

THE NEW NORTH WALES TRANSMITTER

Popular Wireless & TELEVISION TIMES

A SHORT-WAVE
FORECAST

By J. C. JEVONS

EVERY
WEDNESDAY
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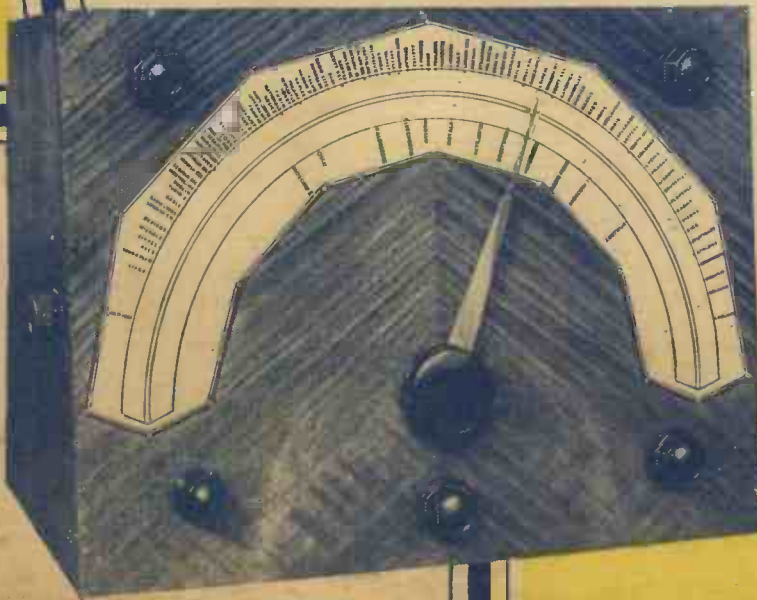
THE

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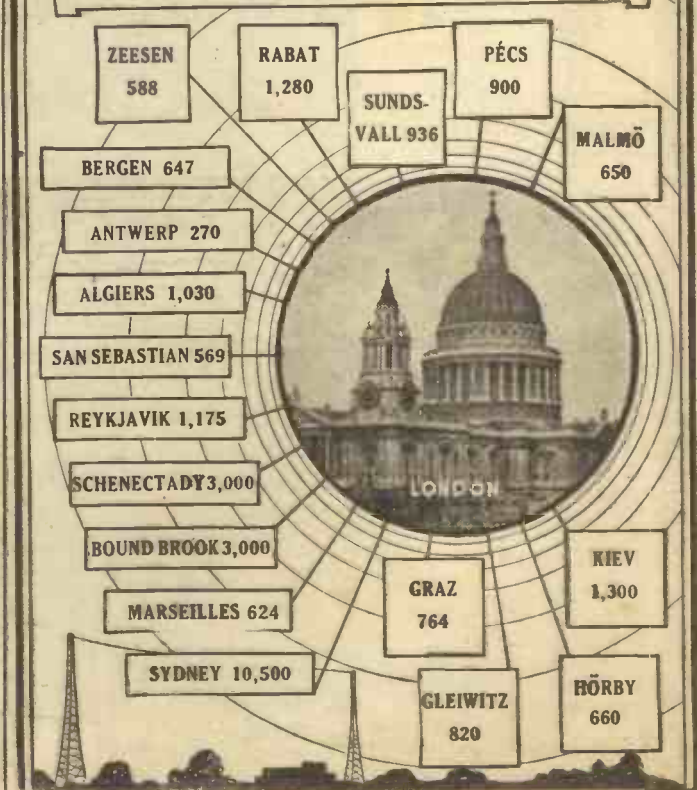
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P.A. 52B

HOW MANY MILES?

Distances from London of Foreign Stations You Have Heard





Editor: G. V. Dowding.

Asst. Editors: A. Johnson-Randall, A. S. Clark.

RADIO IN ASIA
SWING ALONG
DEFENCE OFFER

RADIO NOTES & NEWS

SMALL WONDER
NIGHT SKY
FRIENDLY ACT

France Forges Ahead

DESPITE occasional setbacks France is forging ahead with her radio plans, and some of the promised 1937 improvements are already taking shape.

The Lyons (P.T.T.) station is having its spring-clean, and extra polish on the floor is being accompanied by extra kilowatts in the aerial—which is why the engineers have been using the low-powered transmitter on Monday evenings recently.

Radio-Normandie's new station has been delayed by the blight of recent French strikes, but the new building at Louvetot (near Havre) is finished, and should be in action shortly, superseding Fécamp.

Algiers, also, is in the hands of the specialists, who are performing an operation for removing old junk and grafting on extra punch and better quality. The convalescent Algiers resumes duty again on February 17th, so give him a few days to settle down, and then see what your set thinks of the recent doctoring.

Asia Takes to Radio

RADIO appears to be destined to do for Asia what printing did for the civilisation of the West.

Serious attempts are now being made to educate the 200,000,000 people in China who cannot read, through radio lectures and loudspeaker-equipped vans; and since moving pictures are used as an additional attraction, there is no difficulty in getting attentive audiences. In remote districts the vans are known as Chah-Lee, and "Clap hands, here comes Chah-Lee," is the brightest spot of the week.

Afghanistan, also, has got the radio craze, and it is expected that a 20-kilowatt station will be calling from Kabul before the end of this year.

During 1936, Palestine nearly doubled the size of its 1935 radio audience of

12,000. India I have already told you about, and more news of progress there comes in nearly every week.

A Good Time When Doing Time

WHEN Mr. E. M. Hanlon, Minister for Health and Home Affairs, recently switched on a powerful wireless set in Brisbane Gaol, he inaugurated a new era in prison control in Queensland. The set is an 11-valve dual-wave instrument, and is connected with nine loudspeakers in the different prison blocks.

Hitherto lights have been switched off at 8 p.m., but now an extra hour is granted,

that risk if some poor devil's reason is saved, now and then.

Swing Along

AFTER months of spirited differences of opinion, the leaders of the big dance orchestras and the B.B.C. have reached financial agreement on the always-vital question of "How much?"

The answer is now £2 per player for 25-35 minutes; £2 10s. per player for 40-50 minutes; and £3 per player for 55-65 minutes.

Probably you feel that at these rates the boys should be able to swing along very nicely; but the leaders point out that by the time they have rehearsed, transported the players to and from the studio, and paid up to, say, £8 a tune for special orchestras, the above-mentioned minimum rates are none too rosy. So a joint committee has been formed in order to facilitate smooth working in the future.

BETTER SERVICE FOR WALES



The station building and aerial mast at the new North Wales B.B.C. station at Penmon. The mast is 250 feet high and is surmounted by a red aircraft-warning light. Some interesting facts about the station are given on page 633.

Radio and Defence

THE Government has had an offer from the Radio Manufacturers' Association to place the resources of member firms at the disposal of the Government for national defence purposes.

Plans for the co-ordination of the industry in the event of a national emergency have been discussed, and the fact that huge supplies of wireless apparatus would become necessary immediately has been faced. The Navy, Army and Air Force are all radio-minded these days. And, however much

and radio programmes are available during that period. The hope is that men serving long sentences will benefit, and will endeavour to gain the good-conduct privilege of hearing the radio programmes.

Whenever prison radio is mentioned, some people talk a lot of rot about "making prison life attractive." It's worth taking

one deplors the necessity for thinking of these contingencies, it is the Government's plain duty to keep an eye on our reserves of radio equipment, and also on the machinery available for the production of special apparatus such as that used by the forces.

(Continued overleaf.)

NEXT WEEK: THE S.T.800 AGAIN

A FRIENDLY ACT BUT AN UNFRIENDLY GIFT

Somewhere a Voice is Calling . . .

HIGH above the waving palm trees of Singapore there rise the Minarets of the great Masjid Sultan Mosque—the largest mosque in the country.



In accordance with age-old custom a muezzin, at certain hours, calls the faithful to prayer from the minarets of the mosque.

Departing from the age-old custom, the enterprising authorities have now installed G.E.C.

power amplifying equipment to magnify the muezzin's voice. There are two speakers in one of the Minarets to call the faithful to prayer and two more speakers in the body of the Mosque for amplifying services and lectures.

The equipment is a great success, and when it comes into action daily at 4.30 a.m. it effectually cuts through Singapore's Serenade of the Night, for the loudspeakers on the Minaret have a range of about one mile.

Leeds Looking Up

THE Leeds and District Radio Society has moved to more central premises, and their H.Q. is now in the Y.W.C.A., Cookridge Street.

Main interest lies at the moment in the Morse classes, lectures, demonstrations, and in the club receiver, which is in the course of construction.

Among the attractive trips planned for the near future is a visit to the North Regional station.

Anyone interested is cordially invited to write for particulars of the Society to the Secretary, Mr. J. Kavanagh, 63, Dawlish Avenue, Leeds.

Scare for Scotland

THERE was a wagging of sporans and a flutter along the banks and braes recently when it was rumoured that Glasgow was moving westwards, at the rate of several feet



a year. Back in 1865 the Glasgow longitude had been fixed by time-signals over a telegraph line to Greenwich, and that was (supposedly) that. But recent observations from radio time-signals

appeared to indicate that the whole city had moved a couple of hundred yards westwards since the longitude was first fixed.

When this became known inquiries were immediately put through to Greenwich Observatory, to know whether the whole country was pivoting round, or what? Pausing a moment from the mass production of Six Pips, the Greenwich stargazers smiled tolerantly, and explained; it would probably be found, they said, that this Westward Ho! business was just moon-

shine, and that the discrepancy was due to a mistake having been made in the first instance when the longitude was fixed.

Jock MacPherson, however, tells a different story. He swears that when returning from the New Year celebrations at 3 a.m., he actually saw the whole city move—not only westwards, but up and down!

Small Wonder

AFTER writing my recent Note on the little Danish portable that could be carried in the handbag, I saw an account of an Irish midget that will want a lot of beating.

BROADCASTING BREVITIES

THE LINCOLNSHIRE HANDICAP: Regional, March 17.

It is now possible to announce definitely that for the first time the microphone will visit the Carlholme, Lincoln, to broadcast that thrilling race, the Lincolnshire Handicap. It is rather a surprising fact that this famous sprint has never been broadcast. Enormous interest exists in the double event of the Lincoln and Nations. In addition, the Lincoln opens the flat-racing season and British listeners will welcome the broadcast of the result of this famous mile of the year.

DANCE BAND AND VARIETY ACT: Midland, February 25.

George Hames and his Band are to broadcast for the first time on February 25th. The Band began six years ago. All the fourteen members are natives of Nottingham. The Clayton Sisters, who will give their double act as an interlude, are appearing at the Birmingham Alexandra Theatre pantomime. They began in the chorus at the same theatre and after several years in leading pantomimes in Scotland and in variety, returned to their home town as principals in "Mother Goose." They have broadcast on a number of occasions, but this is their first visit to a Birmingham studio.

ONCE A GIPSY: Northern, February 21.

Freer and his Gipsy Band, who are to broadcast from the Manchester studios on February 21, are proud of being an all-British combination. After War service Horace Freer, a Birmingham man, joined a genuine Hungarian tzigane band. At first he hated the lilting gipsy music, and his inability to adapt his playing to this specialised form produced much criticism from his foreign colleagues. Gradually, however, the music grew on him; he came to play it "as to the manner born," and in course of time he formed his own gipsy band of thirteen players, which performs regularly at a Manchester store. Dressed in colourful costumes, the band are often mistaken for real gipsies, and on one occasion an old lady, having listened to their performance, stepped on to the platform and handed the leader sixpence, saying "It's always lucky to cross a gipsy's palm with silver."

Constructed by Mr. Reid, a telegraph clerk on the Great Northern Railway at Enniskillen, it measures 7 in. \times 4 $\frac{1}{2}$ in. \times 1 $\frac{1}{2}$ in., all in. There are three valves, and they pick up the British programmes, as they fly through the air, with the greatest of ease.

Mr. Reid is an ex-Naval man, who spent three of the war years in spotting submarines and Zeppelins. And if my information is correct, he can do as much with a pair of round-nosed pliers as some fellows will ever manage with their fancy ball-bearing, all-tearing electrical lathes.

Personalia

MR. C. A. L. CLIFFE, who was appointed Empire News Editor of the B.B.C. in 1935, has now been made Assistant Director of Empire Broadcasting. Before joining the B.B.C. he was in the Colonial Office,

Night Sky

VERSATILITY is one of the strong points of the Eiffel Tower. It is known to you and me as a radio station, but it also tells Parisians what make of car to buy, what the temperature is doing, and what the time is, besides which it has served as a war telegraph station and an observatory.

Now they are proposing to turn it into a giant flag, by using millions of electric lamps to blaze the Tricolour across the night sky of Paris. Then the whole Tower will become a Cathedral of Light, flashing every colour of the rainbow in unparalleled illuminations.

Frenchmen are getting wildly excited by this unique prospect—with just one exception. He is a fellow who keeps a radio shop in the very shadow of the foot of the Tower. He can't help wondering what his quality demonstrations will be like when the world's biggest flashing sign is in full swing just across the road!



A U.S.A. Radio Record

John Listener of the United States had a boom year in 1936, according to returns now made available. Some 1,400,000 new houses were provided with radio equipment, while the trade's entire sales for the year came out (including the exports) at the remarkable total of £86,000,000. This was about thirty per cent higher than the previous record.

Friendly Act

AMONG the queerest gifts ever received by a radio artist is the one sent to the chap who runs "The Friendly Act"—a broadcast talk of uplift nature, which is a daily reminder of the power of a kind word, a smile, and a good turn. A dear old lady, much moved by these worthy sentiments, thought she would give the broadcaster a small token of appreciation.



So she sent him a big box of tricks, with a covering letter to say it was an invention of her late brother's—nobody knew just what, but the inventor had entertained great hopes of it. Somehow that covering letter got lost, so the recipient opened the case to find out what was in it.

He must have touched off a spring somewhere for there was a roar like twelve thunderclaps in series, bells rang, sirens hooted, and a big stick came out and smote the new owner a Carnera-like crack on the cranium.

It was not the end of the world, as he supposed; but an ambitiously-planned burglar alarm!

ARIEL.

OPERATING THE SUPER CENTURION

By JOHN SCOTT-TAGGART

Britain's Leading Designer discusses the circuit of his Coronation Set and tells you how to get the best results from this magnificent 1937 star design. Remember that this splendid receiver utilises the famous Uni-plane system and can be easily constructed by the veriest novice.

THERE has been in all my more popular receivers a certain similarity of operation. That similarity when analysed lies in the fact that two tuned circuits are employed, the selectivity of each being made adjustable. The idea of adjustable selectivity is now being boosted in connection with many commercial receivers, but actually the desirability of such adjustability was stressed by myself as long ago as the S.T.300, and it has been used in every important set since.

It is the question of adjustable selectivity which makes it necessary to have extra controls, and for the user of the set to understand the effect of each of the knobs. Selectivity is, of course, tied up with the question of signal strength. A change in selectivity will nearly always alter the strength of signals. The simplest method of obtaining selectivity consists in the reduction of losses in one or more tuned circuits, and the reduction of these losses may or may not cause a decrease in signal strength.

A Simple Tuned Circuit

This matter is so important that it is well worth while to understand how selectivity is obtainable. A simple tuned circuit consists of an inductance coil with a condenser connected across it. Such a simple circuit will pick up oscillations of a given frequency. Put in another way, wireless signals of a given wavelength can be picked up by such a circuit. When these oscillations are produced in the circuit you get voltages set up across it, and these are usually passed on to a valve to be amplified and are subsequently detected. The object of the high-frequency part of the receiver is simply to get the desired signals as strongly as possible, and signals of other wavelengths not at all.

An ordinary tuned circuit will respond not only to the wavelength to which it is tuned (i.e. the one which will produce the maximum voltages across the tuned circuit), but will also pick up wavelengths above and below. The voltages produced will certainly be weaker than those produced by the desired station, assuming that all the stations influence the aerial to the same degree. Interference is thus experienced and our object in improving selectivity is to make the tuned circuit (or several of them) more selective. This word

simply means that the circuit or the set selects the desired station while rejecting signals of differing wavelength.

If the tuned circuit is made more efficient by using a better quality inductance and a better condenser, two desirable effects are obtained: one is that the signals desired are increased in strength, and the other is that the undesired signals are decreased in strength.

The Effect of Aerial Losses

A given tuned circuit may be efficient or inefficient, but it will certainly be made worse by connecting it to the source of the oscillations; this source, in the case of the first tuned circuit of a set, will be nearly always the aerial which feeds the incoming oscillations into the tuned circuit. This feeding process may be through a small condenser connected between the lead-in and the tuned circuit or by means of transformer action, a coil being connected between aerial and earth, this coil being coupled to the inductance of the tuned circuit, so that any oscillations in the aerial circuit will be transferred to the tuned circuit.

Unfortunately losses in the aerial circuit will also be transferred, so that the tuned circuit is no longer as efficient as it was "on its own." It is as though we had inserted a resistance in the tuned circuit, thus increasing its "damping." This automatically has the effect of worsening the selectivity and permitting waves of other wavelengths to influence the tuned circuit.

To overcome or rather lessen the effect of aerial damping on the tuned circuit we can insert a small condenser in the aerial circuit and by adjusting its value control the selectivity of the tuned circuit. When the condenser is large the signal strength will be increased, while if the condenser is very

small it will be decreased. This is the usual rule and will be found to apply to practically all designs. Meanwhile the selectivity is altering; as the condenser is made large and more energy is fed to the tuned circuit so will the selectivity become worse, while when there is very little energy fed to the tuned circuit the selectivity improves as the aerial losses are not communicated to the same extent to the tuned circuit. The ideal state of affairs from a selectivity point of view would be for the aerial connection to be severed, but obviously this would result in no signals coming through. If the coupling is made very loose, i.e. if the connection between aerial and tuned circuit is slight, the signals will be weak but selectivity will be good. Here we see why it is an advantage to have a sensitive set because we can afford to have the couplings weak and, therefore, get better selectivity while maintaining adequate signal strength. In general, the fewer the valves the worse the selectivity.

Striking A Balance

This, of course, presumes that similar circuits are used in both cases. The mere fact that a set has more valves does not in any way imply that the selectivity is better. There is actually nothing magical about the use of coupler condensers. You cannot improve the selectivity by them beyond that of the simple tuned circuit by itself. But as we cannot use a tuned circuit by itself but must have some means of feeding it with signals, a coupler condenser is an admirable method of giving us that balance between signal strength and selectivity which we desire. This balance is not always the same. For example, the selectivity varies according to the wavelength to which the set is tuned. The coupler will

at a given setting introduce more losses as we go down in wavelength, so that it is desirable to alter the aerial coupler to give the same degree of selectivity. As we go down in wavelength the aerial coupler should be reduced while as we go up in wavelength the aerial coupler requires to be increased in value. We can explain this roughly by saying that the aerial coupler condenser offers more and more of an obstacle as the wavelength increases. Hence, by altering the main tuning condenser to a higher wavelength without altering the aerial coupler we shall



automatically have lessened the "coupling" between the aerial and the tuned circuit, this resulting in greater selectivity and weaker signals. To keep the balance right we must, therefore, increase the capacity of the aerial coupler. At any given wavelength selectivity will be improved by reducing the capacity of the aerial coupler (i.e. turning it to the left), while if we want greater signal strength we shall increase the aerial coupler capacity by turning the knob to the right.

Sometimes selectivity is not a matter of great importance. For example, during daylight hours one frequently gets no interference at all on certain stations, and under these conditions it may be desirable to increase the coupler so that the signals are made louder.

Improving Selectivity

Selectivity can be improved not only by improving the quality of a single tuned circuit and arranging for the coupling to be as slight as possible, but also by the connection of one or more extra tuned circuits. Provided the design is correct the addition of every extra tuned circuit will improve selectivity. But each circuit requires to be suitably connected to the preceding circuit, and this is commonly done by interposing a high-frequency amplifying valve. Each circuit requires to be accurately tuned, and this means either a separate condenser correctly adjusted or a correctly ganged arrangement. Ganging calls for great accuracy in the tuning condenser and in the coils, and the adjustment is beyond the capability of the average constructor who has not the required instruments, even if the component manufacturers obliged with suitably matched coils or condensers, which is by no means certain.

The difficulty of ganging has ruled out the use of more than two tuned circuits except in special sets which are invariably more expensive. If we are only using two tuned circuits we have obviously got to make the most of them, and their selectivity must be capable of being increased as far as possible.

The Second Tuned Circuit

The use of an aerial coupler has already been described for the first tuned circuit. The second tuned circuit will ordinarily be in the anode circuit of a high-frequency amplifying valve, say an H.F. pentode. Here, again, we have the old problem of feeding the second tuned circuit with oscillations. It is very desirable to be able to control the strength of these oscillations, and we can alter the connection, so to speak, between the valve and the tuned circuit. This can be done in various ways, and in the case of the S.T.300 and S.T.400 a differential condenser was used to feed the second circuit with amplified oscillations. The development of the variable- μ amplifying valve enabled a simpler system to be adopted. By increasing the negative bias on the grid of the variable- μ valve the degree of amplification given by the valve is decreased as also is the damping effect of the anode circuit of the valve. Here, then, we get a repetition of the aerial coupler effect: as the amplification in the valve is reduced so will signal strength in the second tuned circuit also be reduced, but selectivity will be improved. Similarly, if we increase the amplification given by the

INCORPORATES DOUBLE REACTION

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valve by reducing the negative bias we increase the signal strength but reduce the selectivity.

A correct balance is obviously desirable, and this is obtained by adjusting the voltage. How far we should be able to adjust this voltage is a matter of argument. In the S.T.600 I used a potentiometer so that it was possible to get every possible variation of bias, but in practice it was found that one really only needed two settings, one with the grid voltage at zero and the other at, say, $-4\frac{1}{2}$ volts. The first setting gave maximum signal strength with ordinary selectivity, while the negative bias gave high selectivity with a weakening of signals.

Instead of a potentiometer I have used on several sets (including the Super Centurion) a switch which gives three positions. In the first position the set is switched

TERMINAL CONNECTIONS FOR SUPER CENTURION

There are six terminals on the Super Centurion, viz., A, E, H.T. + 1, H.T. + 2, L.S. - and L.T. +. Certain of these terminals are used for the L.T. -, H.T. - and L.S. + connections, to save providing additional terminals.

The connection from the minus socket of the high-tension battery is taken to the E terminal on the strip.

The negative terminal of the L.T. accumulator is also connected by a wire to terminal E.

The positive lead of the loudspeaker (if not marked, it is simply the other lead) is connected to the terminal H.T. + 2 on the strip.

The full set of connections to the receiver are therefore as follows:

- A .. Aerial wire.
- E .. Earth lead; wire from negative of H.T. battery; wire from negative of accumulator.
- H.T. + 1 Wire going to wander-plug inserted at about 72 volts in H.T. battery.
- H.T. + 2 Wire going to 120 volts on H.T. battery; one lead from loudspeaker (positive, if marked).
- L.S. - One (negative, if marked) lead from loudspeaker.
- L.T. + Wire going to positive of accumulator.

off, while in the middle position a bias is given to the grid of the H.F. valve, this bias being usually $-4\frac{1}{2}$ volts, but the constructor can himself alter this on the grid-bias battery. In the third position maximum signal strength is obtained, but with only ordinary selectivity.

In the case of the Super Centurion—as, in fact, in the case of the S.T.800 and other of my sets—you must always think of two tuned circuits, each of which may be improved in selectivity by an extra knob. The first circuit is tuned by means of the aerial balancer condenser whose knob is on the bottom left-hand corner of the panel. The aerial coupler knob controls the selectivity of that circuit, so you should always associate the two together in your mind. Do not think of the various knobs on the panel as being completely independent, because they are not. The second tuned circuit is controlled by the main knob with the long pointer and from a tuning point of view this is the most important circuit as it is calibrated and its calibration remains fixed. This tuned circuit has a selectivity "control" by means of the selectivity switch. If, therefore, we want to get selectivity we can get it either on the aerial circuit

by means of reducing the aerial coupler (turning the knob to the left), or on the second circuit by turning the selectivity switch to the middle position. Usually we shall improve the selectivity of both circuits.

So far regard has been given only of the method of connecting the tuned circuit to the source of oscillations which in the first case is the aerial and in the second case is the amplifying valve. We now come to an extremely important additional method of obtaining selectivity, and that is reaction. Reaction consists in amplifying the oscillations and feeding them back on to the original source, i.e. the tuned circuit. The amount of "feed-back" must be carefully adjusted so that, while signal strength is increased, the set does not become unstable through the valve oscillating. A variable reaction control is, therefore, essential.

What Reaction Does

Reaction was originally used as a means of increasing signal strength, and its merits as a means of improving selectivity were not widely appreciated, probably because selectivity has only been appraised at its true value since the ether became congested. Frankly, I doubt whether the proper use of reaction is understood by more than half the people who operate sets using this device. Although I have explained this matter a dozen times, a further reiteration will not be amiss. Reaction will increase the strength of a desired station, but will not reduce interference. It, therefore, differs from methods of obtaining selectivity by the use of several tuned circuits. Several tuned circuits will weaken interference and perhaps cut it out entirely, while the desired signal will itself be weakened to some extent unless valves are used between the circuits to increase signal strength.

Applying reaction, therefore, does not automatically produce selectivity. If on a given wireless set you are hearing interference from a nearby station (nearby as regards wavelength) the application of reaction may make the desired station louder but it will probably leave the interference exactly as it was and, therefore, still a nuisance. But it may not even increase the strength of the desired station. If this is already very loud, increasing reaction will not make any difference, or, at any rate, certainly no difference of a beneficial nature. You can only get a certain signal strength out of a wireless receiver, this depending upon the output of one or other of the valves in the set. When any one of these valves becomes overloaded, the application of stronger signals to it will not result in louder signals from the speaker. What probably happens is that severe distortion occurs. The application of reaction to a strong signal should never be attempted for this reason. This advice is disregarded in tens of thousands of cases, and is the result of all kinds of complaints of lack of selectivity and in other cases of break-through on the long waves.

Reduce Signal Strength First

Reaction is really a means of increasing the disparity between desired signals and interference. We thus have a means of producing an artificial kind of selectivity which is of extreme value. The secret of the proper use of reaction lies in reducing signal strength until the interference can no longer be heard. It may actually

be there, but cannot be detected by the ear. Having reduced the interference to inaudibility, we naturally have also reduced the strength of the desired station, but on applying reaction the desired station immediately comes up in strength, while the interference is left in the limbo of inaudibility. The rule, therefore, is always to reduce signal strength before applying reaction. Signal strength may be reduced in various ways, but the usual one would be to reduce the aerial coupler by turning the knob to the left, or in the case of the Super Centurion, also by turning the selectivity switch to the half-way position.

Three Distinct Operations

Although everyone accepts reaction as a very simple operation, I am not at all sure that it is as simple as most people think. Far be it from me to suggest that any wireless operation requires special skill, but if you are to get the most out of a receiver you will certainly have to treat a reaction more seriously. The average user may reduce signal strength in accordance with instructions, and then apply reaction. If he then does not get the required sensitivity or selectivity he is inclined to blame the set or the instructions. Actually there are three distinct operations in adjusting reaction. First of all the circuit must be correctly tuned; next, the signal strength heard must be accurately reduced; thirdly, the reaction must be adjusted correctly, which really means, in difficult cases, adjustment to the critical point just before oscillation. A fourth operation is really called for, and this consists in slightly retuning the main tuning control. This slight retuning may be necessitated by the reaction affecting wavelength slightly, but even if this were completely overcome retuning would still become necessary because before reaction was applied it is highly unlikely that the circuit was accurately tuned, and the slight inaccuracy only shows up when reaction is applied.

If we analyse the matter still further we will find that quite a number of slight changes of both reaction and tuning knobs is necessary, but these operations are almost instinctive and only take a matter of a second or two. Certainly the experienced operator of a set hardly realises he is perfecting reception by a process of trial and error.

Initial Adjustment of Volume

But apart from this titivating of reaction the initial adjustment of signal strength is the most important. Of course, it is not important if the problem of selectivity does not arise. Then we can apply a little or considerable amount of reaction as we please without any serious disadvantage. But if we are to separate two stations by the use of reaction adjusted critically it becomes vitally important to have the original signals the right strength. What this strength is is a matter of experiment and experience. Perhaps the best way is to make the signal very weak and then to apply critical reaction and listen to the strength.

If the strength is not loud enough you can increase the original signal strength by increasing the coupler, for example.

EMPLOYS UNI-PLANE CONSTRUCTION

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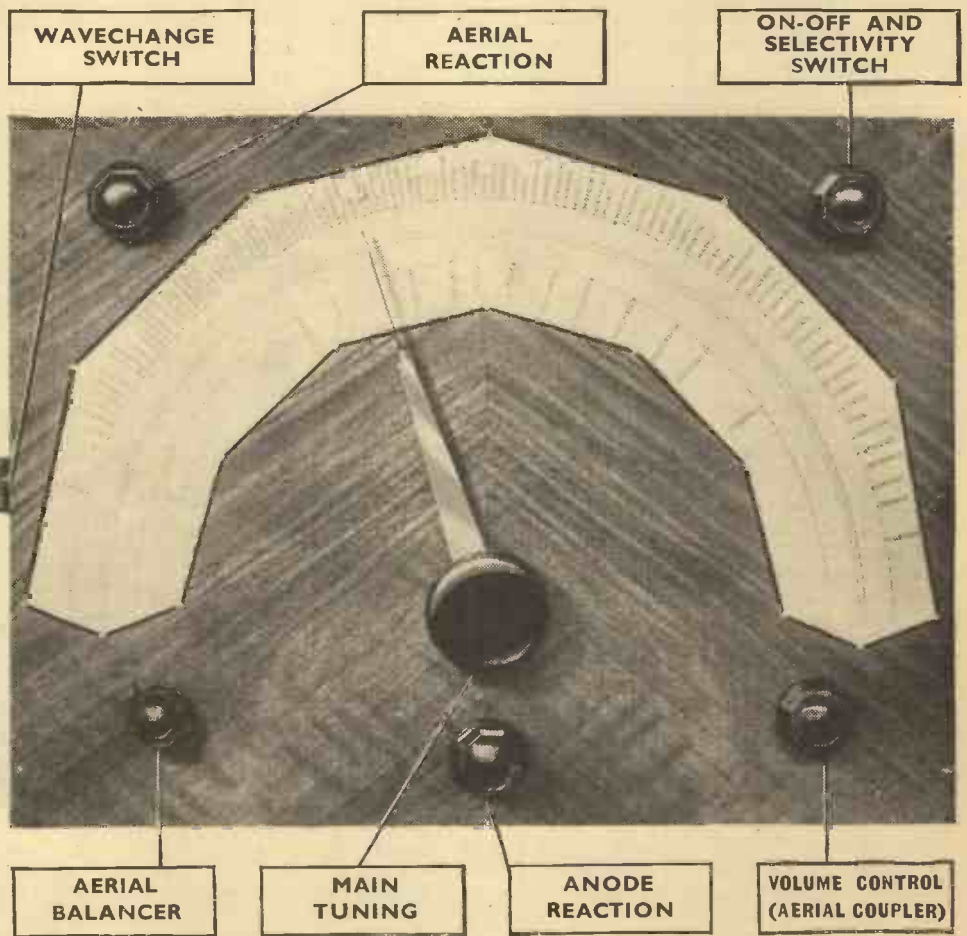
In the Super Centurion you will do it by increasing the aerial coupler slightly. After an adjustment of reaction you would then note how loud the signal was. If satisfactorily loud your difficulties are over. If not loud enough, you should increase the coupler still further and apply critical reaction once more.

This system of starting with the signals too weak is certainly the safest. If you start with signals fairly strong you will do one of two things. You will either increase reaction insufficiently, thereby losing the full benefit of the selectivity it can produce, or you will increase reaction up to the critical point, and your signals will be much too strong and distorted. After every adjustment of reaction the main tuning

published by myself at the very beginning of 1919 in the "Electrical Review." This was the so-called "tuned anode circuit," which emerged from the welter of circuits of 1922 to a position of priority which it held jointly with the S.T.100 circuit for several years. But even at this early date the S.T.100 provided a degree of double reaction, although not deliberately intended. In the S.T.100 there were two tuned circuits, and they were coupled together to produce reaction. This reaction benefited both tuned circuits, but the S.T.400 many years later was the first popular set to introduce separately controlled reactions, while the S.T.600 represented a further big step in the correct use of the double reaction principle.

A Highly-Effective Scheme

In the S.T.800—a set already greatly complicated by all-wave additions—the double reaction principle was omitted, but in the Super Centurion it is once more used



circuit should, of course, be carefully readjusted as a slight alteration is almost certain to be necessary.

The benefits of reaction are so startling, and have so long been appreciated, that it is not to be wondered at that a couple of reaction adjustments will give even better results. If you have one circuit and reaction will improve its selectivity, the application of reaction to all the circuits will give even better results. The use of two tuned circuits with reaction applied to the anode circuit is still the most popular arrangement in use to-day, and is commonly employed by commercial battery sets of simple design. The father of all these circuits is that

with great effect. Naturally, on a three-valve set the benefits are correspondingly greater. It has already been explained that the greater the number of valves the looser can the couplings be made and, therefore, the greater the selectivity. This, of course, is a very wasteful system because you are deliberately throwing away signal strength in order to get selectivity. When you use reaction the reverse applies, and you can increase the couplings and also the reaction so that signal strength may be increased at the same time as selectivity, provided always, of course, that you do not make the set sufficiently sensitive to pick up the background of interference.

ON THE SHORT WAVES



**SUPERHETS—
THE FIRST STAGES**
Some practical information
by W. L. S.

I HAVE already said a little about the superhet and its layout, but my advice concerning details has been rather vague. I have simply suggested that the output stage and power-pack should be mounted on a second chassis, leaving the first free for the H.F. and I.F. portions of the set.

Now I want to come down to brass tacks still more, and have a look at the H.F. side of the "super"—which is, without a manner of doubt, its most important section.

So many people who build superhets seem to think that all they need is some sort of detector and some sort of oscillator to beat with it. After that, by some magic property, the wonderful I.F. amplifier (the operation of which is wrapped in mystery) will clear everything up for them and give them a set that is just too, too marvellous.

It seems a funny way of going on! But I have met it so many times that I feel sure that it is a wide-spread disease.

Let's leave queer ideas alone and come down to facts. The first detector of a superhet should be just as carefully planned and laid out as the detector of a two-valve receiver—or even of a "single." No superhet is better than its first detector; if that is flatly tuned and brings in all manner of interference, the sharpest tuning I.F. amplifier ever made isn't going to be capable of sorting it out.

The oscillator which beats with the detector, too, must be almost as carefully built as the ordinary oscillating detector. Above all, it must be stable; and it must oscillate smoothly and evenly over the whole range through which it tunes.

A Superhet Worth Having

If we use an H.F. stage before the detector—and most modern superhets that work really well do so—that must also be a good one. In short, if we build the whole thing up on the unit principle, making sure that each section is pulling its weight as we do so, we shall have a superhet that is worth having.

I recently made one in a series of units, and though it was a most unwieldy beast, it gave such terrific results that I tolerated the appearance of the thing. It really

opened my eyes and showed me how hopelessly bad some of these modern, compact superhets (especially of the home-brew variety) really are. Of the commercial jobs I cannot say much, except that they vary tremendously in their efficiency. Some are really excellent, and others, while doing reasonably well what they set out to do, might be much better for a little "titivation."

Fig. 1, on this page, shows a straight H.F., detector and oscillator for the early part

from interaction if you connect, across two parts of it, tuned circuits that are beautifully coupled to one another by all sorts of stray capacities and inductances?

I have drawn Fig. 2 to show you the kind of precautions that you really should take if you want to get the best out of a frequency changer. The rear coil and condenser are on the "detector" side of the valve, and the foremost pair serve for the oscillator part of the works. The condensers are screened from one another; but the coils are not only screened, but also are separated, deliberately, as far away from one another as the layout will allow.

If a tuned H.F. stage, as in Fig. 1, is in use, a three-gang condenser and three sets of coils are necessary, and another "wiggler" must be added to the screen, allowing you to mount the H.F. coil at the back, and on the left.

Now for some circuit details. The usual values of grid leak and condenser are suitable for the detector part of the circuit; but the oscillator, which is like an oscillating detector with no reaction control, must be dealt with in a different way.

With the conventional values of grid condenser and leak it will probably howl at audio-frequency in one part of the tuning range, and pack up completely in another. That is what the average oscillating detector would do if one set the reaction control at a predetermined value and left it alone.

H.F. AND COMBINED DETECTOR-OSCILLATOR

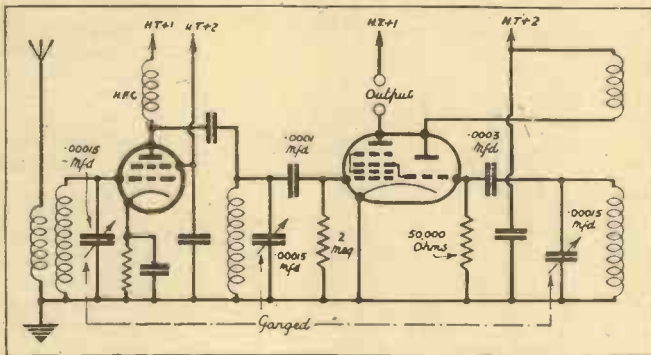
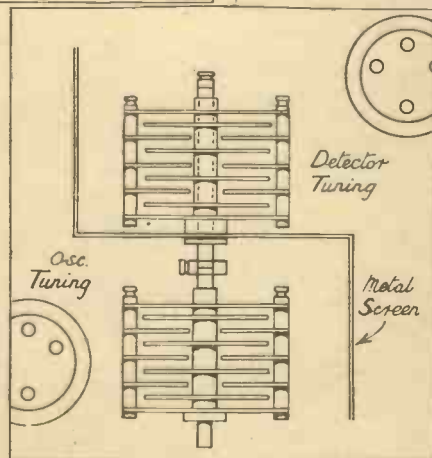


Fig. 1. A straight H.F. detector and oscillator for a superhet. The detector and oscillator are combined, a triode-hexode being used. Fig. 2 (right) shows how the screening between the detector and oscillator tuning condensers.

of a superhet. Nowadays it is the fashion to combine the detector and oscillator, and to call the combined unit a "frequency changer." This is all very well, if we don't start imagining that frequency changing is the only thing that it has to do.

The modern triode-hexode is really excellent for the purpose. The two sections of the valve are well separated, and one does not get that awful "pulling" effect that was so often present with the older types of valve.

Don't forget, however, that you can completely ruin any advantage obtained from this excellent valve by giving your tuned circuits a bad layout. What's the use of designing a valve that gives freedom



The output is taken from the anode circuit of the hexode section and the two terminals shown in the circuit diagram normally take the I.F. primary connections.

The I.F. amplifier is a very straightforward business, but I will deal with one or two possible snags in a later article. It is advisable to use a separate H.T. tapping for the oscillator section, as shown, and then the voltage that gives the most even operation can be chosen and left alone.

Gridleak Value

Such a state of affairs is normally righted quite easily by giving it a very low value of gridleak. I have shown a grid condenser of 0.0003, and a gridleak of 50,000 ohms, which is what the makers of the triode-hexode generally recommend.

ON THE SHORT WAVES—Page 2

POINTS from the POST-BAG

W. L. S. Replies to Correspondents

R. C. F. (Streatham) is building a transmitter, and tells me that the circuit he wants to use employs two .00016 variable condensers. He wants to know how to make the best use of one .00025 and one .00015 for the job. As I don't even know what the circuit is, however, I can't possibly say—except to make the obvious remark that whatever can be done by a .00016 can also be done by a .00025, except that part of the scale won't be used.

R. C. F. also wants to know the address of the nearest amateur transmitter to him, but I think he would be better advised to approach either the R.S.G.B. (53, Victoria Street, S.W.1) or the South London and District Transmitters' Society. The address of the secretary of the latter society is 144, West Hill, Putney, S.W.

A Spot of Bother

B. E. G. (Worcester Park) has built the ultra-short-wave two-valver that I sketched in the issue of October 24th, but complains that he can only get it to "super" half-way round the dial. And it only does that with a low-impedance valve which seems unsuitable for the job. I can't suggest a cure here, but it's almost certain to be in the wiring and the layout of the coils. Loosen the aerial coupling, tighten the coupling between the coils, increase the H.T. But you know all those dodges as well as I do.

A. W. (Banbury) sends a diagram of his set and a list of components, and complains that he can only receive distant stations at very poor strengths. What can I suggest? Well, A. W., this seems to be the complaint of everyone who has made a short-waver that doesn't go properly, for one of a thousand different reasons.

The set uses a screened-grid detector, followed by a resistance-coupled triode, followed by a transformer-coupled pentode, and if the detector is working properly there should be sufficient amplification to blow anyone's head off.

These troubles are *always* in the detector stage. Either the coils are inefficient or the H.F. choke is not suitable, or the aerial coupling is wrong, or the layout is bad, or — One simply can't finish the list!

Connect your phones across the anode resistance in the detector circuit, A. W., and see if you can hear anything at all. Play about with the detector arrangements until you can get nice readable signals from a single valve, and then reinstate your L.F. amplifiers—and I guarantee that you will be able to bend the walls and rattle the windows.

Explaining a Report

C. R. H. (Bristol) wants to know if a blue print of my H.F. unit is available. I'm afraid there isn't such a thing in existence, but I intend to give the practical diagram of its layout as soon as possible.

He also asks for explanation of reports given on these lines: 21.30, 19.72 m., R7/N/N. Being duly translated into

English, that means 9.30 p.m., 19.72 metres, R7 (strength 7), no atmospherics, no fading.

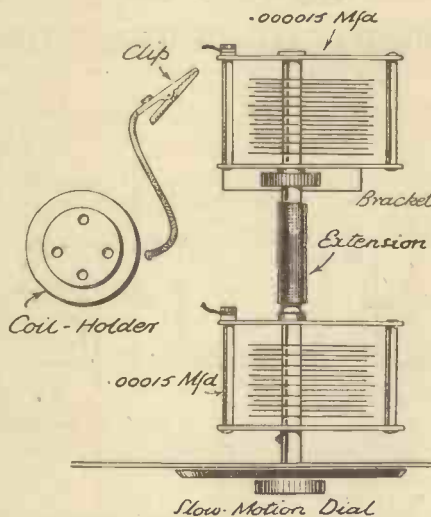
Atmospherics and fading are designated X and F. XX means "much plenty atmospherics" and FF means "severe fading." "N" means "no"—and after it the X's and F's can be left out.

The diagram on this page represents a particular kind of band-spreading scheme. Two tuning condensers—one large and one small—are used, and a crocodile clip makes provision for changing over from one to the other. The coils are so arranged that when they are tuned with the little condenser only they cover the desired waveband. Thus they might be so cut that the wave-ranges covered with the two condensers would be 21–44 metres or 20.5–22 metres. Naturally, the smaller condenser will also have a smaller *minimum* capacity than the other one, and the band will thus start a little lower when it is in use.

This scheme is useful, but you need patience in getting the coils cut just right.

Here's a query about the "Simplex" Two. B. P. T. (Bath) says, "I notice in your list of parts a .25 megohm grid leak for the L.F. valve; my dealer supplied the

A NOVEL SCHEME



A novel band-spreading scheme. Two tuning condensers are ganged, by means of an insulated extension piece, to a single control knob. One condenser is of much smaller capacity than the other and the change over is effected with a crocodile clip.

kit with a 250,000 ohms resistor instead." Seeing that a megohm is a million ohms, that seems all right to me! B. P. T. says that he can't control reaction nicely—it's better when the negative G.B. plug is removed. Perhaps he tries to use too much grid-bias—especially if his valves are ancient. Try about 1½ volts and see what happens, B. P. T.

Regarding your band-spread query—yes, a band-spreading condenser would definitely improve the "Simplex" Two. But as it was designed as a *simple* and cheap set I didn't include one in the original.

A. B. (no address) wants to know how to start on short waves, and particularly if the two-valve A.C. converter described in the issue of October 10th, 1936, is suitable. It certainly is, and he would be well advised to use it as a starting-point. It should go well with any modern all-mains receiver.

But no "point-to-point" wiring diagram has been published.

HEARD ON THE AIR

LOOKING back over some of the few hundred thousand words that I have written in this section, I was rather amazed to find how the character of the stuff has changed in the last year or so. Readers used to love a column or so of "station news," and they frequently wrote in to tell me of all the nice, new short-wave broadcasters that they had been logging.

All this kind of interest seems to have disappeared. People take short-wave broadcast for granted now, and their interests are confined to the sets they make and how they work, or to the amateur wavebands, which seem to have aroused more interest during the past year than ever before.

First Hand News via Short Waves

History is repeating itself. Before there was much regular broadcasting the amateurs were the chief centre of interest; now that there is so much broadcasting that it is taken for granted, the amateurs have slipped back into focus again!

All the interesting things that readers have told me about lately have happened on the amateur bands. To-night I have been listening to a conversation between a French amateur and one of the Spanish rebel stations—each telling the other to get off the air. (Incidentally, why these Spanish stations should plunk themselves right in the amateur bands is a mystery to me.)

Last week I heard first-hand news of the flood conditions in the U.S.A. from more than a dozen amateurs using telephony on the 10- and 20-metre bands, as well as thirty or forty emergency stations handling rush traffic as hard as they could go.

The amateur certainly has opportunities of keeping himself in the public eye in the States. In each of the afflicted towns there seemed to be at least one station that was independent of public power supplies, and in one instance the station I heard was the only link between the flooded town and the rest of the world, for the time being.

The Resourceful Amateur

I heard one of these emergency stations operating with dry batteries only—and putting in quite a fair signal over here, more than three thousand miles away. Another reported that the town's mains were "dissed," and that he was using a small petrol engine driving a generator.

Once again the American amateur has proved himself a resourceful and ingenious fellow, and the total effect of all these emergency stations must have been tremendous. Hats off to the American "ham" once more. He has done it again.

How many readers have noticed an improvement in the strength and quality of the Empire programmes from Daventry of late? I don't know whether it's just "conditions," but I have been receiving them much better than ever before—and that is at a distance of 100 miles or so, possibly the least favourable distance one could imagine.

W. L. S.

A SHORT-WAVE FORECAST By J. C. JEVONS

IF coming events cast their shadows before, then it is safe to say that the ultra-short waves will be responsible for many surprising developments in the not-far-distant future. Last year the "all-wave" receiver made its first big bid for popularity, and this year it is likely to sweep the field at Radio Olympia.

But with television on 6 or 7 metres already in operation, we have to face a new situation. The ordinary listener, having once made contact with the short-waves—say between 14 and 70 metres—will not like the idea of being left high and dry when it comes to the new television service. He will naturally want to get down below the 10-metre mark, even if, at first, it is only a question of "hearing" what is going on there. "Seeing" will no doubt come later, but meanwhile we may take it that most of this year's short-wave radio sets will tune down to at least 5 metres.

Utilising "Dwarf" Waves

Acquaintance with the "digit" waves—between 1 and 10 metres—will, in turn, prepare the way for making contact with the so-called "dwarf" waves, which are measured in centimetres instead of metres. Perhaps this is looking rather far ahead, but, on the other hand, the ether is already chock-a-block on the long and medium waves for broadcasting. We cannot stagnate, and if we are to find room for further developments we must prepare for them at the short-wave end of the scale.

It is not as though this part of the ether were unknown territory. Whilst the B.B.C. have been preparing the way for transmitting sound and picture programmes between 6 and 7 metres, the Post Office and other big concerns have been opening up commercial point-to-point radio services for telegraphy and telephony on 15, 18, and 26 centimetres.

A Lot to be Learnt

It may be argued that these very short waves are only used at present for "beam" working over comparatively short distances, and that they are, therefore, not suitable for broadcasting, where the object is to supply programmes to the largest number of listeners over as wide an area as possible. To some extent this is true, but it is only a part of the whole story.

We are only at the threshold of the modern short-wave era in wireless, and have still a lot to learn about the behaviour of these waves in actual practice. Many of us can recall how the early amateurs, using ultra-short waves and very low power, secured results which gave a distinct "jolt" to the professional radio engineer. In the same way, it is quite on the cards that we may all have to face similar surprises in the future.

Expert opinion, for instance, puts a limit of twenty-five miles on the new television service, but we now know that excellent

Our contributor, in looking ahead at the development of ultra-short waves suggests that quite soon a large number of commercial receivers will go down below 10 metres. He also anticipates the use in the future of ultra-short waves for broadcasting activities

reception is being secured at places located well over forty miles away, and at various points of the compass from Alexandra Palace.

At the same time, we must admit that "dud" reception areas occur, even inside a ten-mile radius—but that is beside the point. What is remarkable, for the moment, is the practical proof that 7-metre radiation will reach out far beyond the so-called "optical" range. And, in view of this, who will venture to say what may be done in the future with even shorter waves—once we understand how to ensure the proper conditions for transmission and reception?

One advantage of working with short waves, as distinct from long waves, lies in the comparative simple form of aerial that is required. Perhaps "simple" is scarcely the right word to use, since a certain amount of skill is required to get the correct coupling for maximum efficiency. But in

particularly well to directional working. Half a dozen dipole wires set up side by side, and backed by similar reflectors, will give a clear-cut beam of radiation—a result which it is impossible to produce on the medium and long waves without enormous cost.

Cutting Out Vertical Radiation

It is true that "beam" wireless is not required for broadcasting—except possibly as a relay-link between one transmitter and another—to replace the usual telephone trunk line. But the directional action of the aerial is not necessarily limited to producing horizontal beams for point-to-point working. Short-wave aeriels can also be used to give a directional effect vertically. In other words they can be made to radiate uniformly, in all directions, in the horizontal plane, without radiating any energy at all in the vertical plane. This, of course, is just what is wanted for broadcasting.

Cut out the "sky wave," and keep all the radiation where it is wanted, pointing circularly outwards and downwards, like the ribs of an open umbrella.

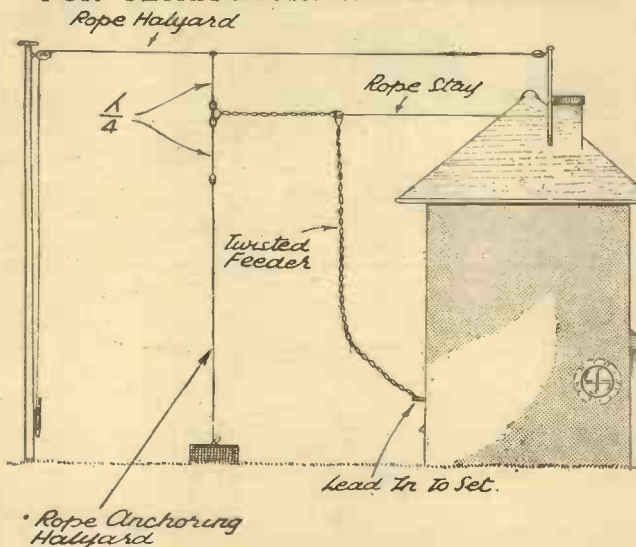
Here we get a glimpse of the short-wave broadcast system of the future. Imagine a large number of short-wave transmitters arranged in groups, each group, say of three or four, operating on different wave-lengths and catering for the needs of a comparatively small area. In this way they will supply that area with a wider variety of programmes than at present, and at less cost. Because of their limited "spread" the local programmes will not overlap with any of the "outside" transmissions, thus giving local listeners a choice of from three to four different stations on quite a simple type of receiver. The various groups of transmitters over the whole country will be linked up through short-wave "beam" relays to half a dozen separate studios, so as to "ring the changes" at will from

studio to studio.

Television—The Touchstone

This is where the future of short-wave broadcasting appears to lie. Television is, in a sense, the touchstone. If it proves to be the success we all anticipate, now that it is backed with the prestige of the British radio industry, and the experience of the B.B.C., we may look forward to the time when the wave-band below 10 metres will carry more broadcast traffic—both sound and picture—than any other part of the ether. How long it will be before the short waves become the main traffic roads of the ether one cannot predict. But we do know that radio is a rapidly progressive science.

FOR ULTRA-SHORT-WAVE RECEPTION



A typical aerial of the type which provides an efficient pick-up of energy in ultra-short-wave reception.

practice the ordinary listener will buy his dipole aerial and down-lead as a matched unit from the manufacturer, just as he now buys his valves already fitted with electrodes.

The point is that short-wave aeriels are extremely compact, and relatively inexpensive to erect—a distinction which is just as important in the case of transmission as in reception. It means, for instance, that thirty or forty ultra-short-wave stations can be erected for the cost of one medium-wave transmitter—a factor which is bound to make itself felt when the time comes, as it must before long, for recasting the present broadcast service.

Because of the compactness of the aerial system, ultra-short waves lend themselves

LEARNING FRENCH THROUGH YOUR RADIO

THIS week I propose to deal with what is perhaps the most-used verb in French, namely, FAIRE (to make, to do). Its uses are threefold. It is used (1) alone, (2) with an INFINITIVE, (3) REFLEXIVELY, and with an INFINITIVE. That is:

- (1) FAIRE. To make, to do.
- (2) FAIRE ENTRER. To make to enter — i.e. to show in.
- (3) SE FAIRE COMPRENDRE. To make oneself understood.

But first of all let me give you the NINE TENSES of FAIRE. It is an IRREGULAR VERB, but for all that not difficult to learn.

- PARTICIPLES. FAISANT FAIT**
- T. No. 1 (I make, I do)
fais, fais, fait, faisons, faites, font.
 - T. No. 2 (I was making, etc.)
faisais, faisais, faisait, faisions, faisiez, faisaient.
 - T. No. 3 (I did, etc.)
fis, fis, fit, fimes, fîtes, firent.
 - T. Nos. 4, 5, 6, 7
J'ai fait (I have made, done)
J'avais fait (I had made, done)
J'aurai fait (I will have made, done)
J'aurais fait (I would have made, done)
 - T. No. 8. (I will make, do)
ferai, feras, fera, ferons, ferez, feront.
 - T. No. 9. (I would make, do)
ferais, ferais, ferait, ferions, feriez, feraient.

Please learn these TENSES thoroughly. Now for some examples of FAIRE.

Tout ce que je fais est nécessaire et important
All that I do is necessary and important.

Si je faisais cela je serais heureux.
If I did that I would be happy.

Il le fit sans penser aux conséquences.
He did it without thinking of the consequences.

Il a fait son devoir.
He has done his duty.

Nous avons fait de notre mieux.
We had done our best.

Quand vous l'aurez fait venez me voir.
When you have done it come and see me.

Ils l'auraient fait s'ils en avaient eu l'occasion.
They would have done it if they had had the opportunity.

Il le fera sans difficulté.
He will do it without difficulty.

Je le ferais maintenant si l'occasion se présentait.
I would do it now if the opportunity arose.

All this is quite straightforward and should present little difficulty.

FAIRE plus AN INFINITIVE isn't quite so straightforward, and requires some explanation. I can best explain this use of FAIRE by taking an example. Let us consider the expression FAIRE BÂTIR (to build, to cause to build, to get somebody else to build for you).

Now, in English, I, like many others, say unblushingly, "I am building a house in such-and-such a street." Rather comic, isn't it, when you come to think of it? What a house it would be! I don't think the borough surveyor would think much of it when he saw it. In fact, I am certain he would never pass the plans in the first place. No! I am not building the house, because professionally I am not a builder. But what I am doing is this: I am commissioning a builder to do it for me. That is, I am getting it done for me. I am making it to be built. Consequently, when I wish to say in French that I am building a house I mustn't say:

JE BÂTIS UNE MAISON *but* JE FAIS BÂTIR UNE MAISON.

There are scores of similar expressions in French. Let me give you a few. First

This week we reach Part 48 of our special easy-way language series

By S. C. GILLARD, M.A.

of all, there are those to be found in a recipe.

- FAIRE CUIRE (to cook)
Faites cuire les soles dans cette sauce
Cook the soles in this sauce
- FAIRE FONDRE (to melt, dissolve)
Faites fondre le beurre;
Dissolve the butter
- FAIRE JETER
Faites jeter quelques bouillons
Bring it to the boil several times

Il nous a fait venir
He sent for us
Faites-le entrer
Show him in
La fumée l'a fait tousser
The smoke made him cough
Le bruit fit aboyer le chien
The noise set the dog barking
Allez-vous faire manger le chien?
Are you going to feed the dog?
Ne me faites pas attendre!
Don't keep me waiting!

And study the following, which I got from a NEWS BULLETIN:

Le président de la Reichsbank a fait savoir, il y a huit jours, que ses obligations de service ne lui permettent pas malheureusement d'assister à la réunion.
The president of the Reichsbank announced a week ago that his duties do not permit him, unfortunately, to be present at the meeting.

Le gouverneur de M. a fait envoyer 1,500 hommes de la Garde Nationale à Flynt.

The governor of M. has ordered 1,500 men of the National Guard to be sent to Flynt.

Sa mère l'a fait inscrire sur le registre avec les prénoms français de Jean Jacques.

His mother had him registered with the French christian names of J. J.

Pour faire trancher la question le Crédit municipal de B. a pris l'offensif et...

To get the question settled the Credit municipal has taken the offensive and...

Nous avons le regret de vous faire part du décès de Monsieur X.

We regret to announce the death of Monsieur X.

Business letters in French often begin with:

Monsieur,
J'ai l'honneur de vous faire savoir que...

Sir, I have the honour to inform you that...

And lastly, SE FAIRE plus the INFINITIVE.

Learn the following:

Se faire peser To get oneself weighed
Se faire photographier To get oneself photographed
Se faire connaître To get oneself known

Se faire entendre To make oneself heard
Se faire comprendre To make oneself understood
Se faire prier To have to be asked
Se faire couper To get cut
Se faire lire To have oneself read to

Study these sentences now. Notice particularly the INFINITIVE:

Je viens de me faire peser
I have just had myself weighed

Il peut à peine se faire comprendre.
He can hardly make himself understood

Ne vous faites pas tant prier!
Don't take so much asking!

Je vais me faire couper les cheveux
I am going to get my hair cut

Elle se faisait lire le journal par sa mère
She used to get her mother to read the newspaper to her

Un bruit se fit entendre
A noise was heard

Je vais me faire photographier demain
I am going to have my photograph taken to-morrow

Now a short reading test consisting of typical News Bulletin sentences.

Le commissaire a fait une suggestion extraordinaire. L'équipage du navire "M-J," fait prisonnier par le croiseur allemand "K," a été remis sain et sauf aux autorités espagnoles.

F.M. a décidé de faire un film sur la vie intime des artistes d'Hollywood.

Elle cherche à se faire connaître des magnats d'Hollywood.

Il ne veut plus travailler autant qu'il l'a fait ces deux dernières années. C'est cet après-midi que Monsieur R., le juge d'instruction dijonnais a fait subir le premier interrogatoire sur cette catastrophe. Monsieur Alfred Cortot fera, à 14h. 45, une conférence sur César Frank.

Il fait appel à tous ceux qui s'intéressent à ses initiatives.
[Note: Fair copy of last week's test is on Page 643. Ed.]

AUTOMATIC PROGRAMME SWITCHING



One of the new German Telefunken sets. A novel feature is the clock, seen on the right, which can be pre-set so as automatically to switch the receiver on and off at times to suit the listener's requirements.

- FAIRE FRIRE (to fry)
Il faut faire frire les pommes de terre
It is necessary to fry the potatoes
- FAIRE BOUILLIR (to boil)
Cela fera bouillir la marmite
That will keep the pot boiling
- Faites bouillir le lait
Bring the milk to the boil
- And don't forget the famous Persil advertisement:
Je fais simplement bouillir mes rideaux pendant vingt minutes dans la solution de Persil
I just boil my curtains for twenty minutes in the solution of Persil
- And another Persil advertisement says:
Un lavage ordinaire est incapable de FAIRE DISPARAITRE les impuretés
Ordinary washing is incapable of getting rid of (making to disappear) dirt.

Learn also the following FAIRE plus INFINITIVE expressions:

- Faire savoir to inform
- Faire envoyer to cause to be sent
- Faire inscrire to have inscribed
- Faire part to inform
- Faire trancher to settle
- Faire venir to send for
- Faire entrer to show in
- Faire tousser to make to cough
- Faire aboyer to set barking
- Faire manger to feed
- Faire attendre to keep waiting
- Faire monter to bring up
- Faire remarquer to remark
- Faire voir to show

Here are a few sentences to illustrate the verbs above:

- Le soleil fait fondre la neige
The sun melts the snow
- Le soleil fait sécher le linge
The sun dries the washing
- Il fait venir le médecin
He sends for the doctor

FROM OUR READERS

A TIMELY WORD FOR QSL HUNTERS

The Editor, POPULAR WIRELESS.

Dear Sir,—Queries about QSLs from S.W. stations having appeared from time to time in your paper, perhaps many readers will be interested to hear of my own experiences in this sphere. I must say, right away, that the whole QSL business is grossly overdone, and probably the only people who benefit from it are the P.O. authorities. A year or two ago I was bitten by the craze myself, and for a long time spent a small fortune on postage stamps, QSL cards, and postal reply coupons. I will give you some figures covering a period of twelve months, so that readers may form their own opinions of the "QSL racket."

Reports sent during a period of twelve months, 186.

Verifications received, 54.

Percentage of reports acknowledged, 29.

A few details will also prove interesting, and will probably save intending "QSLers" a fair amount of time and money. Note the following:

Reports to U.S.A. (districts 5, 6, and 7)	28
Veri's received	4
Reports to Argentine	12
Veri's received	2
Reports to Brazil	15
Veri's received	0
Reports to Australia	28
Veri's received	5
Reports to Canal Zone	6
Veri's received	0
Reports to Peru	7
Veri's received	0

No comment is needed on the above figures, except, possibly, a few trite remarks anent the incurable optimism of *homo sapiens*!

Many people imagine that the inclusion of a postal reply coupon is a guarantee of a reply, but such, unfortunately, is very far from being the case. I sent coupons to all the really interesting stations, but the only response was less than a dozen cards. Among the quite uncommon countries which failed to acknowledge my reports, were Siam, Curacao, Paraguay, Surinam, Bahamas, Nicaragua, Cook Islands, Alaska, British Solomon Islands, and New Caledonia.

The best advice I can give to interested readers is this: "If you intend, in the future, to send out a considerable number of reports to short-wave amateur stations, join a radio society that conducts a free QSL bureau (such as the R.S.G.B.), and save yourselves a great deal of time and a large number of stamps."

Yours faithfully,

R. B. WEBSTER.

Launt House, Carlton Road, Worksop.

OLD SCHOOL TIES THAT FADED.

The Editor, "Popular Wireless."

Dear Sir,—The series of articles called "1936 Broadcasting Reviewed," now running in "P.W.," make very imposing reading; but the "review" is not so good when some of the items are taken for individual analysis. The outside broadcasts, for instance. The pre-

Interesting facts and figures from a reader who has sent reception reports to all parts of the world



dominant impression is that, while the established features were, as usual, put over more or less successfully, the promise was not wholly fulfilled in the most important events of 1936 owing to the B.B.C. commentators failing to rise to the heights the occasions demanded.

The departure and maiden voyage of the R.M.S. "Queen Mary" was a broadcasting event looked forward to with pleasurable anticipation and from which great things were expected. We certainly weren't disappointed in so far as her departure from England and subsequent transatlantic voyage were concerned.

NEW B.B.C. STATION MACHINE-ROOM



The filament and G.B. generators in the machine-room at Penmon, Anglesey. Both machines are duplicated in case of breakdown. On the right are pumps for water cooling the anodes of the transmitting valves.

The anti-climax came when the American and British commentators joined forces at the ship's berthing in New York.

The air was pregnant with anticipation when the American commentator invited the B.B.C. man to tell the world how many radio transmitters they were using on board (a question any twelve-year-old schoolboy passenger could have answered with complete details, I'll wager), and—ye gods!—the best the world-representative of British broadcasting could do was to stutter that "he didn't know"! Was his face red?

I'm afraid that a good many old school ties lost their brightness in that sad and awful moment; and many a Pukka Sahib, struggling valiantly to uphold British prestige in the far-flung Outposts of Empire, hung his head in silent humiliation before his coolies at this inglorious demonstration that the Old Country wasn't what she was, by gad, sir! (It is reported that Colonel Ginswiler, late Poona Militia, in a moment of mental aberration brought on by this letting down of the Old Flag, refused a drink, and, on being afterwards informed of this lapse, took to his bed and has never since been the same.)

There is an outstanding fact concerning the Aldershot Tattoo which remains vividly in mind—namely, that the commentator's sense of timing was stupendous. The massed bands—piece-de-resistance of the programme from the listener's point of view—never managed to blow more than a few notes round and around before the B.B.C. interrupter came in strong with a few chatty remarks about the weather and the enormous crowds present; and it was almost uncannily the way he contrived to dry up exactly as the music ceased to come out here. One redeeming bright spot, however, in an otherwise decidedly scrappy exhibition was provided by a Canadian's impromptu comments on the British attitude to the Abyssinian question in view of our own early colonising efforts. Very refreshing. (And I'll bet he was soundly ticked off by the powers that be for being enterprising enough to say something almost original down a B.B.C. microphone.)

The height of fatuity, however, was reached at the broadcast opening ceremony of the Olympic Games. The B.B.C. commentator found everything frightfully boring and amusing, and his abysmal ignorance about what was going on was astounding—even for a B.B.C.-ite!

Thousands of pigeons were released from the Stadium—our commentator, there for the express purpose of telling us all about it, mind you—"didn't quite know why"; some veteran Olympian presented Herr Hitler with an olive branch—he "didn't know who the fellow was." Then the German Sports Minister made a welcoming speech to the contestants which bored our commentator to tears almost, and he was so darned intent upon inanely explaining that he "didn't know what it was all about" that we very nearly missed Herr Hitler's declaration that the Games were on.

"Comparisons are odious," said some disillusioned wise-cracker, who had been compared to his disadvantage; and to compare the B.B.C.'s anæmic attempts to visualise a scene for its listeners with the racy, informative, quickfiring commentaries of the American "Masters of Commentary"—well, as Snuzzle puts it: Are we mortified?

I am all for introducing fresh blood into broadcasting, but if the new so-styled "specialists" can do no better than this, let us, until such time as television enables us to see for ourselves, stick to the old gang—Howard Marshall, H. T. B. Wakelam and Co.

Yours truly, A. E. ROSE.

75, Brendon Street, Long Eaton, Notts.

LIZARD SAVES 'PHONES

The Editor, POPULAR WIRELESS.

Dear Sir,—It was whilst I was winning the big bust in the M.E.F., 1916.

The "aerial" to Headquarters (20-gauge enamelled) came through the top of the tent and down the pole to the 'phones.

We had rigged up a cut-out to earth the sparks when the atmospherics were bad, and on one occasion an extra big spark caught one of the lizards (which used to climb the pole after flies, etc.), and he dropped, hitting the cut-out with his head. This earthed the spark and he spun round and his tail hit the cut-out and switched it in again.

(Please turn to page 637.)

WIN A GUINEA

Each week a guinea is awarded to the sender of the letter which, in the opinion of the Editor, is the best one. This week it goes to Mr. R. B. Webster. Now what about you? Other readers will be interested in what you have to say, and you may be one of the lucky prize winners.

AERIALS FOR PLANES

A new automatic trailing aerial, introduced in America, which is immediately adjustable for various wavelengths.

A SUITABLE transmitting antenna for airplanes has been the subject of much consideration and research. There are three main types of antennæ—the fixed type; fixed trailing wire and reel type weighted trailing wire.

The fixed type, owing to its short length, its low effective height and its high capacity, is relatively inefficient and used only on aircraft where limited range or extremely high-frequency transmission is desired.

The airlines have found it advisable to use a fixed trailing wire type of antenna. However, the disadvantage of this type is that constant whipping and abrasion shortens their length and they require frequent replacement. The necessity for replacement is so prevalent that TWA has developed an auxiliary antenna which can be released by remote control when the main trailing wire antenna becomes broken or lost.

The Normal Reel Type

The reel type weighted trailing wire antenna has proved to be very reliable and considerably more efficient than the other two types, which, reduced to simple language, means greater transmitting range for a given transmitter output. However, it too has certain disadvantages, the main one being that the hand reel upon which the wire is wound must be placed in a position where the pilot

can operate it. In most cases the transmitter has to be located in the back of the airplane, which necessitates running a connection from the antenna hand reel back to the transmitter. The disadvantage in this is that there is always considerable loss due to radiation within the frame of the ship from this long-lead wire. There is also the disadvantage that it requires considerable physical effort on the part of the pilot to reel the antenna in and out, and it is difficult for him to judge exactly the length of wire he has extended. In an emergency it is sometimes necessary to land the ship promptly, in which case there is no time for the pilot to reach over and reel in the extended antenna, should it be out at the time.



The aerial winch and control panel. The 'phone on the right gives an idea of their small size.

For the private pilot, as well as for the airline, the problem of satisfactory transmitting antennæ has been solved by the new Learadio Motoreel which provides a variable length weighted trailing wire antenna with all the advantages of all three types of antennæ mentioned above and none of their disadvantages. The reel itself may be located alongside the transmitter and the fairlead protruding from it arranged to emerge directly below and out of the belly of the ship. This practically eliminates radiation losses within the ship and makes the whole length of antenna effective for transmission.

Power in the Aerial

The rated power of a transmitter means very little. The amount of power in the antenna means a great deal. The Motoreel allows accurate matching of the antenna load to the output impedance of the transmitter, which insures radiation of practically all the power the transmitter is able to deliver. In many cases 50-watt transmitters are delivering only 5 watts to

the antenna because of mismatch. It is obvious that in these cases it would be far better to have a 10-watt transmitter putting 10 watts actually into the antenna, which would result in greater transmitting range and considerable saving in weight and payload, not to mention decreased battery drain and lower first and operating cost.

One of the greatest advantages of the Learadio Motoreel is that it allows the pilot to match properly his antenna for a number of different transmitting frequencies. Pilots are more and more realising the necessity for multiple frequency transmission. The

(Please turn to page 641.)

THE development of broadcasting is of special interest at the present time. This is, no doubt, the most formidable instrument at the service of international propaganda. The number of receiving sets in use in each country is increasing rapidly. A voice reaching the listener through space strikes his imagination and claims his attention.

In this field Italy made a late start as compared to other countries, but thanks to the work accomplished in 1934 and 1935, the technical and political equipment of our broadcasting system has risen to a rank which places it at least on a level with that of radio organisations of countries which were formerly at the vanguard of all others.

Concerning Political Aspects

In due course I shall deal with the artistic aspect of broadcasting, but I first wish to dwell upon the journalistic and political side of the matter. Thanks to our excellent wireless equipment, we can address the world in 18 languages, among them being: Albanian, Bulgarian, Arab, German, Hungarian, English, Croatian, French, Greek, Spanish, Portuguese, Esperanto, Hebrew, etc. Our news bulletins are listened to with the keenest interest everywhere. No less than 59,084 letters received from radio listeners last year

RADIO IN ITALY

By His Excellency Galeazzo Ciano

You may grumble at the B.B.C. now and then and think their attitude somewhat "schoolmasterish," but would you like our broadcasting to be run on a similar plan, or with a similar guiding spirit as that which is behind Italian radio? Or would you?

bear witness to this statement, and each one has been answered. Whoever applied for information or explanation on some point was given it. 24,008 requests for publications and data on Fascism were met by the shipment of 124,546 publications and pamphlets.

A new feature was introduced in broadcasting by the institution of courses of lessons in the Italian language, with the distribution of free papers on grammar especially prepared for students in Germany, Great Britain, France, Spain, Hungary, Greece and Rumania. The total number of students following these courses exceeds 35,000, and thousands of requests for the institution of new ones are reaching us constantly from countries for which we have not held them so far. These requests will be complied with as soon as the new ultra-powerful station of Santa Palomba, to be opened shortly, relieves the other stations of their present double programmes for home and foreign con-

sumption, and enables us to develop our propaganda on a vaster scale.

A certain amount of control already performed over musical and other broadcasts connected with the stage, effected with the co-operation of a Special Committee to which Senator Corbino and Senator Visconti have contributed their knowledge and experience, will become increasingly more discriminating in order that our radio programmes may achieve the standard and quality which befit our national traditions. Radio programmes have received some criticism, but one must not forget the many difficulties encountered in putting together no less than 34,229 hours of transmission every year, and one must also consider that the audience is a large and varied one, where widely differing tastes and requirements have to be met.

Self-Criticism Common

A survey of polemics and discussions held in the Press of every country on the subject of broadcasts shows that every nation criticises its own broadcasts and quotes the neighbour as an example. As a matter of fact our organisation is among the most frequently quoted, and at the last Congress of the *Union Radiophonique* held in Paris, the highest praise was expressed for the artistic part of our programmes.

PENMON: THE NEW NORTH WALES TRANSMITTER

On February 1st, the B.B.C. brought into operation their plan for serving the densely populated area in North Wales by the opening of a new 5 kw. station near Beaumaris.



The transmitter and programme control desk at Penmon.

THE opening of the newly-constructed transmitting station at Penmon in Anglesey marks another step in the development of broadcasting in Great Britain. More particularly, it is a step towards the carrying into effect of the B.B.C.'s intention to provide a Welsh programme to as many listeners in Wales as possible. The power of the station, although only 5 kw., will enable it to serve the north of Wales which, next to the extreme south, is the most densely populated area.

Use of a Common Wave

Recent progress in the operation of two or more transmitters on a single wavelength makes it possible to synchronise the new transmitter with the West Regional transmitter at Washford on the latter's wavelength of 373.1 metres. This is a fortunate circumstance in view of the extremely limited number of wavelength channels available for broadcasting in Great Britain. The two transmitters will at all times radiate the same programme. From July, 1937, when arrangements for providing a separate service to the west of England come into force, this programme will become one catering exclusively for the interests of Welsh listeners, and will be known as the Welsh Regional programme.

The Penmon station is the first of the 5-kw. type to be built by the B.B.C. Although in some respects it is a miniature of the transmitters recently erected at Lisnagarvey, Northern Ireland, and at Burghhead, North Scotland, there are many points of difference in detail.

* * *

Careful consideration was given to the choice of an appropriate site for the new station, having regard to the distribution of population in the area which it was desired to serve. The site chosen, which is two miles N.N.E. of Beaumaris, was only decided upon after a number of tests had been made from various possible sites in the district, a mobile transmitter being used to obtain the necessary data.

* * *

The transmitter building has a single storey, and its dimensions are 68 feet by 45 feet. The building contains a transmitter room, machine room, control room, and other subsidiary rooms.

Single-Unit Transmitter

In the transmitter room is the transmitter, built as a single unit, and a desk at which the programme is controlled. This differs from the practice at previous stations, where the programme control desk is in the control room.

In the machine room are motor-generators providing the filament-heating and grid-bias supplies, together with pumps for circulating cooling water to the high-power valves.

The control room contains amplifiers, a wireless check-receiver, and general testing apparatus on one side, whilst on the other

B.B.C. WELSH SERVICE



This map gives a good idea of the population density of Wales. The south is served by the West Regional transmitter at Washford in Somerset, and the north by the new Penmon station.

is apparatus associated with the synchronising of Penmon with the West Regional transmitter at Washford.

* * *

The high-frequency energy is conveyed by a tubular feeder from the transmitter to a small building near the base of the mast in which are the necessary coupling circuits for transferring the energy to the mast itself.

At Penmon, as at Lisnagarvey and Burghhead, a single mast acts as the aerial. The mast is 250 feet high, having at the top a capacity ring (actually a number of turns of wire, supported by eight radial rods).

The power supply is taken from the 11,000-volt mains of the North Wales Power Company, Ltd., and is transformed down to 400 volts, at which pressure it is used in the building.

* * *

The new transmitter, as already indicated, is designed to provide to listeners in North Wales a service of a Welsh programme. The anticipated area of the station is roughly that to the north-west of a line joining Mostyn on the estuary of the Dee and Nevin on the Caernarvonshire coast.

RECORDS BROKEN

Listeners' splendid response to broadcast appeals

THE B.B.C. announces that the broadcast appeals broke several records during 1936, when a total amount just exceeding £200,000 was subscribed to the Week's Good Causes, the Christmas Wireless for the Blind appeal and the Children's Hour appeals. For the first time the £200,000 mark has been reached in a year, and the sum is greater by £75,000 than the total for 1935, which was itself a record.

Appeal for Red-Cross Work

The response to the appeal for funds for Red-Cross work in Abyssinia, which was broadcast on January 5th, 1936, realised £27,408, the largest amount ever subscribed as the result of a single broadcast. The two best Regional appeals also constituted a record, listeners contributing £7,783 to Nottingham General Hospital following an appeal by Sir Louis Pearson in the Midland Region, and £5,362 to the Tower Hill Improvement after an appeal by Lord Wakefield from London Regional. The best Children's Hour result was obtained by Derek McCulloch's Christmas appeal in the London Children's Hour, from which Poor Children on London's Housing Estates benefited by more than £1,330.

Christmas 1936 also brought the largest response to the Wireless for the Blind appeal, when over £18,000 was received. The Wireless for the Blind appeal was one of four appeals for different causes broadcast during the year by Mr. Christopher Stone, the contributions to which are only a few hundred pounds short of £50,000.

"OVER THERE"

A feature devoted to various aspects of American radio, giving interesting sidelights on the artists and microphone methods of that country

WHAT MEN LIKE

ELEANOR HOWE, famous C.B.S. home economist, recently made a survey from coast to coast and from Maine to Mexico to determine the favourite dish of America's menfolk, and she found that fried chicken holds first place, with apple pie and griddle cakes running a close second and third.

SWING MUSIC WON'T LAST

AL GOODMAN, N.B.C.'s Show Boat maestro, predicts swing music will pass out of the picture in a year.

"We've had fads before, and we'll have them after swing is forgotten. But while it's here, we might just as well make the most of it. And band leaders are doing just that. I don't believe the history of popular music can match this era for giving musicians opportunities to show ingenuity, individuality and inventiveness."

As fruits of this ingenuity, Goodman points to the various new styles: sweep music, slide music, swing music and sweet music.

In all these types, Goodman explains, the rhythm of the dance number is exaggerated. That is why he predicts swing music won't last. The nation's dancers are melody lovers, and when they've had enough of exaggerated rhythm, they will insist upon having melody back.

DID HE KNOW THEM?

WHEN the New York Post's Ted Thackrey, formerly of the Shanghai Evening Post, spoke over C.B.S. on the situation arising out of Dictator Chiang's kidnapping, Frank Gallop, announcer, drew him out before air-time.

"Did you know any people named Gallop in Shanghai?" Frank asked him.

"You bet I did," said Thackrey. "I often played squash with Herb Gallop and his brother. Do you know them?"

"They're my brothers," said the announcer.

CATCHING MELODY

TWELVE microphones are spotted in the Metropolitan Opera House, in New York City, for Saturday afternoon opera broadcasts. Instruments in the footlights pick up the voices of the actors and singers, and others high in the wings catch the melodies of the orchestra during the performance.

MORE FILM STARS BROADCASTING

HOLLYWOOD has its movies galore, and now it's annexing radio programmes right and left; maybe looking to the time when it will be a twin centre to New York in microphone productions. Many broadcast features are being switched to the West Coast—about twenty major networks are originating from there—for two reasons: 1, there is a tendency to use talent from the movies; 2, because radio entertainers are attracted by what the movies have to offer.

ANNA STEN BROADCASTS

AN infrequent radio performer, Anna Sten, exotic screen star, was recently heard with a most frequent performer, Ben Bernie, when he and all the lads entertained on the American Can Co. programme over the N.B.C.-Blue Network.

Miss Sten became a film celebrity in Russia and Germany before she was taken to Hollywood by Sam Goldwyn.

STAR FROM JAPAN

THE first Japanese actress to be starred regularly on a network broadcast is believed to be pretty Elizabeth Ito, twenty-three-year-old graduate student at the University of Chicago.

ANOTHER RADIO SOCIETY

A SOCIETY, known as the National Association for the Prevention of Radio Interference, has been formed to suppress man-made noise throughout the United States. From now on telephone dials, elevators, electric fans and washing machines will be closely scrutinised. Utilities operating street cars, buses and trains are advised to start an inspection service of their equipment.

IS AMERICA GOING Highbrow?

FRANK BLACK, general music director of N.B.C., reports that during 1936 there was a 45.7 per cent increase in the quantity of classical music presented over the N.B.C. networks.

WILD WEST LISTENERS

MEXICO now has 250,000 radio receivers, 10 per cent of which are battery operated, according to a report to the Department of Commerce.

SIX ARRANGERS FOR ONE BAND

REX CHANDLER, brilliant conductor of the Universal Rhythm programme of the Ford Dealers of America, brings a colourful background to his direction of one of the largest dance orchestras in radio. In addition to being a top-ranking musician, he is an aviation enthusiast and a world traveller.

The Universal Rhythm orchestra is made up of forty-three pieces. Usually, dance bands average from eighteen to twenty men. The reason for the large Chandler band is the intricate arrangements. It takes a permanent staff of six arrangers to prepare the orchestrations.

LITTLE THINGS

ABOUT BIG PEOPLE

Helen Pickens, of the Pickens Sisters, sleeps with a pillow over her head, not under.

Helen Marshall, soprano, collects fans and has one with a bullet hole that figured in a murder case.

Don Bestor matches his ties—with his spats!

Howard White of the Landt Trio and White, can play the piano with gloves on.

Edith Dick, warbler, eats a quart of ice-cream every day.

Emil Coleman is writing a history of dance music in all its forms, in collaboration with J. Fred Cooz, prominent composer.

Ed Wynn owns and uses several of the comic hats that he wore early in his career. Charlie Chaplin would not part with those big, flapping shoes for a fortune.



Miss Beverley Roberts, N.B.C. star, who recently won first prize in a competition for the most beautiful voice in Hollywood.

NEW USE FOR TOMATOES

"WHEN the dot for your 'i' lands in your lap instead of the cheque-book, the ink-stain may be removed by soaking with tomato-juice and then washing it in the regular way—provided you're wearing linen, silk, or cotton."—Allen Prescott ("Wife Saver" on C.B.S.).

WHERE'S THAT FLEA?

"PLEASE feed Oscar." This message was lettered anonymously on a box which had holes punched in it. A sound of scratching gave a sign of life within. C.B.S. mail-room attendant peeked cautiously; saw that Eddie Cantor was the recipient of a small white rat; forwarded it to the comedian in Hollywood. Eddie has also received a dozen fleas and a preserved frog since he began his search for his lost trained flea, Oscar.

PARIS IN THE SPRING

A MERICAN listeners heard of Paris Spring and Summer fashion trends even before the Parisians themselves, when Captain Edward Molyneux went on-the-air recently. The world-famous English couturier, speaking direct from Paris, discussed forthcoming styles almost a week before the first of the most important Paris openings.

WORDS DON'T FAIL HER!

THOSE champion long-distance novels—Hervey Allen's epic story "Anthony-Adverse," and Margaret Mitchell's best seller, "Gone With the Wind," are just handbooks compared to the writings of Myrtle Vail, author, and "Myrt," of the C.B.S. "Myrt and Marge" serial.

She has just passed the 1,500,000-word mark in writing her popular series.

With this enormous collection of words, "Myrt" has written enough material to fill ten books the size of "Gone With the Wind," since she first conceived the idea for the "Myrt and Marge" programme. Script by script, Miss Vail has written 775 fifteen-minute episodes since she has made her C.B.S. debut in the double rôle of script writer and co-star on the broadcasts in 1930.

TELEVISION TOPICS—Collected by A. S. Clark

“TELEFRAMES” Items of general interest

AN often overlooked point about the high cost of apparatus for modern high-definition television is the loss of practical participation by a large number of television enthusiasts. There were many enthusiasts who could afford the simple apparatus required for 30-line television reception with the aid of their radio receivers.

But POPULAR WIRELESS still remembers them as it did in the past, when a special feature was run in POPULAR WIRELESS for them. All developments are watched by our technicians from the point of view of the ordinary constructor, and we feel the future holds much to justify a hopeful outlook.

A CELEBRITY STUDIO

The plans for the extension building of the B.B.C.'s headquarters includes among the underground studios a special one for television. We understand this is to be a celebrity studio. It will be reserved especially for cabinet ministers and other distinguished people to save the tiresome journey to the Alexandra Palace. Television certainly needs the appearance of more celebrities.

THE CORONATION BAN

It spite of rumours that all chances of the Coronation being televised from inside the Abbey were gone, there is still plenty of hope at the time of writing. We feel sure the B.B.C. will do everything possible to provide inside scenes.

DUBLIN TELEVISION

The Corinthian, a cinema in Dublin that is being rebuilt, is to be equipped with television apparatus.

It is stated that if the experiment is successful, other Dublin theatres will follow suit; but it is difficult to see what they will receive in order to prove the success of the scheme.

TELEVISION REFLECTIONS

The National Physical Laboratory reports the discovery of new electrified layers above the earth. These are such that they will reflect waves of the length used at present for television.

That such would one day be discovered we never doubted, for ranges covered by 5 metres have indicated that something of the sort must be happening. It is suggested that the layers are responsible for double pictures on certain television receivers.

Echoes that would not be heard on sound broadcasting can easily be seen on a cathode-ray screen. In fact the cathode-ray tube has long been used for the measurement of radio echoes.

ONE SYSTEM NOW

Marconi-E.M.I. is now the only system

of television being used at the Alexandra Palace. The choice was certainly right, but bearing in mind that in many quarters the Baird film transmissions were considered the better, it must by no means be assumed that the present method of film transmission is necessarily the last word.

A weekly feature which will keep the reader au fait with all the latest news and developments in television science. It will appeal alike to the newcomer to television and the advanced experimenter.

MONEY BACK.

Those who bought H.M.V. and Marconi-phone television receivers when they first came out can now congratulate themselves that they were right in not waiting for prices to fall. The prices of the television receivers made by these firms were recently dropped by approximately a third, and those who bought before this drop are to be reim-

A BATCH OF COSSOR TUBES



Cathode-ray tubes awaiting their connecting caps in the Cossor factory. The girl in the background is fitting a cap to the tube in front of her.

bursed with the difference, a matter of £30-£40.

At 60 guineas, the price of a television receiver is beginning to approach the value-for-money class of present-day ordinary radio receivers. Large scale mass production, keen competition and nationwide demand will probably all have to come before prices will again be subject to any further substantial revision.

HENRY HALL: SOLO PIANIST

Henry Hall, Director of the B.B.C. Dance Orchestra, appears in the, for him, unusual rôle of solo pianist in the evening television transmission on February 26th. The programme is one of the "Composer at the Piano" series.

Henry Hall originally trained as a concert pianist, but he also mastered the groundwork of composition by scoring for orchestras, brass and military bands. In recent years he has composed many popular songs, some of which have served as signature tunes. A notable example was "Come ye Back to Bonnie Scotland," which he adopted as a signature tune for his Glenegles Hotel Band. "Here's to the Next Time," the closing-down tune of the B.B.C. Dance Orchestra, is his, and he also composed a tune used by bands and variety artists in many parts of the world—"It's Time to Say Good-Night."

THE SCOPHONY LIGHT CELL

ALTHOUGH it is yet to be proved that mechanical systems can hold their own with cathode-ray television receivers, there are many extremely interesting things about mechanical systems.

For instance, one of the very puzzling things about Scophony is the statement that it is able to deal with a number of the light points which make up the picture, simultaneously. At first thought this would appear to require a separate complete channel for each of the extra points dealt with simultaneously.

Actually, nothing of the sort applies. It is due to the ingenious light cell used at the receiver that this is possible.

LIKE WAVES IN WATER

A beam of light passes through a cell containing a certain liquid, and is then scanned to cover the face of the viewing frame. The liquid in the cell is such that waves set up by varying electrical voltages applied to it alter the amount of light it will pass.

The waves, like waves in water, travel along the liquid in the same sequence as that in which they are originally produced by the electrical voltages.

Suppose now that the light passing through the cell is in the form of a slot equal in thickness to one line of the picture and as long as, say, ten picture points. The waves at one end of this slot represent the picture point being dealt with at any moment.

The speed at which the waves travel along the liquid is made exactly equal to the speed at which the spot moves across the screen. The result is that by the time the spot has moved along one picture unit the vibrations produced by the preceding unit will have moved exactly the same amount in the opposite direction.

The result is that the light shining through the cell at the point the waves have then reached will fall on the picture at the same spot as that when they were originally produced. The light value for a given picture spot thus can remain on the screen for a time equal to that taken to produce ten picture spots or until the waves in the fluid of the cell have died out.

A considerably brighter picture is thus obtained than by normal methods.

TELEVISION TOPICS—Continued

WHAT WOULD YOU?

I AM anxious that these "Television Topics" should carry just the kind of information in which readers are interested, or need for their experimental work.

Correspondence we receive, whether in the nature of letters of enquiry or letters of comment, is a considerable help in enabling us to gauge the requirements of readers. Let's have even more of them.

At the same time, there must be many who refrain from taking an interest, practical or otherwise, in television because it is so new and therefore they find themselves "all at sea." If these or any other readers will write to me about their television troubles or puzzles, I will be personally responsible for their replies either by post or by the provision of articles when the items are of sufficient general interest to warrant the latter.

Even if the information required is not immediately to hand, steps will be taken to obtain it.

So just drop a line to say what you want and we will see that the supply meets the demand.

Manufacturers are invited to send in information about their television products so that this may be passed on to readers at the earliest opportunity. Readers will thus have an opportunity to learn about new lines of which they might otherwise not even know the existence.

A. S. CLARK

THE HOME-CONSTRUCTION POSITION

WHAT is the position of home construction of television receivers?

When will it reach the stage where the average set builder can tackle the job?

Although there is more of it, the actual constructional work of a television receiver is no more difficult than that of an ordinary receiver. It is built up in sections, and the hardest part, the vision receiver, is on a par with the normal superhet from a constructional point of view.

Those Final Adjustments

Where, you may ask then, does the difficulty come in?

It is in the final adjustments after the units have all been joined together. Balancing up a triple-gang condenser and intermediate stages is almost easy compared with making a television assembly work. Very small points can completely upset the obtaining of pictures altogether.

And it requires considerable experience to decide, from what is seen on the screen, which part of the apparatus is at fault.

From the constructor's point of view,



The new Belgian Broadcasting House which is nearing completion in Brussels. It will be ready by the end of this year and will contain the world's largest studio. The tower is to carry a television aerial at the top of the mast.

developments are required which will permit copies of a design to be made that will work without tedious adjustment after completion.

TELEVISION FOR BEGINNERS

MORE ABOUT THE VISION RECEIVER

BY G. STEVENS

VISION receivers can be either "superhets" or "straight" sets, like ordinary broadcast receivers. It will be easier for us to consider straight sets first and then talk about the superhet, because a lot of the components are common to both and have much the same job in life. Don't forget, though, that the "audio" frequency stages of a vision receiver have become "radio" frequency stages on account of the enormous band of frequencies which we have to accommodate.

Question of Band-width

Assuming that we have the proper type of aerial (and this is another special job that we can talk about later), the first thing is the tuning of the input to the receiver. The normal arrangement of a broadcast receiver of the simplest type is usually like this:

Band-pass tuner—H.F. valves—detector—L.F. valves, with another tuned circuit before the detector. Occasionally we may vary the arrangement and use a diode detector, or something like

that, but the main lay-out is always on these lines.

Now if we follow this convention on the lay-out of a vision receiver, the first thing we find is that the band-pass tuner arrangement is not at all suitable, as it is specifically designed to narrow the response of the H.F. circuit to incoming frequencies. The normal band-width, i.e. the range of frequency covered by the tuned circuit, is 10,000 cycles in ordinary medium-wave receivers. We want a band width of 2 megacycles for reproducing pictures in detail, and it would therefore be of no use at all to put in a circuit designed deliberately to limit the frequency response of the receiver to 10,000 cycles or a little more. In fact, the problem in designing television receivers is to accommodate the wide frequency band without loss at the higher frequencies, and to do this we have to specially "broaden" the tuning of the H.F. stages.

A favourite way of doing this is to introduce resistance into the circuit with the condenser and

inductance of the tuning system. A tuned circuit having extra resistance has a much wider frequency response on either side of the normal wavelength than a tuned circuit in which the resistance is kept to a minimum. The majority of "straight" television receivers have a plain tuned circuit for the first valve, followed by a tuned circuit in the anode or grid circuit of the H.F. valve, in which the tuning has been "broadened" by some arrangement like extra resistance or its equivalent.

If the very highest frequencies are not amplified sufficiently, due to stray capacities in the circuit (see last article), they can be given a boost by putting a choke in the circuit to produce an increased voltage across it at high frequencies.

Then the valves themselves. The amplification obtained from a valve stage, i.e. the valve plus all its resistances, chokes and what-not, is never the same as the magnification factor of the valve, which may be taken to represent the 100 per cent. ideal amplification. For example, a valve with a magnification factor of 100 may, if you are lucky, give a stage gain of 80, which in turn means that if you put 1 millivolt signal on to the grid, you get '08 volts change in the anode voltage.

Now, when we use valves in high-frequency circuits, the stage gain comes down with a run, owing to the effect of the stray capacities which we talked about last time, and the overall gain of a high-magnification valve at television frequencies may be only 4 or 5. This means that we shall want a much greater number of valves to give a certain magnification than in the case of medium-wave signals. Alternatively—and this is an important point—we can try to put up the gain by reducing the stray capacities as much as possible, and this is where the special types of valves such as the "acorn" come in.

Low Capacity Valves

They have been specially designed to have the very lowest stray capacity, and should give a much higher gain than ordinary valves. Unfortunately, the fly in the ointment is that their characteristics are, in general, not as good as those of ordinary valves, and what we gain on the roundabouts we tend to lose on the swings. You will probably find that you can get quite sufficient gain with ordinary H.F. valves, provided that you take care in the wiring, and that the special types are only worth including in certain cases.

MY MUSIC HALL PROBLEMS

By JOHN SHARMAN

Listeners often criticise the B.B.C. Music Hall programmes from St. George's Hall. "Why don't you give us better turns?" they say. The desire to hear the tip-top variety artists is, of course, readily understandable; but, unfortunately, it isn't so easy to put an all-star show on the air as you might think. Let John Sharman tell you of his difficulties.

IN the old days, before the B.B.C. leased St. George's Hall, it was famous as a theatre of mystery where, on the stage, masters of legerdemain convinced astonished audiences that the impossible could happen.

To-day its mystery is a private "back stage" affair, its puzzles and riddles devised by artists, agents and "acts"—and John Sharman, producer of Music Hall, has to solve them. He has an office above the foyer. Three phones are on his desk and one or the other is invariably ringing. Before him is a large sheet of paper divided into 52 squares after the fashion of a crossword puzzle. Each square represents a Saturday night; each must be filled with the names of five or six good "names."

30 Years In the Show Business

You would not think it possible that this dapper well-groomed man with the twinkling eyes and the inevitable cigarette between his lips could have been in the show business for more than 30 years. Yet, that perhaps is why he knows everyone else in it; why he can fix up contracts months ahead, or, what is more, find a deputy-act two hours before the curtain goes up. In short, it is why he knows the clues and the answers to his crossword puzzle.

But let him, in his own way, tell you something of the humour and difficulty of fixing up Music Hall for each Saturday throughout the year.

"The other day," he said, "someone came to me after the show and said: 'It was dreadful. Why don't you get the best acts in the country?' I invited the person to compile an ideal programme. Afterwards I had to point out that two of the star turns were abroad, two were on tour, and the remaining one was too expensive.

Dashing From the Suburbs

"One cannot expect the public to know of these difficulties; there is no reason why they should. It must be remembered, however, that those who take part in Music Hall must be in London and must be free at the time of the broadcast. Frequently those who are engaged have to dash by car to St. George's Hall from a suburban town during the interval between appearances in a twice-nightly show. It is not a question of money; sometimes Music Hall costs quite a bit less than the allowance, though listeners really do usually hear the best artists available at the time.

"Things have changed a lot since the million-licence days. First there was a quiet type of studio entertainment; then it was decided to broaden out in method.

From that time Music Hall has never looked back. After running once a week it became a monthly performance for a time, but there was such an outcry we were compelled to resume the weekly show.

"My whole aim is to put on an honest-to-goodness variety bill. But this is the kind of thing that sometimes makes it a little nerve-wracking." And John Sharman smiled.

"A week or so ago the usual final rehearsal was taking place on the morning of one of the acts phoned: 'Cut the act,' he said, 'the boys can't go on. They have a prior booking.' So I had to go on to the stage and tell the boys. I felt completely sunk. However, I made a list of five other 'acts' and started phoning them. Three were already appearing in programmes in the next week or so; that cancelled them out. One other was on tour. I traced the agent of the fifth. He said: 'The boys are filming at Elstree till four o'clock!' I said 'Get them here by seven.' The show began at 9.20. The boys arrived at 8.15, rehearsed, and went into the bill. That kind of thing happens quite often."

Suiting the Greatest Number

Mr. Sharman answered a couple of questions that listeners often ask.

"Why do we have a Music Hall at 8.0 p.m. one Saturday and at 9.20 p.m. the next? To suit the greatest number of listeners. Shopkeepers, for instance, complain that they can never hear the earlier show.

"Do artists 'make up' as usual for microphone shows? Yes, many of them do. Will Fyffe—to give an example—always wears his 'costume,' Alexander and Mose always black their faces. It is the same with many other artists who without their trappings and make-up would lack the essential atmosphere. I remember the time when a famous comedian, whose walrus moustache I regarded as a vital part of his stock-in-trade, made his first broadcast. To my horror his moustache was missing, but I said nothing. Afterwards he came to me and said: 'I don't think I "got across" well; what was the reason?' I knew he hadn't done too well, so I said: 'Well, you hadn't got your moustache.' On his next broadcast he wore it. The act was a great success.

"It is necessary, too, to have an audience.



Mantovani, leader of the well-known Tipica Orchestra, plays a "number" to his sister, Stella Roberta, who sings with the orchestra. Mantovani made one of his welcome appearances on the radio last week.

We usually have 200 people in St. George's Hall for Music Hall so that the artists get 'applause-reaction' and 'laughter-reaction.' It's a hard job to joke without knowing if you're getting the laughs."

FROM OUR READERS

(Continued from page 631.)

Had it not been for the lizard our 'phones would have been burnt out.

"Believe it or not!"

Yours faithfully,

C. G. STALLWOOD.

10, Warwick Road, Sidecup.

PRESENTING ARMS

The Editor, "Popular Wireless."

Dear Sir,—Ref. your inquiry in your R.R.R. on page 532 of "P.W." Line regiments present arms from the slope; rifle regiments present from the "order" (i.e. "attention position"), though, of course, I am no authority on arms drill as performed by the Pantomime Army.

Yours faithfully,

Eastbourne. G. BURBERRY. Lt.-Col.

OVERHEARD TELEPHONE CONVERSATIONS

The Editor, POPULAR WIRELESS.

Dear Sir,—I read with interest the letter from Mr. Halls, regarding the telephone conversations he accidentally overheard when in Canada.

I also came across the same effect just after the war.

A friend of mine was living near a solitary telephone cable running to the local post-office, and he discovered that when his detector grid circuit was opened he could hear the telephone conversations quite clearly. There was no telephone fitted to his house or his neighbours' houses either. I know in this case that only one wire was used to the post-office, the return being through the earth, and I think it can be stated that it is the earth currents that are being received.

I suggest that why Mr. Halls received it a mile away from the telephone cable, was that either the earth current was taking the shortest path, which happened to be near his farm, or that the conductivity of the earth was better at his farm than near the cable.

I believe that earth signalling was used during the war. It would be interesting to know what range was obtained. It was done with heavy-duty buzzers on Morse code. Perhaps some of your readers can oblige with a few details?

Yours faithfully,

H. G. COLLIN (G 2 D Q).

"Don Que," Rectory Grove, Wickfor, Essex.

RANDOM RADIO REFLECTIONS

By VICTOR KING

PUT MORE PEP IN THE TELEVISION PROGRAMMES! :: A LOSS TO "P.W." :: THE EUROPEAN ETHER WAR

THOSE TELEVISION PROGRAMMES

THE other day I met a friend a few minutes after he had witnessed a television programme. I asked him what he thought of it. And he told me that he was very greatly impressed indeed—with television as such. But he thought the programme material was poor and that its presentation lacked "life."

"Television progress will be slow unless they pep up the programmes," he said.

Now this man is the editor-in-chief of an important group of magazines which includes a film paper—just the kind of individual who could help television tremendously.

And the B.B.C. should realise that it is men like him who are the very ones that are making a point of seeing these early television programmes. In effect, they are scouts for the man in the street. It is they, not "ordinary viewers," who will expedite or retard television progress—not by conscious propaganda one way or another, but by their implicit acceptance or rejection of this new thing; their recognition of it as a vital force or their lukewarm interest in it as something that may be scientifically interesting but lacking entertainment.

Therefore, I urge upon the B.B.C. to recognise the existence of these early investigators, and to make special arrangements for them to see television programmes in comfort and in good reception conditions and, above all, to flog into the programmes—to get some life and go into them. Enthusiasm can offset poorness of material. At present programme presentation at Alexandra Palace is painfully lacking in enthusiasm and "life."

The announcers all seem so condescending and bored. They should clear the whole lot out and get some Brian Michie's and "Bill" Hanson's on the job. What if they are not "telegenic"? Hanson is as handsome does, I say, and whatever the beauty of their faces the present bunch will never put television over unless they stop acting like bored members of a too-too-dull-my-dear cocktail party and get some life and "hail-fellow-well-met" spirit into their work.

A GOOD FELLOW GONE

THAT was a shock—to call in at the "P.W." Research Dept. and find that since my last visit, only a week or so ago, one of its most popular members had died. It was all the more of a shock because he had seemed to be in such excellent health, except that he was puzzled by a slight stiffness of the jaw.

"You've been talking too much," I said playfully, little realising that the dread tetanus from which he died was already developing.

Yes, J. R. Wheatley was a grand chap. I remember when he joined the staff of "P.W." as a lad of nineteen, some twelve years ago. He worked his way up from the position of junior mechanic to that of Chief of Technical Queries.

But he also advanced in ability as a practical mechanic, and was ever willing to apply his skill in order to help others. He was so good-natured that I am afraid one tended to take advantage of the fact. I owe him a considerable personal debt of gratitude, for he voluntarily assisted me on innumerable occasions, and much of my experimental gear bears the hall-mark of his painstaking and skilful work. Mostly done in his spare time, too.

J. R. W.'s empty chair in the "P.W." Research Dept. is a poignant reminder of a good fellow who'll be sorely missed.

THAT JAMMING

THE European war in the ether has been slowly increasing in intensity during the past few weeks. And when I say "war" I mean war and not only that local affair in Spain with the Government and Insurgent radio stations dodging each other's deliberate heterodynes all day long.

There are German stations shouting insults at Russia and Russia replying in kind—but German citizens are sent to prison if they are caught listening to it. And Russia slanging Japan and Italy slanging Russia and Germany having ether cracks at Czechoslovakia, and so on and so on.

The other phase is the attempts of the various protagonists to blot out each other's stations. I hear a whisper that this is causing a certain amount of feverish activity through "diplomatic channels." Some of that jamming is getting so ferocious that it is butting into ship and other commercial stuff.

You may remember that the nations most intimately concerned were brought together at Geneva in an effort to obtain ether peace. That failed, or has so far failed, and meanwhile the ether becomes more and more chaotic.

Yes, you were quite right in thinking that there was something funny about those loud signals which suddenly break through and stop you getting any change out of a carefully tuned-in distant station. Of course, accidental jamming *does* occur—sometimes!



JOSEPH SEAL, organist of the Lonsdale Cinema, Carlisle, whom listeners recently heard at the console of the B.B.C. theatre organ.

SPOT OF INFLUENCE

COMPLETE impartiality is very hard to achieve. Even in a (now) rigidly regimented organism like the B.B.C. tiny loop-holes will keep forming. Knowing a good bit about "the other side of the 'mike,'" I can, of course, spot them much easier than the average listener.

But I bet most of you spotted that little lapse in a recent "Songs You Might Never Have Heard" programme. All these songs are supposed to be presented anonymously. So they were—with one exception. In this case the announcer introduced a song with a direct and un concealed clue as to the person who was responsible for it. And when it came to the rapid repeat of all the numbers he slipped in an encouraging comment regarding it, whereas all the others merely had their titles given. Was it accidental?

Reminds me of an interesting racket. One day a smartly dressed gentleman presented himself to me and carefully leading up to it asked me if I'd like to be able to call myself "Doctor" Victor King. I was sufficiently curious to ask for details, and he told me that if I were prepared to pass over one hundred pounds he could arrange for me to be given an honorary degree at a university. A British one, too!

But as I turned down the proposition I can't say for certain that it wasn't a confidence trick. However, there are all kinds of titles and degrees which can be quite readily purchased—particularly in America. A confession! When visiting a certain country a few years ago I paid the equivalent of fifty pounds for a grand-sounding order. It was all *most* discreetly arranged. I must add, however, that if I hadn't parted with my cash for this noble decoration I probably wouldn't have got away with the spot of business upon which I was engaged. It's a palm-greased world, my brothers.

CURING PLOPPY REACTION ON A SHORT-WAVE SET

A. G. B. (Ashford) wants to know if it is usual for the connection of the grid leak to the negative filament of the detector in a short-wave set to cure ploppy reaction.

Yes, A. G. B., it is. That is one of the peculiarities of the detector valve. It is wrapped up with the working impedance of the valve which is increased when the grid is given a small negative bias—as is the case when you connect the leak to L.T. — You will probably not get quite such sensitive detection with the leak connected in this way, but you will certainly get smoother reaction simply because the valve will oscillate more readily when it has a negative bias on the grid—provided that bias is not too great, of course.

Many short-wave designs make use of a 300-ohm potentiometer across the L.T. of the detector valve, and the grid leak is connected to the slider of this potentiometer. Then the slider can be moved along until a point is reached where the reaction is not ploppy. A point is usually found with the slider not fully across to the negative side, so that the full negative bias that can be applied by connecting the leak to L.T.—is not present. This potentiometer scheme gives a better result theoretically than the method of using the leak direct on the negative L.T. of the valve. It enables a compromise between smooth reaction and rectifying efficiency to be obtained.

A PECULIAR FAULT

Do you remember a query in "P.W." of January 23rd, regarding a fading fault? It was sent by "W. H. S. (Devon)." What do you think the trouble was? The cure has been found by W. H. S., who has raced you all except one to the post. That one suggested a high resistance H.F. path in the long-wave circuits. He will be interested in the following:

"I have cured the complaint," says W. H. S., "but even so am stumped for an all-round completely satisfying explanation. The H.T. fuse in negative lead consists of a 2-volt bulb in a porcelain holder. Vibration, I presume, had caused it to slacken considerably, so much so that three partial turns were needed to screw the bulb tight in its holder. Therefore, the contact must have been poor. Anyhow, tightening has cured the fading, but don't ask me why."

"There was never any diminution of current flow, or stuttering caused by the make-and-break of contact which occurs when fuses work loose. Just a gradual fading of reception, with no current drop, the fading being temporarily cured by detaching the earth lead from the set. Would the potential difference between H.T.—and the earth proper caused by the 'wonky' fuse cause this?"

Well, there you are! What have you got to say? Frankly, it beats me. I cannot see that the potential difference is going to build up so much as all that without the bad contact becoming so bad that the anode current of the set would drop. Apparently that did not take place, so we are still faced with the problem. If that fuse had been in an H.F. circuit things might be more readily understood, but it was harmlessly tucked away in the H.T. negative feed to earth and to L.T. — So, as the Americans say—What?

THE BIG VOICE

M. L. (Malvern).—I have a five-valve straight set with frame aerial. Unfortunately, when Droitwich is on I can hear him on the medium waves blotting out the Midland Regional. I have been told to try a .00005-

mfd. grid condenser instead of the .0003-mfd. in the set. Will this cure it?

Probably not. It may help a little, but I expect that most of the trouble is the fact that as Droitwich is only about twenty miles away from you you are getting him injected right into the wiring and components of the set. Try enclosing the whole thing except aerial in an iron box and earth the box. That may help matters a bit.

There is a possibility that the H.F. chokes in the set are tuning roughly to Droitwich, and that they are also causing trouble. You could put further H.F. chokes in series with them to see if this assisted. But I should try the metal box first, making it of comparatively thick iron or tin, and be sure it is well earthed. Sounds a bit cumbersome, perhaps, but I really think it is your best chance.

HANDS UP!

I have had a short but very generous letter from a reader.

He is E. D. Barrett, of Moat Farm, Buckland, Aylesbury, Bucks. He is willing to help readers out with blue prints and copies of "P.W." giving details of the S.T.600, S.T.700, S.T.800, the "Centurion" and the "Silver King."

But please do not forget that postage must be refunded for any of these books or blue prints that are desired.

If you would like one or other of these, please do not send off right away with the postage money. Mr. Barrett will be flooded with "orders" if that is done. Drop him a line first, and I am going to suggest to him that he refuses to supply anyone who does not write first, asking if he can supply the copy and how much the postage will be. Furthermore, to avoid Mr. Barrett having to reply to hundreds of letters and cards, do not expect any reply. If unanswered, take it that Mr. Barrett has written to someone else, and arranged with him to have the particular book. He cannot write to all of you, and must obviously pick one to answer and to send his book to later on when he has received the postage.

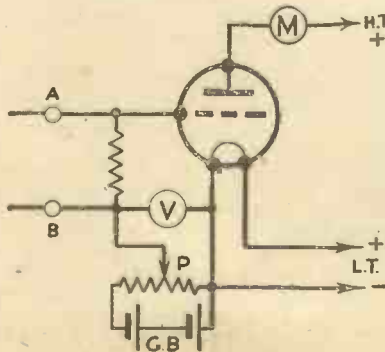
Hands up, readers! Who wants a copy? Don't all write at once.

SOS

Can anyone supply a copy of "P.W." giving details of the Skyhawk? It is wanted by

TECHNICALITIES EXPLAINED—No. 40

Valve Voltmeter



How can a valve be used as a voltmeter? In the manner which is roughly shown in the sketch. The valve is placed in a circuit as shown, and is set by grid bias to the anode bend point. The anode current is measured by the meter M. The source of voltage to be measured is connected across A and B. Then the potentiometer P is moved until the anode current of the valve becomes exactly what it was before the voltage across A and B was applied. The voltmeter V shows the amount of additional grid bias voltage that has had to be used to get the anode current back to its original point—in other words, the amount of voltage that has had to be used to counteract the applied voltage. Thus we know what static voltage is equivalent to the applied voltage. This is a rather rough form of valve voltmeter, but it shows the basis of the more delicate instruments, and is certainly a very useful form for general comparison work.

E. J. Tyler, 6, Grove Road, Dunstable, Beds. Don't forget, write a card first if you can help this reader. Thank you.

HOW SHALL I USE THEM?

D. L. T. (Isle of Man).—Re the efficiency of American valves, I want to use a group of D.C. American types in a set. Four of the valves take .3 amp. and the remaining valve .7 amp. How can I use this combination?

It is not an easy thing to balance up currents, but it can be done in two ways. You can provide a series feed for the .3 amp. valves and a separate heater feed for the .7 valve, or you can by-pass the three .3 amp. heaters by a resistance that will allow a TOTAL of .7 amp. to flow, the whole of that current flowing through the .7 amp. valve.

The resistance will have to be of such a value that it passes 4/7ths of the current, while the .3 amp. heaters (three of them in series) pass the remaining 3/7ths of the current. Then the whole lot is connected in series with the .7 amp. valve heater. If you know the resistance of the .3 amp. valves or the voltage across them you will be able to calculate the total resistance provided by the three series heaters, and then to work out a resistance to go in parallel which will be capable of passing 4/7ths of the current.

For the sake of argument, suppose that the resistance of each .3 amp. valve was 20 ohms. You would then have a total of 60 ohms in series in that part of the heater circuit. That 60 ohms is supposed to pass .3 amp. Therefore the voltage across it is 18 volts.

Now you want a resistance in parallel with that 60 ohms, and across which the same 18 volts is to be applied, but of such a value that it will pass .4 amp.

Going back to the old formula, we have the value of resistance equal to voltage divided by current.

In other words $R = E/C$. That is $R = 18/.4$ or 180/4. The answer is therefore 45 ohms.

Now, having done that, you have a resistance bank of 45 ohms in parallel with 60 ohms. In series with that you have the resistance of the .7 amp. valves. That fact must be remembered when you decide on the resistance that you are going to put in series with the set and the mains in order to limit the current flowing through the heaters. Don't go and consider that you have the 60 ohms still there from the heaters of the .3 amp. valves you have only approximately 25.7 ohms. Your mains resistance will have to be adjusted accordingly.

I have taken only a very rough set of figures here. The best plan is to have an adjustable parallel resistance and an adjustable mains resistance and to vary them under meter measurements of current until you get the right current flowing, always starting far too high in resistance so that there is no danger of burning out the valves.

SEEN ON THE AIR

*News and Views on the Television Programmes
by our special radio-screen correspondent*

L. MARSLAND GANDER

THE great television decision, which I have referred to in these notes during the last few weeks as imminent, has been made. Acting on the recommendation of the Television Advisory Committee the Postmaster-General has adopted the single standard of 405 lines and 50 pictures per second for all future transmissions from Alexandra Palace, until the end of 1938.

The B.B.C. followed this with an announcement that transmissions from the Alexandra Palace would be on the Marconi-E.M.I. system only. Though, as I have revealed in these notes, the committee has been considering the matter carefully in recent weeks it came as a big surprise that a decision was made so soon. It is only four months since transmissions on the double standard in alternate weeks began.

At first it was generally assumed that the side-by-side trial of the two systems would last for two years. Lately it had been reported that the period would be curtailed to six months, until just after the Coronation. Now the experimental period has been cut shorter still. What is the reason for this sudden revision of policy?

There is no doubt that until this moment the public have been a little shy of television. The use of the word "experimental" has not given prospective purchasers the fullest confidence.

Big Price Reductions

It has also now been demonstrated that on a single standard of transmission receivers can be marketed at cheaper prices. As I write Marconiphone and H.M.V. have announced slashing cuts in the prices of their sets, reducing the purchaser's outlay by about 33½ per cent. Sets which cost 95 guineas may now be bought for 60 guineas.

Other manufacturers may be expected to follow this example. It must be strongly emphasised that Baird sets and those of other manufacturers are already also able to pick up the 405-line transmission.

The next move is expected to be concerted action by manufacturers and the B.B.C. to popularise television thoroughly in the London area. Consistently brighter programmes and an extension of hours will be obvious contributions from the B.B.C. In reducing prices and concentrating experimental work on enlargement of the screen the manufacturers are doing their share. Hire-purchase terms have now made television sets available for an outlay of only £1 a week.

The B.B.C. is considering the broadcast of an additional hour's television daily between 6 and 7 p.m. Choice of this hour is governed by a desire to show television to home-going city workers who can pop into shops at this time. Sunday transmissions are also a distinct possibility of the near future.

Considerable speculation has been aroused by the committee attaching the description "London standard" to the 405-line definition at 50 pictures a second. Does this mean, may well be asked, that a different standard might be adopted for, say, a Birmingham station?

I have no authoritative information on the subject at the time of writing, but I regard it as unlikely that the committee will adopt any different standards for the provinces at present. But if, for the sake of argument, Firm XYZ

came along with a marvellous system of 600-line scanning better than anything we have yet seen, it is not inconceivable that the Advisory Committee might propose a second station in the provinces on that definition while London continued with its 405-line scanning. However, I am looking far into the future.

It is interesting that America has accepted the nation-wide standard of 441 lines at 50 pictures a second, which cannot be very different in its results from the new London standard. Most people agree, too, that we have not yet seen the best that 405 lines can produce.

The new decision is important because it will bring other systems of optical and mechanical reception on the market. I have not yet heard the intentions of Ekco and Scophony, but some time ago I was informed



Cracow's interval signal is a guitar, the strings of which are plucked by a special mechanism operated by an electric motor.

One of the most exciting and successful television broadcasts yet given was that on the England v. Ireland amateur boxing contests from the concert hall of Alexandra Palace. This was the first television broadcast from a public boxing show, virtually a rehearsal of the big fight transmissions of the future.

I am not a boxing enthusiast, but I keenly felt the appeal and promise of this programme. Clean hitting, swift movement, the roars of an excited crowd—all these factors contributed to a real live sporting entertainment. An anti-television journalist watching with me grudgingly admitted that it was the best television show he had seen.

A Good View of the Fight

The B.B.C. technicians had a field day in connection with this transmission. A special platform was slung from the roof at a short distance from the ring and a height of about a dozen feet from the ground. On it, suspended over the audience, were accommodated the cameras and the camera man. I give the camera man full marks for his manipulation. We saw the combatants in their corners, we followed them round the ring, telescopic lenses showing us close-ups as good as any seen from a ringside seat.

Now compare this vivid transmission with the demonstrations of physical exercises, the first-aid lessons, and the instruction in cooking which we had during the same week. All these items are very interesting to some people, but do realise, Mr. Cock, that they are minority items. I have said before, and find virtue in repetition, that they are the sort of transmissions which should be introduced when we have television all day long, and there is plenty of time.

Personally, I was intrigued with Stephen Thomas's production of Lewis Carroll's "Hunting of the Snark." But I wondered what sort of an impression it was making on the passing throng at demonstration theatres. Weird figures posturing in hideous masks—I cannot imagine the 1937 hedonist rushing off to buy a television set after a "basin full" of that.

I was charmed with Frances Day in the floor-show "Hokey." Her piquant personality is admirably suited to the home screen. The Saturday night cabaret was, I thought, somewhat overdressed. I wondered if it had been influenced by the purity campaign said to be on foot in Broadcasting House. "Tour de Paris" thus belied its title in my opinion.

The Copyright Question

The following letter has been received from the Secretary-Treasurer of the International Federation of the Phonographic Industry.

The Editor, POPULAR WIRELESS.

Dear Sir,—My attention has been drawn to an article by your legal expert which appears in your issue of January 23rd, under the title "Why Copyright?"

Dealing with the performances of artists, the author makes the definite statement that copyright subsists in such performances and that they are covered by the copyright law.

With all respect to your legal expert, I must profoundly disagree with his opinion, which, in my view, is an entirely erroneous exposition of the copyright law as affecting artists' performances, the truth being, of course, that performances, as such, receive no protection whatever under the Copyright Act, 1911.

Possibly the writer of the article has in mind the Dramatic and Musical Performers' Protection Act, 1925, which Act, however, is not founded on copyright at all, and, in fact, confers no proprietary rights upon the artist.

As artists are likely to be seriously misled by the article referred to, I would suggest that a correction is advisable.

Yours faithfully,

BRIAN BRAMALL.

Gramophone Buildings, Hayes,
Middlesex, England.

by Mr. E. H. Traub, co-inventor of the Mihaly-Traub receiver, that the firm would not market the set until a single standard of definition had been adopted.

Prospects of Bigger Screens

These systems are interesting because, of course, they hold out prospects of a bigger screen, and a flat screen. But I am not going to be drawn on to the treacherous ground of set comparison.

I said earlier that one of the B.B.C.'s most useful contributions to a campaign for the popularising of television would be consistently brighter programmes. Some recent programmes have been in the highest degree entertaining and full of rosy promise for the future of television. Others have slid back to the dull old standards of birds, beasts and fishes and still life.

INTERFERENCE SERIAL (PART I)

WOO-O-F!

"Oh, heck!" I mutter. "He's at it again!"

You, gentle reader, may have met with the same sort of thing. It goes like this: you switch on the set, adjust the volume nicely, and then sit back in your arm-chair to listen to Music Hall, say.

Everything's just right for the moment, when up comes the volume with a terrific blare, sometimes a bit distorted, sometimes just too loud to listen to. At first you dash to the set and cut down the strength a little, but you soon learn better. You see, the sudden increase in volume is not due to the set at all, but to some outside bloke whom I call Mephistopheles. But I must go back some months when I had just moved into a new house and installed "Gertie." Gertie is 1937 "all-singing, all-talking" superhet, and when she first took up her position in one corner of the sitting-room was as near perfection as could be.

Then, to my chagrin, a nasty buzz suddenly arrived—the kind of buzz that cuts out everything and makes you switch off.

"Ha," said I, "Gertie has developed a cold! I must cure that."

But, being cautious, I removed the aerial and earth leads, and discovered that the buzz no longer existed.

Making Doubly Sure

To make doubly sure, I got a first-class service-man to come along and give Gertie the once-over. He said: "O.K. Nothing wrong there."

So I put this horrid buzz down to outside interference—possibly a refrig. or some sort of high-frequency apparatus in a nearby house.

And then—suffering snakes!—along came Mephistopheles with his terrific howls and up-and-down effects on Gertie's volume. Nearly every time I switch on to a decent variety show or, in fact, any programme of the popular type I have to shut down. And I believe there is a definite connection between the buzz and the other fiendish interference. It seems curious to me that the buzz appears immediately to precede or follow on the oscillation and silent-point-tuning effects of Mephistopheles, and always that beastly buzz arrives just when there is a worth-while programme on.

Can both forms of interference be caused by the same nearby set? I wish I knew. Anyhow, I'm fed-up, and I am going to do something I have never done before—write to the P.M.G. about it. I'll let you know what happens, chaps.

A. J. R.

AERIALS FOR PLANES

(Continued from page 632.)

engineering problem involved in matching a given length of antenna to various frequencies is quite difficult to solve. Being able to vary the length of the antenna to get maximum radiation eliminates this problem and insures putting all of the transmitter's power to work without waste.

With the Learadio Motoreel it is possible to pre-select any given length of antenna, turn the "operate" switch to the "out" position, and the Motoreel will automatically reel out the length of antenna selected and stop. Warning lights on the remote control indicate when the antenna is extended. These lights remain on until the antenna has been retracted. They are a constant warning to the pilot when the antenna is out. Complete retraction of the antenna is obtained by turning the control handle on the remote unit to the "in" position. When the antenna is all the way in and the weighted swivel fish is in its proper position against the fairlead, the warning lights go out.

The use of an antenna current meter in conjunction with the remote control unit

enables the pilot to select a length of antenna giving maximum current circulation. It is only necessary for him to note that length and reset the antenna accordingly each time he wishes to use his transmitter on that particular frequency.

Ground Communication

The swivel fish is so arranged that when the antenna is completely retracted there is a short flexible piece of wire still extended for short-range communication when approaching airports for a landing and for communicating with the control tower when the ship is on the ground.

The weight of the Motoreel, together with its wire, swivel fish, remote control, flexible connecting cables, fairlead, etc., is less than 10 lb. complete.

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SUPER CENTURION KIT "A" YOURS FOR 5/-

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Complete kit of components exactly as specified by Mr. John Scott-Taggart, with ready-drilled panel and casibuilt cabinet parts, but less valves, cabinet and extractor. Cash or C.O.D. Carriage Paid £2/8/9.

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SUPER CENTURION EXTRACTOR is available as a kit of parts or ready-built at the same price, £1/4/0. Cash or C.O.D., or add 2/3 to dep. and each m'thly payment. Please state which is required when ordering.

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<p>KIT "B" As Kit "A" but including set of 4 FIRST specified valves only, less cabinet and speaker, etc. Cash or C.O.D. Carr. Pd. £4/16/6, or 9/- down and 11 monthly payments of 10/0.</p>	<p>KIT "CT" As Kit "A" but with valves and Peto-Scott Table Cabinet only, less speaker, etc. Cash or C.O.D. Carr. Pd. £5/14/0, or 10/6 down and 11 monthly payments of 10/6.</p>	<p>KIT "CLL" As Kit "A" but with valves and Peto-Scott Type "LL" Console cabinet only, with speaker baffle, less speaker, etc. Cash or C.O.D. Carr. Pd. £6/14/0, or 12/3 down and 11 monthly payments of 12/3.</p>
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2/6

DOWN

NEW AND DIFFERENT! PETO-SCOTT 1937 SHORT-WAVE

ADAPTOR-CONVERTER KIT

13-74 METRES

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- Drilled steel chassis
- Drilled steel panel

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- Covering 12-94 Metres.
- Maximum volume and efficiency.
- Detector and 2 L.F. Circuit.
- Slow-Motion Reaction Condenser.
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The RADIO Bulletin

Up-to-the-minute news concerning the radio industry

A NEW all-wave model has just been released by Invicta Radio. This set, which costs £10 15s., is a consolette and embodies a superhet circuit. There are four valves (plus rectifier), and the short-wave range is 16.5 to 52 metres.

Among the special features of this set are delayed A.V.C.; a Magnavox elliptical cone speaker; a sloping dial which is illuminated, and marked in metres and has station names on the medium and long waves; manual volume control operating on pick-up and radio; and tone control.

The standard model is designed for A.C. mains of 200-250 volts, 40/100 cycles. A non standard model for 100-250-volt mains is available for an extra 10s. 6d.

BURGOYNE "DRAGONETTE"

Burgoyne Radio have introduced a new four-valve superhet for A.C. mains. Known as the "Dragonette," this set has a triple stage automatic volume control and is equipped with Litz wound coils. A three-colour "neon style" tuning dial is engraved in both station names and metres.

There is also a variable tone control and the undistorted output is 2½ watts. The "Dragonette" is housed in a highly polished walnut cabinet and costs 9½ guineas.

Robbing the Anode

THE resistance value to be used for a decoupling resistance depends upon the voltage which is to be used and the current taken by each valve. Subject to the condition that the necessary amount of current must reach the valve, it is desirable to make the value of the decoupling resistance as high as possible. If the decoupling resistance is too high, however, you will be robbing the anode of too much voltage; you will easily understand this when you remember, for example, that if a resistance of 1,000 ohms is incorporated in a circuit in which 1 milliamp. is passing, the 1,000 ohms resistance will be responsible for doing away with 1 volt of electromotive force.

The value of the decoupling condenser generally varies from about 0.1 microfarad to 0.5 microfarad for high-frequency circuits, whilst for low-frequency circuits a decoupling condenser may have a value of 1 to 2 microfarads. There is no very hard-and-fast rule with regard to the value either of the decoupling resistance or of the decoupling condenser, and in point of fact the value of the one depends to some extent upon the value of the other.

Superhet Pointers

The superheterodyne set has come greatly into favour in the last three or four years, and for this there are a number of factors responsible. For one thing the very great selectivity obtainable with this type of circuit is particularly suited to modern conditions, whilst for another thing the

WEARITES AT THE B.I.F.

Power transformers, smoothing chokes, radio-frequency tuning coils and switches are among the apparatus on the Wright & Weaire stand at the British Industries Fair, which is now being held at Olympia.

Another exhibit is a group of specialised radio instruments intended for checking the performance of receivers and accessories. The group includes:

1. A metre unit with a total of twenty different ranges for A.C. or D.C. voltages, resistance, capacity and inductance.

2. An all-wave oscillator unit providing a source of radio and audio-frequency voltage at known frequencies.

3. An A.C. mains operated valve tester suitable for testing British and American valves.

4. A condenser tester operating on the Wien bridge principle, giving capacities from 2 microfarads to 50 microfarads on a direct reading scale.

Typical examples of press work, small bakelite mouldings, capstan and precision lathe turned parts are also on view.

BRIMAR AMERICAN TYPE VALVES

It is estimated that approximately one and a half million sets in Great Britain are equipped with American type valves and

that during 1936 half a million replacement valves for these sets were sold.

In view of this it is interesting to note that Standard Telephones and Cables, Limited, have introduced a range of valves suitable for replacement purposes in the American type of set.

These valves are all manufactured in Great Britain at the Brimar Valve Factory,

Foots Cray, Sidcup, Kent, and the makers state that they are equivalent in all respects to American products bearing the same type numbers. The prices are in accordance with those fixed by the B.V.A., and the type numbers available are as follows: 6A7, 6B5, 6B7, 6C6, 6D6, 25Z5, 42, 43, 75, 78, 80 and 89.

TAIL PIECE

This is a true story. Prospective purchaser enters a West Country radio store and requests a demonstration of an American all-wave receiver in the window. The salesman duly demonstrates on direct

transmission from a trans-atlantic station. Prospective purchaser says she dislikes set because it "talks too much like an American." The salesman explains that the set was actually manufactured in the United States, whereupon prospective purchaser decides that that probably accounts for it, turns set down and buys a Pye T10 instead!



The Burgoyne "Dragonette."

TECHNICAL JOTTINGS

Some Items of Interest

By Dr. J. H. T. Roberts, F.Inst.P.

difficulty of manipulation which characterised the superhet receiver of ten years ago has been entirely done away with.

Second Channel

Another important improvement in the superhet is the cutting out of second-channel interference, which used formerly to be a great drawback. When second-channel interference is present you get double settings at all different positions on the dial, whilst a powerful station will be received at even more than two positions. With the suppression of the second-channel interference, however, this has been done away with, and this is one more of the important factors which contributes to the increasing use of the superheterodyne principle in modern receiving sets.

A New Electron Tube

A very interesting new type of electron tube, working on lines somewhat similar to the Zworykin image tube, has been developed and was lately demonstrated in Germany by Von Ardenne.

This new type of tube uses a translucent photo-electric cathode at one end, which converts light rays into an electron beam, this latter striking a fluorescent screen at

the other end of the tube and so producing a visible image. One of the principal advantages claimed for this Ardenne tube over the Zworykin tube is that it has no complicated anode-focusing rings. Optical correction is brought about by means of a spiral of resistance-material which is coated, by a special process, on to the neck of the tube.

This coating acts as a simple potentiometer and produces a strong static field with an intensity-gradient increasing towards the image end of the tube. It is claimed that this spiral resistance coating has the effect of making a more gradual intensity gradient than the metal rings used in the Zworykin tube, and so produces better image correction.

Amongst the many applications of this new type of electron tube two important ones are seeing through fog and the examination of microscopic specimens.

Improving Loudspeakers

A new system for extending the frequency-response of a loudspeaker has been developed by a German inventor and was recently demonstrated in Berlin. This system is adjustable over the entire frequency range so as to supply any desired frequency characteristic. The main speaker unit is mounted at the back, and in front of the cone are three deflectors, two of which hinge from the bottom so that their positions in relation to the cone can be varied. The third deflector is pierced with a large number of holes of various sizes,

(Continued on next page.)

TECHNICAL JOTTINGS

(Continued from previous page.)

the deflector being hinged at the top. These deflectors serve to change the projecting efficiency of the sound chamber.

Variable Shutters

At the front of the sound compartment is a variable shutter which serves to reduce the opening of the sound compartment.

As well as the main speaker unit there are two subsidiary ones which are fitted with baffle plates, forming resonant chambers to increase the frequency range over which they will respond.

At the back of the main unit is a compartment stuffed with glass wool, which suppresses any back wave.

Speaker Developments From Paris

Another interesting loudspeaker development comes from Paris and deals with an arrangement for correcting the natural defects in reproduction of the loudspeaker cone diaphragm by the use of corrugations, special shapes, special materials, and so on. A new cone of French design, actually used in commercial speakers, is made with an exponential taper, the idea being to combine the actions of an air column and piston-type unit.

It is claimed that with these new cones a much greater region can be covered and that also much improved frequency-response is obtainable.

A Car Aerial

One of the important points in car radio (which incidentally is very much more popular in America than it is here) is a suitable form of aerial. In the States a number of different types of car aerial have made their appearance on the market. One particularly ingenious one is secured along the length of the roof of the car, outside, by means of a number of short rubber pillars, each provided with a rubber suction-cup at the lower end by which it is secured to the car roof. The aerial itself consists of a length of pure copper tubing, about $\frac{3}{8}$ in. diameter, cadmium or chromium plated, with a shielded lead-in, connection being made so that there is no possibility of corrosion. The rubber mounting is claimed to do away almost entirely with the effects of vibration in the aerial, as well as being very convenient for attachment and detachment. The "stickage" of the rubber suction cups depends, of course, upon the nature of the surface of the car roof. The makers of the aerial say that the rubber cups will stick to practically any type of roof and that rain or moisture only has the effect of making it stick all the more securely.

Is a Moving-Coil Better?

Many people think that you have only got to have a moving-coil speaker and you will have a first-class frequency-response. But you want to remember that there may be as much difference between one moving-coil speaker and another as there is between the average moving-coil speaker and the average speaker of any other type. Simply because the speaker is a moving-coil, that does not of itself convey any guarantee of efficiency as regards frequency-response, reproduction, or anything else.

It Has a Reputation

I suppose this idea has arisen because, when the moving-coil speaker was introduced a few years ago, it was hailed as so much superior to any of its predecessors that it gained a reputation quite irrespective of the variations in the merits of individual members of the type.

The principal advantage of the moving-coil speaker is the fact that the armature or moving part, which is attached to the reproducing diaphragm, is very light in weight. This armature consists almost entirely of a small coil of wire into which the speech-currents are fed, the coil of wire itself being positioned in a powerful magnetic field in the gap of a permanent magnet or, in some cases, a magnet which is energised by means of a field-current.

Compare With Moving-Iron

The essential point, however, as compared with a loudspeaker of the ordinary moving-iron type, is that the moving element is so light in weight that it can more faithfully follow the variations in the magnetic strength brought about by the speech currents. In other words, it can more faithfully reproduce what is passed into the speaker.

A Matter of Opinion

A really good moving-coil speaker is no doubt much better for all-round purposes than a good speaker of any other type (although here, again, this is a matter which is often the subject of heated controversy), but the mere fact that it is

LEARNING FRENCH THROUGH YOUR RADIO

A fair copy of last week's test :

1. Vous devez imiter la prononciation des speakers français.
2. Nous devions écouter l'orchestre de la station jusqu'à 8h.
3. Elle dut le faire immédiatement.
4. J'ai dû rester tout le jour chez moi.
5. Il avait dû le répéter souvent.
6. Ils auront dû le dire plusieurs fois.
7. Elle aurait dû isoler le malade.
8. Nous devrons partir avant minuit.
9. Vous devriez lui permettre de le faire.

a moving-coil speaker tells you little or nothing. You want to be quite sure that you have got hold of a good moving-coil speaker, as an indifferent or poor one may not serve you nearly as well as a good example of, say, a moving-iron type of speaker.

To Get You Out of a Difficulty

A screwdriver which, like the music, goes round and around has now been invented to get you out of that difficulty with a screw which you just can't get at because something gets in the way. This new screwdriver consists really of the "end" of an ordinary screwdriver and the "handle," but with the rigid shaft knocked out and a piece of flexible shafting instead (that sort of coiled-wire arrangement used for grinding-tools and in dentists' drilling machines). If a screw is in a very awkward position and things are in the way, you insert the small end in the slot of the screw, bend the shaft of the screwdriver into a suitable position and then, holding the end of the screwdriver against the screw with one hand, turn the handle with the other.

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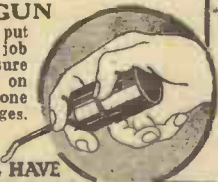
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RED-HOT NEWS

How the short waves give you up-to-the-minute details of happenings in all parts of the world.

NEWS of the American flood tragedy creeps over here into our broadcast bulletins and our daily newspapers, but it takes radio—direct radio—to bring home to one the full force of that disaster which, even as I write, is still being worked out by Fate in the stricken areas of the Ohio and Mississippi rivers.

Over here we get the bare bones of the details of the floods. By listening direct to the American short-wave stations, you hear the whole story put over, hour by hour, in vivid description, word-pictures that are not easily forgotten.

Listeners who have no means of tuning in the short waves miss a great deal of interest in their radio. I am not suggesting that a disaster such as the floods should be regarded as radio entertainment, but it is of interest to all listeners to be able to tune-in America and get not only such news direct and in full, but all the other fascinating bits and pieces the American stations are so fond of dishing up.

I, for one, would not be without a set that can cover the short waves. Many of you will have built the S.T. 800, and so have brought these wavelengths into the scope of your listening. But there are others among you and your friends who even now still dally by the wayside, not realising what benefits in interest and entertainment can be obtained from short waves. To you and them, I say, do not hesitate any longer. Set to work to build a set, or to buy a unit that can be attached to your present receiver, enabling you to tune down to the wavelengths on which such interesting material is being broadcast.

A Neat and Inexpensive Unit

These units are legion, some good, some bad and some indifferent. Many seem to be expensive, others remarkably cheap. But nearly all of them will work well enough to enable you to get American broadcasts on your set, no matter what the receiver is that you are using.

One of the neatest and least expensive that I have tried recently is the Ridco "Ranger." It costs a mere 27s. 6d., without valve, or ten shillings more with the valve. It works from the ordinary broadcast receiver power supply, and can be obtained either in battery or A.C. form. In either case, there is no difficulty in fixing the unit, and when once fixed you do not have to disconnect it when you have finished on the short waves. You just operate a switch and the unit is cut out of circuit, and your broadcast set goes on as before.

The system on which the Ridco works is that of the superhet frequency changer. It is actually a single-valve superhet frequency changer which converts your own receiver into a short-wave super. If the set is already a super on broadcast wavelengths, that does not matter; it becomes a double super, with all the sensitivity that accrues from that fact.

To fix the unit, all you have to do is to plug-in a valve adaptor in a suitable stage in your set—preferably the output stage if a pentode output is used, or an H.F. stage if the output valve is a triode. I am speaking now of the mains model. In the battery model the valve adaptor method does not have to be used; the power is obtained from the batteries of the set.

Thus adaptor, in the case of the A.C. unit, merely draws the power from the mains portion of the set for the operation of the valve in the unit. If the power is not sufficient when the adaptor is plugged into the H.F. stage of the set, then a special adaptor can be obtained with complete smoothing unit, so that the power can be obtained direct from the rectifier valve in the mains receiver.

It is all made very simple for the operator of the unit, and I cannot see how he can possibly go wrong, unless he is a complete nut.

Simple Changeover Switching

The outside aerial is disconnected from the broadcast set and connected to the unit, and the unit is connected to the aerial terminal of the set via a screened lead. This feeds into the set the short-wave "superhetted" output from the unit.

Finally, there is an earth connection, and the whole thing is ready.

If you don't want the short waves, you operate a switch on the unit; that cuts it out and switches it off. When the short waves are required, you merely switch the unit on, switch to the short-wave band you require (either 15-33 or 30-85 metres) and tune in by the single dial on the panel of the unit.

There is only one adjustment that has to be carried out on the main receiver other than the control of volume, which is done in the usual way, as it is when you are listening on broadcast wavelengths. That adjustment is to tune the broadcast set to a wavelength between 1,800 and 2,000 metres. That is because the intermediate superhet frequency to which the short-wave unit is tuned lies between those wavelengths.

The best setting for the receiver tuning is found by tuning in a short-wave station and then tuning

the broadcast set until the station and the background are at their loudest. More accurate tuning adjustment can be obtained by listening to the background than to a station, for this gives a more sensitive indication.

With the set tuned, you merely turn the dial on the unit and the short-wave stations roll in. They do come in well, too, on the unit I tested. There is no difficulty in getting a good bag of the most useful American stations, and from about midday to well after midnight, by changing the wavelengths on which I was listening, I could be sure of American programmes.

Naturally, the power with which they come in is to a large extent governed by the type of broadcast receiver with which the unit is used. If it is an insensitive set, you cannot expect that the stations will be very loud, except in particularly favourable conditions. But if the set is a superhet or a one- or two-stage H.F. receiver, the stations come in very well indeed. With a superhet I found it necessary to reduce the volume on many stations.

The special type of short-wave coils in the unit certainly seem to operate well, and I had no kick against the efficiency of the model I tested. A high-gain intermediate frequency output transformer is used to couple the octode frequency changer valve to the input to the ordinary broadcast receiver, and this transformer seemed to be well up to scratch.

K. D. R.

RADIO WANTS QUALIFIED MEN

TO anyone seeking to improve his position and embark on a career at once interesting and profitable, there is none offering wider scope for advancement than that which entails a practical knowledge of radio. At the present time, with Television becoming daily a more practical reality, the need for qualified men becomes more and more urgent.

Radio manufacturers, with their factories, offices, laboratories, servicing and sales departments, require men with a practical knowledge of radio in all its branches. In many other directions—wholesalers, retailers, the Press, etc.—a knowledge of radio technique is important and a means of securing a well-paid post. Readers who are interested can obtain full information as to how this knowledge may easily be acquired in their spare time by means of postal tuition. Write to the Principal, Technical & Commercial Radio College (Dept. P.W.86), Fairfax House, High Holborn, London, W.C.1, for a free copy of their book entitled "Radio As a Career."

1936 BROADCASTING REVIEWED

The Northern Region

THE year 1936 saw a further expansion of the broadcasting organisation in the North.

Six new appointments were created and filled on the Regional programme staff. Structural improvements were carried out at Manchester and Newcastle, studios at both of which establishments were equipped with ribbon microphones and apparatus capable of playing Watts discs as well as ordinary gramophone records. The premises occupied by the B.B.C. in Sheffield since 1923 were closed at the end of August, other studio accommodation having been taken in the city. Work on the construction of the North-East transmitting station at Stagshaw, Northumberland, was continued.

These changes were reflected in the programmes, the increased power having been applied not only to stimulate the output, but also to improve the quality of programmes. Particularly noticeable was the increase in the number of specially produced programmes: programmes which might generically be played,

(Continued on next page.)

1936 BROADCASTING REVIEWED

(Continued from previous page.)

talks, concerts or outside broadcasts, but which in view of the nature of their presentation could only be described as "feature programmes." While the output was increased, the amount of work involved in connection with each individual programme was increased to an even greater extent. More attention was given to programme research and reconnaissance. In addition to the regular studio auditions—thousands of which are given every year—sections of the Region were systematically combed for talent. In particular, Francis Bolton made a special tour of ten big Northern towns in the early autumn, giving auditions to over a thousand aspirants "on their own ground."

During the autumn and winter seasons, the Northern programme included regular concerts by the leading orchestral and choral societies of the Region, such as the Hallé, the Liverpool Philharmonic and the Northern Philharmonic (Leeds) societies, the Leeds Choral Union, the Huddersfield Glee and Madrigal Society, and the Sheffield Musical Union. These concerts were conducted by musicians of international repute, such as Sir Thomas Beecham, Sir Hamilton Harty, Sir Henry Wood, Pierre Monteux, Robert Heger, and Nikolai Malko; while the soloists included Gaspar Cassado, Egon Petri, Mark Hambourg, Mary Jarred, Myra Hess, and Alexander Kipnis. In the sphere of chamber music there were regular concerts by the Manchester Tuesday Midday Concerts Society, concerts by the Rodewald Society of Liverpool, and midday recitals from Leeds and Sheffield Universities.

Special Programme from Lincoln Cathedral

The B.B.C. Northern Orchestra of thirty-five players gave regular orchestral concerts, and on October 9th the strings of the orchestra went to Lincoln Cathedral to collaborate with the Cathedral Choir in a special programme of the works of William Byrd, some time organist of the Cathedral. There were also regular broadcasts by brass bands, dance bands and cinema organists. The "Swing Low, Sweet Music" concerts of the Revue Orchestra (now known as Tommy Matthews' Concert Orchestra) were a feature of the year's programmes. In the autumn a special "swing" orchestra was formed by Henry Reed and provided a series of concerts.

In addition to numerous sketches, about a dozen plays by north-country authors were heard. Among the most notable were "The Two Brass Men," by Francis Dillon, and "Portrait of a Lady," by James R. Gregson. Of Northern feature programmes, the two broadcasts of D. G. Bridson's "The March of the '45," and the same author's "Harry Hopful" programmes, are worthy of particular mention.

There were regular broadcasts from Northern music-halls, a rota of some fourteen different theatres being drawn on. A composite variety feature from Blackpool—"Top o' th' Tower"—in August, was probably the most ambitious programme of its kind ever undertaken. Perhaps the year's most interesting example of studio variety was provided by a number of young artists, none of them over sixteen, "spotted" during Mr. Bolton's tour. In addition, 1936 saw numerous Northern outside broadcasts, covering events such as the Manx Tynwald Ceremony and the launching of the Orient liner "Orcades" from Barrow-in-Furness. There were also running commentaries on the Manx T.T. Races, the Manchester November Handicap, Northumberland Plate races, and other sporting events.

(To be continued.)

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MISCELLANEOUS BARGAINS.—All brand new in original sealed cartons: Telsen A.C./D.C. Multimeters, test anything radio or electrical, 8/6. Telsen 2-range Voltmeters, 3/-; 3-range meters, including milliamps., 4/- Ace (P.O.) Microphones, with transformer ready for use with any receiver, 4/6; 36 assorted Tru-ohm Resistances, 1 watt, colour-coded and marked, 3s 6d on card, 6/- per card. Bell Transformers, 200/250 volts input, 3, 5 and 8 volts output, 3/6; Morse Signal Units, incorporating buzzer, tapper and flash with international code, complete with batteries and bulb, 3/9 each. Varley Square Peak Coils, B.P.5, 2/-; Marconi V.24 and Q type valves (useful for short-wave experiments), 1/6; glass insulators, 4d. Light weight headphones, double pole, 4,000 ohms each ear piece, 3/- pair. A.C. Trickle Chargers, for 2, 4 and 6 volts, 17/6.

CAR and RADIO BATTERY CHARGERS, incorporating Westinghouse Metal Rectifier. This Charger will enable you to keep your car batteries fully charged, for use on 2, 6 and 12 volts, 45/- each.

REGENTONE ELIMINATORS, A.C., 200/250 volts, type W.5a, with trickle charger, 37/6.

SOUTHERN RADIO. Branches at 271-275, High Road, Willesden Green, N.W.1; 46, Lisle Street, London, W.C.2. All mail orders to 323, Euston Road, London, N.W.1.

SOUTHERN RADIO, 323, Euston Road, London, N.W.1 (Near Warren St. Tube). Phone: Euston 3775.

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(Continued)

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WARD, 46, Farringdon Street, London, E.C.4. Tele.: 110Lborn 9703.

S.T.800. Kits A exact to specification, £3/7/6. A.C. Versions, £8/0/0. S.T.700. Author's Kit B wired and tested £3/14/0. Radio Goods. Lowest Prices. Part Exchanges. Servwell Wireless Supplies, 64, Prestbury Road, London, E.7.

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WANTED, Modern used Radio Sets, Short-wave parts and Adaptors. Speakers, Eliminators, Meters, Motors and Pick-ups. Spot cash paid. Bring or send. University Radio Ltd., 82, Hampstead Road, London, N.W.1.

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"POPULAR WIRELESS" when
communicating with Advertisers
—THANKS!
★.....★

SILENCE

It must be noted that there are really no degrees to this type of fault. A set either works or does not, if when you make it work by following this chart the results are not satisfactory, turn to the chart which describes the new symptoms experienced

MAINS SETS

Test house fuses and connections to mains

Test all fuses in set
Suspect one of the valves

Remove valves from set and test each one for correct emission

OR

Test in set by substituting one at a time by other similar valves

Look for breaks in aerial or earth system or in speaker connections

(A) Suspect internal disconnection and bang set sharply with fist

BATTERY SETS
Test L.T. voltage. (It should be 2 volts with set switched on)

Test H.T. voltage

Check over all battery connections

If a fault is found in the L.T. connections but there is still silence, re-carry out test indicated by arrow

INSTRUCTIONS: To use this chart simply follow the heavy line from point to point. When it divides read notes and follow line which applies in case under consideration

Test for output from all windings of mains transformer (H.T. and L.T.)

1. Run over all wiring, looking for disconnected lead
2. Test filament and anode sockets, etc., of valve-holder(s) for right voltages
3. Test grid circuits for continuity by working from point to point
4. Test all comps. one at a time, either by substitution or by removal and use of meters

Test for H.T. voltage on set side of smoothing comps. and rectifier

THEN

Localise fault by testing with phones in det. and L.F. valve anode circuits

If no clicks are heard as result of "A" test

Push each component and pull each wire until a broken connection or contact is found. (In case of a mains set, do this with an insulated screwdriver or with rubber gloves on)

If clicks are heard as result of "A" test

POPULAR WIRELESS "SPEEDY-RIGHT" FAULT-FINDING CHARTS.
No. 1.—SILENCE.