

5.30, Exchange; Weather; Time. 5.40, Talk: Ibsen's Play, The Pretenders. 6.0, Talk: Military Heroes. 6.20, Military Band Concert from Plauen. Conductor, Tietze. 7.20, Talk: Germans Abroad. 7.45, See Berlin (Funkstunde). 8.0, News. 8.15, See Stuttgart. 8.45, The Pretenders—Play (Ibsen), with Music by Ambrosius. 10.20, News; Sports Notes. 10.50, Dance Music from Breslau. 12.30 a.m. (Saturday), Close Down.

LINZ.—Relays Vienna.

LUXEMBOURG

230 kc/s, 1,304 metres; 120 kW.—7.45 a.m., Records. 8.0, News in French; Record; News in German; Record. 12 Noon, Concert by the Station Orchestra; Conductor, Pensis; Overture, Titus (Mozart); Fantoccini (Gillet); Selection from Die Toten Augen (d'Albert); Chanson de Mai (Dupuis). 12.30 p.m., News in French and German. 12.40, Concert (contd.): Les Fables de la Fontaine (Mouton); Andante cantabile (Tchaikovsky). 1.0, Exchange. 1.5, Concert (contd.); Selection from The Blue Mazurka (Lehár). 1.15, Records. 1.30, Exchange. 1.35, Records. 2.0, Exchange. 3.45, Exchange. 6.30 till Close Down, Dutch Evening. 6.30, Variety Concert. 7.30, Racing Results. 7.35, Cabaret Programme. 8.0, News in French and German. 8.20, Concert by the Station Orchestra; Conductor, Pensis: The Policeman's Holiday (Erwin); Air and Dance (Delius). 8.35, Exchange. 8.40, Concert (contd.): Suite, Nell Gwyn (German); Two Symphonic Rhapsodies (Coates); Cockney-Suite (Kotelbey). 9.30, Variety. 9.45, Concert by the Station Orchestra; Conductor, Pensis: Overture, The Daughter of the Regiment (Donizetti); Selection from Les Cloches de Corneville (Planquette); Wedding Day on Troldhaugen (Grieg). 10.10, Song Recital by Jules Michel; Arias from: La Juive (Halévy); Romeo and Juliet (Gounod), Il Seraglio (Mozart), Mignon (Thomas) and Rose et Colas (Monsigny). 10.30, Dance Music by the Station Dance Band; Conductor, Juss.

MADRID

EAJ7, 1,095 kc/s, 274 metres; 7 kW.—9.0 a.m., News. 10.0, Exchange; Announcements. 10.30, Interval. 2.0 p.m., Chimes; Weather; Light Music; Talk. 2.30, Concert by the Station Sextet. 3.0, Amusement Guide; Exchange; Variety Music. 3.30, Concert by the Station Sextet: Serenata (Toselli); Suite of Asturian Songs (Vila). 4.0, Light Music. 4.15, Concert by the Station Sextet: Waltz from Sylvia (Delibes); Suite No. 1 (Sorozabal). 4.50, News. 5.0, Interval. 6.0, Chimes; Light Music. 7.0, Announcements; Spanish Songs. 7.30, Exchange. 7.35, (approx.), Concert; Part I, Opera Music: Selection from Il re pastore (Mozart), Figaro (Mozart); Tosca (Puccini); Tannhäuser (Wagner); Lohengrin (Wagner); Ernani (Verdi); Part II: Orchestral Music: Prelude to Faust (Gounod); Piece (Lefehüre); Ballet Music from Coppelia (Delibes); Spanish Serenata (Bizet); March from The Golden Cockerel (Rimsky-Korsakov). 8.30, News; Programme for Women. 9.50, Sports Notes. 10.0, Chimes. 10.30, Symphony Concert (on Records): Overture, Coryolanus (Beethoven); Prelude and Death of Isolda from Tristan and Isolda (Wagner); Symphony in G Minor (Mozart); Ein Heldenleben (R. Strauss). In the interval at 11.0, News. 12.45 a.m. (Saturday), News. 1.0, Chimes and Close Down.

MADRID

EAQ, 10,000 kc/s, 30 metres; 20 kW.—11.15 p.m., News. 11.30, Spanish Music. 11.45, News. 12 Midnight, Concert of Spanish Music. 1.0 a.m. (Saturday), Close Down.

MALMO.—Relays Stockholm.

MILAN

814 kc/s, 368.6 metres; 50 kW. Relayed by Turin, 1,140 kc/s, 263.2 metres; Genoa, 986 kc/s, 304.3 metres; and Florence, 610 kc/s, 491.8 metres.—7.30 a.m., Gym. 7.45, Time; News. 11.30, Light Music. 12.30 p.m., Records. 12.45, News. 1.0, Time; News. 1.5 to 2.15, Concert by the Malatesta Chamber Orchestra. In the interval at 1.30, Records; Exchange. 2.15 to 2.25, Exchange. 4.35, News. 4.45, Programme for Children. 5.10, Recital by Rita De Vincenzi (Soprano) and Diego Pramauro (Baritone). 5.55, Weather. 6.0 to 6.10, Notes for Farmers. 7.0, Announcements. 7.15, News in Foreign Languages. 8.0, Time; News; Records. 8.30, Government Notes. 8.45, One-Act Comedy. 9.30, Così fan tutti—Opera (Mozart). After the Opera, Dance Music. 11.0, News.

MONTE CENERI

1,167 kc/s, 257.1 metres; 15 kW.—12 Noon, Announcements. 12.5 p.m., Concert by the Station Orchestra: March (Blon); Pesther-Walzer (Lanner); Overture in Italian Style (Schubert); Caprice (Brahms); Selection from Fedora (Giordano); Tom the Rhymer (Loewe); Russian Dance (Tchaikovsky). In the interval at 12.29, Time Signal from Neuchâtel Observatory. 12.55,

News. 1.5, Records. 1.30, Interval. 3.59, Time Signal from Neuchâtel Observatory. 4.0, See Beromünster. 6.0, Interval. 7.45, News. 8.0, In the Vineyards of Ticino—Folk Scenes. 8.45, Concert of Light Music; Soloist, Mue. Bianchi (Songs). 9.30, Trio Concert: Siciliana (Pergolesi); Gavotte (Martini); La Romanesca (Sconosciuto); Minuet from Le Bourgeois gentilhomme (Lully); Serenade (Haydn); Largo (Handel). 10.0 (approx.), Close Down.

MORAVSKA-OSTRAVA

1,158 kc/s, 259.1 metres; 11.2 kW.—6.0 a.m., See Prague. 7.15, Interval. 9.50, See Prague. 10.40, See Brno. 10.50, See Bratislava. 11.0, See Prague. 12.30 p.m., See Brno. 1.30, See Prague. 2.0, Interval. 3.15, See Bratislava. 4.15 to 4.20, See Prague. 5.40, Records. 5.50, Tourist Report. 6.0, Local News. 6.5, Wireless Notes. 6.10, Record. 6.15, German Transmission: Talk: The Moravská-Ostrava Theatre Season; Records. 6.55, See Prague. 8.10, Reading. 8.25, See Brno. 8.45, See Prague. 9.15, Quartet in G minor, Op. 74, No. 3 (Haydn). 9.40, Wagner Song Recital by Lida Maszkova. 10.0, See Prague. 11.0 (approx.), Close Down.

MOSCOW (No. 1)

174 kc/s, 1,724 metres; 500 kW.—5.0 a.m., News. 5.15, Fanfare. 5.45, Gym. 6.15, Musical Programme. 8.15, Programme for Children. 9.0, Musical Programme. 9.58, Time. 10.0, News. 10.15, Concert. 11.15, Technical Talk for Farmers. 3.0 p.m., Programme Announcements. 3.15, Programme for Children. 3.58, Time. 4.0, News. 4.15, Book Review. 4.50, Communist Party Programme. 5.30, Literary Programme for the Red Army. 5.30, Records; Request Music. 8.0, Dramatic Programme. 9.0, Talk in Czech: Women in Management. 9.55, Chimes. 10.5, Talk in English: Women in Management. 11.5, Programme in German: (a) Talk: Women in Management, (b) Science Notes.

MOTALA.—Relays Stockholm. MUH-LACKER.—See Stuttgart.

MUNICH

740 kc/s, 405.4 metres; 100 kW. Relayed by Augsburg and Nürnberg, 1,267 kc/s, 236.8 metres; and Kalserslautern, 1,195 kc/s, 251 metres.—6.30 a.m., Gym. 6.45, Motto; Records. 7.5, Programme for Young People. 7.15, Time; News. 7.25, Song and Violin Recital by Anna Neumeister (Soprano), Hermann Gees (Tenor), Franz Hochstaedter (Violin) and Mary Wurm (Pianoforte). 9.50, Gym. for Women. 10.10, Broadcast for Schools. 10.55, Market Prices. 11.5, Programme for Farmers. 11.15, Time; News. 11.30, Post Office Propaganda; Records. 12 Noon, Orchestral Concert; Conductor, Kloss; Soloist, Laberer (Clarinet). 1.15 p.m., Time; News. 1.25, Schubert Records. 2.0, News. 2.20, Reading. 2.50, Programme for Women. 3.30, Talk: Art in Munich. 3.50, Weather; Programme for Farmers. 4.0, Concert by the Small Station Orchestra; Conductor, Kloss; Soloist, Hans Böck (Bass). 5.30, Talk: The Old Testament and the Edda. 5.50, Thirteenth Century Violin Music by a Violin Trio. 6.10, Talk: Bamberg. 6.30 (from Nürnberg), Holiday Talk. 6.50, Time; Weather; Programme for Farmers. 7.0, Concert by the Station Dance Orchestra; Conductor, Aulich. 7.45, See Berlin (Funkstunde). 8.0, News. 8.15, See Stuttgart. 8.45, Symphony Concert by the Station Orchestra and Choir; Conductor, Winter; Soloist, Elisabeth Waldenau (Contralto); Rhapsody for Contralto, Male Voice Choir and Orchestra (Brahms); Symphony in C (Schubert). 9.35, Monthly Political Review. 10.0, Time; News. 10.20, Programme to be announced. 11.0, See Hamburg. 12 Midnight (approx.), Close Down.

NAPLES.—Relays Rome. NOTODDEN.—Relays Oslo.

OSLO

260 kc/s, 1,154 metres; 60 kW. Relayed by Hamar, 519 kc/s, 578 metres; and Jeløy, 6,990 kc/s, 42.92 metres.—10.0 a.m., Exchange. 11.15, Service. 11.50, Exchange. 12.55 p.m., Time. 1.0 to 2.0, Records. In the intervals, at 1.15, Weather; Report for Farmers; and at 1.45, Exchange. 2.0, Exchange. 5.0, Concert of Light Music, relayed from Bergen, 850 kc/s, 352.9 metres. 6.0, A Microphone Visit to a Farm. 6.30, Concert of Light Music. 7.0, Announcements. 7.15, Weather; News. 7.30, Time; Notes for Farmers. 7.45, Theatre Notes from Bergen. 8.0, Pianoforte Recital by Rolf Brandt Rantava: Romance (Henselt); Etude, Op. 5 (Henselt); Dance of the Witch (Henselt); Nocturne in E. Op. 62 (Chopin); Arabesque (Leschitzky); Selection from Die Fledermaus (Strauss-Grünfeld). 8.30, Talk. 9.0, Recital of Grieg Songs by Ingrid Traae Jersin (Contralto) and Dagne Constance Knutsen (Contralto); Introductory Talk; Die Müllerin; Eingehüllt in grane Wolken; Ich stand in dunkeln Träumen; Was soll ich sagen; Die Weise; Morgenthau; Abschied; Jägerlied; Das alte Lied; Wo sind sie hin? 9.35, Reports. 9.40, Weather. 9.45, News. 10.0, Topical Talk. 10.15, Choral Concert from Stavanger, 1,276 kc/s, 235.1 metres.

OSTERSUND.—Relays Stockholm.

SEPT. 14th **FRIDAY** continued

PARIS

POSTE PARISIEN, 959 kc/s, 312.8 metres; 100 kW.—7.10 a.m., Fanfare. 7.15, Records. In the interval at 7.20, News. 8.0, Concert. In the interval at 8.20, News. 8.45, Cookery Hints. 12.5 p.m., Records. 12.25, News. 12.35, Records. 1.5, Exchange. 1.15, Records. 1.30, Exchange. 1.35, Records. 2.0, Exchange. 3.15, Exchange. 3.45, Exchange. 4.50, Exchange. 6.45, Notes for Farmers. 6.45, Exchange. 6.50, Talk. 6.58, Schubert Records: Ave Maria; Liebeslied; Military March. 7.10, News. 7.30, Gounod Recital. 7.50, Popular Music. 8.0, Interval. 8.10, Announcements. 8.12, Concert by the Station Orchestra; Conductor, Mathieu; Soloist, Germaine Corney (Songs). 10.20, News. 10.30 till Close Down, Programme in English arranged by the International Broadcasting Company of London. 10.30, Gramophone Concert. 11.0, I.B.C. Goodnight Melody and Close Down.

PARIS

RADIO-PARIS, 182 kc/s, 1,648 metres; 75 kW.—6.45 a.m., Gym. 7.0, Records. 7.15, Press Review; Weather. 7.45, Gym. 8.0, Records. 10.15, Concert relayed from Vichy. 12 Noon, Dance Music by the Lucien Goldy Band; Soloist, Jean Sorbier (Songs). In the interval at 1.30 p.m. (approx.), Exchange. 3.45, Exchange. 6.20, Weather; Talk for Farmers; Racing Results. 6.45,



Andre Gaudelette whose voice is often heard by listeners to announcements from the Poste Parisien station.

Records. 7.0, Talk on Hunting. 7.15, Ballet Music from Le Cid (Massenet), on Records. 7.25, Social Assurance Societies' Report. 7.30, Topical Talk. 8.0, Readings. 8.30, News; Weather. 8.45, Robert-Macaire—Burlesque in Four Acts, preceded by the Prologue: L'Auberge des Adrets. In the interval at 9.15 (approx.), News; Medical Talk. 10.30, Dance Music by the Atkins Dance Band.

PITTSBURGH

KDKA, 580 kc/s, 306 metres; 50 kW. Relayed by W8XK on 48.86 metres, 25.27 metres.—3.0 p.m., Edward MacHugh. 3.15, Sammy Fuller. 3.30, To-day's Children. 3.45, News; Cooking School. 4.0, Marine Band Shut-in-Hour. 5.0, Fields and Hall. 5.15, Charles Sears. 5.30, Vic and Sade. 5.45, Hotel William Penn Orchestra. 6.0, Market Reports. 6.15, Hon. Archie and Frank. 6.30, Farm and Home Hour. 7.30, KDKA Home Forum. 8.0, Gale Page. 8.15, Visit Foreign Village. 8.30, The Little Concert Hall. 9.0, Betty and Bob. 9.15, Singing Stranger. 9.30, Business News and Markets. 9.45, Arm Chair Driver. 10.0, Chick Webb and Orchestra. 10.15, KDKA Kiddies' Klub. 10.30, Singing Lady. 10.45, Little Orphan Annie. 11.0, Dan and Sylvia. 11.14, Baseball Résumé. 11.30, Comedy Stars of Hollywood. 11.45, Lowell Thomas. 12 Midnight, News; Drama; Music. 12.15 a.m. (Saturday), Sleepy Hall's Orchestra. 12.30, Nancy Martin. 12.45, Frank Buck. 1.0 to 6.0, Popular Programme.

PORSGRUND.—Relays Oslo.

PRAGUE

638 kc/s, 470.2 metres; 120 kW.—6.0 a.m., Time; Gym; Music; News. 7.15, Interval. 9.50, News. 10.5, News in German. 10.10, Records. 10.30, Literary and Musical Broadcast for Schools. 10.40, See Brno. 10.50, See Bratislava. 11.0, Record. 11.5, Broadcast for Schools. 11.55, Notes for Farmers. 12 Noon, Time; Talk for Farmers. 12.10 p.m., Records. 12.20, News. 12.30, See Brno. 1.30, Labour Market. 1.40, Records. 1.50, Exchange. 1.55, Exchange and Weather in German. 3.15, See Bratislava. 4.15 to 4.20, Exchange; Weather. 5.40, Records. 5.50, Notes for Housewives. 5.55, Reading. 6.5,

Records. 6.10, Report for Farmers. 6.20, German Transmission: Talk: Television. 6.55, News and Weather in German. 7.0, Time; News. 7.10, Concert of Opera Music by the Station Orchestra; Conductor, Jeremias: Overture, Viola (Weiss); Air from The Brandenburgers in Bohemia (Smetana); Ballet Music from Faust (Gounod); Two Airs from Russalka (Dvorák); Polonaise from Eugene Onegin (Tchaikovsky). 8.10, See Bratislava. 8.25, See Brno. 8.45, Recitations; Record; Talk. 9.15, See Bratislava. 10.0, Time; News. 10.15, Concert of Popular Czech Songs. 10.45, News in Russian. 11.0 (approx.), Close Down.

RJUKAN.—Relays Oslo.

ROME

Call 1R0, 713 kc/s, 420.8 metres; 50 kW. Relayed by Naples, 1,104 kc/s, 271.7 metres; Milan (No. 2), 1,348 kc/s, 222.6 metres; Turin (No. 2), 1,357 kc/s, 221.1 metres; and 2R0, 11,810 kc/s, 25.4 metres.—7.30 a.m., Gym. 7.45 to 8.0, Time; News. 12.30 p.m., Records. 1.5 to 2.15, See Milan. In the interval at 1.30, Time; News. 4.30, Children's Radio Review. 4.55, News; Exchange. 5.10, See Milan. 5.55, Weather. 6.0 to 6.10, Corn Prices. 7.0, Announcements. 7.15, News in Foreign Languages. 8.0, Time; News. 8.10, Records. 8.30, Government Notes. 8.45, Organ Recital. In the intervals, Talk; Announcements. 11.0, News.

RUYSSELEDE

10,330 kc/s, 29.04 metres; 8 kW.—7.45 a.m., News in French. 8.0, See Brussels (No. 2.). 9.0, News in Flemish. 9.15 (approx.), Close Down.

SALZBURG.—Relays Vienna.

SCHENECTADY

WGY, 790 kc/s, 379.5 metres; 50 kW. Relayed at intervals by W2XAF on 31.48 metres and on 19.56 metres.—7.0 p.m., Will Aubrey—Wandering Minstrel. 7.30, Woman's Radio Review; Talks; Orchestra. 11.35, Exchange. 12 Midnight, Cities Service Concert: Jessica Dragonette. 12.30 a.m. (Saturday), WGY Farm Forum. 1.0 to 3.0, Popular Programme.

SOTTENS

677 kc/s, 443.1 metres; 25 kW.; and Geneva, 401 kc/s, 748 metres.—6.0 to 6.15 a.m., Gym. 12.29 p.m., Time. 12.30, News in French and German. 12.45, Concert by the Small Radio Lausanne Orchestra; Conductor, Moser. 1.0, Exchange. 1.5, Concert (contd.). 2.0, Interval. 3.59, Time. 4.0, Concert by the Station Orchestra; Conductor, Echehard; Part I: Overture, Ali-Baba (Cherubini); Japanese Suite (Holst); Extract from The Pearl Fishers (Bizet); Four Ways (Coates); Records. Part II, Light Music. 6.0, Talk for Women. 6.30, Light Music for the Small Radio Lausanne Orchestra. 7.30 to 9.15, See Beromünster. 9.15, News in French and German. 9.30, See Beromünster. 10.15, Talk: The Work of the League of Nations. 10.35, Close Down.

STOCKHOLM

704 kc/s, 426.1 metres; 55 kW. Relayed by Boden and Östersund, 413.5 kc/s, 726 metres; Göteborg, 941 kc/s, 318.8 metres; Hörby, 1,131 kc/s, 265.3 metres; Motala, 216 kc/s, 1,389 metres; and Sundsvall, 601 kc/s, 499.2 metres.—7.20 a.m., Gym. 7.45, Service. 8.0, Weather. 12.30 p.m., Weather. 12.45, Exchange. 12.55, Time. 1.0, Broadcast for Schools. 1.25, Accordion Recital by Johansson, relayed from Falun, 1,086 kc/s, 276.2 metres. 1.45, Talk, relayed from Malmö, 1,312 kc/s, 228.7 metres. 2.5, Orchestral Concert of Light Music. 3.0, Interval. 5.0, Weather. 5.5, Folk Music and Songs. 5.45, Reading. 8.15, Records. 7.15, Weather; News. 7.30, Talk. 7.45, Recital by Eugénie Knös (Pianoforte) and Set Svanholm (Songs): Prelude, Choral and Fugue (Franck); Five Songs from Tannhäuser (Sjögren); Rondo in D (Mozart). 8.30, Talk: Foreign Politics. 8.50, Programme by the Five Kentucky Singers. 9.15 (from Göteborg), Talk: Handwork and Industry. 9.45, Weather; News. 10.0 (from Göteborg), Organ Recital. 11.0 (approx.), Close Down.

STRASBOURG

859 kc/s, 349.2 metres; 15 kW.—10.30 a.m., Concert by the Station Orchestra, relayed from Bordeaux Lafayette, 1,077 kc/s, 278.6 metres. 12 Noon, Records. 12.45 p.m., News. 1.0, Time; Exchange. 1.15, Records. 2.15, See Paris (Ecole Supérieure). 3.30, Concert relayed from Vichy. 4.45, Talk: Physical Education and Sports. 5.0, Jean Cras Concert by the Station Orchestra and Soloists; Suite for Flute and Harp; Songs; Quintet for Harp; Flute, Violin, Viola, and Cello. 6.0, Topical Talk in German. 6.15, Elocution Lesson. 6.30, Orchestral Concert; Conductor, de Villers: Overture, Prometheus (Beethoven); Symphony in E flat (Mozart); Ballet Music from Faust (Gounod). 7.30, Time; News. 7.45, Records. 8.0, Press Review in German; Lot-

tery Results. 8.30, Symphony Concert relayed from Vichy; Conductor, Emile Cooper: Symphonic Poem, Don Juan (R. Strauss); Escapes (Ibert); Scenes from Petruska (Stravinsky); Overture, Tannhäuser (Wagner). 10.0 (approx.), Press Review. 10.10, Orchestral Concert relayed from the Café de l'Odéon; Conductor, Théodore: Waltz, The Blue Danube (Strauss); Overture, Egmont (Beethoven); Intermezzo (Translatour); Second Slav Rhapsody (Friedemann); Selection from A Midsummer Night's Dream (Mendelssohn); Swabian Country Waltz (Krome). 11.0 (approx.), Close Down.

STUTTGART

MUHLACKER, 574 kc/s, 522.6 metres; 100 kW.—5.35 a.m., Programme for Farmers. 5.45, Hymn; Time; Weather. 5.50, Gym. 6.15, Records. 6.40, Time; News. 6.55, Records. 7.25, See Munich. 8.10, Weather; Water Level. 8.15, Gym. 8.35, Interval. 9.0 to 9.15, Programme for Women. 10.0, News. 10.10, Cinema Organ Recital by Kurt Albrecht. 10.30, Recital by Keefer-Biurhardt (Soprano), Margarethe Hofmann (Flute), and Leo Hantz (Guitar): Flute and Guitar: Rigaudon (Rameau); Lieder (Zelter): (a) Ständchen, (b) So geht's Liebchen, (c) Die Spröde, (d) Die Bekehrte; Flute and Guitar: Minuet (Gluck); Five Old French Pastorales; German Dance (Mozart); Bourrée (Handel). 11.0, Cello Concerto in A Minor, with Orchestra (Schubert-Cassado), on Records. 11.25, Post Office Propaganda; Records. 11.55, Weather. 12 Noon, Suppé Records. 1.0 p.m., Time; News. 1.20, Concert by the Mannheim Philharmonic Orchestra; Conductor, Becker: Overture, Ilka (Doppler); Selection from La Traviata (Verdi); Selection from Le Postillon de Longjumeau (Adam); Overture, Donna Juanita (Suppé); Delirienwalzer (Jos. Strauss); Selection from The Geisha (Jones); March (Blon). In the interval at 1.50, Time; News. 2.30, Talk: The Stuttgart Fire Brigade. 3.10, Recital of Fritz Lubrich; Music by Annemarie Banzhaf (Soprano) and the Composer (Pianoforte). 3.40, Programme for Children. 4.0, See Frankfurt. 5.30, Talk: Heinrich von Treitschke. 6.0, Talk for Young People. 6.25, Flanders—Lorraine—Alsace—Sequence of Literature and Music (Kipp). 7.0, Military Band Concert from Ulm; Conductor, Schilling. 7.30, Time; Weather; Programme for Farmers. 7.45, See Berlin (Funkstunde). 8.0, News. 8.15, Transmission for all German Stations: A Swabian Church Festival—Sequence (Stockinger). 8.45, See Königsberg. 10.0, Sports Review. 10.20, Time; News. 10.35, Local News. 10.45, See Breslau. 12 Midnight, See Frankfurt. 1.0 a.m. (Saturday), Close Down.

SUNDSVALL.—Relays Stockholm.

TOULOUSE

913 kc/s, 328.6 metres; 10 kW.—8.0 a.m., Dance Refrains. 8.30, News. 8.35, Opera Arias; Orchestral Music. 12 Noon, Orchestral Music. 12.15 p.m., Songs. 12.30, News. 12.45, Request Music. 1.0, News. 1.5, Orchestral Music. 1.15, Sound Film Music. 1.30, Orchestral Music. 1.45, Chansonnettes. 2.0, News; Amusement Guide. 6.0, News. 6.15, Opera Music: Entr'acte from Lakmé (Delibes); Pastoral from L'Arlésienne (Bizet); Extracts from Romeo and Juliet (Berlioz); Selection from Madame Butterfly (Puccini). 6.30, Tourist Talk. 6.35, Operetta Arias. 6.45, Orchestral Music. 7.0, Chansonnettes. 7.15, Soloist Programme: Fantasia in D minor (Mozart); Rêve d'enfant (Ysaye); Le cygne (Saint-Saëns); Ellesmere (Grace); Pavane pour une Infante défunte (Ravel). 7.30, News. 7.45, Songs. 8.0, Le corbeau et le renard—a Fable. 8.15, Symphony No. 34 in C (Mozart). 8.30, Medical Talk. 9.0, Le régiment qui passe—Radio Fantasy. 9.30, Military Music. 10.0, Au caveau de dix heures—a Radio Fantasy. 10.15, News. 10.30, Orchestral Music. 11.0, Spanish Songs. 11.15, Rumbas. 11.30, Sound Film Music. 11.50, Operetta Music: Overture, The Drum Major's Daughter (Offenbach); Selection from A Waltz Dream (O. Straus); Air from Elle est à vous (Yvain). 12 Midnight, News. 12.5 a.m. (Saturday), Songs. 12.15, Orchestral Music. 12.30 (approx.), Close Down.

TRONDHEIM.—Relays Oslo.

TURIN.—Relays Milan.

VALENCIA

850 kc/s, 352.9 metres; 1.5 kW.—2.0 to 3.0 a.m. (Saturday), Programme in English arranged by the International Broadcasting Company of London. 2.0, Light Orchestral Concert. 2.30, The Family Gathering. 3.0, I.B.C. Goodnight Melody and Close Down.

VATICAN CITY

15,120 kc/s 19.84 metres; 10 kW. (Morning). 5.970 kc/s, 50.26 metres; (Evening).—11.0 to 11.15 a.m., Religious Information in German. 8.0 to 8.15 p.m., Religious Information in Italian.

VIENNA

592 kc/s, 506.8 metres; 120 kW. Relayed by Graz, 886 kc/s, 338.6 metres; Innsbruck, 519 kc/s, 478 metres; Klagenfurt, Linz, and Salzburg, 1,294 kc/s, 231.8 metres.—9.0 a.m., News. 9.20, Market Prices. 9.30, Weather. 10.50, Water Level. 11.30, Records: Alpine Songs and Dances. 11.55, Weather. 12 Noon, Concert by the Vienna Symphony Orchestra; Conductor and Pianist, Holzer; Soloists, Karl Rosner (Violin) and Adolf Hönigsberg (Bugle Horn). In the interval at 1.0 p.m., Time; News. 2.0, Announcements. 3.30, Time; Weather; Exchange. 3.50, Programme for Women. 4.10, News. 4.15, Reading for Women. 4.40, Records: Sound Film Music. 5.20, Talk: Poultry Farming. 5.30, Talk. 5.50, Violin and Guitar Recital by Gustav Macho and Alfred Rondorf: Sonatina No. 3, Op. 1 (Paganini); Duo concertante in A (Giuliani); Waltz (Brahms). 6.20, Weekly Sports Report. 6.30, Tourist Report. 6.40, Wireless Notes. 7.0, Time; News. 7.30, Upper Austrian Folk Songs. 8.10, Local News. 8.30, Liebele—Play in Three Acts (Arthur Schnitzler). 10.0, Orchestral Concert; Conductor, Eichinger; Soloist, Jaroslav Suchy (Violin): Overture, Prince Methusalem (Joh. Strauss); Three Pieces (Mascagni): (a) Serenade, Como col capo sotto l'ala bianca, (b) Duet from L'Amico Fritz, (c) Intermezzo from William Ratcliff; Selection from Polenbut (Nedbal); Finlandia (Sibelius); Waltz, Rudolfs-Klänge (Jos. Strauss); Præludium (Järnefelt); Berceuse (Järnefelt); Selection from Fedora (Giordano); Violin Solo: Gipsy Dance (Nochez); Song from Sissy (Kreiser); Selection from Viktoria and her Hussar (Abraham); March (Ziehrer). In the interval at 10.30, News. 12 Midnight, Dance Records. 1.0 a.m. (Saturday), Close Down.

WARSAW

223 kc/s, 1,345 metres; 120 kW.—6.45 a.m., Hymn. 6.48, Records. 6.58, Gym. 7.8, Records. 7.15, News. 7.25, Records. 7.35, Household Hints. 7.40, Programme Announcements. 7.50, Announcements; Music. 8.0, Interval. 11.57, Time. 12 Noon, Fanfare from St. Mary's Church, Cracow. 12.3 p.m., Weather; Press Review. 12.10, Guitar Recital. 12.25, Commentary on an Air Race from Mokotow Airport. 12.50, Talk for Women. 1.5, News. 1.10, Records. 1.30, Interval. 3.30, News. 3.35, Exchange; Caruso Records with Commentary. 4.45, Programme for Invalids, relayed from Lwow, 795 kc/s, 377.4 metres. 5.15, Pianoforte Recital by Jonas: Variation in D on a Minuet of Dupont (Mozart); Sonata in C minor Op. 10 No. 1 (Beethoven); Waltz and Dance (Schumann); Consolation (Liszt).



The microphone at Hamburg has often to respond to the frequencies of Ferdinand Kronz's voice. He is a prominent member of the staff.

Frühlingsnacht (Schumann-Liszt). 5.50, Books Review. 6.0, Reading. 6.10, Art Notes. 6.15, Schumann Recital relayed from Poznan, 868 kc/s, 345.6 metres. 6.45, Talk. 7.0, Choral Concert. 7.25, Topical Talk. 7.35, Recitation. 7.45, Programme Announcements. 7.50, Sports Notes. 8.0, Commentary on an Air Race from Mokotow. 8.30, Concert by the Station Symphony Orchestra; Conductor, Mazurkiewicz; Soloist: Irena Dubiska (Violin); Introductory Talk relayed from Cracow, 986 kc/s, 304.3 metres; Selection from The Vovsyvode (Tchaikovsky); Violin Concerto in D (Brahms); The Alpine Symphony (R. Strauss). In the interval at 9.15 (approx.), News; Talk: Work in Poland. 10.55, Light Music. 11.15, Weather. 11.20, Dance Records.

ZURICH.—Relays Beromünster.

ATHLONE

565 kc/s, 531 metres; 60 kW. Relayed by Dublin, 1,348 kc/s, 222.6 metres; and Cork, 1,240 kc/s, 241.9 metres.—1.30 to 2.50 a.m., Time; Weather; Exchange; Records. 5.0, Programme for Children. 6.45, News. 7.0, Characters from Dickens by Desmond Creen. 7.15, Irish Talk by S. O'Duinnin. 7.30, Time. 7.31, Classical Music by the Station Orchestra. 8.0, Valerie Trimble (C. 4.0). 8.10, Waltz Songs by K. McCully (Soprano). 8.25, Concert of Strauss and Gungl Waltzes by the Station Orchestra. 8.55, Sanchia Pielou (Harp). 9.25, Irish Music by the Station Orchestra. 9.45, Deugian Supple (Songs). 10.0, Variety Programme. 10.30, Time; News; Weather. 10.40, Variety by the Wickham Sisters. 11.0 (approx.), Close Down.

BARCELONA

795 kc/s, 377.4 metres; 5 kW.—8.15 a.m., News; Records. 9.0, Chimes; Gym; Records. 9.20, News; Records. 10.0, Obituary. 12 Noon, Chimes; Weather. 1.0 p.m., Programme for Women. 2.0, Records. 2.30, Theatre Notes; Amusement Guide; Records. 3.0, Announcements; Sextet Concert: Selection from The Yellow Jacket (Lehár); Song and Dance (Balzguer); Serenata (Albeniz); Jota from Los Voluntarios (Jimenez); Selection from El bateo (Chueca); Vaya por Faradón (Fernández). In the interval, Talk. After the Concert, Exchange. 4.0, Programme for Hospitals. 4.30, Amateurs at the Microphone. 5.0, News; Interval. 7.0, Violin and Pianoforte Recital by Jarque and Coma; Romantic Serenade (Serra); Gavotte (Bach-Kreisler); Melody (Ackermann); Largo (Handel); Air de Ballet (Berlioz); Song (Filippucci). In the interval at 7.30, News. 8.0, Request Records. 8.30, Exchange; Request Records. 9.0, Educational Talk. 9.10, Records. 9.30, Medical Talk in Catalan. 9.45, Press Review. 10.0, Chimes; Weather. 10.5, Announcements; Exchange. 10.10, Programme from Madrid (EAJ). 1.0 a.m. (Sunday), News. 2.0 to 3.0, Programme in English, arranged by the International Broadcasting Company of London. 2.0, Spanish Music. 2.30, Tango Band. 2.45, Sweet Music. 3.0, I.B.C. Goodnight Melody and Close Down.

BARI

1,059 kc/s, 283.3 metres; 20 kW.—7.30 a.m. to 7.15 p.m., See Rome. 7.15, Weather; News in Foreign Languages; Records. 8.0 till Close Down, See Rome.

BASLE.—Relays Beromünster.

BERLIN

DEUTSCHLANDSENDER, 191 kc/s, 1,571 metres; 60 kW.—5.45 a.m., Weather. 5.50, Press Review. 6.0, Gym. 6.15, Motto. 6.20, See Königsberg. 8.0, Interval. 8.45, Gym. for Women. 9.0, Interval. 9.40, Talk: Light Athletics in Europe. 10.0, News. 10.10, Tom Thumb—Play for Children (Grimm-Wollmann). 10.50, Programme for Children. 11.15, Weather. 11.30, Reading (F. W. Fitzsimmons). 11.45, Talk: Ethnology. 11.55, Weather. 12 Noon, See Cologne. 12.55 p.m., Time. 1.0, Records of Light Music; Weather. 1.45, News. 2.0, Interval. 2.45, Greetings; Programme Notes. 3.0, Weather Exchange. 3.15, Talk for Children. 3.40, Economic Report. 4.0, See Königsberg. 6.0, Sports Review. 6.20, Talk for Workers. 6.40, Wireless Notes. 6.50, Topical Talk. 7.5, Recital of German Music by Delores Maass (Violin), Carl Schlotmann (Songs) and Walter Thiele (Pianoforte). 7.45, Topical Dialogues. 8.0, Motto; Weather; News. 8.10, Autumn—Variety Programme by Hans Bund and his Dance Band, Hans Jungher's Accordionists, Luciano (Mouth Organ), Mischa Ignatiev (Balalaika) and Ingi Vesten. 10.0, News. 10.30, Report on Records: The International Light Athletic Championship, Germany v Finland. 10.45, Weather. 11.0, See Munich. 12 Midnight, Close Down.

BERLIN

FUNKSTUNDE, 841 kc/s, 356.7 metres; 100 kW.—6.0 a.m., Gym. 6.15, Weather; Meditation. 6.20, See Königsberg. 7.0, News. 7.10, See Königsberg. 8.0, Gym. 8.20, Interval. 10.0, Weather; News. 10.10, Market Prices. 10.30, Records and Announcements. 11.30, Interval. 12 Noon, Concert from Königsberg. In the interval at 12.30 p.m., Weather. 1.0, News. 1.15, Records. 2.0, Weather; News; Water Level. 2.15, Records. 3.0, Exchange; Market Report. 3.20, Interval. 3.35, Friczhens und Lotte—a Sequence (Overbeck). 4.0, Concert by the Walter Fenske Orchestra, and the Five Parodists; Soloist, Hugo Köth (Pianoforte); Orchestra: (a) Triumph-Walzer (Gröschel), (b) Die Spieluhr tanz (Ortleb); Pianoforte: Waltz Paraphrase on Strauss Melodies (Köth); Orchestra: (a) Auf meiner Geige (Kirchstein), (b) Du hast so etwas (Marleh), (c) Wo das Glück wohnt (Hoffmann); The Five Parodists: (a) Lasst uns die Sorgen mit Musik vertreiben (Doelle), (b) Ich hab' dir zu tief in die Augen gesehn (Böhmet), (c) Es ist so wunderschön in Dich verliebt zu sein (Mackeben); Orchestra: (a) Melodie im Frühling (Blume), (b) Baby lacht (Plessow); Interlude: Farewell to Summer—Pictures of City Life; Orchestra: Liebes-Suite (Cowley); The Five Parodists: (a) Blümlein im Walde (Kistenmacher), (b) Die al te Mühle (Tobias), (c) Ich ging einmal spazieren (arr. Bangert);

SATURDAY
SEPTEMBER THE FIFTEENTH

Pianoforte: Waltz Paraphrase (Schütt); The Five Parodists: (a) Ich fahr mit Dir ins Blaue (Kauler), (b) Helene, ach Helene (Carste), (c) Dem Glücklichen schlägt keine Stunde (Bangert); Pianoforte: Mariogold (Mayerl); Orchestra: (a) Burlesca (Lojero), (b) Original Russian Melodies. 6.0, Announcements. 6.5, Sports Talk. 6.20, Violin Recital by Willy Stuhlfauth. 6.50, Autumn—Songs and Poems (arr. Evers). 7.30, Echoes of the Day. 8.0, News. 8.15, Variety Programme. In the interval at 10.20, News. 1.0 a.m. (Sunday), Close Down.

BERNE.—Relays Beromünster.

BEROMUNSTER

556 kc/s, 539.6 metres; 60 kW.—6.0 to 6.15 a.m., Gym. 12.29 p.m., Time Signal from Neuchâtel Observatory. 12.45 to 2.0, See Sottens. 3.59, Time Signal from Neuchâtel Observatory. 4.0 to 6.0, See Monte Ceneri. 6.0, Records of Swiss Music. 6.30, Talk for Women. 7.0, Chimes; Time; Weather; Market Prices. 7.15, Records: Opera Music. 7.30 to 10.30, See Sottens. 10.30, Close Down.

BODEN.—Relays Stockholm. BODO.—Relays Oslo.

BRATISLAVA

1,004 kc/s, 298.8 metres; 13.5 kW.—6.0 to 7.15 a.m., See Prague. 9.45, Announcements. 9.50, See Prague. 10.10, News in Hungarian. 10.15, Records. 10.30, See Moravská-Ostrava. 11.0, Water Level. 11.5 to 12 Noon, Records. 12 Noon, See Prague. 12.5 p.m., Talk for Farmers. 12.10, News in Slovak. 12.15, Record. 12.20, See Prague. 12.30, See Moravská-Ostrava. 1.30, See Prague. 1.40, News and Weather in German and Hungarian. 1.50, See Prague. 2.0 to 2.5, Programme for Farmers. 3.15 to 4.15, See Prague. 4.40, See Brno. 5.40, Topical Talk. 5.50, Record. 5.55, Programme for Workers. 6.10, Hints for Housewives. 6.15, Hungarian Transmission: Cabaret Programme. 6.55, See Prague. 7.10, Records. 7.30, Talk: The Status of Indian Women. 7.45, An Operetta (Rehor). 8.45, Records. 9.0, Violin Recital by Simek. 9.30, Hebrew Song Recital by Rosenbach. 10.0, See Prague. 10.15, News in Hungarian. 10.30, See Prague. 11.30 (approx.), Close Down.

BREMEN.—Relays Hamburg.

BRESLAU

950 kc/s, 315.8 metres; 60 kW. Relayed by Gleiwitz, 1,231 kc/s, 243.7 metres.—5.0 a.m., Hymn; Motto. 5.10, Records. 6.0, Time; Weather; Gym. 6.25, Orchestral Concert. 7.0, Time; Weather; News. 7.15, Concert (contd.). 8.0 to 8.15, Recipes. 9.0, Time; Weather; News. 10.40 to 11.10, Programme for Children. 11.30, Time; Weather; News; Water Level. 12 Noon, See Munich. 1.15 p.m., Records. 1.30, Time; Weather; News. 1.45, Records of Light Music. 2.20, Exchange. 2.25, Post Office Propaganda; Records. 2.50, Market Prices. 3.10, Book Review. 3.25, Talk: in a Balloon above the Clouds. 3.45, Discussion: Currency Reform. 4.0, Orchestral Concert. Conductor, Kaden. March, Germania (Keil); Overture, Der Geiger aus Tirol (Genée); Two Elegiac Pieces for Strings (Grieg); (a) Herzwunden, (b) Letzter Frühling; March and Finale from the Suite for Wind Instruments (Strecke); Musikalisches Kunterbunt (Schmalstich); March from Die lustige Woche (Elsner); Overture, Aus der Grafschaft Koschinsky; Selection from Oberon (Weber); Tone Piece, Königin Luise in Paretz (Leuschner); Waltz, Estudiantina (Waldteufel). 6.0, Talk for Housewives. 6.20, Song Recital by Lotte Leffer (Soprano): Four Songs (Müller): (a) Dodoowa been ich derhaime, (b) Liebeskammer, (c) Der schichterne Hons, (d) Wanderlust; Sommerliedja (Amft); Mei Därla (Wieczorek); D'r Went'r is schien (Amft). 6.50, Programme Notes; Weather. 7.0, Chimes. 7.5, Programme to be announced. 7.30, Programme Announcements with Records. 8.0, To-day's News. 8.10 to 12 Midnight, See Leipzig. In the interval from 10.20 to 10.50, Time; News. 12 Midnight, Programme from Berlin (Funkstunde). 1.0 a.m., Close Down.

BRNO

922 kc/s, 325.4 metres; 32 kW.—6.0 to 7.15 a.m., See Prague. 9.50, See Prague. 10.30, See Moravská-Ostrava. 11.0, See Prague. 12.5 p.m., Programme for Farmers. 12.10, See Prague. 12.30, See Moravská-Ostrava. 1.30, Talk on Economics. 1.40, See Prague. 2.0 to 2.5, Programme for Farmers. 3.15 to 4.15, See Prague. 4.40, Variety Programme: Brass Band Music; Recitations; Records. 5.40, Notes for Housewives. 5.45, German Transmission. Song Recital by Gerda Redlich (Contralto). 6.20, Talk: The Panama Canal. 6.30, Records. 6.45, Programme for Workers. 6.55, See Prague. 7.10, Trio Concert. Furiant (Bayer); Elegy (Rucka); Waltz (Nedbal); Nocturne (Roob); Polka (Balling). 7.30, See Prague. 7.45, See Bratislava. 8.45, Russian Literary and Musical Programme. 9.30, Ccascience—Play in One Act

(Durdik), with Incidental Music by Ambros. 10.0, See Prague. 11.30 (approx.), Close Down.

BRUSSELS (No. 1)

520 kc/s, 483.9 metres; 15 kW.—11.55 a.m., Weather. 12 Noon, Orchestral Concert; Soloist, Boulvin (Songs): One-step (Closset); Overture, The Black Domino (Auber); Waltz (Ströbl); Selection from The Count of Luxembourg (Lehár); Songs: (a) Aria from Hamlet (Thomas), (b) Piece (Schubert); Paraphrase on La Paloma (Yradien-Weniger); Waltz (Gabelles); Le Pas des fleurs (Delibes). 1.0 p.m., News. 1.10, Records. 2.0, Interval. 4.40, Announcements. 4.45, Talk. 5.0, Orchestral Concert; Soloist, Mme. De Troch (Songs): Le Carnaval des animaux (Saint-Saëns); Fox-trot (Uhlmann); Melody (Poliakin); La Mouche (Bohm); Songs: (a) Serenade (Strauss), (b) Ich grolle nicht (Schumann), (c) La Vierge de Cologne (Liszt); Le petit air blanc (Ibert); Les bêtes savantes (Albert). 6.0, Talk: Namur. 6.15, Records. 6.30, Song Recital by Angèle Bradter: Le Furet du Bois joli (de Bréville); La Mort des Lys (de Bréville); Berceuse (Rheine-Baton); The Cossack (Moniuszko); Sur une tombe (Lekeu); Aria from The Fair at Sorotchinsk (Mussorgsky). 6.45, Records. 7.30, Science Talk; Wireless Notes. 8.0, Promenade Concert relayed from London. 9.40, Talk. 9.57, Promenade Concert (contd.). 10.40, Concert by the José Schnyder's Orchestra from the Ancienne Belgique. 12 Midnight, Close Down.

BRUSSELS (No. 2)

932 kc/s, 321.9 metres; 15 kW. Programme in Flemish.—11.57 a.m., Weather. 12 Noon, Records. Selection from Don Pasquale (Donizetti); Extracts from Le Cid (Massenet). 1.0 p.m., News. 1.10, Orchestral Concert. Soloist, Ferari (Violin): Selection from Les Saltimbanques (Ganne); Spanish Legend (Rust); Berceuse (Crabbé); The Skaters' Waltz (Waldteufel); Violin and Orchestra: Zigeunerweisen (Sarasate); Ballet égyptien (Luigini). 2.0, Interval. 4.40, Announcements. 4.45, Reading. 5.0, Programme for Children. 6.0, Records: Sonata in A Minor for Violin (Bach); Selection from The Good-Humoured Ladies (Scarlatti-Tommasini). 6.30, Jazz Music with Commentary. 7.30, Film Review. 7.55, Announcements. 8.0, Concert by the Radio Orchestra. Soloist, Toutenel (Songs): Gallop (Hauregard); Romanian Dance, Wanda (Barch); Alma de Dios (Serrano-Martra); Une journée à Elgilar (Sermon); Four Songs; The Carillon (Élgar); Schubert Fantasia (Foulds); Norwegian Dances (Grieg). 8.45, Recitation. 9.0, Concert by the Radio Orchestra. Soloists, Misson (Violin) and Toutenel (Songs): March (Slinding); Fantaisie appassionata for Violin and Orchestra (Vieuxtemps); Dance and Cortege (Moszkovsky); Gigue (Grétry-Mottl); Negro Dance (Niemann); Songs (Schumann): (a) Schöne Wiege meiner Leiden, (b) Auf das Trinkglas eines verstorbene Freundes, (c) Der Hidalgo; Suite (Ansell); Plantation Song (Clutsam); Piece (Finck). 10.0, News. 10.10, Concert by José Schnyder's Orchestra from the Ancienne Belgique. 12 Midnight, Close Down.

BUCHAREST

823 kc/s, 364.5 metres; 12 kW.—12 Noon, Water Level; Records. 12.45 p.m., Amusement Guide; Exchange; Records. 1.15, Time; Weather; News. 1.40, Records. 5.0, Concert by the Motzoi Orchestra. 6.0, Time; Weather; News. 6.20, Concert (contd.). 7.0, Educational Programme. 7.15, Records. 7.45, Talk. 8.0, Song Suite, Toté Blätter (Gretschaninov), by Mme. Olympie Grozowska. 8.20, Concert by the Station Orchestra: Overture, Der Opernhall (Heuberger); Suite for Strings (Micheil); Dance Suite (Foulds); Chansons d'amour (Meyer-Helmund). 9.0, Letterbox. 9.20, Concert (contd.): On the Mediterranean (Ialowics); Selection from Viktoria and her Hussar (Abraham); Gondoles venetiennes (Leemans); Scherzo (Brunetti). 10.0, News. 10.30, Music relayed from a Restaurant.

BUDAPEST

546 kc/s, 549.5 metres; 120 kW.—6.45 a.m., Gym. 9.45, News. 10.0, Talk. 10.40, Talk. 11.10, Water Level. 12 Noon, Chimes. 12.5 p.m., Concert by the Hetényi-Buday-Sobó Trio. 1.30, Orchestral Concert. 2.40, Notes for Housewives. 4.0, Handwork Lesson. 5.0, Programme for Scouts. 6.0, Talk: The Working Week. 6.35, Hungarian Song Recital by Sándor Teleki with accompaniment by the Csorba Cigány Band. 7.50, Fruska—Comedy in Three Acts (Conners). 9.35, News. 9.55, Pianoforte Recital by Eduard Kilyény: Sonata in A (Mozart); Moment musical (Schubert); Der Erikönig (Schubert). 10.40, Police Band Concert; Conductor, Franz Szöllösy.

CASSEL.—Relays Frankfurt.

COLOGNE

658 kc/s, 455.9 metres; 60 kW.—5.30 a.m., Hymn; Records. 6.5, Gym. 6.25, See Bres-

lau. 6.50, Hymn. 7.0, Time; News. 7.15, See Brestlau. 8.0, Time; Weather; Water Level. 8.5, Gym. for Women. 8.20 to 8.30, Talk for Women. 10.0, Time; News; Water Level. 10.10, Programme for Children. 10.30, Concert by the Klemp-Vocal Trio; Soloists, Hans Haass (Harpischord) and Marga Bäuml (Guitar). 11.0, See Frankfurt. 11.30, Announcements; Records. 12 Noon, Wind Instrument Concert from Dortmund; Conductor, Notz. 12.45 p.m., News; Greetings. 1.0, Concert by the Station Chamber Quintet. 1.45, News. 2.0, Records. 2.45, Variety. 3.30, Economic Report. 3.45, Talk: Heating Apparatus. 4.0, See Berlin (Funkstunde). 5.0, Talk: Gotthard Kettler. 5.20, Musical Programme. 5.50, Reading: A Journey to America. 6.10, Talk with Records: English Student Life. 6.40, Topical Talk. 6.50, Economic and Sports Notes. 7.0, Dance Music by the Station Orchestra; Conductor, Hartmann. 8.0, News. 8.15, Westphalian Evening—Programme relayed from the Stadthalle, Hagen, and the Hohen-Syburg. In the interval, Relay of the Young People's Festival from the Hohen-Syburg. Address by Herr Kolbow and Karl Wagenfeld. 10.0, Time; News. 10.20, Ladies, left! Gentlemen, right!—A Ball in Olden Days—Literary and Musical Programme; The Station Chamber Orchestra; Conductor, Hartmann; Leo Eysoldt and his Band; Conductor, Baumgarten, and Soloists. 1.0 a.m. (Sunday), Close Down.

COPENHAGEN.—Relays Klumborg. CORK.—Relays Athlone. DANZIG.—Relays Königsberg. DRESDEN.—Relays Leipzig.

FECAMP

1,456 kc/s, 206 metres; 10 kW.—11.30 a.m. to 12 Noon, Programme in English arranged by the International Broadcasting Company of London. 11.30, Dance Music. 12 Noon to 4.30 p.m., Programme in French. 4.30 to 6.0, Programme in English by the I.B.C. 4.30, Tunbridge Wells, Isle of Thanet, Dover and Folkestone Concert; Part 1, Wishes. 5.0, Part 2, Dance Music. 5.30, Part 3, Orchestral Music. 6.0 to 11.0, Programme in French. 11.0 till Close Down, Programme in English by the I.B.C. 11.0, Gilbert and Sullivan Selection. 11.30, Concert arranged by the I.B.C. (Ireland) Ltd.; Music from the Opera. 12 Midnight, Dance Music. 12.15 a.m. (Sunday), Dance Music. 12.30, I.B.C. Time Signal. 12.31, Club Concert for Liverpool Listeners; Dance Music by Lew Stone and his Band (on Records). 1.0, I.B.C. Goodnight Melody and Close Down.

FLENSBURG.—Relays Hamburg. FLOR-ENCE.—Relays Milan.

FRANKFURT

1,195 kc/s, 251 metres; 17 kW.—5.45 a.m., Hymn; Time; Weather. 5.50, Gym. 6.40, Time; News. 6.50, Weather. 6.55, Orchestral Concert. Conductor, Friess. 8.10, Water Level; Weather. 8.15 to 8.35, Gym. 10.0, News. 10.10, A Sequence for Schools. 11.0, Opening of the Frontier Exhibition. 11.30, Programme Notes; Economic Report; Weather. 11.45, Social Notes. 12 Noon, Concert. 1.0 p.m., Time; News. 1.10, Local News. 1.20, See Stuttgart. 1.50, News. 2.0, See Stuttgart. 2.30, Economics—Report and Discussions. 2.45, Time; News. 2.55, Weather. 3.10, Morse Lesson. 3.30, Records. 4.0, See Berlin (Funkstunde). 6.0, Talk: Frontier Problems. 6.20, Weekly Review. 6.35, Surprise Programme. 6.50, Weather. 7.0 (from Freiburg), Military Band Concert, Conductor, Lühmann. Parademarsch der langen Kerls (Roland); Overture, Maritana (Wallace); Song from Sigurd Jorsalfar (Grieg); Serenade, Amina (Lincke); Wedding Serenade (Klose); Selection from Das Nachtlager von Granada (Kreutzer); March (Brase); Waltz, In lauschiger Nacht (Ziehrer); Die Post im Walde (Schäfer); March, Hell Hitler (Lachowski). 8.0, Time; News. 8.5, Local Review. 8.15, Variety Programme from Leipzig. 10.20, News. 10.35, Topical Talk. 10.45, Local News. 11.0, See Munich. 12 Midnight, Gramophone Concert. 1.0 a.m. (Sunday), Close Down.

FREDRIKSSTAD.—Relays Oslo. FREIBURG.—Relays Stuttgart. GENEVA.—Relays Sottens. GENOA.—Relays Milan. GLEIWITZ.—Relays Brestlau. GÖTEBORG.—Relays Stockholm. GRAZ.—Relays Vienna. HAMAR.—Relays Oslo.

HAMBURG

904 kc/s, 331.9 metres; 100 kW. Relayed by Bremen, Flensburg, and Hanover, 1,330 kc/s, 225.6 metres.—5.45 a.m., Time; Weather; Market Prices. 6.0, Gym. 6.15, Time; Weather. 6.20, See Königsberg. 7.0, Time; Weather; News. 7.10, See Königsberg. 8.0, Weather; Recipes for Housewives. 8.10, Announcements; Records. 10.50, News. 11.0, Schills Heldentod—Play (Dahms). 11.30, See Königsberg. In the interval, Market Report; Time; Weather and Shipping. 1.0 p.m., Exchange. 1.15, Weather. 1.20, Musical Programme. 2.15, News. 2.30, Records: Gallop. 3.0, Wireless Notes. 3.15, Exchange. 3.40, Shipping and Aviation Notes. 4.0, Concert by the Station Symphony Orchestra; Conductor, Eibenschütz. 5.30, Heinrich von Treitschke Memorial Programme. 6.0, Records. 6.35, Military Programme. 6.55, Weather. 7.0 (from Bremen), Concert of German Dance Songs by the Unterweser Quartet; Conductor, Renard. 7.30 (from Hanover), Concert by the Mandoline and Guitar Club; Conductor, Adam; March, Frank und frei (Kollman-

SEPT. 15th **SATURDAY** continued

eck); Paraphrase on Die Königskinder (Henze); Caprice for Mandoline (Kollinack); Volksliederranken (Wormsbacher). 8.0, News. 8.10, Variety: The Station Orchestra; Conductor, Secker; Soloists, Gertrud Schnitzer, Hans Marten-Hansen, Otto Stadelmaier and Herbert Taubert. 10.0, News. 10.20, Musical Programme. 11.0, Programme from Berlin (Funkstunde). 11.0 a.m. (Sunday), Close Down.

HANOVER.—Relays Hamburg.

HILVERSUM

160 kc/s, 1,875 metres; 7 kW. until 3.40 p.m. Transmitted on Kootwijk, 50 kW. from 3.40 p.m.—7.40 a.m., Programme of the Workers' Radio Society (V.A.R.A.): Records. 9.40, Religious Programme of the Liberal Protestant Radio Society (V.P.R.O.). 9.55 till Close Down, V.A.R.A. Programme. 9.55, A Revue on Records for Night Workers. 11.40, Concert by the V.A.R.A. Ensemble. Conductor, Bakels. 1.40 p.m., Interval. 1.55, Concert (contd.). 2.40, Records. 3.10, Film Review. 3.25, Interval. 3.40, Records. 4.10, Orchestral Concert. Conductor, Wins. 4.40, A Radio Report. 5.0, Concert (contd.). 5.40, Literary Talk. 6.0, Orchestral Concert. Conductor, v.d. Horst. Soloists, Booy (Songs). 7.10, Organ Recital by Jong. 7.40, S.O.S. Messages. 7.43, Press Review. 7.50, Records. 8.10, A Radio Film. 9.10, Concert by the V.A.R.A. Orchestra. Conductor, de Groot. 9.40, Recitations. 9.50, Press Review. 9.55, Concert (contd.).

HORBY.—Relays Stockholm.

HUIZEN

995 kc/s, 301.5 metres; 7 kW. (until 6.40 p.m.); 20 kW. from 6.40 p.m.). Programme of the Catholic Radio Society (K.R.O.).—7.40 a.m., Records. 8.55, Interval. 9.40, Records. 10.10, Concert. 10.40, Records. 11.10, Religious Address. 11.40, Police Notes. 11.55, Records; Pigeon-Flying Report. 1.25 p.m., Interval. 1.40, Programme for Young People. 2.10, Records. 2.40, Programme for Children. 3.40, Records. 4.20, Concert by the K.R.O. Orchestra; Conductor, Van 't Woud; Marschperlen (Blankenburg); Silver Clouds (Kettelbey); Skaters' Waltz (Waldteufel); Records; Comedy Overture (Kéler-Béla); Dance of the Merry Mascots (Kettelbey); Aus galanter Zeit (Klass); Caravane orientale (Scassola); Selection from Tosca (Puccini); Radetzky March (Strauss). 6.0, Press Review. 6.25, Concert by the K.R.O. Orchestra (contd.): Ballet Music from Ritter Fasman (Strauss). 6.40, Police Notes. 6.55, Talk. 7.15, Records. 7.25, Talk. 7.40, Concert by the K.R.O. Boys; Conductor, Lustenhower. 8.10, News. 8.15, Song Recital by Tan Hahn. 8.30, Records. 8.40, Concert by the K.R.O. Boys; Conductor, Lustenhower. In the interval from 9.10 to 9.25, Pianoforte Solos by Ricardo. 9.55, Song Recital by Jan Hahn. 10.10, News. 10.15, Pianoforte Solos by Ricardo. 10.30, Records. 11.40 (approx.), Close Down.

INNSBRUCK.—Relays Vienna.

KALUNDBORG

238 kc/s, 1,261 metres; 75 kW. Relayed by Copenhagen, 1,176 kc/s, 255.1 metres; and Skamlebaek, 49.5 metres.—7.0 a.m., Gym. 8.30, Cathedral Service. 11.0, Weather. 11.14, Fish Prices. 11.15 to 11.45, Geography for Schools. 12 Noon, Chimes; Weather. 12.5 p.m., Harald Andersen's String Ensemble from the Bellevue Strand Hotel. 2.0, Interval. 2.30, Classical Records. 3.0, Reading for Children. 3.30, Concert by Louis Prell's Instrumental Ensemble: Rocking Horses (Paull-Wolner); Waltz Intermzzo (Krome); Metropolitan (Bloom); Selection from Good News (Sylvia-Brown-Henderson); Czardas (Nicklass-Kemper); Curly (Powell); The Wedding of the Dragon-Fly (Barrow); Waltz (Richfield); Intermzzo (Kark); Negro Spirituals; Mexican Serenade (Lowitz-Kochotte); Waltz (Pozy); The red and blue Blues (Edwards); Fox-trot (Rawlez). In the interval at 4.20, Reading. 5.30, Exchange. 5.42, A Poem. 5.45, Talk: Bishop Monrad. 6.15, French Lesson. 6.45, Weather. 7.0, News. 7.15, Time. 7.16, Talk: Women in Parliament. 7.30, Talk: Danish Engineers Abroad. 8.0, Time. 8.1, Concert of Italian Music by the Radio Orchestra; Conductor, Fritz Mahler; Madrigals (Monteverdi Malipiero); Concerto grosso No. 11 in B flat (Corelli); Italian Songs and Dances of the Seventeenth Century (Respighi); Comedy Overture (Busoni). 8.40, Reading. 9.0, From Strauss to Lehár—Concert by the Radio Orchestra; Conductor, Fritz Mahler; Soloists, Marius Jacobsen (Tenor) and Else Brems (Soprano); Overture, Die Fledermaus (Joh. Strauss); Song from A Night in Venice (Joh. Strauss); March from Fatinitza (Suppé); Waltz from A Kiss in Spring (Kálmán); Overture, A Waltz Dream (Strauss); Duet from Paganini (Lehár); Waltz, Gold and Silver (Lehár). 9.45, News. 10.0, Billy Mayerl Pianoforte Music by Viktor Fischer. 10.15, Concert by the Radio Orchestra; Conductor, Fritz Mahler; Overture, Ruslan and Ludmilla (Glinka); Three Slav Dances (Dvorák); Mefistowalzer (Liszt); Hungarian Rhapsody No. 1 (Liszt). 11.0, Dance Music from the Nimb Restaurant by Jens Warny Dance Band. 12.15 a.m. (Sunday), Close Down.

KIEL.—Relays Hamburg. **KLAGENFURT**.—Relays Vienna.

KONIGSBERG

1,031 kc/s, 291 metres; 60 kW. Relayed by Danzig, 1,303 kc/s, 230.2 metres.—5.0 a.m., Records. 5.30, Weather. 6.0, Gym. 6.20, Band Concert; Conductor, Hennig. 7.0, News. 7.10, Concert (contd.). 8.0, Service. 8.30 to 9.0, Gym. for Women. 10.40, News. 10.55, Weather. 11.30, Concert by the Small Station Orchestra; Conductor, Wilcken. Weather in the interval. 1.0 p.m., Weather. 1.5, Records of German Music: Suite No. 2 in B Minor (Bach); Baritone Solos: (a) Heinrich der Vogler (Loewe), (b) Die beiden Grenadiere (Schumann); Overture, Idomeneo (Mozart); Strassburglied (Kienzl); Valse d'amour, Op. 130, No. 5 (Reger); Selection from Hansel and Gretel (Humperdinck); Overture, Prometheus (Beethoven); Baritone Songs (Ochs): (a) Die Düne, (b) Taufe auf der Nehrung; Aus deutschen Gauen (Christern). 2.30, Post Office Propaganda; Records. 3.0, Market Prices. 3.20, Talk for Women. 3.30, Programme for Children. 4.0, Concert by the Small Station Orchestra; Conductor, Wilcken; Road Report in the interval. 6.0, Talk: Television. 6.15, Market Prices. 6.20, Reading. 6.55, Eroica Variations with Fugue in E Flat, Op. 35 (Beethoven), by Prof. Ansoerg (Pianoforte). 7.30, Report from the Ruins of a Monastic Town in East Prussia. 8.0, News. 8.10 (from Danzig), Variety Programme; Conductor, Normann. 10.0, News. 10.30, Dance Music by the Erich Börschel Band. 12.30 a.m. (Sunday), Close Down.

KOSICE.—Relays Prague.

LAHTI

166 kc/s, 1,807 metres; 40 kW. Relayed by Helsinki, 895 kc/s, 335.2 metres.—7.5 a.m. to 7.20, Service in Swedish. 7.30 to 7.45, Service in Finnish. 11.0, Exchange. 11.5, Music. 11.30, Exchange. 11.45, News in Finnish and Swedish. 11.59, Time; Weather. 4.0 p.m., Records. 5.0, Dialogues. 5.30, Violin Recital by Viljo Nuotio: Souvenir (Drdla); Midnight Reflections (Malneck-Signonelli); Sicilian Serenade (Beccce); Capriccio (Annio); Mazurka (Nuotio). 5.50, News in Finnish. 5.59, Time; Weather. 6.10, News in Swedish. 6.15, Talk. 6.30, Sports Notes. 6.50, Song Recital. 7.10, Dynamittia—Play (Kahn). 7.50, Concert by the Station Orchestra; Overture, Die beiden Husaren (Doppler); Selection from Polenblut (Nedbal); Loreley-Paraphrase (Neavdaba); Melody (Merikanto); Polka (Kunila); Finnish Song (Saarenpää); March (Kajanus). 8.45, News in Finnish. 9.0, News in Swedish. 9.10, Dance Music by the Fred Kiias Band, relayed from the Grand Restaurant.

LAUSANNE.—Relays Sottens.

LEIPZIG

785 kc/s, 382.2 metres; 120 kW. Relayed by Dresden, 1,285 kc/s, 233.5 metres.—5.50 a.m., Notes for Farmers. 6.0, Gym. 6.25, See Brestau. 7.0, News. 7.15, See Brestau. 8.0, Gym. 8.20 to 9.0, Records. 9.40, Economic Notes. 9.45, Programme Notes. 9.55, Weather; Water Level. 11.0, Post Office Propaganda; Records. 11.30, News; Time. 11.40, Weather. 11.45, Programme for Farmers. 12 Noon, Concert by the EmDe Orchestra. In the interval at 1.0 p.m., News. 2.0, News; Exchange; Weather. 2.20, "The Brave Little Tailor"—Play for Children. 3.0, Review of the Week. 3.15, Review of Books on German Art. 3.40, Economic Notes; Weather; Time. 4.0, Concert by the Leipzig Symphony Orchestra. Conductor, Blumer. Soloists, Koderle (Baritone). Overture, Die Weine des Hauses (Beethoven); Songs: (a) In questa tomba oscura (Beethoven), (b) Vorrei morire, and (c) L'ultima canzone (Tosti); Overture, Scherzo and Finale (Schumann); Songs (Schubert): (a) Der Wegweiser, (b) Das Wirtshaus, (c) Wasserflut; Two Pieces from Aus Italien (Richard Strauss); Drei Wanderer—for Voice and Pianoforte (Hans Hermann); Dance (Debussy). 5.30, Talk: Books for Young People. 5.50, Talk: Bull-fighting in Barcelona. 6.10, A Modern Dictionary. 6.25, Concert of Operetta Music by the Station Orchestra. Conductor, Findeisen. March from Der Feldprediger (Müllcker); Overture, Les Cloches de Corneville (Planquette); Waltz from Das süsse Mädel (Reinhardt); Two Pieces from The Cousin from Nowhere (Künneke); Selection from Die Afrikareise (Suppé); Waltz from Die Puppe (Bayer); Selection from Der Vagabund (Zeller); Mazurka, Frauenhens (Jos. Strauss); Gallop, Flirt (Ziehrer); Lagunenwälder (Joh. Strauss); March, Halt dich fest (Stolz). 7.35, Talk: Charlemagne. 8.0, News. 8.10 to 12 Midnight (from Dresden), Variety Programme. In the interval from 10.20 to 10.50, News. 12 Midnight, Close Down.

LINZ.—Relays Vienna.

LUXEMBOURG

230 kc/s, 1,304 metres; 120 kW.—7.45 a.m., Records. 8.0, News in French; Record; News in German; Record. 12 Noon, Exchange.

12.5 p.m., Concert by the Station Orchestra. Conductor, Pensis: Overture, Phèdre (Masse-net); Kirschblüte (Albert); Selection from The Queen of Spades (Tchaikowsky); Du alter Stephansturm (Brandl). 12.30, News in French and German. 12.40, Concert (contd.): Faschingsuite (Schmalstich). 1.0, Exchange. 1.5, Concert (contd.): Invano (Amadei); Erotique (Grieg); Radetzky March (Strauss). 1.15, Records. 3.45, Exchange. 6.30 till Close Down, French Evening. 6.30, Variety Concert. 7.30, Racing Results; Exchange. 7.35, Song Recital by Faniard. 8.0, News in French and German. 8.20, French Concert by the Station Orchestra; Conductor, Pensis: Prelude to Faust (Gounod); Ballet Music from Isoline (Messager); Danse le Jardin (Debussy); Mélancolie en Barque (Bernard); Sur le lac (Godard). 9.0, Economic and Social Notes. 9.5, Concert (contd.): Suite de Danse (Pierné); España (Chabrier). 9.30, Variety Programme. 10.30, Dance Records.

MADRID

EAJ7, 1,095 kc/s, 274 metres; 7 kW.—9.0 a.m., News. 10.0, Exchange; Announcements. 10.30, Interval. 2.0 p.m., Chimes; Weather; Light Music; Talk. 2.30, Suite (Grieg) by the Radio Sextet. 3.0, Amusement Guide; Exchange; Light Music. 3.30, Sextet Concert: Rhapsody (Marie-Ourdine); Selection from The Mastersingers (Wagner). 4.0, Light Music. 4.15, Sextet Concert: Habanera (Chapelier); Mandolinata (Soller); Selection from La verbena de la Paloma (Bretón). 4.40, News; Film Review. 5.0, Interval. 6.0, Chimes; Light Music. 7.0, Announcements. 7.5 (approx.), Concert; Part 1—Music by an Orchestra of Spanish Instruments: Cádiz (Albéniz); Estudiantina (Turina); Selection from El Señor Joaquín (Caballero); Pavane (Morena-Torroba); Selection from Egua, azucarillos y aguardiente (Chueca); Jota (Soutullo). Part 2—Musical Comedy and Operetta Music: Selection from El hermano lobo (Penella); Ball at the Savoy (Abraham); El mal des Amores (Serrano); Paganini (Lehár); and La mala sombra (Serrano); Sarasate Violin Recital. 8.30, News. 8.35, (approx.), Concert; Part 1—Opera Arias: Arias from Manon (Masse-net), Norma (Bellini), Tosca (Puccini), The Force of Destiny (Verdi), The Flying Dutchman (Wagner), and Lohengrin (Wagner). Part 2—Orchestral Concert: March, El Capitan (Souza); Serenade (Wolkman); The Flight of the Bumble Bee (Rimsky-Korsakov); Ballet Music from The Three Corners Hat (Falla); Ballet Music from Rosamunde (Schubert); Selection from Lohengrin (Wagner); Piece (Hahn); Dance (Turina); Ay, Ay, Ay (Freire). 9.50, Sports and Bullfighting Notes. 10.0, Chimes; Time. 10.5 (approx.), A Musical Comedy; Station Orchestra and Soloists; Conductor, Cantos. In the interval at 11.0, News. 12.45 a.m. (Sunday), News; Time. 1.0 a.m., Chimes and Close Down.

MADRID

EAQ, 10,000 kc/s, 20 metres; 20 kW.—7.0 to 9.0 p.m., Programme for the Canary Islands, Guinea and Europe. 7.0, Popular Music. 8.15, Talk. 8.30, Light Music. 11.15, News. 11.30, Spanish Music. 11.45, News. 12 Midnight, Concert of Spanish Music. 12.45 a.m. (Sunday), Light Music. 1.0 to 1.30, Programme in English, arranged by the International Broadcasting Company of London; On the Shores of the Mediterranean. 1.30, I.B.C. Goodnight Melody and Close Down.

MALMO.—Relays Stockholm.

MILAN

814 kc/s, 368.5 metres; 50 kW. Relayed by Turin, 1,140 kc/s, 263.2 metres; Genoa, 986 kc/s, 304.3 metres; and Florence, 610 kc/s, 491.8 metres.—7.30 a.m., Gym. 7.45 to 8.0, Time; News; Market Prices. 11.30, Records. 12.45 p.m., News. 1.0, Time; Announcements. 1.5 to 2.15, Concert by the Chesl-Zanardelli-Cassone Trio. In the interval from 1.30 to 1.45, Records. 4.35, News. 4.45, Programme for Children. 5.0; Talk for Women. 5.10, Dance Music. 5.55, Weather. 6.0 to 6.10, Programme for Farmers; Lottery Results. 7.0, Tourist Report; Dopolavoro Notes. 7.15, News in Foreign Languages. 8.0, Time; News; Records. 8.30, Sports Talk. 9.0, Concert. Talk and News in the intervals. News after the Programme.

MONTE CENERI

1,167 kc/s, 257.1 metres; 15 kW.—12 Noon, Announcements. 12.5 p.m., Concert by the Radio Orchestra: Overture, Le Maçon (Auber); Selection from Le Tribut de Zamora (Gounod); Prelude to I Rantzau (Mascagni). 12.29, Time; Weather. 12.33, Concert by the Radio Orchestra (contd.): Joseph Strauss Potpourri (Fetras); Arab Song (Humphries); Intermzzo, Anita (Siede). 1.5, Records. 1.30, Automobile Club Report. 1.50, Talk for Housewives. 2.0, Interval. 3.59, Time. 4.0, Violin Duets by Prof. Keller and Luigi Gay des Combes;

Serenade No. 1, Op. 23 (Viotti); Duetto concertante No. 3 (de Bériot). 4.30, Records of Dances: Tarantella, Fidanziati (Galaverni); Waltz, Sempre allegri (Ferruzzi); Mazurka, Vieni a danzar (Brunelli); Polka, Tita (Ferruzzi); Waltz, Il girovago (Buzzi); Polka L'orso e la volpe (Galaverni); Tarantella delle rose (Galaverni); Polka, Scacciapensieri (Ferruzzi); Polka, Chiarina (Del Pistoia); Gallop, Precipizio (Galaverni). 4.45, Records of Galli-Curci: Aria from La Traviata (Verdi); Aria from L'Etoile du Nord (Meyerbeer); Aria from Rigoletto (Verdi). 5.0, Concert from the Kursaal, Lugano: Overture, Les Dragons de Villars (Maillart); Two Dances; Barcarolle from Silvano (Mascagni); Two Dances; Dance of the Waves, from Loreley (Catalani); Two Dances. 5.30, Programme for Children. 6.0, Interval. 7.45, News. 8.0, Dances. 8.30, Fantaisias and Potpourris. 9.30, Songs. 10.0, Talk: Reminiscences of an Alpinist. 10.15, Dance Music from the Cecl Casino, Lugano. 11.0 (approx.), Close Down.

MORAVSKA-OSTRAVA

1,158 kc/s, 259.1 metres; 11.2 kW.—6.10 a.m., See Prague. 7.15, Interval. 9.50, See Prague. 10.30, Band Concert. 11.0, See Prague. 12.30 p.m., Concert by the Station Orchestra; Conductor, Divis: Selection from The Geisha (Jones); Waltz, Traumdeale (Fucik); Piece (Friml); Mazurka from Polenblut (Nedbal); Joh. Strauss Potpourri; Scherzando (Aust); Polka (Fucik); March (Kostal). 1.30, See Prague. 2.0, Interval. 3.15 to 4.15, See Prague. 4.40, See Brno. 5.40, Records. 5.50, Topical Talk. 6.0, Local News. 6.5, Record. 6.10, Folk Songs and Dances by a Village Band. 6.55, See Prague. 7.10, Accordion Recital by Bláha; Mazurka (Simicek); Overture, The Caliph of Bagdad (Boieldieu); Waltz, Wiener Praterleben (Translatour); Polka (Vacek). 7.30, See Prague. 7.45, See Bratislava. 8.45, See Prague. 9.30, Choral Concert of Popular Songs. 10.0 to 11.30, See Prague. 11.30 (approx.), Close Down.

MOSCOW (No. 1)

174 kc/s, 1,724 metres; 500 kW.—5.0 a.m., News. 5.15, Fanfare. 5.45, Gym. 6.15, Musical and Dramatic Programme; Report. 8.15, Programme for Children. 9.0, Musical Programme. 9.58, Time. 10.0, News. 10.15, Concert of Caucasian and Armenian Music. 3.0 p.m., Announcements. 3.15, Recitations for Children. 3.58, Time. 4.0, News. 4.30, Communist Party Programme. 5.30, Red Army Programme. 6.30, Programme for Collective Farm Workers. 8.0, Orchestral Concert. 9.0, German Programme: (a) Talk: The Peasant Problem, (b) Sports Notes. 9.55, Chimes. 10.5, French Programme: Review of the Week; Letterbox; Sports Notes. 11.5, Spanish Programme: Review of the Week; Letterbox.

MOTALA.—Relays Stockholm. **MUM LACKER**.—See Stuttgart.

MUNICH

740 kc/s, 405.4 metres; 100 kW. Relayed by Augsburg and Nürnberg, 1,267 kc/s, 236.8 metres; and Kaiserslautern, 1,195 kc/s, 251.5 metres.—6.30 a.m., Gym. 6.45, Hymn; Records. 7.15, Time; Weather; News. 7.25, Concert from Stuttgart. 10.40, Market Prices. 10.50, Market Report. 11.0, Talk: Harvest Thanksgiving Day. 11.25, Time; Weather; News. 11.30, Post Office Propaganda; Records. 12 Noon, Orchestral Concert; Conductor, Erich Kloss: Overture, Nakiris Hochzeit (Lincke); Two Pieces (Gade): (a) Rosemarie's Serenade, (b) The Blue Grotto; Hungarian Fantasia, Pannonia (Leopold); Waltz, Je t'aime (Waldteufel); Steig in die Gondel ein (Nütli); Florentine Song (Raffaelli); Flute Solo: Bird Song (Popp); Kubelik Serenade (Drdla). 1.15 p.m., Time; Weather; Market Prices. 1.25, Records: March; Overture, Martha (Flotow); Waltz, Les Sirènes (Waldteufel); Song, Wenn einer Liebe spürt (Künneke); Potpourri, Rheinfreuden (Strasser); Song, An der Weser (Pressel); Pizzicato Polka (Strauss); March (Meissner). 2.0, News; Sports Notes; Exchange. 2.20, Play for Young People. 2.45 (from Nürnberg), Chess Lesson. 3.15, Reading. 3.35, Weather; Market Prices. 3.50, Labour Market Report. 4.0 (from Augsburg), Concert by the Augsburg Concert Orchestra; Conductor, Schmidt-Breston: Overture, A Night in Venice (Strauss); Selection from Madame Butterfly (Puccini); Two Pieces (Grieg): (a) Morning, (b) Anitra's Dance; Potpourri, Von Wien durch die Welt (Hruby); Overture, Die schöne Galathee (Suppé); Selection from The Bird Fancier (Zeller); Waltz Intermzzo, Tanzausch (Schmalstich); March, Deutschlands Ruhm. 5.30, Talk: Adolf Oberländer. 5.50, Sonatas for Two Violins, 'Cello and Harpsichord (Corelli and Rosenmüller). 6.10 (from Nürnberg), Programme for Girls. 6.30, Book Review. 6.50, Wireless Notes. 7.0, Concert of Favourite Old Dances by the Station Orchestra; Conductor, List. 8.0, News. 8.10, The Anti-Rheumatism Campaign—Thirtieth Anniversary Festival of the Anti-Rheumatism League; Part I—Committee Meeting (on Records); Part II—Concert in the Market Square; Part III—Festival Concert: Prologue, Recital on Two Pianofortes and Songs, followed by The Witch of Burg Rabenhorst—Play (Warzenstetter). 10.0, News. 10.20, Programme to be announced. 11.0, Concert by the Small Station

Orchestra; Conductor, Kloss. 12 Midnight, Close Down.

NAPLES.—Relays Rome. NOTODDEN.—Relays Oslo.

OSLO

260 kc/s, 1,454 metres; 60 kW. Relayed by Mamar, 519 kc/s, 578 metres; and Jeloy, 699 kc/s, 42.92 metres.—11.15 a.m., Service. 11.50, Exchange. 12.55 p.m., Time. 1.0 to 2.0, Records; in the intervals, at 1.15, Weather; Report for Farmers, and, at 1.45, Exchange. 5.0, Concert of Light Music. 6.0, Programme for Children. 6.45, Talk: Economy. 7.0, Announcements. 7.15, Weather; News. 7.30, Time. 7.31, Popular Norwegian Music relayed from Bergen, 850 kc/s (352.9 m.). 7.45, Popular Norwegian Music. 8.0, Richard Nordraak—Play (Duo).

OSTERSUND.—Relays Stockholm.

PARIS

POSTE PARISIEN, 959 kc/s, 312.8 metres; 100 kW.—7.10 a.m., Fanfare. 7.15, Records. In the intervals at 7.30 and 8.30, News. 8.45, Cookery Hints. 12 Noon, Exchange. 12.5 p.m., Operetta Records. Selection from (a) Rip Van Winkle (Planquette), (b) Véronique (Messager-Tuvan); Air from Le jour et la nuit (Lecocq). 12.25, News. 12.35, Records. 1.5, Exchange. 1.15, Concert by the Station Orchestra. Overture, Le roi l'a dit (Delibes); Serenade (Widor); Ballet Music from Romeo and Juliet (Gounod); En sourdine (Offenbach); Selection from La belle Héloïse (Offenbach); Piece (Albéniz); Kaiser-Walzer (Joh. Strauss). 2.0, Interval. 4.50, Exchange. 6.45, Exchange. 6.49, Records: Air from The Damnation of Faust (Berlioz); Cavatina from Romeo and Juliet (Gounod); Aria from La Traviata (Verdi). 7.10 (approx.), Talk and News. 7.30, Orchestral Concert of Neapolitan Music. Soloist, Schipa (Songs). 8.0, Interval. 8.10, Talk: The Event of the Week. 8.20, Concert. 8.50, Interval. 9.0, Dance Music by the Station Jazz Band. 10.20, News. 10.30 till Close Down, Programme in English arranged by the International Broadcasting Company of London. 10.30, Instrumental Concert. 11.0, I.B.C. Goodnight, Melody and Close Down.

PARIS

RADIO-PARIS, 182 kc/s, 1,648 metres; 75 kW.—6.45 a.m., Gym. 7.0, Records. 7.15, News; Weather. 7.45, Gym. 8.0, Records. 10.15, Concert, relayed from Vichy. 12 Noon, Symphony Concert; Conductor, Letombe; Extracete (Letombe); Overture, William Tell (Rossini); Dance (Razigade); Selection from La Petite Fonctionnaire (Messager); Arabesque No. 1 (Debussy); Peer Gynt Suite, No. 2 (Grieg); Suite of Waltzes (Metra); Symphonic Poem, Phaeton (Saint-Saëns); Hungarian Serenade (Joncières); Overture, Patrie (Bizet); Ballet Music from the Queen of Sheba (Gounod); Carnival Suite (Thomé); Doll's Wedding March (Lecocq); Overture, The Caliph of Bagdad (Boieldieu); Entry of the Gladiators (Fucik). 3.0, Programme for Children. 6.20, Weather; Talk for Farmers; Racing Results. 6.50, Talk: The Fur Industry. 7.0, Science Talk. 7.20, Latin Press Review. 7.30, Topical Talk. 8.0, La Princesse de Trebizonde—Operetta (Offenbach). In the interval at 8.30, News; Weather; and at 9.15 (approx.), News; Talk. 10.30, Dance Music.

PITTSBURGH

KDKA, 980 kc/s, 306 metres; 50 kW. Relayed by W8XX on 48.86 metres, 25.27 metres.—3.0 p.m., Edward MacHugh. 3.15, KDKA Home Forum. 3.30, Singing Strings. 3.45, News; Originalities. 4.0, Bobby and Sue—Helen Irwin. 4.15, KDKA Kiddies' Klub. 5.0, Field and Hall. 5.15, Genia Fomanova. 5.30, Vic and Sade. 6.0, Words and Music. 6.15, Songfellows. 6.30, Farm and Home Hour. 7.30, Royal Hawaiian Orchestra. 8.0, Tommy Tucker's Orchestra. 9.15, Platt and Nierman. 9.30, Chicago Symphony Orchestra. 10.30, A Recreo—Bill and Alex. 10.45, Orphan Annie. 11.0, Time; Temperature; Weather. 11.15, Goodrich Baseball Résumé. 11.30, Twenty Fingers Harmony. 11.45, John Herrick (Baritone). 12 Midnight, Stanley Metcalfe; News. 12.15 a.m. (Sunday), Al Williams. 12.30, Hotel William Penn Orchestra. 1.0 to 6.0, Popular Programme.

PORSGRUND.—Relays Oslo.

PRAGUE

638 kc/s, 470.2 metres; 120 kW.—6.0 a.m., Time; Gym.; Music; News. 7.15, Interval. 9.50, News. 10.5, News in German. 10.10, Records. 10.30, See Moravská-Ostrava. 11.0, Records. 12 Noon, Time; Notes for Farmers. 12.10 p.m., Records. 12.20, News. 12.30, See Moravská-Ostrava. 1.30, Talk for Workers. 1.40, Records. 1.50, Exchange. 1.55, Exchange and Weather in German. 2.0, Interval. 3.15, Military Band Concert; Conductor: Pesta; Florentine March (Fucik); Overture (Pesta); Selection from I Pagliacci (Leoncavallo); Potpourri (Skroup); Torch Dance (Meyerbeer); Czech Song and Dance Potpourri (Händl). 4.40, See Brno. 5.40, Notes for Housewives. 5.45, Record. 5.50, Notes for Farmers. 5.55, Record. 6.0, Talk for Workers. 6.10, Record. 6.15, German Transmission: Talk: Pianoforte Recital by Langer; Prelude (Finke); Polonaise in E (Liszt). 6.55, News in German. 7.0, Time; News. 7.10, Concert by the Maudr Bagpipe Trio. 7.30, Talk: Young

People and the Theatre. 7.45, See Bratislava. 8.45, Brass Band Concert: March (Obruca); Polka (Ecker); Waltz from The Merry Widow (Lehár); Polka (Mlaha); Mazurka (Dufek); Potpourri (Blecha); Piece (Ilmann); Polka (Ondracek); March (Kovarik). 9.30, Dance Records. 10.0, Tim; News. 10.15, Records. 10.30, Variety Concert: A Horn Quartet; Station Orchestra; Accordion Duo and Soloists. 11.30 (approx.), Close Down.

REYKJAVIK

208 kc/s, 1,442 metres; 16 kW.—12 Noon, Weather. 2.15 p.m., Popular Programme. 5.0, Weather. 9.10, Weather. 9.25, Musical Programme. 9.50, Announcements. 10.0, Time Signal; Concert by the Station Trio. 10.30, Reading. 11.0, News. 11.30, Records of Icelandic Male Voice Choirs; Dance Music. 2.0 a.m. (Sunday), Close Down.

RJUKAN.—Relays Oslo.

ROME

CALL 1RO, 713 kc/s, 420.8 metres; 50 kW. Relayed by Naples, 1,104 kc/s, 271.7 metres; Milan No. 2, 1,348 kc/s, 222.6 metres; Turin No. 2, 1,357 kc/s, 221.1 metres, and 2RO, 11,810 kc/s, 25.4 metres.—7.30 a.m., Gym. 7.45 to 8.0, Time; News; Market Prices; Weather. 12.30 p.m., Records. 1.5 to 2.15 p.m., Records of Light Music. In the interval from 1.30 to 1.45, Time; News. 4.30, Children's Radio Review. 4.55, News; Exchange; Lottery Results. 5.10, Song and Pianoforte Recital: Nino Mazziotti (Tenor), Carlo Platania (Baritone); Elvi Lacorini (Soprano) and Renata Sabatelli (Pianoforte); Pianoforte: (a) Siciliana (Zipoli); (b) Toccata (Paradisi); Duets from Dafni (Mulè) and La Bohème (Puccini); Soprano. (a) Desio di voli (Zanella); (b) Aria from Hérodiade (Massenet); Pianoforte: (a) Serenade (Borodin); (b) Carillon (Liadov); Baritone Aria from Dinorah (Meyerbeer); Duet from The Force of Destiny (Verdi); Soprano: Aria from Der Freischütz (Weber). 5.55, Weather. 6.0 to 6.10, Wheat Market Prices. 7.0 to 7.15, Tourist Report: Report of the Royal Geographical Society; Dopplavoro Notes. 8.0, Time; News; Sports Notes. 8.10, Records. 8.30, Government Announcements. 8.45—Variety Concert, followed by Dance Music from the Royal Hotel, Naples. 12 Midnight, Close Down.

RUYSSLEDE

10,330 kc/s, 29.04 metres; 8 kW.—7.45 p.m., News in French. 8.0, See Brussels No. 1. 8.54 Records. 9.0, News in Flemish. 9.15 (approx.), Close Down.

SALZBURG.—Relays Vienna.

SCHENECTADY

WGY, 790 kc/s, 379.5 metres; 50 kW. Relayed at intervals by W2KAF on 31.48 metres and on 19.56 metres.—7.0 p.m., Paul Whiteman and his Orchestra. 7.30, Week-end Revue; Variety Programme. 11.45, Exchange. 12 Midnight, General Electric Programme. 12.30 a.m. (Sunday), Hands Across the Border. 1.0 to 3.0, Popular Programme.

SOTTENS

677 kc/s, 443.1 metres; 25 kW.; and Geneva, 401 kc/s, 748 metres.—6.0 to 6.15 a.m., Gym. 12.20 p.m., Time. 12.30, News in French and German. 12.45 (from Geneva), Records. 1.0 (from Geneva), Exchange. 1.5 (from Geneva), Records. 1.30, Programme for the Chamber of Commerce Festival; Songs and Dances by Massed Choirs and Soloists. 4.0, See Monte Generi. 6.0 to 7.30, See Beromünster. 7.30 (from Geneva), Wireless Station. 7.59, Weather. 8.0, Concert by the Station Orchestra. Conductor: Echenard; Part I—Light Music: Part II—Modern Music; Suite, Zauberspiegel (Gall); Ballet Music (Hindemith). 9.0, News in French and German. 9.15 (from Geneva), Cabaret. 10.10 (from Geneva), Talk: The Work of the League of Nations. 10.30, Close Down.

STOCKHOLM

704 kc/s, 426.1 metres; 55 kW.—Relayed by Boden, and Östersund, 413.5 kc/s, 726 metres; Göteborg, 941 kc/s, 318.8 metres; Hörby, 1,131 kc/s, 265.3 metres; Motala, 216 kc/s, 1,389 metres; and Sundsvall, 601 kc/s, 499.2 metres.—7.20 a.m., Gym. 7.45, Service. 8.0, Weather. 12.30 p.m., Weather. 12.45, Exchange. 12.55, Time. 2.0, Records: Violin Concerto in E minor, Op. 64 (Mendelssohn); Moment musical in F minor (Schubert); Impromptu in B flat (Schubert); Träumerei (Schumann); Aria from Der Freischütz (Weber); Overture, Euryanthe (Weber). 3.0 (from Sundsvall) Reading. 3.20, Recital by Erik Arnbom (Oboe) and Ludwig Warszewski (Clarinet); Oboe Solos: (a) Nocturne Rösel; (b) March from Scènes écossaises (Godard); Adagio and Rondo from the Clarinet Concerto in A (Mozart). 3.45, Talk. 4.0 (from Göteborg), Light Music by the Asti Orchestra. 5.0, Weather. 5.5, Programme for Children. 5.45, Records. 6.35, Variety Programme. 7.15, News. 7.30, Con-

cert of Operetta Music by the Station Orchestra; Conductor, Herbert Sandberg; Soloists, Inez Köhler and Ragnar Hultén (Songs); Selection from Venus auf dem Erde (Lincke); Selection from The Dollar Princess (Fall); Two Songs (Blech); March from The Circus Princess (Kálmán); Songs from The Duchess of Chicago (Kálmán); March from The Three Musketeers (Riesenthal-Benatzky). Song from The Czarevitch (Lehár); Waltz (O. Straus); Two Songs from The Geisha (Jones); March from Boccaccio (Suppé). 8.45, Talk: The Macedonian Frontier. 9.15, Old Dance Music by the Skarup Wind Band. 9.45, News. 10.0, Children's Day Ball relayed from the Town Hall. 12 Midnight, Close Down.

STRASBOURG

859 kc/s, 349.2 metres; 15 kW.—10.30 a.m., Concert, relayed from Marseilles, 749 kc/s, 400.5 metres. 12 Noon, Records. 12.45 p.m., News. 1.0, Time; Records; Announcements. 1.15, Concert, relayed from Lyons la Doua. 2.0, Records. 2.45 to 3.0, Music Talk: Jean-Marie Leclair. 3.30, Concert from Vichy. 4.45, Talk: The Emancipation of the Jews in France. 5.0, Concert by the Station Orchestra; Conductor, de Villers; Soloist, Jean Hazart (Songs); Extracts from Castor et Pollux (Rameau); Fantasia on Two Popular Themes (Bretagne); Carnaval d'Athènes (Bourgault-Ducoudray); Voice and Orchestra: La terre de France (Hussonmorel); Persian Dance (Gross). 6.0, French Lesson. 6.15, Talk: Fruit-growing. 6.30, Tourist Talk. 6.45, Concert of Light Music; Conductor, Roskam; Soloist, Jean Weber (Saxophone); Overture, Zampa (Hérold); Waltz, O Frühling wie bist du so schön (Lincke); Foxtrot (Kudritzki and Kirchstein); Selection from Cocorico (Ganne); Tango (Romberg); Intermezzo, Polopole (Fetras); Saxophone Solo; Slow Foxtrot, Lonely Lane (Kahal and Fain); March (Mélina). 7.30, Time; News. 7.45, Announcements. 8.0, Press Review in German; Lottery Results; Announcements. 8.30, Military Band and Choral Concert, relayed from Verdun; Conductor, Semler-Collely; Soloist, Terrail (Songs); Alsace-Lorraine (Tayoux-Chassaing); Coronation March (Tchaikovsky); Symphony No. 1 (Fauquet); Soloist and Choir: (a) Marche des aventuriers, (b) Auprès de ma blonde, (c) Dis-moi quel est ton pays; Selection from Werther (Massenet); March, Orient et Occident (Saint-Saëns); Marche Consulaire à Marengo (Fungott). In the interval at 9.25 (approx.), Talk. 10.30, News. 10.40, Dance Music from the Caveau de l'Aubette. 12 Midnight (approx.), Close Down.

STUTTGART

MUHLACKER, 574 kc/s, 522.6 metres; 100 kW.—5.35 a.m., Talk for Farmers. 5.45, Hymn; Time; Weather. 5.50, Gym. 6.15, Concert by the Philharmonic Orchestra from Karlsruhe; Conductor, Zehn. 6.40, Time; News; Weather. 6.55, Concert from Karlsruhe (contd.). 8.10, Weather; Water Level. 8.15, Gym. 8.35, Interval. 10.0, News. 10.10, Recital of Songs and Ballads by Karl Hauser (Baritone). 11.0, Music from the Mountains—Records. 11.25, Post Office Propaganda; Records. 11.55, Weather. 12 Noon, See Leipzig. 1.0 p.m., See Frankfurt. 1.5, Local News. 1.20, Records; Am Sonntag (Björke); Ich freu mich so aufs Wochenende (Rathke); Waltz, Du und Du (Strauss); In die weite Welt; Potpourri, Aus Winkeln und Gassen (Haunemann); Kasperles Wochenende (Flamm); Gallop, Posthorn (König); March (Jörns). 1.50, Time; News. 2.0, Records of Swabian, Bavarian and Swiss Music; Potpourri of Swabian Folk Music (Esterl); Bavarian Folk Dances; Swiss Folk Song; Swabian Peasant Dance; Bayrisch-Zell (Staudacher); Folk Song, Der Schweizer Kubreiger; Schweizer Schützengilde (Zimmer). 2.30, Der Wildtöter—A Radio Play for Young People (Kautz). 3.10, Morse Lesson. 3.30, The Ring of Dykes—a Sequence about Friesland (Carls). 4.0, See Berlin (Funkstunde). 5.30, Modern Music—Recital by Maria Degischer (Soprano), Anton Maria Topitz (Harmonium and Pianoforte) and Otto Hohn (Violin); Three Songs for Soprano, Violin and Organ (Wilhelm Jerger): (a) Es blüht den Engeln wohl bekannt, (b) Mutter Christi, hoch erhoben, (c) Ave Maria; Five Songs to Text by Storm (Walter Reichl): (a) Im Volkston, (b) Lied des Harfenmädchens, (c) Trost, (d) Nachts, (e) Reisetag. 6.0, See Frankfurt. 6.20, Dance Music. 7.0, Ein Mann muss wieder lachen—Play (Hofmeier). 8.0, News. 8.5, See Frankfurt. 8.15, Variety Programme from Esslingen. 10.20, News. 10.35, Talk: Germany's Rowing Championship. Prospects. 10.50, Local News; Weather; Sports Notes. 11.0, See Munich. 12 Midnight to 1.0 a.m. (Sunday), See Frankfurt. 1.0 a.m., Close Down.

SUNDSVALL.—Relays Stockholm.

TOULOUSE

913 kc/s, 328.6 metres; 10 kW.—8.0 a.m., Dance Refrains. 8.30, News. 8.35, Chanson-

nettes; Accordion Solos. 12 Noon, Military Music. 12.15 p.m., Opera Arias. 12.30, News. 12.45, Request Music. 1.0, News. 1.5, Orchestral Music. 1.15, Operetta Arias. 1.30, Orchestral Music: March from Suite No. 2 (Stravinsky); Suite from Cydalise et le Chevre-pied (Pierné); Scene from Isolde (Messager); Ronde villageoise (Chabrier). 1.45, Songs. 2.0, News. 6.0, News. 6.15, Orchestral Music: Selection from Eva (Lehár); Tell me to-night (Spoliansky); Waltz from The Merry Widow (Lehár); Hungarian Dance (Berney); Czardas (Kun). 6.30, Opera Arias. 6.45, Operetta Music. 7.0, Songs. 7.15, Orchestral Music. 7.30, News. 7.45, Hunting Horn Music. 7.50, Talk. 8.15, Harp Recital: Arabesque No. 1 (Debussy); Marguerite douloureuse au rouet (Zabel); The Prophet Bird (Schumann); Follets (Hasselmann); Spring Song (Mendelssohn). 8.30, Chansonnettes. 9.0, Concert Version of The Dubarry—Operetta (Millocker-Mackeben). 10.0, Sound Film Music. 10.15, News. 10.30, Orchestral Music. 11.0, Request Music. 11.15, Hawaiian Guitar Music. 11.30, Operetta Music; Folk Music. 12 Midnight, News. 12.5 a.m. (Sunday), Au caveau de minuit—a Radio Fantasy. 12.15, Operetta Music: Selection from Pas sur la bouche (Yvain) and The Dollar Princess (Fall). 12.30 (approx.), Close Down.

TRONDHEIM.—Relays Oslo. TURIN.—Relays Milan.

VATICAN CITY

15,120 kc/s, 19.84 metres; 10 kW. (Morning); 5,970 kc/s, 50.26 metres (Evening).—11.0 to 11.15 a.m., Religious Information in Various Languages. 8.0 to 8.15 p.m., Religious Information in Italian.

VIENNA

592 kc/s, 506.8 metres; 120 kW. Relayed by Graz, 886 kc/s, 338.6 metres; Innsbruck, 519 kc/s, 578 metres; Klagenfurt, Linz and Salzburg, 1,294 kc/s, 231.8 metres.—9.0 a.m., News. 10.50, Water Level; Weather. 11.30, Talk for Women. 11.55, Weather. 12 Noon, Records. 1.0 p.m., Time; News. 1.10, Records: Potpourri, Alpenstrüßchen (Rosenkranz); Hungarian Melodies; Fanny (Frim); In a Monastery Garden (Ketybek); Two Songs from Die gelbe Lilie (Farkas-Kraus); Two Songs from Frasnuta (Lehár); March Potpourri (Komzak). 2.0, Announcements. 2.10, Records: Prayer from Rienzi (Wagner); Largo (Handel); Gavotte (Gosse-Burmester); Aria from Martha (Flotow); Wiener nacht (Joh. Strauss-Grünfeld). 2.30, Interval. 3.30, Time; Weather; Exchange. 3.45, Talk in English: Celtic Art in the British Isles. 4.10, News. 4.15, Humorous Sketches of Vienna. 4.35, Concert by the Minich Zither Quartet: Pötzleinsdorferin (Schrammel); Der Tauba (Lechner); Hobomoko (Reves); Alpenstimmen aus Oesterreich (Weinwurm); Heinkelmannchens Hochzeit (Kepping); Das Lied vom Regenbogen (Reindel); Galanterie (Bertl); March (Mayer). 5.5, Orchestra Concert; Conductor, Ganglberger. 6.20, Talk: Touring through Greece. 6.45, Time; News. 7.0, Manon—Opera in Four Acts (Massenet), relayed from the Opera House. 10.0, News. 10.20, Concert by the Vienna Symphony Orchestra; Soloist, Rosner (Violin); Conductor, Holzer; Overture, The Land of Smiles (Lehár); Violin Solo; Canzonetta (Godard); Silhouette (Neumann); Joseph Strauss Potpourri (Fetras); March (Chmel); Selection from The Dollar Princess (Fall); Leb' wohl, mein Junge (Engel-Berger); Indigo (Stefanides); Waltz (Ivanovic); Berceuse (Silving); Old Viennese Serenade (Silving); Potpourri (Bednarz). 11.45, Dance Music. 1.0 a.m. (Sunday), Close Down.

WARSAW

223 kc/s, 1,345 metres; 120 kW.—6.45 a.m., Hymn. 6.45, Records. 6.58, Gym. 7.8, Records. 7.15, News. 7.25, Records. 7.35, Hints for Housewives. 7.40, Announcements. 7.50, Advertising Notes; Music. 8.0, Interval. 11.57, Time. 12 Noon, Fanfare from St. Mary's Church, Cracow. 12.3 p.m., Weather. 12.5, Press Review. 12.10, Light Music by the Grossman Ensemble. 1.0, News. 1.5, Overture, Romeo and Juliet (Tchaikovsky), on Records. 1.30, Interval. 3.30, News. 3.35, Exchange. 3.45, Records. 4.30, Programme for Children from Lwów, 795 kc/s, 377.4 metres. 5.0, Violin and Pianoforte Recital by Kochanski and Lefeld: Sonata (Maszynski); Sonata (Szymanowski). 5.50, Talk. 6.0, Talk for Farmers from Wino, 536 kc/s, 559.7 metres. 6.10, Art Notes. 6.15, Humorous Programme from Lwów. 6.45, Announcements. 7.0, Dance Music by Olga Lada (Songs) and Altenberg and Rybczynski (Two Pianofortes). 7.20, Talk from Lwów. 7.30, Records of Albert Sandler (Violin). 7.45, Announcements. 7.50, Sports Notes. 8.0, Report of the International Challenge Cup Race from Mokotow Air Port. 8.30, Songs by Fogg. 8.45, News. 8.55, Topical Talk. 9.0, Pianoforte Recital, Sofia Rabecwicz. Chorale No. 2 in E (Bach-Busoni); Sonata in E, Op. 109 (Beethoven); Isolda's Death from Tristan and Isolda (Wagner-Liszt); Fire Mazic from The Valkyrie (Wagner-Brassin). 9.45, Reading. 10.0, Advertising Notes; Music. 10.15, Dance Music from Café Adria. 11.0, Weather; Aviation Notes. 11.5, A Sketch. 11.35, Records of Light Music and Dance Music. 12 Midnight, Dance Music from Café Adria.

ZURICH.—Relays Beromünster.

PRINCIPAL BROADCASTING STATIONS OF EUROPE

Arranged in Order of Frequency and Wavelength

(Stations with an aerial power of 50 kW. and above in heavy type)

Station.	kc/s.	Tuning Positions.	Metres.	kW.	Station.	kc/s.	Tuning Positions.	Metres.	kW.
Kaunas (Lithuania)	155		1935	7	Strasbourg, P.T.T. (France)	859		349.2	15
Brasov (Romania)	160		1875	20	Poznan (Poland)	868		345.6	16
Hilversum (Holland). (<i>Kootwijk, 50 kW. after 3.40 p.m.</i>)	160		1875	7.5	London Regional (Brookmans Park)	877		342.1	50
Lahti (Finland)	166		1807	40	Graz (Austria). (<i>Relays Vienna</i>)	886		335.6	7
Moscow, No. 1, RW1 (Komintern) (U.S.S.R.)	174		1724	500	Limoges, P.T.T. (France)	895		335.2	0.5
Paris (Radio Paris) (France)	182		1648	75	Helsinki (Finland)	895		335.2	10
Madrid, No. 3 (Telecomunicaciones) (Spain)	183		1639	1	Hamburg (Germany)	904		331.9	100
Istanbul (Turkey)	185		1621	5	Toulouse (Radio Toulouse) (France)	913		328.6	60
Berlin (Deutschlandsender Zeesen) (Germany)	191		1571	60	Brno (Czechoslovakia)	922		325.4	32
Ankara (Turkey)	200		1500	7	Brussels, No. 2. (<i>Flemish Programme</i>)	932		321.9	15
Daventry National	200		1500	30	Algiers, P.T.T. (Radio Alger) (Algeria)	941		318.8	12
Minsk, RW10 (U.S.S.R.)	208		1442	35	Göteborg (Sweden). (<i>Relays Stockholm</i>)	941		318.8	10
Reykjavik (Iceland)	208		1442	16	Breslau (Germany)	950		315.8	60
Paris (Eiffel Tower)	215		1395	13	Paris (Poste Parisien) (France)	959		312.8	100
Motala (Sweden). (<i>Relays Stockholm</i>)	216		1389	30	Grenoble, P.T.T. (France)	968		309.9	20
Novosibirsk, RW76 (U.S.S.R.)	217.5		1379	100	West Regional (Washford Cross)	977		307.1	50
Warsaw, No. 1 (Raszyn) (Poland)	223		1345	120	Cracow (Poland)	986		304.3	2
Luxembourg	230		1304	150	Genoa (Italy). (<i>Relays Milan</i>)	986		304.3	10
Kalundborg (Denmark)	238		1261	75	Huizen (Holland). (<i>7 kW. till 6.40 p.m.</i>)	995		301.5	20
Leningrad, No. 1, RW53 (Kolpino) (U.S.S.R.)	245		1224	100	Bratislava (Czechoslovakia)	1004		298.8	13.5
Oslo (Norway)	260		1154	60	North National (Slaithwaite)	1013		296.2	50
Madona, No. 1 (Latvia)	262		1145	50	Barcelona, EAJ15 (Radio Asociación) (Spain)	1022		293.5	3
Moscow, No. 2, RW49 (U.S.S.R.)	271		1107	100	Königsberg (Heilsberg Ermland) (Germany)	1031		291	60
Rostov-on-Don, RW12 (U.S.S.R.)	355		845.1	20	Leningrad, No. 2, RW70 (U.S.S.R.)	1040		288.5	10
Sverdlovsk, RW5 (U.S.S.R.)	375		800	50	Scottish National (Falkirk)	1050		285.7	50
Smolensk, RW24 (U.S.S.R.)	364		824.2	10	Bari (Italy)	1059		283.3	20
Geneva (Switzerland). (<i>Relays Sottens</i>)	401		748.1	1.3	Tiraspol, RW57 (U.S.S.R.)	1068		280.9	4
Moscow, No. 3 (RCZ) (U.S.S.R.)	401		748.1	100	Bordeaux, P.T.T. (Lafayette)	1077		278.6	12
Voroneje, RW25 (U.S.S.R.)	413.5		725.5	10	Zagreb (Yugoslavia)	1086		276.2	0.7
Oulu (Finland)	431		696.1	1.5	Falun (Sweden)	1086		276.2	2
Ufa, RW22 (U.S.S.R.)	436		688.1	10	Madrid, No. 2, EAJ7 (Union Radio) (Spain)	1095		274	7
Hamar (Norway). (<i>Relays Oslo</i>)	519		578	0.7	Madona, No. 2 (Latvia)	1104		271.1	50
Innsbruck (Austria). (<i>Relays Vienna</i>)	519		578	0.5	Naples (Italy). (<i>Relays Rome</i>)	1104		271.7	1.5
Ljubljana (Yugoslavia)	527		569.3	5	Alexandria, No. 1 (Egypt)	1122		267.4	0.25
Viipuri (Finland)	527		569.3	13	Belfast	1122		267.4	1
Bolzano (Italy)	536		559.7	1	Nyiregyhaza (Hungary)	1122		267.4	6.2
Wilno (Poland)	536		559.7	16	Hörby (Sweden). (<i>Relays Stockholm</i>)	1131		265.3	10
Budapest, No. 1 (Hungary)	546		549.5	120	Turin, No. 1 (Italy). (<i>Relays Milan</i>)	1140		263.2	7
Beromunster (Switzerland)	556		539.6	60	London National (Brookmans Park)	1149		261.1	50
Athlone (Irish Free State)	565		531	60	West National (Washford Cross)	1149		261.1	50
Palermo (Italy)	565		531	4	Kosice (Czechoslovakia). (<i>Relays Prague</i>)	1158		259.1	2.6
Stuttgart (Mühlacker) (Germany)	574		522.6	100	Moravska-Ostrava (Czechoslovakia)	1158		259.1	11.2
Riga (Latvia)	583		514.6	15	Monte Ceneri (Switzerland)	1167		257.1	15
Vienna (Bisamberg) (Austria)	592		506.8	120	Copenhagen (Denmark). (<i>S.-w. Stn., 49.5 m.</i>)	1176		255.1	10
Rabat (Radio Maroc) (Morocco)	601		499.2	6.5	(<i>Relays Kalundborg</i>)				
Sundsvall (Sweden). (<i>Relays Stockholm</i>)	601		499.2	10	Kharkov, RW4 (U.S.S.R.)	1185		253.2	10
Florence (Italy). (<i>Relays Milan</i>)	610		491.8	20	Frankfurt (Germany)	1195		251	17
Cairo, No. 1 (Abu Zabal) (Egypt)	620		483.9	20	Prague, No. 2 (Czechoslovakia)	1204		249.2	5
Brussels, No. 1 (Belgium). (<i>French Programme.</i>)	620		483.9	15	Lille, P.T.T. (France)	1213		247.3	5
Lisbon (Bacarena) (Portugal)	629		476.9	15	Trieste (Italy). (<i>Relays Milan</i>)	1222		245.5	10
Trøndelag (Norway)	629		476.9	20	Gleiwitz (Germany). (<i>Relays Breslau</i>)	1231		243.7	5
Prague, No. 1 (Czechoslovakia)	638		470.2	120	Cork (Irish Free State) (<i>Relays Athlone</i>)	1240		241.9	1
Lyons, P.T.T. (La Doua) (France)	648		463	15	Nice (Juan-les-Pins) (France)	1249		240.2	2
Cologne (Langenberg) (Germany)	658		455.9	60	Rome, No. 3 (Italy)	1258		238.5	1
North Regional (Slaithwaite)	668		449.1	50	San Sebastian (Spain)	1258		238.5	3
Sottens (Radio Suisse Romande) (Switzerland)	677		443.1	25	Nürnberg and Augsburg (Germany) (<i>Relay Munich</i>)	1267		236.8	2
Belgrade (Yugoslavia)	686		437.3	2.5	Norwegian Relay Stations	1276		235.1	0.5
Paris, P.T.T. (Ecole Supérieure) (France)	695		431.7	7	Dresden (Germany) (<i>Relays Leipzig</i>)	1285		233.5	1.5
Stockholm (Sweden)	704		426.1	55	Aberdeen	1285		233.5	1
Rome, No. 1 (<i>Short-wave station, 25.4 metres</i>)	713		420.8	50	Austrian Relay Stations	1294		231.8	0.5
Kiev, RW9 (U.S.S.R.)	722		415.5	36	Danzig. (<i>Relays Königsberg</i>)	1303		230.2	0.5
Tallinn (Esthonia)	731		410.4	20	Swedish Relay Stations	1312		228.7	1.25
Madrid, No. 1, EAJ2 (Radio España) (Spain)	731		410.4	3	Budapest, No. 2 (Hungary)	1321		227.1	0.8
Munich (Germany)	740		405.4	100	German Relay Stations	1330		225.6	1.5
Marseilles, P.T.T. (France)	749		400.5	5	Montpellier, P.T.T. (France)	1339		224	5
Katowice (Poland)	758		395.8	12	Lodz (Poland)	1339		224	1.7
Midland Regional (Daventry)	767		391.1	25	Dublin (Irish Free State) (<i>Relays Athlone</i>)	1348		222.6	1
Toulouse, P.T.T. (France)	776		386.6	2	Milan, No. 2 (Italy) (<i>Relays Rome</i>)	1348		222.6	4
Leipzig (Germany)	785		382.2	120	Turin, No. 2 (Italy). (<i>Relays Rome</i>)	1357		221.1	0.1
Barcelona, EAJ1 (Spain)	795		377.4	5	Warsaw, No. 2 (Poland)	1384		216.8	2
Lwow (Poland). (<i>Relays Warsaw</i>)	795		377.4	16	Lyons (Radio Lyon) (France)	1393		215.4	5
Scottish Regional (Falkirk)	804		373.1	50	Tampere (Finland)	1420		211.3	1.2
Milan (Italy)	814		368.6	50	Newcastle	1429		209.9	1
Bucharest (Romania)	823		364.5	12	Béziers (France)	1429		209.9	2
Moscow, No. 4, RW39 (Stalina) (U.S.S.R.)	832		360.6	100	Paris, (Radio LL)	1429		209.9	2
Berlin (Funkstunde Tegel). (<i>Short-wave Stations, 16.89, 19.73, 25.5, 31.38 and 49.83 metres.</i>)	841		356.7	100	Miskole (Hungary)	1438		208.6	1.25
Bergen (Norway)	850		352.9	1	Fécamp (Radio Normandie)	1456		206	10
Valencia (Spain)	850		352.9	1.5	Pecs (Hungary)	1465		204.7	1.25
Simferopol, RW52 (U.S.S.R.)	859		349.2	10	Bournemouth	1474		203.5	1
					Plymouth	1474		203.5	0.3
					Antwerp (Belgium)	1492		201.1	0.1

SHORT-WAVE STATIONS OF THE WORLD

(N.B.—Times of Transmission given in parentheses are approximate only and represent G.M.T.)

Metres.	kc/s.	Call Sign.	Station.	Metres.	kc/s.	Call Sign.	Station.
58.31	5,145	OK1MPT	Prague (Czechoslovakia). (Experimental.)	31.35	9,570	W1XAZ	Springfield, Mass. (U.S.A.). (Relays WBZ.) (D. 11.00, Su. 13.00.)
50.26	5,969	HVJ	Vatican City, Rome. (D. 19.00, Su. 10.00 also.)	31.30	9,585	GSC	Empire Broadcasting.
50.0	6,000	RW59	Moscow. (Relays No. 1 Stn.) (D. 21.00.)	31.28	9,590	W3XAU	Philadelphia, Pa. (U.S.A.). (Relays WCAU.) (D. 16.00.)
50.0	6,000	EAJ25	Barcelona, Radio Club (Spain). (D. 20.30.)	31.28	9,590	VK2ME	Sydney (Australia). (06.00, 10.00 and 14.30.)
49.83	6,020	DJC	Zeesen (Germany). (D. 17.30 and 23.15.)	31.27	9,595	HBL	Radio Nations, Prangins (Switzerland). (S. 22.30.)
49.67	6,040	W1XAL	Boston, Mass. (U.S.A.). (D. ex Su. 21.45, Su. 00.00.)	31.25	9,600	CT1AA	Lisbon (Portugal). (T. and F. 22.00-00.00, 20.30.)
49.67	6,040	W4XB	Miami Beach, Florida (U.S.A.). (D. 12.00.)	30.43	9,860	EAQ	Madrid (Spain). (D. 22.30, S. 18.00 also.)
49.59	6,050	GSA	Empire Broadcasting.	28.98	10,350	LSX	Buenos Aires (Argentina). (D. 20.00.)
49.5	6,060	W3XAU	Philadelphia, Pa. (U.S.A.). (Relays WCAU.) (D. 00.00.)	26.83	11,181	CT3AQ	Funchal (Madeira). (Su. 15.30, T. and Th. 22.00.)
49.5	6,060	VQ7LO	Nairobi (Kenya Colony). (D. ex T. and Th. 16.00, T. 08.00, Th. 13.00.)	25.63	11,705	FYA	Paris, Radio Colonial (France). (Colonial Stn. E-W, D. 02.00, 19.00 and 22.15.)
49.5	6,060	OXY	Skamlebaek (Denmark) (Relays Copenhagen.) (D. 1,900.)	25.6	11,715	VE9JR	Winnipeg (Canada). (D. 00.00.)
49.43	6,069	VE9CS	Vancouver, B.C. (Canada). (Su. 16.00, S. 04.30.)	25.57	11,730	PHI	Eindhoven (Holland). (Temporarily suspended.)
49.34	6,080	W9XAA	Chicago, Ill. (U.S.A.). (Relays WCLF.) (D. ex. Su. 19.00, Su. 15.30.)	25.53	11,750	GSD	Empire Broadcasting.
49.22	6,095	VE9GW	Bowmanville, Ont. (Canada). (Su. 16.00, M., T., W. and Th., 18.00, F. and S. 12.00.)	25.51	11,760	DJD	Zeesen (Germany). (D. 01.45, 17.30, 22.00.)
49.18	6,100	W3XAL	Bound Brook, N.Y. (Relays WJZ.) (M., W. and S., 21.00.)	25.45	11,790	W1XAL	Boston, Mass. (U.S.A.). (D. ex Su. and S. 22.00, S. 23.30.)
49.18	6,100	W9XF	Chicago, Ill. (U.S.A.). (T., Th. and F., 21.30, F. and S., 02.30.)	25.4	11,810	2RO	Prato, Smeraldo, Rome. (D. 15.00 and 21.00.)
49.1	6,109	VUC	Calcutta, India. (D. ex F. and S., 15.30, F., 14.30, S. 17.45.)	25.36	11,830	W2XE	Wayne, N.J. (U.S.A.). (Relays WABC.) (D. 19.00.)
49.02	6,120	W2XE	Wayne, N.J. (U.S.A.). (Relays WABC.) (D. 22.00.)	25.29	11,860	GSE	Empire Broadcasting.
49.0	6,122	ZTJ	Johannesburg (S. Africa). (D. ex Su. and S. 04.45, 08.30, 14.00, Su. 13.00, 17.30, S. 14.00.)	25.27	11,870	W8XK	Pittsburg, Pa. (U.S.A.). (Relays KDKA.) (D. 21.18.)
48.86	6,140	W8XK	Pittsburg, Pa. (U.S.A.). (Relays KDKA, D. 21.30-05.00.)	25.25	11,880	—	Paris, Radio Colonial (France). (Colonial Stn. N-S, D. 15.45 and 19.00.)
48.0	6,250	HJ3ABF	Bogota (Colombia).	25.0	12,000	RNE	Moscow. (Relays No. 2 Stn.) (Su. 04.00, 11.00 and 15.00.)
46.89	6,425	W3XL	Bound Brook, N.J. (U.S.A.). (Experimental.)	23.39	12,825	CNR	Rabat (Morocco). (Su. 11.30.)
45.38	6,610	RW72	Moscow. (Relays Stalin Stn.) (M., W., F. and S. 21.00.)	19.84	15,123	HVJ	Vatican City, Rome. (D. 10.00.)
45.0	6,667	8KR	Constantine (Algeria).	19.82	15,140	GSF	Empire Broadcasting.
43.0	6,976	EAR110	Madrid. (T. and S. 22.00.)	19.73	15,200	DJB	Zeesen (Germany). (D. 05.35 and 12.45.)
40.3	7,444	HBQ	Radio Nations, Prangins (Switzerland).	19.72	15,210	W8XK	Pittsburg, Pa. (U.S.A.). (Relays KDKA.) (D. 15.00.)
38.48	7,797	HBP	Radio Nations, Prangins (Switzerland). (Su. 22.30.)	19.68	15,243	FYA	Paris, Radio Colonial (France). (Colonial Stn. E-W, D. 12.00.)
37.33	8,935	CNR	Rabat (Morocco). (S. 20.00.)	19.64	15,270	W2XE	Wayne, N.J. (U.S.A.). (Relays WABC.) (D. 15.00.)
36.65	8,186	PAR3	Rio de Janeiro (Brazil). (D. 00.00.)	19.56	15,330	W2XAD	Schenectady, N.Y. (U.S.A.). (D. 19.00.)
31.55	9,510	VK3ME	Melbourne (Australia). (W. and S. 10.00.)	16.89	17,760	DJE	Zeesen (Germany).
31.55	9,510	GSB	Empire Broadcasting.	16.88	17,770	PHI	Eindhoven (Holland). (Su. and S. 12.00.)
31.48	9,530	W2XAF	Schenectady, N.Y. (U.S.A.). (Relays WGY.) (D. 23.35.)	16.87	17,780	W3XAL	Bound Brook, N.J. (Relays WJZ.) (D. 14.00.)
31.38	9,560	DJA	Zeesen (Germany). (D. 11.45 and 22.00.)	16.86	17,790	GSG	Empire Broadcasting.
				13.97	21,470	GSH	Empire Broadcasting.
				13.93	21,540	W8XK	Pittsburg. (D. 12.00.)

The Diary of an Ordinary Listener

The Brilliance of Toscanini at the Salzburg Relay

A SYMPHONY Concert by the Vienna Philharmonic Orchestra, conducted by Toscanini, would be an outstanding musical event in the most prolific week, but coming as it did when the general run of continental programmes were only of average interest, it seemed to stand out with added prominence. Toscanini must have a wonderfully magnetic musical personality as he seems to get exactly the desired tone and expression from each individual member of the strings, wood-wind, brass or percussion groups, and when he has under his control such a superb orchestra as the Vienna Philharmonic, the crispness and clarity he obtains is well-nigh perfect. This was especially noticeable in Brahms' Variations on a Theme by Haydn in which the subject was at no time obscured by the attendant embellishments, in fact, I can honestly say that I have never before fully appreciated this work. He also imparted to Beethoven's Seventh Symphony an exceptionally crystalline sparkle especially in the fascinating scherzo. I find I have waxed so enthusiastic over this concert that I had almost forgotten to mention that it originated at the Festspielhaus, Salzburg, and was relayed from Vienna, Paris P.T.T., Beromünster, Brussels No. 2, Hilversum, Monte Ceneri, Prague and the B.B.C. National Stations.

It is rather curious to note the coincidence of items in the various foreign programmes. Warsaw, on Friday evening, was transmitting Beethoven's 8th Symphony, played by the Station Orchestra, but as this station

was not coming through at its best, I switched over to Radio Paris to hear a spirited performance of Offenbach's "La Fille du Tambour-Major" which proved an efficient substitute. The Beethoven Symphony was, however, performed the following evening at the Basilica di Massenzio and transmitted from Rome, so my disappointment was appeased and after hearing it I went over to Hamburg for an entertaining programme of light and dance music and heard again the "Merry Widow" waltz and other evergreen melodies. Radio Toulouse was also giving a good selection of operatic music, and later I enjoyed some dance music by the Locatelli Orchestra from Paris P.T.T., and was again impressed by the cheerful spirit the French manage to impart to their jazz. It is quite the exception to hear a French "crooner" wailing in self-pity that "It doesn't mean a thing to yee-oo" when the object of his admiration has had the good sense to get fed up with him and to prefer someone a little more of a "he-man."

Opera from Vichy Casino

Sunday offered us a good varied selection from which to choose, and I settled down to enjoy Act I of "La Tosca" from the Casino at Vichy, which was relayed by Radio Paris and Bordeaux-Lafayette. The orchestra was conducted by Salfi, but I was unable to catch the names of the principals, though this did not detract from the enjoyment of their singing. I wished I could also

have seen the action even though Cavardossi might, as usual, offend my orderly mind by going straight from the Madonna's bright blue robe to her golden hair without troubling even to wash out his paint brush. After the end of the Act, I went over to Hilversum where the V.A.R.A. Orchestra were discoursing light music.

On Monday, I tried to get Brussels No. 2 as I was anxious to hear Meuleman's music and find out if he is as good a composer as he is a conductor, but this station was not coming through well, so I switched over to Huizen to listen to the Organ and String quartet concert, but was again rather disappointed as it seemed that reception that evening was stronger from the north than from the south, and Bach's prelude and Handel's Organ Fantasia had a pronounced background of a dialect play creeping through from the North National Station which did not blend well with the music. I next tried Strasbourg, seeing that there was to be a Wagner programme relayed from Vichy, but apparently struck the interval. This, however, did not greatly disturb me as I happened upon a Handel trio which proved quite as entertaining.

On Tuesday, the concert of light music by the A.V.R.O. Orchestra from Hilversum seemed most suited to a man disinclined, as I was that evening, for concentration and I listened with pleasure to that old and well tried favourite the "Poet and Peasant" overture. Curiosity then took me to Rome to hear Mascagni's opera "L'Amico Fritz," but never having seen a performance of this I was unable to visualise the action, and perhaps for that reason did not find the music as attractive as the better known "Cavalleria Rusticana" for which familiarity has never in me bred satiety.

CALIBAN.

HINTS and TIPS

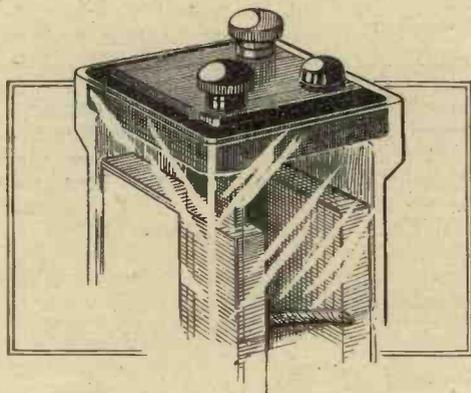
Practical Aids to Better Reception

LOW-TENSION accumulators of the mass type are widely used for small battery sets where the normal filament consumption does not exceed about 0.5 amp. This type of cell is fitted with very thick plates, which are widely spaced, and are not provided with separators.

Short-circuited Accumulators

After a prolonged period of use, it will sometimes be found that a flake of the plate material will become partly detached from one of the elements, and may bridge the space between plates rather in the manner shown in the accompanying illustration. The result will be a more or less complete short-circuit, and unless the necessary steps are taken the cell will be rendered useless.

Fortunately, it is quite easy to put matters right. A rod or strip of insulating material may be inserted through the filling hole, and used to push down the loose flake to the bottom of the cell, where it will not do any damage—that is, unless it



A detached flake of plate material can effect a short-circuit between accumulator plates.

is large enough to bridge the space between the plates even in this position. Should it be as large as this, there still exists the possibility of breaking it into smaller pieces by firm pressure.

IF one should be unfortunate enough to damage the reaction winding of a coil assembly, whether in a "straight" set or a superheterodyne, it is necessary to take a considerable amount of care in repairing it. There is no need to stress the importance of the fact that the repaired coil should have the original number of turns—that is self-evident.

The Reaction Winding

But it would seem that those whose experience does not date back to the days of

swinging reaction coils are apt to overlook the equal importance of spacing between the tuned and reaction windings. A very small error in this respect may be responsible for failure to obtain self-oscillation, and so it is important that the winding should occupy exactly the same position as originally.

IT was recently stated in these pages that interference from ignition systems of motor cars is mainly confined to short-wave receivers. This would seem to be in accordance with experience and with experimental investigation of the subject; interference at ordinary broadcast frequencies is usually not radiated at sufficient strength for it to really cover any very considerable distance.

However, the experience of a reader, who writes to us on this subject would seem to prove that ordinary broadcast receivers are subject to fairly serious interference from cars in certain circumstances. It was at first thought that the trouble was probably due to a bad contact in the household electrical system, but this theory was subsequently disproved, and it was confirmed that the disturbances were radiated directly from motor vehicles of all types, and that both magneto and coil ignition systems were equally responsible.

Experimental alterations to the aerial-earth system proved abortive, but it was found that the interference was reduced by rearranging the detector-L.F. components of the detector grid circuit of the set, which employs a simple det.-L.F. circuit. Finally, the interference was completely eliminated by mounting the detector valve and all its grid circuit components in an aluminium screening box, the aerial connection being passed into the box through screened sleeving.

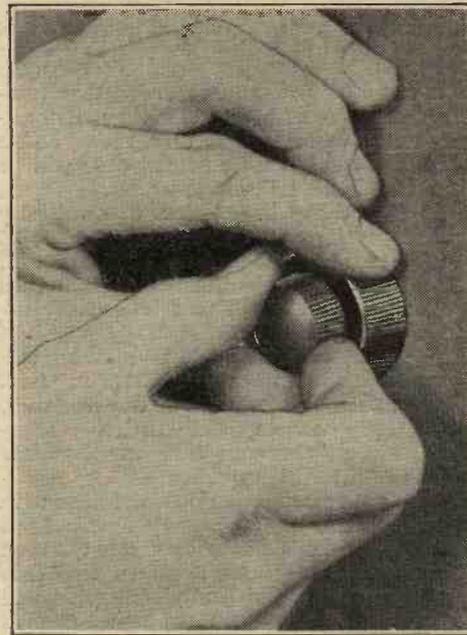
It is possible that some abnormal condition in the detector grid circuit is responsible for this unusual and rather puzzling experience, but this description will at least suggest the possibilities of effecting a cure to others who are similarly affected.

THE simpler type of receiver, with one H.F. stage and a total of two tuned circuits, is often controlled by a two-gang tuning condenser fitted with what is generally described as a concentric trimmer. As a rule, the trimming condenser spindle passes through a hollow main spindle, and the main and subsidiary adjusting knobs are mounted concentrically, as the illustration shows.

When operating a receiver of this sort in the ordinary way, there is a possibility that one will finally arrive at an adjustment which is not correct; although both circuits

may appear to be in resonance with the incoming signal, actually only one of them is correctly tuned.

To avoid this possibility, it is recommended that, instead of rotating both



The art of accurate two-circuit tuning with an external trimmer.

main and trimming controls separately, they should be operated simultaneously. The procedure is to turn the main control slowly through the position of resonance, in the meantime rotating the trimming knob continuously and comparatively rapidly round about the position corresponding to loudest signals. After making two or three "traverses" through the tuning position in this way, one can rest assured that both circuits are really accurately tuned.

Operation of a set in the manner recommended will at first appear to be difficult and awkward, but the necessary knack is not difficult to acquire.

THE RADIO INDUSTRY

THE Willis World Clock, designed by J. H. Willis and Co., of Norwich, and reviewed in *The Wireless World* of August 27th, is now being distributed by Sifam Electrical Instruments Co. The price has been fixed at £8 8s.

The Plessey Co., Ltd., of Vicarage Lane, Ilford, are supplying the wireless equipment for the Rymill Expedition, which is due to leave London during September for the regions around Graham Land in the Antarctic. Attempts will be made to establish communication with the Post Office short-wave station at Portishead.

A booklet recently issued by F. C. Heyberd and Co., 10, Finsbury Street, London, E.C.2, deals with mains equipment, and contains a large number of circuit diagrams and practical wiring plans. Copies are obtainable for 3d., post free.

The Interfering Motor Car

The External Trimmer

Letters to the Editor:—

Iron-cored Coils

Signatures : The "Common Supply" at Olympia

Iron-cored Coils

IT has been brought to our notice that a statement has recently been made criticising the use of iron-cored coils in receiver design.

It must be generally conceded that iron-cored coils are of higher efficiency than air-cored coils of reasonable dimensions, and a receiver fitted with iron-cored coils will be superior for the following reasons:—

- (1) Selectivity in relation to sensitivity will be greater to a marked extent.
- (2) Signal-to-noise ratio will be improved.
- (3) Band pass circuits designed for a given band width will more effectively exclude unwanted signals.

Side-band cutting should be no more evident than with air-cored coils; in fact, owing to the steeper sides of the resonance curve, it is possible to obtain better selectivity and at the same time use a greater band width for high quality.

High note attenuation does not arise with suitable filters.

Iron-cored coils have, of necessity, been made to a far greater accuracy than has been the practice with air-cored coils, and for this reason they do not suffer from a lack of uniformity.

Change of inductance with frequency may

have provided the material for the suggestion of lack of uniformity, but when considered numerically this change of inductance over the frequency band covered is negligible, being insignificant compared with variations in the apparatus associated with the tuned circuit.

The fact that iron-cored coils provide such a high degree of selectivity naturally requires that special care should be taken to avoid tracking errors. When inefficient coils are used any small tracking errors are masked by the poor selectivity of the tuning circuits.

Whatever coil characteristics may be required, iron-cored coils can be produced to the desired need and an improved performance may always be expected where iron-cored coils are used.

R. F. COLLINSON, Colvern Ltd.

W. FILLMORE, Jackson Bros. (London), Ltd.

J. M. G. REES, Varley (Oliver Pell Control), Ltd.

Signatures

With reference to Mr. Hele's letter on the subject of names, if certain people are granted the privilege of placing their name in a prominent position on the front of the object, so long as they appreciate that it is a privilege and not a right I cannot see that much harm is done.

Whether Mr. Hele's subdivision into mechanical or theoretical skill, as distinct from personal artistic abilities, is a sound test I think is a little doubtful. For example, is a house by Lutyens any less an artistic creation than a piano by Steinway? And although Mr. Hele might like to see Steinway on the front of his piano, I very much doubt whether he would like to see Lutyens written across the front of his house, even if he had been the designer.

I do not doubt that there are many purchasers of, for example, Steinway pianos, who would be grieved if the name Steinway were not on the front, but surely it does not make it any better or worse a piano by the omission, but the only value presumably that is affected is the value from the snobbish angle.

Furthermore, if the claim of such people to have their name placed on the front of the instrument is because they are artists, then presumably they will be prepared to defend themselves on the lines that the adding of the particular sequence of letters forming their name will add to the artistic

merit of the composition as a whole, rather than detract from it. There may be others, but personally I only know of one, where this has been successfully attempted. I believe you will find that Rimsky-Korsakov in such things as "The Hymn to the Sun" works in a musical phrase which is essentially his signature.

Finally, I think Mr. Hele will agree that there are very few things in this life which are essentially the effort of an individual. I should imagine this is very true of organs. The use of a name as a trade mark and as guarantee of genuineness I agree is in every way justified, but this purpose can just as well be served by placing the name in some inconspicuous position.

P.P. MURPHY RADIO, LTD.
FRANK MURPHY.

Welwyn Garden City.

The "Common Supply" at Olympia

I THINK that it is time some serious protest was made against the present system of "Noise Supply" at Olympia.

One of the necessities for obtaining good reproduction is to match the loud speaker to its valve; somewhat naturally this is impossible when approximately 200 speakers are being fed from one amplifier, each speaker being under separate control.

In the days of the moving iron speaker, when a few extra peaks in the response curve did not matter very much, matching was not considered essential. Now, however, that a good speaker is available, it is very disappointing to find that the Olympian music not only failed to show its good qualities, but made it sound definitely unpleasant.

Presumably, the purpose of the noise at Olympia is to provide some sort of comparative test of loud speakers. Under the present system this is quite impossible.

There seem to be several other methods available for this test. One that has been suggested in these columns before is to permit the reception of certain broadcast programmes at certain times, according to a fixed schedule. Another is to allow each exhibitor to make what noise he likes; this system is used in some of the Continental exhibitions. The possibilities of "wired wireless" for this purpose might be investigated with advantage. Alternatively, the old system of demonstration rooms could be reinstated.

R. B. RANSOME.

Cinema Quality

AS a regular reader of *The Wireless World* since the first number appeared, I should like to state that I agree entirely with your remarks in reply to the criticism in "To-day's Cinema," and also with the original comments in your paper on recent B.B.C. talkie excerpts. *The Wireless World* has always been the champion of quality, and I am firmly convinced, as recent correspondence has also shown, that the general public is not indifferent to good quality. I heartily endorse the remarks of your correspondent, Mr. H. R. Wilkinson, that it is very seldom one hears, even in the best cinemas, good-quality reproduction, and I think the cinema experts would be very much surprised if they could hear the criticisms that I have often heard made by ordinary non-technical members of the audience.

I hope you will continue to maintain the stand you have taken up, and if this publicity does anything to improve the quality of reproduction in cinemas the public will again be indebted to *The Wireless World*.
Sheffield.

W. BURNET.

Calling Up the "Yard"

Radio Equipment for Police 'Plane



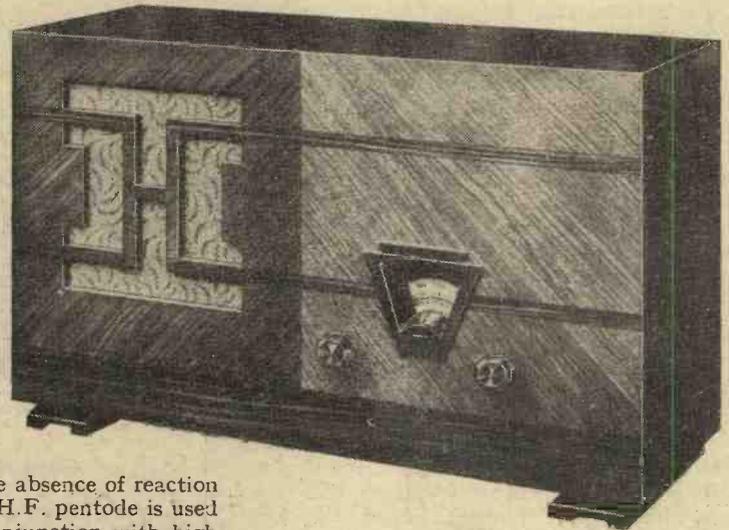
For direct communication with headquarters from the Scotland Yard Autogiro there has been installed a Marconi transmitting and receiving equipment.



Mullard "M.B. THREE"

A Battery Receiver with Simplified Controls

FEATURES. — *Type.* — Table-model "straight" receiver for battery operation. *Moving-coil loud speaker.* **Circuit.**—Variable-mu pentode H.F. amplifier—pentode detector—pentode output valve. **Controls.**—(1) Combined tuning control and waverange switch. (2) Volume control and on-off switch. **Price.**—8 guineas. **Makers.**—Mullard Wireless Service Co., Ltd., Mullard House, Charing Cross Road, London, W.C.2



TO obtain an adequate performance in the matter of range and, more particularly, of selectivity, the majority of three-valve battery receivers make use of reaction to supplement the amplification of the H.F. valve and to increase the sharpness of tuning. This is quite a sound plan where a certain amount of skill on the part of the user can be relied upon, but there is quite a considerable demand for a receiver which will give good results in the hands of the uninitiated.

The Mullard "M.B. Three" is a set which could be given as a present with the certain knowledge that the recipient would have no difficulty in obtaining the maximum performance of which the circuit is capable, even if he had not previously handled a wireless receiver of any kind. There are only two control knobs. The left-hand control incorporates the on-off switch and gives variation of volume, while the right-hand control, in addition to operating the tuning scale, enables the waverange to be changed by pushing in or pulling out the spindle. No reaction is employed, so that the complication of a concentric trimming

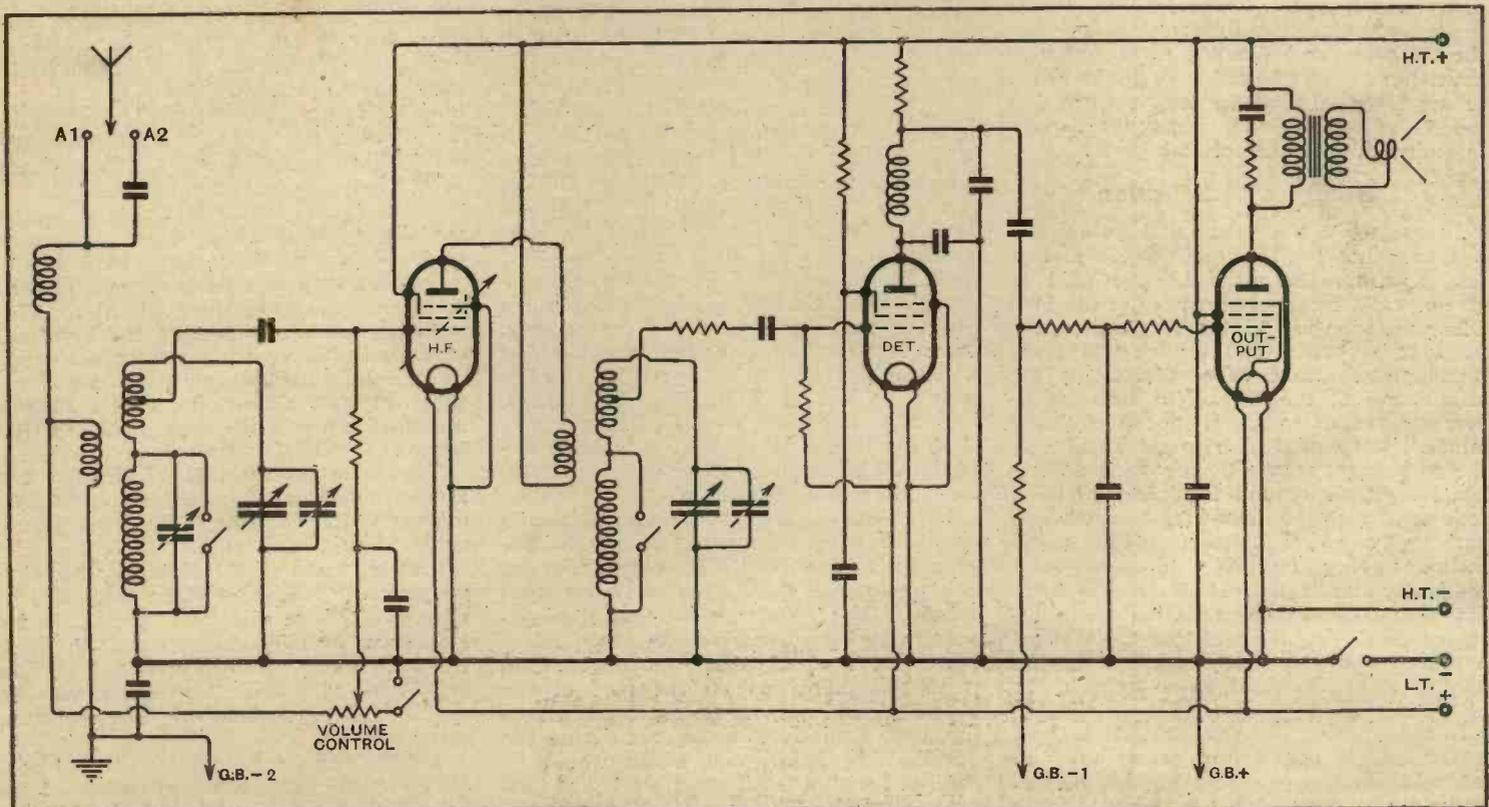
control on the main tuning knob is avoided and the tuned circuits can be ganged with accuracy.

To compensate for the absence of reaction a sensitive variable-mu H.F. pentode is used in the H.F. stage in conjunction with high efficiency litz-wound coils. In view of the high amplification of the pentode valve very complete screening is necessary to ensure stability of the circuit, and, in addition, the tuning coils are mounted mutually at right angles.

In a circuit of this type it is usual to find that the amplification is greater at the bottom than at the top of the waverange, and to compensate for this the makers have included a loading-coil in series with the aerial lead. Volume is controlled in the H.F. stage by a potentiometer, which simultaneously puts a shunt resistance across the aerial coupling coil and varies the bias of the H.F. pentode. A switch is included to prevent the discharge of the grid bias cells when the set is not in use. The detector is also of the H.F. pentode

type and is followed by resistance coupling to the output valve, which is a pentode specially designed to ensure battery economy.

The first impression on switching on the set is that it lacks the "liveliness" one usually associates with circuits incorporating reaction. The absence of background hiss due to reaction is no doubt responsible for this, and further acquaintance with the set leaves no doubt that the efficiency of the H.F. circuits, if it does not quite make up for the absence of reaction, is, at any rate, sufficient to ensure a performance which could not otherwise be obtained with such simplicity of control. In Central London, during the hours of daylight, Midland Regional, as well as the two Brookmans



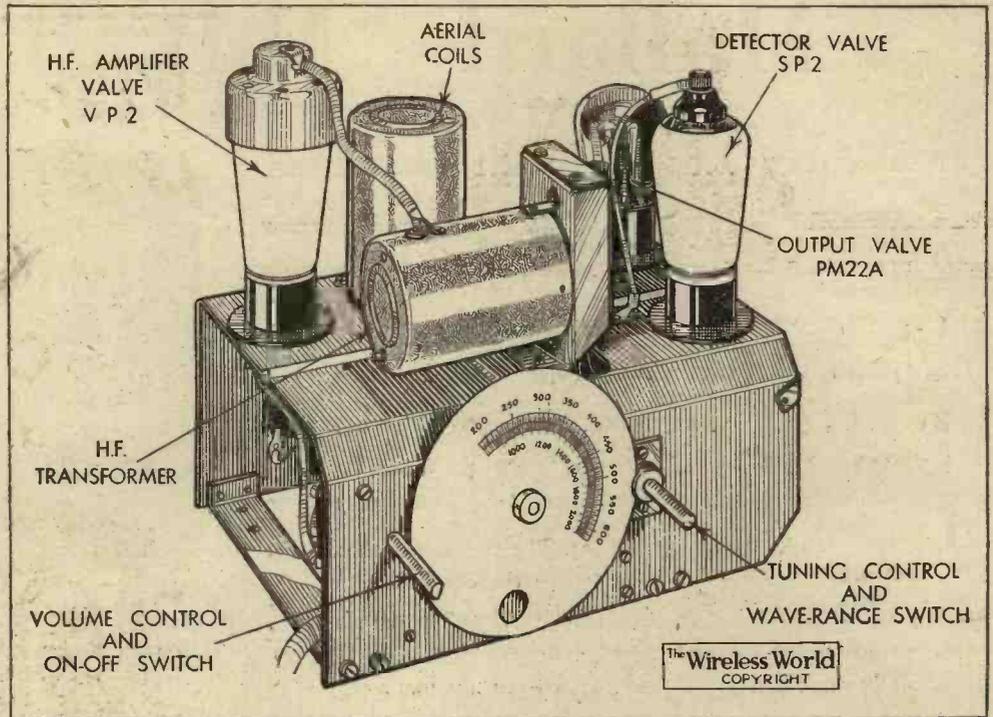
COMPLETE CIRCUIT DIAGRAM. Pentode valves are used throughout and the tuning coils are litz-wound.

Mullard "M.B. Three"—

Park transmitters, was capable of giving a programme of adequate volume, while the only foreign station which could be received was Fécamp, near the bottom of the wave-range. On long waves, on the other hand, at least five stations, other than Daventry, were received at good programme strength. While there was no trace of interference between Daventry and Radio Paris, it was not found possible to obtain sufficient separation to find the Deutschlandsender between these two stations. On the medium waveband the National transmitter could be heard over a band of approximately 65 kc/s, and the Regional transmitter over 90 kc/s.

The moving-coil loud speaker gives very pleasant quality of reproduction up to a level of about 400 milliwatts, above which there is evidence of overloading. The H.T. consumption was tested and found to be 8.7 mA. at maximum sensitivity and 6 mA. at minimum.

There can be no doubt that the features which will sell this set are the ease of control and the economy of maintenance, while its performance will amply satisfy those who require reliable reception from the local station with the choice of five or six medium-wave foreign programmes after dark, in addition to a similar number on long waves throughout the day.



Very complete screening of the H.F. valve and litz-wound tuning coils are features of the chassis.

RADIOLYMPIA is over. As a show of radio receivers it was satisfactory; as a radio exhibition it was not good enough. I do not flatter myself that what I am going to write will raise any controversy; I fully expect that I shall be told that I do not know all the facts; perhaps even that my opinions are not shared by anybody.

What I should like to know, however, is whether Radiolympia, as the annual wireless exhibition, is solely organised for the benefit of dealers and persons interested in the sale of radio receivers and components, or whether its aim is to inculcate the listening habit in the British general public. Are the organisers endeavouring to attract non-listeners or would-be listeners to the show, or are they satisfied to exhibit their new models to those of the community already interested in wireless entertainment?

Difficulties of Selection

Is it merely a trade show and nothing but a trade show? The question is a pertinent one, as from the visits I have paid to Radiolympia I cannot see, barring the Post Office contribution to the Exhibition, the band or orchestra and the general Neon illuminations, what other attractions are offered free to the general public. If the average person, who is not technically minded, but would wish to get an idea of the advantages reaped by becoming a wireless fan, strolls around Radiolympia, he is soon sated with the innumerable models and patterns of wireless receivers—in many instances very tastefully displayed—and brilliantly illuminated. He is not assisted in any way to make the selection of an instrument, barring the fact that the amount he intends to lay out may restrict the number to be examined, as no receiver can be demonstrated.

In my opinion, a more restful atmosphere would tend to help a prospective buyer in taking a decision and making his choice. Radiolympia, as it is now organised, is only comparable to a collection of West End

RADIOLYMPIA

Constructive Comments of a Disappointed Visitor

showrooms, without possessing any of their advantages.

And then, what of the radio theatre? A good all-round performance by a number of artists who appear regularly before the microphone and who through this means are actually seen as well as heard. But, if you think it over, in what way does this differ from regular performances given in the principal London or provincial music halls? Is this variety performance to be taken as the standard type of entertainment with which the purchaser of a radio set will be fed when he has installed it in his own home? No, as clearly stated by the commentator who from time to time apologises through the microphone, explaining that, admittedly, many of the turns given cannot be appreciated unless seen. Moreover, the radio theatre is not a free entertainment offered by the B.B.C. or the organisers, but one which must be paid for, and that at roughly West End prices.

So far I shall be accused of putting forward nothing but destructive criticism. Now for constructive suggestions.

It is perfectly true that the Exhibition is organised to permit manufacturers to display their wares, and it is evident that for this purpose all these lanes of stands must remain. But could not the organisers do something more to entertain the public? First, extra space must be devoted to permit of relaxation on the part of the visitors; could not, for instance, gardens be installed, similarly to those seen during the Ideal Home Show, and which would be equipped with a small stage serving as outdoor studio? The public possesses the studio complex, and is always anxious to

see how the broadcasts are made. Why not also demonstrate the value of a wireless receiver by presenting a row of furnished rooms—a series of tableaux illustrating different classes of the community enjoying the benefits of wireless entertainment?

Let us have also the picture of radio in its earlier stages; the family grouped around the simple crystal receiver, each member equipped with headphones, and, as an apposite example, radio as it is understood in greater comfort to-day.

Widen the Scope

Is there any reason why the wireless cabin of a liner should not be built up as an exhibit, and even the more modest equipment, say, of a fishing trawler? Call upon other Government departments for suitable contribution to a radio exhibition; the Navy, the Army, the Royal Air Force. Would not the public be interested?

In the past the B.B.C. has presented models of Broadcasting House, of transmitting stations; they have explained in pictures, and in even more concrete illustrations, many sides of their activities. Why were these discontinued? Surely Radiolympia is not visited by the same people every year, and newcomers would welcome these features. Cannot the amateurs rig up an experimenter's den, fully equipped with home constructed apparatus?

The mere presentation of the few sets I saw at one stand cannot convey to the average visitor any idea of the developments achieved in these circles.

Finally, make of Radiolympia more than an ordinary exhibit of radio receivers; let it be a centre of attraction, giving the on-looker a general insight, and in some instances a more detailed review of all radio activities. This would help him to visualise the vast field covered by wireless transmission.

A little extra imagination, coupled with the necessary initiative, can make of our annual Radio Exhibition a model of what such shows can be.



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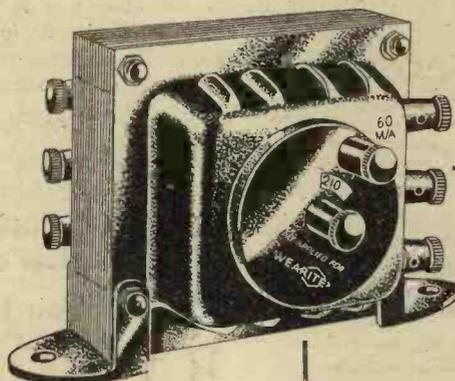
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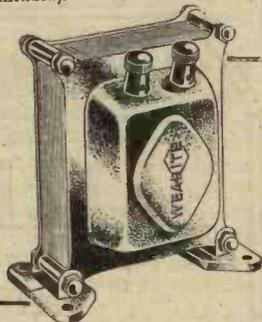
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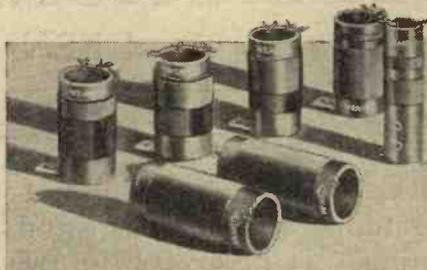
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(This advertisement continued on next page.)

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PARAMOUNT—Westinghouse transformers, H.T.8, 9 or 10, with 4v. 2a., 4v. 4a., shrouded, 16/-, post 1/-.

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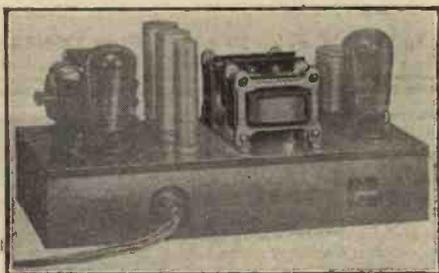


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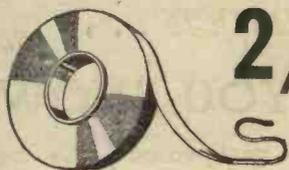
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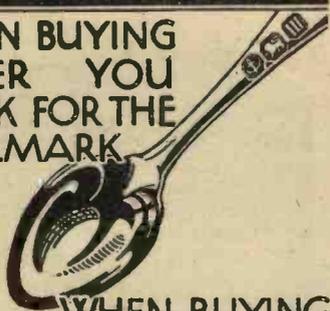
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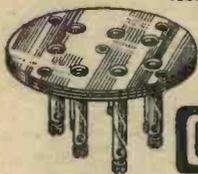


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PREMIER Mains Transformers, output 350-0-350v. 90 m.a., 4v. 3-5a., 4v. 2-3a., 4v. 1-2a. (all C.T.), with screened primary; 10/-.

PREMIER Auto Transformers, 100-110/200-250v. or vice versa, 100-watt; 10/-.

SPECIAL Offer of Mains Transformers, manufactured by Phillips, input 100-120v. or 200-250v., output 180-0-180 volts 40 m.a., 4v. 1 amp., 4v. 3 amps., 4/6; 200-0-200v., 4v. 1a., 4v. 3a., 4/6.

WESTERN ELECTRIC Mains Transformers, 300-0-300v. 65 m.a., 4v. 1-2a., 4v. 2-3a., 6/6; 500-0-500v. 150 m.a., 4v. 3-5a., 4v. 2-3a., 4v. 1a., C.T., 4v. 1a. C.T., 19/6; 1,000-0-1,000v. 250 m.a., 4v. 3a. C.T., 4v. 3a. C.T., 49/6; 2,000-0-2,000, 150 milliamperes, 49/6.

PREMIER L.T. Charger Kits, consisting of Premier transformer and Westinghouse rectifier, input 200-250v. A.C., output 8v. 1/2 amp., 14/6; 8v. 1 amp., 17/6; 15v. 1 amp., 19/-; 6v. 2 amp., 27/6; 30v. 1 amp., 37/6; 2v. 1/2 amp., 11/-.

COLLARO Gramo. Unit, consisting of A.C. motor, 200-250v. high quality pick-up and volume control, 49/-; without volume control, 42/-.

B.T.H. Trusped Induction Type (A.C. only) Electric Gramophone Motors, 100-250v.; 30/- complete.

B.T.H. Gramophone Motors, 100-250 volts A.C. or D.C., specially recommended for D.C., complete; 30/-.

EDISON BELL Double Spring Gramophone Motors, complete with turn-table and all fittings, a really sound job; 15/-.

SPECIAL Offer of Wire Wound Resistances, 4 watts, any value up to 50,000 ohms, 1/-; 6 watts, any value up to 15,000 ohms, 1/6; 15 watts, any value up to 50,000 ohms, 2/-; 25 watts, any value up to 50,000 ohms, 2/6.

WIRE Wound Potentiometers, 15,000 ohms, 1/6; 50,000 ohms, 2/-; 500,000 ohms, 3/-; 1,000 ohm wire wound semi variable resistances, carry 150 m.a., 2/-.

CENTRALAB Potentiometers, 50,000; 250,000, 1/2 meg. any value, 2/-; 200 ohms, wire wound, 1/-.

POLAR Star, manufacturers' model, 3-gang condensers, fully screened, 7/6; with trimmers.

AMERICAN Triple Gang 0.0005 Condensers, with trimmers, 4/11; Utility Bakelite 2-gang 0.0005 screened with uniknob trimmer, 3/6; Polar Bakelite condensers, complete with knob, 0.00015, 0.00035, 0.0003, 0.0005, 1/-.

ORMOND Condensers, 0.0005 2-gang semi-shielded, 2/6; brass vanes, with trimmers, 3/6.

MAGNAVOX D.C.152, 2,500 ohms, 17/6; D.C.154, 2,500 ohms, 12/6; D.C.152 Magna, 2,500 ohms, 37/6, all complete with humbucking coils; please state whether power or pentode required; A.C. conversion kit for above types, 10/-; Magnavox P.M. 7in. cone, 18/6.

RELIABLE Canned Coils with Circuit, accurately R matched, dual-range, 3/- per coil; ditto, iron cored, 3/6.

RELIABLE Intervalve Transformers, 2/-; multi ratio output transformers, 4/6.

T.C.C. Electrolytic Condensers, 550v. working, 650v. peak, 8 mf., 4/-; 4 mf. or 8 mf., 440v. working, 3/-; 15 mf., 50v. working, 1/-; 25v. working, 25 mf., 1/3; 6 mf., 50v. working, and 2 mf., 100v. working, 6d.

T.C.C. Condensers, 250v. working, 2 mf., 1/9; 2 mf. 1,500v. working, 6/-; 4 mf., 1,500v. working, 10/-.

H.M.V. Condensers, 400v. working, 4x4x1x1x1x0.1x0.1x0.1x0.1, 4/9; 4x2x1x1x1x0.5, 3/9.

(This advertisement continued on next page.)

ELECTRADIX REDUCTIONS

At the new Reduced Price It is a Prize Itself.

GET A DIX-ONEMETER

The ideal of multi-range moving coil meters. Microamps to 20 amps, milli volts to 1,000 volts, 50 ranges on one meter. Two linear scales with mirror and knife edge pointer.

ONLY

55/-

A remarkably low price for a meter worth £10. For Novice or expert. Test Booklet Free.



The High-grade Radio Tester. Low Price. High Value. INSTRUMENT IN CASE, 55/- MULTIPLIERS EACH, 6/6. COMPLETE RADIO OUTFIT £4.17.6

For other Bargains see our Advertisement in Components for Sale Column or send for Illustrated List free.

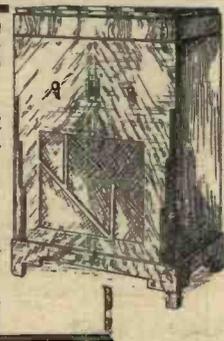
ELECTRADIX RADIOS
218, UPPER THAMES STREET, LONDON, E.C.4

Write for Illustrated Catalogue of **RADIO-GRAMPHONE CABINETS**

of exclusive modern design, made by craftsmen, in highly figured Oak, Walnut or Mahogany, post free.

REMARKABLE VALUES. Cabinets made to order a speciality. Maker, under license, of the HOWE BOX BAFFLE. Recommended by the B.B.C. Full details on request.

GILBERT
Cabinet Maker - SWINDON
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YOU CAN HAVE MUSIC WHEREVER YOU GO!

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Ask your dealer to-day or send to us for Free Illustrated Literature. **BAKER'S SELHURST RADIO, LTD.,** 75 and 77, Sussex Rd., Croydon, Surrey.



SPEEDY SERVICE - NO SUBSTITUTES

EVERY RADIO REQUIREMENT VALVES - SPEAKERS - SETS - COMPONENTS, etc.

Order your needs to-day from the postal service specialists: all goods are brand new and guaranteed and are delivered immediately carriage paid at list prices for cash with order or C.O.D. (Pay the postman)

INTERNATIONAL RADIO BUREAU 199, DEANSGATE MANCHESTER.



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DO YOU KNOW?

All the best value ones bear this symbol on every box or writing pad.

Peppys Stationery

Look for it.

From all stationers. or the stationery departments of Boots Ltd.

MAINS TRANSFORMERS

HEYBERD

MONARCH OF THE MAINS.

Heyberd manufacture a large range of Mains Transformers for valve or metal rectification. There is a Transformer for every purpose. Made with the finest BRITISH steel and wire by BRITISH workmen. Here are popular models for valve rectifiers:—

Model	Secondary Output	PRICE
715.	230 + 230v. 30 ma. 2+2v. 1 amp. 2+2v. 3/4 amps.	25/-
803.	250 + 250v. 75 ma. 2+2v. 1 amp. 2+2v. 5/6 amps.	29/-
804.	350 + 350v. 80 ma. 2+2v. 2.5 amps. 2+2v. 4 amps.	32/6
805.	350 + 250 + 250 - 350v. 120 ma. 2+2v. 2.5 amps. 2+2v. 5 amps. 2+2v. 2 amps.	49/6
806.	600 + 500v. 120 ma. 2+2v. 2 1/3 amps. 2+2v. 5/6 amps. 2+2v. 2 amps.	59/-



Cut out this advertisement, write your name in the margin, and send NOW with 3d. in stamps for NEW 1935 Radio Hand book describing these Transformers and showing how to build the mains unit or battery charger to suit your particular requirements, etc.

F. C. HEYBERD & CO.,
10, Finsbury St., London, E.C.2.



"We're Fluxite and Solder—the reliable pair; Famous for Soldering—known everywhere! For faulty connections—someone's to blame! When fixing up YOUR Set—let THIS be YOUR aim!"

See that Fluxite and Solder are always by you—in the house—garage—workshop—anywhere where simple, speedy soldering is needed.

ALL MECHANICS WILL HAVE FLUXITE

IT SIMPLIFIES ALL SOLDERING

All Ironmongers sell Fluxite in tins: 4d., 8d., 1s. 4d., and 2s. 8d. Ask to see the FLUXITE POCKET SOLDERING SET—complete with full instructions—7s. 6d. Ask also for our leaflet on HARDENING STEEL with Fluxite.

FLUXITE LTD. (Dept. W.W.)
Dragon Works, Bermondsey Street, S.E.1

FOR ALL REPAIRS!



Components, Etc., for Sale.—Contd.

(This advertisement continued from previous page.)
VARLEY Constant Square Peak Coils, band pass type B.P.7, brand new in maker's carton with instructions and diagram, 2/6.
VARLEY H.F. Intervalve Coils B.P.8, band pass, complete with instructions in original cartons; 2/6.
SCREENED H.F. Chokes by One of the Largest Manufacturers in the Country; 1/6.
PREMIER British-made Meters, moving iron, flush mounting, accurate, 0-10, 0-15, 0-100, 0-250 m.a., 0-1, 0-5 amps.; all at 6/-.
ALARGE Selection of Pedestal Table and Radiogram, cabinets, by best manufacturers, at a fraction of original cost, for callers.
THE Following Lines 6d. each, or 5/- per dozen.—Chassis valve holders, 5-, 6-, or 7-pin, screened screen grid leads; any value 1-watt wire end resistances, wire end condensers, 0.0001 to 0.1 trimming condensers, Bulgin 5 amp. mains switches.
PLEASE Send for Fully Illustrated Catalogue.

PREMIER SUPPLY STORES, 20, High St., Clapham, S.W.4. Telephone: Macaulay 2188. Nearest Station, Clapham North Underground. [6241]

WOBURN RADIO Offer Final Summer Clearance:—

RESISTANCES.—Bargain parcel of 1 1/2 watt, wire wound, accurate to 1%, containing 13 resistors, values 100 ohms to 0.1 meg., 3/9, post 3d.; Parcel B, containing 27 resistors as above, 7/6.
DUBILET 2 mfd., 1,000v. test 1/3; Wego, 750v. test, 1 mfd., 1/-; 2 mfd., 1/3; 4 mfd., 2/3; tubulars, 0.01, 0.02, 0.1, 6d.; snap type chokes, H.F. 1/-; S.W.H.F., 1/-; Radiophone straight line drives, with escutcheon, listed 8/6, 3/9; toggles, 6d.

WESTERN ELECTRIC Microphones, boxed, very sensitive, at 2/3; transformer for same, ratio 85/1, 2/3, post 3d.

PORTABLES.—Large clearance of shop soiled five-valve portables good condition, working order, less valves and batteries, 18/6; postage 1/3.

WR.C. Eliminators, guaranteed 12 months, 150v. 30 m.a. output, A.C. model with trickle charger (2v., 4v., 6v., 1/2 amp.) 32/6; A.U., 21/-; universal, 21/-; D.C., 9/8.

NEW Trade List Now Ready; enclose heading.

WOBURN RADIO Co., 9, Sandlans St., Bedford Row, W.C.1, Holborn 7289. [6369]

UTILITY SALES Co. Bargains—all guaranteed new.

CELESTION P.M.W., 45/- model, 17/6; Ekco T.C.1, 1/2 amp. L.T. charger, 17/6 (list £27/6).

REGENTONE A.C. Eliminator with L.T. Charger, S.G. and det. tapings, variable; 35/- (list £4/12/6).

MAINS Transformer by Standard Cable Co., primary 200-240, secondary 300-0-300 60 m.a., 4v. 3a., ct., 4v. 2a.; 8/6.

IGRANIC Band-pass Unit, comprising 3 iron core coils on base dual wavelength; 14/6 (list 33/-).

IRON Core Coils Dual Wave, matched for S.G., including diagrams for 3 circuits, 2/6 each; also Lucerne, iron cored, 2/6.

MICROPHONES, Western Electric, hanging, 2/6; hand types, 3/6, including diagrams; transformers for ditto, 3/6 each.

BUTTONS, large tested model, 1/-; electric soldering iron, any voltage, fine valve, 4/6.

GE.C. 1934 Thirty-three 3-valve Receiver, complete with Ocean valves and cabinet, sealed cartons; £4/10.

ELECTRIC Clock, bakelite case, battery model, complete and guaranteed; 12/6.

MARCONI 2v. Sets, ring valves, Marconi H.T., Exide L.T., speaker; (list £24/4), £2/12/6.

METRO VIC Mains Transformers, 200-240 volts, 250-0-250 60 m.a., 4v. 5a., 4v. 2a., guaranteed; 10/-.

CASH With Order, carriage paid, 24 hours' service.

UTILITY SALES Co., 27a, Sale St., Paddington, London. [6410]

GILBERT INDUSTRIES Sensational Start to the New Season.

PA. Amplifiers, brand new, 6 watts undistorted output, using 2PX4's.

LAATEST Auto-coupled Circuit, including remote control, input transformer, high capacity smoothing and choke filter output.

A STEEL Chassis, custom built job, available owing to a broken contract.

READY to Work, less valves, at 65/-; carefully packed and post paid. (few only with valves).—Gilbert Industries, Ltd., 519, London Rd., Westcliff-on-Sea. 'Phone: Southend 492071. [6363]

EPTON Here Again, with brand new and guaranteed surplus bargains!

13/6 Will Buy a 22/6 Cosmocord 1934 Pickup, with balanced tone arm, volume control, rest, etc.

17/6 Will Buy a Westinghouse H.T.8 Rectifier and Regentone Transformer to Match (180v. 100 m.a., 4v. 4a.); 18/6 for H.T.9 rectifier and transformer (300v. 100 m.a.).

45/- Will Buy a Celestion £6/10 P.P.M.79 Model De Luxe P.M. Speaker (Universal Transformer), in walnut, mahogany, or oak cabinet, packed in original carton.

EPTON, 93, New Rd., Chingford, E.4. (Cash with order or e.o.d.) [6341]

1/6—Cadmium plated chassis, 4-valve, pressed steel, 14x9; post 6d.

2/9—Plew A.V.C. units for battery receivers, prevents fading, list 10/-, brand new.—Kay, 167, City Rd., London, E.C.1. [6159]

MAINS RADIO DEVELOPMENT COMPANY'S Following Guaranteed Lines.

FRANKLIN 1-watt Colour Coded Resistances, 100 to 100,000 ohms, 4d., 3/6 per dozen.

HELLESEN 8 mfd. Wet Electrolytics, 435v. working, 2/4; Radiophone 10,000 ohm potentiometers, with switch, 1/9.

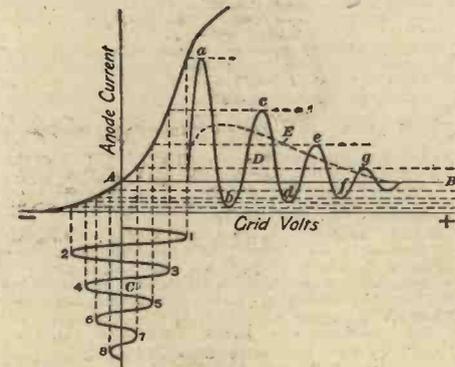
T.C.C. Standard Fixed Condensers, 250v. A.C. working, 2 mfd., 1/4; 0.1 mfd., 6d.

SYSTOFLEX Standard Gauge, new, 3ft. lengths, 1/- per 12; Radiophone on-off toggles, 6d.

MIKADO 0.0005, 0.002 mfd. Condensers, 250v. working, 9d. per 12; Ferranti B.8 chokes, 4/6.

MAINS RADIO DEVELOPMENT COMPANY, 4.6, Muswell Hill Rd., London, N.6. 'Phone: Tudor 4046. [6378]

Do You Know What This Graph Means?



The man who can analyse these curves and understand what they indicate knows his job. But if they do not convey to him perfectly definite information, it would appear that he needs more training than he has had. He is not competent to fill a responsible position in wireless.

Radio has developed so rapidly throughout the last ten years that it has now greatly outgrown the supply of technically qualified men required for the better posts. Moreover, it continues to develop with such speed that only by knowing the basic principles can pace be kept with it.

The I.C.S. Radio Courses cover every phase of radio work. Our instruction includes American broadcasting as well as British wireless practice. It is a modern education, covering every department of the industry.

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Included in the I.C.S. range are Courses dealing with the Installing of radio sets and, in particular, with their Servicing, which today intimately concerns every wireless dealer and his employees. The Operating Course is vital to mastery of operating and transmitting.

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- COMPLETE RADIO
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- WIRELESS ENGINEERING
- WIRELESS OPERATORS
- EXAMINATION (state which)

Name Age

Address

Components, Etc., for Sale.—Contd.

SOUTHERN RADIO'S Bargains.—Set manufacturers' guaranteed surplus.

VARIABLE Condensers.—Lotus 3-gang 0.0005, 12/6; Lotus 2-gang, 0.0005, 8/6; Lotus Dyblock single, 0.0005, 4/9 (list 9/6); all these condensers are complete with dials, escutcheons, knobs, fully screened with trimmers and boxes; Hydra block condensers 18 mid. (2+2-8+2+1+1), 1.000v. D.C. 7/- each; Dubilier 4 mfd. (2+1+1), 1.000v. D.C. 2/9; 4.5 mfd. (2.25+2.25) 1.000v., for mains noise suppression, 3/-; Utility Midget 2-gang variable condensers, 0.0005, with concentric trimmers, 3/5; T.C.C. 0.1+0.1, 1/3 each.

SPEAKERS—Blue Spot permanent magnet, with universal transformer for power, super power, pentode and Class B; 23/- (list 39/6).

G.E.C. Stork Speaker in Cabinet; 19/6 (list £3/15).

S.T.400 Kits, all specified proprietary components; £2/19/6 (list £4/17/6).

EKCO A.C. Eliminators, each new and boxed, in original sealed cartons; type A.C.25, 33/6 (list £3/17/6); type K.12, with trickle charger, 37/- (list £3/17/6); Ekco trickle chargers, type T.C.1, for 2-, 4- and 6-volt accumulators, 20/- (list 42/-).

IGRANIC Superhet Coils, set of 4 (1 Osc., 2 I.F., with pigtails, 1 L.F. plain); 12/6 (list 50/-).

LISSEN Superhet 3 Coils Kit, screened, ganged on base with wave change and filament switches; type L.N.5181, for battery or mains; 12/6 (list 30/-).

VARLEY Constant Square Peak Coils, complete with all accessories, new, boxed, B.P.5; 2/4.

VARLEY H.F. Inter-valve Coils, B.P.6; 2/3.

FRAME Aerials.—Lewcos dual wave superhet; 9/- each (list 27/6).

PICK-UPS—Marconi No. 19 (1934), 22/6 each (list 32/6).

READY Radio Instamat Transformers, for matching any valve to speaker; Junior model, ratios 1.2:1, 1.1:1, 2:1, 3:1, 7/6 (list 27/6); Senior model, ratios 10:1, 12½:1, 14:1, 16:1, 20:1, 25:1, 12/6 (list 37/6).

RECEIVERS—3-valve screen-grid Elector Super, complete with valves, Exide batteries and accumulator, Celestion moving coil speaker, contained in magnificent walnut cabinet; £3/10 (list £10).

OSRAM Thirty-Three Music Magnet, complete with G.E.C. speaker, 2 Osram screen-grid and Osram power valves in original bakelite walnut cabinet; £3/12/6 (list £9/9); in original sealed cases.

BOTOLPH Lightweight Portable Receivers, complete with 5 Mullard valves, Exide batteries and accumulator, overall size 13in.X11in.X8in., £2/19/6 (list £8/8); a real suitcase portable.

READY Radio Meteor Screen-grid 3-valve Kits, all specified components new, in sealed cartons; 25/-, less valves; with 3 Mullard valves, 42/6 (list £57/6).

"A" Kit, as above, complete with magnificent walnut cabinet and Celestion perm. mag. speaker, less valves, £3/5; with 3 Mullard valves, £4/2/6 (list £8/17/6).

MULLARD Radio for the Million, "Station Master Three" battery kits, complete with cabinet and 5 Mullard valves (screen grid, H.L. power), brand new in original sealed cartons; £2/19/6 complete.

MISCELLANEOUS—Westinghouse metal rectifiers, H.T.6, 7, 8, 9/3 each; Ferranti chokes, 20 henry 60 m.a., 5/9 each; Lewcos superhet, 8-way bases, complete with valve holders, grid leak, fixed condenser, type "48," 2/- each; Lissea base turntables, 1/6 (list 5/-); Lewcos coils, B.P.F./R., 4/-; T.B.F./C., 3/3; O.S.C./126 (Extensor), 3/3; T.O.S./R., 3/3; Morse tapping keys, with buzzer and flashlight signal, complete with battery and bulb, 2/- each.

ALL Goods Guaranteed and Sent Carriage Paid.

BRANCHES at 271-275, High Rd., Willesden Green, N.W.10, and at 46, Lisle St., W.C.2. Please send all post orders to 323, Euston Rd., N.W.1.

SOUTHERN RADIO, 323, Euston Rd., London, N.W.1 (near Warren St. Tube). 'Phone: Museum 6324. [6366]

PEARL and **PEARL** Bargain List A Free.—190, Bishopsgate, London, E.C.2. [0421]

THE Following Unused Set Manufacturers' Surplus, all goods guaranteed perfect; immediate delivery.

TRANSFORMERS, 350-0-350v., 75 m.a., 4v. 4a-4v. 2a., 12/6; A.C. and D.C. eliminators, first class make, tappings S.G., detector, and power (150v., 25 m.a.), A.C. type, with Westinghouse rectifier, 25/-; D.C. type, 12/6.

DUBILIER Resistors, 1 watt type, 7d.; 2 watt type, 1/2; 3 watt type, 1/9; Dubilier or T.C.C. condensers, 8 mf. or 4 mf., 500v. working, 50v. 50 mf., 200 mf. 10v., 3/6; Mansbridge type, 4 mf. 400v., 4/-.

MARCONI K19 Pick-ups, 22/6; B.T.H. pick-up tone arms, 3/-; B.T.H. needle armature pick-ups, 29/-.

CLIX 5-pin Valve Holders, 5d.; Rotorohm volume controls, with switch, 2/6.

WESTINGHOUSE Rectifiers, H.T.8, 9/6; H.T.9, H.T.10, L.T.4, L.T.5, 10/9; transformers (Regentone) for H.T.8 or H.T.9, with 4v. 4a. L.T. 7/-; carriage paid, cash with order or c.o.d.; send for list.

WARD, 45, Farringdon St., London, E.C.4. 'Phone: Holborn 9703. [6403]

GRAMOPHONE Converters, loud speakers, cabinets, pedestals, tables, illustrated lists.—Beds Distributors, Biggleswade. [6531]

TELEPHONES, wall, complete, 16/-; table 'phones, 15/-; pedestals, 7/6; hand 'phones, 4/6; microphones, 2/6 and 4/6; buzzers, 2/-.—Below.

FLEXIBLE Shafts, complete, transmit 1 h.p., 2/6; large Morse keys, 4/-; Brown's single earphones, 1/-.—Below.

SPARK Coils, 10in. 25/-, 15in. 35/-, 17in. 50/-, 2in. complete 17/6; mercury breaks with motor, 35/- and 70/-.—Below.

DYNAMOS for Charging, 20v. 8a, 32/6, 50v. 4a, 37/6, 50v. 15a, 90/-, and others; voltmeter, 0-500v., 15/-; ampeters, 0-3 7/6, 0-20 12/6, 0-50 15/-, 0-250 20/-; mine exploders, 17/6.—Below.

GALPIN, 75, High Rd., Lee, London, S.E.13. Cash with order or c.o.d. Close half-day Thursday. [6392]

Components, Etc., for Sale.—Contd.

COLVERN 1935 Ferrocort G1-2-3, with J.B. ganged condenser; 2 guineas.—Wright, Copsewood Way, Northwood. [6385]

NEW Selenium Cells of Marvellous Sensitiveness for Talkie Film Work, relay apparatus, etc., 300 microamperes per Lumen.

ELECTRIC Eyes, light-sensitive discs, generate own electricity on exposing to light, no battery, the very latest.—Particulars, B. Harding, 139, High Holborn, W.C.1. [6407]

BIRMINGHAM RADIOMART Revised List Now Ready; more components than advised in whole these columns; stamp essential.

RADIOMART—Utility fully screened 3-gang, with trimmers, list 22/-, 6/6; Utility disc dials, 2/-.

RADIOMART—Latest 2½in.X¾in. visual tuning meter, illuminated, 6 m.a., similar R.G.D.; 5/9.

RADIOMART—Igranic smoothing chokes, 20-10hy., 260 ohms, 100 m.a., Stalloy core impregnated interleaved windings; 2/9.

RADIOMART—Single Span formers, 1in.X2in., 7 for 10d.; 100 m-mid. micros., 1/3.

RADIOMART—Radiophone straight line dials, illuminated, ours have oxidised escutcheons, knob; 3/6.

RADIOMART—Igranic boxed nickelcore 3-1, 5-1 transformers, list 10/6, 3/11; Igranic 8/6 parallel feed, 2/11.

RADIOMART—Centralab 1-watt colour coded resistances, nearly all values; 6d.

RADIOMART—Radiophone wire-wound logarithmic potentiometers, 5,000, 2/-; 15,000, with concentric independent main switch, 2/9.

RADIOMART—Aerovox 8x8 mfd. dry, the world's best electrolytic; 3/6; cheapest smoothing possible.

RADIOMART—Utility 1934 bakelite condensers, 0.0005, 10d.; 0.0003, 8d.; 0.0002, 0.0001, 6d.; 0.0003 differentials, 1/6.

RADIOMART—Cadmium 5-valve chassis, 1/6; 4-valve, 1/-; postage 6d. extra.

RADIOMART—Utility screened 2-gang 0.0005 bakelite Uniknob, disc drive, 2/11.

RADIOMART—Telsen boxed differential condensers with knob, 0.0001, 0.00015, 1/-; 0.0003, 0.00035, 1/3.

RADIOMART—Met-Vick boxed H.F. chokes, really efficient, 1/-; Utility snap switches, 9d.

RADIOMART—Colvern 5-watt wirewound potentiometers, 2,500, 15,000, 1/6; Magnum, 25,000, 1/9.

RADIOMART—Non-inductive wire-wound tubulars, 1,500v., 0.1 mfd., 0.01, 0.02, 0.05, 6d.; Philips ditto, 0.0001, 0.001, 2d.; 0.25, 0.5, 9d.; T.C.C. 0.25, 1/-.

RADIOMART—Sovereign 50,000 genuine wirewound potentiometers, 5-watt, 2/-; Electrad 50,000 potentiometers, 1/6.

RADIOMART—T.C.C. 250v. A.C., equivalent 400v. D.C. working, 4x4x4 (12 mfd.), 3/9; T.C.C. 8 mid. electrolytics, 3/-.

RADIOMART—Milliammeters, ammeters, flush, nickel, 2½in., 5/9; super ditto, 2½in., 6/9; read A.C. or D.C., all ranges.

RADIOMART (G5NI), shortwave specialists, actually stock Hammarlund and National superhets and components.

RADIOMART—Shortwave receiver components, Eddy-stone Midget 6-pin formers, 1/-; shortwave H.F.C. 9d.

RADIOMART—Microvariables 15, 40, 100 m-mid., 1/3; super all brass 0.0001 shortwave piktal, 1/9.

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POLAR Star 0.0005 Superhet, 9/6; two Wearite Baby superhet I.F. transformers, 6/-; O.P.M.6, 15/6; two Cydon 0.0002 short-wave condensers, 4/6 each.—Ideal Radio, 23, Claridon Rd., Harrow. Harrow 1950. [6406]

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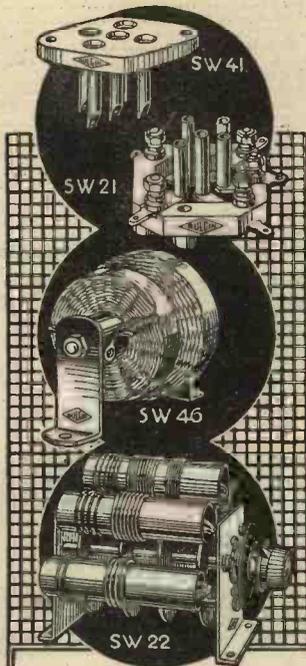
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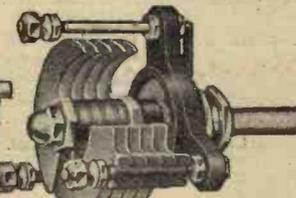
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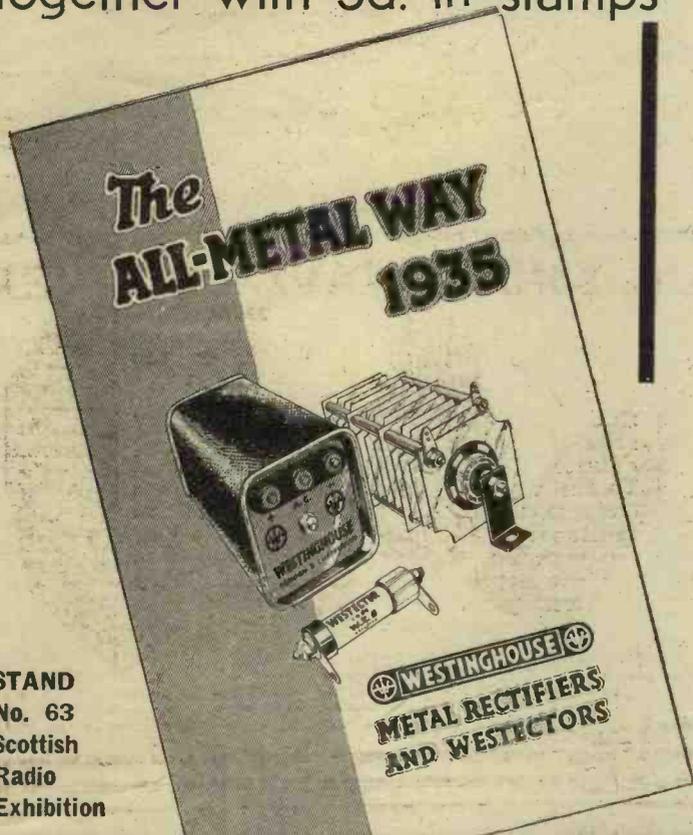
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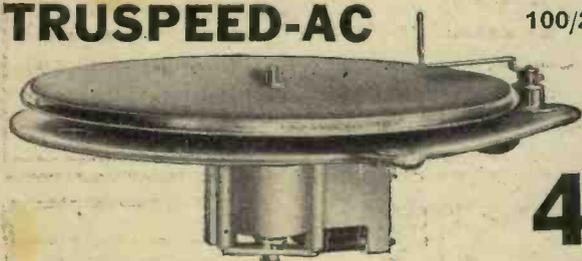
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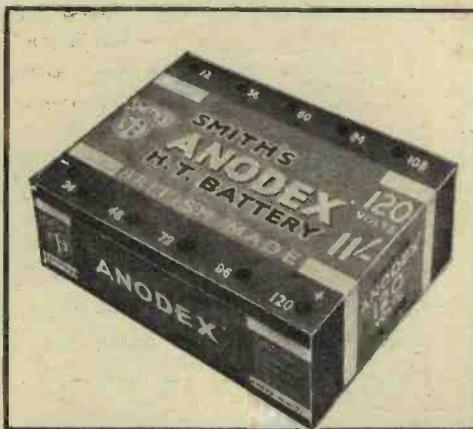
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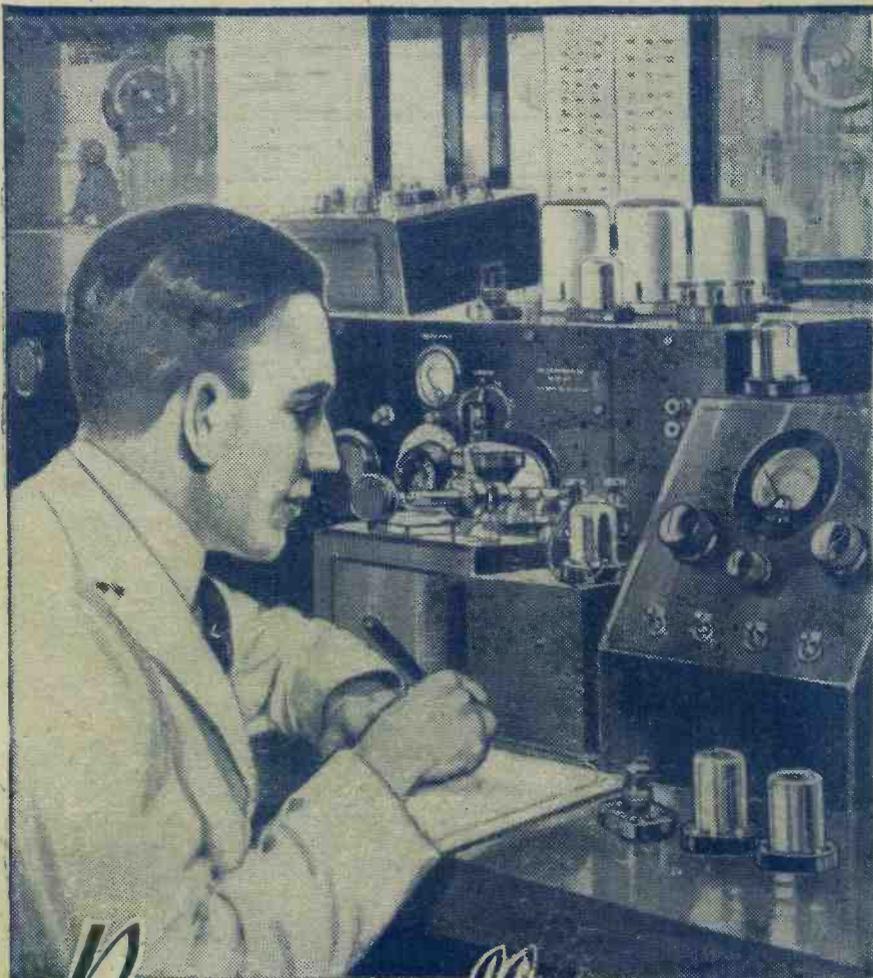
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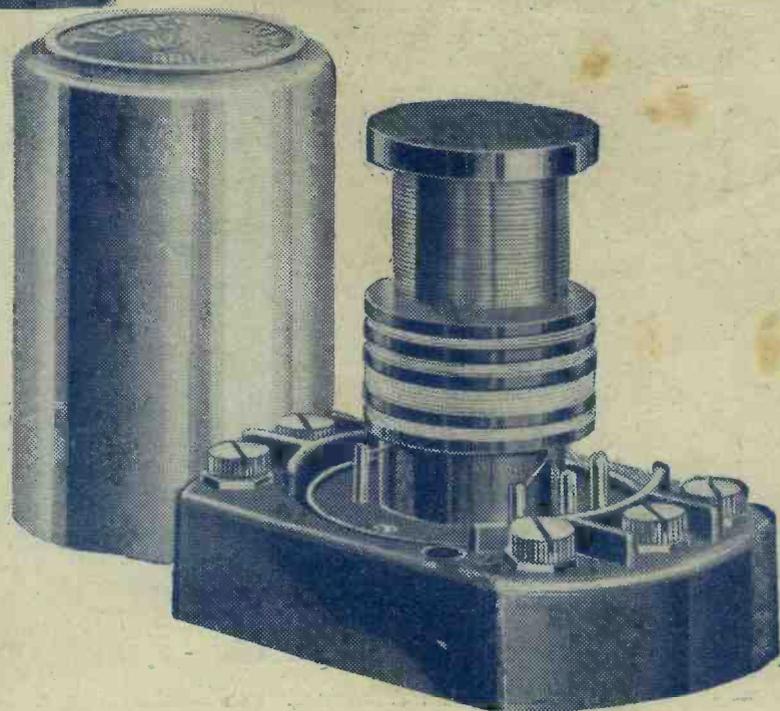
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THE PRACTICAL RADIO JOURNAL

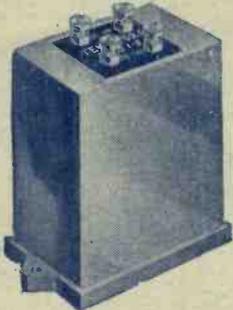
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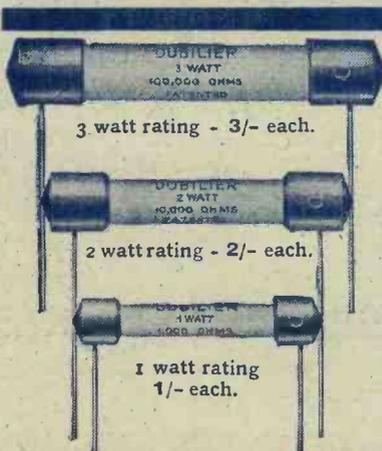
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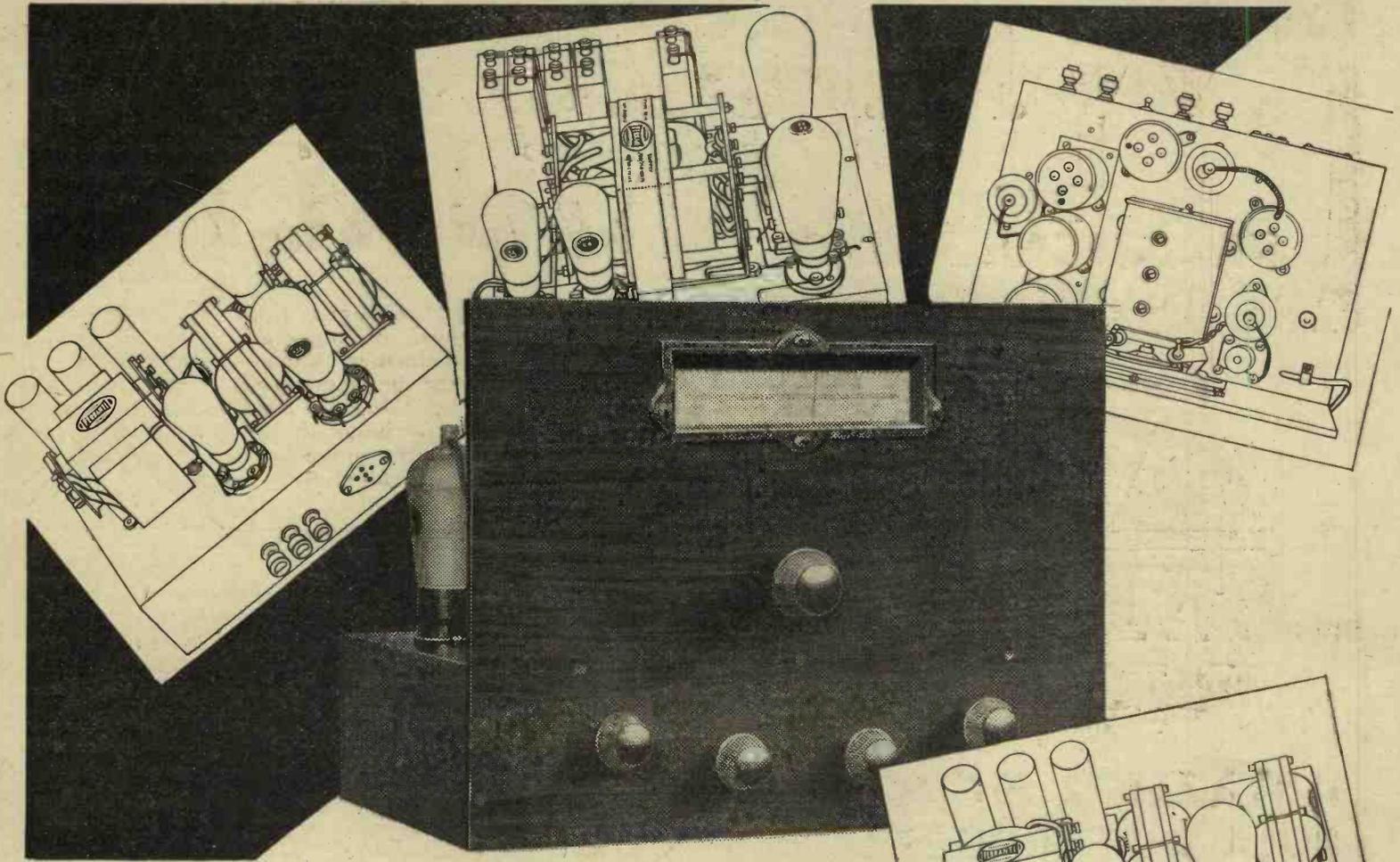
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The Wireless World

THE
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*As many of the circuits and apparatus described in these
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making use of them, to satisfy themselves that they would
not be infringing patents.*

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EDITORIAL COMMENT

Broadcasting and Cinema Quality

Arousing Public Interest

SELDOM have we had occasion for such genuine satisfaction as we feel at the interest taken in recent references in *The Wireless World* to broadcasting in relation to cinema reproduction quality.

We have received a very large number of letters discussing the question both from the broadcasting and the cinema aspects. Our satisfaction is not derived from having been the cause of provoking argument as to the relative merits and efficiency of the two methods of sound reproduction, but because the correspondence shows that the public is taking a very genuine interest in the question of quality, and it is not, as we were inclined to fear, content to accept as "good enough" reproduction which falls short of what can reasonably be attained.

We do not wish to create a situation where *The Wireless World* acts as a medium for an acrimonious discussion on the relative merits of cinema and broadcast reproduction, because we feel that the position is influenced by so many different factors that it would be difficult to resolve such an argument into any useful result. We do hope, however, that our readers will continue to interest themselves in this question by making their own comparisons and agreeing to be dissatisfied with the present average quality, both from broadcasting and from cinema reproduction. Only by encouraging the feeling that all is not so well as it should be can we hope that progress will be made, and something more nearly approaching perfection attained in the future.

On the general question of good quality of reproduction, or "high

fidelity" as it is generally termed in America, we are badly in need of a definition. Already we have met with the expression "high fidelity" used in what might be termed borderline cases. There seems to be a real need to agree upon correct terminology to apply to various degrees of quality in terms of the range and intensity of frequencies produced, otherwise "high fidelity" will become as indefinite a definition as "short waves." The public should be trained to associate the expression "high fidelity" only with reproduction of quite unusual quality.

The Manchester Show

The Exhibition Arrives from Glasgow

THE Scottish Radio Show having closed, the Exhibition moves on again to Manchester, where it opens to-day. The Exhibition will provide the public of the Midlands with an opportunity of acquainting themselves first-hand with all that is newest amongst the products of the manufacturers.

The Olympia Show numbers of *The Wireless World* will still provide a guide to the exhibits at Manchester, as practically all the firms there were also showing in London, and the plan of the Manchester Hall and List of Exhibitors, published elsewhere in this issue, will enable visitors to find their way about easily. The B.B.C. is organising a theatre at Manchester on much the same lines as in London, although the accommodation will not be so large.

We wish all success to Manchester, and hope that the exhibition will prove equally as attractive as the Olympia and Scottish shows which have preceded it.

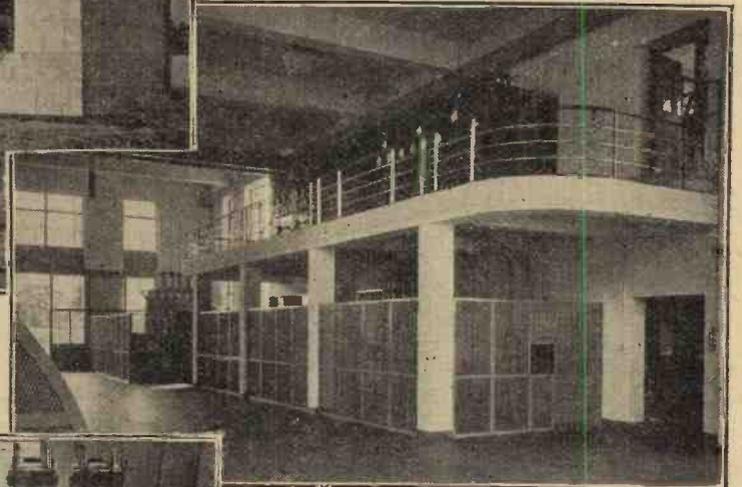
DROITWICH

The 150 kW. station at the new site is now in operation. The building is also designed to house the Midland Regional transmitter, of 50 kW.



the engineer at the control table has an almost complete view of the distributed equipment.

The B.B.C. has stated "it will not be possible to determine the exact perform-



THE B.B.C., and Mr. Noel Ashridge, the Chief Engineer and his colleagues in particular, are to be congratulated on the completion of Droitwich, the latest of their transmitters, which, as the National station, commenced transmissions last week.

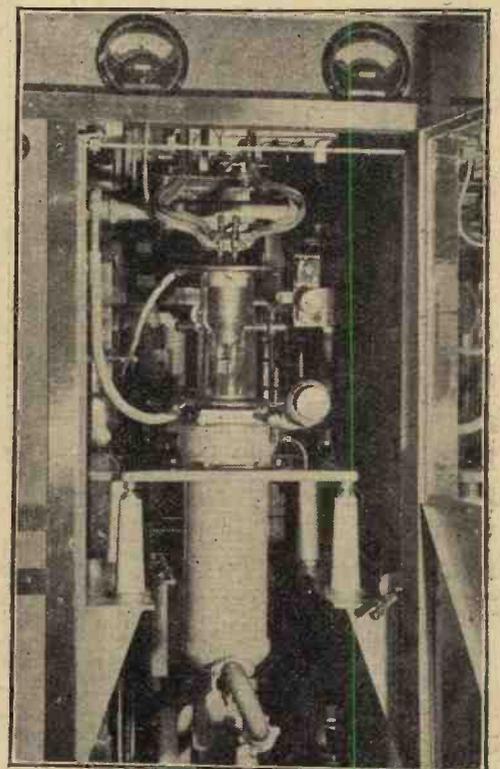
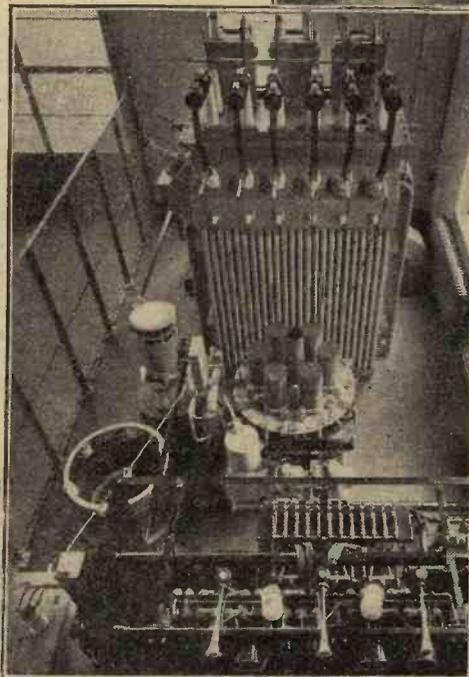
The aerial transformer house and National aerial down-lead termination.

It is, perhaps, scarcely correct to refer to the station as complete, because although a part of the machinery is already installed for the Regional transmitter, this equipment will not be ready for operation for some time.

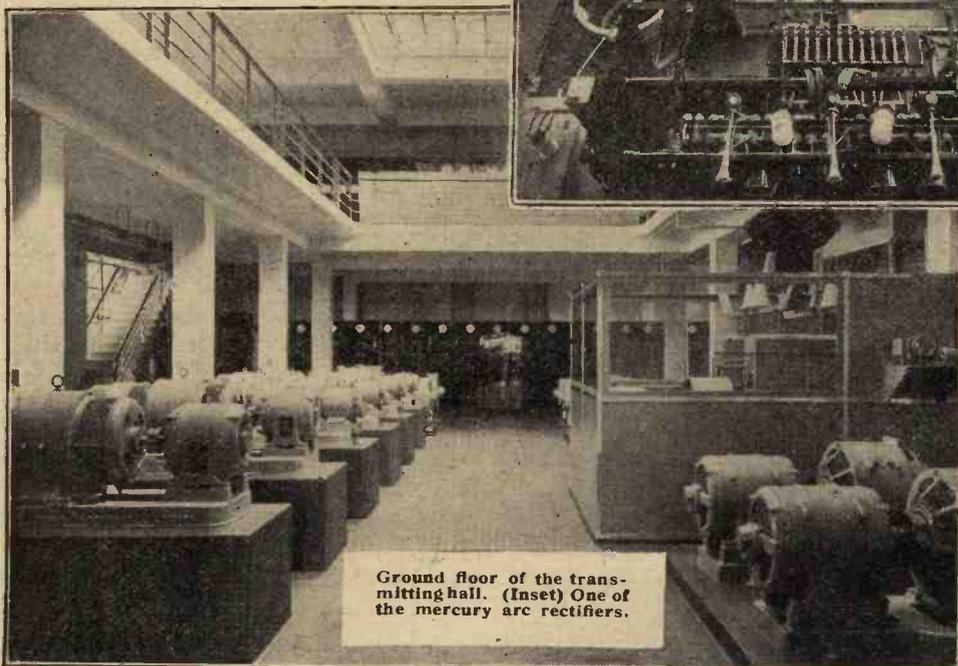
The group of pictures appearing on this page gives a general idea of the layout of the station and the general arrangement. The control table located in the gallery is of special interest, as from here the entire equipment is supervised. The planning of the station has also been so arranged that

The high-tension machine room.

ance of the station until it has been in regular service for at least a year," but already listeners will have noted with



One of the 50 kW. valves in the final push-pull modulated-high-frequency stage.



Ground floor of the transmitting hall. (Inset) One of the mercury arc rectifiers.

satisfaction the very great improvement in signal strength and quality in almost every part of the country.

Transient Sounds

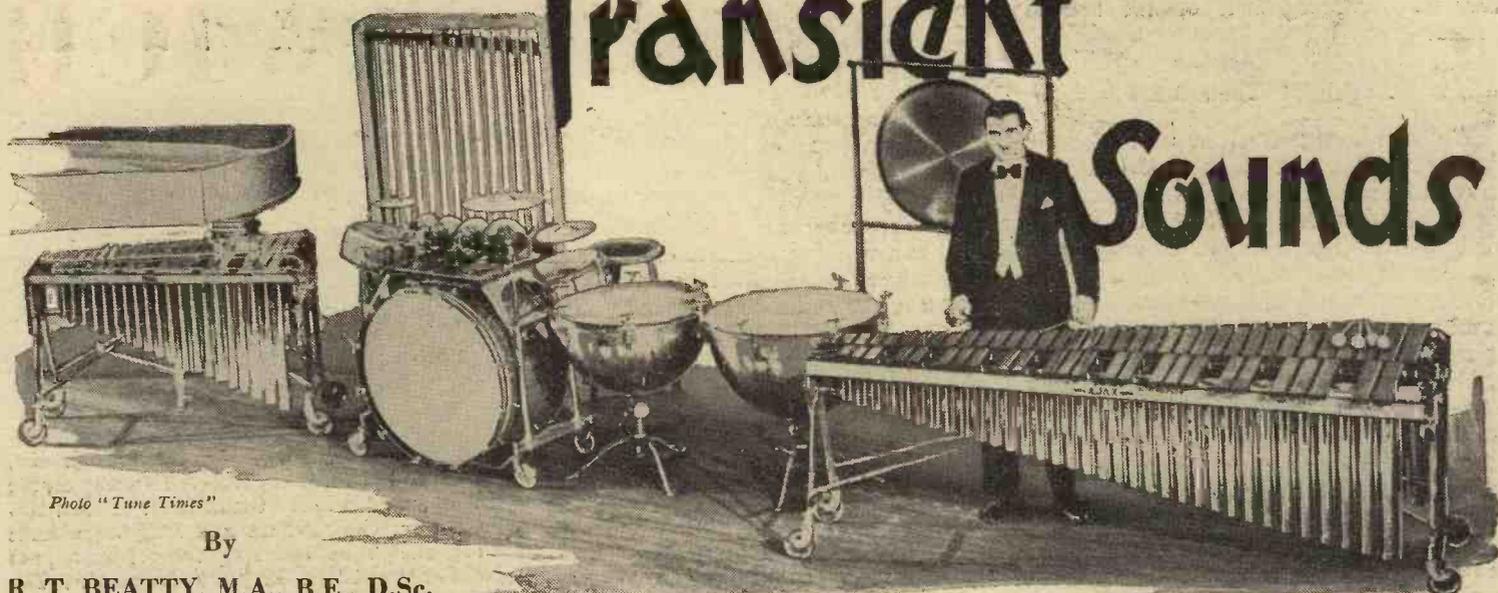


Photo "Tune Times"

By

R. T. BEATTY, M.A., B.E., D.Sc.

An Explanation of the Difficulty of Reproducing True Percussion Notes Through the Loud Speaker

FROM time to time discussion arises on the question of the effect of transient sounds on electrical reproducing apparatus. Transients are probably more difficult to reproduce faithfully than any other type of sound. In this article the author explains the nature of transient sounds so that the reader will find it easier to understand the effects which they give in the process of sound reproduction.

EVERYONE must have noticed at one time or another that the sounds which emerge from a loud speaker contain two well-marked types. One type is of full, easy-flowing, melodious vibrations which fall pleasantly on the ear and can be listened to from the depths of an easy chair: Viennese waltzes, for example, or the sympathetic voices of Sir Walford Davies or of A. J. Alan. The impression of ease given by such sounds is well founded, for records of the actual form of the waves of sound show smoothly rounded curves, never hastening, never stumbling, flowing gently into new forms and cadences, devoid of shocks and harshness.

These are the continuous sounds; undulations in which each vibration is repeated many times before merging into its successor. It is with such sounds that a wireless set can deal most successfully, and, most remarkably, not only a wireless set, but also the human ear, and even the human mind itself.

Perhaps it is fortunate that continuous sounds are not the only ones among which we live. For in their presence, though the higher mental faculties may be stimulated, we feel less alert, less capable of rapid decision, somewhat benumbed by the atmosphere of lotus land. It is noteworthy that it is not to those races which have developed the most melodious forms of language that success in the evolutionary struggle has been granted. The South Sea islanders, for example, have left a fainter mark in history than the inhabitants of Northern Britain. Let us, therefore, be thankful

for an admixture of the sounds with which we are now about to deal, the troublesome and refractory sounds of the second type—the transients.

What are Transients ?

In human speech the smoothly flowing vowel sounds are interrupted by comparatively short and explosive consonants: these latter are not so much in evidence in the performance of the singing voice, since singers take care to slur them or avoid them as having little musical value. Not all consonants are of an explosive nature; some can be maintained for a long time, such as l, m, n, r, but others, for example, p, t, k, represent single puffs of air suddenly released: they are incapable of the rapid repetition required to maintain continuous vibration, and are indeed *transient* phenomena—full stops, so to speak, interposed between one phrase and another. The colour of speech and the characteristic accent of any individual depend largely on the amount of emphasis laid on these consonants.

Explosive sounds mean sudden changes in wave form, and their faithful reproduction demands apparatus capable of immediate response, that is, devoid of inertia either of an electrical or a mechanical nature. This is an ideal difficult, though not impossible, to realise, and as a result we find that transients suffer severe distortion over the telephone, and less severe but still considerable distortion as they pass through the various components of a wireless set.

Transients in their most extreme form are sudden dislocations of wave form—simple puffs of air rapidly produced and rapidly extinguished. They arouse no sensation of pitch. Rapid repetition of a transient results in a musical note as when a jet of air is interrupted by a rotating toothed wheel, while a multitude of different transients results in noise.

Coloured Transients

From a wireless point of view it is fortunate that transients seldom occur in this raw condition. Suppose we try to make a sudden sound by drawing a cork from a bottle of soda water, the first puff of escaping gas overshoots the mark, and air rushes in to fill the partial vacuum so that a few oscillations are produced; even though they die away rapidly, a brief musical note has been emitted which gives colour to the transient. If the bottle is half-empty there is a bigger air-space to fill at each surge, and so the oscillations are slower. If the reader will think of various ways of producing transients he will soon realise that such coloration is always present to some extent. When a paper-bag is burst oscillations are set up just as with a popping cork: in the orchestra, drum beats and the clashing of cymbals are followed by after vibrations, and footfalls take their colour both from vibrations of the ground and from echoes due to surrounding objects.

It seems, then, that transients seldom stand alone, but carry with them their own musical accompaniment, and it is on

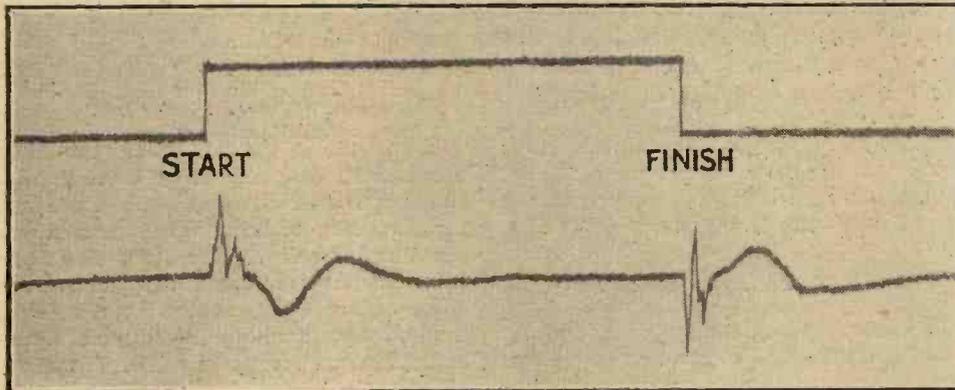
Transient Sounds—

this accompaniment that we must mainly rely for our recognition of the sudden sound.

Artificial Transients

We have seen that, owing to the elastic properties of air, a single puff is nearly always followed by a series of vibrations, so that it is difficult to produce an isolated disturbance. But it is quite easy to obtain the desired (or undesired) effect in the set itself. For example, if we touch the grid terminal of any valve with the terminal of a charged condenser, the voltage of the grid is suddenly changed, and then rapidly falls to its original value owing to leakage through the grid resistance. Similar results may be produced by a loose wire, as many listeners know by painful experience.

Measurements of the distorting effect of a receiving set have frequently been made by applying a standard shock from a charged condenser to the grid of the first valve and recording the wave-form at various points of the set. The resulting shape varies from one set to another, but in all cases the outline of the final form is less



Oscillograph records (top) of a current impulse applied to a moving-coil loud speaker and (bottom) of the sound output showing colouration superimposed by the characteristics of the diaphragm.

sharp than the original; thus, an applied flat-topped wave may become like an inverted U by the time it reaches the moving coil of the loud speaker. This change in shape is due to the fact that most components are essentially leaky devices which allow electric charges to drain away even during the short time required for the wave to pass. Condensers leak because they are connected to earth through high resistances, while coils, whether acting as chokes or combined with condensers to form rejector circuits, cannot act as complete barriers to electric flow (for this would require their impedance to be infinitely great). In fact, a receiving set always tends to return to its undisturbed electrical state, and so is quite incapable of maintaining the horizontal summit of a flat-topped wave.

Sea Waves and Electric Waves

There is here a certain analogy with water waves. Waves of definite shapes and sizes can be produced on a liquid surface by means of a wave-making machine, but by no possible art can a flat-topped

wave—a wave looking like a brick sliding along a floor—be maintained; even if momentarily produced it rapidly loses its sharp edges, and merges in time into a smooth undulation.

Now let us turn to the loud speaker. The moving coil and cone possess inertia, and when we require them to follow faithfully an abrupt change in wave form, we are really demanding that the speed of travel should pass to a different value in an infinitely short space of time. This is evidently impossible—as impossible as to start a railway train at sixty miles an hour the moment the starting lever is moved. But what actually does happen is curious; under the impact of the abrupt blow the cone crumples slightly, and in recovering emits a characteristic note which is rapidly damped, so that the transient, itself considerably distorted, is coloured by a sound which is no constituent of the transient but is a cry of protest from the diaphragm of the loud speaker.

If we are sufficiently interested in pure reproduction to desire to eliminate this sound, we must have a loud speaker whose natural frequency of vibration is so high as to be outside the audible range. Electrostatic speakers which give this result have

been constructed in which the moving parts consist of piezo-electric crystals such as quartz or Rochelle salt.

The Art of Speaking

It is clear, then, that there are great impediments to the faithful reproduction of transients by electrical apparatus. Especially is this the case in telephony, since economy demands that we must put up with a system in which only 50 per cent. of words are intelligible, the remainder being guessed from their context. But this defect is not without its advantages, for it is compelling people to speak more clearly and carefully, and assists in arresting the natural tendency of languages to degenerate, as French has degenerated by slurring and elision from the stately Latin tongue which gave it birth. Chatterers and snufflers are unpopular on the telephone and in the studios of the B.B.C. Though the gabbling cross-talk comedian may fail to get across the ether, the pleasant and well-modulated voice will always command attention.

**DISTANT
RECEPTION NOTES**

NOW that we are on the threshold of a new wireless "season" it is interesting to see what kind of an account the Lucerne Plan has given of itself after having been in operation for eight months. Perhaps the most convincing method of discovering whether it has, or has not, brought about an improvement is to compare one's log for the past week with that of the corresponding week of 1933.

The most striking feature revealed by a glance at the appropriate page of my 1933 log is the frequency with which the entry "het." (standing for heterodyned) appears against the names of well-known stations whose transmissions, but for interference, would have been received with ample volume. No fewer than fifteen of such stations on the medium and long wavebands are shown as suffering from heterodynes either persistent or very frequent. The number really well received during that week was only seventeen.

Greater Programme Value

And now for the present time. Of the worth-while stations two pairs only were causing mutual interference. These were the Eiffel Tower and Motala (working for some quaint reason within a single kilocycle of one another) and Oslo and Madona. The last-named station has, of course, no right on the long waveband, and for its intrusion the Lucerne Plan is in no way to blame. Very occasionally (though not during the week in question) Prague is interfered with, apparently by Lisbon, and other cases of interference, none of which appears during this week's record, are those of Algiers with either Brussels No. 2 or Breslau, Barcelona EAJ15 with Königsberg, and Lille PTT with Trieste.

The number of stations received at good volume and clear of interference during the past week averages rather over thirty per evening. This is counting only those whose programmes could be heard with real entertainment value.

It may be suggested that the improvement is apparent rather than real, the superiority of a 1934 receiving set over a 1933 model being the most important factor in the case. May I hasten to say that in both instances the same receiving set was used without any alteration whatever?

We must concede, then, that the Lucerne Plan is definitely a success in that it allows more stations to be received. At the same time it must be admitted that the number of possible stations has been slightly reduced by the Lucerne Plan owing to group wavelength and shared wavelength working. In the autumn of 1933 there were between fifty and sixty stations from which good reception was a possibility. The number has now been reduced somewhat, but it is surely a far, far better thing to be able to log evening after evening thirty stations out of a possible forty-five than to enter, as one did last year, seventeen, or less than 33 per cent. of the possible total.

Though it seems that the sunspot minimum is past, and that we are making our way slowly towards another maximum, there is no doubt that the present autumn and winter are going to be good for long-distance reception.

D. EXER.

New Visual Indicator

Tuning

WIDESPREAD adoption of automatic volume control has popularised visual tuning indicators on account of the difficulty of tuning accurately by ear with receivers so equipped. Many methods of visual tuning are possible, and a new development in this field is described in this article, and it is of particular interest in that it lends itself readily for use with existing sets.



Climax
Production for
A.C. Receivers

THE fact that automatic volume control largely smooths out variations in volume has led to the development of many types of visual tuning indicators to show when a receiver is tuned accurately to a station. The Climax model is of an unusual type, embodying no moving parts. An ordinary lamp is used as the indicator, and with no signal it glows only dimly; when a signal is tuned in, however, it becomes brighter and tuning is carried out for maximum brilliancy.

The apparatus involved is extremely simple but ingenious. The lamp is heated from the 4 volts L.T. supply to the valve heaters through a resistance R (Fig. 1), the secondary of a transformer T being connected across it. The primary of this transformer is connected in the anode circuit of one of the valves controlled from the A.V.C. system.

therefore, that if the secondary impedance can be increased in any way a greater current will flow through the lamp and its brilliancy will increase.

The impedance of the secondary depends upon its inductance, and this in turn depends upon the D.C. magnetisation of the iron core, and hence upon the steady current through the primary. Consequently, it will be seen that the lower we make the anode current of the controlled valve, the greater will be the secondary

by the transformer, the A.C. voltage injected would be likely to cause mains hum. In order to overcome this, therefore, a choke Ch and a 4-mfd. condenser are included, and are effective in preventing all traces of hum.

The unit which is marketed by Climax consists of the transformer, choke, and variable resistance R assembled in a metal box with coloured leading-out wires for the necessary connections. Three pairs of leads are brought out, and to connect the unit to an existing receiver it is necessary only to connect the yellow pair to the holder for the lamp, which can be mounted in any convenient position. The brown pair of leads must be connected to the heater terminals of one of the valves. The lead between positive H.T. and the intervalve coupling of one of the valves controlled by the A.V.C. system must be broken, and the black lead from the unit joined to the free terminal of the coupling and to one side of a 4-mfd. condenser, the other terminal of which is connected to positive H.T. and the fitting of the unit is complete.

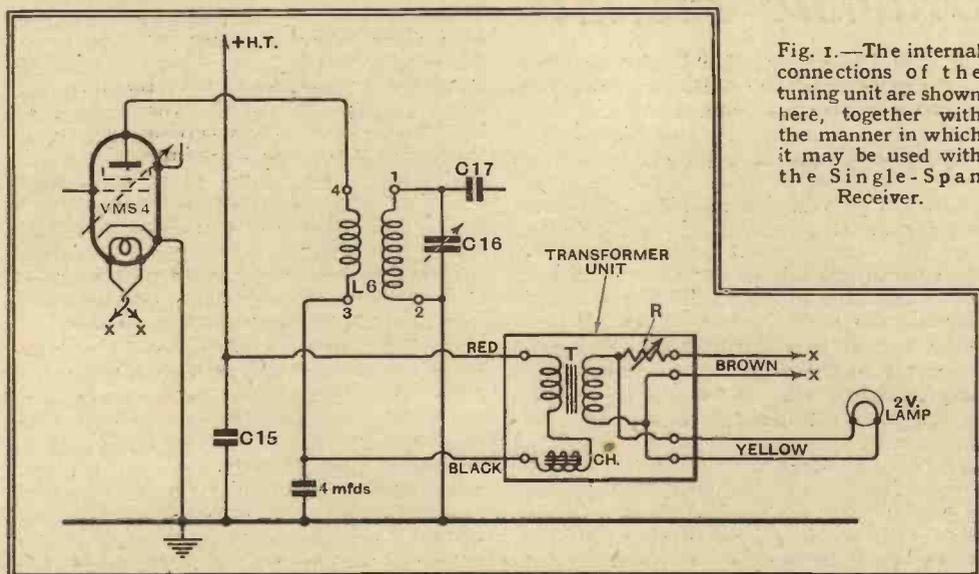


Fig. 1.—The internal connections of the tuning unit are shown here, together with the manner in which it may be used with the Single-Span Receiver.

Connecting the Unit to a Receiver

The simplicity of the connections is readily apparent from the diagrams which accompany this article. Fig. 1 shows the unit connected to the I.F. valve of the Single-Span Receiver, while Fig. 2 shows that even in so different a set as the New Monodial Super the modifications needed are the same. In both these sets, the indicator is shown connected in the I.F. valve anode circuit, for this point is usually the most convenient and is least likely to lead to any instability. In the case of a receiver such as the Everyman A.C. Super, however, in which the I.F. valve is also provided with an L.F. coupling, it is considered advisable to connect the indicator to the H.F. valve, for at this point there is less possibility of hum being introduced.

Now the brilliancy of the lamp depends on the current flowing through it, and the current depends not only upon the value assigned to the resistance R, but also upon the impedance of the transformer secondary shunting the lamp. It can be seen,

impedance of the transformer and the more brilliant will be the lamp. The net result is that the brilliancy increases with signal strength.

Since the heater supply is coupled to the anode circuit of the controlled valve

The lamp employed must be rated for 2 volts and a suitable type is supplied with the unit. The variable resistance R is adjustable by means of a screwdriver through a hole in the case, and, to start

New Visual Tuning Indicator—

with, it should be fully turned in an anti-clockwise direction. When the set has been switched on, R should be adjusted so that the lamp glows dimly with the set tuned to no signal. It should then be found that the brilliancy increases when a signal sufficiently strong to operate the A.V.C. system is tuned in. The brilliancy depends upon the signal strength, and the lamp will usually be very bright during local reception. If the lamp appears too bright, however, the resistance should be turned a little in an anti-clockwise direction, otherwise the life of the lamp may be reduced.

The Performance of the Indicator

On test the indicator functioned admirably, being not only sensitive to weak signals which give only a small change of anode current in the controlled valve, but giving a very definite indication of tuning on a strong local station. Many indicators fail in one of these respects, and are either

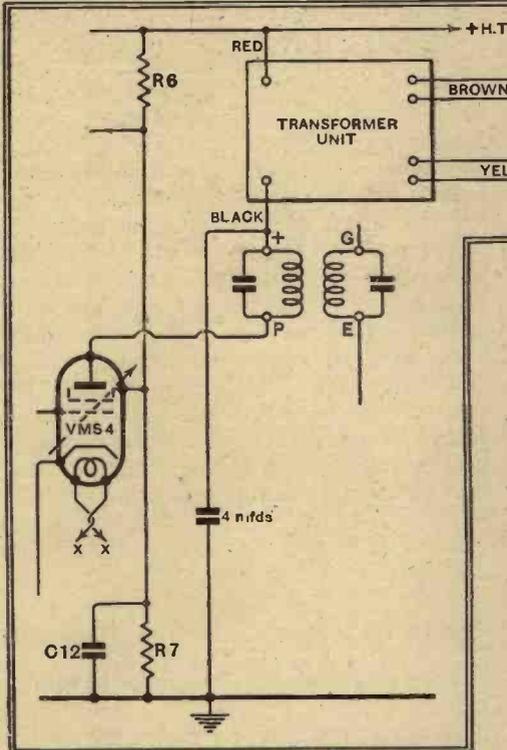


Fig. 2.—This diagram shows how to connect the unit to the I.F. stage of the new Monodial Super.

insensitive to weak signals or are overloaded by a local, but this particular type has shown itself satisfactory for both. It was found that the best results were secured by mounting the lamp behind some diffusing material such as ground glass, although a piece of tracing paper makes an excellent substitute. Without such a screen, one is apt to be dazzled by the light when tuning to a strong signal, and one cannot immediately detect the variations in intensity when tuning to weaker signals.

The lamp may be mounted in any convenient position in the set and it may even replace the dial light, although the brilliancy may then be hardly sufficient for

the weaker stations on account of the relative opacity of the usual celluloid dial as compared with a ground-glass screen.

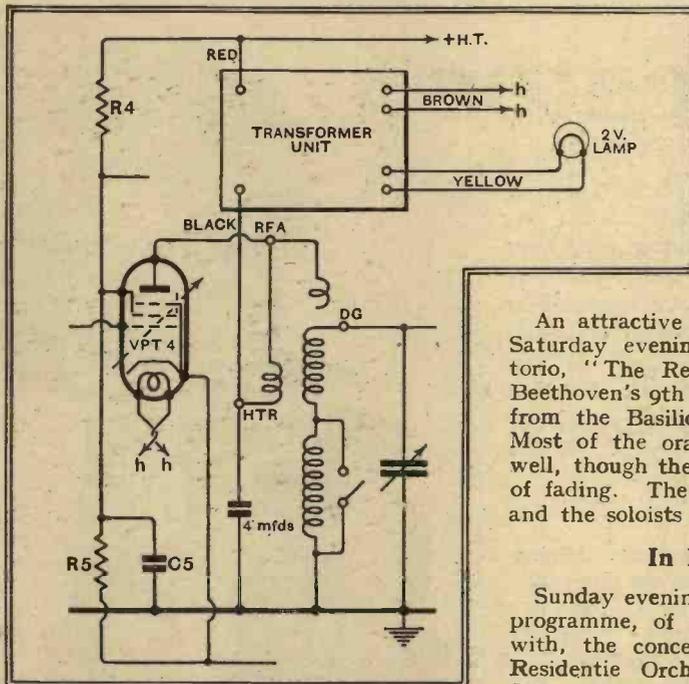


Fig. 3.—In the case of a receiver such as the Everyman A.C. Super the tuning indicator is best connected to the H.F. valve.

The indicator is sold complete with lamp at the price of 16s. 6d., and is obtainable from Climax Radio Electric, Ltd., Haverstock Works, Parkhill Road, Hampstead, London, N.W.3.

The Diary of an Ordinary Listener

IF it be indeed true, I cordially welcome the statement that German wireless listeners are to be given a holiday from politics, Nazi metaphysics, and Nazi moralisings until the end of October. In normal times I rely upon the various German stations to provide the mainstay of Continental musical programmes, but, of late, there has been so much output of oratory that the musical side of their entertainment has considerably suffered. If, therefore, the Germans are really getting weary of this windy diet, it is a matter for rejoicing on the part of ordinary listeners in other countries, though I, for one, would be loth to deprive a great nation of its innocent amusements.

The second concert by the Vienna Philharmonic Orchestra, conducted by Toscanini on August 30th, maintained the high standard set the previous week, though I did not find the actual programme so interesting. I thoroughly enjoyed Brahms's Symphony in F and Debussy's delightful "L'après midi d'un faune," in which all the incidents of the faun's afternoon ramble were musically depicted with unusual clearness. The concert was relayed from Salzburg by Vienna, Radio-Paris, Prague, Bucharest, Budapest, Kalundborg, and Strasbourg.

On Friday the National Orchestra of France, conducted by Manuel Rosenthal, gave a selection of French operetta music, including Messager's "Veronique" and Offenbach's "La Belle Helene," which came through well from Ecole Superieure, Paris, while Warsaw transmitted a good programme by the Station Symphony Orchestra, of which the principal items were Tchaikovsky's "Casse-Noisette" suite and his 5th Symphony.

An attractive programme from Turin on Saturday evening comprised Perosi's oratorio, "The Resurrection of Christ" and Beethoven's 9th (choral) Symphony relayed from the Basilica di Massenzio at Rome. Most of the oratorio came through fairly well, though the station had occasional fits of fading. The chorus was well balanced and the soloists excellent.

In Lighter Vein

Sunday evening offered a good variety of programme, of which I selected, to start with, the concert of light music by the Residentie Orchestra from the Kurhaus, Scheveningen, relayed by Hilversum, knowing from previous experience that it would be well played and would come through well even at a comparatively early hour. When this was finished I listened for a time to a fine organ recital from Milan, and thence to Berlin, Funkstunde, where the Station Orchestra was giving an entertaining concert of light music.

The programme from Radio-Paris seemed best suited to my taste on Monday, as I generally enjoy concerts by the excellent orchestra of the Casino at Vichy. On this occasion the opening number was a "Symphonique Classique" by Prokofiev, which sounded to me like rather modernised Mozart, and this was followed by Saint-Saens' Concerto No. 3 for violin and orchestra. The soloist, I think, was not at his best that evening, as he often strayed from "the middle of the note," especially in the double-stopped passages, so I went over for a time to Hilversum, where the V.A.R.A. Orchestra, under de Groot, was playing various operatic selections, including a potpourri of Donizetti's airs and the well-known march from "Aida." Returning to Radio-Paris, I found the interval pleasantly filled with 'cello solos, of which I heard an "Elegie" by Fauré and Glazounov's "Serenade Espagnole." The second part of the orchestral concert began with Schumann's Pianoforte Concerto in A Minor, in which the solo part was admirably played by F. Laug.

On Tuesday I hoped to have heard the Grieg anniversary concert from Strasbourg, but reception was not at its best so early in the evening, so I employed my time with more prosaic matters until darkness had set in, when I turned my attention to the Symphony Concert by the A.V.R.O. Orchestra, broadcast from Hilversum, and beginning with the prelude to "Hansel and Gretel," followed by Dvorak's Violin Concerto in A Minor, in which Ruth Posselt played the solo part with great delicacy and expression. The Station Orchestra at Luxembourg, conducted by Henri Pensis, is always well worth hearing, and I listened with much satisfaction to Mozart's "Eine Kleine Nachtmusik" and Saint-Saens' stirring Military March.

CALIBAN.

Watching a Circuit Work

Voltage and Current Measurements that Diagnose Receiver Performance

THE multitudinous uses to which meters may be put in testing a modern receiver were well brought out by a test panel shown at Olympia by Everett-Edgcumbe. The arrangement adopted for the display was highly ingenious and enabled the various functions performed by the meters to be appreciated at a glance. A three-valve battery receiver was employed, and its circuit was mounted on a large board. The fourteen

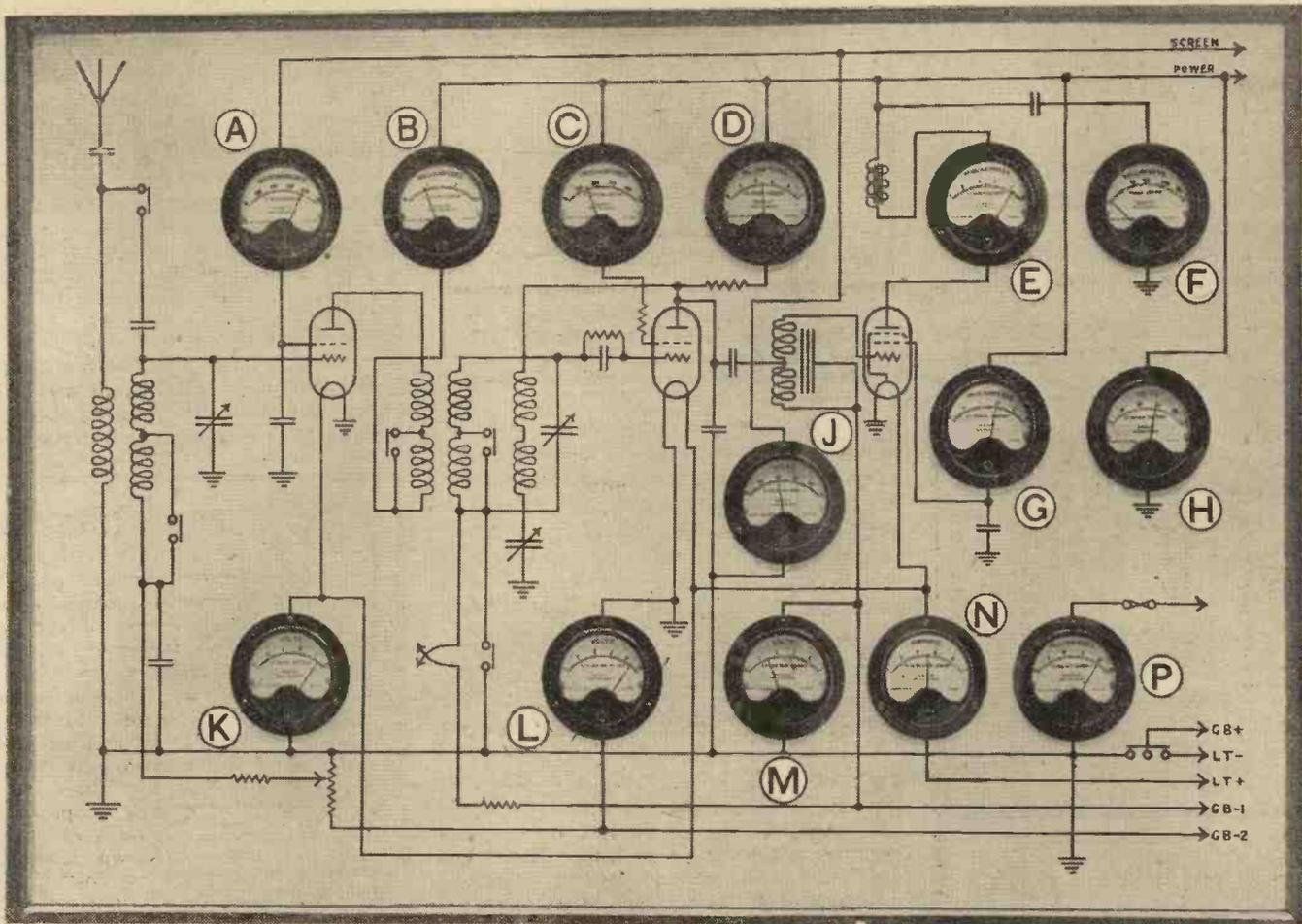
valves to be read, and a seventh meter in the main H.T. circuit showed the total anode current. Two voltmeters showed the H.T. and screen voltages, and the fourteenth meter, of the A.C. type, showed a reading of the power output.

The receiver was fed from a modulated oscillator, and it was particularly noticeable that the application of a test signal (unmodulated) caused a change of detector current but that the currents in the

operated under linear conditions there was no change in the steady anode current.

It should be realised, of course, that the full quota of fourteen meters is not necessary for the satisfactory testing of a receiver, and they are needed only when, as in this case, it is desired to show simultaneously the conditions obtaining in all the different circuits.

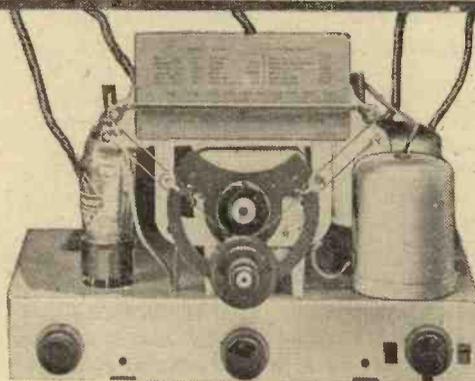
With the exception of power output, a



The varied uses of meters in set testing are well brought out in this test panel. Screen current of the H.F. valve is shown by (A), with a full-scale reading of 500 microamperes, and a similar meter (C) shows the detector screen current. A 0.5 mA. meter (B) records the H.F. valve anode current, but for the detector an instrument (D) with a maximum reading of 1 mA. is used. Meters of the 10 mA. type are employed for the screen (G) and anode (E) currents of the output pentode, and the A.C. output is read

on the output meter (F). The 0-150 v. voltmeter (H) shows the total anode voltage and the 0-100 v. meter (J) the screen voltage of the H.F. valve. Filament voltage is recorded by (K), an instrument with a maximum scale of 2.5 volts, and filament current by the ammeter (N) of the 1 amp. type, while the total H.T. current can be read from the 0-15 mA. meter (P). The total voltage of the bias battery and the output valve bias are shown by (L) and (M), with full-scale readings of 10 volts and 5 volts respectively.

single multi-range voltmeter and milli-ammeter will enable every voltage and current to be determined one at a time. The output meter employed is of the copper-oxide rectifier type, and shows the power obtained from the output valve; its chief value, however, is to be obtained only when a modulated oscillator is available.



others were mounted on this circuit in the positions in which they were actually connected. The meters were arranged to show filament voltage and current, the grid bias voltage applied to the output valve and the total voltage of the bias battery. Six milliammeters enabled the individual anode and screen currents of the three other circuits remained unchanged, thus showing the correct operation of the circuits. Switching on the modulation resulted in a reading being obtained on the output meter, but as the output valve was

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Hints and Tips

Aids to Better Reception

THE diode is now very commonly employed as a detector because of its inherent freedom from distortion when used with a sufficiently large signal input. In practice it is almost impossible to overload a correctly designed diode detector,

Diode Detectors

but it should be remembered that if the correct operating conditions are not adhered to and overloading occurs, such overloading may easily damage the valve. The limitation to the input is usually set by the current which flows as a result of the input voltage rather than by the voltage itself, and so the diode load resistance enters into the question.

The fundamental diode detector circuit is shown in Fig. 1 and the current through the load resistance R is often about 90 per cent. of the peak input voltage divided by the value of the resistance. If the resistance be 100,000 ohms, therefore, and the input be 50 volts, the current will be about 0.45 mA. If the load resistance were 1 megohm, however, the current would only be 0.045 mA., and for the same current an input of 500 volts would be required.

The maximum current which a diode can safely pass depends upon its design, and in the case of the diodes fitted in the popular duo-diode-triode valves it is believed to be under 0.25 mA. in many cases, although it undoubtedly varies in

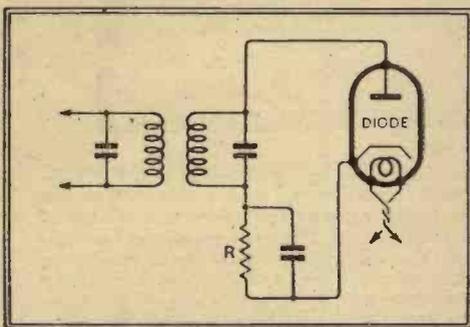


Fig. 1.—The fundamental circuit of a diode detector.

different makes of valves. If the maximum current rating is exceeded the cathode loses much of its power of emitting and the rectification characteristics show great possibilities of distortion. Fig. 2 shows at (A) the type of detection characteristic normally found, and at (B) the results from a diode which has been overloaded and so damaged.

The point of greatest importance to the

diode user is that the possibility of such overloading depends very largely upon the value of the resistance R . The choice of a suitable value is made by the designer of the receiver, and this question of overloading must be given consideration as

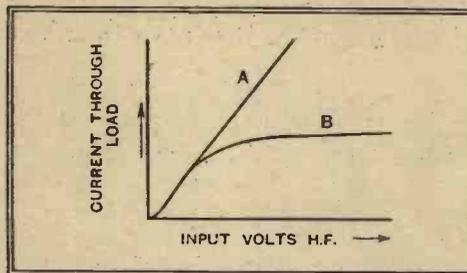


Fig. 2.—The characteristic of a diode normally takes the form of curve A, but if the valve has been damaged it may be like curve B and serious distortion will occur.

well as many other factors. It should be noticed, however, that should this resistance be short-circuited while the receiver is tuned to a strong signal, the diode will pass a heavy current and may easily be destroyed. In the case of a receiver in which such a defect has been found, therefore, the possibility that the diode has been damaged should not be overlooked.

THERE are occasions when one is unable to obtain the correct type of grid-bias battery or, indeed, a grid-bias battery of any kind. If the need for replacement should be urgent, it is necessary to fall back on ordinary flashlamp batteries, which, though inconvenient, will serve the purpose for a time.

Makeshift Grid-bias Batteries

But even here a certain amount of discrimination should be used, and it is the purpose of this note to point out the unsuitability of so-called torch batteries, which consist of a number of cells (generally two or three) mounted end to end and enclosed in a tubular cardboard container. When this type of battery is used for its normal purpose, contact between the positive pole of one cell and the negative of the next is ensured by the pressure of a spring mounted in the lower end of the container, and there is no permanent junction between the individual elements. It is easy to see that when the cells are not under pressure there is more than a risk that they will fail to make contact, and if batteries of this type are used for grid-bias purposes there is a real

danger that an interruption in the circuit will take place sooner or later.

EVERY superheterodyne includes an oscillator of one form or another. Although it is usually a very trouble-free piece of apparatus, difficulty occasionally arises in getting it to function either at all or over a part of the tuning range. It is

Superhetero- dyne Oscillators

very easy to determine whether a valve is oscillating or not, for it is necessary only to connect a milliammeter in the anode circuit and to note the steady anode current. If measures are then taken to ensure that the valve cannot possibly oscillate, such as by short-circuiting the tuned circuit or the reaction coil, a change of anode current will be found if the valve is oscillating. The direction of this change depends upon the type of oscillator, and almost invariably one which functions with a grid leak will show a rise in current when it stops oscillating, whereas one which has a low resistance grid-cathode path and is biased by a battery or by a cathode resistance will show a fall of current. It is normal also for the steady anode current to vary somewhat as the tuning condenser is rotated when the valve is in the oscillating condition.

The circuit of a typical modern oscillator is shown in Fig. 3 and a milliammeter for checking purposes would be inserted

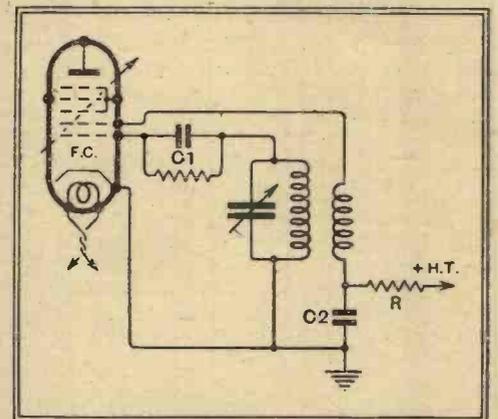


Fig. 3.—A typical modern oscillator circuit. Non-oscillation may be caused by defective condensers C_1 and C_2 .

in series with the resistance R . If satisfactory oscillation cannot be secured, the first thing to do is to check the connections to the coils, and if all seems in order to try reversing the leads to the reaction coil, for the valve cannot oscillate except by virtue of stray capacity couplings if these connections are incorrect. If this fails to effect any improvement an internal open circuit in C_1 or C_2 should be suspected and the valve itself should be checked. If satisfactory results are still unobtainable, and it is certain that the connections are all sound and the coils free from short-circuits, non-oscillation can only be due to an insufficient number of turns on the reaction coil and it is worth while to try increasing their number by some 30 per cent.



Winter Seasons of "Proms"

LOVERS of the promenade concerts will be delighted to hear that the B.B.C. are planning a two weeks' season of Promenade Concerts, to be given at the Queen's Hall, from December 31st to January 12th. This winter season will be conducted on the same lines as the more usual summer concerts, and the services of Sir Henry Wood have been secured.

To-night's Promenade Concert

Schonberg's Five Orchestral Pieces will be performed in the second part of to-night's Promenade Concert. These date from 1909, and were first performed at a Promenade Concert in 1912. To-night's performance will commemorate Schonberg's sixtieth birthday, which was celebrated yesterday.

—and To-morrow

Irene Scharrer, the well-known pianist, is broadcasting to-morrow evening in the Pianoforte Concerto No. 2 in G Minor (Saint-Saëns). Other artists will include Luella Paikin (soprano), who will sing the Aria, "Una voce poco fa" (Il Barbiere), by Rossini, and Stuart Robertson (baritone) in the Aria, "Revenge! Timotheus Cries" (Alexander's Feast), by Handel.

Programme Innovation

SOME interesting programme innovations begin on October 8th, the most important being a continuous alternative programme service from 10.45 a.m. onwards.

From 10 p.m. onwards dance music will be confined to the Regional wavelengths for about one hour, while the National wavelength will be used for readings, talks, and other programmes having a more serious appeal. Similarly, the Children's Hour at 5.15 will be confined exclusively to Regional, the National transmitters being reserved for Henry Hall.

The News Service

There will be important developments in news presentation. The first news bulletin will be given at 6 p.m., while the second, which will be given Nationally at 9.30, will be extended in length to include special features under the direction of Mr. Coatman, the News Editor.

The second news on the Regional wavelengths will follow immediately after that on the National, i.e., at 10 p.m.

By Our Special Correspondent

Endeavour's Challenge for America Cup

THE first race in the series for the America Cup takes place on September 15th. The winning yacht must win four races in order to secure the Cup; consequently, the deciding race cannot take place before September 19th at the earliest, and will probably be a few days later.

On the evening on which the deciding race is completed a special programme will be broadcast on the National wavelength, at approximately 11.15 p.m., entitled "Endeavour's Challenge for America Cup," and this will include a brief history of the Cup and give incidents in Endeavour's short career.

Launch of New Liner

AN interesting broadcast is due to take place on September 26th, when the new Cunard liner is launched by Her Majesty the Queen. An address is to be made by H.M. the King, and Sir Percy Bates, chairman of the Cunard Steamship Company, will also speak. A full description of the scene at the shipbuilding yard will be given.

Sheep Dog Trials

THE International Sheep Dog Trials, organised by the International Sheep Dog Society, will be relayed from Ely Racecourse, Cardiff, in the National Programme to-morrow. A running commentary will be made by Mr. R. N. Jones.

The Late Mr. Mould

MR. JOHN T. MOULD, whose death, at the age of 73, occurred on Thursday, September 6th, was held in affectionate esteem by all who knew him in the ranks of professional wireless men. He played an active part in 1925 in the formation of the Radio Manufacturers' Association, of which he was vice-chairman in 1928, chairman in 1929, and vice-president since 1930.

Mr. Mould was a director of the Igran Electric Co., Ltd.

Our title picture shows the impressive scene at the Third Workers' Olympiad staged recently in a 20-acre field at Prague. By means of the Philips public address installation masses of athletes were able to perform evolutions in perfect synchrony.

English Broadcasts from Denmark

ENGLISH talks from abroad have a flavour of their own—possibly distance lends enchantment—so I shall tune in on Sunday next at 1 p.m. to hear Mr. Campbell-McCallum giving a talk from the Danish stations on the subject of "Famous Escapes." The talk lasts until 1.20.

Another English item from the Danish stations occurs on Tuesday next at 11.15, when Education Inspector Bjorneboe is in charge of a broadcast from a schoolroom during an English lesson.

How Long Do They Listen?

A DANISH daily paper recently canvassed its readers to discover how long the average man spends daily at his receiver. The answers differed widely. Some listened for one hour a week. Others claimed a hundred and twenty-four hours in seven days. The average results go to show that listeners spend approximately thirty hours a week at their loud speakers.

Twenty-five per cent. of Danish listeners confine themselves to the local stations. The remaining 75 per cent. spend about a fifth of their time in tuning-in foreign programmes.

Proposed Station for Athens

I UNDERSTAND that the Greek Government is considering a project for a 50,000-watt station at Athens, and a smaller one in Salonica.

Greece and Albania are the only European countries without broadcasting stations.

Wireless Classes

MANY people will be making full use of the winter evenings by attending evening classes. The wireless courses at the Regent Street Polytechnic provide a thorough training in the principles and technique of the subject, extending over a period of five years. Enrolment dates are September 17th to 21st.

The Borough Polytechnic is also holding classes on Radio Communication, and a special course of lectures on "Loud Speakers and Acoustic Problems" is being delivered by Dr. N. W. McLachlan. Enrolment nights are Monday, September 17th, Wednesday, September 19th, and Friday, September 21st.

UNBIASED

By FREE GRID

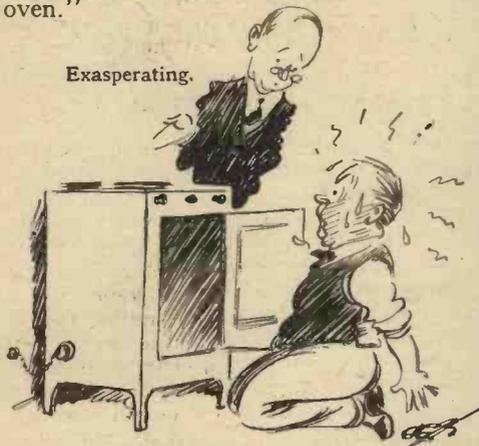


Another Hot Head

I HAVE long protested against the almost sinful state of ignorance in which the general public are content to wallow so far as radio, electrical and general scientific matters are concerned, and I have done my best to lead the crusade against this appalling state of affairs.

If anything were needed to convince me that the fight, so far from being over, is hardly yet begun, it has been provided by a scarcely credible instance of almost super-human ignorance which came before my notice recently.

It appears that a prominent and respected citizen whose chief claim to fame lay in his enthusiasm for wireless and scientific subjects in general was so overcome by the short-circuiting of his heart's desire on the part of another that he decided to go home and betake himself to the time-honoured solace of the "gas oven."



Exasperating.

Unfortunately, although his enthusiasm for wireless and all things scientific was considerable, his technical knowledge was not, with the result that, after making his head comfortable in the oven of the family "cooker" with a pillow, he was surprised to find himself still conscious but thoroughly uncomfortable after a few minutes had elapsed.

Indeed, had it not been for the timely arrival of a more technical member of the family, who, painstakingly explained to him the difference between the action of a gas oven and an electric oven, he might, after all, have actually found himself expiring instead of merely perspiring.

Ask the Dustman Again

IT is extraordinary how many people there are who think that they can identify the set I had in mind the other

week when I suggested that its makers might do worse than paraphrase the slogan of a well-known firm and urge the public to "ask the dustman about the new — radio." The curious part about the whole thing is that not one of my correspondents has hit upon the right set; as they all appear to be confident that they have guessed its identity, however, it would seem that there are more dud sets about than even I, in my wildest moments, thought to be the case.

Perhaps the most astonishing thing about the business is, however, the number of letters of abuse which I have had from various manufacturers, all of whom have got the idea that I was having a tilt at their particular product. All I can say is that if they find that the cap fits, then by all means let them wear it.

Radiolfaction

THE simple faith which some people have in my integrity is very touching, and if I were not fully conscious of the complete absence of any moral turpitude on my part, it would be quite embarrassing. The latest instance of this is provided by a reader from Rutherglen, Stuart by name, but evidently not by nature, who with a truly touching faith in my moral integrity sends me details of an unpatented invention of his which is so ingenious in its simplicity and effectiveness that I cannot refrain from passing on the details to you.

Briefly, the invention is that of a radiolfactor or smellievisor, as he somewhat pungently puts it. A device of this nature has hitherto completely baffled our most



A "Super" test.

astute scientists and yet the solution has proved to be as simple as it is effective. The working drawings which accompany it paint a far more vivid picture of its modus operandi than I could hope to do in mere words.

As will be seen the smell is first transformed into mechanical energy by means of a special beat frequency oscillator, and this in its turn is converted by the usual

optical mechanism of a televisior first into electrical and then into etheric energy. The conversion process at the receiving station is not merely a reversal of that at the transmitter, but is actually far simpler. The etheric energy is converted into electrical energy by the usual aerial system, and is then passed direct to the patent detector. The beauty of the detector is that, unlike the ordinary valve or crystal, its output is not proportionate to the input or to the square of it, but is sensibly constant at all inputs and is independent of frequency or wavelength; actually it is operated by the physical effects of the slight electric shock it receives. Supplies of this intriguing detector, known by its Latin name of *Scuncus odiferus*, will shortly be available at all radio stores, reputable or otherwise.

The "Magic" Box

I AM sorry to see that once more several so-called magic devices for improving the performance of a receiver are again making their appearance. They usually take the form of a largish box, the contents of which are not disclosed, it being merely stated that by connecting the apparatus up in a certain manner, the tone of a receiver is improved, or some such allegedly beneficial effect bestowed on it.

In nearly every case these devices consist of a fixed condenser and merely have the effect of chopping off the high notes. One which I tried last week had such a large capacity that it had a serious effect on even a low impedance loud speaker. Of course, the connecting of a condenser across a loud speaker for reduction of high notes is perfectly legitimate, and, indeed, it is a highly desirable thing in the case of certain receivers.

In one particularly glaring case a sum of no less than 8s. 6d. is being asked for a combined tone-filter and heterodyne eliminator which on examination I found to consist of nothing more than a paper dielectric 0.005 mfd. condenser in an unnecessarily large case.

I have no objection at all to the sale of these devices in cases where it is definitely stated what they are, but I do cavil at the practice of certain foreign importers who give their wares fancy and misleading names which, in my opinion, are deliberate attempts to take advantage of the lack of knowledge of the lay public.

Television in Germany

The Progress Reviewed from a Survey of the Apparatus Exhibited at the Berlin Radio Show

BY A BERLIN CORRESPONDENT

AS in former years, the television industry contributed richly to the Berlin Radio Exhibition. It must, however, be noted that in Germany there seems to be little intention to push the sale of television sets at present. There is a disposition to wait and see whether the present type of transmission, using ultra-short waves, is going to remain; also, whether the 180-line picture will be adhered to, for although

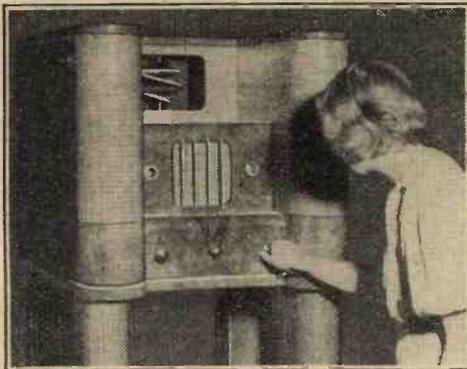


Fig. 1.—The Tekade receiver with mirror-screw for 180 lines.

this number of lines gives a satisfactorily sharp image, there is already a feeling in favour of a larger number of lines. Another fact restricting development in Germany is that at present only Berlin is provided with ultra-short wave transmissions, and these have a range only of about 50 km.

The following points emerge from this year's exhibit. The picture brightness has been increased considerably by the use of high-power high-vacuum cathode-ray tubes. The cathode-ray tube is now practically universal, but Tekade still keep to the mirror-screw (Fig. 1), which is designed for 180 lines.

The Telefunken picture-and-sound receiver is shown in Figs. 2 and 3. The picture receiver is of the superheterodyne type,

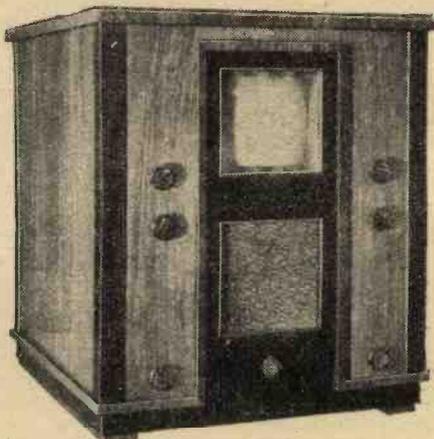


Fig. 2.—The Telefunken cathode-ray television receiver.

with a preliminary H.F. stage, a mixing stage acting also as oscillator, and a four-stage I.F. amplifier. By the use of highly damped intermediate circuits it is arranged that the whole frequency band which has to be transmitted, some one million cycles/sec. in width, is uniformly reproduced, giving an improved sharpness of contrast. Naturally, this high damping would reduce the amplification were it not for the fact that special new valves of particularly steep slope (8-9 milliamps./volt) are used.

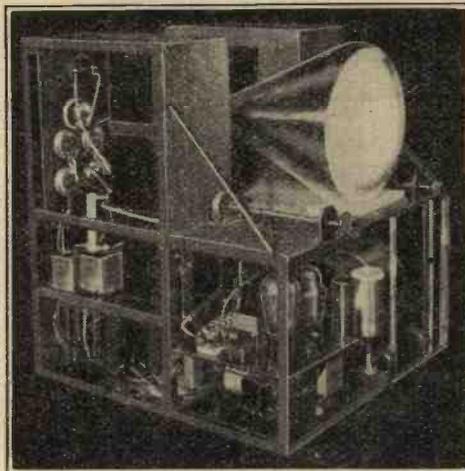


Fig. 3.—An interior view of the Telefunken equipment.

The sound receiver is a three-valve reflex set, and both receivers are worked off a common aerial with a coupling circuit arranged to prevent mutual interference. The picture signals, after passing through the picture receiver, arrive at an electrical "distributor" which separates the image frequencies from the scanning frequencies and sends each to its proper circuit. Synchronisation is obtained by impulses from the transmitter.

A mains transformer is provided with two rectifiers—one providing the H.T. for the cathode-ray tube and the other the anode voltages for the picture and sound receivers, and for the "distributor" and scanning circuits. Great care has been taken to ensure that the common mains unit does not lead to interaction between the various circuits.

The Fernseh Company showed a sound-and-film transmitter and a light-beam scanner (Fig. 4). Both of these are provided with a fading-in arrangement so that

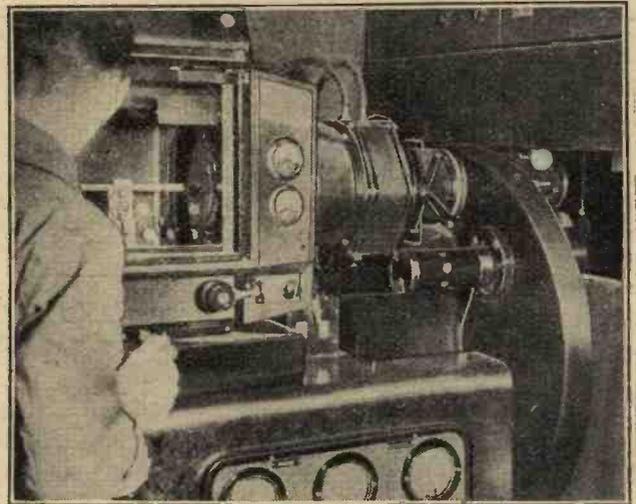


Fig. 4.—The Fernseh Company's direct-scanning apparatus for 180 lines.

spoken comments on the film may be introduced. In both transmitters the perforated discs rotate in a vacuum. In the case of the light-beam scanner the illumination is by a new type of high-power arc with a current consumption of 150 amperes. The film-transmitter will deal with standard films up to 1,500 metres, or (for test purposes) will use a continuous strip. The optical systems of both transmitters have been improved so as to have a very high efficiency.

Portable Television Transmitter

The Fernseh Company also showed a television transmitting truck; this works on the well-known "intermediate film" system, but this year the film is dried immediately after the transmission and is ready for use as a negative for copying. The camera and photographic section can be kept out of action and the television transmitter used as an ordinary film-transmitter, so that a particular subject can be repeated as often as desired. The same firm again showed a large picture projecting receiver on the continuously working intermediate film principle, giving 3 x 4 metre pictures. In their



Fig. 5.—Von Ardenne with one of his high-power cathode-ray tubes.

Television in Germany—

home receiver (cathode-ray tube) the image measures 24×30 centimetres.

The Loewe Company showed a similar system to that of the previous year. One receiver only is used for sound and picture; otherwise the arrangement resembles that of Telefunken. Von Mihaly did not exhibit, but von Ardenne showed his high-power cathode-ray tube (Fig. 5). An important point in von Ardenne's apparatus is that he uses an aperiodic amplifier with an enormous frequency range. For picture reception he uses a superheterodyne, the intermediate frequency of which is rectified in the cathode-ray tube itself, the lower bend of the tube characteristic being employed. In

this way interference due to a separate demodulator is eliminated. For sound reception an ultra-short wave audion receiver is employed instead of a superheterodyne.

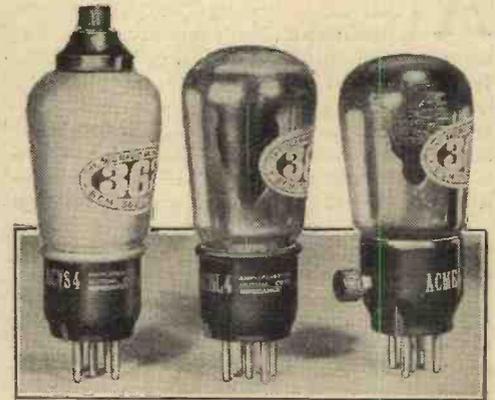
Tekade showed a very economically priced kit set, containing all the parts of an ultra-short wave, television receiver. It includes a new output transformer passing all the frequencies involved in 180-line transmissions.

Although not actually exhibited, it is anticipated that in a few months' time a very interesting invention—a "light amplifier" will be developed. This is an entirely new idea, and will enable the light of dim television images to be so intensified that a cathode-ray tube image may be projected on to a large screen.

362 A.C. VALVES

A Range of Indirectly Heated Valves for A.C. Mains Operation

THE 362 Radio Valve Co., Ltd., Stoneham Works, Stoneham Road, Upper Clapton, London, E.5, now market a very comprehensive range of valves for A.C. mains operation. The series includes screen-grid valves with and without variable- μ characteristics, a multi-electrode H.F. amplifier which comes within the category of an H.F. pentode, a general purpose triode, a power output triode, and a multi-electrode output valve of the pentode type.



Selection of 362 A.C. mains valves.

The specimens that have been tested all show very good agreement with the maker's figures, and from an examination of the electrode assembly there seems little likelihood of their characteristics changing by displacement of the electrodes after leaving the works, as they are of sturdy construction and well braced by mica bridge and spacing pieces. It is evident, also, that much care and attention is given to the assembly, in addition to which the workmanship is very good indeed.

The ACPX₄, which is the triode power valve of this series, has an A.C. resistance of 2,030 ohms and a mutual conductance of 3.2 mA./volt measured with 250 volts H.T. and a grid bias of -15 volts. It passes approximately 50 mA. in the anode circuit, so a bias resistor of 300 ohms will give the correct working conditions. The optimum working load for this valve is 3,000 ohms, and its price is 9s.

Tests were made also with the ACHL₄, the A.C. general purpose triode, which has a rated A.C. resistance of 10,000 ohms, an amplification of 30, and a mutual conductance of 3 mA./volt. Assuming these figures are for 100 volts H.T. and zero grid bias, our specimen proved slightly better than the standard, for its mutual conductance was 4.1 mA./volt and its amplification 29.9, the A.C. resistance being, therefore, 7,300 ohms.

Under working conditions, with 200 volts H.T. and -3 volts grid bias, the mutual conductance fell to 3 mA./volt and the amplification to 21.9, but the A.C. resistance remained unchanged at 7,300 ohms. The anode current was just 12mA. This valve costs 7s. 6d.

The valves have proved very satisfactory in use, and the ACHL₄ was further tested in the detector position of a short-wave set, where it gave extremely good results. The valve oscillates readily and is not microphonic.

The screen-grid type are metallised, and costs 12s. 6d. each, while the price of the multi-electrode output model is 13s. All these valves are fitted with 4-volt one-amp. filaments.

EELEX M2 SUPER SHORT-WAVE CONVERTER

THE M2 Super Eelex is the latest addition to the Eelex range of short-wave converters. It is A.C. operated and entirely self contained, incorporating its own H.T. supply unit in which is used a Westinghouse rectifier. Two valves are employed; one functions as an



Eelex model M2 Super short wave converter.

oscillator and the other as a detector-amplifier, this arrangement having the advantage that the most suitable type of valve can be fitted in each position, the recommended combination being a Mazda AC/SG, or Marconi MS₄, as the oscillator and a Mullard SP₄ for the detector, and metallised valves are used in both positions.

This unit is designed to take the Eelex Duplex reversible short-wave coils, two of which give a continuous waveband of 15 to 115 metres, each coil providing two ranges. One only is supplied with the converter and this covers the 15 to 55 metre band.

As it is a superheterodyne unit the broadcast set to which it is connected must include at least one H.F. stage unless it be a broadcast superheterodyne, in which case there is no need for an H.F. stage between the short-wave unit and the frequency changer in the set.

Its installation requires no alteration to the home receiver as the connections are external, all that is required being to join the aerial and earth terminals to two sockets on the converter and change over the aerial lead. This could be done by a switch and the converter left permanently in circuit and so ready for use at any time.

The broadcast set should be tuned to about 1,900 metres (158 kc/s) as the converter is wavelength-calibrated for an I.F. frequency of this order. There are four separate scales on the full-vision dial, one for each of the ranges provided by the two

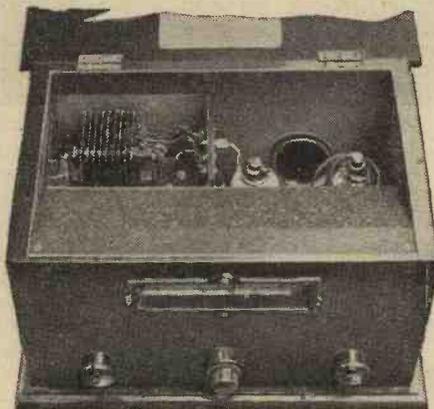
Eelex coils, and suitable markings indicate to which they relate.

The use of a separate oscillator valve simplifies considerably the handling of this unit, as constant reaction conditions are maintained over the whole waveband. This reduces the tuning to a single control, namely, the oscillator condenser and the reaction condenser requires no further attention after the initial adjustment.

As a frequency changer, the unit is adequately sensitive, but it must be remembered that the amplification of the signal rests mainly with the broadcast receiver and those that possess a high sensitivity on the long waveband will give the best results.

Straight sets with but one H.F. stage provide ample amplification to receive at good volume most of the short-wave programmes usually receivable in this country, and the same performance can be expected elsewhere. Although it is entirely A.C. operated, no increase in background noise due to mains hum could be detected.

Being a superheterodyne unit all stations tune in at two settings of the oscillator condenser, and the correct one to give agreement with the calibrated scales is the lower—in wavelength—of the two.



The H.T. unit in the Eelex M2 Super short wave converter is housed in a separate screened compartment.

The unit is housed in a cabinet measuring 8½ in. × 14 in. × 8½ in. high, and it can be supplied in oak, walnut or mahogany finish, the price being £8 15s. complete. The extra coil to extend the waveband to 115 metres costs 2s. 6d.

The makers are J. J. Eastick and Sons, Eelex House, 118, Bunhill Row, London, E.C.1.

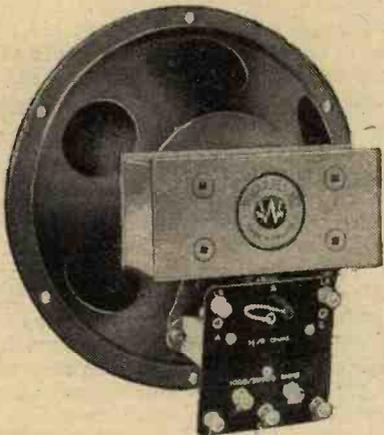
New Apparatus Reviewed

Recent Products of the Manufacturers

WHARFEDALE "BRONZE" LOUD SPEAKER

IN its latest form this universal chassis is fitted with a nickel-aluminium alloy magnet which gives not only an electro-acoustic efficiency comparable with mains-energised units, but an improvement in response, particularly in the bass. A re-designed cone with much freer suspension has brought down the bass resonance to 75 cycles, and the increased flux ensures that magnetic damping keeps this and other resonances in control. The middle register is aurally uniform, and while there is a rise in the region of 3,200 cycles, this is gradual and does not assume the harsh character often encountered in medium-size moving-coil units. In the extreme top the response is again above the average, and in the model tested showed no serious falling off below 7,000 cycles. The brilliance of the top is adequately balanced by fullness of tone in the middle and lower registers, and the general effect is very satisfying to the ear.

A universal transformer is included which gives a range of effective impedances for 1.5 to 11 ohms and 1,000 to 20,000 ohms. The



New Wharfedale "Bronze" loud speaker with nickel-aluminium alloy permanent magnet.

price is 42s. 6d., and the makers are Wharfedale Wireless Works, 62, Leeds Road, Bradford. The chassis is also available in a black and chromium cabinet known as the Nubian model at 75s. 6d.

NEW BLOCK ACCUMULATOR

THE type B.45 two-volt cell is one of a number of new models recently introduced by Block Batteries, Ltd., By-Pass Road, Barking, Essex. It is totally enclosed in a moulded bakelite case measuring 6½ in. high and 3 in. square at the base. Terminals with non-interchangeable heads are used and they are fitted on the front of the case, in which position they are sufficiently removed from the filler vent to prevent corrosion by acid spray or by creeping of the electrolyte. Further protection is provided by a moulded lid totally enclosing the filler orifice.

From several discharge tests at 0.5 amp. we estimate that if used for four hours a day the battery will give about a fortnight's service on each charge. It holds its charge

for long periods when not in use, and owing to the nature of the construction internal sulphation is very slow and the cell may be stored for a considerable time in a fully-charged state without attention.

The B.45 model is fitted with a rubber carrying strap and the price is 8s. 6d.



Block Batteries new 2-volt 45-amp. hr. cell.

GOLTONE CABLE PLUG AND SOCKET

MESSRS. WARD & GOLDSTONE, LTD., Frederick Road (Pendleton), Salford, 6, include in their new season's products a bakelite cable plug made in four- and five-pin types to fit standard valve holders. They can be employed to terminate inter-chassis connecting cables, being designed to take a cable of quite large outside diameter as would be used for this purpose. The hole in the screw-on cap is 11/32 in., which allows sufficient clearance for the Goltone special five-way flexible cable with two extra heavy conductors for the L.T. supply.

Raymart short-wave H.F. choke, valve holder and low-capacity anode connector.

The base part of the plug carrying the pin is designed so that all the connecting screws are isolated by raised wings of bakelite to prevent bare strands of one lead accidentally contacting with adjacent screws or wires.

A Goltone flush-mounting valve holder serves as the fixed portion of the connector and consists of a disc and a square of bake-



Goltone five-pin bakelite plug and chassis-mounting valve holder.

lite material to which the sockets are riveted.

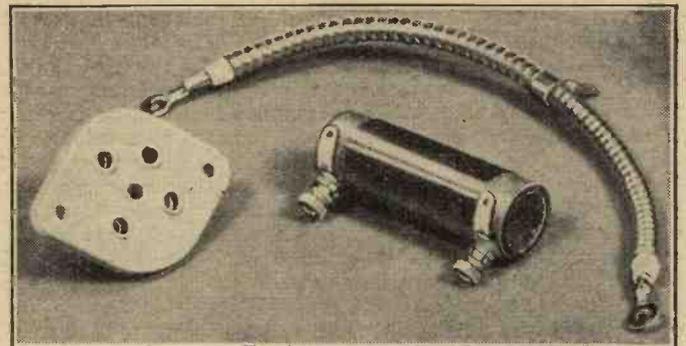
With the specimens tested a perfectly satisfactory contact was made between all five pins and their respective sockets. The sockets are split lengthwise and expand when the plug is inserted, so that the pins, which are of the split type, are not subjected to the same compression strain as with plain sockets.

The bakelite plug costs 1s. 9d. with four pins and 2s. for the five-pin model, while the corresponding valve holders cost 4d. and 5d. each.

RAYMART SHORT-WAVE COMPONENTS

THE Radio Mart, 19, John Bright Street, Birmingham, has introduced a range of short-wave components; at present the items available comprise a short-wave choke, a chassis mounting valve holder assembled on a Frequentite base, and a low-capacity screened anode connector in which the wire is spaced from the metal shield by Frequentite insulators.

The H.F. choke has been tested in a set and performed satisfactorily down to just below 10 metres, this being the lowest wavelength explored, and from its behaviour it seemed quite probable that it would serve for even shorter wavelengths. Reaction, using the customary capacity-control method, was smooth throughout, and no blank spots were encountered from 10 to 80 metres, which band covers the principal short-wave interest. It measures 1½ in. long, is ½ in. in diameter, and is intended to be suspended in the wiring, a quite practical arrangement, as it is light and compact. The price is 9d.



The other two items are particularly well suited for use on the short waves. The good H.F. properties of the insulating material used in the valve holder and the anode connector ensure the minimum of loss. The valve holder costs 9d., and the anode connector is.

Letters to the Editor

A Critic of Quality—Cinema Quality

The Editor does not hold himself responsible for the opinions of his correspondents

A Critic of Quality

I HAVE read with considerable interest the article "Impressions of Olympia" by "A Critic of Quality" in your issue of August 31st, and although I am in hearty agreement with many of the criticisms made, there are a few sweeping assertions which cannot be allowed to pass unchallenged. I refer particularly to loud speakers and output transformers.

Your contributor says that one always thinks of the loud speaker as the weakest link in the chain, and he refers slightly to the "same old cones and the same old permanent magnets." He might as well go to the Motor Show and write about "the same old wheels and the same old rubber tyres."

I am quite unable to understand why highbrow writers and theorists always appear to imagine that loud speakers in this country are manufactured by deaf mutes and nitwits who cannot tell the difference between the sound of a Steinway Grand and a ukulele.

It is inaccurate and most unfair to state that the "same old cones and the same old magnets" are being used. The facts are as follows:—

An immense amount of time and large sums of money have been expended in experiments on cones, and I should like to take your "Critic of Quality" and let him see the elaborate amplifying and testing equipment used by the progressive cone makers and speaker makers, and although I am only a small manufacturer, I have a thousand last year's cones which I should be pleased to dispose of at 1d. each. Although the new cones may look like the same old cones, the performance is entirely different.

In magnets we have the new nickel aluminium alloy which is giving a flux density of 9,000 lines or more, where 7,000 lines was general last year. Are these the same old magnets?

Your "Critic of Quality" says that output transformers possessing accurate matching properties are a snare and a delusion, and I can only conclude that he has not gone to the trouble of testing one before expressing himself in such terms. This is only one of the numerous cases where an ounce of practice is worth a ton of theory. The ratio is generally varied by tappings on the secondary of the transformer, so that the primary inductance is not affected.

Perfect matching is always unattainable, because the impedance of any speaker varies with frequency. The Universal type of transformer works quite well, and the resulting frequency response is quite as good as most commercial superhets, and it enables traders to cover a wide range of requirements without being overburdened with stock. In any case, very wide variations of speaker impedance are permissible, and changes of 50 per cent. with pentode valves or 75 per cent. with power valves have only very slight effect on the reproduction.

I am forced to the conclusion that your "Critic of Quality" is a theorist with enough money to indulge his fancy, but he

should remember that there are millions of people who cannot afford to pay more for a complete receiver than he probably pays for a single loud speaker, and I maintain that these people now receive extremely good value for their money.

Furthermore, I would claim that a modern P.M. speaker costing less than 45s. would to-day give better quality used with a high-class local station set than a so-called quality speaker costing £7 or £8 used on a commercial superhet; which would prove that the speaker is not the weakest link in the chain.

I do not think we ought to expect revolutionary changes at every Radio Exhibition, with consequent scrapping of existing stocks, causing huge losses to makers and traders alike. Steady progress and reliability of products should now be the aim.

However, I was pleased to note from the last paragraph that your critic, although highbrow, is still human, as he appears to have noticed the legs of the sixteen Radiolympia Girls.

Per pro Wharfedale Wireless Works,
G. A. BRIGGS.

Cinema Quality

HAVING read Mr. Wilkinson's letter in a recent issue of *Wireless World*, I would like to point out some facts which do not seem to be known to the average "wireless" public, regarding sound equipment in cinemas.

The better-known cinema equipments are the property of the manufacturers—Western Electric, R.C.A., British Acoustic Films, and B.T.H., for example. The apparatus is installed under licence and is regularly serviced by these companies' engineers.

Unless there is some definite fault (with the equipments mentioned above, at any rate) it is not possible for an intermediate stage to overload before the output. The output stage is arranged to suit the size of theatre and a very generous margin of safety is always allowed.

I can assure Mr. Wilkinson that a great number of cinema operators are "competent sound engineers," but they cannot make diamonds out of sows' ears! I would suggest that the next time he inspects a talkie outfit he also has a look at the sound track of the film.

In some cases the original negative of a picture is retained in America and a positive print is sent to this country. From this print a "duped" negative is obtained and our ordinary service prints are taken from this "duped" negative. It is a wonder that sound quality can be so good as it usually is, considering the losses which must take place at each transfer.

"Clear, undistorted outputs" require more than good grade reproducing apparatus and competent sound engineers—a pure, undoped input is the first necessity.

It is easy to "guess" at what may be wrong with the sound at a cinema, but it takes a lot of experience to "know."

One of your weekly contributors once mentioned that he had visited a cinema and heard the amplifier motor boating during the

newsreel. On hearing the same newsreel at a different cinema, he discovered the motor boating effect there also. He then stated that the recording amplifier must have been oscillating at the time the picture was taken. The noise was actually traced to the frame lines of the picture passing over the sound slit!

I mention this point only to prove how easy it is for "radio ears" to mislead their users when listening to other methods of sound pick-up.

JAMES MCCALL.
Troon.

YOUR Editorial on the quality of cinema reproduction prompts me to write and uphold your views, and I consider your statements are anything but "wild and obviously absurd."

I had the occasion recently to see and hear a film in the private theatre of a well-known film company, and the quality of reproduction was nearer perfection than anything I have ever heard from a film, and I was told that that particular film had been shown some three hundred or so times.

While on holiday at a south-east coast resort I saw the same film again, and the difference had to be heard to be believed. The voices were thin and nothing like the original, and the music was entirely lacking in bass notes, one could see the double bass being plucked but no sound was audible from it. If I had not previously seen this film and heard what could be got from it on good apparatus I should no doubt have put the blame on the recorder. I told the manager what I thought about his reproduction on leaving the cinema and he seemed very surprised and informed me that the apparatus was new three years ago.

This instance only goes to prove that the projectionists have quite a lot to learn yet, and many cinema reproducers sound as if a new set of valves would be welcome.

Referring to the recent broadcasts by the B.B.C. of excerpts from the sound-track of films, I consider that the reproduction was anything but good, and at times the speech was unintelligible. Where the fault of this lies I cannot say with any accuracy, but I should imagine it was again the film reproducers. Let me take this opportunity of congratulating you on your campaign for better quality, because the majority of the listening public does not know how good broadcasting can sound on the right apparatus.

N. E. FAIRBROTHER.
Leeds.

THE RADIO INDUSTRY

MUCH useful data relating to the use of resistances, together with a full description of the latest Erie products, is contained in a small booklet issued by the Radio Resistor Co., Ltd., under the title of *High Resistance Products*. Copies are obtainable from 1, Golden Square, London, W.1, on payment of 1½d. to cover postage.

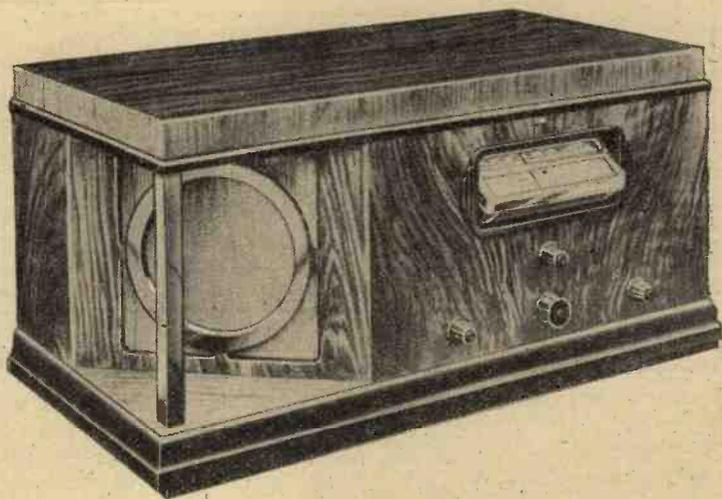
The latest Colvern publication, Radio List No. 13, deals exclusively with their Ferrocarril products. It is essentially a small technical booklet on the use of coils rather than a catalogue, and is well illustrated by circuit diagrams. Copies are supplied free on application to Mawney's Road, Romford, Essex.

Ferranti Class B Input and Output transformers were employed in the short-wave transmitter which was used in the balloon for communication purposes when the Stratosphere ascent was made in South Dakota during July. The transmitter is now on view in the National Broadcasting Company's museum.

Clarke's Atlas "7.5.8." Receiver

A Superheterodyne of Wide Range and High Selectivity

FEATURES.—Type.—Table-model superheterodyne with A.V.C., for operation from A.C. mains. Circuit.—Octode frequency changer—variable-mu pentode I.F. amplifier—duo-diode-triode second detector—triode output valve. Full-wave indirectly heated valve rectifier. Controls.—(1) Tuning with "Spectrum" station indicator. (2) Volume control and on-off switch. (3) Waverange switch. (4) Tone control. Price.—14 guineas. Makers.—H. Clarke & Co. (Manchester), Ltd., Atlas Works, Patricroft, Manchester.



ALTHOUGH in its external features this receiver is of unconventional design, the circuit arrangement is quite straightforward. Excluding the power rectifier there are four valves, the first of which is one of the new Mullard octode frequency changers. It is preceded by a band-pass filter in which separate magnetic couplings are provided for medium and long waves. The single I.F. amplifier is a variable-mu pentode, and this valve, together with the pentode portion of the frequency changer, is controlled by the A.V.C. bias from the duo-diode-triode second detector. The input to the A.V.C. diode is taken from the primary of the second I.F. transformer to eliminate sideband screech as the tuning control passes through the setting of a powerful station. The triode amplifying portion of the second detector is resistance-capacity coupled to a large triode output valve. A tone control

circuit is connected in the anode circuit of this valve, and terminals are connected across the primary of the output transformer for the attachment of an external loud speaker.

The power rectifier is indirectly heated so that excessive voltages are not applied to the smoothing condensers before the receiving valves have warmed up. An electrostatic screen is interposed between the primary and the secondary windings of the mains transformer.

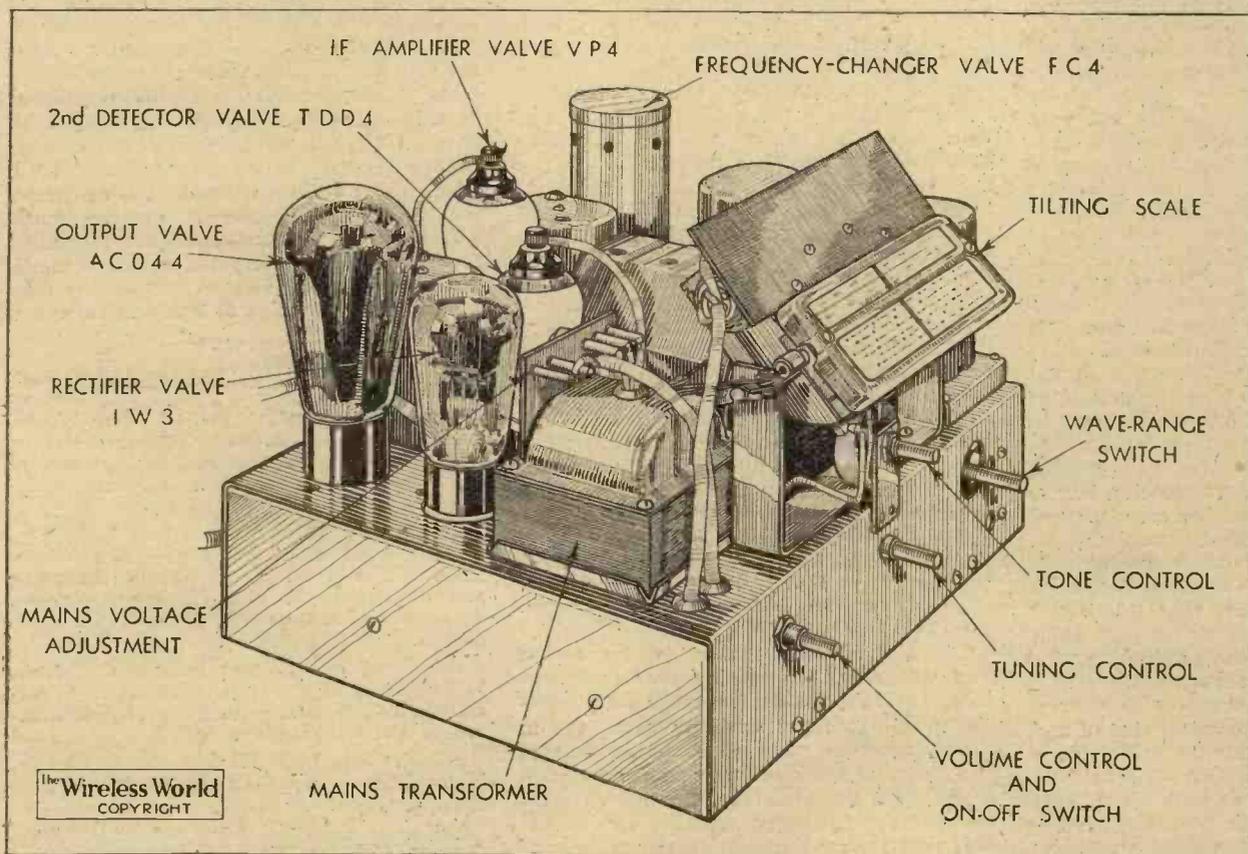
A short self-contained aerial is interlaced in the perforations of the back panel of the set, and although quite a useful range is obtained with this aerial, the majority of our tests were conducted on an outdoor aerial of standard length. Under these conditions the performance in the matter of selectivity was very creditable indeed. In

Central London the Regional and National transmitters at Brookmans Park occupied only 32 and 35 kc/s respectively. In other words, just over one channel was lost on either side of each station.

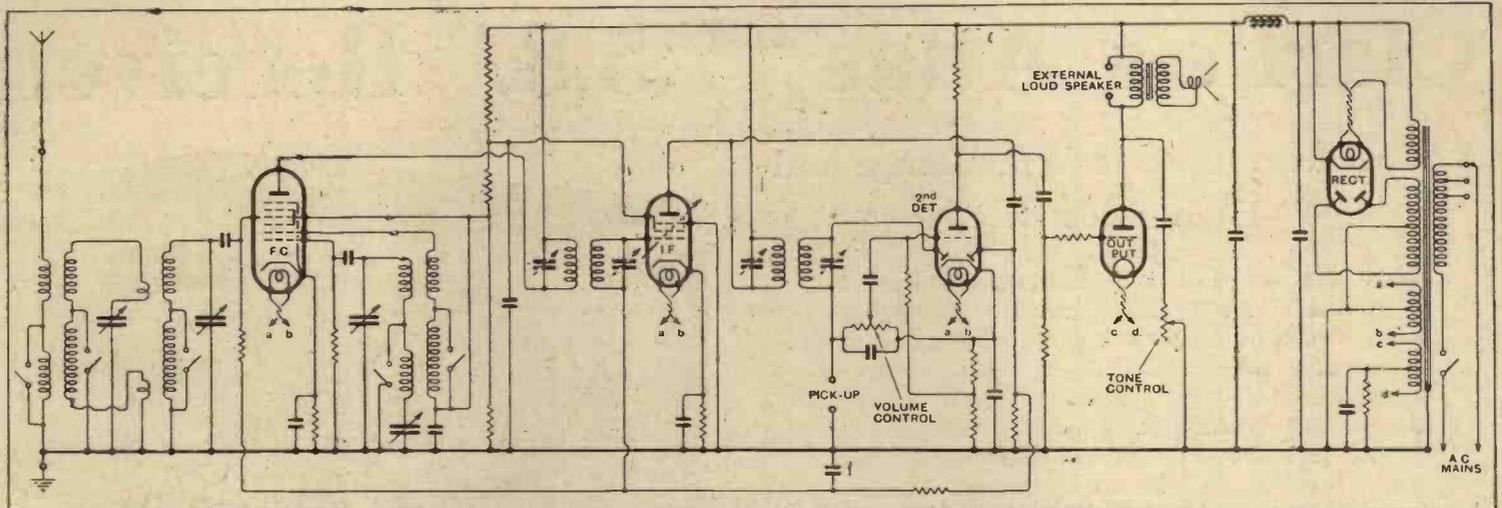
In spite of the high selectivity, the receiver was very pleasant to handle, and no difficulty was experienced in tuning-in accurately to each station. There was no objectionable sideband screech, and yet the quality of reproduction showed that there was no serious loss of the sidebands carrying the higher audio frequencies.

The unusual position of the loud speaker at 45 degrees to the front of the cabinet is not, perhaps, conducive to the best quality of reception when one is tuning the set, but at any distance from the loud speaker the internal reflections in the room will tend to cancel out any directional effects which might be apparent near to the set itself. Owing to the high over-all sensitivity of the set it is possible, in spite of the automatic volume control, to provoke overloading, but this point is not reached until the volume level is well above that ordinarily required for a living room of normal dimensions. At maximum sensitivity there was some tendency to microphonic reaction which was most noticeable when the tone control was brought into use, but this could always be stopped by backing the volume control slightly.

The design of the tuning dial presents many novel features. It is of the horizontal type, and



A novel station indicator with selective illumination is an interesting feature of the chassis.



The circuit includes an octode frequency changer, and a high degree of selectivity is provided by the input band-pass filter.

is pivoted on the axis of the thread controlling the pointer, so that the user can tilt it to any desired angle. The top half of the scale is marked in wavelengths, and the lower half is occupied by a station indicator operating on a principle which has been given the name "Spectrum Tuning." The settings of the names of the principal medium- and long-wave stations are impressed on the back of a translucent plate in green and red colours respectively. Separate dial lights, provided with the appropriate colour filters, are controlled

by the waverange switch, and, by careful choice of the dyes used in each filter, light is transmitted through only one group of lettering at a time. Thirteen stations are indicated on long waves and thirty-six on medium, but the set is capable of receiving considerably more stations than are indicated on the medium waveband. We will go so far as to say that the performance in the matter of range and selectivity is one of the best we have as yet encountered in a superheterodyne receiver making use of only four valves.

meters are invariably used for purposes of illustration.

Great stress is rightly laid upon the importance of taking full measurements of the current and voltage conditions obtaining in a receiver, since abnormalities may immediately lead to the location of the defect. The stress laid upon continuity and resistance tests, however, is only slightly less, and there is no doubt that they are of fundamental importance. It is shown how approximate measurements of inductance and capacity can readily be made with the aid of an A.C. meter, and this is recommended, not for laboratory use, but for the routine checking of doubtful components.

The book is well printed and bound and unusually free from errors. In dealing with the oscillator of a superheterodyne, however, it is stated that the anode current will increase when the valve ceases to oscillate. Actually, of course, the current will usually increase or decrease according to whether the oscillator is biased by a grid leak or a cathode resistance. This is the general rule, but there are a few exceptions where abnormal working conditions have been chosen. The section of the book devoted to ganging is somewhat sketchy, but this is only to be expected in a book which deals mainly with the use of meters for voltage and current measurements. The book can be confidently recommended to those who are unfamiliar with the multitudinous uses to which simple meters may be put in the location of faults in receivers.

New Literature on Servicing

Servicing Superheterodynes. By John F. Rider. Pp. 278 + xiii, with 94 diagrams. Published by John F. Rider, 1440 Broadway, New York City.

As its title implies, the aim of the author has been to prepare a manual which will help the service man to diagnose and remedy the faults which may develop in superheterodynes of the broadcast type, and in this he has undoubtedly succeeded. He has very rightly taken the line that no one can expect to locate the more obscure faults without an understanding of the principles underlying the operation of the receiver, and the early chapters, therefore, are devoted to superheterodyne theory insofar as it differs from that of a straight set. In view of the importance which must be attached to a sound grounding in fundamental theory, it is unfortunate that the author's explanation of the process of frequency-changing should be incorrect. He shows how the mixing of two currents of different frequencies leads to a complex current the amplitude of which varies at a frequency equal to the difference between the two original frequencies, but he goes on to say that if another circuit tuned to the difference-frequency be coupled to it, a current of the difference-frequency will flow in it. It is easy to demonstrate, both in theory and in practice, that this is not so, and that rectification or its equivalent is an essential part of the production of a current of the difference-frequency.

The author is more sure of his ground when he comes to the practical side of servicing, and there is little to criticise adversely in this major section of the book. In dealing with the curing of whistles he very wisely stresses the importance of finding their cause before attempting a remedy, and points out that, although the audible

effects may be very similar, there are very many different causes for whistles which naturally call for different remedies.

The book assumes a thorough knowledge of the servicing procedure adopted in the case of straight sets, and deals solely with the special problems raised by the superheterodyne. The range covered is wide, and includes short-wave apparatus as well as medium-wave sets; but since the book is of American origin there is no reference to long-wave reception problems. Many modern developments, although not confined to superheterodynes, are treated, and reference will be found to A.V.C., Q.A.V.C., and tuning indicators.

The book is well printed and bound, and contains numerous circuit diagrams illustrating American practice in receiver design. It should prove helpful to any service man who is unacquainted with the special problems of the superheterodyne and who is equipped with adequate testing gear, which must include a calibrated oscillator, output meter, ohmmeter, multi-range voltmeter and milliammeter, and valve tester as a minimum.

"Radio Servicing Simplified." Published by The Automatic Coil Winder and Electrical Equipment Co., Ltd., of Winder House, Douglas Street, London, S.W.1. 86 pages. Price 2s. 6d.

The aim of this book is to cover the general ground of tracing defects in receivers with the aid of a multi-range voltmeter, milliammeter, and ohmmeter, and in this it succeeds most admirably. Most of the remarks are applicable to any high grade type of measuring instrument, although as might be expected, in view of the fact that it is published by the makers of the well-known Avo apparatus, these

CATALOGUES RECEIVED

Sound Sales, Ltd., Tremlett Grove Works, London, N.19.—Illustrated literature dealing with this season's components and a range of heavy-duty chokes for use in interference suppressors.

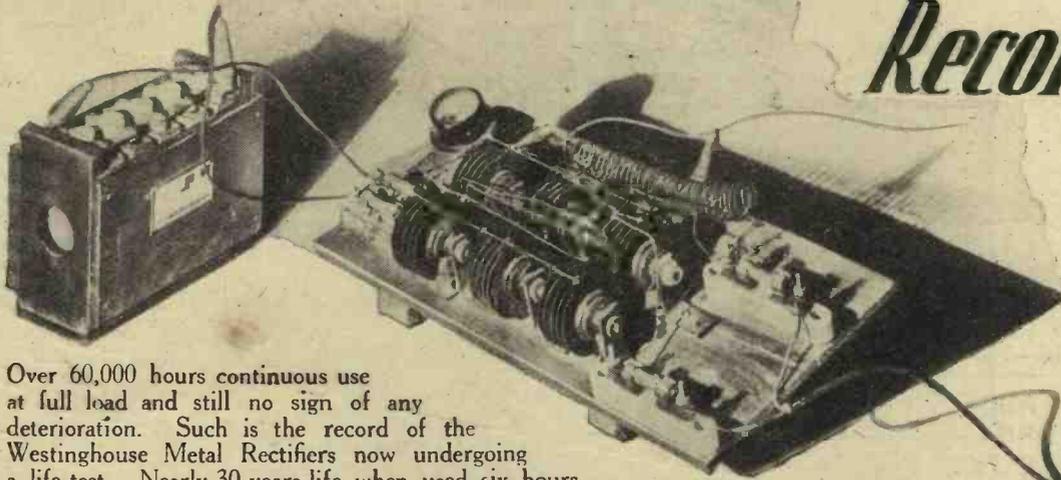
The Edison Swan Electric Co., Ltd., 155, Charing Cross Road, London, W.C.2.—Catalogue of Mazda valves and leaflets illustrating and describing the B.T.-H. Minor pick-up, Senior R.K. loud speaker, and B.T.-H. headphones.

Provincial Incandescent Fittings Co., Ltd., Pifco House, High Street, Manchester.—Illustrated folder describing the Pifco range of Rotameters and Radiometers.

British Insulated Cables, Ltd., Prescot, Lancashire.—Leaflet describing the B.I. Copper Earthing Rods.

British Television Supplies, Ltd., Bush House, London, W.C.2.—Leaflet describing B.T.S. television kits.

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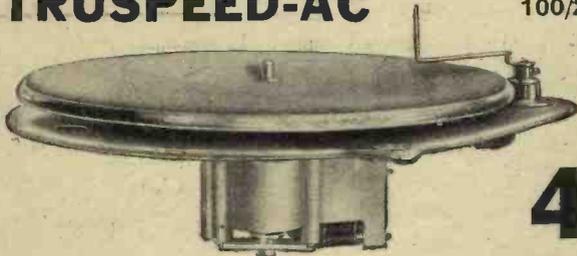
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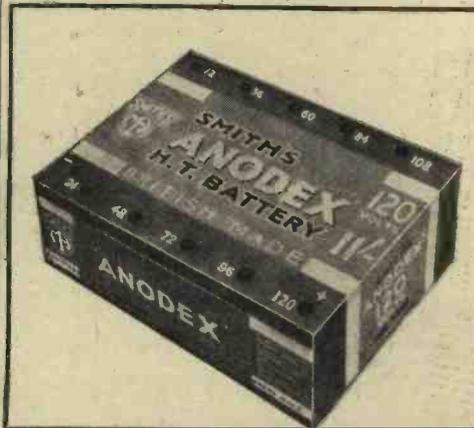
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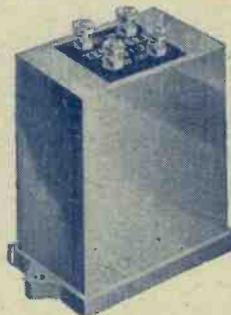
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*As many of the circuits and apparatus described in these
pages are covered by patents, readers are advised, before
making use of them, to satisfy themselves that they would
not be infringing patents.*

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EDITORIAL COMMENT

Shorts and the Ultra-Shorts

Problems of Allocation

IN terms of the age of wireless, short waves, and especially those below 10 metres, are of recent discovery, or at least, their practical value has only lately been realised. It is, therefore, quite natural that the gradual allocation of these wavelengths should have been made in a somewhat haphazard fashion. Very little systematic consideration seems to have been given to their distribution and their peculiar properties have not been taken into account sufficiently in this connection.

In other parts of the wireless spectrum it has been the custom to allot bands of frequencies to particular uses by international agreement. When it comes to allocating waves of an optical or quasi-optical character for such purposes as television, beacons, and short-distance communication, we believe that the problem should be tackled from a different viewpoint, with far more consideration given to the geographical positions in which the stations are intended to operate.

Local in Character

On long waves, for example, care is taken to see that overlapping channels are not allotted anywhere in the world because interference would take place, but it would be absurd to adopt the same principle in the case of optical waves used in this country and, for example, in Australia and America. Coming nearer home we might well suggest the possibility that a short-wave television service for the London area could utilise the same channel as similar services, say, in Wales and Scotland, without fear of mutual interference.

The problem, therefore, seems to resolve itself more into one of location than actual channels, and suggests the probability that if this principle is adopted more stations can be accommodated than could possibly be contemplated on the system of allocation applying to other wavelengths. Against this view, of course, must be mentioned the fact that, on the very short wavelengths maintaining a steady carrier frequency is not by any means easy and, therefore, a wider frequency channel will, in practice, be required than is necessary theoretically.

In taking wavelengths below 10 metres as a class, it must be remembered that this band includes waves of very different character, and it is probably necessary to consider sub-dividing them into several further classes.

Larger Wireless Sets

Portability the Only Excuse for Compactness

WE noticed in a paragraph in a daily newspaper recently a statement to the effect that the large type of wireless receiver is dead and that small receivers are to be the new order of the day.

Such a statement seems to us a curious contradiction of the facts. Midget sets have met with comparatively little popularity in this country, and we seem rather to be entering upon a vogue of better quality receivers when compactness is regarded as of little importance compared with other considerations.

There can surely be no sound argument in favour of extreme compactness where both quality and accessibility must suffer, except in the special case of receivers designed primarily for portability, when the owner expects a certain amount of compromise.

From TRIODE to DOUBLE-DIODE-PENTODE

The Purpose of Every Electrode

By A. L. M. SOWERBY, M.Sc.

Part I.

The Triode and the Simple Tetrode

THE simplest thermionic valve that can be used to provide amplification of alternating voltages is the triode. As its name implies, the triode contains three electrodes. Of these, one, the cathode, acts as a source of free electrons, which boil off from it into the surrounding vacuum when its specially prepared surface is heated to the requisite temperature.

These electrons, being negative charges, are violently attracted towards the anode, an electrode maintained by a battery, or its equivalent, at a potential considerably more positive than that of the cathode. The third electrode, or grid, is an open-work metallic structure placed between cathode and anode in such a way that all electrons reaching the anode have to pass through the meshes of the grid.

In many valves the cathode is directly heated by the passage through it of a current. In this case it consists of a thin wire, the filament, coated with a material which liberates electrons freely at a dull red heat. The filament is usually designed to run from a 2-volt accumulator, though 4-volt and 6-volt valves are used for special purposes. In other valves the cathode is indirectly heated, in which case it consists of a coated tube within which there runs an insulated metal wire called, in this case, the heater. This separation of heating and electron-emitting functions provides freedom from hum when it is desired to heat the valve from the mains, and also allows the individual cathodes to be given any desired potential even though all the valves in the receiver are heated from a common source.

Controlling the Electron Stream

The electrons emitted from the cathode tend to form a cloud round it and have not, of themselves, any inclination to a concerted movement in one direction. The attractive field set up by the positive anode draws a proportion of them through the meshes of the grid, and on, in faster and faster flight, to the anode. But since they have to pass through the grid on their way, the number taking this trip through space can be controlled by applying a suitable potential to the grid. If

this is made negative enough, it will drive back so many electrons that scarcely any will reach the anode, and the anode current will be very small. If, on the other hand, it is given the same potential as the cathode, it will offer comparatively little hindrance to their flow, and the anode current will be large.

The way in which the anode current depends on the grid voltage is shown in the curves of Fig. 1, which are the familiar "characteristic curves" of an ordinary triode. The curves are made by setting the anode voltage at the figure marked against each individual curve, and noting

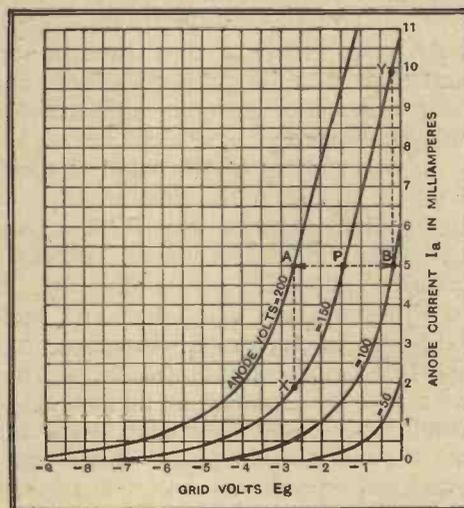


Fig. 1.—TRIODE. Grid volts-anode current. Characteristic curves of Cossor 41 MHL.

the anode current corresponding to each one of a number of grid voltages.

The straight portions of all the curves are roughly parallel; their inclination may be read as representing the number of milliamperes increase in anode current for a reduction in (negative) grid potential of one volt. This figure, conventionally taken at 100 volts on the anode and zero grid voltage, is known as the mutual conductance or slope of the valve. Since it shows the extent to which the potential of the grid controls the current through the valve, it is the main index to the valve's performance. In particular, it is valuable to know how an alternating grid

voltage AB such as that due to a signal will affect the anode current, set initially at P by choice of grid and anode voltages. The swing of grid voltage from A to B will clearly cause a corresponding swing of anode current from X to Y, so that the final anode current will consist of the steady current P with an alternating current of total swing XY superposed upon it.

Another set of curves can be plotted from the same data, showing the relationship between anode voltage and anode current at a series of fixed grid voltages. These curves, shown in Fig. 2, illustrate by their inclination the impedance, or A.C. resistance, of the valve. If the valve is set at $E_a = 143\text{v}$, $E_g = -2\text{v}$ (P in Fig. 2), an alternating anode voltage of 10 volts peak will swing the anode current in sympathy from E to F, a peak swing (PE or PF) of 0.73 mA. If the application of an alternating voltage V causes a current I to flow, the resistance in the circuit must be $E/I = 13,700$ ohms. This is, therefore, the resistance to the passage of alternating current offered by the valve when working at the grid and anode voltages symbolised at P. A little consideration will show that a steep curve implies that the valve has a low, and a flat curve a high A.C. resistance.

A Practical Example

In any practical stage of amplification it is not enough that the alternating voltage applied to the grid of the valve should develop an alternating current in the anode circuit; there must be some load in the anode circuit across which this alternating current can develop a voltage to feed the next valve's grid. The presence of this load modifies the shape, and especially the slope, of the curves of Fig. 1, so that the simple deduction of alternating anode current by means of the valve-curves of that diagram would lead to erroneous results in a practical case.

In the case of a stage of amplification such as that of Fig. 3, a simple construction from the curves of Fig. 2 will give all necessary information as to the degree of amplification obtainable. With an anode resistance of 20,000 ohms connected between battery and anode, the anode cur-

From Triode to Double-Diode-Pentode—
rent is zero if the voltage actually on the anode is 200v. (Point A, Fig. 2). At 10 mA. the whole voltage of the battery

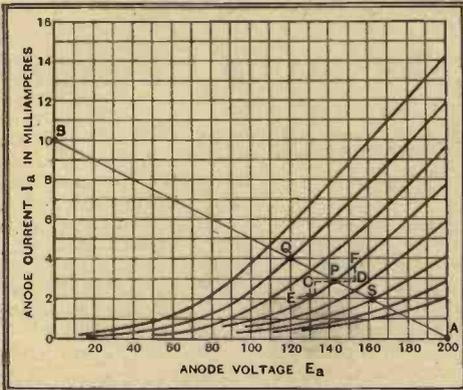


Fig. 2.—TRIODE. Anode current-anode volts. Characteristic curves of Cossor 41 MHL.

is dropped across the resistance, and the anode voltage is zero (Point B, Fig. 2). The line AB is thus the load-line, to some point on which every possible voltage-current combination taken up by the valve when operating must correspond.

If the initial bias on the valve is 2v., the working point will be at P. If the pick-up delivers a signal that swings the grid from -1 to -3v., the anode current and anode voltage will swing up and down the line AB between the limits Q and S. The alternating anode current will thus be 1.05 mA., and the alternating anode voltage 21.8v. The effective slope of the valve under these particular operating conditions thus amounts to 1.05 mA. per volt, and the effective amplification of the stage is 21.8 times.

The Amplification Factor

Inspection of the figure shows that if the line AB were more nearly horizontal the amplification would be greater (bigger swing in anode volts for 1 volt swing on the grid). A load-line passing horizontally through P would represent an indefinitely high A.C. load of low D.C. resistance (e.g., a high-inductance choke) and would give an amplification of 36.7 times. This figure, representing the maximum amplification obtainable from the valve under even theoretically ideal conditions, is called its amplification factor, represented by the symbol μ . It is, in effect, the change in anode volts necessary to hold the anode current constant against a change of one volt in the grid bias, and so may be obtained from ordinary "static" curves such as those of Fig. 1.

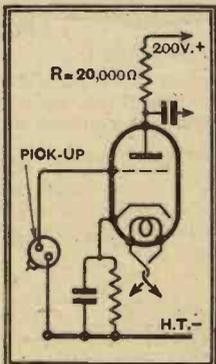


Fig. 3.—A triode amplifier for gramophone pick-up. Performance of this stage is analysed in Fig. 2.

If we know the amplification factor and the A.C. resistance of a valve, we can easily deduce the mutual conductance. A volt of A.C. applied to the grid is equivalent to μ volts at the anode, and the alternating anode current is driven through the A.C. resistance R_0 by this voltage. Thus one volt at the grid drives a current of μ/R_0 amps. through the valve; this ratio is therefore the mutual conductance g .

In such a case as that of Fig. 3, the alternating anode current has to be driven through both the A.C. resistance of the valve and the load-resistance; the current is therefore $\mu/(R + R_0)$ for every volt applied to the grid. This current, in flowing through the load-resistance R , develops across it a voltage, $\mu R/(R + R_0)$ for each volt on the grid; this expression, therefore, is that for the actual amplification realised in the particular stage shown. Inserting in the formula the individual figures for this case, where $\mu = 36.7$, $R_0 = 13,700$, and $R = 20,000$ ohms, we get 21.8 times, exactly as found graphically from Fig. 2.

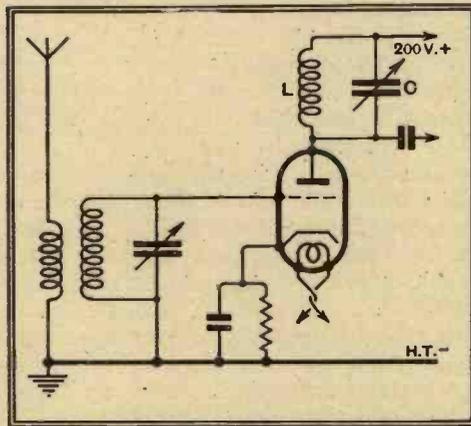


Fig. 4.—A triode amplifier for high-frequency signals. Exactly equivalent (L.C. replacing R) to Fig. 2.

For high amplification the requirements are evidently a valve of high amplification factor and low A.C. resistance, used in conjunction with a high anode load. In high-frequency amplification it is easy to build up a load of some 100,000 ohms in the form of a tuned circuit, while higher loads can be obtained by special design. In Fig. 4 is shown a stage of high-frequency amplification put together on the lines of the low-frequency stage of Fig. 3; the source of signals is now a tuned circuit connected to an aerial, while the anode resistance is replaced by the tuned circuit LC, which may be reckoned as offering a load of some 100,000 ohms to signals of the frequency to which it is tuned.

This amplifier, simple and straightforward though it is, will not work. The reason is found in the capacity between anode and grid of the valve, through which energy is fed back from anode to grid in amount sufficient to set up and maintain oscillations in the grid circuit.

To prevent this unfortunate effect, it is customary to use a valve in which the capacity between anode and grid is reduced, by suitable screening, to a negligibly small amount. The screen used

consists of a closely woven mesh of wire interposed between grid and anode in such a way that no part of the anode can "see" any part of the grid. To prevent capacity between connecting wires, either the anode (most English valves) or the grid (American valves) is connected to a terminal on the top of the bulb, as shown in Fig. 5.

In order that the screen shall be effective, it is necessary that it shall be earthed sufficiently to prevent alternating voltages due to the signal from appearing on it when a signal is applied to the grid. If it is earthed directly its potential will be approximately that of the cathode, and by screening off the D.C. field from the anode it will prevent this from acting on electrons in the neighbourhood of the cathode; there will therefore be no anode current, and the valve will not amplify.

Effect of the Screen

By earthing the screen through a condenser large enough to act as a virtual short-circuit to signal voltages, it becomes possible to raise the screen to a suitable positive potential. If this is done, leaving the anode at zero potential, the cathode, grid, and screen form a triode of conventional type, the current through which is controlled by the grid-potential exactly as shown in Fig. 1.

Owing to the presence of the screen, a voltage applied to the anode will have a very small effect indeed upon the total number of electrons passing through the valve as a whole; this will depend almost entirely upon the voltage applied to the screen. Leaving this constant, the application of a steadily rising anode voltage will result in pulling more and more of the

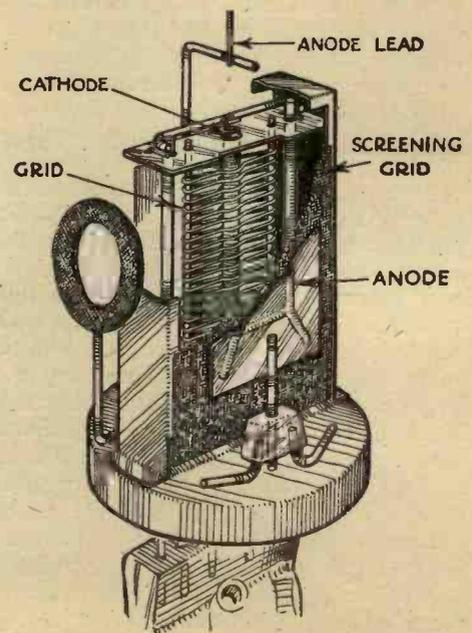


Fig. 5.—The arrangement of the electrodes in a typical screened grid valve.

electrons through the meshes of the screen instead of allowing them to finish their travels there. The anode, therefore, robs the screen.

This effect is shown in the curves of

From Triode to Double-Diode-Pentode—

Fig. 6. So long as the anode is decidedly more positive than the screen it takes nearly the whole of the current; the curve for $E_g = -2$ shows that over the range $E_a = 120$ to $E_a = 200$ the anode current only changes by 0.025 milliamp. Over this range of anode voltages the valve has a very high A.C. resistance; for this particular grid-bias voltage the figure is 3.2 megohms. The curve for $E_g = -1.5$ is less flat; its inclination gives an A.C. resistance of 0.50 megohm. Discussion of

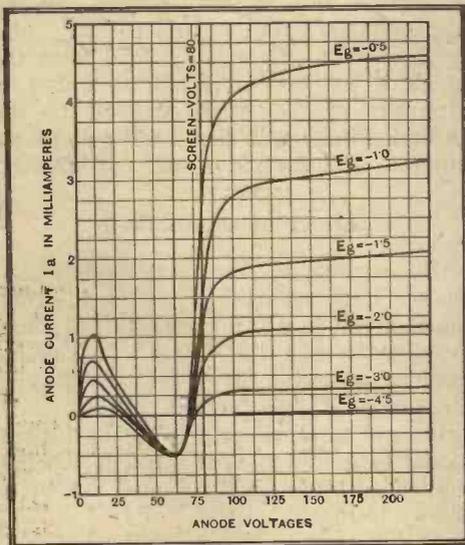


Fig. 6.—SCREENED TETRODE. Characteristic curves of Cossor MSG/HA.

the reason for the extraordinary antics of these curves in the region of anode voltages near and below the screen voltage will be postponed; it is enough to note here that the screen-grid valve is always used with an anode voltage considerably higher than that on the screen, so that only the flat part of the curves to the right of the diagram applies to ordinary usage.

Amplification Factor of S.G. Valves

At $E_a = 200$, the anode current of the valve of Fig. 6 is 2.05 mA. for $E_g = -1.5$, but falls to 1.1 mA. for $E_g = -2$. The average mutual conductance of the valve over this range of grid voltages is thus 0.95 mA. per half-volt, or 1.9 mA. per volt. Combining this figure with a mean value for the A.C. resistance—say 1.0 megohm—we find that the amplification factor of the valve is 1900 ($\mu = gR_0$). Some mild confirmation of this is obtained from Fig. 6 when we note that the curve $E_g = -2$ would apparently have to be continued the better part of a thousand volts to the right to increase the anode current to the value obtained by reducing the grid bias to -1.5 volts.

With a combination of high A.C. resistance and high amplification factor, the behaviour of a screened valve in a receiver differs in some respects from that of a triode. Reverting, for example, to the stage of high-frequency amplification of Fig. 4, we find that the gain of the stage, assuming the dynamic resistance R of the

tuned circuit to be 0.1 megohm, will be $1900 \times 0.1 / 0.1 \times 1.0$ if $R_0 = 1.0$ megohm and $\mu = 1900$. This gain comes out at 173 times. Inspection of the figures just given shows that it is the high A.C. resistance of the valve that is responsible for the stage-gain being only one-eleventh of the rated amplification factor of the valve.

It is interesting to observe the way in which the gain increases with anode-circuit resistance for two equivalent valves, one a tetrode and one a triode. Curves showing this are given in Fig. 7; to make the comparison fair, both the valves taken to illustrate the point have the same slope of 2 milliamps per volt.

For low values of anode resistance, the gain given by the two valves is much about the same, but the curve for the triode bends over, and for high resistances becomes very nearly a horizontal line at a height equal to the amplification factor of the valve. The curve for the screened valve, on the other hand, is nearly a straight line of constant slope; it, too, will turn over eventually, but at values of anode-circuit load far above anything practically possible. Roughly speaking, the triode tends to give a constant gain, while the tetrode gives a gain proportional to anode-circuit load. Expressed differently, the triode gives an output at more or less constant voltage, irrespective of small changes in the value of a fairly high load, whereas the tetrode passes a constant A.C. current through any load that is not too extravagantly high.

Looking at the formula for gain, $A = \mu R / (R + R_0)$, it is clear that if the anode load is low compared with the A.C. resistance of the valve, we may write, for ap-

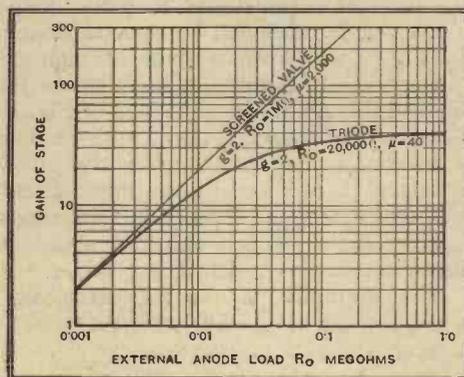


Fig. 7. Comparison of stage-gain given by triode and tetrode, both of slope 2 mA/v, with different anode-circuit loads.

proximate results, $A = \mu R / R_0$, or $A = gR$. Thus a tetrode of slope 2.0 mA./v., used with an anode resistance of 50,000 ohms, gives a gain of 100 times. (Accurate value, for the valve taken for Fig. 7, 95.3 times.)



The Cossor MSG/HA valve referred to in Fig. 6.

In the case of screened valves, their amplifying abilities can therefore be accurately compared by a simple comparison of slopes.

(To be continued.)

THE RADIO INDUSTRY

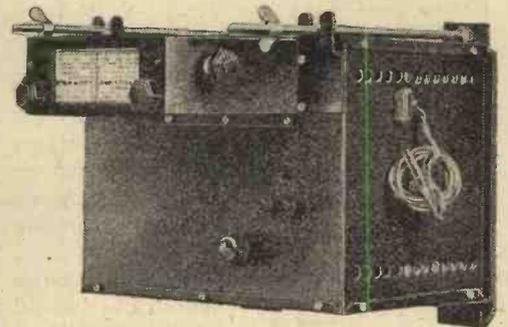
INTERESTING NEWS comes from Ferranti, who announce the introduction of a car-radio receiver, to be known as the Ferranti Motorset. It is of the single-unit type (with built-in speaker) and is directly controlled, being designed for mounting below the dashboard. Five valves, of which two are multiple valves, are used in a superheterodyne circuit; H.T. is derived from the car battery through a self-rectifying vibratory generator.

"The Cossor Wireless Book," just issued by A. C. Cossor, Ltd., Highbury Grove, London, N.5, is much more than a mere catalogue of valves. It includes many pages of general technical data, lists of stations, etc. Free copies are available for readers.

Twelve motor-generator sets, including one of unique design for operating at 50,000 volts above earth potential, have been supplied by the G.E.C. for the new Droitwich station.

Belling and Lee, Ltd., Cambridge Arterial Road, Enfield, Middlesex, have just issued a comprehensive booklet entitled "Cutting the Crackle Out of Radio." All aspects of man-made interference are dealt with in an authoritative manner, and much useful information on suppressive measures is given. Price: 6d., post free. Incidentally, the same firm have just issued their new season's catalogue.

Arrangements have now been completed for increased production of the Amplion "Radiolux" superheterodynes, with the result that reductions in price have become possible. New prices are:—A.C. table model, 12 guineas; D.C. table model, 13 guineas; radio-gramophone, 21 guineas.



The new Ferranti "Motorset," for installation under the dash of a car. The tuning panel protrudes to the level of the dash-board.

The latest Marconi valve catalogue is a very helpful little booklet, and contains curves and operating data for all types of Marconi valves, with complete tables of valve combinations for a number of typical modern sets.

A booklet is being issued by Celestion, Ltd., which outlines the history of their loud speakers. A large quantity of these interesting booklets were distributed to visitors to Olympia, and copies can still be obtained.

Catalogues Received

Wingrove and Rogers, Ltd., Arundel Chambers, 188-9, Strand, London, W.C.2.—Polar condensers.

Rich and Bundy, Ltd., New Road, Ponders End, Enfield, Middlesex.—Mains transformers, chokes, output transformers, etc.

Halford Radio, Ltd., 39, Sackville Street, Piccadilly, London, W.1.—Halford superheterodyne receivers.

Push-Pull Input Systems

Methods of Feeding a Push-Pull Amplifier

By W. T. COCKING

THAT apparatus designed primarily for high-quality reproduction is appreciated by the discriminating listener has been amply demonstrated by the reception of *The Wireless World* Push-Pull Quality Amplifier.¹ Correspondence has shown, however, that some doubt exists as to the best method of coupling it with an existing receiver. Some notes on this matter were given in the constructional articles, but were necessarily confined to a few cases.

The input connections of the amplifier are shown in Fig. 1, and about 5.07 volts R.M.S., or 7.17 volts peak, must be maintained across the input terminals for an output of 4 watts. This input must be so split that one-half of it (3.585 volts) appears between AE and one-half between BE. Moreover, the voltage across AE must be 180 degrees out of phase with that across BE.

The simplest input system is undoubtedly a push-pull transformer with its two outer secondary terminals connected to A and B and its centre-tap to E. In order to preserve the transformer characteristics, of course, C₁ and C₂ should be short-circuited, and R₁ and R₂ removed

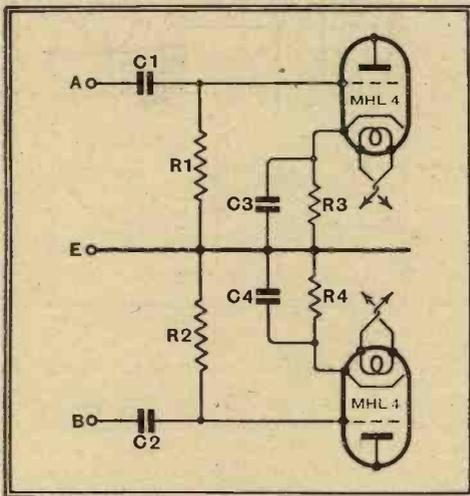
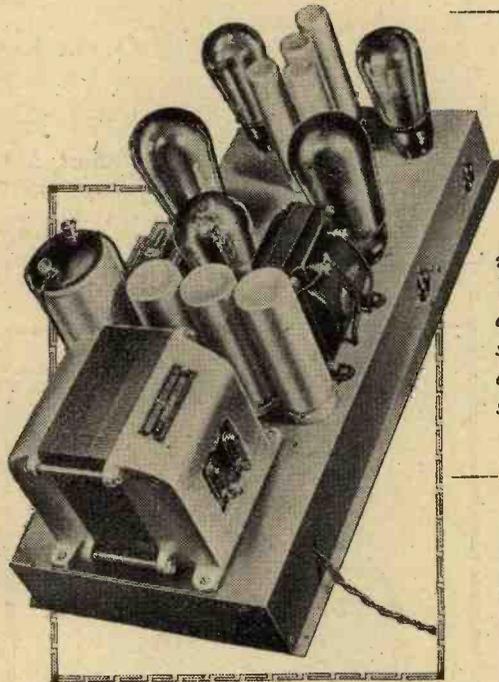


Fig. 1.—The input circuit of the Push-Pull Quality Amplifier.

from the amplifier. The primary of such a transformer is naturally connected in accordance with standard practice.

¹ *The Wireless World*, May 11th and 18th, 1934.



"The Wireless World" Push-Pull Quality Amplifier.

Many feel, however, that the full benefit of the amplifier is not obtained if a transformer be included, and prefer to adhere to resistance coupling throughout. The simplest coupling is then undoubtedly a direct feed from a diode detector, as shown in Fig. 2. The resistances R_a and R_b should each be of 50,000 ohms, and C_a can be 0.0001 mfd., the output terminals, of course, are connected to the correspondingly lettered input terminals of the amplifier.

Direct Diode Feed

The modulated input appearing across the circuit LC is applied between the diode anode and cathode in the usual way through the by-pass condenser C_a. Rectification occurs in the diode and modulation frequency currents flow through R_a and R_b exactly as with the usual diode detector. Since the current through R_a is the same as that through R_b, and the two resistances are of equal value, it follows that the potentials developed across them have the same value. Now consider the question of phase. Suppose that A is positive with respect to B at a given instant, then E is also positive with respect to B, and A is positive with respect to E. If E is more positive than B, however, B must be negative with respect to E. We thus find that the points A and B are always of equal and opposite potential with respect to E, and so the system is suitable for feeding a push-pull stage.

One of the greatest disadvantages of this system is that volume control must normally take place before the detector, and if gramophone reproduction be required, a separate feeder stage is necessary for this.

THE methods which can be employed for feeding a push-pull amplifier are many and various, and the correct arrangement depends upon the type of receiver which is used. Some of the more important feeder systems which may be used with "The Wireless World" Push-Pull Quality Amplifier are described in this article, and it is shown that the method to be adopted depends very largely upon whether a straight or superheterodyne receiver is employed.

It has been said that the total amplifier input required for 4 watts output is 7.17 volts peak, and if this is to be obtained with 80 per cent. modulation, the detector input must be about 13 volts peak if an MHL4 valve with grid and anode strapped be used for the diode. If the two diode anodes of a duo-diode-triode be used, the input required will be about 15 volts peak. In either case, detection should be almost completely distortionless. An input of this order can rarely be obtained, even from

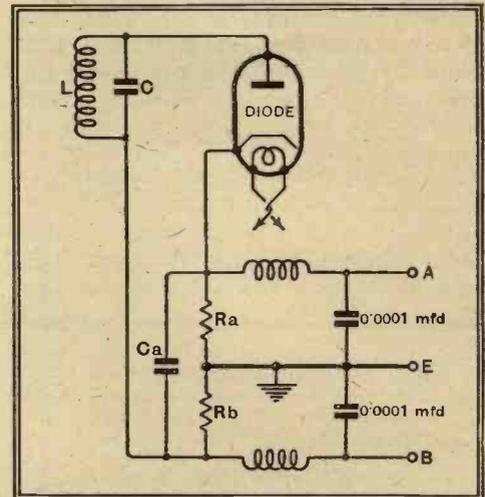


Fig. 2.—The amplifier may be fed directly from a diode in the manner shown in this diagram.

a local station, without an H.F. stage, and for more than purely local reception two stages should be provided.

One disadvantage of the circuit of Fig. 2 is that neither terminal of the tuned circuit can be earthed, but this may be overcome by rearranging the connections on the lines shown in Fig. 3. The tuned circuit can then be of any conventional type such as an H.F. transformer or the tuned grid circuit.

A more generally useful arrangement is shown in Fig. 4, and it will be observed that the triode section of the duo-diode-triode valve is connected in the same way

Push-Pull Input Systems—

as the triode in the feeder unit described for the Push-Pull Quality Amplifier. In this case the push-pull output is obtained with the aid of a triode, and the

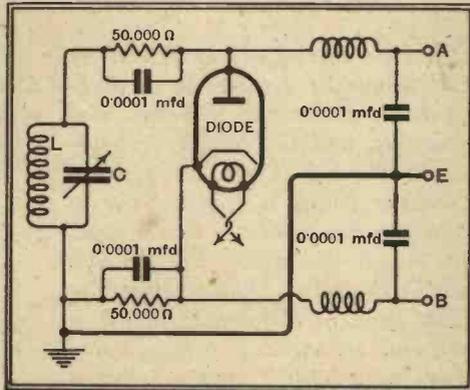


Fig. 3.—An alternative method of using a diode for feeding the amplifier when the tuned circuit must be earthed.

mechanism is the same on both radio and gramophone. The operation can best be seen from the simplified diagrams of Fig. 5, and the complete triode circuit is shown at (a). Now the impedance of *Ca* and *Rd* in parallel is negligible at the operating frequencies, and the reactance of *Cb* is also negligibly small, while *Rc* is very high. As regards L.F., therefore, we can replace Fig. 5a by Fig. 5b, and it will be seen that as in the diode circuit the output is taken across two series connected resistances of equal value, the midpoint of which is earthed. The operation, therefore, is identical, and the differences in the practical circuit are only those occasioned by the necessity for providing the correct steady operating potentials on the valve.

Using a Duo-diode-triode

In Fig. 4 rectification occurs in the diode circuit, and the resulting L.F. potentials are passed to the triode through

a resistance-capacity coupling. Since there is an additional stage of amplification, the detector input is now much less, for it has to provide an output of only 0.36 volt peak on an 80 per cent. modulated carrier. When giving such a small output a diode detector is by no means distortionless, so in the interests of quality it is necessary to provide the detector with a larger input and to throw away a portion of the output.

Recent work on diode detectors has shown that when the MHD4 valve is used with the two diode anodes connected together, and with a load resistance of 100,000 ohms, the input can be as small as 2 volts peak without distortion becoming

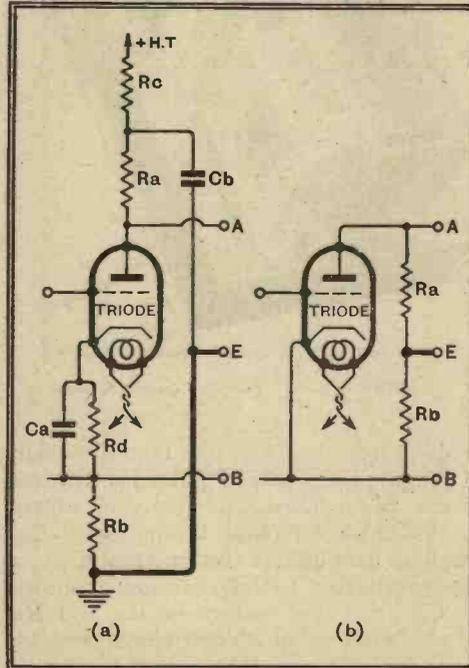


Fig. 5.—The fundamental connections of the triode portion of the valve in Fig. 4 are shown at (a), while (b) illustrates how the phase reversal is obtained.

appreciable. It is, in fact, only about 0.25 per cent. for 80 per cent. modulation, and is even less for larger inputs. It has previously been thought that the input should be of the order of 10 volts, but it now appears that this figure is unnecessarily high. It should not be forgotten, however, that diodes vary in their characteristics, and a valve of a different make may require a larger input.

With a 2 volts detector input, the output is 1 volt peak for 80 per cent. modulation, and the triode portion of the valve requires 0.36 volt. Since we must throw away a portion of the detector output by means of

some form of potentiometer, it is convenient to adopt a round figure for the ratio of detector output to amplifier input, for this will lead to standard values of components. Let this ratio be 3-1, obtained by the insertion of the 500,000 ohms resistance *R'* (dotted in Fig. 4). The detector output required is then $0.36 \times 3 = 1.08$ volts peak, and will be obtained with an 80 per cent. modulated carrier of 2.15 volts peak, or 1.52 volts R.M.S. between the points (aa) of Fig. 4.

The voltage at (aa) must be produced across some type of H.F. circuit, and it is here that most difficulty arises, for neither terminal may be earthed. In the case of a superheterodyne the matter is easily arranged, and the circuit of the preceding stage can take the form shown in Fig. 6. There is also no difficulty in a single-span receiver and details of the connections were given in *The Wireless World* for June 22nd, 1934.

With a straight set the solution is not so straightforward, because in these days of ganged tuning one side of the variable

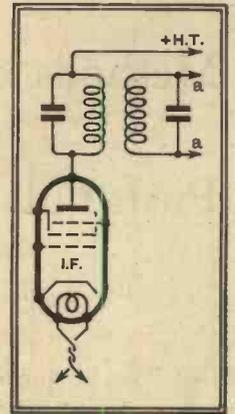


Fig. 6.—The last I.F. coupling in a superheterodyne usually takes the form shown here and it may precede the valve of Fig. 4 by joining the points (aa) on the two diagrams.

Fig. 4.—A duo-diode-triode can be employed to provide both detection and amplification by using the arrangement shown in this diagram. The H.F. input circuit is connected to the points (aa).

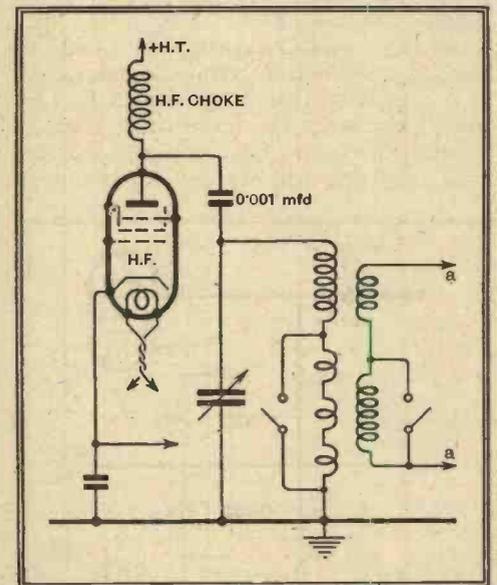
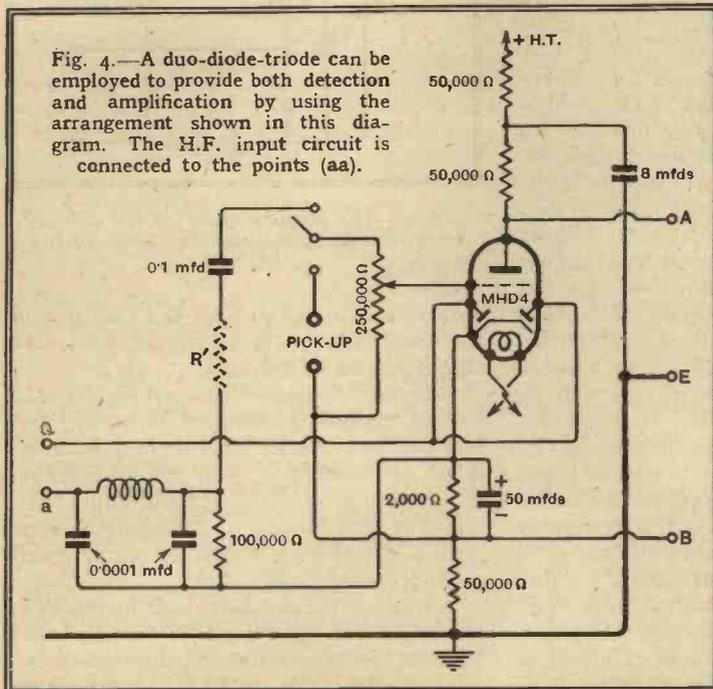


Fig. 7.—In the case of a straight set the feeder system of Fig. 4 is best preceded by a transformer coupling as shown in this diagram.

condenser must be earthed. The difficulty can be got over by adopting the arrangement of Fig. 7. It will be seen that an H.F. transformer is employed, but the normal primary winding is used to feed the diode detector, and the tuned circuit is fed from the H.F. valve by means of an H.F. choke and a condenser.

Push-Pull Input Systems—

For maximum efficiency, the transformer ratio should not be greater than some 2-1, but quite good results can be secured with a ratio as high as 3-1. With none of these systems, of course, is it possible to employ reaction satisfactorily.

Although the duo-diode-triode lends itself best to feeding a push-pull amplifier, it is quite possible to use a grid detector and reaction can then be embodied. The connections of such an arrangement are shown in Fig. 8 which is self-explanatory. Apart from the ability to obtain reaction, this system has no advantage over the recommended method embodying a duo-diode-triode, and it is indeed inferior to it in certain respects.

The use of the amplifier on gramophone is quite straightforward and has already been fully dealt with, but it is sometimes desired to employ a microphone. Essentially this is no different from a pick-up, and it is only necessary to connect the secondary of the microphone transformer to the pick-up terminals. Most good quality microphones are designed to operate into an impedance of 500 ohms, and the resistance of the volume control is 250,000 ohms. In general, therefore, the transformer should have a ratio of 1-22.4.

Using a Microphone

The only difficulty which may be experienced is in obtaining sufficient volume, for most good quality microphones give only a small output, perhaps 0.1 volt or

less, while the input required by the amplifier is about 0.36 volt peak. The only remedy, of course, is to increase the amplification, and there is no doubt that this is best done by including another stage of push-pull amplification between the feeder valve and the amplifier proper. A pair of MHL4 valves with the same connections and circuit values as those in the amplifier should function admirably. This arrangement is hardly worth while,

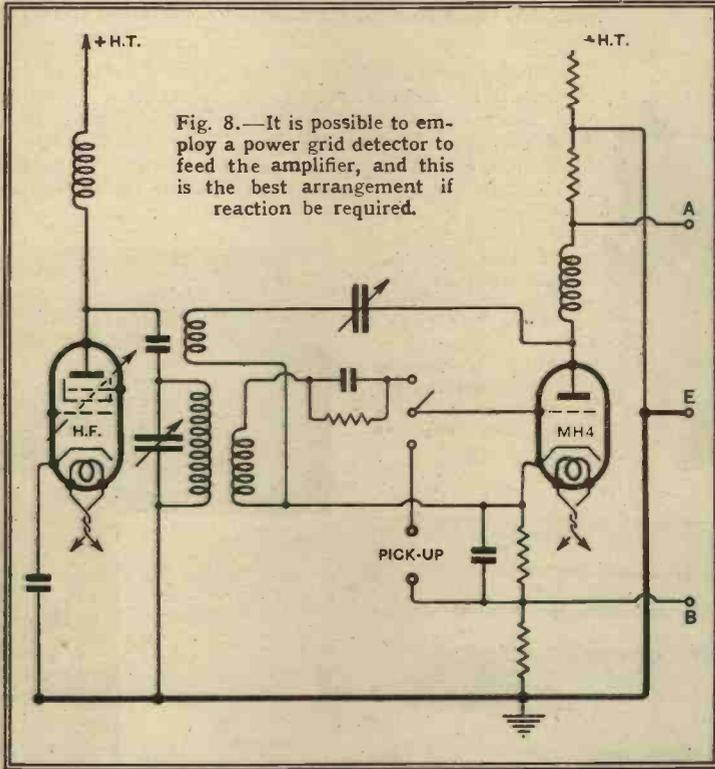


Fig. 8.—It is possible to employ a power grid detector to feed the amplifier, and this is the best arrangement if reaction be required.

of course, unless the equipment is to be used chiefly with a microphone, for on radio and gramophone the amplification would be unnecessarily large.

In general, therefore, the arrangement of Fig. 9 is best adopted for microphone working. The L.F. transformer should be of low ratio, about 1-1, so that excessive amplification is not obtained, and a good frequency response is secured with the pick-up volume control connected across its secondary. The necessary current for operating the microphone can be

secured by connecting a battery to the points (bb), or it may be obtained by closing these points by a resistance, shunted by a 50 mfd. electrolytic condenser, which is included in the main negative H.T. return lead of the amplifier. The value of the resistance, of course, will depend upon the current and voltage requirements of the microphone, and so will vary according to the component selected.

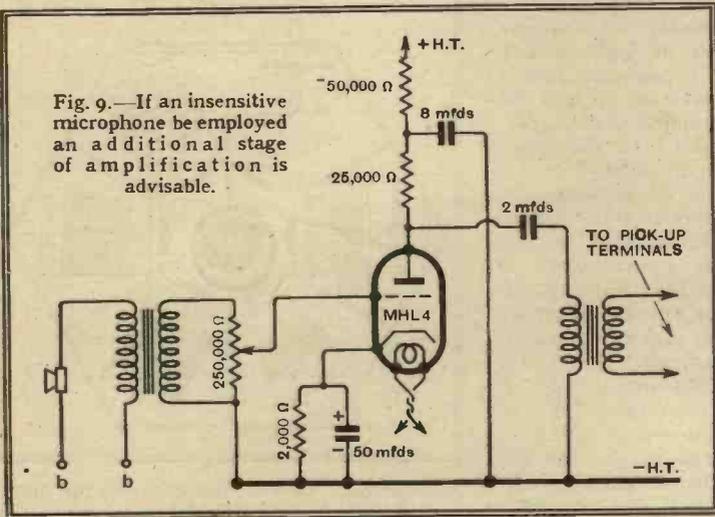


Fig. 9.—If an insensitive microphone be employed an additional stage of amplification is advisable.

U.R.S.I. London Meeting

THE Union Scientifique Internationale Radio (U.R.S.I.) met in London for its third plenary session between September 11th and 19th. In the absence through illness of the president (Prof. A. E. Kennelly, of Harvard), Dr. W. H. Eccles, F.R.S., acted as president for the London meeting. The delegates were welcomed on behalf of the president of the Royal Society on the afternoon of the 11th and were entertained to dinner by the Government on September 18th, when the Postmaster-General, Sir Kingsley Wood, was the chief speaker.

The delegation assembled in London included representatives from America, France, Belgium, Italy, Denmark, Sweden, Switzerland, Japan, New Zealand and South Africa, amongst the best-known visiting scientists being Dr. J. H. Dellinger, of the U.S. Bureau of Standards; Dr. van der Pol, of Eindhoven; MM. Gutton and Mesny, from France, and Dr. Harald Norinder, the well-known Swedish-American authority on lightning.

The work of the Union is divided between five Commissions: (1) Standards and Measurements; (2) Propagation of Waves; (3) Atmospherics; (4) International Co-operation, and (5) Radio Physics.

During the London meeting the delegates made numerous visits to adjacent places of radio and allied interest, these including the National Physical Laboratory, the Radio Research Station, Slough, the Rugby and Baldock stations of the Post Office, and the Cavendish Laboratory at Cambridge, while other activities included receptions at Broadcasting House and at the Royal Institution, where the director, Sir William Bragg, gave an account of the researches of Faraday.

Television for the Amateur Constructor, by H. J. Barton Chapple, M.Sc., 2nd edition, 266 pages, +xxiii. Published by Sir Isaac Pitman and Sons, Ltd. Price 12s. 6d.

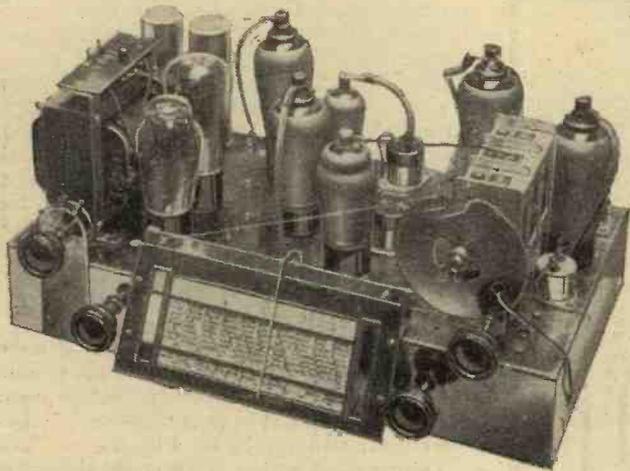
The practical, as distinct from the theoretical side of television forms the key-note of this book, and the various theoretical considerations which necessarily arise are dealt with in a very elementary manner. The first chapter deals with the general principles of television and the second with the fitting up of a suitable workshop for the home construction of apparatus. The next five chapters are devoted to a discussion of suitable types of television receiver and H.T. supply units, and constructional details of a certain amount of apparatus is given. The theoretical treatment is sketchy, and it is unfortunate that in certain cases the apparatus recommended is not of a type which would usually be considered suitable for the best reproduction of sound broadcasting. One is tempted to enquire, therefore, how it can meet the more stringent requirements of television.

Four chapters are devoted to a description of the construction and operation of disc and mirror-drum apparatus, and in the final chapter the possibilities of high-definition television on ultra-short waves are briefly discussed. In the preface the author states that in preparing this second edition he has endeavoured to bring the book up to date, but we notice that the valves recommended for certain receivers described are still of the 6-volt types which have been obsolescent for some years. When revising the older edition a point like this might well have received attention.

Paris Radio Exhibition

Considerable Technical Progress in the French Industry

THE eleventh Radio Show, which was held at the Grand Palais, in Paris, from September 6th—16th, brought together more than 200 exhibitors and attracted a large public. For the first time foreign firms have been allowed to participate in the Exhibition. It may be said at once that, stimulated by foreign influence, the technical side of the French radio industry has made such progress in recent years that it is now well able to hold its own in competition with foreign products



which makes a high degree of selectivity imperative.

Since 1926 the superheterodyne has maintained its position as the most popular circuit in France. It may be

cuit diagram of a good French superheterodyne (the "Superoctodyne 8"), by Mildé. This all-wave receiver includes a pentode H.F. stage, an octode frequency-changer, a pentode I.F. valve, followed by a diode for the detector and A.V.C. purposes.

(Left) A good example of the French superheterodyne "Superoctodyne," by Mildé. It should be noted that the tall screened coils are of the iron-cored type.



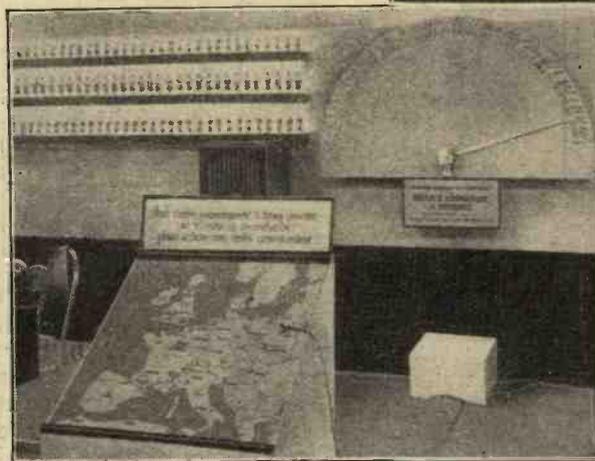
A Grammont receiver fitted with Telematic tuning system.

THE very drastic effect which the financial crisis in France has had upon wireless manufacturers has been beneficial in so far as it has contributed to raise the general standard of production. In spite of a constant tendency towards price reduction, apparatus of good quality is well in evidence.

Midget sets which in 1933 were to be found on almost all the stands, and which seemed as if they would bring the musical reproduction of radio into disrepute, have now almost disappeared. Refinements such as A.V.C., silent tuning, tone control, visual tuning indicators, which were only associated last year with receivers of very high prices, appear in 1934 even on the most popular models.

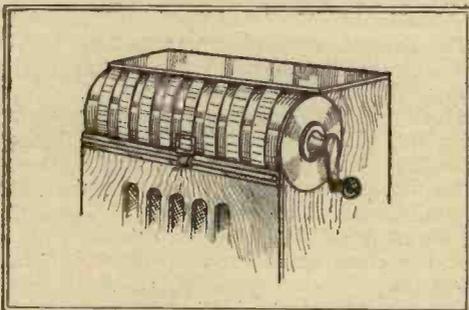
It is also important to record the appearance of a very large number of all-wave receivers covering wavelengths from 15-1,950 metres.

At least 90 per cent. of the receivers at the Show were superheterodynes, the number of valves utilised varying from four to eight, and the prices ranging from £10 to



Apparatus set up at the Exhibition to demonstrate the Telematic remote control tuning system. The tuning condenser is rotated by means of a small electric motor to its proper tuning position, corresponding to the station on the map where the plug is inserted into the socket.

An additional valve is used for silent tuning, and the two L.F. stages both embody pentodes. The visual indicator consists of a millimeter located in the plate circuit of the two first valves, while the coils are iron-cored types. The sensitivity of the receiver is given as 3 microvolts, the selectivity 10,000 to 1 for 9 kc., and the undistorted output 3.5 watts.



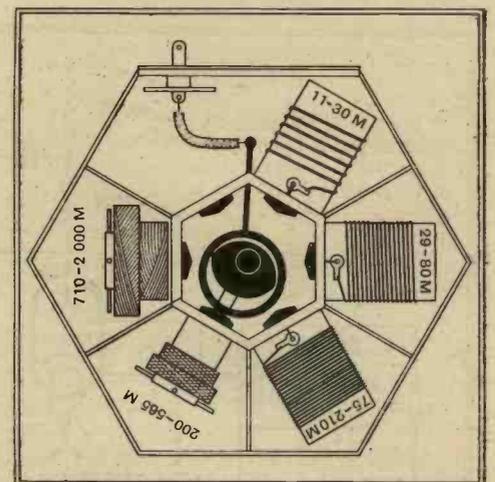
An original type of tuning scale. The names of the stations are helically arranged on a raised strip on the cylinder. When the cylinder is turned the names of the stations appear in the window, which can travel along a guide.

£40. The popularity of a frequency-changing circuit in France can be explained principally because of the chaotic state of the present broadcast distribution in France,

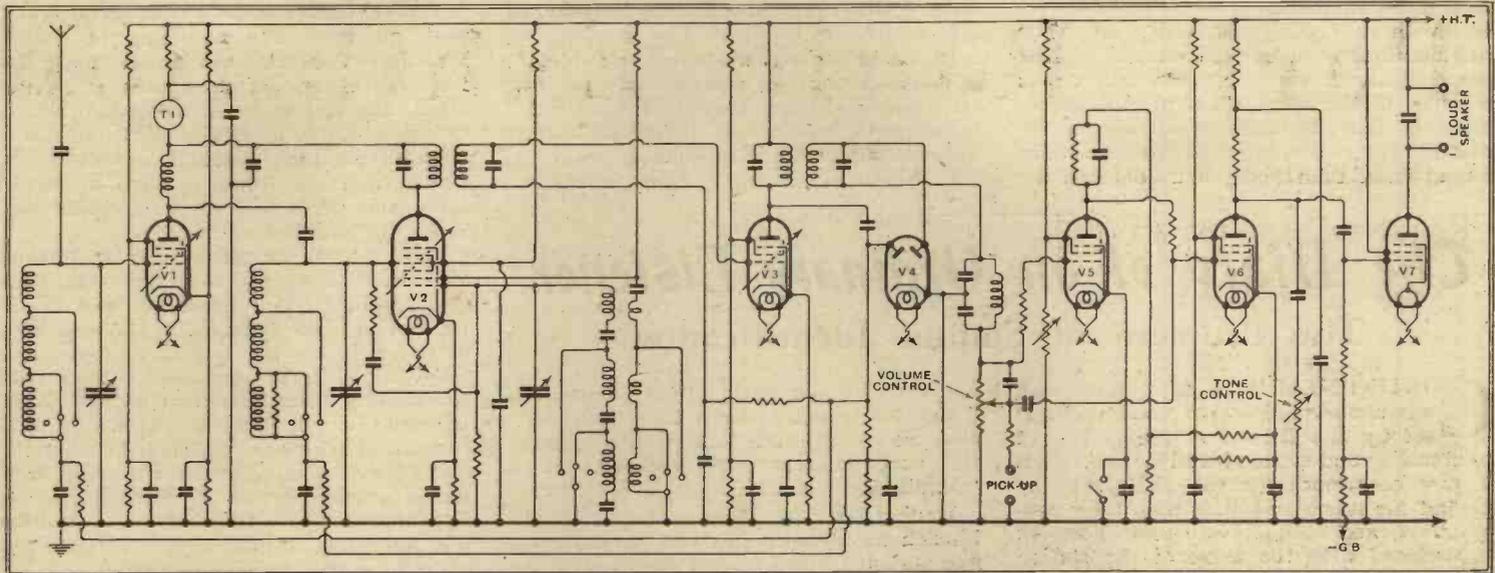
on account of this necessity for extreme selectivity that receivers of high quality have delayed making an appearance, and it is only recently that receivers capable of good reproduction, but employing the superheterodyne principle, have been developed as a result of modern circuit improvements.

For the last three years France has been invaded by valves of American type, which, in spite of the cost of transport and import duty, are sold cheaper than valves of European manufacture. On this account, the majority of French superheterodynes previously employed the American pentagrid as a frequency-changing valve. But the recent drop in prices of European valves, and particularly the production of the octode, have had a considerable effect on the demand for American types. At the Paris Show this year the majority of the superheterodynes were fitted with octodes.

By way of example, we publish the cir-



A sectional view of the all-wave coil unit by Gamma. The switching arrangement is particularly ingenious.



Circuit of the Mildé "Superoctodyne" all-wave receiver with A.V.C., silent tuning, and visual indicator. The valve V5 provides for silent tuning by biasing the valve V6 beyond the current cut-off point in the absence of a signal.

In the simpler types of superheterodynes all of these refinements are naturally not included, but, all the same, even the most modest of them, with only four valves, generally employ A.V.C., although not

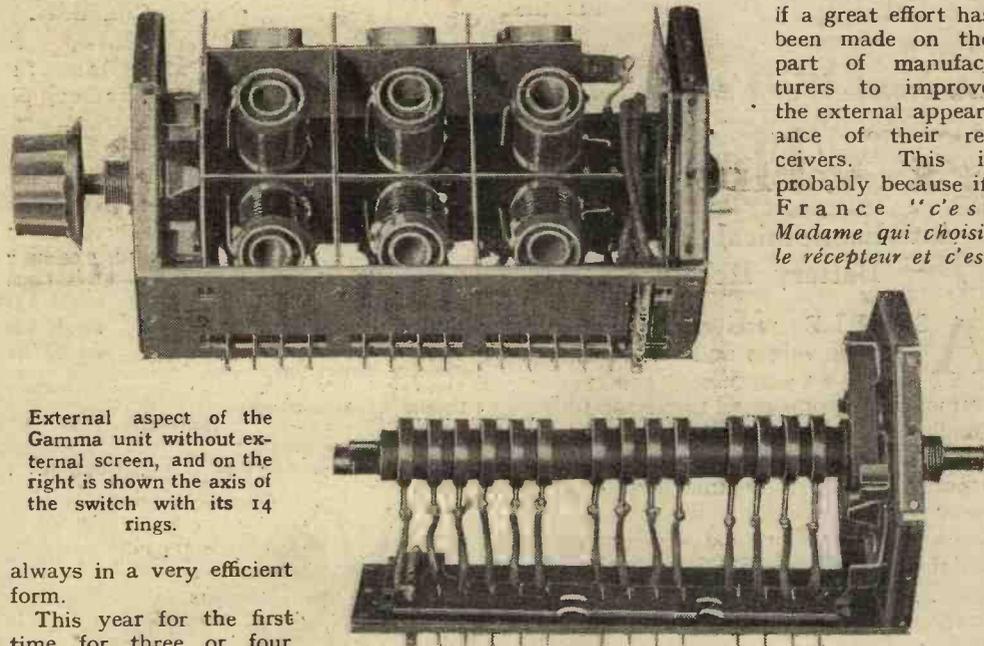
A receiver for D.C. alone is not popular in France, and scarcely any manufacturers produce them. Every type of receiver is now fitted with moving-coil types of loud speaker.

escutcheon window then shows the name of the station to which the receiver is tuned. By this arrangement the length of the scale is extended to several metres.

Another manufacturer, Grammont, has adopted a tuning system invented by Vinogradov, and known as "Telematic." This is a method of automatic tuning by remote control in which the variable condenser is rotated by a small electric motor. To set the motor in action a plug has to be inserted in a socket; the inventor has been able to arrange the sockets to correspond to the different stations on a map. This device is illustrated on the previous page.

Amongst the components the new coil units for all wavelengths produced by Gamma are of particular interest. These units are offered in hexagonal form, divided into fifteen shielded compartments. Each unit consists of aerial coil, H.F. coupling, and oscillator coil, and they cover five wavelength ranges: 11-30 metres, 29-80 metres, 75-210 metres, 200-565 metres, and 710-2,000 metres, making in all thirty coils. Oscillator coils are provided with trimmers and padding condensers.

All this arrangement is accommodated in a hexagonal unit 145 mm. long and 80 mm. in diameter, and the switching is incorporated in the centre of the unit. The switch itself is of ingenious construction; it is composed of a series of fourteen rings controlled by an eccentric. Each unit can make con-

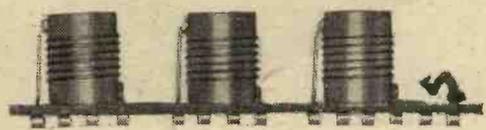


External aspect of the Gamma unit without external screen, and on the right is shown the axis of the switch with its 14 rings.

always in a very efficient form.

This year for the first time for three or four years, battery sets have made a modest come-back. Two models were shown, one of which is designed by a battery manufacturer, and the other by the firm Geco.

The great majority of French receivers, however, are for alternating current, but

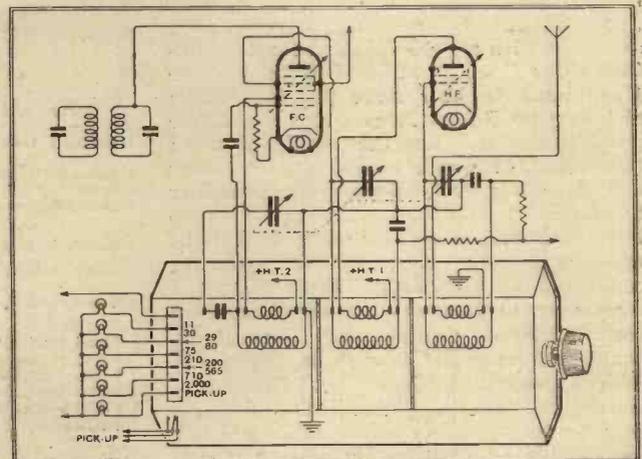


The group of coils covering wavelengths 11-30 metres.

there are signs that the universal A.C.-D.C. sets are becoming more and more popular. All valve manufacturers in France now have A.C.-D.C. valves for series connection at 12-30 volts. Quite a number of D.C. receivers now have their equivalent in universal A.C.-D.C. types.

Monsieur qui paie...

The cabinets are often very artistic productions constructed of the best woods, but the greatest ingenuity has probably been shown in the direction of the presentation of tuning scales. In this connection, one manufacturer has had the idea of placing the names of the stations on a helix, the strip carrying the names being in relief on a cylinder placed at the top of the receiver. Rotation of the cylinder controls the variable condensers, and at the same time carries along a small escutcheon sliding on a guide along the length of the cylinder. A sketch of the device is shown on the previous page. The



Circuit of the tuner showing the connections to the H.F. and oscillator modulator valves.

Paris Radio Exhibition—
tact with six radially disposed points. The ring does not turn, but oscillates in a plane perpendicular to the axis, and a stiff wire is soldered to the unit, which permits movement of the ring without allowing it to rotate. The switch provides in six positions for no fewer than eighty-four contacts, the

sixth position providing for the inclusion of a pick-up.

In concluding with a description of this ingenious accessory, it remains only to draw attention to the fact that the French Exhibition gives evidence of a very real effort towards improvement in quality.

E. AISBERG, Editor "Toute la Radio."

The Diary of an Ordinary Listener

The Problem of Station Identification

CONTINENTAL stations might, with advantage, follow the good example set by the B.B.C. in the matter of punctuality and station-identification. It is a rare occurrence for the B.B.C. to be behind the advertised time with their programmes, and almost every announcement is prefaced with the name of the station transmitting, whereas many Continental stations seem to regard time as a mere matter of relativity, and feel satisfied if any part of their programme begins within twenty minutes of its advertised time. One has often to wait impatiently until the end of a long concert before being absolutely certain of the station, especially if it is in the somewhat congested area between the London and the Scottish Regional wavelengths inhabited by Strasbourg, Budapest, Berlin Funkstunde, Moscow IV, and Milan, together with several lesser lights. It is, of course, true that the B.B.C. does not announce the station nor the next item during the "Proms.," but this is an exception to the general rule, and I have no doubt that foreign listeners would welcome an announcement of the next item in place of a transmission of the applause following the previous item. These sage reflections are the outcome of a long wait on Thursday, September 6th, for a Beethoven quartet which was down on the programme of Poste Parisien. It seemed as if the relay of Cigány music from Budapest was never coming to an end, and, although I quite enjoyed the light music, it was not the Beethoven I wanted. Eventually, I got tired of waiting, and switched over to Frankfurt for part of the concert from Nürnberg, where the Nazi Festival was in full swing, and thence to Rome for the end of "The Merry Widow."

"Chu-Chin-Chow"

The following evening an influx of visitors prevented me listening to anything much beyond social chatter.

On Sunday Luxembourg attracted my attention with a good selection from "Chu-Chin-Chow," after which I went over to Radio-Paris to hear some popular Italian airs sung by Robert Marino to a mandoline accompaniment. But the mandoline is an instrument of which I soon tire, so, after hearing a song by Tosti and part of another by Lama, I transferred my attention to Poste Parisien, where a concert of light music was being given by the orchestra conducted by G. Balay. From France I went over to Denmark for the concert of their National music by the Radio Orchestra, broadcast from Kalundborg and Copenhagen, and thence to Hilversum, where the excellent A.V.R.O. orchestra were in the midst of some music which I was unable to identify, though, as it had a decidedly Beethovenish flavour, I found it eminently suited to my taste; this was

followed by an Aria from Massenet's "Manon," which brought the concert to a close, so I went south to Munich, and heard the very efficient N.S. orchestra in a "Meditation" by Haydn.

Having left my receiver tuned to the Munich wavelength, this was naturally the first station I heard when I switched on the following evening, and I was fortunate to come in for Mozart's elaborate Aria, "Ach was webrach ich," charmingly sung. Brussels No. 1 was transmitting a Wagner concert relayed from the Casino at Vichy which started with the Overture to "The Mastersingers," but it sounded to me as if the brass had not sufficiently warmed up, and was, in consequence, decidedly sharp, so I went over to Hilversum, where the

A.V.R.O. orchestra and Hans Schouwman were giving a fine rendering of Grieg's Pianoforte Concerto in A Minor. Reception from Hilversum did not appear as good as usual, the station being somewhat heterodyned, probably by Brasov, so I returned to Brussels for the "Parsifal" overture, by which time the trumpets were in perfect tune, and performed their important part in a most satisfactory manner.

Munich again seemed to offer the greatest attraction during the earlier part of Tuesday evening, and I heard the end of the 1st Act of "La Bohème." Leaving Mimi to go off to the fair with her artist friend amid thunders of applause, I next tried Kalundborg, being anxious to hear the Westminster Choir of Princeton, U.S.A., and to compare it with our own choir in Westminster Abbey. Kalundborg was suffering from morse interference, so I changed over to Copenhagen, where the result was better but not altogether satisfactory. I heard the choir in a chorus by J. S. Bach and was struck with their precision, but could not hear them clearly enough to make a fair comparison with their English rivals.

I finished up the evening with a good selection of operatic music by the Stuttgart Station Orchestra, which included Nicolai's overture "The Merry Wives of Windsor," and the waltz from Johann Strauss's "Weiner Blut."

CALIBAN.

In Next Week's Issue

The Standard Two

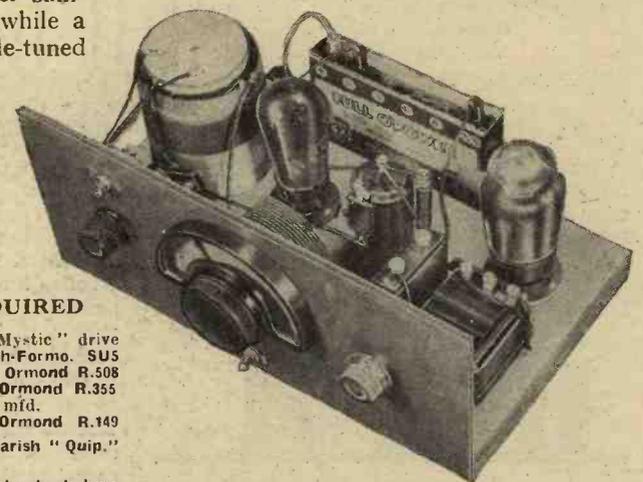
An Economical Two-valve Battery Receiver

A SIMPLE receiver employing modern valves and components can give a surprisingly good performance when operated under suitable conditions. A Q.P.P. output stage enables good quality to be secured economically at a volume level sufficient for many requirements, while a reacting detector with a single-tuned aerial circuit provides adequate sensitivity and selectivity for local reception. In good locations it is even possible to secure good reproduction of several Continental transmissions.

THE LIST OF PARTS REQUIRED

- | | |
|--|-------------------------------------|
| 1 Variable condenser, 0.0005 mfd. and "Mystic" drive | Graham Farish "Ohmite" |
| 1 Reaction condenser, 0.0003 mfd. | Ormond R.508 |
| 1 Knob for above | Ormond R.355 |
| 1 Slow-motion midget condenser, 0.0001 mfd. | Ormond R.149 |
| 1 Q.P.P. transformer, 1-3 | Graham Farish "Quip." |
| 1 Valve holder, 5-pin | Clix chassis mounting standard type |
| 1 Valve holder, 7-pin | Clix chassis mounting type |
| 1 Fixed condenser, 0.0001 mfd. | T.C.C. Type "M" |
| 1 Fixed condenser, 0.0002 mfd. | T.C.C. Type "M" |
| 1 Fixed condenser, 0.0005 mfd. | T.C.C. Type "M" |
| 2 Fixed condensers, 0.005 mfd. | T.C.C. Type "M" |
| 1 Fixed condenser, 1 mfd., 400 volts, D.C. test. | T.C.C.50 |
| 1 Resistance, 50,000 ohms, 1 watt | Graham Farish "Ohmite" |
| 1 Resistance, 150,000 ohms, 1 watt | Graham Farish "Ohmite" |
| 1 Resistance, 1 megohm, 1 watt | Graham Farish "Ohmite" |

- | | |
|---|------------------------|
| 1 Resistance, 2 megohms, 1 watt | Graham Farish "Ohmite" |
| 1 Screened H.F. Choke | Kinva I.D.S. |
| 1 S.P.D.T. Switch | Bulgin S.81 |
| 2 Three-point switches | Bulgin S.87 |
| 1 Six-way connector | Bryce |
| 1 Four-way battery cable, with terminals and spade ends | Harbros |
| 4 Ebonite shrouded terminals, A.E. Pick-up (2) | Belling-Lee, Type "B" |
| 1 9-volt grid bias battery | |
| 1 Pair grid bias battery clips | Bulgin No. 1 |



- | | |
|---|-----------------------|
| 1 Three-pin plug and socket panel | Belling-Lee 1119 |
| 1 Paxolin tube, 3in. diameter by 3 1/2in. length | Wright and Weaire |
| 2 Coils (see text) | |
| Wood baseboard, 12in. by 7in., Wood panel, 12in. by 6in. | |
| 1 oz. No. 22 tinned copper wire, 5 lengths Systoflex, wood, etc. | |
| Screws: 2 1/2in. No. 2 R/hd.; 13 1/2in. No. 4 R/hd.; 4 1/2in. No. 4 R/hd.; 4 1/2in. No. 4 R/hd.; 4 1/2in. No. 4 C/sk. | |
| Valves: 1 Osram HL2; 1 Osram QP21 | |
| Loud Speaker: Moving coil with special transformer | Goodman's "Grille" PM |

HINTS and TIPS

Practical Aids to Better Reception

AS most readers are aware, the National programme will shortly be radiated only by the long-wave transmitter at Droitwich, and no longer by local medium-wave stations. One of the minor results of this somewhat revolutionary change in broadcasting will be to render almost useless that particular type of two-station receiver which is designed for switching over between "National" and "Regional" programmes. Admittedly, sets of this type have never enjoyed wide popularity, but quite a large number of them are probably still in use, if only as understudies to more ambitious outfits.

Although it is by no means impossible to modify a "switch-over" set to cover a

be combined in a single double-pole double-throw switch.

USERS of wave-traps designed to suppress second-channel interference, such as the twin-station device described in *The Wireless World* of January 26th, may be reminded that these pieces of apparatus should not be used in quite the same way as ordinary wave-traps.

Eliminating Second Channel Interference

Instead of adjusting the trap circuits to give minimum signal strength from the interfering local stations, they should be set to the wavelengths at which the interfering whistles occur, in order to reduce their intensity to the greatest possible extent.

WE all know that a periodical checking of the various anode currents provides a most helpful and informative index as to the condition of both receiver and valves. But, too often, the task of making these measurements is postponed indefinitely, for the reason that suitable "break-in" points for inserting the meter in circuit are not accessible, and as a rule it becomes necessary to disturb the internal wiring.

Measurements Without Instability

Alternatives to this procedure are offered by the use of valve adaptors (for interposition between the various valves and their holders), or, so far as screen-grid valves are concerned, by connecting the meter between the anode cap and the existing anode connection; these points are generally accessible. But, more often than not, the result of adopting either plan will be the production of instability, for the reason that the meter leads are at high oscillating potential, and will probably be responsible for spurious couplings with some other circuit.

To avoid these troubles, it is a good plan to preclude the possibility of unwanted self-oscillation by short-circuiting the grid load of the valve concerned. But the component which constitutes this load may also be inaccessible, and it is useful to know that, so far as H.F., I.F. or detector valves are concerned (and these are the only ones likely to give trouble), the effect of a short-circuit may be brought about by connecting a large condenser (0.1 to 1 mfd.) between grid and cathode pins of the valve; this can be done most easily by the help of an adaptor, of which the condenser may form a permanent part. Although the condenser will pre-

vent the development of signal-frequency voltages across the grid circuit, it will not alter bias voltage, and so the reading of anode current will be normal.

UNTIL recently, the practice of connecting receiving apparatus directly to A.C. mains (not through a transformer) was to be strongly discouraged; it was contrary to I.E.E. regulations, and anyone following it ran the risk of invalidating his fire insurance policy. But now these regulations have been modified, and provided all the official precautions—and they are fairly stringent—are taken, the use of transformerless A.C. sets may at least be considered.

As a matter of fact, these changes will not affect the great majority of wireless amateurs, who will still prefer, for various reasons, to use a transformer. But in certain cases, particularly for temporary or experimental purposes when the mains voltage is low, it is useful to know that a rectified H.T. output of approximately twice the input A.C. voltage may be obtained from a simple circuit, such as that shown in Fig. 2, without a step-up transformer.

A metal rectifier of the voltage-doubling type, with a suitable rating as to voltage input and current output, may be employed. Of course, the receiver or apparatus to which rectifying equipment of this sort is connected must be completely isolated from earth so far as metallic connections are concerned; in fact, it must be treated as if it were operated from D.C. mains. Risk of accidental contact with any "live" parts must be avoided, and even those parts of the circuit that are usually regarded as being at low or earth

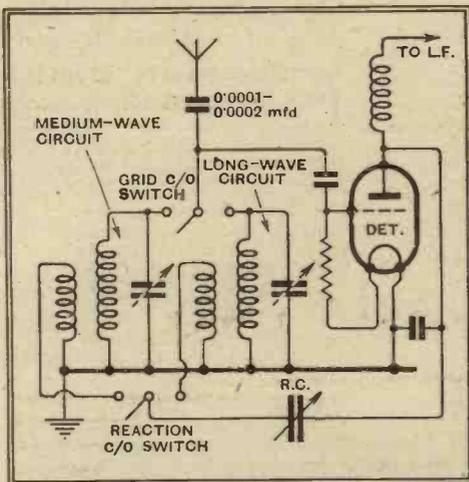


Fig. 1.—Switching pre-tuned circuits into action; a simple alternative programme set.

long-wave and a medium-wave station (instead of two different wavelengths on the medium band), an alteration or addition to the existing tuning coils is always involved. Now few of the coils used in this type of set are of current design, and so the obtaining of long-wave counterparts is almost impossible; as a result, it will probably be found easiest to re-model the tuning system entirely.

In the accompanying Fig. 1 is shown what represents one of the simplest and most straightforward switching systems for alternative-station reception. Admittedly, it has no pretensions to high performance, but is capable of working satisfactorily under fairly easy conditions, and it offers the great advantage of needing nothing abnormal in the way of coils. Semi-variable or cheap fully-variable condensers may be used for tuning.

It will be seen from the diagram that two single-pole double-throw switches are required, one for changing over the detector grid connections and the other for the reaction circuit. Although those switches are shown separately for the sake of clarifying the operation of the system, in actual practice the two elements would

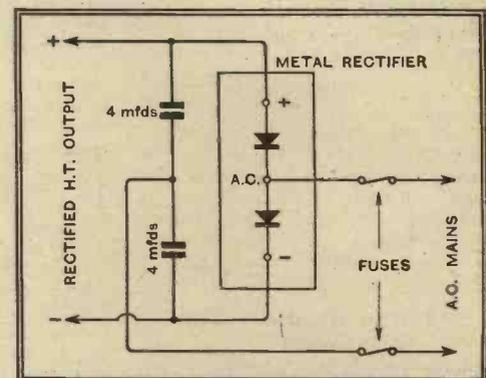


Fig. 2.—Voltage-doubling circuit for direct connection to A.C. mains.

potential must be properly isolated and protected. Indeed, to be absolutely safe and to keep within the letter and spirit of the regulations, the precautions necessary are so extensive that it will be agreed that, after all, an improvised transformerless arrangement has few attractions except in special circumstances.



Artillery "in action," assisted by a wireless-equipped car, during the Army manoeuvres in the Salisbury district.

More Radio Licences

OVER three-quarters of a million extra wireless licences have been taken out in Great Britain during the past year. The total number of licences in force at the end of August was 6,428,960, as compared with 5,654,400 in August, 1933.

Relays Illegal in France

RADIO relay systems are at present illegal in France. Encouraged by British and Belgian enterprises, several municipalities granted rights to private companies to organise relay systems in certain localities, but the Post Office has issued a declaration that all installations of this kind are against regulations.

The Death Ray Again

NOW that the Loch Ness monster appears to be on vacation, the French Press has resorted once more to the death ray. *La Dépêche de Toulouse* recently described how military authorities of most nations would soon possess the secret of a powerful death ray sufficient to annihilate 400 aeroplanes flying at a height of 250 miles.

Slow Morse from Ireland

THE Irish Radio Transmitters' Society is providing Morse practice for its members on Sundays from 11 a.m. B.S.T. on a wavelength of 84.2 metres. Transmissions consist of a general call to all Irish stations in telephony, followed by slow Morse from an automatic code machine. The call-sign is EI6F.

Reports of the transmissions will be welcomed by Mr. D. O'Farrell (EI6F), Park House, Booterstown Avenue, Co. Dublin.

"Large Studio" Too Small

NOW that the Norwegian studio orchestra has been augmented from nine to thirty musicians, the so-called "large studio" at Oslo is proving far too small, writes a correspondent. No arrangement of fans, however ingenious, can prevent an oppressive rise of temperature, and it has already been suggested that the orchestra should start a nudist colony in the studio! It has now been arranged that the augmented orchestra shall play in the main hall of the National Gallery.

Radio Agen Redivivus

RADIO AGEN, the small French station at Lot-et-Garonne, destroyed by fire in July last, is rapidly being rebuilt. Transmissions may be expected at the end of October.

Spoken Warning

A NEW Paris subway admits vehicles of limited dimensions only. At the Porte de la Villette a loud speaker has been installed connected to a photo-electric cell system which gauges the dimensions of every vehicle as it approaches. Frequently, as a van draws near, the speaker declaims in a loud voice: "Car too high. Pass to the right."

Electro-Radio-Biology

EVERY kind of radiation, from ultra-short waves to ultra-violet rays, X-rays, and cosmic rays, is being discussed at the first International Congress of Electro-Radio-Biology, opened last week in the Doge's Palace, Venice, by the Marchese Marconi.

It is hoped to find an entirely new approach to the practice of medicine. In his inaugural speech the Marchese Marconi warned his hearers of the difficulty of preserving a critical judgment regarding new means of restoring health, because health concerned all and roused men's imaginations. Men who had lost their health were prepared to pay anything to regain it, and consequently tremendous interests were involved.

The Amateur in America

IN the United States there are now exactly 46,390 licensed amateurs, according to the latest report of the Federal Communications Commission. America, therefore, has more transmitting amateurs than the whole of the rest of the world. The figures were 41,555 in 1933, 22,739 in 1931, and only 8,205 in 1924.

Why there should have been such a remarkable increase is an interesting question. It is contended that the depression left many American youths idle to pursue the hobby, but this would not explain how they came by the necessary funds! Other observers say it was due to a natural growth of interest in a fascinating field, from which many workers have later graduated into important positions in the radio and communications industry.

Current Events in Brief Review

Micro-Waves in Australia

EXPERIMENTS with micro-waves are now being conducted by Amalgamated Wireless (Australasia), Ltd. The company demonstrated apparatus using a wavelength of 50 centimetres at a recent radio exhibition in Melbourne.

Television Lecture in Manchester

A LECTURE on television is being delivered to-day by Mr. H. M. Dowsett, M.I.E.E., F.Inst.P., research manager of Marconi's Wireless Telegraph Co., Ltd., at a joint luncheon of the Manchester Athenæum Electrical Club and the Electrical Association for Women. We understand that there are a few tickets available, which can be obtained on application to Mr. E. Golland, Hon. Secretary, Manchester Athenæum Electrical Club, Princess Street, Manchester, 1.

Wavelength Parley in Lisbon

TOMORROW (Saturday) sees the opening of an important technical conference at Lisbon held by the Comité Consultatif Internationale des Radio Communications, commonly known as the C.C.I.R. This is an international Government advisory committee dealing with all phases of radio control with which Governments are concerned.

Of the few questions to be discussed likely to be of interest to broadcasting organisations there are the use of anti-fading aerials and single wavelength working by high-power stations.

German Licence Increase

GERMAN licences totalled 5,440,466 on September 1st, an increase of 82,647 over the figure of a month earlier.

The "Chronicle" Wireless Annual

THE twelfth edition of the "Chronicle" Wireless Annual is as attractive as its predecessors. This popular radio handbook of 180 pages should appeal more than ever to all classes of radio users, containing, as it does, articles touching on every phase of wireless and broadcasting. For the home set builder there are designs for a wide selection of receivers, ranging from a five-valve super set (designed by Mr. W. I. G. Page, B.Sc.) to an easily constructed two-valve quality receiver.

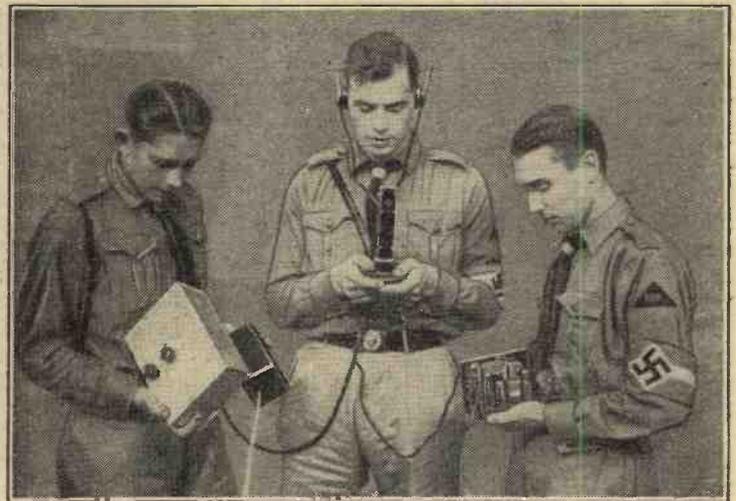
Such subjects as mains noises and their suppression, television, the cause and cure of interference, and home recording are dealt with succinctly in a series of short articles by experts. The Annual makes an excellent shillingworth.

An "Ultra Shorts" Field Day

IVINGHOE BEACON, North Bucks, was the transmitting centre chosen by the Golders Green Radio and Scientific Society for direction finding experiments on five metres on Sunday last.

After initial adjustments had been carried out on the hill, the party broke up into some half-dozen groups, proceeding with their receivers in various directions from the transmitter.

Test signals were sent out for five minutes in each quarter of an



TWO-WAY TELEPHONY ON GLIDERS. A complete ultra short-wave transmitting and receiving outfit developed by the Hitler Youth organisation for use with gliders. The transmitter is on the left and receiver on the right. The youth in the centre is holding the microphone. British experimenters carried out wireless tests on gliders at Dunstable Downs on Sunday last.

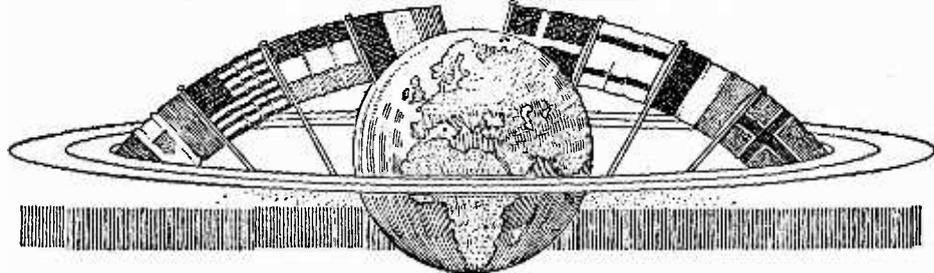
Most Government delegations will include members of the technical staffs of the broadcasting companies, and for this reason the technical committee of the International Broadcasting Union will be able to meet in Lisbon during the conference to discuss several minor questions affecting wavelength exchanges. Mr. Ashbridge, chief engineer of the B.B.C., will be present.

The most consistently good results were obtained north and north-west of the transmitter, though a group six miles due west gave an exceptionally accurate map reading of the location of the transmitter. The majority of receivers were of the super-regenerative type.

On Wednesday next the Society will hold a meeting to collate and discuss results.

The Wireless World

FOREIGN PROGRAMME SUPPLEMENT



SUNDAY SEPTEMBER THE TWENTY-THIRD

ATHLONE

565 kc/s, 531 metres; 60 kW. Relayed by Dublin, 1,348 kc/s, 222.6 metres; and Cork, 1,240 kc/s, 241.9 metres.—1.0 to 2.0 p.m., Records. 3.30 (approx.), Commentary on the All-Ireland Football Final, relayed from Croke Park. 8.30, Time Signal. 8.31, Sacred Music by St. Andrew's Boys' Choir, with Organ. 9.0, Concert of Sacred Music by the Station Orchestra. 9.30, Song Recital by Joan Kelleher (Mezzo-Soprano). 9.45, Sports Talk. 10.0, Shakespearian Drama, with Orchestra, presented by John Stephenson and Company. 11.0, Time Signal; News; Weather; Close Down.

BARCELONA

795 kc/s, 377.4 metres; 5 kW.—8.15 a.m., News; Records. 9.0, Chimes; Gym; Records. 9.20, News; Records. 10.0, Obituary. 12 Noon, Chimes; Weather. 1.0 p.m., Records. 2.0, Records. 2.30, Theatre Notes; Amusement Guide; Records. 3.0, Sextet Concert: Selection from The Circus Princess (Kálmán); Serenata (Pacheco); Spanish Dance, Tirana (Millán-Morabel); Overture, La Torre del Oro (Jiménez); Song from El carro de la Alegría (Campiña-Corral); Selection, El Hermano Lobo (Penella). 4.0, Programme for Hospitals. 5.0, Interval. 6.30, Talk in Catalan for Farmers. 7.0, Concert by the Station Orchestra. 7.30, Song Recital by Pascual Albero (Tenor). 8.0, Choral Concert. 9.0, Dance Music by the Hollywood Band, from the Hollywood Bar. 10.0, Chimes; Records. 11.45, Chess Lesson. 12 Midnight, Close Down.

BASLE.—Relays Beromünster.

BELGRADE

686 kc/s, 437.3 metres; 2.5 kW.—10.25 a.m., Programme Announcements. 10.30, Gym. 11.0, Records. 11.10, Water Level. 11.20, Records. 11.30, Talk. 11.59, Chimes. 12.5 p.m., Concert by the Station Orchestra. In the interval at 12.45, Announcements. 1.30, News; Time Signal. 3.0, Records of Folk Music. 3.30, Military Band Concert. 5.30, Choral Concert. 5.55, Time Signal; Programme Announcements. 7.0, Talk. 7.30, Announcements. 7.40, Concert of Folk Music by the Dusko Popov Orchestra; Soloist, Nada Aleksandrovic (Songs). 8.10, Talk. 8.40, Variety Programme. 10.10, Time Signal; News; Sports Notes. 10.15, Concert by the Station Orchestra. 11.0, Songs with Orchestra. 11.30 (approx.), Close Down.

BERLIN

DEUTSCHLANDSENDER, 191 kc/s, 1,571 metres; 60 kW.—6.10 a.m., Motto. 6.15, See Hamburg. 8.0, Programme for Farmers. 8.55, Talk. 9.35, Interval. 10.5, Weather. 10.10, Talk. 10.20, Interval. 11.0, Recitation. 11.10, Weather. 11.30, Chamber Music on Records. 12 Noon, Greetings. 12.10 p.m., Concert from Königsberg. 2.0, See Stuttgart. 3.0, Chess Talk. 3.15, Concert by the Barnabas von Gezy and Hans Bund Bands (on Records). 4.0, Report: The European Light Athletic Championships, Germany v. France, at Magdeburg. 4.15, Dance Music from Breslau. In the intervals at 4.50, Weather Forecast for the Gordon Bennett Balloon Races; and at 5.0, Report of the German St. Leger Horse Races. 5.30, Military Band Concert, relayed from London. In the interval at 5.45, Report: The European Light Athletic Championships, Germany v. France, at Magdeburg. 6.30, Sports Report. 6.45, Rhinish Anecdotes (Müller-Schlösser), with Records. 7.30, Adventurers and Settlers—Play (Schaffner). 8.5, See Cologne. 10.0, News. 10.30, Report: The World Professional Tennis Championships on Records. 10.45, Weather. 11.0, Weather Forecast for the Gordon Bennett Balloon Races. 11.10, Light Music and Dance Music from Cologne. 11.30, Popular Records.

BERLIN

FUNKSTUNDE, 841 kc/s, 356.7 metres; 100 kW.—6.0 a.m., Gym. 6.15 to 8.15, See Hamburg. 8.25, Announcement. 8.30, Reading. 8.55, Chimes. 9.0, Service from Potsdam Garrison Church. 10.0, Cathedral Chimes. 10.5, Weather. 10.10, Interval. 11.30, Chalapi Records. 12 Noon, See Munich. 1.0 p.m., Announcements. 1.10, Concert from Cologne. 2.0, Announcements. 2.15, Records for Children. 3.0, Programme for Small-Holders. 3.45, Talk for Farmers. 4.0, Concert: Part I, Dance Music by an Accordion Band; Part II, Hans Busch Orchestra: March (Sudessi); Venetian Barcarolle (Tusa); Flirtation (Rau); Waltz (Lubbe); Intermezzo (Gillet); Serenade (de Micheli); Canzonetta for Violin (d'Ambrosio); Waltz, Deutsche Grusse (Jos. Strauss). In the interval at 5.0, Report: The World Professional Tennis Championships. 5.30, Military Band Concert, relayed from London. 6.0, Yorck, Count of Wartenburg—Sequence (Probst). 6.35, Zigeunerlieder, Op. 103 (Brahms) by Margarete Heyer (Contralto). 6.55, Trio in D, Op. 6 (Peterka) by Hidegheti, Käte Grandt, and Lehmann. 7.40, Sports Report. 8.0, Lortzing Opera Music; Concert by the Station Orchestra, Choir, and Soloists, Anni Frind (Soprano), Otto Albrecht (Tenor), Carl Schlottmann (Bass), and Georg Köppen (Bass); Conductor, Steiner: Extracts from: (a) Der Wildschütz, (b) Die beiden Schützen, (c) Der Waffenschmied, (d) Czar and Carpenter, and (e) Undine. 9.20, Dance Music by the Small Station Orchestra. 10.20, News. 10.50, See Leipzig. 1.0 a.m. (Monday), Close Down.

BERNE.—Relays Beromünster.

BEROMUNSTER

556 kc/s, 539.6 metres; 60 kW.—7.30 a.m., Concert by a Male Voice Choir. 8.0, Interval. 10.0, Protestant Service. 10.45, Records of Chamber Music. 11.30, Literary Programme. 12 Noon, Concert by the Station Orchestra; Conductor, Neppach; Part I—Light Music. 12.30 p.m., Time; Weather; News. 12.40, Concert (contd.); Part II—Viennese Music. 1.30 to 2.30, Programme for Farmers. 4.0, Dance Music by the Station Dance Band. 5.30, Talk in Dialect: Stamp Collecting. 5.50, Records: Harvest Songs and Dances. 6.30, Talk: Japan. 7.0, Time; Sports Notes. 7.5, Records. 7.20, Dialogue: The Theatre (Rost). 7.50, Dramatic Programme. 9.0, News. 9.10, Talk by Carl Zuckmayr. 9.25, Concert by the Station Orchestra; Conductor, Gilbert. 10.15, Review of Swiss Books. 10.25, Sports Notes and Close Down.

BODEN.—Relays Stockholm. **BODO.**—Relays Oslo.

BRATISLAVA

1,004 kc/s, 298.8 metres; 13.5 kW.—6.30 a.m., See Prague. 8.30, Service from Kosice, 1,158 kc/s, 259.1 metres. 9.45, Records. 10.0, See Prague. 11.0, Military Band Concert from Trencanské Teplice; Conductor, Margold. 12 Noon, See Prague. 1.30 p.m., Talk for Farmers. 1.45, Water-Level. 1.50, Records. 2.0 to 2.30, Report on the Start of the Stefánik Marathon. 4.0, Military Band Concert, relayed from Trencanské Teplice; Conductor, Margold. 5.30, Reading. 6.5, Egon and Emily—Dialogue (Morgenstern). 6.10,

Talk for Housewives. 6.15, Hungarian Transmission: Hungarian Country Music by Ant: Mazán (Songs) and R. Macudzinski (Pianoforte); Commentary by Nemeth. 6.55, See Prague. 7.35, Reading. 7.50, Sports Report. 7.55, In the Regions of Váh—Musical and Literary Sequence, by the Cast of the Slovak National Theatre. 8.45, Talk. 9.0, See Brno. 10.0, See Prague. 10.20, News in Hungarian; Sports Notes. 10.30, See Prague. 11.30, Close Down.

BREMEN.—Relays Hamburg.

BRESLAU

950 kc/s, 315.8 metres; 60 kW. Relayed by Gleiwitz, 1,231 kc/s, 243.7 metres.—5.0 a.m., Hymn; Motto; Records. In the interval at 5.40, Time; Weather. 6.10, Time; Weather. 6.15, See Hamburg. 8.15, Motto. 8.25, Recital on Two 'Celli by Binnowsky and Bormann. 9.0, Chimes. 9.5, Protestant Service. 10.0, Recitations. 10.20, Choral Concert; Conductor, Pilatus. 11.10, Imaginary Conversations—Sequence (Paul Ernst), with Introductory Talk. 12 Noon, Concert by the Station Orchestra; Conductor, Rischka; Soloist, Bruno Janz (Violin). 2.0 p.m., News. 2.10, Legal Talk. 2.30, A Gramophone ABC (Steinbach) (arr. Freudenberg). 3.30, The Enchanted Chest—Play for Children, after an Old Chinese Fairy Story (Koller). 4.0, Dance Music. 5.30, Military Band Concert relayed from London. 6.30, Sports Report. 6.55, Reading. 7.20, Talk. 7.30, Topical Report. 8.0, Concert of Light Music by the Station Orchestra; Conductor, Topitz. 10.20, Time; News. 10.45, Light Music and Dance Music from Cologne. 1.0 a.m. (Monday), Close Down.

BRNO

922 kc/s, 325.4 metres; 32 kW.—6.30 a.m., See Prague. 8.30, Organ Recital by Budik, relayed from the Huss House. 9.0, See Prague. 9.15, Song Recital by Marie Fialova. 9.40, See Prague. 11.0, See Bratislava. 12 Noon, See Prague. 1.30 p.m., Talk for Farmers. 1.45, See Prague. 2.15, Record. 2.20, Programme for German Farmers. 4.0, See Bratislava. 5.30, Talk. 5.45, See Prague. 7.55, See Bratislava. 8.45, See Prague. 9.0, Revue (Konupka and Weis); Members of the National Theatre and Station Orchestra; Conductor, Bakala. 10.0, See Prague. 11.30 (approx.), Close Down.

BRUSSELS (No. 1)

620 kc/s, 483.9 metres; 15 kW.—10.0 a.m., Request Records. 11.0, Orchestral Concert; Soloist, Rubeau (Tenor). 11.55, Weather. 12 Noon, Records of Light Music. 12.30 p.m., Monologues by Hélène Lefèvre. 12.40, Records. 1.0, News. 1.10, Concert by the Radio Orchestra; Soloists, Durand (Trumpet) and Anita Touret (Songs). 2.0, Interval. 5.0, Dance Records. In the interval, Football Results. 6.0, Pianoforte Recital by Lambert Wilmet; Allegro appassionato, Op. 4 (Scriabin); Le petit âne blanc from Histoires (Ibert); Two Impromptus, Nos. 1 and 3, Op. 10 (Absis). 6.15, Orchestral Concert: Overture, Boccaccio (Suppé); Waltz, L'étoile polaire (Waldteufel); In the American Style (Fischer); Selection from Mirella (Gounod); Le flûte de Pan (Mouquet); Suite orientale (Grieg); Spiel kamaraden (Jessel). 7.15, Religious Address. 7.30, News. 8.0, Concert of French Opera Music by the Symphony

Orchestra; Soloists, Angenot (Tenor) and Raidich (Bass): Overture, Le roi d'Ys (Lalo); Tenor Aria from L'attaque du moulin (Bruneau); Ballet Music from Lakmé (Delibes); Bass Aria from Louise (Charpentier); Ballet Music from Samson and Delilah (Saint-Saëns); Flower Song from Carmen (Bizet); Meditation from Thais (Massenet); Bass Aria from Mignon (Thomas); Waltz from Faust (Gounod). 9.0, Recitations. 9.15, Concert by the Symphony Orchestra; Soloists, Engenot (Tenor) and Raidich (Bass): Ronde wallonne (Jongen); Tenor Songs; Entracte from Jean Michel (Dupuis); Bass Songs, (a) Deep River, (b) Ol' Man River (Kern), (c) Les berceaux (Fauré), (d) L'amour de moi (Pierrot); Le songe d'une nuit d'hiver (De Boeck). 10.0, News. 10.10, News. 10.15, Dance Music by Schnyder's Band. 12 Midnight, Close Down.

BRUSSELS (No. 2)

932 kc/s, 321.9 metres; 15 kW.—Programme in Flemish.—10.0 a.m., Orchestral Concert; Soloist, Rubeau (Songs). 11.0, Records. 11.57, Weather. 12 Noon, Concert by the Radio Orchestra; Soloists, Misson (Violin) and Anita Touret (Songs). 1.0 p.m., News. 1.10, Pianoforte Recital by Mme. Monden-Longerstaey: Chaconne (Bach-Busoni); Etude in E (Chopin); Prelude in A (Debussy); Toccata (De Boeck); Rhapsody No. 11 (Liszt). 1.30, Records. 2.0, Interval. 5.0, Sonata Recital by Mme. Husson-Michaux (Pianoforte) and Frezin (Cello): Sonata in C (Handel); Grand Sonata (Loillet); Sonata in F (Porpora). 5.30, Sports Results. 5.33, Dance Records. 6.30, Viola d'amore Recital by Distelmans: Suite (Milandra); Prelude (Hammer); Conte (Fanusis); Bohemian Dance (Meyer). 6.50, Symphony No. 8 (Beethoven), on Records. 7.15, Religious Address. 7.30, News. 7.55, Music Review. 8.0, Concert by the Radio Orchestra and a Vocal Quartet; Soloist, Boyarine (Balalaika). 8.45, Recitations. 9.0, Orchestral Concert (contd.). 10.0, News. 10.10, See Brussels No. 1. 12 Midnight, Close Down.

BUCHAREST

823 kc/s, 364.5 metres; 12 kW.—10.30 a.m., Religious Notes. 10.45, Sacred Music. 11.0, Concert by the Station Orchestra: March (Elliot); Waltz (Zeller); Gavotte (Lincke); Dance of the Hours, from La Gioconda (Ponchielli); Ballet Music from La Source (Delibes); Piece (Aston). 12 Noon, Water Level; Records. 12.45 p.m., Amusement Guide; Talk on Modern Music. 1.15, Time; Weather; News. 1.40, Records of Light Music. 4.0, Programme for Country People. 5.0, Dance Music by the Blue Star Jazz Band. 6.0, Time; Weather; News. 6.15, Dance Music. 7.0, Educational Programme. 7.15, Records. 7.45, Talk. 8.0, Concert by the Station Orchestra: Overture, Tancredi (Rossini); Suite, Russian Scenes (Bantock); Selection from Grisélidis (Massenet); Selection from The Little Dutch Girl (Kálmán); Haydn Potpourri (Tavan). 8.40, Wagner Song Recital by Aida Helta: Im Treibhaus; Schmerzen; Träume; Aria from Tannhäuser. 9.0, Sports Notes. 9.10, Concert by the Station Orchestra; Soloist, Teodoru (Violin); Piece (Akermans); Waltz (Strauss); In a Monastery Garden (Ketyebel); Le monastère de Saint Honorat (Kostal); Potpourri of Popular Songs (Pashill); March (Schmeling). 10.0, News.

BUDAPEST

546 kc/s, 549.5 metres; 120 kW.—9.15 a.m., News. 10.0 Roman Catholic Service. 11.0, Protestant Service. 12.30 p.m., Weather. 12.40, Mendelssohn Concert by the Opera House Orchestra. Conductor: Fridl. Overture, Ruy Blas; Extract from A Midsummer Night's Dream; Spring Song; The Scottish Symphony. 2.0, Hungarian Song Recital by

SEPT. 23rd SUNDAY continued

Miklos Szodö, accompanied by the Inre Magyar Cigány Band. 3.0, Programme for Farmers. 3.45, Programme to be announced. 4.35, Talk. 5.0, Report of a Football Match. 6.0, Light Music by the Maudits Band. 7.15, Variety Programme. 8.20, Sports Notes. 8.40, Light Music by the Budapest Concert Orchestra. Conductor: Zsolt. Piece (Hubay); Hungarian Sketches (Volkmann); Hungarian Rhapsody (Székely); Meditation from Thais (Massenet); Vidalita (Stefania); Hungarian Réverie (Koményi); Selection from Count Rinaldi (Szirmai). 10.10, News. 10.30, Sound Film Music. 11.10, Concert by the Bura Cigány Band.

CASSEL.—Relays Frankfurt.

COLOGNE

658 kc/s, 455.9 metres; 60 kW.—6.15 a.m., See Hamburg. 8.0, Time; News. 8.10, Legal Talk. 8.30 to 9.0, Service. 9.15, Surprise Programme. 10.15, German Folk Songs and Dances—Sequence of Talks with Records and Musical Illustrations. 10.45, Pianoforte Sonata No. 10 in C (Mozart) by Hans Haass, with Introductory Talk. 11.15, Report: The German Art Exhibition at Düsseldorf. 11.30, Programme to be announced. 12 Noon, Records. 12.55 p.m., Greetings. 1.0, Announcements. 1.10, Concert by the Small Station Orchestra. 2.0, See Stuttgart. 3.0, Children's Songs. 3.20, Talk: Old Germanic Beliefs. 3.30, Anecdotes about Famous People, with Musical Interludes. 4.0, Military Band Concert. In the interval at 4.45, Report on the Cartel Horse Races from Horst-Emscher. 5.45, See Berlin (Deutschlandsender). 6.0, Orchestral Concert. 7.0, Hans Heuken Song Recital by Helma Helmich (Contralto), accompanied by the Composer: Ich ziehe hin; Song; Letzter Sonnenstrahl; Trübe endet nun der Tag; Im Mondlicht. 7.15, The Potato—Instructive Sketch (Paul Hombrecher). 7.45, Sports Report. 8.5, Flotow Concert by the Station Orchestra; Conductor, Kühn. 9.0 (approx.), La Veuve Grapin—Operetta (Flotow); Conductor, Kühn. 10.0, Time; News. 10.30, Light Music and Dance Music by the Small Station Orchestra and the Fröhliche Fünf; Conductor, Eysoldt. 1.0 a.m. (Monday), Close Down.

COPENHAGEN.—Relays Kalundborg. **CORK.**—Relays Athlone. **DANZIG.**—Relays Königsberg. **DRESDEN.**—Relays Leipzig.

FECAMP

1,456 kc/s, 206 metres 10 kW.—10.0 a.m., to 11.15 a.m., Programme in English, arranged by the International Broadcasting Company of London. 10.0 a.m., The Wind and the Rain. 10.30, Military Band Music. 11.0, Sacred Music. 11.15, French Programme of Sacred Music. 11.30 to 12 Noon, Programme in English, arranged by the I.B.C. (London) Happy Half-Hour; Gramophone Records. 12 Noon, Programme in French. 2.0 to 6.30 p.m., Programme in English, arranged by the I.B.C. (London). 2.0, Dance Music by the Casa Loma Orchestra (on Gramophone Records). 2.30, Ballad Concert. 3.0, Russian Music. 3.30, Light Music. 4.0, Orchestral Music. 4.15, The Thought for the Week by the Rev. James Wall, M.A., Precentor of Durham Cathedral; Orchestral Music (contd.). 4.30, The I.B.C. Nursery Corner with the Uncles; Birthday Greetings. 4.45, Things we Mustn't Have. 5.0, Request Programme. 5.30, Concert Popular Selections from the Opera. 5.45, East of Suez. 6.0, The Old Folks' Request Programme. 6.30, Programme in French. 9.30 till Close Down, Programme in English, arranged by the I.B.C. (London). 9.30, Concert of Gramophone Records. 10.0, Old Favourites. 10.30, Light Music. 11.0, Vaudeville: Waltz Time. 11.30, Concert arranged by the I.B.C. (Ireland), Ltd.; Dance Music. 12 Midnight, Club Concert for Edinburgh Listeners; Dance Music. 12.30 a.m. (Monday), I.B.C. Time Signal. 12.31, Dance Music. 1.0, I.B.C. Goodnight Melody and Close Down.

FLensburg.—Relays Hamburg. **FLOR-ENCE.**—Relays Milan.

FRANKFURT

1,195 kc/s, 251 metres; 17 kW.—6.15 a.m., See Hamburg. 8.15, Time; News. 8.25, Gym. 8.45, Choral Music. 9.0, Roman Catholic Service. 9.45, Des Lebens Schattenbild—Songs (Kerner); Music by Schumann and Wolf. 10.15, Song Cycle (Kaun) by the Hilda Male Voice Choral Society; C. Müller-Contwig (Mezzo-Soprano), Silbereisen (Baritone) and Körper (Pianoforte). 11.15, Otto Anthes reads his own short stories. 11.30, Chamber Music by the Station Choir and Orchestra; Soloist, Emil Bartholmes (Baritone). 12 Noon, Orchestral Concert; Conductor, Schum; Overture, Marco Spada (Auber); Minuet in G (Beethoven); Overture, Die vier Menschenalter (Lachner); Serenade (Leuschner); Piece (Luchini); Suite (Fauchey); Overture, Donna Juanita (Suppé). 1.0 p.m., Records; Suites. 2.0, See Stuttgart. 3.0, Programme for Farmers. 4.0, Concert from Wiesbaden. 5.45, See Berlin (Deutschlandsender). 6.0, Goodbye to Summer—Sequence. 6.40, Dance Burlesque (Hessenberg) in memory of Heinrich Hoffmann; Orchestra; Conductor, Hessenberg. 7.10, Variety Programme. 8.15, Sports Notes. 8.30, See Stuttgart. 10.0, Families can make their own coffee—a Sunday Outing in Old Cassel. 10.20, Time; News. 10.35, Local News; Sports Report. 11.0, Dance Music. 12

Midnight, Records. 2.0 a.m. (Monday), Close Down.

FREDRIKSSTAD.—Relays Oslo. **FREIBURG.**—Relays Stuttgart. **GENEVA.**—Relays Sottens. **GENOA.**—Relays Milan. **GLEIWITZ.**—Relays Breslau. **GÖTEBORG.**—Relays Stockholm. **GRAZ.**—Relays Vienna. **HAMAR.**—Relays Oslo.

HAMBURG

904 kc/s, 331.9 metres; 100 kW. Relayed by Bremen, Flensburg, and Hanover, 1,330 kc/s, 225.6 metres.—6.15 a.m., Harbour Concert. 8.15, Time; News. 8.30, Gym. 8.45, Wireless Notes. 9.0, Art Notes. 9.15, Records. 11.0, Concert by the Röhing Vocal Quartet: Sie ist mir lieb, die werthe Magd (Praetorius); All mein Gedanken (arr. Schreck); Two Songs (Gastoldi); Ich bin hinausgegangen (Schumann); Mein Mädchen hat einen Rosenmund (Brahms); Hell ins Fenster scheint die Sonne (Hauptmann). 11.20, Talk: Heligoland and its Bird Sanctuary. 12 Noon, See Munich. 12.55 p.m., Time; Weather. 1.0, See Munich. 2.0, Programme for Children. 3.0, Records. 3.45, A Soldier's Reminiscences. 4.0, See Breslau. 5.10, Report: The Gliding Competition at Hanover. 5.30, Military Band Concert, relayed from London. 6.30, De Swarte Halm—Dialect Play (Bellmer). 7.0, Concert by a Mandoline Orchestra. Conductor: Bernhardt. Overture, The Nuremberg Doll (Adam); Die Mäusehochzeit (Fall); Romance (Kahut); North German Folk Dances (Ritter); March, Wien, bleibt Wien (Schrammel). 7.35, Sports Report. 7.55, Weather. 8.0, Musik und Liebe—Operetta in Three Acts (Müller). Conductor: The Composer. 10.0, News. 10.30, Report (on Records): The European Light Athletic Championships, Germany v. France, at Magdeburg. 11.0, Dance Music from Leipzig. 12 Midnight, Close Down.

HANOVER.—Relays Hamburg.

HILVERSUM

160 kc/s, 1,875 metres; 7 kW. (until 3.40 p.m.). Transmitted on Kootwijk, 50 kW., from 3.40 p.m.—8.10 to 11.40 a.m., Programme of the Workers' Radio Society (V.A.R.A.). 8.10, Record. 8.15, Talk for Gardeners. 9.10, Recitations; Records. 9.40, Concert by the V.A.R.A. Orchestra. Conductor: de Groot. 10.10, Talk. 10.25, Concert (contd.). 10.55, Talk. 11.10, Concert (contd.). 11.40 to 4.40 p.m., Programme of the General Broadcasting Society (A.V.R.O.). 11.40, Time; New Records. 12.10 p.m., Concert of Light Music by the Kovacs Lajos Orchestra and a Women's Choir. 1.40, Book Talk. 2.10, Records. 2.40, Symphony Concert by the A.V.R.O. Orchestra. Conductor: Albert van Raalte. In the intervals, Records. 4.10, Records. 4.40 to 5.40, V.A.R.A. Programme. 4.40, Concert of Opera Music by the V.A.R.A. Orchestra. Conductor: de Groot. Extracts from Lischen und Fritzen (Offenbach). Tales of Hoffmann (Offenbach), and Schwanda (Weinberger). 5.10, Sports Talk. 5.30, Potpourri, Anno dazumal (Morena), by the V.A.R.A. Orchestra. 5.40 to 7.40, Programme of the Liberal Protestant Radio Society (V.P.R.O.). 7.40 till Close Down, A.V.R.O. Programme. 7.40, Time; News. 7.55, Concert of Classical Music by the A.V.R.O. Orchestra. Conductor: Albert van Raalte. Soloist: Elisabeth Rothberg (Soprano). Overture, Don Giovanni (Mozart); Aria, Ah Perfido (Beethoven); Ave Maria (Verdi); Scene and Romance from Aida (Verdi); Invocation (Cantu); Selection from Faust (Gounod); Albumblatt (Wagner); Aria from Tannhäuser (Wagner). 8.55, News. 9.10, Autumn—Orchestral and Choral Concert. Conductor: Louis Schmidt. Sonnet (Louis Schmidt); Paysages d'automne (Waldteufel); A Poem; Chant d'automne (Waldkovsky); Autumn Song (de Micheli); Autumn Winds (Packov); A Poem; Valse de septembre (Godin); Tango (Palla); Waltz Song (Noordijk); Autumn Shadows (Clarke); March from Herbstmanöver (Kálmán). 10.10, Light Music by the Kovacs Lajos Orchestra and the A.V.R.O. Girls. 10.40, Records. 11.40, Close Down.

HORBY.—Relays Stockholm.

HUIZEN

995 kc/s, 301.5 metres; 7 kW. (until 6.40 p.m.); 20 kW. from 6.40 p.m.—8.10 to 9.10 a.m., Programme of the Christian Radio Society (N.C.R.V.). Divine Service. 9.19 to 4.40 p.m., Programme of the Catholic Radio Society (K.R.O.). 9.10, Records. 9.40, High Mass from Zwertemeer. 11.25, Records. 11.40, Talk. 11.55, Concert by the K.R.O. Orchestra, conducted by Gerritsen. 12.40 p.m., Literary Talk. 1.0, Concert by the K.R.O. Orchestra (contd.). 1.40, Religious Address. 2.10, Records. 2.30, Farewell Service for the Roman Catholic Missionaries to Africa, relayed from Keer. 4.10, Programme for Hospitals. 4.40 to 7.25, Programme of the N.C.R.V. 4.40, Records of Sacred Music. 5.25, Divine Service from Neerbosch. 6.40, Recital of Sacred Music by Mlle. Geest (Soprano) and Kloeck (Organ). 7.25 till Close Down, Programme of the K.R.O. 7.25, Foot-

ball Report. 7.30, Talk. 7.55, Concert by the Orchestra of St. Henry's Hospice for the Blind, at Grave, for the Sixty-fifth Anniversary of its Foundation: Liberty Bell (Lohsa); Selection from The Merry Widow (Sousa); Address; Address by Msgr. Diepen; Cantata for Choir (Blokker); Talks by Blind Boys; Das dumme Kätzchen (Duffels); Talk; Address; Two Pieces (Grieg); (a) Ich liebe dich, (b) Erotica; Dutch Peasant Dances (Siep); Chanson de fête. 9.25, Concert by the K.R.O. Boys. Conductor: Lustenhouwer. 9.55, News. 10.0, Records. 10.20, Choral Epilogue. 10.40 (approx.), Close Down.

INNSBRUCK.—Relays Vienna.

KALUNDBORG

238 kc/s, 1,261 metres; 75 kW. Relayed by Copenhagen, 1,176 kc/s, 255.1 metres; and Skamlebaek, 49.5 metres.—8.0 a.m., Gym for Women. 8.15, Gym. 8.30, Weather. 9.15 to 9.45, Talk. 10.0, Divine Service. 11.30, News. 12 Noon, Chimes. 12.1 p.m., Scandinavian Concert by the Radio Orchestra; Conductor, Reesen. 1.0, Talk in English by Reginald Spink: The Tolpuddle Martyrs. 1.20, Talk in German: The Austrian Revolt, November, 1918. 1.40, Talk in French: Paris. 2.0, Records. 2.30, Songs for Children. 3.0, Concert by the Radio Orchestra; Conductor, Mahler; Soloist, Thune Stephens (Songs). 5.0, Divine Service. 6.20, Talk: Psychology. 6.50, Weather. 7.0, News. 7.15, Time. 7.30, Talk: Wessel, the Danish Humorist. 8.0, Time. 8.1, Military Band Concert; Conductor, Dyring. 8.25, The Waldemar Period—Talk with Fröhlich Music. 9.10, German Folk Songs by Dagmar Schou; Es leit ein Schiloss in Osterreich; Elselein, Liebste Elselein; Nacht sprach mein Lieb; Es gingen zwei Gespielen gut; Es flog ein kleins Waldvögelin. 9.25, Military Band Concert (contd.). 9.55, News. 10.5, Military Band Concert (contd.). 10.25, Talk. 10.35, Military Band Concert (contd.). 11.0, Dance Music by Teddy Petersen and his Band from the Wivex Restaurant. In the interval at 12 Midnight, Chimes. 12.30 a.m. (Monday), Close Down.

KIEL.—Relays Hamburg. **KLAGENFURT.**—Relays Vienna.

KONIGSBERG

1,031 kc/s, 291 metres; 40 kW. Relayed by Danzig, 1,303 kc/s, 230.2 metres.—6.15 to 8.15 a.m., See Hamburg. 9.0, Divine Service. 10.40, Talk: Children and the Nation. 10.50, Weather; Programme Announcements. 11.0 (from Danzig), Trio in G minor for Piano-forte, Flute, and Cello (Weber). 11.30, Readings. 12 Noon, Concert by the Opera House Orchestra. Conductor: Wöllner. Overture, Nachklänge aus Ossian (Roland); Prelude to Tiefland (d'Albert); Selection from Hansel and Gretel (Humperdinck); Waltz (Busoni); Overture, Princess Golden Shoes (Rust); Bavarian Tales (Richardz); Selection from Der Kubregier (Kienzl); Hymn and Triumphal March from Aida (Verdi); Overture, The Queen's Kerchief (Joh. Strauss); March (Ailbott). 2.0 p.m., See Stuttgart. 3.0, Chess Lesson. 3.30, Talk: German Household Words. 3.45, Concert by the Small Station Orchestra. Conductor: Wilcken. In the interval at 4.50 (approx.), Sports Notes. 5.45, See Berlin (Deutschlandsender). 6.0, Recital on Two Pianofortes by Margarete Schluchmann and Marie Fischer: Rondo (Chopin); Petite Suite (Debussy). 6.30, Talk: Ball Lightning. 7.0, Folk Songs by Kees Veening (Bass-Baritone). 7.30, The Dance—Poetry Recital (Goethe, Liliencron, Kyser, and Münchhausen). 8.0, Concert by the Small Station Orchestra. Conductor: Wilcken. March (Radeck); Overture, Fatinitza (Suppé); Waltz, Golden Rain (Waldteufel); Spanish Rhapsody (Richardy); Polka and Air from The Bird Fancier (Zeller); Wine, Woman and Song (Joh. Strauss); Fanfareklänge (Fueick). 8.45, Piesco—Tragedy (Schiller). 10.0, News. 10.20, Sports Report. 10.40, Light Music and Dance Music from Cologne. 12.30 a.m. (Monday), Close Down.

KOSICE.—Relays Prague. **LAUSANNE.**—Relays Sottens.

LEIPZIG

785 kc/s, 382.2 metres; 120 kW. Relayed by Dresden, 1,285 kc/s, 233.5 metres.—6.15 a.m., See Hamburg. 8.15, Choral Concert. 9.0, Service. 9.35, Programme Announcements. 10.0 to 10.30, Talk: The German Reich. 12 Noon, Concert by the Leipzig Symphony Orchestra. Conductor: Armbrust. Part I, Opera Music. Part II, Operetta Music. 2.0 p.m., Programme Announcements. 2.30, Folk Songs by the Dessau Children's Choir. Conductor: Rex. 3.0, Talk for Farmers. 3.30, Frauenliebe und -leben (Schumann), by Lotte Lehmann, on Records. 4.8, Singing by a Choir of Two Thousand Girls. 4.15, Concert from Berlin (Funkstunde). 5.15, Hitler Youth Appeal for Hostels. 5.30, Military Band Concert from London. 6.30, Reading (Lerch). 6.50, Introductory Talk to the following Transmission. 7.0, Gianni Schicchi—Opera in One Act (Puc-

cini). The Leipzig Symphony Orchestra. Conductor: Blumer. 8.0, Report from the Leipzig Zoo. 8.30, See Stuttgart. 10.0, See Berlin (Deutschlandsender). 10.20, News; Sports Notes. 10.50 (from Dresden), Dance Music by the Emde Orchestra. 1.0 a.m. (Monday), Close Down.

LINZ.—Relays Vienna.

LUXEMBOURG

230 kc/s, 1,304 metres; 150 kW.—7.45 a.m., Records. 8.0, News in French; Record; News in German; Record; Pigeon Flying Notes. 11.30, Record; Religious Address; Record. 11.50, News in French and German. 12 Noon, Variety. 12.30 to 1.0 p.m., Programme in English, arranged by the International Broadcasting Company (Ireland) Ltd. Concert: Dance Music. 1.0, Dance Music. 1.30, Light Music. 2.0 to 3.0, Programme in English, arranged by the I.B.C. (London). 2.0, Concert; Dance Music. 2.30, Variety Concert (Gramophone Records). 3.0, Light Music. 4.0, Records. 5.0, Variety Programme. 8.0, Dance Music and Sound Film Music. 8.30, Racing Results; News in French and German. 9.0, Variety Programme. 10.0, Concert of Light Music. 10.30, Dance Music. 11.0, Concert.

MADRID

EAJ7, 1,095 kc/s, 274 metres; 7 kW.—9.0 a.m., News. 10.0, Announcements. 10.30, Interval. 2.0 p.m., Chimes; Time; Popular Music. 2.30, Sextet Concert. 3.0, Amusement Guide; Light Music. 3.30, Sextet Concert. 4.0, Light Music. 4.30, Sextet Concert. 5.0, Interval. 6.0, Chimes; Concert by the Municipal Band. Conductor: Villa. 7.30, Orchestral Concert. 8.30, Literary Review; Dance Music. 10.0, Chimes; Time; Sextet Concert. In the interval, Programme by Ramón Gómez de la Serna. Song Recital by Consuelo Obregón (Soprano). Talk: The History of Spanish Poetry. 1.0 a.m. (Monday), Chimes. 2.0, Dance Music, arranged by the International Broadcasting Company of London. 3.0, I.B.C. Good-night Melody; Close Down.

MALMO.—Relays Stockholm.

MILAN

814 kc/s, 368.6 metres; 50 kW. Relayed by Turin, 1,140 kc/s, 263.2 metres; Genoa, 986 kc/s, 304.3 metres; and Florence, 610 kc/s, 491.8 metres.—9.40 a.m., News. 10.0, See Rome. 11.0, Mass from the Church of the Annunciation, Florence. 12 Noon to 12.15 p.m., Bible Reading. 12.30, Records. 1.0, Time; News. 1.5 to 2.15, Records. 4.15, Records; Sports Notes. 5.15, Light Music. 6.15, Weather. 6.20, Sports Notes. 7.30, Time; News; Dopplavoro Notes; Records. 8.0, Sports Notes; Announcements; Records. 8.45, See Rome. 9.15, Concert conducted by Molinar.

MONTE CENERI

1,167 kc/s, 257.1 metres; 15 kW.—11.30 a.m., News; Religious Address. 12 Noon, Time; Weather. 12.5 p.m., Mass (Ramella). 12.30, Concert by the Radio Orchestra. 12.55, News. 1.5, Orchestral Concert (contd.). 1.30, Song Records. 2.0, Interval. 5.0, Announcements; Dance Music relayed from the Cecil Casino, Lugano. 5.30, Harp and Harpsichord Recital (on Records). 6.0, Programme for Children. 6.30, Talk. 6.45, Sports Notes; Dance Records. 7.15, Medical Talk. 7.30, Flute Recital by Luciano Italiani; Sonata in E Minor (Platti); Sonata in G (Haase). 7.45, News. 7.55, Sports Results. 8.0, Cinema Organ Recital (on Records). 8.15, Talk on Art. 8.30, Il Paese dei Campanelli—Operetta in Three Acts (Carlo Lombardo-Ranzato) (on Records); Conductor, Domenico Lombardo. 10.0, Sports Results.

MORAVSKA-OSTRAVA

1,158 kc/s, 259.1 metres; 11.2 kW.—6.30 a.m., See Prague. 8.30, See Brno. 9.0, See Prague. 9.15, Song Recital by Kügler. 9.40, See Prague. 10.0, Quintet (Taffanel). 10.25, See Prague. 11.0, See Bratislava. 12 Noon, See Prague. 1.45, Records. 1.55, Report on the Start of the Ostrava Motor Race. 2.20, See Brno. 2.50, The Ostrava Motor Race (contd.). 4.0, See Bratislava. 5.30, Report on the Finish of the Ostrava Motor Race. 5.55, See Prague. 7.55, See Bratislava. 8.45, See Prague. 9.0, See Brno. 10.0, See Prague. 11.30 (approx.), Close Down.

MOSCOW (No. 1)

174 kc/s, 1,724 metres; 500 kW.—5.0 a.m., News. 5.15, Fanfare. 5.45, Gym. 6.15, Musical Programme. 8.15, Programme for Children. 9.0, Musical Programme. 9.58, Time. 10.0, News. 10.15, Trio Concert. 11.15, Review of the Week in Swedish. 12 Noon, Programme in English: Talk on the Revolution; Museum; Letter Box. 3.0, Programme Announcements. 3.15, Programme for Children. 3.58, Time. 4.0, News. 5.30, Concert Version of Don Giovanni—Opera (Mozart) by the Station Orchestra, Choir, and Soloists. 9.0, Review of the Week and Letter Box in German. 9.55, Chimes. 10.5, Programme in English: Review of the Week; Talk: The Museum of the Revolution. 11.5, Talk in Swedish: Soviet Law.

MOTALA.—Relays Stockholm. **MUHLACKER.**—See Stuttgart.

SEPT. 23rd **SUNDAY** continued

MUNICH

740 kc/s, 405.4 metres; 100 kW. Relayed by Augsburg and Nürnberg, 1,267 kc/s, 236.8 metres.—6.15 a.m., See Hamburg. 8.15, Wireless Notes. 8.45, Trio for Pianoforte, Oboe and Viola (Adolf Ruthardt). 9.30, Protestant Service. 10.10, Chimes. 10.15, Reading. 10.40, Vocal and Instrumental Concert. 11.20, Michelangelo — Sequence (Kühne-Hellmessen). 12 Noon, Military Band Concert from the Feldherrnhalle. 1.0 p.m. (from Nürnberg), Orchestral Concert; Conductor, Böhm. 2.0, Time; Weather; Programme Announcements. 2.10, Talk for Farmers. 2.30, Records: Opera and Light Music. 3.20, Zwerz Nase—Play (Emma Hentes and Lydia Schulenburg) with Music by Fuchs. 4.0, See Berlin (Funkstunde). 5.30, Talk: Robert Peary's Expedition to the North Pole. 5.45, See Berlin (Deutschlandsender). 6.0, Harvest Song.—Literary and Musical Sequence (Müller-Albrecht). 6.40, Wessobrunn in the Autumn—Sequence (Schröder-Justin). 7.30, Variation and Fugue on a Beethoven Theme for Two Pianofortes (Röger), by Ludwig Kusche and Ludwig Schmidmeier. 8.0, Weather; Sports Report. 8.10, Das verbotene Lied—Singspiel in Three Acts (Werther). 10.0, Time; News. 10.30, Dance Music by the Station Dance Band. 12 Midnight, Close Down.

NAPLES.—Relays Rome. **NOTODDEN.**—Relays Oslo.

OSLO

260 kc/s, 1,154 metres; 60 kW. Relayed by Hamar, 519 kc/s, 578 metres; and Jeløy, 6,990 kc/s, 42.92 metres.—10.5 a.m., Symphony No. 7 in A (Beethoven) on Records. 5.15 p.m., Orchestral Concert: Overture, Egmont (Beethoven); Waltz (Waldteufel); Suite No. 2 from L'Arlesienne (Bizet); Lichtertanz (Rubinstein); Humoresque (Dvorák); Paso doble (Hajos). 6.15, Talk. 6.45, Sibelius Pianoforte Recital by Kosti Vehanen: Impromptu in G Minor; Andantino in F; Arabesque; Valse chevaleresque; Five Songs: (a) The Village Church, (b) The Fiddler, (c) The Oarsman, (d) The Storm, (e) In Mournful Moon. 7.15, Weather; News. 7.30, Time Signal. 7.31, Reading by Hank Aabel. 8.0, Variety Items. 8.30, Programme for Young People: Talk; Reading; Music. 9.40, Weather. 9.45, News. 10.0, Topical Talk. 10.15, Sports Notes. 10.30, Trio Concert of Old Dance Music. 11.0, Dance Records. 12 Midnight (approx.), Close Down.

OSTERSUND.—Relays Stockholm.

PARIS

POSTE PARISIEN, 959 kc/s, 312.8 metres; 100 kW.—10.0 a.m., Press Review. 10.20,

Announcements. 10.25, Records. 11.20, Concert. 11.50, Records: Extracts from Monsieur Papillon (Mouet, Lafarge and Favre). 12.5 p.m., Interlude by Kito, the Clown. 12.15, Records of Orchestral Music. 12.45, News. 12.50, Song Records of Paul Weill. 1.20, Interlude. 1.30, Soloist Programme. 2.0, Interval. 5.0 to 7.0, Programme in English arranged by the International Broadcasting Company of London. 5.0, Band of H.M. Coldstream Guards (Gramophone Records). 5.15, Light Music. 5.30, Celebrity Concert (Gramophone Records). 6.0, Orchestral Music. 6.15, Dwellers in the Open Air. 6.30, Dance Music. 7.20, News. 7.25, Sports Notes. 7.35, Records: Polonaise in A flat (Chopin); Etudes in A flat and G (Chopin); Valse impromptu in A flat (Liszt). 7.50, Records of Kreisler and Chahapiu. 8.0, Interlude. 8.10, Le Voyageur et l'Amour—Play in Two Acts (Paul Morand). 8.45, Interlude. 8.55, Variety Programme. 10.20, News. 10.30 till Close Down, Programme in English by the I.B.C. 10.30, Light Music. 11.0, Old Favourites. 11.30, I.B.C. Goodnight Melody and Close Down.

PARIS

RADIO-PARIS, 182 kc/s, 1,648 metres; 75 kW.—7.0 a.m., Records. 7.15, Press Review; Weather. 7.45, Gym. 8.0, Records. 11.30, Organ Recital by Pierre Revel, from the Cavaillé Colle: Prelude and Fugue in A (Bach); Pastorale (Franck); Toccata in D minor (Bach). 12 Noon, Religious Address. 12.20 p.m., Records of Sacred Music: Chorale (Bach); Cantate Domino (Alain); Fugue in G minor (Bach). 12.30 p.m., Bilboquet. 12.45, Records: Serenade (Walden); O sole mio (Di Capua); Pas des écharpes (Chaminade); Extract from La Vie Parisienne (Offenbach). 1.0, Concert of Popular Music by Victor Pascal's Orchestra. 3.0, Variety Programme for Young People. 4.0, Records: Selection from La Bohème (Puccini); Swanee River (arr. Kreisler); Vieux airs limousins (Rouchaud); Le Retour du Marin (Liersot); Moorish Serenade (Chapi); The Nightingale (Alabiev); Saudades do Brasil (Milhaud); Enfleurement (Ganne); Partir avec vous (Clere); Chanson de la Esmeralda (Mexquita); Follets (Hasselmanns); Selection from Rose Marie (Friml); Dans la Fumée (Bos); Bells Across the Meadow (Kettelbey). 5.0, Socrate et sa femme—Comedy (Bauville). 6.0, Concert by Paul Dony's Orchestra. 7.0, Radio Paris Guignol. 7.30, Topical

Talk. 8.0, Concert of Light Music by André's Orchestra. Soloists: Mmes. Germaine Lix and Jeanne Montague, and MM. Jossy and Tibiana (Songs). In the interval at 8.30, Press Review; Weather, and at 9.15, News. 10.30, Dance Music by Goldy's Dance Band.

PITTSBURGH

KDKA, 980 kc/s, 305 metres; 50 kW. Relayed by W8XK on 48.86 metres and 25.27 metres.—3.0 p.m., Southernaires. 3.30, Samovar Serenade. 4.0, First U.P. Church, N.S. 5.15, Gould and Shefter. 5.30, Radio City Concert. 6.30, Highlights of the Bible. 7.0, South Sea Islanders. 7.30, Concert Artists. 8.0, Organ Recital. 8.30, Temple of Song. 9.0, Vesper, Seaside Church. 10.0, Roses and Drums. 10.30, Radio Explorer's Programme. 10.45, Mildred Dilling (Harp). 11.0, Those Three Girls. 11.15, Baseball Resumé. 11.30, International Tidbits. 12 Midnight, Siken Strings. 12.30 a.m. (Monday), Musical Art Programme. 1.0 to 6.0 a.m., Popular Programme.

PORSGRUND.—Relays Oslo.

PRAGUE

638 kc/s, 470.2 metres; 120 kW.—6.30 a.m., Gym.; Music; News. 7.0, Concert by the Karlsbad Municipal Orchestra, relayed from Karlsbad. 8.30, See Brno. 9.0, Talk. 9.15, Concert by a Cello Quartet: Requiem for Three Cellos and Pianoforte (Popper); Minuet (Beethoven); Adagietto from L'Arlesienne (Bizet); Serenade (Cassade); Intermezzo (Lalo); Scherzo (v. Goens). 9.40, Talk for Workers. 10.0, Pianoforte Suite (Kálik) by Emil Mikelka. 10.25, Talk and Readings: Jaromir Borecky. 10.55, Announcements. 11.0, See Bratislava. 12 Noon, Chimes. 12.5 p.m., News; Weather. 12.15, Light Music by a Miners' Band. 1.30, Programme for Farmers. 1.45, Sketch for Farmers. 2.15 to 2.25, Announcements. 4.0, See Bratislava. 5.30, Theatre Reminiscences by Bohuslav. 5.45, Records. 5.55, Arlecchino—Theatrical Capriccio (Busoni) by the Station Orchestra and Soloists: Conductor, Svoboda. 6.55, News and Weather in German. 7.0, News; Weather. 7.5, Recital of Italian Songs and Arias by Vittorio Weinberg (Baritone). The Shepherds (Pizzetti); Selection from Nebbie (Respighi); Aida (Recl); Arias from Otello (Verdi) and Andrea Chénier (Giordano). 7.35, Discussion: The Russian Theatre To-day. 7.55, See Bratislava. 8.45, Broman reads

from his own Works. 9.0, See Brno. 10.0, Time; News. 10.20, Record. 10.25, News and Sports Notes in German. 10.30, Dance Music by Osten's Jazz Band. 11.30, Close Down.

RJUKAN.—Relays Oslo.

ROME

Call 1RO. 713 kc/s, 420.8 metres; 50 kW. Relayed by Naples, 1,104 kc/s, 271.7 metres; Milan, No. 2, 1,348 kc/s, 222.6 metres; Turin, No. 2, 1,357 kc/s, 221.1 metres; and 2RO, 11,810 kc/s, 25.4 metres.—9.40 a.m., Announcements. 10.0, Programme for Farmers. 11.0, See Milan. 12 Noon, Bible Reading. 12.15 p.m., Interval. 12.30, Records. 1.5 to 2.15, See Milan. In the interval at 2.0, Time; News. 4.15, Talk. 4.30, Records; Sports Notes. 5.0, Vocal and Instrumental Concert: Lilia Salomone (Pianoforte), Elena Cheli (Soprano) and Giulio Zambonelli (Baritone): Pianoforte Solos: (a) Sonata No. 2 (Galuppi), (b) Sole mattino sul prato del Roccolo (Pizzetti), (c) Danse nègre (C. Scott), (d) Danze d'Ariele (Pick-Mangiagalli); Soprano Solos: (a) Italian Folk Songs Neretti (b) Gondole e chittarre (Bianchini), (c) Ninna-Nanna sulle campane di Barza (Bonaccorsi); Baritone Solos: (a) Aria from Faust (Gounod), (b) Aria from A Masked Ball (Verdi), (c) Prologue to I Pagliacci (Leoncavallo). 6.15 to 6.20, Weather. 7.30, Sports Notes; Announcements. 8.0 to 8.30, Programme in English arranged by the International Broadcasting Company of London: Music by Paul Whiteman and his Band (on Gramophone Records). 8.45, Donna Juanita—Comic Opera in Three Acts (Suppé). In the intervals, Talk; Announcements. After the Programme, News.

RUYSSELEDE

10,330 kc/s, 29.04 metres; 8 kW.—7.45 p.m., News in French. 8.0, See Brussels No. 1. 9.0, News in Flemish. 9.15, Close Down.

SALZBURG.—Relays Vienna.

SCHENECTADY

WGY, 790 kc/s, 379.5 metres; 50 kW. Relayed at intervals by W2XAF on 31.48 metres, and W2XAD on 19.56 metres.—7.0 p.m., Talkie Picture Time—Sketch. 7.30, Musical Programme. 11.45, Fitch Programme; Wendell Hall. 12 Midnight, Chase and Saboron Hour; Jimmy Durante. 1.0 to 4.30 a.m. (Monday), Popular Programme.

SOTTENS

677 kc/s, 443.1 metres; 25 kW.; and Geneva, 401 kc/s, 748 metres.—9.55 a.m., Chimes. 10.0, Protestant Service from Neuchâtel. 11.15, Relay from the National Costume Fête at Montreux. 11.45, Records: Chamber Music. 12.30 p.m., News. 12.40 (from Geneva), Records. 2.0, Interval. 3.0, The Valkyrie—

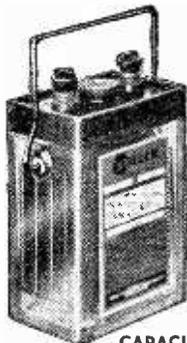
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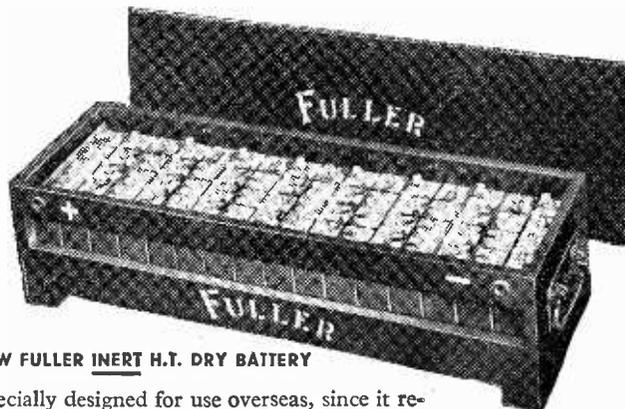
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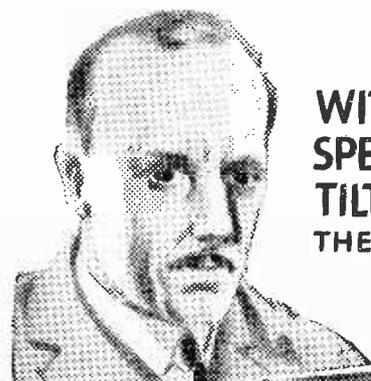
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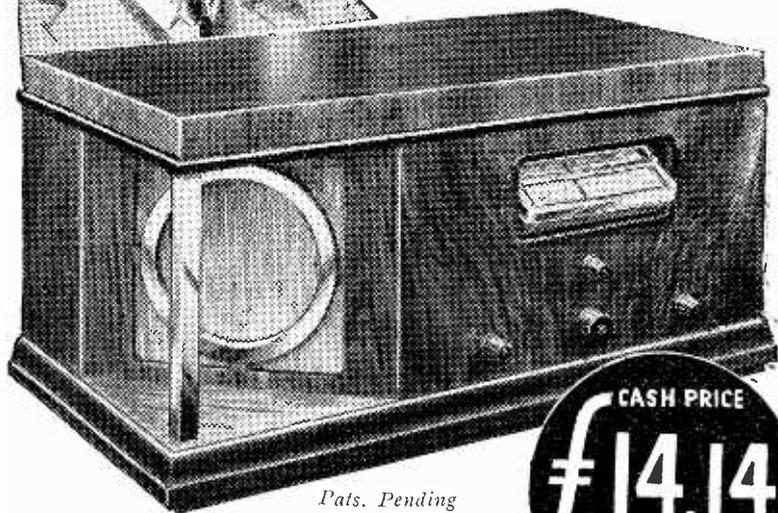
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SEPT. 23rd SUNDAY continued

Opera in Three Acts (Wagner). 5.0, Interval. 6.0, On m'a volé mon Portefeuille—Comedy in One Act (Raoux). 6.30, Song Recital by Raoul (Chatelain). 7.0, Religious Address. 7.30, Turina Concert by the Neuchâtel Trio. 7.55 (from Geneva), Sports Notes. 8.0, Boy Scouts Concert: A Vocal Quartet; Recitations; Choruses. 8.30, Concert by the Radio Suisse Romande Orchestra; Conductor, Echehard; Soloist, Marya Lucher (Songs). In the interval at 9.15, News. 10.0 (from Geneva), Sports Results. 10.15 (approx.), Close Down.

STOCKHOLM

704 kc/s, 426.1 metres; 55 kW. Relayed by Boden and Ostersund, 413.5 kc/s, 726 metres; Göteborg, 941 kc/s, 318.8 metres; Hörby, 1,131 kc/s, 265.3 metres; Motala, 216 kc/s, 1,389 metres; and Sundsvall, 601 kc/s, 499.2 metres.—9.0 a.m., Talk for Farmers. 9.30, Symphony No. 30 in E Flat (Mozart), conducted by Weingartner (on Records). 10.0, Talk in Esperanto, relayed from Uppsala. 10.30, Theatre Review. 11.0, Divine Service. 12.45 p.m., Weather. 3.0, Temperance Talk. 3.30, Recital of German Music by Emma Lampert (Songs) and Hans Lampert (Piano-forte): (a) Feber Nacht (Wild), (b) Ruhe, meine Seele (R. Strauss), (c) Breit über mein Haupt (R. Strauss); Piano-forte: Two Romances (Schumann); Songs (arr. Reinmann): (a) Die Linde im Tal, (b) Der Schwere Traum, (c) Swabian Folk Song. (d) Gut' Nacht. 4.0, Relay of the Reformation Monument Unveiling Ceremony at Orebro. 4.30 (from Göteborg), Programme for Children. 5.5, Records. 6.0, Evensong. 7.15, News. 7.35, Peasant Festival Programme from Skansen. 9.0, Military Band Concert. Conductor, Widner. 9.45, News. 10.0, Concert of Chamber Music by the Sibelius Quartet: String Quartet in C (Mozart); String Quartet in D Minor (Sibelius). 11.0 (approx.), Close Down.

STRASBOURG

859 kc/s, 349.2 metres; 15 kW.—9.30 a.m., Records. 10.45, Protestant Service in German. 11.30, Roman Catholic Service. 12 Noon, Announcements; Records. 12.15 p.m., Orchestral Concert; Conductor, de Villers; Soloists, Grégoire (Violin) and Pogoda (Piano-forte). In the interval at 1.0, Time; News. 2.0, Records. 3.0, Interval. 4.0, Records. 5.0, Programme from Paris (Ecole Supérieure), 437.1 metres. 6.0, Medical Talk. 6.15, Sports Talk. 6.30, Concert of Light Music; Conductor, Roskam. Soloist, Jean Weber (Saxophone). 7.30, Time; News. 7.45, Records. 8.0, Press Review in German; Lottery Results; Announcements. 8.30, Military Band Concert from the Esplanade, Metz; Conductor, Leroy; March, Louis XIV (Millot); Overture, Le Pré aux Cleres (Hérold); Selection from Lohengrin (Wagner); Three Norwegian Dances (Grieg); The Two Grenadiers (Schumann); Selection from Lakmé (Delibes); March (Allier); Six Dances in Old Style from Le Roi s'amuse (Delibes); Suite, Dolly (Fauré); Romance and Bolero (Dancla); Overture, The Merry Wives of Windsor (Nicolai); March (Blémant). In the interval at 9.30, Press Review. 10.30, Dance Music from Le Caveau de l'Aubette. 12 Midnight (approx.), Close Down.

STUTTGART

MUHLACKER, 574 kc/s, 522.6 metres; 100 kW.—6.15 a.m., See Hamburg. 8.15, Time; News. 8.25, Gym. 8.40, Announcements. 9.0, Roman Catholic Service. 9.45, Interval. 10.30, Recital by the Stuttgart Choral Society. Conductor, Müller. 10.50, Piano-forte Recital by Fritz Hübsch: Sonata in G Minor, Op. 81 (Rüdiger); Variations (Jos. Haas). 11.20, In the Forest—Gramophone Concert. 12 Noon, Military Band Concert, relayed from Ellwangen: March (Hessler); Overture, Platte Bursche (Suppé); Waltz from Eva (Lehar); Quadrille from Die Fledermaus (Joh. Strauss); Waltz Potpourri No. 2 (Robert Schumann); Variations (Jos. Haas). 1.15, Talk with Records. 2.0, Rübezahle—Play for Children (Dora Koreny-Scheck). 3.0, Pastor Werner and his Bruderhaus (Refuge) at Reutlingen—Sequence (Richter). 3.40, Zither Recital. 4.0, See Berlin (Funkstunde). 5.30, Spanish Guitar Music by Artur Faiss. 5.45, See Berlin (Deutschlandsender). 6.0, Reading. 6.20, Schumann Piano-forte Recital by Günther Homann: Kinderszenen; Sonata in G Minor, Op. 22. 6.50, Records. 7.30, Sports Report. 7.45, The Plamen Balloon—a Play about the Gordon Bennett Races (Georg Koch). 8.30, Concert of Italian Music. The Station Orchestra and Choir, a Guitar and Mandoline Orchestra, and Soloists: Iris Malpieri (Soprano) and Giovanni Barberini (Tenor). 10.0, Weather; Sports Report. 10.45, News. 10.35, Announcements. 10.45, Dance Music from Baden-Baden. 12 Midnight, See Frankfurt. 2.0 a.m. (Monday), Close Down.

SUNDSVALL.—Relays Stockholm.

TOULOUSE

913 kc/s, 328.6 metres; 10 kW.—11.0 a.m., Dance Refrains. 11.30, Songs; Overture

Music. 12 Noon, Opera Music. 12.15 p.m., Orchestral Music. 12.30, Roman Catholic Service. 12.45, Sound Film Music. 1.0, News. 1.15, Chansonnettes. 1.50, Cinema Organ Solos. 1.45, Protestant Service. 2.0, Amusement Guide. 6.0, News. 6.15, Opera Music; Aria from Rigoletto (Verdi); Duet from The Pearl Fishers (Bizet); Aria from The Damnation of Faust (Berlioz); Aria from Faust (Gounod). 6.30, Orchestral Music. 6.45, Songs. 7.0, Light Music. 7.15, Duets. 7.30, News. 7.45, Military Music; March (Holzmann); Washington Post (Sousa); Marche militaire (Saint-Saëns); Les petits grenadiers (Maquier); March (Beethoven). 8.15, Orchestral Music; Selection from Les deux pigeons (Messager); Overture, Der Freischütz (Weber); Airs on a Swiss Theme (Möler). 8.30, Humorous Sketches. 9.0, Concert Version, The Mastersingers—Opera (Wagner). 10.0, Sound Film Music. 10.15, News. 10.30, Soloist Programme. 11.0, Overture Songs: Songs from La Mascotte (Audran), La petite dame du train bleu (Pares and Van Parys), Passionnément (Messager), La Madone du pommier (Christine), and La fille de Madame Angot (Lecoq). 11.15, Hawaiian Guitar Music. 11.30, Light Music. 11.50, Orchestral Music. 12 Midnight, News. 12.5 a.m. (Monday), Au caveau de minuit—a Radio Fantasy. 12.15, Opera Music: Overture, Mignon (Thomas); Overture, The Barber of Seville (Rossini). 12.30 (approx.), Close Down.

TRONDHEIM.—Relays Oslo. TURIN.—Relays Milan.

VIENNA

592 kc/s, 506.8 metres; 120 kW. Relayed by Graz, 886 kc/s, 338.6 metres; Innsbruck, 519 kc/s, 578 metres; Klagenfurt, Linz, and Salzburg, 1,294 kc/s, 231.8 metres.—8.15 a.m., Time; Weather. 8.20, Gym. 8.40, Hints for the Week. 9.45, Records. 9.55, Ernst Arndt reads. 10.5, Concert by the Viennese Chamber Orchestra; Conductor, Audieth; Soloist, Schneiderhan (Violin); Overture, Euryanthe (Weber); Violin Concerto in G minor, Op. 26 (Bruch); Der Alcázar (Roehlitz); Les Préludes (Liszt). 11.20, Report of the Opening of the Grossglockner-Hochalpenstrasse, relayed from Fuschertörl. 12.45 p.m., Concert of Light Music by the Vienna Symphony Orchestra; Conductor, Holzer. 2.0, Report on the Austrian Marathon Race (on Records). 2.50, News. 3.0, Talk: Viennese Vinticulture. 3.20, Books for Young People. 3.45, Recital by the Mildner Quartet: Flute Quartet in A (Mozart); String Quartet in G minor, Op. 10 (Debussy). 4.25, Talk: International Waterways. 4.50, Commentary on the Second Half of the International Football Match, Austria v. Czechoslovakia, relayed from the Stadium. 5.45, Jazz Music by Leo Jaritz's Jazz Band. 6.25, Travel Talk: Crete and Greece. 6.50, Paul Praeger reads. 7.20, Announcements. 7.30, Lieder and Aria Recital by Sophie Kars (Soprano). 8.0, Motto. 8.5, Der Weistempel—Drama in Five Acts (Schönherr). 10.0, Balalaka Music by Dimitrii Tureroff. 10.30, News. 10.50, Concert by the Vienna Symphony Orchestra; Conductor, Holzer. 11.50, Records of Light Music. 1.0 a.m. (Monday), Close Down.

WARSAW

223 kc/s, 1,345 metres; 120 kW.—9.0 a.m., Hymn. 9.3, Records. 9.13, Gym. 9.23, Records. 9.30, News. 9.40, Records. 9.50, Hints for Housewives. 9.55, Programme Announcements. 10.5, Divine Service relayed from Lwow, 795 kc/s (377.4 metres); Sacred Music on Records. 11.57, Time. 12 Noon, Fantasia from St. Mary's Church, Cracow. 12.3 p.m., Weather. 12.5, Theatre Review. 12.15, Concert by the Station Symphony Orchestra; Conductor, Mierzejewski; Soloists, Adamska (Cello) and Mossakowski (Songs); Leonora Overture No. 3 (Beethoven); Cello Concerto (Dvorak); Four Songs, Moniuszko Potpourri (Rybicki). In the interval at 1.0, Topical Talk. 2.0, Records: Light Music. 3.0, Agriculture Talk relayed from Poznan, 868 kc/s (345.6 metres). 3.15, Violin Recital by Erica Morini (on Records). 3.25, Market Prices. 3.35, Music on Two Piano-fortes (on Records). 3.45, Talk for Farmers. 4.0, Reading. 4.20, Song Recital by Michalowski. 4.45, A Story for Children. 5.0, Dance Music relayed from Lwow. 5.50, Book Reviews and Science Notes. 6.0, Dramatic Programme. 6.45, Talk for Young People. 7.0, Concert of Light Music by the Station Orchestra; Conductor, Nawrot; Soloist, Hoherman (Banjo and Accordion). 7.45, Programme Notes. 7.50, Topical Talk. 8.0, Concert by the Station Symphony Orchestra; Conductor, Latoszewski; Soloist, Gimpel (Piano-forte); Symphonic Poem; Tatra (Novak); Piano-forte Concerto in A minor (Schumann). 8.45, News. 8.55, Labour Exchange. 9.0, Humorous Programme from Lwow. 9.45, Sports Notes. 10.0, Technical Letterbox. 10.15, Announcements; Records. 10.30, Dance Music from the Gastronomica. 11.0, Weather; Aviation Notes. 11.5, Dance Music (cont'd).

ZURICH.—Relays Beromünster.

MONDAY

SEPTEMBER THE TWENTY-FOURTH

ATHLONE

565 kc/s, 531 metres; 60 kW. Relayed by Dublin, 1,348 kc/s, 222.6 metres; and Cork, 1,240 kc/s, 241.9 metres.—1.30 to 2.30 p.m., Time Signal; Exchange; Weather; Records. 4.0, Concert by the Gresham Instrumental Trio relayed from the Gresham Hotel; Soloist, Betty Byrne (Songs). 6.0, Programme for Children. 6.45, News. 7.0, Irish Lesson. 7.15, Talk on the Radio Exhibition. 7.30, Time Signal. 7.31, Sibelius and Sinding Concert by the Station Orchestra. 8.0, Sibelius and Dvorak Song Recital by Pearl McConkey. 8.15, Sinding and Sibelius Pianoforte Recital by Tilly Fleischmann. 8.30, Talk by Lord French: Madagascar. 8.45, Concert by the Station Orchestra. 9.0, Song Recital by P. Kirwan (Tenor). 9.15, Talk: The Mystics in Drama. 9.45, Concert by the Station Orchestra. 10.0, Variety Programme. 10.30, Time Signal; News; Weather. 10.40, Traditional Fiddle Solos by F. McKenna. 10.50, Records. 11.0 (approx.), Close Down.

BARCELONA

795 kc/s, 377.4 metres; 5 kW.—12 Noon, Chimes; Weather. 1.0 p.m., Programme for Women. 1.45, Records. 2.0, Records. 2.30, Theatre Notes; Amusement Guide; Records. 3.0, Sextet Concert: Part I, Sound Film Music; Part II, Selection from Gipsy Love (Lehar); Intermezzo (Hupfermann); Spanish Dance No. 5 (Granados); Selection from Don Lucas del Cigarral (Vives); Melody from El Carro del Sol (Serrano); Rhapsody, El Ruiseñor de la Huerta (Magenti). After the Concert, Labour Exchange Report. 4.0, Programme for Hospitals. 5.0, Interval. 7.0, Concert by the Station Trio; Selection from The Master Singers (Wagner); El Cuclillo (Duquini); Romance (Saint-Saens); Symphonic Entr'acte (Desprez); Melody (Rachmaninov); Chanson breve (Demaret); Selection from Don Quixote (Massenet). In the interval at 7.30, News. 8.0, Request Records. 8.20, Sports Notes. 8.30, Exchange; Request Records. 9.0, Wireless Talk. 9.10, Aviation Notes. 9.20, Records; Geography and History Talk. 9.45, Press Review. 10.0, Chimes; Weather; Social Notes; Market Prices. 10.10, Humorous Review of the Week in Verse. 10.20, Concert of Sardanas. 11.0, Concert by the Station Orchestra. 11.30, Announcements. 12 Midnight, Dance Music from the Shanghai Bar by the Melody Boys' Orchestra. 1.0 a.m. (Tuesday), News; Close Down.

BASLE.—Relays Beromünster.

BELGRADE

686 kc/s, 437.3 metres; 2.5 kW.—10.45 a.m., Programme Announcements. 10.50, Water Level. 11.0, Records. 11.59, Chimes. 12.5 p.m., Concert by the Station Orchestra. 12.45, Exchange; Announcements. 1.10, Concert by the Station Orchestra. 1.30, News; Time Signal. 4.0, Talk. 4.30, Concert by the Station Orchestra: March (Jakl); Overture (Binicki); Waltz (Marinkovic); Arabisches Gold (Rust); Suite (Travaglia). 6.25, Time Signal; Programme Announcements. 6.30, German Lesson. 7.0, Records. 7.10, Announcements. 7.20, Records. 7.30, Talk. 8.0, Werther—Opera (Massenet), relayed from the Theatre National, Zagreb, 1,086 kc/s, 276.2 metres. In the interval at 10.0, Time Signal; News.

BERLIN

DEUTSCHLANDSENDER, 191 kc/s, 1,571 metres; 60 kW.—5.30 a.m., Weather Forecast for the Gordon-Bennett Balloon Race. 5.45, Weather. 5.50, News. 6.0, Gym. 6.15, Motto. 6.20, See Hamburg. In the interval at 7.0, News. 8.0, Interval. 8.45, Gym. 9.0, Interval. 9.40, Report for Housewives. 10.0, News. 10.10, Report on Records: The German Excavations of Prehistoric Remains. 10.50, Physical Training for Schools. 11.15, Weather. 11.30 to 11.40, Weather Report for the Gordon-Bennett Balloon Race. 11.55, Weather. 12 Noon, See Stuttgart. 1.0 p.m., Cruising—Records. 1.40, Weather. 1.45, News. 2.0, Interval. 2.45, Greetings; Announcements. 3.0, Weather; Exchange. 3.15, Talk for Women. 3.40, Handicrafts for Young People. 4.0, See Munich. In the interval at 4.50, Weather for the Gordon-Bennett Balloon Race. 6.0, A Visit to the Nordic Society's Authors' Home at Travemünde—Talks by well-known Writers (on Records). 6.25, Concerto for Harpsichord and Eight Instruments (Rasch) by Bruno-Hilte Reinhold and Members of the Station Orchestra; Conductor, The Composer. 6.55, A Poem; Weather. 7.0, Address by Reichsminister Darré: The National-Socialist Agrarian Policy. 7.20, The Jupiter Symphony (Mozart) by the Berlin Philharmonic Orchestra conducted by Heinrich Laber (on Records). 7.45, A Visit to a Museum. 8.0, Motto; News. 8.15, See Munich. 8.45, Christian Man—Historical Play (Erwin von Wehrenalp). 10.0, News. 10.30, Talk: The Yawl Olympia. 10.45, Weather. 11.0, Weather Report for the Gordon-Bennett Balloon Race. 11.10, Concert from Hamburg. 12 Midnight, Close Down.

BERLIN

FUNKSTUNDE, 841 kc/s, 356.7 metres; 100 kW.—6.0 a.m., Gym. 6.15, Weather;

Prayers. 6.20, See Hamburg. In the interval at 7.0, News. 8.0 to 8.20, Gym. 8.30, Records; Announcements. 9.45, Cookery Hints. 10.0, News. 10.10 to 10.25, Market Prices. 11.25 to 11.30, Exchange. 12 Noon, Concert from Hamburg. In the interval, Weather. 1.0, News. 1.15, Records: Folk Music. 2.0, News. 2.15, Berlin Opera Announcements (on Records). 3.0 to 3.20, Exchange. 4.0, Concert of Light Music by the Station Orchestra; Conductor, Willy Steiner. 6.0, Announcements. 6.5, Report of the Hitler Youth Sports Tournament. 6.30, Chamber Music by Irgard Veidt. Ernst von Knorr and Hans Bastian (Violins) and Alexander Ecklebe (Pianoforte): Kleine Spielmusiken for Three Violins, Op. 13a (Wilhelm Maler); Theme, Variations and Fugue for Two Violins (von Knorr); Variations and Fugue for Pianoforte on a Reger Theme (Ecklebe), played by the Composer. 7.20, An Interview with Dr. Otto Kimmel, Director of the Prussian State Museum. 7.40, Echoes of the Day. 8.0, News. 8.15, See Munich. 8.45, See Hamburg. 9.50, Cabaret Programme on Records. 10.20, News. 10.50, A Love Serenade. 12 Midnight Close Down.

BERNE.—Relays Beromünster.

BEROMUNSTER

556 kc/s, 539.6 metres; 60 kW.—12 Noon, Records. 12.29 p.m., Time Signal from Neuchâtel Observatory; Weather; News. 12.40, Records. 1.25, Time; Weather; Exchange; Interval. 3.30, Talk: Books for Women. 3.59, Time Signal from Neuchâtel Observatory. 4.0, Concert of Chamber Music by the Station Quartet; Soloist, Erna Niemann (Harp). 5.0, Saxophone Duets by Schwaller and Imark. 5.30, Pianoforte Recital by Arturo Milesi, the Blind Pianist. 6.0, Records. 6.30, Programme for Young People. 7.0, Time; Weather. 7.1, Talk: Sunday Pursuits and Excursions. 7.10, Records. 7.30, Talk: Egypt. 8.0, Lecture-Recital: The Violin Sonata. 8.40, Divertissement No. 4 for Flute, Clarinet and Bassoon (Mozart). 8.50, Weather; News. 9.0, L'Arbre enchanté—Comic Opera in One Act (Gluck). 10.15 (approx.), Close Down.

BODEN.—Relays Stockholm. BODI.—Relays Oslo.

BRATISLAVA

1,004 kc/s, 298.8 metres; 13.5 kW.—6.0 to 7.15 a.m., See Prague. 9.45, Announcements. 9.50, See Prague. 11.0, Record. 11.5, See Moravská-Ostrava. 11.55, See Prague. 12 Noon, Talk for Farmers. 12.10 p.m., Local News in Slovak. 12.15, Record. 12.20, See Prague. 1.40, News and Weather in German and Hungarian. 1.50, See Prague. 2.0 to 2.5, Exchange. 3.15, Concert by the Station Orchestra; Conductor, Schimpl. 4.15 to 4.20, See Prague. 5.30, Literary Talk. 5.45, Pianoforte Recital by L. Holoubek. 6.10, Talk for Housewives. 6.15, Hungarian Transmission: Reading; Scarlatti Pianoforte Recital by Hrabussay; Legal Talk. 6.55, See Prague. 7.10, Song Recital by Emma Simandlová. 7.35, Talk: Slovak Industry. 7.50, Play in Three Acts by the Cast of the Slovak National Theatre. 9.25, Concert by the Vasica Jazz Orchestra. 10.0, See Prague. 10.45, News in Hungarian. 11.0, Close Down.

BREMEN.—Relays Hamburg.

BRESLAU

950 kc/s, 315.8 metres; 60 kW. Relayed by Gleiwitz, 1,231 kc/s, 243.7 metres.—5.0 a.m., Hymn; Motto; Records. In the interval at 5.40, Time; Weather. 6.0, Time; Weather; Gym. 6.25, See Cologne. In the interval at 7.0, Time; News. 8.0, Folk Song Records. 8.40, Gym. 9.0, Time; News. 10.10 to 10.40, Concert for Schools by a Mandoline and Late Orchestra. 11.30, Time; News. 12 Noon, Concert by the Silesian Symphony Orchestra. In the intervals at 12.30 p.m. and 1.30, News. 2.20, Exchange. 2.25, Announcements; Records. 2.50, Market Prices. 3.10, Book Review. 3.30 (from Gleiwitz), A Harvest Festival in Upper Silesia—Sequence in Dialect. 4.0, Concert by the Bad Charlottenbrunn Kurhaus Orchestra; Conductor, Alfred Oelfer; March (Seifert); Overture, Le brasseur de Preston (Adam); Selection from Der Bettelstudent (Müllhölzer); Waltz (Gungl); Ballet Suite (Popy); Clog Dance from Czar and Carpenter (Lortzing); Festival Overture, Viva Academia (Zimmer); Folk Song Potpourri (Schreiner); Waltz, Loreley Rheinklänge (Strauss); March (Urbach). 5.30, Weather; Market Prices. 5.35, Dialogue: Hunting with the Camera. 6.0, Topical Talk. 6.20, Talk with Records: A Journey to Vigo. 6.50, Announcements; Weather. 7.0, See Berlin (Deutschlandsender). 7.25, Recital of Japanese Songs (Zieritz) by Elisabeth Laube (Soprano). 8.0, News. 8.15, See Munich. 9.0, Music of the Pusztá; Recital by Karoly Kiss (Violin), Elemér Kiss (Cym-

bal) and Hattwig (Pianoforte). 9.40, Recital of Beethoven Sonatas by Georg Dohrn (Pianoforte); Sonata in A, Op. 2, No. 2; Sonata in C sharp minor, Op. 27, No. 2. 10.20, Time; News. 10.45, Gay Vienna—Concert by the Station Orchestra; Conductor, Ernst Topitz. 12 Midnight, Close Down.

BRNO

922 kc/s, 325.4 metres; 32 kW.—6.0 to 7.15 a.m., See Prague. 9.50, See Prague. 11.0, See Moravská-Ostrava. 11.55, See Prague. 12 Noon, Talk for Farmers. 12.10 p.m., See Prague. 1.30, Social Notes. 1.40, See Prague. 2.0 to 2.5, Market Prices for Farmers. 3.15, See Bratislava. 4.15 to 4.20, See Prague. 5.40, See Prague. 5.50, Hints for Housewives. 5.55 to 6.30, German Transmission: Readings (Goethe and Kreisler); Talk. 6.30, Recital of Slovak Songs by Milada Markova. 6.45, Legal Talk for Workers. 6.55, See Prague. 7.10, See Moravská-Ostrava. 7.35, See Prague. 11.0 (approx.), Close Down.

BRUSSELS (No. 1)

620 kc/s, 483.9 metres; 15 kW.—11.55 a.m., Weather. 12 Noon, Records. 1.0 p.m., News. 1.10, Orchestral Concert; Soloist, Alle, Meigrot (Songs); March (Turine); Waltz, Dolores (Waldteufel); Overture, Le pré-aux-clères (Hérold); Hymn to Saint Cecilia (Gounod); Selection from La fille de Madame Angot (Lecocq); Songs; Suite, Mascerade (Lacôme). 2.0, Interval. 4.55, News. 5.0, Dance Records. 6.0, Science Talk. 6.15, Orchestral Concert; Soloist, Ferari (Violin); March, Montreal (Gillon); Overture, The Caliph of Bagdad (Boieldieu); Waltz (Luigini); The Tea Caravan (Niemann); Selection from La Navarraise (Massenet); Violin (Serenade (Drdla); Fête des accordailles (de Teyze); Suite breve (Henri Büsser). 7.15, Records. 7.30, Film and Theatre Review. 8.0, Concert by the Symphony Orchestra; Soloist, Berthe Albert (Songs); Prelude to Tristan and Isolde (Wagner); Symphony in D minor (Franck); Chansons enfantines (Mussorgsky); Suite, Dolly (Faure). In the interval at 8.15, Yvain Gilkin Programme: Talk and Readings. 10.0, News. 10.10, Dance Records. 11.0, (approx.); Close Down.

BRUSSELS (No. 2)

932 kc/s, 321.9 metres; 15 kW.—Programme in Flemish.—11.57 a.m., Weather. 12 Noon, Orchestral Concert; Soloist, Wigy (Violin): Adan Potpourri (Urbach); Waltz from The Arabian Nights (Joh. Strauss); Overture, La belle Hélène (Offenbach); Extase (Ganne); Violin: Fantasia on Hulleboreck's Songs (Wigy); Potpourri, Servus Wien (Dostal); March, King Cotton (Sousa). 1.0 p.m., News. 1.10, Records. 2.0, Interval. 4.55, News. 5.0, Concert by the Symphony Orchestra; Soloist, Denise Biestraete ('Cello): Carnaval romain (Berlioz); 'Cello Solo: Idéal d'enfant (Keurvels); Passacaglia (Guillaume); Scherzo-Waltz (Guillaume); Melancolie (Delin); Ballet Music from Henry VIII (Saint-Saens). 5.45, Programme for Children. 6.30, 'Cello Recital by Denise Biestraete. 6.45, Request Records. 7.15, Talk. 7.30, Art Review. 8.0, Concert of Light Music by the Radio Orchestra. 8.45, Concert of Belgian Sound Film Music by the Radio Orchestra. 10.0, News. 10.10, Dance Records. 11.0 (approx.), Close Down.

BUCHAREST

823 kc/s, 364.5 metres; 12 kW.—12 Noon, Water Level; Records. 12.45 p.m., Amusement Guide; Records of Light Music. 1.15, Time; Weather; News. 1.40, Records of Light Music. 5.0, Concert by the Station Orchestra: Overture, Hamlet (E. Bach); Waltz from Casanova (Lincke); Andante (Beethoven); Nocturne (Clemens); Selection from La Juive (Halévy). 6.0, Time; Weather; News. 6.15, Concert by the Station Orchestra: Cockney Suite (Ketelbey); Berceuse (Squire); Two Pieces (Fétras); Foxtrot (Kochmann); Piece (Gyldmark); Intermezzo (Siede); The Frog's Wedding (Beil). 7.0, Educational Programme. 7.15, Records. 7.45, Talk. 8.0, Concert of Chamber Music by the Metzner Quartet: Old English Folk Songs (Pochon); The Mill (Raff-Pochon); Andante in G (Dittersdorf); Quartet in E minor No. 2, Op. 44 (Mendelssohn); Old Black Joe (Foster-Pochon); Bagatelle (Scarlatescu-Jiann). 8.30, Talk. 8.45, Song Recital by Anne Gadiu; Aria from Il Trovatore (Verdi); Song (Curtis); Song (Burdes); Aria from L'Africaine (Meyerbeer); Aria from Madame Butterfly (Puccini). 9.15, Music relayed from the Poiana Carpatzi Restaurant. In the interval at 10.0, News.

BUDAPEST

546 kc/s, 549.5 metres; 120 kW.—6.45 a.m., Gym. 9.45, News. 10.0, Talks. 12 Noon, Chimes. 12.5 p.m., Trio Concert. 1.30, Band Concert. 2.40, Market Prices; Cookery Hints. 4.0, Programme for Students. 5.0, Concert

by the Berend Chamber Orchestra, relayed from Margaret Island. 5.45, Talk. 6.15, Pianoforte Recital by Irén Marik. 7.0, Talk: Hungarian Music. 7.35, Concert by the Lakatos Cigány Band. 8.35, Talk. 9.10, Wagner Concert by the Opera House Orchestra. Conductor: Otto Berg. Soloists: György Losonczy and Erzsé Bodo. Overture, Tristan and Isolde; Bacchanale from Tannhäuser; Selection from The Flying Dutchman; Extract from The Mastersingers; Fire Magic from The Valkyrie. 10.30, Weather. 10.50, Talk in Italian. 11.0, Dance Music by the Fejes Band.

CASSEL.—Relays Frankfurt.

COLOGNE

658 kc/s, 455.9 metres; 60 kW.—5.30 a.m., Greetings; Records. 6.5, Gym. 6.25, Concert by the Solingen Municipal Orchestra, relayed from the Town Hall, Solingen; Conductor, Werner Saam. In the interval at 6.50, Greetings; Time; News. 8.0, Time; Weather. 8.5, Gym. 8.20 to 8.30, Cookery Hints. 10.0, Time; News. 10.10, Recital by Will Smit (Violin) and Hans Haass (Pianoforte). 10.30, Talks. 11.30, Post Office Concert. 12 Noon, Concert by the Station Chamber Quintet: Javanese Dream (Ey-sold); Brise de mer (Leoncavallo); Two Movements from the Spring Suite (Nevin); Piece (de Michel); Leggenda d'amore (Bece); Tango (Meisel); Faszinata (Murzilli). 12.45 p.m., News; Greetings. 1.0, Concert by the Station Orchestra; Conductor, Julius Kahn; Soloist, Walter Schneiderian (Violin); Prelude to Mignon (Thomas); Polonaise for Violin and Orchestra (Wieniawski); Paraguayan Suite (Brus-selmans); March (Preckher); Waltz, Marienklinge (Strauss); Greenland Suite (Juel-Fredricksen); Serenade (Glan); Intermezzo, Herbststimmung (Rust); Chromatic Gallop (Liszt). 2.45, Cattle Prices. 3.30, Exchange. 3.50, Topical Talk. 4.0, Opera Records. 5.0, Talk: The Paper-Coal of Rott. 5.15, Recital by Lotte Hellwig-Josten (Violin) and Hans Haass (Pianoforte); Sonata for Violin and Pianoforte, Il trillo del diavolo (Tartini); Spanish Dance (Sarastate); Slav Dance (Dvorak). 5.35 (approx.), Reading. 6.0, Gym. 6.20, Italian Lesson. 6.40, News. 6.50, Exchange; Sports Notes. 7.0, See Berlin (Deutschlandsender). 7.25, Weekly Review. 8.0, News. 8.15, See Munich. 8.45, Variety Programme. 10.0, Time; News. 10.20, Deutsches Liederspiel, Op. 14 (Heinrich von Herzogenberg) for Solo Voices, Mixed Choir and Pianoforte Duet. 11.0, Country Maidens—Literary Sequence with Old Chamber Music. 12 Midnight, Close Down.

COPENHAGEN.—Relays Kalundborg. CORK.—Relays Athlone. DANZIG.—Relays Königsberg. DRESDEN.—Relays Leipzig.

FECAMP

1,456 kc/s, 206 metres; 10 kW.—11.30 a.m. to 12 Noon, Programme in English arranged by the International Broadcasting Company of London: Happy Half-Hour; Light Orchestral Music. 12 Noon, Programme in French. 4.30 to 6.0 p.m., Programme in English arranged by the I.B.C. (London). 4.30, Dance Music. 5.0, Chichester, Bognor, Hastings and Eastbourne Concert, Part I—At the Seaside. 5.30, Southend Concert; Military Band Music. 6.0, Programme in French. 11.0 till Close Down, Programme in English arranged by the I.B.C. (London). 11.0, Talkie Time; Tunes from the Talkies and Shows. 11.30, In the Club this Week. 12 Midnight, Concert for Dalkite Listeners; Dance Music. 12.30 a.m. (Tuesday), I.B.C. Time Signal. 12.31, Dance Music. 1.0 a.m., I.B.C. Goodnight Melody and Close Down.

FLENSBURG.—Relays Hamburg. FLOR-ENCE.—Relays Milan.

FRANKFURT

1,195 kc/s, 251 metres; 17 kW.—5.45 a.m., Hymn; Time; Weather. 5.50, Gym. 6.40, Time; News. 6.50, Weather. 6.55, Concert by the Badenweiler Kurhaus Orchestra; Conductor, Albert Hitzig. 8.10, Weather. 8.15 to 8.35, Gym. 10.0, News. 11.0, Concert. 11.30, Announcements. 11.45, Social Notes. 12 Noon, See Stuttgart. 1.0 p.m., Time; News. 1.10, Announcements. 1.20, Records. 1.50, Time; News. 2.0, Song Records. 2.30, Industrial Review. 2.45, Time; Exchange. 2.55, Weather. 3.10, Discussion for Young People. 3.35, The Bachelor's Kitchen—Discussion, with Practical Hints. 3.45, Programme for Students. 4.0, See Stuttgart. 5.30, Anecdotes of Ludwig Finckh. 5.45, Sonata for Violin and Pianoforte (Konrad Kreutzer) by Otto Keller and Franz Diebold. 6.0, Our State Railways—Sequence for Young People (Herbert Kayser). 6.25, See Stuttgart. 6.45, Weather; Announcements. 7.0, See Berlin (Deutschlandsender). 7.30, Local Review. 7.45, Topical Talk. 8.0, Time; News. 8.15, See Munich. 8.45, Die Opernprobe—One Act Opera (Lortzing). 9.45, Autumn in Old Frankfurt Gardens—Sequence by Paul Laven, 10.20, Der Holzdieb—Comic Opera in One Act (Marschner). 12 Midnight, See Stuttgart. 1.0 a.m. (Tuesday), Close Down.

FREDRIKSSTAD.—Relays Oslo. FREI-BURG.—Relays Stuttgart. GENEVA.—Relays Sottens. GENOA.—Relays Milan. GLEIWITZ.—Relays Breslau. GÖTEBORG.—Relays Stockholm. GRAZ.—Relays Vienna. HAMAR.—Relays Oslo.

HAMBURG

904 kc/s, 331.9 metres; 100 kW. Relayed by Bremen, Flensburg and Hanover, 1,330 kc/s, 225.6 metres.—5.45 a.m., Time; Weather; Report for Farmers. 6.0, Gym. 6.15, Time; Weather. 6.20 (from Bremen). Concert by the Bremen Municipal Orchestra. Conductor: Reinhold Krug. In the interval at 7.0, Time; News; Talk. 8.0, Weather; Hints for Housewives. 8.10, Announcements; Records. 10.50, News. 11.0, Folk Songs. 11.30 (from Hanover). Concert by the Hanover Symphony Orchestra, relayed from Hanover Castle. Conductor: Otto v. Sosen. Soloist: Julius Schönherr (Violin). March (Liszt); Romantic Overture (Hilari); Salut d'amour (Elgar); Gavotte (Steinmann); Overture, Die Felsenmühle (Reissiger); Das ganze Deutschland soll es sein (Blüme); Gruss von Weserstrand (Kruhl); March (Kruhl). In the interval, Announcements; Talk. 1.0 p.m., Exchange. 1.15, Weather. 1.20, Light Music. 2.15, News. 2.30, Waltz Song Records. 3.0, Exchange. 3.40, Shipping and Aviation Notes. 4.0, See Munich. 5.30, The Girls' Sports Festival—Report for Young People. 6.0, Humorous Programme. 6.45, Exchange. 6.55, Weather. 7.0, Programme for Children, relayed from Rostock. 8.0, News. 8.15, See Munich. 8.45, Das Lied von der Glocke (Schiller), with Music by Hugo Distler. The Station Choir and a Boys' Choir. Conductor: Gregor. The Station Orchestra; Conductor: Maass. 10.0, News. 10.20, Address by Reichsminister Walter Darré: The National Socialist Agrarian Policy (on Records). 10.45, Records. 11.0, The Dance of the Instruments—Concert by the Station Dance Band. Conductor: Gebhardt. Wedding Dance of the Flamingos (Robert); Waltz for Three Pianofortes; Frühlingstimmen (Strauss-Gebhardt); Serenade for Oboe, Alto Saxophone, Trumpet, Drum and Pianoforte (Giratis); Nocturne for Alto Saxophone and Harp (Bumke); Foxtrot (Schmidseider); Serenade for Saxophone and Strings from Les Millions d'Arlequin (Drigo); Fantasia (Golwyn). 12 Midnight, Close Down. HANOVER.—Relays Hamburg.

HILVERSUM

160 kc/s, 1,875 metres; 7 kW. (until 3.40 p.m.). Transmitted on Kootwijk, 50 kW., from 3.40 p.m. Programme of the General Broadcasting Society (A.V.R.O.).—7.40, Time; Records. 9.40, Time. 9.41, Service. 9.55, Records. 10.10, Recitations. 10.40, Recital by Piet van Egmond (Organ) and Jeanne Ruygrok (Soprano). 11.40, Time. 11.41, Concert of Light Music by Kovaacs Lajos and his Orchestra. In the interval, Records. 1.40 p.m., Song Recital by Geard Holthaus (Baritone): Five Songs from Die schöne Müllerin (Schubert): (a) Das Wandern, (b) Der Nengierige, (c) Morgengruss, (d) Trockne Blumen, (e) Ungeduld; Records; Four Indian Love Lyrics (Woodforde-Finden); Records. 2.40, Concert by the A.V.R.O. Orchestra. Conductor: Nico Trepp. Overture, Preciosa (Weber); Symphony in B flat, No. 12 (Haydn); Grieg Potpourri (Haydn); Adagio for Strings (Léku). 3.40, Interval. 3.55, Records. 4.10, Illustrated Music—Talk. 5.10, Concert of Light Music by the Rembrandt Theatre Orchestra. Conductor: Daaf Hartogs. 6.25, Records. 6.40, Recital by Nicolas Roth (Violin) and Egbert Veen (Pianoforte). Sonata, Op. 45 (Grieg); Mazurka in A minor (Chopin-Kreisler); Fereckles (Roth); Schön Rosmarin (Kreisler). 7.40, Records. 7.49, Time; News. 7.45, Records. 8.40, Dirk's Bridge Party—Play (de Sinclair). 9.10, Mozart Symphony Concert by the A.V.R.O. Orchestra. Conductor: Nico Trepp. Soloist: Georg Kuhlenkampf (Violin). Symphony in G minor; Violin Concerto in D. 10.10, Concert of Light Music by Cornelius Godalban's Orchestra, relayed from the Carlton Hotel, Amsterdam. 11.40, Close Down. HORBY.—Relays Stockholm.

HUIZEN

995 kc/s, 301.5 metres; 7 kW. (until 6.40 p.m.); 20 kW. from 6.40 p.m. Programme of the Christian Radio Society (N.C.R.V.).—7.40 a.m., Bible Reading. 7.55 to 9.10, Records. 10.10, Service. 10.40, Religious Address. 11.10, Talk. 11.40, Police Notes; Records. 12.10 p.m., Song and Pianoforte Recital by Mlle. Bolten (Contralto) and Mne. Hoogers-Höfel. 1.10, Oboe and Pianoforte Recital by B. de Vries and Tump; Sonata in C minor (Händel); Duet (Laurischkus); Records; Concerto in F minor (Telemann). 1.40, Programme for Schools. 2.15, Records. 2.25, Talk for Housewives. 2.55, Records. 3.25, Interval. 3.40, Bible Reading and Sacred Music. 4.40, Records. 5.10, Organ Recital by Blaauw: Festival March (Becker); Serenade (Jensen); Meditation (Silver); Rondo in D (Mozart); Extract from Faust (Gounod); In the Mystic Land of Egypt (Ketelbey); Three Pieces (Loeschorn): (a) Schummerlied, (b) Gondeliers, (c) Saltarello. 6.10, Letter Box. 6.40, Police Notes; Church Notes. 6.55, Records. 7.10, Letter Box. 7.40, Orchestral and Choral Concert. Conductor: v. d. Hurk. Extract from Cantata No. 29 (Bach); O. hilf Christi (Hammerschmidt); Selection from L'Enfance du Christ (Berlioz); Three Pieces (Bansnenn): (a) Lobe den Herrn, (b) Der lieben Sonne Licht und Pracht, (c) Men roept van Groenlands bergen; Song Cycle; Grieg Potpourri (arr. Urbach); Children's Symphony

SEPT. 24th MONDAY continued

(Romberg); Selection from Le Cid (Masse-net); Iland in Hand (v. Blon); Abschied von den Bergen (Carl); Gallop (Ramthor); Bergerette (Fétras); Die Zauberklarinette (Vollstedt); Arioso (Gumbert); Serenata d'Amalfi (Bece); Viva el Torero (Popy). In the interval at 8.40, Talk. 10.25, Records. 11.25 (approx.), Close Down. INNSBRUCK.—Relays Vienna.

KALUNDBORG

238 kc/s, 1,261 metres; 75 kW. Relayed by Copenhagen, 1,176 kc/s, 255.1 metres; and Skamlebaek, 49.5 metres.—7.0 a.m., Gym. for Women. 7.15, Gym. 8.30, Divine Service from Copenhagen Cathedral. 11.0, Weather. 11.10, Fish Prices. 12 Noon, Chimes. 12.1 p.m., Music by the Bendix String Ensemble from the Wivex Restaurant. 2.50, Talk for Housewives. 3.0, Concert by the Radio Orchestra; Conductor: Keesen; Overture, Das Modell (Suppé); Waltz from Die geschiedene Frau (Fall); Suite, Summer Days (Coates); Ave maris stella (Grieg); Norwegian Bridal Procession (Grieg); Piedmontese Dance No. 1 (Sinigaglia); Spanish Serenade (Glazounov); Les nuances roses (Gillet); Traversée heureuse (Schmitt); Selection from The Rose of Stamboul (Fall); Gopak from The Fair at Sorotelsk (Mussorsky). In the interval at 3.50, Poetry Reading. 5.0, Programme for Children. Reading from the Pickwick Papers (Dickens). 5.30, Exchange; Market Prices. 5.42, A Poem. 5.45, Talk: A Motor Tour of South America. 6.15, English Lesson. 6.45, Weather. 7.0, News. 7.15, Time Signal. 7.15, Discussion: Air Transport and its Possibilities. 7.30, Talk: The Press and Private Life. 8.0, Time. 8.1, Programme for Girls. 8.30, Italian Concert by the Chamber Orchestra; Conductor, Mailer: Sonata for Strings and Harpsichord (Vivaldi); Concerto grosso in F for two Violins, 'cello, Strings and Harpsichord (Scarlatti). 8.55, Back to the Land—Song Recital by Hallander Helleman, with Introductory Talk by Nienland. 9.30, Recital by Ole Frøsig (clarinet) and Folmer Jensen (Pianoforte); Fantasietücke (Schumann); Theme with Variations (Weber). 9.55, News. 10.10, Extracts from Cagliostro in Wien—Operetta (Johann Strauss), by the Radio Orchestra; Conductor, Mailer. 11.0, Dance Music by the Aage Juhl-Thomsen Band from the National Scala. In the interval at 12 Midnight, Chimes from the Town Hall. 12.30 a.m. (Tuesday), Close Down.

KIEL.—Relays Hamburg. KLAGENFURT.—Relays Vienna.

KONIGSBERG

1,031 kc/s, 291 metres; 60 kW. Relayed by Danzig, 1,303 kc/s, 230.2 metres.—5.0 a.m., Records. 5.50, Weather. 6.0, Gym. 6.20, See Hamburg. In the interval at 7.0, News. 8.0, Service. 8.30, Gym. 9.5 (from Danzig). Broadcast for Schools: A German Family in North America—Extracts from the Letters of German Settlers. 10.40, News. 10.55, Weather. 11.30, See Hamburg. In the interval, Weather. 1.0 p.m., Time; Weather. 1.5, Records. In the intervals, News. 2.30, Exchange. 3.0, Market Prices. 3.15, Review of Periodicals. 3.45, A Puppet Play. 4.15, Concert by the Small Station Orchestra. Conductor: Wilcken. Part I, Music of Königsberg Composers. Suite, Erotica (Jensen); Romance (Maschke); Rauschenlied (Kursch); Ballet Suite (Hinfeld). Part II, Viennese Music. Overture, Prince Methusalem (Strauss); Two Songs from Die schöne Galathee (Suppé); Gavotte (Lincke); Glow-worm Idyll (Lincke); Waltz from Eva (Lehár). 5.30, Talk: Iduma's Golden Apples. 5.50, Recital of Love Songs by Joachim Stein (Tenor); An Rose (Curschmann); Der Schiffer fährt zu Land (Curschmann); Chanson du printemps (Gounod); Das Ringeln (Chopin); Es muss ein Wunderbares sein (Liszt); Vöglein, wohin so schnell Franz; Keine Sorg um den Weg (Raff). 6.15, Market Prices. 6.25 (from Danzig). Talk: Herrensgrabin. 6.55, Weather. 7.0, Sports for Young People. 7.30, Duet No. 1 in B flat for Violin and 'cello (Rolla), by Franz Schiffmann and Curt Sachs. 8.0, News. 8.15, See Munich. 8.45, See Hamburg. 10.0, News. 10.30, Topical Talk. 11.0, Concert by the Small Station Orchestra. Conductor: Wilcken. Overture, Raymond (Thomas); Waltz (Jos. Strauss); Pustaklänge (Sertiz); Leggenda d'amore (Bece); Selection from La Tosca (Puccini); Suite from La Source (Delibes). 12 Midnight, Close Down.

KOSICE.—Relays Prague. LAUSANNE.—Relays Sottens.

LEIPZIG

785 kc/s, 382.2 metres; 120 kW. Relayed by Dresden, 1,285 kc/s, 233.5 metres.—5.50 a.m., Report for Farmers. 6.0, Gym. 6.25, See Cologne. In the interval at 7.0, News. 8.0, Gym. 8.20, Records. 9.0, Interval. 9.40, Exchange. 9.45, Announcement; Weather. 10.10, Discussion in English for Schools: Sport in England. 11.0, Records; Announcements. 11.30, News. 11.40, Weather. 11.45, Programme for Farmers. 12 Noon, Concert

from Hamburg, 1.0 p.m., News. 1.10, Records; Folk Music. 2.0, News; Exchange; Weather. 2.15 to 2.45, Records; Hungarian Music. 3.0, Book Review. 3.40, Exchange. 4.0, Light Music by the Station Orchestra. Conductor: Blumer. Overture, Vintager's Bride (Nedbal); Ein Abend in St. Petersburg (Meyer-Helminnd); Irish Rhapsody (Herbert); Waltz, Fesche Geister (E. Strauss); Selection from Madame Butterfly (Puccini). 5.0, Talk: August von Hofmann, the famous Chemist. 5.20 (from Dresden), Organ Recital by Alfred Hottinger: Prelude, Chaconne, and Fugue in D minor (Bach); Improvisation, Zum Abschied (Hottinger). 5.50, Exchange; Weather; Time. 6.0, See Berlin (Deutschlandsender). 6.20, Talk on the 8.45 Transmission. 6.40, Records: Folk Songs and Soldier Songs. 7.0, See Berlin (Deutschlandsender). 7.25, Chamber Music by Walter Kretschmar (Baritone, Guitar, and Lute), Hans Flynarezik (Violin), and Karl Meisner (Viola). Chamber Music in A Minor for Violin and Lute (Schlensog); Songs with Violin and Lute Accompaniment (Schlensog): (a) Vom singenden Tod, (b) Zigeunermelodie; Songs for Voice and Two Stringed Instruments (Göfferje): (a) Der hat vergebem, das ewige Leben, (b) Kein Feuer, keine Kohle; Sonata in D for Guitar, Violin, and Viola (Kretschmar). 8.0, News. 8.15, See Munich. 8.45, Der Sachsenspiegel—Three Scenes (Raymund Schmidt). 9.45, Quintet in A. Op. 81 (Dvorák). 10.20, News. 10.50, Concert of Light Music by the Station Orchestra. Conductor: Emil Luh. 12 Midnight, Close Down.

LINZ.—Relays Vienna.

LUXEMBOURG

230 kc/s, 1,304 metres; 150 kW.—7.45 a.m., Records. 8.0, News in French; Record; News in German; Record. 12 Noon, Concert by the Station Orchestra; Conductor, Penis: Overture, Giralda (Adam); Waltz Dorfseelwalben aus Oesterreich (Strauss); Mon Suzon (Clément); Selection from Les Cloches de Corneville (Planquette); Intermzzo No. 1 (Kalkmann). 12.30 p.m., News in French and German. 12.40, Concert (cont'd). Selection from The Bartered Bride (Smetana); Piece (Schytte); Selection from The Flower of Hawaii (Abraham); March (Blon). In the interval at 1.0, Exchange. 1.15, Records. 1.30, Exchange. 1.35, Records. 2.0, Exchange. 3.45, Exchange. 6.30, Concert of Light and Dance Music. 7.30, Racing Results. 7.35 till Close Down, Czech Evening. 7.35, Records. 8.0, News in French and German. 8.20, Concert by the Station Orchestra; Conductor, Penis: Overture, Carnaval (Dvorák); Suite No. 1 for Strings (Janacek); Berceuse (Kricka); Humoresque (Dvorák); At the Fair (Königsberger). In the interval at 8.30, Exchange. 9.15, Symphony Concert by the Station Orchestra; Conductor, Penis; Soloist, Casselanne (Violin): Overture, Coriolanus (Beethoven); Concerto for Violin and Orchestra (Tchaikovsky); Suite No. 1 (Ibert). 10.25, Dance Records.

MADRID

EAJ7, 1,095 kc/s, 274 metres; 7 kW.—2.0 p.m., Chimes; Time; Weather; Light Music. 2.30, Sextet Concert. 3.0, Amusement Guide; Exchange; Popular Music. 3.30, Sextet Concert. 4.0, Popular Music. 4.30, Sextet Concert. 5.0, Interval. 6.0, Chimes; Light Music. 7.0, Announcements; Orchestral Concert: Prelude (Guridi); Piece (Rachmaninov); Waltz from Faust (Gounod); Peer Gynt Suite No. 1 (Grieg); Intermzzo (Granados); Turkish March (Mozart). 7.30, Exchange; Spanish Musical Comedy Extracts. 8.0, News; Recital of Old Music: Sonata in D (Leclair); The Harmonious Blacksmith (Handel); Turkish March (Mozart); Sonata in C (Bach); Tambourin (Rameau); Le Coucou (Daquin); Minuet from Don Giovanni (Mozart). 8.30, Sextet Concert. In the interval at 9.0, Sports Notes; at 9.30, Bull Fighting Notes; and at 10.0, Chimes; Time. 10.20, Extract from Manon—Opera (Massenet) on Records. In the interval at 11.0, News. 12.45 a.m. (Tuesday), News; Time; Announcements. 1.0, Chimes; Close Down.

MALMO.—Relays Stockholm.

MILAN

814 kc/s, 368.6 metres; 50 kW. Relayed by Turin, 1,140 kc/s, 263.2 metres; Genoa, 986 kc/s, 304.3 metres; and Florence, 610 kc/s, 491.8 metres.—7.30 a.m., Gym. 7.45, Time; Announcements. 8.0, Interval. 11.30, Concert by the Chesi-Zanardelli-Cassone Trio. 12.30 p.m., Records. 12.45, News. 1.0, Time; News. 1.5, Concert by the Ferruzzi Orchestra. In the interval at 1.30, Records; Exchange. 2.15 to 2.25, Exchange. 4.35, News. 4.45, Programme for Children. 5.10, Dance Music. 5.55, Weather. 6.10, Notes for Farmers; Corn Prices. 7.0, Announcements. 7.15, News in Foreign Languages. 8.0, Time; News; Records. 8.30, Government Notes. 8.45, Request Programme. 9.45, Talk. 10.0, Variety. 11.0, News.

MONTE CENERI

1,167 kc/s, 257.1 metres; 15 kW.—12 Noon, News; Records. 12.29 p.m., Time; Weather. 12.33, Dance Records. 12.55, News. 1.3, Jazz Records. 1.15, Cookery Hints. 1.30, Interval. 3.59, Time. 4.0 to 6.0, See Beromünster. 7.45, News. 8.0, Lecture Recital: The Violin Sonata. 8.40, Records: Divertimento No. 4 for Flute, Clarinet and Bassoon (Mozart). 8.50, News. 9.0, L'arbre enchanté—Opéra bouffe (Gluck). 10.15, Close Down.

MORAVSKA-OSTRAVA

1,158 kc/s, 269.1 metres; 11.2 kW.—6.0 to 7.15 a.m., See Prague. 9.50, See Prague. 11.0, Record. 11.5, Military Band Concert; Conductor, Michalek. 11.55, See Prague. 3.15, See Bratislava. 4.15 to 4.20, See Prague. 5.40, See Prague. 5.50, Talk. 6.0, News. 6.5, Reading. 6.20, German Transmission: Talk for Workers; German Lesson. 6.55, See Prague. 7.10, Dance Music by the Station Orchestra; Conductor, Musil; Soloist, Malina (Songs). 7.35, See Prague. 7.50, Impressions d'Italie (Charpentier) by the Station Orchestra; Conductor, Divis. 8.20, Summer—Lyric Comedy in Three Acts (Stranek). 10.0, See Prague. 10.45, Records. 11.0 (approx.), Close Down.

MOSCOW (No. 1)

174 kc/s, 1,724 metres; 500 kW.—5.0 a.m., News. 5.15, Fanfare. 5.45, Gym. 6.15, Musical Programme. 8.15, Programme for Children. 9.0, Musical Programme. 9.58, Time. 10.0, News. 10.15, Concert for Collectivist Farmers. 3.0, Programme Announcements. 3.15, Programme for Children. 3.58, Time. 4.0, News. 4.30, Concert of French Operetta Music. 7.30, Violin and Song Recital. 9.0, Talk in German: The Changing Face of Russia. 9.55, Chimes. 10.5, Programme in English: Literary Programme; Letter Box. 11.5, Talk in Hungarian; Soviet Law.

MOTALA.—Relays Stockholm. MUHLACKER.—See Stuttgart.

MUNICH

740 kc/s, 405.4 metres; 100 kW. Relayed by Augsburg and Nürnberg, 1,267 kc/s, 236.8 metres.—6.30 a.m., Gym. 6.45, Motto; Records. 7.15, Time; News. 7.25, Concert by the Rosenberger Chamber Quartet. 9.50, Gym. 10.10, Kasperl's Mountain Expedition—Play for Schools (Huber). 11.5, Market Prices. 11.15, Time; News. 11.30, Report for Farmers. 12 Noon, Records. 1.15 p.m., Time; News. 1.25, Concert by the Munich Concert Orchestra; Conductor, Hagel. 2.0, News. 2.20, Talk: Workers' Dwellings. 2.50, Programme for Children. 3.10, Spanish Folk Song Recital by Friedel Gross-Dunnerlein. 3.30 (from Nürnberg), Reading. 3.50, Weather; Notes for Farmers. 4.0, Concert by the Small Munich Symphony Orchestra; Conductor, Bernhard Bischoff. 5.30, Talk, The Lutheran Bible. 5.50, Recital by Elisabeth Rosée (Soprano) and Wiedemann (Piano). 6.10, Book Review. 6.30, The Echo—Chamber Music for Two String Trios (Haydn). 6.50, Time; Weather; Notes for Farmers. 7.0, See Berlin (Deutschlandsender). 7.25, Haustein Music for Zither by Laurenz Obermaier and Wally Messerer. 8.0, News. 8.15, Transmission for all German Stations: Alpine Folk Music—Concert by Maria Seybold, Hans Saurer and Son (Harp and Dulcimer); The Riedering Singers and the Bavarian Musicians; Conductor, Erich Kloss. 8.45, Pianoforte Recital by Friedrich Keitel: Concerto in D Minor (W. F. Bach); Waltz in C Sharp Minor (Chopin). 9.0, Concert of South American Music by the Station Orchestra; Conductor, Burle-Marx. 10.0, Time; News. 10.20, Programme to be announced. 11.0, Chamber Music by the Stubenrauch Trio.

NAPLES.—Relays Rome. NOTODDEN.—Relays Oslo.

OSLO

254 kc/s, 1,181 metres; 60 kW. Relayed by Hamar, 519 kc/s, 578 metres; and Jeløy, 6,990 kc/s, 42.92 metres.—11.15 a.m., Service. 11.50, Exchange. 12.55 p.m., Nautic Time Signal. 1.0 to 2.0, Records. In the interval at 1.15, Weather; Talk for Farmers; and at 1.45, Exchange. 5.30, Concert. 6.30, French Lesson. 7.0, Book Review. 7.31, Weather; News. 7.30, Time Signal. 7.35, Talk for Farmers. 8.0, Programme for the Seventieth Anniversary of the Poet, Nils Collet Vogt; Talk; Reading. 8.30, The Seventh Scandinavian Music Festival—Sweden; Music by the Philharmonic Orchestra; Conductor, Tor Mann; Soloist, Gunnar de Frumerie (Pianoforte); Sinfonia breve (Nyström); Variations and Fugue for Pianoforte and Orchestra (de Frumerie). 9.15, Review of Foreign Affairs. 9.40, Weather. 9.45, News. 10.0, Topical Talk. 10.15, Records. 11.0 (approx.), Close Down. OSTERSUND.—Relays Stockholm.

PARIS

EPICOLE SUPERIEURE, 695 kc/s, 431.7 metres; 7 kW.—12 Noon, Tourist Report. 12.15 p.m., Concert by the National Orchestra; Conductor: Rosenthal; Soloist: Gina Reilly (Songs); Overture, La Surprise de l'Amour (Poise); Suite, Legends of the Rhine (Gungl); Ballet Music from The Aventure de la Guimard (Messager); Songs from La Mascotte (Audran), Les Monsque-

SEPT. 24th **MONDAY** continued

laires au couvent (Verney), Madame (Christiné); Songs; Italian Caprice (Tchaikovsky); Negro Spiritual (arranged Coleridge-Taylor); Concerto gross No. 8 (Corelli); Pastoral from The Judgment of Midas (Cools); Ballet Music from Hamlet (Thomas); Overture, Prometheus (Beethoven). In the interval at 1.0, News. 2.0, Records. 5.45, Talk. 6.0, Talk: Economics. 6.30, News. 7.45, Talk. Aviation. 7.53, Assurance Societies Reports. 8.0, Sound Film Records. 9.5, See Vienna. After the Relay: News. 10.0, Dance Music.

PARIS

POSTE PARISIEN, 959 kc/s, 312.8 metres; 100 kW.—7.10 a.m., Fanfare; Records. In the interval at 7.30, News. 8.5, Concert. 8.20, News. 8.45, Cookery Talk. 12 Noon, Exchange. 12.5 p.m., Concert by the Station Orchestra; Overture, Mirella (Gounod); Suite, Espana (Albéniz); Bruyères (Debussy); Minuet (Boëllmann); Joyeuse marche (Chabrier); Invitation au voyage (Charpentier); Adoration (Fillipucci); Cosatouche (Dargomyzsky); Orchestral Suite (Chaminade); Pressnia (Cools); Pavane for Flute, Clarinet and Strings (Dupont); Selection from Manon (Massenet); Bouquet de valse (Bose). In the intervals at 12.25, News. 1.5, Exchange, and at 1.30, Exchange. 2.0, Exchange. 3.15, Exchange. 3.45, Exchange. 4.50, Exchange. 6.45, Exchange. 6.49, Records. 7.10, News. 7.30, Gardening Talk. 7.37, Records of Concert Waltzes: Espana (Chabrier); Méphisto Valse (Liszt). 7.50, Extracts from Figaro (Mozart) on Records. 8.0, Interlude. 8.10, Humorous Programme by Max Régulier and Company. 8.30, Interlude. 8.40, Exchange. 8.50, Concert by Gino Bordin and his Hawaiian Guitar Band. 9.30, Interlude. 9.40, Hot Jazz Records. 10.20, News. 10.30 till Close Down, Programme in English arranged by the International Broadcasting Company of London. 10.30, High Society. 10.45, Light Music. 11.0, I.B.C., Goodnight Melody and Close Down.

PARIS

RADIO PARIS, 182 kc/s, 1,648 metres; 75 kW.—6.45 a.m., Gym. 7.0, Records. 7.15, Press Review; Weather. 7.45, Gym. 8.0, Records. 12 Noon, Concert by Victor Pascal's Orchestra; Serenade (Fillipucci); Paquita (Pracánico); Das Veilchen (Mozart-Mateo); March (Rathke); Violin Solo: The Student passes by (Ibanez); Berceuse (Jännefeld); Waltz (Jonasson); Lu Lu Fado (Milano); Pianoforte Solo; Song (Lehár); Nuit ensorcelée (Chopin-Mateo); Mazurka (Benatzky); La Lune qui danse (Aubry); Violin Solo; Song (Lehár); Extract from The Jewels of the Madonna (Wolf-Ferrari); Qu'avez vous fait de mon amour (Tibor); Czardas (Gungl); Song (Lehár); Gavotte (Siede); Waltz from The Chocolate Soldier (O. Straus). In the interval at 1.20, Exchange. 2.0, Interval. 3.45, Exchange. 6.20, Weather; Notes for Farmers; Exchange; Racing Results. 6.35, Talk: The Sahara Exhibition. 6.50, Book Review. 7.15, Film Review. 7.30, Topical Talk. 8.0, Un Perdreau de l'année—Play (Tristan Bernard). In the interval at 8.30, Press Review; Weather; and at 9.15, News. 9.30, Chamber Music: Septet with Trumpet (Saint-Saëns); Songs by Scarlatti, Beethoven and Schumann; The Trout Quintet (Schubert). 10.30, Dance Music by Les Cadets de France Orchestra.

PITTSBURGH

KDKA, 980 kc/s, 306 metres; 50 kW.—Relayed by **W8XK** on 48.86 metres and 25.27 metres.—3.0 p.m., Harvest of Song. 3.15, Sammy Fuller. 3.30, To-day's Children. 3.45, News; Cookery Hints. 4.0, Uncle Tom and Betty. 4.15, Tony Wons. 4.30, Melody Mixers. 5.0, Fields and Hall. 5.15, Charles Sears (Tenor). 5.30, Vic and Sade. 5.45, Hotel William Penn Orchestra. 6.0, Exchange. 6.15, Honourable Archie and Frank. 6.30, Farm and Home Hour. 7.30, KDKA Home Forum. 8.0, Radio Guild. 9.0, Betty and Bob. 9.15, Gale Page. 9.30, Exchange. 9.45, The Chicago Symphony Orchestra. 10.15, KDKA Kiddies' Klub. 10.30, The Singing Lady. 10.45, Orphan Annie. 11.0, Dan and Sylvia. 11.15, Baseball Résumé. 11.30, Comedy Stars of Hollywood. 11.45, Lowell Thomas. 12 Midnight, Amos 'n' Andy. 12.15 a.m. (Tuesday), Victor Merry-Makers. 12.30, Nancy Martin. 12.45, News; Dramatic Programme. 1.0 to 6.0, Popular Programme.

PORSCRUND—Relays Oslo.

PRAGUE

638 kc/s, 470.2 metres; 129 kW.—6.0 a.m., Gym; Music; News. 7.15, Interval. 9.50, News. 10.5, News in German. 10.10, Record. 10.15, Play for Schools. 10.40, Records. 11.0, Record. 11.5, See Moravská-Ostrava. 11.55, Market Prices; Weather. 12 Noon, Time; Notes for Farmers. 12.10 p.m., Records. 12.20, News. 12.30, Dance Music by Kostal's Orchestra. 1.30, Labour Exchange. 1.40, Records. 1.50, Exchange. 1.55, Exchange and Weather in German. 2.0, Interval. 3.15, See Bratislava. 4.15 to 4.20, Exchange; Weather. 5.30, Talk on Economics. 5.40, Talk. 5.50, Announcements. 5.55, Record. 6.0, Programme for Farmers. 6.10, Programme for Workers. 6.20, German Transmission; Talk; Music Review. 6.55, News. 7.0, Time; News. 7.10, See Moravská-Ostrava. 7.35, Political Review. 7.50, Cittern Recital by Gleissner.

8.5, Double Face—Play (Emil Synek). 9.35, Recital by Zika (Violin) and Jaros (Cello): Duet in C, Op. 19 (Stanic); Duet, Op. 21 (Hybler). 10.0, Time; News. 10.15, Records. 10.45, Talk in German: The International Congress of Philosophers in Prague. 11.0, Close Down.

RJUKAN—Relays Oslo.

ROME

Call 1R0, 713 kc/s, 420.8 metres; 50 kW. Relayed by Naples, 1,104 kc/s, 271.7 metres; Milan, No. 2, 1,348 kc/s, 222.6 metres; Turin, No. 2, 1,357 kc/s, 221.1 metres; and 2R0, 11,810 kc/s, 25.4 metres.—7.30 a.m., Gym. 7.45, Time; Announcements. 8.0, Interval. 12.30 p.m., Records. 1.5, See Milan. In the interval at 1.30, Time; News. 2.15, Interval. 4.30, Programme for Boys. 4.50, News; Exchange. 5.0, Vocal and Instrumental Concert by Adriana Fusco (Pianoforte), Nino Mazzotti (Tenor), Carlo Platania (Baritone), Gualda Caputo (Soprano) and Luisetta Castellazzi (Mezzo-Soprano); Suite (Lully); Tenor Solo: Recitative from Dafni (Mullé); Baritone and Tenor Duet from The Force of Destiny (Verdi); Duets for Soprano and Mezzo-Soprano: (a) Duet from Così fan tutte (Mozart), (b) Duet from Der Freischütz (Weber), (c) Fandango (Pagans); Vivace and Gigue from Sonata in A (Paradisi); Baritone Aria from Dinorah (Meyerbeer); Tenor and Baritone Duet from La Bohème (Puccini). 5.55 to 6.10, Announcements; Corn Prices. 7.0, Announcements. 7.15, News in Foreign Languages. 8.0, Time; News; Records. 8.30, Government Notes. 8.45, See Milan. 9.45 (approx.), Talk by Ernesto Murolo. 10.0 (approx.), Symphony Concert; Conductor, Selvaggi. 11.0, News.

RUYSSSELEDE

10,330 kc/s, 29.04 metres; 8 kW.—7.45 p.m., News in French. 8.0, Records: Act I of Tosca—Opera (Puccini), and Ballet Music from Marouf—Opera (Rahand). 9.0, News in Flemish. 9.15, Close Down.

SALZBURG—Relays Vienna.

SAN SEBASTIAN

1,258 kc/s, 238.5 metres; 3 kW.—2.0 to 3.0 a.m. (Tuesday), Programme in English arranged by the International Broadcasting Company of London. 2.0, Selection of Waltzes. 2.30, Records. 3.0, I.B.C. Goodnight Melody and Close Down.

SCHENECTADY

WQY, 790 kc/s, 379.5 metres; 50 kW. Relayed at intervals by **W2XAF** on 31.48 metres and **W2XAD** on 19.56 metres.—7.0 p.m., Dreams Come True; Barry McKinley (Songs). 7.15, Health Hunters. 7.30, Woman's Radio Review; Talk; Orchestra. 11.25, Exchange. 12 Midnight, Topical Talk. 12.30 a.m. (Tuesday), Voice of Firestone Garden Concert. 1.0 to 3.0 a.m., Popular Programme.

SOTTENS

677 kc/s, 443.1 metres; 25 kW.; and Geneva, 401 kc/s, 748 metres.—7.0 a.m., Gym. 7.15, Interval. 12.29 p.m., Time Signal from Neuchâtel Observatory. 12.30, News. 12.40, Concert by the Small Radio Lausanne Orchestra. Conductor, Moser. 1.0 Exchange. 1.5, Dance Music. 1.15, Light Music. 1.45, Dance Music. 2.0, Interval. 3.59, Time Signal from Neuchâtel Observatory. 4.0 to 6.0, See Beromünster. 6.0, Programme for Children. 6.30, Programme for Women. 6.50, Concert by the Small Radio Lausanne Orchestra: Part I, Country Music. Part II, Light Music. 7.15, Dance Music. 7.30, Wireless Review. 7.40, Talk: The Agricultural Situation. 7.59, Weather. 8.0, Cello Recital by Altizer. 8.25, La Pie borgne—Comedy in One Act (Benjamin). 9.15, News. 9.25, Concert by the Small Radio Lausanne Orchestra; Soloist, Madeleine Dubuis. 10.15, Talk: The Work of the League of Nations. 10.30 (approx.), Close Down.

STOCKHOLM

704 kc/s, 426.1 metres; 55 kW. Relayed by Boden and Östersund, 413.5 kc/s, 726 metres; Göteborg, 941 kc/s, 318.8 metres; Hörby, 1,131 kc/s, 265.3 metres; Motala, 216 kc/s, 1,389 metres; and Sundsvall, 601 kc/s, 499.2 metres.—7.20 a.m., Gym. 7.45, Morning Service. 8.0, Weather. 12.15 p.m., Gym. for Schools. 12.30, Weather. 12.45, Exchange. 12.55, Time. 1.0, A Microphone Vltit to Möby Castle. 1.30, Light Music and Reading. 5.0, Weather. 5.5, Folk Music. 5.45, Records. 6.45, Talk by Carl Wiman, relayed from Uppsala. 7.15, News. 7.30, Accordion and Pianoforte Recital. 8.0, Talk: Psychology. 8.30, Concert, relayed from Oslo. 9.15, Reading (Hemmer). 9.45, Weather; News. 10.0, Orchestral Concert of Light Music, relayed from Malmö, 1,312 kc/s, 228.7 metres. 11.0 (approx.), Close Down.

STRASBOURG

859 kc/s, 349.2 metres; 15 kW.—11.0 a.m., Variety Concert. 12 Noon, Records. 12.45,

News. 1.0 p.m., Time; Exchange. 1.5, Records. 5.0, Orchestral Concert from Rennes (P.T.T.), 1,040 kc/s, 288.5 metres. 6.0, Literary Talk: Lantier. 6.15, Readings from the Works of Alsatian and Lorraine Authors. 6.30, Orchestral Concert; Conductor, de Villers; Soloist, Marianne Ricklin (Songs); Overture, Rosamund (Schubert); Songs (Grétry); Jeux d'enfants (Bizet); Ballet Music from Lakmé (Delibes); Polovstian March (Borodin). 7.30, Time; News. 7.45, Records. 8.0, Press Review in German; Lottery Results; Announcements. 8.30, Records. 8.40, Programme to be announced. 9.5, See Vienna. 10.0 (approx.), Press Review.

STUTTGART

MUHLACKER, 574 kc/s, 522.6 metres; 100 kW.—5.45 a.m., Hymn. 5.50, Gym. 6.15, Records. 6.40, Time; News. 6.55, Records. 7.25, See Munich. 8.10, Weather. 8.15, Gym. 8.35, to 8.40, Water Level. 9.0 to 9.15, Programme for Women. 10.0, News. 10.10, The Enchanted Pie—Fair Play for Schools (Pocci-Hofmeier). 10.30, Recital of Classical Dances by Hedwig Kaiser (Pianoforte): German Dances (Schubert); Waltz in A Flat (Brahms); Hungarian Dance No. 1 (Brahms); Spanish Dance No. 5 (Granados); Seguidillas (Albéniz); Mazurka in B Flat (Chopin); Waltz in E Flat (Chopin). 11.0,



SIGNOR PARELLI, who, as musical director at Turin, is responsible for many of the operatic and orchestral programmes heard on the North Italian network.

Heckenröschen—Duet Cycle (Karl Eichorn) by Hermann Lingor (Tenor) and Emma Mayer (Contralto). 11.25, Announcements; Records. 11.55, Weather. 12 Noon, Light Music by the Philharmonic Orchestra; Conductor, Paul Schröder; Overture, An mein Vaterland (Albion); Waltz, Münchner Kindl (Komzak); Prelude to Die Marktenderin (Humperdinck); Die Wachtparade kommt (Eilenberg); March (Blankenburg); Overture, The Nuremberg Doll (Adam); Waltz, Die Werber (Lanner); Polka Leichtes Blut (Strauss). 1.0, News. 1.20, See Frankfurt. 1.50, Time; News. 2.0 to 2.30, See Frankfurt. 3.40, Dialogue: Photography in the Service of German Race Propaganda. 4.0, Concert by the Philharmonic Orchestra. 5.30, Talk: Nature Preservation. 5.45, Reading of Lyrics (Oppenberg). 6.0, Report on Records: The Girls' Sports Festival at Tübingen. 6.25, French Lesson. 6.45, Dance Records. 7.0, See Berlin (Deutschlandsender). 7.30, Local Review. 7.40, Time; Weather; Programme for Farmers. 8.0, News. 8.15, See Munich. 8.45, See Frankfurt. 9.45, Concert Version of Schwarzwälder Kirsch—Operetta (Claas Valentin) by the Cast of the National Theatre, Mannheim; Introductory Talk by the Director. 10.20, Time; News. 10.35, Talk. 10.45, News. 11.0, See Frankfurt. 12 Midnight, Concert. 1.0 a.m. (Tuesday), Close Down.

SUNDSVALL—Relays Stockholm.

TOULOUSE

913 kc/s, 328.6 metres; 10 kW.—8.0 a.m., Dance Refrains. 8.30, News. 8.35, Orchestral Music. 8.45, Operetta Songs. 12 Noon,

Orchestral Music. 12.15 p.m., Chansonnettes. 12.30, News. 12.45, Request Music. 1.0 p.m., News. 1.5, Military Music. 1.15, Opera Arias. 1.30, Accordion Music. 1.45, Sound Film Music. 2.0, News; Amusement Guide. 6.0, News. 6.15, Orchestral Music; The Roses (Métro); Gipsy Waltz (Zubalov); Melody; The Blue Danube (Strauss). 6.30, Songs. 6.45, Soloist Programme. 7.0, Operetta Songs; Songs from Trois de la marine (Seotto); Florestan I (Heymann); The Land of Soules (Lehar). Frasquita (Lehar), and Un soir de réveillon (Miretti). 7.15, Orchestral Music; Un peu d'amour (Silesu); Melody (Rubinstein); Les oiseaux de la forêt (Messier); Amina (Lincke). 7.30, News. 7.45, Sound Film Music. 8.15, Pianoforte Recital: Valse brillante No. 1 (Chopin); Prelude (Rachmaninov); Spanish Dance in D (Granados); The Butterflies (Zubalov). 8.30, Chansonnettes. 8.0, Military Music. 9.10, Carmen—Opera in Four Acts (Bizet). In the interval at 10.15, News. 11.50, Orchestral Music; Oublie-moi (Telesler); Spring Song (Sibelius); Potpourri (Jessel). 12 Midnight, News. 12.5 a.m. (Tuesday), Au cavaud de minuit—Radio Fantasy. 12.15, Argentine Band Music. 12.30 (approx.), Close Down.

TRONDHEIM—Relays Oslo. **TURIN**—Relays Milan.

VATICAN CITY

15,120 kc/s, 19.84 metres; 10 kW. (Morning); 5,970 kc/s, 50.25 metres (Evening)—11.0 to 11.15 a.m., Religious Information in Italian. 8.0 to 8.15 p.m., Religious Information in Italian.

VIENNA

592 kc/s, 506.8 metres; 120 kW. Relayed by Graz, 886 kc/s, 338.6 metres; Innsbruck, 519 kc/s, 578 metres; Klagenfurt, Linz, and Salzburg, 1,294 kc/s, 231.8 metres.—9.0 a.m., News. 9.20, Market Prices. 9.30, Weather. 10.50, Water Level. 11.30, Records: Swiss Folk Music. 11.55, Weather. 12 Noon, Concert by the Vienna Symphony Orchestra; Conductor, Holzer; Soloist, Theo Salzmann (Cello). 1.0 p.m., Time; News. 1.10, Concert (contd.). 2.0, Announcements. 3.30, Time; Exchange. 3.50, Programme for Women. 4.10; News. 4.15, Reading for Young People. 4.40, Recital by Maria Hinko-Tunner (Soprano) and Maria Sabatin (Pianoforte). 5.10, Talk: Richard Wagner and Viennese Opera. 5.30, Records of Jack Hylton's Band. 6.15, Talk. 6.35, Talk: Western Culture. 7.0, Time; News. 7.20, Variety Programme. 8.0, Talk: The Tenth Anniversary of Ravag. 8.15, Programme to be announced. 9.5, Concert by the Vienna Symphony Orchestra; Conductor, Oswald Kabasta; Soloist, Therese Tröster (Pianoforte); Concertino for Pianoforte and Strings (Gál); Suite Op. 20 (Kornauth). 10.5, Report of the League of Nations Conference from Geneva. 10.25, News. 10.45, Concert of Viennese Operetta Music by the Vienna Symphony Orchestra; Conductor, Holzer; Overture, The Gipsy Baron (Strauss); Waltz from Das Veilchenmädel (Hellmesberger); Lass dir Zeit (Zeller); Overture, The Enchanted Castle (Müllöcker); March (Eysler); Overture, Der Schatzmeister (Ziehrer); Polka, Lieb' Mamachen (Weinberger); Waltz, Kind, du kamst tanzen (Fall); Songs, Das Glückel (Stolz); Hungarian Dance Suite, from Der Teufelsreiter (Kálmán); Overture, A Waltz Dream (O. Strauss); Waltz (Ascher); Overture, Wiener Frauen (Lehár). 11.45, Folk Music relayed from the Bürgertheater Restaurant. 1.0 a.m. (Tuesday), Close Down.

WARSAW

223 kc/s, 1,345 metres; 120 kW.—6.45 a.m., Hymn. 6.48, Records. 6.58, Gym. 7.8, Records. 7.15, News. 7.25, Records. 7.35, Hints for Housewives. 7.40, Announcements. 7.50, Light Music. 8.0, Interval. 11.57, Time. 12 Noon, Fanfare from St. Mary's Church, Cracow. 12.3 p.m., Weather. 12.5, Press Review. 12.10, Concert from Wilno, 536 kc/s, 559.7 metres. 1.0, News. 1.5, Song Records. 1.30, Interval. 3.30, Announcements. 3.45, Exchange. 3.50, Concert of Light Music by the Wilkosz Orchestra; Soloist, Konarek Korska (Songs); Foxtrot (Lazzerini); Waltz from Giuditia (Lehár); Piece (Carr); Three Songs; Slow Foxtrot (Petersburgski); Tango, Campagnola (Nev); Serenade (Wroblewski); Tango, Senta (Cesoli); Two Songs; Foxtrot (Nesbit); Waltz (Clar); Tango (Murzilli); Foxtrot (Brown); Pasodoble (Bruguera). 4.45, German Lesson from Lwów, 795 kc/s, 377.4 metres. 5.0, Sonata in F, Op. 24, for Violin and Pianoforte (Beethoven), by Lili Hakowska and Jasienska. 5.25, Letter Box. 5.35, Song Recital by Platto; Lorelei (Liszt); Song (Schumann); Der Nussbaum (Schumann); Zulejka (Szymanowski); Les astres (Noskowski). 5.50, Talk. 6.0, Letter Box. 6.10, Art Notes. 6.15, Banjo and Pianoforte Duets from Lwów. 6.35, Choral Records. 6.45, Programme for Children. 7.0, Around Poland with the Microphone. 7.25, Programme for Boy Scouts. 7.30, Reading. 7.45, Announcements. 7.50, Sports Notes. 8.0, Records. 8.40, Interval. 8.45, See Vienna. In the interval, News; Talk. 10.0, Talk. 10.15, Announcements; Light Music. 10.30, Dance Music from the Adria. 11.0, Weather. 11.5, Dance Music from the Adria.

ZURICH—Relays Beromünster.

ATHLONE

565 kc/s, 531 metres; 60 kW. Relayed by Dublin, 1,348 kc/s, 222.6 metres; and Cork, 1,240 kc/s, 241.9 metres.—1.20 to 2.30 p.m., Time Signal; Exchange; Weather; Records. 4.0, Concert by the Army Band. 6.0, Programme for Children. 6.45, News. 7.0, Talk in Irish. 7.15, Recitations (Crawford Neil) by M. Nisimblaligh. 7.30, Time Signal. 7.31, Concert by the Station Orchestra. 7.45, Song Recital by Dorothy Griffith (Soprano). 7.55, Concert by the Station Orchestra. 8.10, Song Recital by Dorothy Griffith (Soprano). 8.20, Songs of the Counties by Cathal O'Byrne. 8.35, Harp Solos by Annie Fagan. 8.50, Variety by Eva Brennan and Company. 9.30, Recital of Irish Cello Music by A. L. Carew. 9.45, Irish Songs by Stan O'Brian. 10.0, Variety Programme. 10.30, Time Signal; News; Weather. 10.40, Records. 11.0 (approx.), Close Down.

BARCELONA

795 kc/s, 377.4 metres; 5 kW.—8.15 a.m., News; Records. 9.0, Chimes; Gym; Records. 9.20, News; Records. 10.0, Obituary. 12 Noon, Chimes; Weather. 1.0 p.m., Programme for Women. 1.45, Records. 2.0, Records. 2.30, Theatre Notes; Amusement Guide; Records. 3.0, News; Sextet Concert; Exchange. 4.0, Programme for Hospitals. 5.0, News. 7.0, Concert by the Station Trio: March (Fucik); Minuet (Ganne); Hymn to the Sun (Rimsky Korsakov); Selection from La Bohème (Puccini); Nocturne in B flat (Chopin); Piece (de Svévác); Selection from Mephistopheles (Boito). In the interval at 7.30, News. 8.0, Request Records. 8.15, Sports Talk. 8.30, Exchange; Talk in Catalan. 9.0, Wireless Notes. 9.10, Anti-War Propaganda. 9.20, Records. 9.30, Geography and History Lesson. 9.45, Press Review. 10.0, Chimes; Weather; Social Notes; Exchange. 10.10, Variety Programme. 10.40, Concert by the Station Orchestra: Waltz (Waldteufel); Chanson triste (Tchajkovsky); March from Cydalise et le Chevre-pied (Pierre). 11.0, Schubert Song Recital by Carmen Gombau. 11.30, Concert by the Station Orchestra. 12 Midnight, Dance Music by the Melody Boys' Orchestra from the Shang-hai Bar. 1.0 a.m. (Wednesday), News.

BASLE.—Relays Beromünster.

BELGRADE

686 kc/s, 437.3 metres; 2.5 kW.—10.45 a.m., Programme Announcements. 10.50, Water Level. 11.0, Concert by the Station Orchestra. 11.59, Chimes. 12.5 p.m., Records. 12.45, Exchange; Announcements. 1.10, Records. 1.30, News; Time Signal. 4.0, Programme for Women. 4.30, Records. 5.0, Talk. 6.25, Time Signal; Programme Announcements. 6.30, Serbian Lesson. 7.0, Recital by Miroslava Binicki (Songs) and Milan Dimitrijevic (Violin); Air (Bach); La Folia (Corelli); True Love (Brahms); Frühlingslied (Kühnemann-Redwitz); In Freud und Leid (Ritter); Melody (Tchajkovsky); Prelude and Allegro (Pignani-Kreisler); Ave Maria (Schlesinger); Frühlingsblüten (Reinecke); Echo (Köhler). 8.0, Talk. 8.30, Records. 8.50, Announcements. 9.0, Hebrew Song Recital by Grussmann. 9.30, Sketch. 9.50, Time Signal; News. 10.10, Songs with Orchestra. 10.40, Dance Records. 11.0 (approx.), Close Down.

BERLIN

DEUTSCHLANDSENDER, 191 kc/s, 1,571 metres; 60 kW.—5.30 a.m., Weather Report for the Gordon Bennett Balloon Race. 5.45, Weather for Farmers. 5.50, News. 6.0, Gym. 6.15, Motto. 6.25, See Leipzig. In the interval at 7.0, News. 8.0, Interval. 8.45, Gym for Women. 9.0, Interval. 10.0, News. 10.10, An Historical Play (Forster) on Records. 10.50, Programme for Children. 11.15, Weather. 11.30, Weather Report for the Gordon Bennett Balloon Race. 11.40, Interval. 11.55, Weather. 12 Noon, See Leipzig. 12.55 p.m., Time. 1.0, Extracts from Aida (Verdi) on Records. 1.45, News. 2.0, Interval. 2.45, Greetings; Programme Announcements. 3.0, Weather; Exchange. 3.15, Talk: Hermann Löns. 3.40, A Discussion: Broadcast Gymnastics for Children. 4.0, See Cologne. 4.50, Weather Report for the Gordon Bennett Balloon Races, 1934. 5.0, See Oslo. 6.5, Records of Swedish Music. 6.20, Topical Talk. 6.50, Result of the National Literary Competition of the 14th September, 1934: Heinrich George reads from one of the Six Books of the Month. 7.20, Songs among the Reads—A sketch about Music (Jahn). 8.0, Motto; Weather; News. 8.10, See Hamburg. 9.10, Animals Dance—Records. 10.0, News. 10.30, Talk: The Rowing Regatta. 10.45, Weather. 11.0, Weather Report for the Gordon Bennett Balloon Race. 11.10, Records. 12 Midnight (approx.), Close Down.

BERLIN

FUNKSTUNDE, 841 kc/s, 356.7 metres; 100 kW.—6.0 a.m., Hymn; Gym. 6.15, Prayers. 6.20, Orchestral Concert; Conductor, Schönfeldt. In the interval at 7.0, News. 8.0 to 8.20, Gym. 8.30, Announcements; Records. 9.30, Hints for Housewives. 9.45, Programme for Children. 10.0, News. 10.10 to 10.25, Market Prices. 11.25 to 11.30, Exchange. 12 Noon, Concert by the Small Station Orchestra; Conductor, Steiner (Violin); March (Schmidt); Overture, Die Frau Meisterin (Suppé); Serenade (Drdla);

Waltz, Gold and Silver (Lehár); Colombine (Kark); Slav Rhapsody No. 2 (Friedemann); Piece (Bortkiewicz); Barcarolle (Rust); Waltz, Lotoblumen (Ohlson). In the interval at 12.30 p.m., Weather. 1.0, News. 1.15, Opera Records. 2.0, News. 2.15, Viennese Records. 3.0 to 3.20, Exchange. 4.0, See Stuttgart. 5.30, Dance Records. 6.0, Topical Talk. 6.5, Do you know your Ancestors?—A Play for Young People. 6.35, A Black Day for Käberlein—Humorous Scene (Krause). 6.50, Symphonic Studies for Pianoforte Op. 13 (Schumann) by Gisela (Binz). 7.20, Poetry in a Quarry—A Sequence. 7.40, Echoes of the Day. 8.0, News. 8.15, The German Farmer—A Radio Poem (Keienburg) with Music by Wagner-Regeny. 9.5, Concert by the Station Orchestra; Conductor, Frick-hoefler; Soloist, Lore Shepans (Contralto); Idylle (Jos. Marx); First Movement from the Goethe Symphony Op. 152 (Reiter); Five Songs for Contralto and Orchestra (Bittner): (a) Es dunkelt, (b) Gesang der Liebenden (c) Das Ständchen, (d) Des Abends, (e) Hymnus; Intermezzo and Carnival Music from Notre Dame (Schmidt). 10.20, News. 10.50, Dance Music from Breslau. 12 Midnight (approx.), Close Down.

BERNE.—Relays Beromünster.

BEROMUNSTER

556 kc/s, 539.6 metres; 60 kW.—12 Noon, Concert by the Station Orchestra; Conductor, Neppach. 1.25 p.m., Time; Weather; Exchange. 3.30, Concert of Popular Opera Music by the Small Station Orchestra; Conductor, Gilbert. 3.59, Time Signal from Neuchâtel Observatory. 4.0, See Sottens. 6.0, Records: Light Music. 6.30, Programme for Young People. 7.0, Time; Weather. 7.1, Labour Exchange. 7.15, Songs and Recitations. 7.40, Concert of Marches; Conductor, Fasolis. 8.5, Report: A Visit to a Porcelain Factory. 9.0, Weather; News. 9.10, Concert of Operetta Music by the Station Orchestra. 9.30, Minna Magdalena—Play (Goetz). 10.0, Concert by the Station Orchestra; Conductor, Gilbert. 10.15 (approx.), Close Down.

BODEN.—Relays Stockholm. **BODO.**—Relays Oslo.

BRATISLAVA

1,004 kc/s, 298.8 metres; 13.5 kW.—6.0 to 7.15 a.m., See Prague. 9.45, Announcements. 9.50, See Prague. 10.10, News in Hungarian. 10.15, Programme for Hungarian Schools. 10.55, Record. 11.0, Water Level. 11.5, See Prague. 12.10 p.m., Local News in Slovak. 12.15, Record. 12.20, See Prague. 12.30, Concert by the Station Orchestra; Conductor, Schimpl. 1.30, See Prague. 1.40, News and Weather in German and Hungarian. 1.50 to 2.0, See Prague. 3.15, See Brno. 4.15 to 4.20, See Prague. 5.40, Talk: Cycling in Slovakia. 5.50, See Prague. 6.0, Records. 6.10, Talk for Housewives. 6.15, Hungarian Transmission: Victor Egri Programme; Talk and Reading. 6.55, See Prague. 7.10, Talk: Slovakia after 1918. 7.25 to 10.45, See Prague. In the interval at 10.15, See Brno. 10.45, News in Hungarian. 11.0, Close Down.

BREMEN.—Relays Hamburg.

BRESLAU

950 kc/s, 315.8 metres; 60 kW. Relayed by Gleiwitz, 1,231 kc/s, 243.7 metres.—5.0 a.m., Hymn; Motto; Records. In the interval at 5.40, Time; Weather. 6.0, Time; Weather; Gym. 6.25, See Leipzig. In the interval at 7.0, News. 8.0, Opera Records. 9.0, News. 10.10 to 10.40, Stanley Livingstone—A Play for Schools (Tissot). 11.30, News. 11.45, Notes for Farmers. 12 Noon (from Gleiwitz), Orchestral Concert; Conductor, Ziehr; March (Blankenburg); Selection from The Barber of Seville (Rossini); Tyrol in Song and Dance (Fetras); Waltz (Ohlson); Selection from Madame Butterfly (Puccini) and Der Obersteiger (Zeller); March (Silwedel); Overture, Leicester (Anber); Waltz (Gungel); Serenade (Heykens); March (Wildehen). In the interval at 12.30 p.m., Notes for Farmers, and at 1.30, News. 2.20, Exchange. 2.25, Announcements; Records; Market Prices. 3.40, Sonatas for Flute and Pianoforte by Knust and Bernert; Sonatas in B minor, G minor and F (Handel); Sonata in A (Frederick the Great). 3.40, A Discussion on Gymnastics. 4.0, Military Band Concert. 5.30, Market Prices. 5.35, Talk for Women. 5.55 (from Gleiwitz), Magazine Review. 6.20, Upper Silesian Folk Songs (arr. Heideuck) by Erich Blich: Feinslieb verlore; Nachtbesuch; Losgeküht; Wassermanns Braut; Des Grafen Töchterlein; Husarenlieben; Leise tönt die Abendglocke. 6.50, Announcements; Weather; Market Prices. 7.0, Der goldene Klang—Play (Mühlberger), with Music by Szczuka; Conductor, Rischka. 8.0, To-day's News. 8.10, Community Singing from Fraustadt. 9.10, Recital by the Zilcher Trio and Margret Zilcher-Kiesekamp (Soprano); Trio Sonata in C (Bach-Zilcher); Rocco Suite for Soprano, Violin and Piano-

TUESDAY
SEPTEMBER THE TWENTY-FIFTH

forte (Zilcher); Ten Variations, Op. 121, on the Song Ich bin der Schneider Kakkadu (Beethoven). 10.10, Technical Talk. 10.20, News. 10.45, Dance Music by the Station Dance Band; Conductor, Ilgner. 12 Midnight (approx.), Close Down.

BRNO

922 kc/s, 325.4 metres; 32 kW.—6.0 to 7.15 a.m., See Prague. 9.50, See Prague. 10.15, See Moravská-Ostrava. 11.0, See Prague. 12.30 p.m., See Bratislava. 1.30, Talk on Economics. 1.40 to 2.0, See Prague. 3.15, Concert by the Station Orchestra; Conductor, Bakala; March (Cui); Selection from The Snow Maiden (Rimsky-Korsakov); Polonaise from A Life for the Czar (Glinka); Tatra Suite (Smatek); Waltz (Lukeska); March Intermezzo (Bayer). 4.15 to 4.20, See Prague. 5.40, Hints for Housewives. 5.45, Music Report. 5.55, Saxophone Solos by Bystrycky. 6.10, Talk: Finance. 6.20, German Transmission: Social Notes; Programme for Workers; Sports Notes; Talk for Farmers. 6.55, See Prague. 7.10, See Bratislava. 7.25 till Close Down. See Prague. In the interval at 10.15, Schrammel Concert.

BRUSSELS (No. 1)

620 kc/s, 483.9 metres; 15 kW.—11.55 a.m., Weather. 12 Noon, Popular Records. 12.45 p.m., Song Recital by Irma Lievts; Aria from The Creation (Haydn); Elsa's Dream from Lohengrin (Wagner); Chanson triste (Duparc). 1.0, News. 1.10, Extracts from the Cello Concerto (Lalo), by Marie-Jeanne Vanneest. 1.30, Records of Cigány Music. 2.0, Interval. 4.55, News. 5.0, Concert of Dance Music by the Symphony Orchestra. 5.30, Programme for Children. 6.15, Redemption (Frank) on Records. 6.30, Recital by Mme. Pinks-Broadbent (Cello) and Rasette Moldavsky (Pianoforte): Sonata in E minor (Brahms); Part I from the Sonata, Op. 111 (Beethoven); Etude Op. 8, No. 2 (Scriabin); Toccata (Jongen). 7.15, Talk. 7.30, Art Review; Notes for Women. 8.0, Caludi Concert by the Radio Orchestra. 8.45, Double Bass Recital by Hignet: Gavotte from Suite No. 6 (Bach); Legend (Misek); Russian Airs (Nanny). 9.0, Talk: Young People. 9.10, Concert by the Symphony Orchestra; Soloist, Hignet (Double Bass); Variations and Fugue on a Theme of Handel (Delme); Double Bass Concerto (Dragonetti); Double Bass; Perpetuum mobile (Laska); Rhapsody No. 1 (Debussy). 10.0, News. 10.10, Request Records. 10.55, Christus vincit (Liszt). 11.0 (approx.), Close Down.

BRUSSELS (No. 2)

932 kc/s, 321.9 metres; 15 kW.—Programme in Flemish.—11.57 a.m., Weather. 12 Noon, Records. 1.0 p.m., News. 1.10, Overture and Selection from The Merry Wives of Windsor (Nicolaï) on Records. 2.0, Interval. 4.55, News. 5.0, Mozart Concert by the Symphony Orchestra: Overture, Don Giovanni; Symphony in G minor; German Dances. 5.45, Programme for Children. 6.30, Records. 7.0, Talk. 7.15, Records. 7.30, Talk for Housewives. 8.0, Music of the Nations—Concert by the Symphony Orchestra: Overture, Libussa (Smetana); Slav Rhapsody (Dvorák); Symphonic Dance (Grieg); Rhapsody No. 6 (Liszt); Selection from His Life for the Czar (Glinka); Flemish Dance (Blockx). 8.45, A Sketch. 9.15, Concert by the Radio Orchestra; Soloist, de Booy. 10.0, News. 10.10, Dance Records. 11.0 (approx.), Close Down.

BUCHAREST

823 kc/s, 364.5 metres; 12 kW.—12 Noon, Water Level; Records. 12.45 p.m., Amusement Guide; Exchange; Records of Light Music. 1.15, Time; Weather; News. 1.40, Records of Light Music. 5.0, Concert by the Gica Ionescu Orchestra; Soloist, Gica Ionescu (Pianoforte); Johann Strauss Potpourri; National Song Potpourri; Serenade (Schubert); Two Pieces (Mauriotti); Vers ta fenêtre (Moretti); Tango (Ionescu); Selection from Lilaie Time (Schubert-Berté); Russian Song; Pianoforte Solo; Potpourri of Romanian Melodies. 6.0, Time; Weather; News. 6.15, Concert by the Gica Ionescu Orchestra; Two Preludes (Chopin); Concert Waltz (Moskovsky); Tango (Andreescu); Tango (Bosnicanu); Caricoa (Younans); Popular Romanian Songs. 7.0, Educational Programme. 7.15, Records. 7.45, Talk. 8.0, Beethoven Symphony Concert by the Station Orchestra; Conductor, Ionel Berlea; Soloist, Herez (Pianoforte); Symphony No. 1 in C; Pianoforte Concerto in E flat; Symphony No. 5 in F. In the interval at 9.0, Talk. 10.0, News.

BUDAPEST

546 kc/s, 549.5 metres; 120 kW.—6.45 a.m., Gym. 9.45, News. 10.0, Talks. 12 Noon, Chimes. 12.5 p.m., Concert by the Budapest Chamber Orchestra. 1.30, Concert by the

Rác Cigány Band. 2.40, Market Prices; Cookery Notes. 4.0, Programme for Women. 5.0, Talk. 5.35, Song Recital by Dora Bárony. 6.15, French Lesson. 7.30, Talk. 8.5, Records. 8.40, Recital by Piroksa Vaszary and György Kürthy. 9.50, String Quartet Concert.

CASSEL.—Relays Frankfurt.

COLOGNE

658 kc/s, 455.9 metres; 60 kW.—5.50 a.m., Hymn; Records. 6.5, Gym. 6.25, See Leipzig. In the interval at 6.50, News. 8.0, Time; Weather. 8.5 to 8.20, Gym for Women. 10.0, News. 10.10, Gym for Children. 10.30, Records. 11.0, Talk with Records: The East. 11.30, Announcements; Records. 12 Noon, Concert by the Station Schrammel Quartet; Soloist, Schneider (Baritone). 12.45 p.m., Announcements; Greetings. 1.0 to 2.45, Concert by the Station Chamber Orchestra; Conductor, Hartmann; Overture, Der Wildschütz (Lortzing); Lagunen-Walzer (Strauss); Selection from The Barber of Seville (Rossini); Forest Murmurs (Czibulka); Norwegian Rhapsody (Svendsen); Waltz, Toujours on j'amain (Waldteufel); Pikante Blätter (Komzak); Two Pieces (Aht): (a) O Jugend, wie bist du so schön, (b) Gute Nacht, du mein herziges Kind; Ein Morgen in Sanssouci (Kockert). In the interval at 1.45, Announcements. 3.10, A Discussion on the New Trade Laws. 3.30, Exchange. 3.45, Book Review for Women. 4.0, Concert by the Small Station Orchestra; Conductor, Eysoldt; Soloist, Kreisel (Saxophone); Spitzweg-Folge (Niemann-Spiess); Two Pieces (Grieg-Mauss): (a) Liebe, (b) Die alte Mutter; Blauso Stunde (Beste); Extracts from Karneval (Bohm-v. d. Berg); Two Pieces (Zeh): (a) Heimweh, (b) Liebesständchen; Saxophone Solo (Beste); Three Pieces (Jensen-Mauss): (a) Kassandra, (b) Die Zauberin, (c) Eros (from Erotikon). 5.0, A Visit to the Folkwang Museum, Essen. 5.30, Three Ballads (Loewe). 5.45, Talk: Widukind. 6.0, A Play for Young People. 6.20, Talk: Electricity. 6.40, Topical Talk. 6.50, Exchange; Sports Notes. 7.0, Concert by a Wind Instrument Orchestra; Conductor, Kühn. 7.45, Report from the Essen Exhibition. 8.0, News. 8.10, Concert by the Station Chamber Quintet. 8.45, The Poor Broom-makers—Play (Carl Hauptmann), with Music (Zillig). 10.0, News. 10.20, Chess Lesson. 10.30 (approx.), Close Down.

COPENHAGEN.—Relays Kalundborg. **CORK.**—Relays Athlone. **DANZIG.**—Relays Königsberg. **DRESDEN.**—Relays Leipzig.

FECAMP

1,456 kc/s, 206 metres; 10 kW.—11.30 a.m. to 12 Noon, Programme in English arranged by the International Broadcasting Company of London. 11.30, Happy Half-Hour; Dance Music. 12 Noon, Programme in French. 4.30 to 6.0 p.m., Programme in English arranged by the I.B.C. (London). 4.30, Torquay, Exeter, Plymouth and Devonport Concert; Part I: Yodelling Holland. 5.0, Part II: Dance Music. 5.30, Part III: Orchestral Music. 6.0, Programme in French. 11.0 till Close Down, Programme in English arranged by the I.B.C. (London). 11.0, Request Programme compiled by the Saints Rhythm Club. 11.30, Concert arranged by the I.B.C. (Ireland), Ltd.: Light Music. 12.30 a.m. (Wednesday), I.B.C. Time Signal. 12.31, Dance Music. 1.0, I.B.C. Goodnight Melody and Close Down.

FLENSBURG.—Relays Hamburg. **FLORINCE.**—Relays Milan.

FRANKFURT

1,195 kc/s, 251 metres; 17 kW.—5.45 a.m., Hymn; Time; Weather. 5.50, Gym. 6.40, Time; Announcements. 6.50, Weather. 6.55, Concert from Stuttgart. 8.10, Water Level; Weather. 8.15 to 8.35, Gym. 10.0, News. 10.45, Cookery Hints. 11.0, Announcements; Records. 11.30, Announcements; Exchange; Weather. 11.45, Social Notes. 12 Noon, Records. 1.0 p.m., Time; Local News. 1.20, Orchestral Concert. In the interval at 1.50, News. 2.30, Industrial Review. 2.45, Time; Exchange. 2.55, Weather. 3.0, News. 3.10, Programme for Women. 3.30, Talk. 3.50, Art Notes. 4.0, Concert by the Station Orchestra; Conductor, Belker; Soloist, Herta-Irene Müller-Gärtner (Mezzo-soprano) and Kullmann (Pianoforte); Part I—Light Music; Dance Suite from Le roi s'amuse (Delibes); Two Pieces from An Indian Fairy Story (Förster); Ballet Suite from Hiawatha (Coleridge-Taylor); Part II—Paul Graener Lieder for Mezzo-soprano; Part III—Old Dance Music. 5.30, Talk. 5.45, Hunting Songs by Peter Schäfer (Bass). 6.0, Technical Talk. 6.15, Industrial Reports. 6.25, Italian Lesson. 6.45, Weather; Exchange; Announcements; Time. 6.50, Light Orchestral Concert from Freiburg. 7.45, Topical Talk. 8.0, Time; News. 8.10, Little Know Selumann Lieder by Willy (Baritone). 8.40, Gehlhansen—Sequence (Paul Laven). 9.10, Concert by the Station Orchestra; Conductor, Belker; Gallop (Eilenberg); Waltz from La Poupée (Andran); Polka (Bayer); Selection from Ten Maids and no Man (Suppé); Waltz, Das Leben ist doch schön (Ed. Strauss); Polka-Mazurka from Die Jagd nach dem Glück (Suppé); Waltz (Vollstedt); Polka (Joh. Strauss). 10.20, Time; News. 10.35, Topical Talk. 10.45, News. 11.0, See Stuttgart.

SEPT. 25th **TUESDAY** continued

12 Midnight, Jean Sibelius Records. 1.0 a.m. (Wednesday), Close Down.
FREDRIKSSTAD.—Relays Oslo. **FREIBURG**.—Relays Stuttgart. **GENEVA**.—Relays Sottens. **GENOA**.—Relays Milan. **GLEIWITZ**.—Relays Breslau. **GOTEBORG**.—Relays Stockholm. **GRAZ**.—Relays Vienna. **HAMAR**.—Relays Oslo.

HAMBURG
 904 kc/s, 331.9 metres; 100 kW. Relayed by Bremen, Flensburg and Hanover, 1,330 kc/s, 225.6 metres.—5.45 a.m., Time; Weather; Notes for Farmers. 6.0, Gym. 6.15, Time; Weather. 6.20, See Berlin (Funkstunde). In the interval at 7.0, Time; News. 8.0, Weather; Talk for Housewives. 8.10, Announcements; Records. 10.50, News. 11.0, Harvest Festival Music for Schools. 11.45, Records. 12 Noon, Hints for Housewives. 12.5 p.m., Time; Weather; Shipping Notes. 12.15, Concert from Berlin (Funkstunde). 1.0, Exchange. 1.15, Weather. 1.20, Light Music. 2.15, News. 2.30, Records. 3.0, Exchange. 3.40, Shipping and Aviation Notes. 4.0, See Stuttgart. 5.30, Talk for Women. 6.10, Topical Talks. 6.45, Exchange. 6.55, Weather. 7.0, Programme for Young People (on Records). 8.0, News. 8.10, Johann Strauss—Literary and Musical Sequence (Scheffler). The Station Orchestra and Soloists. Conductor: Eibenschütz. 9.10, See Stuttgart. 10.0, News. 10.20, Light Music. 11.0, Orchestra. Concert from Kiel. Conductor: Döring. Schweizer Schützengilde (Zimmer); Bergweisen (Clemus); Kirchweih in Tirol (Krome); Erinnerung an Luzern (Blon); Fantasia on Swiss Songs (Leopold); The Secrets of the Adige (Carena); Edelweiss (Lange); Tyrolse March (Dreyer). 12 Midnight (approx.), Close Down.

HANOVER.—Relays Hamburg.
HILVERSUM
 160 kc/s, 1,875 metres; 7 kW. (until 3.40 p.m.). Transmitted on Kootwijk, 50 kW., from 3.40 p.m.—7.40 a.m. to 5.10 p.m., Programme of the General Broadcasting Society (A.V.R.O.). 7.40 a.m., Time. 7.41, Records. 8.40, Concert by the Rentmeester Orchestra. 9.40, Time. 9.41, Service. 10.10, Concert by the Rentmeester Orchestra. 10.40, Cookery Talk. 11.10, Records. 11.40, Time. 11.41, Concert of Light Music by the Minstrels. In the interval, Records. 1.55 p.m., Records. 2.10, Cello and Pianoforte Recital by Bram van Zanten and Egbert Veen. 2.40, Talk for Women. 2.50, Records. 3.40, Interval. 3.55, Records. 4.10, Concert by a Children's Choir. Conductor: Hamel. 4.40, Programme for Children. 5.10, Talk arranged by the Liberal Protestant Radio Society (V.P.R.O.). 5.40 till Close Down. A.V.R.O. Programme. 5.40, Concert by the A.V.R.O. Orchestra. Conductor: Gerharz. Jugend Heraus (Teike); Hungarian Comedy Overture (Keler-Bela); Piece (Vollstedt); Johann Strauss Potpourri (Schlögel). 6.10, Talk by the R.V.U. 6.40, Concert by the A.V.R.O. Orchestra. Conductor: Gerharz. Soloist: Judith Toff (Soprano). Overture, Iphigenia in Aulis (Gluck); Two Songs (Gluck); Prelude to Le Déluge (Saint-Saëns); Songs: (a) La cloche (Saint-Saëns), (b) Aria from Samson and Delilah (Saint-Saëns); Potpourri (Charpentier). 7.40, Time. 7.41, News. 7.45, Talk: The English Lessons. 7.55, Concert by the A.V.R.O. Orchestra. Conductor: Gerharz. Soloist: Egbert Veen (Pianoforte). Pianoforte Concerto (Dittersdorf); Four Waltzes (Brahms). 8.20, Recitation. 8.40, Variety Programme. Kovacs Lajos and his Orchestra. The Paradise Garden Hawaiians, Pierre Palla (Organ), and Boris Lensky (Violin). 10.40, Records. 11.40 (approx.), Close Down.

HORBY.—Relays Stockholm.
HUIZEN
 995 kc/s, 301.5 metres; 7 kW. (until 6.40 p.m.); 20 kW. from 6.40 p.m. Programme of the Catholic Radio Society (K.R.O.).—7.40 a.m., Records. 8.55, Interval. 9.25, Pontifical High Mass from Utrecht. 11.25, Records. 11.40, Police Messages. 11.55, Records. 12.40 p.m., Concert by the K.R.O. Boys. 1.25, Interval. 1.40, Programme for Women. 2.40, Records. 3.10, Concert. Mile. Eline Hemrick (Soprano). Tromp (Viola). and Boshart (Pianoforte). Soprano Solos: (a) Aria from Der Schauspielerdirektor (Mozart), (b) Aria from La Traviata (Mozart), (c) Ständchen (Strauss), (d) Waldeinsamkeit (Reger); Violin Solos: (a) Le Déluge (Saint-Saëns), (b) Minuet (Paderewsky-Kreisler), (c) Polchielletto (Kreisler), (d) Hungarian Dance, No. 3 (Brahms), (e) Mummenschanz (Korngold); Records; Soprano Solos: (a) Aria from Faust (Gounod), (b) Ich ging mit Lust durch einen grünen Wald (Mahler), (c) De nachtegaal (Zagwijn); Violin Solos: (a) Romance (Wieniawsky), (b) Suite (Röntgen). 4.40, Records. 4.55, Light Music by the K.R.O. Boys. 5.40, Talk. 6.0, Light Music by the K.R.O. Boys. 6.40, Police Messages. 6.55, Talk. 7.15, Records. 7.30, Talk. 7.40, Concert by the K.R.O. Orchestra. Conductor: Gerritsen. Rakoczy Overture (Kéler-Béla); Dream Children (Elgar); Selection from Madame Butterfly (Puccini); Symphony No. 1 in C (Beethoven). In the interval at 8.10, News and Talk. 9.0, Recitation. 9.10, Concert by Travin and his Russian Ensemble. 9.40, Concert by the K.R.O. Orchestra: Two Nocturnes (Debussy); Suite, Mother Goose (Ravel); Selection from The Czarevitch (Léhar). In the interval at 10.10, News and Recitation. 10.40, Concert by Travin and his Russian

Ensemble. 11.10, Records. 11.40 (approx.), Close Down.

INNSBRUCK.—Relays Vienna.
KALUNDBORG
 238 kc/s, 1,261 metres; 75 kW. Relayed by Copenhagen, 1,176 kc/s, 255.1 metres; and Skamlebaek, 49.5 metres.—7.0 a.m., Gym. 8.30, Service from Copenhagen Cathedral. 10.15 to 10.45, Hygiene Talk for Schools. 11.0, Weather. 11.10, Fish Prices. 12 Noon, Chimes. 12.2 p.m., Concert by Nielsen's String Ensemble, relayed from the Ritz. 2.0, Interval. 3.0, Concert by the Radio Orchestra; Conductor, Mahler; Soloist, Peder Jacobsen (Songs): Overture. La rencontre imprévue (Gluck); Divertimento, Il combattimento dell'umane passioni (v. Dittersdorf); Minuet (Schubert); March from Indigo (Strauss); Waltz, Aquarellen (Jos. Strauss); Overture, Gasparone (Müllbacher); Songs of the Forest; Overture, Costi fan tutte (Mozart); March in D (Mozart); Waltz from Donna Diana (Reznicek); March from The Mikado (Sullivan); Ballet Music from Ali Baba (Lecocq); Overture, La belle Hélène (Offenbach). 5.0, See Oslo. 5.30, Exchange; Poem. 5.45, Talk: André Gide. 6.15, German Lesson. 6.45, Weather. 6.54, Wireless Notes. 7.0, News. 7.15, Time. 7.20, Talk: Children's Day. 7.30, Talk: Present Day Economics. 8.0, Chimes. 8.2, Mouth Organ Recital. 8.15, Verdi Records. 8.30, Le Retour de l'Enfant prodige—Play (André Gide); Translation by Jörgen Budtz-Jørgensen. 9.15, Concert of French Music by the Radio Orchestra; Conductor, Emil Reesen: Overture, Les petits Savoyards (Dalavrac); Ballet Music from Naila (Delibes); Overture, The Black Domino (Anther); Dance from Le roi l'a dit (Delibes); Suite from Izeul (Pierné); Rigaudon from Le tombeau de Couperin (Ravel). 10.10, News. 10.25, Grand Duo in C, Op. 140 (Schubert), by Folmer Jensen and Ove Peters. 11.0, Dance Music by Johansen's Band, relayed from the Lodberg. In the interval at 12 Midnight, Chimes. 12.30 a.m. (Wednesday), Close Down.

KIEL.—Relays Hamburg. **KLAGENFURT**.—Relays Vienna.

KONIGSBERG
 1,031 kc/s, 291 metres; 60 kW. Relayed by Danzig, 1,303 kc/s, 230.2 metres.—5.0 a.m., Records. 5.50, Weather. 6.0, Gym. 6.20, Concert from Berlin (Funkstunde). In the interval at 7.0, News. 8.0, Prayers. 8.30, Gym for Women. 9.0, Interval. 10.40, News. 10.55, Weather. 11.5, Talk: The German Peasantry. 11.30 (from Danzig), Records. 12 Noon, See Berlin (Funkstunde). In the interval at 12.30 p.m., News. 1.1, Time; Weather. 1.5, Scandinavian Records. In the intervals at 1.20 and 2.0, News. 2.30, Announcements; Records. 3.0, Market Prices. 3.10, Book Review. 3.25, Recital by Honka von Ferenczy (Songs). 3.50, Fashion Notes. 4.0, Concert by the Small Station Orchestra. Conductor: Wilcken. Fantastic March (Wilcken); Overture, Turandot (Lachner); Nordic Lyric Suite (Palmgren); Selection from Ernani (Verdi); Intermezzo (Schmalstich); Minuet (Richter); Russian Rhapsody (Heusser); Overture, Giralda (Adam). 5.20, Talk: The History of the Town of Calico. 5.45, Pianoforte Quintet in F minor (Franck). 6.15, Market Prices. 6.25, Talk by Vice-President Rhode: Handwork and National-Socialist Policy. Political Education. 6.55, Weather. 7.0 (from Danzig), Programme for Young People. 7.30, Mandoline and Guitar Music. Conductor: Lenzing. Overture in D minor (Köhler); Minuet (Graziani-Walter); Spanish Waltz (Mann); Am Spinnrädchen (Ritter); Ländler (Althoff); March (Blankenburg-Mandt). 8.0, Weather; News. 8.10, East Prussia in August, 1914—Radio Scenes. 9.30, Records. 9.45, Report of the Parade of Stallions in Georgensburg. 10.0, News. 10.30, Dance Music and Light Music by the Small Station Orchestra and Börschel's Dance Band. 12 Midnight (approx.), Close Down.

KOSICE.—Relays Prague. **LAUSANNE**.—Relays Sottens.

LEIPZIG
 785 kc/s, 382.2 metres; 120 kW. Relayed by Dresden, 1,285 kc/s, 233.5 metres.—5.50 a.m., Notes for Farmers. 6.0, Gym. 6.25, Orchestral Concert from Dessau. In the interval at 7.0, News. 8.0, Gym. 8.20, Records. 9.0 to 9.20, Programme for Women. 9.40, Exchange. 9.45, News. 10.10 to 10.50, A Sequence for Schools: Count Zeppelin. 11.0, Announcements; Records. 11.30, News; Time. 11.40, Weather. 11.45, Notes for Farmers. 12 Noon (from Dresden), Concert by the Dresden Philharmonic Orchestra. Conductor: Schestak. Overture, Turandot (Lachner); Tanzmoments (Herbeck); Selection from Manon (Massenet); Waltz, Am Neckarstrand (Müllbacher); Overture, Tancred (Rossini); Aquarellen (Gade); Serenade No. 3 for Strings (Volkmann); Slav Dances Nos. 1 and 3 (Dvorák); Overture, Isabella (Suppé). In the interval at 1.0 p.m., News; Time. 2.0 to 2.15, News; Exchange; Weather. 3.0,

Julius Kleugel Cello Records. 3.15, Programme for the Hitler Youth. 3.35, Exchange. 4.0, See Munich. 4.40, Talk by Albert Schweitzer: Old Legal Forms in Modern Speech. 5.0, See Oslo. 6.0, Exchange; Weather; Time. 6.10, Talk: Germany and Greece. 6.30, Concert by the Station Orchestra. Conductor: Blumer. Soloist: Kindscher (Violin). Overture, Indigo (Joh. Strauss); Ballade and Polonaise for Violin and Orchestra (Vieuxtemps); Dance of the Niads, and Fantastic Rondo from the Suite, Hersilia (d'Ambrosio); Two Pieces for Pianoforte (Schütt): (a) A la bien-aimée, (b) Réverie; Three Pieces (Nicodé): (a) Bolero, (b) Moorish Dance Song, (c) Serenade; Waltz (Ed. Strauss); Piedmontese Dance No. 1 (Sinigaglia). 7.35, Talk: Marshal Radetzky. 7.55, Announcements. 8.0, News. 8.10, Casanova—Opera in Three Acts (Lortzing), by the Leipzig Symphony Orchestra and Soloists. Conductor: Weber. 10.20, News. 10.50, Dance Music from Breslau. 12 Midnight (approx.), Close Down.

LINZ.—Relays Vienna.

LJUBLJANA
 527 kc/s, 569.3 metres; 5 kW.—12.15 p.m., Records. 12.50, News. 1.0, Weather; Records. 6.0, Talk. 6.20, Records for Children. 7.0, Programme for Children. 7.30, Talk. 7.50, Weather; Cookery Hints. 8.0, Programme for Sokols. 8.20, Songs and Mandoline Quartet Music. 9.20, Concert by the Station Orchestra. 10.10, Weather; News. 10.30 to 11.0, Programme in English arranged by the International Broadcasting Company of London; Concert of Light Music.

LUXEMBOURG
 230 kc/s, 1,304 metres, 150 kW.—7.45 a.m., Records. 8.0, News in French; Record; News in German; Record. 12 Noon, Concert by the Station Orchestra; Conductor, Pensis: March (Goldmark); Montanina (Pumo); Symphonic Poem, Finlandia (Sibelius); Selection from Electra (R. Strauss); Piece (Silesu). 12.30 p.m., News in French and German. 12.40, Concert (cont'd.): Promenade matinale and Aubade (Pierné); Suite, Le Printemps (Nevin); Tango (Demaret); Selection from Hit the Deck (Youmans-Salabert); March (Morena); in the interval at 1.0, Exchange. 1.15, Record. 1.30, Exchange. 1.35, Records. 2.0, Exchange. 3.45, Exchange. 6.30, Concert of Light Music and Dance Music. 7.30, Racing Results. 7.35 till Close Down, Belgian Evening. 7.35, Talk: Luxembourg as a Tourist Country. 7.40, Records. 8.0, News in French and German. 8.20, Pianoforte Recital by Zakin. 8.35, Exchange. 8.40, Concert of Belgian Music by the Station Orchestra: Prelude (Rogister); Belgian Military Waltz (Fréméaux); Suite pastorale (Vreuls); Chanson de Mai (Dupuis); Sur le Rocher (Gachet); Berceuse (Leemans); Week-End Suite (Caldesi); Berceuse (Soiron); Piece (Wallet); Badinage (Jongen-Mouton). 9.30, Pianoforte Recital by Berthe Bernard. 10.0, Concert by the Station Trio; March (Kreisler); Serenade (Gölschlegel); Barcarolle (de Taeye); Nina (Pergolèse-Kreisler); Berceuse de Jocelyn (Godard); Piece (Fancelli); Syncopation (Kreisler). 10.30, Dance Music by the Station Jazz Band; Conductor, Jouza.

MADRID
 EAJ7, 1,095 kc/s, 274 metres; 7 kW.—9.0 a.m., News. 10.0, Announcements; Exchange; Weather. 10.30, Interval. 2.0 p.m., Chimes; Time; Weather; Popular Music; Talk. 2.30, Sextet Concert of Mozart Music. 3.07 Amusement Guide; Exchange; Popular Music. 3.30, Sextet Concert of Schubert Music. 4.0, News; Popular Music. 4.30, Sextet Concert of Beethoven and Wagner Music. 4.50, Film Review; News. 5.0, Interval. 6.0, Chimes; Light Music. 7.0, Announcements; Hygiene Talk. 7.30, Exchange; Military Band Concert. 8.0, News; Pianoforte Recital. 8.30, Hunting and Fishing Notes. 8.45, Concert. Part I, Operetta Music. Part II, Opera Music. 9.40, Sports Notes. 10.0, Chimes; Time; History Talk by Ramón Gómez de la Serna. 10.30, Song Recital by Carmen Girolami (Mezzosoprano). 11.0, News; Sextet Concert. 11.30, Programme relayed from a Theatre. 12.45 a.m. (Wednesday), News; Time. 1.0, Chimes. 2.0 till Close Down, Programme in English, arranged by the International Broadcasting Company of London: Dance Music. 3.0, I.B.C. Good-night Melody and Close Down.

MALMO.—Relays Stockholm.
MILAN
 814 kc/s, 368.6 metres; 50 kW. Relayed by Turin, 1,140 kc/s, 263.2 metres; Genoa, 986 kc/s, 304.3 metres; and Florence, 610 kc/s, 491.8 metres.—7.30 a.m., Gym. 7.45, Time; News. 8.0, Interval. 1.30, Operetta Records. 12.30 p.m., Records. 12.45, News. 1.0, News. 1.5, Concert by the Malatesta Chamber Orchestra. In the interval at 1.30, Records; Exchange. 2.15 to 2.25, Exchange. 4.35, News. 4.45, Programme for Children. 5.10, Concert by the Doreno Orchestra. 5.55,

Weather. 6.0 to 6.10, Notes for Farmers; Corn Prices. 7.0, Announcements. 7.15, News in Foreign Languages. 8.0, Time; News; Records. 8.30, Government Notes. 8.45, Donna Juanita—Operetta in Three Acts (Suppé); Conductor, Fabbri. In the interval: Talk; Art Notes. 11.0 (approx.), News.

MONTE CENERI
 1,167 kc/s, 257.1 metres; 15 kW.—12 Noon, News. 12.5 p.m., Light Music by the Radio Orchestra: Russian March (Ohlsen); Waltz (Strauss); Overture, La battaglia di Legnano (Verdi); Nocturne (Derksen). 12.29 p.m., Time; Weather. 12.33, Concert (cont'd.): Selection from Hérodiade (Massenet); Piece (Deshayes); Dance (Friml). 12.55, News. 1.5 to 1.30, Records. 3.59, Time. 4.0 to 6.0, See Sottens. 7.45, News. 8.0, Concert of Fantasias and Symphonic Pieces. 8.45, Italian Opera Arias. 9.0, Popular Songs. 9.30, Dance Music. 10.0, Close Down.

MORAVSKA-OSTRAVA
 1,158 kc/s, 259.1 metres; 11.2 kW.—6.0 to 7.15 a.m., See Prague. 9.50, See Prague. 10.15, Concert by the Station Orchestra; Conductor, Divis. 11.0, See Prague. 12.30 p.m., See Bratislava. 1.30 to 2.0, See Prague. 3.15, See Brno. 4.15 to 4.20, See Prague. 5.40, Talk: The Great War. 5.50, Records. 5.55, News. 6.0, Talk: How to Learn Foreign Languages. 6.10, Reading. 6.20, See Brno. 6.55, See Prague. 7.10, See Bratislava. 7.25 to 10.45, See Prague. In the interval at 10.15, See Brno. 10.45, Talk in Esperanto: Estonia. 11.0 (approx.), Close Down.

MOSCOW (No. 1)
 174 kc/s, 1,724 metres; 500 kW.—5.0 a.m., News. 5.15, Fanfare. 5.45, Gym. 6.15, Musical Programme. 8.15, Programme for Children. 9.0, Musical Programme. 9.58, Time. 10.0, News. 10.15, Concert for Collectivist Farmers. 3.0 p.m., Programme Announcements. 3.15, Programme for Children. 3.30, Communist Party Programme. 4.0, News. 5.30, Red Army Programme. 6.30, Reading for Collectivist Farmers. 8.0, Orchestral and Choral Concert. 9.0, Technical Talk in German. 9.55, Chimes. 10.5, Talk in French; Soviet Law. 11.5, Talk in Dutch; Soviet Law.

MOTALA.—Relays Stockholm. **MUN-LACKER**.—See Stuttgart.

MUNICH
 740 kc/s, 405.4 metres; 100 kW. Relayed by Augsburg and Nürnberg, 1,267 kc/s, 236.8 metres.—6.30 a.m., Gym. 6.45, Motto; Records. 7.15, Time; Weather; News. 7.25, Concert from Stuttgart. 9.50, Cookery Hints. 10.10, French for Schools. 10.55, Market Prices. 11.5, Notes for Farmers. 11.15, News. 11.30, Announcements; Records. 12 Noon, Concert by the Station Orchestra; Conductor, List: Overture, The Merry Wives of Windsor (Nicolaï); In the Steppes of Central Asia (Borodin); Waltz Fantasia (Glinka); Hungarian Rhapsody No. 2 (Liszt); Scherzo (MacDowell); Valse triste (Sibelius); Polonaise from Eugene Onegin (Tchaikovsky). 1.15, News. 1.25, Soloist Records. 2.0, News; Announcements; Exchange. 2.20, Recital by Grauert (Bartone), Hoffmann (Violin) and Maria Fahmüller (Clavier): Toccata and Fugue in D for Pianoforte (Bach); Aria for Baritone and Pianoforte from Julius Caesar for Clavier and Baritone (Handel); Two Old Italian Pieces for Violin and Clavier: (a) Tempo di minuetto (Pugnani), (b) Largo and Allegro commodo (Tartini). 2.50, Talk for Women. 3.30, Talk. 3.50, Weather; Notes for Farmers. 4.0, Concert by the Small Station Orchestra; Conductor, Kloss: Overture, Die Fledermaus (Joh. Strauss); Intermezzo from Suor Angelica (Puccini); Extracts from Arabella (R. Strauss); Pesther-Walzer (Lanner); Extracts from Liselott (Künneke); Chinese Sketches and Oriental Scene (Leemans); Dance of the Merry Mascots (Ketelbey); Two Pieces (Schütt): (a) Styria Waltz, (b) A la Gavotte. 5.30, Talk: Reclaiming Land from the North Sea. 5.50, The Wanderer Fantasia (Schubert) by Pillney (Pianoforte). 6.10, Talk by a University Student: Life in a Students' Hotel. 6.30, Song Records. 6.50, Time; Weather; Notes for Farmers. 7.0, Concert by the Station Orchestra; Conductor; List. 8.0, News. 8.15, D'Schultheisswahl—A Swabian Comedy of the Rococo Period (Weichenmayr). 9.35, With the Microphone to Alt Lindau, Lake Constance. 10.0, Time; Weather; News; Exchange; Sports Notes. 10.20, Programme to be announced. 11.0, Concert from Lindau, Lake Constance. 12 Midnight (approx.), Close Down.

NAPLES.—Relays Rome. **NOTODDEN**.—Relays Oslo.

OSLO
 260 kc/s, 1,154 metres; 60 kW. Relayed by Hamar, 519 kc/s, 578 metres; and Jeløy, 6,980 kc/s, 42.92 metres.—11.45 a.m., Service. 11.50, Exchange. 12.55 p.m., Nauen Time Signal. 1.0 to 2.0, Records. In the interval at 1.15, Weather; Talk for Farmers, and at 1.45, Exchange. 4.40, Talk. 5.0, The Seventh Scandinavian Music Festival—Norwegian and Swedish Chamber Music. Soloists, Julia Clausen, Krogh and Rigmor Nordbye (Songs), Halvorsen (Violin), Berit Cleve (Pianoforte); Serenade for String Quartet

SEPT. 25th TUESDAY continued

(Heunberg); Songs; Violin and Pianoforte Sonata in E Minor (Cleve); Songs. 6.30, Programme for Women. 7.0, Announcements. 7.15, Weather; News. 7.30, Time Signal. 7.31, Recital of Popular Norwegian Songs by Alf and Ihle. 8.0, Talk. 8.30, Concert; Soloist, Solheim (Pianoforte). 9.10, Talk. 9.40, Weather. 9.45, News. 10.0, Topical Talk. 10.15, A Play. 11.0 (approx.), Close Down.

OSTERSUND.—Relays Stockholm.

PARIS

ECOLE SUPERIEURE, 695 kc/s, 431.7 metres; 7 kW.—12 Noon, Tourist Report. 12.15 p.m., Concert relayed from Toulouse, P.T.T., 776 kc/s, 386.6 metres. In the interval at 1.0, News. 2.0, Records; Sonatas and Light Music. 4.0, See Pontoise (Radio-Colonial). 6.0, Dramatic Programme. 6.30, News. 7.45, Science Talk. 7.50, Relay from the Opera-Comique: Tosca—Opera in Three Acts (Puccini); Cavalleria Rusticana—Opera in Two Acts (Mascagni).

PARIS

POSTE PARISIEN, 959 kc/s, 312.8 metres; 100 kW.—7.10 a.m., Fanfare; Records. In the intervals at 7.30 and 8.20, News. 8.45, Cookery Talk. 12 Noon, Exchange. 12.5 p.m., Records. 12.25, News. 12.35, New Records. 1.5, Exchange. 1.15, Records. In the interval at 1.30, Exchange. 2.0, Exchange. 3.15, Exchange. 3.45, Exchange. 4.50, Exchange. 6.45, Exchange. 6.49, Records. 7.10, News. 7.30, Records: Le Carnaval des Animaux (Saint-Saëns). 8.0, Interval. 8.10, Concert by the Paris Saxophone Quartet: Allegro vivace (Raff); Scherzo (Schubert); Minuet (Beethoven); Scherzo (Schumann); Cordoba (Albéniz); Moment musical (Schubert); Presto (Mendelssohn). 8.40, Exchange. 8.50, The Trout Quintet (Schubert). 9.30, Interval. 9.40, Dance Music. 10.20, News. 10.30 till Close Down. Programme in English arranged by the International Broadcasting Company of London. 10.30, Light Music. 11.0, I.B.C. Goodnight Melody and Close Down.

PARIS

RADIO PARIS, 182 kc/s, 1,648 metres; 75 kW.—6.45 a.m., Gym. 7.0, Records. 7.15, Press Review; Weather. 7.45, Gym. 8.0, Records. 12 Noon, Symphony Concert; Conductor, André; Soloist, Janine Carlyse (Songs); Neapolitan March (Costa); Waltz Suite, España (Chabrier-Waldteufel); Overture, La Fête au Village Voisin (Boieldieu); Two Songs; Chanson intime (de la Presle); Extract from Mignon (Thomas); Songs; Devant la Madone (Massenet); Selection from The Pearl Fishers (Bizet); Two Songs; Minuet (Paradis); Potpourri (Cléric); Songs; Destiny (Baynes); Selection from The Desert Song (Romberg); Malaguena (Albéniz); Tango (Albéniz); The Mosquitos' Parade (Whitney). In the interval at 1.20, Exchange. 3.45, Exchange. 6.20, Weather; Notes for Farmers; Exchange; Racing Results. 6.45, Records. 7.0, Talk: The Russian Theatre. 7.30, Topical Talk. 8.0, L'Épervier—Play (de Croisset). In the interval at 8.30, Press Review; Weather; and at 9.15, News. 10.30, Dance Music by Victor Pascal's Orchestra.

PITTSBURGH

KDKA, 980 kc/s, 306 metres; 50 kW. Relayed by W8XK, on 48.86 metres; and 25.27 metres.—3.0 p.m., Edward MacLough. 3.15, Castles of Romance. 3.30, To-day's Children. 3.45, News; Cookery Hints. 4.0, Honey-mooners. 4.15, Tony Wons. 4.30, Melody Mixers. 5.0, Fields and Hall. 5.15, Merry Maes. 5.30, Vic and Sade. 5.45, Hotel William Penn Orchestra. 6.0, Exchange. 6.15, Honourable Archie and Frank. 6.30, Farm and Home Tour. 7.30, KDKA Home Forum. 8.0, Sammy Fuller. 8.15, Congress of Clubs. 8.30, Joseph Gallicchio and his Orchestra. 9.0, Betty and Bob. 9.15, Singing Stranger. 9.30, Exchange. 9.45, Chicago Symphony Orchestra. 10.15, KDKA Kiddies' Klub. 10.30, The Singing Lady. 10.45, Orphan Annie. 11.0, Dan and Sylvia. 11.14, Baseball Resume. 11.30, News; Musical Programme. 11.45, Lowell Thomas. 12 Midnight, Amos 'n' Andy. 12.15 a.m. (Wednesday), Programme to be announced. 12.30, Household Musical Memories. 1.0 to 6.0, Popular Programme.

PONTOISE

RADIO-COLONIAL, 15,244 kc/s, 19.68 metres; 15 kW. (1.30 to 5.0 p.m.); 11,905 kc/s, 25.20 metres (5.15 to 12 Midnight), and 11,705 kc/s, 25.63 metres (12.15 a.m. Monday to 6.0).—4.0 to 5.0 p.m., Concert by the Station Orchestra; Conductor, Benvenuti; The Unfinished Symphony (Schubert); Pavane (Fauré); Ballet Music from Le Cid (Massenet); Selection from The Love Parade (Schertzingler). 6.30 to 7.30, Quintet Concert: Overture, Fingal's Cave (Mendelssohn); Selection from Don Quichotte (Massenet); Images (Ibert); Selection from La Vivandière (Godard); Selection from Le bourgeois Gentilhomme (Lully); Selection from Gipsy Love (Lehár); Selection from Conte Obligado (Moretti). 7.50, See Paris (Ecole Supérieure). 5.0 to 6.0 a.m. (Wednesday), Recital by Mme. Fascholin (Violin), Caurat (Tenor), and Petit (Pianoforte).

PORSGRUND.—Relays Oslo.

PRAGUE

638 kc/s, 470.2 metres; 120 kW.—6.0 a.m., Gym; Music; News. 7.15, Interval. 9.50, News. 10.5, News in German. 10.10, Record. 10.15, See Bratislava-Ostrava. 11.0, Record. 11.15, How Stanley found Livingstone—Play for Schools. 11.50, Record. 11.55, Market Prices; Weather. 12 Noon, Time; Discussion for Farmers. 12.10 p.m., Records. 12.20, News. 12.30, See Bratislava. 1.30, Talk on Economics. 1.40, Records. 1.50, Exchange. 1.55, Exchange and Weather in German. 2.0, Interval. 3.15, See Brno. 4.15 to 4.20, Exchange; Weather. 5.40, Record. 5.45, Announcements. 5.50, Topical Talk for Farmers. 6.0, Record. 6.5, Market Prices. 6.15, Record. 6.20, German Transmission; Talk; Readings. 6.55, News in German. 7.0, Time; News. 7.10, See Bratislava. 7.25, Talk on the following Relay. 7.30, Aida—Opera, in Four Acts (Verdi), relayed from the State Opera House; Conductor, Milan Zuna. 10.55, News in English. 11.10, Close Down.

RJUKAN.—Relays Oslo.

ROME

Call 1RO, 713 kc/s, 420.8 metres; 50 kW. Relayed by Naples, 1,104 kc/s, 271.7 metres; Milan, No. 2, 1,348 kc/s, 222.6 metres; Turin, No. 2, 1,357 kc/s, 221.1 metres; and 2RO, 11,810 kc/s, 25.4 metres.—7.30 a.m., Gym. 7.45, Time; News. 8.0, Interval. 12.30 p.m., Records. 1.5, See Milan. In the interval at 1.30, Time; News; Exchange. 2.15, Interval. 4.30, Children's Radio Review. 4.55, News; Exchange. 5.5, Recitations. 5.10, Concert of Light Music: El caballero (Rossi); Waltz (Fall); Memorie (Petralla); Serenata amorosa (Frontini); Extract from The Barber of Seville (Rossini); Serenata bruna (Rosati); Lamento di Federico (Cilea); Extract from La donna perduta (Pietri); Lullaby (de Micheli). 5.55, Weather. 6.0, Corn Prices. 6.10 to 6.15, Atmospheric Signals. 7.0, Announcements. 7.15, News in Foreign Languages. 8.0, Time; News. 8.10, Records. 8.30, Government Notes. 8.45, Chamber Music: Brunetti (Pianoforte), Manno and Finardi (Violin), Syveso (Viola), Martorana (Cello) and Prokopieni (Bass); Pianoforte Quintet Op. 44 (Schumann); Aria from Sadko (Rimsky Korskoy); My Mother (Moniuszko); Death (Gretchaninov); Two Russian Folk Songs. 9.30 (approx). La chioma de Berenice—A One-Act Play (Guglielminetti). 10.15, Dance Music. 11.0, News.

RUYSSELEDE

10,330 kc/s, 29.94 metres; 8 kW.—7.45 p.m., News in French. 8.0, See Brussels (No. 1). 8.45, Tchaikovsky Records: (a) Danse arabe, (b) Danse chinoise, (c) Valse des fleurs. 9.0, News in Flemish. 9.15, Close Down.

SALZBURG.—Relays Vienna.

SCHENECTADY

WGY 790 kc/s, 379.5 metres; 50 kW. Relayed at intervals by W2XAF, on 31.48 metres; and W2XAD, on 19.56 metres.—7.0 p.m., Irving Aaronson and his Orchestra. 7.15, WGY Matinee Players. 7.30, Women's Radio Review; Talks; Orchestra. 11.25, Exchange. 12 Midnight, Leo Reisman's Orchestra, with Phil Ducey. 12.30 a.m. (Wednesday), Wayne King and his Orchestra. 1.0 to 3.0, Popular Programme.

SOTTENS

677 kc/s, 443.1 metres; 25 kW; and Geneva, 401 kc/s, 748 metres.—7.0 to 7.15 a.m., Gym. 12.29 p.m., Time; News. 12.40 (from Geneva), Records. In the interval at 1.0 p.m., Exchange. 2.0, Interval. 3.59, Time. 4.0, Concert by the Small Radio Lausanne Orchestra: Conductor, Moser; Overture, Così fan tutte (Mozart); Minuet and Finale from the London Symphony (Haydn); Mozart Potpourri (Tchaikovsky); Village Dances (Beethoven). 4.35, Dance Music. 4.50, Records. 5.5, Chamber Music. 5.30, Light Music. 5.45, Dance Music. 6.0, Readings. 6.20, Concert by the Small Radio Lausanne Orchestra: Part I—Folk Music; Part II—Light Music. 7.0, Talk: The Valais Vintage Festival. 7.20, Dance Music by the Radio Lausanne Jazz Band. 8.0, Talk: The Jura Mountains. 8.30, Jura Programme, relayed from Tramelan; The Tramelan Choir; Conductor, Vouarnard. In the interval, Talk: The Tramelan Art Gallery. 9.15, News. 9.25, Recital by Gentil (Violin), Lévy (Cello) and Gentil (Pianoforte). 10.15 (from Geneva), Talk: The Work of the League of Nations. 10.30 (approx.), Close Down.

STOCKHOLM

704 kc/s, 426.1 metres; 55 kW.—Relayed by Boden and Östersund, 413.5 kc/s, 726 metres; Göteborg, 941 kc/s, 318.8 metres; Hörby, 1,131 kc/s, 265.3 metres; Motala, 216 kc/s, 1,389 metres; and Sundsvall, 601 kc/s, 499.2 metres.—7.20 a.m., Gym. 7.45, Service. 8.0, Weather. 12.30 p.m., Weather. 12.55, Time. 1.0, Swedish Lyrics and Music—Programme by Hedengran (Readings), Hahn (Pianoforte) and Hylbom (Violin). 1.45 (from Göteborg), Orchestral Concert of Light

Music. 2.45, Talk in English: The Rush Hour, relayed from Malmö, 1,312 kc/s (228.7 metres). 5.0, Weather. 5.5, Programme for Children. 5.45, Records. 6.45, Elementary French Lesson. 7.30, Jacob von Thyboe—Comedy (Holberg). 9.0, Concert by the Station Orchestra: Conductor: Wiklund; Suite, Master Olof (Aulin); Two Pieces for Strings (Wiklund); Hungarian Rhapsody No. 1 (Liszt). 9.45, Weather; News. 10.0, Orchestral Concert: Conductor: Wiklund; Soloist: Eckerberg (Pianoforte); Variations on a Theme of Haydn (Brahms); Pianoforte Concerto in C Minor, No. 24 (Mozart); Overture, Prometheus (Beethoven). 11.0 (approx.), Close Down.

STRASBOURG

859 kc/s, 349.2 metres; 15 kW.—11.0 a.m., Programme from Lyons (La Doua). 12 Noon, Records. 12.45 p.m., News. 1.0, Time; Exchange. 1.5 to 2.0, Orchestral Concert; Conductor, de Villers; Spanish Dances (Fallá); Overture, Cigale et Magali (Casadesu); Selection from Carmen (Bizet); Hungarian Rhapsody No. 2 (Liszt); Suite from The Chocolate Soldier (O. Strauss); March, Pomp and Circumstance (Elgar). 4.45, Talk: Tunis. 5.0, Concert from Grenoble, P.T.T., 986 kc/s, 309.9 metres. 6.0, Legal Talk in German. 6.15, Topical Talk. 6.30, Orchestral Concert; Conductor, Roskam; Overture, Paragraph III (Suppé); Foxtrot (Allouche); Serenade (Moszkovsky); Waltz Potpourri (Salabert); Selection from The Girl in the Taxi (Gilbert); Tango (Mora and Merin); Saxophone and Pianoforte: Valse lente (Guntz); Sittin' on a Backyard Fence (Kahal and Fain); Patronille galante (Lachaux); I ain't Lazy (Franklin); March, Piccadilly (Benoit). 7.30, Time; News. 7.50, See Paris (Ecole Supérieure). In the interval, Press Review in German; Lottery Results; Announcements.

STUTTART

MUHLACKER, 574 kc/s, 522.6 metres; 100 kW.—5.35 a.m., Notes for Farmers. 5.45, Hymn; Time; Weather. 5.50, Gym. 6.15, Concert by the Philharmonic Orchestra from Mannheim. In the interval at 6.40, Time; Announcements; Weather. 8.10, Weather. 8.15, Gym. 8.35, Water-Level. 8.40, Interval. 10.0, News. 10.10, French for Schools. 10.35, Accordion Recital of Scandinavian Music by Alfred Kaul: Two Pieces (Sinding): (a) Song, (b) Folk Melody; Two Pieces (Sjögren): (a) Legend No. 6, (b) Legend No. 13; Five Pieces (Grieg): (a) Ballad Melody, (b) Melody in C, (c) The Lonely Wanderer, (d) Erotica, (e) Album Leaf. 11.0, Brahms Lieder by Käthe Ivers. 11.25, Announcements; Records. 11.55, Weather. 12 Noon, See Frankfurt. 1.0 p.m., Local News. 1.20, See Frankfurt. In the interval at 1.50, News. 2.30 to 2.50, Talk for Women. 3.30, Violin Recital by Gerda Reichert: Sonata No. 3, Op. 137 (Schubert); Minuet and Rondo in G (Beethoven). 4.0, Concert by the Station Orchestra: Conductor: Görlich; Soloists: Gross and Thomas (Violins), Hantz (Guitar), Thaler (Accordion); Overture, The Princess of the Golden Slippers (Rust); Fairy Suite (Ketelbey); Waltz (Waldteufel); Suite Campestre (Amadei); Interlude: Old Viennese Dances by the Station Schrammel Quartet; March (Latani); Overture, A Night in Venice (Joh. Strauss); In the Harbour of Port Said (Lautenschläger); Waltz (Ziehrer). 5.30, Recital by Elisabeth Jentsch (Soprano), Jantz (Tenor), and Jentsch (Baritone). 6.0, Hints for Amateur Picture Collectors. 6.15 to 6.45, See Frankfurt. 6.45, Variety Programme from Karlsruhe. 7.30, Dance Music. 7.45, Time; Weather; Notes for Farmers. 8.0, News. 8.10, Wildernesses and Steppes in South Germany—What the Excavations at Trönggen Reveal. 8.35, Folk Music by the Mössing Zither Trio and Soloists. 9.10, Concert by the Station Orchestra. 10.20, News. 10.35, Topical Talk. 10.45, Local News. 11.0, Concert by the Station Orchestra. 12 Midnight, See Frankfurt. 1.0 a.m. (Wednesday), Close Down.

SUNDSVALL.—Relays Stockholm.

TOULOUSE

913 kc/s, 328.6 metres; 10 kW.—8.0 a.m., Dance Refrains. 8.30, News. 8.35, Light Music. 12 Noon, Opera Music. 12.15 p.m., Chansonnettes. 12.30, News; Exchange. 12.45, Request Music. 1.0, Market Prices. 1.5, Music by a Viennese Orchestra. 1.30, Sound Film Music. 1.45, Accordion Solos. 2.0, Amusement Guide. 6.0, News. 6.15, Opera Music: Transformation Music from Parsifal (Wagner); Prelude to the Third Act of The Mastersingers (Wagner); Overture, Figaro (Mozart). 6.30, Songs. 6.45, Orchestral Music. 7.0, Operetta Airs. 7.15, Marches. 7.30, News; Exchange. 7.45, Opera Music: Arias from (a) Thaïs (Massenet), (b) La Bohème (Puccini), (c) La Traviata (Verdi), (d) Werther (Massenet). 8.15, Symphony Orchestra: Mascara (Lacôme); Overture, Egmont (Beethoven). 8.30, Chansonnettes. 9.0, Hunting Horn Music. 9.30, Sound Film Music. 10.0, Light Music by a Viennese Orchestra. 10.15, News. 10.30, Chansonnettes.

11.0, Cinema Organ Music. 11.15, Opera Arias: Arias from (a) Figaro (Mozart), (b) Tales of Hoffmann (Offenbach), and (c) Scheherazade (Ravel). 11.30, Light Music. 11.50, Choral Music. 12 Midnight, News. 12.5 a.m. (Wednesday), Au cavaeu de Minuit—Radio Fantasy. 12.15, Music by an Argentine Band. 12.30 (approx.), Close Down.

TRONDHEIM.—Relays Oslo. TURIN.—Relays Milan.

VATICAN CITY

15,120 kc/s, 19.84 metres; 10 kW (Morning); 5,970 kc/s, 50.26 metres (Evening).—11.0 to 11.15 a.m., Religious Information in English. 8.0 to 8.15 p.m., Religious Information in Italian.

VIENNA

592 kc/s, 506.8 metres; 120 kW. Relayed by Graz, 886 kc/s, 338.6 metres; Innsbruck, 519 kc/s, 578 metres; Klagenfurt, Linz, and Salzburg, 1,294 kc/s, 231.8 metres.—9.0 a.m., News. 9.20, Market Prices. 9.30, Weather. 10.50, Water-Level. 11.30, Records of Alpine Music. 11.55, Weather. 12 Noon, Classical Records. In the interval at 1.0 p.m., Time; News. 2.0, Announcements. 3.30, Time; Weather; Exchange. 3.50, Programme for Women. 4.10, News. 4.15, Programme for Children. 4.40, Recital by Irene Königshofer-Rethy (Soprano) and Olga Höfler-Schuch (Pianoforte); Arias from Figaro (Mozart); Il Trovatore (Verdi) and Oberon (Weber); Pianoforte Solos: Pastorale in E minor (Scriabin); Gavotte in B minor (Bach-Sant-Saëns); Two Pieces from the Suite, Woodland Sketches (MacDowell): (a) To a Wild Rose, (b) Will o' the Wisp; Arabesque (Debussy); Rhapsody in G minor, Op. 79 (Brahms). 5.10, Talk: The Return Sixty Years Ago of the Austrian North Pole Explorers. 5.35, Records. 6.5, Talk: Wolf-Ferrari's Opera, Sly. 6.25, Talk: The Faculty of Commerce at Vienna University. 6.40, Technical Talk. 7.0, Time; Announcements; Weather. 7.10, Topical Talk. 7.30, Concert of Italian Chamber Music by the Vienna Symphony Orchestra; Conductor, Schönherr; Soloists: Felier (Tenor) and Rosner (Violin); Festival Overture (Cardoni); Neapolitan Suite (de Micheli); Lotta (Buzzi-Peccia); Addio bel sogno (de Curtis); Funiculi-Funicula (Denza); Extracts from the Suite, Oriental Impressions (Amadei); Mal d'amore (Pecchia); Marechiaro (Tosti); Torna a Sorrento (de Curtis); Intermezzo (Giordano); Serenata for Violin (Toselli); Tarantella (de Crescendo); Rosa Catena (Mignone); 'O surdato 'nnamurato (Cannio); Three Pieces (Calotta): (a) Interlude, (b) Burlesque, (c) Festa di Maggio; Potpourri of Folk Songs (Acerbi). 8.50, Der Tod des Tizian—One-Act Play (Hugo von Hofmannsthal); Das Apostelstück—One-Act Play (Maxwell). 10.20, Literary Competition: Finding a Poet for an Unfamiliar Schubert Lied. 10.30, News. 10.50, Dance Music. 12.30 a.m. (Wednesday), Records of Light Music. 1.0 (approx.), Close Down.

WARSAW

223 kc/s, 1,345 metres; 120 kW.—6.45 a.m., Hymn. 6.48, Records. 6.58, Gym. 7.8, Records. 7.15, News. 7.25, Records. 7.35, Hints for Housewives. 7.40, Programme Announcements. 7.50, Announcements. Light Music. 8.0, Interval. 11.57, Time. 12 Noon, Fanfare from St. Mary's Church, Cracow. 12.3 p.m., Weather. 12.5, Press Review. 12.10, Concert by the Lawrusiewicz Hawaiian Guitar Orchestra. 12.45, Programme for Children. 1.0, News. 1.5, Viola and Cello Records. 1.30, Interval. 3.30, Announcements. 3.35, Exchange. 3.45, Concert of Light Music by the Grossman Orchestra: Waltz, Manola (Waldteufel); Creol Serenade (Fronde); Argentine Tango, Hermosa (Borsatto); Slow Foxtrot (Adams); Foxtrot (Sperino); Selection from Viktoria and her Hussar (Abraham); Serenade (Gounod); Boston Waltz and Foxtrot from Frasquita (Lehár). 4.45, Letterbox. 5.0, Violin Recital by Dvorakovski: Sarabande (Bach); Presto from Sonata No. 11 (Porpora-Bachmann); Crepuscule (Halvorsen); Valse lente (Merikanto-Burmester); Mazurka (Lyzeki); Hungarian Piece (Janichnow). 5.25, Talk. 5.35, Records: Light Music. 5.50, Letterbox. 6.0, Programme for Farmers. 6.10, Art Notes. 6.15, Bass Solos by Serge Benoit; Aria from Les Huguenots (Meyerbeer); Death (Gretchaninov); Arias from the Queen of Spades (Tchaikovsky); Prince Igor (Borodin) and Boris Godunov (Mussorgsky); Ballad (Rubinstein). 6.45, Literary Sketch. 7.0, Concert by a Mandoline Orchestra from Poznan, 888 kc/s, 345.6 metres. In the interval at 7.20, Topical Talk. 7.45, Programme Announcements. 7.50, Sports Notes. 8.0, Viennese Concert by an Orchestra, the Reveliers Choir, Schrammel Quartet and Soloists, relayed from Lwow, 795 kc/s, 377.4 metres. 8.45, News. 8.55, Talk. 9.0, Concert by the Station Symphony Orchestra; Conductor, Mierzejewski; Soloist, Dudicz (Songs); Overture, The Countess (Moniuszko); Aria from Goplana (Zelen-ski); Overture, The Thieving Magpie (Rossini); Arias from The Tales of Hoffmann (Offenbach) and Romeo and Juliet (Gounod); Symphonic Dance (Grieg); Ballet Music from Faust (Gounod). 10.0, Announcements; Light Music. 10.15, Dance Music from the Adria Café. In the interval at 11.0, Weather.

ZURICH.—Relays Beromünster.

WEDNESDAY
SEPTEMBER THE TWENTY-SIXTH

ATHLONE

565 kc/s, 531 metres; 60 kW. Relayed by Dublin, 1,348 kc/s, 222.6 metres; and Cork, 1,240 kc/s, 241.9 metres.—1.30 to 2.30 p.m., Time Signal; Exchange; Weather; Records. 4.0, Concert by the Savoy Instrumental Quartet; Soloists, Philip Dore (Organ), J. C. Doyle (Songs). 6.0, Programme for Children. 6.45, News. 7.0, Irish Lesson. 7.15, German Lesson. 7.30, Time Signal; Band Concert. 8.30, Song Recital by A. J. O'Farrell (Bartone). 8.40, Pianoforte Duets by Alice Bell and Dorothy Stokes. 8.50, Song Recital by A. J. O'Farrell (Bartone). 9.0, Pianoforte Duets by Alice Bell and Dorothy Stokes. 9.10, Song Recital by Nan Daly (Soprano). 9.20, Play, presented by E. Young and Company. 9.50, Accordion Solos by M. Grogan. 10.0, Variety Programme. 10.30, Time Signal; News; Weather. 10.40, Records. 11.0 (approx.), Close Down.

BARCELONA

795 kc/s, 377.4 metres; 5 kW.—8.15 a.m., News, Records. 9.0, Chimes; Gym; Records. 9.20, News; Records. 10.0, Obituary. 12 Noon, Chimes; Weather. 1.0 p.m., Programme for Women. 1.45, Records. 2.0, Records. 2.30, Theatre Notes; Amusement Guide; Records. 3.0, Sextet Concert. 4.0, Programme for Hospitals. 5.0, News. 5.30, Interval. 7.0, Concert by the Station Trio. In the interval at 7.30, News. 8.0, Request Records. 8.30, Exchange; Talk for Women. 9.0, Wireless Notes. 9.10, Records. 9.30, Geography and History Lesson. 9.45, Press Review. 10.0, Chimes; Weather; Social Notes; Exchange. 10.10, Concert by the Station Orchestra: March (Haber); Selection, Los Pápiras (Luna); Waltz (Rust); Minuet (Filipicci); Serenade (Tchaikovsky); Overture, Fingal's Cave (Mendelssohn). 11.0, Two Catalan Plays: (a) Tal hi va qui no s'ho creu—One-Act Comedy (Vidal-Valenciano). (b) La Vivor de l'Estornell One-Act Comedy (Soler). 1.0 a.m., (Thursday), News. 2.0 till Close Down. Programme in English by the International Broadcasting Company of London. 2.0, Village Life—Concert. 2.30, Orchestral Music. 3.0, I.B.C. Goodnight Melody and Close Down.

BASLE.—Relays Beromünster.

BELGRADE

686 kc/s, 437.3 metres; 2.5 kW.—10.45 a.m., Programme Announcements. 10.50, Water Level. 11.0, Records. 11.59, Chimes. 12.5 p.m., Concert by the Station Orchestra. 12.45, Exchange; Announcements. 1.10, Concert by the Station Orchestra. 1.30, News; Time. 4.0, Talk. 4.30, Concert by the Station Orchestra: Overture, The Black Domino (Auber); Potpourri (Domini); Piece (Mokranjatz); Selection from Aida (Verdi); Waltz, Wienerkinder (Strauss); Gallop (Eilenburg). 6.25, Time; Programme Announcements. 6.30, French Lesson. 7.0, Records. 7.10, Announcements. 7.20, Records. 7.30, Talk. 8.0, An Opera, relayed from Ljubljana, 527 kc/s, 569.3 metres. In an interval at 10.0, Time; News.

BERLIN

DEUTSCHLANDSENDER, 191 kc/s, 1,571 metres; 60 kW. 5.30 a.m., Weather; News. 6.0, Gym. 6.15, Motto. 6.20, See Königsberg. In the interval at 7.0, News. 8.0, Interval. 8.45, Gym. for Women. 9.0, Interval. 9.40, Gym. for Children. 10.0, News. 10.10, See Hamburg. 10.50, Programme for Children. 11.15, Weather. 11.40, Interval. 11.55, Weather. 12 Noon, See Breslau. 12.55 p.m., Time. 1.0, Records of Drinking Songs. 1.45, News. 2.0, Interval. 2.45, Greetings; Announcements. 3.0, Weather; Exchange. 3.15, Sun, Wind, and Rain—Songs by Children. 3.40, Records of Love Songs. 4.0, See Munich. In the interval at 4.50, Weather. 5.30, Waltz Records. 6.0, Talk by Commander von Engendorff, of the Karlsruhe (on Records); My Impressions of America. 6.15, Birds in Music—Records. 6.30, Hermann Löns Programme—Stories, Ballads, and Songs to the Lute, by Oskar Esenfelder. 7.30, Elementary Italian Lesson. 8.0, News. 8.10, See Frankfurt. 8.30, Recital on Two Pianofortes by Jäger and Stech. 9.0, Talk by the Station Director. 10.0, News. 10.30, Talk: Can America Understand Germany? 10.45, Weather. 11.0, Weather Report for the Gordon-Bennett Balloon Race. 11.10, Waltz Records. 11.30, Concert of Danish Music from Kalundborg (on Records). 12 Midnight, Close Down.

BERLIN

FUNKSTUNDE, 841 kc/s, 356.7 metres; 100 kW.—6.0 a.m., Hymn; Gym. 6.15, Prayers. 6.20, See Königsberg. In the interval at 7.0, News. 8.0, Gym. 8.20 to 8.35, Physical Culture. 9.0 to 9.40, Dialect Reading (Hermann Löns). 10.0, News. 10.10, Exchange. 10.30, Records; News. 11.25 to 11.30, Exchange. 12 Noon, Concert by the Heyden Orchestra: Waltz, Toujours on jamaïs (Waldteufel); Violette (Busz); Serenade (Muzilli); Karussell (Kiek-Schmidt); Silliano (Schmalstieg); Madrigalet (Bullerian); Piece (de Michel); Two Guitars: Frühling und Liebe (Grothe); Serenata (Panizzi). In the interval at 12.30 p.m., Weather. 1.0, News. 1.15, Records. 2.0, News. 2.15, Chamber Music and Song Records. 3.0 to 3.20, Exchange. 4.0, See Königsberg. 5.30, Talk: Preparations for the

Olympic Games. 6.0, Announcements. 6.5, Talk for Mothers. 6.30, Recital of Contemporary Songs by Elisabeth Bauer-Hamann (Contralto); Songs (Heis): (a) Nun muss ich dich lassen, (b) Mitternacht-Glocke, (c) Mich quält der Raum, (d) Es ist ein Stern; Songs (Kurt Schubert): (a) Abend im Feld, (b) Ein Marienlied, (c) Zweier Seelen Lied, (d) Der Spuk. 6.50, String Quartet in C Minor, Op. 19 (Busoni) by the Bruinier Quartet. 7.20, Community Singing. 7.40, Echoes of the Day. 8.0, News. 8.10, Mozart Recital by Heinrich and Carl Steiner: Sonatas for Violin and Pianoforte in E Flat and A. 8.35, Talk for Young People: The Thirty Years' War. 9.0, Over the Moor—Hermann Löns Anniversary Sequence, with Incidental Music. In the interval, Reminiscences of Hermann Löns by his Brother, Ernst. 10.20, News. 10.50, Records of Light Music and Dance Music. 1.0 a.m. (Thursday), Close Down.

BERNE.—Relays Beromünster.

BEROMUNSTER

556 kc/s, 539.6 metres; 60 kW.—12 Noon, Records; Ballet Suites. 12.29 p.m., Time Signal from Neuchâtel Observatory; News. 12.40, Records; Light Music. 1.25, Time; Weather; Exchange. 3.30, Talk for Women. 3.59, Time Signal from Neuchâtel Observatory. 4.0, Concert of Russian Music. 4.45, Classical Dances. 5.15, Records; Viennese Waltzes. 5.30, Viennese Songs and Duets. 5.50, Records. 6.0, Programme for Children. 6.30, Talk: The Fur Industry in Switzerland. 7.0, Time; Weather; Market Prices. 7.30, Talk: The Chemist. 7.50, National Dances by the Station Orchestra; Conductor, Hofmann. 8.30, Jakob Bühler reads from his own Works. 9.0, News. 9.10, Twelve Chorals for Organ. 9.50, Talk: The Zürich Stamp Exhibition. 10.15 (approx.), Close Down.

BODEN.—Relays Stockholm. BODO.—Relays Oslo.

BRATISLAVA

1,004 kc/s, 298.8 metres; 13.5 kW.—6.0 to 7.15 a.m., See Prague. 9.45, Announcements. 9.50, See Prague. 10.10, News in Hungarian. 10.15, See Moravská-Ostrava. 11.0, Water Level. 11.5, Concert by the Station Orchestra; Conductor, Dyk. 11.55, See Prague. 12 Noon, Talk for Farmers. 12.10 p.m., Local News in Slovak. 12.15, Record. 12.20, See Prague. 12.30, See Moravská-Ostrava. 1.40, News and Weather in German and Hungarian. 1.50 to 2.0, See Prague. 3.15 to 4.20, See Prague. 5.30, Viola Recital by Lily Kratochvílová: Sonata in F minor (Rubinstein). 6.0, Talk. 6.10, Talk for Housewives. 6.15, Hungarian Transmission: Sports Notes; Recital of Arpad Balász Songs by Renée Szorová; Educational Talk. 6.55, See Prague. 7.10, Pianoforte Recital by L. Syobodová. 7.35, Talk: The New Russian Theatre. 7.50, Violin Recital by G. Pauliny; Chaconne (Bach); Minuet (Beethoven-Burmeister); Serenade (Pierné); Piece from The Violin-Maker of Cremona (Hubay). 8.15, See Prague. 10.45, News in Hungarian. 11.0, Close Down.

BREMEN.—Relays Hamburg.

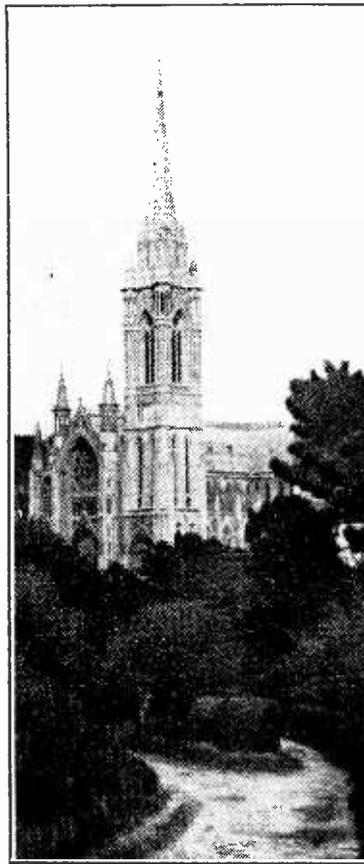
BRESLAU

950 kc/s, 315.8 metres; 60 kW. Relayed by Gleiwitz, 1,231 kc/s, 243.7 metres.—5.0 a.m., Hymn; Motto; Records. In an interval at 5.40, Weather. 6.0, Time; Weather; Gym. 6.25, Orchestral Concert. In the interval at 7.0, Time; News. 8.40, Gym. for Women. 9.0, Time; News. 10.10 to 10.40, Löns Lieder Recital by Lotte Neumann with Lute Accompaniment. 11.30, Time; News. 11.45, Talk: Hermann Löns, the Peasant Author. 12 Noon, Concert by the Station Orchestra; Conductor, Topitz. In the intervals at 12.30 p.m., Time; Weather; and at 1.30, Time; News. 2.20, Exchange. 2.25, Announcements; Records. 2.50, Market Prices. 3.10, Book Review. 3.30, Handwork for Children. 4.0 (from Gleiwitz), Concert by the Glück auf Orchestra; Conductor, Gichnik; March (Hoffmann); Burlesque Overture (van der Muffmann); Waltz (Löhr); Zirkusvolk (Kark); Russian Fantasia (Grothe-Kirchstein); Serenade, Aida (Meis-d); Waltz (Moised); Parade of the Clowns (Herzberg); March Song, Uns gehört die ganze Welt (Schmalstieg). 5.15, See Leipzig. 5.30, Announcements. 6.0, Contralto Recital by Elisabeth Wolfsegger: Der Tod und das Mädchen (Schubert); Des Mädchens Klage (Schubert); An ein Veilchen (Brachms); Sapphische Ode (Brachms); Ruhe meine Seele (R. Strauss); Alterszeiten (R. Strauss). 6.30, Programme to be announced. 6.50, Announcements. 7.0, Nun helf mir Gott und unser blanke Waffen—Play with Sixteenth Century Folk Songs (arr. Wittkowski); The Station Choir, the Station Orchestra and Soloists;

Conductor, Wirth. 8.0, News. 8.10, War Reminiscences. 8.35, See Berlin (Funkstunde). 9.0, A Radio Expedition to Tibet—Sequence (Wittkowski). 10.0, Ernst Freiherr von Wolzogen, a Breslau writer—Readings with Commentary. 10.20, Time; News. 10.45, Dance Music by the Station Band; Conductor, Igner. 3 a.m. (Thursday), Close Down.

BRNO

922 kc/s, 325.4 metres; 32 kW.—6.0 to 7.15 a.m., See Prague. 9.50, See Prague. 10.15, See Moravská-Ostrava. 11.0, Record. 11.5, See Bratislava. 11.55, See Prague. 12 Noon, Market Prices. 12.10 p.m., See Prague. 12.30, See Moravská-Ostrava. 1.20, Records. 1.30, Social Notes. 1.40, Records. 1.50, See Prague. 2.0 to 2.10, Exchange. 3.15 to 4.20, See Prague. 4.30 to 5.0, Report from a Labour Camp.



CARILLON RECITALS are frequently relayed from St. Colman's Cathedral, Queenstown, seen above, by the Athlone, Dublin and Cork stations.

5.40, Hints for Housewives. 5.45, German Transmission; Talk; Recitations. 6.20, Talk for Students. 6.30, Records. 6.45, Talk for Workers. 6.55, See Prague. 7.35, Talk: The Baikal. 7.50, Sonata in B minor (Chopin) by Marie Dvorakova (Pianoforte). 8.15, See Prague. 11.0 (approx.), Close Down.

BRUSSELS (No. 1)

620 kc/s, 483.9 metres; 15 kW.—11.55 a.m., Weather. 12 Noon, Orchestral Concert; Soloist, Pol Gilson (Songs); Wedding March (Paradisi); Overture, The Thieving Magpie (Rossini); Songs: (a) Aria from L'ombre Flotante, (b) Un rien (Dammé); Selection from Rigoletto (Verdi); Violin; Tambourin chinois (Kreisler); Songs: (a) Air from Aïon-Hamet (Dubois), (b) Because (d'Hardelot); Ballet Music from Les mystères Dionysiaques (Ma-senet). 1.0 p.m., News. 1.10, Popular Records. 2.0, Interval. 4.55, News. 5.0, Dance Records. 6.0, Talk: Free Thought. 6.15, Orchestral Concert of Light Music; Soloist, Duquesne (Trumpet). 7.15, Debussy Records. 7.30, Medical Talk; Announcements. 8.0, Concert Version of Lila Time—Operetta (Schubert-Berté). In the interval at 9.0, The Bear—One-Act Farce (Teliekov). 10.0, News. 10.10, Dance Music by the Schuyders Band. 11.0 (approx.), Close Down.

BRUSSELS (No. 2)

932 kc/s, 321.9 metres; 15 kW. Programme in Flemish.—11.57 a.m., Weather. 12 Noon, Records of Light Music. 1.0 p.m., News. 1.10, Orchestral Concert: Overture, La-strata (Lincke); Waltz, Mon rêve (Waldteufel); Fantasia on Flemish Songs (Walpot); First Waltz Potpourri (Robrecht). 2.0, Interval. 4.55, News. 5.0, Concert by the Radio Orchestra; Soloist, Béthune (Violin); Trois paysages (Brusselians); Bosphorus (Bayens); Piece (Bokalanikoff); Arlequinade (Cazaneuve); First Suite (Guiraud); Romance for Violin (Svendsen); Fresques (Gaubert); Norwegian Dances (Grieg). 6.0, Choral in A minor (Franck) on Records. 6.30, Sonata Recital by Scharris (Pianoforte) and Pitsch (Cello); Sonata No. 2 (Bach); Sonata No. 3 (Beethoven). 7.0, Act IV of Mephistopheles (Boito) on Records. 7.30, News. 8.0, Promenade Concert relayed from London. 9.35, Sketch (Balling). 9.55, Promenade Concert (cont.). 10.25, News. 10.35, Dance Music relayed from Brussels (No. 1). 11.0 (approx.), Close Down.

BUCHAREST

823 kc/s, 364.5 metres; 12 kW.—12 Noon, Water Level; Records. 12.45 p.m., Amusement Guide; Exchange; Records of Light Music. 1.15, Time; Weather; News. 1.40, Records of Light Music. 5.0, Concert by the Station Orchestra: Overture, The Ace of Hearts (Kinneke); Waltz (Translaten); Traumland (Fück); Waltz from Eine Ball-nacht; Waltz (Zehrer); Waltz, Die Kosen-den (Lammer); Waltz (Fall); Overture, Antony and Cleopatra (Zerco). 6.0, Time; Weather; News. 6.15, Concert of Modern French Operetta Music; Selections from L'eau à la bouche (Pares-Parys); Bonche à Bonche (Yvain); Deshabillez vous (Mer-cier); No, No, Nanette (Youmans). 7.0, Educational Programme. 7.15, Records. 7.45, Talk. 8.0, Stan Golestan Concert; Soloists, Gimist Brissou and Filionescu (Pianofortes); Jean (Flute); Ghica (Viola); Metani (Clarinet); Alie, Bohesco (Violin); Zelinsky (Oboe); Sonatina for Pianoforte and Flute; Arioso and Allegro from the Concerto for Viola and Pianoforte; Elegie for Clarinet and Pianoforte; Piece for Violin and Pianoforte; Elegy and Folk Songs for Oboe and Pianoforte; Pastorale; Records; String Quartet No. 1 in A flat. 10.0, News.

BUDAPEST

546 kc/s, 549.5 metres; 120 kW.—6.45 a.m., Gym. 9.45, News. 10.0, Two Talks. 12 Noon, Chimes from the University Church. 12.5 p.m., Popular Concert. 1.30, Records. 4.0, Programme for Students. 5.0, Medical Talk. 5.35, Concert by the Toll Cigány Band. 6.50, Talk. 7.25, Choral Concert. 8.15, Reading. 8.50, Concert by the Budapest Concert Orchestra; Conductor, Polgár. Soloist: Rozsi Walter (Songs). Overture, The Crown Diamonds (Auber); Aria from Le Cid (Masse-net); Danse macabre (Saint-Saëns); Selection from Oberon (Weber); Piece (Weiner); Suite (Bortkiewicz). 10.15, News. 10.35, Concert by the Veres Cigány Band from the Café Ostende, followed by Dance Music.

CASSEL.—Relays Frankfurt.

COLOGNE

658 kc/s, 455.9 metres; 60 kW.—5.30 a.m., Hymn; Records. 6.5, Gym. 6.25, See Bres-lau. In the interval at 6.50 Time; News. 8.0, Time; Announcements. 8.5, Gym. for Women. 8.20 to 8.30, Talk for Mothers. 10.0, Time; News. 10.10, Hermann Löns Anniversary Programme for Schools. 11.10, Announcements. 11.40, Legal Talk. 12 Noon, Song Records. 12.45 p.m., Announcements; Greetings. 1.0, Concert by the Augmented Station Orchestra; Conductor, Kühn; Soloists, Schreiber (Cello) and Hans Hauss (Pianoforte); Minuet from the Hauff Symphony (Mozart); Adagio from the Cello Concerto (Haydn); Slerzo from Symphony No. IV (Beethoven); Air from the Suite in D (Bach); Scherzo from the Rhine Symphony (Schumann); First Movement from the Pianoforte Concerto in B flat minor (Tchaikovsky); Allegro con grazia from the Pathetic Symphony (Tchaikovsky). In the interval at 1.45, Announcements. 3.0, Sports Report. 3.30, Exchange. 3.50, Topical Talk. 4.0, See Hamburg. 5.0, Book Review. 5.20, Chamber Music by Children; Conductor, Abshagen. 6.45, Talk: A Tour of Italy, Suily and Topoli. 6.0, Industrial Review. 6.20, Hermann Löns Memorial Programme. 6.40, Topical Talk. 6.50, Exchange; Sports Notes. 7.0, Concert by the Small Station Orchestra; Conductor, Eysoldt; Prelude to Nakis Hochzeit (Lincke); Waltz, Donau-sagen (Fück); Selection from Aida (Verdi); Love's Dream after the Ball (Czibulka); Sizzietta (Blou); Six Bravoura Variations on the Folk Song, Muss i denn zum Städtele hinaus (Kühmann); Bib und Bob (Demaret); March, Diabolos (Maus). In the interval at 7.30, A Flying Visit. 8.0, News. 8.10, See Frankfurt. 8.35, See Berlin (Funkstunde). 9.0, See Munich. 10.0, Time; News. 10.35, Light Music and Dance Music by the Schlenkermann Orchestra relayed from Elberfeld. 12 Midnight, Close Down.

COPENHAGEN.—Relays Kalundborg. CORK.—Relays Athlone. DANZIG.—Relays Königsberg. DRESDEN.—Relays Leipzig.

FECAMP

1,456 kc/s, 206 metres; 10 kW.—11.30 a.m. to 12 Noon, Programme in English arranged by the International Broadcasting Company of London, Happy Half Hour: Request Programme. 12 Noon, Programme in French. 4.30 to 6.0 p.m., Programme in English arranged by the I.B.C. (London). 4.30, Isle of Wight, Portsmouth and Southsea Concert: Part I, Half an Hour with Schubert. 5.0, Part II, Dance Music. 5.30, Part III, Light Music. 6.0, Programme in French. 11.0 till Close Down, Programme in English arranged by the I.B.C. (London). 11.0, Talkie Time: Tunes from the Talkies and Shows. 11.30, Concert: Dance Music. 12 Midnight, Club Concert for Inveresk Listeners: Dance Music. 12.30 a.m. (Thursday), I.B.C. Time Signal. 12.31, Dance Music by Ambrose and his Orchestra (Gramophone Records). 1.0, I.B.C. Good-night Melody and Close Down.

FLENSBURG.—Relays Hamburg. **FLOR-ENCE.**—Relays Milan.

FRANKFURT

1,195 kc/s, 251 metres; 17 kW.—5.45 a.m., Hymn; Time; Weather. 5.50, Gym. 6.40, Time; Announcements. 6.55, Military Band Concert. 8.10, Announcements. 8.15 to 8.35, Gym. 10.0, News. 10.10, Jungens im Sturm!—Sequence for Schools (Voss). 10.50, Household Hints. 11.0, Concert. 11.30, Announcements. 11.45, Social Service. 12 Noon, See Stuttgart. 1.0 p.m., Time; News. 1.20, See Stuttgart. 1.50, Time; News. 2.0, See Stuttgart. 2.30, Industrial Review. 2.45, Time; Exchange. 2.55, Weather. 3.10, **Trier-Freiburg-Kaiserslautern** Inter-Relay Programme: Six Hermann Löns Lieder (Edgar Hansen) by Maria Coomes-Strauss (Soprano), the Composer accompanying, relayed from Trier; Our Alemannic Heritage—Radio Picture (Paul), relayed from Freiburg; Trio in E flat for Flutes and Piano-forte (Siltz), relayed from Kaiserslautern. 4.0, See Königsberg. 5.30, Talk: Field-Marshal Count York of Wartenburg. 5.45, A Camping Sketch for Young People (Kuhnert). 6.20, Reading of Bismarck's Letters to his Wife. 6.35, German Lyrics (Linke). 6.45, Announcements. 6.50, Concert by the Station Orchestra; Conductor, Caspar; Overture, The Nuremberg Doll (Adam); Flower Waltz (Waldteufel); Selection from Die Fledermaus (Joh. Strauss); Entr'acte and Waltz from Coppélia (Delibes); Polka (Jones); Waltz (Waldteufel); March, Verliebte Brüder (Nedbal). 7.45, Topical Talk. 8.0, Time; News. 8.10, Topical Talk. 8.35, See Berlin (Funkstunde). 9.0, Dance Music by the Renner Band with Humorous Interludes. 10.20, Time; News. 10.35, See Stuttgart. 10.45, News. 11.0, Concert of Folk Music by Paul Haarer (Hermann Löns Lieder to the Flute), Eisele (Zither) and Uthicke (Accordion). 12 Midnight, See Stuttgart. 1.0 a.m. (Thursday), Close Down.

FREDRIKSSTAD.—Relays Oslo. **FREI-BURG.**—Relays Stuttgart. **GENEVA.**—Relays Sottens. **GENOA.**—Relays Milan. **GLEIWITZ.**—Relays Breslau. **GOTEBORG.**—Relays Stockholm. **GRAZ.**—Relays Vienna. **HAMAR.**—Relays Oslo.

HAMBURG

904 kc/s, 331.9 metres; 100 kW. Relayed by Bremen, Flensburg, and Hanover, 1,330 kc/s, 225.6 metres.—5.45 a.m., Time; Announcements. 6.0, Gym. 6.15, Time; Weather. 6.20, See Königsberg. In the interval at 7.0, Time; News. 8.0, Weather; Talk for Housewives. 8.10, Announcements; Records. 10.10, Hermann Löns Anniversary Programme for Schools. 10.50, News. 11.0, Humpty Dumpty—Radio Play in English for Schools (Grünwald). 11.30, Concert Version of La Bohème—Opera (Puccini) (on Records). 12 Noon, Household Hints. 12.5 p.m., Time; Announcements. 12.15, Concert relayed from Berlin (Funkstunde). 1.0, Exchange; Market Prices. 1.15, Weather. 1.20, Popular Music. 2.15, News. 2.30, Records—Music from Many Lands. 3.0, Exchange, 3.40, Shipping; Aviation. 4.0, Concert of Modern German Dances by the Station String Quartet, the Station Orchestra, and Girmatis (Pianoforte). Conductor, Maass. 5.30, Reading (Zukovsky). 6.50, German Dialect Ballads by Germer and Jakshat (Songs), with Commentary. 6.30, Popular Records. 6.45, Exchange; Market Prices. 6.55, Weather. 7.0 (from Bremen). Military Band Concert. Conductor: Entelmann. Florentine March (Fueick); Overture, Martha (Plotow); Hungarian Dances, Nos. 5 and 6 (Brahms); Schatz-walzer (Joh. Strauss); Schmeichelkätzchen (Ellenberg); March Potpourri, Alte deutsche Treue (Frantzen); Intermezzo, Elfengedächter (Rhode). 8.0, News. 8.10, Talk: Bremen Cathedral (on Records). 8.35, See Berlin (Funkstunde). 9.0, The Diamond Seekers—Play (Heydrich). 10.0, News. 10.20 (from Kiel). Concert by the Neumünster Choir, relayed from the Oberlyzeum. Conductor: Klinker (Pianoforte). Soloist: Trude-Maria Schnell (Soprano). Glaube (Böttger); Lied des Volkes (Erdlen); Arias from (a) Iphigenia in Aulis (Gluck) and Tannhäuser (Wagner); Der träumende See (Schumann); Feldsamsamkeit (Wendel); Aria from Oberon (Weber); Von Freiheit und Vaterland (Goepfert); Mahnung (Heinrichs). 11.0 (from Hanover). Concert by the Hanover Chamber Orchestra, Conductor: von Sosen.

SEPT. 26th WEDNESDAY continued

Overture, The Queen's Kerchief (Joh. Strauss); Finale from Arielle, die Tochter der Luft (C. P. E. Bach); Mazurka (Dvorák); Neapolitan Suite (de Michel); Alpine Song Fantasia, Die Berge hoch! (Pachernegg); Paraphrase on the Song, Ich hört ein Vöglein pfeifen (Schauss); Old Styrian Dance, Bauerngalopp (Pachernegg). 12 Midnight, Close Down.

HANOVER.—Relays Hamburg.

HILVERSUM

160 kc/s, 1,875 metres; 7 kW. (until 3.40 p.m.). Transmitted from Kootwijk, 50 kW., from 3.40 p.m.—7.40 to 9.40 a.m., Programme of the Workers' Radio Society (V.A.R.A.). 7.40, Records. 9.10, Dietetics. 9.40, Religious Programme of the Liberal Protestant Radio Society (V.P.R.O.). 9.55 till Close Down, V.A.R.A. Programme. 9.55, Records and Talk for Workers. 11.40, Concert of Light Music. Conductor: v. d. Horst. Soloist: Booy (Songs). 12.25 p.m., Talk. 12.28, Organ Recital by Jong. Ballet Music from Sylvia (Delibes); Little man, you've had a busy day (Wayne); The musical box (Heykens); Piece (Warren). 12.55, Concert of Light Music (cont'd.). 1.25, Programme for Women. 1.40, Interval. 1.55, Dress-making Lesson. 2.40, Programme for Children. 5.10, Concert of Italian and Spanish Music. Conductor: Wins. 5.40, Concert by the Small V.A.R.A. Ensemble. Conductor: Bakels. Overture, Nina-Nini (Seelig); Melody (Arezzo); Extract from The Beggar's Opera (Gay); Movement from the Symphony, La Reine (Haydn); Records; L'Elle dans la plaine (Brusselmans); La serenata (Braga); Twilight (Cesek); Russian Songs (Delmas); La cathédrale engloutie (Debussy); Prelude to La demoiselle Elus (Debussy). 6.40, Sports Notes. 7.0, Organ Recital by Steyn. 7.20, Talk. 7.40, S.O.S. Messages. 7.43, Records. 7.55, Craignebille—Play (Anatole France). 8.40, Extracts from The Gipsy Princess (Kálmán) (on Record). 9.25, Talk. 9.28, Press Review. 9.40, Concert by the V.A.R.A. Orchestra. Conductor: de Groot. Overture, Il Guarany (Gomez); La verberna (Lacôme); Variations on a Theme of Tchaikovsky (Arensky); Marching Song (Grainger); Molly on the shore (Grainger); Tambourin chinois (Kreiser); Suite from Tsar Saltan (Rimsky-Korsakov). 10.40, Records. 11.40, Close Down.

HORBY.—Relays Stockholm.

HUIZEN

995 kc/s, 301.5 metres; 7 kW. (until 6.40 p.m.); 20 kW. from 6.40 p.m. Programme of the Christian Radio Society (N.C.R.V.).—7.40 a.m., Bible Reading; Prayer. 7.55 to 9.10, Records. 10.10, Religious Programme. 10.40, Organ and Soprano Solos by Jurjaanz and Mme. Neerden-Ongers. 11.40, Police Notes; Records. 12.10 p.m., Concert by the Amsterdam Chamber Orchestra. Conductor: Kiekens. Kleiner Wienermarsch (Kreiser); Overture, The Italian Girl in Algiers (Rossini); Czardas (Monti); Poème (Fibich); Suite (Dvorák); Records; Overture, Titus (Mozart); Two Indian Love Lyrics (Woodford-Finden); Bohemia (Fétras); Geister-reigen (Gluck-Barger); Hyde Park (Jalowicz). 1.40, Records. 2.40, Organ Recital by Liney. Selection from Lohengrin (Wagner); La Serenata (Braga); Suite orientale (Popy); Souvenir (van den Linden); Scherzi (Schubert); Träumerei (Schumann); Melody in F (Rubinstein); Florentine March (Fueick). 3.25, Interval. 3.40, Concert by the Hartvelt Trio. Trio in D (Leclair); Sonata for Violin and Pianoforte (Bordewijk-Roepman); Records; Trio (Smetana). 4.40, Programme for Children. 5.40, Talk for Farmers. 6.10, Programme to be announced. 6.40, Police Messages; Religious Notes. 6.55, Records. 7.10, Talk. 7.40, Choral Concert. Conductor: Vranken. Wie sich ein Vater erbarmet (Bach); Songs (Bach): (a) Letztes Glück. (b) Im Herbst; La bataille de Marignan (Jannequin); Den Uil (Diepenbroek); Records; Wilt heden nu treden (arr. Vranken, Jr.); Merck toch hoe sterck (arr. Vranken, Jr.); Heer Jezus heeft een hofken (van Duysse); Oene van Sneek (arr. Vranken, Jr.). 8.40, Talk: India. 9.10, Recital by Van den Hurk (Flute), Dongen (Oboe), and Kloek (Organ). Trio Sonata in C minor (Loeillet); Oboe Concerto (Marcello); Flute Solo, First Movement from Symphony No. 7 (Widor); Duo concertant (Klose). In the interval at 9.40, News. 10.10, Records. 11.10 (approx.), Close Down.

INNSBRUCK.—Relays Vienna.

KALUNDBORG

238 kc/s, 1,261 metres; 75 kW. Relayed by Copenhagen, 1,176 kc/s, 255.1 metres; and Skamlebaek, 49.5 metres.—7.0 a.m., Gym. 8.30, Service from Copenhagen Cathedral. 11.0, Weather. 11.10, Fish Prices. 12 Noon, Concert by the Bendix String Ensemble, relayed from the Wivex. 2.0 p.m., Interval. 3.0, Records. 3.30, Concert by Preil's Instrumental Ensemble; Symphonic March (Savino); Waltz Potpourri (Winther); Hungaria (Black); Suite, A. Mediterranean

Cruise (Jalowicz); Valsette (Bazant); Metropolis (Grofé); Foxtrot (Rawicz); Persian Scene (Rust); Waltz, Schön ist die Welt (Lehár); Ein Cocktail in der Wunderbar (Katscher); Italian Serenade (Caludi); Songs (Rasbach); Foxtrot-Intermezzo (Schoppe-Landschütz); When I am looking at you (Stothart); Two little Finches (Kling); Foxtrot (Rawicz). In the interval at 4.25 (approx.), Talk for Women. 5.30, Exchange. 5.45, Talk for Farmers. 6.15, French Lesson. 6.45, Weather; Announcements. 7.0, News. 7.15, Time. 7.30, Talk: Modern Industrial Conditions. 8.0, Chimes. 8.2, The Hansen Family—Humorous Sketch (Locher). 8.15, Danish Music by the Radio Orchestra; Conductor, Reesen; Overture, Der Erlenhügel (Kublan); Minuet from King and Marshal (Heise); Prelude to Once upon a Time (Lange-Müller); King Christian X Homage March (Andersen). 8.45, Missionary Address: Changes of Rule and Race in India. 9.15, Concert of Modern Danish Music by the Radio Orchestra; Conductor, Reesen; Carl Nielsen Potpourri (Reesen); Danish Folk Melody (Tarp); Memorial Suite (Rissager). 9.45, Report: A Lottery Draw. 10.10, News. 10.25, Concert of Scandinavian Music by the Radio Orchestra; Conductor, Reesen; Norwegian Rhapsody No. 4 (Svendsen); Selection from Swan White (Sibelius); Homage March from Sigurd Jorsalfar (Grieg). 11.0, Dance Music by Donde's Band, relayed from the Lorry. In the interval at 12 Midnight, Chimes. 12.30 a.m. (Thursday), Close Down.

KIEL.—Relays Hamburg. **KLAGENFURT.**—Relays Vienna.

KONIGSBERG

1,031 kc/s, 291 metres; 60 kW. Relayed by Danzig, 1,303 kc/s, 230.2 metres.—5.0 a.m., Records. 5.50, Weather. 6.0, Gym. 6.20 (from Danzig). Military Band Concert. In the interval at 7.0, News. 8.0, Prayers. 8.30, Gym for Women. 9.0, Interval. 10.40, News. 11.30, Song Records. 12 Noon, See Berlin (Funkstunde). 1.5 p.m., Popular Records. In the intervals, News. 2.30, Announcements; Records. 3.0, Exchange. 3.10, Poems (Friedrich). 3.20, Household Hints. 3.30, Programme for Children. 4.0, Concert by the Opera House Orchestra. Conductor: Kaestner. Overture, The Thieving Magpie (Rossini); Selection from Il Trovatore (Verdi); Three Swedish Dances (Graener); Overture, Le maçon (Auber); Kaiserwalzer (Joh. Strauss); Ballet Suite from Sylvia (Delibes); March (Carl). 5.30, Talk by an Explorer: The Bedouin. 5.50 (from Danzig). Talk for Parents. 6.15, Exchange. 6.25, Handwork for Boys. 6.55, Weather. 7.0, Hermann Löns Anniversary Programme. 7.30, Handel Organ Recital by Adolf Schütz, with Commentary. Overture, Lotharius; Chaconne in F; Echo Sonata; Aria; Trompetenstück; Concerto in G. 8.0, News. 8.10, See Frankfurt. 8.35, See Berlin (Funkstunde). 9.0, See Breslau. 9.10, Recital by Mia Neussitzer-Toenisson (Soprano). 10.20, News. 10.45, Dance Music. 12.30 a.m. (Thursday), Close Down.

KOSICE.—Relays Prague. **LAUSANNE.**—Relays Sottens.

LEIPZIG

785 kc/s, 382.2 metres; 120 kW. Relayed by Dresden, 1,285 kc/s, 233.5 metres.—5.50 a.m., Notes for Farmers. 6.0, Gym. 6.25, See Breslau. In the interval at 7.0, News. 8.0, Gym. 8.20, Records. 9.0, Interval. 9.40, Exchange. 9.45, Announcements. 10.10, See Hamburg. 11.0, Announcements; Records. 11.30, News; Time; Weather. 11.45, Notes for Farmers. 12 Noon, See Stuttgart. 1.0 p.m., News; Time. 1.10, Operetta Records. 2.0, News. 2.15 to 2.45, Opera Records. 3.20, Review of Hermann Löns Books. 3.40, Exchange. 4.0, The Poet of the Moors—a Hermann Löns Sequence with Music by a School Choir and Orchestra (Rasche). 4.45 (from Dresden). Recital by Rosl Müller (Violin), Gertrud Seydewitz (Mezzo-soprano), and Richter-Haaser (Pianoforte). 5.15, Harvest Thanksgiving Preparations—Report. 5.30, Talk: Leopold von Ranke, the Historian. 5.50, Exchange; Weather. 6.0, Variety Programme. 7.0, Beware of the Bend—a Safety First Play for Motorists (Schwerla). 8.0, News. 8.10, Talk: The Spirit of Weimar. 8.35, See Berlin (Funkstunde). 9.0, An Evening in Old Vienna—Concert by the Leipzig Symphony Orchestra. Conductor: Blumer. Soloists: Johanna Barklin (Soprano) and Erik Wirl (Tenor). Overture, Die Fledermaus (Joh. Strauss); Duet from Der Bettelstuden (Müllöcker); March from Boccaccio (Suppé); Waltz from Der Vizeadmiral (Müllöcker); O Herrgott, hast du dein Wien nimmer gesehn (Thoms); Moulinet-Polka (Jos. Strauss); Song from The Queen's Kerchief (Joh. Strauss); Wien wird schön erst bei Nacht (Stolz); Wien bleibt Wien (Schrammel); In Wien gibt's manch' witziges Gassel (Stolz); Song from The Bird Fancier (Zeller); Gallop, Gross-Städtisch (Ziehler); Song from Wiener Blut (Joh. Strauss); New Viennese Folk Music (Kon-

zak). 10.20, News. 10.50 (from Dresden). Concert by the Dresden Soloists' Ensemble: Overture, Fahrend Volk (Lenschner); Three Lyric Pieces (Keller); Wanderer-Suite (Knümmann); Gondoliera (Ries); Frühlingszeit (Beecker); Ich liebe dich (Grieg); March, Malenkinder (Siede); Selection from Liselott (Künneke). 12 Midnight, Close Down.

LINZ.—Relays Vienna.

LUXEMBOURG

230 kc/s, 1,304 metres; 150 kW.—7.45 a.m., Records. 8.0, News in French; Record; News in German; Record. 12 Noon, Concert by the Station Orchestra; Conductor, Pensis; Overture (Strauven); Grieg Potpourri (Crbach); Waltz (Komzak). 12.30 p.m., News in French and German. 12.40, Concert (cont'd.); Suite de Carnaval (Schmalstich). 1.0, Exchange. 1.5, Concert (cont'd.); Selection from The Land of Smiles (Lehár). 1.15, Records. 1.30, Exchange. 1.35, Records. 2.0, Exchange. 3.45, Exchange. 6.30, Concert of Light Music and Dance Music. 7.30, Racing Results. 7.35 till Close Down, Spanish Evening. 7.35, Accordion Recital by Marc Braum. 8.0, News in French and German. 8.20, Concert of Spanish Music by the Station Orchestra; Conductor, Pensis; Overture, El Guarany (Gomez). 8.30, Exchange. 8.35, Concert (cont'd.); Waltz, El Turia (Granados); Romance andalousa (Sarasate); Dances Nos. 5 and 6 (Granados); Spanish Suite (Albeniz); Record. 9.40, Concert of Spanish Music by Foreign Composers, by the Station Orchestra; Conductor, Pensis; Spanish Dances (Moszkowki); Record. 9.30, Sonata in B minor (Liszt) by René Delporte (Pianoforte); Record. 9.50, Concert (cont'd.); Pièce en Forme de Habanera (Ravel); Suite from Le Cid (Massenet); Andalousa (Rubenstein); Rhapsody España (Chabrier); Caprice espagnol (Rimsky-Korsakov). 10.40, Dance Records.

MADRID

EAJ7, 1,095 kc/s, 274 metres; 7 kW.—9.0 a.m., News. 10.0, Announcements; Exchange. 10.30, Interval. 2.0 p.m., Chimes; Time; Weather; Popular Music; Talk. 2.30, Sextet Concert. 3.0, Amusement Guide; Exchange; Light Music. 3.30, Sextet Concert. 4.0, News; Popular Music. 4.30, Sextet Concert. 4.50, Film Review; News. 5.0, Interval. 6.0, Chimes; Light Music. 7.0, Announcement; Military Band Concert. 7.30, Exchange; Argentine Songs. 8.0, News. 8.15, Concert. Part I, Cello Recital: Andante (Bach-Silotti); Serenade (Schubert); Minuet (Mozart); Song (Dvorák); The Flight of the Humble Bee (Rimsky-Korsakov); Intermezzo, Goyescas (Granados); Minuet (Debussy); Granada (Ros); Bolero (Rubio). Part II, Orchestral Concert of Spanish Music. Part III, Song Recital: Arias from Samson and Delilah (Saint-Saëns), Mignon (Thomas), El palo moruno (Falla), Seguidilla murciana (Falla); Lullaby (Falla); Polo (Falla); Tirana (Nin); Aria from The Barber of Seville (Rossini). Part IV, Violin Recital: Partita in G minor (Bach); Romance in F (Beethoven); To Spring (Grieg); Caprice (Elgar); Orientale (Cui); Introduction and Tarantella (Sarasate). 9.40, Sports Notes. 10.0, Chimes; Time; Announcements. 11.0, News. 11.15, Concert by the Station Sextet. Soloist: Carmen Bonet (Mezzo-soprano). In the Interval, Programme by Ramón Gómez de la Serna. 12.45 a.m. (Thursday), News. 1.0, Chimes; Close Down.

MALMO.—Relays Stockholm.

MILAN

814 kc/s, 368.6 metres; 50 kW. Relayed by Turin, 1,140 kc/s, 263.2 metres; Genoa, 986 kc/s, 304.3 metres; and Florence, 610 kc/s, 491.8 metres.—7.30 a.m., Gym. 7.45, Time; News. 11.30, Concert by the Ferruzzi Orchestra. 12.30 p.m., Records. 12.45, News. 1.0, Time; Announcements. 1.5, Concert by the Chesi-Zarandelli-Cassone Trio. In the interval at 1.30, Records; Exchange. 2.15 to 2.25, Exchange. 4.35, News. 4.45, Programme for Children. 5.10, Concert of Chamber Music. 5.55, Weather. 6.0 to 6.10, Corn Prices. 7.0, News. 7.15, News in Foreign Languages. 8.0, Time; Announcements; Records. 8.30, Government Notes. 8.45, Comedy, Pirandello. 9.0, Concert by the Symphony Orchestra; Conductor, Guarneri. In the interval, Talk. 11.0 (approx.), News.

MONTE CENERI

1,167 kc/s, 257.1 metres; 15 kW.—12 Noon, News. 12.5 p.m., Concert by the Radio Orchestra: Overture, Orpheus and Eurydice (Gluck); Suite, Esquisses Bandades (Brusselmans); Barcarolle (Grünfeld); Sottiquay (Gabriel-Marie). 12.29, Time; Weather. 12.33, Orchestral Concert (cont'd.); Selection from La Bohème (Fueick); Lullaby (Kricka); Sword Dance (Poldini). 12.55, News. 1.5, Records. 1.15, Fashion Talk. 1.30, Interval. 3.59, Time. 4.0 to 6.0, See Beromünster. 7.45, News. 8.0, Talk for Farmers. 8.15, Concert by the Radio Orchestra; Conductor, Leopoldo Casella; Overture, Sotomisa (Paër); Petite Suite (Debussy); Prelude and Clair de lune from Werther (Massenet); Dance of the Waves from Loreley (Catalani); Suite campestre (Amadei). 9.0, No Reply from L303—Comedy (Martin Kost). 10.0 (approx.), Close Down.

SEPT. 26th **WEDNESDAY** continued

MORAVSKA-OSTRAVA

1.158 kc/s, 259.1 metres; 11.2 kW.—6.0 to 7.15 a.m., See **Prague**. 9.50, See **Prague**. 10.15, Concert by the State Police Band; Conductor, Sochor. 11.0, Record. 11.5, See **Bratislava**. 11.55, See **Prague**. 12 Noon, Literary Programme. 12.10 p.m., See **Prague**. 12.30, Concert by the Station Orchestra; Conductor, Musil. 1.20, Records. 1.30, See **Prague**. 1.40 to 2.0, Records. 2.15 to 4.20, See **Prague**. 5.40, Talk on Art. 5.50, Record. 5.55, News. 6.0, Talk. 6.10, Talk for Workers. 6.20, Pianoforte Recital by Alfred Rotter. 6.45, Records. 6.55, See **Prague**. 7.35, Reading. 7.50, Sketch (Röslér). 8.15, See **Prague**. 10.45, Records. 11.0 (approx.), Close Down.

MOSCOW (No. 1)

174 kc/s, 1,724 metres; 500 kW.—5.0 a.m., News. 5.15, Fanfare. 5.45, Gym. 6.15, Musical Programme. 8.15, Programme for Children. 9.0, Musical Programme. 9.58, Time. 10.0, News. 10.15, Concert for Collectivist Farmers. 3.0 p.m., Programme Announcements. 3.15, Programme for Children. In the interval, at 4.0, News. 5.30, Red Army Programme—Reading. 6.30, Literary and Musical Programme for Collectivist Farmers. 8.0, Play (Kornaitchouk), with Incidental Music by Kobalevsky. 9.0, Talk in Czech: The Harvest. 9.55, Chimes. 10.5, Talk in English: The Changing Face of Russia. 11.5, Talk in German: Towns of the Soviet Union.

MOTALA.—Relays **Stockholm**. **MUH-LACKER**.—See **Stuttgart**.

MUNICH

740 kc/s, 405.4 metres; 100 kW. Relayed by **Augsburg** and **Nürnberg**, 1,267 kc/s, 236.8 metres.—6.30 a.m., Gym. 6.45, Motto. 6.50, Italian Lesson. 7.15, Time; News. 7.25, Concert of Schrammel Music. 9.50, Gym. for Women. 10.10, Hermann Löns Anniversary Programme for Schools. 10.55, Market Prices. 11.5, Notes for Farmers. 11.15, Time; News. 11.30, Announcements; Records. 12 Noon, Concert by the Munich Symphony Orchestra; Conductor, Ebner. 1.15 p.m., Time; News. 1.25, Popular Records. 2.0, News. 2.20 (from **Nürnberg**), Klavier-Skizzen, Op. 26 (Kilcher), by Karl Leinhardt. 2.50, Talk: Spanish Gardens. 3.10, Pianoforte Lesson. 3.30 (from **Nürnberg**), Talk: Hermann Löns. 3.50, Announcements. 4.0, Variety Programme by the Schneider Orchestra and Soloists. 5.30, Programme for Children. 5.50, Sonata, Op. 31, No. 2 (Beethoven), by Anni Dümmler (Pianoforte). 6.10, Old Danzig—Sequence for Young People (Paris). 6.50, Time; Announcements. 7.0, See **Breslau**. 8.0, News. 8.5, An Imaginary Conversation with Goethe and Goethe Lieder. 8.35, See **Berlin (Funkstunde)**. 9.0, A Trifle too Exotic—German Composers' Conceptions of Music from Foreign Lands—versus the Reality; The Station Orchestra; Conductor, Kloss; Humorous Commentary by Hans Reimann; Real Records from Strange Lands. 10.0, Time; News; Exchange. 10.20, Josef Renner Recital by Haase (Baritone), Winkler (Violin), and Schoedel (Organ). 11.0, Dance Music by the Station Band; Conductor, Aulich.

NAPLES.—Relays **Rome**. **NOTODDEN**.—Relays **Oslo**.

OSLO

250 kc/s, 1,154 metres; 60 kW. Relayed by **Hamar**, 519 kc/s, 573 metres, and **Jeløy**, 6,990 kc/s, 42.92 metres.—11.15 a.m., Service. 11.50, Exchange. 12.55 p.m., Nauen Time Signal. 1.0 to 2.0, Records. In the intervals at 1.15, Weather; Talk for Farmers; and at 1.45, Exchange. 5.0, Records. 6.0 till Close Down, Programme to be announced.

OSTERSUND.—Relays **Stockholm**.

PARIS

POSTE PARISIEN, 959 kc/s, 312.8 metres; 100 kW.—7.10 a.m., Fanfare; Records. In the interval at 7.30, News. 8.5, Concert. 8.20, News. 8.45, Cookery Talk. 12 Noon, Exchange. 12.5 p.m., Operetta Records. 12.25, News. 12.35, Records. 12.45, Dance Music by the Station Jazz Band and a Vocal Trio; Soloist, Carol King. In the intervals at 1.5 and 1.30, Exchange. 2.0, Exchange. 2.15, Exchange. 3.45, Exchange. 4.50, Exchange. 6.25, Jewish Programme. 6.45, Exchange. 6.49, Wagner Records; Entry of the Gods in Valhalla from the *The Rhinegold*; Extracts from *Siegfried*. 7.10, News. 7.30, News. 7.45, Records. 8.0, Interval. 8.10, Pianoforte Recital by Yolande Kornhold. 8.30, The Sacred Flame—Play in Three Acts (Somerset Maugham). In the intervals, Exchange; Talk. 10.20, News. 10.30 till Close Down, Programme in English arranged by the International Broadcasting Company of London. 10.30, Around the Shops. 11.0, I.B.C. Good-night Melody and Close Down.

PARIS

RADIO PARIS, 182 kc/s, 1,648 metres; 75 kW.—6.45 a.m., Gym. 7.0, Records. 7.15, News. 7.45, Gym. 8.0, Records. 12 Noon, Talk: Education. 12.15 p.m., Dance Music by the Lucien Goldy Band; Soloist, Jean Sorbier (Song Refrains). In the interval at 1.20, Exchange. 3.45, Exchange. 6.20, Weather; Notes for Farmers; Talk; Ex-

change; Racing Results. 6.45, Medical Talk. 7.0, Talk. 7.15, British Press Review. 7.30, Topical Talk. 8.0, Readings by Paul Reboux. 8.30, News. 8.45, Records. 8.55, Concert from **Vienna**. 10.0, Song Recital by Sobrier and Henriette Lebard. 10.30, Dance Music by Atkins' Band.

PITTSBURGH

KDKA, 980 kc/s, 306 metres; 50 kW. Relayed by **W8XK**, on 48.85 metres; and 25.27 metres.—3.0 p.m., Harvest of Song. 3.15, Sammy Fuller. 3.30, To-day's Children. 3.45, News; Cookery Hints. 4.0, Uncle Tom and Betty. 4.15, Tony Wons. 4.30, United States Army Band. 5.0, Fields and Hall. 5.15, Charles Sears (Tenor). 5.30, Vic and Sade. 5.45, Hotel William Penn Orchestra. 6.0, Exchange. 6.15, Honourable Archie and Frank. 6.30, Farm and Home Hour. 7.30, KDKA Home Forum. 8.0, Don Carlos and his Orchestra. 8.15, Harry Kogen's Orchestra. 8.45, Human Values. 9.0, Betty and Bob. 9.15, Karen Fladoes. 9.30, Exchange. 9.45, Chicago Symphony Orchestra. 10.15, KDKA Kiddies' Klub. 10.30, The Singing Lady. 10.45, Orphan Annie. 11.0, Dan and Sylvia. 11.14, Baseball Résumé. 11.30, Comedy Stars of Hollywood. 11.45, Lowell Thomas. 12 Midnight, Amos 'n' Andy. 12.15 a.m. (Thursday), Johnny Johnson's Orchestra. 12.30, Irene Rich. 12.45, Music; News; Drama. 1.0 to 6.0 a.m., Popular Programme.

PORSGRUND.—Relays **Oslo**.

PRAGUE

638 kc/s, 470.2 metres; 120 kW.—6.0 a.m., Time; Gym; Music; News. 7.15, Interval. 9.50, News. 10.5, News in German. 10.10, Record. 10.15, See **Moravská-Ostrava**. 11.0, Record. 11.5, See **Bratislava**. 11.55, Notes for Farmers. 12 Noon, Time; Talk for Farmers. 12.10, Records. 12.20, News. 12.30, See **Moravská-Ostrava**. 1.20, Talk for Brain Workers. 1.30, Labour Market. 1.40, Labour Market in German. 1.50, Exchange. 1.55, Exchange and Weather in German. 2.0, Interval. 2.15, Concert by the National Guards' Band; Conductor, Labsky. 4.15 to 4.20, Exchange; Weather. 5.30, Talk for Workers. 5.40, Talk: Light and Classical Music. 5.50, Talk for Farmers. 6.0, Announcements. 6.5, Record. 6.10, Talk for Workers. 6.20, German Transmission: Topical Talk; Talk for Workers; News. 6.55, News in German. 7.0, Time; News. 7.10, Concert of Schrammel Music. 7.35, Talk. 7.50, Song Recital by Pia Igy. 8.15, Talk: Denmark's National Holiday. 8.25, Queen Dagmar's Land—Radio Picture. 9.0, Concert for Arnold Schönberg's Sixtieth Birthday; The Station Orchestra; Conductor, Jirák: The Kolisch Quartet; Soloist, Julie Nussy-Bächerova (Songs); Concerto grosso in A, Op. 6 (Schönberg-Handel); String Quartet No. 2 in F sharp minor with Soprano Solo (Schönberg). 10.0, Time; News. 10.15, Records. 10.45, News in French. 11.0 (approx.), Close Down.

RJUKAN.—Relays **Oslo**.

ROME

Call 190, 713 kc/s, 420.8 metres; 50 kW. Relayed by **Naples**, 1,104 kc/s, 271.7 metres; **Milan No. 2**, 1,348 kc/s, 222.6 metres; **Turin No. 2**, 1,357 kc/s, 221.1 metres; and **PRO**, 11,810 kc/s, 25.4 metres.—7.30 a.m., Gym. 7.45, Time; Announcements. 8.0, Interval. 12.30 p.m., Records. 1.5, Concert of Light Music. In the interval at 1.30, Time; News. 2.15, Interval. 4.30, Programme for Children. 4.55, News; Exchange. 5.10, See **Milan**. 5.55, Weather. 6.0 to 6.10, Corn Prices. 7.0, News; Report of the Royal Geographical Society. 7.15, News in Foreign Languages. 8.0, Time; News. 8.10, Records. 8.30, Government Notes. 8.45, The Love of the Three Kings (Montemezzi). 11.0, News.

RUYSSELEDE

10,330 kc/s, 29.04 metres; 8 kW.—7.45 p.m., News in French. 8.0, See **Brussels No. 1**. 9.0, News in Flemish. 9.15, Close Down.

SALZBURG.—Relays **Vienna**.

SCHENECTADY

WGY, 790 kc/s, 379.5 metres; 50 kW. Relayed at intervals by **W2XAF**, on 31.48 metres; and **W2XAD** on 19.56 metres.—7.0 p.m., Dreams Come True; Barry McKinley (Songs). 7.15, The Wise Man—Dramatic Programme. 7.30, Woman's Radio Review; Talks; Orchestra. 11.25, Exchange. 12 Midnight, Guest Artists and Instrumental Quartet. 1.0 to 3.0 a.m. (Thursday), Popular Programme.

SOTTENS

677 kc/s, 443.1 metres; 25 kW.; and **Geneva**, 401 kc/s, 748 metres.—7.0 to 7.15 a.m., Gym. 12.29 p.m., Time; News. 12.40 (from **Geneva**), Records. In the interval at 1.0, Exchange. 2.0, Interval. 3.59, Time. 4.0, See **Beromünster**. 6.0 (from **Geneva**), Programme for Women. 6.35 (from **Geneva**), Esperanto Lesson. 6.40 (from **Geneva**), Opera Records. 6.50 (from **Geneva**), Chess Lesson. 7.10 (from **Geneva**), Geography Talk. 7.40 (from

Geneva), Wireless Notes. 7.59, Weather. 8.0 (from **Geneva**), Songs of the Mountains—Lecture-Recital; A Double Vocal Quartet; Conductor, Schenk: Le ruisseau (Bovet); Souvenir lointain (Schneeberger); Sur l'alpe voisine (Daleroze); Le flot et le vent (Bovet); Chants montagnards (Mouton); Les cloches du soir (Weyts). 9.15, News. 9.25 (from **Geneva**), Concert of Light Music by the Geneva Municipal Orchestra; Conductor, Gabelles; Soloist, Dupont (Cornet). 10.0 (from **Geneva**), Talk: The Work of the League of Nations. 10.15 (approx.), Close Down.

STOCKHOLM

704 kc/s, 426.1 metres; 55 kW. Relayed by **Boden** and **Ostersund**, 413.5 kc/s, 726 metres; **Göteborg**, 941 kc/s, 318.8 metres; **Hörby**, 1,131 kc/s, 265.3 metres; **Motala**, 216 kc/s, 1,389 metres; and **Sundsvall**, 601 kc/s, 499.2 metres.—7.20 a.m., Gym. 7.45, Service. 8.0, Weather. 12.5 p.m., Gym. for Schools. 12.30, Weather. 12.55, Time. 1.0, Talk for Schools. 1.20, Orchestral Concert of Light Music, relayed from **Malmö**, 1,312 kc/s, 228.7 metres. 2.25, Talk. 2.45, Programme for Children. 3.0, Interval. 5.0, Weather. 5.5, Song Recital by Nonne Hall and Erierson-Bönick, relayed from **Norrköping**. 5.25, Reading (Janson). 5.45, Records. 6.45, Elementary German Lesson. 7.15, Weather; News. 7.30, Literary Review, relayed from **Uppsala**. 8.0, Bach Pianoforte Recital by Iso Elinson: Five Preludes and Fugues; The Italian Concerto. 8.40, A Report. 9.0, Cello Recital by Kinkulkin: Sonata in D minor (Corelli); Chanson triste (Kalinnikov-Kinkulkin); Grottesque (Haas); Harlequin (Popper). 9.20, Talk. 10.0, Dance Records. 11.0 (approx.), Close Down.

STRASBOURG

859 kc/s, 349.2 metres; 15 kW.—11.0 a.m., Concert relayed from **Marsailles**, 749 kc/s, 400.5 metres. 12 Noon, Orchestral Concert of Light Music; Conductor, Roskam: Slav Rhapsody (Volpatti); Waltz, Myosotis (Waldteufel); Violin Solo, Tango (Albéniz); Selection from The Last Waltz (O. Strauss); Sing a little Low-down Tune (Tobias-Scholl-Menchner); Wedding Serenade (Klose); Don't say Good-night (Dubin-Warren); In the Kingdom of Buddha (Armandola); Down South (Myddleton); Aloha, Beloved (Long and Canfield); March, Angelina (Ricardo). 1.5 to 2.0 p.m., Records. 4.45, Talk in German: Electricity. 5.0, Concert relayed from **Bordeaux-Lafayette**. 6.0, Medical Talk. 6.15, Talk in German: The New Austrian Constitution. 6.30, Pierre Bretagne Concert; Jean Hazart (Songs), Roskam (Cello) and Pogoda (Pianoforte); Sonata in G for Cello and Pianoforte; Songs: Les Voexis secrets; Pianoforte Solo, Petite Suite rustique; Songs: Images de mon pays. 7.30, Time; News. 7.45, Records. 8.0, News in German. 8.30, The Dollar Princess—Operetta in Three Acts (Fall); Conductor, de Villers. In the interval at 9.30, News. 11.0, Dance Music from the Caveau de l'Aubette. 12 Midnight (approx.), Close Down.

STUTTART

MUHLACKER, 574 kc/s, 522.6 metres; 100 kW.—5.35 a.m., Notes for Farmers. 5.45, Hymn; Time; Weather. 5.50, Gym. 6.15, Records. 6.40, Time; Announcements. 6.55, Records. 7.25, See **Munich**. 8.10, Weather. 8.15, Gym. 8.35 to 8.40, Announcements. 9.45, Talk for Mothers. 10.0, News. 10.10, Rentlingen—Sequence for Schools (Nothardt). 10.40, Talk: Influenza. 11.10, Chopin Recital by Gertrud Schaufele-Steingässer (Pianoforte); Waltz in A flat, Op. 34, No. 1; Waltz in A minor, Op. 34, No. 2. 11.25, Announcements; Records. 11.55, Weather. 12 Noon, Concert by the Station Orchestra. 1.0 p.m., News. 1.20, The Four Seasons—Concert on Records. 1.50, Time; News. 2.0, Folk Music Records. 2.30, Concert by the Hühnerfeld-Saar Choir. 3.0, Stories for Children. 3.15, Theodor Röhmayr and Lothar Windsperger Song Recital by Hilde Noller (Mezzo-Soprano). 3.45, Talk: Destructive Insects. 4.0, See **Königsberg**. 5.30, Legal Talk. 5.45, Readings (Essig). 6.10, Pianoforte, Viola and Flute Recital, relayed from **Karlsruhe**. 6.50, Swabian History Talk. 7.20, Accordion Concert. 7.45, Time; Weather; Notes for Farmers. 8.0, News. 8.10, Political Talk. 8.35, See **Berlin (Funkstunde)**. 9.0, See **Breslau**. 10.0, Talk in Dialect, relayed from **Karlsruhe**. 10.35, Topical Talk. 10.45, News. 11.0, Dance Music by the Wende Band. 12 Midnight, Light Music. 1.0 a.m. (Thursday), Close Down.

SUNDSVALL.—Relays **Stockholm**.

TOULOUSE

913 kc/s, 328.6 metres; 10 kW.—8.0 a.m., Dance Refrains. 8.30, News. 8.35, Orchestral Music. 8.45, Songs. 12 Noon, Arias from Opera. 12.15 p.m., Light Music. 12.30, News; Exchange. 12.45, Request Music. 1.0, Market Prices. 1.5, Sound Film Music. 1.15, Light Orchestral Music. 1.30, Songs. 1.45, Military Band Music. 2.0, News.

6.0, News. 6.15, Light Music. 6.30, Chansonnets. 6.45, Opera Music: Selection from *Rigoletto* (Verdi); Prelude to *Parsifal* (Wagner); Prelude to *Faust* (Gounod). 7.0, Sound Film Music. 7.15, Hawaiian Guitar Solos. 7.30, News; Racing Results; Exchange. 7.45, Orchestral Music: Spanish Dance No. 6 (Granados); Marche militaire (Saint-Saëns). 7.50, Talk. 8.15, Medical Talk. 8.30, Duets. 9.0, Le Roman d'Amour—Radio Fantasy. 9.30, Military Band Music. 10.0, Au Caveau de Dix Heures—Radio Fantasy. 10.15, News. 10.30, Operetta Music: Selection from *The Bayadere* (Kálmán); La Mascotte (Andran); Les Vingt Huit Jours de Chairette (Roger-Tavian); Waltz from *Die Teresina* (O. Strauss). 11.0, Request Music. 11.15, Light Music. 11.30, Songs. 11.50, Balalaika Music and Russian Songs. 12 Midnight, News; Announcements. 12.5 a.m. (Thursday), Opera Music; Arias from Boris Godunov (Mussorgsky); The Valkyrie (Wagner) and Der Freischütz (Weber). 12.15 a.m., Orchestral Music; Academic Festival Overture (Brahms); Selection from Idomeneo (Mozart). 12.30, Close Down.

TRONDHEIM.—Relays **Oslo**. **TURIN**.—Relays **Milan**.

VATICAN CITY

15,120 kc/s, 19.84 metres, 10 kW. (Morning); 5,970 kc/s, 50.26 metres (Evening).—11.0 to 11.15 a.m., Religious Information in Spanish. 8.0 to 8.15 p.m., Religious Information in Italian.

VIENNA

592 kc/s, 506.8 metres; 120 kW. Relayed by **Graz**, 886 kc/s, 338.6 metres; **Innsbruck**, 519 kc/s, 578 metres; **Klagenfurt**, **Linz**, and **Salzburg**, 1,294 kc/s, 231.8 metres.—9.0 a.m., News. 9.20, Market Prices. 9.30, Weather. 10.50, Water Level Report. 11.30, Programme for Women. 11.55, Weather. 12 Noon, Popular Records. 1.0 p.m., Time; News. 1.10, Popular Records. 2.0, Announcements. 2.10 to 2.30, Records of Famous Artists. 3.30, Time; Announcements. 3.50, Programme for Children. 4.10, News. 4.15, Handwork Programme. 4.30, Sound Film Records. 5.30, Recital of Contemporary Austrian Music by Frieda Müller (Soprano) and Jenő Takacs (Pianoforte): Songs (Mojsisovic): (a) Ein Traum, (b) Am Stieckhais, (c) Die Georgine, (d) Waldlied; Pianoforte Solos (Jenő Takacs): (a) Seventeen Miniatures from the Philippines, (b) Three Bagatelles. 6.0, Talk. 6.25, Talk: The Eighth World Congress of Philosophers at Prague. 6.50, Topical Talk. 7.0, Time; News. 7.20, Dance Music by the Fox Jazz Band and Roland (Song Refrain). 8.5, Concert by the Vienna Symphony Orchestra, relayed from the Konzerthausaal; Conductor, Kabasta; Soloist, Enid Szantheo (Contralto): Symphonic Variations on an Old German Dance Song (Robert Wagner); Five Songs (Rinaldini); Symphony No. 2 in C Minor (Bittner). 10.0, Orchestral Concert: March (Dostal); Waltz, Gold and Silver (Lehár); Overture, Mariabella (Fueck); Romance and Waltz Intermezzo (Hies); Selection from *Faust* (Gounod); Overture, Der Schatzmeister (Ziehrer); Wine, Woman and Song (Joh. Strauss); Potpourri, Fortissimo (Kálmán); Potpourri, Streiflichter (Morena); March Refrain, Frühjahrsparade (Stolz). 12 Midnight, Dance Records. 1.0 a.m. (Thursday), Close Down.

WARSAW

223 kc/s, 1,345 metres; 120 kW.—6.45 a.m., Hymn. 6.48, Records. 6.58, Gym. 7.8, Records. 7.15, News. 7.25, Records. 7.35, Hint for Housewives. 7.40, Programme Announcements. 7.50, Announcements; Light Music. 8.0, Interval. 11.57, Time. 12 Noon, Fanfare from St. Mary's Church, Cracow. 12.3 p.m., Weather. 12.5, Press Review. 12.10, Orchestral Concert from **Cracow**, 986 kc/s (304.3 metres). 1.0, News. 1.5, Ketybey Records. 1.30, Interval. 3.30, Announcements. 3.35, Exchange. 3.45, Dramatic Programme. 4.0, Talk with Illustrations: The Waltz. 4.45, Talk for Children. 5.0, Song Recital by Zmigród-Fedyczkowska. 5.25, Dialogue for Women: Mother and Daughter. 5.35, Records. 5.50, Sports Notes. 6.0, Programme for Farmers. 6.10, Art Notes. 6.15, Violin and Pianoforte Recital by Olechowski and Rosenbaum: Sonata in A Minor (Veracini); Pieces (Reger): (a) Wiegelnied, (b) Capriccio, (c) Minuet; Lyric Poem, Op. 9 (Tcherepnin). 6.45, Talk: The Economic Development of the North-Eastern Countries. 7.0, Light Music from the Adria Café. In the interval at 7.20, Topical Talk. 7.45, Programme Announcements. 7.50, Sports Notes. 8.45, Records: The Squire Celeste Octet. 8.5, News. 8.55, Talks. 9.0, Chopin Pianoforte Recital by Drzewiecki. 9.30, Talk. 9.40, Danish National Festival Programme: Concert of Danish Music by the Station Symphony Orchestra; Conductor, Grondahl; Soloist, Einar Nørby (Songs); Address by the Danish Minister; Danish and Polish National Anthems; Solemn Overture in G (Peder Gram); Aria from *Eliza* (Kuhlau); Aria from *Mascerade* (Nielsen); Symphony No. 1 in G Minor, Op. 7 (Nielsen); Song No. 1 from the *Jutland Cantata* (Hye-Knudsen); Overture (Bentzon). In the intervals at 10.0, Announcements; Light Music, and at 11.0, Weather. 11.30, Dance Music from the Oaza.

ZURICH.—Relays **Beromünster**.

ATHLONE

565 kc/s, 531 metres; 60 kW. Relayed by Dublin, 1,348 kc/s, 222.6 metres; and Cork, 1,240 kc/s, 241.9 metres.—1.30 to 2.30 p.m., Time Signal; Exchange; Weather; Records. 4.0, Concert by the Garda Síochána Band. Soloist, Kitty Fagan (Songs). 6.0, Programme for Children. 6.45, News. 7.0, French Lesson. 7.15, Recitations. 7.30, Time Signal. 7.31, Violin and Piano-forte Duets by R. Christopher and J. J. O'Reilly. 7.50, Song Recital by Marie Hipwell (Mezzo-Soprano). 8.5, Variety and Musical Programme by J. MacDonagh and Company. 9.5, Piano-forte Recital by Julia Gray. 9.20, Recital of Anglo-Irish Songs by Sean C. Bowen (Tenor). 9.30, Pipes and Fiddle Selections by MacAonghusa and O'Higgins. 10.0, Variety Programme. 10.30, Time Signal; News; Weather. 10.40, Records. 11.0 (approx.), Close Down.

BARCELONA

795 kc/s, 377.4 metres; 5 kW.—8.15 a.m., News; Records. 9.0, Chimes; Gym; Records. 9.20, News; Records. 10.0, Obituary. 12 Noon, Chimes; Weather. 1.0 p.m., Programme for Women. 1.45, Records. 2.0, Records. 2.30, Theatre Notes; Amusement Guide; Records. 3.0, News; Film Talk; Sextet Concert; Exchange. 4.0, Programme for Hospitals. 5.0, News. 7.0, Concert by the Station Trio. In the interval, at 7.00, News. 8.0, Request Records. 8.30, Exchange; Request Records. 9.0, Wireless Notes. 9.10, Talk in Catalan. 9.20, Records. 9.30, Geography and History Talk. 9.45, Press Review. 10.0, Chimes; Weather; Social Notes; Exchange. 10.10, Concert by the Station Orchestra. 10.30, Concert. 11.0, Vincente Diaz de Tejada reads from his own Works. 11.10, Piano-forte Recital by Rosaura Goma. 11.30, Song Recital by Eusebio Carasusán (Tenor). 12 Midnight, Dance Music by the Melody Boys' Orchestra from the Shanghai Bar. 1.0 a.m. (Friday), News and Close Down.

BASLE.—Relays Beromünster.

BELGRADE

686 kc/s, 437.3 metres; 2.5 kW.—10.45, Programme Announcements. 10.50, Tides. 11.0, Records. 11.30, Military Band Concert. 11.59, Chimes. 12.5 p.m., Military Band Concert. 12.45, Exchange; Announcements. 1.10, Military Band Concert (contd.). 1.30, News; Time. 4.0, Programme for Schools. 5.0, Records. 6.55, Time; Programme Announcements. 7.0, Records. 7.10, Talk. 7.30, Announcements. 7.40, Records. 8.0, Talk. 8.30, Clarinet Recital. 9.0, Arias and Duets from Manon (Massenet) and Faust (Gounod) by Katica Kovanovic and Vlasta Popovic, with the Station Orchestra. 10.0, Time; News. 10.15, Dance Records. 10.40, Dance Music. 11.30, Close Down.

BERLIN

DEUTSCHLANDSENDER, 191 kc/s, 1,571 metres; 60 kW.—5.45 a.m., Weather; News. 6.0, Gym. 6.15, Motto. 6.20, See Berlin (Funkstunde). In the interval at 7.0, News. 8.0, Interval. 8.45, Gym. for Women. 9.0, Talk on Records; Economic Conditions in New York. 9.40, Domestic Science. 10.0, News. 10.10, Old German Dances. Introductory Talk and Commentary by Rütz. 10.50, Physical Training. 11.15, Weather. 11.30, Talk; Bee-keeping. 11.55, Weather. 12 Noon, See Cologne. 12.55 p.m., Time. 1.0, Records of Zither Music; Weather. 1.45, News. 2.0, Interval. 2.45, Greetings; Announcements. 3.0, Weather; Exchange. 3.15, Animal Voices—Guessing Competition for Children (on Records). 3.40, Julius Patzak sings Viennese Songs (on Records). 4.0, See Leipzig. 5.40, Heinrich Zillich reads from his own Works. 6.0, Northern Folk songs—Recital by the Station Solo Quartet. 6.30, York von Wartenberg Memorial Programme. 6.55, Poem; Weather. 7.0, A Century's German Music—Concert by the Small Station Orchestra. Conductor, Hess. Overture, Iphigénie en Aulide (Gluck); Minuet from the Military Symphony (Haydn); Overture, Figaro (Mozart); Larghetto from Symphony No. 2 (Beethoven); Overture, Preciosa (Weber); Entr'acte from Rosamunde (Schubert); Radetzky March (Joh. Strauss). 8.0, Motto; News. 8.15, Our Village—Hamburg, Königsberg, Frankfurt, Stuttgart and Munich Inter-Relay Programme. (For details see Munich.) 10.0, News; Sports and Art Notes. 10.25, Talk; Freiherr vom Stein. 10.45, Weather. 11.0, Dance Music by the Casani Club Orchestra from London. 11.25, Concert of Gypsy Music from Budapest. 12 Midnight, Close Down.

BERLIN

FUNKSTUNDE, 841 kc/s, 356.7 metres; 100 kW.—6.0 a.m., Hymn; Gym. 6.15, Weather; Meditation. 6.20, Concert by the Eduard Prach Orchestra. In the interval at 7.0, News. 8.0, Gym. 8.20, Interval. 9.0, See Berlin (Deutschlandsender). 9.40, Interval. 9.45, Games for Children. 10.0, News; Market Prices. 10.30, Records; Announcements. 11.25, Exchange. 11.30, Interval. 12 Noon, Orchestral Concert from Königsberg. In the interval at 12.30 p.m., Weather. 1.0, News. 1.15, Records; Light Music. 2.0, News. 2.15, Extracts, Othello (Verdi) on Records. 3.0, Exchange. 3.20, Interval. 4.0, Orchestral Concert. In the interval: Travel Talk; Easter Island. 6.0, Announcements. 6.5, Back to the Land—Play for Young People

THURSDAY
SEPTEMBER THE TWENTY-SEVENTH

(Ulrich). 6.20, With the Microphone through the Berlin Docks. 7.0, Recital of Old German Folk Songs by the Station Choir; Conductor, Weigel; Drei Laub auf einer Linde; Gott hüthe dich (Lechner); Mit Fröhlichkeit (Johann Staden); Rundadimella (Schein); Ein Henlein weiss (Scandelli). 7.15, Recital of New Hungarian Music by Pál Kiss (Piano-forte); Lamentatio, Op. 11 (Kodály); Two Concert Studies (Dohnányi); Suite, Op. 14 (Béla Bartók); Six Hungarian Folk Dances (Béla Bartók). 7.40, The Station Director discusses the Winter Programme. 8.0, News. 8.10 to 1.0 a.m. (Friday), German, Polish, Hungarian, Swedish and English Inter-Relay Programme. 8.10, Dance Music by the Adalbert Lutter Band from the Wilhelmshalle, Berlin. 8.30, See Warsaw. 9.15, Concert from Budapest. 10.0, See Stockholm. In the interval at 10.20, News. 10.40, Inter-Relay Programme (contd.); Dance Music by the Casani Club Orchestra from London. 11.25, Gypsy Music from Budapest. 12 Midnight, Dance Music by the Adalbert Lutter Band from the Wilhelmshalle, Berlin. 1.0 a.m. (Friday), Close Down.

BERNE.—Relays Beromünster.

BEROMUNSTER

556 kc/s, 539.6 metres; 60 kW.—12 Noon, Concert of the Nineteenth Century French Music by the Station Orchestra. 1.25 p.m., Time; Weather; Exchange. 3.30, Records; Light Music. 3.59, Time. 4.0, See Sottens. 6.0, Records. 6.30, Talk in Dialect. 7.0, Time; Weather; Traffic Notes. 7.5, Talk: The Work of the League of Nations. 7.25, Recital of Old French Songs by Marguerite Altzyer. 8.0, Talk: The Swiss Constitution. 8.30, Bach Piano-forte Music by Hermann Hans Wetzel. 9.0, Weather; News. 9.10, Vincent and Ganguin—Sequence (Börner). 10.10, Weekly Review for Swiss Abroad. 10.30 (approx.), Close Down.

BODEN.—Relays Stockholm. **BODO**.—Relays Oslo.

BRATISLAVA

1,004 kc/s, 298.8 metres; 13.5 kW.—6.0 to 7.15 a.m., See Prague. 9.45, Announcements. 9.50, See Prague. 10.0, News in Hungarian. 10.15, Records. 10.30, See Brno. 11.0, Water Level. 11.5, See Prague. 12 Noon, Talk for Farmers. 12.20 p.m., See Prague. 12.30, Concert by the Station Orchestra; Conductor, Schimpl. 1.30, See Prague. 1.40, News and Weather in German and Hungarian. 1.50, See Prague. 2.0 to 2.5, Exchange. 3.15 to 4.20, See Prague. 4.40, See Prague. 5.40, Talk; Young Slovakia. 5.50, Records. 6.0, Talk for Workers. 6.10, Talk for Housewives. 6.15, Hungarian Transmission; Educational Talk; A Slovak Tale. 6.55, See Prague. 10.45, News in Hungarian. 11.0, Close Down.

BREMEN.—Relays Hamburg.

BRESLAU

950 kc/s, 315.8 metres; 60 kW. Relayed by Gleiwitz, 1,231 kc/s, 243.7 metres.—5.0 a.m., Song; Motto; Records. In the interval at 5.40, Weather. 6.0, Time; Weather; Gym. 6.25, See Cologne. In the interval at 7.0, Time; News. 8.0, Light Music on Records. 9.0, Time; News. 10.10 to 10.40, The Saar—Sequence for Schools (Reinicke). 11.30, Time; News. 11.45, Talk for Farmers. 12 Noon, Orchestral Concert. Conductor, Kadon. March (Weigl); Overture, Marco Spada (Auber); Orchestral Suite (Joon); Hungarian Rhapsody No. 13 (Liszt); Waltz (Joh. Strauß); Overture, Le roi La dit (Debussy); Polish March (Leopold); Sinfonietta for Strings (Haydn); Selection from La Traviata (Verdi-Schreiner); Silesian Dances (Müller); Capriccio for Flute and Orchestra (Kempfer); Ein Sommerabend am Rhein (Zimmer). In the interval at 12.30 p.m., Weather; and at 1.30, Time; News. 2.20, Exchange. 2.25, Announcements; Records. 2.50, Market Prices. 3.10, Piano-forte Recital by Charlotte Bretschneider; Aufschwung (Schumann); E. Flat (Beethoven); Variations in E. Flat (Beethoven). 3.40, Humorous Play for Children (Colbert). 4.0, Concert of Festival Music by the Station Orchestra. Conductor, Rischka. Suite from Baechetto musicale (Schein); Intrada I and II (Hassler); Air (Bach); Festliche Overture in B. Flat (Handel); Fencer's music (Handel); Ballet Suite No. 2 (Gluck); Two Minuets (Haydn); Overture, Figaro (Mozart); Triumphant March from Tarpeia (Beethoven). 5.30, Announcements. 5.35 (from Gleiwitz), Talk for Mothers. 5.55, Reading (Schönberg). 6.25, Reading (Graitsh). 6.50, Announcements. 7.0, Hermann Löns—Literary Sequence (Kaupfert), with Songs by Gerda Specht (Mezzo-Soprano) and Kurt Blume (Tenor). 8.0, News. 8.10, Reading (Wagenführ). 8.30, Lull Close Down, Polish, Hungarian, Swedish and English Inter-Relay Programme. 8.30, See Warsaw. 9.15, Concert

from Budapest. 10.0, See Stockholm. 10.20, Interval; Time; News. 10.40, Inter-Relay Programme (contd.). 10.40, Dance Music relayed from London. 11.25, Gypsy Music relayed from Budapest. 12 Midnight, Close Down.

BRNO

922 kc/s, 325.4 metres; 32 kW.—6.0 to 7.15 a.m., See Prague. 9.50, See Prague. 10.30, Programme for Schools. 11.0, See Prague. 12.30 p.m., See Bratislava. 1.30, See Prague. 2.10 to 2.40, Labour Exchange in German. 3.15 to 4.20, See Prague. 4.40, See Prague. 5.40, Hints for Housewives. 5.45, Talk: The Society Woman. 5.55, Records. 6.10, Theatre and Film Notes. 6.20, Two Talks in German. 6.55, See Prague. 7.35, Reading. 7.50, Record. 7.55, See Prague. 11.0 (approx.), Close Down.

BRUSSELS (No. 1)

620 kc/s, 483.9 metres; 15 kW.—11.55 a.m., Weather. 12 Noon, Popular Records. 1.0 p.m., News. 1.10, Orchestral Concert: March (Weyls); Selection from La petite mariée (Lecocq); Cortège oriental (Lemmens); Sornettes (De Taeye); Petite Suite (Kalkman); Tarantella (Caludi); March Potourri (Voitschach). 2.0, Interval. 4.55, News. 5.0, Operetta Records. 5.30, Programme for Children. 6.0, Talk. 6.15, Orchestral Concert: Piece (Noack); In the Jungle (Brusselmaus); Russian Melodies (Higgs); Violin and Piano-forte: Two Spanish Dances (Sarasate); Selection from Fatinitza (Suppé); Interlude by Requillé; Scherzo (Deprez); Selection from Hans the Flute Player (Ganne). 7.15, Talk for Workers. 7.30, Sports Notes; Colonial Review. 8.0, Concert by the Symphony Orchestra; Soloist: Duxek (Violin); Selection from Le tableau parlant (Grétry); Violin Concerto (Mozart); Ballet Air from Orchestral Pieces (Saeckling-Govaert); First Suite from Nannama (Lalo); Concerto grosso, No. 11 (Corelli). 9.0, Talk; Communal Finance. 9.15, Concert by the Symphony Orchestra; Overture, The Siege of Corinth (Rossini); Ballet Music from William Tell (Rossini); Interlude: Programme by The Renaudins; Selection from Thaïs (Massenet); Petite Suite (Henri Büsser). 10.0, News. 10.10, Request Records. 11.0 (approx.), Close Down.

BRUSSELS (No. 2)

932 kc/s, 321.9 metres; 15 kW.—Programme in Flemish. 11.57 a.m., Weather. 12 Noon, Popular Orchestral Music: Love Song (Toselli); Malagena (Moszkowsky); The man I love (Geršwin); Marrakesch (Percy); Paysages (Douliez); Rondo français (Boëllmann); Moorish Song (Turina); The Angels' Sérénade (Braga); Autrefois (Sibelius); Song from The Merry Widow (Lehár); Russian Melody (Akinenko); Cloches du soir (Saint-Saëns). 1.0 p.m., News. 1.10, Selection from Il Trovatore (Verdi) on Records. 2.0, Interval. 4.55, Announcements. 5.0, Concert by the Symphony Orchestra; Romantic Overture (Kéler-Béla); Oehsemennett (Haydn); Valse lente (Chopin); Danse (Debussy); Joyeuse marche (Chabrier). 5.45, Programme for Children. 6.30, Programme for Young People. 7.15, Talk. 7.30, Tourist Report. 8.0, Extracts from The Barber of Seville (Karel Albert) by the Radio Orchestra. In the interval at 8.45, Roman Catholic Address. 9.50, Prayers. 10.0, News. 10.10, Records. 11.0, Close Down.

BUDAPEST

546 kc/s, 549.5 metres; 120 kW.—6.45 a.m., Gym. 9.45, News. 10.0, Two Talks. 12 Noon, Chimes from the University Church. 12.5 p.m., Concert by the Szmirnov-Balalaika Orchestra. 1.30, Police Band Concert. 2.40, Household Hints. 4.0, Fairy Tales. 5.0, Talk for Farmers. 5.30, Concert of Light Music by the Bertha Orchestra. 6.20, English Lesson. 6.50, Talk for the Fiftieth Anniversary of the Opera House. 7.25, Gala Programme relayed from the Opera House. 10.45, Concert by the Csorba Gypsy Band, relayed from the Britannia Hotel.

CASSEL.—Relays Frankfurt.

COLOGNE

658 kc/s, 455.9 metres; 60 kW.—5.30 a.m., Hymn; Records. 6.5, Gym. 6.25, Concert by the Düsselhof Concert Orchestra, from the Bach-Saal, Düsseldorf. In the interval from 6.50 to 7.5, Hymn; News. 8.0, Weather; Water Level. 8.5, Gym. for Women. 8.20, Cookery. 8.30, Interval. 10.0, News. 10.10, Topical Talk. 11.10, Military Talk. 11.30, Records; Announcements. 12 Noon, Concert by the West German Chamber Orchestra; Conductor, Hartmann; Overture, The Nalads (Benett); Aquarellen-Walzer (Strauss); Selection from La

Favorita (Donizetti); Nocturne (Liszt); Ein Fest im Gnomereich (Witteborne); Durch Webers Zauberwald (Urbach); Salut d'amour (Elgar); Ständchen (Widor); Waltz, Abendsterne (Lanner); Rhapsody No. 6 (Liszt). In the interval at 12.45 p.m., News; Greetings. 1.45, News. 2.0, Humour and Light Music on Records. 3.0, Industrial Talk. 3.15, Talk by a State Railway Superintendent. 3.30, Exchange. 3.50, Topical Talk. 4.0, Concert by the Station Orchestra; Conductor, Kühn; Soloist, Margot Griepkoven (Soprano); Overture, Ein tolles Mädel (Ziehrer); Song from The Gipsy Baron (Strauss); Waltz from Der Kellermeister (Zeller); Extracts from Das Pensionat (Suppé); Czardas from Die Fledermaus (Strauss); Selection from Der Obersteiger (Zeller); Waltz, Alt-Wien (Kremsler). 5.0, Science Talk. 5.20, Song Recital by Wilhelm Strienz. 5.50, Programme in Dialect. 6.0, A Visit to Danzig—Programme for Young People. 6.20, Recital of Contemporary Music for Young People. 6.40, News. 6.50, Exchange; Sports Report. 7.0, Pearls in Wine—Sequence. 7.30, Love Songs on Records. 8.0, News. 8.10, Siegerland—Sequence with Records (Schreiber). 9.10, Three Scenes from Björnson's Olav Trygvason (Grieg). 10, News; Weekly Review. 10.40, Dance Music by the Casani Club Orchestra from London. 11.25, Concert of Gypsy Music from Budapest. 12 Midnight, Close Down.

COPENHAGEN.—Relays Kalundborg. **CORK**.—Relays Athlone. **DANZIG**.—Relays Königsberg. **DRESDEN**.—Relays Leipzig.

FECAMP

1,456 kc/s, 206 metres; 10 kW.—11.0 to 11.30 a.m., Programme in English arranged by the International Broadcasting Company of London; Happy Half-Hour—Military Band Concert. 11.30, Programme in French. 4.30 to 6.0 p.m., Programme in English arranged by the I.B.C. (London). 4.30, Worthing, Littlehampton, Brighton and Hove Concert; Part I—This Hectic Life. 5.0, Part II—Dance Music. 5.30, Part III—Gramophone Records. 6.0, Programme in French. 11.0 till Close Down. Programme in English arranged by the I.B.C. (London). 11.0, Light Orchestral Concert. 11.30, Concert arranged by the I.B.C. (Ireland), Ltd.: Tunes from the Talks and Shows. 12 Midnight, Concert for Penicik Listeners; Dance Music. 12.30 a.m. (Friday), I.B.C. Time Signal. 12.31, Dance Music. 1.0, I.B.C. Good-night Melody and Close Down.

FLensburg.—Relays Hamburg. **FLORINCE**.—Relays Milan.

FRANKFURT

1,195 kc/s, 251 metres; 17 kW.—5.45 a.m., Hymn; Time; Weather. 5.50, Gym. 6.40, Time; News. 6.50, Weather. 6.55, See Stuttgart. 8.10, Water Level; Weather. 8.15 to 8.35, Gym. 10.0, News. 10.45, Hints for the Housewife. 11.0, Announcements; Records. 11.30, Announcements; Economic Notes; Weather. 11.45, Social Notes. 12 Noon, Records of Light Music. 1.0 p.m., Time; News. 1.10, Local News. 1.20, Military Band Concert; Conductor, Hermann von der Dövenmühle; Overture, Nakhiris Holzeitz (Lincke); Sérénade (Métray); Song from Nakhiris Holzeitz (Lincke); Die türkische Schawache (Michaelis); Selection from Der Justige Krieg (Joh. Strauss); Polka-Mazurka, Frauentherz (Jos. Strauss); Waltz, Ma bien aimé (Waldteufel). In the interval at 1.50, Time; News. 2.30, Economic Report. 2.45, Time; Economic Notes. 2.55, Weather. 3.10, The Soldier and the Dancer—Fairy Play for Children. 4.0, See Cologne. 5.30, Discussion: Art and Technique. 5.50, Topical Talk. 6.10, Talk; Cider. 6.25, Spanish Lesson. 6.45, Weather; Economic Notes; Programme Notes. 6.50, Request Records of Wedding Music. 7.30, Local News. 7.45, Topical Notes. 8.0, News; Art Notes. 8.15, Our Village—Munich, Hamburg, Königsberg, Frankfurt and Stuttgart Inter-Relay Programme. For details see Munich. 10.0, Time; News; Sports Notes. 10.15, Hermann Löns, Man and Poet—Literary and Musical Sequence (Eugen Weber). 11.0, See Hamburg. 12 Midnight, Vienna by Night—Records. 1.0 a.m. (Friday), Close Down.

FREDRIKSSTAD.—Relays Oslo. **FREIBURG**.—Relays Stuttgart. **GENEVA**.—Relays Sottens. **GENOA**.—Relays Milan. **GLEIWITZ**.—Relays Breslau. **COTEBORG**.—Relays Stockholm. **GRAZ**.—Relays Vienna. **HAMAR**.—Relays Oslo.

HAMBURG

904 kc/s, 331.9 metres; 100 kW. Relayed by Bremen, Flensburg, and Hanover, 1,330 kc/s, 225.6 metres.—5.45 a.m., Time; Announcements. 6.0, Gym. 6.15, Time; Weather. 6.20, See Berlin (Funkstunde). In the interval at 7.0, Time; News. 8.0, Weather; Talk; Convalescence. 8.10, Announcements; Records. 10.50, News. 11.0, Friedrich List—Biographical Play for Schools (Brockmeier). 11.45, Records. 12 Noon, Household Hints. 12.5 p.m., Time; Announcements. 12.15, Concert relayed from Königsberg. 1.0, Exchange; Weather. 1.20, Popular Music. 2.15, News. 2.30, Operetta Records. 3.0, Exchange. 3.40, Shipping; Aviation. 4.0, See Leipzig. 5.30, Talk: A University Student in the Labour

SEPT. 27th **THURSDAY** continued

Service. 5.45, Legal Talk. 6.0, Talks. 6.25, War Reminiscences. 6.45, Exchange; Weather. 7.0, Dance Music by the Station Band. Conductor: Bolt. 8.0, News. 8.15, Our Village—Munich, Stuttgart, Frankfurt, Hamburg, and Königsberg Inter-Relay Programme. (For Details see Munich.) 10.0, News. 10.20, Musical Programme. 11.0, Pianoforte Sonata in B flat (Mozart) by Edmund Schmid. 11.25, String Quartet in C minor, Op. 51 (Brahms) by the Schmalmaek Quartet. 12 Midnight, Dance Music by the Station Band and Soloists. Conductor: Gebhardt. 1.0 a.m. (Friday), Close Down.

HANOVER.—Relays Hamburg.

HILVERSUM

160 kc/s, 1,875 metres; 7 kW. (until 3.40 p.m.). Transmitted on Kootwijk, 50 kW., from 3.40 p.m. Programme of the General Broadcasting Society (A.V.R.O.).—7.40 a.m., Time; Records. 9.40, Time. 9.41, Service. 9.55, Records. 10.10, Recitations. 10.40, Recital by Boris Lensky (Violin) and Egbert Veen (Pianoforte): Sicilienne (Paradis-Beskin); Two Minnets (Schubert); Gavotte (Vieuxtemps); Largo (Dvorak); Slav Dances (Dvorak). 11.10, Records. 11.40, Time. 11.41, Light Music by John van Brück's Orchestra. In the interval. Records. 1.40 p.m., Chamber Music by The Hague Trio: Trio in C (Haydn); Trio in A minor, No. 2 (Chaminade). In the interval. Records. 2.40, Light Music by the Kovacs Lajos' Orchestra. 3.25, Interval. 3.40, Programme for Hospitals. 4.10, Records. 4.25, A Play for Children. 5.10, Light Music by Tuschinski's Orchestra; Conductor, Max Tak. 6.10, Sports Talk. 6.40, Records. 7.10, Light Music by the Ramblers, relayed from The Hague; Conductor, Theo Masman. 7.40, Time; News. 7.45, Concert of Light Music by the A.V.R.O. Orchestra; Conductor, Nico Treep: Overture, Morning. Noon and Night (Suppé); Selection from White Horse Inn (Stolz-Benatzky-Krome); Abendlied (Schumann-Svendsen); Piece (Bull-Svendsen); The Cigarette Girl (Siede); Piece (Siede); Honeymoon March (Rosey). 8.30, Recitations. 8.50, L'Enfant prodigue—Cantata (Debussy) by the A.V.R.O. Choir and Orchestra; Hélène Cats (Soprano), Louis van Tulder (Tenor) and Willem Ravelli (Bari-tone); Conductor, Nico Treep. 9.40, Light Music by the Lajos Kiss Orchestra relayed from The Hague. 10.10, Records. 10.40, News. 10.50, Light Music. 11.40 (approx.), Close Down.

HOBBY.—Relays Stockholm.

HUIZEN

995 kc/s, 301.5 metres; 7 kW (until 6.40 p.m.), 20 kW. from 6.40 p.m.—7.40 to 8.55 a.m., Programme of the Catholic Radio Society (K.R.O.). 7.40, Records. 9.40 to 10.40, Programme of the Christian Radio Society. 9.40, Records. 9.55, Religious Programme. 10.25, Records. 10.40 to 1.40 p.m., K.R.O. Programme. 10.40, Records. 11.10, Religious Address. 11.40, Police Notes. 11.55, Concert by the K.R.O. Orchestra; Conductor, van 't Woud: Los Banderilleros (Volpatti); Overture, Kamd um die Liebe (O. Straus); Hofballtänze (Lammer); Selection from A Life for the Czar (Glinka); The Singing Stream (Carr); Three Dances from Tom Jones (German); Records; Overture, Raymond (Thomas); Herbststimmung (Rust); Insekten machen Musik (Zimmer); Mascarade (Lacôme); Lolita (Buzzi-Peccia); Grand Galop chromatique (Liszt). 1.40 till Close Down. N.C.R.V. Programme. 1.40, Handwork Lesson. 2.40, Recital by Karin Maria Kwant (Soprano) and Maur (Tenor). 3.25, Interval. 3.40, Bible Reading; Songs and Organ Music. 4.40, Handwork Programme for Young People. 5.10, Sacred Song Recital by de Heer. 6.10, Records. 6.40, Police Notes. 6.55, Records. 7.10, Press Review. 7.40, Records. 7.55, Recital by Mens (Organ). Mme. Sala (Soprano) and Isterdael (Cello), relayed from St. Peter's Church, Leyden; Organ: Sonata No. 1 (Mendelssohn); 'Cello: (a) Larghetto con poco moto (Loh); (b) Cantabile (Nardini); Soprano: (a) Per la Gloria (Bubnoncini); (b) Care selve (Handel); (c) Alleluja (Mozart); Organ: Prelude, Fugue and Variations (Frank); 'Cello: Air (Jongen); Soprano: (a) Song (Meyer); (b) L'eglise paysanne (de Boeck); 'Cello: Adieu (Register); Song, Mein gläubiges Herz (Bach). 5.10, Talk for Parents. 9.40, News. 9.50, Dance Records. 11.25 (approx.), Close Down.

INNSBRUCK.—Relays Vienna.

KALUNDBORG

238 kc/s, 1,261 metres; 75 kW. Relayed by Copenhagen, 1,176 kc/s, 255.1 metres; and Skamlebaek, 49.5 metres.—7.0 a.m., Gym. 8.30, Cathedral Service. 11.0, Weather. 11.10, Fish Prices. 11.15 to 11.45, French for Pools. 12 Noon, Time; Chimes. 12.5 p.m., Andersen's String Ensemble from the Bellevue Strand Hotel. 2.0, Interval. 2.40, Reading. 3.0, Concert by Teddy Petersen's Orchestra, from the Wivex. 4.45, A Microphone Visit. 5.30, Exchange. 5.42, A Poem. 5.45, Talk for Dairy Farmers. 6.15, English Lesson. 6.45, Weather. 6.54, Announcements. 7.0, News. 7.15, Time. 7.30,

Lecture-Recital: The Psalms. 8.10, Concert by the Radio Symphony Orchestra; Conductor, Nikolai Malko; Soloist, Conchita Supervia (Coloratura Soprano); Overture, The Italian Girl in Algiers (Rosini); Soprano Solos: Adagio from The Italian Girl in Algiers and Grand Rondo from La Cererentola (Rosini); I Pini di Roma (Respighi); Ten Minutes Interval; Two Pieces (Albéniz-Arbois); Soprano Solos: (a) Tel majo diamanto (Granados), (b) Granada (Albéniz), (c) La Romeria de los Burlados (Pittaluga), (d) Polo (Nin); Spanish Caprice Op. 34 (Rimsky-Korsakov). 10.15, News. 10.30, Report: A Foreigner's Idea of Copenhagen. 11.10, Dance Music by the Jens Wamy Dance Band from the Nimb Restaurant. In the interval at 12 Midnight, Chimes. 12.30 a.m. (Friday), Close Down.

KIEL.—Relays Hamburg. KLAGENFURT.—Relays Vienna.

KONIGSBERG

1,031 kc/s, 291 metres; 60 kW. Relayed by Danzig, 1,303 kc/s, 230.2 metres.—5.0 a.m., Records. 5.50 Weather. 6.0, Gym. 6.20, See Berlin (Funkstunde). In the interval at 7.0, News. 8.0, Prayers. 8.30 to 9.0, Gym. for Women. 9.5, Alfred Krupp—Play for Schools (Gert. R. Schmalnauer). 9.35, Talk for Housewives. 9.50, Gym. for Children. 10.40, News. 10.55, Weather. 11.30, Concert of New Light German Music, by the Small Station Orchestra, conducted by Eugen Wilchen. 1.0 p.m., Time; Weather. 1.5, Records of Classical and Romantic Music. In the intervals at 1.20 and 2.0, News. 2.30, Exchange. 3.0, Market Prices. 3.15, Book Review. 3.30, Eurythmics for Children. 4.0 (from Danzig), Concert by the Danzig State Theatre Orchestra; Conductor, Kallipke; Overture, Le domino noir (Auber); Selection from Der Wildschütz (Lortzing); Carnaval à Paris (Svendsen); Selection from The Gipsy Baron (Strauss); Polonaise No. 2 (Liszt); Waltz, España (Waldteufel); Slav Dances Nos. 5-8 (Dvorak); Pizzicato Polka (Joh. Strauss); Perpetuum mobile (Joh. Strauss); Intermezzo from Die Wallfahrt nach Mekka (Wetzel); Salut d'amour (Elgar); Overture, Don Giovanni. (Mozart) 5.50 (from Danzig), Reading of short Stories (Hans Franck). 6.15, Market Prices. 6.25, Nature Study. 7.0, Violin Recital by Rolf Schroeder. 7.30, Folk Songs by a Boys' Choir; Conductor, Scholz. 8.0, News. 8.15, Our Village—Munich, Stuttgart, Frankfurt, Hamburg and Königsberg Inter-Relay Programme. (For Details see Munich.) 10.0, News. 10.30, Records. 10.40, Dance Music from London, followed by Cigány Music from Budapest. 12 Midnight, Close Down.

KOSICE.—Relays Prague. LAUSANNE.—Relays Sottens.

LEIPZIG

785 kc/s, 382.2 metres; 120 kW. Relayed by Dresden, 1,285 kc/s, 233.5 metres.—5.50 a.m., Notes for Farmers. 6.0, Gym. 6.25, See Cologne. In the interval at 7.0, News. 8.0, Gym. 8.20 to 9.0, Records. 9.40, Exchange. 9.45, Programme Notes. 9.55, Weather; Water Level. 10.10 to 10.50, Through the Hartz Mountains—Sequence for Schools. 11.0, Announcements; Records. 11.30, News. 11.40, Weather. 11.45, Notes for Farmers. 12 Noon, Concert from Königsberg. 1.0 p.m., News. 1.10, Operetta Records. 2.0, News; Exchange; Weather. 2.15 to 2.45, Records of the Don Cossack Choir and Palalaika Orchestra. 3.40, Exchange. 4.0 (from Dresden), Concert by the Dresden Philharmonic Orchestra; Conductor, Schestak; Soloist, Hans Garvens (Violin); Overture, Così fan tutte (Mozart); Violin Concerto No. 8 (Sporh); Comely Suite (Wausch); Overture, Maritana (Wallace); Czardas, Zsambeki (Gungl); Suite champêtre (Chabrier); Ballet Music from Esmeralda (Drigo). 5.30, Talk: Caspar David Friedrich. 5.50, Exchange; Weather; Time. 6.0, War Reminiscences. 6.20, Concert of Folk Dances by the EmDe Orchestra and the German Folk Musicians' Society. 7.30, Talk: Acoustics. 7.50, News. 8.0, Promenade Concert relayed from London. 8.40, Twice Hanged Roskamm—Play (Wilky). 9.45, Dance Music from Stockholm. 10.20, News. 10.40, Dance Music from London. 11.20, Cigány Music from Budapest. 12 Midnight, Close Down.

LINZ.—Relays Vienna.

LUXEMBOURG

230 kc/s, 1,304 metres; 150 kW.—7.45 a.m., Records. 8.0, News in French; Record; News in German; Record. 12 Noon, Concert by the Station Orchestra; Conductor, Pensis; Overture, Richard III (Gilson); Valse triste (Sibelius); Selection from Les Saltimbanques (Ganne); Contemplation, for Trio (Massellier); Air (Rimsky-Korsakov). 12.30 p.m., News, in French and German. 12.40, Concert (cont'd.): Dance of the Merry Mascots (Ketebeay); Le Berger (Marsiek); Venise (Fleuret); Four Pieces (Nerini). 1.0, Exchange. 1.5, Concert (cont'd.): Selection from The Dubarry (Millöcker-Mackeben);

Frühlingseinzug (Blon). 1.15, Records. 1.30, Exchange. 1.35, Records. 2.0, Exchange. 3.45, Exchange. 6.30, Concert of Light Music and Dance Music. 7.30, Recing Results. 7.35 till Close Down, German Evening. 7.55, Reading. 7.40, Song Recital by Papier (Bartone). 8.0, News in French and German. 8.20, Song Recital (cont'd.): Four Songs (Wolf): (a) In der Frühe, (b) Bitterolf, (c) Verborgtheit, (d) Der Musikant. 8.30, Exchange. 8.35, Concert by the Station Orchestra; Conductor, Pensis; Overture, Ondine (Lortzing); Réverie du Soir (Saint-Saëns); Liszt Potpourri (Urbach); Polichinelle (Rachmaninov); Valse célèbre (Moszkowsky); Suite, Nell Gwyn (German); Angelus (Micheli). 9.35, Concert of German Music by the Station Orchestra; Conductor, Pensis; Soloist, Ludwig Hoelscher (Cello); Concerto for 'Cello and Orchestra (Schumann); Divertimento, Op. 27 (Trapp). 10.25, Records.

MADRID

(E.A.J.T.), 1,095 kc/s, 274 metres; 7 kW.—9.0 a.m., News. 10.0, Announcements; Exchange. 10.50, Interval. 2.0 p.m., Chimes; Time; Weather; Talk; Popular Music. 2.30, Sextet Concert. 3.0, Amusement Guide; Exchange; Popular Music. 3.30, Sextet Concert. 4.0, News; Popular Music. 4.30, Sextet Concert. 4.50, Announcements; Time. 5.0, Interval. 6.0, Chimes; Light Music. 7.0, Announcements; Operatta Music. 7.30, Exchange; Flamenco Songs. 8.0, News; Organ Recital; Programe for Children. 9.40, Sports Notes. 10.0, Chimes; Time; Sextet Concert. 10.30, Concert from Paris (Ecole Supérieure). 11.30, News; Guitar Recital by Pepita Atalaya de Senor; Song Recital. 12.45 a.m., (Friday), News. 1.0, Chimes. 2.0 till Close Down. Programme in English arranged by the International Broadcasting Company of London; Dance Music. 3.0, I.B.C. Goodnight Melody; Close Down.

MADRID

EAQ, 10,000 kc/s, 30 metres; 20 kW.—11.15 p.m., News. 11.30, Spanish Music; News. 1.0 a.m. (Friday) to 1.30, Programme in English, arranged by the International Broadcasting Company of London; Orchestral Music. 1.30 a.m., I.B.C. Good-night Melody and Close Down.

MALMO.—Relays Stockholm.

MILAN

814 kc/s, 368.6 metres; 50 kW. Relayed by Turin, 1,140 kc/s, 263.2 metres; Genoa, 986 kc/s, 304.3 metres; and Florence, 610 kc/s, 491.8 metres.—7.30 a.m., Gym. 7.45, Time; News. 8.0, Interval. 11.30, Popular Records. 12.45 p.m., News. 1.0, Time; Announcements. 1.5, Fashion Notes. 1.10, Concert by the Doreno Orchestra. In the interval at 1.30, Records; Exchange. 2.15 to 2.25, Exchange. 4.35, News. 4.45, Programme for Children. 5.10, Concert by the Ches-Zarandelli-Cassone Trio. 5.55, Weather. 6.0 to 6.10, Corn Prices. 7.0, Announcements. 7.15, News in Foreign Languages. 8.0, Time; News; Records. 8.30, Government Notes. 9.0, Symphonic Concert from Teatro Regio. Turin. 11.0, News.

MONTE CENERI

1,167 kc/s, 257.1 metres; 15 kW.—12 Noon, Announcements; News. 12.5 p.m. (approx.), Concert by the Station Orchestra. In the interval, at 12.29, Time; Weather. 12.55, News. 1.5, Sports Notes. 1.15, Records. 1.30, Interval. 3.59, Time. 4.0 to 6.0, See Sottens. 7.44, Announcements. 7.45, News. 8.0, Talk. 8.15, Records: Marches from Aida (Verdi); Carmen (Bizet); The Damnation of Faust (Berlioz); The Prophet (Meyerbeer); Faust (Gounod); The Force of Destiny (Verdi); and Tannhäuser (Wagner). 9.0, Sacred Songs by Anna Borellini; Prayer (Stradella); Crucifix (Fauré); Aria from Stabat Mater (Pergolesi). 9.15, Records; Mandoline Music. 10.0, Close Down.

MORAVSKA-OSTRAVA

1,158 kc/s, 259.1 metres; 11.2 kW.—6.0 to 7.15 a.m., See Prague. 9.50, See Prague. 10.30, See Brno 11.0, See Prague. 12.30 p.m., See Bratislava. 1.30, See Prague. 2.0 to 2.10, See Brno. 3.15 to 4.20, See Prague. 4.40, See Prague. 5.40, Talk. 5.50, Tourist Report. 6.0, News. 6.5, Book Review. 6.15, Record. 6.20, German Transmission; Song Recital by Mme. Funk; Records. 6.55, See Prague. 7.35, Reading. 7.50, Record. 7.55, See Prague. 11.0 (approx.), Close Down.

MOSCOW (No. 1)

174 kc/s, 1,724 metres; 500 kW.—5.0 a.m., News. 5.15, Fanfare. 5.45, Gym. 6.15, Musical Programme. 8.15, Programme for Children. 9.0, Musical Programme. 9.58, Time. 10.0, News. 10.15, Concert for Collectivist Farmers. 3.0 p.m. Programme Announcements. 3.15, Programme for Children. 3.58, Time. 4.0, News 4.30, Communist Party Programme. 5.30, Red Army Programme. 6.50, Talk for Collectivist Farmers. 8.0, Concert. 9.0, Press Review

in German. 9.55, Chimes. 10.5, Talk in French: The Harvest. 11.5, Talk in Spanish: The Harvest.

MOTALA.—Relays Stockholm. MUHLACKER.—See Stuttgart.

MUNICH

740 kc/s, 405.4 metres; 100 kW. Relayed by Augsburg and Nürnberg, 1,267 kc/s, 236.8 metres.—6.30 a.m., Gym. 6.45, Motto; Records. 7.15, Time; News. 7.25, See Stuttgart. 9.50, Talk for Housewives. 10.0, Our Daily Bread—Harvest Home Sequence (Bedall). 10.40, Notes for Farmers. 10.50, Market Prices. 11.0, Programme for Farmers. 11.20, Time; News. 11.30, Post Office Programme; Records. 12 Noon, Records. 1.15, Time; News. 1.25, Lincke Concert by the Small Station Orchestra; Conductor, Kloss; Ballet Overture; Herbststimmung; Indra-Polka; Intermezzo, Sylphide; Amina; Overture to an Operetta. 2.0, News. 2.20, Recital by Nini Diehl (Soprano), Gernot Burrow (Bass) and Erika Lyncker (Pianoforte): Soprano Songs (Richard Strauss): (a) Du meines Herzens Krönlein, (b) Die Nacht, (c) Hoffen und Meiden; Ballad in G minor (Grieg); Baritone Songs (Ertel): (a) In einer Sturmzeit, (b) Jane Grey, (c) Trinklied der Landsknechte. 3.0, Reading (Auzinger). 3.30, Programme for Women. 3.50, Weather; Programme for Farmers. 4.0, Concert by the Small Station Orchestra; Conductor, Kloss; Overture, Masaniello (Auber); Aria from the Suite in D (Bach); Gavotte from the Violin Sonata (Bach); Scenes from Der Freischütz (Weber); Waltz, Klänge aus Wien (Döring); Cradle Song (Dowell); Fairy Tale (Poldini); Kéler-Béla Potpourri (Rhode); Es leuchtet der Mond (Leopold); Suite (Micheli). 5.30, Talk: Tracing in Works of Art. 5.50, Grün ist die Heide—Hermann Löns Sequence (Weinberger); by Helma Panka (Soprano) and Besemfelder (Songs to the Lute). 6.30, Talk: Superstitious. 6.50, Time; Weather; Programme for Farmers. 7.0, Loewe Recital by the Kraft Quartet, Luise Pflüger (Soprano), Georg Hann (Baritone), and Otto Pfanzelt (Clarinet); Extracts from the Pianoforte Trio in G minor, Op. 12; Songs for Soprano: (a) Das vergessene Lied, (b) Die Mutter an der Wiege; Songs for Baritone: (a) Odins Meeresritt, (b) Der Mönch zu Pisa; Pieces from Scottish Pictures, Op. 112; Songs for Soprano: (a) Süßes Begräbnis, (b) Schwalbenmärchen, (c) Niemand hat's gesehen; Songs for Baritone: (a) Meeresleuchten, (b) Prinz Eugen; Extracts from the String Quartet in F, Op. 24, No. 2. 8.0, News. 8.15, Our Village—Munich, Hamburg, Königsberg, Frankfurt and Stuttgart Inter-Relay Programme: Munich, Bavarian Harvest Home; Hamburg, Fishing Village; Königsberg, Frontier Village; Frankfurt, Wine District Village; Stuttgart, Harvest Moon in the Swabian Alps. 10.0, News; Sports Notes. 10.20, Programme to be announced. 10.40, Dance Music from London. 11.25, Cigány Music from Budapest.

NAPLES.—Relays Rome. NOTODDEN.—Relays Oslo.

OSLO

254 kc/s, 1,154 metres; 60 kW. Relayed by Hamar, 519 kc/s, 578 metres; and Jeløy, 6,990 kc/s, 42.92 metres.—10.0 a.m., Egg Prices. 11.15, Service. 11.35, Records. 11.50, Nauen Time Signal. 1.0 to 2.0 p.m., Records. In the intervals at 1.15, Weather; Talk for Farmers, and at 1.45, Exchange. 5.0, The Seventh Scandinavian Music Festival—Finnish and Danish Chamber Music; Soloists, Byrding and Ester Ingman (Songs); Quintet for Pianoforte, Two Violins, Viola and 'Cello (Raito); Songs by M. Byrding; Trio for Flute, Clarinet, and Bassoon (Melartini); Kilpinen Songs by Ester Ingman; Sonata for 'Cello and Pianoforte, Op. 14 (Gram). 6.30, Service. 7.0, Announcements. 7.15, Weather; News. 7.30, Time. 7.31, Bellman Song Recital. 8.0, Programme for Farmers. 8.30, Concert of Light Music. 9.10, Medical Talk. 9.40, Weather. 9.45, News. 10.0, Topical Talk. 10.15, Violin Recital of Old Dances by Bolstad. 10.45, Close Down.

OSTERSUND.—Relays Stockholm.

PARIS

ECOLE SUPERIEURE, 695 kc/s, 431.7 metres; 7 kW.—12 Noon, Tourist Report. 12.15 p.m., Popular Records. 1.0, News. 1.15, Concert relayed from Lille, 1,213 kc/s, 247.3 metres. 2.0, Operetta and Dance Records. 4.0, Records. 5.30, Esperanto Lesson. 6.0, Art Review. 6.30, News. 7.45, Talk: Hygiene. 7.53, Talk. 8.0, Dalcroze Records. 8.30, Concert of Chamber Music: Trio for Flute, Clarinet and Pianoforte (Weber); Songs (Schubert): (a) Die Krähe, (b) Die Stadt, (c) Heideröslein; Piece for Flute and Pianoforte (Blavot); Interlude: Recitations: Pianoforte (a) Etude in A flat (Chopin), (b) Jardins sous la pluie (Debussy); Songs: (a) Norwegian Songs (Gorges), (b) Fedia (Erlanger), (c) Cingarella (Tomasi); Violin and Pianoforte Sonata (Franck). 10.25 (approx.), News. 10.30, European Concert by the National Orchestra; Conductor, Inghibrecht; Soloists, Bassant (Pianoforte), and Elsa Rühlmann (Songs); Overture, Carnaval roman (Berlioz); Ballad for Pianoforte and Orchestra (Faure); Prélude à l'après-midi

d'un faune (Debussy); Song; Schéhérazade (Ravel); Napes from Impressions d'Italie (Charpentier).

PARIS

POSTE PARISIEN, 959 kc/s, 312.8 metres; 100 kW.—7.10 a.m., Records. In the intervals, Press Review; Cookery Hints. 12 Noon, Exchange. 12.5 p.m., Records of Military Music. 12.15, Programme by Kito, the Clown. 12.25, News. 12.35, Concert. 1.5, Exchange. 1.15, Records for Children. 1.35, New Records. 2.0, Exchange. 3.15, Exchange. 3.45, Exchange. 6.45, Exchange. 6.49, Extracts from Laktmés (Delibes) on Records. 7.10, News. 7.30, Programme for Children. 8.0, Talk. 8.10, Weekly Review by Max Régner. 8.15, Concert. 8.45, Exchange. 8.55, Cigány Music from the Café Martin. 9.30, Interval. 9.40, Concert. 10.20, News; Exchange. 10.30 till Close Down, Programme in English arranged by the International Broadcasting Company of London. 10.30, Tunes from the Talkies and Shows. 10.45, Concert, Dancing Memories. 11.0, I.B.C. Good-night Melody; Close Down.

PARIS

RADIO-PARIS, 182 kc/s, 1,648 metres; 75 kW.—6.45 a.m., Gym. 7.0; Records. 7.15, News. 7.45, Gym. 8.0, Records. 12 Noon, Protestant Address. 12.30 p.m., Concert by the Victor Pascal Orchestra: Serenade Berceuse (Lucciani); Romanian Song (Liamine); March (Stolz); Song (Denza); Piano-forte Solo; Waltz (Fryberg); Tarantella (Volpatti); Serenade (de Micheli); Rondo; Violin Solo; March (de Micheli); Spanish Dance (Granados); Romance (Schmalstich); Selection from White Horse Inn (Benatzky); 'Cello Solo; Flamenca (Sentis); Se tu vorreste (Tosti); Syncopeation (Kreisler); Hungarian Czardas (Leoni); Song, Santa Lucia (Mario); Overture, La finta giardiniera (Mozart); Song, Sorrentina (Volpatti); Suite of Waltzes from Eva (Lehár). In the interval at 1.20, Exchange. 3.45, Exchange. 6.20, Announcements; Talk; Exchange; Racing Results. 6.45, Talk. 7.0, Reading. 7.30, Topical Talk. 8.0, Vocal Concert. In the intervals at 8.30, News, and at 9.15, News; Review by Paul Reboux. 10.30, See Paris (Ecole Supérieure).

PITTSBURGH

KDKA, 980 kc/s, 306 metres; 50 kW. Relayed by WXXK on 48.86 metres, and 25.27 metres.—3.0 p.m., Edward MacHugh. 3.15, Castles of Romance. 3.30, To-day's Children. 3.45, News; Cookery Hints. 4.0, Hazel Arth (Contralto). 4.15, Tony Wons. 4.30, Frances Ingram. 4.45, United States Navy Band. 5.0, Fields and Hall. 5.15, Merry Macs. 5.30, Vic and Sade. 5.45, Hotel William Penn Orchestra. 6.0, Exchange. 6.15, Honourable Archie and Frank. 6.30, Farm and Home Hour. 7.30, KDKA Home Forum. 8.0, Tommy Tucker's Orchestra. 8.30, Music Magic. 8.45, State Federation Pa. Women. 9.0, Betty and Bob. 9.15, Dorothy Page. 9.30, Exchange. 9.45, (Chicago Symphony Orchestra, 10.15, KDKA Kiddies' Klub. 10.30, The Singing Lady. 10.45, Orphan Annie. 11.0, Dan and Sylvia. 11.14, Baseball Résumé. 11.30, Kings and Queens of Sport. 11.45, Lowell Thomas. 12 Midnight, Amos 'n' Andy. 12.15 a.m. (Friday), Lois Miller and Reed Kennedy. 12.45, Music; News. 1.0 to 6.0 a.m., Popular Programme.

PORSGRUND.—Relays Oslo.

PONTOISE

RADIO-COLONIAL, 15,244 kc/s, 19.68 metres; 15 kW. (1.30 to 5.0 p.m.); 11,905 kc/s, 25.20 metres (5.15 to 12 Midnight), and 11,705 kc/s, 25.63 metres (12.15 a.m. Monday to 6.0).—4.0 to 5.0 p.m., Octet Concert: Selection from Il Seraglio (Mozart); Gavotte (Martini); Jeux d'enfants (Bizet); Selection from Romeo and Juliet (Gounod); Serenade (Mesquita); Selection from The Arabian Nights (Joh. Strauss); Selection from Show Boat (Kern). 6.30 to 7.30, Quintet Concert: Selection from Les Noces de Jeannette (Massé); Chaconne and Rigaudon (Moussy); Russian Suite (Doyen); Selection from Werther (Massenet); Arioso (Bach); Bouffées printanières (Waldteufel); Selection from Les Cloches de Corneville (Planquette). 8.30, Programme to be announced. 1.0 a.m. (Friday), Recital of Old and New Songs by Suzy Vinker.

PRAGUE

638 kc/s, 470.2 metres; 120 kW.—6.0 a.m., Time; Gym; Music; News. 7.15, Interval. 9.50, News. 10.15, News in German. 10.10, Records. 10.30, See Brno. 11.0, Record. 11.5, Broadcast for Schools. 11.55, Notes for Farmers. 12 Noon, Time; Records. 12.20 p.m., News. 12.30, See Bratislava. 1.30, Talk: Economics. 1.40, Records. 1.50, Exchange. 1.55, Exchange and Weather in German. 2.0, Interval. 3.15, Concert by the Station Orchestra; Conductor, Parik; Overture, Patrie (Bizet); At Twilight (Fibich); Slovak Melodies (Konrad); Scherzo in D (Sequens); Waltz, Roses from the South (Joh. Strauss). 4.15 to 4.20, News. 4.40, Dance Music by the Symphony Jazz Band. 5.40, Announcement. 5.45, Talk for Farmers. 5.55, Record. 6.0, Talk for Workers. 6.10, German Transmission; Book Review; Talk for Farmers. 6.55, News. 7.0, Time; News.

SEPT. 27th THURSDAY continued

7.10, Children's Songs by the Prague Chamber Orchestra and Soloists; Conductor, Herti. 7.35, The Stoker and Mechanic of an International Express at the Microphone. 7.55, Introductory Talk to the following Relay. 8.0, Concert of Dvorák's Slav Dances by the Czech Philharmonic Orchestra, relayed from the Smetana Concert Hall; Conductor, Jerenias. 10.0, Time; News. 10.15, Dance Music by the Czech Jazz Band. 11.0 (approx.), Close Down.

RIGA

583 kc/s, 514.6 metres; 15 kW.—6.0 a.m., Choral. 6.5, Gym. 6.40 to 7.10, Concert. 11.0, Exchange. 11.5, Records. 11.30, Weather. 11.35, News. 12 Noon, Gardening Talk. 3.50 p.m., Records. 4.20, Talk: The Theatre. 4.50, Accordion Recital of Latvian Songs and Dances. 5.20, Talk. 5.50, Latvian Song Recital by Olga Vitolins. 6.10, Variety Programme. 6.40, English Lesson. 7.10, Weather. 7.15, Symphony Concert by the Station Orchestra; Conductor: Medius; Soloist: Pauls Suberts (Piano-forte); Symphonic Suite, Scheherazade (Rimsky-Korsakov); Piano-forte Concerto in A Minor (Grieg); Overture, Sakuntala (Goldmark); Dances from Prince Igor (Borodin). In the interval at 8.0, News, and at 9.0, Weather; News. 9.30, Concert of Light Music. 10.0, Concert of Fall Operetta Music.

RJUKAN.—Relays Oslo.

ROME

Call 1R0, 713 kc/s, 420.8 metres; 50 kW. Relayed by Naples, 1,104 kc/s, 271.7 metres; Milan No. 2, 1,348 kc/s, 222.6 metres; Turin No. 2, 1,357 kc/s, 221.1 metres; and 2R0, 11,810 kc/s, 25.4 metres.—7.30 a.m., Gym. 7.45, Time; News. 8.0, Interval. 12.30 p.m., Records. 1.5, Popular Concert. In the interval at 1.30, Time; News; Exchange. 2.15, Interval. 4.30, Programme for Children. 4.50, News; Exchange. 5.0, Recital by Tina Bari (Violin), Agnese Dubbini (Soprano), and Maria Pisani and Edvige Risca (Songs); Violin: Movements from the Sonata in G Minor (Locatelli); Soprano Solos: (a) Madrigal, (Somonetti), (b) La castellana (Pennacchio), (c) Ave Maria from I Lombardi (Verdi); Violin Solos (Kreisler): (a) Liebesleid, (b) Liebesfreud; Duets from: (a) Titus (Mozart), (b) Le roi de Lahore (Massenet), (c) La regata veneziana (Rossini). 5.55, Weather. 6.0 to 6.10, Corn Prices. 7.0, Announcements. 7.15, News in Foreign Languages. 8.0, Time; News. 8.10, Records. 8.30, Government Notes. 8.45, Concert. In the intervals, Theatre Talk and Review. After the concert, News.

RUYSSELEDE

10,330 kc/s, 29.04 metres; 8 kW.—7.45 p.m., News in French. 8.0, See Brussels (No. 1). 9.0, News in Flemish. 9.15, Close Down.

SALZBURG.—Relays Vienna.

SCHENECTADY

WGY, 790 kc/s, 379.5 metres; 50 kW. Relayed at intervals by W2XAF on 31.48 metres and by W2XAD on 19.56 metres.—7.0 p.m., Dreams Come True; Barry McKinley (Songs). 7.15, Musical Programme. 7.30, Woman's Radio Review; Talks; Orchestra. 11.25, Exchange. 12 Midnight, Fleischmann Hour with Rudy Vallee's Orchestra. 1.0 to 3.0 a.m. (Friday), Popular Programme.

SOTTENS

677 kc/s, 443.1 metres; 25 kW.; and Geneva, 401 kc/s, 748 metres.—7.0 to 7.15 a.m., Gym. 12.29 p.m., Time. 12.30, News. 12.40 (from Geneva), Records. In the interval at 1.0, Exchange. 2.0, Interval. 3.59, Time. 4.0 (from Geneva), Concert by the Station Orchestra; Conductor, Echenard; Three Pieces (Debussy): (a) Marche écossaise, (b) Dance, (c) La boîte à joloux; Extract from Pelléas et Mélisande (Fauré); Mother Goose (Ravel). 4.45, To be announced. 5.10, Concert (contd.): Extract from Orpheus in the Underworld (Offenbach); Ballet du printemps (Thomas); Mélodrame de Piccolino (Guiraud); Minuet for Flute (Glück); Bacchanale from Samson and Delilah (Saint-Saëns). 6.0 (from Geneva), Reading for Children. 6.20 (from Geneva), Talk for Children. 6.30 (from Geneva), Bridge Lesson. 6.45 (from Geneva), Talk for Mountaineers. 7.0 (from Geneva), Suite Ancienne for Violin and Piano-forte (Rhené-Baton). 7.15 (from Geneva), Talk: The International Music Festival in Venice. 7.40 (from Geneva), News. 7.59, Weather. 8.0 (from Geneva), Quartet No. 3 (Glière), by the Klein Quartet. 8.30 (from Geneva), Talk: Sinal. 8.45, Concert by the Station Orchestra; Conductor, Echenard; Concerto in G (Bach); Violin Concerto in A minor (Bach); Octet (Schubert). In the interval at 9.15, News. 10.0 (from Geneva), Talk: The Work of the League of Nations. 10.20 (from Geneva), Popular Songs. 10.50 (approx.), Close Down.

STOCKHOLM

704 kc/s, 426.1 metres; 55 kW. Relayed by Boden and Östersund, 413.5 kc/s, 726 metres; Göteborg, 941 kc/s, 318.8 metres; Hörby, 1,131 kc/s, 265.3 metres; Motala, 216 kc/s, 1,389 metres; and Sundsvall, 601 kc/s, 499.2 metres.—7.20 a.m., Gym. 7.45, Prayer. 8.0, Weather. 12.30 p.m., Weather. 12.45, Exchange. 12.55, Time. 1.0, Extract from Master Olof—Play (Strindberg). 1.45 (from Göteborg), Light Music. 2.45, Talk. 3.0, Interval. 5.0, Weather. 5.5 (from Östersund), Service. 5.30, Concert from Oslo. 6.15, Records. 6.45, English Lesson. 7.15, Weather; News. 7.30, Records of Viennese Music. 7.50, Talk from Malmö, 1,312 kc/s, 228.7 metres. 8.20, Coloratura Soprano and Baritone Recital by Eugénie Triguez and Donald Campbell; Coloratura Soprano Solos: Lo, hear the gentle Lark (Bishop); Little Boats (Hughes); Girometta (Sibella); Lullaby (Sadero); Una voce poco fa (Rossini); Scottish Folk Songs for Baritone: The Scots wha hae, The Rowan Tree, The wee wee German Lairdie, Ae fond Kiss, Nancy's Hair; Duets (Parcell): (a) Let us wander, (b) My dearest, my fairest, (c) Shepherd, Shepherd, leave deceyng; Duet from Don Giovanni (Mozart). 9.0, Dance Music from Warsaw; Cigány Music from Budapest. 10.0, Dance Music. 10.40, Dance Music from London. 11.25, Close Down.

STRASBOURG

859 kc/s, 349.2 metres; 15 kW.—11.0 a.m., Concert relayed from Bordeaux-Lafayette, 1,077 kc/s, 278.6 metres. 12 Noon, Records of Light Music. 12.45 p.m., News. 1.0, Time; Exchange. 1.5, Records. 1.15, Orchestral Concert relayed from Lille, 1,213 kc/s, 247.3 metres. 2.0, Programme for Children. 3.0, Interval. 4.0, See Paris (Radio Colonial). 5.0, Orchestral Concert relayed from Marseille, 749 kc/s, 400.5 metres. 6.0, Talk in German: America. 6.15, History Talk: Lucile Desmoulins. 6.30, Orchestral Concert; Conductor, de Villers; Overture, Romeo and Juliet (Tchaikovsky); Selection from Lohengrin (Wagner); Symphonic Poem, Helvetia (Scassola); Algerian Suite (Saint-Saëns). 7.30, Time; News. 7.45, Local News. 8.0, Press Review in German; Lottery Results; Announcements. 8.30, Dramatic Programme: (a) Silhouette—Sketch (Fay), (b) Une visite de nocces—One-Act Play (Dumas fils), (c) C'était hier—Dialogue (Hervier), (d) A la porte—One-Act Play (Verconsin). In the interval at 9.30, News. 10.30, See Paris (Ecole Supérieure). 1.30 (approx.), Close Down.

STUTTART

MUHLACKER, 574 kc/s, 522.6 metres; 100 kW.—5.35 a.m., Programme for Farmers. 5.45, Hymn; Time; Weather. 5.50, Gym. 6.15, Military Band Concert. 6.40, Time; News. 6.55, Military Band Concert (contd.). 8.10, Weather. 8.15, Gym. 8.35, Water Level. 8.40, Interval. 9.0, Gym. for Women. 9.15, Interval. 10.0, News. 10.10, A Visit to a Library of World-War Books (on Records). 10.40, Two Pieces, Op. 36 (Max von Schillings): (a) Helldunkel, (b) Invokation, by Gerhard Eucken (Piano-forte). 11.0, Recital of Music in Waltz Time by Fritz Ries, from the Ufa-Palast. 11.25, Records; Announcements. 11.40, Technical Talk for Farmers. 11.55, Weather. 12 Noon, See Frankfurt. 1.0 p.m., Announcements. 1.20, See Frankfurt. 1.50, News. 2.0, See Frankfurt. 2.30, Interval. 3.15, Programme of Music and Fairy Tales for Children. 4.0, See Cologne. 5.30, Discussion: Memorials. 5.45, Fairy Tales and Legends in Song—Recital by Gertrud Probst (Soprano): Es war ein alter König (Wolf); Die Fischerkinder (Pfitzer); Maria und der Schiffer (Knab); Mir träumte von einem Königskind (Trunk); Song (Gounod); Die schwarze Laute (Graener). 6.15, Astronomy Talk. 6.25, Spanish Lesson. 6.45, Recital on Eight Piano-fortes by Music School Students: Overture, Semiramis (Rossini). 7.0, Roses White and Red—Sequence of Folk Music (Ganss), by the Station Choir and Orchestra, a Zither Trio and Soloists; Conductor, Ganss. 7.30, Local Review. 7.40, Time; Weather; Talk for Farmers. 8.0, News. 8.15, Our Village—Munich, Hamburg, Königsberg, Frankfurt and Stuttgart Inter-Relay Programme. (For Details see Munich.) 10.0, Concert by the Otto Schulrabe Balalaika Orchestra: Russian March; Russian Waltz (Kiüss); Russian Folk Song Potpourri (Schulrabe). 10.20, Time; News; Sports Report. 10.40, Dance Music by the Casani Club Orchestra, from London. 11.25, Concert of Cigány Music from Budapest. 12 Midnight, See Frankfurt. 1.0 a.m., Close Down.

SUNDSVALL.—Relays Stockholm.

TOULOUSE

913 kc/s, 328.6 metres; 10 kW.—8.0 a.m., Dance Refrains. 8.30, News. 8.35, Orchestral and Sound Film Music. 12 Noon, Viennese Orchestra. 12.15 p.m., Light Music. 12.30, News. 12.45, Request Music. 1.0, Harvest Songs. 1.15, Paysanneries—Radio Fantasy. 1.30, Symphony Orchestra. 1.45, Oper-

etta Music. 2.0, News. 6.0, News. 6.15, Military Music. 6.30, Opera Arias. 6.45, Orchestral Music. 7.0, Sound Film Music. 7.15, Operetta Music: Song from Countess Maritza (Kálmán); Selection from (a) The Land of Smiles (Lehár), (b) The Chocolate Soldier (O. Straus), (c) Ciboulette (Hahn). 7.30, News; Exchange. 7.45, Russian Songs. 8.0, Concert of Harvest Songs. 8.30, Talk: South-Western Corn Markets. 9.0, A Visit to a Granary. 9.30, Folk Songs. 10.0, An Anecdote. 10.10, A Fable (La Fontaine), with Music. 10.15, News. 10.30, Harvest Festival Concert: Overture, Poet and Peasant (Suppé); Invocation à la nature (Massenet); Eglogue, Poème Virgilien (Rabaud); Heureux petit berger (Gounod); Selection from Messidor (Bruneau); Légende de la sauge (Massenet); To Spring (Grieg). 11.15, A Village Festival—Sequence. 12 Midnight, News. 12.5 a.m. (Friday), Au moulin de la chanson—Radio Fantasy. 12.15, Viennese Orchestra. 12.30 (approx.), Close Down.

TRONDHEIM.—Relays Oslo. TURIN.—Relays Milan.

VATICAN CITY

15,120 kc/s, 19.84 metres; 10 kW. (Morning); 5,970 kc/s, 50.26 metres (Evening).—11.0 to 11.15 a.m., Religious Information in French. 8.0 to 8.15 p.m., Religious Information in Italian.

VIENNA

592 kc/s, 506.8 metres; 120 kW. Relayed by Graz, 886 kc/s, 338.6 metres; Innsbruck, 519 kc/s, 578 metres; Klagenfurt, Linz, and Salzburg, 1,294 kc/s, 231.8 metres.—9.0 a.m., News. 9.20, Market Prices. 9.30, Weather. 10.50, Water Level. 11.30, Talk: Austria. 11.55, Weather. 12 Noon, Concert by the Vienna Symphony Orchestra; Conductor, Holzer; Soloist, Rosner (Violin); Overture, Der Bettelstudent (Millöcker); Tales of the Danube (Morena); Harlequinade for Violin (Rosner); Andante with Variations (Seidler); Waltz, Liebe im Mai (Strauss); Selection from Eva (Lehár); March (Silving); Dance Suite (Stilp); Serenata (Toselli); Waltz (Zieller); Potpourri (Hrubý). In the interval at 1.9 p.m., News. 2.0, Announcements. 2.10, Records of Famous Singers. 3.30, News. 3.50, Programme for Unemployed Youth. 4.10, News. 4.15, Tales for Children. 4.55, Opera Records. 5.10, Violin Recital by Adler: La Folia (Corelli-Leonard); Humoresque (Káiser); Der Zephir (Hubay); Abendlied (Glück); Perpetuum mobile (Novacek). 5.45, Talk: Heating Problems. 6.0, Talk: Thought. 6.25, Talk: Television. 6.50, Theatre Notes. 7.0, News. 7.20, Talk: Radio Marvels. 7.50, Strauss Concert by the Vienna Symphony Orchestra; Conductor, Holzer; Soloist, Maria Gerhart (Soprano); Johann Strauss Senr.: Radetzky March; Waltz, Loreley-Rheinklänge; Annenpolka; Johann Strauss, Junr.: Waltz, Frühlingsstimmen; Overture, Die Fledermaus; Waltz, The Blue Danube; March from Simplicius; Waltz, Wo die Zitronen buh'n; Polka and Czardas from Ritter Pasmán; Intermezzo from The Arabian Nights; Bacchanale from Indigo; Overture, Prince Methusalem; Josef Strauss: Waltz, Mein Lebenslauf ist Lieb' und Lust; Polka; Frauenherz; Dorfschwalben aus Oesterreich; Overture, Frühlingsluft; Eduard Strauss: Doktrinen-Walzer; Johann Strauss (Grandson): Gallop, Frisch durch's Leben. 9.50, Topical Talk. 10.10, News. 10.30, Orchestral Concert from Paris. 11.30, Dance Music by the David Mathé Band from the Café Palmhof; Soloist, Viktor Sternau (Songs). 1.0 a.m. (Friday), Close Down.

WARSAW

223 kc/s, 1,345 metres; 120 kW.—6.45 a.m., Hymn. 6.48, Records. 6.58, Gym. 7.8, Records. 7.15, News. 7.25, Records. 7.35, Hints for Housewives. 7.40, Programme Announcements. 7.50, Announcements; Light Music. 8.0, Interval. 11.57, Time. 12 Noon, Fanfare from St. Mary's Church, Cracow. 12.3 p.m., Weather. 12.5, Press Review. 12.10, Programme for Children. 12.30, Records. 1.0, News. 1.5, Labour Exchange. 1.10, Records. 1.45, Interval. 3.30, Announcements. 3.35, Exchange. 3.45, Concert of Light Music by the Górzynski Jazz Band; Soloist, Górska (Songs). 4.45, French Lesson. 5.0, Hamlet—Tragedy (Shakespeare). 6.15, Letterbox. 6.25, Talk for Farmers. 6.40, Violin Recital by Stella Dorthelmer, relayed from Cracow, 986 kc/s, 304.3 metres. 7.0, Talk on Books. 7.15, Song Recital by Dygas. 7.35, Topical Talk. 7.45, Programme Announcements. 7.50, Sports Notes. 8.0, Jazz Music by Altenberg and Rybczynski (Piano-fortes) and Olga Lada (Songs). 8.30, Concert of Popular Polish Music: Soloist, Bogucki (Songs); Potpourri of Polish Melodies (Suchocki); Mazurka (Osmański); Couaivienne; Polka (Dzierzanowski); Oberek (Suchocki); Mazurka (Wronski); Mountain Songs (Dzierzanowski); Mazurka (Namysłowski); Krakowiaks (Dzierzanowski); Oberek (Suchocki). 9.15, News. 9.25, Talk. 9.30, Records. 9.45, Talk. 10.0, Announcements; Light Music. 10.15, Three Eternal Songs, Op. 10 (Karłowicz) by the Station Symphony Orchestra; Conductor, Straszynski. 10.45, Talk in English: Sport in Poland. 11.0, Weather. 11.5, Dance Music from the Paradis.

ZURICH.—Relays Beromünster.

ATHLONE

565 kc/s, 531 metres; 60 kW. Relayed by Dublin, 1,348 kc/s, 222.6 metres; and Cork, 1,240 kc/s, 241.9 metres.—1.50 to 2.30 p.m., Time; Exchange; Weather; Records. 4.0, Concert from Robert's Café; Soloist, John Lynskey. 6.0, Programme for Children. 6.45, News. 7.0, Gardening Talk. 7.15, Literary and Dramatic Talk. 7.30, Time. 7.31, Concert by the Station Orchestra. 7.50, Song Recital by E. Kirk (Contralto). 8.0, Pianoforte Recital by Joan Trimble. 8.10, Contralto Song Recital (contd.). 8.20, Vocal Duets by Mollie Phillips and Robert Irwin, with Orchestra. 8.45, Val Vouden (Entertainer). 9.0, Concert by the Station String Orchestra. 9.15, Song Recital by T. Walshe (Tenor). 9.30, Concert by the Sianisa Gaedhead Band. 10.0, Variety Programme. 10.30, Time; News; Weather. 10.40, Variety Programme by the Nono Brothers. 11.0, Close Down.

BARCELONA

795 kc/s, 377.4 metres; 5 kW.—8.15 a.m., News; Records. 9.0, Chimes; Gym; Records. 9.20, News; Records. 10.0, Obituary. 12 Noon, Chimes; Weather. 1.0 p.m., Programme for Women. 1.45, Records. 2.0, Records. 2.30, Theatre Notes; Amusement Guide; Records. 3.0, sextet Concert; Tourist Talk in the interval. 3.45, Exchange. 4.0, Programme for Hospitals. 5.0, News. 7.0, Trio Concert. In the interval at 7.30, News. 8.0, Request Records. 8.30, Exchange; Request Records. 9.0, Wireless Notes. 9.10, Records. 9.30, Educational Programme for Children. 9.40, Records. 9.45, Press Review. 10.0, Chimes; Weather; Announcements, Programme for Seamen; Exchange. 10.10, Concert by the Station Orchestra: España cañi (Marquina); Selection from Marouf (Rabaud); Waltz (Krome); Piece (Ugo); Gavotte (Wollstedt); Indian Wedding (Percy); Dance (Corbellini). 11.15, Choral Concert. 12 Midnight, Dance Music by the Melody Boys' Orchestra from the Shang-hai Bar. 1.0 a.m. (Saturday), News and Close Down.

BASLE.—Relays Beromünster.

BELGRADE

685 kc/s, 437.3 metres; 2.5 kW.—10.45, a.m., Programme Announcements. 10.50, Water Level. 11.0, Concert by the Station Orchestra. 11.59, Chimes. 12.5 p.m., Records. 12.15, Recital of Opera Arias by Mme. Nikovic-Grosano; Arias from Mignon (Thomas), La Bohème (Puccini), La Traviata (Verdi). 12.45, Exchange; Announcements. 1.10, Records. 1.30, News; Time. 4.0, Gym. for Children. 4.30, Concert by the Station Orchestra: Overture, The Daughter of the Regiment (Donizetti); Lyric Suite (Lindner); Piece (Mokraujatz); Dance of the Hours (Ponchielli); Harlequin and Colombine (Kaskel); Serbian Potpourri (Petrovic); March (Petrovic). 6.55, Time; Programme Announcements. 7.0, Talk. 7.30, Announcements. 7.40, Records. 7.45, Talk. 8.15, Programme from Zagreb, 1,086 kc/s, 276.2 metres. 9.45, Records. 10.0, Time; News. 10.15, Concert from the Domovina Restaurant. 10.50, Records. 11.0, Close Down.

BERLIN

DEUTSCHLANDSENDER, 191 kc/s, 1,571 metres; 60 kW.—5.45 a.m., Weather. 5.50, News. 6.0, Gym. 6.15, Motto. 6.20, See Hamburg. In the interval at 7.0, News. 8.0, Interval. 8.45, Gym. for Women. 9.0, Löns Lieder. 9.40, Reading. 10.0, News. 10.10, Records in Broadcasting—A Peep behind the Scenes. 10.50, Games for Children. 11.15, Weather. 11.30, A Discussion for Women. 11.55, Weather. 12 Noon, See Munich. 12.55 p.m., Time. 1.0, Records of Spanish Music; Weather. 1.45, News. 2.0, Interval. 2.45, Greetings; Programme Announcements. 3.0, Weather; Exchange. 3.15, Talk: Frau Aja, Goethe's Mother. 3.40, Records. 4.0, See Munich. 5.30, Book Review. 5.45, Discussion: New German Films. 6.10, Modern Song Recital by Adelheid Armhold: Five Songs (Knafl); (a) Schlafend trägt man mich, (b) Weisses Schaf, (c) Mich besingt die Zeit mit Schall, (d) Winterabend, (e) Das ist nicht Zeit; Five Songs (Pfitzner): (a) Lockung, (b) Das verlassene Mägdelein, (c) Leuchtende Tage, (d) Hast du von den Fischerkindern, (e) Frieden; Three Songs (Haas): (a) Die Schmitzerin, (b) Kuckuck und Schäferin, (c) Gutzgauchs Fall. 6.35, A Poem: Weather. 6.40, A Spook on the Roof—Adventure Play (Kasten). 7.10, Beethoven and Schubert Music by Ely Ney (Pianoforte): Thirty-two Variations in C minor (Beethoven); Sonata in A flat, Op. 110 (Beethoven); Extracts, Moments musicaux (Schubert); Impromptu in A flat, Op. 90 (Schubert). 8.0, Motto; News. 8.15, See Frankfurt. 8.55, Concert by the Station Orchestra; Conductor, Lindner; Soloist, Ely Ney (Pianoforte): Pianoforte Concerto in B flat (Mozart); Symphony in E (Goetz). 10.0, News; Sports Notes. 10.30, Topical Talk. 10.45, Weather. 11.0, See Cologne. 12 Midnight (approx.), Close Down.

BERLIN

FUNKSTADT, 841 kc/s, 356.7 metres; 100 kW.—6.0 a.m., Gym. 6.15, Weather; Prayer. 6.20, See Hamburg. In the interval at 7.0, News. 8.0, Gym. 8.20, Records; Announcements. 9.0, See Berlin (Deutschlandsender). 9.40, Talk for Women: Old Bayreuth. 10.0, Weather; News. 10.10 to 10.25, Market

FRIDAY
SEPTEMBER THE TWENTY-EIGHTH

Prices. 11.25 to 11.30, Exchange. 12 Noon, Concert from Hamburg. In the interval at 12.30 p.m., Weather. 1.0, News. 1.15, Records of Russian Music. 2.0, News. 2.15, Recital by Irmgard Preiss (Soprano), Herbert Schlimke (Pianoforte) and Edmund Josefak (Bartone). 3.0 to 3.20, Exchange. 4.0, See Brestau. 6.0, Announcements. 6.5, Book Review. 6.30, Chamber Music by Willy Steiner and Carl Bohm (Violins), Alfred Schattschneider (Cello) and Karl Rockstron (Pianoforte); Dances for Violin and Piano forte: (a) Gavotte (Handel), (b) Minuet (Méhul), (c) Folk Dance (Weber); Divertimento in G for Two Violins and Cello (L. Mozart); Silhouettes for Two Violins and Pianoforte, Op. 9 (Jouy). 7.0, Legal Talk. 7.10, Talk: German Lakes. 7.25, Echoes of the Day. 7.45, Political Review. 8.0, News. 8.15, See Frankfurt. 8.55, Recital of Paul Graener Songs by Walter Ludwig (Tenor), the Composer at the Pianoforte. 9.30, Third Symphony in D flat (Bittner), by the Station Orchestra; Conductor, Otto Frickhoeffer. 10.20, News. 10.50, La Waltz Time—Concert by the Small Station Orchestra; Conductor, Willy Steiner: Abendsonne (Lanner); Sesta (Waldteufel); Two Waltzes (Dvorák); Herbststürmen (Löhrl); Orchestren (Schöman). 11.30, Andreas Schüller Programme by Hans Helmut Weber. 12 Midnight, Close Down.

BERNE.—Relays Beromünster

BEROMUNSTER

556 kc/s, 539.6 metres; 60 kW.—12 Noon, Dance Music on Records. 12.29 p.m., Time; Weather; News. 12.40, Potpourris on Records. 1.25, Time; Weather; Exchange;

interval at 7.0, Time; News. 8.0, March Records. 8.40, Gym. for Women. 9.0, Time; News. 10.10 to 10.40, Talk: By Motor-Cycle through Spain. 11.30, Time; News. 12 Noon, Concert by the Bunzlau Municipal Orchestra: March (Blankenburg); Grieg Potpourri (Urbach); Gavotte from Idomenio (Mozart); Waltz, Wine, Woman and Song (Joh. Strauss). In the interval at 12.30, Time; Weather; and at 1.30, Time; News. 2.20, Exchange. 2.25, Post Office Propaganda; Records. 2.50, Market Prices. 3.10, Readings. 3.25, Kaun and Wolf Tenor Solos by Alfred Stöckel, with Commentary: Four Songs (Kaun): (a) Entelied, (b) Venedig, (c) Auf ein altes Bild, (d) Auf einer Wanderung; Four Songs (Wolf): (a) Verschwiegene Liebe, (b) Fussreise, (c) Der Mensch, (d) Der Genesende an die Hoffnung. 4.0, Concert by the Station Orchestra: Conductor, Rischka; Soloists, Margot Hasse (Violin) and Kurt Hattwig (Pianoforte); Overture in E minor (Nitschke); Rossini Potpourri (Respighi); Canzonetta (Bocherini); Waltz in D (Cramer); Wiegand (Reger); Capriccio (Reger); Festliche Musik (Koschinsky); Suite from Belshazzar (Sibelius); Romanian Melody (de Sarasate); Melody (Stojowsky); Allegretto tranquillo (Grieg); Prelude to Gaudemur (Humperdinck); Intermezzo; In Hammersbach (Elgar); Valse lento (d'Ambrosio); March (Gabetti). In the interval at 5.30, Weather; Market Prices. 5.50, Talk. 6.15, Programme for Young People: Scapa Flow—Sequence (Willi Rockow). 6.50, Programme Announcements; Weather; Market Prices. 7.0, Report from the Waterworks in Upper Silesia. 7.45, See Berlin (Funkstunde). 8.0, News. 8.15 to 10.20, See Frankfurt. 10.20,

by Daisy Gilbert and Maria Boon. 7.30, Legal Talk and Literary Review. 8.0, Ex-Servicemen's Programme; Address; Recitations; Music. 9.15, Concert by the Symphony Orchestra; Soloist, José Pierre (Songs); Symphony No. 1 in B flat (Schubert); Songs: (a) Variations on Le carnaval de Venise (Benedict), (b) Aria from The Puritans (Bellini), (c) Song (Jonelli); Ballet Music from Rosamund (Schubert); Melodica (Schubert); Military Marches Nos. 3 and 4 (Schubert). 10.0, News. 10.10, Request Records. 10.25, Dance Music. 11.0, La Brabagone.

BRUSSELS (No. 2)

532 kc/s, 321.9 metres; 15 kW. Programme in Flemish.—11.57 a.m., Weather. 12 Noon, Records. 1.0 p.m., News. 1.10, Popular Orchestral Music; Soloist, Olga Shamsheff (Songs to the Guitar); Marche jubilaire (de Boeck); Waltz, Une journée à Séville (Waldteufel); Overture, Don Pasquale (Donizetti); Baby plays Soldier (de Micheli); Selection from The Three Musketeers (Friml); Songs; Cinema Suite (Ketelbey). 2.0, Interval. 4.55, Announcements. 5.0, Records: The Scottish Symphony (Meindelssohn); Hungarian Dances Nos. 1, 2 and 3 (Brahms). 6.0, Records: Acts I and III from Fedora (Giordano). 6.45, Song Recital by Jacqueline De Kessel. 7.0, Talk: Economics. 7.15, Records: Extracts from the Sonata in D minor, Op. 45, for Violin and Pianoforte (Grieg). 7.30, News. 8.0, Promenade Concert, relayed from London. In the interval at 9.35, Recitations. 10.30, News. 10.40, Dance Records. 11.0, Close Down.

BUCHAREST

823 kc/s, 364.5 metres; 12 kW.—12 Noon, Water Level; Records. 12.45 p.m., Amusement Guide; Exchange; Records of Light Music. 1.15, Time; Weather; News. 1.40, Records of Light Music. 5.0, Concert by the Station Orchestra: Overture, William Tell (Rossini); Country Suite (Amadei); Rusticella (Cortopassi); Souvenir de Birolia (Karastoyanoff); Aubade (D'Ambrósio); Noël Pastoral (Albert); Idylle (Königsberger); Peasant Scenes (Smetana). 6.0, Time; Weather; News. 6.15, Concert by the Station Orchestra. 7.0, Educational Programme. 7.15, Talk. 8.0, Violin Recital of Italian Music by Sandu Albu: La Folia (Corelli); Concerto in E minor (Nardini); Minuet (Porpora); Allegretto (Bocherini); Prelude and Allegro (Pugnani). 8.30, Talk. 8.45, Song Recital by Florica Popovici; Le Rossignol amoureux (Rameau); Aria from The Magic Flute (Mozart); Elegy (Duparc); Nocturne (Fauré); Nicolette (Ravel); Two Romanian Folk Songs. 9.15, Pianoforte Recital by Ily Wechsler: Etude de Concert in G flat (Moszkovsky); Prelude in G sharp (Rachmaninov); The Flight of the Bumble Bee (Rimsky-Korsakov); Etude (Scriabin); Idyll (Rogalski); Oriental Fantasy (Baškirev). 9.45, News.

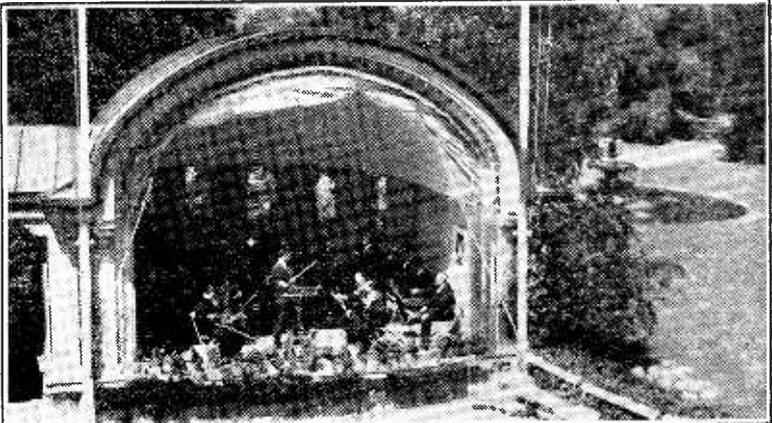
BUDAPEST

546 kc/s, 549.5 metres; 120 kW.—6.45 a.m., Gym. 9.45, News. 10.0, Talk. 10.40, Talk. 12 Noon, Chimes from the University Church. 12.5 p.m., Concert by the Szalay Cigány Band. 1.30, Orchestral Concert; Conductor, Fridl. 2.40, Hints for Housewives. 4.0, Handwork Lesson. 5.0, Report from a Mine. 5.50, Tártozat Recital by Imre Dobos. 6.30, Talk: National Economy Day. 7.5, Records. 7.45, Sports Notes. 8.0, A Comedy (Sardon and Najac). 9.45, News. 10.5, Concert by the Horváth Cigány Band. 10.30, Foreign News. 11.15, Pianoforte Recital by Takács.

CASSEL.—Relays Frankfurt.

COLOGNE

658 kc/s, 455.9 metres; 60 kW.—5.30 a.m., Motto; Records. 6.5, Gym. 6.25, Reading. 6.35, Request Records. 6.50 to 7.5, Time; Weather; News. 8.0, Time; Weather; Water Level. 8.5, Gym. for Women. 8.20 to 8.35, Talk: The Stepmother. 10.0, Time; News; Water Level. 10.10, Talk for Schools. 10.45, Talk with Records: The Melle District. 11.0, Chopin and Brahms Recital by Otti Kersten (Pianoforte) and Auguste Welter (Soprano); Pianoforte Solos (Chopin): (a) Nocturne in F Sharp Minor, (b) Prelude in D Minor; Soprano Solos (Brahms): (a) Die Mainacht, (b) Auf dem See; Ballade in F Minor for Pianoforte (Chopin). 11.30, Post Office Propaganda; Records. 12 Noon, Concert by the Station Chamber Quintet. 12.45 p.m., News; Greetings. 1.0 to 2.45, Concert by the Small Station Orchestra. In the interval at 1.45, News. 3.15, Talk: The Westphalian Iron Industry. 3.30, Exchange. 3.45, Book Review for Young People. 4.0, Concert by the Station Chamber Orchestra; Conductor, Hartmann; Prelude to Nakisris Hoehzeit (Lincke); Waltz, Blonde or Brunette (Waldteufel); Delibes Potpourri (Urbach); Cherry Blossom (Albert); Piece (Alstyne); A-B-C Potpourri (Komzak); Russian Song and Dance Potpourri (Fetras). 5.0, Literary Talk. 5.15, Talk with Records: Scandinavian Folk Music. 5.45, Talk: Rhinish Place Names. 6.0, Music for Young People. 6.20, English Conversation. 7.0, Spinnstube—Folk Song Sequence (Hatzfeld); The Station Choir and Soloists; Conductor, Breuer. 7.45, Political Report. 8.0, News. 9.15, See Frankfurt. 8.55, Orchestral Concert; Conductor, Buschkötter; Soloist,



Mario Galli and his orchestra in the "Kungsparken" (King's Park) at Malmö. The orchestra is often heard over the Swedish network of more than 30 stations.

Interval. 3.30, Records. 3.59, Time. 4.0, Concert of Rocco Period Music. 4.55, Concert of Light Music by the Station Orchestra; Conductor, Neppach; Soloists, The Wildhaber Sisters (Songs). 6.0, Reading for Children. 6.30, Gardening Talk. 6.45, Six Folk Songs. 7.0, Time; Weather; Market Prices; Tourist Report; Sports Notes. 7.20, Talk. 7.50, Lobetanz—A Poem with Music. In the interval at 9.10 (approx.), Weather; News. 10.15 (approx.), News; Close Down.

BODEN.—Relays Stockholm. **BODO.**—Relays Oslo.

BRATISLAVA

1,004 kc/s, 298.8 metres; 15.5 kW.—6.39 a.m., See Prague. 8.30, Records. 9.10, Announcements. 9.15, Catholic Address. 9.39, See Prague. 11.0, See Brno. 12 Noon, See Prague. 12.15 p.m., Concert by the Station Orchestra; Conductor, Dyk. 1.30, See Prague. 1.45 to 1.50, Water-Level. 4.0, Concert by the Station Orchestra, relayed from Kosice, 1,158 kc/s, 259.1 metres. 5.36, Talk: The Dead Sea. 5.45, Organ Recital by A. Ledvina. 6.10, Talk for Housewives. 6.15, Hungarian Transmission; Talk; Readings; Records. 6.55, See Prague. 7.40, Talk. 7.55, Recital of Slovak Folk Songs by St. Hoza (Tenor). 8.20, Recitations. 8.35, Violin Recital by J. Simon. 8.55, Act III of The Feast at Boleslav—Drama (Durych). 9.35, Recital of Russian Songs by B. Archipov. 10.0, See Prague. 10.45, News in Hungarian. 11.0, Close Down.

BREMEN.—Relays Hamburg.

BRESLAU

950 kc/s, 315.8 metres; 60 kW. Relayed by Gleiwitz, 1,231 kc/s, 243.7 metres.—5.0 a.m., Hymn; Motto; Records. In the interval at 5.40, Time; Weather. 6.0, Time; Weather; Gym. 6.25, See Leipzig. In the

Time; News. 10.45, Dance Music by the Station Dance Band; Conductor, Hlgenes. 12 Midnight (approx.), Close Down.

BRNO

922 kc/s, 325.4 metres; 32 kW.—6.30, See Prague. 8.45, Records. 8.55, Political Talk for Workers. 9.15, Violin Recital by Zamecnik. 9.30, See Prague. 11.0, Concert by the Station Orchestra and Moravian Teacher's Vocal Union; Conductor, Janota; Soloist, Walter. 12 Noon, See Prague. 12.15 p.m., See Bratislava. 1.30 to 1.45, See Prague. 4.0, Concert by the Station Orchestra, relayed from Kosice, 1,158 kc/s, 259.1 metres. 5.30, Talk. 5.45, Records. 5.55, German Transmission: The Broken Jug—Comedy (Kleist). 6.55, See Prague. 7.55, Song Recital by Pribytkov (Bass). 8.15, Extract from Saint Wenceslas (Durych), by Members of the National Theatre. 9.0, See Moravská-Ostrava. 10.0, See Prague. 11.0 (approx.), Close Down.

BRUSSELS (No. 1)

620 kc/s, 483.9 metres; 15 kW.—11.55 a.m., Weather. 12 Noon, Popular Orchestral Music; Soloists, Gilman (Flute), Durand (Tenor); March (Spoel); Waltz, Les sirènes (Waldteufel); Overture, The Gipsy Baron (Joh. Strauss); Adoration (La Gye); Potpourri (Urbach); Souvenir de Spa for Flute (Meurice); Ideale (Tosti); Fantasia on Paganini (Léhar). 1.0 p.m., News. 1.10, Records. 2.0, Interval. 4.55, Announcements. 5.0, Dame Concert by the Symphony Orchestra: Marche cortège; Symphony in F; Caprice; Venetian Dancer; Bucolique; Seguidilla Valse Symphonique. 6.0, Talk. 6.15, Request Records. 6.30, Beethoven Recital by Jean Brennet (Pianoforte): Sonata in F Minor, Op. 2, No. 1; Sonata in A, Op. 2, No. 2. 7.0, Talk. 7.15, Musical Monologues

SEPT. 28th **FRIDAY** continued

Hoelscher (Cello): Prelude to Die Geschöpfe des Prometheus (Beethoven); Cello Concerto in A Minor (Schumann); Variations, Enigma (Elgar). 10.0, Time; News. 10.20, Theatre Talk. 11.0, Dance Music by the Leo Eysoldt Dance Band. 12 Midnight, Close Down.

COPENHAGEN.—Relays **Kalundborg**. **CORK**.—Relays **Athlone**. **DANZIG**.—Relays **Königsberg**. **DRESDEN**.—Relays **Leipzig**.

FECAMP

1,456 kc/s, 206 metres; 10 kW.—11.30 a.m. to 12 Noon, Programme in English arranged by the International Broadcasting Company of London; Happy Half-Hour; Request Programme. 12 Noon, Programme in French. 4.30 p.m. to 6.0, Programme in English arranged by the I.B.C. (London). 4.30, Concert; Dance Music. 5.0, Bonnemouthe, Weymouth, Southampton and Winchester Concert; Part 1, Patrick Waddington. 5.30, Part 2, Orchestral Music. 6.0, Programme in French. 11.0 till Close Down, Programme in English arranged by the I.B.C. (London). 11.0, Talkie Time; Times from the Talkies and Shows. 11.35, Concert; Variety (on Gramophone Records). 12 Midnight, Concert for Musselbong Listeners; Dance Music. 12.30 a.m. (Saturday), I.B.C. Time Signal. 12.31, Dance Music. 1.0 a.m., I.B.C. Good-night Melody and Close Down.

FLENSBURG.—Relays **Hamburg**. **FLORINCE**.—Relays **Milan**.

FRANKFURT

1,195 kc/s, 251 metres; 17 kW.—5.45 a.m., Hymn; Time; Weather. 5.50, Gym. 6.40, Time; News. 6.50, Weather. 6.55, Orchestral Concert; Conductor, Hoffmann. 8.10, Water Level; Weather. 8.15 to 8.35, Gym. 10.0, News. 10.45, Hints for Housewives. 11.0, Announcements; Records. 11.30, Announcements; Exchange; Weather. 11.45, Social Notes. 12 Noon, See **Munich**. 1.0 p.m., Time; News. 1.10, Local News. 1.20, See **Stuttgart**. 1.50, Time; News. 2.0, See **Stuttgart**. 2.30, Economic Report. 2.45, Time; Exchange. 2.55, Weather. 3.10, Programme for Women. 4.0, See **Stuttgart**. 5.30, Talk: Peasant Stock. 5.45, Chopin Pianoforte Recital by Ada Turana: Prelude in D Flat; Ballad in G Minor. 6.0, Programme for Young People: Prince Eugene—Sketch (Dieter Bassermann). 6.25, Talk: Astronomy. 6.45, Weather; Exchange; Announcements; Time. 6.50, Concert by the Trier Municipal Orchestra; Conductor, Creutzburg: Overture, The Hermit's Bell (Maillart) Peer Gynt Suite No. 1 (Grieg); Prelude to Hansel and Gretel (Humperdinck); Kaiser-Walzer (Joh. Strauss); Slav Rhapsody (Friedemann); Overture, Bandienstreiche (Suppé). 7.45, See **Berlin (Funkstunde)**. 8.0, News. 8.15, Transmission for all German Stations: The Tannus in Autumn—Sequence. 8.55, Concert by the Station Orchestra and Choir with Franz Hauke (Saxophone); Conductor, Belker: Overture, Berliner Luft (Lincke); Choir and Orchestra: Waltz, Wiener Blüt (Joh. Strauss); Selection from The Merry Widow (Lehár); Choir and Orchestra: Waltz, Roses from the South (Joh. Strauss); Potpourri, Münchner Leben (Pollak). In the interval, a Sketch. 10.20, Time; News. 10.35, Local News; Weather; Sports Report. 10.45, Sports Review. 11.0, Spirits of the Rhine—Hildegard von Bingen and Casarius von Heisterbach. 12 Midnight, Johann Strauss Concert by the Station Orchestra; Conductor, Rosband: Overture, Eine Nacht in Venedig; Waltz from Jabuka; Egyptian March; Waltz, Wine, Woman and Song; Annen Polka; Waltz, Morgenblätter; Polka-Mazurka, Der Klügere gibt nach; March from The Gipsy Baron; Waltz, The Blue Danube. 1.0 a.m. (Saturday), Close Down.

FREDRIKSSTAD.—Relays **Oslo**. **FREIBURG**.—Relays **Stuttgart**. **GENEVA**.—Relays **Sottens**. **GENOA**.—Relays **Milan**. **GLEIWITZ**.—Relays **Breslau**. **GÖTEBORG**.—Relays **Stockholm**. **GRAZ**.—Relays **Vienna**. **HAMAR**.—Relays **Oslo**.

HAMBURG

904 kc/s, 331.9 metres; 100 kW. Relayed by **Bremen**, **Flensburg**, and **Hanover**, 1,330 kc/s, 225.6 metres.—5.45 a.m., Time; Weather; Notes for Farmers. 6.0, Gym. 6.15, Time; Weather. 6.20 (from **Kiel**), Orchestral Concert; Conductor, Döring. In the interval at 7.0, Time; News. 8.0, Weather; Talk for Housewives. 8.10, Announcements; Records. 10.50, News. 11.0, Play for Schools. 11.30 (from **Bremen**), Concert by Fredo Niemann's Wind Instrument Orchestra from the Town Hall; March (Teike); Hungarian Comedy Overture (Keler-Bela); Waltz (Fétras); Serenade (Brase); Selection from Eugene Onegin (Tchaikovsky); March (Unrath); Zigeunerstüchchen (Nehü); Selection from Gasparone (Müllcker); Intermezzo, Sefira (Siede); March (Bratfisch). In the interval, Report for Housewives; Time; Announcements. 1.0 p.m., Exchange. 1.15, Weather. 1.20, Musical Programme. 2.15, News. 2.30, Records; Russian Music. 3.0, Exchange. 3.40, Shipping and Aviation Notes. 4.0, See **Königsberg**. 5.30, Reading. 5.45, Programme for Young People. 6.0, Wilhelm Plog Programme. 6.45, Exchange. 6.55, Weather. 7.0 (from **Flensburg**), Shock-headed Peter—Choral Sequence Op. 28 (Fritz Reuter); Orchestra and Women's Choir; Conductor,

Röder; Soloist, Gertrud Trenkrog (Harpischord). 7.45, See **Berlin (Funkstunde)**. 8.0, News. 8.15, See **Frankfurt**. 8.55, Character Test—Musical Play (Siegfried Scheffler); The Station Orchestra and Soloists; Conductor, Seeker. 10.0, News. 10.20, Musical Programme. 11.0 (from **Flensburg**), from the Deutsche Hans. Orchestral Concert; Conductor, Röder: Rakoczy Overture (Keler-Bela); Meditation on Thais (Massenet); Paraphrase on the Song, Aus der Jugendzeit (Friedemann); Pusztá-Ritt (Hagspiel); Selection from La Poupée (Audran); Waltz, Les Sirènes (Waldteufel); March (von Blon). 12 Midnight (approx.), Close Down.

HANOVER.—Relays **Hamburg**.

HILVERSUM

160 kc/s, 1,875 metres; 7 kW. (until 3.40 p.m.). Transmitted on **Kootwijk**, 50 kW. from 3.40 p.m.—7.40 to 9.40 a.m., Programme of the Workers' Radio Society (V.A.R.A.). Records. 9.40, Religious Programme of the Liberal Protestant Radio Society (V.P.R.O.). 9.55 to 11.40, V.A.R.A. Programme. 9.55, Recitations. 10.10, Organ Recital by Steyn. 10.40, Recitations (contd.). 10.55, Songs and Instrumental Music. 11.40 to 3.40 p.m., Programme of the General Broadcasting Society (A.V.R.O.). 11.40, Time; Records. 12.10 p.m., Concert of Light Music by the Rentmeester Orchestra. In the interval, Records. 1.50, Dressmaking Lesson. 2.10, Pianoforte Recital by Willem van der Andel: Sonata quasi una fantasia, Op. 27, No. 2 (Beethoven); Mazurka, Op. 68, No. 2 (Chopin); Eight Waltzes, Op. 39 (Brahms); (Chopin); Nocturne, Op. 15, No. 2. 2.40, Records. 3.43 to 7.40, V.A.R.A. Programme. 3.43, Dressmaking Lesson. 4.25, Records. 4.40, Programme for Children. 5.10, Orchestral Concert of Light Music; Conductor, Wins. 5.40, Concert by the Small V.A.R.A. Ensemble: Overture, Gri-Gri (Lincke); Piece (MacDowell); Waltz No. 1, Op. 54 (Dvorák); Stelldichein mit Columbine (Heykens); Intermezzo (Hellmesberger); Folly Dance (Haines). 6.10, Orchestral Concert of Light Music; Conductor, Horst. 6.40, Organ Recital by Jong: Selection from Rigoletto (Verdi); Did you ever see a Dream walking? (Revel); Serenade (Heykens); Speak to me of Love (Lenoir); Es ist kein Zufall (Stolz). 7.10, Talk. 7.30, Records. 7.37, S.O.S. Announcements. 7.40 to 10.40, V.P.R.O. Programme. 10.40 till Close Down, V.A.R.A. Programme of Records. 11.40 (approx.), Close Down.

HORBY.—Relays **Stockholm**.

HUIZEN

955 kc/s, 301.5 metres; 7 kW. (until 6.40 p.m.), 20 kW. from 6.40 p.m.—7.40 a.m. till Close Down, Programme of the Christian Radio Society (N.C.R.V.). 7.40, Bible Reading; Prayers. 7.55, Records. 9.10, Interval. 10.10, Religious Address. 10.40, Concert by the Van der Horst Ensemble. In the interval at 11.40, Police Notes; Records. 1.10 p.m., Organ Recital by Visser: Au matin (Godard); Berceuse (Godard); Gavotte (Niemann); Gavotte (Corelli); Piece (Voss); Four Songs without Words (Mendelssohn); Fantasia (Visser); Piece (Simon); Serenade (Heykens); Spanish Dances Nos. 1 and 2 (Moszkowsky); Improvisation (Visser). 2.10, Reading. 2.40, Cello Recital by Werner: Suite in D (d'Hervelois); Sonata in A Minor (Galliard); Records; Sonata (Corelli). 3.25, Interval. 3.40, Records. 4.40, Recital by Mme. A. de Vink-Verschoor (Soprano), Smulders (Tenor), Stotyn (Oboe), and Schellevis (Pianoforte). 6.10, Talk. 6.40, Police Notes; Church News. 6.55, Records. 7.10, Literary Talk. 7.40, Concert by a Double Male Voice Quartet; Conductor, Vischer; Soloist, Bouwmeester (Organ); Beati Mortui (Mendelssohn); Nimmer Nacht (Andriessen); Meditation for Organ (Martin); Piece (Faulkes); Prayer and Lullaby (Guilmant); Sanctus (Schubert); Die Vesper (Beethoven); Piece (Wierts); Four Pieces for Organ (Bouwmeester): (a) Melody, (b) The Flute, (c) Songs, (d) Improvisation. 8.40, Talk. 9.10, Concert for String Orchestra; Soloists, Stoghem and Vonk (Violin) and Mlle. Lankhant (Pianoforte); Concerto in D Minor for Two Violins and Orchestra (Bach); Pianoforte Concerto in A (Mozart); Symphony in E Flat (Haydn). In the interval at 9.30, Press Review. 10.40, Records. 11.10, Close Down.

INNSBRUCK.—Relays **Vienna**.

KALUNDBORG

238 kc/s, 1,261 metres; 75 kW. Relayed by **Copenhagen**, 1,176 kc/s, 255.1 metres; and **Skamlehaek**, 49.5 metres.—7.0 a.m., Gym. 8.30, Divine Service from Copenhagen Cathedral. 10.15 to 10.45, Natural History Talk for Schools. 11.0, Weather. 11.10, Fish Prices. 12 Noon, Time; Chimes. 12.2 p.m., Concert by the Bendix String Ensemble, relayed from the Wivex Restaurant. 2.0, Interval. 2.40, Concert by Carl Rydahl's Instrumental Ensemble: Overture, The Bohemian Girl (Balfe); Minuet in E (Mozart); Waltz, Passage d'automne (Waldteufel); Selection from The Daughter of the

Regiment (Donizetti); Minuet and Gavotte from Manon (Massenet); Dance from Weyland the Smith (Henriques); Classic Minuet (Riis-Magnussen); Valse lento (Dolff); Matinata (Leoncavallo); Fantasia on Swedish Folk Songs and Dances (Eysden); The Wedding of the Rose (Jessé); Pepita Polka (Lumbye); March (Ryning). In the interval at 3.30, Reading (Sick). 4.40, Play with Songs for Young People. 5.30, Exchange; Fish Market Prices. 5.45, Talk. 6.15, Elementary German Lesson. 6.45, Weather. 6.54, Announcements. 7.0, News. 7.15, Time. 7.16, Talk relayed from the University; The Layman and the Law. 8.0, Time. 8.1, Review, by Per Kuntzon. 8.10, Harp Recital by Maria Korchińska: Extracts from the Suite for Harp (Rameau); Impromptu (Ronsse); Fantasia (Saint-Saëns). 8.30, Sonkin's Big Prize—Tragi-Comedy in Three Acts (Juschekwitsch), translated by Kalekar. 9.30, Song Records. 9.40, A Visit to Hilleröd Castle. 10.10, News. 10.25, Chamber Music by Hye-Knudsen (Flute), Henriques (Violin), Adda Varning (Viola), Duet for Flute and Violin (C. P. E. Bach); Serenade in G. Op. 141 (Reger). 10.55, Dance Music from the Ritz Restaurant. In the interval at 12 Midnight, Time; Chimes. 12.30 a.m. (Saturday), Close Down.

KIEL.—Relays **Hamburg**. **KLAGENFURT**.—Relays **Vienna**.

KONIGSBERG

1,031 kc/s, 291 metres; 60 kW. Relayed by **Danzig**, 1,303 kc/s, 230.2 metres.—5.0 a.m., Records. 5.50, Weather. 6.0, Gym. 6.20, See **Hamburg**. In the interval at 7.0, News. 8.0, Prayers. 8.30 to 9.0, Gym. for Women. 9.5 (from **Danzig**), French Lesson for Schools. 10.40, News. 11.30, See **Hamburg**. 1.1 p.m., Time; Weather. 1.5, Records. In the intervals at 1.20 and 2.0, News. 2.30, Announcements; Records. 3.0, Exchange. 3.15, Handwork Lesson for Children. 3.40, Programme for Women. 4.5, Concert by the Small Station Orchestra; Conductor, Wilken: Overture, Hunyadi László (Erkel); Selection from Thais (Massenet); Gipsy Festival (Heykens); Serenata (de Micheli); Suite, Ein Schubertabend in Wien (Ralf); Waltz from The Arabian Nights (Joh. Strauss); In the Village (Tchaikovsky); Humoresque (Tchaikovsky); Selection from Le Roi d'Yvetot (Adam). 5.30, Soprano Song Recital by Käthe Corandae-Laechehn; Willst du dein Herz mir schenken (Bach); Ancora (Lotti); La Violetta (Scarlatti); Tre Giorni (Pergolesi); Schwand des Tages Pracht (Glück) Wiegenlied (Mozart). 5.50, Talk: Salmon Fishing in East Prussia. 6.15, Market Prices. 6.25, Programme for Young People. 6.55, Weather. 7.0, Concert by the Small Station Orchestra; Conductor, Wilken: March (Schrammel); Overture, Light Cavalry (Suppé); Jetzt wird gemütlich (Leuschner); Amorettegenien (Fucik); Waltz, Gold and Silver (Lehár); Auf der Lüneburger Heide (Blume); Vom Rhein der Wein (Lincke). 7.45, See **Berlin (Funkstunde)**. 8.0, News. 8.15, See **Frankfurt**. 8.55, Concert by the Opera House Orchestra; Conductor, Lorber; Soloist, Schröder (Violin); Kleist Overture (Wetz); Violin Concerto in D (Brahms); Les Préludes (Liszt). 10.0, News. 10.30, Dance Music by the Erich Börschel Jazz Band. 12.30 a.m. (Saturday), Close Down.

KOSICE.—Relays **Prague**. **LAUSANNE**.—Relays **Sottens**.

LEIPZIG

785 kc/s, 382.2 metres; 120 kW. Relayed by **Dresden**, 1,285 kc/s, 233.5 metres.—5.50 a.m., Report for Farmers. 6.0, Gym. 6.25, Concert by the EmDe Orchestra. In the interval at 7.0, News. 8.0, Gym. 8.20, Records. 9.0, See **Berlin (Deutschlandsender)**. 9.40, Exchange. 9.45, Announcements. 11.0, Announcements; Records. 11.30, News; Time. 11.40, Weather. 11.45, Programme for Farmers. 12 Noon, Johann Strauss Records. 1.0 p.m., News. 1.10, Concert by the Halle Chamber Orchestra; Conductor, Zschiesing. In the interval at 2.0, News; Exchange. 2.40 to 3.0, Programme for Women. 3.15, Talk: Old Germanic Peasant Culture. 3.35, Exchange. 4.0, See **Cologne**. 5.0, Songs by a Boys' Choir. 5.20, Niemann Pianoforte Recital by the Composer: Twelve Kocheler Ländler, Op. 135; Suite, Op. 71. 5.50, Exchange; Weather; Time. 6.0, Talk: With the Volunteer Corps in the Baltic in 1919. 6.20, Working Men and Women describe their State-subsidised Holidays. 6.40, Military Band Concert; Conductor, Bier. 7.45, See **Berlin (Funkstunde)**. 8.0, News. 8.15, See **Frankfurt**. 9.0, Concert by the Leipzig Symphony Orchestra; Conductor, Weisbach; Soloist, Friedrich Wührer (Pianoforte); Pianoforte Concerto No. 2 in G minor, Op. 15 (Rachmaninov); Symphony No. 2 in D, Op. 43 (Sibelius). 10.20, News; Sports Notes. 10.50, Dance Music from **Königsberg**. 12.30 a.m. (Saturday), Close Down.

LINZ.—Relays **Vienna**.

LUXEMBOURG

230 kc/s, 1,304 metres; 150 kW.—7.45 a.m., Records. 8.0, News in French; Record; News in German; Record. 12 Noon, Concert by the Station Orchestra; Conductor, Pensis: Overture, Port and Peasant (Suppé); Kind, Du kannst tanzen (Fall); Indian Love Lyrics (Woodford-Pinden); Piece (Valisi). 12.30 p.m., News in French and German. 12.40, Concert (contd.); Two Pieces for Trio (Pierne); (a) Vision d'Orient, (b) Enchantment; Slav Dance No. 10 (Dvorák); Suite orientale (Popy). 1.0, Exchange. 1.5, Concert (contd.); Wedgwood Blue (Kettelbey); Piece (Macbeth); Piece (Allbrocht). 1.15, Records. 1.30, Exchange. 1.35, Records. 2.0, Exchange. 3.45, Exchange. 6.30, Concert of Light Music and Dance Music. 7.30, Racing Results. 7.35 till Close Down, Dutch Evening. 7.35, Violin Recital by René Mertzling; Elegie (Caplet); Two Movements from Concerto No. 4 in D minor (Vieuxtemps); Finale from Concerto No. 2 in D minor (Wieniawski). 8.0, News in French and German. 8.20, Concert by the Station Orchestra; Conductor, Pensis: Overture, Casanova (Lincke); Moonlight on the Alster (Fétras). 8.35, Exchange. 8.40, Concert (contd.); Selection from Mignon (Thomas); Polichinelle (Daneau); Song (Amadié); Piece (Ciére); Suite pour mes petits Amis (Pierne); Liebeslied (Kreisler); Rhapsody No. 2 (Liszt). 9.30, Concert. 9.50, Song Recital by Venant Pauk (Baritone); Aria from Opera de Stamboul (Trémissot); Aria from Quo Vadis (Nougnes); Aria from La Danseuse de Tanagra (Hirschmann); Song from Dances of Death (Mussorgski). 10.25, Dance Music by the Station Dance Band; Conductor, Jouza.

MADRID

(EAJ7), 1,095 kc/s, 274 metres; 7 kW.—9.0 a.m., News. 10.0 to 10.30, Exchange; Announcements. 2.0, Chimes; Weather; Light Music. 2.30, Concert by the Station Sextet. 3.0, Amusement Guide; Exchange; Variety Music. 3.30, Concert by the Station Sextet. 4.0, News; Variety Music. 4.30, Concert by the Station Sextet. 4.50, News. 5.0, Interval. 6.0, Chimes; Light Music. 7.0, Announcements. 7.10 (approx.), Opera Music: Dance of the Hours from La Gioconda (Ponchielli); Ballet Music from Faust (Gounod); Egyptian Ballet from Aida (Verdi); Dances from Prince Igor (Borodin). 7.30, Exchange; Music of the Asturias. 8.0 News. 8.10 (approx.), Concert by a Quartet of Spanish Instruments. 8.40 (approx.), Programme for Women. 9.40, Sports Notes. 10.0, Chimes; Song Recital by Hilario Azcona (Baritone). 11.0, News. 11.10 (approx.), Concert by the Station Sextet. 11.30, Relay from a Theatre. 12.45 a.m. (Saturday), News. 1.0, Chimes; Close Down.

MALMO.—Relays **Stockholm**.

MILAN

814 kc/s, 368.6 metres; 50 kW. Relayed by **Turin**, 1,140 kc/s, 263.2 metres; **Cenoa**, 986 kc/s, 304.3 metres; and **Florence**, 610 kc/s, 491.8 metres.—7.30 a.m., Gym. 7.45, Time; News. 11.30, Concert by the Ches-Zanardelli-Cassone Trio. 12.30 p.m., Records. 12.45, News. 1.0, Time; News. 1.5 to 2.15, Concert by the Ferruzzi Orchestra. In the interval at 1.30, Records; Exchange. 2.15 to 2.25, Exchange. 4.35, News. 4.45, Programme for Children. 5.0, Orchestral Concert; Conductor, La Rosa Parodi; The Scottish Symphony (Mendelssohn); Omaggio a Vivaldi (La Rosa Parodi); Suite (Pick-Mangiagalli); Selection from Oberon (Weber). 5.55, Weather. 6.0 to 6.10, Programme for Farmers. 7.0, Announcements. 7.15, News in Foreign Languages. 8.0, Time; News; Records. 8.30, Government Notes. 8.45, The Dance of the Dragonflies—Opera in Three Acts (Lehár); Conductor, Ricci. In the intervals, Talk; Literary Notes. After the Operetta, Dance Music. 11.0, News.

MONTE CENERI

1,167 kc/s, 257.1 metres; 15 kW.—12 Noon, Announcements; News; Concert by the Station Orchestra: Overture, La fanciulla della Asturie (Secchi); Selection from Le Postillon de Longjumeau (Adam); Elegy (Sohlström); Suite (Cassard); Song from The Flying Dutchman (Wagner). In the interval at 12.29 p.m., Time; Weather. 12.55, News. 1.5, Records. 1.30, Interval. 3.59, Time. 4.0 to 6.0, See **Beromünster**. 7.45, Announcements; News. 8.0, Talk on the following Transmission. 8.15, Symphony Concert; Conductor, Casella; Symphony in E Flat (Mozart); Military March (Schubert). 8.55, Talk: The Blue Danube. 9.5, Viennese Waltzes by the Station Orchestra; Pesterwalzer (Lanner); Herbstrosen (Jos. Strauss); Wine, Woman and Son (Joh. Strauss). 9.30, Popular Tyrolese Music. 10.0, Close Down.

MORAVSKA-OSTRAVA

1,158 kc/s, 259.1 metres; 11.2 kW.—6.30 a.m., See **Prague**. 11.0, See **Bрно**. 12 Noon, See **Prague**. 12.15 p.m., See **Bratislava**. 1.30 to 1.45, See **Prague**. 4.0, Concert by the Station Orchestra, relayed from **Kosice**, 1,158 kc/s, 259.1 metres. 5.30, Reading and Recitations. 5.50, Record. 5.55, German Transmission: Programme for Children; Talk. 6.55, See **Prague**. 7.55, See **Bрно**. 9.0, Concert by the Sokol Vocal Union; Conductor, Hradil. 9.30, St. Wenceslas

(Kricka) by the Station Orchestra; Conductor, Musil. 10.0, See Prague. 11.0 (approx.). Close Down.

MOSCOW (No. 1)

174 kc/s, 1,724 metres; 500 kW.—5.0 a.m., News. 5.15, Fanfare. 5.45, Gym. 6.15, Musical Programme. 8.15, Programme for Children. 9.0, Musical Programme. 9.58, Time. 10.0, News. 10.15, Concert for Collectivist Farmers. 3.0, Programme Announcements. 3.15, Programme for Children. 3.58, Time. 4.0, News. 4.30, Communist Party Programme. 5.30, Red Army Programme. 8.0, Symphony Concert; Soloist, Abramov (Bass). 9.0, Talk in Czech: The Children's Museum. 9.55, Chimes. 10.5, Talk in English: The Seventieth Anniversary of the First International. 11.5, Talk in German: The Seventieth Anniversary of the First International.

MOTALA.—Relays Stockholm. **MUHLACKER**.—See Stuttgart.

MUNICH

740 kc/s, 405.4 metres; 100 kW. Relayed by Augsburg and Nürnberg, 1,267 kc/s, 236.8 metres.—6.30 a.m., Gym. 6.45, Motto; Records. 7.5, Programme for Young People. 7.15, Time; News. 7.25, Recital by Maria Walter (Soprano), Sofie Stoiber (Mezzo-Soprano), Otto Hlert (Tenor), Lorenz Winkler (Baritone) and Richard Staab (Pianoforte). 9.50, Gym. for Women. 10.10, Graf Zeppelin, Soldier and Combatant—Sequence (Gerhard Niese) on Records. 10.55, Market Prices. 11.5, Programme for Farmers. 11.15, Time; News. 11.30, Post Office Propaganda; Records. 12 Noon, Concert by the Small Station Orchestra; Conductor, Kloss; Soloist, Adalbert Huber (Viola). 1.15 p.m., Time; News. 1.25, Records. 2.0, News. 2.20, Reading. 2.50, Programme for Women. 3.30, Sports Talk: Hanns Braun. 3.50, Weather; Programme for Farmers. 4.0, Concert by the Small Station Orchestra; Conductor, Kloss. 5.30, Talk by a Member of the German East Africa Expedition, 1934. 5.50, Divertimento for Pianoforte, Flute, Oboe, Clarinet, Horn and Bassoon (Joun). 6.10, Talk: Cancer Research. 6.30 (from Nürnberg), Holiday Hints. 6.50, Time; Weather; Programme for Farmers. 7.0 (from Nürnberg), Concert by the Small Symphony Orchestra; Conductor, Röhrl. 7.45, See Berlin (Funkstunde). 8.0, News. 8.15, See Frankfurt. 8.55, Concert by the Station Orchestra; Conductor, Winter; Soloist, Elizabeth Waldenau (Contralto). 9.35, Variety Programme by Charlotte Radspieler (Commentary), Mülhlfeld (Guitar), Hilfe (Tenor), Rückenschuss and Uli Schmid (Violins) and Schmidmeier (Pianoforte). 10.0, Time; News. 10.20, Programme to be announced. 11.0, See Hamburg. 12 Midnight, Close Down.

NAPLES.—Relays Rome. **NOTODDEN**.—Relays Oslo.

OSLO

260 kc/s, 1,154 metres; 60 kW. Relayed by Hamar, 519 kc/s, 578 metres; and Jeløy, 6,990 kc/s, 42.92 metres.—10.0 a.m., Butter Prices. 11.15, Service. 11.50, Exchange. 12.55 p.m., Nauen Time Signal. 1.0, Records. In the intervals at 1.15, Weather; Talk for Farmers; and at 1.45, Exchange. 2.0, Market Prices. 5.0, Records. 6.0, Talk. 6.30, English Lesson. 6.50, Talk for Farmers. 7.0, Announcements. 7.15, Weather; News. 7.30, Time. 7.31, The Seventh Scandinavian Music Festival—Finland; The Philharmonic Orchestra; Conductor, Schneevogt; Symphony (Sibelius); Fantasia for Cello and Orchestra (Klami); Concertino for Chamber Orchestra (Ranta); Ballet Suite from Okon Fuoko (Madetofa); Concerto No. 4 for Pianoforte and Orchestra (Palmgren); Andante elgiaco (Linnala); Prelude and Fugue on a Theme of Robert Kajanus (Merikanto); Symphonic Overture (Kajanus). 9.40, Weather; News. 10.0, Talk. 10.15, Literary Programme. 10.45, Close Down.

OSTERSUND.—Relays Stockholm.

PARIS

POSTE PARISIEN, 959 kc/s, 312.8 metres; 100 kW.—7.10 a.m., Fanfare; Records. In the intervals, News. 8.0 to 8.20, Concert. 8.45, Cookery Hints. 12 Noon, Exchange. 12.5 p.m., Records. 12.25, News. 12.35, New Records. 1.5, Exchange. 1.15, Records. 2.0, Exchange. 3.15, Exchange. 3.45, Exchange. 6.45, Exchange. 6.49, Notes for Farmers. 6.50, Talk. 6.58, Records of Czech Music. 7.10, News. 7.30, Records. 7.50, Humorous Records. 8.0, Interval. 8.10, Le Déjeuner—Biblical Opera (Saint-Saëns) by the Station Orchestra, Choir and Soloists; Conductor, Mathien. 10.20, News; Exchange. 10.30 till Close Down, Programme in English arranged by the International Broadcasting Company of London. 10.30, Concert; Records. 11.0, I.B.C. Goodnight Melody; Close Down.

PARIS

RADIO-PARIS, 182 kc/s, 1,648 metres; 75 kW.—6.45 a.m., Gym. 7.0, Records. 7.15, News. 7.45, Gym. 8.0, Records of Light Music. 12 Noon, Jewish Address. 12.30 p.m., Concert of Light Music by the Lucien Goldy Orchestra; Soloist, Jean Sorbier (Song Refrains). In the interval at 1.20, Exchange. 3.45, Exchange. 6.20, Announcements; Talk; Exchange; Racing Results.

SEPT. 28th

FRIDAY continued

6.50, Talk: Hunting. 7.0, A Dialogue. 7.25, Social Assurance Societies' Report. 7.30, Topical Talk. 8.0, Reading by Pierre Asso. 8.30, News. 8.45, Three Plays: (a) An Evening in Sorrento (Turgeniev), (b) La folle journée (Mazeaux), (c) Le renard et la grenouille (Sacha Guitry). In the interval at 9.15, Talk: Diabetics. 10.30, Dance Music by the Adolff Band.

PITTSBURGH

KDKA, 980 kc/s, 306 metres; 50 kW. Relayed by W8XK on 48.86 metres, and 25.27 metres.—3.0 p.m., Edward MacHugh. 3.15, Sammy Fuller. 3.30, Today's Children. 3.45, News; Cookery Hints. 4.0, Marine Band Shut-in-Hour. 5.0, Fields and Hall. 5.15, Charles Sears. 5.30, Vic and Sade. 5.45, Hotel William Penn Orchestra. 6.0, Exchange. 6.15, Honourable Archie and Frank. 6.30, Farm and Home Hour. 7.30, KDKA Home Forum. 8.0, Gale Page. 8.15, Visit Foreign Village. 8.30, Little Concert Hall. 9.0, Betty and Bob. 9.15, Karen Pladoes. 9.30, Exchange. 9.45, Armchair Driver. 10.0, Orchestra. 10.15, KDKA Kiddies' Klub. 10.30, The Singing Lady. 10.45, Orphan Annie. 11.0, Dan and Sylvia. 11.14, Baseball Resume. 11.30, Comedy Stars of Hollywood. 11.45, Lowell Thomas. 12 Midnight, Amos 'n' Andy. 12.15 a.m. (Saturday), Sleepy Hall's Orchestra. 12.30, Nancy Martin. 12.45, News; Drama; Music. 1.0 to 6.0, Popular Programme.

PORSGRUND.—Relays Oslo.

PRAGUE

638 kc/s, 470.2 metres; 120 kW.—6.30 a.m., Gym.; Music; News. 7.0, Promenade Concert from Karlsbad. 8.30, Talk. 8.45, Records. 8.55, Talk for Workers. 9.15, Records. 9.30, Mass from St. Guy's Cathedral. 10.30, Literary Talk: St. Wenceslas. 11.0, See Brno. 12 Noon, Chimes; News. 12.15 p.m., See Bratislava. 1.30 to 1.45, Talk for Farmers. 4.0, Orchestral Concert from Kosice, 1,158 kc/s, 259.1 metres.—5.30, Reading. 5.45, Records. 5.55, German Transmission: Concert by a Viennese Quartet: String Quartet in D (Mozart); String Quartet in C sharp minor (Beethoven). 6.55, News and Weather in German. 7.0, News; Weather. 7.5, St. Wenceslas in Poetry, Prose and Drama—A Sequence. 7.40, Reading. 7.55, Introductory Talk on the following Transmission. 8.0, Concert by the St. Wenceslas League, relayed from the Smetana Concert Hall. 10.0, Time; News. 10.15, Records. 10.45, Russian News. 11.0, Close Down.

RJUKAN.—Relays Oslo.

ROME

Call IRO, 713 kc/s, 420.8 metres; 50 kW. Relayed by Naples, 1,104 kc/s, 271.7 metres; Milan No. 2, 1,348 kc/s, 222.6 metres; Turin No. 2, 1,357 kc/s, 221.1 metres; and ZRO, 11,810 kc/s, 25.4 metres.—7.30 a.m., Gym. 7.45 to 8.0, Time; News. 12.30 p.m., Records. 1.5 to 2.15, See Milan. In the interval at 1.30, Time; News. 4.30, Children's Radio Review. 4.55, News; Exchange. 5.10, Concert of Light Music: Festa a Siviglia (Scasola); Serenade (Montanaro); Selection from Adriana Lecouvreur (Cilea); Gipsy Song (Rossi); Selection from The Merry Widow (Lehar); Danza dei gnomi (de Micheli); Piece (Gilbert); Serenade, Tanguilla (Bazant); Selection from Sicilian Vespers (Verdi); Foxtrot (Nissim). 5.55, Weather. 6.0, Wheat Market Prices. 6.10, Religious Talk. 7.0, Announcements. 7.15, News in Foreign Languages. 8.0, Time; News. 8.10, Records. 8.30, Government Notes. 8.45, Concert of Modern Symphony Music; Symphony in D (Prokofiev); Extract from Le Convent sur Peau (Casella) I piccoli sokkati (Piekangiagalli); Air from The Fire Bird (Stravinsky); Air from Petrushka (Stravinsky). 10.0, Variety. 10.30 (approx.), Dance Music. 11.0, News.

RUYSSELEDE

10,330 kc/s, 29.04 metres; 8 kW.—7.45 p.m., News in French. 8.0, Part Relay of the Promenade Concert from London. 8.52, Overture, Oberon (Weber-Godfrey) on Records. 9.0, News in Flemish. 9.15, Close Down.

SALZBURG.—Relays Vienna.

SCHENECTADY

WGY, 790 kc/s, 379.5 metres; 50 kW. Relayed at intervals by W2XAF on 31.48 metres and by W2XAD on 15.56 metres.—7.0 p.m., Will Audrey—Wandering Minstrel. 7.30, Woman's Radio Review; Talks; Orchestra. 11.25, Exchange. 12 Midnight, Cities Service Concert; Jessica Dragonette. 12.30 a.m. (Saturday), WGY Farm Forum. 1.0 to 3.0, Popular Programme.

STOCKHOLM

704 kc/s, 426.1 metres; 55 kW. Relayed by Boden and Ostersund, 413.5 kc/s, 726 metres; Göteborg, 941 kc/s, 318.8 metres; Hörby, 1,131 kc/s, 265.3 metres; Motala, 216 kc/s, 1,389 metres; and Sundsvall, 601 kc/s, 499.2 metres.—7.20 a.m., Gym. 7.45, Service. 8.0,

Weather. 12.30 p.m., Weather. 12.45 p.m., Exchange. 12.55, Time. 1.0, Concert relayed from Kalundborg. 2.0, Talk. 2.30, Sonata No. 42 in A for Pianoforte and Violin (Mozart) on Records. 2.45 to 3.5, Talk: Life in a Danish School. 5.0, Weather. 5.5, Accordion Recital by Carl Gylling and Axel Ander. 5.30, Reading from L'Anneau d'Améthyste (Anatole France). 6.0, Records. 7.0, Weather Review. 7.15, Weather; News. 7.30, Talk: Birds. 7.50, Bach and Purcell Concert; Eta Harich-Schneider (Cembalo). Kerstin Lindberg-Torlund (Songs), and Karl Achatz (Flute): Suite in G for Cembalo (Purcell); Songs: (a) When I am laid in Earth (Purcell), (b) Komm in mein Herzenhaus (Bach), (c) Höchster, was ich habe (Bach); Sonata in C for Flute and Cembalo (Bach); Cembalo Solos (Purcell): (a) Ground in C minor, (b) Toccata. 8.30, Talk: Dictators in the Past. 9.0, Concert of Swedish Folk Songs by the Orfeus Choir; Conductor, Sven Lizell; Soloist, Folke Jonsson (Baritone). 9.30, A Microphone Visit. 9.45, News. 10.0, Orchestral Concert: March (Bon); Guitar (Bizet); Selection from The Värmländers (Randel-Rudolf); Träumerei (Schumann); Serenade (Giuliano); Waltz (Waldteufel); By the Fountain (Ottoson); Cupid's Arrows (Freeman); Selection from The Gipsy Baron (Joh. Strauss). 11.0 (approx.), Close Down.

STRASBOURG

859 kc/s, 349.2 metres; 15 kW.—11.0 a.m., Orchestral Concert relayed from Lille, 1,213 kc/s, 247.3 metres. 12 Noon, Orchestral Concert. 1.5 to 2.0, Records of Light Music. 12.45 p.m., News. 1.0, Time; Exchange. 1.15, Orchestral Concert relayed from Paris (Ecole Supérieure). 2.0, Interval. 4.45, Literary Talk. 5.0, Programme from Lyons (la Doua), 463 metres. 6.0, Topical Talk in German. 6.15, French Elocution Lesson. 6.30, Programme from Paris (Radio Colonial), 19.68. 7.30, Time; News. 7.45, Records. 8.0, Press Review in German; Lottery Results; Announcements. 8.30, Les petites Brebis—Operetta in Two Acts (Varney). In the interval, News. 10.0, Orchestral Concert relayed from the Odéon Café; Conductor, Théodore; Amorettenzünze (Gungl); Overture, Eine Nacht in Venedig (Joh. Strauss); Schubert Potpourri; Potpourri, Echo de Russie (Léopold); Selection from White Horse Inn (Stolz-Benatzky). 11.0 (approx.), Close Down.

STUTTART

MUHLACKER, 574 kc/s, 522.6 metres; 100 kW.—5.35 a.m., Announcements. 5.45, Hymn; Time; Weather. 5.50, Gym. 6.15, Records. 6.40, Time; Announcements. 6.55, Records. 7.25, See Munich. 8.10, Weather. 8.15, Gym. 8.35, Water Level. 8.40, Interval. 9.0 to 9.15, Talk for Women. 10.0, News. 10.10, Violin and Pianoforte Recital by Theo Meyer and Eva Lorch: Sonata No. 1 in D, Op. 12 (Beethoven); Sonatina in G Minor (Schubert). 10.40, Soprano Song Recital by Maria Geiger, with Harpsichord Accompaniment. 11.0, Soldier Songs to the Lute, by Heinz Esehwege. 11.25, Announcements; Records. 11.55, Hints for Housewives. 7.40, Programme Announcements. 7.50, Announcements; Light Music. 8.0, Interval. 11.57, Time. 12 Noon, Fanfare from St. Mary's Church, Cracow. 12.3 p.m., Weather. 12.5, Press Review. 12.10, Concert of Light Music: Waltz Potpourri (Pewzner); Potpourri of Viennese Melodies (Kozzak); Paraphrase on Two Guitars (Katzner); Waltz (Pewzner); Parade of the Tin Soldiers (Jessel); Mazurka (Lewandowski). 12.45, Talk for Women. 1.0, News. 1.5, Records: Violin Concerto in E Flat (Mozart). 1.30, Interval. 3.30, Announcements. 3.35, Exchange. 3.45, Concert of Light Music by the Adamka-Grossman Ensemble: Lyric Suite (d'Albert); Air from Sigismund Angustus (Jofeyko); Waltz from Najja (Delibes); Old Arietta (Brogli); Gondoliera (Moszkowski); In Seville (Ranzato). In the intervals, Tenor Solos by Adam Raczkowski, relayed from Poznan, 868 kc/s, 345.6 metres. 4.45, Programme for Invalids relayed from Lwów, 795 kc/s, 377.4 metres. 5.15, Choral Concert from Poznan. 5.50, Book Review. 6.0, Talk for Young People. 6.10, Art Notes. 6.15, Trio Concert of Italian Music: Canto amoroso (Scarlatti); Album Leaf (de Micheli); Sicilian Serenade (Becece); Leggenda d'amore (Becece); Pieces (Tosti): (a) Ivano, (b) Ideale, (c) Serenade. 6.45, Talk. 7.0, Records. 7.20, Talk: Results of the Gordon-Bennett Balloon Race. 7.30, Song Records. 7.45, Programme Announcements. 7.50, Sports Notes. 8.0, Hints for Holidays. 8.5, Talk on the following Transmission. 8.15, Concert of Polish Music by the Philharmonic Orchestra; Conductor, Fitelberg; Soloist, Hoffman (Pianoforte); Overture, Le conte (Moniuszko); Pianoforte Concerto in A Minor (Chopin); Symphony, From Spring to Spring (Noskovski). In the interval, News. 10.30, Recitations. 10.40, Announcements; Light Music. 11.0, Weather. 11.5, Dance Music from the Adria Café.

TOULOUSE

913 kc/s, 328.6 metres; 10 kW.—8.0 a.m., Dance Refrains. 8.30, News. 8.35, Concert. 12 Noon, Symphony Orchestra. 12.15 p.m., Songs. 12.30, News. 12.45, Request Programme. 1.0, News. 1.5, Soloist Concert. 1.15, Opera Arias. 1.30, Dance Music. 1.45, Chansonnettes. 2.0, News. 6.0, News. 6.15, Orchestral Music. 6.30, Operetta Songs. 6.45, Orchestral Concert of Opera Music: Extracts from Madame Butterfly (Puccini), Carmen (Bizet) and Werther (Massenet). 7.0, Sound Film Music. 7.15, Orchestral Music. 7.30, News; Racing Results; Exchange. 7.45, Songs. 8.15, Reading. 8.30,

Medical Talk. 8.45, Opera Arias: Arias from Rigoletto (Verdi), Faust (Gounod), and Tales of Hoffmann (Offenbach). 9.0, Marine—Fantasy. 9.30, Concert. 10.0, Tyrolese Music. 10.15, News. 10.30, Light Music. 11.0, Operetta Songs. 11.15, Music by a Viennese Orchestra. 11.30, Chansonnettes. 11.50, Orchestral Music: Moment musical (Schubert); Suite orientale (Popy). 12 Midnight, News. 12.5 a.m. (Saturday), Au caveau de minuit—Fantasy. 12.15, Orchestral Music. 12.30, Close Down.

TRONDHEIM.—Relays Oslo. **TURIN**.—Relays Milan.

VALENCIA

850 kc/s, 352.9 metres; 1.5 kW.—2.0 a.m. to 3.0 a.m. (Saturday), Programme in English arranged by the International Broadcasting Company of London. 2.0 a.m., Organ Recital. 2.30, Military Band Concert. 3.0, L.B.C., Goodnight Melody and Close Down.

VATICAN CITY

15,120 kc/s, 19.84 metres; 10 kW (Morning), 5,970 kc/s, 50.26 metres (Evening).—11.0 to 11.15 a.m., Religious Information in German. 8.0 to 8.15 p.m., Religious Information in Italian.

VIENNA

592 kc/s, 506.8 metres; 120 kW. Relayed by Graz, 885 kc/s, 338.6 metres; Innsbruck, 519 kc/s, 578 metres; Klagenfurt, Linz and Salzburg, 1,294 kc/s, 231.8 metres.—9.0 a.m., News. 9.20, Market Prices. 9.30, Weather. 10.50, Water Level. 11.30, Records of Folk Music. 11.55, Weather. 12 Noon, Concert by the Vienna Symphony Orchestra; Conductor, Schönherr. In the interval at 1.0 p.m., Time; News. 2.0, Announcements. 3.30, Time; Announcements. 3.50, Readings for Women. 4.15, News. 4.20, Pianoforte Trio in G (Mozart) by the Schwarz Trio. 4.45, Operetta Records. 5.30, Talk. 5.55, Pianoforte Recital by Hedda Ballon: Prælium (Jos. Marx); Toccata (Heller); Extracts from the Triptych (Rinaldini); Scherzo (d'Albert); Rhapsody in C (Dohnany); Toccata (Casella). 6.25, Sports Review. 6.35, Tourist Report. 6.50, Time; News. 7.0, Local News. 7.20, Concert by the Vienna Symphony Orchestra; Conductor, Holzner; Soloist, Rita Georg (Soprano); Overture, The Queen's Kerchief (Joh. Strauss); Song from Roses from Florida (Fall); Song from Ball at the Savoy (Abraham); Intermezzo from The Count of Luxembourg (Lehar); Selection from Marietta (O. Straus); Songs from (a) The Du Barry (Müllbacher-Mackeben), (b) The Duchess of Chicago (Kálmán); Overture, Der Hofnarr (Müller); Song from Schön ist die Welt (Lehar); Müllbacher Potpourri (Morena); Polka, Leichtes Blut (Joh. Strauss). 8.45, Variety Items. 8.55, Talk: Broadcasting and the Intellectual Life. 9.15, The Gothic Mass in D minor (Reidinger), by the Vienna Symphony Orchestra, and the Vienna State Opera Choir and Soloists; Conductor, Kabasta. 10.20, Popular Records. In the interval at 10.30, News. 11.20, Dance Music by the Totzauer Jazz Band; Soloist, Haintze (Song Refrains). 1.0 a.m. (Saturday), Close Down.

WARSAW

223 kc/s, 1,345 metres; 120 kW.—6.45 a.m., Hymn. 6.48, Records. 6.58, Gym. 7.8, Records. 7.15, News. 7.25, Records. 7.35, Hints for Housewives. 7.40, Programme Announcements. 7.50, Announcements; Light Music. 8.0, Interval. 11.57, Time. 12 Noon, Fanfare from St. Mary's Church, Cracow. 12.3 p.m., Weather. 12.5, Press Review. 12.10, Concert of Light Music: Waltz Potpourri (Pewzner); Potpourri of Viennese Melodies (Kozzak); Paraphrase on Two Guitars (Katzner); Waltz (Pewzner); Parade of the Tin Soldiers (Jessel); Mazurka (Lewandowski). 12.45, Talk for Women. 1.0, News. 1.5, Records: Violin Concerto in E Flat (Mozart). 1.30, Interval. 3.30, Announcements. 3.35, Exchange. 3.45, Concert of Light Music by the Adamka-Grossman Ensemble: Lyric Suite (d'Albert); Air from Sigismund Angustus (Jofeyko); Waltz from Najja (Delibes); Old Arietta (Brogli); Gondoliera (Moszkowski); In Seville (Ranzato). In the intervals, Tenor Solos by Adam Raczkowski, relayed from Poznan, 868 kc/s, 345.6 metres. 4.45, Programme for Invalids relayed from Lwów, 795 kc/s, 377.4 metres. 5.15, Choral Concert from Poznan. 5.50, Book Review. 6.0, Talk for Young People. 6.10, Art Notes. 6.15, Trio Concert of Italian Music: Canto amoroso (Scarlatti); Album Leaf (de Micheli); Sicilian Serenade (Becece); Leggenda d'amore (Becece); Pieces (Tosti): (a) Ivano, (b) Ideale, (c) Serenade. 6.45, Talk. 7.0, Records. 7.20, Talk: Results of the Gordon-Bennett Balloon Race. 7.30, Song Records. 7.45, Programme Announcements. 7.50, Sports Notes. 8.0, Hints for Holidays. 8.5, Talk on the following Transmission. 8.15, Concert of Polish Music by the Philharmonic Orchestra; Conductor, Fitelberg; Soloist, Hoffman (Pianoforte); Overture, Le conte (Moniuszko); Pianoforte Concerto in A Minor (Chopin); Symphony, From Spring to Spring (Noskovski). In the interval, News. 10.30, Recitations. 10.40, Announcements; Light Music. 11.0, Weather. 11.5, Dance Music from the Adria Café.

ZURICH.—Relays Beromünster.

ATHLONE

655 kc/s, 531 metres; 60 kW. Relayed by Dublin, 1,348 kc/s, 222.6 metres; and Cork, 1,240 kc/s, 241.9 metres.—1.30 to 2.30 p.m., Time; Exchange; Weather; Records. 4.0 to 6.0, Concert by the Artane Band; Soloist, W. Lemass. 6.0, Records. 6.45, News. 7.0, Talk by M. Laverty. 7.15, Talk in Irish. 7.30, Time. 7.31, Music from the Masters—Concert by the Station Orchestra. 7.50, Talk: The Salzburg Festival. 8.20, Song Recital by S. Doherty (Soprano). 8.30, Comedy Sketch by Aoife Taaffe and Company. 9.0, Concert by the Station Orchestra. 9.30, Song Recital by M. O'C. Maguire (Bass-Baritone). 9.45, Pianoforte Recital by Carl Hardebeck. 10.0, Variety Programme. 10.30, Time; Weather; News. 10.40, Records. 11.0, Close Down.

BARCELONA

795 kc/s, 377.4 metres, 5 kW.—8.15 a.m., News; Records. 9.0, Chimes; Gym; Records. 9.20, News; Records. 10.0, Obituary. 12 Noon, Chimes; Weather. 1.0 p.m., Programme for Women. 1.45, Records. 2.0, Records. 2.30, Theatre Notes; Amusement Guide; Records. 3.0, News; Sextet Concert, Part I, Sound Film Music; Part II, Light Music; March (Ronald); Waltz from The Chocolate Soldier (O. Strauss); Spanish Serenade (Plauas); Song (Luna Moreno Torroba); Variations (Sancho-Marraco); Selection from La Gaita blanca (Jimenez-Vives). In the interval, Talk. 4.0, Programme for Hospitals. 4.30, Amateurs at the Microphone. 5.0, News. 7.0, Trio Concert, Overture, Zampa (Herold); Night on the Volga (Russo); Serenade (Doornack); Oriental Romance (Gaines); Intermezzo, Barberina (Lindsay); Idyl (Fevrier); Selection from Mignon (Thomas). In the interval at 7.30, News. 8.0, Request Records. 8.30, Exchange; Request Records. 9.0, Educational Programme. 9.10, Records. 9.30, Medical Talk in Catalan. 9.45, Press Review. 10.0, Chimes; Weather. 10.5, Social Notes. 10.10, Programme of Musical Comedies from Madrid (EAJ.7). 1.0 a.m., (Sunday), News. 2.0 till Close Down. Programme in English by the International Broadcasting Company of London. 2.0, Orchestral Music. 2.30, Variety Programme. 3.0, I.B.C. Goodnight Melody and Close Down.

BASLE.—Relays Beromünster.

BELGRADE

686 kc/s, 437.3 metres; 2.5 kW.—10.45 a.m., Programme Announcements. 10.50, Tides. 11.0, Records. 11.59, Chimes. 12.5 p.m., Concert by the Station Orchestra. 12.45, Exchange; Announcements. 1.0, Concert by the Station Orchestra. 1.30, News; Time. 4.0, Records. 4.30, Concert of Light Music by the Aranicki Orchestra. 6.55, Time; Programme Announcements. 7.0, Concert of Slav Dances. 7.30, Announcements. 7.40, Concert (contd.). 8.0, Talk. 8.30, Mokranjatj Concert by the Station Orchestra and Choir; Conductor, Jovanovic. In the interval at 10.0, Time; News. 10.30, Concert from the Ruski Car Restaurant. 11.0, Dance Records. 11.30, Close Down.

BERLIN

DEUTSCHLANDSENDER, 191 kc/s, 1,571 metres; 60 kW.—5.45 a.m., Weather. 5.50, News. 6.0, Gym. 6.15, Motto. 6.20, See Königsberg. In the interval at 7.0, News. 8.0, Interval. 8.45, Gym. for Women. 9.0, Interval. 9.40, Sports Notes. 10.0, News. 10.10, Rumpelstiltskin—Fairly Play after Grimm (Freund), with Incidental Music. 10.40, Programme for Children. 11.15, Weather. 11.30, Reading (Schleppitzki). 11.45, Science Report. 11.55, Weather. 12 Noon, See Breslau. 12.55 p.m., Time. 1.0, Records of Light Music; Weather. 1.45, News. 2.0, Interval. 2.45, Greetings; Announcements. 3.0, Weather; Exchange. 3.15, Handwork Programme for Children. 3.40, Industrial Review. 4.0, See Frankfurt. 6.0, Sports Review. 6.20, Talk for Workers. 6.45, Programme Announcements. 6.55, A Poem; Weather. 7.0, Woods and Moors—Wind Instrument Concert on Records. 7.40, Topical Discussion. 8.0, Motto; News. 8.10, See Munich. 10.0, News. 10.30, Sports Talk; Canoeing. 10.45, Weather. 11.0, Variety Programme, relayed from Munich. 12 Midnight, Close Down.

BERLIN

FUNKSTUNDE, 841 kc/s, 356.7 metres; 100 kW.—6.0 a.m., Hymn; Gym. 6.15, Weather; Meditation. 6.20, See Königsberg. In the interval at 7.0, News. 8.0 to 8.20, Gym. 10.0, News. 10.10, Exchange. 10.30, Records; Announcements. 11.0 to 11.30, Exchange. 12 Noon, Concert from Königsberg. In the interval at 12.30 p.m., Weather. 1.0, News. 1.15, Operetta Records: Overture and Song from Eine Nacht in Venedig (Joh. Strauss); Overture, Light Cavalry (Suppé); Selection from The Bird Fancier (Zeller); Overture and Song from Boccaccio (Suppé); Overture, Der Opernball (Heuberger). 2.0, News. 2.15, Dance Records. 3.0 to 3.20, Exchange. 3.35, Discussion: Mountains. 4.0, Concert by the Small Station Orchestra; Conductor, Steiner; Soloist, de Vogt (Songs to the Lute); Selection from Gri-Gri (Lincke); Tändelei (Sommer); Csardas, Magyar-bor (Muhrl); In a Persian Market (Kettelbey); Waltz, Leuchtende Sterne (Robrecht); Songs to the Lute, Von Wald und Heide; Three Bavarian Dances (Pachernegg);

SATURDAY SEPTEMBER THE TWENTY-NINTH

Wiener Puppen (Mühlenau); Poranek (Lindsay); Interlude, Discussion on Man's Aspirations and Technical Progress Heuzel-männchen (Hellmesberger); Kokoko-Liebeslied (Meyer-Helmund); Songs to the Lute, Von Wald und Heide; Miniatures (Cui); Waltz, Ewig blauer Himmel (Kutsch). 6.0, Announcements. 6.5, Talk: Physical Training in France and Belgium. 6.20, Martin Plüdemann Song Recital. 6.50, Indian Summer—Sequence (Girgenson), with Incidental Music by Karl Knauer. 7.40, Echoes of the Day. 8.0, News. 8.15, Dance Music by the Hans Bund Band. 10.20, Weather; News; Sports Notes. 10.50, See Leipzig. 1.0 a.m. (Sunday), Close Down.

BERNE.—Relays Beromünster.

BEROMUNSTER

556 kc/s, 539.6 metres; 60 kW.—12 Noon, Records: Xylophone and Saxophone Music. 12.29 p.m., Time; Weather; News. 12.40, Operetta Music on Records. 1.25, Time; Weather; Exchange. 1.30, Parliamentary Notes. 1.45, Wireless Notes. 2.0, Book Review. 2.20, Concert by the Elite Accordion Orchestra; Conductor, Voegeli. 2.40, Talk: Scientific Research. 3.0, Interval. 3.59, Time. 4.0, See Monte Ceneri. 6.0, Report from the Gempenstolle Gliding Camp. 6.30, Talk: Ludwig Richter. 7.0, Chimes. 7.15, Time; Weather; Market Prices. 7.20, Report: Tour of the Basle Municipal Theatre before the Curtain goes up. 8.0, Talk: Television. 8.30, Old Cello Music. 9.0, Weather; News. 9.10, Humorous Programme with Dance Music. 11.0 (approx.), Close Down.

BODEN.—Relays Stockholm. BODO.—Relays Oslo.

BRATISLAVA

1,004 kc/s, 298.8 metres; 13.5 kW.—6.0 to 7.15 a.m., See Prague. 9.45, Announcements. 9.50, See Prague. 10.10, News in Hungarian. 10.15, See Moravská-Ostrava. 11.0, Water Level. 11.5, See Prague. 12 Noon, Talk for Farmers. 12.10, p.m., Local News in Slovak. 12.15, Record. 12.20, See Prague. 12.30, See Moravská-Ostrava. 1.30, See Prague. 1.40, News in German and Hungarian. 1.50, See Prague. 2.0 to 2.5, Danube Shipping Company Report. 3.15 to 4.15, See Prague. 4.40, See Brno. 5.40, Topical Talk. 5.50, Record. 5.55, Talk for Workers. 6.10, Talk for Housewives. 6.15, Hungarian Transmission: Song Recital by Marie Németh. 6.55, See Prague. 7.10, See Moravská-Ostrava. 7.55, See Prague. 8.35, See Brno. 9.0, Vlachy—Folk Play with Songs (Brozik-Nizkovsky); Music by Kostál; The Station Orchestra; Conductor, Dyk. 10.0, See Prague. 10.15, News in Hungarian. 10.30, See Prague. 11.30, Close Down.

BREMEN.—Relays Hamburg.

BRESLAU

950 kc/s, 315.8 metres; 60 kW. Relayed by Gleiwitz, 1,231 kc/s, 243.7 metres.—5.0 a.m., Hymn; Motto; Records. 6.0, Time; Weather; Gym. 6.25 (from Gleiwitz), Band Concert: Conductor: Glielink. In the interval from 7.0 to 7.15, Time; Weather; News. 10.40, Programme for Children. 11.30, Time, News; Weather; Water Level. 12 Noon, Concert by the Station Orchestra: Conductor: Topitz; March, Heil Europe (Blon); Overture, Semiramis (Rossini); Serenade, Les Millions d'Arlequin (Drigo); Waltz, Nordseebilder (Joh. Strauss); Rosengavotte (Osterhold); Selection from Czar and Carpenter (Lortzing); Three Miniatures (Cui); Waltz, Die Hydrotaphen (Gungl); Hungarian Dances (Brahms); Overture, Paragraf III (Suppé); Overture, Venus auf Erden (Lincke); Annen-Polka (Joh. Strauss); Selection from Der Tenor der Herzogin (Künnecke); Gallop (Blon). In the interval from 1.30 to 1.45, Time; Weather; News. 2.20, Exchange. 2.25, Announcements; Records. 2.50, Programme for Farmers. 3.10, Talk: Unemployment in America. 3.30, Discussion: The Lutheran Bible. 4.0, Military Band Concert: Conductor: Kiefer; Landsknechte auf dem Marsch (Schmelzing); Festival Overture, Vivat Academia (Zimmer); Tanz der Glockenblumen (Rathke); Scandinavian Wedding (Brase); Swabian Rhapsody No. 4 (Kaenipfert); Waltz, Ein Frühlingssonntag (Rathke); March, Unter den Reichsfarben (Siede); March, Aufbruch der Nation (Sticheritz); Hessian Standard March (arranged Krause); Overture, The Thieving Magpie (Rossini); Selection from Der Freischütz (Weber); March (Böhms); March (Schep-pang). 6.0, Talk: Reichenau Figures of Speech. 6.25, Topical Talk. 6.50, Programme Notes; Weather. 7.0, Chimes. 7.5, Eduard Reinacher reads his own Poems. 7.30, Programme Announcements with Records. 8.0, News. 8.10, See Königsberg. 10.0, Reading (Dr. Otto Wedding). 10.20,

News. 10.45, Variety Programme from Freiburg; The Station Dance Band: Conductor: Ilgner; and Soloist. 1.0 a.m. (Sunday), Close Down.

BRNO

922 kc/s, 325.4 metres; 32 kW.—6.0 to 7.15 a.m., See Prague. 9.50, See Prague. 10.15, See Moravská-Ostrava. 11.0, See Prague. 12.30 p.m., See Moravská-Ostrava. 1.30, Talk for Tradesmen. 1.40, See Prague. 2.0 to 2.5, Market Prices. 3.15 to 4.15, See Prague. 4.40, Happy Week-End—Concert by the Station Orchestra; Conductor, Bakala: Czech Wakes (Moor); Sousedska (Chvala); Serenade (Suk); Potpourri (Maly); Czech Polka (Flegl); Waltz (Fucik); March (Nedbal). 5.40, Hints for Housewives. 5.45, German Transmission: Wagner Programme. 6.20, Literary Review. 6.35, Theatre Notes; Record. 6.45, Programme for Workers. 6.55, See Prague. 7.10, See Moravská-Ostrava. 7.55, See Prague. 8.35, Gym. Lesson accompanied by Kopecky (Accordion). 9.0, See Bratislava. 10.0, See Prague. 11.30 (approx.), Close Down.

BRUSSELS (No. 1)

620 kc/s, 483.9 metres; 15 kW.—11.55 a.m., Weather. 12 Noon, Orchestral Concert of Patriotic Songs. 1.0 p.m., News. 1.10, Records: Overture, 1812 (Tchaikovsky); Hymn to Liberty (Gosse); Extract from The Daughter of the Regiment (Donizetti); Li Mçyns Dominic (Duyseux); Raspognans (Duyseux); Extract from La Vivandière (Godard); Li Saint Amour (Van Damme); P'chanson des verités (Lorienx); Extracts from La rosière de Saleny (Grétry) and Colinette à la Cour (Grétry); Craumignons liégeois (Prévot). 2.0, Interval. 4.40, Announcements. 4.45, Talk. 5.0, Concert by the Radio Orchestra: Walloon March (Ernotte); Oriental Dance Suite (Hillier); Aphrodite (Jongen); Adagio pathétique for Violin and Orchestra (Marsick); Souvenirs (Jehin); Paysage (Rogister); Pastoral Suite (Ramsay); One-Step (Grillaert); Walloon Songs (Hillier). 6.0, Reading of Walloon Literature. 6.15, Programme for Young People. 6.45, Popular Walloon Music; Soloist, Durand (Tenor): Li s'eret de moien (Batta); Two Songs (Van Damme); Minuet and Berceuse (Delporte); Chanson à Josette (Desprez); Printemps d'amour (Kalkman); Two Pieces (Grétry). 7.15, Talk: The Walloon Movement. 7.30, Science Talk; Wireless Notes. 8.0, Concert by the Symphony Orchestra: Soloists, Rachel Piette (Songs), Stoefs (Flute), Georges (Trombone), and Pouillard (Songs); Fantasia on a Walloon Theme (Ysaye); Aria from Richard Coeur de Lion (Grétry); Rhapsody on a Tournai Theme (Daneau); Nocturne for Flute and Orchestra (Marchot); Arioso for Trombone and Orchestra (Marchot); Duet from Masaniello (Auber); Extract from The Drum Major's Daughter (Offenbach); A Walloon Kondo (Jongen); Extracts from Jean Michel (Dupuis); Overture, Cour d'ognon (Dupuis); Duets (Marsick); Walloon Songs (Hillier); La Brabançonne (arr. Van Campenhout). In the interval at 9.0, Talk. 10.0, News. 10.10, Dance Records. 11.0, Dance Music from L'Antienne Bel-gique. 12 Midnight, Close Down.

BRUSSELS (No. 2)

932 kc/s, 321.9 metres; 15 kW.—Programme in Flemish.—11.57 a.m., Weather. 12 Noon, Records. 1.0 p.m., News. 1.10, Popular Orchestral Music; Soloist, Wigy (Violin) and Steurs (Accordion): Une fête à Aranjuez (Demersman); Forest Murmurs (Razigade); Padilla Potpourri (Salabert); Polonaise No. 2 for Violin and Orchestra (Wieniawsky); Waltz Potpourri (Morena). 2.0, Interval. 4.40, Announcements. 4.45, Talk. 5.0, Programme for Children. 6.0, Records: Four German Dances (Mozart); Elegiac Melody (Grieg). 6.15, Talk. 6.30, Violin Recital by Amanda Webb. 7.0, Concerto No. 2 (Chopin) on Records. 7.30, Film Review. 7.55, News. 8.0, Orchestral Concert; Conductor, De Préter; Soloist, Henriette Clairy (Songs): Part I: Overture, Le roi d'Ys (Lalo); Procession nocturne (Rahaud); Songs: (a) Le drapeau (De Préter), (b) To Spring (Grieg); Autrefois (De Préter); Le chasseur mandit (Franck); Part II: Wagner: Prelude to Lohengrin; The Rhine Journey from Siegfried; Prelude and Death of Isolde from Tristan and Isolde; Overture, The Mastersingers (Wagner). In the interval, Humorous Programme. After the Concert, News. 11.0, See Brussels (No. 1). 12 Midnight, Close Down.

BUCHAREST

823 kc/s, 364.5 metres; 12 kW.—12 Noon, Water Level; Records. 12.45 p.m., Amusement Guide; Exchange; Records of Light Music. 1.15, Time; Weather; News. 1.40, Records of Light Music. 5.0, Concert of Popular Romanian Music by the Fanica Luca Orchestra. 6.0, Time; Weather; News. 6.15,

Concert by the Fanica Luca Orchestra. 7.0, Educational Programme. 7.15, Records. 7.45, Talk. 8.0, Song Recital by Mircea Lazar, accompanied by the Station Orchestra: Sicilienne (Mascagni); Flower Song from Carmen (Bizet); Aria from The Mastersingers (Wagner); Aria from La Juive (Halévy). 8.20, Concert by the Station Orchestra: Ballet Music from Sylvia (Delibes); Ballet Music, Iris (Nottara). 9.0, Letterbox. 9.20, Concert by the Station Orchestra; Waltz from Schön ist die Welt (Lehár); Wienertanz No. 1 (Friedmann-Gärtner); Gavotte in D minor (Bach); Peasant Dance (Zanella); Dance (Mascagni); Russian Dance No. 1 (Bullérien); Spanish Dance No. 6 (Granados); Rigaudon (Hartog); Dance (Snoeck). 10.0, News.

BUDAPEST

546 kc/s, 549.5 metres; 120 kW.—6.45 a.m., Gym. 9.45, News. 10.0, Talk. 10.40, Talk. 12 Noon, Chimes from the University Church. 12.5 p.m., Military Band Concert. 1.30, Concert. 2.40, Hints for Housewives. 4.0, Handwork Lesson. 5.0, Orchestral Concert of Modern Light Music; Conductor, Fridl. 6.0, Talk. 6.30, Hungarian Folk Songs by Béla Csoka. 7.40, Gala Programme by the Philharmonic Society; Conductor, Póhnyáni, The Hungarian National Anthem; Prologue. Talk: Hungarian Music; Festival Overture (Dohnányi); Dance (Kodály); Suite No. 1 (Bartok); Les Préludes (Liszt). 10.15, News. 10.40, Records.

CASSEL.—Relays Frankfurt.

COLOGNE

658 kc/s, 455.9 metres; 60 kW.—5.30 a.m., Hymn; Records. 6.5, Gym. 6.25, See Breslau. In the interval at 6.50, Time; News. 8.0, Time; Weather; Water Level. 8.5, Gym. for Women. 8.20 to 8.35, Practical Hints. 10.0, Time; News; Water Level. 10.10, Programme for Children. 10.30, Topical Readings. 11.30, Announcements. 12 Noon, Concert by the Station Quintet and the Frohe Sänger. In the interval at 12.45 p.m., Announcements; Greetings. 1.45, Announcements. 2.0, Records of Light Music. 2.45, Anecdotes. 3.30, Exchange. 3.45, Talk: The Uses of Gas. 4.0, Concert of Folk Songs; The Station Chamber Choir; Conductor, Breuer; The Station Children's Choir; Conductor, Hüsch; Soloists, Engels (Tenor), Remagen (Baritone), Ida Gille (Guitar), and Grape (Pianoforte). 5.0, Talk: Borken Museum. 5.15, Variety Programme by Young People. 5.45, Reading (Senge). 6.0, The German Calendar—October. 6.40, Topical Talk. 6.50, Exchange; Sports Notes. 7.0, Concert of Bellini Opera Music, with Commentary: The Station Orchestra and Station Chamber Choir; Conductor, Kühn; Soloists, Olga Schramm-Tschörner (Soprano), Engels (Tenor), and Rood (Baritone). 8.0, News. 8.15, Variety Programme by the Leo Eysoldt Orchestra; Irene de Noiret (Songs from Many Lands); Georg Neumüller (Bavarian Humourist), and Engels (Tenor). 10.0, Time; Weather; News. 10.20, Light Music and Dance Music by the Harvey and Wirtz von Lehn Bands, relayed from Gelsenkirchen-Horst. 1.0 a.m. (Sunday), Close Down.

COPENHAGEN.—Relays Kalundborg. CORK.—Relays Athlone. DANZIG.—Relays Königsberg. DRESDEN.—Relays Leipzig.

FECAMP

1,456 kc/s, 206 metres; 10 kW.—11.30 a.m. to 12 Noon, Programme in English arranged by the International Broadcasting Company of London: Happy Half Hour; Dance Music. 12 Noon, Programme in French. 4.30 to 6.0 p.m., Programme in English arranged by the I.B.C. (London). 4.30, Tunbridge Wells, Isle of Thanet, Dover and Folkestone Concert; Part I, Variety (Gramophone Records). 5.0, Part II, Dance Music. 5.30, Part III, Come to Spain. 6.0, Programme in French. 11.0 till Close Down, Programme in English arranged by the I.B.C. (London). 11.0, I.B.C. Member's Request Programme: A Raie da Costa Memorial Programme. 11.30, Concert arranged by the I.B.C. (Ireland), Ltd.: Music from the Opera. 12 Midnight, Dance Music by Ray Noble and his Orchestra (Gramophone Records). 12.15 a.m. (Sunday), Dance Music. 12.30, Concert for Roslin Listeners. 1.0 a.m., I.B.C. Goodnight Melody and Close Down.

FLENSBURG.—Relays Hamburg. FLOR-ENCE.—Relays Milan.

FRANKFURT

1,195 kc/s, 251 metres; 17 kW.—5.45 a.m., Hymn; Time; Weather. 5.50, Gym. 6.40, Time; News. 6.50, Weather. 6.55, See Stuttgart. 8.10, Water Level; Weather. 8.15 to 8.35, Gym. 10.0, News. 11.0, Concert. 11.30, Programme Notes; Market Prices; Weather. 11.45, Announcements. 12 Noon, Orchestral Concert; Conductor, Limpert; Overture, Le Maçon (Auber); Intermezzo from L'Amico Fritz (Mascagni); Selection from Adriana Lecouvreur (Cilea); Ballet Music from Sicilian Vespers (Verdi); Serenade from The Third Suite (de Michel); Selection from Dalibor (Smetana). 1.0 p.m., Time; News. 1.10, Wireless Notes. 1.20, See Stuttgart. 1.50, Time; News. 2.0, See Stuttgart. 2.30, Economics—Reports and Discussions. 2.50, Time; Market Prices. 3.0, Weather. 3.10, See Stuttgart. 3.30, Invitation to the Dance—Recital by Lilly Trautmann (Soprano) and Fritz Kullmann (Piano-

SEPT. 29th **SATURDAY** continued

forte). 4.0, Variety Concert; The Station Orchestra; Conductor, Willy Naue; the Franz Renner Dance Band; Madlen Madsen (Soprano), and Emil Seidenspinner (Tenor). 6.0, Talk: Frontier Problems. 6.20, Weekly Review. 6.35, Surprise Programme. 6.50, Time; Weather. 7.0, Concert of Light Music by the Station Orchestra. 8.0, Time; News. 8.5, Local News. 8.10, See **Munich**. 10.0, Büdingen—Sequence (arr. Bassermann). 10.20, Time; News. 10.30 to 10.35, Local News. 10.45, Dance Music. 12 **Midnight**, See **Stuttgart**. 2.0 a.m. (**Sunday**), Close Down.

FREDRIKSSTAD.—Relays **Oslo**. **FREIBURG.**—Relays **Stuttgart**. **GENEVA.**—Relays **Sottens**. **GENOA.**—Relays **Milan**. **GLEIWITZ.**—Relays **Breslau**. **GÖTEBORG.**—Relays **Stockholm**. **GRAZ.**—Relays **Vienna**. **HAMAR.**—Relays **Oslo**.

HAMBURG

304 kc/s, 331.9 metres; 160 kW. Relayed by **Bremen**, **Flensburg**, and **Hanover**, 1,330 kc/s, 225.6 metres. 5.45 a.m., Time; Weather; Market Prices. 6.0, Gym. 6.15, Time; Weather. 6.20, See **Königsberg**. In the interval at 7.0, Time; Weather; News. 8.0, Talk for Housewives. 8.10, Announcements; Records. 10.50, News. 11.0, Scenes from the Life of Theodor Storm (Albert Petersen). 11.30, See **Königsberg**. In the interval at 12 **Noon**, Talk for Housewives; Time; Weather; Shipping. 1.0 p.m., Exchange. 1.15, Weather. 1.20 (from **Stettin**), Musical Programme. 2.15, News. 2.30, Everything has Rhythm—Gramophone Concert; Spanish March, Lolita (Santugini); Waltz, Rief brummt der Bass (Blume and Ebert); Foxtrot, Lollipops (Reser); Folk Songs for Choir, Wenn die Soldaten; Violin Solo: Serenade (d'Ambrosio); Intermezzo, Vielliebchen (Siede); Marching Song, Lola (Uhlhand); Foxtrot, Pacific Express (Melchichino-Lazzarini). 3.0, Wireless Announcements. 3.15, Exchange. 3.40, Shipping and Aviation Notes. 4.0 (from **Kiel**), German Week at Kiel—Band Concert; Conductor, Hori; March, Germania (Heib); Festival Overture (Leutner); Selection from the Gipsy Baron (Joh. Strauss); Intermezzo, Goldregen (Kockert); Waltz, Ein Frühlings-sontag (Rathke); March, Frei weg (Latam); Potpourri, Deutscher Sang (Hannemann); Parade im Märchenwald (Noack); Lagunen-Walzer (Joh. Strauss); Intermezzo (Lindsay); Archduke Albrecht, March (Kornzak); Titania March (Schwittmann). 5.30, Wilfred Wood reads from his own Works. 6.0, Records; Overture, Marihana (Wallace); Waltz from Frau Luna (Lincke); Song from Die Fledermaus (Strauss); Selection from The Land of Siles (Lehár); Komm mit mir, Schatz (Lührs); Pizzicato Polka (Strauss); Grau in Grau (Kirchstein). 6.35, Programme for Schools. 6.55, Weather. 7.0 (from **Hanover**), Pianoforte Recital by Willy Craney (Pianoforte); Impromptu in B Minor (Schubert); Jardins sous la pluie (Debussy); Ballad in D Minor (Mazur); Tarantella, Venezia e Napoli (Liszt). 7.30, Reading. 8.0, News. 8.10, From St. Paul to Haiti—Programme of Dance Music by the Station Dance Band and Soloists; Conductor, Bolt. In the interval at 10.0, News. 12 **Midnight**, Dance Music from **Leipzig**. 1.0 a.m. (**Sunday**), Close Down.

HANOVER.—Relays **Hamburg**.

HILVERSUM

100 kc/s, 1,875 metres; 7 kW. (until 3.40 p.m.). Transmitted on **Kootwijk**, 50 kW., from 3.40 p.m.—7.40 to 9.40 a.m., Programme of the Workers' Radio Society (V.A.R.A.); Records. 9.40 to 9.55, Religious Programme of the Liberal Protestant Radio Society (V.P.R.O.). 9.55 till Close Down, V.A.R.A. Programme. 9.55, Concert. 11.40, Orchestral Concert of Light Music; Conductor, Wius. 1.25 p.m., Interval. 1.40, Talk. 1.56, Records. 2.10, Organ Recital of Light Music by Jong. 2.40, Film Review. 2.55, Song Recital by Mia Dorel with Pianoforte and Accordion Accompaniment. 3.25, Interval. 3.40, Concert of Light Music by the V.A.R.A. Small Ensemble; Conductor, Bakels. 4.25, Talk. 4.40, Concert (cont.). 5.20, Literary Talk. 5.40, Records. 6.10, Song Recital with Talk. 6.40, Folk Lore. 7.0, Concert by the V.A.R.A. Children's Choir. 7.40, S.O.S. Announcements. 7.43, Records. 8.0, Talk. 8.10, Dance Music. 8.40, Concert by the Preciosa Male Voice Octet; Du Hirte Israëls (Bortnanski); Litanei (Schubert); Heilig, heilig (Schubert); Heerenhuis (Boers). 8.55, Announcements. 9.10, Octet Concert (cont.). 9.20, Concert of Light Music by the V.A.R.A. Orchestra; March (Sontag); Paysages d'Automne (Waldteufel); Slav Rhapsody No. 1 (Friedemann). 9.40, News. 9.55, Concert (cont.); Selection from Les Dragons de Villars (Maillart); Suite from Carmen (Bizet); Humoresque (Dvorák); Slav Dances (Dvorák). 10.25, Records. 10.40, Concert (cont.); Das Dorfgelächeln (Gerstenberg); Gipsy Idyll (Ferraris); Waltz, Wo die Zitronen blühen (Strauss); Extase (Ganne); Selection from White Horse Inn (Stolz-Benatzky). 11.10, Records. 11.40, Close Down.

HORBY.—Relays **Stockholm**.

HUIZEN

995 kc/s, 301.5 metres; 7 kW. (until 6.40 p.m.). 20 kW. from 6.40 p.m. Programme of the Catholic Radio Society (K.R.O.).—

7.40 a.m., Records. 8.55, Interval. 9.40, Records. 10.10, Concert. 10.40, Records. 11.10, Religious Address. 11.40, Police Messages. 11.55, Records. 12.40 p.m., Light Music by the K.R.O. Boys; Conductor, Lustenhouwer. 1.25, Interval. 1.40, Programme for Young People. 2.10, Records. 2.40, Programme for Children. 3.40, Choral and Orchestral Concert with Records, relayed from **Gitze-Rijon**. 4.50, Talk on Esperanto. 5.0, Records. 6.0, Press Review. 6.25, Records. 6.40, Police Notes. 6.55, Talk. 7.15, Records. 7.25, Concert by the K.R.O. Orchestra; Conductor, Van 't Woud; Overture, Chal Romano (Ketybey); Il Barco (Arditi); Potpourri (Hruby); Slav Rhapsody No. 1 (Friedemann). 8.15, News. 8.15, Talk. 8.25, Concert (cont.); Freiheitsjubel (Blankenburg); Overture, Die schöne Galathee (Suppé); Two Pieces (MacDowell): (a) To a Wild Rose; (b) To a Water Lily; Gnomes March (Ketybey); Love's Dream after the Ball (Czibulka); Nocturne in E Flat, No. 2, Op. 9 (Chopin); Bank Holiday (Ketybey); Toreador and Andalous (Rubinstein); March (Piercy). 9.10, Talk. 9.25, Recital by Wim Sommeveld (Pianoforte) and Fons Goossens (Songs to the Guitar). 9.40, Light Music by the K.R.O. Boys; Conductor, Lustenhouwer. 10.10, News. 10.15, Songs. 10.25, Light Music by the K.R.O. Boys. 11.10, Records. 11.40 (approx.), Close Down.

INNSBRUCK.—Relays **Vienna**.

KALUNDBORG

238 kc/s, 1,261 metres; 75 kW. Relayed by **Copenhagen**, 1,176 kc/s, 255.1 metres, and **Skamlebaek**, 49.5 metres.—7.0 a.m., Gym. 8.30, Divine Service from Copenhagen Cathedral. 11.0, Weather. 11.10, Fish Prices. 11.5, German Broadcast for Schools. 12 **Noon**, Time; Chimes. 12.2 p.m., Concert by the Harald Andersen's String Ensemble, relayed from the Bellevue Strandhotel. 2.0, Reading (Kainbau). 2.30, Popular Records. 3.0, Programme for Children. 3.30, Concert by the Radio Orchestra; Conductor, Reesen; Soloist, Edga Gaspari (Pianoforte); Overture, Norma (Bellini); Ballet Music from Faust (Gounod); Träume (Wagner-Svendsen); Extract from the Lyric Suite (Grieg); Valse triste (Sibelius); Finlandia (Sibelius); Pianoforte Solos: (a) Prelude, Fugue and Variations (Franck), (b) Sicilienne (Bach-Galston), (c) Gavotte and Minuet (Bach); Three Dances from The Bartered Bride (Smetana); Selection from Javotte (Saint-Saëns); Frühlingsglaube (Schubert-Reesen); Balscene (Mayseder-Helmsberger); Extract from Scenes napolitaines (Massenet). 5.30, Exchange; Fish Market Prices. 5.42, A Poem. 5.45, English Talk: The Week-end and Sport in England. 6.15, French Lesson. 6.45, Weather. 7.0, News. 7.15, Time. 7.30, Political Review. 8.0, Time. 8.1, Talk: Holberg Characters—Erasmus Montanus. 8.45, Sonata in G for Violin and Harpsichord (Emborg). 9.0, Dance Music by Louis Prell's Instrumental Ensemble. 9.25, Contemporary Danish Song Recital by Else Ammentorp. 9.40, Dance Music (cont.). 10.10, News. 10.25, Dance Music by Louis Prell's Dance Band. 11.15, Modern Danish Lyrics by Lulu Ziegler. 11.30, Dance Music (cont.). 12.30 a.m. (**Sunday**), Close Down.

KIEL.—Relays **Hamburg**. **KLAGENFURT.**—Relays **Vienna**.

KONIGSBERG

1,031 kc/s, 291 metres; 60 kW. Relayed by **Danzig**, 1,303 kc/s, 230.2 metres.—5.0 a.m., Records. 5.50, Weather. 6.0, Gym. 6.20, Band Concert; Conductor, Kosenmund. In the interval at 7.0, News. 8.0, Service. 8.30 to 9.0, Gym. for Women. 10.40, News. 10.55, Weather. 11.5, Agricultural Talk. 11.30, Band Concert; Overture, King Midas (Eilenberg); Song, An der Weser (Pressel); Mimosa Waltz from The Golska (Jones); The Mill in the Black Forest (Eilenberg); Student Song Potpourri (Schmützer); Liebesserenade (Noack); Potpourri of Johann Strauss Waltzes (Ed. Strauss); Schön ist die Jugend (Rhode); March (Sontag). In the interval at 12 **Noon**, Weather. 1.0 p.m., Time; Weather. 1.5, Records. In the interval at 1.20, News; Programme Notes. 2.0, News. 2.30, Announcements; Records. 3.0, Market Prices. 3.10, Book Review. 3.20, Talk for Women. 3.30, Schwätzchen hinterm Kürtis—Play for Young People (Biemann). 4.0 (from **Danzig**), Concert by the Danzig Theatre Orchestra; Conductor, Kallipke; Overture, The Water Carrier (Cherabini); Selection from Tiefland (d'Albert); From the New World (Dvorák); Greek Dance Suite, Eriakia (Schwäbder); Waltz, Nordseebilder (Joh. Strauss); Ballet Fantasia (Paepke); Narcissus (Nevin); Slow Waltz (Schütt); Ballet Music from Il Cossallo di Szigetiz (Smareglia); Overture, Waldmeister (Joh. Strauss). In the interval at 5.0, Road Report. 5.45, Book Review. 6.15, Market Prices. 6.25, Organ Recital by Schütz; Passacaglia in D Minor (Buxtehude); Sonata on the Ninety-Fourth Psalm

(Reybke). 7.0, Topical Talk. 7.25, Recital by Henry Wolf (Soprano) and Hermann Schenk and Paul Schmidtke (Trombone). 8.0, News. 8.10, Goodbye to Summer—Humorous Sequence (Lange) with Music by Henschke; The Station Orchestra, Dance Band and Soloists. 10.0, News. 10.30, Records. 10.50, See **Leipzig**. 12.30 a.m. (**Sunday**), Close Down.

KOSICE.—Relays **Prague**. **LAUSANNE.**—Relays **Sottens**.

LEIPZIG

785 kc/s, 382.2 metres; 120 kW. Relayed by **Dresden**, 1,285 kc/s, 233.5 metres.—5.50 a.m., Notes for Farmers. 6.0, Gym. 6.25, See **Breslau**. In the interval at 7.0, News. 8.0, Gym. 8.20 to 9.0, Records. 9.40, Economic Report. 9.45, Programme Notes. 9.55, Weather; Water Level. 11.0, Announcements; Records. 11.30, News; Time. 11.40, Weather. 11.45, Programme for Farmers. 12 **Noon**, Concert by the Leipzig Symphony Orchestra; Conductor, Blumer; Overture, Czar and Carpenter (Lortzing); German Dances (Roger); Idyll, Biene Maja (Schroeder); Carnaval à Paris (Svendsen); Waltz, Wiener Fresken (Jos. Strauss); Little Suite (Niemann); Overture, Ilka (Doppler). 1.0 p.m., News; Time. 1.10, Records of Old Songs. In the interval at 2.0, News; Exchange; Weather. 2.15, Records. 2.30, Fairy Tales for Children. 3.10, Weekly Review. 3.25, Talk: Books for Girls. 3.45, Economic Notes; Weather; Time. 4.0, See **Frankfurt**. 5.30 (from **Dresden**), A Duets by Adolf and Anna Arnold. 6.0, A Modern Dictionary. 6.15, Report from the Saal and Unstrut Wine Growing Districts. 7.0, Recital of Lóns Songs to the Lute by Oskar Besenfelder; Auf der Lüneburger Heide; Wilde Rosen; Der Tauber; Im Walde; Aus und vorbei; Das beste Wildbret; Schifferlied; Das Buchenblatt; Die goldene Wiege; Hunsenlied. 7.30, Talk: The German Peasant's Home. 7.55, Announcements. 8.0, News. 8.15, Concert of Dance Suites; The Leipzig Symphony Orchestra and the EmDe Orchestra; Conductor, Weber; Soloists, Ria Rosal (Soprano) and Rio Gebhardt (Pianoforte); Tanz in der Dorfschenke (Liszt); Recitative and Polonaise from Mignon (Thomas); Ballet Music, Ritter Pasman (Joh. Strauss); Concerto in E flat for Pianoforte and Orchestra (Gebhardt); Ballet Scenes (Glazunov); The Blue Danube—Waltz for Soprano and Orchestra (Joh. Strauss); Symphonic Dance Suite (Künneke). 10.20, News; Sports Notes. 10.50, Dance Music by the EmDe Orchestra. 1.0 a.m. (**Sunday**), Close Down.

LINZ.—Relays **Vienna**.

LUXEMBOURG

230 kc/s, 1,304 metres; 150 kW.—7.45 a.m., Records. 8.0, News in French; Record; News in German; Record. 12 **Noon**, Concert by the Station Orchestra; Conductor, Pensis; Overture, Raymond (Thomas); Potpourri (Adam); Meditation from Thais (Massenet); Les Elfes s'amuseent (Gaches); Andalous (De Tacey). 12.30 p.m., News in French and German. 12.40, Concert (cont.). Suite variée (Piercé); Piece (Wood); Aubade (Caludi); Sérénade d'Arlequin (Van Dam); Léhar Potpourri (Hruby). 1.15, Records. 3.45, Exchange. 6.30, Concert of Light Music and Dance Music. 7.30, Racing Results; Exchange. 7.35, till Close Down, French Evening, Concert of French Music by the Station Orchestra; Conductor, Pensis; Overture, Le Roi Pa dit (Delibes); Scènes écossaises for Oboe and Orchestra (Godard); Pavane pour une Infante défunte (Ravel). 8.0, News in French and German. 8.30, Humorous Programme. 9.0, Social and Economic Notes. 9.5, Concert by the Station Orchestra; Conductor, Pensis; Soloist, Victor Jaans (Baritone); Prelude in G minor (Hardmann); Aria from La Bohème (Puccini); Extracts from Lakmé (Delibes); Méditation (Glazunow); The Two Grenadiers (Schumann); Rhapsody No. 6 (Liszt); Aria from Le Châlet (Adam). 10.0, Musical Programme. 10.50, Dance Records.

MADRID

EAJ7, 1,095 kc/s, 274 metres; 7 kW.—9.0 a.m., News. 10.0, Exchange; Announcements. 10.30, Interval. 2.0 p.m., Chimes; Weather; Variety Music; Talk. 2.30, Concert by the Station Sextet; Pasodoble (San José); Seguidillas del velatorio (Barrios); El zacateque (Barrios); Selection from Marenma (Allegro). 3.0, Amusement Game; Exchange; Variety Music. 3.30, Concert by the Station Sextet; Petite Suite (Busser); Marche des petits soldats de plomb (Pierné). 4.0, News; Variety Music. 4.30, The Station Sextet; Symphonic Caprice (Lehmberg); Potpourri (Nichols). 4.50, Film Notes; News. 5.0, Interval. 6.0, Chimes; Light Music. 7.0, Announcements. 7.10 (approx.), Orchestral Concert; Overture, Hansel and Gretel (Humperdinck); Marche militaire (Schubert); Selection from Coppélia (Delibes); Intermezzo, La leyenda del beso (Soutullo and Vert); Romance

(Tchaikovsky); Pavane pour une Infante défunte (Ravel). 7.30, Exchange; Duets. 8.0, News. 8.10, Guitar Solos. 8.25, Concert. Part I: Orchestral Music; Part II: Flamenco Songs; Part III: Pianoforte Recital. 9.40, Sports Notes. 10.0, Chimes. 10.10, A Musical Comedy; The Station Orchestra and Soloists; Conductor, Cantos. In the interval at 11.0, News. 12.45 a.m. (**Sunday**), News. 1.0, Chimes; Close Down.

MALMO.—Relays **Stockholm**.

MILAN

814 kc/s, 368.6 metres; 50 kW. Relayed by **Turin**, 1,140 kc/s, 263.2 metres; **Genoa**, 986 kc/s, 304.3 metres; and **Florence**, 610 kc/s, 491.8 metres.—7.30 a.m., Gym. 7.45 to 8.0, Time; News. 11.30, Records. 12.45 p.m., News. 1.0, Time; Announcements. 1.5 to 2.15, Concert by the Malatesta Chamber Orchestra. In the interval from 1.50 to 1.45, Records. 4.35, News. 4.45, Programme for Children. 5.0, Talk for Women. 5.10, Dance Music. 5.55, Weather. 6.0 to 6.10, Wheat Market Report; Lottery Results. 7.0, Tourist and Popolavoro Notes. 7.15, News in Foreign Languages. 8.0, Time; News; Records. 8.30, Talk: Sport. 8.45, L'amore dei tre re—Opera in Three Acts (Montemezi). Talk and Book Review in the intervals. News after the Programme.

MONTE CENERI

1,167 kc/s, 257.1 metres; 15 kW.—12 **Noon**, Announcements; News; Concert by the Station Orchestra; March (Blankenburg); Waltz, Die Schönbrunner (Lauer); Overture (Rossi); Russian Romance (Friml); Selection from Martha (Flotow); Suite (Anbert). In the interval at 12.29 p.m., Time; Weather. 12.55, Announcements. 1.5, Records. 1.30, Report for Motorists. 1.40, Records. 1.50, Talk for Housewives. 2.0, Interval. 3.59, Time. 4.0, Recital of Neapolitan Songs. 4.30, Clarinet Solos by Rubino; March (Carosio); Spanish Waltz (Cerafo); Argentine Tango (Carosio); Mazurka (Petillo); Waltz from Mirella (Gounod); Invitation to the Polka (Rubino). 5.0, Concert by the Vidor von Jekim Quartet from a Café. 5.30, Old Dance Music; Minuet (Galimberti); Gavotte (Graziani); Quadrille (Richardson); Schottisch (Vendral); Polka (Carosio); Mazurka (Piacenza); Waltz (Arditi). 6.0, Interval. 7.44, Announcements; Time. 8.0, Concert of Popular Music. 8.45, Programme Announcements. 9.0, Vendemmia—Musical Play in Three Acts (Gragnani); Orchestra, Choir and Soloists, Conductor, Filippello. In the interval: Talk.

MORAVSKA-OSTRAVA

1,158 kc/s, 259.1 metres; 11.2 kW.—6.0 to 7.15 a.m., See **Prague**. 9.50, See **Prague**. 10.15, Brass Band Concert. Conductor, Malik. 11.0, See **Prague**. 12 **Noon**, Talk for Farmers. 12.10 p.m., See **Prague**. 12.30, Concert by the Station Orchestra. Conductor, Divis. 1.30 to 2.0, See **Prague**. 3.15 to 4.15, See **Prague**. 4.40, See **Brno**. 5.40, Talk: The Idea of a United States of Europe. 5.50, Topical Talk. 6.0, News. 6.5, Talk on Bull-fighting. 6.20, Talk for Workers. 6.30, Schrammel Concert. 6.55, See **Prague**. 7.10, Revue (arr. Zeman-Musil). The Station Orchestra and Soloists. Conductor, Musil. 7.55, See **Prague**. 8.35, See **Brno**. 9.0, See **Bratislava**. 10.0, See **Prague**. 11.30 (approx.), Close Down.

MOSCOW (No. 1)

174 kc/s, 1,724 metres; 500 kW.—5.0 a.m., News. 5.15, Fanfare. 5.45, Gym. 6.15, Musical Programme. 8.15, Programme for Children. 9.0, Musical Programme. 9.58, Time. 10.0, News. 10.15, Concert for Collectivist Farmers. 3.0 p.m., Programme Announcements. 3.15, Programme for Children. 3.58, Time. 4.0, News. 4.15, Book Review. 9.0, Programme in German; Talk on the Harvest; Sports Notes. 10.5, Programme in French; Review of the Week; Letter Box; Sports Notes. 11.5, Review of the Week and Letter Box in Spanish.

MOTALA.—Relays **Stockholm**. **MUHLACKER.**—See **Stuttgart**.

MUNICH

740 kc/s, 405.4 metres; 100 kW. Relayed by **Augsburg** and **Nürnberg**, 1,267 kc/s, 236.8 metres.—6.30 a.m., Gym. 6.45, Motto; Records. 7.15, Time; Weather; News. 7.25, Programme from **Stuttgart**. 10.40, Notes for Farmers. 10.50, Market Report. 11.0, Talk. 11.20, Time; Weather; News. 11.30, Records; Announcements. 12 **Noon**, Records. 1.15 p.m., Time; Weather; News. 1.25, Concerto in G for Pianoforte and Orchestra (Beethoven), by the Station Orchestra, conducted by Winter; Soloist, Frieda Stahl (Pianoforte). 2.0, News; Sports Notes; Programme Announcements. 2.20 (from **Nürnberg**), Musical Programme for Young People. 2.45 (from **Nürnberg**), Chess Lesson. 3.15, Reading. 3.35, Weather; Market Prices. 3.50, Labour Exchange. 4.0, See **Frankfurt**. 5.30, Talk: Harvest Customs. 5.50, Pieces for String Quartet (Kirchner). 6.10, Reading for Girls. 6.30, Talk: By Car through South-West Africa. 6.50, Wireless Notes. 7.0, Dance Music by the Station Dance Band; Conductor, Antich. 8.0, News. 8.10, The October Festival—Variety Programme. 10.0, News. 10.20, Programme to be announced. 10.40, Variety Programme (cont.). 12 **Midnight**, Close Down.

NAPLES.—Relays **Rome**. **NOTODDEN.**—Relays **Oslo**.

OSLO

254 kc/s, 1,154 metres; 60 kW. Relayed by Hamar, 519 kc/s, 578 metres; and Jeløy, 6,990 kc/s, 42.92 metres.—11.15 a.m., Service. 11.50, Exchange. 12.55 p.m., Nauen Time Signal. 1.0 to 2.0, Records. In the Interval at 1.15, Weather; Talk for Farmers; and at 1.45, Exchange. 5.0, Orchestral Concert. 6.0, Programme for Children. 6.45, Talk: Economics. 7.0, Announcements. 7.15, Weather; News. 7.30, Time. 7.31, Concert of Norwegian Music. 8.0, Revue relayed from the Chat Noir. In the Interval at 9.20, Topical Talk. 9.40, Weather; and at 9.45, News. 11.0, Dance Records. 12 Midnight, Close Down.

OSTERSUND.—Relays Stockholm

PARIS

ECOLE SUPERIEURE, 695 kc/s, 431.7 metres; 7 kW.—8.0 to 8.30 a.m., News. 10.30, Concert from Marseille, 749 kc/s, 400.6 metres. 12 Noon, Tourist Talk. 12.15 p.m., Quintet Concert. In the Interval at 1.0, News. 1.30, Programme by René Gerly. 2.0, Records. 2.30, Vocal Programme. 6.0, Literary and Science Talk. 6.30, News. 7.45, Legal Talk. 7.53, Talk: Animal Protection. 8.0, Records: D'une prison (Hahn); Arias from Manon (Massenet); Sigurd (Reyer); Le Pré aux Clercs (Hérold); Les Noces de Jeannette (Massé); Chansons de Miarka (Georges). 8.30, Symphony Concert by the National Orchestra; Conductor, Desormière; Soloist, Mlle. Rolland (Songs); Orchestral Suite, Jephthé (Montclair); Ballet Suite (Gluck); Songs: Aria from Zémir et Azor (Grétry); Le jeune pâtre breton (Berlioz); Symphonic Poem, Phéon (Saint-Saëns); Two Songs: Valse nobles et sentimentales (Ravel). After the Concert, News. 10.0, Dance Music.

PARIS

POSTE PARISIEN, 959 kc/s, 312.8 metres; 100 kW.—7.10 a.m., Fanfare; Records. In the intervals, News; Cookery Hints. 12 Noon, Exchange. 12.5 p.m., Thomas Records: Extracts from Hamlet and Mignon. 12.25, News. 12.35, New Records. 1.5, Exchange. 1.15, Concert by the Station Orchestra: Overture, L'Oiseleur (Baukner); Two Romanian Dances (Bola); Selection from La Mascotte (Audran); Oriental Dance (Glazunov); Extract from Jeux d'enfants (Bizet); Waltz, Bluets et coquelicots (Waldeufel). 2.0, Interval. 3.45, Exchange. 6.45, Exchange. 6.49, Extract from L'Apprenti sorcier (Dukas) on Records. 7.2, Topical Talk. 7.10, News. 7.30, Songs of the Sea (on Records). 8.0, Interval. 8.10, Weekly Review. 8.20, Concert. 8.50, Interval. 9.0, Dance Music by the Station Jazz Band, A Vocal Trio and Carol King (Songs); Conductor, Alain Romans. 10.20, News; Exchange. 10.30 till Close Down, Programme in English arranged by the International Broadcasting Company of London. 10.30, An Evening on the Pier. 11.0, I.B.C. Goodnight Melody; Close Down.

PARIS

RADIO PARIS, 182 kc/s, 1,648 metres; 75 kW.—6.45 a.m., Gym. 7.0, Records. 7.15, News. 7.45, Gym. 8.0, Records of Light Music. 12 Noon, Symphony Concert; Conductor, André: Marche des loups d'or (Fauchey); Waltz (Zichner); Overture, Le pré aux clercs (Hérold); Songs, Forest Murmurs (Czibulka); Fantasia; Songs; Minuet (Valensi-Daube); Selection from The Prophet (Meyerbeer); Duets; Gavotte (Bernard); Selection from Giroflé-Girofla (Lecocq); Songs; Waltz, Venezia (Desormes); Selection from Fortunio (Messager); Le coïline des nymphes (Février); The Cooks (Gabriel-Marie); The Teddy Bears' Picnic (Bratton). 3.0, Programme for Children. 6.20, Announcements; Practical Beekeeping; Exchange; Racing Results. 6.35, Two Talks. 7.0, Science Talk. 7.15, Press Review. 7.30, Topical Talk. 8.0, Flossie—Operetta (Szulc); Conductor, Labis. In the intervals at 8.20, News; and at 9.15, News; Review by Bonnaud. 10.30, Dance Music by the Golden Band.

PITTSBURGH

KDKA, 980 kc/s, 306 metres; 50 kW. Relayed by W8XK on 48.86 metres; and 25.27 metres.—3.0 p.m., Edward MacHugh. 3.15, KDKA Home Forum. 3.30, Singing Strings. 3.45, News; Originalities. 4.0, Bobby and Sue—Helen Irwin. 4.15, KDKA Kiddies' Klub. 5.0, Fields and Hall. 5.15, Genia Fonarova. 5.30, Vic and Sade. 5.45, Paul Pendarvis and his Orchestra. 6.0, Words and Music. 6.15, Songfollies. 6.30, Farm and Home Hour. 7.30, Royal Hawaiian Orchestra. 8.0, Tommy Tucker's Orchestra. 8.30, Saturday's Songsters. 9.0, Don Carlos and Orchestra. 9.15, Platt and Nierman. 9.30, Chicago Symphony Orchestra. 10.30, A Recreo—Bill and Alex. 10.45, Orphan Annie. 11.10, Time; Temperature; Weather. 11.14, Goodrich Baseball Résumé. 11.30, Twenty Fingers Harmony. 11.45, John Herrick (Baritone). 12 Midnight, Programme to be announced. 12.15 a.m. (Sunday), Al Williams. 12.30, Hotel William Penn Orchestra. 1.0 to 6.0 a.m., Popular Programme.

PORSGRUND.—Relays Oslo.

PRAGUE

638 kc/s, 470.2 metres; 120 kW.—6.0 a.m., Gym.; Music; News; Weather. 7.15, Interval. 9.50, News. 10.5, News in German.

SEPT. 29th SATURDAY continued

10.10, Record. 10.15, See Moravská-Ostrava. 11.0, Record. 11.5, Recital by Muzik's Quartet: Overture, The Devil and Kate (Dvorak); Caucasian Sketches (Ippolitov-Ivanov); Piece; Intermezzo (Stelzig); Tango (Benes). 11.55, Notes for Farmers; Exchange; Weather. 12 Noon, Time; Notes for Farmers; Hints. 12.10 p.m., Records. 12.20, News; Weather. 12.30, See Moravská-Ostrava. 1.30, Talk: Industry. 1.40, Records. 1.50, Exchange. 1.55, Exchange and Weather in German. 2.0, Interval. 3.15, Dance Music by Harry Osten and his Jazz Orchestra. 4.15, Interval. 4.40, See Brno. 5.30, Announcements. 5.45, Notes for Farmers; Market Prices. 5.55, Record. 6.0, Talk for Workers. 6.10, Record. 6.15, German Transmission: Recital by Members of the German Theatre in Prague; Four Songs (R. Strauss); Aria from Czar and Carpenter (Lortzing); Operetta Songs. 6.50, Sports Notes; News. 7.0, Time; News; Weather. 7.10, See Moravská-Ostrava. 7.55, Talk. 8.10, Eight Songs from Op. 39 (Novak) by Martha Krasova (Contralto). 8.45, See Brno. 9.0, See Bratislava. 10.0, Time; News; Sports Notes. 10.15, Records. 10.30, Wind Band Concert. 11.30, Close Down.

RJUKAN.—Relays Oslo.

ROME

Call 190, 713 kc/s, 420.8 metres; 50 kW. Relayed by Naples, 1,104 kc/s, 271.7 metres; Milan No. 2, 1,348 kc/s, 222.6 metres; Turin No. 2, 1,357 kc/s, 221.1 metres; and 2R0, 11,810 kc/s, 25.4 metres.—7.30 a.m., Gym. 7.45 to 8.0, Time; News. 12.30 p.m., Records. 1.5 to 2.15, Light Music: Melody (Kochmann); Song, Stornello al sole; Selection from The Dollar Princess (Fall); Life in Japan (Higgs); Caucasian Sketches (Ippolitov-Ivanov); Burlesque (Culotta); Fox trot (Escobar); Selection from Siberia (Giordano); Stelle filanti (Restelli). In the interval from 1.30 to 1.45, Time; Announcements. 4.30, Children's Radio Review. 4.55, News; Exchange; Lottery Results. 5.10, Vocal and Instrumental Concert; Claro Sardo (Pianoforte), Mary Luisa Sardo (Violin), Adelio Zagonara (Tenor), and Giselda Bonitibus (Soprano); Pianoforte Solos: (a) Gavotte (Lully), (b) Gigue (Rame); Tenor Solos: (a) Hindu Song (Rimsky-Korsakov), (b) Serenade from Iris (Mascagni), (c) Princesita (Padilla); Violin Solos: (a) Spanish Romance (Carnevali-Corti), (b) Marguerite (Rachmaninov-Kreisler), (c) Saltarelle (Wieniawski); Soprano Solos: (a) Margherita (Gallas), (b) Gotine gialle (Brogi), (c) Granadinas (Barrera-Galleja), (d) Aria from Il diavolo (Massenet). 5.55, Weather. 6.0 to 6.10, Corn Market. 7.0, Tourist Notes; Report of the Royal Geographical Society and Dopolaro Notes. 7.15, News in Foreign Languages. 8.0, Time; News. 8.10, Records. 8.30, Government Notes. 8.45, Comedy. News in the interval. 12 Midnight, Close Down.

RUYSELEDE

10,330 kc/s, 29.04 metres; 8 kW.—7.45 p.m., News in French. 8.0, See Brussels (No. 2). 9.0, News in Flemish. 9.15, Close Down.

SALZBURG.—Relays Vienna.

SCHENECTADY

WGY, 790 kc/s, 379.5 metres; 50 kW. Relayed at intervals by W2XAF on 31.48 metres; and by W2XAD on 19.56 metres.—7.0 p.m., Irving Aaronson and his Orchestra. 7.30, Week-end Revue; Variety Musicale. 11.25, Exchange. 12 Midnight, General Electric Programme. 12.30 a.m. (Sunday), Hands Across the Border. 1.0 to 3.0 a.m., Popular Programme.

SOTTENS

677 kc/s, 443.1 metres; 25 kW.; and Geneva, 401 kc/s, 748 metres.—7.0 to 7.15 a.m., Gym. 12.29 p.m., Time. 12.30, News. 12.40 (from Geneva), Records. In the interval at 1.0, Exchange. 2.0, Interval. 3.59, Time. 4.0, Report of the Geneva Walking Trials. 4.30 to 6.0, See Monte Ceneri. 6.0 (from Geneva), Programme for Children. 6.30 (from Geneva), English Lesson. 6.45 (from Geneva), Programme for Young People. 6.55 (from Geneva), Jazz Records. 7.5 (from Geneva), Hints for Rammers. 7.15 (from Geneva), Film Review. 7.40, News. 7.59, Weather. 8.0, Talk with Musical Illustrations: Seventeenth and Eighteenth Century French Music and its influence on Foreign Composers. 8.35, Concert by the Station Orchestra; Conductor, Echenard: Septet (Beethoven). 9.0, News. 9.10 (from Geneva), Delmet and Hahn Song Recital by Nicolas Amato. 9.35, Concert (contd.); Light Music. 10.0, Report of the Geneva Walking Trials. 10.20 (from Geneva), Dance Music. 11.30 (approx.), Close Down.

STOCKHOLM

704 kc/s, 426.1 metres; 55 kW. Relayed by Boden and Östersund, 413.5 kc/s, 726 metres; Göteborg, 941 kc/s, 311.8 metres; Hörby, 1,131 kc/s, 265.3 metres; Motala, 216 kc/s,

1,389 metres; and Sundsvall, 601 kc/s, 499.2 metres.—7.20 a.m., Gym. 7.45, Service. 8.0, Weather. 12.30 p.m., Weather. 12.45, Exchange. 12.55, Time. 2.0, Orchestral Concert of Light Music. 3.0, Programme for Children, relayed from Örebro, 1,312 kc/s (228.7 metres). 3.30 (from Göteborg), Light Music. 4.30, Talk. 5.0, Weather. 5.5, Records. 5.45, Old Dance Music by Sven Sköld's Band. 6.20, Relay of the Inauguration of the Göteborg Municipal Theatre. 7.15, News. 7.30, Records; Walter's Prize Song and Prelude, from The Mastersingers (Wagner). 7.45, Breaking Up—Play (Alice Svensk). 8.15, Concert by the Station Orchestra; Conductor: Ivar Hellman; Soloist: Ally Hallman (Songs); Marek (Komzak); Overture, Die schöne Galathee (Suppe); Songs: (a) In Wien, wo der Wein und der Walzer blüht (Stolz), (b) A Viennese Waltz (Benatzky), (c) So küsst man nur in Wien (Abraham); German Dances (Schubert); Waltz (Reiml); Polka (Strauss); Vienna, City of my Dreams (Sieczynski); Songs: (a) Aria from The Circus Princess (Kálmán), (b) Ich muss wieder einmal in Grinzing sein (Benatzky); Fortissimo (Kálmán-Geiger); March (Blon). 9.45, News. 10.0 (from Göteborg), Dance Music. 11.0 (approx.), Close Down.

STRASBOURG

859 kc/s, 349.2 metres; 15 kW.—11.0, Concert from Grenoble, 968 kc/s, 309.9 metres. 12 Noon, Records. 12.45 p.m., News. 1.0, Time; Records. 1.15, Programme in German, relayed from the Ruins of the Château du Haut-Barr. 2.0, Interval. 2.30, Concert from Paris (Ecole Supérieure). 3.30, Talk on French Music. 3.45, Talk for Women. 4.0, Programme from Paris (Radio Colonial), 19.68 metres. 5.0, Richard Strauss Concert by the Station Orchestra; Conductor, de Villiers; Soloist, Poeyt (Horn); Don Juan; Concerto for Horn and Orchestra; Selection from Der Rosenkavalier. 6.0, French Lesson. 6.15, Talk in German for Farmers. 6.30, Talk: Czech Castles. 6.45, Orchestral Concert of Light Music; Conductor, Roskam (Cello); Marche Roumaine (Ganne); Waltz, Die Schönbrunner (Lammer); Overture, Athalia (Mendelssohn); Selection from The Merry Wives of Windsor (Nicolaï); Cello Solos: Two Pieces (Filipucci). 7.30, Time; News. 7.45, Local News. 8.0, Press Review in German; Announcements. 8.30, Franco-Yugoslav Festival Programme, relayed from Nancy: The Yugoslav Choir of Merlebach and a Military Band; French and Serbian Songs. 10.30, News. 10.40, Dance Music from the Caveau de l'Aubette. 12 Midnight, Close Down.

STUTTGART

MUHLACKER, 574 kc/s, 522.6 metres; 100 kW.—5.35 a.m., Notes for Farmers. 5.45, Hymn. Time. Weather. 5.50, Gym. 6.15, Concert by the Philharmonic Orchestra, relayed from Karlsruhe; Conductor: Zelm. 6.40, Time; Announcements. 6.55, Records. 8.10, Weather. 8.15, Gym. 8.35 to 8.40, Water Level Report. 10.0, News. 10.10, Records of Viennese Schrammel Music. 10.30, Sonata (Haydn) by Hermann Klais (Cello) and Ely Ehrhardt (Pianoforte). 10.50, Aria Recital by Ines Metzger-Klunn (Contralto); Arias from Semiramis (Gluck); Dieh preist, Allmächtiger, der Sterne Jubelklang! (Nicodé); Arietta (Pergolesi); Arietta (Marsello). 11.25, Announcements; Records. 11.55, Weather. 12 Noon, See Frankfurt. 1.0 p.m., News; Weather. 1.20, Records. 1.50, Time; News. 2.0, Records; Lustig und fidel (Die-trich); Freut euch des Lebens (Jos. Strauss); Lustige Herzen (Pokorny); Piece (Grunov); Waltz, Mein Lebenslauf ist Lieb und Lust (Jos. Strauss); Piece (Reverfing-Gruber); Liechen ade (Niel). 2.30, Youth Hostels—Sequence for Young People. 3.10, Morse Lesson. 3.30, Lute Recital by Artur Faiss; Two Dances (da Parma); Suite (de Visée). 3.45, Talk: The German Race. 4.0, Concert by the Philharmonic Orchestra, relayed from Mannheim. 6.0, See Frankfurt. 6.20, Tally Ho!—Hunting Sequence (Held). 7.0, See Munich. 8.0, News. 8.5, Local Review. 8.10, See Munich. 10.0, Weather; Sports Notes. 10.20, News. 10.45, Dance Music by the Willi Wende Band. 12 Midnight, Concert. In the Interval, Fifteen Variations and Fugue in E Flat, Op. 35 (Beethoven), by Otto Sonnen. 2.0 a.m. (Sunday), Close Down.

SUNDSVALL.—Relays Stockholm.

TOULOUSE

913 kc/s, 328.6 metres; 10 kW.—8.0 a.m., Dance Refrains. 8.30, News. 8.35, Orchestral Music. 8.45, Songs. 12 Noon, Music by a Viennese Orchestra. 12.15 p.m., Opera Arias. 12.30, News; Exchange. 12.45, Request Music. 1.0, News. 1.5, Orchestral Music. 1.15, Sound Film Music. 1.30, Military Band Music. 1.45, Popular Songs. 2.0, Amusement Guide. 6.0, News. 6.15, Opera Music: Extracts from The Valkyrie (Wagner), Der Preischutz (Weber), Faust (Gounod), Tristan and Isolde (Wagner). 6.30, Songs. 6.45, Light Orchestral Music. 7.0, Soloist Programme. 7.15, Operetta

Music. 7.30, News; Racing Results; Wheat Market Prices; Exchange. 7.45, Light Music. 7.50, Talk. 8.15, Concert Version of Azor—Operetta (Gabaroché). 9.0, Light Orchestral Music. 9.15, Pianoforte Recital by Pitié. In the Interval: Songs by Malicet. 10.0, Sound Film Music. 10.15, News. 10.30, Military Band Music. 11.0, Request Music. 11.15, Opera Music: Extracts from Louise (Charentier), La Bohème (Puccini). 11.30, Operetta Music: Extracts from The Drum Major's Daughter (Offenbach), Louis XIV (Pares and Parys), Brummel (Habu), Frasquita (Lehár). 11.50, Choral Music. 12 Midnight, News. 12.5 a.m. (Sunday), Au caveau de Minuit—Radio Fantasia. 12.15, Orchestral Music: Adagio etto from Symphony No. 5 (Mahler); Norwegian Rhapsody (Lalo). 12.30, Close Down.

TRONDHEIM.—Relays Oslo. TURIN.—Relays Milan.

VATICAN CITY

15,120 kc/s, 19.84 metres; 10 kW. (Morning), 5,970 kc/s, 50.26 metres (Evening).—11.0 to 11.15 a.m., Religious Information in Various Languages. 8.0 to 8.15 p.m., Religious Information in Italian.

VIENNA

592 kc/s, 506.8 metres; 120 kW. Relayed by Graz, 886 kc/s, 338.6 metres; Innsbruck, 519 kc/s, 578 metres; Klagenfurt, Linz and Salzburg, 1,294 kc/s, 231.8 metres.—9.0 a.m., News. 10.50, Water Level; Weather. 11.30, Programme for Women. 11.55, Weather. 12 Noon, Records: Potpourri (Lindemann); Selection from La Vie Parisienne (Offenbach); Eysler Potpourri (Hrubý); Waltz from Die geschiedene Frau (Fall); Entry of the Little Fauns (Pierné); Faust Fantasia (Wieniawski); Torna a Sarricento (de Curtis); Offenbach Potpourri. 1.0 p.m., Time; News. 1.10, Records: Potpourri, Wiener Leben (Komzak); Song (Wood); Fahrt in den Wiener Wald (Joh. Strauss); Berceuse (Gretchaninov); Selection from Der arme Jonathan (Müllöcker); Española (Serrano); Selection from Rose Marie (Friml-Stöckart). 2.0, Announcements. 2.10, Records: Arias from La Juive (Halévy), The Bartered Bride (Smetana), I Pagliacci (Leoncavallo), and The Magic Flute (Mozart); Princesita (Padilla). 2.30, Interval. 3.0, Time; Weather; Exchange. 3.15, French Talk: Les cris de Paris. 3.40, Der Traum ein Leben—Play in Four Acts (Grillparzer). 5.30, News. 5.35, Concert by the Vienna Mandoline Society; Conductor, Schmidhuber; Overture, The Caliph of Bagdad (Boieldieu); Träumerei (Schumann); Gavotte, Schön Liebchen (Döpl); Faust Fantasia (Walter); Alex-Polka (Bass); Volksliedchen und Märchen (Komzak). 6.0, Relay of the Ceremony from the Seipel Dollfus Mausoleum—Transferring the Two Coffins to the Crypt. 8.0, Time News. 8.10, Dramatic Programme for the Tenth Anniversary of the Vienna Radio Station; Talk by Dr. Hans Nüchtern; 1924. Der Ackermann und der Tod (—Dialogue (von Saaz); 1934. Red-White Red (Song of a Flag)—Sequence (on Records); Mary Stuart in Scotland—Play (Marie von Ebner-Eschenbach). 10.30, News. 10.50, Dance Music. 12 Midnight, Dance Records. 1.0 a.m. (Sunday), Close Down.

WARSAW

223 kc/s, 1,345 metres; 120 kW.—6.45 a.m., Hymn. 6.48, Records. 6.58, Gym. 7.8, Records. 7.15, News. 7.25, Records. 7.35, Hints for Housewives. 7.40, Programme Announcements. 7.50, Announcements; Light Music. 8.0, Interval. 11.57, Time. 12 Noon, Fanfare from St. Mary's Church, Cracow. 12.3 p.m., Weather. 12.5, Press Review. 12.10, Concert by the Nina Manska Ensemble: Waltzes from The Bayadere (Kálmán); En Japon (Gauvin); Two Pieces (Nieman); The Nightingale and the Rose (Rimsky-Korsakov); Intermezzo and Air from The Czar's Bride (Rimsky-Korsakov); La quenouille de Bonne-Maman (Gillet); Serenade (Carosio); The Musical Snuff Box (Nikolajevsky); Twilight (Bece); Minuet (Godard); Serenade (Gauvin). 1.0, News. 1.5, Opera Records. 1.30, Interval. 3.30, Announcements. 3.35, Exchange. 3.45, Records. 4.30, Dramatic Programme from Lwów, 795 kc/s, 377.4 metres. 5.0, Recital by Hoffman (Mezzo-Soprano) and Sznajderman (Violin); Violin Solos: (a) Nocturne in F sharp minor (Rozzycki) (b) Slav Dance in G minor (Dvorak-Kreisler). (c) Hebrew Melody (Achron); Songs: (a) Nocturne (Chausson). (b) Le temps des lilas (Chausson). (c) Song (Mahler); Violin Solos: (a) Berceuse (Stravinsky). (b) Caprice (Wieniawski). (c) Moto perpetuo (Paganini); Songs: (a) In the Silent Night (Rimsky-Korsakov). (b) Le vergé fleur (Arenski). (c) The Roses (Cezek). 5.50, Programme for Women. 6.0, Programme for Farmers from Wilno, 536 kc/s, 559.7 metres. 6.10, Art Notes. 6.15, Sonata in D Op. 18 for Cello and Pianoforte (Rubinstein) relayed from Lwów. 6.45, Report. 7.0, Dance Music from the Adria Café. In the interval at 7.20, Talk from Poznań, 868 kc/s, 345.6 metres. 7.45, Programme Announcements. 7.50, Sports Notes. 8.0, Talk: War Reminiscences. 8.15, Announcements; Light Music. 8.30, Talk on the following Relay. 8.45, See Rome. In the interval, News. 11.20, Weather. 11.25, Humorous Programme. 11.55, Dance Music from the Gastronomía Restaurant. ZÜRICH.—Relays Beromünster.

PRINCIPAL BROADCASTING STATIONS OF EUROPE

Arranged in Order of Frequency and Wavelength

(Stations with an aerial power of 50 kW. and above in heavy type)

Station.	kc/s.	Tuning Positions.	Metres.	kW.	Station.	kc/s.	Tuning Positions.	Metres.	kW.
Kaunas (Lithuania)	155		1935	7	Poznan (Poland)	868		345.6	16
Brasov (Romania)	160		1875	20	London Regional (Brookmans Park)	877		342.1	50
Hilversum (Holland). (<i>Kootwijk, 50 kW. after 3.40 p.m.</i>)	160		1875	7	Graz (Austria). (<i>Relays Vienna</i>)	886		338.6	7
Lahti (Finland)	166		1807	40	Limoges, P.T.T. (France)	895		335.2	0.5
Moscow, No. 1, RW1 (Komintern) (U.S.S.R.)	174		1724	500	Helsinki (Finland)	895		335.2	10
Paris (Radio Paris) (France)	182		1648	75	Hamburg (Germany)	904		331.9	100
Istanbul (Turkey)	185		1621	5	Toulouse (Radio Toulouse) (France)	913		328.6	10
Berlin (Deutschlandsender Zeesen) (Germany)	191		1571	60	Brno (Czechoslovakia)	922		325.4	32
(<i>S.-w. Stns., 16.89, 19.73, 25.51, 31.38 and 49.83 m.</i>)					Brussels, No. 2 (Belgium). (<i>Flemish Programme</i>)	932		321.9	15
Ankara (Turkey)	200		1500	7	Algiers, P.T.T. (Radio Alger) (Algeria)	941		318.8	12
Droitwich	200		1500	150	Göteborg (Sweden). (<i>Relays Stockholm</i>)	941		318.8	10
Minsk, RW10 (U.S.S.R.)	208		1442	35	Breslau (Germany)	950		315.8	60
Reykjavik (Iceland)	208		1442	16	Paris (Poste Parisien) (France)	959		312.8	100
Paris (Eiffel Tower) (France)	214		1395	13	Grenoble, P.T.T. (France)	968		309.9	20
Motala (Sweden). (<i>Relays Stockholm</i>)	216		1389	30	West Regional (Washford Cross)	977		307.1	50
Novosibirsk, RW76 (U.S.S.R.)	217.5		1379	100	Cracow (Poland)	986		304.3	2
Warsaw, No. 1 (Raszyn) (Poland)	223		1345	120	Genoa (Italy). (<i>Relays Milan</i>)	986		304.3	10
Luxembourg	230		1304	120	Huizen (Holland). (<i>7 kW. till 6.40 p.m.</i>)	995		301.5	20
Kharkov, RW20 (U.S.S.R.)	232		1293	20	Bratislava (Czechoslovakia)	1004		298.8	13.5
Kalundborg (Denmark) (S.-w. Stn., 49.5 m.)	238		1261	75	North National (Slaithwaite)	1013		296.2	50
Leningrad, RW53 (Kolpino) (U.S.S.R.)	245		1224	100	Barcelona, EAJ15 (Radio Asociación) (Spain)	1022		293.5	3
Tashkent, RW11 (U.S.S.R.)	256.4		1170	25	Königsberg (Heilsberg Ermland) (Germany)	1031		291	60
Oslo (Norway)	260		1154	60	Leningrad, No. 2, RW70 (U.S.S.R.)	1040		288.5	10
Moscow, No. 2, RW49 (Stechelkovo) (U.S.S.R.)	271		1107	100	Scottish National (Falkirk)	1050		285.7	50
Tiflis, RW7 (U.S.S.R.)	280		1071.4	35	Bari (Italy)	1059		283.3	20
Rostov-on-Don, RW12 (U.S.S.R.)	355		845	20	Tiraspol, RW57 (U.S.S.R.)	1068		280.9	4
Sverdlovsk, RW5 (U.S.S.R.)	375		800	50	Bordeaux, P.T.T. (Lafayette) (France)	1077		278.6	12
Geneva (Switzerland). (<i>Relays Sottens</i>)	401		748	1.3	Zagreb (Yugoslavia)	1086		278.2	0.7
Moscow, No. 3 (RCZ) (U.S.S.R.)	401		748	100	Falun (Sweden)	1086		276.2	2
Voroneje, RW25 (U.S.S.R.)	413.5		726	10	Madrid, EAJ7 (Union Radio) (Spain)	1095		274	7
Oulu (Finland)	431		696	2	Madona (Latvia)	1104		271.1	50
Ufa, RW22 (U.S.S.R.)	436		688	10	Naples (Italy). (<i>Relays Rome</i>)	1104		271.7	1.5
Hamar (Norway) (<i>Relays Oslo</i>)	519		578	0.7	Alexandria (Egypt)	1122		267.4	0.25
Innsbruck (Austria). (<i>Relays Vienna</i>)	519		578	0.5	Belfast	1122		267.4	1
Ljubljana (Yugoslavia)	527		569.3	5	Nyiregyhaza (Hungary)	1122		267.4	6.2
Viiipuri (Finland)	527		569.3	13	Hörby (Sweden). (<i>Relays Stockholm</i>)	1131		265.3	10
Bolzano (Italy)	536		559.7	1	Turin, No. 1 (Italy). (<i>Relays Milan</i>)	1140		263.2	7
Wilno (Poland)	536		559.7	16	London National (Brookmans Park)	1149		261.1	50
Budapest, No. 1 (Hungary)	546		549.5	120	West National (Washford Cross)	1149		261.1	50
Beromunster (Switzerland)	556		539.6	60	Kosice (Czechoslovakia). (<i>Relays Prague</i>)	1158		259.1	2.6
Athlone (Irish Free State)	565		531	60	Moravska-Ostrava (Czechoslovakia)	1158		259.1	11.2
Palermo (Italy)	565		531	4	Monte Ceneri (Switzerland)	1167		257.1	15
Stuttgart (Mühlacker) (Germany)	574		522.6	100	Copenhagen (Denmark). (<i>Relays Kalundborg</i>)	1176		255.1	10
Riga (Latvia)	583		514.6	15	Kharkov, No. 2, RW4 (U.S.S.R.)	1185		253.2	10
Vienna (Bisamberg) (Austria)	592		506.8	120	Frankfurt (Germany)	1195		251	17
Rabat (Radio Maroc) (Morocco)	601		499.2	6.5	Prague, No. 2 (Czechoslovakia)	1204		249.2	5
Sundsvall (Sweden). (<i>Relays Stockholm</i>)	601		499.2	10	Lille, P.T.T. (France)	1213		247.3	5
Florence (Italy). (<i>Relays Milan</i>)	610		491.8	20	Trieste (Italy)	1222		245.5	10
Cairo (Abu Zabal) (Egypt)	620		483.9	20	Gleiwitz (Germany). (<i>Relays Breslau</i>)	1231		243.7	5
Brussels, No. 1 (Belgium). (<i>French Programme</i>)	620		483.9	15	Cork (Irish Free State) (<i>Relays Athlone</i>)	1240		241.9	1
Lisbon (Bacarena) (Portugal)	629		476.9	15	Juan-les-Pins (Radio Côte d'Azur) (France)	1249		240.2	2
Trøndelag (Norway)	629		476.9	20	Rome, No. 3 (Italy)	1258		238.5	1
Prague, No. 1 (Czechoslovakia)	638		470.2	120	San Sebastian (Spain)	1258		238.5	3
Lyons, P.T.T. (La Doua) (France)	648		463	15	Nürnberg and Augsburg (Germany) (<i>Relay Munich</i>)	1267		236.8	2
Cologne (Langenberg) (Germany)	658		455.9	60	Norwegian Relay Stations	1276		235.1	0.5
North Regional (Slaithwaite)	668		449.1	50	Dresden (Germany) (<i>Relays Leipzig</i>)	1285		233.5	1.5
Sottens (Radio Suisse Romande) (Switzerland)	677		443.1	25	Aberdeen	1285		233.5	1
Belgrade (Yugoslavia)	686		437.3	2.5	Austrian Relay Stations	1294		231.8	0.5
Paris, P.T.T. (Ecole Supérieure) (France)	695		431.7	7	Danzig. (<i>Relays Königsberg</i>)	1303		230.2	0.5
Stockholm (Sweden)	704		426.1	55	Swedish Relay Stations	1312		228.7	1.25
Rome, No. 1 (Italy) (S.-w. stn., 25.4 m.)	713		420.8	50	Budapest, No. 2 (Hungary)	1321		227.1	0.8
Kiev, RW9 (U.S.S.R.)	722		415.5	36	German Relay Stations	1330		225.6	1.5
Tallinn (Esthonia)	731		410.4	20	Montpellier, P.T.T. (France)	1339		224	5
Madrid, EAJ2 (Radio España) (Spain)	731		410.4	3	Lodz (Poland)	1339		224	1.7
Munich (Germany)	740		405.4	100	Dublin (Irish Free State) (<i>Relays Athlone</i>)	1348		222.6	1
Marseilles, P.T.T. (France)	749		400.5	5	Milan, No. 2 (Italy) (<i>Relays Rome</i>)	1348		222.6	4
Katowice (Poland)	758		395.8	12	Turin, No. 2 (Italy). (<i>Relays Rome</i>)	1357		221.1	0.1
Midland Regional (Darenty)	767		391.1	25	Basle and Berne (Switzerland)	1375		218.2	0.5
Toulouse, P.T.T. (France)	776		386.6	2	Warsaw, No. 2 (Poland)	1384		216.8	2
Leipzig (Germany)	785		382.2	120	Lyons (Radio Lyons) (France)	1393		215.4	5
Barcelona, EAJ1 (Spain)	795		377.4	5	Tampere (Finland)	1420		211.3	1.2
Lwow (Poland)	795		377.4	16	Newcastle	1429		209.9	1
Scottish Regional (Falkirk)	804		373.1	50	Béziers (France)	1429		209.9	2
Milan (Italy)	814		368.6	50	Paris, (Radio LL) (France)	1429		209.9	2
Bucharest (Romania)	823		364.5	12	Miskolc (Hungary)	1438		208.6	1.25
Moscow, No. 4, RW39 (Stalina) (U.S.S.R.)	832		360.6	100	Fécamp (Radio Normandie) (France)	1456		206	10
Berlin (Funkstunde Te3el) (Germany)	841		356.7	100	Pecs (Hungary)	1465		204.7	1.25
Bergen (Norway)	850		352.9	1	Bournemouth	1474		203.5	1
Valencia (Spain)	850		352.9	1.5	Plymouth	1474		203.5	0.3
Simferopol, RW52 (U.S.S.R.)	859		349.2	10	International Common Wave	1492		201.1	0.1
Strasbourg, P.T.T. (France)	859		349.2	15	Liepāja (Latvia)	1737		173	0.1

SHORT-WAVE STATIONS OF THE WORLD

(N.B.—Times of Transmission given in parentheses are approximate only and represent G.M.T.)

Metres.	kc/s.	Call Sign.	Station.	Tuning Positions.	Metres.	kc/s.	Call Sign.	Station.	Tuning Positions.
58.31	5,145	OK1MPT	Prague (Czechoslovakia). (Experimental)	.....	31.38	9,560	DJA	Zeesen (Germany). (Daily 11.45 and 22.00)	.....
50.26	5,969	HVJ	Vatican City, Rome. (Daily 19.00, Sun. 10.00 also.)	.....	31.35	9,570	W1XAZ	Springfield, Mass. (U.S.A.). (Relays WBZ.) (Daily 11.00, Sun. 13.00.)	.....
50.0	6,000	RW59	Moscow. (Relays No. 1 Stn.) (Daily 21.00)	.....	31.30	9,585	GSC	Empire Broadcasting	.....
50.0	6,000	EAJ25	Barcelona, Radio Club (Spain). (Daily 20.30.)	.....	31.28	9,590	W3XAU	Philadelphia, Pa. (U.S.A.). (Relays W.C.A.U.) (Daily 16.00.)	.....
49.83	6,020	DJC	Zeesen (Germany). (Daily 17.30 and 23.45)	.....	31.28	9,590	VK2ME	Sydney (Australia). (06.00, 10.00 and 14.30.)	.....
49.67	6,040	W1XAL	Boston, Mass. (U.S.A.) (Daily ex Sun. 21.45, Sun. 00.00)	.....	31.27	9,595	IBL	Radio Nations, Prangins (Switzerland). (Sat. 22.30.)	.....
49.67	6,040	W1XNB	Miami Beach, Florida (U.S.A.) (Daily 12.00.)	.....	31.25	9,600	CT1AA	Lisbon (Portugal). (Tues. and Fri. 20.30.)	.....
49.59	6,050	GSA	Empire Broadcasting	.....	30.43	9,860	EAQ	Madrid (Spain). (Daily 22.30, Sat. 18.00 also.)	.....
49.5	6,060	W3XAU	Philadelphia, Pa. (U.S.A.). (Relays W.C.A.U.) (Daily 00.00.)	.....	28.98	10,350	L8X	Buenos Aires (Argentina). (Daily 20.00)	.....
49.5	6,060	VQ7LO	Nairobi (Kenya Colony). (Daily ex Tues. and Thurs. 16.00, Tues. 08.00, Thurs. 13.00.)	.....	26.83	11,181	CT3AQ	Funchal (Madeira). (Sun. 15.30, Tues. and Thurs. 22.00.)	.....
49.5	6,060	OXY	Skamlebaek (Denmark). (Relays Kalundborg.) (Daily 19.00.)	.....	25.63	11,705	FYA	Paris, Radio Coloniale (France). (Colonial Stn. E-W. Daily 02.00, 19.00 and 22.15.)	.....
49.43	6,069	VE9CS	Vancouver, B.C. (Canada). (Sun. 16.00, Sat. 04.30.)	.....	25.6	11,715	VE9JR	Winnipeg (Canada). (Daily 00.00)	.....
49.34	6,080	W9XAA	Chicago, Ill. (U.S.A.). (Relays W.C.F.F.) (Daily ex Sun. 19.00, Sun. 15.30.)	.....	25.57	11,730	PHI	Eindhoven (Holland). (Temporarily suspended.)	.....
49.22	6,095	VE9GW	Bowmanville, Ont. (Canada). (Sun. 16.00, Mon., Tues., Wed. and Thurs. 18.00, Fri. and Sat. 12.00.)	.....	25.53	11,750	GSD	Empire Broadcasting	.....
49.18	6,100	W3XAL	Bound Brook, N.Y. (Relays W.J.Z.) (Mon., Wed. and Sat. 21.00.)	.....	25.51	11,760	DJD	Zeesen (Germany). (Daily 01.45, 17.30, 22.00.)	.....
49.18	6,100	W9XF	Chicago, Ill. (U.S.A.). (Tues., Thurs. and Fri. 21.30, Fri. and Sat. 02.30.)	.....	25.4	11,810	2RO	Boston, Mass. (U.S.A.). (Daily ex Sun. and Sat. 22.00, Sat. 23.30.)	.....
49.1	6,109	VUC	Calcutta, India. (Daily ex Fri. and Sat. 15.30, Fri. 14.30, Sat. 17.45.)	.....	25.36	11,830	W2XE	Trato Smeraldo, Rome. (Daily 15.00 and 21.00.)	.....
49.02	6,120	W2XE	Wayne, N.J. (U.S.A.). (Relays W.A.B.C.) (Daily 22.00.)	.....	25.29	11,860	GSE	Wayne, N.J. (U.S.A.). (Relays W.A.B.C.) (Daily 19.00.)	.....
49.0	6,122	ZTJ	Johannesburg (S. Africa). (Daily ex Sun. and Sat. 04.45, 08.30, 14.00, Sun. 13.00, 17.30, Sat. 14.00.)	.....	25.27	11,870	W8XK	Empire Broadcasting	.....
48.86	6,140	W8XK	Pittsburg, Pa. (U.S.A.). (Relays KDK.A.) (Daily 21.30.)	.....	25.25	11,880	—	Pittsburg, Pa. (U.S.A.). (Relays KDK.A.) (Daily 15.00.)	.....
48.0	6,250	HJ3ABF	Bogota (Colombia) ...	.....	25.0	12,000	RNE	Paris, Radio Coloniale (France). (Colonial Stn. N-S. Daily 15.45 and 19.00.)	.....
48.69	6,425	W3XL	Bound Brook, N.J. (U.S.A.). (Experimental)	.....	23.39	12,825	CNR	Moscow. (Relays No. 2 Stn.) (Sun. 04.00, 11.00 and 15.00.)	.....
45.38	6,610	RW72	Moscow. (Relays Stalin Stn.) (Mon., Wed., Fri. and Sat. 21.00.)	.....	19.84	15,123	HVJ	Rabat (Morocco). (Sun. 11.30) ...	.....
45.0	6,667	SKR	Constantine (Algeria) ...	.....	19.82	15,140	GSP	Vatican City, Rome. (Daily 10.00) ...	.....
43.0	6,976	EA1110	Madrid. (Tues. and Sat. 22.00) ...	.....	19.73	15,200	DJB	Empire Broadcasting	.....
40.3	7,444	HBQ	Radio Nations, Prangins (Switzerland) ...	.....	19.72	15,210	W8XK	Zeesen (Germany). (Daily 05.35 and 12.45)	.....
38.48	7,797	HBP	Radio Nations, Prangins (Switzerland). (Sun. 22.30.)	.....	19.68	15,243	FYA	Pittsburg, Pa. (U.S.A.). (Relays KDK.A.) (Daily 15.00.)	.....
37.33	8,935	CNR	Rabat (Morocco). (Sat. 20.00) ...	.....	19.56	15,330	W2XAD	Paris, Radio Coloniale (France). (Colonial Stn. E-W.) (Daily 12.00.)	.....
36.65	8,186	PAR3	Rio de Janeiro (Brazil). (Daily 00.00) ...	.....	16.89	17,760	DJE	Wayne, N.J. (U.S.A.). (Relays W.A.B.C.) (Daily 15.00.)	.....
31.55	9,510	VK3ME	Melbourne (Australia). (Wed. and Sat. 10.00.)	.....	16.88	17,770	PHI	Schenectady, N.Y. (U.S.A.). (Daily 19.00)	.....
31.55	9,510	GSB	Empire Broadcasting	.....	16.87	17,780	W3XAL	Zeesen (Germany) ...	.....
31.48	9,530	W2XAF	Schenectady, N.Y. (U.S.A.). (Relays W.G.F.) (Daily 23.35.)	.....	16.86	17,790	GSG	Empire Broadcasting	.....
					13.97	21,470	GSH	Empire Broadcasting	.....
					13.93	21,540	W8XK	Pittsburg. (Daily 12.00) ...	.....

The Short-Wave World

The Malta Question — Indirect Ray or Ground Wave ?

TWO readers in Malta have now added their quota to the mild controversy concerning the reception of the Empire station in that part of the world. The gentleman who wrote originally is strongly opposed to the idea that—to quote this column—"real short-wave reception by reflected ray hardly enters into the matter." He says definitely that signals show all the signs of reception by indirect-ray—high-speed and differential fading, etc.

The other writer waxes indignant at the implied suggestion that ground-wave reception on such a short wave was possible at a distance of 1,400 miles!

As a matter of fact, it was not put particularly clearly in the first instance, and the writer of these notes bows before the storm. What he *did* mean to imply was that Malta was not sufficiently far from the various European short-wave stations for an accurate reproduction of the characteristic phenomena of long-distance reception to be obtained.

The Difference

Reception, needless to say, must be by the indirect ray, but the severe periodical variations in conditions that one experiences at 4,000 or 5,000 miles are almost entirely absent at a distance of 1,400 miles. A case

in point that fits almost perfectly is that of amateur work between this country and Finland.

On the 14-mc. band there is definitely no doubt that the indirect ray comes into the question; but Finland may be heard reliably on nights when the U.S.A. (or, to keep to the same direction, even Russia) is completely blank.

It is, paradoxically, on nights when general conditions seem specially good that the Finns, 1,000 miles away, cannot be heard. Skip-distance and its variations form the basis of the whole subject.

In other words, though the relative distances of Zeesen, Radio-Coloniale, and the Empire station are very different in Malta and in South Africa, it would be possible for the same proportional strengths of transmission to hold good.

It would be interesting to hear how the various U.S.A. stations are received in Malta and to compare the reports with others from this country. Just at the time of writing, the best transmission (strangely enough) has been from W1XAZ on the 31-metre band.

The *Wireless World* "1935" A.C. short-wave receiver will shortly be installed by the writer as a kind of permanent "check" receiver, and will remain unaltered as long

as it continues to function satisfactorily. It should be possible to announce, in advance, one-hour periods of searching, and to get readers to keep watch at the same time.

It is only by organised checking work of this kind that it is possible to collect any useful data concerning local conditions. At present a commercial six-valve superhet is being used, together with the "stand-by" two-valve battery set which has been in use since 1928 without alteration!

Background Hiss

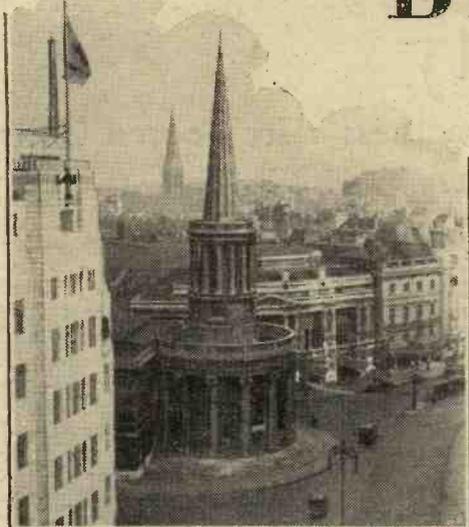
Several transmissions which have been swamped by "background" on the superhet have been received quite clearly on the smaller receiver. This always has been the case, and probably will be for some time to come; "filament-hiss," though reduced to an extremely small figure, still continues to exist in sufficient proportions to embarrass the short-wave enthusiast.

The superhet has quite an audible background when the aerial is removed and the whole thing is put out of tune; in fact, with everything in front of the second detector switched off, there is a background hiss that one might describe as "R2." With the battery set not a sound can be heard when the detector is not oscillating.

MEGACYCLE.

Broadcast Brevities

By Our Special Correspondent



Maida Vale Testing

WITHIN a week or two engineers will set out for Maida Vale—not a long journey, but romantic nevertheless. There, in Delaware Road, they will begin testing the acoustics of the redesigned skating rink. Lines already connect the new studio with Broadcasting House, and the engineers in the control room at headquarters will soon be carefully recording their impressions during tests with various musical instruments and small choral combinations.

On the Air Next Month

At the end of October "Maida Vale" will take its place among the other famous outside studios of the B.B.C. It will probably be on the air by that time.

Strangely enough, it may not be used very extensively at first for, contrary to the original intention, No. 10 studio is being retained for another year and can be used at all times when actual demolition work is not proceeding on Waterloo Bridge.

"No. 10" to Continue

THE "Warehouse," as No. 10 is called, is very popular with artists. Despite the ungenial surroundings, the interior of this old warehouse is extremely inviting and comfortable and gives the visitor the impression of being in Broadcasting House itself.

The Wireless Chorus invariably rehearses in No. 10.

Mobile Recording Service

THAT the B.B.C. will shortly operate a radio reporting service with mobile recording apparatus is no longer a matter of doubt. All that remains to be settled is the system to be used. Mr. Gerald Cock has a wide selection of methods from which to choose, including wax discs, film, and metal tape. In all probability he will choose the last-named.

A Lesson from Germany

The Germans have brought radio reporting to a fine art; indeed, so frequent has been the inclusion of these potted "O.B.s" in the programmes that of late there has been a reaction against them. Noise without vision seldom satisfies for long, and the Germans seem to have exhausted the whole gamut of sounds, from the launching of a ship to the reading of the Riot Act.

Editing an "O.B."

Undoubtedly the potted version of an "O.B." can be put over more artistically than the extempore record. Subsequent editing of the record goes a long way towards heightening the interest of the programme by the deletion of unnecessary passages. In many respects the process is the same as that at the film editing bench.

With the adoption of mobile recording it seems likely that a new editing department will be needed at Broadcasting House.

B.B.C. Orchestra's Provincial Tour

THE Provinces have been singularly patient in the matter of broadcast orchestras. Their patience will be rewarded during the coming season when the B.B.C. Symphony Orchestra, under the direction of its conductor, Adrian Boult, will visit the Free Trade Hall, Manchester (December 5th); the Colston Hall, Bristol (February 13th); the Town Hall, Birmingham (February 27th); and the Caird Hall, Dundee (April 2nd).

Public Performances

The halls will be thrown open to the public and listeners in these areas will therefore be given the opportunity of hearing the orchestra at first hand.

No doubt the performances will be broadcast, but it is hardly fair to the B.B.C. to draw attention to this point. The B.B.C. wishes to fill the halls!

The orchestra is to visit Brussels on March 12th.

A Firm Foundation

THE "Foundations of Music" are as firmly established as ever. Perhaps no other section of the B.B.C.'s activities has been so often excommunicated by a certain class of critic with so little result.

The new "Foundations," which began this week, are directed by no less important a person than Sir Richard Terry, the eminent authority on Tudor and early church music. Under the title, "From Plainsong to Purcell," broadcasts are being given nightly from Monday to Friday each week.

For All to Hear

The ground covered by Sir Richard Terry's series includes plainsong, folksong and the early polyphonic music derived from these sources. Tudor music will be heard as well as old keyboard music and Elizabethan folk songs.

The time-table is to be slightly altered. On Tuesdays and Thursdays the programmes will be broadcast from 6.30 to 6.50 p.m., as previously, and on Mondays, Wednesdays

and Fridays they will be given from 7.5 to 7.25 p.m., thus making it easier for those whose daily work takes them away from their homes to hear the series.

Back to Beethoven

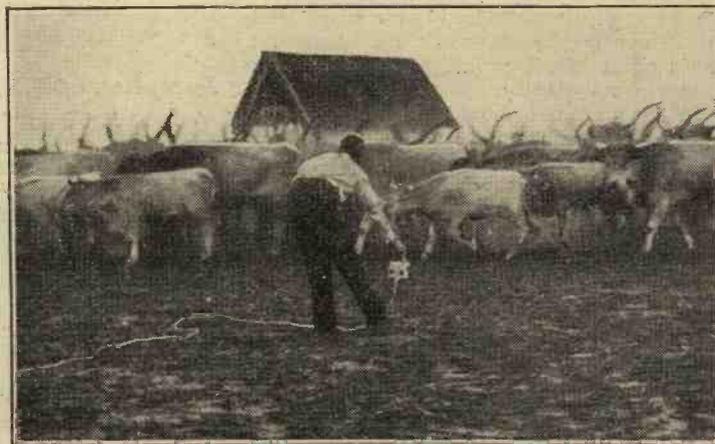
RETURNING from summer holidays, the B.B.C. Chorus of two hundred and sixty amateur voices, goes into rehearsal this week for its first performance of the season at the Queen's Hall on October 5th, when, in a Promenade Concert, it will be heard in the Choral Fantasia and the ninth Symphony, by Beethoven.

The Chorus, consisting of eighty-five sopranos, fifty-five contralto, fifty tenor, and seventy bass voices, rehearses on Friday evenings throughout the season.

Dancing in the Studio

A PROGRAMME of pre-war dances to be broadcast on the London Regional wavelength on October 1st extends an invitation to listeners in its title: "You are Invited to Dance!" This programme will be given by the B.B.C. Theatre Orchestra, conducted by Stanford Robinson, and the M.C. in the studio will be Philip J. S. Richardson. During the broadcast, dances will be performed in the studio and Mr. Richardson will describe them to listeners, who will be able to step in time with dancers in the studio.

The programme will include such old favourites as the Veleta, Barn Dance, Lancers, Sir Roger de Coverley and three types of Waltzes. These are Amoretentanza, the fast "hoppy" type danced in the 'nineties and the early days of the present century; the Choristers, which was the slow waltz in vogue about 1900; and the Archibald Joyce waltz, which was danced everywhere before the war.



EFFECTS IN THE RAW.—No toy trumpets or half coconuts satisfy the "effects" engineers at Budapest. Here is an engineer getting the actual sounds for a "Down on the Farm" programme.

Things We Want to Know

WHETHER the B.B.C. has closed the list of free admission to the variety concerts in St. George's Hall.

Whether the last people on the present list will have to wait two years for admission.

Whether the admission tickets are therefore transferable to their descendants.

Letters to the Editor

Cinema Quality

Reception of B.B.C. Empire Station : Service and Compactness : Iron-cored Coils

The Editor does not hold himself responsible for the opinions of his correspondents

Cinema Quality

AS a film recording and reproduction engineer I much appreciate the points of view expressed by Mr. H. R. Wilkinson (Enfield) in your issue of August 31st, 1934. Certainly to an experienced "L.F. man" cinema reproduction frequently leaves much to be desired, and one rather naturally puts a large amount of blame on to the theatre's outfit, and/or the operators thereof. I must utterly disagree, however, with Mr. Wilkinson when he says that the obvious trouble is pure overloading in one or more stages. He must look much deeper into the matter than this and make his inspections much farther away than the theatre's picture booth.

By far the weakest link in the chain between studio microphone and theatre reproducer is the point where the sound is put on to film, is developed, is printed, is often re-recorded and "mixed," is re-developed and reprinted. Anyone with knowledge of emulsion curves and development and printing curves might well express amazement that the final theatre sound was better than "just intelligible." Even when the enormous difficulties of this link have been satisfactorily overcome, it only requires a small amount of stray oil on the sound track, or the slightest mechanical scratch to once more ruin the result. The average theatre reproducing equipment is capable of giving the *finest possible* performance, but has the thankless task of making something very good from a far-from-perfect input.

Bouquets of two distinct varieties are frequently handed to sound men and reproducing equipment people, but never do we hear of the wonderful chemists and laboratory people who work unceasingly on the biggest of all problems in connection with cinema quality.

In conclusion, I should like to point out to Mr. Wilkinson that so many precautions have been taken in the design of theatre equipment, that it would be a difficult matter for even the most clumsy operator to cause distortion from overloading. And the majority of operators are the most conscientious fellows available. *But*—they are *not allowed* to touch in any way their equipments, except for the replacement of valves, etc. A highly competent service man pays a frequent and *compulsory* visit to every theatre, and thus the possibility of there existing anything like a serious fault or inherent defect in an equipment is rendered exceedingly unlikely.

Wishing long-lived success to your journal, which is "read" and understood by many French engineers here.

LAURENCE E. COUSSELL.

Paris.

AS a regular reader with a firmly established faith in the *Wireless World* I was very interested to see an article in my copy of your paper on Quality of Cinema Reproduction. It has been a constant

amazement to me why cinemas have not been the leaders in the world of quality reproduction instead of being, in my opinion and in the opinion of many others, very far from the ideal. I have visited a large number of luxurious and "not so luxurious" cinemas up and down the country, and I can truthfully say I have only been in one in which the reproduction was anything like good quality. I think the reason for this is that on account of the small size of the place the proprietors were not endeavouring to get a large output from the amplifiers at the expense of quality, which, I think, is the failing of many.

I noticed in another journal an article in which a talkie engineer was pulling to pieces a previous article by a wireless engineer and musician who is highly respected by those interested in good quality reproduction. He was using as one of his arguments that his facts were correct (against the perhaps somewhat unorthodox but highly satisfactory circuits of the wireless-cum-musician engineer) by saying that talkie amplifiers were of the highest standard and that as a result the quality of reproduction of the cinemas was very high.

Perhaps this talkie engineer is so busy with his "High Quality Reproduction" that he has no time to study music, etc., as it is in actual life; if so, surely he would not be so cocksure of the quality of reproduction of his cinemas.

Long may you uphold the interests of all those interested in reproduction as it really should be.

W. O. ROBERTS.

Chorlton-cum-Hardy,
Manchester.

Reception of B.B.C. Empire Station

AT the last monthly meeting of this Society a short article in your issue of July 6th, headed "The Short-wave World," and signed "Megacycle," came under discussion. Towards the end of the article in question reference is made to a letter received from a South African listener, and a reader would gather from what is said that the reception of Daventry in this country is excellent, but that that of Zeesen and Radio Coloniale is *usually* better still.

The article also refers to several South African readers having reported the Empire station as the best of all the Europeans.

I am directed to report that, although for patriotic reasons this Society would be only too happy to endorse the above reports, the unanimous feeling here is that, whatever may have been the state of affairs six or eighteen months ago, the above does not now represent the actual reception by the

Correspondence, which should be as brief as possible, should be addressed to the Editor, "The Wireless World," Dorset House, Stamford Street S.E.1., and must be accompanied by the writer's name and address.

general body of short-wave listeners here—the unanimous opinion of those who frequently check off the comparative volume and quality of the three leading short-wave stations which reach us between 18.00 and 23.00 o'clock being that the one station which stands out prominently in advance of both the others is the one which announces itself as "the German short-wave station, using a directional antenna to Africa." In the 25m. band up to, say, 18.00 G.M.T., or on the 49m. band for the rest of the evening, it comes through with such power that X's may often be regarded as absolutely negligible.

Radio Coloniale ranks next, though Daventry *sometimes* presses it hard for second place.

The quality of the German station is excellent, but that of the other two can seldom be appreciated owing to the ratio of their power to X's being insufficient to submerge the latter.

In these circumstances, it is felt that in the interests of all whose loyalty and patriotism to the old country desire the home station to be the leading short-wave station of the world, only harm can be done by misleading reports of freak or unusual reception, and that it is only when made acquainted with the true facts of general reception that Daventry can be expected to trace its weak spots and compete with its rivals.

GEO. H. JOHN SADLER,

Hon. Sec. and Treasurer, Radio Society
of South Africa, Cape Town.

[Other letters in the same strain have been received.—Ed.]

Service and Compactness

AS a radio engineer mostly engaged on service work, I particularly welcomed the recent reference in your Editorial to the absurd compactness of many commercial broadcast receivers. This unnecessary cramping of the mechanical design (the cabinets are usually of ample proportions) is as useless as it is exasperating, and its elimination by the manufacturers concerned would make sets in general more reliable, and would help considerably the servicing of them afterwards. The majority of radio manufacturers design their sets without any regard to accessibility, and when their products develop faults (which they invariably do) much time and energy is spent in getting at the "innards."

Apart from the general tendency to reduce chassis area to about two-thirds that allowed by the cabinet (sheer idiocy this), some makers still fit coils whose screening cans are soldered up. Others still use bits of bent wire and brass for switches. Some manufacturers fit a really good switch, but so hem it in by other components and wires that it is next to impossible to adjust it. Quite a few makers use plug-and-socket connection between speaker and chassis, but make the speaker leads so short that the chassis, when removed from the cabinet, cannot be connected to the speaker. These

are just a few points at random which the long-suffering service man has to contend with, and among many other things I have often wondered why the manufacturers do not give us more substantial aerial and earth connections than the dainty wander plugs so often supplied.

J. GIBBONS, A.M.I.R.E.
Stoke-on-Trent.

Iron-cored Coils

THE reply by Messrs. Collinson, Fillmore, and Rees to criticisms directed against the iron-core coil should be sufficiently convincing to call for no further comment. There is, however, one point which might prove a loophole in the argument in favour of the iron coil, but this possible defect has been shown, as a result of very careful investigation, to be non-existent.

I refer to the matter of temperature coefficient and maintenance of permeability. In the case of an air coil the expansion of the materials is invariably followed by an equal and opposite contraction. Temperature variation will, therefore, affect all coils similarly, and they will all return to their previous values.

This may or may not be the case with an iron-core coil, and it depends upon the manner in which the core is fixed and the process by which it is made. I believe I am correct in stating that a large proportion of iron-core coils used in this country are made from carbonyl iron.

Tests conducted in many laboratories show that the permeability does not tend to vary, and there appears to be no ageing. In the manufacture of many iron cores an artificial ageing process is employed, particularly when the cores are bakelite pressed.

Very careful tests have been carried out with modern types of iron core, and in each case it has been found that the magnetic

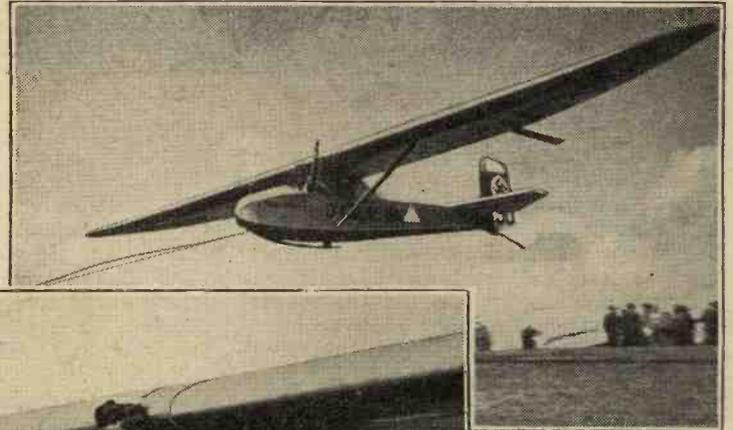
Wireless on Gliders

Lessons by Radio for the Flying Student

ONE of the biggest problems in gliding is being solved by wireless. All gliders have to be flown solo, and the student must, therefore, learn his lessons alone. Now, however, with the aid of short-wave communication between tutor and student, the latter gains confidence and becomes competent in a very short time.

These photographs, taken in the Rhön district, near Frankfurt, tell their own story. Three Telefunken

transmitters are operated on wavelengths between 60 and 100 metres. Two of them are for Morse transmission, and are operated by batteries. Their output is 1 watt. The third, which has an output of 20 watts, obtained from a foot genera-



tor, is used for telephonic tuition.

The glider has a four-valve receiver, weighing only 7lb. Raw beginners depend on loud-speaker reception,



The 20-watt Telefunken 'phone set in use. Power is being derived from the pedal generator.

A well-known gliding expert, Carl Bloch. Note the aerial on the right, which extends some 20ft. to the tail of the glider. (Inset above) A radio-equipped glider is seen commencing a flight. (Right) Telephonic reception on the ground. (Below) Keeping in touch by means of the 20-watt transmitter.



but more seasoned flyers rely on head-phone equipment clamped to their flying helmets.

Signal strength, even with the low-powered outfits, is adequate for the distances likely to be covered by novices.

properties of the cores remain constant, and the temperature coefficient is also constant and reversible.

These facts, I think it will be agreed, when considered with the points raised by your contributors, definitely prove the superiority of the iron-core coil. PAUL D. TYERS.

Watford, Herts.



Philips Superinductance Receiver

TYPE 472A

A Fine Example of Modern Practice in "Straight" Receiver Design

FEATURES. — *Type.* — Five-stage "straight" receiver for operation from A.C. mains. *Circuit.* — Two variable- μ H.F. stages with four tuned circuits—diode detector with A.V.C.—pentode L.F. amplifier—power pentode output valve Full-wave valve rectifier *Controls.* — (1) Tuning with Micro-Index dial (2) Wave-range and on-off switch. (3) Volume control. (4) Tone control. *Price.* — 15 guineas. *Makers.* — Philips Lamps Ltd., 145, Charing Cross Road, London, W.C.2.

It is generally conceded that the makers of this receiver are among the leading exponents of the principle of "straight" H.F. amplification as applied to broadcast reception, and although this year a superheterodyne set is included in their programme it is evident from the numerous improvements incorporated in the remaining straight sets that they have no intention of abandoning what is undoubtedly a very sound principle.

In a straight receiver the attainment of a degree of sensitivity and selectivity comparable with a superheterodyne is by no means easy, involving as it does the solution of tricky problems of ganging and stability in the H.F. circuits. The labour involved, however, is amply repaid by a complete absence of self-generated whistles and a reduction of background noises

have greatly improved in this respect during the past year.

The makers have ensured that the initial advantages in the matter of background noise which the straight type of circuit provides shall not be prejudiced by interference through the power supply. Exceptionally efficient smoothing is provided, and high-frequency choke coils are included in the mains leads. The clarity with which the five or six foreign programmes which are available on medium waves during the hours of daylight stand out from the inevitable minimum of noise level provides immediate proof of the success which has attended the aims of the designers. Further, the sensitivity is such that adequate volume is obtained from these stations with the control at less than two-thirds of its maximum range, which results in a still further reduction of background noise.

There is no evidence of instability at the lower end of the medium waveband, and there is no lack of sensitivity near the top of the wave range. The degree of automatic volume control is adequate, though some attention to the manual control is necessary when receiving the local station. No criticism is possible on the score of selectivity, for in Central London the Brookmans Park transmitters do not encroach more than one channel on either side of their correct setting. On long waves the Deutschlandsender is easily separated from Daventry and Radio-Paris.

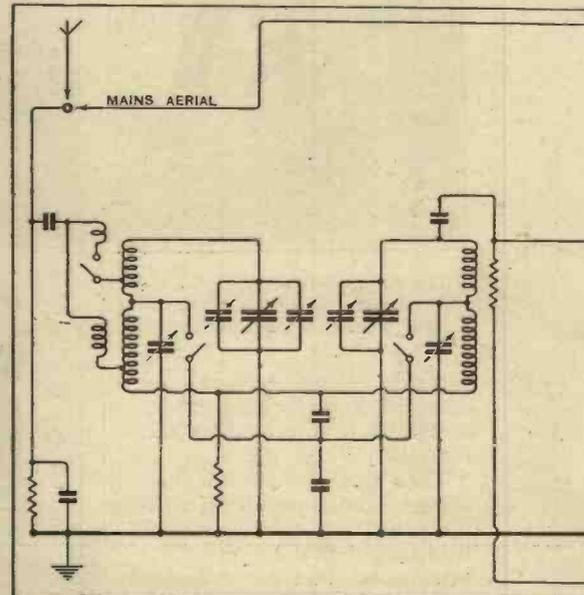
A larger output valve and an entirely new permanent-magnet moving-coil loud speaker have, in our opinion, resulted in a very considerable improvement in quality by comparison with last year's model. The bass response is not so prominent,

and if any criticism is possible it is that the brilliance of the high-note response shows a tendency to hardness. This, however, is a matter of personal opinion, and in any case is easily rectified by the use of the

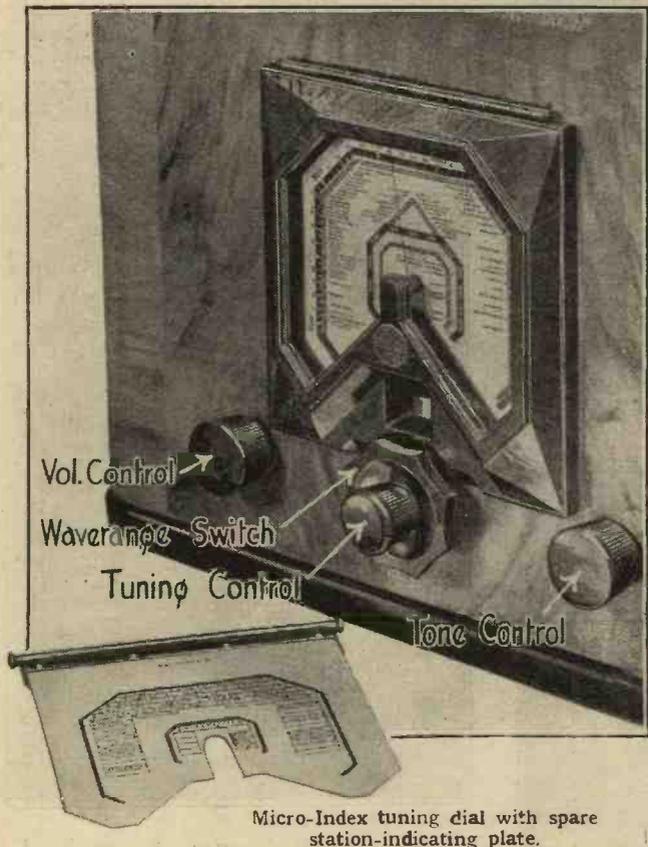
tone control. On the long-wave range the full range of top response is required, as there is evidence of slight side-band cutting.

Sensitivity Compensation

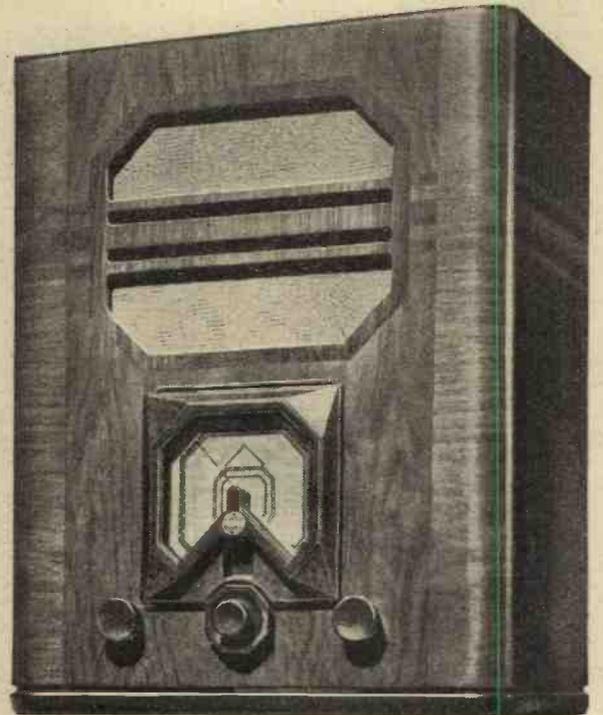
The circuit includes four "Superinductance" circuits of the well-known Philips design in which litz-wire is wound on a cylindrical glass former. The first two circuits are arranged as an input band-pass filter, and the remaining two are associated with the variable- μ H.F. pentode amplifying valves. The initial bias of both these stages is controlled by a potentiometer ganged to the main tuning control, and arranged to give uniform sensitivity over the tuning range of the set. Rectification is by means of a separate diode valve from which A.V.C. bias is applied to the first



Complete circuit diagram. The automatic volume control



generally. Heterodyne whistles between stations cannot, of course, be eliminated except by the use of the tone control and a corresponding loss of quality, but there can be no doubt that conditions in the ether



FIVE-VALVE A.C. MAINS "STRAIGHT" RECEIVER

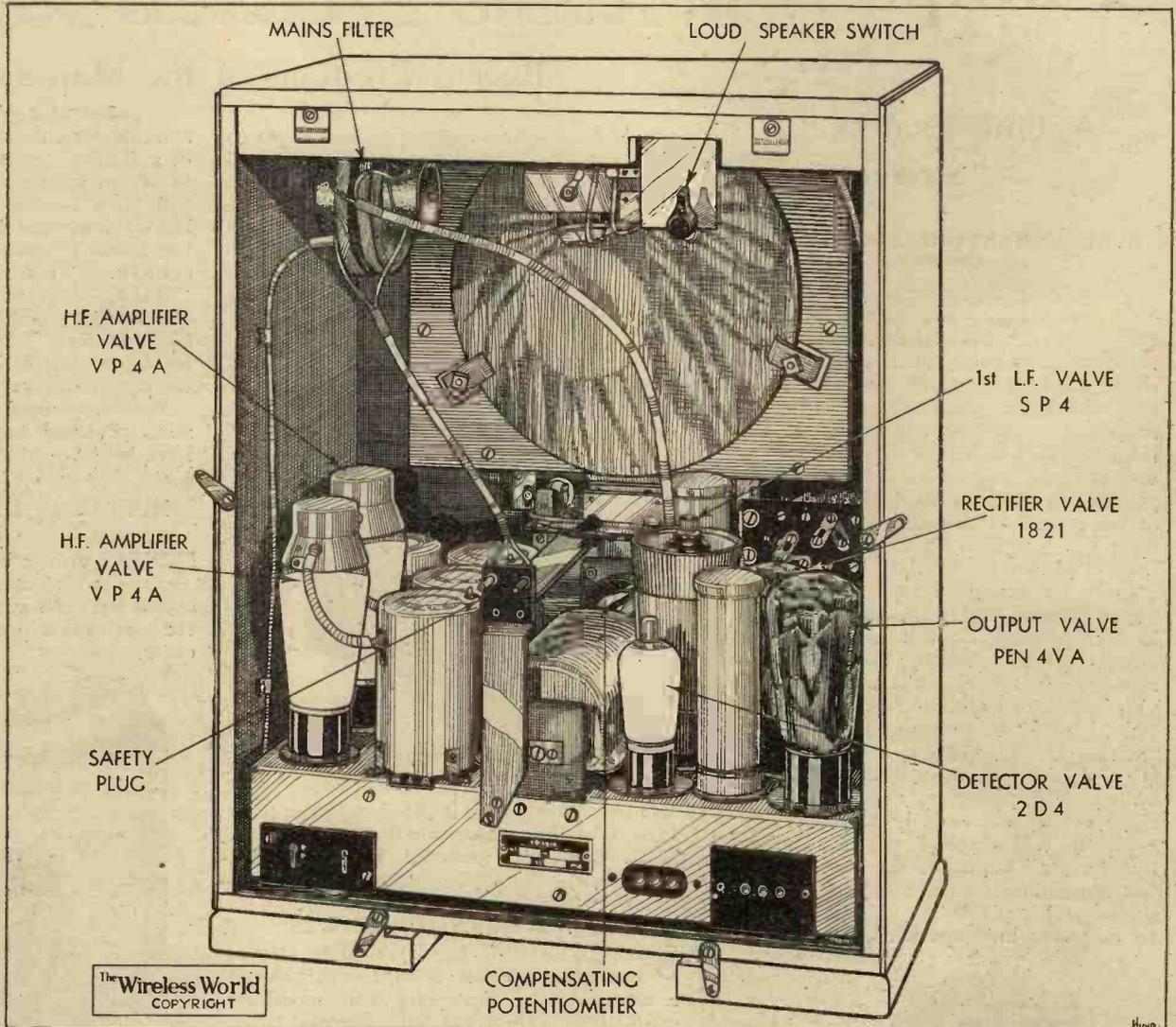
H.F. stage. The diode is followed by a pentode L.F. amplifier which not only increases the overall sensitivity of the set but also ensures an adequate input to the final stage from weakly modulated transmissions. Elaborate precautions are taken to prevent H.F. reaching the output valve, which is a pentode rated to dissipate 8 watts. The tone control is connected across the primary of the output transformer, and a switch is included in the secondary circuit to cut out the internal loud speaker when only the extension loud speaker is required. A full-wave rectifier is used in the power supply, and the voltage drop in the smoothing choke, which is connected in the negative lead, provides bias for the output valve.

The controls are simple to operate, and the open tuning scale is very accurately calibrated in wavelengths. Interchangeable station-indicating dials are provided, one giving a selection of the principal European transmissions, the other being closely calibrated with the name of every station which is likely to be received. The wave-range switch is concentric with the main tuning control, and the setting of the switch is indicated by lettering which appears at a small window below the main

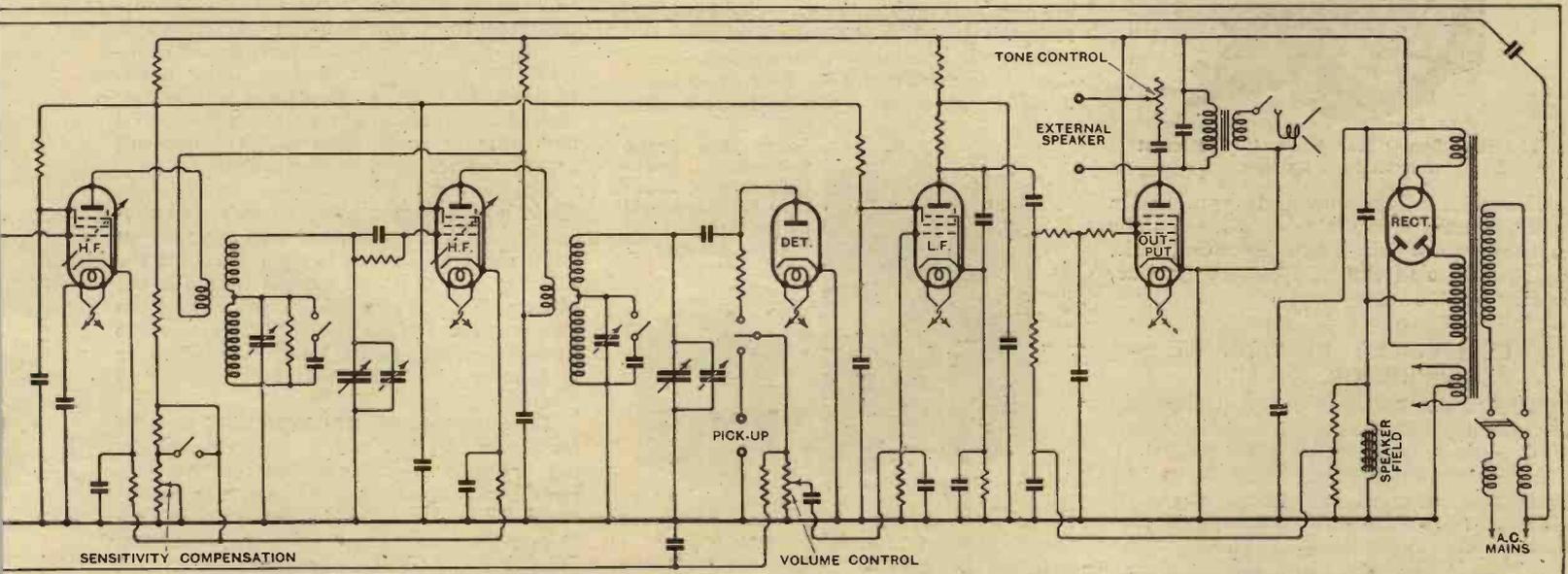
tuning dial. The set is provided with an efficient mains aerial, and a safety plug incorporated in the back panel ensures that current is cut off before access can be obtained to the back of the set.

The cabinet work is sound and the finish

will pass the most critical inspection. From every point of view the purchaser will get very full value for his money, and he need anticipate no feeling of inferiority when discussing performance with owners of super-heterodynes of comparable size.



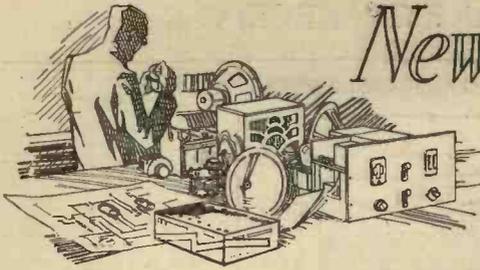
General view of the back of the Type 472A receiver. Note the mains filter coils.



operates in the first H.F. stage, and the initial bias of both H.F. valves is varied with the tuning to give uniform amplification over the wave-range.

New Radio Products Reviewed

Recent Products of the Manufacturers

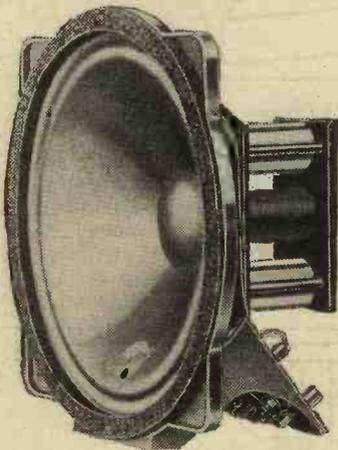


BLUE SPOT "STAR JUNIOR" LOUD SPEAKER

DESIGNED on the same lines as the Blue Spot "Star" unit already reviewed in the pages of this journal, this model is fitted with a simplified magnet system which, while it does not give quite the same electro-acoustic efficiency of the larger model, is nevertheless comparable in performance with cobalt or chrome steel magnets of much larger size. The diaphragm is provided with a spherical cap for the apex of the cone, but the back of the air gap is open.

On test we found that the quality is notable for the good reproduction in the upper register, and while the body of tone is not, perhaps, so full as in the larger models in the range, the fundamental resonance at 100 cycles is sufficient to provide adequate simulation of bass response. The high-frequency output reaches a maximum in the region of 4,500 cycles, and there is a fairly well defined cut-off at 5,000 cycles. The customary resonance at about 2,500 cycles was entirely absent.

The unit is supplied with a universal transformer mounted in the base of the die-cast aluminium frame, and sockets are included which enable the unit to be used as an extension loud speaker.



The Blue Spot "Star Junior" permanent magnet loud speaker.

The price of the chassis is 35s., and a cabinet model is available at 48s. 6d. The makers are the British Blue Spot Co., Ltd., 94/96, Rosoman Street, Rosebery Avenue, London, E.C.1.

BELLING-LEE DISTURBANCE SUPPRESSOR, No. 1171

THIS model has been designed primarily for use with small commutator motors the frames of which are not truly earthed. The unit contains three high-voltage test condensers arranged in such a way that although the electrical disturbances are confined to the motor using its frame as the "earthing" point the mains are completely isolated from all exposed metal parts.

A metal case is employed, and the unit should be screwed securely to the frame so that a good electrical contact is made, and two short rubber-covered leads connected to the brushes on the machine. It can be used in D.C. circuits up to 450 volts, and in A.C. circuits up to 250 volts. A Belling-



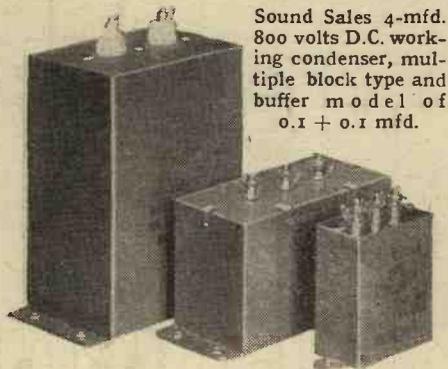
Belling-Lee interference suppressor for small unearthed motors.

Lee twin fuse holder is fitted, and the price is 8s. 6d. The makers are Belling and Lee, Ltd., Cambridge Arterial Road, Enfield, Middlesex.

SOUND SALES CONDENSERS

SOUND SALES, Ltd., Tremlett Grove, Highgate, London, N.19, has introduced a new range of paper dielectric smoothing condensers. There are four principal types ranging from 350-volt D.C. working condensers to models suitable for use in 800-volt D.C. circuits. All are assembled in metal cases fitted with a top cover of insulating material carrying terminals and soldering tags, but, with the exception of the type C, which are the 800-volt models, these have all-metal containers with porcelain insulators on the top supporting the terminals. In this type 2- and 4-mfd. sizes only are available, and they cost 8s. and 15s. each respectively. The test voltage is 2,000 D.C.

Type D contains two models—one a double condenser of 4+4 mfd., and one of 8 mfd.; they are 350-volt D.C. working



Sound Sales 4-mfd. 800 volts D.C. working condenser, multiple block type and buffer model of 0.1 + 0.1 mfd.

models, tested at 750 volts, and the prices are 12s. 6d. and 12s. each respectively.

There is also a buffer condenser of 0.1+0.1 mfd. for 1,000-volt D.C. circuits,

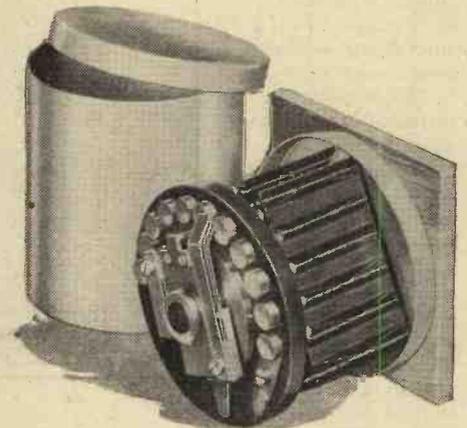
and tested at 2,500 volts. This would be suitable for connecting between the anodes of a full-wave rectifying valve and its filament, an arrangement of condensers which will often remove the last trace of modulation hum when additional smoothing and the usual precautions fail to eliminate it entirely. This model, described as the "BUF," costs 2s. 6d.

A special condenser of 4+4 mfd. for Cathode Ray Tube mains equipment and for 1,500 volts D.C. working is included in the range, and its price is 36s.

Tests have been made with several specimens of these new condensers, and they have been found entirely satisfactory.

MUIRHEAD DECADE RESISTANCE UNITS

THESE units are essentially for laboratory use, and, consequently, it goes without saying that the accuracy of adjustment and the workmanship are both of a very high order.



Muirhead type 5 decade resistance unit wound in steps of 100 ohms.

The type 5, as illustrated, is available in nine different models, six of which are decade resistances, while the remaining three are arranged as ratio units for bridge work. Each unit is fitted with laminated brush-type switches with the switch arm insulated from the panel by a removable Bakelite spindle, which construction facilitates the ganging of two or more units. Incidentally they can be wound to give any desired combination of resistances for special requirements or to form a "T" network attenuator arranged in decibel steps.

The standard decade resistance units are made in 0.1-ohm, 1-ohm, 10-ohm, 100-ohm and 1,000-ohm steps, and the accuracy of adjustment on D.C. is 0.5 per cent. for the 0.1-ohm step unit and 0.1 per cent. for the other units, and this takes into account the switch contact resistance. There are eleven contacts on the switch, and a self-locating mechanism is embodied for each stud position.

These unit boxes are especially suitable for use in all types of test apparatus requiring precision resistances and for the construction of measuring bridges, and prices range from £2 12s. 6d. for the 0.1-ohm step box to £3 17s. 6d. for the 1,000-ohm step unit, and the makers are Muirhead & Co., Ltd., Elmers End, Beckenham, Kent.



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- 6.—0-100M.A. For testing current taken by total valves in set.
- 7.—0-250M.A. For testing current taken by total valves in set.
- 8.—FILAMENT AND RESISTANCE TEST (4,000 ohms.) For D.C. and Rectified A.C.
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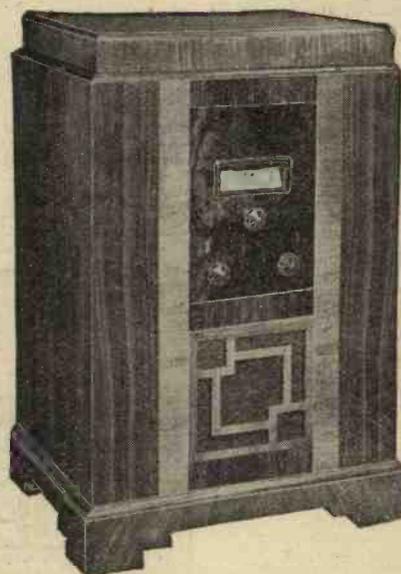
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EKCO, 1933 R.G.23, A.C. Radiogram, list £29/8, showroom model in guaranteed perfect order; £10/10.—Reder, 49, Coborn Rd., London, E.3. [6501]

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Receivers and Amplifiers, Etc.—Contd.

IGRANIC Amplifier, 5 stage A.C. mains, 6 watts undistorted, metres, separate power unit, 3 rectifying valves, in metal cases with stand, cost over £100, bargain at £10.—Gregory, Chelidar. [6496]

1935 Models, 4 valve superhet A.C. or D.C. M.C. speakers, £3/19/6; 5 valve £5/5, car radio £8/10 including valves, approx. Wireless World, deposit.—Lovell Bros., 11, Avon Rd., London, E.17. [6503]

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ARMSTRONG—Universal bandpass superheterodyne chassis, fully delayed A.V.C. specification as A.C. model above; £6/18/6; with Mazda valves, Royalties paid.

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Receivers and Amplifiers, Etc.—Contd.

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VORTEXION—Super model for H.T.8 or 9 or 10, 4v. 1 to 2, 4v. 2 to 4, open type 14/6, shrouded 16/6; post 1/-.

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FERRANTI B.8 L.F. Chokes, 50 m/amps., 4/- each; R.I. Hypercore L.F. chokes, 8/6 each; R.I. Pentomite chokes, 7/6 each; Varley Nicore I transformers, 9/6 each; Hypernik Class B transformer, 6/-; Telsen Class B output, 5/-.

PARMEKO 425-425 4.2, 4.3 amps. mains transformer, 25/-; Varley 500x500 120 m/amps. with L.T. tappings, 25/-; R.I. 250x250, 4v. 3a., 4v. 1a., 4v. 3a., 17/-; Varley 4 volt 5 amp. filament transformer, 8/-.

FERRANTI A.F.4, 7/6; A.F.3, 10/6; A.F.5, 18/-; A.F.6, 18/-; A.F.7, 18/6; A.F.7c, 20/-; B.1, 10/6; B.8, 4/-; O.P.1, 1-1 ratio, 7/-; O.P.2, 25-1, 7/6; O.P.M.1, 10/-; O.P.M.1c, 14/-; O.P.M.2, 10/-; O.P.M.4, 12/-; O.P.M.12c, 7/6; O.P.M.17c, 8/6; O.P.3c, 1-1 P.P., 7/6.

COLVERN 2K.B.1c and I.K.G.R., 17/6; Ferrocart G.1, G.2, G.8, 17/6; G.10, G.11, G.14, 20/-; Lissen superhet coil, 10/- set; Telsen superhet coils, 10/- set; Lewcos and Wearite superhet coils, 4/- each; Radiophone 3-gang 0.0005 with cover, 9/6.

SPECIAL Offer Regentone A.C. Mains Units.

TYPE W.I.F. Output, 150 volts, 12 m/amps., 27/-, listed 50/-; type W.I.C., output 150 volts, 20 m/amps., 30/- each, listed at 55/-; all brand new in sealed boxes.

TYPE W.5A. with Trickle Charger, output 150 volts, 20 m/amps., for 2, 4, or 6 volt accumulator, 37/- each, listed £3/15; type D.C.1 for D.C. mains, output 150 volts, 25 m/amps., 22/6 each.

EKCO Type K25, output 150 volts, 25 m/amps., with 4 tappings, 2 variable, also charger for 2, 4, or 6 volt accumulator, listed £5/7/6, our net price, 39/-.

THE Above Post or Carriage Paid.

OPEN All Day Thursday, Closed Saturday.

PHONE: Clissold 5001.

24, Mildmay Grove, London, N.1. [6518]

PREMIER SUPPLY STORES

OFFER the Following Manufacturers' Surplus New Goods at a Fraction of the Original Cost; all goods guaranteed perfect, carriage paid over 5/-, under 5/- postage 6d. extra, I.F.S. and abroad, carriage extra. Order under 5/- cannot be sent c.o.d. Please send for illustrated catalogue post free.

STUPENDOUS Purchase of Set Manufacturers' Stock.—All electric 3-valve (S.G. det. pen.) set, in walnut cabinet, with moving coil speaker, 200-250 volt 40-60 cycles, chassis built, 200-2,000 metres, with 4 valves; £4/19/6.

ALLELECTRIC 3-stage Amplifiers, 200-250v., 40-60 cycles, 10 watts undistorted output, complete with 5 valves, £7/7; suitable speakers, pick-ups and microphone can be supplied.

TYPE 4480, 9in. diameter, permanent magnet, handles 4 watts, 7 ohms speech coil, 13/6; multi ratio transformer, 4/6 extra.

ELIMINATOR Kits, including transformer, choke, Westinghouse metal rectifier, condensers, resistances and diagram, 120v., 20 m.a., 20/-; trickle charger, 8/- extra; 150v. 30 milliamps. with 4v. 2-3 amps. C.T., L.T., 25/-; trickle charger, 6/6 extra; 250v. 60 milliamps. with 4v. 3-5 amps. C.T., L.T., 30/-; 300v. 60 m.a., with 4 volts 3-5 amps., 37/6; 200v. 50 m.a., with 4v. 3-5 amps. L.T., 27/6.

PREMIER Chokes, 40 milliamps, 25 hys., 4/-; 65 milliamps, 30hys., 5/6; 150 milliamps, 30 hys., 10/6; 60 milliamps, 80 hys., 2,500 ohms, 5/6; 25 milliamps, 20 hys., 2/9.

ALL Premier Guaranteed Mains Transformers Have Engraved Terminal Strips, with terminal connections, input, 200-250v., 40-100 cycles, all windings paper interleaved.

PREMIER H.T.7 Transformer, output 135v. 80 m.a., for voltage doubling, 8/6; 4v. 3-5a., C.T. L.T., 2/- extra; with Westinghouse rectifier, giving 200v. 30 m.a., 17/6.

PREMIER H.T.8 and 9 Transformers, 250v. 60 m.a. and 300v. 60 m.a. rectified, with 4v. 3-5a. and 4v. 1-2a., C.T. L.T. and screened primary, 10/-; with Westinghouse rectifier, 18/6.

PREMIER H.T.10 Transformer, 200v. 100 m.a., rectified with 4v. 3-5a., and 4v. 1-2a., C.T. L.T., and screened primary, 10/-; with Westinghouse rectifier, 19/6.

PREMIER Mains Transformer, output 250-0-250v. 60 m.a., 4v. 3-5a., 4v. 2-3a., 4v. 1-2a. (all C.T.), with screened primary, 10/-.

(This advertisement continued on next page.)

Components, Etc., for Sale.—Contd.

(This advertisement continued from previous page.)

PREMIER Mains Transformers, output 350-0-350v. 90 m.a., 4v. 3-5a., 4v. 2-3a., 4v. 1-2a. (all C.T.), with screened primary; 10/-.

PREMIER Auto Transformers, 100-110/200-250v. or vice versa, 100-watt; 10/-.

WESTERN ELECTRIC Mains Transformers, 300-0-300v. 65 m.a., 4v. 1-2a., 4v. 2-3a., 6/6; 500-0-500v. 150 m.a., 4v. 3-5a., 4v. 2-3a., 4v. 1a. C.T., 4v. 1a. C.T., 19/6.

SPECIAL Offer of Mains Transformers, manufactured by Phillips, input 100-200v. or 200-250v. output 180-0-180 volts 40 m.a., 4v. 1 amp., 4v. 3 amps., 4/6; 200-0-200v., 4v., 1a., 4v. 3a., 4/6.

PREMIER L.T. Charger Kits, consisting of Premier transformer and Westinghouse rectifier, input 200-250v., A.C., output 8v. ½ amp., 14/6; 8v. 1 amp., 17/6; 6v. 2 amps., 27/6; 30v. 1 amp., 37/6; 2v. ½ amp., 11/-.

B.T.H. Trusped Induction Type (A.C. only) Electric Gramophone Motors, 100-250v.; 30/- complete.

SPECIAL Offer B.T.H. Gramophone Motors, A.C. and D.C., 100-250v.; 30/-, listed £3/3.

COLLARO Gramo. Unit, consisting of A.C. motor, 200-250v. high quality pick-up and volume control, 49/-; without volume control, 46/-.

EDISON BELL Double Spring Gramophone Motors, complete with turntable and all fittings, a really sound job; 15/-.

SPECIAL Offer of Wire Wound Resistances, 4 watts, any value up to 50,000 ohms, 1/-; 8 watts, any value up to 15,000 ohms, 1/6; 15 watts, any value up to 50,000 ohms, 2/-; 25 watts, any value up to 50,000 ohms, 2/6.

WIRE Wound Potentiometers, 15,000 ohms, 1/6; 50,000 ohms, 2/-; 500,000 ohms, 3/-; 1,000 ohms wire-wound semi-variable resistances, carry 150 m.a., 2/-.

CENTRALAB Potentiometers, 400 ohms, 1/-; 50,000, 100,000, ½ meg., any value, 2/-; 200 ohms, wire wound, 1/-.

POLAR Star, manufacturers' model, 3-gang condensers, fully screened; 7/6, with trimmers.

AMERICAN Triple Gang 0.0005 Condensers with trimmers, 4/11; Utility bakelite 2-gang 0.0005, screened, with unknob trimmer, 3/6; Polar bakelite condensers, 0.00035, 0.0003, 0.0005, 1/-.

ORMOND Condensers, 0.0005 2-gang semi-shielded, 2/6; brass vanes, with trimmers, 3/6; British Radiophone 110 kc/s intermediate, 3/-.

MAGNAVOX D.C. 152, 2,500 ohms, 17/6; D.C. 154, 2,500 ohms, 12/6; D.C. 152 magna, 2,500 ohms, 37/6, all complete with humbucking coils; please state whether power or Pentode required; A.C. conversion kit for above types, 10/-; Magnavox P.M. 7in. cone, 18/6.

RELIABLE Canned Coils with Circuit, accurately matched, dual range, iron cored; 3/6.

RELIABLE Interval Transformers, 2/-; multi-ratio output transformers, 4/6.

T.C.C. Electrolytic Condensers, 550v. working, 650v. peak, 8 mf., 4/-; 4 mf. or 8 mf. 440v. working, 3/-; 15 mf. 50v. working, 1/-; 25v. working, 25ml., 1/3; 6 mf. 50v. and 2 mf. 100v. working, 6d.; 8-4 mfd., 450v. working, 4/-; 50 mf., 50v. working, 2/9.

T.C.C. Condensers, 250v. working, 1 mf. 1/3, 2 mf. 1/9, 4 mf. 3/-; 4 mf., 450v. working, 4/-; 4 mf., 750v. working, 6/-.

H.M.V. Condensers, 400v. working, 4+4+1+1+1+1+0.1+0.1+0.1+0.1. 4/9; 4+2+1+1+1+1+0.5, 3/9.

DUBILIER Condensers, 8 or 4 mfd., dry electrolytic, 450v. working; 3/-.

VARLEY Constant Square Peak Coils, band-pass type B.P.7, brand new, in maker's cartons, with instructions and diagrams; 2/4.

VARLEY H.F. Interval Coils, B.P.8, band-pass, complete with instructions, in original cartons; 2/6.

SCREENED H.F. Chokes, by one of the largest manufacturers in the country; 1/6.

PREMIER British-made Meters, moving iron flush mounting, accurate, 0-10, 0-15, 50 m.a., 0-100, 0-250 m.a., 0-1, 0-5 amps; all at 6/-.

A LARGE Selection of Pedestal, table and radiogram cabinets, by best manufacturers at a fraction of original cost, for callers.

THE Following Lines 6d. each, or 5/- per dozen.—Chassis valve holders, 5-, 6- or 7-pin, screened screen-grid leads, any value 1-watt wire end resistances, wire end condensers, 0.0001 to 0.1, Bulgin 3-amp. main switches; Cylcon capacitors, double trimmers.

PREMIER SUPPLY STORES.

20-22, High St., Clapham, S.W.4. Phone: Macaulay 2188. Nearest station: Clapham North, Underground. [6520]

SCOTT'S Radio Bargains—Set manufacturers' guaranteed surplus.

SCOTT'S Kit, guaranteed parts for "W.W." Olympic S.S. Six, including valves, £14/10; 1935 A.C. short wave receiver, with valves, £9/12/6; from stock.

SCOTT'S—Transformers for short wave receiver, 12/6; Single Span, 19/-; S.S. Olympic coils, 45/-; S.S. span coils, 34/-, to specification.

SCOTT'S—Pick-ups: Marconi K19 or M25, 21/6; Celestion P2, 16/-; Cosmocord, 12/-; Rothermel piezo electric, 30/-.

SCOTT'S—Rectifiers: Westinghouse H.T.6, 7, 8, 9/-; 9, 10, L.T.4, 5, 10/-; Westectors, W4, W6, 4/6; W.M.24, 26, 6/6.

SCOTT'S—Resistances: Dubilier, etc., 1 watt, all values, 6d.; electrolytic condensers, Dubilier and T.C.C., 4, 3, 50 mfd., 3/-.

SCOTT'S—Gram-motors, Garrard, Autochangers, with Piezo Astatic pick-up, £7/10; Cosmocord grammo. chassis, model 55, with pick-up and autostop, 35/-.

SCOTT'S—Valves: American and non-ring European, also transmitting valves in stock; write for transformer and component list.—67, Harlesden Gardens, N.W.10. [6512]

Components, Etc., for Sale.—Contd.

WOBURN RADIO Offer Following Manufacturers' Surplus:—

UTILITY 0.0005 Condensers, with disc drive and escutcheon, 3/6; twin gang 0.0005, with trimmers, and disc drive, mica dielectric, 3/6; three-gang 0.0005, with trimmers, semi-screened, 4/-; Lissen output transformers, 23/1, 3/6; Class B drivers and chokes, 8/6, with B.V.A. valve, 15/6; chassis valve-holders, 4-5-pin, 1/3 half dozen; Polymet 0.0001 tag condensers, 1/- half dozen; Edison Bell 0.002, 0.005, 0.006, 1/3 half dozen; popular iron-cored canned coils, 2/6; Eston iron-cored coils, 2/6.

MERSHOM 8 mid. 500v. Electrolytics, 2/9; Wego bakelite condensers, 750v. test, 1 mfd., 1/-; 2 mfd., 1/3; 4 mfd., 2/3; Dubilier 2 mfd., 1,000v. test, 1/4; H.F. chokes, 1/-; binocular chokes, 1/3; Columbia L.F. transformers, 3-1 and 5-1, 3/-; tubular condensers, 0.1, 0.01, 0.02, 6d.; toggles, 6d.; Radiophone straight line dials, with escutcheon and dial lights, 3/9; screened flex, 6d. yd.; 7-way battery cord, 6d. yd.; resistances: parcels of 13 wire wound resistances, Truwind, accurate 1%, 1½ watt, values 100 to 75,000 ohms, 3/9; Western Electric microphones, very sensitive, 2/3; microphone transformers for use with same, 85-1, 2/3.

W.R.C. Eliminators, 150v. 30 m.a., all guaranteed 12 months, D.C. 9/6, A.C. 21/-; Universal A.C./D.C., 21/-; A.C. with trickle charger, 32/6; trickle chargers, 12/6; all have 3 positive H.T. tapplings, carriage 1/- extra on all models.

TRADE List Now Ready. Please enclose business heading and stamp.

WOBURN RADIO Co., 9, Sandland St., Bedford Row, W.C.1. Just off Red Lion St., Holborn. Holborn W289. [6465]

SOUTHERN RADIO'S Bargains—Set manufacturers' guaranteed surplus.

VARIABLE Condensers—Lotus 3-gang 0.0005, 12/6; Lotus 2-gang, 0.0005, 9/6; Lotus Dyblook single, 0.0005, 4/9 (list 9/6); all these condensers are complete with dials, escutcheons, knobs, fully screened with trimmers and boxed; Hydra block condensers, 16 mfd. (2+2+8+2+1+1), 1,000v. D.C., 7/- each; Dubilier 4 mfd. (2+1+1), 1,000v. D.C., 2/9; 4.5 mfd. (2.25+2.25), 1,000v. for mains noise suppression, 3/-; Utility Midget 2-gang variable condensers, 0.0005, with concentric trimmers, 3/5; T.C.C. 0.1+0.1, 1/3 each.

SPEAKERS. Blue Spot permanent magnet, with universal transformer for power, super power, pentode and Class B; 23/- (list 39/6).

G.E.C. Stork Speaker in Cabinet; 19/6 (list £3/15).

ST400 Kits, all specified proprietary components; £22/19/6 (list £24/17/6).

REGENTONE A.C. Eliminators, type W.5A., combined with trickle charger, 20 milliamps., brand new and sealed; 39/6 (list £4/12/6).

IGRANIC Superhet Coils, set of 4—(1 Osc., 2 I.F., with pigtailed, 1 L.F. plain); 12/6 (list 50/-).

LISSEN Superhet 3 Coils Kit, screened, ganged on base with wave change and filament switches; type L.N.5181, for battery or mains; 12/6 (list 30/-).

VARLEY Constant Square Peak Coils, complete with all accessories, new, boxed, B.P.5; 2/4.

VARLEY H.F. Inter-valve Coils, B.P.6; 2/3.

FRAME Aerials—Lewcos dual wave superhet; 9/- each (list 27/6).

PICK-UPS—Marconi No. 19 (1934), 22/6 each (list 32/6).

READY Radio Instamat Transformers, for matching any valve to speaker; Junior model, ratios 1: 2, 1: 1, 1½: 1, 2: 1, 3: 1, 7/6 (list 27/6); Senior model, ratios 10: 1, 12½: 1, 14: 1, 16: 1, 20: 1, 25: 1, 12/6 (list 37/6).

RECEIVERS—3-valve screen-grid Elector Super, complete with valves, Exide batteries and accumulator, Celestion moving coil speaker, contained in magnificent walnut cabinet; £3/10 (list £10).

OSRAM Thirty-Three Music Magnet, complete with G.E.C. speaker, 2 Osram screen-grid and Osram power valves in moulded bakelite walnut cabinet; £3/12/6 (list £9/9); in original sealed cases.

BOTOLPH Lightweight Portable Receivers, complete with valves, Exide batteries and accumulator, over-all size 13in.x11in.x6in., £2/19/6 (list £8/8); a real suitcase portable.

READY Radio Meteor Screen-grid 3-valve Kits, all specified components new, in sealed cartons; 25/-, less valves; with 3 Mullard valves, 42/6 (list £5/7/6).

"A" Kit, as above, complete with magnificent walnut cabinet and Celestion perm. mag. speaker, less valves, £3/5; with 3 Mullard valves, £4/2/6 (list £8/17/6).

MULLARD Radio for the Million, "Station Master Three" battery kits, complete with cabinet and 3 Mullard valves (screen grid, H.L. power), brand new in original sealed cartons; £2/19/6 complete.

MISCELLANEOUS—Westinghouse metal rectifiers, H.T.6, 7, 8, 9/3 each; Ferranti chokes, 20 henry 60 m.a., 6/9 each; Lewcos superhet, 8-way bases, complete with valve holders, grid leak, fixed condenser, type "48," 2/- each; Lissen base turntables, 1/6 (list 5/-); Lewcos coils, B.P.F./R., 4/-; T.B.F./C., 3/3; O.S.C./126 (Extensor), 3/3; T.O.S./R., 3/3; Morse tapping keys, with buzzer and flashlight signal, complete with battery and bulb, 2/- each.

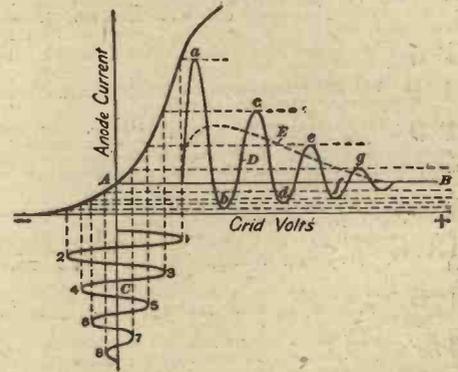
VALVES—Brand new guaranteed American valves, all types; please ask for quotations.

ALL Goods Guaranteed and Sent Carriage Paid.

BRANCHES at 271-275, High Rd., Willesden Green, N.W.10, and at 46, Lisle St., W.C.2. Please send all post orders to 323, Euston Rd., N.W.1.

SOUTHERN RADIO, 323, Euston Rd., London, N.W.1 (near Warren St. Tube). Phone: Museum 6324. [6507]

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Radio has developed so rapidly throughout the last ten years that it has now greatly outgrown the supply of technically qualified men required for the better posts. Moreover, it continues to develop with such speed that only by knowing the basic principles can pace be kept with it.

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- RADIO SERVICING
- RADIO EQUIPMENT
- RADIO SERVICING & SALESMANSHIP
- WIRELESS ENGINEERING
- WIRELESS OPERATORS
- EXAMINATION (state which)

Name Age

Address

Components, Etc., for Sale.—Contd.

GILBERT INDUSTRIES Sensational Start to the New Season.
P.A. Amplifiers, brand new, 6 watts undistorted output, using 2PX4's.
LATEST Auto-coupled Circuit, including remote control, input transformer, high capacity smoothing and choke filter output.
A STEEL Chassis, custom built job, available owing to broken contract.
READY to Work, less valves, at 65/-; carefully packed and post paid (few only with valves).—Gilbert Industries, Ltd., 519, London Rd., Westcliff-on-Sea. Phone: Southend 492071. [6363]

1/6—Cadmium plated chassis, 4-valve, pressed steel, 14x9; post 6d.
4/9—200/250 transformers for H.T.8 or H.T.9, brand new in cartons.
1/9—Viking dual aperture dial in station and degrees with large bronze escutcheon and walnut knob, list 8/6; ditto British Radiophone drum drive, 2/3; cash with order, postage paid.—Kay, 167, City Road, London, E.C.1. [6490]

EPON Here Again, with brand new and guaranteed surplus snip bargains!
13/6 Will Buy 22/6 Cosmocond 1934 Pick-up, complete with balanced tone arm, volume control, rest, etc.
7/6 Will Buy Any One of These American Valves: 227, 245, 80; 10/6 for 224, 47, 35, 51, 2525, 77, 78, 36, 38.
45/- Will Buy a Celestion £5/10 P.P.M.79 De Luxe P.M. Speaker (with Universal transformer), in handsome walnut, mahogany, or oak cabinet, in original carton.
EPON, 93, New Rd., Chingford, E.4. (Cash with order, or c.o.d.) [6460]

PEARL and PEARL Bargain List A Free.—190, Bishopsgate, London, E.C.2. [0421]

UTILITY SALES, 27a, Sale St., W.2, offer following special bargains; write for catalogue.
CELESTION P.M.M.W. M.C. Speaker (457- list), 17/6; Baby model Soundex, 12/6.
EKCO T.C.1 1/2 amp. L.T. Charger, 1934 model (£2/7/6 list); 17/6; guaranteed.
REGENTONE Eliminator, W5A, with L.T. charger £4/12/6 list); 35/-; splendid job.
TRANSFORMER, standard cable, 200/240, 300-0-300, 60 m.a., 4v. 3A.C.T., 4v. 2a.; 8/6, worth 21/-.
IGRANIC Band-pass Iron Core Coils, screened, dual wavelength (33/- list); 14/6, snip.
IRON Core Screened Matched Coils, 3 circuits, 2/6; Lucerne, 2/6, plain, 2/-.
MICROPHONES, Western Electric, hanging 2/6, hand 3/6, transformer 3/6; table model, containing transformer, 8/6, handsome job; diagrams free; buttons, tested, 1/-.
ELECTRIC Soldering Iron, 4/6; De Luxe model, reversible bit, engineer's type, 7/6.
ELECTRIC Wonder Battery Clock, mahogany bakelite, battery lasting year, guaranteed; 15/-.
LOTUS Dyblock 0.0005 Variable Condenser, disc drive, lamp, escutcheon, complete, 4/6; 2-gang, 8/3; 3-gang, 12/3.
CELESTION W8 Pick-up (35/- list), new, boxed, 16/6; Cosmocond latest model, 12/6.
SONOCHORDEL Energised M.C., 2,500 ohm, 7 1/2 in., 12/6; Rothermel Baby P.M., marvellous job, 13/6.
UTILITY SALES, 27a, Sale St., Paddington, London, [6511]

WARD for Unparalleled Bargains in Set Manufacturers' Surplus; all goods are guaranteed perfect; immediate delivery.
OLYMPIC S.S. Six Coils, complete to specification, 45/-; A.C. and D.C. eliminators, first class make, tapings S.G., detector and power (150v., 25 m.a.); A.C. type, with Westinghouse rectification 25/-; D.C. type 12/-.
DUBLIER Resistances, 1-watt type 7d., 2-watt type 1/2, 3-watt type 1/9; Dubilier or T.C.C. dry electrolytic condensers, 8 mfd. or 4 mfd., 500v. peak, 50v., 50 mfd. or 200 mfd., 10v. peak, 3/6.
MARCONI K19 or K25 Pick-ups, 21/-; Rothermel piezo electric, 30/-; Cosmocond, 12/-; B.T.H. needle armature pick-ups, 29/-; B.T.H. pick-up tone arms, 3/-; Clix chassis type valve holders, 5-pin 5d., 7- or 9-pin 6d.; T.C.C. type "M" fixed condensers, any size up to 0.001 mfd., 6d.
WESTINGHOUSE Rectifiers, H.T.8 9/6, H.T.9, H.T.10, L.T.4, L.T.5, 10/9; transformers (Regentone), for H.T.8 or H.T.9, with 4v. 4a. L.T., 7/-.
CARRIAGE Paid, cash with order or c.o.d.; send for list.
WARD, 45, Farringdon St., London, E.C.4. Tel.: Holborn 9703. [6516]

FERRANTI A.F.5 and A.F.7, 15/- each; A.F.5(c), 17/6; O.P.M.4 (c), 13/-;—Young, 151, Lower Richmond Rd., Mortlake. [6467]

SEVERAL New Sets, from 50/-; large quantity of new components, public address gear, etc.; offers accepted; list.—33, Baden Rd., Brighton. [6483]

FERRANTI A.F.5, 15/-; Tungstram 2, P.2018's, R.2018, S.E.2018, S.E.2118, 30/-; T.C.C. 2,000+2,000 mfd., 12v., 5/-; H.T. transformer, about 10,000 volts, 10/-; stamp for reply.—27, Ravensdale Av., N.12. [6500]

FERRANTI—A.F.3, 9/6; O.P.3C, 11/-; 0-200 M.C. milliammeter, 19/-; Varley Nicore 1, 7/6; B.T.H. R.K. energised M.C. speaker, d.c., 15/-; Millgate, ditto, 10/-; c.o.d. if required.—G. Illingworth, 11, Greenfield Av., Hawksworth, Guiseley, Leeds. [6497]

FERRANTI A.F.3, 10/6; A.F.4, 7/6; A.F.5, A.F.6, 17/6; A.F.3c, 11/6; A.F.5c, 19/-; A.F.15c, 15/-; O.P.M.1c, O.P.M.2c, O.P.M.2c, O.P.M.2c, O.P.M.3c, O.P.M.5c, 13/6; O.P.1, O.P.3c, 6/6; B.1 choke, 11/6; B.2, 11/6; 0-15 milliammeter, 18/6.—Bostock and Stonnill, 1, Westbourne Terrace, S.E.23. [6495]

Components, Etc., for Sale.—Contd.

BIRMINGHAM RADIOMART Announces Purchase Set Manufacturers' First Quality Radio Components, all guaranteed new and perfect goods.
RADIOMART—Utility super quality 3-gang air-spaced ball bearing, fully screened with trimmers, list price 24/-, straight or superhet; 6/6.
RADIOMART—Utility 2-gangs, as above, 5/10; Utility dials to fit either, 2/-.
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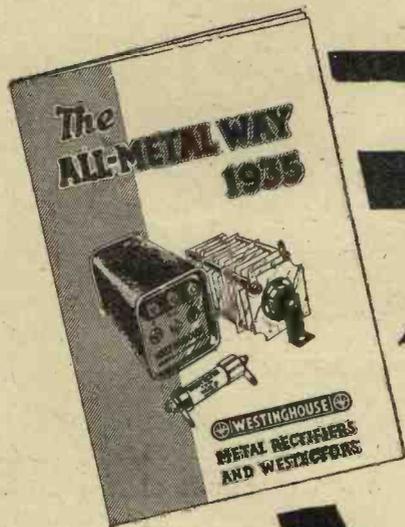
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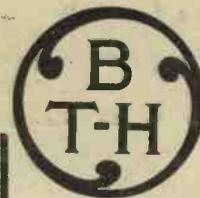
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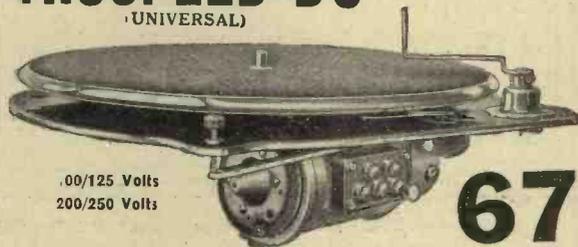
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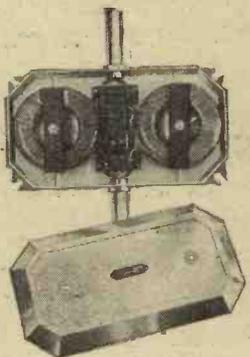
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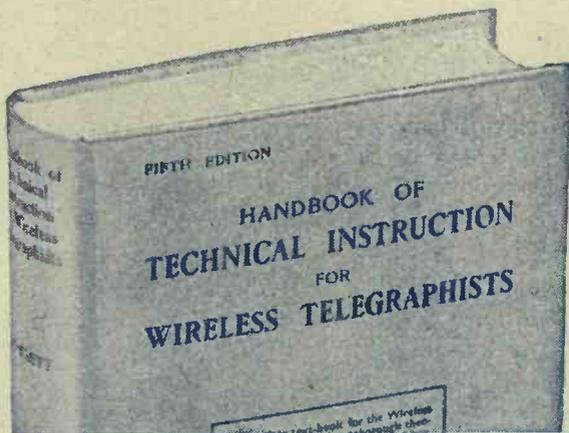
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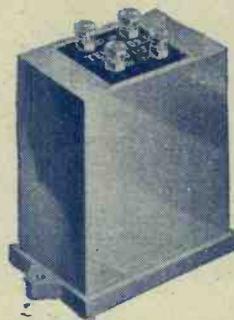


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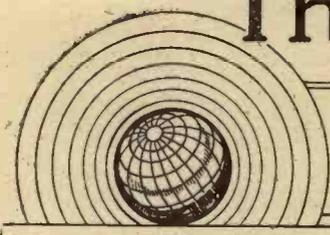
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As many of the circuits and apparatus described in these pages are covered by patents, readers are advised, before making use of them, to satisfy themselves that they would not be infringing patents.

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EDITORIAL COMMENT

The Luxembourg Effect *A Phenomenon Not Fully Explained*

WE have frequently had occasion to comment in these columns on the extraordinary width of physical science that now comes within the scope of "wireless," and on the manner in which matters primarily of wireless interest react on other branches of scientific knowledge and practice. No better illustration of this can be quoted than the number and variety of subjects discussed by U.R.S.I. (Union Radio Scientifique Internationale) at its recent congress in London. And amongst these subjects there is none of more intriguing interest than the so-called "Luxembourg effect," which engaged the attention of the section on Propagation of Waves.

The effect is that which sometimes occurs in the hours of darkness when a receiver is tuned to a certain wanted station, and the modulation of another powerful transmitter is also heard, the frequency of the intruder being neither close in value nor bearing any simple relation to that of the station to which the receiver is tuned. A fair amount of available data now puts it beyond doubt that the effect is a real one, although scientists are still uncertain about its explanation. The fact that it has only been observed at night, when the Heaviside Layer is most active in reflecting broadcast wavelengths, leads to the immediate idea of ionospheric action as the only possible explanation. The first suggestion that has been put forward is that of a non-linear effect—a quasi-rectifying action—in the behaviour of the layer.

The U.R.S.I. discussion of the sub-

ject was led by Dr. Balth van der Pol, of the Philips' Laboratories in Holland, whose workers have already done a great deal of observational work in the matter. More information on the nature of the available data is published in a note elsewhere in this issue. In the present state of knowledge no definite conclusions as to the nature of the effect can be reached and we understand that a small committee has therefore been appointed to organise an international experiment.

This work will call for the co-operation of skilled observers. Since the greatest numbers of British listeners falling within this category are undoubtedly to be found in the ranks of our own readers, we hope that the committee will avail itself of the assistance which the medium of *The Wireless World* provides.

Revising Our Standards *Modern Interpretation of the Simple Set*

FROM time to time it is well to take stock of where we stand in relation to progress in valves and components and revise our standards.

For this reason we include in this week's issue a description of what we describe as a "Standard Two" receiver. This set has been designed not to exemplify any new circuit or new principle but to serve as a standard of to-day for a two-valve receiver of low cost where care has been exercised to make the most of present-day valves and other components without any special elaboration of the circuit.

The performance of the set will, we think, surprise some readers who have been accustomed to using other two-valve battery sets designed to earlier standards.

The Standard Two

A Two-valve Battery Receiver of Modern Design



THE value of the two-valve receiver has been somewhat overshadowed of late by developments in other fields of wireless, but it still remains a highly satisfactory receiver for many purposes. In this article a set is described which embodies modern technique and sets a new standard of performance for inexpensive equipment.

THE straightforward two-valve receiver, once the most popular of any type, has fallen into disrepute of recent years, largely on account of the difficulty of separating the National and Regional high-power transmitters while retaining adequate sensitivity. Two circumstances have arisen, however, which in combination bring back much of the usefulness of this type of receiver—one is the improved performance to be obtained with modern technique, and the other is the lower standard of selectivity which will be needed on the closing down of the medium-wave National transmitters.

The Standard Two follows well-tried practice, and its good performance has been secured through attention to the details of design rather than to the incorporation of any revolutionary circuit. The output valve is naturally of the quiescent type in order to secure economy of anode current consumption while retaining good quality of reproduction. It would not be possible to secure sufficient output from the detector to load a Class "B" valve,

on account of the necessity for using a step-down transformer as the intervalve coupling with such a stage. A quiescent push-pull output stage has been adopted, therefore, and use is made of the QP.21 type of double-pentode. With an H.T. supply of 120 volts, the best results are secured with a grid bias of -7.5 volts, with which the total quiescent current (screen and anode) is about 5 mA. The valve then requires a load impedance of some 20,000 ohms, and is capable of an output of 600 milliwatts.

The Q.P.P. Stage

The maximum signal input required by the two pentodes comprising the QP.21 is 15 volts peak, and a 1.8 ratio transformer is used for the coupling between the detector and output stages; the maximum detector output required on deep modulation is, therefore, $15/1.8 = 8.3$ volts peak. The detector is an HL2 valve, and the transformer in its anode circuit is resistance-capacity fed by the 50,000 ohms resistance R3 and the 1 mfd. condenser C7 (Fig. 1). An H.F. filter, comprising Ch with C5 and C6, is included in the anode

circuit in order to prevent the passage of H.F. currents into the L.F. circuits which would partially load the output stage and prevent the full undistorted output from being obtained.

Before leaving the low-frequency side of the receiver it may be as well to make some mention of parasitic oscillation—a trouble to which quiescent output stages are particularly prone. When parasitic oscillation occurs, the output stage oscillates at a frequency determined largely by the various circuit capacities and the leakage inductance of the transformers, and it may not be within the audible range. It often happens, therefore, that the only symptom of the trouble is severe distortion, but a test with a milliammeter will reveal it in a definite manner. When parasitic oscillation occurs the no-signal anode current is unusually high, and instead of the normal 5 mA. or so it may run up to 20 mA. A definite test for parasitic oscillation is to include a milliammeter in the H.T. lead to the output valve and to note the current with no signal. Then short-circuit one-half of the L.F. transformer secondary and again note the current. If the second reading is different from the

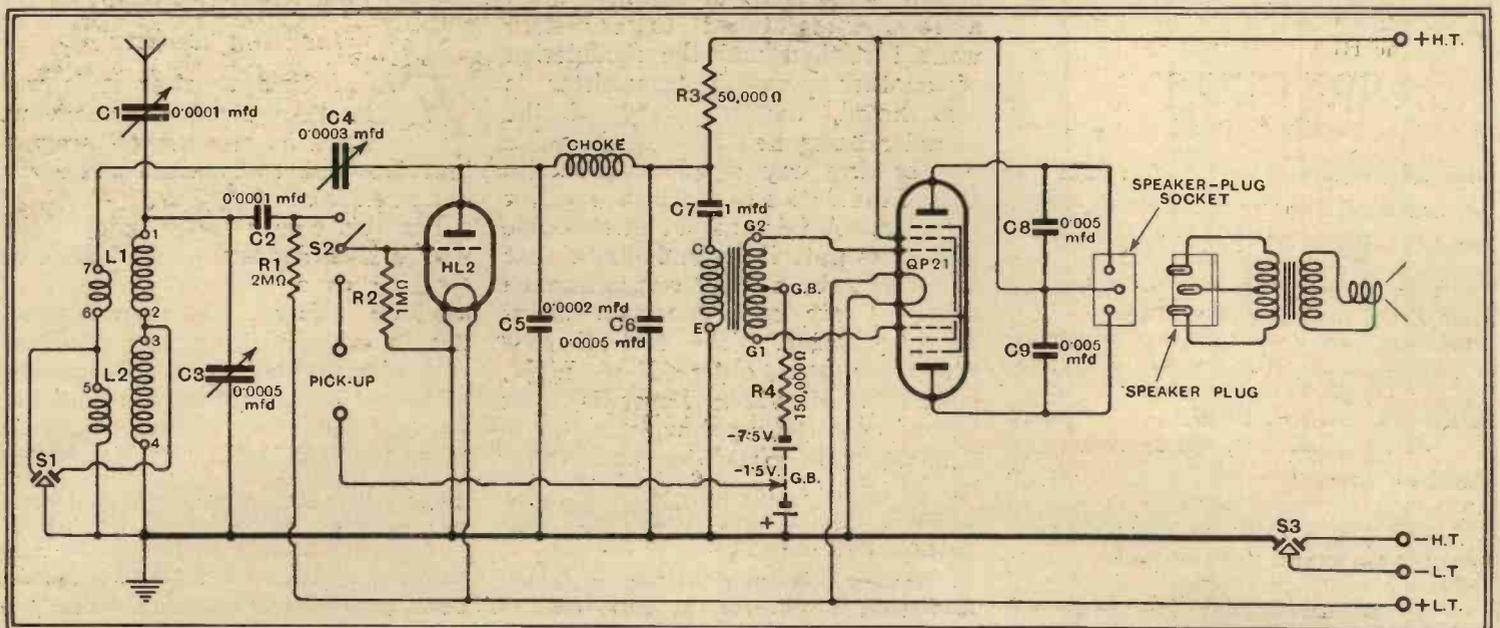


Fig. 1.—The complete circuit diagram of the receiver is shown here, and it will be seen that a reacting detector is used with a Q.P.P. output stage.

The Standard Two—

first, the valve is definitely oscillating. There are two remedies for parasitic oscillation, but neither is always completely successful. It has been the writer's experience, however, that when both are adopted the trouble never occurs, and

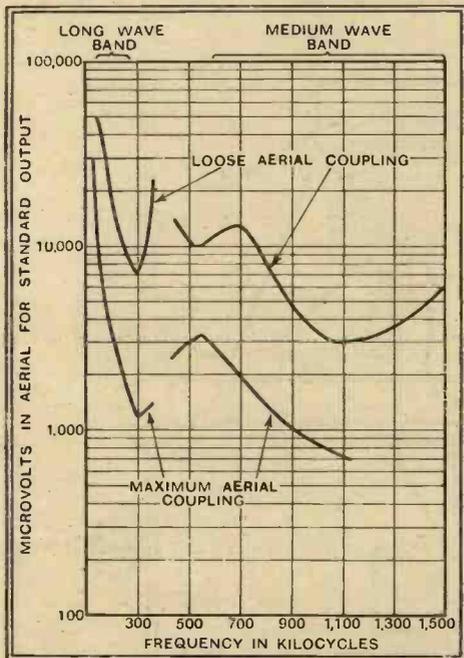


Fig. 2.—The sensitivity curves of the receiver for 50 milliwatts output and critical reaction.

they are accordingly embodied in this receiver. The first remedy is the connection of condensers between each output valve anode and H.T. positive, and these are shown as C8 and C9, the values of 0.005 mfd. being selected in order to maintain the correct load impedance on the output stage at the high audible frequencies. The second remedy is to insert a 150,000 ohms resistance R4 between the centre-tap on the L.F. transformer secondary and the bias supply. It may be said that these precautions against parasitic oscillation proved eminently satisfactory, and at no time in the tests did the valve show any signs of generating them.

Turning now to the H.F. side of the receiver, the HL2 valve functions on radio as a grid detector, and on gramophone as an L.F. amplifier, the changeover being effected by the switch S2. Two grid leaks are employed—one of 2 megohms R1 returned to positive L.T., and the other of 1 megohm returned to negative L.T. The effect of this is similar to that of a single grid leak of 0.6 megohm returned to a point positive with respect to negative L.T. by 0.6 volt. The chief benefit of adopting this method of connection is that a great improvement in the smoothness of reaction is obtained, for the usual plop when oscillation commences is largely avoided without having to use a grid leak of such a high value that reproduction is adversely affected.

The tuning system is of a simple type, tests having shown it to be capable of a better all-round performance than more complex arrangements. On the medium waveband the switch S1 is closed and only

the coil assembly L1 is effective. The main winding consists of 43 turns of No. 24 D.S.C. wire wound on a piece of 3in. diameter tubing, and it is tuned by the 0.0005 mfd. condenser C3. Reaction is obtained by a winding of 15 turns of No. 36 D.S.C. wire placed at the earth end of the main winding, and reaction effects are controlled by the 0.0003 mfd. condenser C4. The switch S1 is open on the long waveband, and the two coils of the assembly L2 are inserted in series with the coils comprising L1. The construction of these coils is extremely simple, for they are wound in a former built up from three discs of wood. Three discs, one having a diameter of 2in. and two of 2½in., are bolted together to form a slot into which the wire can be wound. Each disc should have a thickness of ¼in. The high-potential end of the winding is the start of the coil, which consists simply of 120 turns of No. 36 D.S.C. wire run on in the slot; a tapping is then taken for the earth connection and a further 50 turns run on for reaction.

The Sensitivity

The aerial is connected directly to the high-potential side of the tuned circuit through the 0.0001 mfd. variable condenser C1, which performs several important functions. In the first place it acts as a volume control when receiving stations which are so strong that no reaction is needed. Secondly, it acts in conjunction with reaction as a selectivity

and at the highest frequencies the best results are secured with less than the full capacity. The sensitivity of the receiver on both wavebands with C1 so adjusted that, with a standard artificial aerial and

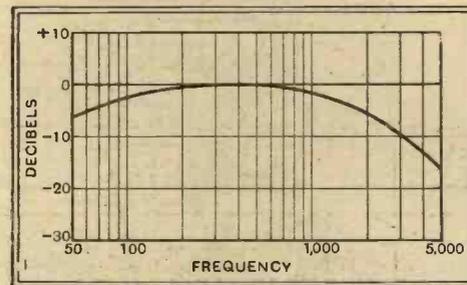


Fig. 3.—The overall fidelity of the receiver does not show the increase in high frequency response obtained through the output pentode.

C3 at minimum, the set tunes to 1,500 kc/s (200 metres) is shown by the curves of Fig. 2 for "Loose Aerial Coupling." It can be seen that the tuning range on the long waveband is 138-355 kc/s, and on the medium waveband 450-1,500 kc/s. The curves are taken with critical reaction and show that the aerial input on the medium waveband for the standard output of 50 milliwatts varies from 3,000 μV. to 14,000 μV.

When the aerial series condenser is set at maximum the tuning range is appreciably affected and becomes 135-360 kc/s



A rear view of the chassis showing the layout.

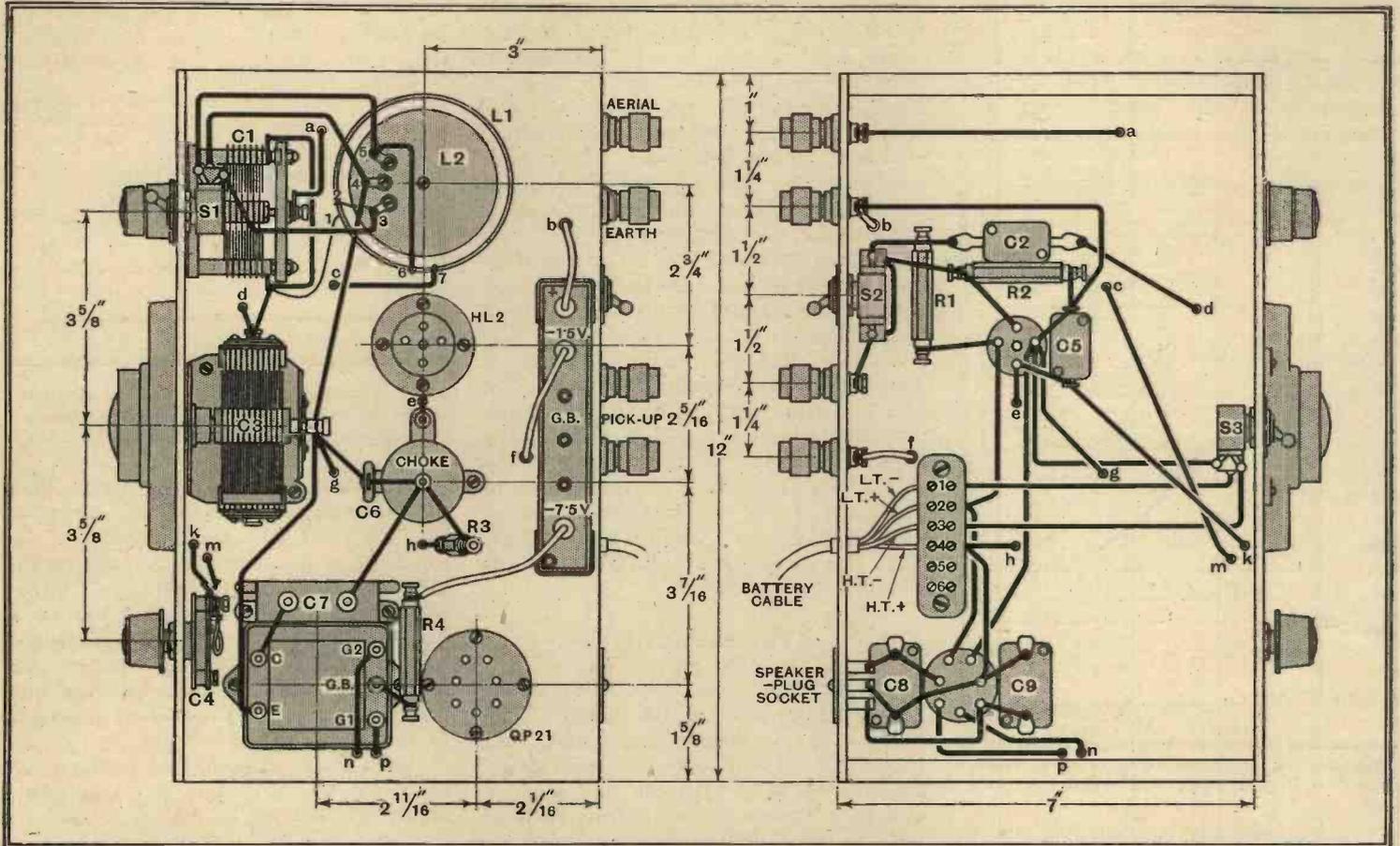
control, and thirdly it enables optimum aerial coupling to be secured for the reception of weak signals.

In general, for maximum sensitivity C1 must have its capacity increased at the lower frequencies (longer wavelengths),

on the long waveband and 435-1,125 kc/s on the medium. The sensitivity is increased considerably, however, and varies between 700 μV. and 3,600 μV. on the medium waveband.

Daylight tests on a moderately efficient aerial in the heart of London showed that a surprisingly large number of stations

THE LAYOUT OF COMPONENTS AND FULL WIRING GUIDE.



THE LIST OF PARTS REQUIRED

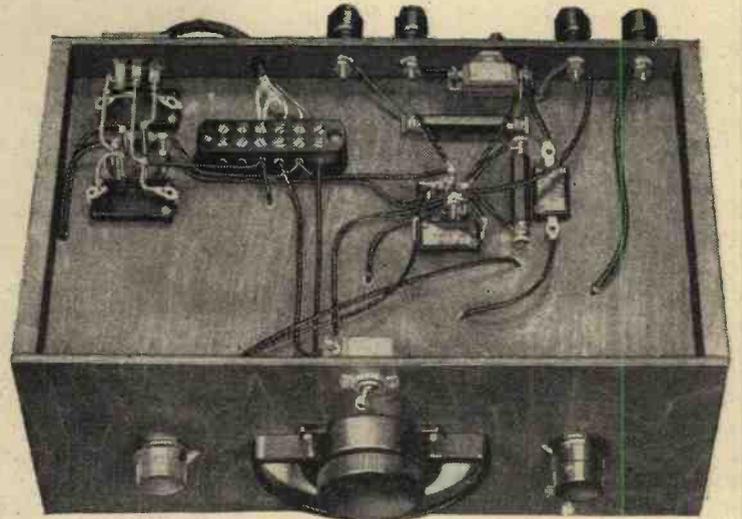
- 1 Tuning condenser, 0.0005 mfd. and "Mystic" drive, C3
Graham Farish-Formo SUs (Ormond)
- 1 Reaction condenser, 0.0003 mfd., C4 Ormond R.508
- 1 Knob for above Ormond R.355
- 1 Slow-motion midget condenser, 0.0001 mfd., C1 Ormond R.149 (Eddystone, Graham Farish)
- 1 Q.P.P. transformer, 1-8 Graham Farish "Quip." (Lissen, Varley)
- 1 Valve holder, 5-pin Clix chassis mounting standard type
- 1 Valve holder, 7-pin Clix chassis mounting type
- 1 Fixed condenser, 0.0001 mfd., C2 T.C.C. Type "M"
- 1 Fixed condenser, 0.0002 mfd., C5 T.C.C. Type "M"
- 1 Fixed condenser, 0.0005 mfd., C6 T.C.C. Type "M"
- 2 Fixed condensers, 0.005 mfd., C8, C9 T.C.C. Type "M"
- 1 Fixed condenser, 1 mfd., 400 v., D.C. test, C7 T.C.C.50 (Dubilier, Graham Farish, Peak, T.M.C.Hydra, Telsen)
- 1 Resistance, 50,000 ohms, 1 watt, R3 Graham Farish "Ohmite"
- 1 Resistance, 150,000 ohms, 1 watt, R4 Graham Farish "Ohmite"
- 1 Resistance, 1 megohm, 1 watt, R2 Graham Farish "Ohmite"
- 1 Resistance, 2 megohms, 1 watt, R1 Graham Farish "Ohmite" (Dubilier, Erie, Ferranti, Claude Lyons, Seradex, Watmel)
- 1 Screened H.F. Choke, Ch Kinva I.D.C. (Bulgin, Wearite)
- 1 S.P.D.T. Switch, S2 Bulgin S.81
- 2 Three-point switches, S1, S3 Bulgin S.87 (Claude Lyons)
- 1 Six-way connector Bryce
- 1 Four-way battery cable, with terminals and spade ends. Harbros (Belling-Lee, Bulgin, Goltone)
- 4 Ebonite shrouded terminals, A.E. Pick-up (2) Belling-Lee, Type "B"
- 1 9-volt grid bias battery
- 1 Pair grid bias battery clips Bulgin No. 1
- 1 Three-pin plug and socket panel Belling-Lee 1119
- 1 Paxolin tube, 3in. diameter by 3 1/2 in. length Wright and Weaire
- 2 Coils (see text)
- Wood baseboard, 12in. by 7in., Wood panel, 12in. by 6in.
- 1 oz. No. 22 tinned copper wire, 5 lengths Systoflex, wood, etc.
- Screws: 2 1/2 in. No. 2 R/hd.; 13 3/4 in. No. 4 R/hd.; 4 3/4 in. No. 4 R/hd.; 4 3/4 in. No. 4 R/hd.; 4 3/4 in. No. 4 C/sk.
- Valves: 1 Osram or Marconi HL2; 1 Osram or Marconi QP21.
- Loud Speaker: Moving coil with special transformer Goodman's "Grille" PM

The construction and wiring of the receiver is clearly shown in these drawings.

could be obtained. The London National and Regional transmissions could readily be received clear of one another provided that C1 was set at a low value, and, indeed, this was necessary to prevent detector overloading. Midland Regional and North Regional both gave reproduction at an enjoyably loud level, although the output stage was not fully loaded. Langenburg and Brussels could both be received at quite intelligible strength. On the long wave-band Droitwich and Radio Paris could be relied upon for programmes of entertainment value, and Huizen, Eiffel Tower, and Luxembourg were also received.

Except in the shadow of a local station, several Continental transmissions should be receivable in most districts at sufficient strength for their programmes to provide alternatives to the locals. Careful handling of the controls is necessary, of course, if such stations are to be received well, for

a receiver of this type is really intended for local reception. With a good aerial the set should provide adequate volume from a medium-wave station at distances up to 30 miles without the tuning becoming in the least critical, and Droitwich should be receivable at very much greater distances.



An underbase view of the receiver.

The overall fidelity curve of the receiver is shown in Fig. 3 and is unusually good for inexpensive equipment of this nature. At 50 cycles the response falls by only

The Standard Two—

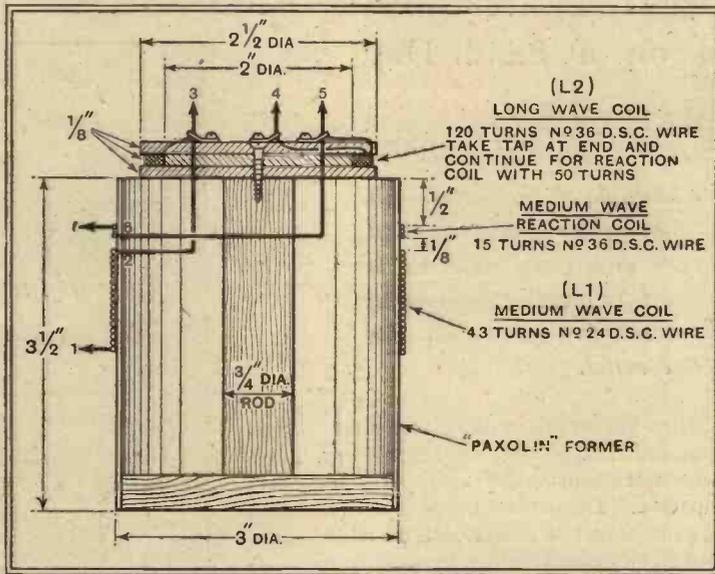
6 decibels, and at 5,000 cycles the drop in the receiver is 16 decibels. It must not be thought, however, that the drop under working conditions is as great as this.

When making measurements the loud speaker is necessarily replaced by a resistance, so that with the constant load the effect of the pentode output stage in accentuating the upper register is not obtained. Due to the rising impedance of the speaker with frequency, therefore, the true response under working conditions does not show such a great drop as the curve of Fig. 3. The second effect is due to the loud speaker itself, since this also exhibits a tendency to accentuate the upper register. The net result is that the practical overall response curve is substantially flat up to some 4,000-5,000 cycles, and it can be shown that a curve measured under "standard" conditions should be similar to that of Fig. 3 for the correct overall result with a pentode-type output valve.

Curves for selectivity are not shown, since this varies so greatly with the settings of the aerial coupling and reaction condensers, as well as with frequency, that a prohibitively large number of families of curves would be necessary to give any idea of the capabilities of the set.

The set is capable of giving a highly satisfactory performance when operated with a 120 volts H.T. supply, and the total no-signal current is then about 6 mA.

A full-size blue print of the combined wiring diagrams is available from the Publishers, Dorset House, Stamford Street, London, S.E.1. Price 1s. 6d. post free.



This drawing shows the details of the coil assembly.

Somewhat larger volume is possible with a higher battery voltage, but at the expense of an increase in current consumption. No attempt should be made to operate the set from an H.T. eliminator, since quiescent output stages do not usually work at their best from an H.T. source of high internal resistance. Moreover, if mains are available, a completely mains-operated receiver should be used. A 2-volts accumulator should be employed for the L.T. supply, and it can be of moderate capacity in view of the small demands, 0.5 ampere, made upon it by the set.

A specimen receiver built to the specification described in this article is available for inspection by readers at 116, Fleet Street, E.C.4.

tion of Prague has been heard at Schwetzingen, Vorarlberg, Innsbruck and Heidelberg, on the carrier of Vienna, while the modulation of Koningswusterhausen has been heard at Newcastle on the carriers of Warsaw and Stuttgart.

An analysis of the cases quoted showed that the effect appeared to occur only when the great circle joining the wanted transmitter and the observing receiver passes the unwanted intruder at a distance of 250 to 300 kilometres (although the U.R.S.I. discussion suggested that this figure might have to be increased).

The suggestion of the effect arising from the Heaviside layer is strengthened by the fact that it only occurs at night. The suggestion of its being due to a non-linear action in the ionosphere is encouraged by the fact that it is most pronounced with the intrusion of the more powerful stations, as if the unwanted transmitter (of higher power) set up more than proportionately strong oscillations of the electrons in the layer. According to this view, the effect would also be stronger the longer the wavelengths of the unwanted stations, which is supported by the available observations. Although such non-linearity is the first suggestion other possibilities are not yet excluded, for example, on the basis of a "Doppler effect," the periodic raising of the conducting layers of the ionosphere rhythmically with the modulation of the unwanted transmitter.

International Experiments Proposed

At the U.R.S.I. meeting Dr. van der Pol described experiments in which Luxembourg and Beromünster had provided special transmissions for the examination of the phenomenon. Beromünster sent out an unmodulated carrier, while Luxembourg emitted its full-strength carrier with characteristic modulations every few minutes. The results were measured as the percentage of apparent modulation of Beromünster due to the intrusion of Luxembourg, this being about 7.5 per cent. at 100 cycles modulation and 1.2 per cent. at 800 cycles. After considerable discussion of the subject, opened by Dr. van der Pol, the U.R.S.I. meeting came to the conclusion that our present knowledge of the subject was inadequate, and called for more experimental information of an international character. A small committee was, therefore, appointed to draw up a programme and make the necessary arrangements, for example, by approaching different European broadcasting authorities to invite their co-operation in providing special transmissions. Details of these tests will be given in our columns when they become available, and it is hoped that active co-operation may be secured in a matter of both scientific and practical interest. In particular, it will be of great interest to ascertain how great an area is covered by the interference. For this reason it appears desirable that observations should be made on all strong stations, whether or not the "Luxembourg effect" is expected.

Interaction of Wireless Waves

The "Luxembourg Effect"

A NOTE in our editorial columns refers to the U.R.S.I. discussion of the "Luxembourg effect," so called because it was first observed by the modulation of that station impressing itself on the output of a receiver tuned to another station.

At least, the first scientifically authenticated account of the effect was that of apparent interaction between waves from the Luxembourg station and a series of other stations observed at Eindhoven, Holland, in conditions which precluded, for example, any possibility of cross-modulation in the receiver itself. This led to the immediate conclusion that the phenomenon originates somewhere in the transmission path, most possibly in a non-linear action, akin to that of rectification, in the ionosphere. The original observations at

Eindhoven were supplemented by others there and elsewhere, as a result of which Dr. van der Pol was able to give to the U.R.S.I. meeting a fairly complete picture of the places and conditions in which the effect had been observed. Thus the modulation of Luxembourg has been heard, at Eindhoven, on the carriers of Radio-Paris, Budapest, Munich, Lyons, Sottens, Mühlacker, Strasbourg, Milan, Poste-Parisien, Frankfurt and Beromünster; at London, on the carriers of Munich, Mühlacker, Beromünster, Trieste, Breslau and Stuttgart; at Brussels, on the carriers of Munich, Lyons, Sottens, Mühlacker, Beromünster, Prague, Leipzig and Langenberg. Similarly, the modulation of Radio-Paris has been heard at Reading, Jersey, Bath, Plymouth and London, on the carrier of Luxembourg; the modula-

Are Ultra-shorts Directional ?

Practical Observations on a Field Day

By H. B. DENT

SINCE quite short aerials, often a multiple of the wavelength, are sometimes recommended for ultra-short wave reception, the likelihood that they may be very directional must not be overlooked. Here is an interesting subject for amateur experiments and the results recorded during a recent five-metre field day are discussed in this article

THE dividing line between the short and the ultra-short wavebands is often given as being in the region of ten metres, and this is more than an arbitrary line of demarcation, for so far as is known at present electromagnetic waves of a higher frequency than about 30 megacycles are not refracted, and come down to the earth in the same way as those of lower frequencies, so that the direct ray only has to be relied on for communication.

This limits the scope of the transmitter to what is generally assumed to be an optical range. So meagre is the data available on this subject that it offers a useful field for the amateur experimenter and especially for radio societies, to investigate, since when the weather permits of outdoor work field days can be organised and reports prepared of reception from a fixed transmitter without the need to go far afield.

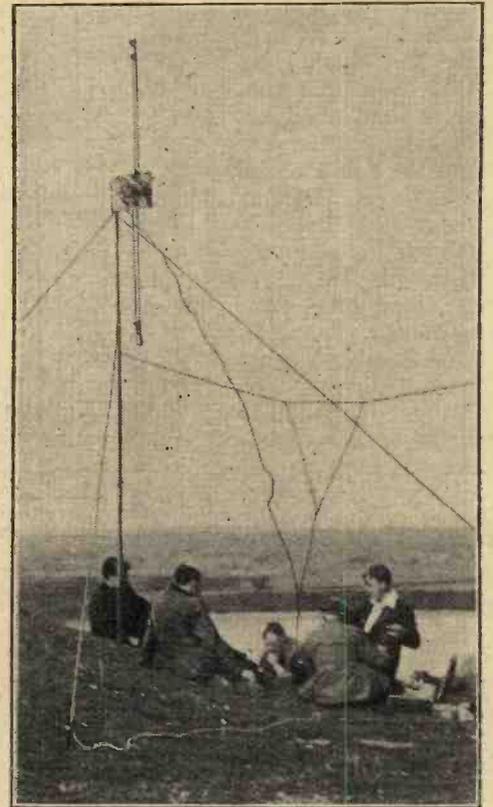
The Golders Green and Hendon Radio and Physical Society this summer held two five-metre field days, the most recent of which, on Sunday, September 16th last, was to investigate the possibilities of the five-metre waveband for direction-finding work. At an informal discussion at the end of the day several of the receiving

parties recorded good directional reception, although the apparatus employed was not especially equipped for this purpose. One receiver used a horizontal di-pole aerial, another a loop, while some had fixed aerials, either vertical or di-pole, and the majority were super-regenerative sets. The writer, being favoured with an invitation to participate, used a receiver fitted with a loop, the circuit being arranged for super-regeneration or for use as a straight det.-L.F. set with reaction.

This receiver, without the super-regeneration attachment, had been out on the first occasion and subsequently modified in view of some useful facts that came to light. In the first case it was found that the loop required to be raised at least four feet above the ground for good reception, as at any lesser height signals were very weak, but raising the set from four to seven feet above the ground gave no further increase in signal strength, so for the second series of tests a tripod stand, with legs four feet long, was constructed.

The Receiver

Super-regeneration is often relied on to tame the set, as without it the straight-forward arrangement is very prone to



The five-metre transmitter rigged on the top of Ivinghoe Beacon. At this period a vertical di-pole aerial was employed.

threshold howling, excessive liveliness and hand-capacity effects, especially when fitted with a loop. This can usually be traced to wandering H.F. currents, for despite what may seem to be adequate filtering, they find their way into the L.F. amplifier and the output stage, the headphones being so live to H.F. that howls and squeaks are produced by holding the leads or touching any metal in the headphones. Only by very complete filtering can these troubles be avoided, but when every trace of H.F. is removed from the output the set handles as well as any other short-wave receiver built for the higher wavelengths.

Special care is needed to keep all stray capacities small, and of course the tuning condenser must have also a small maximum capacity, about 20 micro-mfds. being as a rule quite large

threshold howling, excessive liveliness and hand-capacity effects, especially when fitted with a loop. This can usually be traced to wandering H.F. currents, for despite what may seem to be adequate filtering, they find their way into the L.F. amplifier and the output stage, the headphones being so live to H.F. that howls and squeaks are produced by holding the leads or touching any metal in the headphones. Only by very complete filtering can these troubles be avoided, but when every trace of H.F. is removed from the output the set handles as well as any other short-wave receiver built for the higher wavelengths.

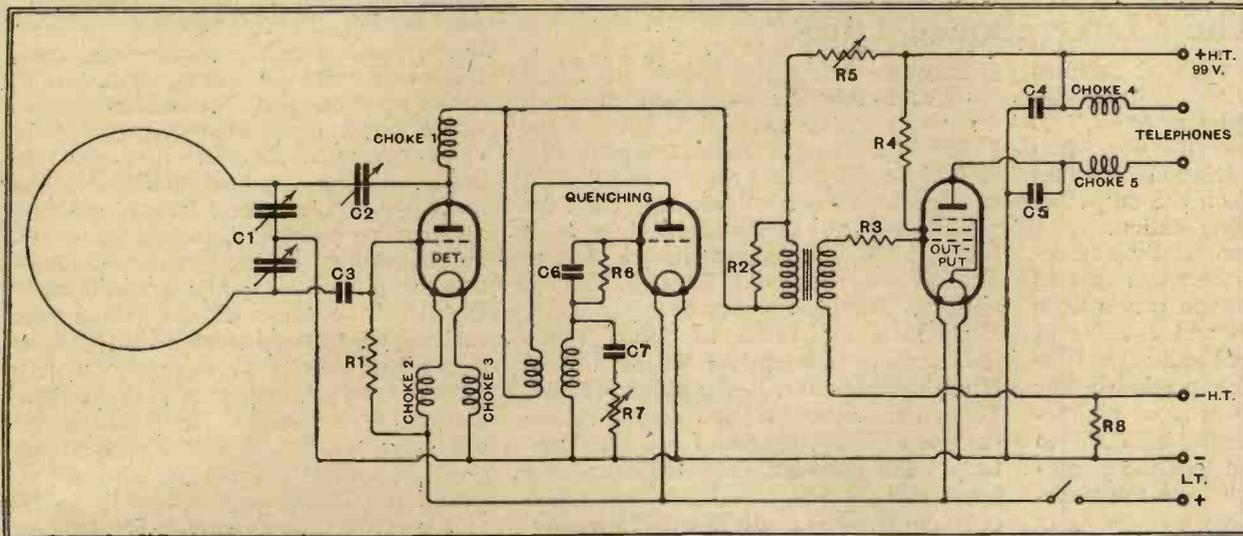


Fig. 1.—Theoretical circuit of the three-valve five-metre super-regenerative receiver incorporating a separate quenching valve.

Are Ultra-Shorts Directional?—

enough. In the receiver illustrated here, the circuit of which is given in Fig. 1, the dual condenser C1 has a capacity of 30 micro-mfds. for each section, and this arrangement is used to enable a centre-tapping to be made in such a way that the loop can be changed quickly, there being two connections only, also, it permits its replacement by a coil for use with an aerial, either of the vertical or of the di-pole type. Later it is proposed to fit a di-pole aerial arranged to be employed either vertically or horizontally.

Operating Notes

The reaction condenser C2 has a very marked effect on the tuning of the circuit and must be kept small; a maximum value of 15 micromfds. should not be exceeded, but only a small part of this is used. The aim should be to obtain self-oscillation of the detector with less than half the total capacity of the reaction condenser. The control of the set is then left to the resistance R5, which can be 50,000 ohms maximum. The reaction condenser is set so that the detector just oscillates without super-regeneration and R7, which is a 1,000-ohms variable resistance in the quenching valve's tuned circuit, will suppress the quenching oscillating when all the resistance is in circuit. For this initial adjustment R5 is set at about half its maximum value. If the quenching valve is now brought into action by reducing R7, a faint hiss should be heard, which increases in intensity with further rotation. It may be necessary to decrease R5 at this stage, since, if the detector is feebly oscillating the quenching will suppress these oscillations. The resistance R7 is an initial adjustment only, as control can

now be effected with R5, which not only controls the detector oscillations but weakens or strengthens the quenching at the same time.

The same effect can be obtained with the reaction condenser, but quite small changes in its capacity alter the tuning of the loop considerably, whereas adjustment of R5 has little effect on the tuning. If C2 is too large, there may be difficulty in tuning down to five metres.

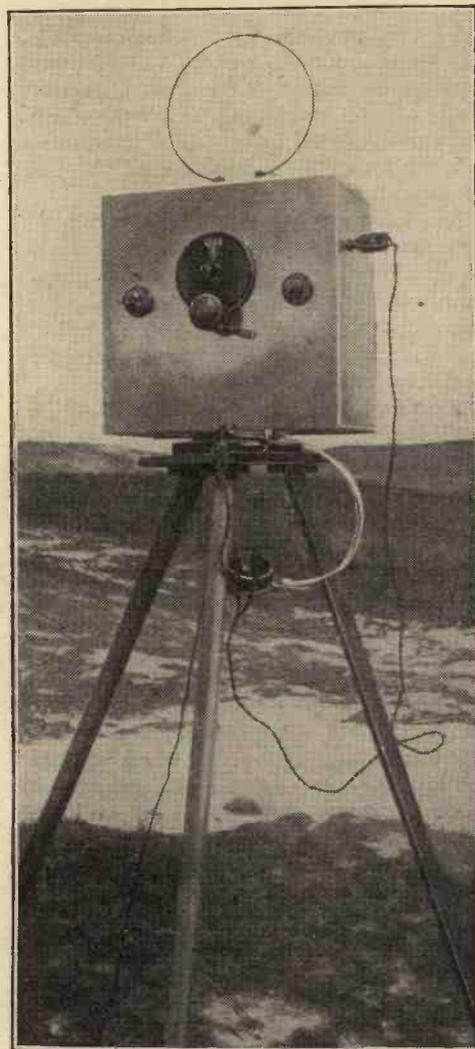
As tests were made also with an experimental superheterodyne receiver, it was not possible to devote as much time to the super-regenerative set as one would have liked, yet there was no doubt whatsoever that with super-regeneration much greater sensitivity was shown. Furthermore, quite marked directional properties were observed, although an unshielded loop was used.

More exhaustive tests will be necessary before this application of the set can be discussed with any assurance, but it was noticed that the plane of the loop had to be set at right angles to the line of the transmitter for loudest signals, while the usual position for maximum strength now gave the minimum. This is at variance with accepted practice, and although the receiving site was not ideal, there being a few trees, also a wire fence nearby, these alone would hardly account for a complete 90 degrees shift. The transmitter at this period was using a horizontal di-pole aerial, so that the wave propagation would be entirely different from that with a vertical aerial.

A di-pole receiving aerial is quite practical for these very short wavelengths, as each arm need be one-quarter wavelength long only. To meet all contingencies the aerial might be arranged so that a quick change is possible from the vertical to the horizontal, so as to conform with the arrangement used at the transmitting end. One of the field receivers used during these tests was in fact fitted with a horizontal aerial of this type, and, when the transmitter was employing a similar arrangement, recorded good directional effects; and although no special provision had been made for direction-finding, a compass-bearing taken along the line of the aerial when plotted on the map passed very close indeed to the transmitting site, the distance being approximately six and a half miles in an easterly direction.

The transmitter was located on Ivinghoe Beacon, some 700 feet above sea level, and eastward of this the country was comparatively flat and at a much lower altitude. To the west and north-west was much high ground, including Dunstable Downs, rising to an even higher altitude in places,

and beyond this no signals could be heard. A hill between the transmitter and the receiver, if it interrupted the direct visual line, would seem to deflect the waves, as nothing was heard of the transmitter in these areas.



Five-metre self-contained receiver fitted with loop aerial for directional reception.

The distance recorded by no means represents the limit of reception, for signals were very strong in those directions where no obstruction intervened. The results have not yet been correlated, and much useful information will, no doubt, come to light when the day's work is fully discussed.

A few details of the construction of the receiver used by the writer might prove of some little interest to those contemplating experiments on these lines in the future. The set and all batteries are housed in an aluminium-covered wood case measuring 12in. x 12in. x 6in., surmounted by a loop of stout copper wire 7½in. in diameter. The batteries are in the lower part, and account for about 4in. of the height of the case, the remainder consisting of the receiver portion. This is assembled on a ½in. wood baseboard, which slides into grooves formed by gluing two narrow battens on the sides of the case.

The dual tuning condenser (C1) is mounted in the centre and raised so that its spindle is about 2in. above the base-



Initial tuning adjustments being made within sight of the transmitter. A superheterodyne for open aerial use is seen on the ground.

Are Ultra-Shorts Directional?—

board. The reaction condenser (C2) is on the left, and the control resistance (R5) on the right. Resistance R7 for control of the quenching (this being an additional fitting not allowed for in the original layout) is fitted on the left-hand side of case and joined in circuit by two flexible leads. But for this one item every component is mounted on the loose baseboard, and the whole can be withdrawn when the knobs and the insulated head of the headphone jack are removed. Incidentally, the jack serves also as the filament switch.

The components need to be chosen with an eye to their size to condense the set into this small compass, yet it is not unduly crowded, as evidenced by the fact that space was easily found to accommodate the extra valve and few components comprising the quenching circuit.

A 99-volt H.T. battery took up 9in. x 5in. x 3in. of the lower compartment, the

remaining space being occupied by an Ever-Ready 2-volt 5 amp. hr. L.T. unspillable accumulator, which measured only 3½in. x 1in. x 3½in. high, and allows for a little packing of sponge rubber on each side of the L.T. cell to keep the batteries in position.

The detector and quenching valves are of the H.L. type, while the output valve is a high-efficiency pentode. Grid bias for this valve is derived from a resistance joined between the negative of the H.T. battery and the L.T. negative, while to conserve H.T. current, since sufficient power to operate headphones only is needed, there is a resistance of 5,000 ohms in the auxiliary grid supply to the pentode.

The case is earthed by fitting a metal plate on the base of the turntable which rests on a metal top plate on the stand, this being joined by a loose lead to a short earth tube.

Revolutionary

SOME time ago I suggested a scientific censor for the lay Press whose representatives are always dishing up as new such old and hackneyed inventions as transmitting speech along a beam of light, a pastime which used to delight our grandfathers in the spacious days of the old Queen.

This particular invention has, of course, been churned out again this year, together with the usual crop of hardy perennials. The latest craze, however, is for inventing wireless valves. Thus I learn from my evening newspaper that an epoch-making invention has been made by a well-known firm of wireless valve manufacturers, and that special detectives are on watch night and day "to guard the precious secret from the activities of unscrupulous spies who are in the pay of a powerful foreign rival."

Naturally, when I noticed this choice item I read on with bated breath, hoping against hope to find some faint clue which would give me an inkling of what this new miracle might be. "The firm's experts," went on the article, "have developed a revolutionary valve which really consists

UNBIASED

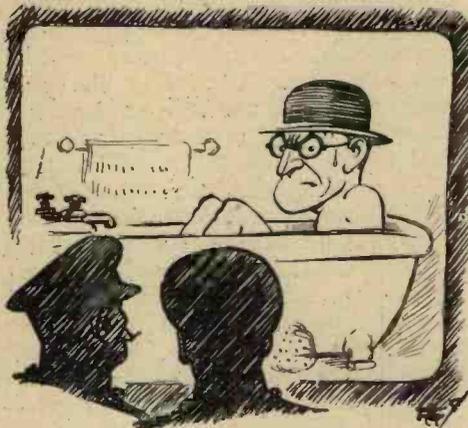
I.C.U. said the P.M.G.

I WAS wending my way homeward rather late some time ago, and feeling somewhat famished as I passed through the Old Kent Road neighbourhood, I dropped into one of the all-night restaurants of the type in which food for the mind is provided simultaneously with that for the body. While awaiting the latter I endeavoured to assimilate the former, but had some difficulty, as the product of our modern educational system who had preceded me in the seat had evidently so far forgotten his table manners as to leave a large splodge of grease on the "table-cloth," so rendering it well-nigh unreadable.

However, when I did manage to decipher it I found to my delight that it was a portion of the wireless page of a Sunday newspaper, and I at once settled down to enjoy myself. My enjoyment was short lived, however, for I found that

to encourage the sale of licences amongst those who do not fulfil their obligations by taking one out before receiving broadcast programmes.

This time I do think, however, that those who are responsible for this sort of thing have really excelled themselves.



Not the least desire to be seen.

We have had the wonders of the famous detector van dished up *ad nauseam*, not forgetting its ability to detect old and disused crystal sets up in the lumber room. The P.M.G. is apparently not the sort of fellow to rest on laurels of this description, however, for it was reported that he had now gone a very big step forward, as it appeared that his new laboratory at Dollis Hill had brought television to such a pitch of perfection that his hirelings could now actually see the image of the unlicensed receivers and their owners projected on to a screen inside the van.

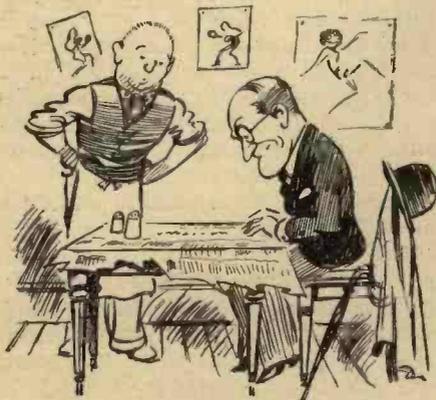
I, for one, intend to make a vigorous protest against this sort of thing, as I am in the habit of listening in my bath and have not the least desire to be seen in my *déshabille* by any myrmidons of the P.M.G.

By FREE GRID

of three valves in one, and it is known as a duo-diode-pentode. This valve will entirely revolutionise set design and render present-day receivers obsolete."

My comments on the matter when I came to this *dénouement* were, I fear, unprintable, and I have not recovered even yet.

Another bright spark has apparently just discovered the virtues of compressed seaweed for sound-deadening purposes. Needless to say, the "discovery" is "revolutionary," so much so, in fact, that it takes us back a complete cycle of ten years when the B.B.C. started to use it for the sound-proofing of studios. So far as my recollection goes it was hailed as revolutionary even then.



Settled down to enjoy myself.

most of the available space was occupied by yet another piece of cunningly concealed propaganda put in by the P.M.G.



To guard the precious secret.

From TRIODE to DOUBLE-DIODE-PENTODE

Part II.—The Variable-Mu Valve and the H.F. Pentode

THE present instalment of this valuable series of articles deals with H.F. amplifiers, and it is clearly explained why the plain S.G. valve has almost completely been ousted by the variable-mu valve and screened H.F. pentode.

By A. L. M. SOWERBY, M.Sc.

The Purpose of Every Electrode

THE simple screened valve, as discussed in the preceding article of this series¹, possesses certain disadvantages of its own from which the triode is more nearly free. The triode, especially the low-impedance triode, has a grid-volts/anode-current curve (type of Fig. 1) which possesses a long straight portion. Since changes in anode current are strictly proportional to changes in grid voltage only so long as the portion of the

tuned circuit providing the load in its anode circuit were 60 times it would never be necessary to give the screened valve a signal greater than 1/20th volt. For so small a voltage-swing as this the curve shown is very much more than adequately long.

But in practice it is quite impossible to ensure that the valve shall never receive more than this carefully controlled signal. Even when quite widely detuned from the local station, the aerial circuit will give the valve far more than 1/20th volt, and when fully tuned in the signal may amount to five volts or more. If the working point is at P, the grid will be swung from -7 v. to +3 v., which will quite evidently lead to considerable distortion of the received wave-form. To make matters worse, the detector valve of the set would be hopelessly overloaded long before the signal input had risen to such values as these, so that it would already have been necessary to apply the volume control.

This, in the case of the screen-grid valve, usually takes the form of a reduction in screen-voltage, which means that the full-line curve of Fig. 8 will have been replaced by some such curve as that shown dotted. This change of operating curve is hardly one that assists the valve to deal, without distortion, with a large signal input.

The effect of this distortion, if the valve were dealing with a simple unmodulated carrier wave, would be unimportant, for distortion of a simple wave-form merely means the importation into it of harmonics. Since these must be some whole-number multiple of the initial frequency, the tuned circuit following the valve would be so far detuned from them that they would develop no appreciable volt-

age across it, and so would be automatically filtered out. (Compare the effect of distortion in a low-frequency amplifier, which is usually designed to amplify all frequencies equally.)

In an ordinary practical case of wireless reception the signal applied to the first valve is very complex. The required station gives a carrier-wave modulated at a number of frequencies—itsself a pretty complicated matter—and there are in addition similar signals of more or less intensity from each of a number of other transmitters. Of these the strongest is likely to be the local station.

Cross-modulation Explained

Suppose that a receiver built to the skeleton circuit of Fig. 9 is tuned to a distant station removed in frequency from the local station by 36 kc. (four channels). We may assume that the combined selectivity of the three tuned circuits is enough

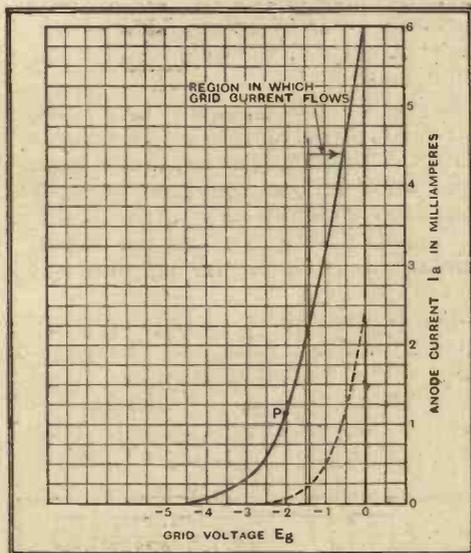


Fig. 8.—Illustrating the limited signal-handling capabilities of an ordinary S.G. valve (Cossor MSG/HA). Dotted curve shows effect of reducing screen voltage.

curve representing their relationship is perfectly straight, it follows that if a signal is of big enough amplitude to carry the grid-voltage momentarily over the limits of the straight portion of the curve the amplified signal will be distorted.

Inspection of Fig. 8, which shows the curve of a typical medium-impedance screened valve, shows that the usable portion of the curve, lying between the minimum bias-point required to suppress grid-current (about -1.4 v.) and the bottom bend, is very restricted. If we suppose that the next valve is a detector requiring 3 volts to operate it, then if the gain given by the screened valve in conjunction with

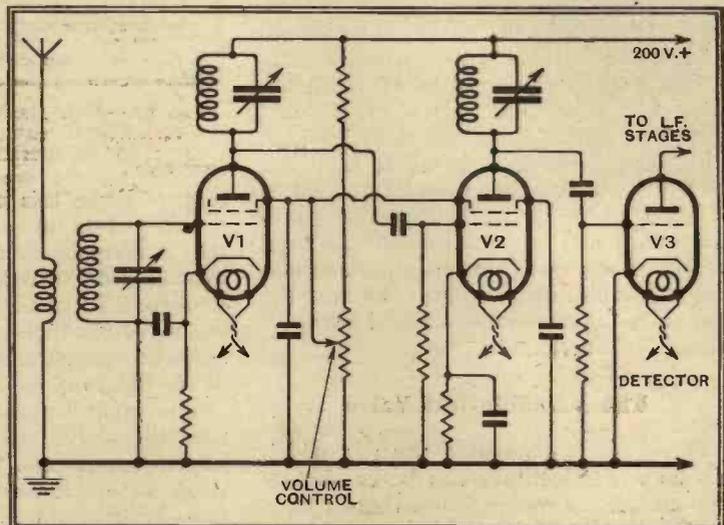


Fig. 9.—A typical "2-H.F." receiving circuit with ordinary S.G. valves; volume control by variation of screen voltage.

to reduce the local station to inaudibility when they are all tuned 36 kc. away from it. Yet at the grid of the first valve, which is protected from the local station by only one tuned circuit, there may well be a very large signal from this station. Enough, it may be, to cause this valve to overload,

¹ Sept. 21st, pp. 242-244.

From Triode to Double-Diode-Pentode— distort, and add unwanted harmonics to every signal that it receives.

Of the various unwanted components of the distorted anode current most are harmless,¹ having frequencies that cannot

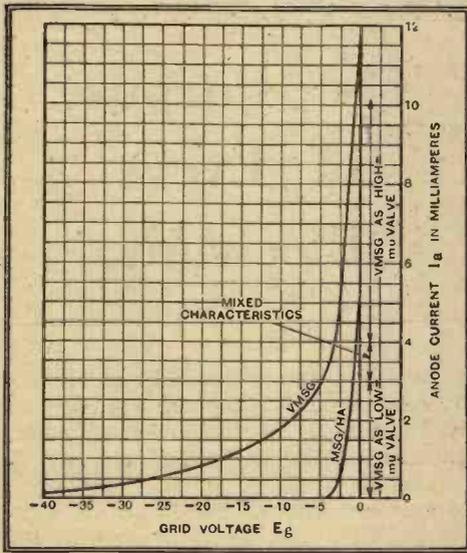


Fig. 10.—Characteristics of variable-mu valve (Cossor VMSG) compared with ordinary S.G. valve.

pass through the subsequent tuned circuits to the detector valve. One, however, consists of the carrier-wave of the desired station, that to which the set is nominally tuned, modulated with the programme of the local station. Since the set is tuned to this carrier, it will pass through the remaining two tuned circuits, being amplified by the second screened valve on the way, and will arrive at the detector valve, with the result that the local station will be heard at the same time as that desired. This form of interference, which is known as *cross-modulation*, can be recognised by the disappearance of the programmes from the local station if the station to which the set is tuned switches out its carrier-wave.

This superposition of unwanted upon wanted station takes place in the first valve; in consequence, the initially high selectivity of the set will fall to that of a set with only one tuned circuit as soon as the first valve is overloaded enough to cause distortion. In the absence of a local station of any great power, cross-modulation naturally does not occur, because the first valve never receives a signal powerful enough to overload it.

The Variable-mu Valve

There are two possible ways in which this lack of selectivity can be combated. One consists in making sure that as soon as the set is tuned away from the local station its signals are sufficiently excluded from the grid of the first valve to prevent overload. This can be done by using two (or more) tuned circuits before the valve—the well-known band-pass filter cure for cross-modulation.

The other line of attack involves re-

placing the first valve by one which does not overload so readily as an ordinary screen-grid valve, so that quite large voltages from the local station can reach its grid without causing this signal to introduce distortion. Further, some method of volume control other than that of reducing screen-voltage, which inevitably reduces the signal-acceptance of the valve, must be provided.

Both these latter conditions are satisfied by the variable-mu valve. Constructionally, this differs from an ordinary screen-grid valve only by having a control grid which has a mesh of uneven pitch. This results in the valve having two independent characteristics; it behaves, in fact, like two valves in parallel. One of these would be an ordinary screen-grid valve of high amplification factor, the other a screened valve of very low amplification factor, requiring therefore a very heavy negative bias on the grid to reduce the anode current to zero.

A curve of such a valve is given in Fig. 10, together with that of an ordinary screen-grid valve (replotted from Fig. 8) for comparison. As the bias on the variable-mu valve is increased, the anode current at first drops rapidly, but at about $-4\frac{1}{2}$ volts, the point at which the current of the ordinary valve cuts off completely, the variable-mu valve is still passing 3 milli-

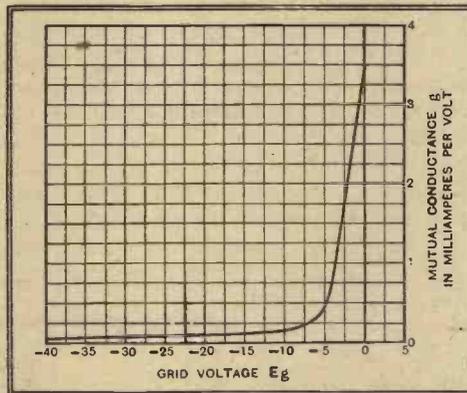


Fig. 11.—How the mutual conductance of a variable-mu valve (Type VMSG) is affected by alterations of bias.

amps. From this point on it behaves as a valve of so low an amplification factor that it is necessary to increase the bias to over 40 volts to reduce the anode current to zero. The current-ranges over which the valve has high- μ and low- μ characteristics are roughly indicated on the right of the diagram.

The great length of this curve shows that the valve will handle very much larger signals than the ordinary screened valve before it introduces cross-modulation. Further, it will be noticed that the curve gets progressively less steep as more bias is applied. That is, the slope of the valve, and hence its amplifying abilities, are reduced by increasing the bias. This offers the desired feature of a volume-control independent of screen-voltage, for all the control that could possibly be desired is available by mere change in bias voltage. This is illustrated in the curve of Fig. 11, which shows the variation of the

slope of the valve with bias. Roughly, the gain of the stage in which this valve is incorporated can be varied over a range of 50 to 1 by change of bias. This is plenty for a single-stage set; if two stages are used the control covers a range of 2,500 to 1.

With strong signals it is necessary to accommodate, without flow of grid current, a larger voltage-swing than is necessary when receiving small signals. The volume-control by bias, in which the working point of the valve moves progressively down the curve as the signal gets stronger, automatically allows for this.

Secondary Emission Effects

It is evident, of course, that the curve of Fig. 10 is not a straight line over its whole length. Some slight distortion must therefore still remain when a really strong interfering signal, of the order of 5 volts, is being received. Even so large a signal as this, it must be noticed, only involves a comparatively small part of the curve, over which the departure from a true straight line is nowhere very serious. The full curvature, as the eye appreciates it by looking at the diagram, never comes into effect at all. Were the curve a straight line, volume-control by bias would obviously cease to be possible, since the slope of the valve would be the same throughout.

In practice, it is found that the variable-mu valve, even though not theoretically perfect, is sufficiently so to provide a complete cure for cross-modulation in all reasonable circumstances. As a result, it has almost entirely replaced the ordinary screen-grid valve for all purposes save that of detection.

The peculiar shape of the curves connecting the anode voltage of a screen-grid valve with the anode current has already been remarked upon. If the effect of slowly raising the anode voltage from zero up to and beyond the screen voltage con-

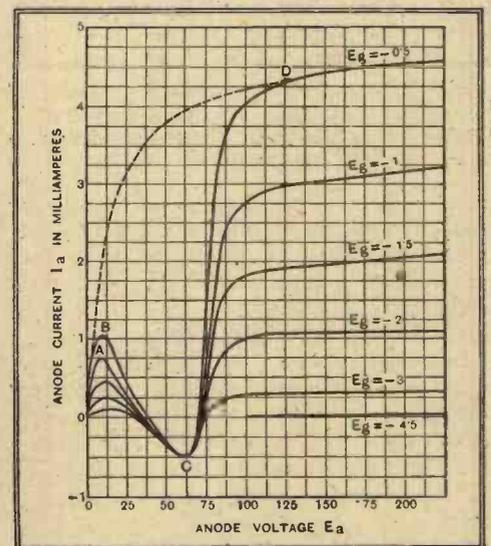


Fig. 12.—The dotted line shows the anticipated characteristics, from simple theory, of an S.G. valve, while the realised characteristics of the actual valve are indicated in full lines.

¹ See "Non-Linear Valve Characteristics"; C. S. Bull, *The Wireless Engineer*, Feb., 1933, p. 85.

From Triode to Double-Diode-Pentode—

sisted only in the progressive increase in the number of electrons drawn through the screen to the anode, one would expect the curve to have some such shape as that shown dotted in Fig. 12. Here the anode current is depicted as rising regularly with anode voltage until the latter reaches that of the screen, after which, the anode by now taking practically all the electrons, the current is shown as rising only very slowly. The curves of Fig. 6, reproduced in full line in Fig. 12, represent the observed behaviour of an actual valve.

The failure of the practical curves to reproduce the admirable simplicity of the theoretical one is due simply to the omission from the theory of the process of *secondary emission*. When an electron strikes a piece of metal at speeds over a certain limit it is liable to dislodge by its impact one or more electrons from the metal itself. These electrons, once liberated into free space, will be attracted to the most positively charged object within their range.

With this new phenomenon in mind, let us trace the course of the curves. On first applying a voltage to the anode, a small current appears. For a certain distance the dotted curve is followed, but at A the observed curve bends sharply away. This corresponds to the beginning of secondary emission from the anode, the released electrons travelling to the more positive screen. The net anode current is naturally reduced by these lost electrons.

The H.F. Pentode

Increasing the anode voltage above that at B results in more electrons reaching the anode, but each additional electron now knocks out more than one on its arrival, and all these reach the screen, which is still at a much higher potential than the anode. The current therefore *decreases* with rising voltage and continues to decrease down to the point C. The fact that the current at C is negative merely implies that the impinging electrons displace secondary electrons at the rate of more than one per head. Beyond C, where the voltage at the anode is not much less than that at the screen, an appreciable proportion of the electrons ejected from the anode are beginning to return to it instead of to the screen. This proportion rapidly rises as the anode voltage reaches and exceeds that on the screen until finally, at D, all secondary electrons return to the anode and the observed curve has rejoined the dotted one.

From the resulting curves it is clear that violent distortion is likely to occur if the alternating voltage developed on the anode during the receipt of a signal is allowed to be great enough to swing the anode momentarily down to a voltage near that of the screen. Nor can a low screen-voltage be used to minimise this effect, for this would reduce the voltage-handling capacity of the valve on the grid side, as we have already seen. To avoid distortion when a screened valve is called upon

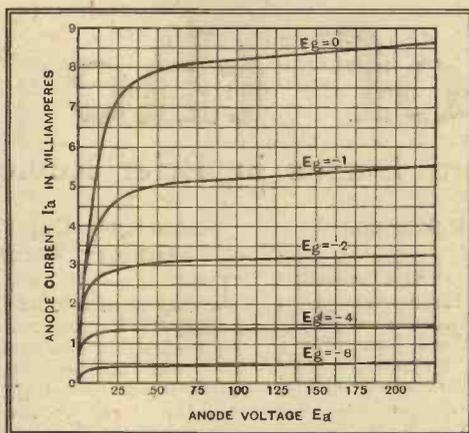


Fig. 13.—Avoiding secondary emission; the curves of a variable- μ screened pentode (Cossor MVS/Pen.). The "kinks" shown in Fig. 12 have disappeared.

to handle a large voltage in its anode circuit it is therefore necessary to suppress this secondary emission.

This is done by inserting an extra electrode between screen and anode and connecting this electrode, called the *suppressor grid*, to the cathode. A secondary electron ejected from the anode is now protected from the attractive field of the screen, while still feeling the pull of the anode. It therefore returns to the latter, leaving the total anode current neither larger nor smaller as the result of its little trip into space.

A screened valve built with the additional suppressor grid has five electrodes in all, and so is known as a *pentode*. That the suppressor really does suppress secondary emission can be seen from the curves of Fig. 13, which relate to a screened pentode. In general shape they agree quite well with the dotted curve of Fig. 12, deduced for a screened valve without taking secondary emission into account.

(To be continued.)

NEWS FROM THE CLUBS

The New Season

Signs are not wanting that the coming club season will be as widely and as vigorously observed as its predecessors. A large number of societies are already in session and others are about to hold their inaugural meetings.

The past summer has been an extraordinarily active one. Most field days have been devoted to direction finding, and a new feature has been experiments with ultra-short waves.

Station Logging Field Day

The International Short-Wave Club of London recently held a field day at Westerham Hill, Kent, four receiving stations being in operation. A competition was arranged, members having to log as many stations as they could between 3 and 6 p.m. The winning station logged no fewer than 68 transmissions. The Hon. Sec. of the Club is Mr. Arthur E. Bear, 10, St. Mary's Place, S.E.16.

"Ultra Shorts"

Five-metre field days have been held by the Golders Green and Hendon Scientific Society and the Kentish Town and District Society. The experiments of the former society were briefly described in last week's *Wireless World*. The Kentish Town Society's experiments included a fixed station G6TV and a mobile station G5SG operated on a car. The Hon. Sec. is Mr. Eric A. C. Jones, 46, Lady Margaret Road, Kentish Town, N.W.5.

Midnight D.F. Test

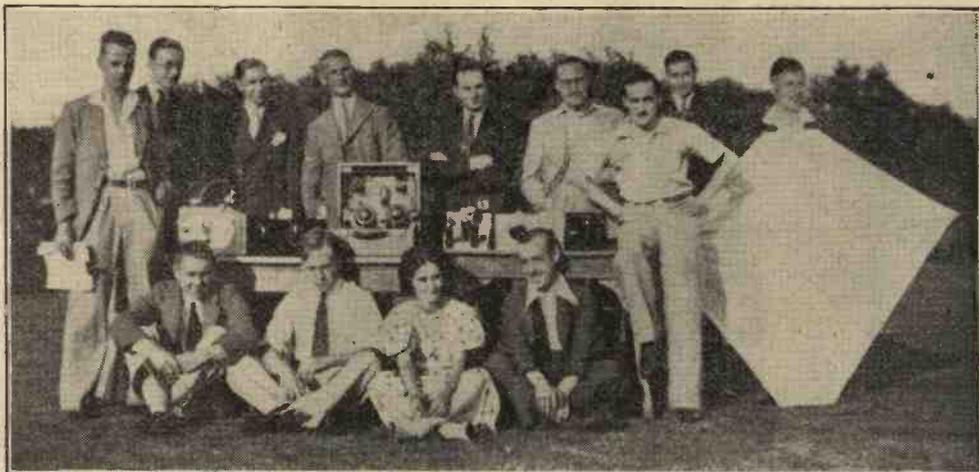
On Saturday, September 29th, Slade Radio (Birmingham) will hold a direction finding test at midnight. All radio enthusiasts in the district are invited to attend. Application for particulars of membership can be obtained from the Hon. Sec. at 110, Hillaries Road, Gravelly Hill, Birmingham. 'Phone: East 0852.

For Manchester Enthusiasts

New headquarters for the International Short-Wave Club, Manchester Chapter, have been found at the British Legion Offices, Long Street, Middleton, where the next meeting will be held on October 2nd. Thereafter during the winter season meetings will probably be held twice a month. At the next meeting a new type of short-wave receiver will be discussed and demonstrated. The Hon. Sec. is Mr. R. Lawton, 10, Dalton Avenue, Thatch Leach Lane, Whitefield, nr. Manchester.

Meetings Twice a Week

Tuesday last, September 25th, saw the reopening of the Bec Radio Society, which is run in conjunction with the Literary Institute, Beechcroft Road, S.W.17. Meetings are on Tuesdays and Thursdays. All classes of members are welcomed, and full particulars may be obtained from the Hon. Sec., Mr. B. W. S. Challans, 1, Baltic House, Balham Hill, S.W.12.



STATION LOGGING TEST. Members of the International Short-Wave Club, London Chapter, who took part in a recent station logging competition at Westerham, Kent. The winning station tuned in sixty-eight transmitters between 3 and 6 p.m. One competitor used a kite-supported aerial.

News of the Week

Current Events in Brief Review

More Like Droitwich

DROITWICH, with its power of 150 kW., will soon have companions of equal calibre in the European ether. Transmitters of the same power are under construction in the Marconi works for Motala (Sweden), Bod (Roumania), and Lahti (Finland).

Short Waves from the Azores

TRANSMISSIONS in English and Portuguese can now be heard from a short-wave station in the Azores Islands. The call sign is CT2AJ and the frequency 3,500 kc/s. The power used is 50 watts. Reports should be sent to Radio CT2AJ, St. Miguel, Azores Islands.

Five-Metre Working

THE increased interest taken in ultra-short-wave working is reflected in the number of enquiries we have received for five-metre transmission schedules.

We should be glad if readers who are carrying out regular tests on the 56-megacycle band would supply us with times of transmission.

Loud Speakers and Acoustics

AS recently announced, Dr. N. W. McLachlan is to give a special series of lectures on "Loud Speakers and Acoustic Problems," at the Borough Polytechnic, Borough Road, S.E.1, on Wednesdays (8-9.30 p.m.), commencing October 3rd, 1934. The lectures will be preceded by others on the mathematical work involved.



A MICROPHONE BLESSING. The Panchen Lama, one of the two supreme pontiffs of the Buddhist faith in Tibet, recently visited Shanghai. The photograph shows the Lama bestowing his priestly benediction on the Chinese populace through a Philips microphone. Loud speakers were installed in front of the Town Hall.

Virtue Rewarded

THERE is jubilation in the ranks of British amateur transmitters at the announcement by the G.P.O. that the frequency channels allotted to them are to be increased as a result of their close adherence to their official frequencies during the past few years.

The 170-metre band has been widened by 20 kc/s, the 80-metre band by 40 kc/s, and the 20-metre band by 50 kc/s. In addition a new band around 10 metres has been specially allotted for amateur television transmission.

French Regional Scheme

BRITISH listeners will first begin to realise the existence of the new French high-power regional scheme early next year. At the recent banquet of the French Radio Trade, M. Quenot, representing the Postmaster-General, assured the trade that the high-power stations scheduled for opening in the first months of 1935 would make their debut at the contract dates.

The majority of the French regional stations will have a power of at least 120 kW. each.

Radio in Russia

NO fewer than sixty-two languages are used in broadcasting from the Russian stations, according to information from official sources. Radio is credited with having banished illiteracy; the vast territories of the Soviet Government are now peopled with radio listeners who, with the aid of the broadcast lessons, have taught themselves to read and write.

America's Cup: Radio History Recalled

THE races for the America's Cup have recalled early radio history. It is not generally realised that it was exactly thirty-five years ago that the utility of wireless was first demonstrated in America. The occasion was the America's Cup contest, in which the American yacht *Columbus* beat Sir Thomas Lipton's *Shamrock I*.

The young Guglielmo Marconi had arranged with the United States lighthouse service to erect a receiving antenna at the lighthouse at Navesink, N.J. A spark transmitter was installed on the steamer *Ponce*, which, keeping in close touch with the contestants, successfully transmitted news bulletins to the land station, these being relayed to the offices of the *New York Herald*. Thousands of words were sent, Marconi and his operators transmitting by morse code at 15 words a minute.

This is in interesting contrast to present-day arrangements, under which the short-wave transmissions of Press messages on the recent contest was accomplished automatically at the rate of 150-200 words per minute.

Licence Fees in Holland?

HOLLAND is at last considering the question of whether listeners should pay licence fees. Up till now the Dutch radio enthusiast has subscribed an optional amount to the particular broadcasting society in which he is interested, but the probability is that a new régime will soon be instituted. The Dutch Parliament will shortly discuss a Bill involving an annual licence fee of three florins, i.e., 8s. or 9s. The proceeds of the tax would be used to construct State broadcasting stations, which would be placed at the disposal of the existing associations.

Lightning and Aircraft

"ON aeroplanes without aereals there is practically no danger to the personnel from lightning. The position, however, is much more serious if the machine has a trailing aerial. The most important thing, therefore, to be done when it is known that the plane is in a danger area or is about to enter a danger area, is to withdraw the aerial."

This quotation is taken from an interesting booklet "Professional Notes No. 66; Lightning and Aircraft," by G. C. Simpson, F.R.S., issued by the Meteorological Office of the Air Ministry, and obtainable from H.M. Stationery Office, price 4d.

The report states that there is no authentic case on record of an aeroplane having been wrecked as the result of having been struck by lightning.

Here and There

THE best story of the week concerns a Dutch burgomaster who, through an oversight, found himself due on the same day and



VATICAN SHORT-WAVE STATION. Father S. J. Soccorsi, the new director of the Papal transmitter. He is seen above at his private transmitter.

hour to preside over a meeting of the Municipal Council and to inaugurate a flower show. He overcame the dilemma by recourse to the resources of the gramophone and a public address system. His flower show speech was recorded on a disc and, by means of a power amplifier, was relayed to the waiting guests at the flower show, who apparently were eminently satisfied with the result.

Courses for Radio Technicians

PROPOSALS for the inauguration of a new department at the Manchester College of Technology, in which radio engineers and technicians could be trained, were announced last week. At present radio engineering is handled by the Electrical Engineering Department at the Manchester College of Technology, under the direction of Prof. J. Hollingworth.

National Studio at Melbourne

THE Australian Broadcasting Commission, which provides the programmes for the national service in Australia, is making arrangements to establish a building at a cost of £30,000 to be used as studio and offices for the Commission in Melbourne. The new building will stand on a site of the dilapidated old Eastern Markets, which half a century ago were a scene of garish life.

BROADCAST BREVITIES

By Our Special Correspondent

One in 18,000

ON the basis of three listeners to every licence Great Britain can boast some eighteen million devotees of the loud speaker. Out of this number, approximately 1,000, i.e., one in 18,000, have written to the B.B.C. anent the transmissions from Droitwich. Some of the letters, as might be expected, are complaints, which can be divided into (a) those from Daventry dwellers who consider that Droitwich is not loud enough, and (b) those from the denizens of Droitwich who find the new station uncomfortably close.

It is difficult not to be sorry for both classes; but, after all, such is life!

Free Pamphlets

A number of letters, mostly from North of the Tweed, ask for free pamphlets dealing with Droitwich and its wonders. In, I believe, seventy-four cases, the writers are actually in need of assistance as regards tuning in the new station.

No doubt the real spate of correspondence will begin on October 7th, when the great change-over takes place.

Until that date Droitwich will continue to transmit the National programme until noon, and also the late dance music.

Flexibility on Sundays

THE Sunday programmes are to be "more flexible," a phrase which may mean anything or nothing to the ordinary listener. I gather, however, that serious efforts (not too serious, I hope) will be made to brighten up the Sabbath, the aim being to secure "a more even distribution of entertainment value."

Much will depend upon the average level of entertainment value. If the plan means that the existing peaks are to be levelled with an administrative steam-roller, the prospect is decidedly flat. I hope, and believe, however, that the intention is to raise the general level from 1 p.m. till 10.30 p.m.

New Peak Periods

On weekdays the peak hours are to be earlier. At present the best talent is usually restricted to a period extending roughly from 8 p.m. to 10 p.m., but at the beginning of October the balance will be shifted towards the 6.30-to-8 p.m. period, when the B.B.C. Dance Orchestra may be heard as well as variety programmes and other lighter forms of entertainment.

The interesting decision has been arrived at not to broadcast Children's Hours from Droitwich, which, during the 5.15-to-6 p.m. period, will transmit dance music.

Scotland Next?

NOW that the North and Midland Regions have augmented studio orchestras it is likely that Scotland, too, will be provided with something more than a studio



THE LAST WORD. The main studio at Broadcasting House, Bristol, which was opened last week by the Lord Mayor. This studio is the largest in the country, with the exception of the Concert Hall at Headquarters, and is equipped with the latest devices.

nonet. In all probability a Scottish broadcasting orchestra will be formed with a minimum of thirty players, but who will comprise it and by whom it will be directed is still on the knees of the gods.

Bristol, with its new studios, is worthily representing the West of England, and possesses a good orchestra. It remains to be seen whether Wales will be satisfied with the existing musical arrangements.

The One-Studio Idea

MULTI-MICROPHONE, as opposed to multi-studio, technique will be used in the broadcast from St. George's Hall of "Monsieur Beaucaire" on October 4th (National) and October 5th (Regional). In this method the artists work under the eyes of the producer, who directs operations from the sound-proof control cubicle overlooking the stage.

For Future Reference

A numbered and squared carpet is employed, and on this the performers move about with the precision of chessmen in accordance with the "lay-out." A small-scale replica is filed so that, years later, a broadcast producer directing the same play can ascertain, by referring to a numbered and lettered square on the diagram, just where Monsieur Beaucaire was pulled from his horse on the road to Bath.

Stuart Robertson, the popular bass-baritone, will play the Duke of Winterset in "Monsieur Beaucaire," and Margaret Lauder the part of the heroine, Lady Mary Carlisle.

The Rhythm Symphony Orchestra

HAVING completed their opening series of short weekly broadcasts, Harold Ramsay and his Rhythm Symphony will give a first full hour's transmission on October 1st on the National wavelength. The programme will be diversified and coloured with a new style of orchestration. It will consist of American dance rhythm, including three types of blues, Viennese waltzes, and popular melodies. Under the title of "Symphony and Rhythm," this hour of popular music will include a generous leavening of vocal numbers.

The Symphony Season

HOT on the heels of the Promenade Concerts come the B.B.C. Symphony Concerts, to be broadcast twice a month from the Queen's Hall. To judge from the eminent names on the advance programme, these Concerts should be among the most memorable in recent years. The conductors include Sir Thomas Beecham, Sir Henry Wood, Adrian Boult, Felix Weingartner, and Stravinsky, and the soloists Casals, Huberman, Heifetz, Dohnanyi, and Schnabel.

The first concert, on Wednesday, October 24th, will consist of the "Mass of Life," by Delius, conducted by Sir Thomas Beecham, with the Philharmonic Choir.

30-line Television: New Time-table

AMONG the many mysteries of radio at the present time none is more tantalising than that concerned with the number of listeners tuning in the 30-line television transmissions from Broadcasting House. Estimates vary from hundreds to thousands and even tens of thousands.

Whatever the number, there will be general satisfaction at the new hours which television will observe as from Saturday, October 13th, when the first afternoon television transmissions will begin, the period being from 4.30 to 5.15. Thenceforth, the transmissions will be twice weekly—on Wednesdays (11 p.m. to 11.45 p.m.) and Saturdays (4.30 p.m. to 5.15 p.m.).

A Later Start?

Eustace Robb, Television Chief at Broadcasting House, is doubtful whether he will have the full three-quarters-of-an-hour on Wednesdays. In most cases the general evening programme overlaps, and it is unlikely that he will get started before 11.15 p.m.

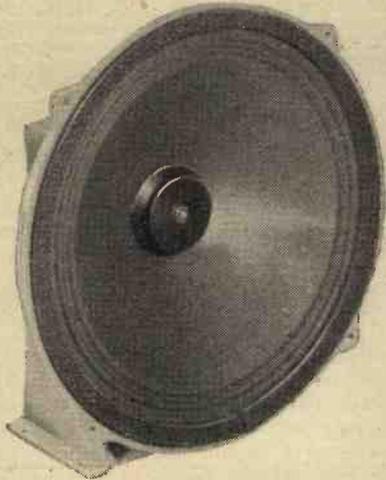
One Minute to Go

The extra quarter of an hour should make a difference to several of my acquaintances who seem to consume at least 25 minutes in getting their televisions synchronised and working properly. Few sights are more pathetic than that of a television enthusiast picking up the image with only one minute to go.

New Apparatus Reviewed

W.B. "STENTORIAN SENIOR" LOUD-SPEAKER

THE material employed in the magnet system is a special type of the new nickel-aluminium alloy known as "Nital." This has resulted in an appreciable increase in efficiency by comparison with earlier models. In the mechanical construction there are also one or two important improve-



W.B. "Stentorian" permanent-magnet moving-coil loud speaker, Model PMS1.

ments. The "Microlode" feature of switched impedance tappings, which has proved so successful in enabling the non-technical user to choose for himself the best operating conditions, now includes a concentric control for connecting the output terminals to the speech coil when it is desired to use the unit as a low-impedance extension speaker. Die castings are used throughout in the construction of the chassis, and the air gap is completely enclosed, back and front, by cotton wool seals.

On test a good output was obtained in the bass from 70 cycles upwards with the principal resonance at just under 100 cycles. Little falling off was noticeable until 800 cycles, but an appreciable dip occurred between this frequency and 1,000 cycles. Moderate resonances were noted at 1,500 and 2,500 cycles, and above the latter frequency the output fell away steadily, though there was still some response at 8,000 cycles. The dip between 800 and 1,000 cycles can be detected when listening to the unit at high volume levels, but otherwise the balance is satisfactory.

Cranley radio coils for the Olympic S-S Six.

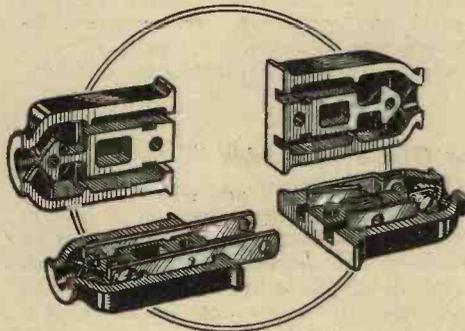


The chassis model costs £2 2s., and the makers are Whiteley Electrical Radio Co., Ltd., Victoria St., Mansfield.

LYONS METEOR CONNECTOR

THE Meteor connector is an American-made article, and marketed in this country by Claude Lyons, Ltd., 40, Buckingham Gate, London, S.W.1. A special feature of its design is that the parts are interchangeable, and with any pair of connectors it is quite easy to arrange them so that a non-reversible connection is obtained, each half being assembled with one prong and one socket. This is especially useful for D.C. circuits or when the connectors are employed to join two pieces of apparatus and quick changes are needed without risk of reversing the leads. At any time reversion to the more orthodox male and female pair can be effected.

The prongs fitted to this connector are of the self-locking blade pattern extensively used in the U.S.A., and the contacts are rated to carry 5 amps. at 250 volts. They cost 1s. each, or 1s. 9d. a pair. Type 81-M has two prongs, the corresponding socket part being the 81-F.



Meteor connectors fitted with interchangeable plugs and sockets.

COILS FOR THE OLYMPIC S-S SIX

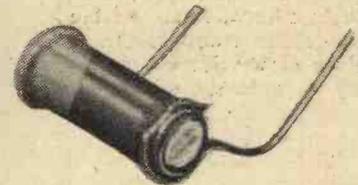
A SET of coils and I.F. transformers for the Olympic S-S Six has been received from Cranley Radio, Ltd., 32, Craven Park Road, Harlesden, London, N.W.10. It comprises a pair of aerial filter coils L1 and L2, and an oscillator tuning unit, the components of which are contained in a large screening can. The assembly includes the oscillator coil L3 and the tuning condenser. The remainder of the apparatus consists of six I.F. transformers, each contained in a screen and fitted with an air-dielectric tuning condenser, and the transformers are all identical save for the coils embodied.

The coils follow closely the specification published in *The Wireless World* and are eminently suitable for use in the Olympic S-S Six. They are priced at £3 10s. for the complete set. This firm also makes smoothing chokes and a mains transformer for this set, and the components are of robust construction.

Recent Products of the Manufacturers

SERADEX HEAVY-DUTY RESISTANCES

THE Seradex range of fixed resistors wound on glass tubes has been extended to include some four-watt models, a 150-ohm specimen of which has been sent in for test. It measures 1½ in. long and is ¾ in.



Seradex 150-ohm four-watt wire-wound resistor.

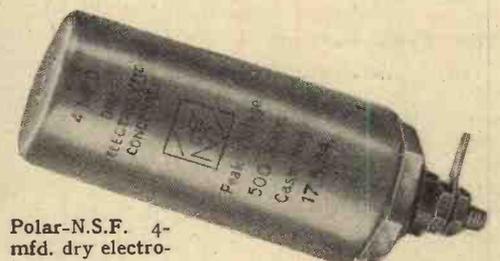
diameter, the resistance wire on this particular size being space-wound.

The maximum current for four watts dissipation with the resistance is 163 mA, and this it carries without overheating. The enamel coating does not soften or peel off, and the resistance value remains sensibly unchanged. Before test the measured value was 153 ohms, and during test with the full current load it was 152.5 ohms approximately. Tinned copper wires are fitted for connecting purposes, and the price is 1s. The makers are Trevor Pepper, 575d, Moseley Road, Birmingham, 12.

POLAR-N.S.F. DRY ELECTROLYTIC CONDENSERS

THE new Polar-N.S.F. range of components includes a series of dry electrolytic condensers assembled in tubular aluminium cases designed for chassis mounting. The case is joined internally to the negative electrode, and the positive is brought out through the centre of an insulated bush in the base. This is a shade under ¾ in. in diameter, and is fitted with a large hexagon nut and a self-locking washer.

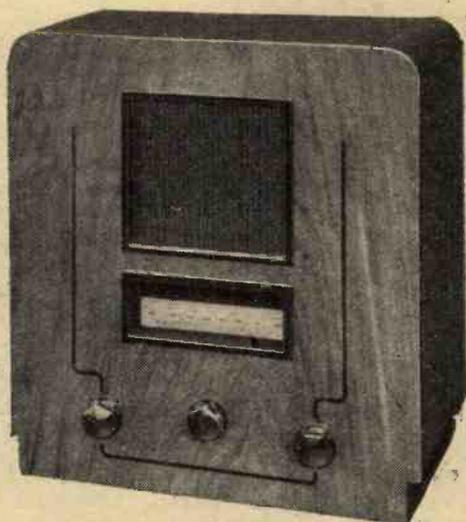
The maximum peak potential is 500 volts D.C., and, although this should not be exceeded in practice, occasional overloads will not damage the condenser, as a generous factor of safety is allowed. Our specimen successfully withstood a 50 per cent. voltage overload without apparent damage, for



Polar-N.S.F. 4-mfd. dry electrolytic condenser.

when the potential was reduced to the recommended maximum value, the leakage current was no greater than before. At 500 volts D.C. it was 0.25 mA., giving an internal resistance to D.C. of 2 megohms.

These condensers are made in 4-, 6-, and 8-mfd. sizes, the prices being 4s. 6d., 5s., and 5s. 6d. each respectively, and they are obtainable from Wingrove and Rogers, Ltd., 188-189, Strand, London, W.C.2.



The Lissen "Skyscraper" Band Pass Three

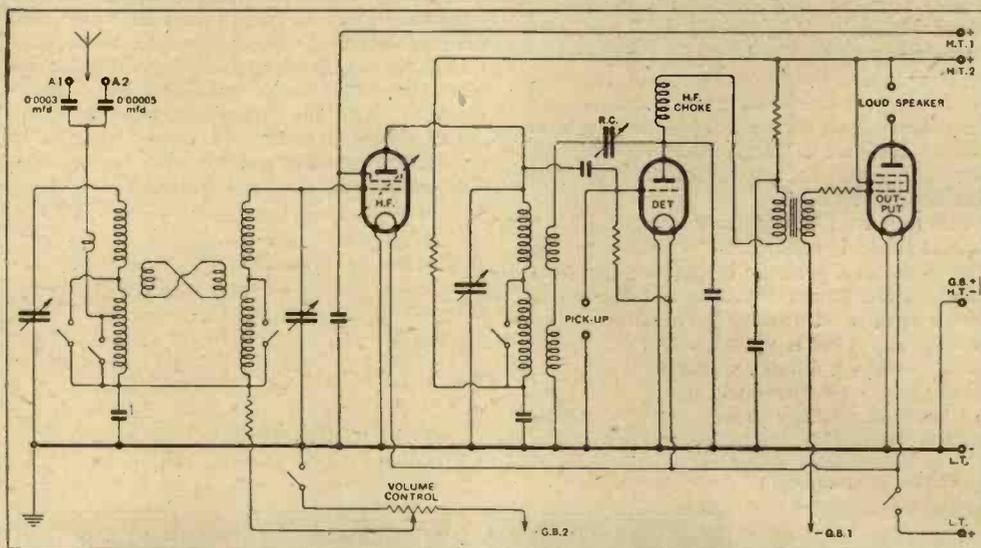
An Up-to-date Battery Receiver for Home Constructors

THE builder of a receiver from a kit of parts nowadays requires something more than an up-to-date circuit arrangement; workmanlike mechanical construction and neat appearance are also needed. In the latest Lissen set, which forms the subject of the present review, he gets both.

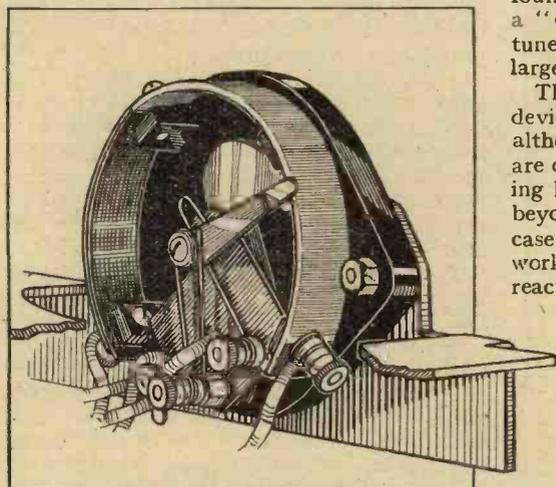
Basically, the receiver embodies an H.F.-det.-L.F. circuit with band-pass input, triode grid detector, and a transformer-coupled output pentode. As the accompanying circuit diagram shows, there is nothing particularly unconventional, but the set has been generously planned in the matter of decoupling, etc. A detail which cannot be shown in a diagram is the dual volume control system, which consists of a mechanically linked potentiometer and re-

acted by the fact that the coils are supplied ready assembled and wired as a unit. Components are in no way cramped as to space, and so wiring is an extremely easy matter.

As the tuning of the various circuits is rather sharper than usual, it follows that the trimming adjustments are fairly critical. However, the correct procedure is described



Complete circuit diagram: the volume control and reaction condenser are mechanically linked.



The combined potentiometer and reaction condenser.

action condenser. During the first part of the rotation of the control knob, bias on the H.F. valve is progressively reduced from maximum negative to minimum, while reaction remains at zero. As the control is advanced still further, the reaction condenser vanes are progressively enmeshed and thus sensitivity is increased.

We have already said that the set is up to date, and so it is hardly necessary to enumerate such features as a fully ganged tuning system, wavelength calibration, and a multiple switch for changing wavelength and controlling the filament circuit. A refinement that might hardly be expected in an inexpensive battery set is the fitting of iron-cored coils throughout.

The constructor's task is greatly simpli-

Both sensitivity and selectivity were found to be distinctly above the average for a "one-H.F." set, even for one with three tuned circuits, and this must be ascribed largely to the use of iron-cored coils.

The operation of the dual volume control device was noted with special interest; although arrangements of this kind are obviously desirable, their functioning has not, in the past, always been beyond criticism. But in the present case it was found that the control worked extremely smoothly; in fact, reaction is better than in many sets where a separate knob is provided for the purpose.

A possible objection to a dual control is that it renders impossible the procedure of artificially increasing selectivity by reducing amplification of the H.F. valve (or the H.F. input to it)

and at the same time sharpening the tuning of the detector grid circuit by applying reaction. It was found, however, that by the use of the alternative aerial connection the necessary conditions for reception in this manner could be brought about quite satisfactorily; no doubt this is because the true selectivity of the receiver is high.

Considering the low consumption of anode current (9 mA. maximum), volume is good, and quality of reproduction is satisfactory. It should be added that for local-station reception in favourable circumstances the total anode current is reduced to slightly over 7 mA. by operation of the volume control.

in detail, and even the beginner should experience no difficulty.

The price of the complete kit of parts with valves is £4 19s. 6d., batteries, loud speaker, and cabinet being extras. The walnut cabinet, complete with permanent-magnet speaker, costs £2 5s., or the



The Lissen kit set is assembled on a ready-drilled metal chassis.

speaker can be had separately at the price of £1 7s. 6d.

The makers are Lissen, Ltd., Worple Road, Isleworth, Middlesex.

Letters to the Editor

The Editor does not hold himself responsible for the opinions of his correspondents

Cinema Quality

YOUR correspondent, Mr. McCall, has plainly drawn a wrong inference from the statements contained in my recent letter on "Cinema Quality"!

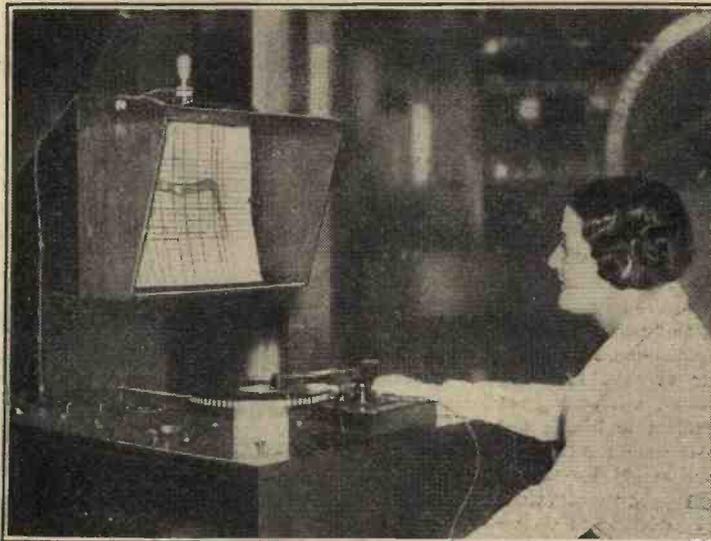
To prevent further misunderstanding, I would explain that judgment I have passed has been based on the average quality of reproduction during the course of whole cinema sessions, and not, as supposed, only when "talkie" films were being shown.

With regard to the loss of quality caused by the duplicating of film sound tracks, I would suggest that this need not be serious if rigorous measures are adopted during comparison tests on a "high fidelity" amplifier to ensure a satisfactory uniformity of those film copies released.

The fact that the better-known makers of cinema sound equipment employ service men to make a periodic inspection and overhaul of their apparatus does not necessarily assure us of good quality during cinema performances. This is no reflection on the engineers, since I know, without doubt, that during some performances many have felt as I have, in wishing to adjust the apparatus on the spot, if only to satisfy a personal and conscientious sense of duty to good quality engendered by their calling.

Since the success, or otherwise, of a film depends entirely upon the quality of the sound accompaniment, and the cinema is the most patronised amusement, I venture to predict that more practical assurances of good quality cinema reproduction,

The Pick-up Response Tester is one of the latest additions to the "His Master's Voice" research laboratories. The spot of light from the mirror galvanometer is focused on the curve on a transparent screen.



on the part of those concerned, would be amply rewarded by the appreciation of the British public. H. R. WILKINSON.
Enfield, Middlesex.

Expanding the Music

A VERY interesting article under the above title in your issue of August 24th last describes what would seem to be a new development in broadcasting technique. It may interest you to have your attention called to the strong resemblance between this "compression" of volume range at the transmitter with automatic "expansion" at the receiver and my somewhat fantastic proposal in your pages some five years ago.* You may remember that I carried the idea a little farther, and proposed that the volume range at the trans-

mitter should be "compressed" so much that the signals reaching the receiver input would always be at full strength however softly the orchestra might be playing. As regards interference, therefore, whether by Morse, atmospherics, or overlapping by other stations, the signal/noise ratio would always be at its most favourable value.

The consequent reduction in all kinds of interference, which was the object of my suggestion, is not mentioned in your new article, although the technique there outlined seems quite capable of giving this remarkable advantage provided the "compression" at the transmitter were made sufficiently complete and were arranged to take place upwards rather than downwards. London. D'ORSAY BELL.

A Critic of Quality

AS the originators of the now popular practice of providing loud speakers with multiple ratio transformers to facilitate matching, we are somewhat disturbed to read your independent contributor's, "A Critic of Quality," sweeping remarks on the subject in your issue of August 31st.

If he had taken the trouble to obtain full

a little accurate information on the subject under discussion.

G. S. TAYLOR,

Whiteley Electrical Radio Co., Ltd.
Mansfield, Notts.

"Common Supply" at Olympia

I THINK Mr. Ransome's letter re "Noise Supply" at Olympia is very largely justified.

Real quality was hardly ever to be heard there, even from loud speakers of outstanding performance in this respect.

After spending hours on the stand near a loud speaker somewhat better than the one I use at home, I would return home and hear results infinitely better than I had heard all day.

Surely the object of Radiolympia is to send the visitor home with the intention of scrapping his set. The present standard of reproduction has absolutely the reverse effect.

The poor quality is, in my opinion, due to several factors in addition to the question of matching the speaker to the supply. Actually, each speaker point at Olympia is fed through an independent 2,000 ohm resistance. This makes matching a fairly simple matter, and limits, but does not eliminate, the effect on the common supply of irregularities in loading caused by the fact that the average speaker and its transformer does not behave as a pure resistance. The rising impedance at high frequencies tends to compensate for top loss, and may therefore be useful rather than harmful. The same cannot be said for peaks in the impedance curves due to speaker resonances, and these might therefore be expected to reappear on better speakers having flatter impedance/frequency curves. This applies also to the impedance variations due to many output transformers of poor design.

The principal fault, in my opinion, lies in the material of which the programme consisted.

Up to the present I have never heard really first-class reproduction from commercial gramophone records unless scratch was, to say the least, audible—even on the smoothest of records. The B.B.C. have fairly successfully eliminated scratch, but real naturalness (assuming it was on the record) has gone with it.

The remainder of the programme consisted of direct microphone work. The announcements, though of excellent intelligibility, suffered from that peculiar distortion which seems to be characteristic of carbon microphones. That part of the programme which came via Broadcasting House consisted mostly of outside broadcasts. I distinctly remember Edinburgh and Bayreuth (Germany), to quote but two. Quality capable of doing justice to first-class loud speakers cannot be expected after a few hundred miles of landline.

That part of the programme which came from London included the promenade concerts from the Queen's Hall. These, though musically very fine, were not up to the very high standard which the B.B.C. occasionally put over from some of their studios.

information concerning the W.B. Stentorian or to examine one carefully he would find that this instrument, although providing accurate matching for any output, has not a tapped primary at all, the necessary adjustment being obtained by a series of taps on the secondary winding. His objections are not only entirely inapplicable to the W.B. Stentorian, but also to the products of the majority of reputable speaker manufacturers whose output transformers, although different in other respects, have the tapped secondary in common with our own. "A Critic of Quality" has condemned the whole "crop of speakers without output transformer possessing accurate matching properties" purely on the strength of a theoretical disadvantage in the tapped primary method, which is used in very few cases.

We suggest to your contributor that before he again casually damns the opinions and designs of a number of responsible specialist manufacturers he takes the trouble to obtain

* "Pretty Idea . . ." *Wireless World*, May 15th, 1929, pp. 515-516.

Anyone who listened with a good loud speaker on Friday, September 7th, to the Promenade concert (Queen's Hall), and also to the B.B.C. Orchestra, Section C (from the studio), which was being transmitted simultaneously on the other station, will agree that the transmission from the Queen's Hall, particularly as regards balance, was greatly inferior to that from the studio.

The Queen's Hall transmission on that occasion sounded much the same as on those occasions when it was relayed during the show.

Of the direct studio transmissions, I remember being particularly disappointed with the relay of the organ from the concert hall. The jazz record which followed this relay contained more bass than the whole organ transmission put together.

The following, therefore, would be my suggestions for next year:—

Negative.

- (1) Do not use gramophone records.
- (2) Do not use carbon microphones.
- (3) Do not put on O.B.s with hundreds of miles of landlines.
- (4) If the "Proms" cannot be balanced properly leave them out too.
- (5) Omit organs unless they have true bass pipes, the organist is allowed to play them, and the microphone is capable of dealing with them.

Positive.

- (1) Use a live orchestra.
- (2) Balance it properly.
- (3) In the studio with favourable acoustics.
- (4) With first-class microphones for the announcements as well as the items.
- (5) Improve the common supply if possible.

The most satisfactory way of doing this would be to supply those firms who are prepared to pay a little extra through a trap valve, delivering the normal power, and so fed that loading irregularities do not affect its input.

That a visitor to Olympia can return home, switch on, and be thankful that his set sounds better than any of the "latest products," must not occur again in future years.

EXHIBITOR.

London.

'Phone and Key Transmissions

MANY of your readers must have read Mr. A. O. Milne's letter, published in August 17th issue, with mixed feelings.

I refer particularly to his comments on the Royal Air Force.

Has Mr. Milne considered the fact that the operating he criticises as being "from the general operating point of view quite outside the pale" is done by young fellows still in the student stage? That the apparatus generally in use is still that designed and used ten years ago?

Operators trained by the Royal Air Force usually spend a brief twelve months "learning the ropes" after leaving the wireless school before being posted abroad for overseas service.

Can Mr. Milne claim to have been an experienced operator within twelve months of first operating a station? I'm sure he cannot.

On returning from abroad the experienced operator is usually posted to the reserve within a very short time, or has attained a supervisory rank, so that they are seldom heard in the home country.

The economy cuts, which have affected us

all to some extent, and the need for strict economy, have no doubt largely influenced the lack of up-to-date apparatus.

I feel sure that when the old apparatus has been superseded Mr. Milne will have nothing to complain of from the point of view of quality transmissions, for the people responsible for the development of apparatus are always well abreast of the times, even

if the lack of funds prevents the general adoption of their designs.

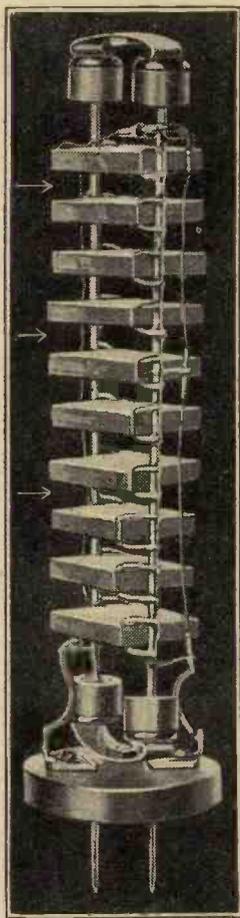
I would like to draw Mr. Milne's attention to the fact, too, that the majority of the "hams" in the East and Far East are service personnel, whose transmissions and operating are such that even he would not criticise adversely.

L. MCALLISTER,
R.A.F. Reservist.

The Piezo-Electric Microphone

Details of the New "Sound-cell" form of Construction

THE properties of Rochelle salt and its application to the construction of loud speakers and microphone pickups have already been discussed in the pages of this journal.¹ It is logical to anticipate that good results will be obtained with this substance in the construction of microphones, and early experiments in which "bi-morph" elements were attached to a light diaphragm through a series of levers, and also experiments with large plates actuated directly by the pressure of the sound waves, gave promising results. As might be expected, however, resonances occurred within the range of frequencies required, and it was not until the development of the so-called "sound-cell" that results comparable with those given by other types of microphone were obtained.



Multiple-element crystal microphone with cover removed. The arrows indicate the direction of propagation of the sound-wave.

The "sound-cell," as developed by the Brush Development Corporation of America, consists of two bi-morph elements approximately 0.03in. in total thickness and $\frac{7}{16}$ in. square arranged to form the opposite sides of a shallow box enclosing a small volume of air. The elements are hermetically sealed with waterproof varnish in the usual way, and the electrodes are connected in parallel, so that E.M.F.s

generated by mechanical shocks to the cell as a whole tend to cancel out, while differential deflections of the plates due to compression and rarefaction of the surrounding air give rise to a cumulative voltage.

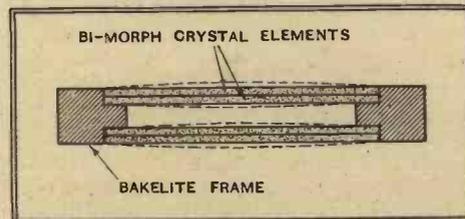
In spite of the small dimensions of the cell, an increase of pressure is experienced at high frequencies where the wavelength of sound

becomes comparable with the size of the cell. This may amount to as much as 4 db. at 10,000 cycles when the direction of sound is at right angles to the surface of the plates. For this reason the cells are mounted edge-wise to the direction of propagation of the sound wave, as shown in the photograph. Under these conditions the variation of output in the extreme top up to 10,000 cycles does not exceed 1 db., and this is due to a phase change over the surface of the cell, and not to the increase of pressure due to reflection.

The dimensions are such that the fundamental mechanical resonance occurs at 10,000 cycles. This gives rise to an increase of output of about 2 db., which may be utilised to correct for losses occurring in the amplifier at this frequency. To increase the total output a number of cells is used, and, with parallel connection, the rise towards 10,000 cycles may be decreased, or by series connection increased. Alternatively, a combination of series and parallel connections may be used to give the desired response and at the same time to keep the impedance of the system as a whole at a conveniently low figure. Incidentally, capacity due to the leads does not give rise to frequency discrimination, but merely reduces the efficiency of the system as a whole. The capacity of each cell is of the order of 0.003 mfd., and the voltage developed is 0.125 millivolt per bar.

It has been suggested that the temperature coefficient of Rochelle salt would prove a serious obstacle to its use in microphone construction, but means have been found of overcoming this difficulty, and in the latest designs it is found that the output does not vary more than 2 db. over a range of temperatures from -8° F. to 120° F.

Although the normal type of piezo-electric microphone is non-directional in a horizontal plane, it is possible to arrange groups of elements with suitable phasing connections that fulfil the special directional requirements



Cross-section of piezo-electric "sound-cell," showing method of assembly.

of film studios. Also, laboratory standard microphones in which the mechanical resonance has been raised to 20,000 cycles have been produced. The elements in the latter type are only $\frac{7}{32}$ in. square and 0.01in. thick, which involves crystal plates on the correct axis of less than five-thousandths of an inch in thickness.

¹ January 5th, 1934.

READERS' PROBLEMS

A Phantom Condenser

A PUZZLED reader, who has been comparing his receiver with the circuit diagram supplied by its manufacturers, has noticed that a condenser is missing. At any rate, he cannot find the aerial series condenser, which, according to the diagram, should be wired across the contacts of the local-distance switch.

As we happen to know the set in question, it is easy to explain the apparent discrepancy. The stray capacity of the switch, when in the "open" position, is high enough for the function it is intended to perform, and so a separate condenser, in the physical sense, is unnecessary. As use is made of the stray capacity in this instance, it is quite legitimate to represent it in the circuit diagram by the usual symbol.

Supplementary H.T. Supply

A QUERIST, who is in the rather unfortunate position of having a 100-volts D.C. supply, asks us to suggest a method whereby this rather inadequate voltage (so far as anode circuit supply is concerned) may be supplemented by an H.T. accumulator battery.

It will be found convenient to connect the supplementary battery in such a way that, when the set is out of use, the cells may be charged from the mains supply. This may be done quite easily by employing a change-over switch in the manner suggested in Fig. 1. When the switch blades are in the left-hand position, the battery will be in series with the mains supply, and will discharge through the anode circuits, while to charge the battery the switch is reversed.

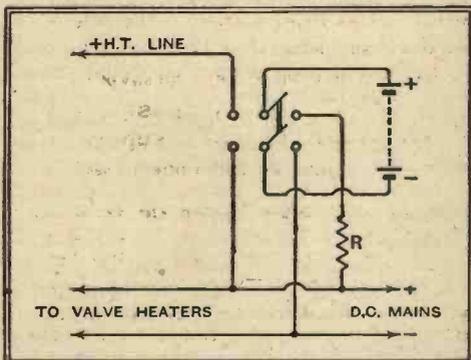


Fig. 1.—A "boosting" battery for increasing H.T. voltage. Provision for charging the cells is made.

In order that the H.T. battery may be fully charged, it is necessary that its voltage should be appreciably less than that of the mains; accordingly, we recommend our correspondent to use not more than about 40 cells (rated at 80 volts). It will be noticed that a limiting resistance, R, is inserted in the charging circuit; the value of this resistance will depend on the charging rate of the battery.

As we believe this query refers to a domestic lighting installation where current is derived from accumulators, no smoothing is shown in the circuit diagram, but it can, of course, be added if needed.

THESE columns are reserved for the publication of matter of general interest arising out of problems submitted by our readers. Readers requiring an individual reply to their technical questions by post are referred to "The Wireless World" Information Bureau, of which brief particulars, with the fee charged, are to be found at the foot of this page

Short-wave Reception

THE loading effect of an aerial on a short-wave receiver of the simpler detector-L.F. type is sometimes so serious at certain wavelengths that it is impossible to provoke self-oscillation. A newcomer to the short-wave field, who has noticed that self-oscillation can be stopped by connecting the aerial to the receiver in the normal way, has come to the conclusion that some fault exists, and asks for suggestions as to how it may be remedied.

We do not think that a genuine fault is indicated; in all probability all that is necessary is to make provision for reducing aerial coupling. The easiest way of doing this is to insert a very small variable condenser in the lead from the aerial terminal to the tuning coil.

This reader's experience draws attention to the advantages of an H.F. stage in a short-wave set. Even though the valve may not provide true H.F. amplification, it acts as a buffer, and removes the aerial loading from the tuned circuit; that is why it is included in the receiver recently described.

Negative Smoothing

IT is standard practice to connect the smoothing chokes in the positive lead of the output of a rectifier, in spite of the fact that the opposite procedure has certain attractions. As a result of connecting the choke in the negative lead, the voltage developed across it, instead of being wasted, may be employed for grid-bias purposes. But, although at first sight it would appear that the smoothing-choke should work equally well in either position, this expectation is not always realised in practice. An interesting example of one of the shortcomings of "negative smoothing" is furnished by the experiences of a correspondent, who

The Wireless World INFORMATION BUREAU

THE service is intended primarily for readers meeting with difficulties in connection with receivers described in *The Wireless World*, or those of commercial design which from time to time are reviewed in the pages of *The Wireless World*. Every endeavour will be made to deal with queries on all wireless matters, provided that they are of such a nature that they can be dealt with satisfactorily in a letter.

Communications should be by letter to *The Wireless World* Information Bureau, Dorset House, Stamford Street, London, S.E.1, and must be accompanied by a remittance of 5s. to cover the cost of the service.

Personal interviews are not given by the technical staff, nor can technical enquiries be dealt with by telephone.

has found that the background of hum in his receiver may be reduced almost to zero by removing the normal earth connection of the set. By doing this, however, performance is impaired in other directions, and we are asked to comment on this matter, saying why the addition of an earth connection should provoke hum.

In all probability this trouble is due to the fact that the effectiveness of the smoothing choke is impaired because it is partially short-circuited by the stray capacity existing between the H.T. secondary and primary windings of the power transformer. This possibility is illustrated diagrammatically in Fig. 2, where the stray capacity that is causing the trouble is represented by a

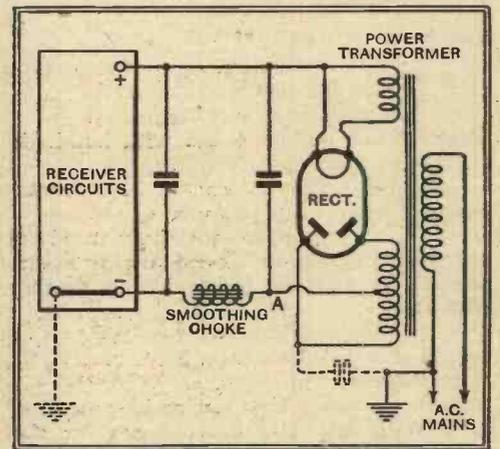


Fig. 2.—Showing how the effectiveness of a smoothing choke may be impaired by connecting it in series with the negative output of the rectifier.

condenser drawn in dotted lines. It will be seen that as soon as an earth connection is added to the receiver, this condenser is virtually connected across the smoothing choke, the circuit being completed through earth. The primary-to-secondary capacity of a power transformer is sometimes quite high, especially when an electrostatic screen is included.

It would be worth while trying the effect of connecting the receiver earth lead to the point marked A instead of to its usual terminal.

Checking Measuring Instruments

A CORRESPONDENT, who doubts the accuracy of his multi-range measuring instrument, is fortunate enough to be able to obtain access to high-grade standard meters, and asks whether there is any objection to making a comparison by connecting the two in parallel.

So far as the voltage ranges are concerned there is not the slightest objection; indeed, the most practical way of determining the error is to connect the meter under suspicion, in parallel with another of unimpeachable accuracy, across a source of voltage which can be adjusted within the necessary limits.

We gather, however, from our correspondent's letter that he proposes to check the "ampere" and "milliampere" ranges in the same way. This is incorrect; on the current ranges the two instruments should be connected in series. It is perhaps worth while adding that, to connect meters in series, one deals with them as if they were batteries, joining the positive terminal of one to the negative terminal of the other.

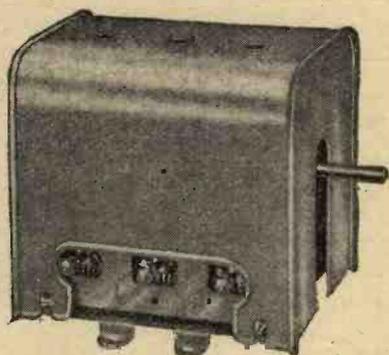


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2 gang ... 12/6 3 gang Superhet 18/9
3 gang ... 18/9 4 gang ... 25/-
4 gang Superhet 25/-

OTHER POLAR DRIVES

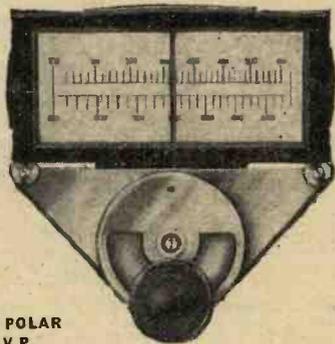
Polar Vertical C.K. ... 6/6
Polar Arcuate ... 5/9
Polar Panel Mounting 5/-

POLAR MICRO-DRIVES

Incorporating two reduction ratios, 100 to 1 and 7 to 1.

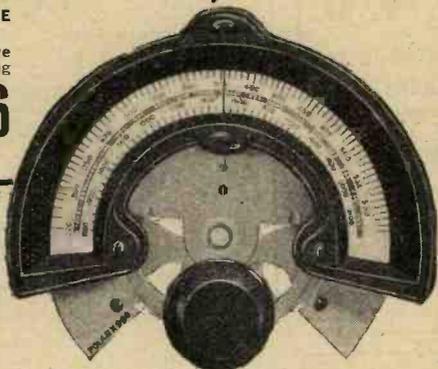
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Slow-motion drive with vertical moving pointer. Two lamp-holders provided **6/6**



POLAR
SEMI-CIRCULAR
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Slow motion. Bevelled scale. Moulded escutcheon. Lamp-holder. Price **5/9**

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& ROGERS, Ltd.

188/189, STRAND,
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Phone: Temple Bar 2244
Works: Old Swan, Litherpool.



The only H.T. Battery with cells that improve with time & hard work

The life of an H.T. battery is measured by the life of its cells. Dry cells become ineffective in a very few months and the whole partly-exhausted battery must be replaced. Lead-acid cells suffer sulphation and disintegration in a year or two and a whole expensive accumulator must be scrapped. Leclanche type cells become exhausted and need periodic replacement. Only the

MILNES H.T. SUPPLY UNIT

goes on from strength to strength, never failing, never running down, improving with hard work such as would wreck any other type of battery. Its nickel-cadmium plates will last for twenty years at least. Its alkaline electrolyte makes sulphation and corrosion impossible. The Milnes Unit calls for no replacements save a change of electrolyte every eighteen months. It is the only H.T. battery in the world which recharges automatically from the L.T. accumulator. The sole running costs are a little extra drain on the L.T. and this is usually too slight to be noticed. Users say that the Milnes Unit saves its cost in a year or so. It is definitely the cheapest and most efficient of all types of H.T. supply. It improves tone, volume and range of all battery sets.

SUPER CAPACITY MODELS RATED FOR DISCHARGES UP TO 40 m/a.

90 volt £3-3-0 100 volt £3-9-5
120 volt £4-2-3 150 volt £5-1-6

Also available in Double Super Capacity for discharges up to 100 m/a. Any size available from 30 volt at £1-4-0 upwards. Also models incorporating Grid Bias sections of 10, 15 or 20 volts.

ALL MODELS AVAILABLE ON EASY HIRE PURCHASE TERMS FROM 4/4 MONTHLY.

SEND THE COUPON NOW FOR FULLY DESCRIPTIVE FREE BOOK.

MILNES RADIO CO. LTD., CHURCH STREET, BINGLEY, YORKS.

Please send me full particulars of Milnes H.T. Supply Unit/Milnes Speakers. No obligation.

Name.....

Street.....

Town.....

County.....

PLEASE WRITE IN BLOCK LETTERS.

B.22

MILNES UNIVERSAL P.M. MC. SPEAKER

A moderately priced permanent magnet speaker with a performance equal to that of many expensive energised models. De Luxe model fitted with high efficiency magnet of nickel-aluminium alloy. Extremely sensitive with a fully balanced response range from below 50 cycles to over 8,000 cycles..... **42/6**

Also Standard model **32/6**

Either chassis available in handsome Walnut cabinets at **47/6** and **67/6**.

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All Milnes Speakers are fitted with Universal Transformers for perfect matching to any output valve or set.

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5605

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Set Manufacturers' Surplus, Clearance and Bankrupt Stocks offered in any of these columns may not be Manufacturers' current lines. Radio components advertised at below the list price do not carry any manufacturer's guarantee.

RECEIVERS AND AMPLIFIERS, ETC.

£8.—H.M.V. Radiogram, D.C., 501 (1932), excellent condition.—77, Castelnau, S.W.13. [6527]

PHILIPS 5-valve Battery, Superhet model 834E, perfect condition; £6/10.—58 Flat, Mantell St., N.1. [6570]

£70.—R.G.D. 1201 Auto, cost £100 in July, owner going abroad.—Box 1676, c/o The Wireless World. [6560]

CROSLLEY and Emmerson's Midgets and Car Radio; send for wholesale catalogue, importer.—Royal, 5, Buckingham Rd., London, E.18. [6447]

A.C./D.C. Receivers, long and medium wave; A.V.C., £6/10; car sets, £10/10, fitted.—Orthodyne Radio, 57, Doughty St., W.C.1. Hol. 1076. [6571]

OUR Kit of Parts for "Wireless World" Quality Amplifier, complete in every detail, including valves; amplifier only, £8/10; feeder unit, 36/-. [6571]

OUR Kit of Parts for "Wireless World" Olympic S.S. Six, complete in every detail, including valves and loud-speaker; £14/10. [6571]

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ARMSTRONG.—Latest 5v. bandpass superheterodyne chassis, with fully delayed A.V.C., 7 highly efficient tuned circuits, bandpass input, Marconi Heptode frequency changer, combined 1st detector and oscillator, bandpass I.F., coupled to Marconi H.F., pentode, bandpass coupled to Cosor Double Diode, giving distortionless detection and A.V.C., resistance coupled to Mazda high slope pentode, Marconi bi-phase rectifier, full vision illuminated tuning, calibrated in wavelengths, combined radio and gramophone volume control, corrected pentode output, giving exceptionally good reproduction; £6/18/6, with valves, royalties paid. [6503]

ARMSTRONG.—Universal triple bandpass superheterodyne chassis, with fully delayed A.V.C., 7 stages, incorporating latest Octode frequency changer and first detector, screened pentode intermediate stage, latest Mazda double diode high slope pentode, full vision illuminated dial calibrated wavelengths, combined radio and gramophone switching, this chassis is really universal, giving equally good results on A.C. and D.C. mains, free from hum; £6/18/6, including Mullard F.C.13, Mullard V.P.13a, Mullard U.R.2, Mazda P.P.4020, Philips R.C.1 valves. [6503]

ALL Armstrong Chassis are Constructed of the Highest Grade Components Throughout, carry 12 months service free guarantee, and are sent on 7 days' approval, carriage paid. [6542]

ARMSTRONG MANUFACTURING CO., 100, King's Rd., N.W.1. Phone: Gulliver 3105. [6542]

ALL Brand New, guaranteed, ordinary receiver A.C. 200-250v. (6 each only) Victor (H.M.V. in America) 5-valve superhet. clock tuning (why be confined to your local stations); all-wave, 15-50, 70-200, 250-550 metres; walnut cabinet, 10½x14x8 at £8/10; another, 4-valve, clock tuning, covering 250-550 and 1,000-2,000 metres (only), £5/5; cabinet, 13x10x8; Midget receivers, working off A.C. and D.C. mains, 100-130 and 200-250 volts, with adaptor provided; Emerson 5-valve L and M wave, A.V.C., pick-up terminals, handsome walnut cabinet, 10½x7½x5½, good quality, approx. 15 stations, at £4/6/2; the same, less cabinet, in sealed carton, at £3/13/6; for those wanting 70 stations or over, guaranteed (8 only) Victor Midgets, in massively constructed walnut cabinet, 10½x14x8, 5-valve superhet, incorporating every refinement of an expensive receiver, A.V.C., tone control, illuminated dial, 3 watts undistorted output, can be operated from batteries with adaptor included, therefore adaptable for car use, list £15/15, at £6/10; also, 4 only, Sparton 6-valve superhets., having all the above points other than not adaptable for batteries, about 80 stations, at £7/5; every set quoted above is complete in every detail with valves and moving coil speaker; all carr. paid.—Degallier's, 4-21, Upper Marylebone St., London, W.1. [6550]

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Exact to Specification

STANDARD TWO

KIT "A" Author's Kit of first specified components, including dual range coil ready wound to specification, but less valves. CASH OR C.O.D. £3 7 6 CARRIAGE PAID. or 12 monthly payments of 6/3.

KIT "B" As for Kit "A," but including set of 2 specified Osram valves. CASH OR C.O.D. £4 15 6 CARRIAGE PAID. or 12 monthly payments of 8/9.

KIT-BITS You pay the Postman. We pay post charges on all orders over 10/-. GREAT BRITAIN ONLY.

- 1 Formo variable condenser with Mystic drive - 6 6
- 1 Graham Farish Q.P.P. transformer - 10 6
- 1 Kinva H.F. screened choke - 4 6
- 1 Ormond slow motion midget condenser - 3 0
- 1 Set of 2 specified Osram valves - £1 8 0

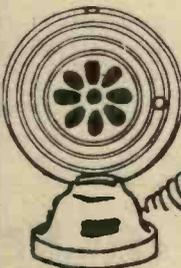
STANDARD TWO COIL

Dual range coil with reaction, ready wound on Paxolin former exactly to "Wireless World" specification. Cash or C.O.D. 6/6 Postage 6d.

EXPORT ORDERS Simply send full cash value plus a suitable amount for half carriage charges and any surplus will be immediately refunded. Packed free, we pay half carriage. Air Mail charges extra. P.E.T.O.-SCOTT, established in 1919, are the largest Radio-by-Mail House in the World. Hire-purchase terms are NOT available to Irish or Overseas Customers.

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HEAR YOUR OWN VOICE OVER YOUR OWN RADIO



With a "Wonder" Microphone you can Talk—Sing—Play and entertain your friends. A riot of fun. Listen and Laugh. Ideal for training to be a broadcaster. The instrument is scientifically constructed to give purity of tone and is highly sensitive. Simple to attach to any set, complete instructions given. About 15 ft. of flex with every instrument. Extension can be made to any distance. 4/6 Post Paid.

UNIVERSAL ELECTRIC SUPPLY CO. LTD., (Dept. W.W.), 4 Brown Street, MANCHESTER.

SINCE 1924 THE FOREMOST NAME IN SOUND REPRODUCTION CELESTION

The Very Soul of Music.

Celestion Ltd., London Rd., Kingston-on-Thames.

THE MOTOR CYCLE

Every Thursday 3d. w.w.15

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37/6.—S.G.3 2-gang Polar, Ormond loudspeaker, in walnut cabinet, listed 8 guineas, without valves and batteries, c.o.d. or cash with order, carriage forward.—Kay, 167, City Road, London, E.C.1. [6489]

PUBLIC Address Amplifiers.—A.C. mains, three stage, 21 watts, undistorted A.C. output, complete with valves, £15; universal A.C./D.C. three stage, 7 watts output, complete, £13; guaranteed 12 months; trade supplied; deferred terms.—D. E. Clarkson, B.Sc. (Eng.), Bridge Works, Bridge Rd., Wallington, Surrey. Phone: Wallington 3953. [6280]

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ACCUMULATORS.—Oldhams 170 volts H.T. (power type), excellent condition; £2/5.—S. Sole, 26, Fortis Green, E. Finchley, N.2. [6528]

MAINS EQUIPMENT.

VORTEXION Specified Olympic S.S. 6 Transformer, S.S.352, 5 years' guarantee, 25/-; less terminals and guarantee, 21/-; power chassis, £3/17/6; choke, 12/6; Single Span model, 25/-; power chassis, £3/10.

VORTEXION—Quality Amplifier or Super Monodial, 425-0-425, 120 m.a., 4v. 6-8a. C.T., 4v. 3a. C.T., 4v. 1a., 4v. 1a., super shrouded, core size 2½in. x 1½in., 2½ regulation primary engraved insulated terminals, weight 14lb., 26/-, carriage 2/-; normal shrouded, 22/-; open type, 20/-, post 1/3; speaker field replacement choke, 16/-; special output transformer to "W.W." specification, 12/6, post 9d.; state valve and speaker; "W.W." universal output transformer, £1; normal 40h. 50 m.a. primary output transformers, 10/6, post 9d.

VORTEXION 7.30h. 120 m.a. Choke, 215 ohms, in die cast shrouding to match; 12/6. IMITATED, but unequalled. Good enough for a "Wireless World" specification is good enough for you.

VORTEXION Cost Little More than the Cheapest, but unequalled by the dearest.

VORTEXION Standards Despatched by Return.

VORTEXION A.C./34, used by author in construction of A.V.C. Three, as illustrated; 18/-.

GUARANTEED 12 Months, and within 5% normal and 2½% super models, neat shrouding, with detachable feet, as used by Government Departments, etc., etc., any model guaranteed 5 years at extra cost of 2/-.

ALL Secondaries Centre Tapped.

VORTEXION.—250-0-250 60 m.a., 4v. 1 to 2a., 4v. 2 to 4a.; open type, 10/-; shrouded, 12/6; post 9d.

VORTEXION.—Ferrocarril III 350-0-350, 60 m.a., 4v. 2.5 C.T., 4v. 3.5 C.T.; open type 13/6, shrouded 16/-; post 9d.

VORTEXION.—Super model for H.T.8 or 9 or 10, 4v. 1 to 2, 4v. 2 to 4, open type 14/6, shrouded 16/6; post 1/-.

VORTEXION.—350-0-350, 120 m.a., 4v. 2 to 5a., 4v. 2 to 4a., 4v. 2.5a.; open type 14/6, shrouded 16/6; super shrouded model, weight 11lb., 4 filaments to specification, 21/-; post 1/3.

VORTEXION.—400 or 450 or 500v. 120 m.a., 4v. 2 to 5, 4v. 2 to 5, 4v. 2.5a.; open type 19/-, shrouded 23/-.

VORTEXION.—400 or 450 or 500, 150 m.a., 4v. 4a., 4v. 2.5, 4v. 2, 4v. 2, 4v. 2, core size 2¼x1¼in., a super job, 22 regulation, 35/-; shrouded, with terminals; less terminals, 30/-; open type, 26/-; post 1/3.

VORTEXION Auto Transformers to B.E.S.A. Specification, 100, 110, or 120v. to 200, 220, or 240 volts, 60 watts, 9/-; post 9d.; 120 watts, shrouded 12/6, open type 10/6, post 1/-; 200 watts, shrouded 16/6, post 1/-; 2,000 watts, £4/10.

VORTEXION 1,000-watt Transformers; £4/10, carriage free.

VORTEXION 30h. at 60 m.a. Chokes, 5/6; 40h. at 60 m.a., 8/6; 30h. at 150 m.a., 200 ohms, 10/6 open type, 12/6 shrouded.

VORTEXION Transformers Made to Your Specification; price according to wattage, 6v. filaments same price unless wattage grossly exceeded; special quotations by return.

VORTEXION (S. A. BROWN), 182, The Broadway, Wimbledon, S.W.19. Tel.: Liberty 2814. [6561]

PARTRIDGE, N., Radio Transformer Specialist.

PARTRIDGE, N., B.Sc. (Eng.), A.M.I.E.E., A.I.Rad.E.

PARTRIDGE Transformers.—"Certainly above the average . . . very soundly constructed transformers."

PARTRIDGE Transformers.—"Runs perfectly cool . . . a sound electrical job . . . represents very good value."

PARTRIDGE Transformers.—"Voltage regulation excellent . . . transformer remained remarkably cool."

PARTRIDGE Transformers.—Guaranteed 12 months; screened primaries, 200-250v., 50 cycles; all L.T. windings centre tapped.

PARTRIDGE Transformers.—250-0-250v., 60 m.a., 4v. 1a., 4v. 2-4a., 11/-; 350-0-350v., 60 m.a., 4v. 2-2½a., 4v. 2-4a., 13/6.

PARTRIDGE Transformers.—350-0-350v., 80 m.a., 4v. 2-2½a., 4v. 2-4a., 4v. 1a., 16/6; 350-0-350v., 120 m.a., 4v. 2-2½a., 4v. 3-5a., 4v. 1-2a., 18/6.

PARTRIDGE Transformers.—425-0-425v., 120 m.a., 4v. 2-2½a., 4v. 3-5a., 4v. 2a., 20/6; 500-0-500v., 100 m.a., 4v. 2-2½a., 4v. 3-5a., 4v. 2a., 21/-.

PARTRIDGE Transformers.—500-0-500v., 120 m.a., 4v. 2-4a., 4v. 3-6a., 4v. 1-2a., 4v. 1-2a., 27/6; larger types supplied to order.

PARTRIDGE Transformers.—0-7½-9-11v., 1-3a., 10/-; 0-15-18-22v., 1-2a., 10/-; 240v. (tapped 200v.), 200 m.a., 4v. 2-4a., 12/9.

PARTRIDGE Transformers.—Step-up or step-down autos, tapped 0-100-110-200-230-250v., 60w., 10/-; 100w., 12/6.

PARTRIDGE Transformers.—For "W.W." single-span, 15/6; for "W.W." P.P. quality amplifier, 27/6; for "W.W." Olympic S.S. Six, 18/6.

(This advertisement continued on next page.)

Mains Equipment.—Contd.

(This advertisement continued from previous page.)
PARTRIDGE Transformers.—Wound to any specification, accuracy of output guaranteed, competitive prices, quick delivery.
PARTRIDGE Output Transformers.—5w. to 100w. speech, no audible distortion, 32-10,000 cycles, designed for any conditions, relay or P.A. work.
PARTRIDGE Chokes.—140H., 60 m.a., 2,500 ohms, 13/6; 75H., 25 m.a., 1,400 ohms, 7/6; 25H., 60 m.a., 560 ohms, 7/3; 22H., 120 m.a., 350 ohms, 9/9.
PARTRIDGE Chokes.—13H., 200 m.a., 160 ohms, 12/-; 8H., 120 m.a., 225 ohms, 6/9; 6H., 500 m.a., 50 ohms, 19/6; 3H., 250 m.a., 70 ohms, 6/6.
PARTRIDGE.—Special Terms to the Trade.
PARTRIDGE.—Trade List per return.
PARTRIDGE, N. B.Sc. (Eng.), A.M.I.E.E., A.I.Rad.E.
PARTRIDGE, N., Kings Buildings, Dean Stanley St., London, S.W.1. Tel.: Vic. 5035. [6348]

BATTERY Chargers; the N.P. for service at low prices; trade list also soiled models.
BATTERY Chargers; 30 volts 6 amps.; bargain, £5; others.—N.P. Electrical, 514, Alum Rock Rd., Birmingham. [6568]

TANTALUM for A.C. Chargers, H.T. and L.T.—Blackwell's Metallurgical Works, Ltd., Garston, Liverpool. [6470]

HOYNE'S Transformers are Manufactured by Engineers with 14 Years' Experience in Radio Transformer Design.

HOYNE'S Transformers, fitted with tapped and screened primaries, filaments, all centre tapped, stout cast aluminium clamps and clearly marked terminal strips are fitted to all models, write for list.

HOYNE'S Components are Guaranteed for One Year; one type only manufactured, the best, as used by many well-known set manufacturers after testing all others.

HOYNE'S—"W.W." transformers wound strictly to specification of author: "W.W." test reports, June 22nd: "The insulation is particularly good throughout the transformer is satisfactory in all respects."

HOYNE'S—Push-pull quality amplifier transformer, 25/-, post 1/3; 7/30 henrys choke, 9/6, post 9d.; 20 henrys, 7/6, post 9d.

HOYNE'S—Single span, 15/-, post 1/-; choke, 10 henrys, 7/6, post 9d.

HOYNE'S—Everyman A.C. super transformer, 12/6, post 1/-; choke, 10 henrys, 7/6, post 9d.

HOYNE'S—A.V.C. Straight Four transformer, 18/-, post 1/3; choke, 26 henrys, 12 m.a., 140 ohms, 9/6, post 9d.

HOYNE'S—Push-pull quality amplifier, complete to "W.W." specifications, wired and fully tested, less valves, £5/12/6; complete kit of components including metal chassis, £5/2/6; field replacement choke, 1,250 ohms, 13/6, post 1/-; output transformer, 12/6, post 1/-.

HOYNE'S—250-0-250v. 60 m.a., 4v. 1 to 2a., 4v. 2 to 4a., 10/-, post 9d.; with extra 4v. 1 to 2a. winding, 12/6, post 1/-.

HOYNE'S—Ferrocart III, 350-0-350v., 60-70 m.a., 4v. 2 to 3a., 4v. 2 to 4a., 12/6, post 1/-; with extra 4v. 1 to 2a. winding, 13/6, post 1/-.

HOYNE'S—350-0-350v., 120 m.a., 4v. 2 to 3a., 4v. 4 to 6a., 4v. 1a., 4v. 1a., 18/-, post 1/3.

HOYNE'S—400 or 450 or 500v., 120 m.a., 4v. 2 to 3a., 4v. 2 to 5a., 4v. 1 to 2a., 18/-, post 1/3.

HOYNE'S—500-450-0-450-500v. 140 m.a., 4v. 2 to 4a., 4v. 4 to 6a., 4v. 2a., 4v. 2a., 27/6, post 1/3; weight 11lb.

HOYNE'S Transformers, built to specifications, keenest prices, best materials and workmanship; quotation by return.

M. J. HOYNE, ALL-POWER TRANSFORMER, Ltd., Offices and Works, 8a, Gladstone Rd., Wimbledon, S.W.19. Tel.: Liberty 3503. [6488]

PARAMOUNT Mains Transformers, equal to any, and better than most; try them once and you will always use them!

PARAMOUNT Auto Transformers, 100-120v. up to 200-250 volts, or vice versa, 60 watt, 8/6; 120 watt, 10/-; shrouded 2/- extra, post 9d.

PARAMOUNT—250-0-250v. 60 m.a., 4v. 1 to 2 amp., 4v. 2 to 4a., open type, 9/6; shrouded, 11/6; post 9d.

PARAMOUNT—350-0-350v. 60 m.a., 4v. 2-5a., 4v. 3 to 5a., 13/-; shrouded, 15/-; post 9d.; 120 m.a., 4v. 5 amp., 4v. 4 amp., 4v. 2-5a., with screened primary, shrouded, 16/-; post 1/-.

PARAMOUNT—Single span model, with 1 1/2 in. x 1 1/2 in. core size, 350-0-350v. 100 m.a., 4v. 5a., 4v. 1a., 4v. 2.5a, shrouded, with screened primary, 2 1/2 regulation, 20/-.

PARAMOUNT—500v. or 450v. or 400v. 120 m.a., 4v. 5a., 4v. 4a., 4v. 2.5a., screened primary, 18/-; shrouded, 21/-, post 1/3; 150 m.a., 4v. 2.5a., 4v. 4a., three 4v. 2a., with 2 1/2 in. x 1 1/2 in. core size, shrouded, 28/-, post 1/3.

PARAMOUNT—Westinghouse transformers, H.T.8, 9 or 10, with 4v. 2a., 4v. 4a., shrouded, 16/-, post 1/-.

PARAMOUNT—Chokes, 30h. 60 m.a., 5/6; 20h. 120 m.a., 8/6, post 9d.

PARAMOUNT Mains Transformers are Guaranteed for 12 Months.

PARAMOUNT Products are Fitted with Neat Aluminium Frames or Shrouds, all filaments C.T., insulating paper 2 1/2 mils thick between each layer, and tested thoroughly before leaving our works.

PARAMOUNT Transformers Made to Your Own Specifications; price according to wattage; quotations by return.

PARAMOUNT Guaranteed Electrolytic Condensers, 4+4 mfd., 500v. peak, 3/6, post 3d.

PARAMOUNT Mains Transformers, manufactured by Brock and Salter, 66, Hartfield Rd., Wimbledon, S.W.19 (one minute from Wimbledon Station). Tel.: Liberty 3226. [6315]

2,000w. Output, Akk-e-Mmar, almost new, 200v. A.C. input, well fitted panel, automatic cut-outs, etc., including circuit resistances; £6.—Coy, 23, Filmer Rd., S.W.6. [6543]



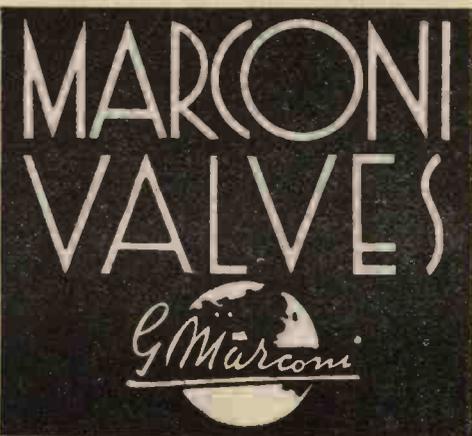
MARCONI MH41 is an A.C.

Triode with exceptional characteristics (M=80, M/R=6) combined with the added advantage of completely hum-free operation. The hum inducing magnetic field has been eliminated by the use of a double helical spiral heater and vastly improved heater-cathode insulation, making the MH41 particularly suitable for use as a grid rectifier or in the initial stages of high gain L.F. amplifiers.

POPULAR MARCONI A.C. TYPES

MX 40	Heptode	20/-
VMP4	Var. Mu. H.F. Pen.	17/6
MSP4	H.F. Pentode	17/6
VMS4B	Var. Mu. S.G.	17/6
MS4B	Screen Grid	17/6
MH41	Triode	13/6
MH4	Triode	13/6
MHD4	D.D. Triode	15/6
MPT4	Power Pentode	18/6
PX4	Power Triode	16/6

★ A card to the Marconiphone Co. Ltd., Radio House, Tottenham Court Road, W.1, will bring you a copy of the comprehensive new catalogue of Marconi Valves.



THE CHOICE OF THE EXPERTS

Mains Equipment.—Contd.

LEDIX Chargers, all steel, A.C. and D.C. mains, 2 to 200 cells at low prices; state requirements; dynamos and rotaries in stock, all sizes; battery superchargers for 2-volt input, 80-volt output, 37/6; fractional H.P. and sewing machine motors, 25/-.—Below.

LEDIX Measuring Instruments, 2 1/2 in. bakelite case, flush panel, any reading, A.C. or D.C.; from 6/- each; ask for full range instrument list.—Below.

LEDIXA Microphone.—We are makers of 25 types for all uses; Home Radio mikes, solid bakelite body, 5/6; G.P.O. microphones, on stand, with mouthpiece, 7/6; P.A. mikes, 50/-; list free.—Electradix Radios, 218, Upper Thames St., London, E.C.4. [0398]

ALL Brand New, guaranteed, cash with order, or c.o.d.: condensers, G.P.O. surplus, 1,500 test, 800 peak, 500 A.C. working, 1 mfd. 1/9, 2 mfd. 2/6, 4 mfd. 4/-; transformers, Standard Telephones (50 only), tapped, input 200-250, screened primary 300-0-300 at 60 m.a., 4v. 2a. (C.T.), 4v. 3a. (C.T.), at 8/6; also hundreds of others, with 12 months guarantee; give your specification for transformer and choke; s.a.e. with enquiries.—Degallier's, 4/21, Upper Marylebone St., London, W.1. [6551]

GABINETS.

MANUFACTURERS' Clearance.

ULTRA "Panther," a modern cabinet, with contrasting figured walnut veneer panels, 20x17x11, 13/6; pedestal type, 35x22x12, 30/-, undrilled; photo sent on request.

SET and Speaker Cabinets; 5/- upwards.

RADIOGRAM Cabinet; 37/6 upwards.

SPEAKER Cabinets; 4/6 upwards.

SEND Particulars of Your Requirements (giving size of set, etc.), or call and make your choice from our stocks of over 100 different types; from 3/6 to £4/10.

REFER to Previous Advt. for Detailed List of Bargains.

H. L. SMITH and Co., Ltd., 287-9, Edgware Rd., London, W.2. Tel.: Padd. 5891. [6052]

PICKETT'S Queen Anne Mahogany Cabinet; £2, cost £9.—Hare, Westholt, Henlow, Biggleswade. [6523]

2/9 each!!!—Amazing bargains; brand new manufacturers' surplus speaker cabinets; write for list.—Hulbert, 6, Conduit St., W.1. [6545]

LOUD-SPEAKERS.

27/6!!!—Brand new B.T.H.-E.K. speakers, 6v. field, suitable for P.A. work, etc.

£2/7/6!!!—B.T.H. speakers, as above, for 100-250v. A.C., complete with field rectifier.

MAGNAVOX D.C.152 (9in. cone), 22/6; Magnavox 154 (6 1/2 in. cone), 16/3; all with hum-bucking coils, power or pentode transformers, and 2,500 or 6,500-ohm fields; Magnavox P.M.254, 18/-; Magnavox P.M.252, 22/6.

ATTENTION to All Orders Within 24 Hours; carriage paid; cash with order or c.o.d.

WARD, 2nd Floor, 45, Farringdon St., London, E.C.4. Telephone: Holborn 9703. [6404]

10/6 each!!!—Amazing bargains; brand new manufacturers' surplus mains energised moving coil speakers, by well-known British maker, 2,500 or 6,500 fields, 8in. cone 10/6 each, 10in. cone 12/6 each, carriage paid, cash with order or c.o.d.—Hulbert, 6, Conduit St., W.1. [6546]

CELESTION P.P.M.79, listed £6/10, senior type P.M. 10in. cone, multi ratio output transformer, in a very fine and noble looking walnut cabinet, brand new in makers' carton, amazing bargain, limited number, 45/-, carriage paid; also Celestion D.C.W., 2,500 ohms, with multi ratio output transformer, listed 35/-, brand new, boxed, 13/9.—W. Burns and Co., Ltd., 11, Old St., E.C.1. [6525]

VAUXHALL—Magnavox permanent magnets, universal, suitable for Class "B" power or pentode, 6in. cone 15/6, 7in. cone 17/6, 10in. cone 23/-; mains energised, 2,500 or 6,500, 10in. cone, 23/-; 7in. cone 15/3; brand new, with humbucking coils; state power or pentode transformer; unused manufacturers' stock; immediate delivery, carriage paid, cash with order or c.o.d.—Vauxhall Utilities, 163a, Strand W.C.2. Temple Bar 9338. [6458]

DO You Want to Hear the Drums and the Oboe, and not a mixture of sounds and resonance? Few only U.S.A. Rolas, all sealed cartons, carriage paid, cash with order or c.o.d., incorporate humbuckers, state if for power or pentode, 7 1/2 in. diameter, 100-150v. D.C. (2,000 ohms), 110-175v. D.C. (2,500 ohms), 200-250v. D.C. (6,500 ohms), at 16/6 each; Senior model, 9in., same voltages at each, 23/-; permanent magnets also, complete with transformer, 9% cobalt, 7,400 line per sq. cm., 7 1/2 in., 26/-; or 9in. Senior, at 31/-.—Degallier's, 4/21, Upper Marylebone St., London, W.1. [6552]

VALVES.

4/9—Gecovalve U.X.245 American output valves, unopened cartons, list 15/-, cash with order, postage paid.—Kay, 167, City Road, London, E.C.1. [6491]

METROPOLITAN RADIO SERVICE Co. for American Valves with a Guarantee; any type at keenest prices; trade supplied.—1021, Finchley Rd., Golders Green, N.W.11. Speedwell 3000. [0436]

SURPLUS Valves.—All brand new; battery types, 2 volt, H.F.2, L.F.2 L.P.2, 1/9; super power, P.P.2, 2/6; screens and pentodes, 3/9; A.C. mains, 4-volt 1 amp. general purpose, 3/3; power, 4/-; screens and pentodes, 4/6; full wave rectifiers, 3/6; postage paid cash with order, or c.o.d. over 10/-.—Clarion Radio Valve Co., 885, Tyburn Rd., Erdington, Birmingham. [6339]

PREMIER SUPPLY STORES announce the Purchase of the Complete Stock of a World Famous Continental valve manufacturer, all the following standard main types fully guaranteed, 4/6 each: H., H.L., L. power, medium, high, low mag. and variable mu screen grids, one, three and four Watt A.C. output, directly heated pentodes, 250v. 60 m.a. full wave rectifiers, D.C. types, 20v. 18 amp. filaments, screen grid H., H.L. power.

THE Following Types, 5/6 each: 350v. 120 m.a., full wave rectifier, 500v. 120 m.a. full wave rectifier, 2 1/2 watt indirectly heated pentode.

THE Following American Types, 4/6: 250, 112, 171, 210, 245, 226, 47, 46, 24, 35, 51, 57, 58, 55, 37, 80.

THE Following Sizes, 6/6 each: 42, 77, 78, 2525, 36, 36, 83, 39, 44, 53, 6A7, 6B7, 2A5, 2A6, 2A7, 2B7, 5Z3, 6CG, 6A4, 6DB, 6F7; the following valve: 866, 25/-.

PREMIER SUPPLY STORES, 20 and 22, High St., Clapham, S.W.4. [6318]

Valves.—Contd.

ALL Types of Brand New American Valves in Stock. Only first-class makes such as Arcturus and R.C.A. stocked, guaranteed for 6 months, 247, 235, 551, 89, 18, 19, 46, 59, 6A7, 15, 22, 41, 38, 39, 73, 75, 57, 53, 224, 44, 36, 235, 83, 43, 5Z3, 121, 2525, 12Z3, 14/6; UX171, UX199, UX280, UX245, UX226, UX227, 7/6; UX250, UX210, UX281, 17/6; UX867 photocells, 25/-; all other types of American valves in stock; we also stock transmitting valves, post paid, cash with order or c.o.d.

WARD, 45, Farringdon St., London, E.C.4. Telephone: Holborn 9703 [6517]

COMPONENTS, ETC., FOR SALE.

R. SPECIAL Notice.—On and after the 1st October we shall be at 44, Lamb Conduit St., London, W.C., to which all letters and orders should be addressed; these are snop premises.

CALLERS Will Kindly Note that Lamba Conduit St. is off Theobalds Rd., and that trams 33 and 35 pass by, the quickest approach from Holborn is Red Lion St.

ODDMENTS to Clear.—Set Telsen S330 coils, 12/6; set Colvern K.B.L.C. K55 12/6; Lewcos Super Sixty coils, 4/-; oscillators, 7/6; Lewcos S.W. intermediates, 4/-; Ferranti S.V.84 transformer, 12/6.

R.I. 7-1 Transformer, second-hand, 5/-; Varley 3h. choke, tapped, 5/-; Geophone 3-1 nickel core transformers, listed at 21/-, 5/9 to clear; Varley 500,000 wire wound resistances, 9d.; B.T.H. Junior speaker, 6v. pot. corrugated cone, 20/-; ditto Senior, 100v., 50/-.

FERRANTI 0-50 m.a. Meter, perfect, 20/-; Ferranti 0-150 m.a. meter, 20/-, flush; Weston pin jack, D.R., 0-200v., 0-6v., 20/-; T.C.C. 2 mid. 800 vw. type, 101 tested, only 4/6 each; Belling Lee Unit pick-up, 17/6, new.

PAIR Magnacore Class B Universal Driver and Output Transformers, new 8/9; latest type Hupermu, 10/-; R.I. 250 m.a. output transformer, 15/72-1, second-hand, 12/6; Marconi 250 m.a. output transformer, ratio 8-1, also "line" winding, 15/-; special Parmeko transformer, section wound, primary 200 ohms, secondary 25,000 ohms, 10/-.

PAIR Transmitting Bottles, U1/F110, U1/F112, any offers? Ferranti radio wattmeter, £5; large original Amplion B.A. speaker, to clear 10/-, not Lion.

RADIOPHONE Volume Controls with Switch, 5,000, 10,000, 15,000, 20,000, 35,000, 100,000, 2/6; also 10,000 graded 9-1 with 3-P. switch, 25,000 graded 9-1 with 2-P. switch, 3/6 each.

WIRE, new Knifetown, etc., 1/2lb. reels, 16S.W.G. En., 8d.; 1/2lb. 18S.W.G. C.C., 8d.; 1/2lb. 26S.W.G. En., 9d.; 1/2lb. 32S.W.G. C.C., 1/-; 1/2lb. 30S.W.G. En., 8d.; 2oz. 30 and 32 C.C., 6d. each.

NEW Garrard No. 11B D/8 Motors, 12in. turntable and fully automatic unit plate, all fittings included; less than half price, 20/-.

RYALL'S RADIO, 33, Chancery Lane, London, W.C. See top of advertisement.

R. [6556]

24.

MILDMAY RADIO EXCHANGE, offers the following sound and perfect, cash with order or c.o.d.

EPOCH 99K P.M. moving coil speaker, listed at £6/2/6, 50/-; Bakers 1931-2 super power P.M. moving coil speaker, 30/-; Epoch A.2. P.M. moving coil speaker; 25/-.

EPOCH 99T for D.C. Mains, 37/6; Magnavox type 152, 2,500 ohms, 27/6; ditto, 200 ohms, 17/6; R.A. 100 P.M. moving coil speaker, 18/-; B.T.H. R.K. Junior P.M. moving coil speakers; 22/6.

KOLSTER BRANDES "Pup" 2-valve A.C. Mains Receivers, complete with valves and speaker, in self-contained cabinet for mains of 200-250 volts, A.C. 37/6 each.

THE "20 Century" Radio Testers, a complete valve and set tester that will give emission reading of all types of valves, battery, A.C. or D.C., without any extra batteries being required, listed at £2/5, offered at the low price of £1 each.

FERRANTI Type E.1. A.C. Mains Supply Unit, complete with rectifying valve, listed at £10; input 200-250 volts A.C., output 200 volts 115 m/amps; £4.

FERRANTI S.V.10 Mains Transformer, input 200-250 volts A.C., 27/6; Ferranti type S.V.8-6 mains transformer, 12/6; Ferranti P.11 auto transformer, 10/-; Ferranti B.8 chokes, 4/- each, 50 m/amps.

RADIOPHONE—3 gang condensers, with screen, 0005, 9/6 each; 4 gang ditto, 10/-; Ferranti 3 gang condensers, 0005, 10/6; T.C.C. 4 MF condensers, working voltage 1,500 volts; 13/- each.

FERRANTI Transformers—A.F.4, 7/6; A.F.3, 10/6; A.F.5, 18/-; A.F.6, 18/-; A.F.7, 18/6; A.F.7c, 20/-; A.F.5c, 20/-; O.P.1, 1-1 ratio, 7/-; O.P.2 25-1 ratio, 7/6; O.P.3 P.P. ratio 1-1, 8/6; O.P.M.1, 10/-; O.P.M.2, 10/-; O.P.M.4, 12/-; O.P.M.12c, 7/-; O.P.M.17c, 8/6; B. chokes, 4/-.

FERRACART G.1, G.2, G.3, 20/-; Lissen superhet coils, 3 gang, 10/-; Wearite and Lewcos superhet coils, 4/- each; set Wearite Every Man Four coils, 15/-; set Varley B.P. 19 coils; Colvern K.61, 62, 63 coils, 17/6.

SPECIAL Offer, Regentone A.C. mains units.

TYPE W. I.F. Output 150 volts, 12 m/amps, 27/-, listed 50/-; type W. I.C. output 150 volts, 20 m/amps, 30/- each, listed at 55/-; all brand new in sealed boxes.

TYPE W.5a, with Trickle Charger, output 150 volts, 20 m/amps, for 2, 4, or 6 volt accumulator, 37/- each listed £3/15; type D.C.I. for D.C. mains, output 150 volts, 25 m/amps, 22/6 each.

EKKO, type K.25, output 150 volts, 25 m/amps, with 4 tappings, 2 variable, also charger for 2, 4, or 6 volt accumulators, listed at £5/7/6; our net price, 39/-.

THE Above, post or carriage paid.

OPEN All Day Thursday, closed Saturday.

PHONE: Clissold 5001.

24, Mildmay Grove, London, N.1. [6538]

COMPARISONS.

Although "our output for the next ten years was booked up" at Olympia (vide daily press) we took more orders at Manchester than at the London Show.

Perhaps the North is more critical than the South; but at both Shows we were told that the Hartley-Turner Speaker was "by far the best." One gentleman at Manchester went so far as to say that our Loud Speaker was "gradely." That, we understand, is the highest possible praise.

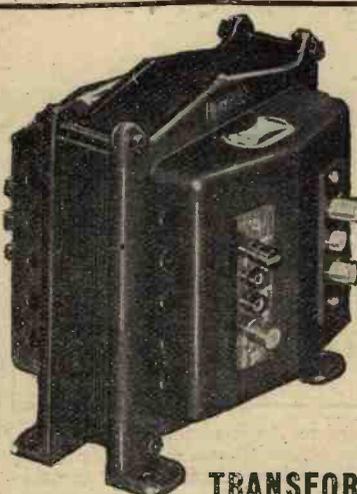
We can supply you with apparatus gradely throughout. Apparatus designed only for High Fidelity Reproduction.

Illustrated Literature free on request.

Hartley Turner Radio Ltd.

THORNBURY ROAD, ISLEWORTH, MIDDLESEX.

Telephone: HOUnslow 1854.



TRANSFORMERS

FOR WESTINGHOUSE L.T. RECTIFIERS.

No matter what your requirements, HEYBERD can supply you with a Transformer. Buy the products of specialists—products noted for their reliability. HEYBERD is the choice of leading set designers.

Below are models for L.T. Battery Chargers:

No.	West. Rect.	Charges	Price
W.36	JL.T.2	2.4 v. at 1 amp.	17/6
W.37	LT.5	2.4 v. at 1 amp.	24/-
W.38	LT.6	2.4 v. at 2 amps.	22/6
W.9	A.4	2.4 v. at 2 amps.	26/-
W.39	A.6	2.4 v. at 3 amps.	26/-

Cut out this advertisement and send NOW with 3d. in stamps for NEW 1935 RADIO HANDBOOK giving full details of Mains Transformers, Units, Battery Chargers, etc., and packed with technical hints and tips.

F. C. HEYBERD & CO.

10, FINSBURY ST.,

LONDON, E.C.2



Components, Etc., for Sale.—Contd.

PREMIER SUPPLY STORES

OFFER the Following Manufacturers' Surplus New Goods at a Fraction of the Original Cost; all goods guaranteed perfect, carriage paid over 5/- under 5/- postage 6d. extra, I.F.S. and abroad, carriage extra. Order under 5/- cannot be sent c.o.d. Please send for illustrated catalogue post free.

STUPENDOUS Purchase of Set Manufacturers' Stock.—All electric 3-valve (S.G. det. pen.) set, in walnut cabinet, with moving coil speaker, 200-250 volt 40-60 cycles, chassis built, 200-2,000 metres, with 4 valves; £4/19/6.

ALL-ELECTRIC 3-stage Amplifiers, 200-250v., 40-60 cycles, 10 watts undistorted output, complete with 5 valves, £7/7; suitable speakers, pick-ups and microphone can be supplied.

TYPE 4480, 8in. diameter, permanent magnet, handles 4 watts, 7 ohms speech coil, 15/6; multi ratio transformer, 4/6 extra.

ELIMINATOR Kits, including transformer, choke, Westinghouse metal rectifier, condensers, resistances and diagram, 120v., 20 m.a., 20/-; trickle charger, 8/- extra; 150v. 30 milliamps, with 4v. 2-4 amps. C.T., L.T., 25/-; trickle charger, 6/6 extra; 250v. 60 milliamps, with 4v. 3-5 amps. C.T., L.T., 30/-; 300v. 60 m.a., with 4v. 3-5 amps., 37/6; 200v. 50 m.a., with 4v. 3-5 amps. L.T., 27/6.

PREMIER Chokes, 40 milliamps, 25 hys., 4/-; 65 milliamps, 30hys., 5/6; 150 milliamps, 30 hys., 10/6; 60 milliamps, 80 hys., 2,500 ohms, 5/6; 25 milliamps, 20 hys., 2/9.

ALL Premier Guaranteed Mains Transformers Have Engraved Terminal Strips, with terminal connections, input, 200-250v., 40-100 cycles, all windings paper interleaved.

PREMIER H.T.7 Transformer, output 135v. 80 m.a., for voltage doubling, 8/6; 4v. 3-4a., C.T. L.T., 2/- extra; with Westinghouse rectifier, giving 200v. 30 m.a., 17/6.

PREMIER H.T.8 and 9 Transformers, 250v. 60 m.a. and 300v. 60 m.a. rectified, with 4v. 3-5a. and 4v. 1-2a., C.T. L.T. and screened primary, 10/-; with Westinghouse rectifier, 18/6.

PREMIER H.T.10 Transformer, 200v. 100 m.a., rectified with 4v. 3-5a. and 4v. 1-2a., C.T. L.T., and screened primary, 10/-; with Westinghouse rectifier, 19/6.

PREMIER Mains Transformer, output 250-0-250v. 60 m.a., 4v. 3-5a., 4v. 2-3a., 4v. 1-2a. (all C.T.), with screened primary; 10/-.

PREMIER Mains Transformers, output 350-0-350v. 90 m.a., 4v. 3-5a., 4v. 2-3a., 4v. 1-2a. (all C.T.), with screened primary; 10/-.

PREMIER Auto Transformers, 100-110/200-250v. or vice versa, 100-watt; 10/-.

WESTERN ELECTRIC Mains Transformers, 300-0-300v. 65 m.a., 4v. 1-2a., 4v. 2-3a., 6/6; 500-0-500v. 150 m.a., 4v. 3-5a., 4v. 2-3a., 4v. 2-3a., 4v. 1a. C.T., 4v. 1a. C.T., 13/6.

SPECIAL Offer of Mains Transformers, manufactured by Philips, input 100-200v. or 200-250v. output 180-0-180 volts 40 m.a., 4v. 1 amp., 4v. 3 amps., 4/6; 200-0-200v. 4v. 1a., 4v. 3a., 4/6.

PREMIER L.T. Charger Kits, consisting of Premier transformer and Westinghouse rectifier, input 200-250v., A.C., output 8v. 1/2 amp., 14/6; 8v. 1 amp., 17/6; 6v. 2 amp., 27/6; 30v. 1 amp., 37/6; 2v. 1/2 amp., 11/-.

B.T.H. Truspeed Induction Type (A.C. only) Electric Gramophone Motors, 100-250v.; 30/- complete.

SPECIAL Offer B.T.H. Gramophone Motors, A.C. and D.C. 100-250v.; 30/-, listed £23/3.

COLLARO Gramo. Unit, consisting of A.C. motor, 200-250v. high quality pick-up and volume control, 49/-; without volume control, 46/-.

EDISON BELL Double Spring Gramophone Motors, complete with turntable and all fittings, a really sound job; 15/-.

SPECIAL Offer of Wire Wound Resistances, 4 watts, any value up to 50,000 ohms, 1/-; 8 watts, any value up to 15,000 ohms, 1/6; 15 watts, any value up to 50,000 ohms, 2/-; 25 watts, any value up to 50,000 ohms, 2/6.

WIRE Wound Potentiometers, 15,000 ohms, 1/6; 50,000 ohms, 2/-; 500,000 ohms, 3/-; 1,000 ohms wire-wound semi-variable resistances, carry 150 m.a., 2/-.

CENTRALAB Potentiometers, 400 ohms., 1/-; 50,000, 100,000, 1/2 meg., any value, 2/-; 200 ohms, wire wound, 1/-.

POLAR Star, manufacturers' model, 3-gang condensers, fully screened; 7/6, with trimmers.

AMERICAN Triple Gang 0.0005 Condensers, with trimmers, 4/11; Utility bakelite 2-gang 0.0005, screened, with unknob trimmer, 3/6; Polar bakelite condensers, 0.00035, 0.0003, 0.0005, 1/-.

ORMOND Condensers, 0.0005 2-gang semi-shielded, 2/6; brass vanes, with trimmers, 3/6; British Radiophone 110 kc/s intermediate, 3/-.

MAGNAVOX D.C. 152, 2,500 ohms, 17/6; D.C. 154, 2,500 ohms, 12/6; D.C. 152 magna, 2,500 ohms, 37/6, all complete with humbucking coils; please state whether power or Pentode required; A.C. conversion kit for above types, 10/-; Magnavox P.M. 7in. cone, 18/6.

RELIABLE Canned Coils with Circuit, accurately matched, dual range, iron cored; 3/6.

RELIABLE Intervalve Transformers, 2/-; multi-ratio output transformers, 4/6.

T.C.C. Electrolytic Condensers, 550v. working, 650v. peak, 8 mf., 4/-; 4 mf. or 8 mf., 440v. working, 3/-; 15 mf., 50v., working, 1/-; 25v. working, 25mf., 1/3; 6 mf. 50v. and 2 mf. 100v. working, 6d.; 8+4 mid., 450v. working, 4/-; 50 mf., 50v. working, 2/9.

T.C.C. Condensers, 250v. working, 1 mf. 1/3, 2 mf. 1/9, 4 mf. 3/-; 4 mf., 450v. working 4/-; 4 mf., 750v. working, 6/-.

H.M.V. Condensers, 400v. working, 4+4+1+1+1+1+0.1+0.1+0.1+0.1. 4/9; 4+2+1+1+1+0.5, 3/9.

DEBULLER Condensers, 8 cr 4 mid., dry electrolytic, 450v. working; 3/-.

VARLEY Constant Square Peak Coils, band-pass type B.P.7, brand new, in maker's cartons, with instructions and diagrams; 2/4.

VARLEY H.F. Intervalve Coils, B.P.8, band-pass, complete with instructions, in original cartons; 2/6.

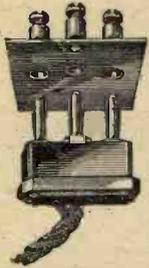
SCREENED H.F. Chokes, by one of the largest manufacturers in the country; 1/6.

PREMIER British-made Meters, moving iron flush mounting, accurate, 0-10, 0-15 50 m.a., 0-100, 0-250 m.a., 0-1, 0-5 amps; all at 6/-.

(This advertisement continued on next page.)

ONCE AGAIN DESIGNER'S SOLE CHOICE

In specifying the Belling-Lee 3-pin plug and socket and "B" type terminal for the STANDARD TWO, the designers again confirm the confidence of all leading technicians in Belling-Lee Radio Connections. Belling-Lee components—terminals, plugs, fuses and connectors of all types—are essential to the complete efficiency, safety and finish of any set. Every terminal is indelibly lettered, and the heads won't come off and get mixed up. In type "B" the names stay the right way up. Ask your dealer to show you the whole range of Belling-Lee components, or write for our free booklet "Radio Connections."



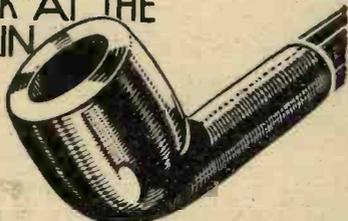
THREE-PIN PLUG.
Designed for connections between receiver chassis and loud-speaker. Centre tap speaker transformers; field coils with connection for earthing speaker chassis, or 3 wire arrangements to carry speech and energising currents to speaker. Three-pin Plug in Walnut Bakelite complete with socket panel.
No. 1118. Price each 1/3

"B" TYPE TERMINAL.
Non-rotating name; bakelite insulated; anti-twist wedge on collar; polished brass, or walnut, white letters. Improved sub-connector nuts. 4 B.A. stem. Insulation washer. (Earth terminal with metal washer).
No. 1001. Each 6d. Rev. Des. 721/378
Each in carton with guarantee.
"R" TYPE TERMINAL.
No. 1003. Each 3d.



BELLING & LEE LTD
CAMBRIDGE ARTERIAL ROAD, ENFIELD, MIDDX

WHEN BUYING A PIPE YOU LOOK AT THE GRAIN

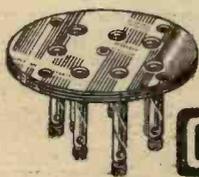


WHEN BUYING A RECEIVER LOOK AT THE VALVEHOLDERS

To enjoy a smoke, a pipe must have a flawless bowl and correctly designed air channels. For continuous enjoyment of radio, you must fit well designed and reliable valveholders — "CLIX."

SPECIFIED FOR THE "STANDARD TWO"

Send for our New 1935 Folder "W.M." Free



CLIX

LECTRO LINX, LTD.,
79, ROCHESTER ROW LONDON S.W.1

HIXON'S ELECTRICAL LABORATORIES LTD.,

Mora Works, Mora Rd., Cricklewood, N.W.2

RADIO AND ELECTRICAL CONSULTANTS

For the very highest class of special apparatus. Experts in all matters relating to Radio Design, Repairs and Overhauls.

Public Address apparatus for the largest or smallest job for sale or on hire.

Any type of Receiver or Amplifier specially built to order in our fully equipped Test Laboratories—nothing mass produced.

ENQUIRIES INVITED.

Telegrams: "Hixonlect," London. Telephone: Gladstone 3744 - 5308.



PERSEUS PROMPT SERVICE for Traders. The Best Selection of Mains Radio, English and American Receivers. Radiograms. "WIRELESS WORLD" & JOURNAL KITS, Components, Valves, Speakers.

ELECTRIC LAMPS, FITTINGS, CABLES, etc. Prompt despatch, Personal Supervision, all your requirements from one source. LISTS FREE. Illustrated Catalogues. Radio 6d., Electric 6d. for postage.

PERSEUS RADIO, W.W., Burton-on-Trent

EPOCH

MOVING COIL SPEAKERS
THE FINEST IN THE WORLD IN EACH OF THEIR PRICE-CLASSES.

Call for a demonstration at Exmouth House and compare yourself. EPOCH RADIO MANUFACTURING CO. LTD. Exmouth House, Exmouth St., London, E.C.1



EVERY FRIDAY FOURPENCE

Components, Etc., for Sale.—Contd.

- BIRMINGHAM RADIOMART** Announces Purchase Set Manufacturers' First Quality Radio Components, all guaranteed new and perfect goods.
- RADIOMART**—Utility super quality 3-gang air-spaced ball bearing, fully screened with trimmers, list price 24/-, straight or superhet; 6/6.
- RADIOMART**—Utility 2-gangs, as above, 5/10; Utility dials to fit either, 2/-.
- RADIOMART**—Utility single 0.0005 or 0.0003, with full size disc drive, walnut knob escutcheon, 2/-.
- RADIOMART**—Igranic smoothing chokes, 20 hy., 100 m.a., 280 ohms, heavy stalloy core, 2/3.
- RADIOMART**—Edgewise visual tuning meter, 6 m.a., illuminated, 2 1/4 x 5/16 in. only, similar R.G.D., 5/9.
- RADIOMART**—Radiophone logarithmic potentiometers, 10,000 ohms, wirewound, with mains switch, 2/-; 5,000, no switch, 2/-.
- RADIOMART**—Radiophone straight line degree dials, illuminated, complete escutcheon knobs, 3/6.
- RADIOMART**—Cosmocond 1934 pick-up, with volume control and rest, 12/-; confidently recommended.
- RADIOMART**—Screened iron-cored dual range coils, with reaction circuit, 2/11; Igranic short-wave ditto, 5/3.
- RADIOMART**—Igranic Parvo 3 1/4-1 list 8/6, 2/11; Philco "Class B" driver, 2/9; Voltra 8/6, L.F., 2/-; Ericsson 15/- L.F., 1/6.
- RADIOMART**—Centralab 1-watt colour-coded resistances, all values, 6d.; Truewind wirewound colour-coded, 2/- dozen; our assortment only.
- RADIOMART**—Aerovox 8x8 mid. 435v. dry electrolytics, 3/6; Hellesen wet 8 mid. 435v., 2/9.
- RADIOMART**—Varley B.P.5 band-pass coils, list 15/-, with circuit, improved selectivity, 2/4.
- RADIOMART**—Cadmium 5-valve chassis, 1/6; grey cellulose 4-valve, 9d., postage 6d. extra.
- RADIOMART**—Magnum radiogram dissolvers, 2/9; wirewound potentiometers. Magnum 25,000, Colvern 2,500, 15,000, 1/6.
- RADIOMART**—Metvick H.F. chokes, 9d.; Lewcos screened anode leads, 3d.; Belling Lee plain terminals, 1/- dozen.
- RADIOMART**—Telsen differentials, boxed, complete knob, 0.0001, 0.00015, 1/-; 0.0003, 0.00035, 1/3.
- RADIOMART**—Telsen wirewound potentiometers, 10,000, 50,000, 1/6; Telsen mains transformers, 50, 25 cycle, 12/6.
- RADIOMART**—Non-inductive tubulars, wire-ended, 1,500v., 0.1 mid., 0.01, 0.02, 0.05, 6d.; Philips ditto, 0.0001, 0.001, 2d.; 0.25, 0.5, 9d.; T.C.C. 0.25, 1/-.
- RADIOMART**—Metvick transformer kit, laminations, clamps, sectional bobbin terminals, complete, 3/6.
- RADIOMART**—Electrad Royalty 50,000, 100,000, 250,000, potentiometer, 1/6; 400 ohm. potentiometers, 6d.
- RADIOMART**—Utility 1934 mica variables, 0.0005, 10d.; 0.0003, 8d.; 0.0002, 0.0001, 6d.; 0.0003, differentials, 1/6.
- RADIOMART**—Telsen kits half price, mains S.G.3, £3/9/6, Selective Four, £2/9/3; Superhet Six, £2/19/3.
- RADIOMART**—Cossor receivers half price, 323, £1/19/9; 336, £4/17/6; 334, £2/17/6; meter 500 ohms per volt, moving coil, list 42/-, 25/-.
- RADIOMART**—Pitco mains radiometer, list 42/-; 500 ohms per volt moving coil, 25/-.
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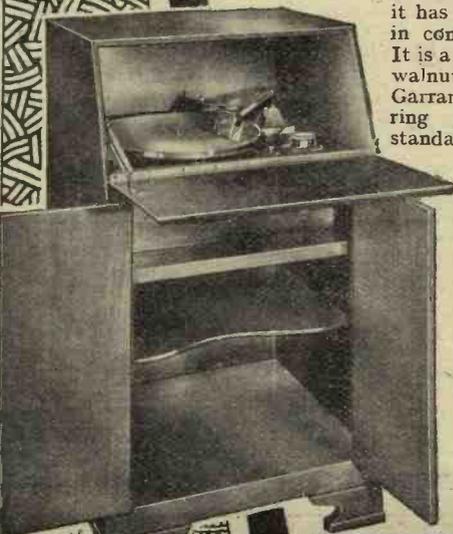
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