

SIGNAL-TO-NOISE RATIO—See page 14.

Practical and Amateur Wireless

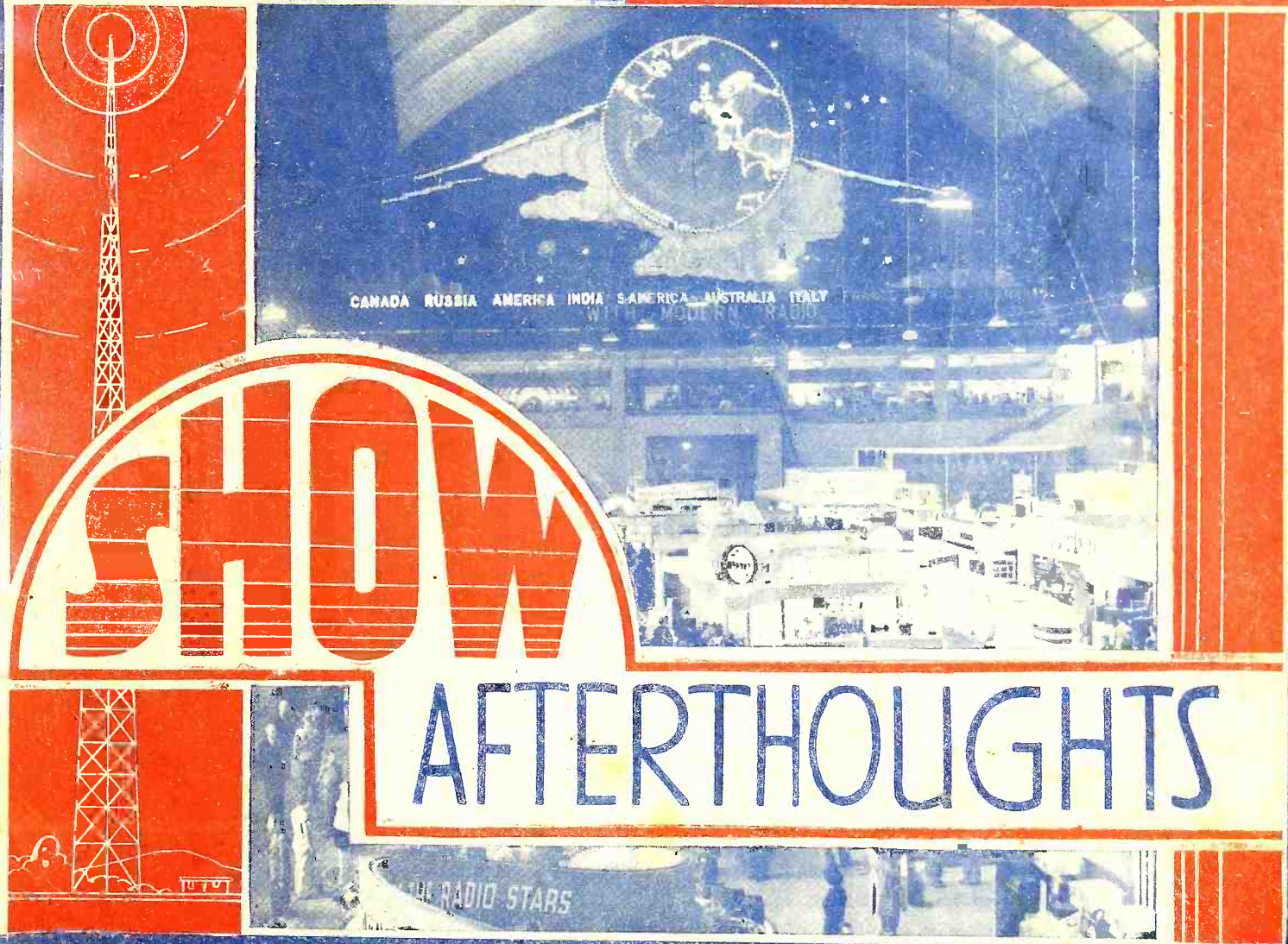
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WEDNESDAY

Edited by **F. J. CAMM**

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Publication**

Vol. 11, No. 261.
September 18th, 1937.

AND PRACTICAL TELEVISION



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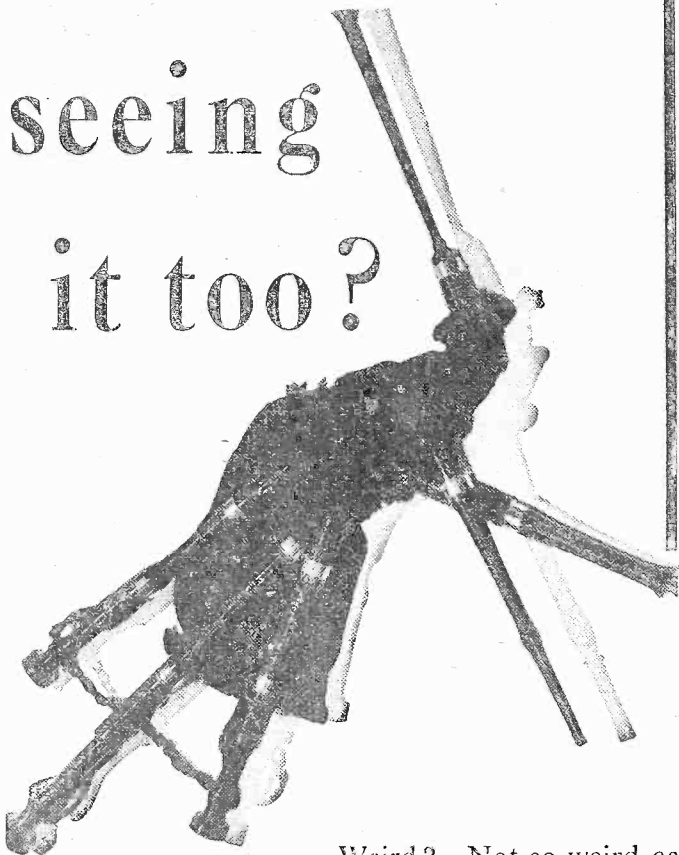
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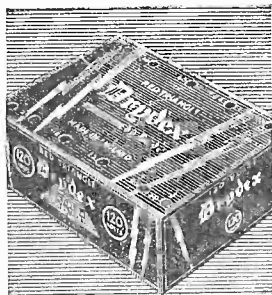
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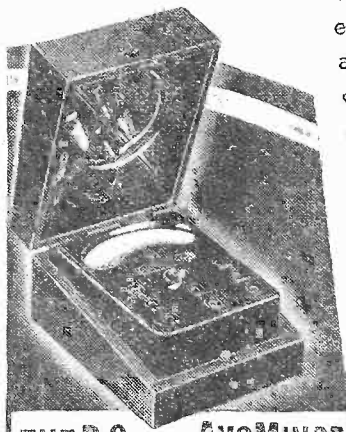
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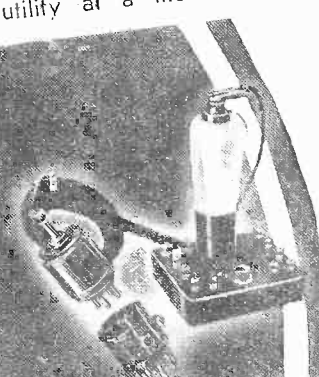
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Making a Beat-Frequency Oscillator Unit—See page 5.



Practical and Amateur Wireless

Edited by F. J. CAMM

Technical Staff:
W. J. Delaney, H. J. Barton Chapple, Wh.Sch., B.Sc., A.M.I.E.E., Frank Preston.

VOL. XI. No. 261. September 18th, 1937.

ROUND *the* WORLD of WIRELESS

Olympia Afterthoughts

WHEN the excitement and interest of the Radio Exhibition have died down, many interesting facts emerge from the confused "first impressions," which the ordinary visitor obtains. So many items are presented to his gaze during the few hours that he is able to be present, that it is difficult to isolate, afterwards, those items which are of the greatest value to the individual. When one is able to go round the Exhibition day by day, and collect various catalogues, the task is much simpler, but no doubt there are many who afterwards remember some particular feature which they intended to inspect during their visit and slipped from mind owing to the interest created by other exhibits. In this issue our popular contributors, the Experimenters, have collected those details which most impressed them during their visits on different days, and consequently their notes will prove of value not only to those who were fortunate enough to be able to visit this national exhibition, but to those who from force of circumstance were unable to make an inspection of the exhibits which were housed this year at Olympia. Turn to page 12 and see what the Experimenters recall in their afterthoughts.

New Commercial Radio Station

IT is announced that Radio-Toulouse will join the list of continental stations being used for English sponsored programmes from October 1st next. An English announcer has been engaged so that the normal programmes from that station may be announced in English in addition to the usual announcements, and thus provide an easily-received alternative programme for listeners in this country.

One Man Wants 70 Radiograms.

AT Radiolympia a visitor to the G.E.C. stand surprised the salesman by asking for seventy radiograms. He was Capt. the Hon. Richard Norton, managing director of the Pinewood Studios. "Captain Norton arrived with Miss Hazel Terry, the Paramount B. & D. film star," said Mr. J. Nilson, who was in charge of the G.E.C. exhibit. "He spent some time studying the radiogram and having its features explained.

"He told us that the intention was to install an all-wave radiogram in each of the star dressing-rooms at Pinewood. Between shots film artists like to be soothed by music. Stars who have radio in their dressing-rooms

are less temperamental than those in silent rooms; but it is no use having a central set with the programmes relayed to each room as the stars' tastes naturally differ, and instead of soothing them it might upset them to be given a programme they didn't like."

Gypsy Melody

THE B.B.C. announces that Eric Maschwitz, former Director of Variety, is preparing a programme of gypsy folk lore

England programme, a waiter who makes his living behind the Snack Bar will describe to listeners a few of his customers.

National Band Festival

ON September 25th, the National Brass Band Festival is to be held. Formerly the Crystal Palace was the scene of this annual event, but due to the fact that this was ruined during the recent fire, the event will now have to take place at the Alexandra Palace. Northern Listeners will be given an eye-witness account of the event by a northern journalist, as the majority of the contestants are from the north of England

Speedway Broadcast

ONE of the most exciting of sports enters broadcasting news again on September 18th, when Bernard Gray will give a running commentary, from Belle Vue, Manchester, on part of the speedway match North versus South.

Promenade Concerts

ON Tuesday, September 21st, the first part of the programme, devoted to works of Richard Strauss, will be broadcast on the National wavelength. Elisabeth Schumann will sing songs with orchestra, and the programme will include the symphonic poem "Till Eulenspiegel" and the Love Scene from "Feuersnot."

Foden's Band

FODEN'S Motor Works Band—for many years now the holders of a proud place in the front rank of the brass band army—are to broadcast on September 21st, in the Northern and Regional programmes, under the conductorship of Fred Mortimer, himself as famous as the band. The name of Mortimer can hardly be separated from that of this band, and in the broadcast concert Alec Mortimer figures with a euphonium solo.

Autumn Broadcast Talks

DAYTIME talks will include Mr. C. H. Middleton's popular Sunday series, "In Your Garden;" practical talks on some of the elements of housewifery under the title, "For the Young Housewife;" a series of six talks on children as seen from varying points of view; and another series entitled, "Before They Go to School," dealing with children between the ages of two and five.

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and music called "Gypsy Melody," which will be broadcast on October 17th.

When Mr. Maschwitz relinquished his post of Variety Director, it was arranged that he should continue to contribute to programmes, and "Gypsy Melody" will be his first programme since his departure.

Gypsy Petulengro is providing the folk lore and will also take part in the broadcast, while Rae Jenkins is responsible for the music, and is forming a gypsy orchestra to play in the programme.

"Private View"

HUNGER does not always make for politeness, and catering for snack-appetites is not the least exacting of summer duties. On September 20th, in the West of

ROUND the WORLD of WIRELESS (Continued)

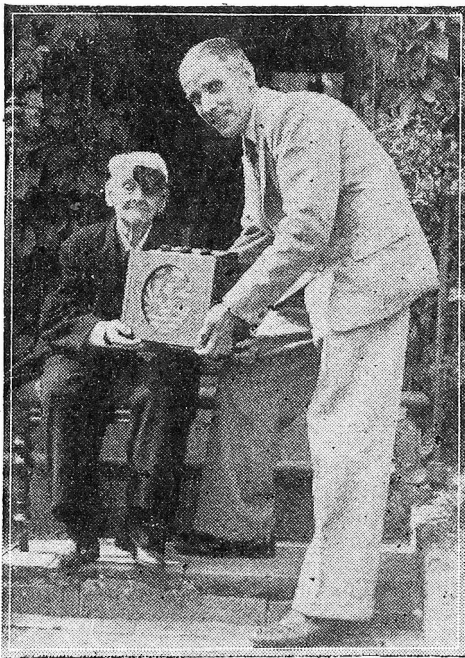
A "Baby" Presented to a Centenarian!

ON the eve of Radiolympia Mr. Henry Cook, of Charndon, Bicester, Oxon, who is seen in the accompanying illustration, reached his 100th birthday, and to commemorate this very auspicious occasion he was presented with a Pye "Baby" Q.

For such a presentation to take place at his time of life is, of course, quite an event, and for the first time Mr. Cook listened with obvious enjoyment to a Baby which spoke many languages, in a natural and unassuming voice, was most obedient, and could be taken anywhere without any trouble. This midget portable is Pye's smallest receiver. It has a four-valve circuit and moving-coil speaker, and is ideal for use in the home, on the river, by the sea, or in the car. Mr. Cook received numerous other gifts and telegrams—one from His Majesty the King—with congratulations and best wishes. He is one of a family of 22 and with his brother—aged 81—is the joint survivor. Most of his time now is spent in his country cottage, so that the Baby Q will be a constant source of entertainment, and will help to pass the time very pleasantly for himself and his two daughters.

Cabaret Show

WESTERN Cabaret will be broadcast from the Royal Bath Hotel, Bournemouth, on September 22nd. This will include: Rudi Grasl, "the amazing young man from Vienna," who imitates all kinds of instruments; Jack and Eddie Eden, in light comedy, and dancing to Harry



Mr. Henry Cook, of Charndon, being presented with a Pye portable receiver on his 100th birthday.

Roy's "Lyrics," directed by Maurice Kasket, with Mona Brandon and John Harris.

Value of Empire Broadcasts

THE value of the B.B.C. short-wave transmissions as a medium for British propaganda throughout the Empire was stressed by Mr. M. J. Railing, Vice-chairman and Joint Managing Director of the General Electric Company, during a visit to Radiolympia. He stated that since the Show

INTERESTING and TOPICAL NEWS and NOTES.

opened the G.E.C. had received messages from towns and villages in all parts of the world as far apart as Nairobi, Rangoon, Penang, Singapore and Durban—to mention a few—praising the broadcasts during Radiolympia, and showing the keenest interest in British affairs. "In these

grammes from Britain, we ought to develop this aspect of short-wave radio if we are not to be crowded off the air in our own possessions."

Dance Music from Germany and America

BRITISH listeners will hear relayed in the Regional programme for half an hour on the night of September 15th dance music from Germany. Eugen Wolff and his Orchestra, playing in Berlin, will have their programme relayed to Britain from



Oscar Rabin, and his popular Romany Band, who were heard recently in the late night dance music programme.

short-wave transmissions," he said, "we have a powerful weapon, which so far has perhaps not been fully appreciated, to combat anti-British propaganda disseminated by other countries. Since the messages we have received reveal a preference in these overseas countries for pro-

the Deutchlandsender station. Immediately the relay ends Germany will take, on the same line, a relay from this country of Henry Hall and his Dance Orchestra.

On September 29th Benny Goodman and his Band will be relayed from New York in the "swing" series, "America Dances."

Jack Strachey's Music

IN a programme devoted entirely to the music of Jack Strachey, well-known composer, to be broadcast in the National programme on September 17th, are several songs which will be broadcast for the first time. Two of them are "Toujours" and "Thank You," both of which have lyrics by Rex Newman and Clifford Grey. The second of these will be sung by Patrick Waddington, accompanied by Jack Strachey himself at the piano. Another item in the programme will be a song which Strachey wrote with Eric Maschwitz, former B.B.C. Variety Director, for last year's Christmas Revue—"Paris is not the same"—which seems likely to become a worthy successor to their "These Foolish Things."

Variety from Bath

IN the feature "Theatres of Variety," a programme will be broadcast from the stage of the Palace Theatre, Bath, on September 24th. This is the opening week of the rebuilt theatre: the original hall opened in 1886 as the "Pavilion"; it later became the "Lyric," and, in 1903, the "Palace" Theatre.

SOLVE THIS!

PROBLEM No. 261

Budd obtained a short-wave adapter for his three-valve broadcast band receiver employing three pentode valves. The adapter plug was inserted in the detector valveholder in the manner suggested by the adapter manufacturers, but no reception could be obtained. Why? Three books will be awarded for the first three correct solutions opened. Address your solutions to the Editor, PRACTICAL AND AMATEUR WIRELESS, George Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2. Envelopes must be marked Problem No. 261 in the top left-hand corner and must be posted to reach this office not later than the first post on Monday, September 20th, 1937.

Solution to Problem No. 250

The primary winding of the I.F. transformer following the I.F. valve was broken.
The following three readers successfully solved Problem No. 259 and books are accordingly being forwarded to them. W. A. Smith, 91, Wilsham Street, Notting Hill, London, W.11; H. Bridge, M.O.P. Hospital, Mossley Hill, Liverpool; J. Juniper, 68, Plymouth Road, Penarth, Glam.

The Amateur Set Designer

In this Second Article of the Series the Problems of Q.P.P. are Discussed

To get the best out of a push-pull system the two valves used should, ideally, have identical characteristics, and if a pair of valves are to be purchased for a push-pull stage, it is very advisable to specify a "matched" pair. If there is any appreciable lack of balance between the two valves, compensation by grid-bias adjustment is desirable. When carrying out the first tests with a push-pull output stage, a milliammeter check should be made of the two anode D.C. values. They should be equal. The fact of their proving to be so does not necessarily indicate that the valves are perfectly matched over the whole range of signal voltage swing, but it is important to see that at least the mean anode currents are balanced up. The output transformer should be electrically symmetrical about the centre tap, and the input transformer, or resistance capacity feed system if such is used, should also be electrically balanced on the two sides.

As with all output stages, the question of load impedance must be gone into thoroughly. From Fig. 5, it should be apparent that the two valves are effectively in series as far as the A.C. component of anode current is concerned. This means that the two valve impedances are acting in series and, therefore, that the optimum load, which must be set up by the speech-coil output transformer combination is twice the value suitable for one valve. To take the normal optimum load specified for one of the valves and to double it to obtain the optimum load (plate to plate) for the two valves in push-pull is correct enough up to a point. The only difficulty, if the limit of output power is being aimed at, is that the normal load specified for a single valve is largely governed by the need to keep down the second harmonic content, but in push-pull this problem does not arise. The amateur who finds himself with a pretty free hand over choice of components would be well advised to consult the valve manufacturer as to the optimum plate-to-plate load for the maximum of undistorted power output.

When a transformer is to be used for coupling to the previous stage, it must be remembered that each of the two output valves receives only the signal voltage developed by one half secondary. The choice of over-all transformer ratio had better be deferred until the designer has sketched out more of the design of the receiver as a whole, because the best ratio for the input transformer is naturally partly dependent upon what voltage is going to be available at the primary.

Resistance-capacity input to a push-pull output stage merits serious consideration under certain circumstances, but we will deal with this under the heading of L.F. voltage amplification, as it is a matter more intimately concerned with the pre-output stage.

With a push-pull output stage there is

some risk of "parasitic" oscillations at very high frequency occurring in the system, and it is generally advisable to take precautionary measures. Fortunately, although the effects of parasitic oscillations are troublesome enough, the cure is neither difficult nor expensive. "Stopping" resistances at each grid will normally be effective and values of 1,000 to 5,000 ohms should be tried. Alternatively (or possibly additionally), resistances of some 100 ohms or so at each anode can be tried.

Q.P.P. (Quiescent Push-Pull)

At the outset it must be understood that Q.P.P. has very marked differences from normal P.P. (push-pull). A theoretical diagram of a Q.P.P. output stage may appear to amount to two valves (generally pentodes) in push-pull, but there is a great difference in operation between the two systems. Furthermore, Q.P.P. transformers are, in the main, of different type to those used for P.P.

Although the two grids of two Q.P.P. valves are supplied with signal voltages in anti-phase and each valve supplies half the total power output to the speaker, the two valves do not work simultaneously as in

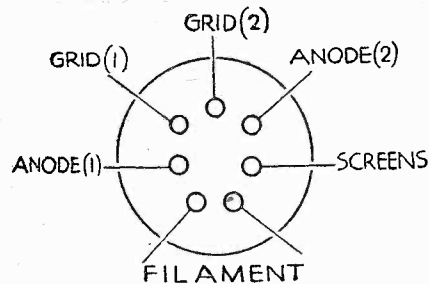


Fig. 6.—Connections of a standard 7-pin Q.P.P. valveholder.

P.P., but work *alternately*. Again, whereas in P.P. the two half primaries of the output transformer both carry the signal component of current together, in Q.P.P. the two half primaries carry the signal current alternately. In brief, while one valve is active the other is "dead," from the signal point of view. A basically important difference between P.P. and Q.P.P. is that in P.P. the two valves are biased as for normal amplification (centre-point biasing), but in Q.P.P. the two valves are biased right back to an operating point near the foot of the anode-current grid-volts characteristic. Such a bias condition would mean the most severe distortion with one valve alone, but with Q.P.P. gives not only satisfactory quality of reproduction but confers a very particular advantage.

The Q.P.P. system is primarily intended to overcome, for the battery user, what is one of the great disadvantages of all other battery-operated output systems (with the exception of Class B, which is allied to Q.P.P.). With any single valve, parallel

valve, or normal push-pull output stage, the mean anode current taken by the stage is more or less constant during reception. It makes no difference whether a local or a distant station is being received, or whether the depth of modulation is great or small, or whether the volume control is turned up or down, there is the same mean anode current being taken all the time. Even during a pause in the broadcast being received, there is still the same mean anode current value being drawn from the H.T. battery. This means that the average designer must consider any other than comparatively small output power as prohibitive with the more ordinary output systems, if the receiver is to be battery operated.

With the Q.P.P. system, however, the mean anode current varies with the amplitude of the signal voltage applied to the output stage. With no signal the "quiescent" current is very small indeed, three milliamps. of no-signal current for a pair of pentodes capable of giving a maximum power output of over 1 watt being quite a normal figure. Compare this with a typical triode output valve rated at less than $\frac{1}{2}$ watt output and taking a mean anode current of nearly 20 milliamps.

Anode Current Fluctuations

With increasing applied signal voltage, the mean Q.P.P. anode current rises. Thus, during reception, the mean anode current goes through very considerable fluctuations. On a strong signal and at a moment of deep modulation, the mean current can be up to 30 to 40 milliamps., but—and this is the whole point of Q.P.P. working—taking an average over a period, the total drain on the H.T. battery is remarkably low, considering the power output which is obtainable. Furthermore, the user can have that comfortable feeling that the more he "turns down the wick" the less will be the H.T. consumption of his receiver. It is amusing to think of the number of people who think that this is so with any type of receiver, but it is certainly the case with Q.P.P., or Class B output. With regard to Q.P.P., it is a common fallacy among the non-technical to imagine that the anode current is always small. Considering the power output obtainable with Q.P.P., it would indeed be a miracle if this were the case, but the existence of such an idea has led many people to make the mistake of using unsuitable H.T. batteries with Q.P.P. receivers. The fact that the anode current peaks run momentarily to high values must not be disregarded, and the H.T. battery chosen must be capable of delivering these current peaks without appreciable voltage drop.

Triode output valves may be used in Q.P.P., but although such a system gives the typical Q.P.P. benefit of good power output with economy of H.T. consumption, it is probable that the designer will pass triodes in favour of pentodes, as the latter give much greater efficiency. Triodes are, however, used for Class B working. The general popularity of pentodes in Q.P.P. has led the valve manufacturers to give us the familiar Q.P.P. valve which really consists of two matched pentodes in one bulb. The connections of a standard 7-pin Q.P.P. valveholder (viewed from above) are shown in Fig. 6. Note that the two screens are internally joined together so that there is only one screen terminal.

From the details of Q.P.P. given above it should be appreciated that there is no balancing out of signal current components in the common H.T. feed line, so it must be anticipated that a receiver using a Q.P.P. output stage will need more extensive

THE AMATEUR SET DESIGNER

(Continued from previous page)

decoupling than one using normal push-pull.

The fact that, at any instant, the signal current component is flowing in one-half only of the output transformer primary has a considerable bearing upon the correct ratio for the output transformer. Actually, the plate-to-plate load is a "transformed load" for one valve, the centre tapped primary acting in itself as a transformer of 2 to 1 ratio. Thus the plate-to-plate load is four times the load for one valve. Inspection of valve data will reveal that the specified optimum plate-to-plate loads for Q.P.P. valves are comparatively high values. This is due not only to the internal transformer action of the centre-tapped primary, but is also due to the fact that the high biasing of the two pentode sections gives the latter greater impedance values than would be the case for ordinary amplification conditions.

The big variations of mean anode current are a necessary feature of Q.P.P., but it is most important that the anode voltage should not have similar wild fluctuations. This implies that the resistances of the external anode circuits must be kept as low as it is possible to make them. This consideration is another that has an important bearing upon the design of the output transformer, for it should be obvious that its primary resistance must be kept low, something of the order of 400 to 800 ohms representing what is required. The maximum permissible value is dependent upon the valve type.

The input transformer of a Q.P.P. stage must have a higher ratio than that suitable for P.P. The necessity for large signal voltage across each half secondary of the input transformer should be apparent when it is considered, first, that one valve is "dead" while the other is supplying power to the speaker and, secondly, that the biasing back of the valves to the foot of the anode current-grid volts characteristic gives a much greater length of characteristic to be covered for full output.

It is necessary to adopt corresponding measures to prevent rise of load impedance as we found to be necessary with single pentode output, and a capacity-resistance filter connected between the ends of the output transformer primary is a usual feature of a Q.P.P. stage.

Grid stoppers should be used (try .1 meg.) or, alternatively, a resistance in the common grid bias lead (try .2 meg.).

Class B Output

Class B is closely allied to Q.P.P. In the case of Class B, however, two small triodes are used with characteristics such that the operating point (near the foot of the characteristic curve as with Q.P.P.) is obtained either with zero grid bias or with a very small negative bias, according to the particular Class B valve used. A Class B valve, of course, consists of two matched triodes in one bulb. Fig. 7 gives the connections of the standard 7-pin valveholder, viewed from above.

The feature which is peculiar to Class B operation is that the two triodes are allowed to drive into grid current under the action of the signal voltages. When using a triode output, in other than a Class B stage, grid current must be avoided at all costs, as previously stated, but in Class B operation the grid voltages can be allowed to run right into the grid current range and no trouble is caused, with one most important provision. When the grid of an output

valve is kept negative so that grid current is never established we can regard the grid circuit as one of no power consumption, but once grid current is set up it imposes a power demand which has got to be met somehow or other. With Class B the difficulty is met by placing in front of the output stage an L.F. stage which is primarily intended to supply the power requirements of the grid circuits of the Class B valve. We usually refer to the pre-output valve as the "driver" valve, and it must be remembered, when planning the receiver, that the Class B output stage is essentially a power-consuming load on the driver stage. The driver valve will either be a small power valve or a valve of the L.F. amplifying type, according to the actual power demand of the Class B valve.

Before proceeding with further details it will perhaps be advisable at this juncture to deal with the "Q.P.P. or Class B"

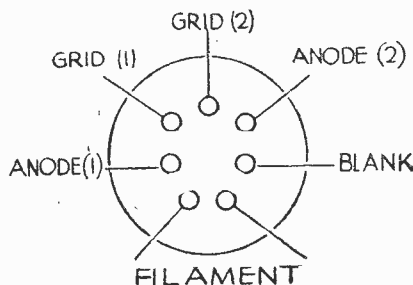


Fig. 7.—Connections of a standard 7-pin Class B valveholder.

question. It is rather a vexed question, too, and a certain amount of personal prejudice or preference is bound to colour any comments on the matter. There is one definite fact about Class B which may,

THE EXIDE MYSTERY

LAST week we published an illustration of a mystery exhibit on the Exide stand at Radiolympia. This consisted of what was apparently a perfectly standard 2-volt cell which gave a reading on any voltmeter of 6 volts. Visitors were very interested in this exhibit and many experts were heard to give their opinion as to how it was done. It is, of course, well known that the voltage of an ordinary single low-tension cell of the type exhibited is only just slightly over 2 volts. Exide make it quite clear that the millennium in accumulator design has not yet arrived, and the exhibit was merely a stunt to show what can happen to a cell under certain service conditions, and demonstrates how deeply the Exide people go into these things. A minute inspection of the cell gives no indication of the reason for the extra 4 volts and the Exide experts explain that it is possible for some such condition to arise accidentally in service—although the possibility is very remote.

The terminal pillars were purposely broken and compound put in the top of the cell so that a space was left between the "breaks" forming cavities round the broken ends. These cavities were filled with acid and the broken ends became "formed" by the passage of current on discharge and charge, and so became definite positive and negative electrodes. Although the two cavities possess very little capacity they furnish just as high a voltage on open circuit as a high capacity cell and, as the circuit is composed of three independent cells connected in series, the resultant voltage is six.

under certain circumstances, influence the designer against this system and that is the necessity for incorporating a driver stage in the receiver. The driver stage, however, must not be looked upon as a source of heavy current consumption for the grid power demand of a Class B valve is not heavy, and normally the driver valve can be kept fairly heavily biased. On the other hand, the driver stage must not be regarded in the light of a normal amplifying stage, contributing considerably to the over-all sensitivity of the receiver. From the latter point of view it is best to disregard the driver stage. Its job is to meet the grid power load of the Class B valve and no more should be expected of it.

The output transformer for Class B, like that for Q.P.P., must have a low primary resistance, something of the order of 400 to 500 ohms. As with Q.P.P., the plate-to-plate load is four times that for one valve. When a Class B valve is used (as distinct from two separate triodes) the optimum plate-to-plate load is readily ascertainable from the makers' data, and the output transformer ratio should, of course, be chosen accordingly. The conditions under which the triodes work in a Class B stage are responsible for a rise of effective load at the upper frequencies causing shrill reproduction unless corrective steps are taken. A capacity shunt may be used across each half of the output transformer primary. Equal condensers should be used, and .005 mfd. represents a value that may be worth trial. Alternatively, two resistance-capacity filters can be used, one across each half primary.

The input transformer that couples the driver valve to the Class B stage demands special consideration for, unlike the usual inter-valve transformer, the driver transformer has to transfer power. There are two special requirements: first, that the ratio shall be such that the "transformed" grid circuit load of the Class B triode shall (when referred back to the primary) be the optimum value for the driver valve and, secondly, that the secondary resistance of the driver transformer shall be low. The latter requirement must never be disregarded. About 300 ohms is a usual value.

Only one-half of the driver transformer secondary is carrying grid current at any particular instant, so the centre-tapped secondary acts as a 2 to 1 transformer, just like the centre-tapped primary of the output transformer. Thus, the effective load across the whole secondary is four times the actual grid circuit load of one triode. N^2 times the effective load across the whole secondary must equal the optimum load for the driver valve, where N is the over-all ratio (whole primary to whole secondary). Usually a 1 to 1 ratio will be suitable, but sometimes the ratio required will be step down. The amateur may save himself some trouble by consulting the valve manufacturer, for the latter can advise him not only as to the best type of driver valve for a given Class B valve but also as to the correct driver transformer ratio.

Grid-stopping resistances must not on any account be used in the grid circuits of the Class B stage. Parasitic oscillations will, however, be prevented by the capacity shunts on the half primaries of the output transformer.

The tendency for high-pitched reproduction may necessitate employing a capacity shunt (or resistance capacity filter) across the driver transformer secondary, in addition to the anode shunts. There will be room for a little experimenting here.

Building a Beat-Frequency Unit

Constructional Details of a Useful Accessory Which May be Added to Most Types of Superhet for the Reception of C.W. Signals. By W. J. DELANEY

MANY amateurs are now using commercial or other types of superhet receiver and will no doubt have found that it is not possible to tune in a C.W. signal on this type of receiver. If you are anxious to pick up amateur transmitting stations using code signals, or if you wish to improve your Morse speed, you will, of course, require to pick up such signals. By using some form of back-coupling in the second detector stage you can receive these signals, and one of the simplest plans is to connect a wire from the anode of the second detector back to some part of the grid circuit. The position of the wire, and the coupling obtained, will govern the degree of feed-back or oscillation, and will thus control the pitch of the signal note which you hear. Alternatively, you can connect a very small neodyne condenser between anode and grid and use this for the purpose. This arrangement—whilst it works very well in the majority of cases—is not completely satisfactory, and a much better plan is to make use of what is known as a beat frequency oscillator. In its simplest form this consists of a valve arranged somewhat after the manner of an ordinary detector with reaction, and the anode circuit is connected through a small capacity to the grid circuit of the second detector. If the circuit is chosen to oscillate at a frequency slightly different from that to which the second detector grid circuit is tuned, then a beat note will be set up, and if the beat-frequency oscillator (abbreviated to B.F.O.) is provided with a variable tuner so that the resonant frequency can be altered, then the pitch of the note given by the code signal will alter, and this will prove of great value.

Cutting Out Interference

Sometimes it will be found when listening on the amateur band that another signal will be heard in the background of the particular signal you wish to hear, and it may be noticed that the note is very similar in pitch. If your receiver is provided with a variable B.F.O. you will be able to adjust this so that the beat note set up by the required station will vary, and it will be possible to make such a difference in the note of that and the interfering station that it will be quite a simple matter to read the desired signal. This circuit is, therefore, well worth the trouble of building, if you are keen to get more fun and experience out of your superhet. The requirements for a B.F.O. are a valve, preferably of the type which will oscillate fairly easily, a tuned circuit covering approximately the band covered by the I.F. transformer, and the associated resistances and condenser. The tuning adjustment may be carried out either by a microdenser of very small capacity, or by a small condenser made up from a dismantled reaction condenser, using two or three plates only with a fairly

wide separation. A circuit of a suitable arrangement is given in Fig. 1, but there are several variations of this device which may be regarded here as in its simplest form. It is imperative to keep all of the wiring and components of this unit well clear of the remaining wiring of the superhet, and the coupling between the set and unit must be made by means of an extremely small capacity. By building the entire unit inside a screening can these requirements may easily be satisfied, and the following will no doubt be found the best means of making up a suitable unit.

Construction

Obtain from B.T.S., or any other firm specialising in the components, one valve or coil-screen, complete with lid. To the inside of the lid a standard valveholder of the chassis-mounting type should be bolted so that when a valve is inserted the remainder of the screen will fit over it and remain in position. A convenient point will have to be found on the chassis near the

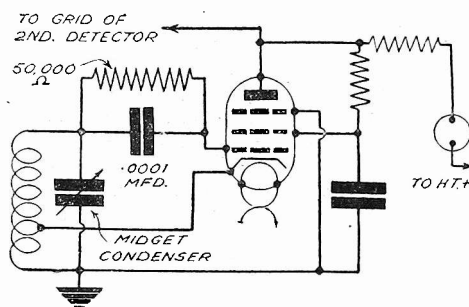


Fig. 1.—Circuit diagram of the beat-frequency oscillator.

second detector to accommodate this screening can, or alternatively it may be mounted on a very small chassis and the wiring for heaters and H.T. run through a screened cable to the receiver. In this case room may be found for the unit on the inside of the cabinet. To the top of the screening can attach the B.F.O. condenser, and attach the grid condenser and leak to the fixed terminal of the condenser. The voltage applied to the anode will depend upon the valve, and here it may be necessary to experiment with a view to finding the most satisfactory series resistance to use. It will be noted that a simple on/off switch is indicated in the H.T. lead, and this will be needed if the unit is installed permanently inside the cabinet, as it will enable the unit to be switched out of use when not required. If this is not done, then the H.T. lead will have to be disconnected to cut out the unit. For the coupling to the second detector the best plan is to make use of the twisted wire capacity such as we have used from time to time in band-pass tuners in sets described in these pages. A length of about 1½ in. of ordinary insulated

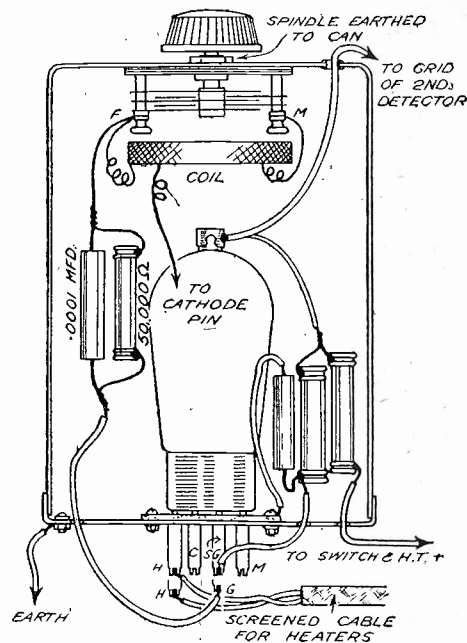


Fig. 2.—Proposed method of mounting valve and components inside a coil-screening can.

connecting wire will generally be found most suitable.

The Coil

The most important item in the circuit is the tuning coil, and this may be home-made, or one of the latest Wearite coils, designed especially for the purpose, may be used. This is known as type B-FO, and costs 1s. 6d. Alternatively, if you have on hand an old I.F. transformer of the frequency used in your receiver, you can take this down and use one of the windings—either primary or secondary. It would be preferable to use a tapped-secondary transformer winding, as this would enable you to make use of the tapping for the reaction winding. If this is not provided you will have to make a tapping, and to save unwinding the coil you can locate a suitable point by carefully scraping points on the edge of the coil until you locate a suitable one. Connection may be made temporarily and afterwards soldered. For those who wish to make their own coil the following details will prove suitable.

For the former a 1½ in. diameter tube is needed, and this may be a simple paxolin tube or a ribbed ebonite former. Three slots are cut in the latter, each ¼ in. wide and about the same depth, in which to wind the wire, but if the solid or smooth surface tube is employed three rings will have to be cut from paxolin or cardboard to enable the winding to be split into three heaps. Into each slot or section forty turns of 36-gauge d.c.c. wire should be wound. If desired, enamelled wire may be used, but in this case care must be taken not to damage the enamel surface and thereby introduce short-circuits. The tap should be made at two or three points so that the best connection may subsequently be found, and the most suitable tapping points are at the centre of the complete winding, at the end of one section (40 turns) and half-way through that section (20 turns).

In use, the unit is simply switched on, and the condenser on top of the can adjusted to produce the required pitch or note. If desired, of course, it may be so mounted that the condenser becomes a panel control, in which case the condenser is always available should it be found that a great deal of listening on the amateur bands is indulged in.

LOUDSPEAKER EXPERIMENTS

A Few Interesting Modifications Which can be Carried Out Without Difficulty and Which May Prove Worth While

IT is now possible to obtain quite cheap loudspeakers from certain dealers in surplus stocks, and in many cases it will be found that the diaphragm has been seriously damaged—hence the low cost of this type of surplus component. In some cases, amateurs also have a spare loudspeaker lying idle—perhaps because they have become dissatisfied with the results and have obtained a new one. These spare speakers may be used as a basis for some interesting experiments and may prove capable of giving really good results when modified in certain ways. If the cone is

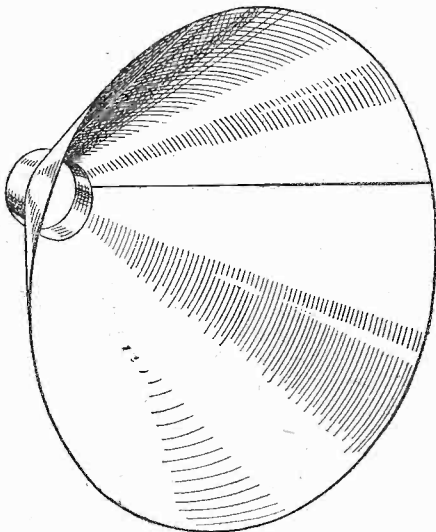


Fig. 1.—A straight cone seam.

destroyed, it will be necessary, of course, to fit a new one, and practically any good stiff paper may be used for this purpose. The method of joining the two edges of the cone may form the first basis for experiments, and it will be found, if a good amplifier is employed, that the reproduction obtained when the seam in the cone is straight as in Fig. 1, will not be so good as when the seam runs across the cone as in Fig. 2. Various forms of joint may be tried in this connection.

Split Cones

A feature which is now being more commonly employed is to use two separate cones for the reproduction of the high and the low notes. One very simple manner in which this arrangement may be adopted, and which will provide hours of interesting experiment, is to cut round the cone and to join the cut together again with a very thin, flexible material such as ordinary silk. In some cases thin paper may be used, but I have found that there is a distinct tendency to buzz when this is used and some form of silk or thin linen is preferable. In some earlier experiments ordinary thin rubber (obtained from a child's balloon) was employed but again this was inclined to buzz or give rise to chatter. The method of cutting and joining the cone is shown in

Fig. 3, and the two cut edges should be separated by a very slight gap. If the joining material is too thin the cone will not be held central in the gap, and thin strips of paper may then be joined at equal distances round the gap in the cone as indicated in broken lines in Fig. 3.

Dual Cones

The Philips receivers are this year fitted with a speaker which has a small narrow-angle cone attached to the centre and a paper cone of this type can easily be affixed to an existing speaker for experimental purposes. The attachment should

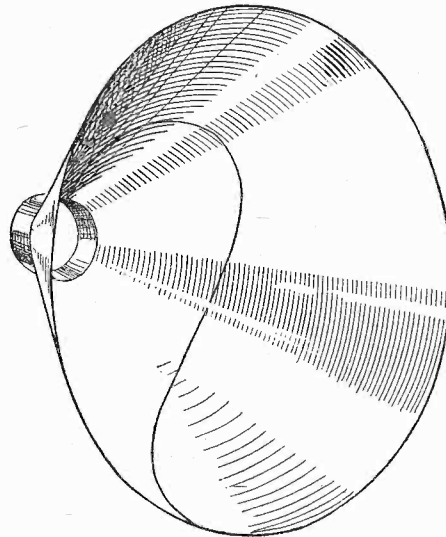


Fig. 2.—A spiral seam in the cone, as shown here, will be found an improvement.

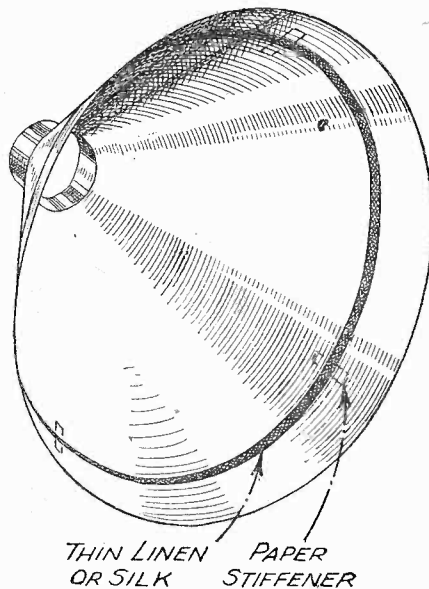


Fig. 3.—By cutting round the cone, and joining it together with a flexible material as indicated here, improved results may be obtained.

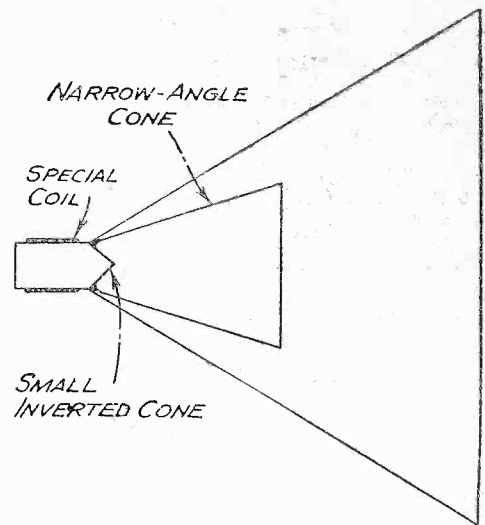


Fig. 5.—By closing the centre as shown here—the tone is modified.

be made by means of some form of cellulose adhesive, or alternatively a bottle of the special Speaker Repair Cement, supplied by Messrs. Holliday and Hemmerdinger, of Holmer Works, Dolefield, Bridge Street, Manchester, may be used. In experiments which I have carried out with this type of cone I have found that much better results were obtained when the centre of the cone was closed. A flat disc produced a peculiar form of lifelessness in speech, but a richness was imparted to music, whilst a shallow cone, fitted in with the apex pointing outwards as shown in Fig. 5, improved speech but did not seem so good for musical items. No doubt a compromise can be found and the shape of this will perhaps depend upon the angle of the small cone. The best length in the tests which I carried out was half the depth of the speaker cone.

Speaker Cabinet Designs

If the speaker is correctly designed it may even then fail to produce the best results due to the wrong design of cabinet. A great deal depends upon the air loading on the cone, and it will be found that in many cases the advantages of a really good baffle—produced by a nice large cabinet—are offset by the large radio or amplifier chassis which is enclosed within it. This obviously means that a separate cabinet for the speaker is required, and this will, in

(Continued on page 19)

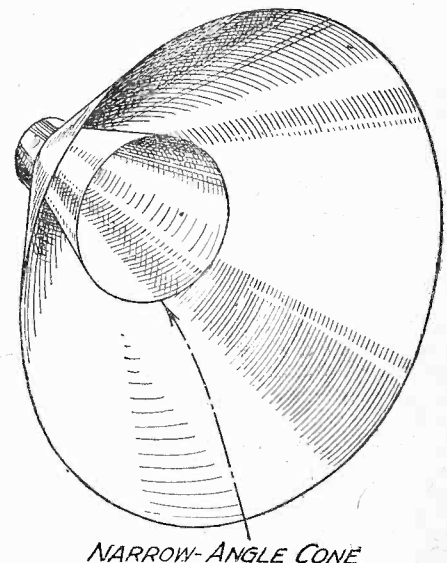
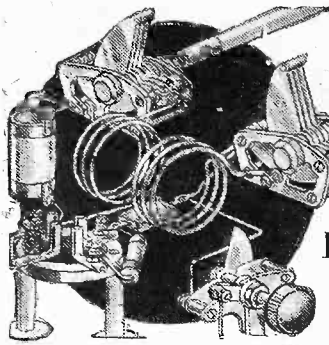


Fig. 4.—A small, narrow-angle cone, mounted inside the normal cone for improved top-note response.



Short Wave Section

D.X. LISTENING ON THE ULTRA-SHORT WAVES

THE perfect ultra-short-wave receiver has yet to be designed, nevertheless, slowly but surely ultra-short-wave technique is evolving its own particular type of receiver, somewhat different from that used in normal broadcast practice. During the last few weeks the writer has been receiving the B.B.C. television signals at a distance of over 100 miles from the Alexandra Palace, and has therefore had ample opportunity to study the effects of comparatively long-distance reception on the ultra-high frequencies.

In view of the above remarks it would appear that ultra-short-wave reception is by no means confined to within optical or quasi-optical distances from the transmitter; reception of amateur signals across the Atlantic on 5 metres definitely proves this, though naturally such reception may be put down to freak conditions. Even so, given a receiver of sufficient sensitivity it should be possible to tune in the television signals from the Alexandra Palace almost anywhere in Great Britain. This reception does not apply to vision but only to the sound transmission. Receiving vision proper, at long distances, is hardly possible at the present stage of television technique; neither the receivers nor the transmissions themselves are equal to it.

Intermediate Frequency

Those who are interested in long-distance reception on the ultra-high frequencies will be aware that, as in broadcast reception, the superheterodyne principle of receiving has the greatest possibilities. If, however, the experimenter converts a standard superhet to receive on the ultra-short waves merely by substituting suitable coils and tuning condensers, he will find it extremely difficult to receive any stations at all. The most important point here is the choice of the intermediate frequency. To obtain easy tuning, even when working down to 5 metres, the wavelength of the intermediate amplifying stages must not be above 50 metres, which represents a frequency of about 6 megacycles.

Any suitable intermediate frequency in this region can be chosen, and it is quite easy to wind suitable I.F. transformers. As a guide, thirty-five turns of No. 30 d.s.c. wire on a lin. former will give an I.F. wavelength of about 45 metres, both primary and secondary being close wound and spaced $\frac{1}{4}$ in. to $\frac{1}{2}$ in. from each other. There must not be any capacity added to either winding, as the capacity due to the windings themselves will be sufficient to peak the frequency. Where it is desired to use several I.F. stages, there is an alternative method of coupling the I.F. valves. Instead of using the conventional transformers, resistance capacity coupling may be used.

R.C. Coupled Stages

Here, a word of explanation is necessary, as it may not be apparent how the superheterodyne principle of amplifying at an intermediate frequency is obtained. The

connecting of the R.C. I.F. stages is similar to ordinary audio R.C. coupling, but the capacity of the coupling condenser is very much smaller so as not to pass the audio frequencies, though no impedance is offered to the radio and supersonic frequencies. The curve of such an I.F. stage will be

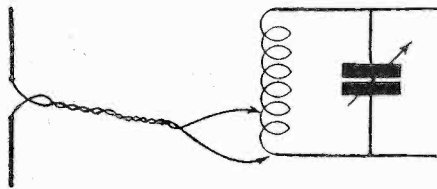


Fig. 1.—Showing the method of tapping feeders from a dipole aerial direct into the grid circuit.

comparatively flat, and will cover a wide range of frequencies. The amplification that is obtained will entirely depend on the values of the coupling components, and is not a function of frequency as in the case of transformer-coupled I.F. stages.

Several stages of R.C. coupled I.F. may be used with excellent stability. It is therefore obvious that this type of I.F. amplification is particularly adapted for use in an ultra-short-wave superhet. One commercial concern has already on the market a special ultra-short-wave superhet, using resistance coupling all the way

coupling could very conveniently be combined when using two stages of I.F. amplification. Fig. 2 shows a suitable circuit which could very easily be made up in the form of an experimental I.F. unit. It will be seen that the first stage consists of suitably valued components for resistance coupling, and the second stage is transformer-coupled to the second detector. An I.F. transformer wound up on the lines already given will do very well, though when using an intermediate frequency in the region of 6 megacycles it will be necessary to broaden the response curve out somewhat by means of resistances across both primary and secondary. It may be necessary to experiment with the value of these, though 10,000 ohms will be found quite suitable for a start.

The reasons for using transformer coupling in the second stage of this I.F. unit are twofold. First of all a little more amplification can be obtained than with the resistance-coupled method, and also it is very easy to add regeneration to the second detector, if necessary, by means of the usual coil and condenser; and, hence, both amplification and selectivity may be controlled to a certain degree. It will be seen that the two I.F. valves are H.F. pentodes, which type of valve is, of course, absolutely necessary here. Any make can be used, though there are one or two specimens on the market which have a very high μ and are particularly suitable.

It will be observed that the I.F. and second detector stages only of an ultra-short-wave superhet have been considered here. There are several first detector oscillator circuits suitable for ultra-short-wave reception, and these will, no doubt, be familiar to the experimenter (making use, for instance, of a triode-hexode valve), but as these circuits require special treatment, they will not be dealt with here. As a matter of fact, an autodyne will give very good results on the ultra-short waves; that is to say, a simple reaction circuit which will act as a combined oscillator detector.

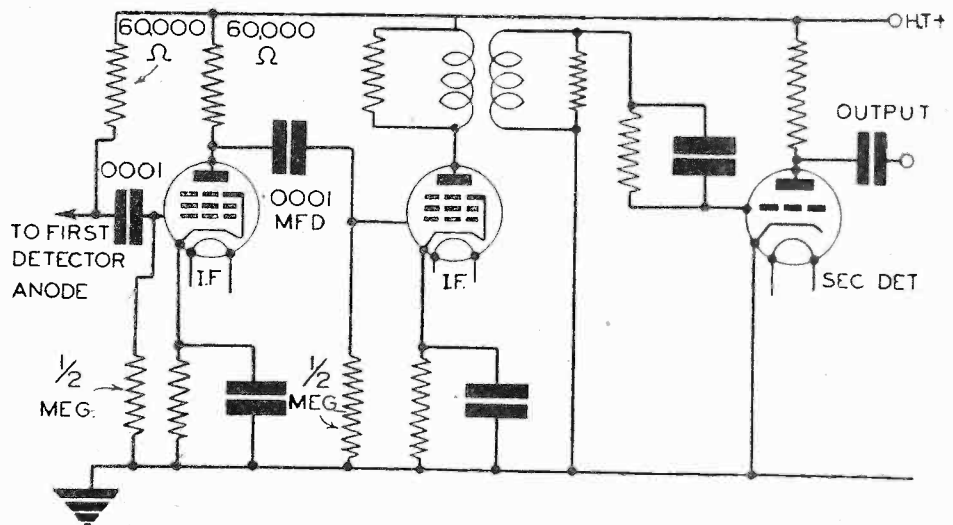


Fig. 2.—Circuit diagram of a two-stage I.F. and second detector unit for an ultra-short-wave superhet, using R.C. coupling in the first stages.

through, and it is predicted that this type of receiver will become very popular before long, owing to its excellent D.X. possibilities.

An Experimental I.F. Unit

Turning once again to suitable I.F. stages for ultra-short-wave superhets, it is thought that both transformer and R.C.

Noise Silencing

One interesting feature of an ultra-short-wave superhet is the noise level, which, unfortunately, is apt to be rather high in a receiver using six or eight valves. However, when a signal is tuned in, a certain amount of this background noise disappears, even at D.X., and gives one the impression that

(Continued overleaf)

SHORT-WAVE SECTION

(Continued from previous page.)

a super-regenerative receiver is being used. To make long-distance listening really effective on the ultra-high frequencies, some form of noise silencing will have to be evolved, otherwise weak signals are still apt to be lost in the background mush.

When listening for long-distance transmissions with an ultra-short-wave superhet, it is most essential to use an aerial cut to frequency. Although an ordinary broad-

cast aerial will bring in signals, there is a 50 per cent. increase in signal strength when using a tuned aerial system. When erecting experimental aerial systems, it is generally convenient to use ordinary lighting flex for feeders, instead of the more expensive concentric cable or spaced feeders. When using the twisted flex an increase in signal strength can be obtained by tapping the feeders on at the low potential end of the grid coil. One end of the feeder is taken direct to the earth side of the coil, while the other should be tapped about half a turn up the coil. The best

results can easily be determined by experiment, of course, as the tapping point will vary with the detector circuit used. (Fig. 1.)

There is no doubt that for long-distance listening on the ultra-short waves a superhet receiver of the type already outlined has many advantages, and if progress is to be made in breaking down the distances that can be covered on the ultra-high frequencies, the simple super-regenerative type of receiver must give way to specially designed superhets of high sensitivity, as ultra-short-wave transmission and reception represents radio in its most advanced form.

Leaves from a Short-wave Log

League of Nations Broadcasts

BETWEEN September 13th and October 3rd, during which period the League of Nations will be holding an Assembly, the Prangins transmitters will broadcast daily, in various languages, a précis or news bulletin in which will be fully described the work which is being carried out. The stations to take this service are: HBL, 31.27 m. (9.59 mc/s); HBP, 38.48 m. (7.78 mc/s), to which will be added HBF, 15.83 m. (18.95 mc/s); HBJ, 20.64 m. (14.535 mc/s), and HBO, 26.31 m. (11.402 mc/s). These, so far as broadcasting is concerned, have only been brought into operation for the relay of programmes from European centres to the United States of America and other distant parts of the earth.

Transmissions from the Normandie

Arrangements have now been made to carry out broadcasts from this crack trans-Atlantic liner on the following dates: September 18th, 22nd, 23rd; October 2nd, 6th, 7th; November 3rd, from G.M.T. 16.00-16.30. On September 20th, and on October 4th and 18th, special transmissions will be made between G.M.T. 11.00-11.30. According to circumstances and conditions prevailing at the time two of the following channels in regular use by the *Normandie* will be chosen, namely 65.72 m. (4.565 mc/s), 33.98 m. (8.83 mc/s), or 22.29 m. (13.457 mc/s). As these are the frequencies adopted for ordinary traffic with Pontoise (France) on or before the dates mentioned above, listeners will, no doubt, be interested in picking up experimental tests. Communication between the French land station and the liner is carried out regularly on 71 m. (4.225 mc/s), 38.96 m. (7.70 mc/s); 33.19 m. (9.04 mc/s); 24.56 m. (12.215 mc/s), and 23.08 m. (13 mc/s). The broadcasts will be passed over for re-transmission to French and other European listeners through the P.T.T. network.

New South African S.-W. Stations

It is reported that a 5-kilowatt transmitter has been installed at Pretoria and that tests are now being made at irregular intervals on 33.71 m. (8.9 mc/s). It is also stated that the African Broadcasting Corporation is experimenting with a new short-wave transmitter at Cape Town; the channel is 49.83 m. (6.02 mc/s).

WIXAL's Twin-beam Transmissions

WIXAL, Boston (Mass.), owned by the World Wide Broadcasting Corporation, is endeavouring to obtain a permit from the

U.S.A. Federal Communications Commission to operate an additional 10-kW station to supplement the 20-kW transmitter already in existence. Two of WIXAL's channels with new equipment of a series of beam aerials will be brought into operation as soon as possible, for the relay of programmes to the South American continent.

Plethora of Italian Signals

On the short-wave bands, listeners now

Tripoli, Libya, and Ethiopia (Abyssinia) through IBC, 17.03 m. (17.62 mc/s); IBT, 18.44 m. (16.27 mc/s); IBS, 20.72 m. (14.48 mc/s); IBD, 24.99 m. (12.005 mc/s), and IBF, 33.08 m. (9.07 mc/s).

Egypt Wants a Powerful Short-waver

The Egyptian Government is considering the installation of a 15-kW short-wave transmitter in the immediate neighbourhood of Cairo for the purpose of relaying the Arabic programmes broadcast by the main station to all parts of the world. One of the most popular features of the day is the reading of excerpts from the Koran, and it is believed that for this portion of the programme alone the construction of a special transmitter would be justified.

RADIO FROM MOUNT SNOWDON

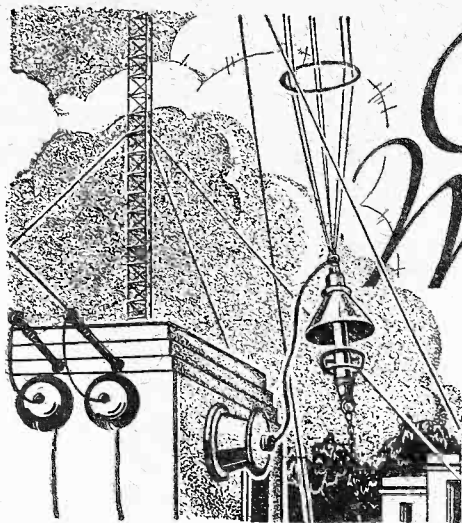


Mr. William Jones, of Colwyn Bay, recently broke the British transmission record for a two-way contact on the ultra-short wavelength of 5 metres. With the assistance of three companions Mr. Jones operated his transmission station GW6OK on the summit of Snowdon in connection with a series of special tests organised by the Radio Society of Great Britain. Contact was established with several 5-metre stations and the tests are proving of great value. The illustration shows the radio enthusiasts at work on the summit of Snowdon.

find numerous Italian telephony stations at all times of the day and night; they are in communication with either shipping or with the African colonies. The channels worked by IAC, Coltano (Pisa) are: 16.89 m. (17.75 mc/s); 16.95 m. (17.699 mc/s); 23.32 m. (12.865 mc/s); 45.20 m. (8.515 mc/s), and 68.79 m. (4.355 mc/s). The last named carries the traffic to Italian ships in the Mediterranean. In addition, Rome-San Paolo may often be heard working with

New Aerials for Boundbrook

The N.B.C. short-wave transmitter at Boundbrook (New Jersey) is being equipped with new directional aerials which should mean much better reception of the broadcasts by European listeners. The power of the signals now transmitted by this station on 16.87 m. (17.78 mc/s), and 49.18 m. (6.1 mc/s), is already much improved, and in the near future a considerable increase in strength should be noted.



On Your Wavelength



By *Thermion*

New President of the B.L.D.L.C.

BEHOLD in me, the one and only Thermion, the new President of the British Long Distance Listeners' Club, at your service and ready to turn a willing hand to any job which comes along in connection with it. Its members, I see, are located in all quarters of the globe, and I shall welcome letters from every member and, moreover, promptly reply to them. Everything within my power which can be done to further the interests of a club, which has a larger membership than any similar organisation in the world, shall be done. I have been approached on many occasions to become President of this, that, or the other society, and I have for various reasons had to decline the honour. This particular Presidency I accepted with alacrity, for it is a national organisation and

one to which I propose to devote considerable time and attention. So I should like to make your acquaintance, and if you have time to drop me a letter I hope you will do so.

Service Charges

IN our issue dated September 4th I published a letter from C. H. R. N., of Kington, Herefordshire. I am asked by Messrs. S. G. Brown, Ltd., the makers of the well-known headphones, to state that they have not charged the sum of 12s. 6d., either to this reader or his dealer, for the repair of his earpiece. They have carefully checked their records and they are able to offer proof beyond all doubt that if C. H. R. N. is under the impression that this charge was made by Messrs. S. G. Brown, Ltd., the impression is erroneous. Perhaps C. H. R. N. will communicate direct with Messrs. S. G. Brown, Ltd., or get his dealer

to do so, as a mistake seems to have occurred somewhere.

A Generous Offer

I HAVE received a very generous offer from Lt.-Col. Puck-Beresford. Since 1921 he has been an enthusiastic set constructor, but as he is moving to a new district he has on hand a great deal of wireless apparatus, much of which is perfectly sound and usable. He wishes me to find a suitable home for it, and I cannot do better than suggest that wireless clubs, or boys' institutes, or working men's clubs should write me a letter setting forth particular reasons why they should receive it. I will consider each letter and act accordingly. Incidentally, Lt.-Col. Puck-Beresford, who called at the Stand for me at a time when I was not there (the inner man has to be satisfied sometimes!) tells me that he is one of the few people who does *not* want to meet me, as he is content to read my articles each week and enjoy them, except when I rant against subjects with which he is in disagreement.



The "Practical and Amateur Wireless" Stand at Radiolympia—a popular meeting-place for all constructors, where all their technical needs were satisfied. "Thermion" was in regular attendance, and stood at the left-hand side, behind the front counter. No attempts were made upon his life and his copy appears, as usual, this week.

Show Attendances

ALTHOUGH the official figures indicate that the daily attendances at the Exhibition are fewer than last year, it is significant that the attendance at our Stand was greater. Does this indicate a revival of home construction this season? Judging from the sale of blueprints and issues in which construction is dealt with I should say that it does; and I hope that this great increase in business will not catch the manufacturers of components unawares, as it has done in the past. The complaints regarding lack of delivery and long delays has been chronic during the past year. The manufacturer can now make amends. In any case he should not accept orders which he cannot execute within a few days. I hope also that there will be fewer complaints of wrong parts being supplied, and that the standard of inspection will be even higher than it has been hitherto.

Publicity

ALTHOUGH some new artistes complain of the lower pay they receive from the B.B.C., it is my opinion that many of them are grossly overpaid, particularly the unknown ones, for the B.B.C. does them a good service in lifting them from obscurity and providing them with opportunities and publicity which the stage would never accord them. Their voices may be good and their patter excellent, but their stage appearance and deportment are simply abominable. You can prove this by comparing the number of successful B.B.C. artistes who have deserted broadcasting and gone on to the variety stage. Very few of them are really successful. They draw a crowd for a couple of nights, but the crowd does not go to see them because of their ability as artistes but merely out of idle curiosity to see what they look like. Nearly always the public is bitterly disappointed. What is going to happen when television is the accepted form of radio entertainment? Surely many of those artistes who have only their voices upon which to rely will be out of engagements. The fact that they continue to broadcast indicates the truth of the old adage that anything will succeed if you plug it enough. You can make the public believe that a thing or a person is good even when it is rotten. A band leader will announce that he is going to play "That very popular number . . ." whether it is popular or not. Having told you that it is popular you believe it without question. What the band



Problem No. 259

WE were surprised by the number of incorrect solutions that were received in connection with this problem. Readers were asked to decide the disadvantages of using A.C. valves in place of the A.C./D.C. type, and the component substitution necessary when making a modification of this nature. A very large proportion of readers stated that the value of the mains dropping resistance would have to be increased owing to the increase in current consumption of the valves! In practice it is not advisable to use A.C. 4-volt 1-amp. valves in place of the normal A.C./D.C. type. The latter have a consumption of .2 amp. for most makes, and, therefore, if the valves are connected in series the total wattage dissipation will be one-fifth of the mains voltage considered as watts, plus the H.T. consumption. With 4-volt 1-amp. valves in use the L.T. consumption is increased five times. This increase in current consumption necessitates a reduction in the value of the heater dropping resistance, and the wire used must, of course, be capable of carrying 1 amp. Apart from the fact that the use of 1 amp. valves increases the consumption, the heat dissipated is excessive and the cabinet is likely to be damaged.

The Oracle Coil Unit

SOME readers are experiencing difficulty in operating the wave-change switch on the Oracle. With this type of switch the position of the locating plate with respect to the switch contacts inside the coil unit must be correctly adjusted before the plate is locked. For example, if the coil switch is set at the short-wave position, the spring contact must rest in the corresponding groove of the locating plate. After the correct position has been found, the plate must be securely locked, by means of the fixing nut, to the component bracket, and when the spindle is rotated the locating plate must remain quite rigid.

Class B, Q.P.P., or Push-pull?

IF best quality of reproduction is desired from a battery-operated receiver, a straight push-pull output stage should be used—preferably two power valves. The current consumption is somewhat high when this circuit arrangement is employed, however—about 15 mA for the output valves if two power valves are employed. H.T. current economy can be effected by using a Q.P.P. or Class B arrangement, but the quality will be definitely inferior to that obtainable from straight push-pull.

leader really means is that he has received a nice fat fee from some music publisher to plug the song, and because he continues to play it you presume that it is popular. If he took the trouble to take a census of popular opinion he would find that the public hates the song. If a song is popular it does not quickly die, and the average life of the so-called popular number is only a few weeks. You cannot say that songs which are so ephemeral are popular. If they are popular will you please define to me an unpopular song? And what is the essence of unpopularity? A short life, surely! Another point: Why should I be compelled to listen to a song which the conductor says he has been "requested" to play. Because one person asks him to play a particular number, has the conductor any right to presume that everyone wishes to hear it? And why should one person be specially favoured in this way? And ought not we to be told who has made the request? It may be just a subtle way of saying that he has been requested to do so by the music publisher, who has complained that it has not been sufficiently plugged. And do, please, save me from the conductor who says "We will now play you" instead of "We will now play to you." I do think that before a conductor is allowed to announce he should be given some lessons in English and elocution; perhaps electrocution is the word I should have used.

Band conducting is the most over-rated, overpaid occupation in the world. I will not call it a profession, as I should have to apologise to all the other professions. The average bandsman is a person attracted to the job by a desire to do as little work as possible for as much money as possible. The sort of person who likes dancing because it puts him amongst the ladies, and who plays tennis because it enables him to dress up in flimsy, feminine attire and play pat-ball with the ladies. Tennis, like crooning, is just an occupation for the effeminate. Rude letters relating to this paragraph will be dropped into the W.P.B., for all intelligent people will agree with me.

Another Record Broken

I AM told that among the records broken at Radiolympia this year is the amount of technical literature carried away by visitors. More than 60,000 brochures and leaflets were taken from the G.E.C. stand alone. Literature concerning the £35 television unit was in the greatest demand.

A PAGE OF PRACTICAL HINTS

SUBMIT YOUR IDEA

READERS WRINKLES

THE HALF-GUINEA PAGE

A Clock-dial Tuning Indicator

THE accompanying sketch, Fig. 1, shows how a clock-dial tuning indicator can be made from a cheap watch which has ceased to function as a time-keeper.

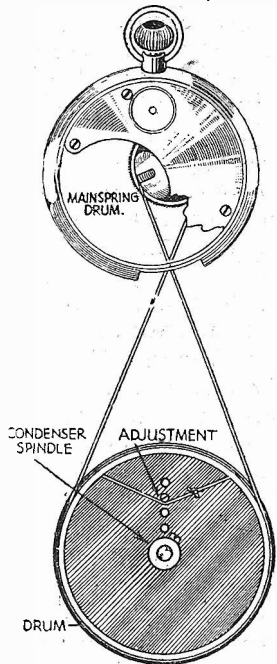


Fig. 1.—General arrangement of a clock-dial tuning indicator.

First of all, the back plate screws are slackened a little, and the balance wheel and intermediate pinions are removed. A slot is cut at the bottom of the casing to allow the cord to pass through, as shown in sketch.

In the watch I used, when the mainspring drum was rotated, the hands of the watch turned through four hours per revolution, so I made the driving drum on the condenser spindle three times the size of the mainspring drum.

The cord is passed over the mainspring drum, crossed over, and then passed twice round the driving drum. It is necessary to cross over the cord so that a clockwise rotation of the condenser will turn the hands of the watch in the correct direction. The ends of the cord are passed through holes in the drum and tied together, and adjustment in tension is made by means of the holes drilled on the drum,

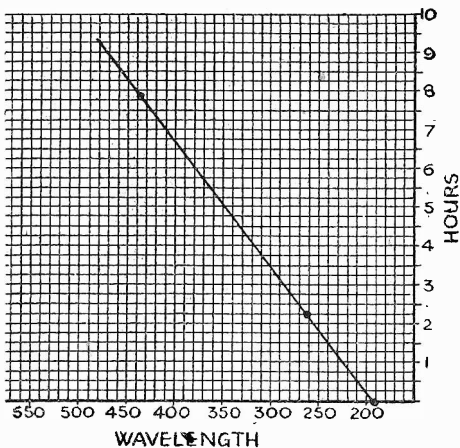


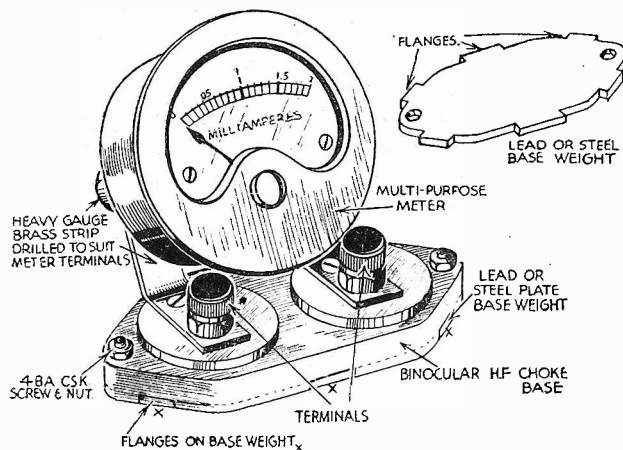
Fig. 2.—Graph showing the relation of dial readings to wavelength, and used in conjunction with the clock-dial tuning indicator.

THAT DODGE OF YOURS!

Every Reader of "PRACTICAL AND AMATEUR WIRELESS" must have originated some little dodge which would interest other readers. Why not pass it on to us? We pay £1-10-0 for the best wrinkle submitted, and for every other item published on this page we will pay half-a-guinea. Turn that idea of yours to account by sending it in to us addressed to the Editor, "PRACTICAL AND AMATEUR WIRELESS," George Newnes, Ltd., Tower House, Southampton Street, Strand, W.C.2. Put your name and address on every item. Please note that every notion sent in must be original. Mark envelopes "Radio Wrinkles." DO NOT enclose Queries with your wrinkles.

as indicated. A small pin under which the cord is passed can be inserted into whichever hole is suitable.

To ensure that the cord shall not run off the drum in the watch it is desirable that a piece of rounded tin be inserted at the back of the slot in the watch and rounded



A handy weighted meter stand.

off to prevent wear on the cord, which can be made to bear lightly against it by adjusting the position of the drum on the condenser spindle.

A graph, showing the relation between the reading of the dial to the wavelength to which the condenser is tuned, can be drawn, as in Fig. 2. Taking any two stations of known wavelength and marking their position on the graph by means of the position of the hands of the watch when they are tuned in, a straight line drawn through these two positions will show at a glance the setting of the dial for other wavelengths.

Initial setting of the hands of the watch can be carried out by the ordinary working of the timepiece.—J. H. MARR (Bathgate, West Lothian).

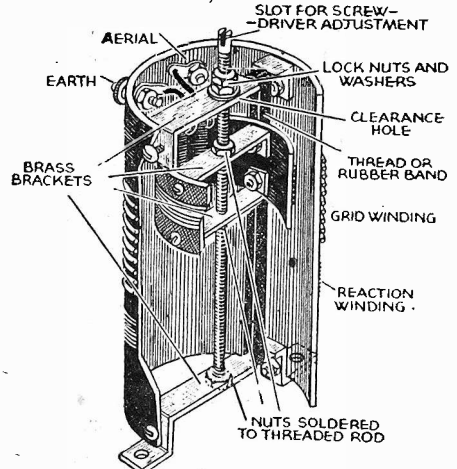
A Simple Meter Stand

THE simplicity and attractiveness of this idea will be evident from the accompanying sketch. I have adapted this fitment to meet many requirements which would otherwise be difficult, and with an element of danger to an unmounted meter. The assembly is self-explanatory, but with regard to the weight, this should be constructed of thick steel plate or lead,

allowing, of course, sufficient room for the locking nuts of the terminals, the shanks of which, in my case, are cut down low. Owing to the moulding being reinforced where the weight-fixing screws are fitted, this must be drilled to accommodate the nuts to avoid fouling the base edge, and possibly causing the fitment to be unstable.—S. R. CHARLES (Morden).

Adjustment for Aerial Coupling

WHILE experimenting with my short-wave receiver I found it advisable to have a form of adjustable aerial coupling. This I did by putting the aerial coil on a separate former which could be made to travel up and down on a threaded rod inside the grid and reaction windings. The materials needed are a piece of threaded rod about 5in. long, four brass strips, and some small nuts and screws. The brass strips are bent and assembled to the formers as shown in the sketch. The right-hand bottom screw in the small former is fixed with the head inside the former and is longer than the others. The projecting part of the screw runs between the elastic band or thread, and this prevents the small former from turning while adjusting the coupling. The protruding part of the threaded rod is slotted with a hacksaw so that adjustment may be carried out with a screw-driver. This considerably lessens the effect caused by the hand being near to the coil.—P. WATSON (Wealdstone).



This sectional view shows a method of adjusting an aerial coupling.

WIRELESS CONSTRUCTOR'S ENCYCLOPEDIA

5/- or 5/6 by post from George Newnes, Ltd., Tower House, Southampton St., Strand, London, W.C.2.

SHOW AFTER

"The Experimenters" Look Back at the Show and Describe Attraction. Naturally, Most of their Time was Spent in Exam

BY now a large number of our readers will have been to Radiolympia and made a careful survey of the exhibits. Those who have been unable to attend will have gained a very good impression of the items which were on show by studying the comprehensive reports which have appeared in these pages.

Nevertheless, we feel justified in giving you some of our impressions of Radiolympia. They may not agree with your own, but you would probably find it impossible to find any two persons whose reactions to the show were identical. Let us say right away that we visited the exhibition as constructors—not as students of handsome electro-mechanical furniture. Our first impressions were that the public showed far less interest in new receivers than they did a few years ago. The time

In short, there must now be a new wave of technical publicity. At the same time, we consider that the time is ripe for a new era in home construction. There are fewer manufacturers of components than there were, but those which remain are able to supply the most exacting requirements of the public. You might call it a survival of the fittest, for the component people who are still in active production are certainly "fit," and we see no reason to suppose that they are other than prosperous. They merit our support—and yours.

Electricity from the Gas Pipe

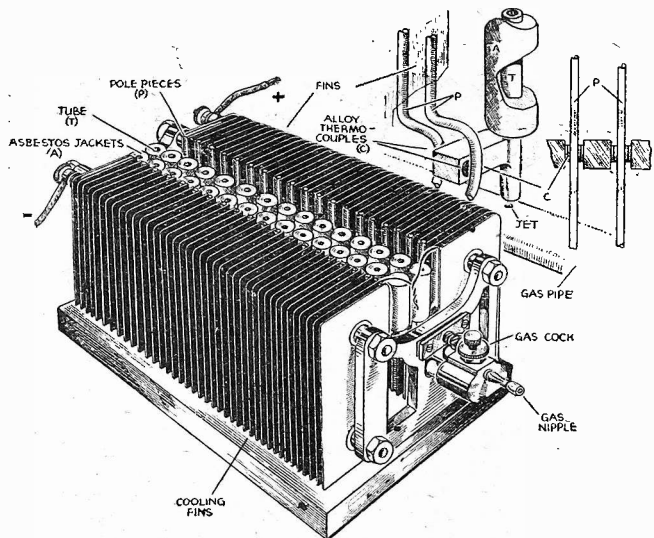
If we were asked what item in the whole of the exhibition fascinated us most, we should find it difficult to give an answer, but there was a unit on the Milnes Radio stand which was definitely intriguing. For years there has been talk of operating a wireless receiver from the gas supply. In most instances any such suggestion has been derided, but at last it has been shown that what might

sensitive galvanometer a reading could be obtained when the metals were exposed to a source of heat. But the principle has always been extremely difficult to apply in practice, because of the infinitesimally small current and voltage which could be produced. By using a number of thermocouples of special design, Milnes have been able to obtain just the effect which has been sought for at least fifteen years.

By the way, please do not write to ask us for constructional details of a device such as this. If we wanted, we could not possibly tell you how to make one. It has taken a very long time to perfect, and a patent has been applied for in connection with it.

Your Own All-wave Coil

On the Wearite-Polar stand we "met" an attractive line in the form of miniature, high-efficiency unscreened coils. They are about $\frac{7}{8}$ in. overall diameter and less than $2\frac{1}{2}$ in. total length, and can be obtained in eight sizes to cover all wavebands from 12 to 2,000 metres. Moreover, the price is only



Something new—the Milnes thermo-charger, which operates from the gas supply.

has arrived when the wireless industry and science is awaiting a new lead from constructors and experimenters.

A New Lead Wanted

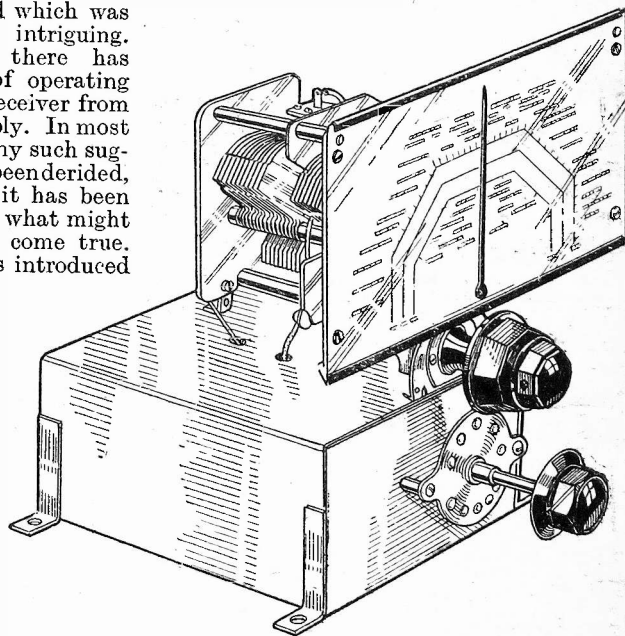
In previous years when new sets were of chief interest because of the novel circuits which they incorporated they attracted a considerable amount of attention; this year visitors could see little beyond attrac-

be called a foolish dream has come true. It is a long time since Milnes introduced their special H.T. accumulator that can be charged from the L.T. accumulator, and this unit has proved its value. But even the L.T. accumulator has to be charged; and that means that a source of electrical power is needed. Thus, a person living out in the wilds was still dependent on a charging station.

But now (or at least very soon, for the device is not ready for marketing in numbers at the moment) you can buy a generator of electricity which operates from the ordinary gas supply. The output is up to 3 amp., which is adequate for charging quite a large-capacity battery. Thus, you light the burners and charge the L.T. accumulator, and then use that to heat the filaments and also to keep the H.T. unit fully charged. Sounds incredible, doesn't it, but it's true. The principle is that of the thermo-couple, which some of you will remember from your school days. Two strips of dissimilar metals are placed together and heat is applied to their junction; as a result, a potential difference is set up between them.

Thermo-couple

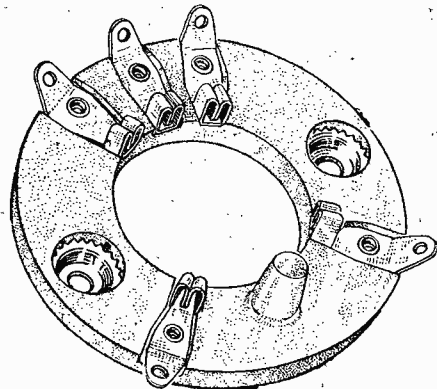
In the school experiments, it was shown that if the metals were connected to a very



The J. B. "Linacore" tuning unit, which has a station-calibrated scale.

Is. 4d. for the smallest sizes, up to Is. 9d. for the largest. They are made to specified inductance values, and can be used in any numbers and combinations to produce a complete multi-waveband tuner covering any desired ranges.

Besides being made in "ordinary" types for aerial and inter-valve tuning, they can be obtained as H.F. transformers or as superhet oscillator coils. In every case complete sets can be matched with complete accuracy by means of midget trimmers, which can be soldered directly to two of the connecting tags. They certainly open up interesting possibilities for the constructor and experimenter.



New Clix ceramic acorn valve holder for 60-degree and 90-degree anode-grid spacing.

tive woodwork and a few—quite a few—well-polished chassis. Many may differ from our views, but we think that manufacturers would do well in future years to concentrate more on the technical features of their sets than merely upon their new tuning controls and scales.

THOUGHTS

Some of the Exhibits that they Found of Particular
 ing Home-Constructor Components and Accessories

10-Metre Tuning

While on the subject of all-wave tuners
 and this subject seemed to permeate the
 (sole show this year) we must mention the
 new Bulgin unit which covers the five

by The Experimenters

bands: 5-10 metres, 12-85 metres in two
 ranges, and the two broadcast bands.
 Quite small, and fitted with high-efficiency
 rotary switch bases, these tuners cost 21s.
 An aerial tuner and 30s. as oscillator coil.
 Both are matched, and a square switch rod
 can be fitted to operate as many units as
 necessary at the same time. We have
 previously stated that all-wave coils of the
 future must include the television band;
 well, here we are. Even if you are not
 particularly interested in television as such, you
 will like to receive the sound portion of the
 transmission, as well as listen to the many

number of years. They have coils, con-
 densers, valveholders, and everything else
 that the short-wave constructor requires;
 their booklet also is interesting, for it shows
 how a standard B.T.S. chassis can be used
 for building a number of alternative re-
 ceivers. Some of these we studied at
 Radiolympia, and found them particularly
 interesting. A special feature is that the
 aluminium chassis is drilled
 and stamped in such a man-
 ner that any component can
 be fitted without further
 drilling being required.

Calibrated Tuning Pack

Jackson Bros. have always
 been friends of the home con-
 structor, so we could not
 resist going over to their
 stand. Most important of
 their new components is the
 "Linacore" all-wave tuning
 pack. It is for use in super-
 het circuits, and comprises
 a complete screened coil
 assembly, tuning from 16.5

to 51, 200 to 550,
 and 800 to 2,000 metres, a double-
 gang condenser, and a rotary
 switch. It has a full-vision tuning
 scale of ample proportions, and
 this is station calibrated. It is
 designed for the popular I.F. of
 465 kc/s. As every unit is ac-
 curately trimmed and adjusted
 before leaving the works, the con-
 struction of a highly-efficient
 modern receiver is as easy as it
 could be.

Varleys had their usual wide
 range of components, but here
 again we were struck by the new
 double-
 gang three-
 bandsuper-
 het coil
 unit, which
 costs 19s.
 6d. The
 short-wave
 range is
 from 18 to
 45 metres,
 this being
 additional
 to the two
 broadcast
 bands.
 There is a
 neat, chas-
 sis-mount-
 ing I.F.
 transformer
 for use

with it, and this is
 fitted with con-
 venient through-
 chassis flexible-lead
 connectors.

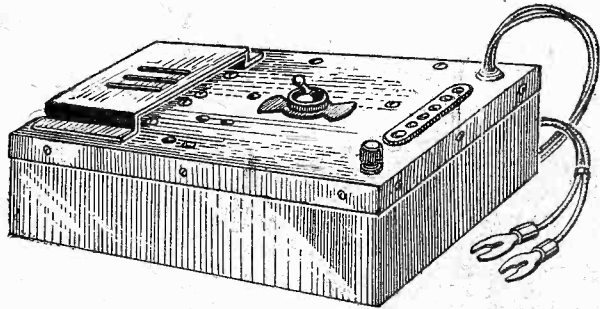
Stopping Static

After spending a considerable amount of
 time at the Belling-Lee stand we found

that there were still many items that we
 had not seen. Anyhow, we did come to the
 conclusion that they have devices for pre-
 venting any and every form of electrical
 interference that could possibly be experi-
 enced, even if the set had to be used in the
 Barking power station. By means of a
 cathode-ray tube, they showed you just
 what interference is, and what effect the
 various suppressor devices have. This
 firm tackled "man-made static" in a very
 thorough manner, and they can be con-
 sidered as among the foremost experts in
 this branch. But they still make millions
 of small connectors, spade terminals, and
 wander plugs which you and we have used
 ever since we took up radio.

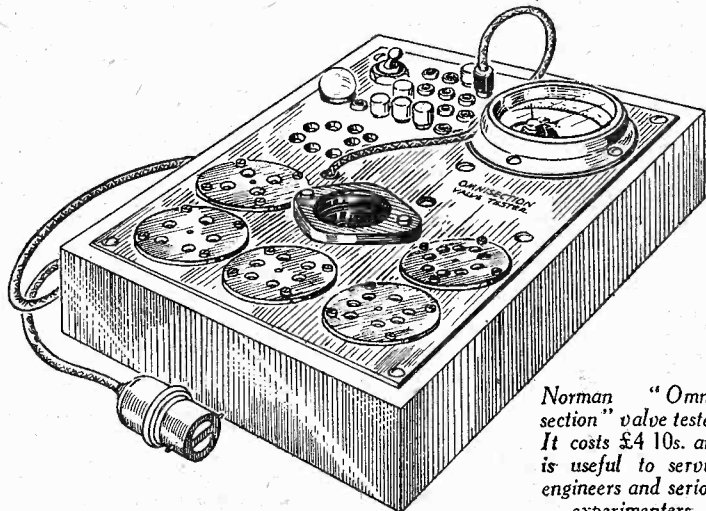
Super Anti-vibration

On the Corsor stand we came across an



New Bulgin vibrator eliminator—it supplies H.T. from the
 L.T. source.

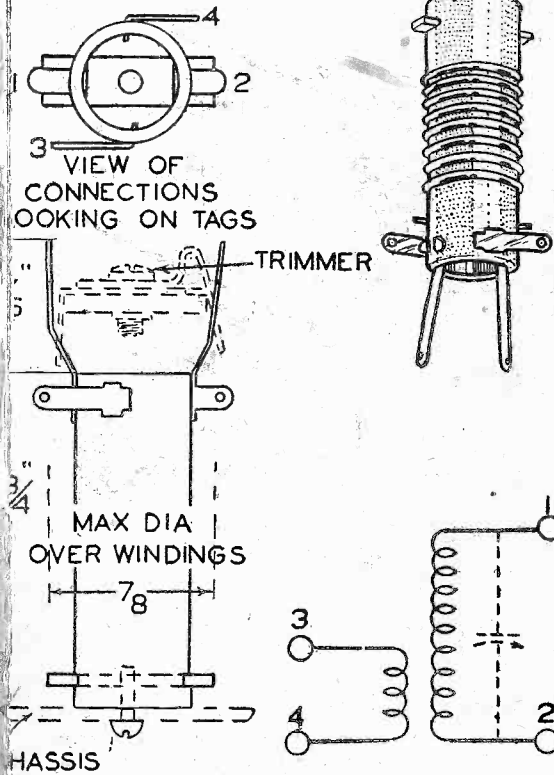
item of interest. We noticed that the gang
 condenser on a particular receiver chassis
 was mounted on a baseplate by means of
 soft-rubber bushes, the base-plate being
 attached to the chassis itself by means of
 similar bushes. Why double-flexible
 mounting? we asked. In answer we were
 shown what would happen if the condenser
 were mounted rigidly. When the set is
 packed for despatch a metal bracket is used
 to protect the condenser, and it holds this
 firmly against the box. The set was
 switched on without removing this bracket,
 the wave-change switch being set to S.W.;
 result: unbelievable howling. Next the



Norman "Omni-
 section" valve tester.
 It costs £4 10s. and
 is useful to service
 engineers and serious
 experimenters.

bracket was removed, as it is intended to be
 when the set is in use. The set was as
 docile as it could be, and there was not the
 slightest suggestion of a howl.

Just shows what a trace of vibration of
 the condenser vanes can do, doesn't it?
 Cheerio.



Principal details and dimensions of the Wearite type P
 coils for use in all-wave sets.

amateurs who are now working around
 metres.

The Chassis—Many Sets

The British Television Supply stand
 occupied a fair share of our attention, for
 the occupiers have been concentrating on
 W. and television components for a

Signal-to-Noise Ratio

If the above title sounds dull and rather uninteresting, I can only say that the subject which it introduces is by no means dull, nor is it confined to technical considerations. The importance of the ratio between the strength of the signal impulses and the H.F. currents representing "noise," or interference, cannot be overstressed, for the most sensitive receiver which it is possible to produce might be no more effective in bringing in weak signals than the simplest two-valver if the ratio is low.

Let me explain that point more fully. Suppose you have a highly-sensitive superhet, the sensitivity of which is given as 5 micro-volts. Without going into the minute details of the position, that means that the set will give a certain "standard" output when the signals applied to the aerial-earth system have an H.F. voltage of 5 micro-volts. A receiver of that type would be classed as extremely good for long-distance reception. Nevertheless, if the "signal strength" of local interference were equivalent to 10 micro-volts, the proper signal would be "swamped." In consequence, the weak, long-distance signal could not be utilised to produce anything

Contrary to Common Ideas, the More Sensitive Receivers are Made the More Difficult is the Problem of Suppressing Interference. One of the Most Useful Methods of Eliminating Interference is by Installing a Special Aerial System, of which Several are Available

By FRANK PRESTON

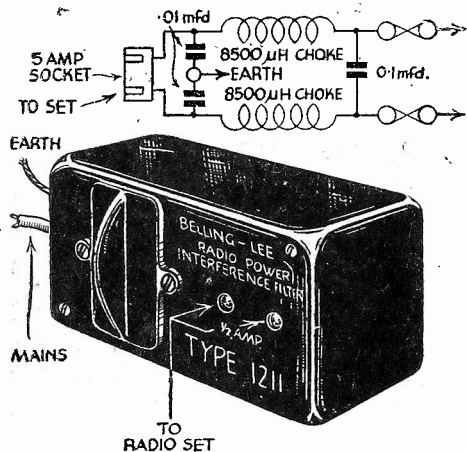
but the reproduction will in most cases be far less satisfactory than that obtained with a less-efficient instrument fed from a moderately-good outdoor aerial.

There are two main reasons for this. The first is that, in the average home with electric wiring, there is always a certain amount of "interference" actually in the house. It might be caused by an imperfect contact between a lamp bulb and its holder, by a bad contact between switch points, or by a vacuum cleaner or other electrical appliance. The second reason is that, when using the unsatisfactory aerial, the receiver volume control has to be turned up much further than is the case when using a more efficient aerial system. As a result, noises generated in the set—by the valves, due to imperfect connections, or even due to the presence of dust—is of greater proportion than when the set is not working "all out."

You might care to try a little experiment. With the receiver connected to an outdoor aerial—an improvised one thrown across the garden will do—tune in a signal that can be

brought up to good strength with the volume control in about its midway position. Next, replace the extended aerial with a length of wire loosely placed around the skirting board. Turn up the volume control, and re-tune if necessary, until the same signal is brought back to approximately its original volume.

The test may prove deceptive, because it might appear that the original volume is not restored even when the control is turned to its maximum point. The reason will probably be that in this case there is so much background noise that signal is partly obliterated. If a few tests are made in connection with the position of the indoor aerial, it is by no means unlikely that it will be found that when the wire is in some positions reception is almost as good as



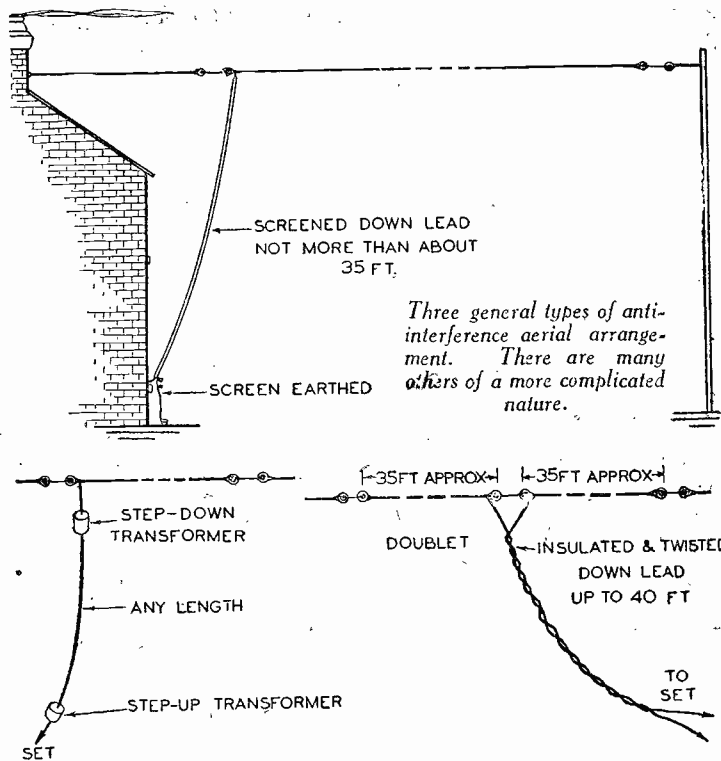
A Belling and Lee interference filter employed on the input circuit to a receiver. Other makes of suppressors such as "Goltone," T.C.C., T.M.C., and Dubilier are available.

approaching entertainment. In fact, a receiver of lower sensitivity would be just as good, if not better, for the purpose.

On the other hand, if the strength of the interference were, say, 2 micro-volts, the signal could probably be received very satisfactorily on the sensitive receiver, whereas it would be unintelligible when using a receiver of lower sensitivity. For example, if the receiver had a rated sensitivity of 20 micro-volts, it would probably not respond to the signal; even if it did the resulting reception would scarcely be of entertainment value.

Aerial—Good or Bad

This brings us to the important question of a suitable aerial system. It is generally considered that a sensitive modern receiver will operate with perfect satisfaction when fed from a short length of wire thrown across the room. Of course, the sensitive receiver will bring in a large number of transmissions when operated in this manner,



Three general types of anti-interference aerial arrangement. There are many others of a more complicated nature.

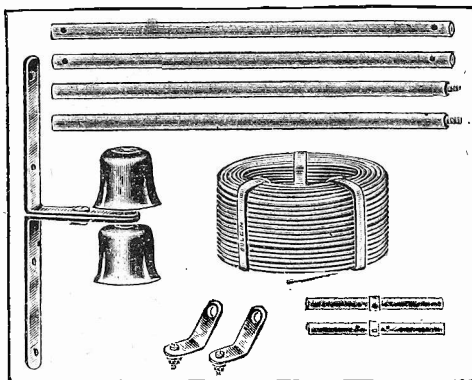
when using the outside wire. In any case, before erecting a permanent indoor aerial it is a good plan to gauge the performance of the set when connected to an outside wire isolated as far as possible from the building.

If an indoor aerial must be employed, it should be placed at the highest convenient point, and preferably just below the roof, for in this position it is at the greatest distance from electrical leads and devices in the house.

Interference Pick-Up

Even a good outdoor aerial will not necessarily be free from interference, but it has the best chance of not being acted upon by interference originating on your own premises. The only part of it which is likely to be within a strong "interference field" is the downlead, and this can easily be screened by using one of the special metal-braided lead-in connectors. This will reduce the signal strength of most stations to a certain extent, but it will be still more effective in eliminating "interference signals," so that the signal-to-noise ratio of the H.F. impulses applied

(Continued on opposite page)



The new Bulgin aerial assembly kit. It is a collapsible dipole intended for ultra-short-wave reception.

A 50,000-MILES TOUR

AS a result of orders for sets taken at Radiolympia, Mr. R. Moxham, G.E.C. radio engineer, is undertaking a 50,000-miles tour, and the main object of his trip will be to give instructions and advice on service to G.E.C. dealers and agents in all parts of the world. Wherever new business is being done by G.E.C. Mr. Moxham will visit the area, no matter how remote it may be.

"We claim that we can give service after sales in any part of the world," said Mr. Moxham, "and my trip is intended to ensure that that claim is literally true."

The journey will not be a new experience for him, for he carried out a similar tour a few years ago. In seven months he travelled 50,000 miles (10,000 of them by air) and visited Palestine, Egypt, East and South Africa, India, Burma, Malay, and Dutch East Indies. As well as instructing service people, Mr. Moxham will also test reception under all conditions.

SIGNAL-TO-NOISE RATIO

(Continued from previous page)

to the receiver will be noticeably increased.

There are, of course, many special anti-interference aerial systems on the market, and the installation of one of these is amply worth while in many situations, especially when the house is near to such sources of interference as picture houses, electric signs, trolley buses and trams. In passing it should be mentioned that certain praiseworthy municipalities have fitted their public-service vehicles with interference-suppression devices.

Impedance-matching Devices

One principle which has been widely employed in the design of anti-interference aerials is that of fitting a step-down transformer between the horizontal span of the aerial and the lead-in, and a corresponding step-up transformer between the lead-in and the set. The lead-in is screened, but signal loss due to the proximity of the screen and the lead-in is infinitesimally small because of the low voltage of the signal transmitted along the wire. A number of the more-recent types of anti-interference aerial are of the doublet type, with twin lead-in and either with or without matching transformers. The design of such systems for all-wave working is somewhat involved, and the construction cannot well be tackled by the average amateur. It is well, therefore, that several manufacturers can supply the necessary fittings.

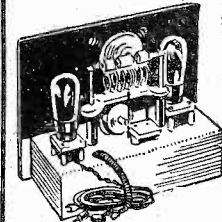
A simple doublet aerial consisting of two end-to-end horizontal spans about 35ft. long each, and twisted wire lead-in is very effective in reducing interference in milder cases. The lead-in wires must, of course, be insulated from each other and the aerial itself, as with all anti-interference systems, should be erected as high as possible. By this means it is lifted out of the interference field, and static picked up by the lead-in is almost completely cancelled out due to the "balanced" conductors. Although most widely employed for S.W. reception, the doublet is equally good on the broadcast bands; it is certainly worth a trial if fairly slight electrical interference is experienced.

Well known among makers of special anti-interference aerial devices are Ward and Goldstone, Bulgin, and Belling-Lee; any of these firms will supply details of their equipment.

PETO SCOTT EVERYTHING RADIO—CASH C.O.D. or EASY TERMS

Peto-Scott PORTABLE 5-metre TRANSCEIVER KIT

TRANSMITS and RECEIVES



For the transmission and reception of telephony within the range of 10-20 miles. This unit brings the opportunity to indulge in transmitting research work within the means of every keen amateur experimenter. Entirely self-contained and available in portable cabinet with collapsible carrying handle.

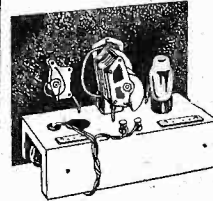
KIT "A" comprising complete kit of parts including ready drilled panel and chassis. Less valves and cabinet. Cash or C.O.D. £2:12:6 Or 5/- down and 11 monthly payments of 4/0.

N.B.—A Post Office Transmitting licence is necessary for the operation of this unit. We will be pleased to furnish further details as to procedure to be followed in applying for a licence.

1-valve ALL-WAVE KIT

Ideal for the All-Wave Beginner!

Save 11/-—buy a Complete Kit.



● A unique All-Wave single-valve combining simplicity of assembly with extraordinary efficiency and low cost.

● Waveranges 18-52, 200-550, 900-2,000 metres.

● Ready assembled tuning-unit incorporates all windings and switching and needs only six simple connections for incorporation.

KIT "A" comprises complete kit of parts for building, including ready-drilled steel panel and chassis, drawings and instructions, less valves and cabinet.

List Value £2:0:10 OUR PRICE 29/6

Or 2/6 down and 11 monthly payments of 2/9

KIT "B" with valves £1:13:3 or 3/- down and 11 monthly payments of 3/1.

NEW 7-watt HIGH-FIDELITY 9 valve ALL-WAVE SUPERHET A.C. MAINS

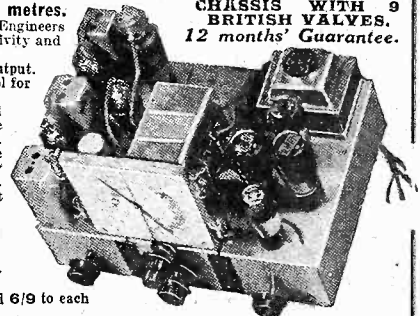
4 WAVEBANDS: 10-21, 20-53, 200-550, 800-1,000 metres. The first British Octal Valve Superhet! Another triumph for Peto-Scott Engineers selectivity on every wave-band.

● Screened R.F. and I.F. valves. ● 7-watt undistorted high-fidelity output. ● Large dial calibrated stations and metres. ● Volume and tone control for radio and grammo. ● Rationalised tri-unit construction. Circuit comprises 9 octal-base British valves, pre-I.F. selector coupled to radio frequency amplifier with transformer coupled to octal triode hexode frequency changer, band-pass L.F. transformer coupled to 2 I.F. amplifiers in cascade, which are bandpass transformer coupled to double diode triode, providing rectification, automatic volume control and low frequency amplification following phase reversing valve feeding 2 L.F. power pentodes, providing 7 watts undistorted fidelity output. Highest grade components. Every chassis rigidly tested. Cash or C.O.D. £11:19:6

Or 27/6 down and 11 monthly payments of 21/3.

HIGH-FIDELITY Model C.750 Field-Energised Moving-Coil SPEAKER for above. Cash or C.O.D. £3/15/-, or add 7/6 to deposit and 6/9 to each monthly payment.

CHASSIS WITH 9 BRITISH VALVES. 12 months' Guarantee.



1938 Stentorian SPEAKERS

MODEL 38S (illustrated). Further improvement on the famous W.B. Senior 37S. New higher flux density and increased sensitivity. Microdode device for matching any receiver. Cash or C.O.D. Carr. Pd. £2/2/0 or 2/6 down and 11 monthly payments of 4/-.

MIDGET MODEL 38M. A new thoroughly efficient permanent magnet moving-coil speaker in extremely compact form. Complete with 3-ratio transformer. Cash or C.O.D. Carr. Pd. 17/6 or 2/8 down and 7 monthly payments of 2/6.

W.B. "ELLIPSIS" MODEL. With elliptical cone for receivers where height of speaker opening restricted. Nipermag magnet, Whiteley speech coil, Microdode universal matching device. Cash or C.O.D. Carr. Pd. £2/2/0 or 2/8 down and 11 monthly payments of 4/-.

The PILOT "SHORT WAVE EXPERIMENTER"

... a booklet of 24 pages, featuring 9 new PILOT Short-Wave Kits, one of which is described below. Each of these designs incorporates a standard chassis and panel. Commencing with a 1-valve Adapter-Converter, you may, when you please, build this up, on the same chassis, into varying forms of 1, 2, 3, and 4-Valve Short-Wave Receivers. Post coupon now for your free copy of this 6d. booklet.

1 VALVE SHORT WAVE

MODEL 140 (illustrated). Rectifying detector, direct coupled to aerial-earth circuit, series aerial condenser ensures efficient operation on all wavelengths. Employs 4-pin coil. Bandsread tuning. KIT "A", less valves, coils, cabinet. List value £2/0/4. Cash or C.O.D. £1:9:6 Or 2/6 down and 11 monthly payments of 2/9. KIT "B", with 4 coils and valve, 4/3, or 4/9 down.

All P.O.'s should be crossed and made payable to the Peto-Scott Co., Ltd. All currency should be registered.

NEW BROADCAST S.G.3 Pentode Kit

● A proved Screened Grid, Detector and Pentode circuit with an amazing performance. ● Powerful reception of British and Foreign programmes. ● Waverange 200-2,100 metres. ● Steel chassis. ● Slow motion tuning, illuminated wavelength dial. ● Only 9 m/a H.T. consumption.

KIT "A" Comprising complete kit of parts for building, including drawings and instructions, less valves, cabinet, speaker, and batteries. Cash or C.O.D. £1:17:6

Or 2/6 deposit and 11 monthly payments of 3/6.

KIT "B" with Valves £3:0:0 or 5/- down and 11 monthly payments of 5/6.

P.A. AMPLIFIER 6-7 Watts High Fidelity

General Purpose Amplifier to earn you extra money!

MODEL A.E. 67—4 valves; Triode, Resistance Transformer-coupled to 2 triple Grid Power Amplifier Valves, in Push-Pull. Full Wave Rectifier. Special precautions have been taken in design to avoid parasitic oscillation in output stage. Fixed and pleasing tone balance. Pressed Steel chassis. Tapped and Screened Mains Transformer. Electrolytic condensers. Volume Control. Mains consumption approx. 60 watts. With microphone, speech easily heard at over 500 feet. Tapped for A.C. Mains 200-250 volts. 40/100 cycles. Output 6-7 watts undistorted. Complete with Valves. Ready to connect to microphone or pick-up. Cash or C.O.D. £4:10:0

Or 7/6 down and 11 monthly payments of 8/6.

POST THIS COUPON NOW FOR TWO FREE BOOKS

Please send me entirely free, (a) The Pilot Short Wave Experimenter described above (priced at 6d.) and (b) The Peto-Scott Radio and Television Catalogue, illustrating the Complete Range of Peto-Scott 1935 Productions. I enclose 2d. (stamps) to cover postage.

PETO-SCOTT CO., LTD., 77 (Pr.W.3.), City Road, London, E.C.1. CHISOLD 9875-6-7 West-End: 62 (Pr.W.3.), High Holborn, London, W.C. Holborn 3248

NAME

ADDRESS

EST. 1919

Practical and Amateur Wireless BLUEPRINT SERVICE

PRACTICAL WIRELESS	No. of	Three-valve : Blueprints, 1s. each.	
Date of Issue. Blueprint	Blueprint	Experimenter's Short-Wave Three (SG, D, Pow)	
CRYSTAL SETS			
Blueprint, 6d.			
1937 Crystal Receiver	9.1.37		PW30A
STRAIGHT SETS. Battery Operated.			
One-Valve : Blueprints, 1s. each.			
All-wave Unipen (Pentode)	—		PW31A
Two-valve : Blueprints, 1s. each.			
Four-range Super Mag Two (D, Pen)	11.8.34		PW36B
The Signet Two	29.8.36		PW76
Three-valve : Blueprints, 1s. each.			
The Long-Range Express Three (SG, D, Pen)	24.4.37		PW2
Selectone Battery Three (D, 2 LF (Trans))	—		PW10
Sixty Shilling Three (D, 2 LF (RC & Trans))	—		PW34A
Leader Three (SG, D, Pow)	22.5.37		PW35
Summit Three (HF Pen, D, Pen)	8.8.34		PW37
All Pentode Three (HF Pen, D (Pen), Pen)	29.5.37		PW39
Hall-mark Three (SG, D, Pow)	12.6.37		PW41
Hall-mark Cadet (D, LF, Pen (RC))	16.3.35		PW48
F. J. Camm's Silver Souvenir (HF Pen, D (Pen), Pen) (All-Wave Three)	13.4.35		PW49
Genet Midget (D, 2 LF (Trans))	June '35		PML
Cameo Midget Three (D, 2 LF (Trans))	8.6.35		PW51
1936 Sonotone Three-Four (HF Pen, HF Pen, Westector, Pen)	17.8.35		PW53
Battery All-Wave Three (D, 2 LF (RC))	—		PW55
The Monitor (HF Pen, D, Pen)	—		PW61
The Tutor Three (HF Pen, D, Pen)	21.3.36		PW62
The Centaur Three (SG, D, P)	—		PW64
The Gladiator All-Wave Three (HF Pen, D (Pen), Pen)	29.8.36		PW66
F. J. Camm's Record All-Wave Three (HF Pen, D, Pen)	31.10.36		PW69
The "Colt" All-Wave Three (D, 2 LF (RC & Trans))	5.12.36		PW72
Four-valve : Blueprints, 1s. each.			
Sonotone Four (SG, D, LF, P)	1.5.37		PW4
Fury Four (2 SG, D, Pen)	8.5.37		PW11
Beta Universal Four (SG, D, LF, Cl. B)	—		PW17
Nucleon Class B Four (SG, D (SG), LF, Cl. B)	6.1.34		PW34B
Fury Four Super (SG, SG, D, Pen)	—		PW34C
Battery Hall-Mark 4 (HF Pen, D, Push-Pull)	—		PW46
F. J. Camm's "Limit" All-Wave Four (HF Pen, D, LF, P)	26.9.36		PW67
Mains Operated.			
Two-valve : Blueprints, 1s. each.			
A.C. Twin (D (Pen), Pen)	—		PW18
A.C.-D.C. Two (SG, Pow)	—		PW31
Selectone A.C. Radiogram Two (D, Pow)	—		PW19
Three-valve : Blueprints, 1s. each.			
Double-Diode-Triode Three (HF Pen, DDT, Pen)	—		PW23
D.C. Ace (SG, D, Pen)	—		PW25
A.C. Three (SG, D, Pen)	—		PW29
A.C. Leader (HF Pen, D, Pow)	7.4.34		PW35C
D.C. Premier (HF Pen, D, Pen)	31.3.34		PW35B
Ubique (HF Pen, D (Pen), Pen)	28.7.34		PW36A
Armada Mains Three (HF Pen, D, Pen)	—		PW38
F. J. Camm's A.C. All-Wave Silver Souvenir Three (HF Pen, D, Pen)	11.5.35		PW50
"All-Wave" A.C. Three (D, 2LF (RC))	17.8.35		PW54
A.C. 1936 Sonotone (HF Pen, H.F. Pen, Westector, Pen)	—		PW56
Mains Record All-Wave 3 (HF Pen, D, Pen)	5.12.36		PW70
Four-valve : Blueprints, 1s. each.			
A.C. Fury Four (SG, SG, D, Pen)	—		PW20
A.C. Fury Four Super (SG, SG, D, Pen)	—		PW34D
A.C. Hall-Mark (HF Pen, D, Push-Pull)	24.7.37		PW45
Universal Hall-Mark (HF Pen, D, Push-Pull)	9.2.35		PW47
SUPERHETS.			
Battery Sets : Blueprints, 1s. each.			
£5 Superhet (Three-valve)	5.6.37		PW40
F. J. Camm's 2-valve Superhet Two-valve	13.7.35		PW52
F. J. Camm's £4 Superhet	—		PW58
F. J. Camm's "Vitesse" All-Wave (5-valver)	27.2.37		PW75
Mains Sets : Blueprints, 1s. each.			
A.C. £5 Superhet (Three-valve)	—		PW43
D.C. £5 Superhet (Three-valve)	1.12.34		PW42
Universal £5 Superhet (Three-valve)	—		PW44
F. J. Camm's A.C. £4 Superhet 4	31.7.37		PW59
F. J. Camm's Universal £4 Superhet 4	—		PW60
"Qualitone" Universal Four	16.1.37		PW73
SHORT-WAVE SETS.			
Two-valve : Blueprint, 1s.			
Midget Short-wave Two (D, Pen)	—		PW38A

These Blueprints are drawn full size. Copies of appropriate issues containing descriptions of these sets can in some cases be supplied at the following prices, which are additional to the cost of the blueprint. A dash before the Blueprint Number indicates that the issue is out of print.

Issues of Practical Wireless .. 4d. Post Paid.
Amateur Wireless .. 4d. " "
Practical Mechanics .. 7d. " "
Wireless Magazine .. 1/3 " "

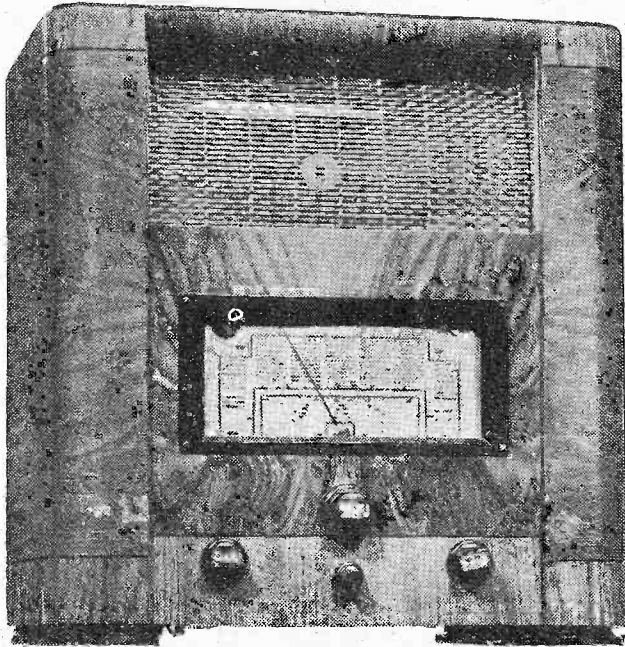
The index letters which precede the Blueprint Number indicates the periodical in which the description appears: thus PW refers to PRACTICAL WIRELESS, AW to Amateur Wireless, PM to Practical Mechanics, WM to Wireless Magazine.

Send (preferably) a postal order to cover the cost of the blueprint and the issue (stamps over 6d. unacceptable), to PRACTICAL AND AMATEUR WIRELESS BLUEPRINT Dept., George Newnes, Ltd., Tower House, Southampton Street, Strand, W.C.2.

Economy A.C. Two (D, Trans) A.C.	—	WM286
Unicorn A.C.-D.C. Two (D Pen)	—	WM394
Three-valve : Blueprints, 1s. each.		
Home-Lover's New All-electric Three (SG, D, Trans) A.C.	—	AW383
S.G. Three (SG, D, Pen) A.C.	—	AW390
A.C. Triodyne (SG, D, Pen) A.C.	19.8.33	AW399
A.C. Pentaquester (HF Pen, D, Pen) A.C.	23.6.34	AW439
Mantovani A.C. Three (HF Pen, D, Pen) A.C.	—	WM374
£15 15s. 1936 A.C. Radiogram (HF, D, Pen)	Jan. '36	WM401
Four-valve : Blueprints, 1s. 6d. each.		
All-Metal Four (2 SG, D, Pen)	July '33	WM326
Harris Jubilee Radiogram (HF Pen, D, LF, P)	May '35	WM386
SUPERHETS.		
Battery Sets : Blueprints, 1s. 6d. each.		
Modern Super Senior	—	WM375
Varsity Four	Oct. '35	WM395
The Request All-Waver	June '36	WM407
1935 Super Five Battery (Superhet)	—	WM379
Mains Sets : Blueprints, 1s. 6d. each.		
1934 A.C. Century Super A.C.	—	AW425
Heptode Super Three A.C.	May '34	WM350
"W.M." Radiogram Super A.C.	—	WM366
1935 A.C. Stenode	Apr. '35	WM385
PORTABLES.		
Four-valve : Blueprints, 1s. 6d. each.		
Midget Class B Portable (SG, D, LF, Class B)	20.5.33	AW389
Holiday Portable (SG, D, LF, Class B)	1.7.33	AW393
Family Portable (HF, D, RC, Trans)	22.9.34	AW447
Two H.F. Portable (2 SG, D, QP21)	June '34	WM363
Tyers Portable (SG, D, 2 Trans)	—	WM367
SHORT-WAVE SETS—Battery Operated.		
One-valve : Blueprints, 1s. each.		
S.W. One-valve converter (Price 6d.)	—	AW329
S.W. One-valve for America	23.1.37	AW429
Rome Short-Waver	—	AW452
Two-valve : Blueprints, 1s. each.		
Ultra-short Battery Two (SG, det., Pen)	Feb. '36	WM402
Home-made Coil Two (D, Pen)	—	AW440
Three-valve : Blueprints, 1s. each.		
World-ranger Short-wave 3 (D, RC, Trans)	—	AW355
Experimenter's 5-metre Set (D, Trans, Super-regen)	30.6.34	AW438
Experimenter's Short-wave (SG, D, Pen)	Jan. 19, '35	AW463
The Carrier Short-waver (SG, D, P)	July '35	WM390
Four-valve : Blueprints, 1s. 6d. each.		
A.W. Short-wave World-Beater (HF Pen, D, RC, Trans)	—	AW436
Empire Short-Waver (SG, D, RC, Trans)	—	WM313
Standard Four-valver Short-waver (SG, D, LF, P)	Mar. '35	WM383
Superhet : Blueprint, 1s. 6d.		
Simplified Short-wave Super	Nov. '35	WM397
Mains Operated.		
Two-valve : Blueprints, 1s. each.		
Two-valve Mains short-waver (D, Pen) A.C.	—	AW453
"W.M." Band-spread Short-waver (D, Pen) A.C.-D.C.	—	WM368
"W.M." Long-wave Converter	—	WM380
Three-valve : Blueprint, 1s.		
Emigrator (SG, D, Pen) A.C.	—	WM352
Four-valve : Blueprint, 1s. 6d.		
Standard Four-valve A.C. Short-waver (SG, D, RC, Trans)	Aug. '35	WM391
MISCELLANEOUS.		
Enthusiast's Power Amplifier (1/8 (1/6))	June '35	WM387
Listeners' 5-watt A.C. Amplifier (1/6)	—	WM392
Radio Unit (2v) for WM392	Nov. '35	WM398
Harris Electrogram (battery amplifier) (1/-)	Dec. '35	WM399
Dc-Luxe Concert A.C. Electrogram	Mar. '36	WM403
New Style Short-Wave Adapter (1/-)	June '35	WM388
Trickle Charger (6d.)	Jan. 5, '35	AW462
Short-Wave Adapter (1/-)	Dec. 1, '34	AW456
Superhet Converter (1/-)	Dec. 1, '34	AW457
B.L.D.L.C. Short-wave Converter (1/-)	May '36	WM405
Wilson Tone Master (1/-)	June '36	WM406
The W.M. A.C. Short-Wave Converter (1/-)	—	WM403

SEEN AT THE SHOW

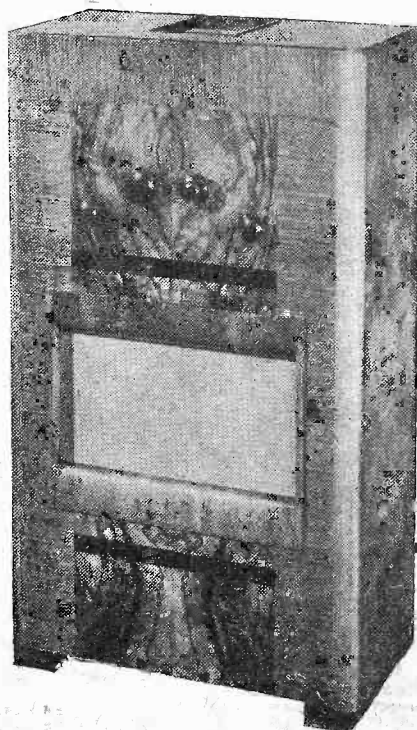
Below is seen the "His Master's Voice" Model 499 A.C., a new six-valve all-world receiver which is being marketed at 14 guineas. This model incorporates many interesting features, including tuning knobs of an entirely new type, and fluid light tuning.



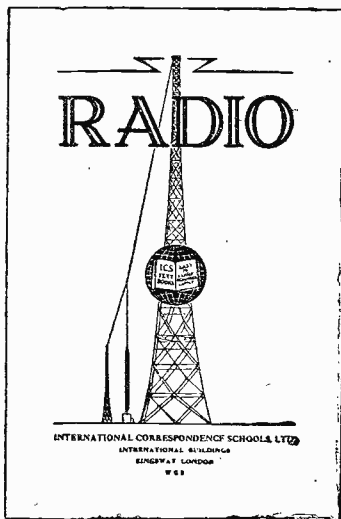
Leonora Corbett, star of "Sarah Simple" at the Gaiety Theatre, wearing one of the "Merry Widow" hats, when she visited the W.B. Radio stand at Radiolympia. Below is the Bush All-wave Console. There are two alternative chassis, the sets being known as models S.U.G. 43 and D.U.G. 43.



Fred Archer was an attraction at Radiolympia. All day long he sat on the H.M.V. stand looking like a wax figure. He has the ability of sitting perfectly still with immobile features, and visitors often wondered whether he was alive or not.



A New 40-Page Booklet—Free



This booklet gives particulars of the many opportunities open to trained men engaged in the Radio industry. It also gives full information about the specialized instruction offered by the I.C.S. This instruction includes American broadcasting as well as British wireless practice, and provides ambitious men with a thoroughly sound training.

Here are the I.C.S. Courses:

Complete Radio Engineering
Complete Radio
Radio Servicemen's
Elementary Radio
Radio Service and Sales
Television

Preparatory Courses for:

I.E.E. Graduateship Exam.

I.W.T. Exams.

C. & G. Exams. in Radio Communication.

P.M.G. Certifs. in Wireless Telegraphy.

The Complete Radio Course covers equipment and radio principles as well as practice.

Efficient Servicing is of first importance to every wireless dealer and his assistants.

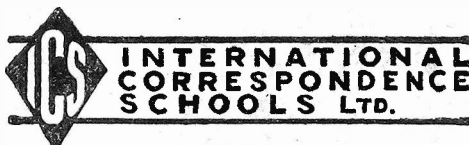
The Service and Sales Course enables the salesman to hold his own with the most technical of customers.

Television will soon be a tremendous branch of the industry. Our Course deals adequately with this subject.

I.C.S. Courses do not cost more than those of other reputable schools teaching by correspondence; indeed, in some cases they cost less. An important consideration lies in the fact that all I.C.S. instruction books and special textbooks are supplied without extra charge. The students of many postal concerns have to buy the books required, that often involving an additional expenditure of several pounds.

SEND FOR OUR "RADIO" BOOKLET

And, if you wish, ask for our free advice.



**Dept. 94, International Buildings,
 Kingsway, London, W.C.2.**

RADIO CLUBS AND SOCIETIES

Club Reports should not exceed 200 words in length and should be received First Post each Monday morning for publication in the following week's issue.

The Golders Green and Hendon Radio and Scientific Society

FOR the twelfth year in succession this society recently held a direction finding meeting, culminating in the Annual Open Competition, which was won by the Southall Radio Society, represented by Mr. Swan. This position was very closely contested there being only a difference of 2 per cent. in the marks of the first and fourth positions.

The Judges were Group Captain G. Straun Marshall, R.A.F., Lieut.-Col. H. Ashley Scarlett, D.S.O., and Mr. H. B. Dent. Mr. P. H. Barfield, of the National Physical Laboratories, after watching the operations closely, examined the apparatus used, expressing surprise at the very high standard of workmanship and design exhibited. Elasticity in design was strikingly demonstrated by the fact that the wavelength used was at very short notice altered from 3,750 kc/s to 7,500 kc/s, but results handed in showed an average error of only 1.25 degrees.

Apart from the increased frequency a new type of transmitting aerial was used,

consisting of a single brass rod about 2½ in. in diameter and about 30ft. high. A short feeder coupled this to the power amplifier tank coil.

General remarks on the contest were as follow:

1. A considerable increase of outside interference made observations at times most difficult.
2. Field strength of signals was greater.
3. Sharpness of minima improved.
4. Some competitors reported a distortion of time zero when body was close to or in between the transmitter and the receiver aerial; others were unable to note such an effect.
5. Most receivers used one stage of H.F., some using push-pull H.F. amplification.
6. Two groups situated with a main line of telegraph wires running towards the transmitter were unable to pick up any signals whilst so situated.

Wallasey Junior Radio Society

A MEETING of this newly formed society will be held at the address given below on Wednesday, September 15th, at 7.30 p.m. The society is intended for young persons under the age of 18, although the presence of a few "old hands" as honorary members will be welcomed. The society will be a development of that which has been running in the Grammar School here for about a year.—A. M. Wilding, 2, Wallacre Road, Wallasey, Cheshire.

Important Broadcasts of the Week

NATIONAL (261.1 m. and 1,500 m.)
 Wednesday, September 15th.—Opping 'O'iday, an excursion to the hop gardens of Kent.
 Thursday, September 16th.—The Pursuit of Pleasure: Three centuries of fun, by Lance Sieveking.
 Friday, September 17th.—Concert Party programme, from the Pier Pavilion, Skegness.
 Saturday, September 18th.—Promenade Concert, from Queen's Hall, London.

REGIONAL (342.1 m.)
 Wednesday, September 15th.—Dance Music relayed from Germany.
 Thursday, September 16th.—Promenade Concert, from Queen's Hall, London.
 Friday, September 17th.—The Belle of New York, a musical comedy.
 Saturday, September 18th.—Music Hall programme.

MIDLAND (296.2 m.)
 Wednesday, September 15th.—Choral and Organ programme, from Southwell Minster.
 Thursday, September 16th.—Bum—To Come: a nonsensical nightmare, by C. H. Averill and Alan Fitton.
 Friday, September 17th.—Play That Again—vocal programme.
 Saturday, September 18th.—Band concert.

NORTHERN (449.1 m.)
 Wednesday, September 15th.—A violin recital.
 Thursday, September 16th.—A Becksides Chronicle—Dying, We Live, by Zachariah Briggus.
 Friday, September 17th.—Children's Variety programme for Grown-ups.
 Saturday, September 18th.—Progress: A story.

WEST OF ENGLAND (285.7 m.)
 Wednesday, September 15th.—The Children's Art Exhibition at Bath: A talk by Lord Waldegrave.
 Thursday, September 16th.—The Incorporation of Weston-super-Mare, a recorded summary of the ceremony in Grove Park.
 Friday, September 17th.—Choral programme.
 Saturday, September 18th.—West Country Composers: Jack Knapman—instrumental programme.

WELSH (373.1 m.)
 Wednesday, September 15th.—Vigil, a radio play, by Emyln Williams.
 Thursday, September 16th.—Lleislan's Blynyddoedd—1897 (A Welsh Scrapbook of 1897).
 Friday, September 17th.—Instrumental programme.
 Saturday, September 18th.—Concert Party programme, from the Pavilion Theatre, Rhyl.

SCOTTISH (391.1 m.)
 Wednesday, September 15th.—Gaelic Concert.
 Thursday, September 16th.—Scots Songs.
 Friday, September 17th.—Programme of Piping.
 Saturday, September 18th.—Scottish Dance Music.

NORTHERN IRELAND (307.1 m.)
 Wednesday, September 15th.—Eye-witness account of Belfast Championship Dog Show.
 Thursday, September 16th.—Instrumental concert.
 Friday, September 17th.—Band concert.
 Saturday, September 18th.—Dance Band programme from the Grand Central Hotel, Belfast.

LOUDSPEAKER EXPERIMENTS

(Continued from page 6)

fact, often prove a worthwhile change. Although we have dealt previously with such details as an inclined baffle, and tone resonators inside the cabinet, there are other features which may not be so obvious. It will be noted, for instance, that the effect of different notes in the musical scale is more pronounced at certain distances, and that the high notes are directed

DOUBLE-CURVE REFLECTOR ENSURES EVEN DISTRIBUTION

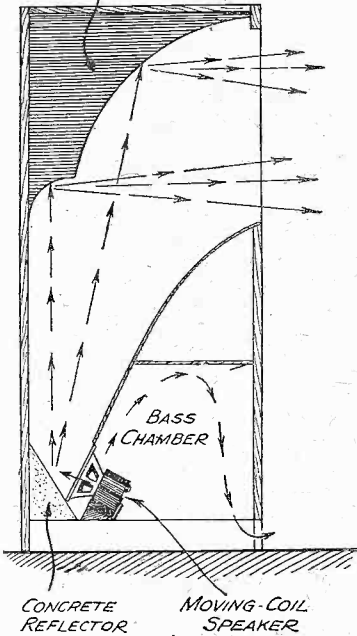


Fig. 6.—The well-known Voigt loudspeaker, in which the low notes are made to follow a longer path to the listener than the high notes.

straight forward in a beam, whilst the lower notes radiate or flow outwards in all directions. In this way, if you are listening at one side of the cabinet some of the higher notes are lost. A cone-shaped inset to the speaker baffle, with the apex pointing in towards the speaker will serve to direct the higher notes outwards but will not always produce an even radiation. If two loudspeakers are employed, one small one for the high notes and a large one for the lower notes, it may prove interesting to place the former directly in the centre of the baffle, and the latter pointing downwards so that the sound has to issue from beneath the cabinet. The height of the cabinet from the floor may be found by experiment, and in most cases will depend upon the volume of the output which is normally employed. The greater the volume the nearer to the floor must the speaker be to avoid swamp- ing the high notes.

NEW PORTADYNE RECEIVER

A VERY interesting model in the Portadyne range is the A58. This is a 5-valve (including rectifier) all-wave superhet priced at 11 guineas. It is fitted with the special Portadyne Rotomatic tuning dial, which has a separate scale for each of the three wave-bands. As only the stations on the particular band to which the receiver is switched are visible on the dial at one time, tuning is greatly simplified. In our issue of September 4th, page 627, we gave a photograph of this receiver, but inadvertently mentioned that it could be seen on Stand 104—this should read Stand 18.

TOPICAL NOTES

A Cause of Instability

INSTABILITY in short-wave receivers sometimes arises through intervalve coupling between one heater and the next; this can be overcome by earthing the appropriate heater through a condenser to chassis. It is usually sufficient to connect a condenser to a point on the heater chain between the two interacting valves, although it is sometimes necessary to shunt a heater with two condensers in series and earth the mid-point. The heater receiving such attention should be the one where the trouble arises and can only be found by trial. As this type of instability only appears at very low wavelengths, a small condenser must be used; .0001 to .001 will be found

suitable. It must, of course, be a non-inductive type, preferably flat.

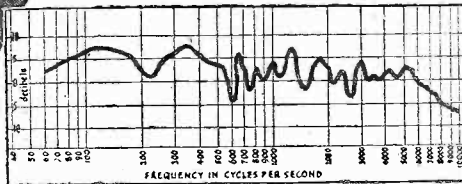
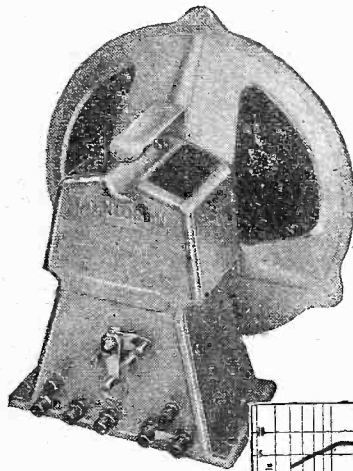
A Television Refinement

AN interesting television refinement seen at Olympia was a circuit arrangement to lessen interference. It consists of a valve used as a limiting device which prevents the screen (or any part of it) from being made brighter than the brightest part of the picture. Thus, if interference is imposed on an area that is the maximum brightness, it does not appear. If it is imposed on a grey or black section, it can drive it to white, but no further, so the dazzling effect caused by interference is completely eliminated.

Manchester Radio Exhibition

The *Evening Chronicle* Radio Exhibition, which opened at the City Hall, Deansgate, Manchester, on September 14th, remains open till September 25th.

Satisfied with your reproduction?
WAIT TILL YOU HEAR THIS!



Make no mistake—here is no mere superficial alteration in design.

An observant glance at speech coil, centring device, and cone will show you a few of the differences; and two or three minutes of listening will show you many more! Another 600 cycles of top response—complete absence of 300 cycle peaks—slight gain in average sensitivity—it takes a keen ear to analyse this new smoothness and fidelity, but no ear can fail to detect it!

Prices (at present) remain at the old low level—17/6 to 42/-. Get your new Stentorian speaker now!



Read Mr. Camm's Opinion

"Good and bad sets will be improved by it. It is an important advance in speaker technique."

J. J. Camm

ANOTHER NEW
Stentorian
DIFFERENT—& BETTER STILL

WHITELEY ELECTRICAL RADIO CO., LTD. (technical dept.), MANSFIELD, NOTTS.

LETTERS FROM READERS

The Editor does not necessarily agree with the opinions expressed by his correspondents. All letters must be accompanied by the name and address of the sender (not necessarily for publication).

A Fine Log from S. Devon

SIR,—As reports from this district seem few and far between, I am taking the liberty of enclosing my log of stations received on the "American One-Valver," plus pentode output. Between May 25th and August 22nd I have received, among others, the following stations: SU1CH, VE1CR, W4CBY, W3BBO, W4EEG, HA8N, W3DDD, W3DLL, W8CNY, SUIRO, LX1TW, I1TKM, F3DN, F8PV, SP1HH, CE3EW, W3EMM, CO2LY, W4AH, LA1G, SU1KG, SU1SG, CT1AY, W8JOE, W3FAM, W4AZK, W5CO, VE1JA, W8AZU, VE1LR, SUZ, W4BMR, W3MD, VE3ED, CO6OM, W3MB, W4BY, W4DIS, PAZHN, ON4SS, W3CHE, SPW, Y12BA, W4TO, W4DZB, W9GED, VE1DC, I1FAG, K4SA, SM5SV, SM5WK, W4CRA, W4DLH, W3APO (Portable), W3CUD, W3LN, CO2WW, W4GW, W3EYC, LA5N, CX2AX, W3AH, VE1GP, W3FIH, W9ZDO, TI2RC, CO7VT, JZK, VE1BR, PY2EJ, CE1AR, W8LPG, W8GGG, W3BBB, VO1I, EA8AE, VE2NI, VP5PZ, VE3BK, W3DNZ, SP1CC, VK2XU, VK4BB, W4IS, HI5X, HI7G, EA9AH, YV5AK, W3ASG, W8CMA, W8NXQ, W8QGW, W8BIA, W8DPZ, and also 73-WIs and 2s. I have built two other S.W. receivers but have gone back to the old one each time. Thanks to your fine weekly I have logged six hundred stations since Feb. 7th.—J. E. BOWDEN (Paignton, Devon).

Valve-testing Panel

SIR,—With reference to the recent correspondence published in your "Letters from Readers" column, I am in entire agreement with two of your readers, that a blueprint for a valve tester for mains use would be greatly appreciated. I have many calls from various friends and neighbours who wish me to test their valves. I can only do this for filament, and not emission. During my visit to Radiolympia I observed several instruments, and in particular one for mains and battery valves, but the price was, I thought, a trifle too much for the constructor. So if you can publish details of a cheap instrument to test H.F. pen., triodes and output pentodes, I am sure you will receive many grateful thanks from a host of the instructors you cater for. The first mains set I made was the Universal Hall-Mark 4, and it has been in use until

quite recently, when the makers discontinued their .18 amp. valves.—E. C. THOMAS (Wapping, E.I.).

A 20-metre Log: Correspondent Wanted

SIR,—I have been a regular reader of your excellent paper for over six months, and I only wish I had taken it years ago. I have not seen a 20-m. log from my district, so I enclose mine:—

W1AXA, W14CLO, W1APA, W1CHG, W1DLA, W2IXY, W3FIH, W3BMA,



A corner of Mr. J. E. Bowden's receiving station.

W3DLL, W4CYU, W4BY, W4DLH, W4AZK, W8MFS, W9GBC, W9PDJ (Portable), W9GBC, W2GBX, PY1EW, PY5AQ, VK3LA, SP1CC, SM5SX, SM5YS, SV13A, OE6DK, K4SA (Porta Rica), OE3AH, SP1HH, and Y12BA.

These stations were received between 18.00 and 21.00 G.M.T. The receiver in use is a home built 0-v-2 with a 30ft. inverted-L aerial. As I am only a beginner on the short waves I should like to correspond with any reader who is also interested in short-wave listening.—P. CARPENTER (49, Whyke Road, Chichester, Sussex).

Another 20-metre Log

SIR,—Not having seen a short-wave log from this district before, I submit mine. All stations were heard on the 20-metre band. CE3DW, YV5ABE, LU1AB, KA1ME, PY2BA, CO2RH, SU1CH, H8AM, SP1HA, CT1AY, CT1JW, VONI, VE1GP, VE1DR, VE2KI, VE1LR, F3JD, F3MF, F8XT, SM7YA, SM5SV, and fifty W stations. My receiver is an 0-v-1.—C. RIDGE (Angus).

A Five-valver for Overseas!

SIR,—I would very much like to add my request to that of D. T. Smith's, appearing in a recent issue of PRACTICAL

AND AMATEUR WIRELESS, asking for a medium- and short-wave super receiver containing five or six valves, the H.F. stages to be sufficient to give A.V.C. Now India is to have several medium- and short-wave transmitters of medium power, quite a lot of people will be considering suitable receivers. There are plenty of American all-wave sets on the market, but only a very few are suitable for this country, as the majority do not tune below 16 metres, and long-wave listening is out of the question altogether in this country. I am the only home constructor in this place, so I was not surprised to receive several requests to recommend a suitable receiver. Up to now I have not been able to recommend any set really suitable for India. The best I could find was one of your straight fours with a converter on one side of the baseboard. This has given me good service for several years, but of late it is not so good on the selectivity side.

I have told my friends to sit back and wait a while, when they will, no doubt, be rewarded with a circuit worth having. Just a word about the coils; the short-wave coils should tune from about 12 up to 100 metres, as we understand the Indian stations will transmit on a wavelength of about 90 m. at night time, and of course we want to tune England in on 13.97 m., which is about the best receiving wave from home, especially in the evenings.

Wishing you and your paper every success.—T. GOULD (Panch Mahals, India).

CUT THIS OUT EACH WEEK.

Do you know

—THAT a static screen between the aerial coupling coil and the grid winding will reduce man-made static on the short waves.

—THAT a modern tetrode can be used in a battery receiver in place of a pentode without altering the wiring.

—THAT a permanent magnet speaker can be used in place of an energised type provided that the field winding of the latter is replaced by a choke.

—THAT when using a small meter for signal indication a resistance shunted across it will enable the reading to be kept within the scale.

—THAT it is often found undesirable to connect a pick-up to a ready-made commercial Universal receiver owing to the fact that the pick-up may be "live" in respect to the mains.

—THAT when desirous of using a pick-up with the above type of receiver the makers should first be consulted concerning the best method of connection.

The Editor will be pleased to consider articles of a practical nature suitable for publication in PRACTICAL AND AMATEUR WIRELESS. Such articles should be written on one side of the paper only, and should contain the name and address of the sender. Whilst the Editor does not hold himself responsible for manuscripts, every effort will be made to return them if a stamped and addressed envelope is enclosed. All correspondence intended for the Editor should be addressed: The Editor, PRACTICAL AND AMATEUR WIRELESS, George Neufes Ltd., Tower House, Southampton Street, Strand, W.C.2

Owing to the rapid progress in the design of wireless apparatus and to our efforts to keep our readers in touch with the latest developments, we give no warranty that apparatus described in our columns is not the subject of letters patent.

FREE ADVICE BUREAU

COUPON

This coupon is available until September 25th, 1937, and must be attached to all letters containing queries.

PRACTICAL AND AMATEUR WIRELESS,
18/9/37.

BOOKS RECEIVED

RADIO SERVICING SIMPLIFIED. 150 pp., 16 illustrations. Published by the Automatic Coil Winder and Electrical Equipment Co., Ltd. Price 2/6d.

THIS is the 6th edition of a most useful book for the service man or experimenter. It has been entirely re-written for modern apparatus and is a valuable work of reference. It takes the reader through the whole routine of testing and servicing modern radio apparatus in a most simple and easy manner, and in addition gives a wealth of detail relative to the more usual types of fault met with. Commencing with a very lucid explanation of Ohm's Law, the book passes on to deal with definite applications of the use of the special Avo apparatus. Every amateur, service man and dealer should obtain a copy of this book without delay.

TELEVISION ENGINEERING, by J. C. Wilson. 492 pp. 276 illustrations. Published by Pitman. Price 30/.

THIS is claimed to be the first work written as a comprehensive text-book on television. Although written primarily from the engineering point of view, it covers all the essential details of the modern television equipment and will prove a valuable guide to a proper understanding of the methods now used for transmission and reception. The theoretical and practical aspects of television are fully dealt with and the descriptions of modern apparatus such as is now used are exceedingly clear and concise. Among the subjects described are scanning, optics, photo-cells, the cathode-ray tube, colour television, synchronising, and amplifying equipment. A foreword by J. L. Baird explains that the new industry which is growing round television will call for the assistance of skilled technicians and thus the book will prove particularly useful to those who are anxious to take part in this development of the radio industry.

OUR FREE CATALOGUE SERVICE

To save readers trouble, we undertake to send on catalogues of any of our advertisers. Merely state, on a postcard, the names of the firms from whom you require catalogues, and address it to "Catalogue," PRACTICAL AND AMATEUR WIRELESS, Geo. Neunies, Ltd., Tower House, Southampton St., Strand, London, W.C.2. Where advertisers make a charge, or require postage, this should be enclosed with applications for catalogues. No other correspondence whatsoever should be enclosed.

Clix Components

TWO new season's folders have just been issued by British Mechanical Productions, Ltd., one giving a range of the popular Clix plugs, sockets, terminals and connectors, while the other folder gives full particulars and prices of valveholders and connecting strips. In the range of connectors is included a handy plug adaptor in which the plug portion gives perfect contact with all types of supply sockets. There is also a fuse plug for low-power circuits up to 5 amp. This plug is fitted with Clix patent self-centring non-collapsible pins, and has single-screw assembly. A loudspeaker "plug-switch" is also listed, suitable for controlling either a set speaker or extension speaker, or both. It is fitted with a quick make-and-break switch operated by a slight side movement of the plug. The other folder includes valveholders and chassis mounting strips.

REPLIES IN BRIEF

The following replies to queries are given in abbreviated form either because of non-compliance with our rules, or because the point raised is not of general interest.

W. A. (S.E.11). There would appear to be a short-circuit in the mains section and the set should not get as hot as you state. We suggest you have it overhauled by the makers or a good local service agent.

A. T. (Dundee). The address is Transreceivers, Ltd., Surbiton, Surrey.

R. H. C. (S.W.6). The best receiver for your purpose would be the Simplest One-valver described in our issue dated December 12th last.

J. E. (West Melton). We suggest that you check the voltage applied to the anode of the detector valve. Disconnect the decoupling resistance and connect the H.T. direct to the coupling resistance as a first test. Make certain that the connections to the coil are in order, and reverse the connections to the transformer secondary to cut out the L.F. whistle.

M. E. (Bournemouth). We regret that we cannot supply a diagram of a set for long waves only. We

believe the makers of your receiver can modernise it by fitting new coils for the purpose.

W. J. McC. (Londonderry). The trouble may be due to the damping of the aerial, or an unsuitable H. F. choke. Try also increasing the value of the grid leak. The fuses, if they are to be inserted in the mains leads, should be of the 3-amp type.

M. T. (Palfrey). We cannot supply blueprints of commercial receivers, and we suggest therefore that you write direct to Messrs. Lissen.

W. D. M. (Reddish). We often receive applications from readers for back numbers which are out of print and should be glad to avail ourselves of your offer to supply these. We cannot purchase back issues, however, and if you wish to sell the complete files we suggest you insert a small advertisement.

R. H. (S.W.8). We cannot trace the station referred to and think it may be a local amateur carrying out re-broadcasting experiments. This is contrary to the terms of the ordinary Amateur licence.

K. H. (Worcester Park). The 2½-watt transmitter should meet your requirements and full details were published in our issues dated December 26th and January 2nd last.

W. G. (Sheffield). We do not publish a book on the subject, but a long series of articles dealing with transmitting commenced last November.

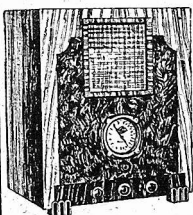
AMAZING SET BARGAINS!

Buy your New Receiver from N.T.S. at an amazing Bargain Price! The wonderful offers below cannot be made indefinitely. Stocks are limited and IMMEDIATE ORDERING IS ESSENTIAL!

CLASS "B" 4 RECEIVER

with 4 Valves, Speaker, Cabinet and batteries.

LIST PRICE £8:18:6 **BARGAIN**



£5 : 19 : 6

- 4 BRITISH VALVES of guaranteed life.
- Single knob tuning.
- Circular Airplane Dial.
- Amazing performance rivaling that of powerful all-mains models.
- Wide choice of foreign stations.
- Moving-coil Speaker.
- Slow motion tuning.
- Bronzed escutcheon.
- New type switch.
- Wavering 200-2,100 metres.
- Output 1½ watts at 120 volts.
- Walnut veneered Cabinet illustrated.
- Absolutely complete, ready to play.
- Yours for 5/- down and 12 monthly payments of 7/6.
- Or 5/- down and 12 monthly payments of 10/6.

5/- DOWN

S.G.3 CHASSIS

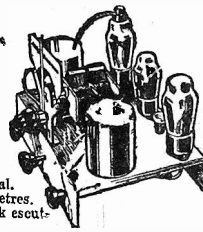
with 3 Valves, knobs and escutcheon.

LIST PRICE £4:4:0

BARGAIN

£2 : 2 : 0

- Screened Grid, H.F. Detector and Pentode Output Valves.
- Screened coils.
- Only 9 m.a. H.T. Consumption.
- Illuminated and Wavelength Calibrated Dial.
- Wave range 200-2,100 metres.
- Complete with Valves, black escutcheon and all knobs.
- Wide choice English and foreign programmes with amazing tone and volume.
- 2/6 down secures; balance in 12 monthly payments of 4/-.
- COMPLETE RECEIVER in walnut-veneered table cabinet with moving-coil speaker, less batteries only. List Price £6 : 6 : 0. Bargain £3 : 7 : 6 or 5/- down and 12 monthly payments of 5/9.



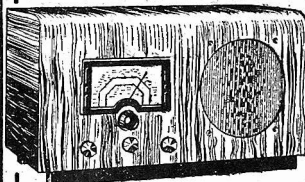
2/6 DOWN

A.C. BANDPASS S.G.4 RECEIVER

LIST PRICE £8:8:0

BARGAIN

£5 : 12 : 6



With 4 VALVES, CELESTION Field-Energised Moving-Coil SPEAKER and Walnut-Veneered CABINET

Wonderful selectivity and sensitivity. 4 matched British valves. Screened Band-pass Coils. Slow Motion Tuning, illuminated dial, Wavelength calibrated. Gramo pick-up sockets, 2½ watts output. Wave range 200-550, 1,000-2,000 metres. For A.C. Mains ONLY, 200-250 volts, 40/80 Cycles. Complete with beautiful walnut-veneered cabinet with airplane dial illustrated, and Celestion Field Energised Moving Coil Speaker, READY TO PLAY. Cash or C.O.D. £5:12:6. Or 5/- down and 12 monthly payments of 6/11. Or 5/- down and 12 monthly payments of 9/11.

5/- DOWN

STRAIGHT 3 RECEIVER

with 3 Valves, Speaker, Cabinet, less Batteries.

LIST PRICE £4:4:0

BARGAIN

£2:10:0



Wavering: 200-2,000 metres.

Complete with 3 British Valves and Moving-Coil Speaker in the handsome horizontal-type walnut-veneered table cabinet illustrated, less batteries only. Cash or C.O.D. £2:10:0. Or 5/- down & 12 monthly payments of 4/3.

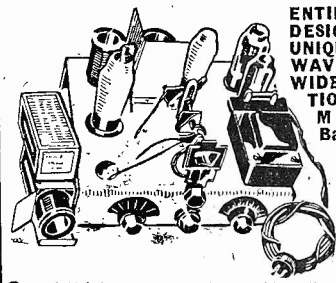
- New type highly selective Straight Battery 3 circuit.
- Slow-motion illuminated dial.
- Pick-up sockets.
- Metal chassis.
- Low H.T. consumption.

5/- DOWN

D.X. FANS' A.C.4

SHORT-WAVE KIT

LIST VALUE £5:10:0 **BARGAIN 75/-**



ENTIRELY NEW DESIGN giving UNIQUE ALL-WAVE WORLD-WIDE RECEPTION 12-94 METRES. Bands & read tuning with air space condensers for efficiency on every wave-band.

- Variable Mu H.F. pentode, leaky grid reacting detector, pentode output and valve rectification.
- Slow motion bandspread dial.
- 3 calibrated scales 0-180, 0-180, 0-10.
- For A.C. Mains 200-250 volts, 40-100 cycles.
- KIT "1" comprises every part for assembly, including 3 pairs 4 and 6-pin coils (12-94 metres), wiring and assembly instructions, less valves only. Cash or C.O.D., 75/- or 5/- down and 12 monthly payments of 7/-.
- 4 Valves 37/6 extra, or add 2/6 to deposit.

5/- DOWN



SPECIAL OFFER!

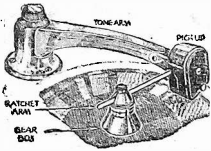
New light weight super-type HEADPHONES highly recommended for short-wave work. List value 15/- **BARGAIN 3/6**

FREE! Write for free Booklet describing the D.X. Fans' A.C.4 Short-Wave Kit and 4 other entirely new N.T.S. Bargain Short-Wave Kits and range of Short-Wave Components. N.T.S. supply everything Radio and Television you saw at Olympia on the famous New Times Easyway System... Receivers, Components, Eliminators, Speakers, Valves... send us a list of your needs for quotation by return. All P.O.'s must be crossed and made payable to New Times Sales Co. All currency must be registered.

EST. NEW TIMES SALES CO., 56 (Pr.W.32) Ludgate Hill, London, E.C.4. 1924.

ELECTRADIX BARGAINS

SOUND RECORDING A HOME at a reasonable cost. No fancy prices for elaborate gear.



The **FRIG RECORDER** fits any Gramo, records on any discs, has positive drive by worm gear and rack. The Recording Stylus is tracked across blank at the exact grooving spiral. Price complete, as illus. with Tone Arm and cutter with real diamond, **37/6**
All Metal discs, 4/- doz.
UNIVERSAL Gramo. Recording A.C. Gramo-motors, and turntable, 25/- and 50/-
GARRARD RECORD CHANGER AND GRAMO-MOTOR, A.C., 25/7/6.

METERS. For fault finding, etc. Bargain line in portable moving coil by Everett Edgecumbe, 40 to 120 volts, for home conversion to multi-range, 21/6. Western flush panel milliammeters, 0-30 or 0-100, 17/6 each. E.E. voltmeters, A.C., 240 v., 25/-.

NEW PANELS. Polished aluminium, 15 and 10 gauge, bright or enameled, 12in. x 12in., 3/-; 15in. x 18in., 5/6. Ebonyite 2in. panels 24in. x 24in. for 5/6.

2-VALVE METAL B. CHASSIS. Drilled and fitted 2 valve holders, transformer, coil, etc., 2/6 each.
SLOPE FRONT TEAK CABINETS. New, make fine instrument panel, 10 x 7 x 11, 3/- each.

OAK CABINETS for Short-wave Battery Receivers, 2 or 3 valve, polished Jacobean finish, 13 1/2in. x 7in. x 6 1/2in. deep, oval front, crackle black aluminium panel fitted geared .0005 mid. condenser, with sunk dial, 3-way coil switch and a single plate condenser. Sliding back and 10 terminal Strip, new, manufacturer's liquidation stock, 15/-.

CONDENSERS. Variable lowloss F type. .0005, 1/9. J.B. .0003, 2/-; Reaction varia, 1/3. Fre. .0003 with S.M. dial, 5/-; 2-gang varia, all aluminium, 3/- only. Fixed condensers, 2 mfd. 250 v., 10d., or 6 for 4/-; 4,000 v. 1 mfd., 6/-, etc.

Projection Lanterns, on Stand, with 250-watt focus bulb, 25/-; Arc lamps, 27/6. Spark Transmitter shortwave sets for model boat remote control, 17/-.

COILS, Philips Superhet set of 3 in makers carton, 3/- set. S.W. coils plug-in, 1/6. Ribbed formers, 9d. Long-wave and B.C. 2-pin, 1/-; Cessor 2- and 4-pin coils, 1/-; Reaction tuners, 9d. H.P. twin chokes, mains, 9d. Rugsy and other coils in stock.

All wavelengths in 2-pin, 1/3. Brownie dual-range 200/2,000, 1/6. M.I.C. concert coils, set of 4, 2/6; aerial, react., long, short and multiple, 1/6. S/W Formers ribbed and slotted, 4d.

RESISTANCES. H.M.V. in glass tubg, wire ends, 10,000, 25,000, 50,000, 100,000, 500,000 ohms and 1 meg., 1/6 set of 6.

CRYSTAL SETS. Still the best Radio Receiver. No battery or valves wanted. Quiet and efficient reception. 500 shop-soiled sets, cheap. Enclosed type, 5/6 and 7/6 each.

SPARK COILS. 2in., 4in., and 1in. gap, with condensers, 10/6.

1 VALVE CABINET AMPLIFIERS, 15/-.

CONSTRUCTORS. Hand geared drills to 1in., 1/3. Ceramic S/W lead-in, brass stem, 8d. 5in. stand-off, S/W insulators, 6d. Portable valve sets kits assembled in enclosure, partly wired, speaker, aerial, and all parts, less valves, 21/-; Metal rectifiers, chassis type, 180 v. 30 m/a., output, 5/-; Lightning Arrestors, make airtight safe in summer storms, 1/- ea. H.M.V. Mains Transformers, 100/250 v. to 700 C.T. 60 m/a., 4 v. 1 a., 4 v. 2 a., 10/6. 30 Hy. Chokes, 50 m/a., 4/-; 1 amp. Chokes, 10/-.

VALVE BARGAINS. Mains Universal 7-pin Freq. Changers, 4/6. A.C. ditto, 4/6. Universal H.F. 7-pin Pentode, 4/6. Power Valves: Ediswan V13B 30-watt, Fil. 5/-; L500 v. Mag. 35, under half price, 10/8. T50 45 valves, 7 v., Fil. 1,800 v., P. Mag. 30, 22/6. AT40, 10 watt, 6 v., Fil. 4/-; H.T. Rectifiers up to 10,000 v., NU2, 5 v. Fil., 250 watts, 35/-; 100 watt T2A, 40/-; Half-wave W.D. Rectifier, 200/1,000 v. 50 m/a., 2/6.

SOLENOIDS. 6-volt for model work or distance switch, core travel 1in. pull 1 oz., 3/6. A.C. Magnets, 230 volts, 30 m/a., 14 ozs., 11/6; 2/6.

FLEX CORDS. 3-way 6ft. long, 6d. 4-way, 12ft., 1/-; 4-way 6ft. with plug and socket, 1/6. Govt. 6ft. head-phone cords, with plug, 1/-.

POCKET HEADPHONES, W.D. all leather headband, strap and cords, 2/6 pair. Wireless type with aluminium headband, 2/9. 4,000 ohms, 4/6. House, Office and Field Telephones, wall and table, from 10/-.

TELEPHONES for House, Office, Garage and Field Sports. Wall type, 15/-; Table models cheap. Send for lists.

TOTE SELECTOR RELAY SWITCHES, 6 gangs of 25 ways, magnet operated, 8/6.

MAGNETIC TRIP SWITCHES, 1/2 to 1 amp. A.C. or D.C. 5v. to 500 volts, bakelite cover, ideal circuit protectors, 8/6.

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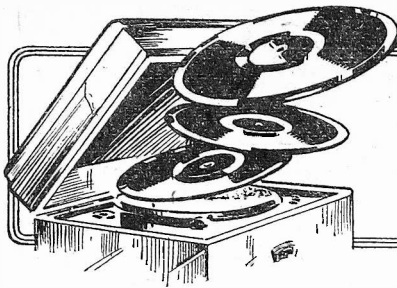
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Impressions on the Wax

Parlophone

RICHARD TAUBER heads the Parlophone list this month with two tunes, both of which are sung in English. They are "Fear Nothing" and "The Old Tree," on *Parlophone RO 20343*, sung in typical Tauber style. A number of records have also been added to their classic series. "Vienna Blood," a selection in two parts, is a remarkably fine record introducing Maria Hesper (soprano) and Herbert E. Groh and Max Schipper (both tenors). These three famous singers are accompanied by a full chorus and orchestra, and sing in German. The number of the record is *Parlophone R 2369*. Joseph Schmidt, tenor, also appears in this series with "Listen to the Old Wells Rippling" and "Sweet Confessions," on *Parlophone R 2370*. The Grand! Symphony Orchestra (Paris) has recorded a "Romeo and Juliet" selection on both sides of *Parlophone R 2373*, and the Rhythm Symphony Orchestra, conducted by Otto Dobrindt, plays "Serenade in Blue" on both sides of *Parlophone R 2374*.

Ronald Frankau and Tommy Handley, with Monte Crick at the piano, make a new Murgatroyd and Winterbottom recording this month on *Parlophone F 865*—"If you Pretend You're Blue," and "Scientifically, Of Course." Leslie A. Hutchinson, or "Hutch," as he is more familiarly known, appears on *Parlophone F 866* singing "In an Old Cathedral Town" and "The Greatest Mistake of My Life." He has also recorded an "On the Avenue" selection on both sides of *Parlophone F 873*.

Decca
The Street Singer, who is at present on a tour of this country, sings two popular numbers. "The Greatest Mistake of My Life" and "When the Harvest Moon is Shining," on *Decca F 6452*. Charlie Kunz presents his Piano Medley No. 6, on *Decca F 6455*, and like its predecessors, contains an array of tunes that are popular at the moment, and, of course, Charlie Kunz plays as attractively as ever. The new series of records of popular tunes in strict dance tempo that Josephine Bradley and her Ballroom Orchestra are making for Decca are proving outstandingly successful. The tunes are played in a straightforward manner and, in fact, are accurate in every way for dancing requirements. Her latest record is "September in the Rain," coupled with "Toodle-oo," on *Decca F 6441*.

Decca

Ambrose and his Orchestra have made five new records this month. *Decca F 6456* comprises "Sing a Song of London" and "Hometown"—two tunes from the new London Palladium show, "London Rhapsody," which has had a very successful preliminary run at Brighton. "Ten Pretty Girls," which appears on one side of *Decca F 6457*, is a most attractive tune, and *Decca F 6447* presents "This Year's Kisses." The other records are equally interesting.

Brunswick
As mentioned in my last review, Brunswick have now introduced special souvenir records. The artistic labels on these discs take the form of a picture from the film with which the songs recorded are concerned. The artists thus featured this month are Bing Crosby and Grace Moore. Crosby sings four tunes from his new film, "Waikiki Wedding." They are "Sweet Leilani" and "In a Little Hula Heaven"—*Brunswick 02443*, and "Blue Hawaii" coupled with "Sweet is the Word for You"—*Brunswick 02444*. Grace Moore sings "Our Song" and "The Whistling Boy" on *Brunswick 02400*, both tunes being from her film "For You Alone."

The Mills Brothers, who are at present in England, have made their latest record at the Decca London studios. This record, which is *Brunswick 02460*, features "Organ Grinder's Swing" and "Let Me Dream." The "Organ Grinder's Swing" is the main feature number of the stage act the Mills Brothers are presenting during their present tour of Great Britain.

Alice Faye, who appears with Dick Powell in the film "On the Avenue," sings two numbers from the film on *Brunswick 02454*. The tunes are "This Year's Kisses" and "Shummin' on the Avenue."

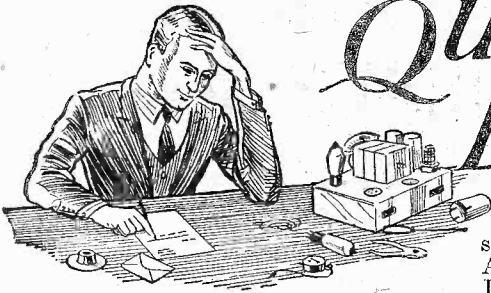
Rex
Gracie Fields adorns the current Rex list with three records from her new film, "The Show Goes On." "Smile When You Say Good-bye" and "I Never Cried So Much in All My Life," on *Rex 9095*; "We're all Good Pals Together" and "The Song in Your Heart"—*Rex 9096*, and "My Love for You" coupled with "In a Little Lancashire Town" on *Rex 9097*. Fine songs these, perfectly presented by the one and only Gracie Fields.

The eminent popular vocalist, Brian Lawrence, in association with Fred Hartley and his Orchestra, has made two new records. *Rex 9094* concerns itself with two numbers from "On the Avenue," the new Dick Powell film.

"Sandy, the Detective" on *Rex 9091*, is the latest humorous sketch made by Sandy Powell for Rex. Sandy as a detective is probably the most farcical guise he has yet adopted.

Bob Mallin, the popular singer of cowboy songs, tries two new ones on *Rex 9081*. Accompanied by his guitar he sings "Prairie Romeo" and "There's Only Five Bullets in My Old Six-shooter."

Vocalion
Whatever you think about swing music, even if you have never bought a swing record before, there could be no more delightful introduction to this style than the selection of Vocalion recordings of Irving Berlin's songs from the film "On the Avenue." All these hits—"I've Got My Love to Keep Me Warm," "Slummin' on Park Avenue," "This Year's Kisses," "Hè Ain't Got Rhythm," and "You're Laughing at Me"—have vocal choruses and are brilliantly played by the cream of America's orchestral talent. They are all in rhythm throughout, and, regarded as records for dancing or for listening, they are suitable in every respect.



QUERIES and ENQUIRIES

Using an Eliminator

"I have built your Vitesse receiver but cannot get satisfactory results. There seems to be a lack of punch and stations come in only faintly. I am running the set from an eliminator—make unknown, which has several tapings and these may not be suitable. What is the best way of finding the output and correct voltages for each stage so that I can use this unit?"—G. R. (Wembley).

THE only satisfactory scheme is to find exactly what the valves require for best working conditions in your particular case. For this purpose obtain an ordinary H.T. battery—quite a cheap one will do as it will only be used for a short test. Take out separate H.T. leads for each valve and plug these into the battery at approximate values as recommended by the makers of the valves. When satisfactory results are obtained, insert a good milliammeter in each H.T. lead and ascertain the current flowing. The voltage will be approximately that marked at the tapping on the battery, and thus you will be able to ascertain the voltage to be dropped from the maximum H.T. output of your mains unit. From the current flowing you can then work out the value of resistance to insert to drop this voltage—dividing the voltage to be dropped by the current flowing expressed in amps.

Signal Indicator

"I am anxious to make really good systematic reports upon amateur signals, and as I propose to work regularly with some other amateurs I should like some form of reliable signal strength indicator. I am unable, at the moment, to afford a very big expense, and should be glad if you could tell me of a simple low-priced signal strength indicator which would answer my purpose."—F. R. (Manchester).

ALTHOUGH a good output meter is the best arrangement, quite a number of amateurs use an ordinary milliammeter in the anode circuit of the second detector. If you use a superhet—as presumably you will if you are going in for serious listening on the amateur bands—then the best plan is to use a triode working as an anode-bend detector in the second detector stage, and a 0.1 milliammeter in the anode circuit will give you quite a good indication of the volume of a received signal. A variable resistance may be joined in parallel with it, if desired, to enable a zero reading to be obtained when an unmodulated carrier is tuned in, or you can adopt any other similar scheme to provide a datum upon which to calibrate your signals.

A Valve Coupler

"I made up, some time ago, a valve testing panel, but at the time I only arranged it for 5-pin valves. I am now anxious to test up to 9-pin valves, but do not want to unscrew the panel and make inside alterations. Is there yet available a form of adaptor which will enable me to make the tests with various types of valve?"—K. A. S. (S. Shields).

MESSRS. BULGIN can supply a set of adaptors, or you can obtain a single adaptor for the purpose from the Automatic Coil Winder and Electrical Equipment Co. This costs 12s. 6d., and is a 9-pin attachment which can be rendered instantly suitable for making tests. It is designed primarily for use with the Avo-Dapter, and if you are familiar with this tester, you will be able to see how the new coupler operates. With the aid of the Avo-Dapter it is possible to test either 4, 5, 7 or 9 pin valves without difficulty.

All-wave Coils

"I am building another receiver in which I should like to incorporate all-wave tuning, but am not satisfied with the published

RULES

We wish to draw the reader's attention to the fact that the Queries Service is intended only for the solution of problems or difficulties arising from the construction of receivers described in our pages, from articles appearing in our pages, or on general wireless matters. We regret that we cannot, for obvious reasons—

- (1) Supply circuit diagrams of complete multi-valve receivers.
- (2) Suggest alterations or modifications of receivers described in our contemporaries.
- (3) Suggest alterations or modifications to commercial receivers.
- (4) Answer queries over the telephone.
- (5) Grant interviews to querists.

A stamped addressed envelope must be enclosed for the reply. All sketches and drawings which are sent to us should bear the name and address of the sender.

Requests for Blueprints must not be enclosed with queries as they are dealt with by a separate department.

Send your queries to the Editor, PRACTICAL AND AMATEUR WIRELESS, George Nownes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2. The Coupon must be enclosed with every query.

details of the all-wave tuners you have so far reviewed. I am aiming at really high efficiency, and wish to build a superhet to cover from about 10 or 12 metres to the long-waves, without too many gaps. Would you favour the use of modern dual-range iron-core coils, with plug-in short-wave coils of the standard type and a multi-contact switch for the wavechange, or some other idea? I should be glad if you could give me some idea of the cheapest and most efficient procedure for my purpose."—E. F. G. (York).

A SERIES of coils has just been announced by Messrs. Wright and Weaire which would apparently just answer your purpose. These are their standard coils supplied without screens, and may be obtained in three types—airial coils, H.F. transformers and oscillators. They are known as "P" type coils, and cover from 12 to 35, 34 to 100, 91 to 261, 250 to 750, 700 to 2,000, 200 to 557, and 16 to 47 metres, tuned with a 450 mfd. tuning condenser. Prices are from 1s. 4d. to 1s. 9d., and the makers supply details which would enable you to build a set round them.

The Colt All-wave Three

"I have just finished building the Colt receiver, but find that I have now lost the list of parts and am uncertain regarding the valves used in this set. Can you please give me these details, type numbers and name."—J. K. (E.13).

THE valves specified for this receiver were Hivac types D.210, L.210 and P.215. These are detector, L.F. and Power and are inserted in that order starting from the left (viewing the chassis from the panel).

Lucerne Coils

"I have been given two coils which are partly stripped, but which are labelled Lucerne models. I should be glad to know what these coils are, how to repair them if they are suitable for modern requirements, and if you have any sets or blueprints in which I could incorporate them. There are two formers in each coil and they are wound with green wire. There have been some letters near the terminals, but these are rubbed out."—F. Y. U. (Kenton).

THE coil is no doubt one of the designs produced by *Amateur Wireless*, in 1934, to enable full or better advantage to be taken of the Lucerne broadcast plan. They may not be found ideal for modern conditions, although they will certainly give very good results. The details of the windings are too intricate to enable them to be given in the form of a reply, but we published the circuit and connection data in our issue dated March 13th last, and from our Blueprint list you will see that there are two or three sets (three and four-valvers) still available for the use of these coils.]

Multi-connectors

"I am carrying out some experiments and wish to obtain some multi-connectors. The ordinary seven-pin valveholder and plug is quite good but I need something with more contacts and capable of carrying a higher load. Can you make any suggestions regarding the supply of suitable items for my requirements?"—Y. S. E. (Colwyn Bay).

THERE are two possible solutions to your query. Messrs. Bulgin can supply a twelve-point plug designed primarily for television purposes and this may be of use to you. A socket is also obtainable, and the pins are of the flat type. Messrs. Belling and Lee can also supply five- or ten-pin plugs and sockets which may be of use to you. We suggest you obtain catalogues from these firms and examine the specifications of the plugs in order to make your choice.

Tone Control

"I have built a Q.P.P. stage, but am not satisfied with the tone of reproduction. All the best parts are used, and I have adopted the straightforward circuit enclosed. Can you suggest how to improve the quality?"—F. T. (Cheshunt).

YOUR circuit is devoid of all decoupling and tone-control components, and therefore you may be experiencing instability as well as excessive high-note reproduction from the two pentodes. We suggest that you decouple the first L.F. and the H.F. stage, and at the same time add a tone control to the output circuit. Probably the addition of a .001 mfd. fixed condenser across the two anodes of the output valves will be all that is needed to reduce excessive high-note reproduction, but if you wish to make a more comprehensive control a .01 condenser may be used in series with a 100,000-ohm variable resistance, the two being joined across the two anodes.

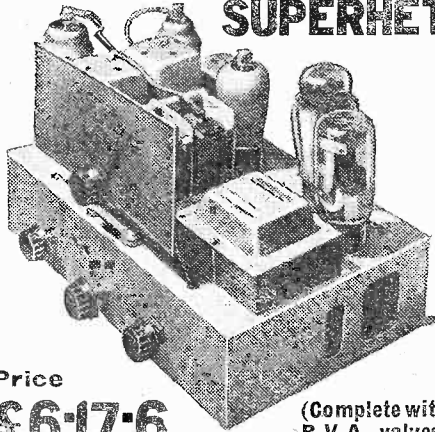
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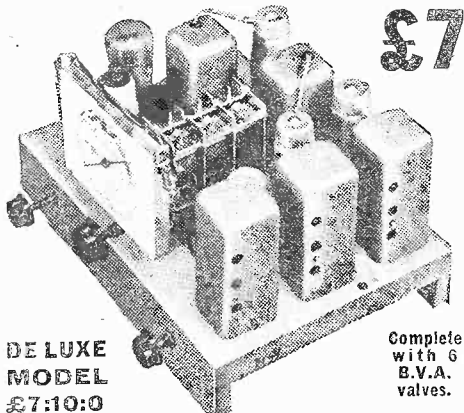


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