THE EXPERIMENTER'S FIRST SET — See Page 483

Practical and Amateur Wireless

3D EVERY WEDNESDAY

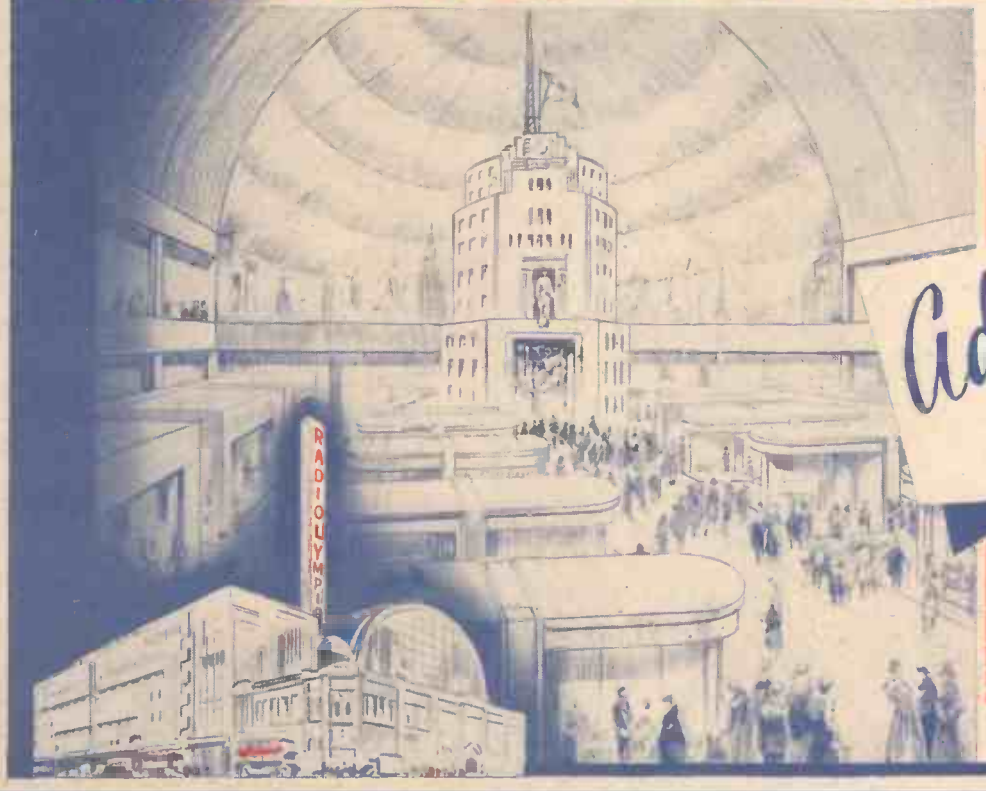
Edited by F. J. CAMM

a GEORGE NEWNES *Publication*

Vol. 14. No. 359. August 5th, 1939.

AND PRACTICAL TELEVISION

RADIOLYMPIA



Advance Details

DIRECTIONAL BEAM AERIALS—SEE PAGE 485

Practical and Amateur Wireless

Edited by F. J. CAMM

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Vol. XIV. No. 359. Aug. 5th, 1939.

ROUND *the* WORLD *of* WIRELESS

Aerial Systems

THE aerial is unfortunately regarded by many amateurs as an awkward accessory, and accordingly is made up in the crudest form. Any old piece of wire is slung in the most convenient position and results are expected to be up to standard. Too much reliance is placed upon the receiver, and in many cases a good set does not get a chance to show what it can do, due to the poor aerial with which it is coupled. The keen amateur, on the other hand, spares no expense in rigging up a reliable aerial system, preferably designed to give good results on all wavelengths covered by the receiver. Good masts; reliable halyards and adequate insulation are not really expensive. All metal work should be galvanised and the use of brass pins for pulleys or similar moving parts should not be overlooked if frequent replacements are to be avoided. In America much more attention is paid to the aerial systems, and some elaborate arrays have been developed for short-wave use. Of these, directional beams are probably the most popular at the present moment, and in this issue we give a few hints as to the method of making and mounting this type of aerial which, whilst of main application to the transmitter, offer to the receiver also many advantages.

The Open Air Club

SINCE it began its outside broadcasts in the West Midlands the Open Air Club has been travelling eastward; and on August Bank Holiday it will meet in the Southwell district of Nottinghamshire. Five speakers—all walkers or cyclists—will take part, with Bill Oakley in the chair. As usual they will tell the story of their week-end explorations informally and without scripts or rehearsal.

Blackpool's Glees

BLACKPOOL has changed much in fifty years, but in one respect it remains the same: its Glee and Madrigal Society can look back with pride on half a century of achievement since its foundation. The Society, under the conductorship of Mr. Herbert Whittaker, who founded it, will, on August 6th, give a recital which will include Wilbye's "Sweet honey-sucking bees" and Kodaly's "Jesus and the Traders."

Mark Hambourg

ON August Bank Holiday Mark Hambourg will broadcast from a B.B.C. studio a recital of works by Liszt, Berlioz, Beethoven and Chopin, and on August 10th he will be heard from Bournemouth, where he will play Tchaikovsky's Pianoforte Concerto in B flat minor, with the Bournemouth Municipal Orchestra, conducted by Richard Austin.

ON OTHER PAGES

International Scout Rally

SOME time ago the 1st Staffordshire Boy Scouts Association conceived the idea of organising an international rally which would give foreign scouts an opportunity not only of meeting English Scouts in camp and sharing their Scout games, but of seeing them in their homes and getting some knowledge of English life. Scouts in eleven countries outside Britain had accepted invitations up to early July. Acceptances have come from Roumania, and Poland, Hungary, Norway, Sweden, Holland, Denmark, Belgium, France, Eire and Northern Ireland will, it is hoped, be represented. The visit will last a fortnight and will include one night and two days billeting in homes of English Scouts, visits to large works in Birmingham, to a coal mine, and to two of the stately homes of Staffordshire, by invitation of Lord Dartmouth (President of the Staffordshire Scouts Association) and of Lord Harrowby. The camp is at Beaudesert Park, on the border of Cannock Chase, and from there a sing-song will be broadcast on August 10th. This is to include foreign Scouts singing national songs.

World Conference of Youth

JOHN H. ROWLEY, President of the Students Representative Council of the University College of North Wales, Bangor, who is attending the World Conference of Christian Youth at Amsterdam from July 24th to August 2nd, will give a talk on the Conference in the Welsh programme on August 6th. He will try to convey to listeners somet[illegible] of the mammoth nature and bu[illegible]nd of the Conference. He will comment on the purpose which lay behind the enterprise. Most of the countries of the world will be represented by delegates, and over 15,000 young people are expected to attend. All the delegates will be between eighteen and thirty-five years of age, and not more than one-third of them are to be over twenty-five. The purpose of the Conference is to provide opportunity for a demonstration of the place of the Christian, and of the Christian Community, in the modern world.

"Undergraduate Summer"

UNDER the title "Undergraduate Summer," Stephen Potter, whose recent "Air Raid" programme will probably be remembered by listeners, has written a feature giving a cross-section of Oxford University life in the Summer term, which he is to produce on August 10th. Numerous recordings have been made for this programme by the B.B.C. Mobile Unit. Dons as well as students have contributed to it. Extracts from lectures and from conversations in Senior and Junior Common Rooms, scenes during Eights Week, part of a Union debate between Ronald Knox and Evelyn Waugh, an O.U.D.S. rehearsal, Press-day in the life of the Editor of *The Isis*, and the Oxford chimes have been recorded. An electrical recording of the programme will be broadcast on August 11th.

ROUND the WORLD of WIRELESS (Continued)

Eisteddfod Reminiscences

THE newly appointed Archdruid, Crwys, will give a talk in Welsh on August 6th in which he will give listeners his reminiscences of past Eisteddfodau. He will deal in particular with the changes which have taken place in the Eisteddfod and will comment on the renaissance which resulted from the Bangor Eisteddfod at the beginning of this century. It was after this Eisteddfod that new adjudicators and new winners, and an entirely new element came into the world of poetry in Wales. He will refer to the influence of the University on the Eisteddfod and upon the new standards which have been adopted.

Making Glass Eyes

THE next speaker in the "Earning a Living" series will be anonymous. On August 11th a manufacturer of glass eyes will describe the processes of making, colouring, matching and fitting these artificial eyes. The founder of this art was a German—Muller of Lauchser.

When the little ship "Pandora" recently left Seattle for New York, via the Arctic Circle, the only contact her crew will have with civilisation will be by short-wave radio, operated by Leo Clark (above). In the lower illustration the "Pandora" is seen on Lake Union just after her test run. The ship is captained by the Rev. Dr. Homer Flint, of Oklahoma.

Approximately 350,000 people in this country wear artificial eyes, but, so far as private practice is concerned, the manufacture of such eyes in England is confined to only seven families. The speaker began his career as a dispensing optician and then studied glass technology.

Variety from Cheltenham

VARIETY programmes are to be broadcast from Cheltenham in two successive weeks, the occasion for the second of these being a special booking at the Montpelier Pavilion for Cricket Week. On August 9th listeners will hear Al and Bob Harvey and other artists at the Opera House. This theatre was built in 1891, and had its first broadcast nearly four years ago.

INTERESTING and TOPICAL NEWS and NOTES

Orchestral Concert

LESLIE HEWARD has chosen works by three foreign composers, including a symphony by Herman Goetz, for a concert by the B.B.C. Midland Orchestra to be given on August 6th.

Radio-controlled Air-raid Sirens

ACCORDING to a recent report, the Government has been supplied with details of the radio-controlled air-raid sirens installed in Manchester. Simultaneous or independent control of the city's sirens is operated from a central transmitter.

From the Light Operas

MARJORIE AVIS (soprano) and Glyn Eastman (baritone) will, on August 4th, sing many favourite numbers from the light opera stage of years ago, in the programme entitled "From the Light Operas." They will be accompanied by the Clifton Light Orchestra.

Variety from Gourock

PART of the show given by the concert party entertaining holiday-makers in the Cragburn Pavilion, Gourock, will be broadcast on August 4th. The principal comedians are Smart and Benson, assisted by Ike Freedman. Other members of the cast whom listeners may hear include McKenzie Reid and Dorothy, accordionists, We Three Fellows and Harold Dayne. Accompanying the show are Ray King and the Pavilion Melodymakers.

Wired Wireless

IT is reported that Central London, Birmingham, Manchester and Edinburgh will be among the first places to be equipped for the proposed Post Office wired broadcasting system.

Holiday Cross-roads

ON the eve of the August Bank Holiday week-end one of the busiest traffic junctions in the country is Gloucester Cross. Most of the traffic is to south and west—towards the seaside resorts of Somerset, Devon and Cornwall, and South Wales. David Gretton will employ the method used in "Standing on the Corner" in order to get short interviews with travellers of all kinds—private motorists, motor-coach passengers, cyclists and walkers.

How to Look at the Seaside

REGINALD ARKELL'S reputation as a humorist is sufficient to guarantee that his talk on August 3rd (West) and August 4th (West and Regional) on "How to Look at the Seaside" will not be a dull dissertation on marine biology. He is a well-known broadcaster, and listeners may remember him in connection with the series of talks entitled "Up to London."

SOLVE THIS!

PROBLEM No. 359

MASON built a three-valve battery receiver which gave good results, but reaction was rather erratic. He decided that a differential condenser would be more suitable, and he found one in his spares box and accordingly replaced the existing condenser. When the set was next tested he could obtain no signals. He checked connections to the condenser and found they were in order. What was the most likely cause of his trouble? Three books will be awarded for the first three correct solutions opened. Address your attempts to the Editor, PRACTICAL AND AMATEUR WIRELESS, Geo. Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2. Envelopes must be marked Problem No. 359 in the top left-hand corner, and must be posted to reach this office not later than the first post on Tuesday, August 8th, 1939.

Solution to Problem No. 358

The milliammeter only operates with a direct current. When connected in the manner described there was no D.C. owing to the filter condenser. In addition a rectifier is needed to measure the A.C. output of the receiver.

The following three readers successfully solved Problem No. 357, and books have accordingly been forwarded to them: A. C. Clarke, 53, Peckham Road, S.E.5; G. Alexander, 6, Dighton Road, Wandsworth, S.W.18; J. N. Snelling, 5, Wellside Gardens, East Sheen, S.W.14.

The Experimenter's First Set

A Simple Single-valve Receiver Specially Arranged for Initial Experimental Work is Here Described by "The Experimenters"

LAST week we made a few suggestions to those constructors who propose to become active experimenters. Now we propose to show how a good start can be made inexpensively but effectively. As we pointed out before, it is not a good plan to start with an elaborate receiver, since with a set of that kind it is far more difficult to keep a careful check on results and to attend to the all-important details.

A Suitable Circuit

A single-valve receiver probably forms the best starting point, and for those readers who have passed through the initial stages of elementary radio construction, the circuit given in Fig. 1 will supply most of the information required. It will be noticed that there are various additions to the basic circuit such as would be used when making a receiver simply for listening, and that provision is made for the easy connection of meters and for the variation of the values of the most important components.

Thus, a closed-circuit jack is included in both the H.T. and L.T. circuits. This type of jack completes the circuit when the plug is not inserted, and allows the meter attached to the plug to be connected in series with the lead immediately the plug is pushed into place. The jack in the H.T.+ circuit is marked J1, while that in the L.T.— lead is marked J2. There is a third jack, but this is of the open-circuit pattern; it is used between the main H.T.+ tapping and H.T.—, and is marked J3. Its purpose is to permit of the reading of H.T. voltage to be taken in the simplest possible manner. It is, of course, important that the correct type of jack be used here, for if one of the closed circuit pattern were fitted the H.T. supply would be short-circuited and the fuse would blow. Incidentally, never make an experimental receiver without using at least one fuse. It provides a good safeguard.

Variable Condensers and Resistors

Still looking at the circuit, it will be seen that there is a fixed condenser (C1) in the aerial lead, a pre-set grid condenser (C4), an optional variable condenser (C6) between the anode of the valve and earth, in addition to the normal tuning and reaction condensers (C2 and C3). It might be argued that it is not necessary to have all these variables, but they effect a remarkable saving in time over the re-connecting of various different values of fixed condenser while carrying out tests.

Similarly, good use is made of variable resistors. Thus, there is a variable grid leak (R1), which is actually a 5-megohm (maximum) chemical resistor, a variable resistor in the reaction circuit (R2) and a third variable resistor (R3) in the H.T. lead to the anode. The two last-mentioned components can be of the ordinary graded wire-wound resistor or potentiometer type. As to the variable condensers, it is suggested that the bakelite-dielectric type be used for all except C2, which should be a standard air-dielectric tuning condenser.

An H.F. pentode valve is shown in Fig. 1, but if this is of the four-pin type it can easily be replaced by a triode if the anode connections are transferred from the top-cap connection to the normal anode terminal on the valveholder. An S.G. valve could be used in place of the pentode without making any wiring changes, provided that the valve were of the four-pin-base type. It will be understood that if a triode detector valve were used, the by-pass condenser C5 and the feed resistor R4 would not be required.

Baseboard Construction

Fig. 2 shows a convenient arrangement for the components, using a flat baseboard and a vertical plywood panel. Although we generally recommend chassis-form construction, the present case is an exception, for it is desirable that everything should be easy of access; additionally, the set is not intended to be of extremely high efficiency—the wiring is rather too long for that.

Readers will understand that it is not important to include all of the parts shown in Figs. 1 and 2, since they are not all essential to the working of the set, although they are desirable for the initial experiments. At the same time, if the variable resistors are not on hand, for example, it would be satisfactory to use fixed components in clip-type holders. Different values of resistor could then be tried, but the range of variation would be limited.

First Experiments

What about the experiments to be made? In the first place it will be best to set all of the variable components, except the tuning and reaction condensers, to their midway positions. The receiver can then be used as a typical and standard one-valve regenerative set. Make yourself familiar with its operation, and especially with the reaction control, remembering that the set should not be allowed to oscillate and so cause interference with other receivers near by. Then, after checking and noting the H.T. voltage at J3, take notes of the anode current, using jack J1 for a milliammeter with a full-scale reading of about 5. It will be found that the current becomes less when the valve breaks into oscillation. It is also a good plan to note the filament current, so that all tests may be carried out while the accumulator is delivering its full voltage.

Smoothing Reaction

Various experiments can then be made to find the component values with which reaction control is perfectly smooth; that is, the valve gradually falls into oscillation without a sudden "plop" being heard in the 'phones. By the way, if it is found that the set cannot be made to oscillate, reduce the capacity of C6, since this acts as an anode H.F. by-pass, and therefore "starves" the reaction circuit to a certain extent. If reaction is still unobtainable it might be necessary to decrease the value of R2, or to reduce R3. The optimum setting of the last-mentioned will be dependent to a large extent on the voltage of the H.T. battery. It is most satisfactory to use a battery of 100 to 120 volts.

After settling these preliminaries, try varying the setting of the grid leak, R1, until the position is found at which the smoothest control of reaction can be obtained. After that, you can carefully alter the settings of R2, R3 and C6. By carefully adjusting C6, after finding the

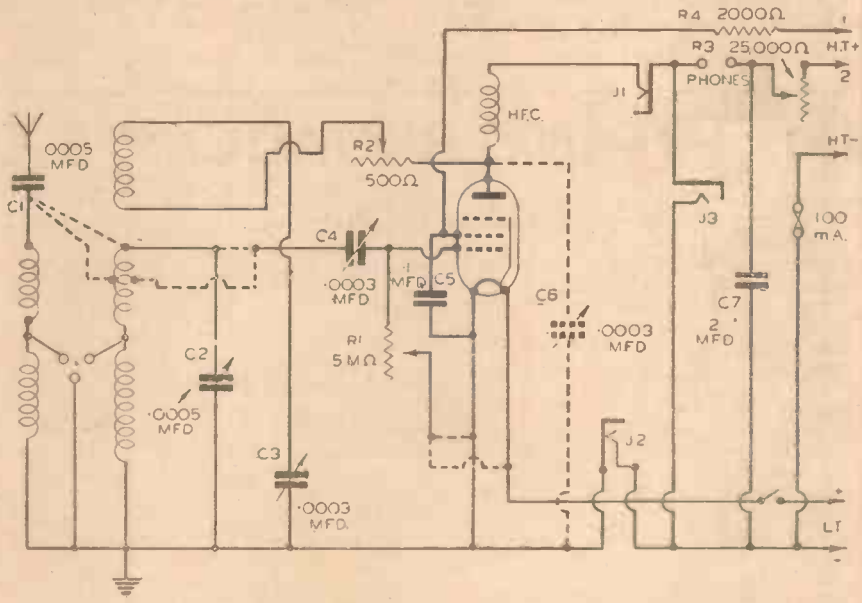


Fig. 1—The circuit employed. Note the use of several variable components and the inclusion of jacks for current and voltage readings.

THE EXPERIMENTER'S FIRST SET

(*Continued from previous page*)

best position of the other components mentioned, it will probably be found that it is possible to obtain steady reaction all round the tuning dial with only very slight readjustments of the reaction condenser C3. The ideal to be aimed at is a setting where the valve will remain just on "the edge" of oscillation point (indicated by a faint breathing sound) throughout the tuning range and without alteration of reaction-condenser capacity. A set so adjusted is ideal for long-distance reception, especially on short waves—where this compromise is not so easily attainable.

Having found the optimum positions of these adjustable components, it might be found interesting to note the result of transferring the grid-leak connection from the positive to the negative L.T. line, as indicated by broken lines in Fig. 1. After changing over, try different settings of the grid leak.

Varying Selectivity

Experiments can next be made in connection with the tuning system. Assuming the use of a coil of the type represented in Fig. 1—although any type of tuner with reaction winding can be used, of course—try connecting the aerial series condenser to the top of the grid winding, and then to a tapping on that winding. In most instances it will be found that tuning is sharpest with the original connections, but a fair degree of selectivity should be obtained when the condenser is joined to the tapping if the capacity of C1 is reduced. Also try transferring the grid-condenser lead from the top of the grid winding to a tapping (when provided). It will probably be found that as tuning is sharpened, the sensitivity is reduced. This is not necessarily always true, and much can be learned by trying the different settings which have been mentioned.

Those are just a few of the interesting experiments that can be tried. Many others will no doubt suggest themselves once the receiver has been put into operation. As we mentioned last week, one of the most important aspects of experimenting is the careful noting of everything observed. Even points which are apparently trivial at the time might assume significance at a later stage. Occasional measurements of voltage and current will indicate changes in working conditions which might otherwise pass unnoticed.

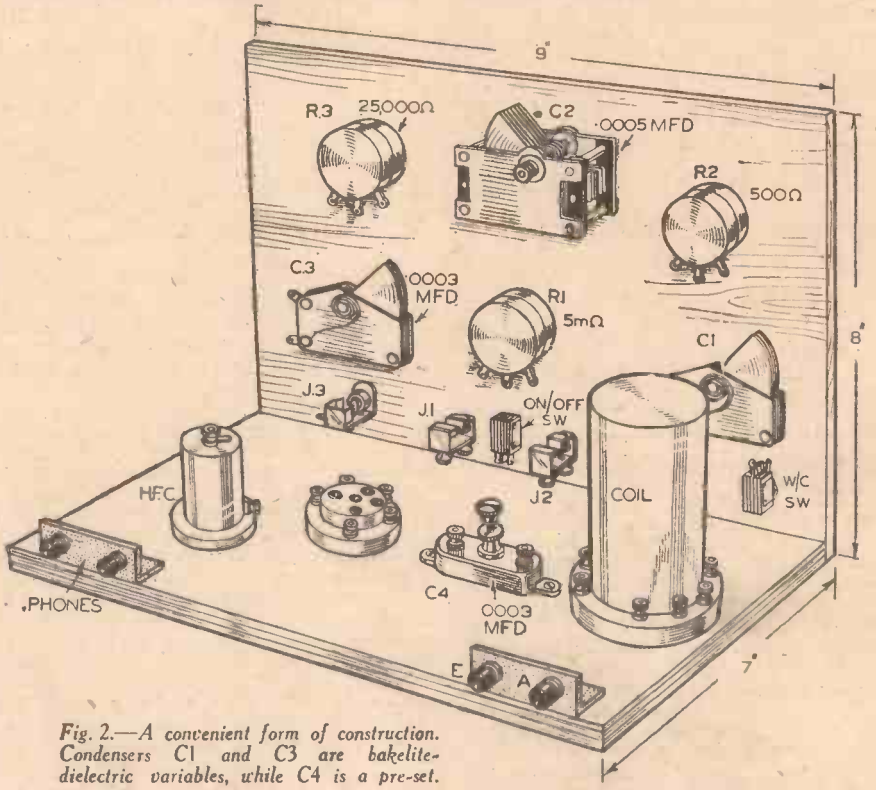


Fig. 2.—A convenient form of construction. Condensers C1 and C3 are bakelite-dielectric variables, while C4 is a pre-set.

IMPORTANT BROADCASTS OF THE WEEK

NATIONAL (261.1 *m.* and 1,500 *m.*)

Wednesday, August 2nd.—Band Waggoners programme.

Thursday, August 3rd.—Orchestral concert from Lucerne.

Friday, August 4th.—Causes of War, feature programme.

Saturday, August 5th.—Up with the Curtain, a variety entertainment.

REGIONAL (342.1 *m.*)

Wednesday, August 2nd.—The Auld Alliance: An affirmation of the ancient friendship between the Kingdoms of France and Scotland, from Scotland, and with recordings made in France.

Thursday, August 3rd.—Life Begins at Sixty (A Boarding House Saga), written and remembered by C. Denier Warren.

Friday, August 4th.—Light Orchestral programme of dance music from the Continent and other parts of the world.

Saturday, August 5th.—On the Spot, a play by Edgar Wallace.

MIDLAND (296.2 *m.*)

Wednesday, August 2nd.—The Sea, orchestral and choral programme.

Thursday, August 3rd.—Band programme.

Friday, August 4th.—Holiday Crossroads: interviews at Gloucester Cross.

Saturday, August 5th.—Band programme from the Pump Room Gardens, Leamington Spa.

WEST OF ENGLAND (285.7 *m.*)

Wednesday, August 2nd.—Music of the Sea: band concert.

Thursday, August 3rd.—Variety from the Public Hall, Paignton.

Friday, August 4th.—From the Light Operas: orchestral programme.

Saturday, August 5th.—Light orchestral music from the Palace Hotel, Torquay.

WELSH (373.1 *m.*)

Wednesday, August 2nd.—Country Magazine: a programme mainly for country people.

Thursday, August 3rd.—A foretaste of the National Eisteddfod: an actuality programme from Denbigh.

Friday, August 4th.—Welsh Airs and Dances: orchestral programme.

Saturday, August 5th.—How to Read the Welsh Countryside—3, Caves, a talk.

NORTHERN (449.1 *m.*)

Wednesday, August 2nd.—The Royal Lancashire Agricultural Show: an eye-witness account.

Thursday, August 3rd.—Country Fancies: Three Scenes by Stephen Kirby—3, Hedger and Ditcher.

Friday, August 4th.—Concert Party programme including Little Theatre, Saltburn.

Saturday, August 5th.—Crowner's Quest, an Elizabethan detective story from the stage play by Eric Barber.

SCOTTISH (391.1 *m.*)

Wednesday, August 2nd.—The Auld Alliance: An affirmation of the ancient friendship between the Kingdoms of France and Scotland, with recordings made in France.

Thursday, August 3rd.—The Scottish Country: New Deer, an Aberdeenshire Parish, from the farmhouse of Auchmunziel, New Deer.

Friday, August 4th.—Concert Party programme from the Cragburn Pavilion, Gourock.

Saturday, August 5th.—Old Airs and Dances: A European Exchange between Sweden and Scotland.

NORTHERN IRELAND (301.1 *m.*)

Wednesday, August 2nd.—Ceilidhe Band.

Thursday, August 3rd.—The Ulster Exhibit at the New York World's Fair, a commentary by Raymond Glendenning, relayed from New York.

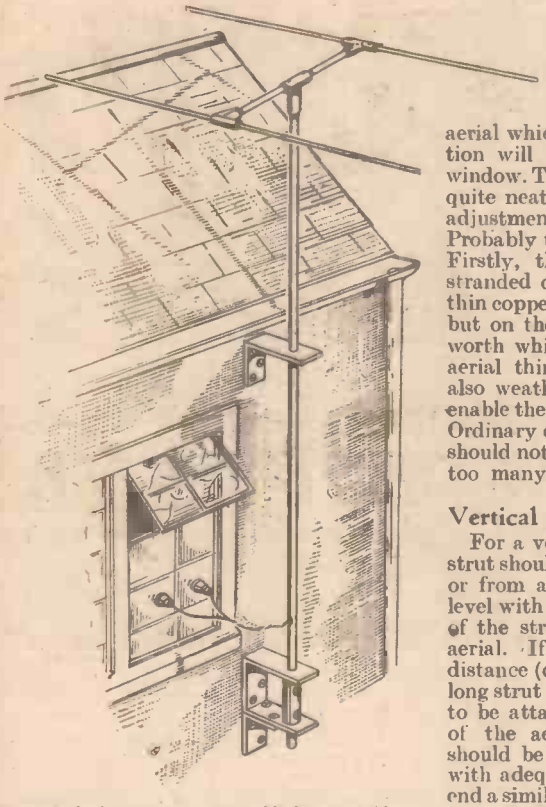
Friday, August 4th.—Cricket: The Ulster Senior Cup Match, a commentary.

Saturday, August 5th.—Wanted, a tune: Schubert or Gershwin? Berlin or Brahms? Orchestral and dance band programme.

DIRECTIONAL BEAM AERIALS

Hints for Erecting Movable Aerials which will Aid in Receiving Long-distance Stations. By W. J. DELANEY

THE transmitter to-day makes use of elaborate aerials designed in such a manner that instead of radiating the signal, it is directed along a beam. Furthermore, in order to make certain of coverage in a given part of the world this type of aerial is often mounted so that it may be turned to direct the beam in the required direction. Although not used to a great extent in this country, the aerials are very popular in the U.S.A., and when listening to some of the amateur transmitters on the higher frequencies one can often hear them explaining as they move the aerial in order to ascertain its effect on signals which are



A method of mounting a rotatable horizontal beam aerial of simple design.

being received. A universal or horizontal type of aerial used with a receiver picks up signals more or less equally from all parts of the compass, and therefore, when it is desired to receive from a given part of the world, a directional aerial will ensure that a high signal-to-noise ratio is obtained. The reduction in noise will often, in fact, enable a station to be read clearly whereas in other conditions it would be unreadable. A few tests have so far been carried out at my station and have provided a number of interesting points. Firstly, due to the contour of the ground it has been found that the station direction alone is not the most important factor. For instance, a standard di-pole with reflector provided good Australian signals when directed almost N.—S. The main factor which it is desired to emphasise is that a rotatable aerial is very valuable and will often enable an adjustment to be made to overcome local conditions.

Types of Aerial

The aerial should preferably be of the di-pole type, designed for a specific wave-band. It may then be fitted with a reflector, or not, just as the operator desires. For maximum efficiency the aerial should be not only rotatable but also adjustable for a horizontal or vertical position, but unfortunately in the average house this is rather a difficult proposition. For normal purposes, therefore, two aerials will be required, one horizontal and one vertical. The height is of the utmost importance, and therefore the roof is obviously brought into demand. We cannot all drill tiles and mount elaborate moving arrays through the roof, and so any aerial which we desire to use in this connection will have to be mounted outside a window. The complete assembly can be made quite neat and tidy, in spite of the various adjustments which may be called for. Probably the simplest plans are as follows. Firstly, the aerial may be of standard stranded copper wire, single thick wire or thin copper tubing. The latter is expensive but on the higher frequencies is definitely worth while. To support the wire type of aerial thin bamboo is not only light, but also weatherproof and sufficiently rigid to enable the minimum of guys to be employed. Ordinary deal scantlings or similar material should not be used as it will warp and needs too many guys or other supports.

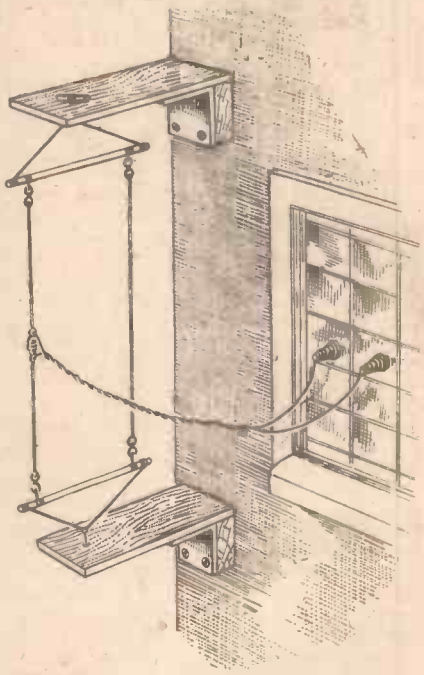
Vertical Assemblies

For a vertical aerial which is rotatable a strut should be attached to the gutter-board or from a chimney stack where this runs level with the side of the house. The length of the strut will depend upon the type of aerial. If a reflector is fitted at the usual distance (quarter or half wave) then quite a long strut will be needed and a guy will have to be attached above it to take the strain of the aerial assembly. The two wires should be attached to a bamboo spreader, with adequate insulation, and at the lower end a similar arrangement must be provided. If the shack is at the lower end of the aerial, then a simple pulley and cord arrangement may be fitted to turn the aerial. If the aerial runs past the shack window, or ends at that level, the aerial may be turned merely by pulling on the feeder cable. This is somewhat crude, but is often employed in view of the avoidance of elaborate equipment and in the interests of economy. If the aerial is only permitted a 180° movement, then no elaborate bearings will be needed and a simple bolt may be used as the pivotal point.

Horizontal Arrays

The horizontal type of aerial is a little more difficult. Firstly, it must have a fairly wide clearance space, and secondly it needs to be clear of the building. This definitely means that it has to go above the roof. If you are using a shack out in a field this may be all right, but in the average house difficulties are introduced. The most satisfactory arrangement can be effected where a sky-light is fitted, as a pane of glass may be removed and a sheet of metal inserted in its place through which the aerial support may be passed. A suitable bearing may be mounted on the metal and the base of the mast may be fitted to the floor of the attic or roof beneath the skylight. The mast may then be easily turned without the need for any driving mechanism. A compass card mounted beneath the support, and an indicating pin will also enable the position of the aerial to be accurately judged. The mast support can be a length of 1¼ or 1½in. welded steel conduit, such as is used for electric-light wiring systems, and the threaded end will facilitate the attachment of the aerial array. This should, of course, be built up on the lines already indicated, using bamboo for the supports and the minimum of guy wires. Car ball-races are obtainable from motor-car scrap dealers and will form a very useful base upon which the aerial can rest, and with suitable spacing the metal supporting mast will not occasion loss. Very large diameter bamboo is obtainable in some parts of the country and could be used for a support in place of the conduit, but if very long it will not carry the weight without bending and is not therefore advised.

Where there is no skylight or other similar means of putting the aerial through the roof, it will have to be supported against the wall, and as the mast will then be capable of being placed close up to the wall the difficulty of a suitable support will not arise.



A simple vertical aerial, with reflector, may be arranged on the lines shown here.

The lower end of the mast may be provided with a large pulley and a cord taken into the room so that it may be turned. A more

(Continued on page 498)

Practical Television

August 5th, 1939. Vol. 4 No. 163.

First Demonstrations

ALTHOUGH Japan is still engaged with war in the Far East, and Italy has many difficult problems of a very varied nature to solve in Europe, both these countries are not allowing technical developments to be neglected, although the rate of progress is necessarily retarded. In Japan the first experimental demonstrations of high-definition television are being made in the capital, and it is interesting to note that the equipment employed follows somewhat on the lines of that used by the B.B.C. Six or seven years ago the Japs showed fine enterprise by conducting some first-class outdoor television experiments, using a portable disc scanner working on the floodlight principle. The most important item shown was a baseball match, but after this work very little was heard until the recent announcements. In Italy, however, work has continued for many years, and steady progress made from the early disc experiments. From time to time steps in this work have been made public by carefully arranged demonstrations, and it was known that a high-definition transmitting station named Monte Mario on the outskirts of Rome was being built. This is now complete, and the first public demonstrations are to be inaugurated in two or three weeks' time. From tests which have already been undertaken, it is expected that the radius of reception will be something of the order of fifty miles.

A Synchronising Suggestion

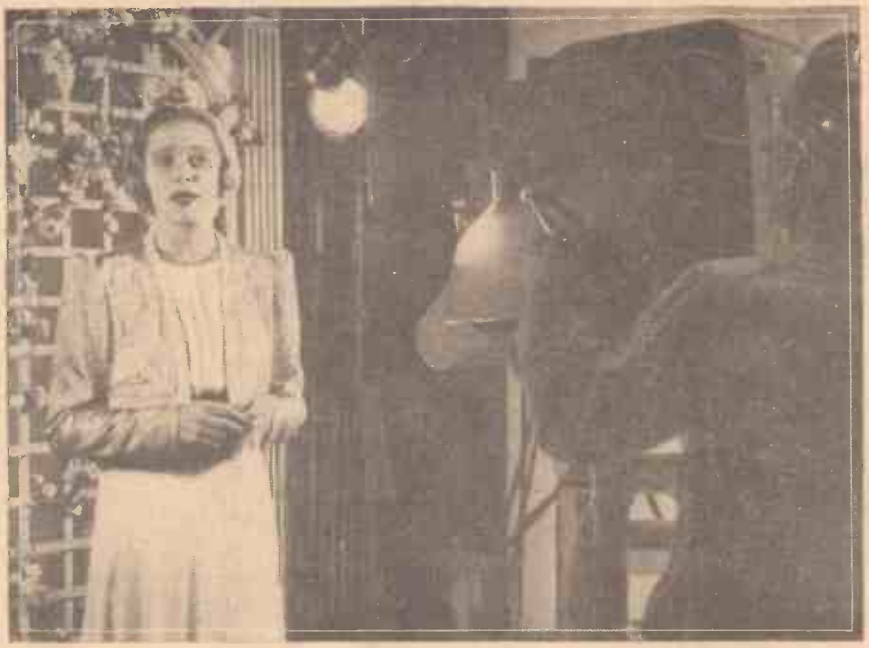
THE problems of synchronising are still of manifest importance amongst set designers, for the quality of a picture can be so easily marred by defects in this section of the equipment. Not only must the combined vision signals and synchronising pulses be separated at the appropriate stage, but the correct triggering of the time base generator must be ensured if a successful picture is to materialise. Many schemes are in use for this purpose, and in one interesting case both the vision and synchronising signals produce a combined voltage variation in a shunt resistance circuit associated with a detector valve. This combined voltage in conjunction with a steady bias fails to trigger an oscillator valve into action, however, until the signal drops to values in the " blacker than black " region, that is below 30 per cent. modulation. When this happens, the oscillator valve functions and generates current pulses which are employed to synchronise the normal time-base generator valves which are providing the usual saw tooth pulses. The oscillator valve pulse is so arranged to be of constant amplitude and take no cognisance of the magnitude of the synchronising pulse but cease as soon as the synchronising signal reverses the direction of the triggering pulse. It is claimed that in this manner a stronger picture hold is brought about in both the line and frame direction because of the independence of the received synchronising pulse magnitude.

A Constructive Approach

THE cinema industry is very anxious to keep in constant touch with the government departments responsible for the development of television, especially insofar as it applies to big screen television, as it is felt that in this way they can mould it to suit at least some of their needs. This constructive approach to the problem is a sound one for the industry is still hoping that it will be possible to arrange for programmes which will be transmitted on one or more wavelengths reserved exclusively for big screen rediffusion. This would completely segregate it from home television and allow subjects to be televised having a mass enjoyment appeal as distinct from that homely fireside atmosphere which characterises so many of the present B.B.C. programmes. If, owing to ether congestion in the television band on the ultra-short waves when the provincial stations begin their service, there seems little likelihood of one or more television wavelengths being available for big-screen working, then the alternative of a wired relay service may merit serious consideration. Up to a fairly recent date it was felt that the cost involved in any wire system of television signal distribution would be prohibitive. Continued research has shown, however, that such need not be the case, for even Post Office telephone lines have been used up to distances of about five miles with suitable terminal apparatus. There does not seem any insuperable obstacle in the way of extending these lengths, and under these circumstances a network of cable link-up between cinemas can be very readily visualised, the signals being derived from some central source charged with generating its own studio programmes, or receiving them by radio and redistributing them to halls with big-screen equipment installed.

Liner Television

WHILE the new luxury transatlantic liners are known to be the last word in comfort as far as the passengers are concerned, a suggestion has now been put forward which will add still more to the amenities offered to those who take the sea trips. The idea is to install a local television circuit so that in the expensive cabins there will be termination points to which a standard television receiver can be connected. In the section of the ship where public entertainments are held will be normal television camera equipment so that each show can be televised, and the resultant signals fed to those cabins where passengers are confined owing to some form of indisposition or because they are loath to join in a crowd. Little difficulty should be encountered in making a scheme of this character work satisfactorily, although naturally a fully trained staff would have to be available to work the apparatus. Furthermore, if receiving aerials were erected on the boat very interesting tests could be undertaken to ascertain whether long-range ultra-short-wave radio reception would be possible from any of the television stations radiating signals. Data on this point is still very vague and uncertain, and any facts derived in this way would prove of value to television engineers.



Miss Alice Marble, the Wimbledon tennis champion, was televised recently. She appeared in the rôle of crooner in " Starlight," from Alexandra Palace. When she is not playing tennis Miss Marble is a professional singer. She has broadcast over the American networks, but never before in this country. Our illustration shows Miss Marble crooning before the television camera.

ON YOUR WAVELENGTH

By Thermion

Poetry Over the Air

THERE are certain forms of entertainment which are unsuited to broadcast. Poetry, as I have said before, is one of them. I have been taken to task by a reader for expressing this point of view. You will remember that I said that all poets plumb the depths of insincerity, and I quoted some of the sickly, sentimental tripe of Tennyson. You can remember some of his lines. "Who cares not to be great but as he saves or serves the State." Referring to duty he says: "He who walks it only thirsting for the right and learns to deaden love of self shall find the stubborn thistle bursting into glossy purples which outredden all the voluptuous garden roses." Referring to the death of the Duke of Wellington he says: "The last great Englishman is low," and in the imaginary interview with Nelson in his tomb, "Mighty seaman, tender and true, and pure as he from taint of craven guile," and so on, and so on, *ad nauseam*. I say, and no one can convince me otherwise, that Nelson was not tender, and he certainly was not pure from taint of craven guile. He was a man like so many other great men who loved to bask in public adulation. Take away the adulation and the glory and the cash, and the public duty would go also. Good horses make good jockeys. Power goes to the head like wine. Authority intoxicates. I therefore repeat that poets who can write such drivel plumb the depths of insincerity. They are merely using an event to demonstrate that they are great poets. Let us examine the work of another poet, Thomas Gray, who wrote the famous Elegy in a Country Churchyard. This is what he wrote:

The curfew tolls the knell of parting day,
The lowing herd winds slowly o'er the lea,
The ploughman homeward plods his weary way,
And leaves the world to darkness and to me.

Now fades the glimmering landscape on the sight,
And all the air a solemn stillness holds,
Save where the beetle wheels his droning flight,
And drowsy tinklings lull the distant folds;

Save that from yonder ivy-mantled tower,
The moping owl does to the moon complain
Of such as, wandering near her secret bower,
Molest her ancient solitary reign.

Now let us examine this in cold logic. The poet says that all the air a solemn stillness holds. Apart from the awkwardness of "all the air a" which is difficult to pronounce, that poem is a piece of contradiction from beginning to end. Let us see how solemnly still the air was. Firstly, the curfew is tolling—clang, clang. The lowing herd is going baa, baa, baa, the ploughman is plodding—plod, plod, plod—and after that the world is left to darkness. We must add, of course, the beetles going whiz, whiz, whiz; the tinkle, tinkle, tinkle of the sheep's bells; the to-whit to-whoo, to-whit, to-whoo of the owls. If that is Gray's idea of a solemn stillness it is not mine, and I do not think that such tripe should be accorded fame. It would make a good basis for a variety stage skit, the lines being announced whilst the noises off gave literal meaning to them. I am afraid, therefore, that my views on poetry remain unchanged.

Note that after the world has gone dark, *the glimmering landscape fades on the sight!*

Radiolympia Conventions

DURING Radiolympia there will be several trade conventions for dealers. I hope that every dealer will attend these conventions, which will be held on Thursday, August 24th between 3.30 and 5.30 p.m. (television), on Wednesday, August 30th and Thursday, August 31st (dealers' convention). Sir Noel Ashbridge and several other well-known speakers will address them. A listeners' convention is also proposed. Some of the conventions will be of a technical character. Dealers should get into touch with the Secretary of the R.M.A., 59, Russell Square, W.C.1, for details of the special terms.

The Cable Link for Birmingham

SOME days ago Mr. F. W. Ogilvie, the Director-General of the B.B.C., stated that the first provincial district to be coupled by cable link would be Birmingham, and that the success of an extension to Birmingham depended on what engineers term a wireless link or a coaxial cable. As a coaxial cable is already laid from London to Birmingham the odds are that they would begin by cable to Birmingham. Thus the hopes of those who thought that there might be a radio link, which would at least be cheaper, have proved groundless.

A.R.P. at Radiolympia

I UNDERSTAND that the plan for an A.R.P. exhibit at Olympia is not to be proceeded with. It is thought that this might have an unsettling effect on the public, and that it might affect sales. I quite agree, because there is not going to be a war, and there is no point in making the public think that there is.

Cheaper Television

THE prices of television receivers are very much down this year, and I believe that many thousands of them will be sold between August and December. The programmes and the receivers are now so good that there is no point in the public waiting further to see which way the cat is going to jump.

A Letter from Graham Walker

IN my notes for the issue dated July 22nd, I had a gentle gibe at the editor of *The Radio Times* concerning a motor-cycle pursuit race at Herne Hill. This also mentioned Mr. Graham Walker, who took part in the pursuit race. The appended letter from Mr. Graham Walker speaks for itself.

"With reference to your notes in your issue of July 22nd, I take no

exception to your querying the choice of the B.B.C. in selecting a motor-cyclist to cover a cycling event. I believe, however, that the Corporation wished the broadcast to be of interest to the general public rather than to cycle racing experts and, apparently, considered I had the necessary qualifications to meet with their requirements.

"The main purpose of this letter is to refute your statement that motor-cycles 'have frequently exceeded' the speeds recorded by H. G. Tyrell Smith, Ernie Nott and myself during our amusing Pursuit Race in 1930.

"If you will supply me with figures showing what you consider to be the fastest time put up by a motor-cycle during motor-paced racing, also the fastest time put up by the well-known exponents of small track racing, I shall be very pleased to supply particulars of the speeds attained during the Pursuit Race under discussion. I think you will find that I shall win the argument!

"As for the suggestion that people did not take cover, it is only fair to add that many people *did*, in fact, move away hastily from the paling fence on the outside of the back stretch—an action which I can assure them was unnecessary, as there was little or no fear of our departing from the straight and narrow path!"

I am much obliged to that famous racing motor-cyclist, Mr. Graham Walker, for writing to me, and if he will let me have the speed at which he rode, I shall be very glad indeed to let him have the official track record figures as applying to this particular track.

I do not know whether any official figures were taken of Mr. Graham Walker's ride, but I do know that figures are available for other motor-paced track events at Herne Hill. I wish Mr. Walker would let me have these so that I could publish them here with the corresponding figures. I understand from the Herne Hill authorities that figures are available for most of the rides, but I have been unable to obtain any official time for his.

The Component Shortage

READERS complain that they are unable to buy some of the components required for amateur-constructed sets from their local stores. This does not mean that there is any shortage of components, but rather that there is a lack of business acumen amongst most radio dealers. The component manufacturers have huge stocks, but dealers nowadays wish to sell commercial receivers. There is not a lack of interest in home construction except amongst dealers. They have been doing their best to kill it for years, but yet have failed to do so. They seek to bite the hand which has fed them. The amateur radio movement provided every firm with its technical personnel, but for the amateur radio movement there would not have been a wireless industry. In the first days of broadcasting it was the amateurs who spread the enthusiasm and the demand. They were the ambassadors for the industry. They coaxed the public in the how and why of radio. When sets were not available, they built them for their friends, in many cases I fear, notwithstanding the royalty problem. Most of the firms commenced by taking on their staffs skilled amateurs, who became their leading designers. Most of those holding important positions in radio to-day were originally amateurs. It is deplorable that the dealers, very few of whom can claim any deep knowledge of radio, should seek to strangle home construction. The only skilled people employed by dealers are amateurs. Most of the service men are amateurs, and most of our leading manufacturers were amateurs. This journal has a healthy circulation to-day, and this indicates that there is a market for which manufacturers should cater. It is interesting to observe that the manufacturers this year at Radiolympia will have a special exhibit which will appeal to home constructors. It will not be jammed amongst the commercial sets, but will be a special little show on its own.

Notes from the Test Bench

Modified Condensers

MANY constructors make use of old variable condensers by dismantling them and reassembling to form a lower capacity. This idea may also be used when a low-capacity high-voltage working type of variable is needed in a transmitter. In this case, it is essential to use a condenser which has really good properties—i.e., good stout vanes, preferably of brass, and high-quality insulation. It should be reassembled with double spacing to avoid flash-over, and if necessary the supporting insulating strips should be replaced by glass or one of the special ceramic materials now on the market. A dismantled valveholder or terminal strip may be used for this purpose. It is essential to make certain that the vanes and spacing washers are all locked really solid and without air gaps.

Flex Feeders

SOME amateurs use ordinary twisted lighting flex as a feeder for a receiving or transmitting aerial. This material is not ideal for the purpose for several reasons. The flex varies in quality and thickness and accordingly it is not possible accurately to gauge its impedance. In any case it is unsuitable for the purpose and a better result may be obtained by using two separate pieces of twin flex, connecting the separate pieces of each in parallel. A greater drawback is that the insulation will not withstand outdoor conditions for very long and it perishes, giving rise to greater difficulties. The special twin feeder, provided with hard weather-resisting insulation should therefore be used in place of flex.

Chassis Design

THE accepted type of chassis for modern receivers is the inverted tray design, where many components are mounted beneath the chassis for simplification of wiring and to provide partial screening. Many constructors still prefer the baseboard type of construction in view of the ease with which circuit tests and measurements may be carried out. A receiver was recently inspected where the two were combined, merely by using the chassis upside-down. The parts were mounted on the inside of the chassis as in a baseboard design, but strips of metal had been run across the side runners to divide the chassis into sections which were adequate for screening purposes, and thus the advantages of both designs were included in a single model. The idea has its merits and is worth developing.

The "Practical Wireless Service Manual"

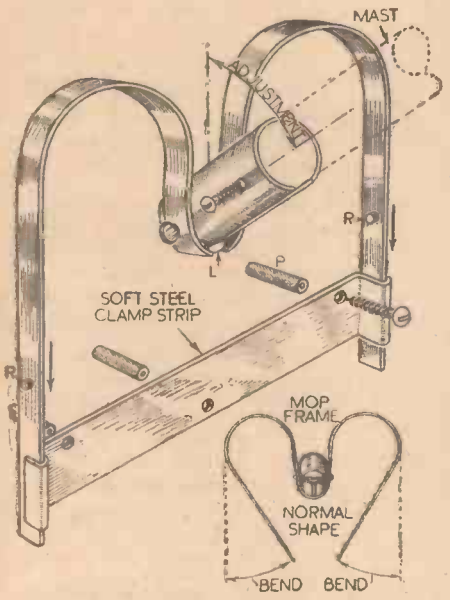
MANY tens of thousands of the "Practical Wireless Service Manual" have already been sold. It is a book which I can sincerely commend to everyone interested in radio, amateur or professional. It is not one of those erudite books published under a flamboyant title, and written by someone who has never been engaged in the industry, and has never had practical training. You know the style of author I mean—the one who speaks learnedly of his laboratory, which usually consists of the corner of the kitchen table, and whose equipment is a 6d. screwdriver, and a red-hot poker, plus a five-shilling meter, which he cannot use.

A PAGE OF PRACTICAL HINTS

SUBMIT YOUR IDEA — **READERS WRINKLES** — THE HALF-GUINEA PAGE

A Wall Mounting Aerial Mast Support

FINDING that a domestic mop frame would serve as a strong wall fitting mast support in a number of different ways, I purchased one for a shilling, and



A novel wall-mounting for an aerial mast.

tried out various methods of hook up, the final fixture being as illustrated.

The "arms" of the mop frame I bent outwards, then proceeded to shape a suitable wall clamp which could be permanently fitted with wall plugs (P), permitting the occasional removal of the frame itself for cleaning and overhauling purposes.

Owing to the lug "L" beneath the swivel mast sleeve, this sleeve rests at an angle and is utilised in this way by myself, but if desired, the frame may be turned round, and slid into the clamp so that a true horizontal mast installation is obtained.

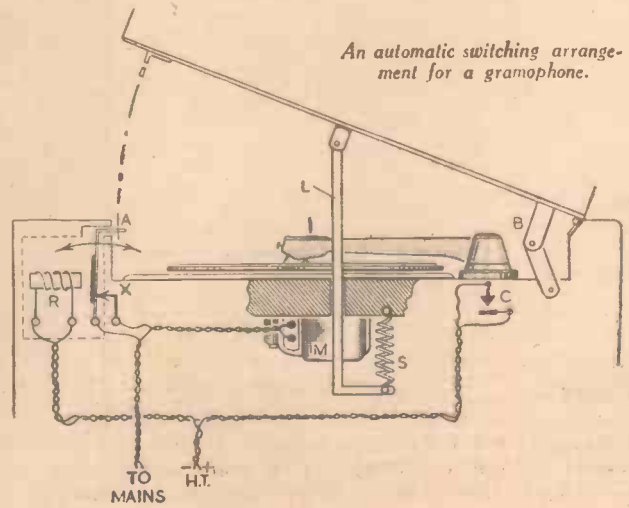
Alternatively, the sleeve may be turned in the angle depicted, for vertical mounting, being held in position by flush mounting against the side of a wall or chimney stack.

To retain the frame arms after sliding into the clamp, two mild steel rivets (R) are punched into holes drilled where shown. A wood screw secures the mast through the existing drilling in the sleeve.—N. G. RAWLINGS (Oldham).

Auto-switching for a Gramophone

THE simple dodge described below makes record changing a somewhat easier job. Many gramophones have an automatic stop, but with this dodge it is possible to raise the lid of the radiogram and stop the motor at the same time.

When the pick-up reaches the end of the record a contact C on its base is closed causing the relay R connected in the main H.T. lead to the amplifier to be energised and draw back the catch A. This releases the lid which is raised by the spring S connected to the lever L which slides through a slot in the motor board, and is hinged to the lid. At the same time the contact at X on the relay is broken and the motor switched off. B is the usual jointed stay for keeping the lid raised, and prevents undue strain on the spring S.—GERALD R. LEWIS (Cheltenham).



An automatic switching arrangement for a gramophone.

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.

SPECIAL NOTICE

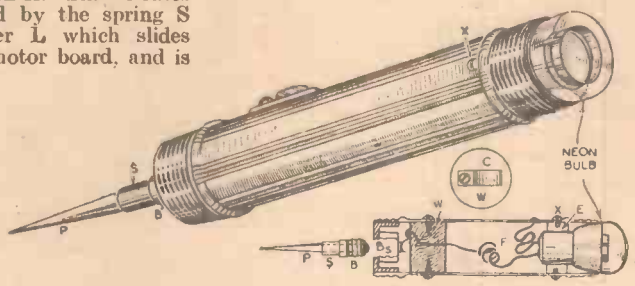
All wrinkles in future must be accompanied by the coupon cut from page 495.

A Neat Case-conducting Neon Test Prod

FOR chassis and power wiring tests (up to 250 volts max.), in relation to earth, I have constructed a neon tester in which the earthy side is indirectly obtained through the body and medium of a metal torch case, as shown in my attached drawings.

Before detailing the construction, I would first like to point out that this test prod is used by holding lightly by the thumb and first two fingers, not at any time in a manual grip, and careful regard is given always to the extent of the earth in every test—for obvious reasons. The torch case battery cap was removed, this end of the torch being used for the neon (Osglim) bulb; then a short length of dowel rod of very nearly the same diameter as the internal diameter of the case, was cut and fitted with a small copper contact (W and C). This contact engages with the bulb holder tip contact, and after providing a connecting wire, the wood is screwed to the case.

To keep the neon bulb in position, a brass collar "E" was drilled and tapped 6 B.A. for the case fixing screws "X" which are just long enough to grip the sleeve of the neon bulb when driven right



A handy neon test prod, and section showing construction.

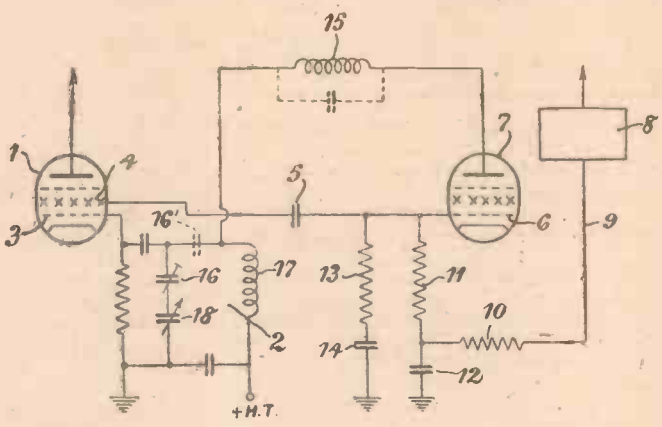
home. Long pieces of flex "F" are necessary for ease of fitment when connecting up the neon bulb and, as illustrated, one "pip" of the bulb is taken and soldered to the tip contact wire in "W," the other pip being connected to the case by passing the bared flex through a small hole drilled in the case and afterwards soldered.

For the prod, I filed down a length of brass rod "P" and with a tight fitting ebonite sleeve "S," securely fitted this into a broken torch bulb base "B," soldering through the pip for continuity when the prod is screwed into the original bulb holder "Bs." The actual torch switch is, of course, not used, but for various other purposes, this switch could introduce or cut out some resistance in the neon circuit.—F.H. SMITH (Bridlington).

New Frequency-control Circuit

An Effective Method of Obtaining Accurate Tuning in a Modern Superhet Receiver

WHEN using automatic frequency-control circuits for superheterodyne receivers, it has been proposed to provide a discriminator unit for deriving a direct current voltage from the intermediate-frequency energy, when the latter shifts from the assigned intermediate-frequency value. In addition to the discriminator unit, a frequency-control valve is provided, electrically connected across the local oscillator tank circuit in such a manner as to simulate across the tank circuit a reactance of a predetermined sign. The direct current voltage output of the discriminator unit is employed to regulate the magnitude of the simulated reactance across the oscillator tank circuit by varying the operating characteristic of the control valve, and the regulation is such that the oscillator frequency is shifted to a frequency depending on the setting of the receiver tuning device, the frequency and strength of the station being received and the discriminator unit characteristic.



An automatic frequency-control circuit incorporating a discriminator unit as described in the text.

The following idea is an improved form of automatic frequency-control circuit in which substantial uniformity of frequency control over a range of frequencies is provided. In this idea, where an automatic frequency control system, including a control valve the gain of which is controlled by a voltage derived from a frequency discriminator circuit and which serves to regulate the frequency of a local oscillator circuit, an impedance or an impedance network is connected between the output circuit of the control valve and the oscillator tank circuit for the purpose of rendering the frequency control effected by the control valve substantially uniform over the range of operating frequencies. This impedance may be constituted by an inductance shunted, if necessary, by a condenser, the inductance serving to tune the anode/earth capacity of the control valve, or that capacity and that of the shunt condenser, to a frequency which is lower than the lowest frequency generated by the local oscillatory circuit.

The diagram shows the main features and in this illustration a local oscillator valve 1 has an oscillatory circuit 2 connected to its control grid 3. The grid 4 is connected through a condenser 5 to the control grid 6 of a frequency-control valve 7. A frequency discriminator circuit indicated by the rectangle 8 provides automatic frequency-control potentials which are conveyed by the conductor 9 through a resistance 10 and leak resistance 11 to the contro grid 6 of the control valve, a condenser 12 being connected between the end of the leak resistance 11 and earth. A resistance/condenser combination 13, 14 is inserted in series between the control grid 6 and earth.

An inductance coil 15 is connected between the anode of the frequency-control valve 7 and the high potential end of the oscillatory circuit 2. This inductance is provided primarily to improve the control of the lower frequencies of the band of frequencies covered by the system, and its value is selected so as to tune the anode/earth capacity of the control valve 7 to a frequency which is lower than the lowest frequency of the oscillatory circuit 2.

The variation in the extent of the frequency control over any given waveband depends upon the effect of the wave-change switching arrangements upon the padding condenser 16 in the local oscillator circuit. It will be understood that the local oscillator circuit connections shown apply to a given band of frequencies, but a different size of inductance coil 17 may be switched in on other wavebands. While the connections shown are convenient in particular cases, it is sometimes inadvisable to include in the switching arrangement the condenser 18 of the local oscillator circuit, which is ganged with the main tuning condenser of the high-frequency circuits. If the switching is such that the padding condenser 16 for any waveband is connected in the position 16, shown in dotted lines, then the necessity for the provision of a form of impedance connection, as described in this suggestion, is increased.

The correction introduced at the lower frequency end of the band enables substantially uniform control to be effected over the range of frequencies covered by the system. The inductance may, if necessary, be shunted by a condenser or, if desired, the inductance may be replaced by another form of impedance or by an impedance network, in order to effect a greater degree of correction. The inductance 15 or network which may be used instead of that inductance, may also serve to effect correction of undesired phase-shift of the potentials fed to the frequency-control valve from the local oscillator.

Special Programme Features

"Mr. Mike Walks in"

"MR. MIKE Walks In" is the title of a new series of broadcasts from Stagshaw, in which the microphone, under the guidance of Ewart Kempson, will "call" and "hear" what the family in an ordinary household has to say about things in general, work in particular, and current events of importance. American listeners are already familiar with this type of programme, and Cecil McGivern, of the B.B.C.'s Newcastle staff, thinks that listeners in this country may find the experiment of interest. The first of these programmes will be broadcast on the Northern and Stagshaw wavelengths on August 12th.

"Don't Tell England"

IT used to be a standing joke in the Middle Ages that an angry Englishman cannot sit down because he has a tail like a pig's and an angry pig puts his tail up.

The foreigners who visited England before the eighteenth century seem generally, from their descriptions, to have found the Englishman a strange and savage animal. They could not understand his language and he did not want to understand theirs. Hence a long series of surprises and misunderstandings for both parties, which to-day make entertaining hearing.

The eighteenth century brought a change. Voltaire set the fashion for things English on the Continent and, since his day, foreign travellers have generally tried and often succeeded in understanding England better than their predecessors.

A programme called "Don't Tell England," which has been written by Igor Vinogradoff and will be produced on August 6th by M. H. Allen, will "play back" a series of short dramatised scenes between foreign visitors and Englishmen from the Middle Ages to the present day

"The Thirty-nine Steps"

THE third episode in John Buchan's thriller "The Thirty-nine Steps," which is being serialised in the Scottish and Regional programmes, will be broadcast on August 6th. The title of this instalment, "The Local M.P. and the Roadman," brings listeners to one of the most breathless episodes of the entire story. In the previous week the hero, Richard Hannay, found Scudder, an American journalist, murdered in his flat in London, obviously by the Black Stone Secret Society. Hannay escapes to Scotland with the notebook of cryptic messages by means of which he may be able to frustrate activities of the gang who want to plunge Britain into war by the assassination of a prominent foreign statesman three weeks later. Hannay is being pursued across moors by the Black Stone gang, who are hunting him both by aeroplane and by car.

Cathode-ray Improvement

A Method of Correcting Curvature of the Field and Image Distortion is Explained in this Article

IT is generally realised that the deflection of the beam in cathode-ray tubes in many cases involves less expenditure of energy (in other words, the deflection sensitivity is greater) if performed before the electrons are given their final acceleration (i.e., at low voltage, and hence low velocity) instead of after that stage, which is more usual. This known fact would doubtless have found wider application had it not been for certain difficulties which arise in the focusing of a good clear picture on the screen.

The two main troublesome effects encountered when the principle of "post acceleration" is employed are curvature of the field, and image distortion, due to the final electron lens.

It is, however, possible to overcome these difficulties, as the following considerations will indicate:

Fig. 1 shows the path taken by the electrons between the point of deflection and the formation of an image upon a screen. Focusing of an electron beam 1 from a cathode (not shown in the drawing) is effected by anodes 2 and 3 between which an electron lens is formed. Deflection of the electron beam 1 is effected by coils 4 and 5. A further lens is formed between anodes 3 and 6, and a final lens is formed between the anodes 6 and 7, the beam 1 then being brought to a focus upon a screen 8. An intermediate image is formed at the surface 9, and if this image is flat, the image finally focused upon the screen 8 will be excessively curved as shown in the figure. This curvature becomes evident as poor definition of the image projected upon the screen. If now the intermediate image is caused to have a curvature, as illustrated at 11 in Fig. 2, the curvature being much smaller than, and opposite to, that at the screen 8 in Fig. 1, the final image at the screen will be sharply focused at all points. The desired curvature of the intermediate image 9 may be obtained by adjustment of the voltages applied to the anodes 6 and 7.

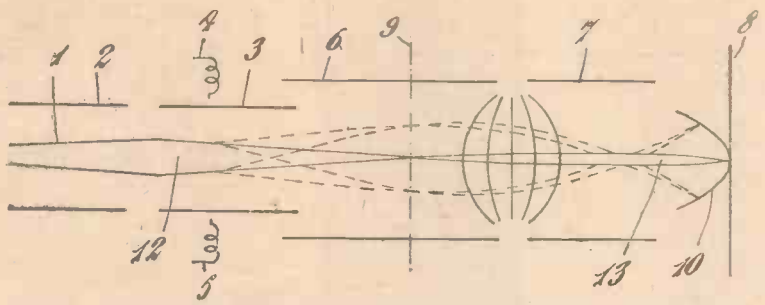


Fig. 1.—The path of the electrons is depicted above, the screen being represented by 8.

Apart from the undesired curvature which is set up, distortion of the image occurs due to the fact that the electrons composing the beam do not pass centrally through the final electron lens. The entrance pupil 12 is effectively in the plane of the scanning coils 4, 5; and the exit pupil 13 is at the point conjugate to this plane, as shown in Fig. 1. Distortion can be considerably reduced if the final electron lens between the anodes 6 and 7 is designed to be free from spherical aberration and, if possible, from coma, with respect to the entrance and exit pupils regarded as object and image respectively. The final electron lens is, therefore, designed and operated with voltage ratios determined by this consideration. The same principle will apply in the case of a virtual image at the right or left of the final electron lens.

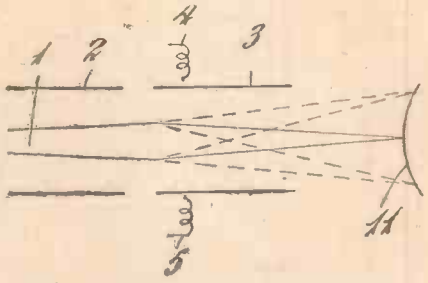


Fig. 2 shows the intermediate image having a curvature opposite to 8 in Fig. 1.

TELEVISION FEATURES

"THE DAY IS GONE"

A KEATS poem has given the title to this eerie play by W. Chetham-Strode, which Royston Morley produced in the evening television programme on July 27th. With the scene laid in a small South Coast town, the play concerns Stanley Thatcher, a chemist with a nagging wife, Mabel. Rose Spiller is in love with Thatcher, and he with her, and when she wins a large prize in a Derby sweepstake and Mabel conveniently dies, they marry. But Mabel's brother, Inspector Webb, also wanted to marry Rosie and, becoming suspicious about his sister's death, stirs up trouble. With Olga Lindo as Mabel, and Valerie Tudor as Rosie, the cast also includes Torin Thatcher and Arthur Wontner.

The author has written a new ending which will be used in this television version of "The Day is Gone," and probably in its projected production in America.

A repeat television performance will be given in the afternoon programme on August 4th.

NOVA PILBEAM IN TELEVISION

NOVA PILBEAM made her television début as Suzanne in Peggy Barwell's special adaptation of "Prison Without Bars," a tragi-comedy of youth, on the evening of July 29th. The strong cast also included Jill Esmond, Sebastian Shaw and Margaret Yarde.

Although "Prison Without Bars" has been filmed both in France and England, the television version contains new scenes and dialogue, so that viewers who have already seen the films will be able to tune in to an entirely new production, for only the basic plot remains the same.

Moultrie Kelsall is the producer of the play, which will be repeated in the afternoon of August 8th.

SPAIN'S NEW BROADCASTING SCHEDULE

PENDING the re-organisation of the Spanish State radio network the schedule of the radio transmission has now been established as under: *Radio Nacional* (Burgos), 238 m. (1,258 kc/s); G.M.T. 09.00-09.30; 14.00-15.00; 19.00-23.45; *Barcelona* (1), 377.4 m. (795 kc/s), G.M.T. 08.00-15.00, 18.00-22.30; *Barcelona* (2), 293.5 m. (1,022 kc/s); G.M.T. 08.00-15.00, 18.00-22.30; *Madrid*, 274 m. (1,095 kc/s); G.M.T. 08.30-09.00, 14.30-01.00; *Saragossa*, 352.9 m. (850 kc/s); G.M.T. 08.00-09.00, 13.00-16.00, and 18.30-24.00; *Seville*, 410.4 m. (731 kc/s); G.M.T. 08.30-09.00, 13.30-16.00, and 19.00-24.00. Of the smaller stations the following are now daily on the air: *Badajoz*, 201 m. (1,492 kc/s); *Bilbao*, 201 m. (1,492 kc/s); *Burgos*, 208 m. (1,445 kc/s); *Logrono*, 206.9 m. (1,450 kc/s); *Melilla* (Spanish Morocco), 200 m. (1,500 kc/s); *Pampluna*, 227 m. (1,320 kc/s); *Xeres*, 201 m. (1,492 kc/s); *Santander*, 200 m. (1,500 kc/s); *Valladolid*, 201 m. (1,492 kc/s); and *Zamora*, 209 m. (1,425 kc/s).

RADIOLYMPIA—A

Names of Exhibitors and So Expect to See and Some of to See at This Ye

WITH only three weeks to go before Olympia opens its doors, manufacturers are getting busy with new ideas and designs which can be introduced for the first time to the public at the Annual Radio Show. As in previous years, there is a great deal of "hush hush," and hints are passed on from one place to another regarding some of the marvellous things which will be seen. So far, of course, there is a reluctance to broadcast the new things and thereby anticipate much of the excitement which rises to its peak during the middle of the month, but the Gramophone Company, makers of the well-known H.M.V. receivers, have revealed one of the developments which will be seen in their new models. Incidentally, a similar feature

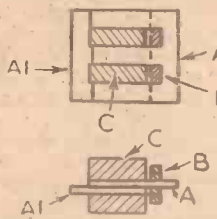


Fig. 1.—Sectional details of the H.M.V. permeability automatic frequency control unit.

will be found in the new Marconiphone models. This feature is merely described by the makers as "permeability automatic volume control."

This system of permeability automatic frequency control is but one of the really important developments in radio which has emerged from "His Master's Voice" design laboratories, and is incorporated only in instruments manufactured at Hayes.

Permeability automatic frequency control is, undoubtedly, an important step forward in radio, and is a point which dealers can hammer home to advantage.

Here is an explanation of the system which will interest our readers.

The effect of the change in the incremental permeability of an iron circuit with D.C. flux has been well known for some time, and this principle has been applied for obtaining automatic frequency control in the new range of models.

The control unit consists of mu-metal laminations passing through the centre of two coils. One of these, which is used to control the flux in the iron circuit, consists of a large number of turns, the other is a coil of few turns connected to the oscillator tuned circuit to produce the necessary frequency change in the oscillator.

In the early experiments the large coil was used as the actual diode load in the discriminator circuit, the diode current producing the required change in flux. This was quite satisfactory except for the fact that it caused rather heavy damping across the tuned circuit with a subsequent loss in selectivity and sensitivity. This method was therefore dropped in favour of the present method of connecting the flux coil in the cathode circuit of either the L.F. or I.F. valve and using it as a D.C. amplifier. In the case of a receiver without an H.F. stage, it is necessary to connect the control unit in the cathode circuit of the L.F. valve. Obviously we cannot have A.V.C. on a valve with the unit in its cathode circuit, and, therefore, with a receiver of this class, we cannot use the I.F. valve, since if we did, the A.V.C. action would be very poor, the mixer being the only controlled valve. In the case of a receiver with an H.F. stage, it is better to use the I.F. valve, as this has a higher slope and is less likely to affect the audio output of the receiver.

Referring back to the control unit, it will be seen from Fig. 1, showing the construction of the unit, that this consists of "E" shaped laminations "A" and "A1," an H.F. coil "B," comprising part of the oscillator-tuned circuit, and a coil "C," to carry the direct current which is dependent on the mistuning of the receiver. The cross

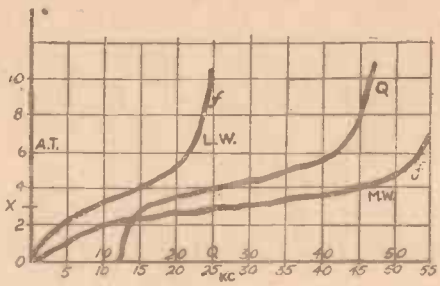


Fig. 2.—Curves showing the effect of D.C. current through coil C.

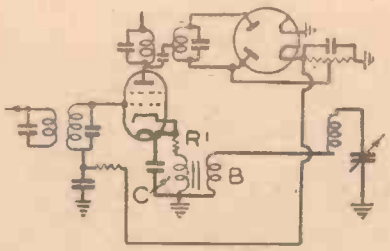


Fig. 3.—Theoretical circuit diagram showing the application of the permeability auto-frequency control.

sectional area of the iron passing through the H.F. coil should for best operation of the unit be smaller than that passing through the coil "C." This is obtained by not allowing the laminations "A1," passing through the coil "C," to enter the coil "B."

The action of the unit is as follows:

When direct current is passed through the coil "C," a change in the inductance of coil "B" is produced by the change in incremental permeability of the iron traversed by the H.F. magnetic flux. This effect causes the inductance of the coil "B" to be reduced, which, when connected in the oscillator circuit, increases the frequency. It has been found that the distance between coils "B" and "C" is rather important in that, due to the coupling through the iron circuit between the two coils, a change in inductance of coil "B" is produced by the variation in coupling between the two coils when D.C. is passed through the coil "C." This change in inductance is the opposite of that obtainable by the change in permeability. Although this effect may be serious at close spacing and seriously reduce the overall change in frequency, it falls off rapidly as the distance between the two coils is increased. It has been found that this second effect is reduced to a negligible amount when the spacing between the two coils reaches about $\frac{1}{16}$ in.

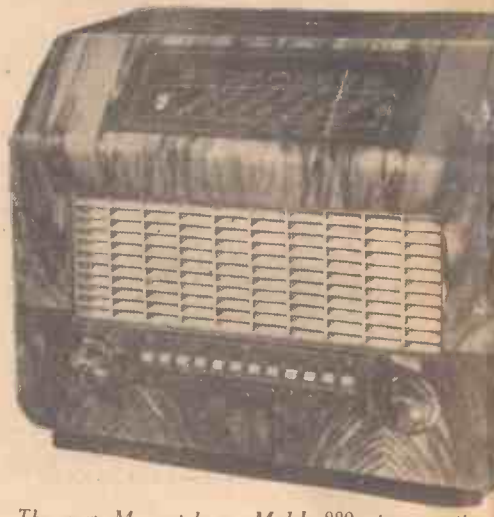
To obtain an efficient unit it is important that the coil "B" is wound as close as practicable to the iron core, in order that as much of the flux as possible shall pass through the iron core.

The curve shown in Fig. 2 is that obtainable when direct current is passed through the coil "C," the H.F. coil "B" being connected in series with the oscillator inductance. It will be seen from the circuit diagram, Fig. 3, that the coil "C" is connected in the cathode of the I.F. valve, which is biased in the normal manner by the cathode resistance R1. The cathode current passing through the coil "C," with the absence of any signal, biases the coil "B" to some point (X) on the curve. This point is usually about three ampere turns.

The discriminator, which may be arranged in the anode circuit of the I.F. valve, has its diode load in the earth end of the grid circuit, as shown. Errors in tuning will produce a voltage varying in polarity and amplitude which will swing the cathode current up or down and so change the frequency of the oscillator to compensate for that error.

Using a triode-hexode of the X.65 class, it has been possible to obtain a frequency shift 55 kc/s at 1,500 kc/s, which varies proportionally to the frequency. On the long waveband, a larger coil is connected in circuit, and on this band a frequency shift of 22 kc/s at 700 kc/s was obtained as shown in Fig. 1. The limitation of the frequency shift is brought about by the damping produced in the oscillator circuit. The greater the efficiency of the oscillator circuit the more shift it will be possible to obtain by increasing the number of turns on the coil "B."

One of



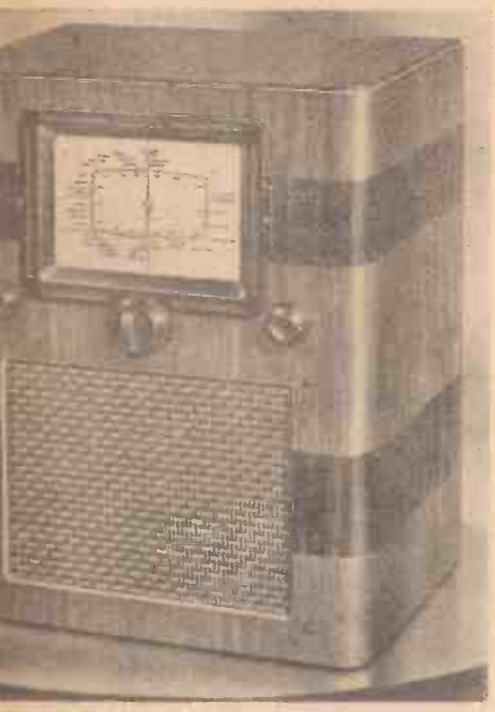
The new Marconiphone Model 880—incorporating "Auto-Drive" self-operating tuner.

DVANCE DETAILS

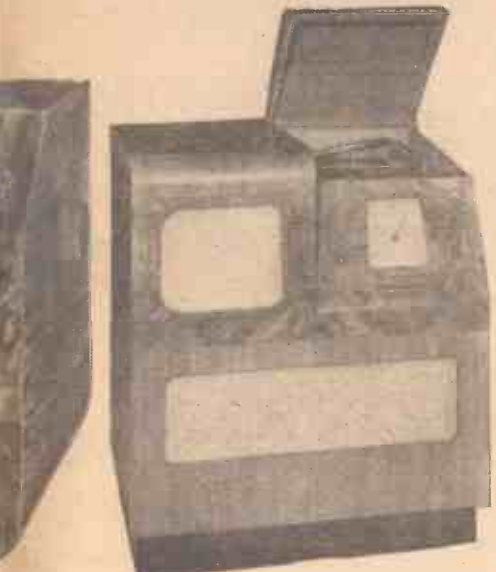
ome of the Things We May the Things We Should Like r's Radio Exhibition

Investigations are continuing on this system, and it is felt that the limit of its developments has not yet been reached.

This, then, is one of the new things which will be seen, and which offers to experimenters some new angle on modern receiver design with which they can experiment.



the new season's Cossor receiver—a 3-valve battery model 30.



a novel The new G.E.C. television-auto-radiogram, model BT.0124.

Television

In the direction of television one or two firms have hinted that apart from a general improvement in detail and picture size, the overall size of cabinets will be considerably reduced, mainly due to the new types of cathode-ray tube which are now available. There are, of course, many features which we should like to see in the television receivers, but, unfortunately, the art has not yet developed to the stage where they can be incorporated. Nevertheless, we think that the average man will be very surprised at the developments which have taken place, especially if he has not seen television since the last exhibition. We should like to see some units designed for the home-constructor, with which television receivers could be built up satisfactorily with a minimum of testing and adjusting difficulties. At the moment, of course, there is a dearth of such apparatus.

Amateur Receivers

There will also be some interesting new "communications" type receivers, a branch of radio which is receiving increasing attention by those firms who specialise in the supply of apparatus for the amateur, as distinct from those who only cater for the general listener to broadcasting. In this connection also we should like to see many more parts of the "unit" type available for the home-constructor so that the construction of this type of apparatus could be simplified, and efficiency at the same time increased. For instance, what about a complete crystal filter unit, ready assembled in its own screening box and as simple to connect in an existing receiver as a standard I.F. transformer? Also, a frequency-meter tuner which would ensure accurate tuning on the higher frequencies, when once it was installed. We should also like to see a complete amateur bands tuner with self-contained switching, built up to a standard—not down to a price—but which would compare favourably with the American units which unfortunately are not readily accessible in this country.

However, perhaps we shall have some of our hopes realised when the doors finally open, and on some of the stands shall see the aids we have mentioned. The following is a list of the firms who have taken space this year, and the numbers of their stands:

EXHIBITORS AT RADIOLYMPIA

THE latest lists issued by the Radio Manufacturers Association give the following firms and Stand Nos. for the forthcoming exhibition:—

Name.	Stand No.
Aerialite, Ltd.	60
Antiference, Ltd.	10
Armstrong Mfg. Co.	69
A. J. Balcombe, Ltd.	37
Baird Television, Ltd.	27
Belling Lee, Ltd.	3 and 26
British Insulated Cables, Ltd.	20
British Pix Co., Ltd.	64
British Railways, Ltd.	4
British Rola, Ltd.	24
Brown Bros., Ltd.	T. 8
A. F. Bulgin & Co., Ltd.	62
Burndept, Ltd.	54
Bush Radio, Ltd.	34
Carr Fastener Co., Ltd.	66
Celestion, Ltd.	25
Chloride Electrical Storage Co., Ltd.	2
E. K. Cole, Ltd.	47
Cosmocord, Ltd.	72
A. C. Cossor, Ltd.	48
Decca Radio & Television, Ltd.	44
Department of Overseas Trade	74
A. J. Dew & Co., Ltd.	T.10
Dubilier Condenser Co., Ltd.	28
Dynatron Radio, Ltd.	1 & 39

The new Pilot 4-valve battery all-wave superhet, Model B-34.

J. J. Eastick & Sons	T. 7
W. G. Eavestaff & Sons, Ltd.	73
The Econasign Co., Ltd.	14
The Edison Swan Elec. Co., Ltd.	23
Gordon Elf, Ltd.	21
E.M.I. Service, Ltd.	100
Erie Resistor, Ltd.	13
Ferguson Radio Corpn., Ltd.	17
Ferranti, Ltd.	41
Garrard Eng. & Mfg. Co., Ltd.	56
General Electric Co., Ltd.	35
Goodmans Industries, Ltd.	19
Gramophone Co., Ltd.	46 & 53
F. C. Heayberd & Co.	57
Hobday Bros., Ltd.	T. 6
Holsun Batteries, Ltd.	40
Iliffe & Sons, Ltd.	6
Alfred Imhoff, Ltd.	70
Invicta Radio, Ltd.	16
Lugton & Co., Ltd.	T. 9
McMichael Radio, Ltd.	38
Marconi-Ekco Instruments, Ltd.	109
Marconiphone Co., Ltd.	36
Mercantile Credit Co., Ltd.	67
Mullard Radio, Ltd.	55
Murphy Radio, Ltd.	33
New Era Publishing Co., Ltd.	5
New London Electron Works, Ltd.	59
NEWNES, LTD., GEORGE	9
Odhams Press, Ltd.	T. 3
Philco Radio & Television Corporation of G.B., Ltd.	31
Pilot Radio, Ltd.	42
Philips Lamps, Ltd.	45
Plessey Co., Ltd.	68
Pye, Ltd.	32
Radio Gramophone Development Co., Ltd.	29
Reproducers & Amplifiers, Ltd.	111
Norman Rose (Electrical), Ltd.	12
R. A. Rothermel, Ltd.	71
Scophony, Ltd.	49
Scott Insulated Wire Co., Ltd.	103
Selecta, Ltd.	T. 4
Henri Selmer & Co., Ltd.	T. 2
Servisol, Ltd.	11
Siemens Electric Lamps & Supplies, Ltd.	52
Steatite & Porcelain Products, Ltd.	61
Sterling Batteries, Ltd.	65
Taylor Electrical Instruments, Ltd.	101
Telegraph Condenser Co., Ltd.	63
Telegraph Construction & Maintenance Co. Ltd.	22
Thompson Diamond & Butcher, Ltd.	T. 5
Trader Publishing Co., Ltd.	7
Ultra Electric, Ltd.	43
Vacuum Science Products, Ltd.	18
Varley (Oliver Pell Control)	108
Vidor, Ltd.	51
Waverley Book Co., Ltd.	8
Westinghouse Brake & Signal Co., Ltd.	30
Wingrove & Rogers, Ltd.	110
Wright & Weaire, Ltd.	102

THE WONDER OF THE ATOM

In This Article the History and Development of the Atom is Briefly Described

WHEN the famous English chemist Dalton "discovered" the atom in 1832, scientists thought that the riddle of matter was solved. From that date we have been apt to think of it as a speck of something which is the ultimate state of matter, the smallest particle, so to speak, into which a substance can be divided. The first jolt to our imagination came with the discovery around 1890 that

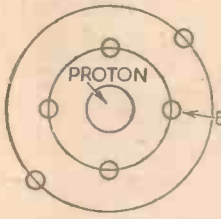


Fig. 1.—The Rutherford atom.

the atom was not the smallest particle, but that these could be further divided into electrons. First of all it had to be decided exactly how the electrons went to make up an atom. Lord Rutherford and Sir J. J. Thompson, two Englishmen whose names will go down into history like that of Newton, startled the twentieth century with the picture of the atom as being a little universe in itself.

The atom, they said, consisted of a centre, or proton, around which the electrons were arranged in the manner of satellites revolving around the sun. The whole was self-contained and practically indestructible; that is to say, the electrons could not be torn from their orbits around the proton. Scientists in all countries set to experimenting and to everybody's pleasure the atom as pictured by the two Englishmen answered splendidly to their requirements, so that mathematical theory began to murmur that not only was the origin of matter solved but they could predict the results of experiments beforehand by calculations.

Unexpected Results

But somehow or other things began to go wrong. First of all, one or two experiments produced entirely unexpected results. They not only were unexpected, but unfortunately contradicted some of the earlier experiments. Slowly but surely the seemingly perfect structure of theory began to crack here and there, more contradictory experiments came in from this country and that until affairs looked like becoming mildly chaotic.

A German, whose name is now a domestic word in science, Max Planck, pointed out that our conception of how the atom with its electrons behaved wanted modifying. He introduced the famous Quantum Theory which said that energy could pass into and out of the atom only in small "packets" or quanta. For the time being the trouble among scientists was smoothed out, at least temporarily.

There now entered the stage a young pupil of Rutherford, a Swede by the name of Niels Bohr, gifted with a penetrating imagination backed by a thorough grasp of mathematics, who twirled, as it were, the electrons of the atoms into motion. The Rutherford action became the Bohr idea of an atom; a proton around which the electrons whirled at incredible speed. All the electrons followed particular paths, in some cases circular orbits, in others ellipses. Once again the furrowed brow of science was smoothed and everywhere experiments began to reveal the reality of this new picture of an atom. It was successful in further explaining radiation, the phenomena of heat and other mysteries. The possibility of splitting the atom became an accepted fact.

Discovery of Radium

Radium had meanwhile been discovered, while Einstein had published his Relativity Theory, both of which were to play a big part in the development of our knowledge about the atom. This brought us to 1913.

The following ten years were not only crammed with surprise, but a shadow, too, was passing over the scientific world. The atom so confidently thought to be a concrete thing in the mind, made up of a proton surrounded by revolving electrons, gradually began to recede from reality.

Instead of experiments bringing man nearer to the truth about matter, they carried him farther away.

He was, therefore, confronted with the

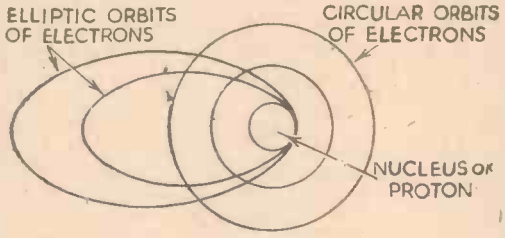


Fig. 2.—The Bohr atom.

anomaly of finding out more about a subject and knowing less. Wonderful apparatus had been devised which could split the atom, send its component electrons in any devised direction. Spectroscopes had been brought to an unheard-of state of efficiency and accuracy to watch the behaviour of an atom when it was vibrating, being split up or formed to other atoms. By what is known as a Wilson cloud-chamber, the path of an electron could be followed as clearly as a meteorite rushing through the heavens. There was little that the physicist could not do, and new important facts were being produced daily in almost every country of the world where scientists were at work.

A Curious Thing

Still the atom continued to recede as something we could never hope to explain. About the middle of the 1920's things came to a pretty pass; to use a colloquialism. We could not shake off the idea that the atom and the electron were something substantial. It was agreed that they might only be ultimately a kind of point charge of electricity, but, nevertheless, something that we could place in our idea. The curious thing, however, about the whole story was that the electron could behave like a wave or simply like a corpuscle, according to the experiment we chose to illustrate the property.

The path of science is lined with brilliant men, and when it reached 1927 one traveller to appear on the road was a Frenchman by the name of de Broglie. Of a titled family, a prince by birth, this young mathematician sprang an entirely new idea upon science. He asked, why consider the electron as something material or like a corpuscle? Why not simply consider it as a wave of energy and leave it at that? Just suppose that electrons are waves of energy following around the proton or centre of the atom. With the intuition of genius he predicted mathematically that electrons would show the wave character clearly if we could find a small enough lattice through which to pass them and cause diffraction, as with light.

Wave of Energy

G. P. Thomson in England and Davisson and Germer in the United States quickly supplied the answer. They used the atoms contained in a crystal as the grating and the electrons, as forecast, were seen to be waves of energy. This was in 1929.

The 1930's then saw the entry of a new kind of scientist, the mathematical philosopher. The conception of the atom as a reality had now receded so far that the ordinary scientist felt he was just beating the air in his attempt to find out exactly what an atom was like. Schrodinger and Heisenburg are two of these new scientists who stand out. They revealed that the atom must no longer be thought of as a little universe of its own, having a central sun and revolving planets. Our mind must, therefore, be rooted out from the idea that this little universe which, incidentally, measures less than a billionth of an inch across, can be pictured at all. Think of it, they say, as merely a mathematical abstraction. The electron is not a "something" but a "probability" that a wave will have its crest at that point.

For Ever Hidden

It is a sad fact that the atom as we know it has gone, vanished into unsubstantiality. It no longer exists as we would like to think of it in Figs. 1, 2 and 3, which represent the history of development of the idea of the atom. And it is an

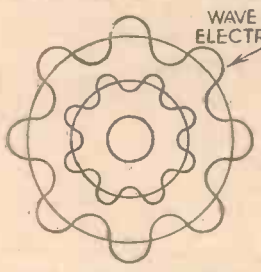


Fig. 3.—The De Broglie atom.

equally sad fact for those who would like to quarrel with this new conception of "matter" on the grounds that it leads us nowhere, that the new mathematical picture is justifying itself on all sides with experiments.

Leaves from a Short-wave Log

Swiss Short-wave Broadcasts

OWING to the fact that the Schwarzenburg (Switzerland) short-wave station was seriously damaged by fire on July 6th and 7th, the service which these transmitters were to carry out will be transferred to the League of Nations station at Prangins. In the meantime, until Schwarzenburg has been rebuilt the broadcasts have been fixed as under: For South America, through HBO, on 26.31 m. (11.402 mc/s), in German, French, and Italian, B.S.T. 00.45-02.15 every Tuesday; on Thursdays at the same time, in Spanish through HBJ, on 20.64 m. (14.538 mc/s). For North America, every Tuesday at B.S.T 02.45-04.15 through HBO in three languages, also on Thursdays, in English through HBJ. For Africa, every Tuesday at B.S.T. 18.45 through HBO, in three languages, and on Saturdays at the same time through HBO in English. For the Far East on Fridays between B.S.T. 14.45-16.30 through HBF on 16.26 m. (18.45 mc/s) in three languages; for Australasia every first Sunday in the month between B.S.T. 06.45-08.30 through HBJ and HBO in three languages, including English. The channels used for North and South America are interchangeable according to atmospheric conditions.

Spanish Short-wave Transmissions

WITH the end of the Civil War and the taking over of all radio stations by the Franco Government complete reorganisation is taking place in the Spanish radio network. The schedule for the short-wave transmitters is now officially announced. The following stations are now in regular operation:

Alcazarquivir 42.12 m. (7.125 mc/s); G.M.T. 12.00-17.00, 19.30-20.30, 00.45-01.00; *Burgos*, 40 m. (7.5 mc/s) relays the *Radio Nacional* programmes from G.M.T. 09.00-09.30, 14.00-15.00 and 19.00-23.45; *Ceuta* (Spanish Morocco), 42.05 m. (7.134 mc/s) is on the ether daily between G.M.T. 18.20-20.00. *Cordoba*, 42.15 m. (7.117 mc/s), G.M.T. 17.00-08.00, 23.00-24.00; *Huelva*, 42.69 m. (7.027 mc/s) works between G.M.T. 14.15-15.30, and from 22.30-24.00; *Jaca*, 21.25 m. (14.115 mc/s) and 41.8 m. (7.117 mc/s) from G.M.T. 01.00-01.30, 14.30-16.30, 17.00-18.00 and 22.30-24.00; *Las Palmas* (Canary Islands) on 20 m. (15 mc/s) and 41 m. (7.391 mc/s), G.M.T. 13.00-14.00, 17.00-18.00 and 21.30-02.30. The two Madrid Stations, EAQ and EAR, on 30.43 m. (9.86 mc/s) and 31.62 m. (9.49 mc/s) respectively, are to be heard on weekdays from G.M.T. 20.30-21.30, and from 00.30-02.30; on Sundays from 21.00-21.30, or sometimes later. *Malaga* operates on two channels, namely, 20.7 m (14.44 mc/s) and 41.54 m. (7.22 mc/s) between G.M.T. 14.00-15.00 and 21.30-01.30. *Melilla* (Spanish Morocco) uses 41.73 m. (7.19 mc/s) and 41.95 m. (7.151 mc/s) from G.M.T. 16.05-17.30, 17.30-18.30 and from 02.00-03.00. *Oviedo* is now to be heard on 40 m. (7.15 mc/s) from G.M.T. 11.00-19.00, 21.00-23.00 and from 02.00-03.15. *San Sebastian* on 42.6 m. (7.042 mc/s) from G.M.T. 08.30-09.00, 19.00-21.00; *Santander* on 41.9 m. (7.16 mc/s) from G.M.T. 09.00-09.30, 14.00-14.30 and from 18.00-23.00. In addition to the Melilla and Ceuta Stations, Spanish Morocco also operates *Tetuan* (1) on 41.6 m. (7.211 mc/s) between G.M.T. 13.30-15.00 and 18.30-19.15, and *Tetuan* (11) on either 21.36 m. (14.05 mc/s), or 40.14 m. (6.996 mc/s) between G.M.T. 01.30-02.00 and 03.00-05.30. *Valladolid* (Spain) now on 42.83 m. (7.006 mc/s) relays Radio Nacional between G.M.T. 13.30-15.00, 17.30-20.00 and 21.30-23.00. A new station at *Villa Sanjurjo* works on 41.93 m. (7.147 mc/s) between G.M.T. 14.00-14.30, and 20.00-22.45. Finally, *Radio Vittoria* relays the Burgos transmission on 25 m. (11.991 mc/s) daily from G.M.T. 01.30-03.00, 13.30-15.00, 18.00-18.45, and from 21.30-22.30.

RETAINING HIGH FREQUENCIES IN TELEVISION

THE true value of high-definition television pictures is lost unless steps are taken to ensure that the receiver employed is capable of handling without attenuation and phase distortion the full modulation frequency imposed by a 405-line picture repeated so as to give 25 pictures per second. Actually, the band-pass width to accommodate this definition is five megacycles but it is known that the B.B.C. do not radiate this fully without attenuation. Any loss of the higher frequencies in the received picture will show up as reduced detail and, although many of the cathode-ray tube sets put on the market at the initiation of the B.B.C. service had very restricted band-pass circuits, the modern receiver shows material improvements in this connection. By careful design and lay-out the deleterious effects of stray resistances, inductances and capacities have been nullified, and compensating circuits have been incorporated to boost the higher frequencies which would otherwise be lost in the multi-stage receiver amplifiers. This must not be over-emphasised, or double images will make their appearance and the pictures will take on a peculiar and unpleasant plastic effect. By a careful mathematical analysis of the whole circuit the designer is able to insert adequate compensation where there is likely to be a falling off in the amplification of the ultra-high frequencies, but all these efforts will be nullified if the set-user does not give suitable consideration to securing the proper balance between contrast and brightness. In spite of the presence of all the signal frequencies a picture without its true black-and-white effects in conjunction with intermediary half-tones is far less pleasant to watch than one which has those desirable characteristics. It is for this reason alone that so many set-users show a marked preference for undertaking their viewing in a semi- or completely darkened room. Under these circumstances the average picture brightness level does not have to be run high in order to overcome the effects of the room illumination. It is well known that spot size increases as the anode voltage is reduced and in consequence tube design has to be watched carefully in relation to screen diameter to ensure that brilliance and definition have a satisfactory compromise to meet the existing conditions of sustained viewing in the home.

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This coupon is available until August 12th, 1939, and must accompany all Queries and Wrinkles.

PRACTICAL AND AMATEUR WIRELESS, 5/8/39.

Constructional Details of "Amateur Wireless" Receivers

The Information Given in these Notes is Repeated from Issues Now Out of Print to Satisfy the Continued Demands of Those Readers Who Have Secured the Blueprints Mentioned

NOTHING is more annoying to the constructor when, after carefully selecting a receiver design from our blueprint list or after having a certain circuit recommended by a friend, he finds that while he can secure a copy of the blueprint, it is not possible for a copy of the issue containing constructional details to be obtained, owing to all available supplies being out of print.

That such a state of affairs should exist may seem to many very unsatisfactory, but, unfortunately, it is one of those evils which cannot be avoided. Only a certain number of copies of any issue are printed, and many readers are wise enough to keep all copies, having the various volumes bound, or stowing the copies away in a safe place for future reference.

Many constructors are finding that it is becoming increasingly difficult to secure copies of back numbers, although quite a number of blueprints of the receivers are still available; therefore, it is proposed to deal as often as may be necessary with the vital constructional details of those receivers whose associated issues are out of print. To commence with, let us consider crystal receivers, the first being the 150-mile Crystal Set.

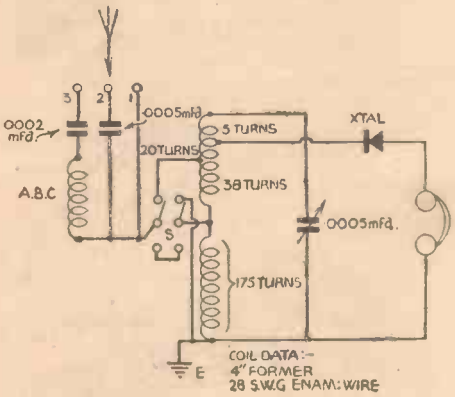


Fig. 1.—The theoretical circuit of the 150-mile Crystal Set. Note the anti-breakthrough choke.

Coil Construction

The coil construction and circuit of this receiver is somewhat different from the usual run of crystal sets; therefore, the following details are essential if it is to be built to the designer's specification.

The theoretical circuit is shown in Fig. 1, from which it will be seen that three tappings are required, apart from the two end connections.

The coil consists, in all, of 213 turns of 28 S.W.G. enamelled wire, the first tapping being taken at the 5th turn from the aerial end of the coil. The second tapping is at the 20th turn, and the third at the 38th, this forming the end of the medium-wave winding.

The long-wave section is straightforward, as it is formed with 175 turns of the same wire; in fact, it is really a continuation of the medium-wave winding, there being no need to break the wire.

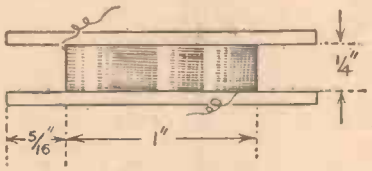


Fig. 2.—Showing how to construct the choke coil A.B.C. in Fig. 1.

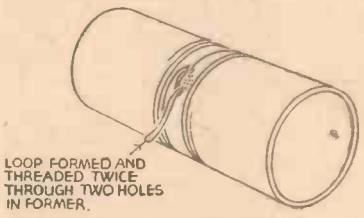


Fig. 3.—It is essential to make all ends secure and this sketch shows the best way of doing this.

Each end is made fast to the former by small bolts, or by threading it through a couple of small holes; the method is of no importance as long as it is secure. Care must be taken to see that the tappings are also quite firm, and that there is no chance of them coming loose. Fig. 3 shows one of the best ways of bringing out these leads.

The switch S is a "double-pole double-throw" and is used to change over the aerial connection from the medium-wave tapping to the long-wave tapping, at the same time shorting out the long-wave section when any medium waves are being received. Any reliable make of switch can be used, as it does not matter whether it is rotary, lever or push-pull, as long as good contacts are made.

The component marked A.B.C. is an inductance which is embodied in the aerial circuit to prevent the medium-wave stations breaking through when long-wave transmissions are desired. In the original specification this item is a commercial product, but as it is doubtful if it can now be obtained, it can be constructed quite easily. It consists of a simple bank wound coil consisting of 200 turns of 34 S.W.G. wound in a slotted former ¼in. wide, the diameter of the former (Fig. 2) being 1in.

It should be noted that one end of A.B.C. is connected to a separate aerial terminal via a .0002 condenser, and if any interference is experienced from medium-wave stations when receiving a long-wave station, the aerial should be connected to this terminal. For medium-wave reception, the better of the other two aerial connections should be used, i.e., according to the aerial arrangements in use. A.2 will give the most selective results.

The 1934 Crystal Set

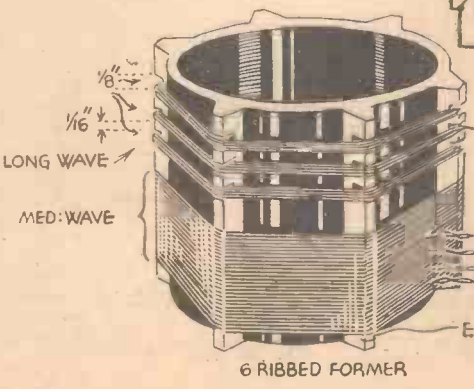
This receiver (blueprint number A.W.444) was described in the issue of *Amateur Wireless* of August 4th and September 22nd, 1934.

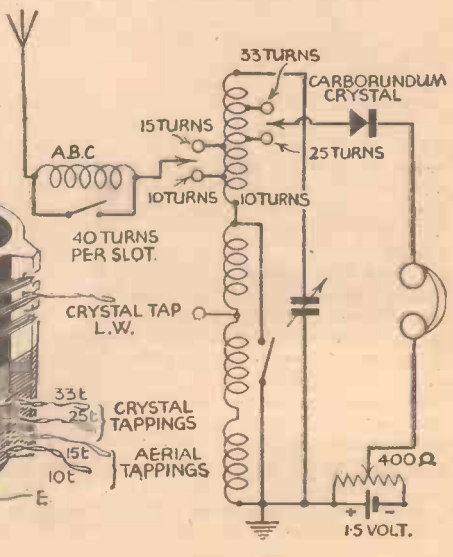
The complete circuit is shown in Fig. 5, and the coil constructional details are as set out below.

The coil former is a length of six-ribbed ebonite tube, the dimensions being 2¼in. long by 3½in. diameter.

(*Continued on facing page*)

Fig. 4 (Below).—Shows the completed coil for the 1934 Crystal Set, while Fig. 5 (Right) depicts the theoretical circuit and connections.





CONSTRUCTIONAL DETAILS OF "AMATEUR WIRELESS" RECEIVERS

(*Continued from opposite page.*)

Tappings are taken at the points indicated in the diagram, and an anti-break-through choke, the same as for the previous set, is included in the aerial lead, a switch being connected in parallel to cut it out of circuit when medium waves are being received. The wire required for the coil is 22 S.W.G. and not 26 S.W.G. as mentioned in the list of parts.

The potentiometer has a resistance of 400 ohms, and is of the baseboard mounting type; the tuning condenser is an Ormond type, R423, of .0005 mfd. capacity, while the dry battery is a Siemens type G.T.

Lucerne and S.W. Coil Details

The A.W. Lucerne dual-range coils were first described in the issue of *Amateur Wireless* of January 27th, 1934, the object of the designers being to produce components which could be made by the home constructor at a very low cost, and without

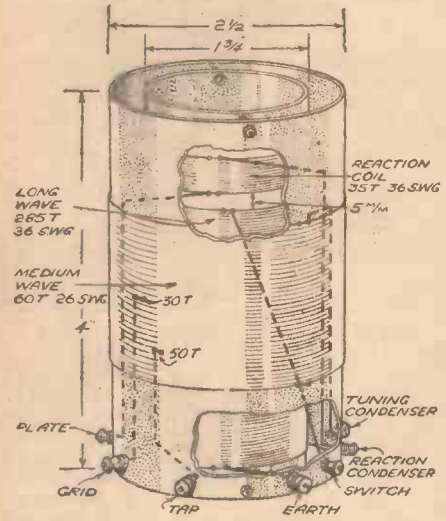


Fig. 6.—The main constructional details of the Lucerne Coil are shown above.

previous experience. The construction and characteristics were such that the coils were suitable for many circuits; in fact, quite a number of receivers were designed around them, and it is still possible to secure blueprints of many of them.

At the time of publication, the coils, ready wound and tested, or the kit of parts could be obtained from Ohmic Accessories, Peto-Scott, and Wearite, and we are given to understand that it is still possible for these firms to supply the items.

Constructional Details

The construction is shown in Fig. 6, where it will be seen that two formers are used, one fitting inside the other and kept in position by four fixing screws and distance pieces, the outer former being used to provide connecting points by the terminals shown.

The theoretical circuit is shown in Fig. 7, and it will simplify matters if both diagrams are studied when making and connecting the various windings. The tappings are provided to secure the highest degree of selectivity possible with a coil of this type, but it must be appreciated that, efficient as the coils are, they cannot be expected to compare with modern iron-cored types. For the reaction coil, the winding connected to the terminals "plate" and "reaction condenser," 35 turns of 36 S.W.G. enamelled wire is required, while for the long-wave

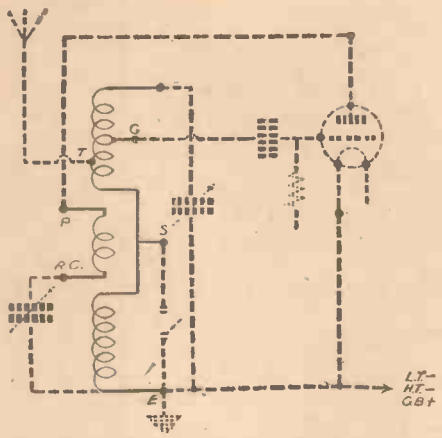


Fig. 7.—The connections for the Lucerne Coil are shown here and it will be seen that it can be used for many circuits.

section, i.e., the coil connected to the "earthy" end of the medium-wave winding and the terminal "switch" and the "earth" terminal, 285 turns of the same wire is necessary.

The reaction and long-wave windings are wound on the inner former, there being a distance of 5 mm. or about ⅛in. between them. It is advisable to note, at this point, that the actual position of the reaction coil in relation to the medium and long-wave windings is very important, if smooth and adequate reaction is to be obtained on both wave-bands.

The above remarks also govern the position of the L.W. winding to that of the M.W., actually the top ends of both windings should be level with each other, otherwise there will be excessive or a loss of reaction on one wave-band.

The medium-wave grid coil consists of 60 turns of 26 S.W.G. enamelled wire, and tappings are taken at the 30th and 50th turns from the upper end. Note the connections to this coil; the commencement goes to the "tuning condenser" terminal; the first tap (30th turn) to "grid"; the second tap (50th turn) to "tap"; and the

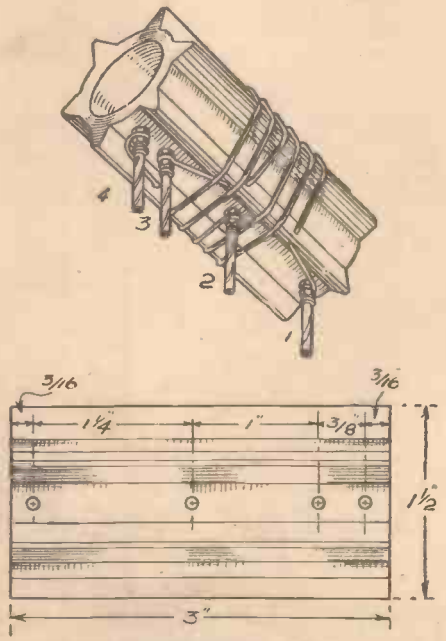


Fig. 9.—The winding of the S.W. coil is not difficult if these diagrams are studied. Drilling holes are clearly indicated.

end of the coil to "switch" and the start of the L.W. winding.

Substituting the Wearite "Unigen" Coil

It is quite possible that some constructors may wish to fit a more modern coil or coils in some of the Lucerne designs, so we give below the equivalent connections, as it is impossible to deal with all makes of coils and every circuit separately.

Unigen Coil. Terminal No.	A.W. Lucerne Coil.
1	Tuning condenser terminal
2	Switch
3	Earth
4	Tap
5	Earth
6	Reaction condenser
7	Grid condenser
8	**See footnote.

The following blueprints of receivers using the Lucerne coils are still available:

Four Station Crystal Set	No. AW427.
Lucerne Minor.	No. AW426.

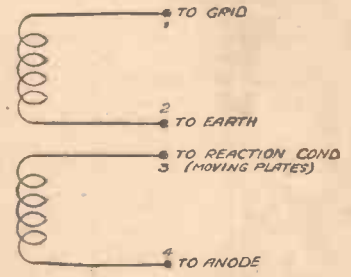


Fig. 8.—The circuits of the S.W. coil shown in Fig. 9.

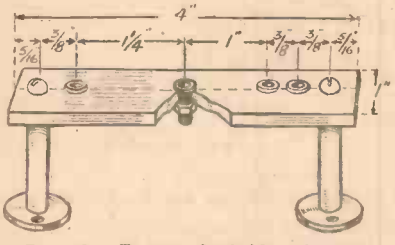


Fig. 10.—The simple holder for the S.W. coils. Measurements must be accurate.

Lucerne Ranger (S.G.4 valve)	No. AW422.
Lucerne Straight Three.	No. AW347.

The A.W. Home-made S.W. Coils

These coils were first described in the issue of *Amateur Wireless* of July 7th, 1934, and they are so designed that a wave-range of 12 to 175 metres is covered with three coils.

Their construction is very simple, while their efficiency, if good quality formers are used, compares very favourably with some commercial products costing many times their price. The theoretical circuit is shown in Fig. 8, and the constructional details in Fig. 9.

The bases or holders are shown in Fig. 10, and it will be noted that the arrangement is such that very low inter-pin capacity is present.

(*Continued overleaf*)

** It will be necessary to modify the original reaction circuit, as one end of the reaction winding on the Unigen coils is connected to earth (3), so the other side of the reaction condenser must be connected to the plate of the detector valve, and not earth as with the Lucerne coil. If, by any chance, metal panels are in use, be sure that the spindle of the condenser is not connected to the plate, otherwise the detector H.T. will be shorted. Regarding terminal No. 8, if so desired a three-point wave-change can be used, and the third contact connected to this terminal.

CONSTRUCTIONAL DETAILS OF "AMATEUR WIRELESS" RECEIVERS

(*Continued from previous page*)

Winding Details

The material required is: three pieces of ebonite tubing of the six-ribbed type, 3in. long, and with a diameter of 1½in.; twelve Clix valve pins, with three nuts on each pin: approximately 7ft. of 20 S.W.G. tinned copper wire, and 14ft. of 20 S.W.G. enamelled. The tinned copper wire is used for the two smallest coils, and the enamelled wire for the third or largest coil. The first coil covers a waveband between 12 and 28.5 metres, and consists of three turns for the grid coil (connections 1 and 2) and three turns for the reaction (3 and 4), each turn being spaced ⅛in.

The second coil, 19 to 59 metres, has eight turns for the grid and five turns for the reaction coil, the spacing being the same as for the other coil.

The largest coil covers the 55 to 175-metre range, and consists of 23 turns of enamelled wire for the grid and 10 turns of the same wire for the reaction, but in this case the turns are wound on without any spacing.

The wave-range specified is with a tuning condenser of .00025 mfd. capacity, and a reaction condenser of the same value.

Before commencing the winding operations, drill the holes for the valve pins, and fit the pins in position ready for anchoring the wire. It is always advisable to stretch the wire before winding, thus removing any kinks. If it is intended to solder the wire to the pins, be careful not to overheat the pins, which would cause them to become loose in the ebonite.

Coil Holder

All the dimensions are given in the diagram, and it is essential that the various points are marked accurately (the same applies to the coil formers), otherwise the pins will not engage with the sockets, which, by the way, are also obtained from Clix.

The supports, which keep the coil holder well clear of the baseboard, are made by Bulgin. These coils are used in many short-wavers, and it is still possible to obtain the blueprints mentioned below from these offices.

The Roma Short-waver (1 valve), A.W. 452.

The Home-made Coil Two (S.W.), A.W. 440.

Short-wave Adapter, A.W.456.

Short-wave Converter, A.W.457.

The A.W. Short-wave World-beater (A.W. 436)

This is a four-valve battery-operated receiver employing one stage of tuned S.G. H.F. amplification, with super-power output valve and ganged tuning.

It is a very efficient receiver, capable of giving most satisfactory results, as numerous reports have already proved, and it is ideal for the S.W. amateur who wants that extra punch and range.

As the issue is now out of print (the blueprint is, of course, still obtainable) we give, in the next column, the list of specified components.

The Twenty-Station Loudspeaker One-valver

The vital part of this circuit (blueprint number A.W. 449) is the valve, and it should be noted that the receiver is designed round the Hivac DB240 valve, therefore it is essential for that make and type to be used.

The only other components to be carefully chosen are the Class B input and output transformers. Use good ones, such as those made, for example, by Wearite, Varley or Bulgin, as they govern the efficiency of the circuit to a great extent.

The coil can be any reliable make of dual range aerial coil with reaction winding. The other components are standard lines, and, as such, do not call for any comment.

"Wireless Magazine" Designs

There are still blueprints of several W.M. designs available, for which the associated issues are out of print, so we give the components specifications of those still suited to modern conditions.

The Economy A.C. Two (W.M. 286)

This circuit, Fig. 11, is of the Det. and Pentode type, employing valve rectification, and it is ideal for local-station reception and pick-up work.

LIST OF COMPONENTS FOR THE ECONOMY A.C. TWO

1 H.F. choke (Varley).
1 L.F. choke (Heayberd), type 752.
Coils: Lotus dual range.*
Condensers, fixed: 1, .0001 mfd. (Dubilier), type 670.
1, .001 mfd. (Dubilier), type 670.
1, .1 mfd. plus .1 mfd., type 1,000 volts, A.C. test (Dubilier).
2 1.0 mfd. type 1,500 volt, D.C. test (Dubilier).
2 4 mfd. type 1,500 volt, D.C. test (Dublier).
Condensers, variable:
1 Formo, .0005 mfd. with S.M. Dial.
1 Polar Compax .0003 mfd.
1 Polar Pre-set .0003 mfd. max.
Panel: Ebonite 9in. x 6in. (Peto-Scott).
Valveholders: 3 W.B. 5-pin type.
Resistances: 1, 600 ohm; 1, 1,000 ohm; 1, 1 megohm grid leak.
Valves: 1 Mazda A.C./H.L. 1 Mazda A.C./P. 1 Mullard D.W.2.
Switches: 1 Bulgin, type S88. 1 Bulgin, type S86. 1 Three-point push-pull.
Transformer (Heayberd).
Transformer output: 1 Ferranti OPM8.

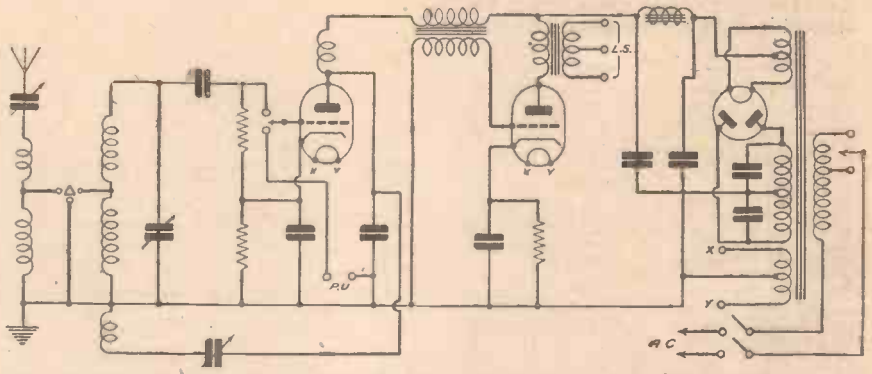


Fig. 11.—The theoretical circuit of the Economy A.C. Two. A modern coil can be used as mentioned in the article.

LIST OF COMPONENTS FOR THE A.W. SHORT-WAVE WORLD-BEATER

Chassis: Peto-Scott. Aluminium 12in. x 6in. x 3in. Aluminium panel 12in. x 9in.
Chokes: Two Eddystone type 948.
Condensers: 1 each tubular .0001, .0003 and .001 mfd.
1 each 250 volt working, .02 mfd., .04 mfd.
2 each 250 volt 2 mfd. (Dubilier or T.C.C.)
Coils: 2 sets—Eddystone 6L.B. (2), 6Y (2), 6R (2), and 6W (2), with two bases, type 964.
Variable Condensers: 1 two-gang .00016 mfd.
1 Eddystone .00025 mfd. with S.M. drive, type 957.
1 Eddystone .0001 mfd., type 900.
Dial: Polar micro-drive semi-circular.
Valveholders: 1 Clix 7-pin chassis mounting.
3 Clix 4-pin, airspring chassis mounting.
Sockets: 4 Belling-Lee sockets, with wander plugs, marked aerial, earth, and P.U. (2)
Resistances: 1 each Erie or Dubilier 30,000-40,000, 60,000-100,000, and 2 megohm.
Sundries: 1 Aluminium screen (Peto-Scott), 4¾in. x 4in.
1ft. brass strip, ½in. x ⅝in.
1 piece 5-ply-wood 3in. x 2¾in.
2 Bulgin jacks, Type J.2.
2 Bulgin plugs, type P15.
1 J.B. coupler, type 2003.
1 Insulated bush to take ¼in. spindle.
1 2in. length, ¼in. rod.
1 2in. metal mounting bracket.
1 Bulgin toggle switch, type S80T.
Wire, plugs, spade ends, etc.
L.F. transformer. Varley 3½: 1 ratio.
Valves: 1 Cossor 215 S.G.
1 Cossor 210 H.F.
1 Cossor 210 L.F.
1 Cossor 220 P.

* As the specified coil is no longer available, a modern iron- or air-cored coil should be fitted, the connections of the Wearite Unigen, and the Varley B.P.50 being given in the following table:

Connections for Alternative Coils:		
Lotus	Unigen	Varley
1	7	1
2	6	8
3	4	3
4	8	—
5	5 and 3	7 and 2
6	2	—

Wire No. 47 on blueprint must be taken to No. 1 on Unigen.

DIRECTIONAL BEAM AERIALS

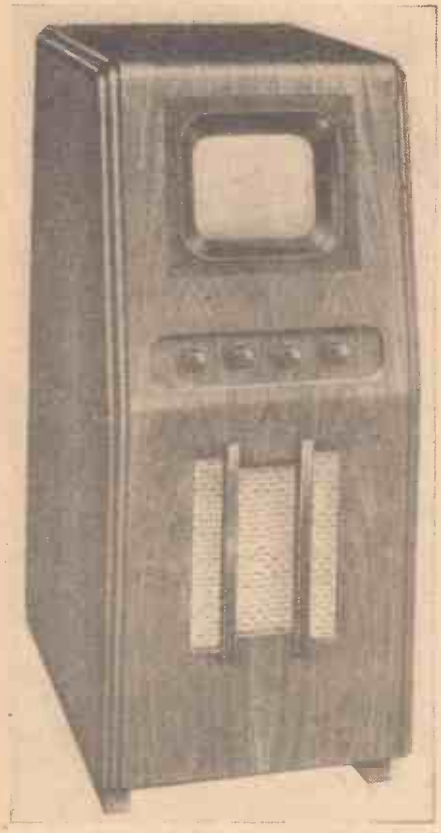
(*Continued from page 485*)

elaborate scheme would be to box in the lower part of the mast support and fit a motor which could be operated electrically from inside the house. This would only entail a single hole through a window or wall through which weatherproof electric cable could be taken. To provide the necessary slow drive the motor will have to be geared to the mast and a standard cycle gear wheel and chain might be used. A small electric fan motor would be adequate if the aerial is well supported and balanced. It is obviously impossible to give constructional details for various types of aerial, but it is hoped that the data given will assist those who have not yet tried this type of aerial to make an attempt to erect a directional aerial with improved performance.

NOTES FROM THE TRADE

New Cossor Receivers

SEVERAL new models are announced by Messrs. Cossor, and amongst them is a new Television console, shown below. This is of the type providing only television reception (sound and vision) and is thus an accessory for those who already own a good broadcast receiver. The tube fitted is of the 7in. type providing a picture 6in. by 5in. There are only four controls, two for vision and two for sound. In order to take full advantage of the improved



The new Cossor television console Model 65.

reproduction which is possible on the high-frequency end of the waverange which is used for television sound, special attention has been paid to the speaker and cabinet design. The speaker is of the 8in. "wide-response" moving-coil type and the acoustic properties of the cabinet are adjusted accordingly. Thirteen valves are utilised in the circuit and the receiver is of the A.C. type. The model number is 65, and the price is 27 guineas. A modified version, Model 65A, is also available in which an extra amplifier (16 valves in all) is included, and this is intended for listeners who are situated at distances over 20 miles from the transmitter. The price of this model is 30 guineas.

A larger receiver is also available in which a radio section is included and the picture size is 12in. by 10in. The radio chassis is of the all-wave type covering the bands from 16 to 52, 195 to 560 and 810 to 2,685 metres. This model, No. 1210, costs 53 guineas, and as in the previous case, a separate design with greater amplification suitable for longer distance reception is available at 56 guineas. The model number is 1210A.

Sinclair Speakers

ELECTRICAL Sound and Television Patents, Ltd., proprietors of Sinclair Speakers, inform us that the name of the street in which they are situated has been changed to Pulteney Terrace and their new postal address is therefore Pulteney Terrace, Copenhagen Street, London, N.1.

New G.E.C. Batteries

THE new batteries recently introduced by the G.E.C. have now been standardised and the full particulars, with prices, are as follows:

Cat. No.	Voltage	Tappings	List Price
			s. d.
BB.388	80	P and N only	6 6
BB.389	1.5	2-pin English socket	2 6
BB.390	45	3-pin English socket	3 9
BB.391	1.5	2-pin Standard socket American No. 742	2 6
BB.392	45	2-pin American socket No. 732	3 9
BB.393	90	3-pin American socket	9 0
BB.394	1.5	2-pin English socket	3 9
BB.395	90 H.T. + 1.5 L.T.	4-pin socket	10 0

Record Valves

THE Record Radio company have sent us one of their latest lists showing a complete table of Record valves of standard British type and "Yale" valves for use as American replacements. There are replacements for practically every type of valve at present on the market, and the list, which gives details of the replacement types, characteristics and prices, may be obtained free on application to the Radio Record Co., Ltd., at Eldon Street House, 2 and 3, Eldon Street, London, E.C.2.

Drydex Batteries

THE Chloride Electrical Storage Co., Ltd., announce two further "Drydex" H.T. Batteries for wireless. They are:

*Type H.*1162.

45 volts. Size 4¼ in. by 2⅝in. by 5⅜in., fitted with 5-hole socket, and suitable for Emerson GT275, and other American "all-dry" sets. The list price is 4s. 6d.

*Type H.*1163 (Yellow Triangle).

90 volts. Measuring 8¼in. by 4⅞in. by 1⅞in. The tappings are two strips at one end, and the battery has been specially produced for Beethoven set P.44. The list price is 7s. 6d.

TOPICAL NEWS

America's Radio "War" Correspondents

AS the N.B.C. recently nominated Mr. John Gunther as semi-official War Correspondent in Europe, the Columbia Broadcasting System has made similar arrangements for special talks to be broadcast from various European centres to New York for re-transmission over their network, including the short-wave channels destined to listeners in other parts of the world. London is represented by Mr. Paul White the Permanent European Director, and Mr. Edward R. Burrow; Geneva by Mr. W. L. Shirer, and Paris by Mr. Th. L. Grandin. The critical areas of Europe are linked up with these radio correspondents. On any evening, when anything untoward has happened during the day, it is always worth while to tune in to one or other of the short-wave stations in the Columbian network, and thus hear three-cornered conversations between their European commentators: the time chosen for these broadcasts is usually about G.M.T. 22.00.

Altered Wavelength

RADIO LIEGE (Belgium), which has been working on 203.5 m. (1,474 kc/s), has raised its channel to 208.6 m. (1,438 kc/s), and shares the wavelength with Miskolc (Hungary).

France Goes "All Foreign"

BETWEEN B.S.T. 21.30 and 21.45, and 22.45-23.00, the French transmitters broadcast news bulletins in nine different foreign languages. English is given from Radio Paris, Lille, Radio-Normandy, Radio Cité, and Radio 37.

Changes In Germany

THE Nurnberg transmitter will shortly reduce its power to 1 kilowatt, and will share the 578 m. (519 kc/s) channel with Innsbrueck; Linz will then operate on 236.8 m. (1,267 kc/s), and its partner Graz will remain on 338.6 m. (886 kc/s), which will also be used by Klagenfurt, now on 231.8 m. (1,294 kc/s). In the near future Nurnberg, Salzburg and Innsbrueck will relay the Munich programmes; Graz will provide its own radio entertainments, and will be relayed by Klagenfurt.

Radio Carthage

A TYPICAL daily programme of the *Radio Carthage* (Tunis), 1 kilowatt station on 215 m. (1,395 kc/s), is as follows: B.S.T. 12.00, music; 13.05, gramophone records; 13.30, news and music; 18.00, children's hour; 19.00, music; 19.15 foreign language courses followed by concert to 20.10, when dance music is broadcast; 20.30, news and outside relay; 21.10, amateur broadcasts. Station closes down towards 22.15 daily.

"Quayside Nights"

ON August 9th listeners will hear "Quayside Nights—Falmouth," a picture of the port, past and present, in the form of a "radio tour." The guides for the evening will be Pat Beech and Bernard Fishwick, and they will visit the Harbour Master's Office, the Town Quay, No. 2 Harbour Terrace, and the Prince of Wales Pier, where they will introduce to listeners some of the people who make up the quayside life of Falmouth.

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.

Special Notice: Will club secretaries please send in reports in the form they appear on this page.

BRISTOL EXPERIMENTAL RADIO CLUB

Headquarters: 21, King's Corridor, Old Market Street, Bristol, 2.

Publicity Manager: D. J. James (2DCX), 40, Robertson Road, Eastville, Bristol, 5.

A MEETING of the above club was held on Tuesday, July 11th. The chief item on the agenda was a talk by G3YT describing his transmitter, which he later demonstrated.

A library under the supervision of Mr. Baldwin was instituted. If any readers have books no longer required by them, the club would be extremely pleased to receive them. Twelve new members were enrolled.

Arrangements were made for members to visit the operating box of the Odeon Cinema, Bristol. Parties were formed for each evening, Tuesday, July 18th, to Friday, July 21st, inclusive. Each group was met by the Chief Operator, who led it up "behind the scenes," where a thorough description of the projectors, amplifying apparatus and lighting effects was given. It was interesting to see the "slick" way reels were changed in the middle of a film without any break in continuity. The enterprise of the company was shown by the fact that special rooms have been provided for television equipment. To complete the evening members were invited to enjoy the programme at the management's expense.

As the second Tuesday of this month falls in Bank Holiday week, the August meeting will not be held until the 15th. The programme will include an illustrated talk on Field Strength Meters and Frequency Measuring Instruments. Details of a visit to the B.B.C.'s Clevedon Broadcasting Station will be announced.

KILMARNOCK AND DISTRICT SHORT-WAVE SOCIETY

Headquarters: Wardneuk Receiving Station, Kilmarnock, Ayrshire.

Secretary: K. Law, 2, Parkerston Terrace, Dunlop, Ayrshire.

Meetings: Tuesdays and Thursdays, 8 p.m.

DURING the last few weeks our President (GM3PB) has been carrying out experiments in co-operation with the society members with new antennæ. A change in QRA has enabled him to erect more ambitious antennæ systems, and he would appreciate reports on his transmissions.

A field day was also held in which 15 members from the Glasgow and District Short-Wave Society participated.

GM3NK (QRP) and GM3PB were at their respective mikes, while the rest of the members set up portable listening stations around the district.

The junior members are forging ahead in the construction group, and are at present carrying out tests on a small P.A. amplifier which they recently built to their own design.

The members participating in the Morse practices are all around 12 w.p.m., and the A.A. members, now numbering six, are hoping soon to be on the air.

There is still room for new members, who will be welcomed. Particulars may be had from the secretary.

WOODFORD AND DISTRICT RADIO SOCIETY

Headquarters: 10, High Road, Woodford Bridge.

Secretary-Treasurer: Ronald A. Ledgerton (2ABC), 64, High Road, Woodford Bridge, Essex.

Meetings: Tuesdays, 7.30 p.m.

THE society have been holding weekly meetings during the month, and so far are pleased to report that the number of members is continually on the increase. We are, in fact, expecting to have to look out for more spacious headquarters soon.

During the last two meetings a society receiver has been discussed, and it was decided to build up a 0-v-0 and use a broadcast receiver, belonging to the president, for L.F. stages. This is now in the process of being done, and we are hoping for good results.

Morse practice is an important part of every meeting, but the number of new members each week is making it a little difficult to get much more than started. Still, we shall always be pleased to welcome new members, either at any meeting or after writing to the secretary, as above, for particulars. S.A.E. please.

SLOUGH AND DISTRICT SHORT-WAVE CLUB

Headquarters: 35, High Street, Slough, Bucks.

Secretary: K. A. Sly (G4MR), 16, Buckland Avenue, Slough.

Meetings: Alternate Thursdays at 7.30 p.m.

AT the last meeting, held on July 20th, 1939, the Morse practice was very successfully divided into two sections, the fast group, employing headphones, whilst the slow group caused QRM with the aid of amplifier and speaker.

The "query corner" continues to be a popular feature and many questions and answers were provided at this meeting.

Meteorological data was distributed amongst the members of the research group. We were pleased to welcome three new members; this brings the number of active members to 27, including four full calls and four A.A. calls. Owing to the great increase in membership in the past few months it has been considered necessary to obtain new premises for our clubroom, and the secretary has been given the task of combing the town for suitable accommodation.

We would emphasise that we still have room for many more members, and all who care to come along to our meetings will be very welcome.

The next meeting will be held at headquarters on August 3rd, 1939, when the agenda will include Morse practice (slow and fast), discussion by members of the research group, query corner, and discussion on DX.

ITEMS OF INTEREST

W.L.W. Announcer Flies Own 'Plane to Stricken Town

A SMALL monoplane which he purchased several weeks ago for pleasure flights was used by Michael Hinn, WLW (Cincinatti) announcer, to get first-hand details of the Morehead, Kentucky, "flash flood" disaster on July 5th.

When news of the flood reached WLW, Hinn was dispatched to the stricken area in his 'plane, accompanied by an auxiliary pilot and a photographer. Unable to land, they flew low over Morehead and the surrounding area for twenty minutes, while Hinn took copious notes on rescue work visible from the 'plane, and drew a map which enabled him to explain to listeners the "bottleneck" character of the valley responsible for the rapid rise and velocity of the flood. More than 100 persons were estimated to have died in Morehead and the surrounding country.

Hinn's graphic report, the first eye-witness account of the disaster to be heard on the air, was brought to WLW listeners late in the afternoon. Shortly afterwards, the same account was fed by WLW to an N.B.C. network, together with an on-the-spot broadcast from Morehead, where Ed Mason, announcer, and WLW engineers and special events men had meanwhile arrived in the station's mobile unit.

Details of the catastrophe were related by a variety of witnesses on another on-the-spot programme, relayed by WLW to the Mutual Network on the "Front Page Parade" broadcast.

Most moving of the spectator stories aired from the stricken town was that told by a woman whose husband, in order to escape the rushing water, had cut a hole into the attic, then hacked another aperture through which she escaped. City officials, Red Cross attaches, and Kentucky State Highway patrolmen appeared on the mobile unit broadcasts to give their estimates of loss of life, property damage, and the problem of rehabilitation.

1st Royal Scots Band

THE band of the 1st battalion the Royal Scots (The Royal Regiment) will be at Leamington Spa during the week, and will broadcast from the Pump Room on August 5th. Bandmaster H. C. Macpherson will conduct. The regimental march, "Dumbarton's Drums," is the oldest regimental march in existence. To this tune the regiment marched to Blenheim. Although the Royal Scots is a Lowland regiment, the privilege of wearing the Royal Stuart Tartan was granted to its pipes by King George V in 1933, the 300th anniversary of the Royal Scots, which is the oldest regiment of foot in the British Army.

Bank Holiday Sport

BANK Holiday sport in the North figures large in broadcast programmes on August 7th. Cricket from Headingley (Yorkshire v. Lancashire) will be the subject of two commentaries in the National programme, by P. G. H. Fender, and at intervals during the afternoon A. E. Lawton, the well-known ex-Derbyshire player, will give commentaries on the same match for Northern listeners. Also at intervals in the afternoon Graham Walker will comment on the major events at the motor-cycle and cycle races in Cadwell Park, Lincolnshire An eye-witness account of the British Crown Green Amateur Bowling Association Individual Merit Championship will be given by Charles Rockliff in the evening, and a recorded commentary by Richard North on the procession and the most interesting events of the Chester Autumn sports and carnival on the Roodee will also be broadcast. These last two events are on the Northern wavelength.

100 British Children to Visit Foreign Esperanto Camp

ON August 7th over 100 British schoolchildren from all over the country, together with a number of teachers, will leave Victoria Station, London, to take part in the 2nd International Esperanto Children's Camp, to be held this year at Tervuren, near Brussels. Several hundred children of many nationalities will be present at the camp, which they will run themselves, and the only language spoken will be Esperanto.

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 Reader's 50-ft. Aerial Masts

SIR,—As a reader of your valuable magazine, even before its amalgamation with *Amateur Wireless*, I would like to congratulate you and your staff on the very high standard you have consistently maintained. The present series on Amateur Transmitting are unsurpassed for their value in helping budding A.A.s.

I would like to add that I have made several pen-friends through your "Letters from Readers" page, by exchanging S.W.L. cards, and would like to "keep the ball rolling" by offering to exchange cards with A.A.s, or any S.W.L. throughout the world. I will reply by return to every letter received.

I enclose a photograph of the masts here, built from details published in PRACTICAL AND AMATEUR WIRELESS. They are 50ft. high, and are used at present to support a centre-fed doublet.—H. KITTERINGHAM, "Holme," Lulworth Crescent, Hamworthy, Dorset, England.

A 20m. Log: Correspondent Wanted

SIR,—I append my log of 20 metres ('phone) from May 30th to July 13th: CN8 (5); ES5C; FA3QV; HA3B; HB9BR; LX1TW, AP; LY1 (3); PY3EN, 4CT, 4BE; SU1 (6); VE3WI; VK4JP; VQ2CM; VP6MR, YD; VU2FA; W1 (18); W2 (8); W3 (6); W4DSY; W8 (3); W9DSE; ZB1E, L, 2B, in addition the usual amount of Europeans. All reception was on a home-built 0-v-1 ('phones) with a 25ft. vertical antenna, and from 20.00 to 21.30 B.S.T.

I should like to get in touch with another S.W.L. in Nottingham.—D. C. JOHNSON, 16, Lorne Grove, Woodborough Road, Nottingham.

SIR,—I enclose a list of DX calls logged here recently on 14 mc/s. All the stations are on 'phone and were received on a 5-valve commercial superhet with a piece of wire slung round the shack walls as an aerial.

Other readers may be interested to know that HVA1A (Vatican City) is on 'phone on the L.F. end of 14 mc/s. I would welcome any correspondent from overseas, and all letters will be answered.—JAMES GRAHAM, 32, St. Monance Street, Springburn, Glasgow.

[*We were very interested in your log which, however, was too long for publication.*—ED.]

From a South African Reader

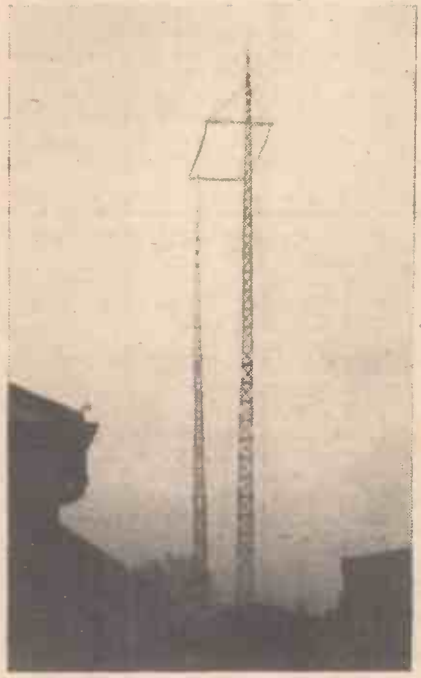
SIR,—Many thanks for my B.L.D.L.C. membership card which I received recently. I hope to become one of the most enthusiastic members out here in South Africa.

My present sets are a single and a three-valver, but I intend to build the S.S. one-valver which is a neat-looking little set. PRACTICAL AND AMATEUR WIRELESS is a very great help to me.

I shall be glad to get in touch with another reader who is keen on short-wave work. I will answer every letter received.—DESMOND BRAY, 114, Gladstone Avenue, Brakpan, Transvaal, South Africa.

An Amateur-band Tuner!

SIR,—I notice that in a recent issue of PRACTICAL AND AMATEUR WIRELESS a circuit is given using an up-to-date "Linacore." This idea could be put to advantage in the form of an amateur-band tuner covering the bands of 28 megacycles, 14, 7, 3.5 and 1.7 mc/s. Several readers during the past have, I believe, required a similar set. Why not a really stripped-down job for keen listeners? Circuit such as (1) H.F. pen.-tuned; (2) Combined first det. and oscillator, say, triode-hexode, or triode-pentode, coupled by a real I.F. transformer, iron-cored, Litz wound, etc., to a var.-mu H.F. pen. as I.F. amplifier, coupled to a double-diode pentode. All the tuning condensers, coils, valveholders, I.F. transformer (fixed at, say, 10 kc/s selectivity), stage-coupling condensers to be fixed upon the one complete chassis. Price no more than about 30s. That this can be done is proved by the advertisements.—A. A. SOONE (Manchester).



A general view of the 50-ft. aerial masts erected by a reader, Mr. H. Kitteringham, of Hamworthy, Dorset.

Logged on a Three-valver

SIR,—I am a comparatively new reader of PRACTICAL AND AMATEUR WIRELESS, and live ten miles from the nearest large town; I am therefore unable to attend any Radio Society meetings and rarely meet any other S.W.L. for a chat. I should greatly appreciate and will acknowledge letters from any other reader, at home and abroad, who cares to write to me.

I append my 14 mc/s log for the week July 4th to 11th, in the hope that it will be of some interest.

Date.	Time.	Call.
4.7.39	07.31	HK2ER
4.7.39	19.10	VQ2CM
6.7.39	21.35	PY1MZ
7.7.39	07.43	VC3AHU
7.7.39	07.45	W7EKA
8.7.39	21.30	W2USA
9.7.39	09.17	XE1AC
—	09.20	XE1CQ
—	09.26	W6NNR (Portable)
—	09.31	W6SZ
—	21.45	W9BCV
—	21.51	W9PEQ
—	22.05	W9IAS
10.7.39	07.11	W9CVN
—	07.13	W6MYO
—	07.21	CO2VK
—	07.25	W6AHD
—	07.40	VK4PF
—	07.41	VC3AIB
—	08.04	W6KNI
—	22.53	VP6MR
11.7.39	07.44	W6MZD
—	07.45	W7GXU

The receiver is an all-wave straight three-valve commercial battery set, and the antenna is an inverted L. I am building the U.S.W. super-regenerative receiver, described in the July 8th issue, and if it is successful I hope to be able to send you a 56 mc/s log in the near future.—RAYMOND D. GAIGER, "Holmsdale," Albany Road, Bishop's Waltham, Southampton.

CUT THIS OUT EACH WEEK

Do you know

—THAT although additional G.B. will reduce H.T. consumption, there is a limit to the voltage which can be employed.
—THAT the reason for the above is that the signal handling capacity of the valve will be reduced and distortion introduced if the G.B. is too high.
—THAT a moist earth connection will offer lower resistance and thus be more efficient.
—THAT the height of an aerial is not necessarily the height of the supporting mast, but its height above the nearest earthed body.
—THAT a tree is not an ideal support for an aerial for many reasons.
—THAT although a screened H.F. choke may be used its position may be critical in a receiver due to low-frequency interaction.

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 Newnes, 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.

LATEST PATENT NEWS

Group Abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, either sheet by sheet as issued on payment of a subscription of 5s. per Group Volume or in bound volumes price 2s. each.

Abstracts Published

THERMIONIC VALVES. — British Thomson-Houston Co., Ltd. No. 504449.

A base for a thermionic valve having an envelope of metal or partially of glass consists of a metal disc 3 that closes the

Fig. 1.

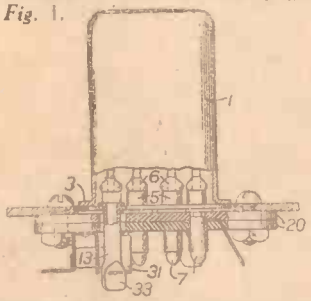


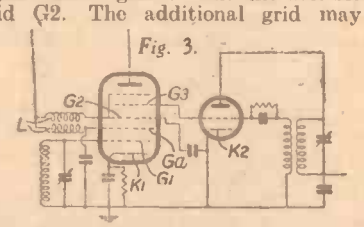
Fig. 2.

envelope 1 and has welded thereto a tube 13 (Fig. 1) for exhausting the envelope. This tube may be sealed by flattening the end 33 or by soldering a metal ball to the end. The tube 13 may be sealed by a glass cap 15, Fig. 2, which is then enclosed in a metal cover 16. When the envelope is of glass, the disc 3 is of a metal having the same coefficient of expansion as glass such as that described in Specification 449807, Group XXIII.

SUPERHETERODYNE CIRCUITS FOR WIRELESS RECEPTION.—Cole, Ltd., E. K., and Brooke, H. A. No. 504560.

In a mixing circuit of the triode-hexode type employing combined or separate tubes, interaction between the signal input and local-oscillation circuit is prevented by providing separate cathodes K1, K2 (Fig. 3) and an additional screening grid Ga in the hexode portion between the signal-control grid G1 and the first screen-grid G2. The additional grid may be

Fig. 3.



connected in common with the screen-grid G2 to high positive potential in which case decoupling chokes or resistances L are provided, or may be at a lower or zero potential.

WIRELESS RECEIVING-APPARATUS ; CONDENSERS.—Gardener, B. W. No. 504573.

A device for inserting in the aerial or loudspeaker leads or other suitable points

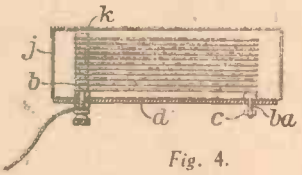


Fig. 4.

of a wireless receiver for improving the tone comprises an assemblage of metal containers and comb-like metallic strips. The box *j* (Fig. 4) and cover *k* contain a number of metallic combs mounted on an insulated bolt *b*. Another nut and bolt *ba*, *c* is provided in the corner of the box in order to make an external connection or to connect the box mechanically to an adjacent box. The complete box may be enclosed inside a screening box from which it is insulated by the strip of insulating material *d*. A number of the boxes may be arranged in series in a line, corner to corner, or a number may be arranged in series inside one another, only the inner one containing combs.

NEW PATENTS

These particulars of New Patents of interest to readers have been selected from the Official Journal of Patents and are published by permission of the Controller of H.M. Stationery Office. The Official Journal of Patents can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2. price 1s. weekly (annual subscription £2 10s.).

Latest Patent Applications

20018.—Baird Television, Ltd., and Willans, P. W. — Electron-discharge devices for television, etc., systems. July 10.

20168.—Belling and Lee, Ltd., and Hodby, A. L.—Two-part electric couplings. July 11.

20226.—Braun, J.—Emission, etc., of detuned radio waves. July 11.

20141.—Cheshire, F. B.—Electrodynamic sound-reproducers. July 11.

19642.—Cork, E. C., and Pawsey, J. L. —High-frequency modulated radio signal transmitters. July 6.

19837.—Lorenz Akt.-Ges., C.—Television transmitters. July 7.

20346.—Marconi's Wireless Telegraph Co., Ltd., and Clough, N. H.—Automatic control arrangements for thermionic valves. July 12.

20347.—Marconi's Wireless Telegraph Co., Ltd., and Myers, L. M.—Television reproducer tubes. July 12.

20205.—Philips Lamps, Ltd.—Radio receivers, etc. July 11.

19714.—R. M. Electric, Ltd., and Bradbury, G. H.—Radio receiving-apparatus. July 6.

20112.—Simnett, K.—Tuning devices for electromagnetic wave-receiving devices. July 11.

Specifications Published

508579.—Johnson G. W. (Philco Radio and Television Corporation).—Antenna circuits for radio receivers.

508580.—Crowley D. J.—Radio receiving sets.

508949.—Disney, A. L., and Belling and Lee, Ltd.—Means for connecting aerials to radio receivers.

508792.—Haslam, A. G., and Belling and Lee, Ltd.—Electrical connecting devices.

508692.—Kolster-Brandes, Ltd., and Newman, L. G.—Radio-frequency transformers.

508695.—Marconi's Wireless Telegraph Co., Ltd., and Banks, G. B.—Television receiver apparatus.

508697.—Ellis, H. D. M.—Thermionic-valve circuits of the push-pull type.

508712.—Scophony, Ltd., and Rosenthal, A. H.—Cathode-ray tube apparatus.

508724.—M-O Valve Co., Ltd., and Warren, G. W.—Thermionic valves.

508777. — Daimler-Benz Akt.-Ges.— Aerials for wireless reception in motor vehicles.

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at the uniform price of 1s. each.

APPLIED TELEVISION

THE principles of television, at least in so far as scanning, photo-electric cell response and cathode-ray tube modulation are concerned, have been suggested and often applied to different types of commercial equipment. Too often is television referred to in terms of entertainment, it being frequently overlooked that its use in other directions may ultimately assume a degree of importance which will outweigh other possibilities. As a slight indication of what is meant in this connection, mention may be made of an American device which has been designed to enable a film camera operator to use his machine in an efficient manner. Strictly speaking, it is an improved form of exposure meter for an image of the scene to be photographed is focused on to a spiral apertured scanning disc and the light variations passing through the holes are made to activate the cathode surface of a photo-electric cell. The varying cell output therefore corresponds to an analysis of the light area of each element of the scene. This output is amplified and fed to the vertical plates of an electrostatically-operated cathode-ray tube, while the movement of the electron beam in a horizontal direction is effected by the same alternating current pulses that drive the disc motor. The ultimate result of this is to trace out on the tube's screen a series of vertical lines whose length is a measure of the light intensity of each area of the scene scanned. In the amplifier itself the overall gain is adjusted to take into account such factors as lens aperture, type of film used in the camera, whether light filters are used and so on. Two horizontal lines on the tube's screen indicate the limits of over-exposure and under-exposure, and if the vertical lines representing light intensity keep within these limits, then the operator handling the camera can be sure that he is giving the correct exposure to suit the particular emulsion with which the film is coated.

BOOK RECEIVED

THE EVOLUTION OF PHYSICS. By Albert Einstein and Leopold Infeld. Published by the Scientific Book Club. 314 pages. Price 2s. 6d. to members.

IN this book the authors have sketched in broad outline the attempts of the human mind to find a connection between the world of ideas and the world of phenomena. They explain, in simple language, the active forces which compel science to invent ideas corresponding to the reality of our world. The book is divided into four sections, dealing respectively with The Rise of the Mechanical View: The Decline of the Mechanical View; Field, Relativity; and Quanta. This interesting volume is illustrated with numerous diagrams and half tones, and there is also an index.

QUERIES and ENQUIRIES

Fading Effects

"I have been told that A.V.C. arrangements will correct fading. I have such a circuit in my commercial receiver, but in spite of this there is still fading. Sometimes the station goes right out. Is there any way of ascertaining whether the A.V.C. is working, and if so, does not it correct this trouble? It is annoying when a station is playing good music, to hear it fade out."—R. D. B. (Manchester).

A.V.C. certainly compensates for fading, but there are times when it is impossible to correct it entirely. If your set is a modern one with a tuning indicator—either of the cathode-ray or meter type—then you should be able to see if the A.V.C. is working by watching the indicator. As the signal varies the bias applied to the controlled valves will vary and the tuning indicator will show such fluctuations. On normal fading the signal will be heard to remain more or less constant although the indicator will show that variations are taking place. There is as yet no way of overcoming serious fading. You can sometimes tell whether the A.V.C. is working if a tuning indicator is not fitted, by noting the increase in noise which is introduced as the gain of the valves is increased due to the fading signal.

Amplifier Design

"I wish to add some further stages of amplification to my four-valver but am not certain whether to use a single triode or push-pull. Could you recommend a circuit and valves for the purpose?"—T. Y. (Barking).

IF there are already two L.F. stages you will have to employ push-pull unless you are prepared to increase the H.T. very substantially. With battery valves there is a limit to this and push-pull will be the only way of carrying the input signal load. With mains apparatus you could use a super-power triode provided that you used 500 volts or so for the H.T. There will, in either case, be a substantial increase in the H.T. consumption. It may be desirable in your case to cut out the present output stage and replace it by a push-pull or similar stage to avoid overloading difficulties, although there may not be sufficient increase in the volume.

Substitute Coils

"Some time ago I built your Corona receiver, but I now wish to modify this to use a slightly different circuit. At the same time I should like to use alternative all-wave coils without introducing complicated switching. Could you recommend a set of similar coils for my purpose, as I am unable to trace any in the books which I have at my disposal?"—D. B. A. (Harrow).

AT the moment there are no direct replacements for the coils in question. In the Bulgin range, however, there are several multi-band coils, but these have to be mounted separately and used with a multi-contact switch. These are, of course, quite suitable as replacements. They will take up more space, but if you are rebuilding the set you will no doubt be able to make the necessary arrangements to accommodate the switch rod and also for the modified wiring which will be required.

Air and Submarine Radio

"I should be glad if you could tell me how submarines and aeroplanes manage for their radio, in view of the fact that there is no earth available and no means of supporting a good aerial."—L. S. I. (Highgate).

THERE is ample room on both submarines and aeroplanes for an aerial and these are, in fact, fitted to both types of craft. On some aeroplanes the aerial is stretched from tail to main planes, and in others a frame aerial is used. These were discussed in a recent article in these pages. The "earth" is obtained from the metal framework of the machine, and this is also used in submarine radio. The aerial in this case is stretched between masts on the top of the craft. When submerged, of course, radio communication is, so far as we are aware, impossible. This is due to the earthing effect of the water on the exposed aerial, and to the screening effect of the metal hull on any interior aerial.

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 Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2. The Coupon must be enclosed with every query.

Insulating Beads

"Some weeks ago you mentioned that special beads were obtainable for insulating wires for coil mounting and similar arrangements. I should like to get hold of these if you could tell me where to get them and about how much they cost. Are they available in different sizes?"—P. B. T. (Bromley, Kent).

THE beads may be obtained from Electradix Radios, Ltd., of 218, Upper Thames Street, E.C.4, price 6d. doz. This size will be quite suitable for your purpose.

L.F. Instability

"I recently built a three-valver (Det. and 2 L.F.) which, whilst it has good range and power, gives a bad whistle all the time signals are on. When I tune between stations the noise goes. Can you suggest what this is and how it may be possible to prevent it?"—B. R. (Glossop).

THE trouble is no doubt L.F. instability. One of the simplest ways of overcoming the trouble is to reverse the connections to either the primary or secondary of one of the L.F. transformers. This, however, may be regarded as a palliative rather than a cure, and you should endeavour to prevent the whistle by modifying the circuit wiring; changing values of decoupling components, or other means.

Short-wave Tuning

"I have made an all-wave set from one of your designs, but am disappointed with the short-wave results. The tuning is very critical, and I cannot separate stations on the 40-metre amateur band. Is there no way of opening out this section so that amateurs can be heard clearly?"—E. P. M. (St. Neots).

IN an all-wave receiver the tuning condenser is the standard .0005 mfd. component. Obviously, therefore, this will give a very wide coverage with the short-wave coils. The 40-metre amateur band is very crowded and many amateur transmitters prefer the 20-metre band owing to the bad QRM which is experienced. Therefore, you cannot hope with a .0005 mfd. tuning condenser to separate the amateur stations and a special short-wave tuner should be made up, with a tuning condenser having a total capacity not greater than .00016 mfd. A bandspread condenser would be of assistance with your present set, but even so you should bear in mind that the short-wave range is roughly 16 to 50 metres, whereas a standard short-wave coil and .00016 mfd. condenser will cover only from 22 to 47 metres, and as previously mentioned in these pages it is preferable to make a coil so that only the amateur band is covered if your interest lies mainly in the amateurs.

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.

P. R. (Ealing). Suitable coils can be obtained from Messrs. Stratton and Co., Ltd., Eddystone Works, Bromsgrove Street, Birmingham, 5, or an ordinary S.W. coil can be tapped, say, 25 per cent. of the total turns from the earth end, to form the feed-back coupling. The values of the resistances will depend on the valve used. Average values would be 10,000, 50,000 variable and a final 15,000 ohms.

T. Y. (Birmingham). No, we would not suggest the procedure you outline. It would be more satisfactory if you follow the more standard arrangements.

P. S. (Woolwich). The idea is quite sound, but you will have to spend a little time experimenting to determine the most satisfactory values for the resistances. For the condenser we would suggest one of the mica dielectric type.

R. P. Y. (Norfolk). Try reducing the screen voltage and improve the decoupling of the detector anode circuit. Are you sure that the H.F. choke is above suspicion?

W. L. H. (Acton). The meter, whether placed in the positive or negative lead, will only register the actual current being consumed by the circuit. The full output of the rectifier will only be indicated when operating conditions are such that the total current is consumed. The current is D.C.

J. J. (Wolverhampton). The details are not too clear: the holes are too big for the valveholders. We can only suggest that you cover them by bolting suitable pieces on sheet metal over them and drilling fresh holes of the correct size.

B. D. (Hendon). A steel mast will be quite satisfactory providing the wire supporting halyards are broken into short lengths, as regards electrical conductors, by means of suitable insulators of the large egg or barrel type.

The coupon on page 495 must be attached to every query

Practical and Amateur Wireless
BLUEPRINT SERVICE

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	7½d. " "
Wireless Magazine	1/3 " "

The Index letters which precede the Blueprint Number indicate the periodical in which the description appears: Thus P.W. refers to PRACTICAL WIRELESS, A.W. to *Amateur Wireless*, P.M. to *Practical Mechanics*, W.M. 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.

PRACTICAL WIRELESS.

	Date of Issue.	No. of Blueprint.
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Leader Three (SG, D, Pow)	22.5.37	PW35
Summit Three (HF Pen, D, Pen)	—	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	PM1
Cameo Midget Three (D, 2 LF (Trans))	—	PW51
1936 Sonotone Three-Four (HF Pen, HF Pen, Westector, Pen)	—	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)	14.8.37	PW64
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))	18.2.39	PW72
The "Rapide" Straight 3 (D, 2 LF (RC & Trans))	4.12.37	PW82
F. J. Camm's Oracle All-Wave Three (HF, Det., Pen)	23.3.37	PW78
1938 "Triband" All-Wave Three (HF Pen, D, Pen)	22.1.38	PW84
F. J. Camm's "Sprite" Three (HF Pen, D, Tet)	26.3.38	PW87
The "Hurricane" All-Wave Three (SG, D (Pen), Pen)	30.4.38	PW89
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Nucleon Class B Four (SG, D (SG), LF, Cl. B)	—	PW34B
Fury Four Super (SG, SG, D, Pen)	—	PW34C
Battery Hall-Mark 4 (HF Pen, D. Push-Pull)	—	PW46
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All-Wave "Corona" 4 (HF, Pen, D, LF, Pow)	9.10.37	PW73
"Acme" All-Wave 4 (HF Pen, D (Pen), LF, Cl. B)	12.2.38	PW83
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A.C. Leader (HF Pen, D, Pow)	7.1.39	PW35C
D.C. Premier (HF Pen, D, Pen)	—	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
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A.C. 1936 Sonotone (HF Pen, HF Pen, Westector, Pen)	—	PW56
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Four-valve: Blueprint, 1s. 6d.		
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MISCELLANEOUS.		
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Superhet Converter (1/-)	—	AW457
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The W.M. A.C. Short-wave Converter (1/-)	—	WM403

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CONVERSION UNITS for operating D.C. Receivers from A.C. Mains, 100 watts output, £2/10/0.—150-watt Model for operating Radiogramophones, £3/10/0. Send for lists.—Chas. F. Ward, 46, Farringdon Street, London, E.C.4. Tel: Holborn 9703.

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BANKRUPT BARGAINS. List free. Large stock radiograms and receivers, valves, etc. Please state requirements for quotation. Easily cheapest. Repairs.—Butlin, 6. Stanford Avenue, Brighton.

LITERARY

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MISCELLANEOUS

BLUEPRINT S.T. Super Centurion required. Can any reader please oblige?—E. O'Connor, Moore Terrace, Monkstown, Dublin.

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ANTHONY EDEN

By

WINSTON CHURCHILL

Mr. Anthony Eden when Foreign Secretary, leaving a Cabinet Meeting with the Prime Minister.

In this article written exclusively for the August STRAND, the world-renowned politician and writer says of Anthony Eden:

It is very unfair to make Mr. Eden the scapegoat of the Sanctions policy. . . . The misfortunes which followed arose directly from the Baldwin polity of "Sanctions without war."

After ten years of experience of the Foreign Office, he entered upon the precarious and onerous task of conducting British Foreign Affairs in a period of manifest national weakness and growing international tension.

The Eden resignation was a memorable event. . . . It is sufficient to say that the Foreign Secretary had no choice, and that it was within the rights of the Prime Minister to give him no choice. He was undoubtedly an obstacle to a policy of placating Mussolini.

With its permeating and far-reaching social and politica influence the power of the Conservative Party to break a resigning Minister has often been proved. . . . All this force was now applied to Eden. The papers addicted to the policy of appeasing the Dictators simply ceased to report his speeches, or reported them in a manner which was an insult.

Let us hope the Conservative Party will one of these days recognize that they will have need of him. . . .

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RADIOLYMPIA NEWS AND NOTES—

See Page 522.

Practical and Amateur Wireless

AND PRACTICAL TELEVISION

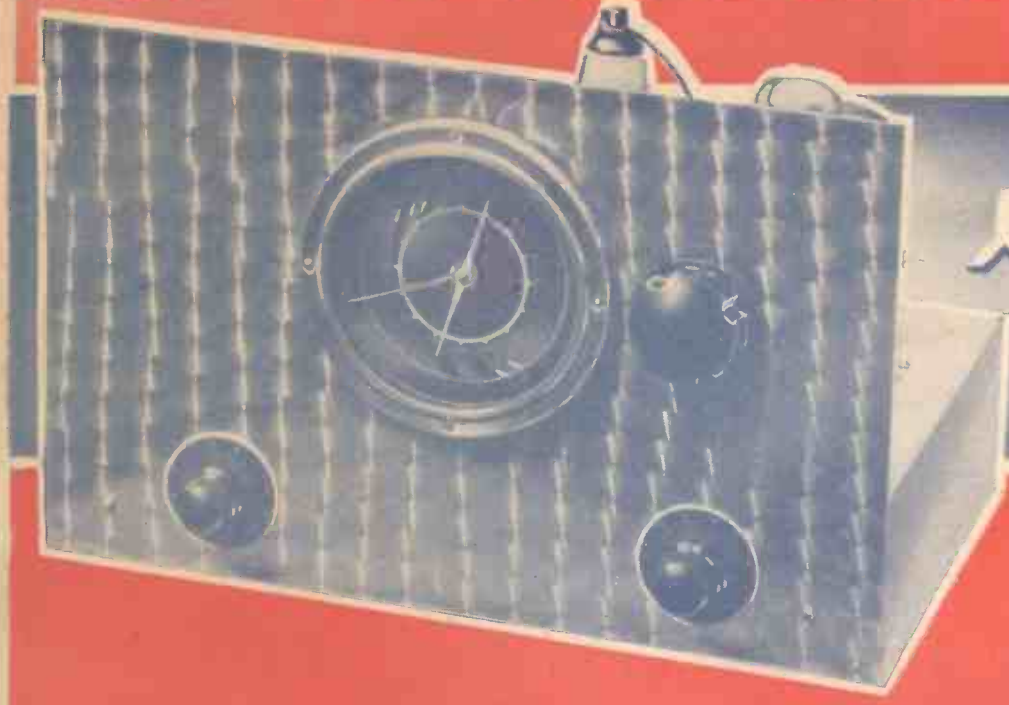
3D. EVERY WEDNESDAY

Edited by F. J. CAMM

a GEORGE NEWNES *Publication*

Vol. 14. No. 360. August 12th, 1939.

The KESTREL Short-Wave 4



TRANSMITTING TOPICS—See Page 507

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. XIV. No. 360. Aug. 12th, 1939.

ROUND *the* WORLD *of* WIRELESS

The Kestrel S.W. Four

NUMEROUS letters have been received from our readers giving their ideas of the ideal short-wave receiver. The remarks contained in each letter have been noted, and the final analysis provides most striking evidence of the widely-varying requirements.

To satisfy those requiring an efficient all-round communication receiver, the Air Hawk 9 was produced and, according to the numerous reports received, it is apparent that the designer has succeeded in pleasing quite a large section of our short-wave enthusiasts.

On the other hand, however, many are still asking for a battery-operated set. Those in favour of a superhet just balance those who plump for a good straight circuit, but there are some things which both schools of thought have in common, and they are: the design must not be too expensive, it must not be too heavy on current, it must be simple to operate and, at the same time, be capable of putting up a good performance as regards range and selectivity.

It is impossible to satisfy everybody with any one design, therefore it is hoped that the Kestrel, which, incidentally, forms a happy compromise, will find many enthusiastic supporters. It makes its bow, so far as you are concerned, this week, as a three-valver, but finishes as a very efficient four-valver using one stage of H.F. amplification which can be tuned, or aperiodic, according to the frequency of the station being received.

The design is sound; there are no fancy frills or gadgets, and careful thought has been given to the layout and wiring of the components, so that even the beginner can make a good job of the constructional work.

The Air Hawk 9 has already earned its laurels; it now only remains for the little hawk—the Kestrel—to find as many supporters, and show its big brother what a straight four can do in the hands of competent operators.

Aston Hippodrome Orchestra

IVAN HUCKERBY will conduct the Aston Hippodrome Orchestra in a popular programme on Saturday evening, August 19th. This orchestra has been without a permanent home since last winter when there was a destructive fire at the Aston Hippodrome. This broadcast will be from St. Stephen's Hall, Birmingham.

Blackpool Hour

THE North Regional O.B. unit are taking their microphones to the seaside again on August 17th in order to provide listeners with another characteristic "Blackpool Hour." This will, as usual, consist of a tour of the resort's various entertainment centres, including the Arcadian Follies at the South Pier, Larry Brennan and his band at the Empress Ballroom, excerpts from revues at Feldman's theatre and the North Pier, and part of the famous circus at the Tower.

ON OTHER PAGES

Light Listening

FOR the August number of the Midland radio magazine, "Light Listening," John Moore and Tristam Beresford, the Editors, have a personality page, featuring V. C. Buckley, traveller; a short story, a country sketch, a letter from the Near East, and John Day's gossip column. A new feature is entitled "The Credit Side." The idea is that in these days when humanity is much maligned, it is worth hearing views from the man-in-the-street on some of its redeeming virtues. The first contributor will be T. A. Waterhouse, a Birmingham engineer and a well-known angler. Publication day is August 14th.

Eleven Thousand Whalers

A. L. LLOYD, of the B.B.C. Features and Drama Department has written a feature programme describing the modern whaling industry in the Antarctic, which is to be broadcast on August 30th. He is well qualified to do so, since before he joined the Corporation he saw two years' service as a whaler. He sums up his experiences as "very hard work for very good money," and his programme will demonstrate that every penny paid out to whalers is certainly earned.

Listeners to "The Voice of the Seaman" will expect and receive a script at once lively and accurate, dramatic and documentary.

The production will be by Laurence Gilliam.

Morecambe in Regional Concert Party

MORECAMBE, besides providing an hour on Saturday, August 12th, for the National programme, has a share in the Regional concert party series on August 9th, when the show from the Palace Theatre will include Morrell and Melville, Biddy Brewin, Rhythm Rascals, Derek Moreland, Joyce Jay, Blonday Sisters, Lorraine and Yvonne, Frank Richards, Elaine Robinson, Harry Taylor, Arthur King.

Northern Items in the National Programme

DURING the week ending August 12th the North provides more than 14 hours for National and Regional programmes (eight hours to National and six to Regional). Midday music on Thursday, August 10th, for example, includes Horace Finch at the Blackpool Empress Ballroom from 12.30, the Swingtime Quartet, piano, clarinet, trumpet and guitar at 1 p.m., and the Halifax Special Constabulary Military Band at 2.15 in an hour's programme.

New French Station

RADIO-NATIONAL, the new high-power French broadcasting station at Allouis, which was recently opened by the Minister of Posts, Telegraphs and Telephones, is stated to have a power of 450 kilowatts.

ROUND the WORLD of WIRELESS (Continued)

A Radio Outpost

ON the summit of the famous Mount Fuji, in Japan, there stands a meteorological observatory 12,400ft. above sea-level. It is manned by four young meteorologists and a radio operator. At regular intervals these men make observations of the sky, and send their reports by radio to the central observatory in Tokyo. And it is these reports, predicting fair weather or giving warning of approaching storms in the surrounding area, that make civil aviation safe in Japan.

Studio Variety

IN a programme of studio variety on August 9th the artists will be Warwick Vaughan, the Warwickshire impressionist who has frequently broadcast, and Cleo Sabel, of Birmingham, who will make her radio debut in songs at the piano. Both these artists will also take part in the National programme the following afternoon.

A Radio Comedy

NORTHERN IRELAND listeners may remember the broadcast of "Apollo in Mourne," an amusing radio play in blank verse and prose about the Greek god's flirtations in a small public-house in County Down. Another comedy by the same author, Richard Rowley, will be broadcast on August 10th. This play is entitled "P.G.'s at Drumgarriff." The estate of Drumgarriff, like its owner, is aristocratic but threadbare, and this comedy recounts the P.G.'s success in restoring it to its old dignity.

Northern Concert Parties

LISTENERS in all parts of the country will hear two Northern Concert Party shows during the third week in August. Neil and Claxton's "Revelry" will be broadcast from the New Central Pier, Morecambe, in the Regional programme of August 16th, as part of the "Shows from the Seaside" series. The National series, "Round the Concert Parties," will include on August 18th the Redcar Follies from the New Pavilion, Redcar.

Organ Recital

REGINALD PORTER-BROWN, who will broadcast an organ recital from the Forum Cinema, Southampton, on Friday, August 18th, went to Southampton in 1937. He has broadcast many recitals of different types of music since he was first heard in a "You Pays Your Money" programme in 1934.

INTERESTING and TOPICAL NEWS and NOTES

Cricket Commentary

A COMMENTARY from the County Cricket Ground, Weston-super-Mare, will be given by R. M. Rickett on the match between Somerset and Glamorgan, on August 12th. R. M. Rickett first broadcast with Stephen Fry (son of "C. B.") in a commentary at Trent Bridge when Notts played Surrey last Whitsun.

An anti-Jitter movement has just been started by Leon Cortez, the Radio coster comedian, and recently he initiated Mr. George Lansbury as a member. Perfect harmony (more or less) reigned in Mr. Lansbury's East London home when the couple burst into song.

Whitley Bay "Whip-Round"

WHITLEY BAY provides what promises to be a lively little programme on August 19th. This will take the form of a quick survey of the entertainments offered by this popular seaside resort during its summer season. Included in the programme will be Charlie Hann and his Rex Hotel dance band, George Clifford from the Empress Ballroom, interviews in the White City, and probably a number of other items.

Dance Rhythms

JAN BERENSKA and his Orchestra, of the Pump Room, Leamington Spa, will be heard on August 11th in a programme which will include Viennese, Hungarian, Spanish, English and American dance rhythms.

Torquay Municipal Orchestra

ON Sunday, August 13th, a programme will be broadcast by the Torquay Municipal Orchestra, leader, Harold F. Petts, conductor, Ernest W. Goss, from the Pavilion, Torquay. May Bartlett (violoncello), who is also well-known as a singer, and Kenneth Ellis (bass) will be the solo artists.

Radio-controlled Car

A RADIO-CONTROLLED motor-car is one of the latest productions of Mr. H. J. R. Rieder, the Sea Point radio experimenter and his partner, Mr. J. Boyle, a mechanical engineer, at Cape Town, S. Africa.

Dr. Reed's Reminiscences

DR. W. H. REED, M.V.O., leader of the London Symphony Orchestra, will, on August 10th, give the second of the series of talks in which he recalls his association with many famous composers and players.

Song Recital

ROY HENDERSON is to pay a visit to the Midlands, where he spent part of his youth, to give a song recital on August 12th. He has family associations both with Wolverhampton and Nottingham, and for a number of years he was Chorus Master of the Nottingham Philharmonic Society.

Variety from Cheltenham

FOR Cheltenham Cricket Week a special variety bill is to be put on at the Montpellier Gardens, and on August 17th there will be a broadcast. Remembering that the record for the Pavilion is held by "The March Hares," David Burnaby has named his party "The March Hares of 1939." It includes Michael North, Mario de Pietro, and the Cheltenham Spa Light Orchestra.

SOLVE THIS!

PROBLEM No. 360

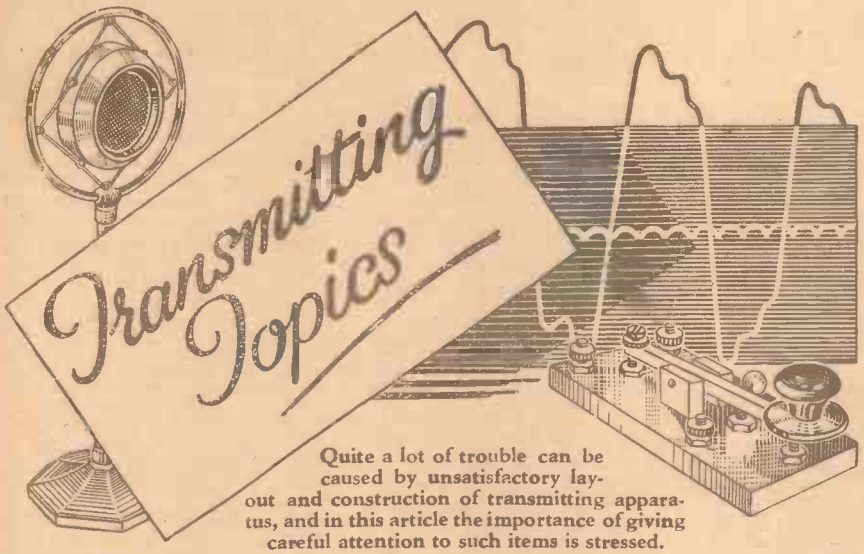
ROBERTS had an ordinary three-valve receiver of the S.G. det. and L.F. type, employing a pentode in the output stage. Results were quite satisfactory but he was troubled with a slight hum, and a friend advised him to try a larger smoothing choke and a higher capacity condenser across the bias resistance of the output valve. Roberts did as he was advised; he purchased the choke from one of the well-known makers, and secured a 50 mfd. electrolytic condenser from out of another set. He took great pains to make a good job of the alterations but, much to his disgust, the reproduction was far worse, and the sensitivity much less than usual. Where had he slipped up, or hadn't he?

Three books will be awarded for the first three correct solutions opened. Entries must be addressed to The Editor, PRACTICAL AND AMATEUR WIRELESS, Messrs. George Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2. Envelopes must be marked Problem No. 360 in the top left-hand corner and must be posted to reach this office not later than the first post on Monday, August 14th, 1939.

Solution to Problem No. 359

The differential condenser had been in the spares box for some time and the dielectric had become damaged or perished, therefore, when it was put into commission it developed a short circuit.

The following three readers successfully solved Problem No. 358 and books have accordingly been forwarded to them. E. J. Preece, St. Georges, 362, Milton Road, Cambridge; J. Griffiths, 65, Wilton Road, Salisbury, Wilts; and E. Greenhalgh, 23, Church Street, Ainsworth, Nr. Bolton, Lancs.



Quite a lot of trouble can be caused by unsatisfactory lay-out and construction of transmitting apparatus, and in this article the importance of giving careful attention to such items is stressed.

AN examination of pictures illustrating amateur transmitting stations always reveals the fact that there appears to be no recognised system of construction, and if one is in the position to visit many shacks or dens one soon realises that the method of construction is, invariably, governed by available space and, of course, finances.

The Americans seem to favour rack construction, which allows the various sections of the complete installation to be built as separate units and assembled in one of the various rack formations. The method is now being widely adopted in this country, and as it most certainly offers many advantages, it is well worthy of consideration, especially if the den is not too spacious.

There are two popular forms of rack assembly and these are depicted in Fig. 1, where it will be seen that one consists of a vertical rectangular framework, either of wood or metal, so designed that it can carry several chassis or baseboards, together with their associated panels. The other system can be likened to a vertical crate which is provided with horizontal ledges to enable baseboard or chassis assemblies to be housed in tiers. It is not proposed in this article to enter into any discussion concerning the merits or demerits of either form of construction as each has its own supporters, their opinions, no doubt, being based on their circuit layouts and their methods of experimenting.

Unit Layout

The beginner, and as a matter of fact many an old hand, finds the unit idea more flexible when laid out in a line on a bench or shelf, and for those using this arrangement, as shown in Fig. 3, it must be said that it is certainly very easy to get at any one particular part quickly or see the complete circuit at a glance.

The rack assembly certainly looks more professional, provided one determines what controls or meters are required on each panel before commencing constructional work. If due consideration is not given to these details in advance, then the whole appearance of the assembly can be ruined by unsymmetrical controls and, possibly, unsightly holes or screws.

Although it is now possible to purchase all the various parts for a complete rack in many sizes at quite reasonable prices, it is quite possible that many amateurs will wish to make their own. Therefore, to enable them to do this, the essential details are shown in Fig. 2, together with suggested dimensions which, of course, can be varied to suit individual requirements.

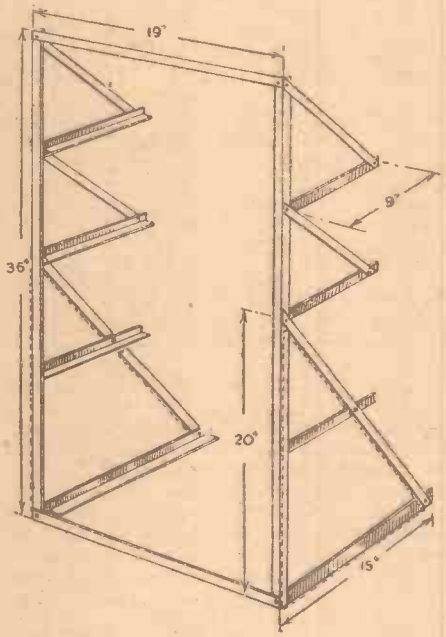


Fig. 2.—The general details for the construction of a serviceable metal rack.

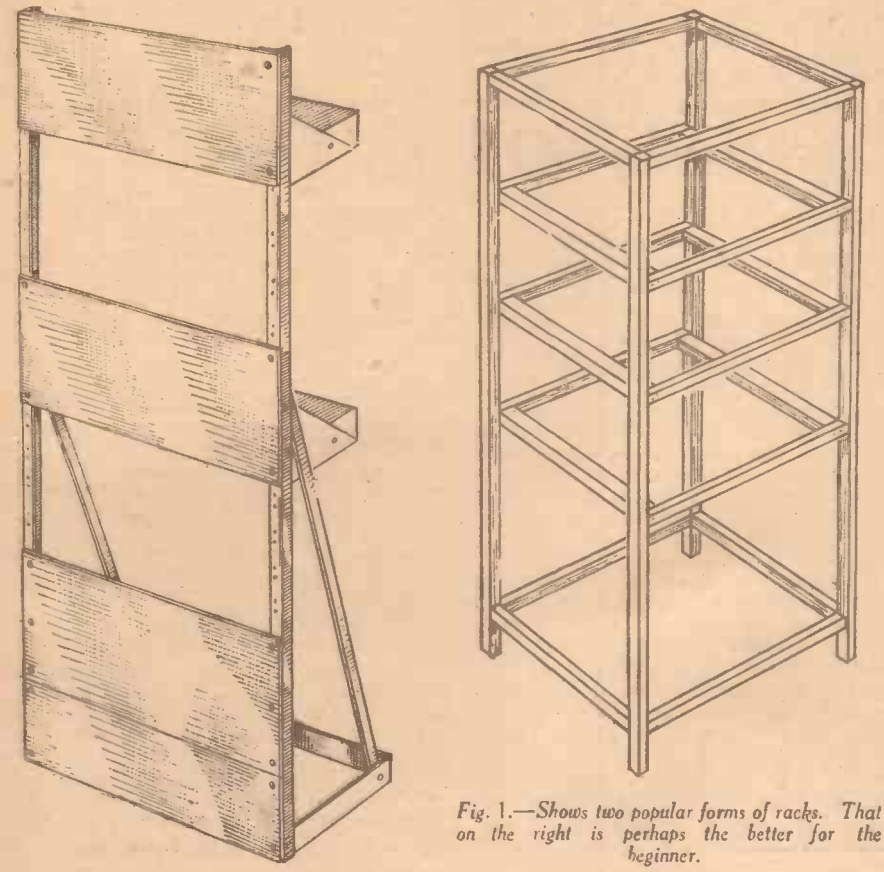


Fig. 1.—Shows two popular forms of racks. That on the right is perhaps the better for the beginner.

Rack Construction

For the two main vertical supports $\frac{3}{4}$in. or 1in. by $\frac{3}{32}$in. or $\frac{1}{4}$in. angle iron will be quite rigid enough, and if it is given a smooth polish with a suitable file or emery cloth it will look quite neat when finished off with an enamel according to the maker's taste. For the horizontal bearers, the same material can be used, provided it is fixed so that the metal forms a support for the chassis or baseboard and a side guide at the same time. The idea is clearly shown in the diagram. To support the rack in a vertical position and to prevent any possibility of it tilting when the weight of the various sections is applied, it is necessary to fit substantial feet to the bottom ends of the uprights. Ways of doing this will, no doubt, be apparent to many readers, so the construction shown need only be taken as a guide. On the actual rack under consideration, the same angle iron is used to form the horizontal feet and the necessary rigidity was provided by using the two sloping strips between each end of the feet and the vertical uprights. A more robust construction would, of course, be secured by using a piece of sheet

(Continued overleaf)

TRANSMITTING TOPICS

(Continued from previous page.)

metal of, say, $^1/_{16}$in. or $^3/_{32}$in. thick, cut in the form of a triangle and bolted to the feet and the verticals as indicated by the dotted lines in the diagram.

The same applies to the horizontal chassis bearers, as it is essential to strengthen them to provide the required support. With the method of assembly shown, the baseboard or chassis, complete with

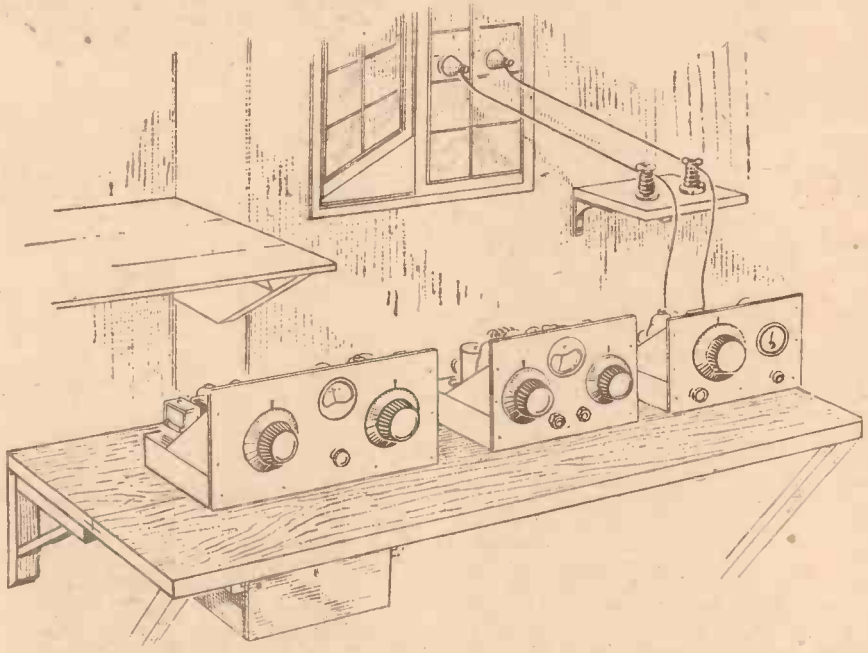


Fig. 3.—The unit idea which allows the placing of the various sections to suit available space.

panel, slides into the rack from the rear, thus allowing the vertical support to form, as it were, a frame along the two outside edges, and at the same time allowing very easy removal of any one particular section. The slight gaps between the top of one panel and the bottom of another can, if so desired, be hidden by strips of small wooden moulding coloured to match the rest of the framework.

Whether baseboard or chassis construction is used depends entirely on the constructor or the design of the apparatus he is making, but the writer is inclined to favour the former, as he for one likes to be able to see and get at everything, without going to a lot of trouble or performing back-breaking contortions.

Layout of Components

In the initial stages of transmitter construction, many of the troubles which beset the operator are often caused by lack of consideration of component layout.

It is not possible to illustrate how or where every component should be placed, so one might say that the golden rule is to remember that all components carrying H.F. currents and capable of creating or being affected by an electro-magnetic field, must be placed so that they do not interfere with or become affected by other components. For example, the field built up round a coil of the solenoid type takes the form shown by the dotted lines in Fig. 4 and the strongest part of the field is at the ends of the coil where the dotted lines are the most profuse. If such a component, therefore, has to be mounted near, say, a variable condenser, or any other item which would be affected by the coil's field, then it is obvious that it must be so placed that the weakest part of the field is towards the condenser, as shown in Fig. 4.

This applies in particular to all inductances, and even the wiring of the circuit which carries H.F. currents, as many weird forms of interaction and instability can often be traced to the proximity of two or more wires or components to each other.

If a metal panel or chassis is used, care should be taken to see that any coil is not placed too close to these, otherwise eddy currents will be set up in the metal, and serious losses introduced.

Earthing

Too little attention is so often given to the earth return connection of the various parts of a circuit. In a transmitter, it is essential to see that all earthing wires are as short and stout as possible, as, strange as it may seem, they will introduce resistance and a certain amount of inductance into the circuit. To avoid having these points at different potential, it becomes necessary, therefore, to use reasonably heavy gauge wire and, for any given section of a transmitter, connect the earth returns to one definite point, taking care that this is so located that all connections are approximately the same length. When the individual sections have to be connected to a common earth wire, it is then quite a simple matter to make the necessary connections to the one point on each chassis or baseboard.

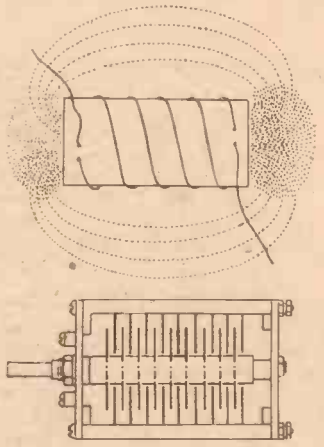


Fig. 4.—Illustrates the effective field created round a coil. The condenser is in the weakest area.

When making the junction point, don't use a small screw or bolt, thinking that the wires will be held by placing them under the head. Use a 4 B.A. bolt right through the chassis or baseboard, and let it hold sufficient soldering tags to provide a connection for each wire.

ITEMS OF INTEREST

Radio Tangiers

THE new station which has been established at Tangiers (Morocco), although under private ownership, will be placed under the control of the French Protectorate; the power will be 25 kilowatts. Most of the broadcasts will be made in the French and English languages.

Spanish Transmitter in Morocco

IT is reported that the Spanish Government proposes to erect a medium-wave broadcasting station near Larache (Spanish Morocco); the channel to be used will be 293.5 m. (1,022 kc/s).

Alter In Your List

RADIO Méditerranée (France) has been authorised to use 227.1 m. (1,321 kc/s), instead of its present wavelength of 230.2 m. (1,303 kc/s), until March 1st, 1940, provided its broadcasts do not interfere with those of the Hungarian station at Magyarovar using the same channel.

Radio Antwerp

THE 400-watt privately owned transmitter at Antwerp (Belgium) announcing itself as *Radio Antwerpen* (Flemish) or *Radio Anvers* (French) is now on the air almost daily on 204.5 m. (1,463 kc/s). The studio usually opens at B.S.T. 20.30 with a musical broadcast, occasionally relaying opera from the local theatre, and closes down with the playing of the Belgian National Anthem (*La Brabançonne*) towards B.S.T. 22.30.

New York's New Station

WITH the suspending of broadcasts from WPG, Atlantic City (N.Y.), and those from WBIL, Kearny (N.Y.), the channel freed in this manner, namely 1,100 kc/s (272.7 m.), will now be taken over by a new 5-kilowatt station in New York City; it is to be operated by the Greater New York Broadcasting Corporation.

Danzig Shouts Them Down

THE powerful transmitter which the German Reich has installed on the Hagelsberg mountain, near Danzig, is now sending out such powerful signals that owners of smaller sets are now unable to listen to foreign transmissions; in particular the B.B.C. broadcasts in the German language, it is stated, can now only be heard on the more elaborate and, in consequence, more expensive receivers.

NEW SEASON'S MODELS

A Brief Survey of Some of the New Receivers which will be Seen at This Year's Radiolympia

SINCE going to press with the last issue, a few more details have come through regarding some of the models which will be on show at Olympia.

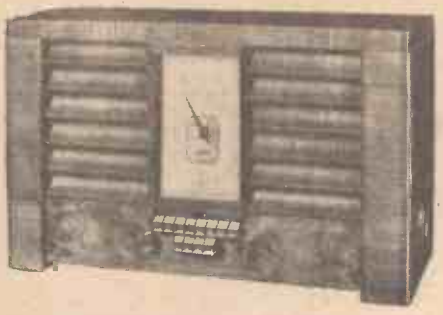
Quite a number of the manufacturers have not kept all the new season's models

Marconiphone model 883, a recently introduced 5-valve, 3-waveband push-button receiver.

until the opening date of the exhibition, so it is quite possible that some of the receivers will have already been seen in the dealers' windows.

Marconiphone Model 883

This is a recently introduced console model incorporating five valves in a three-waveband push-button circuit, and designed for A.C. operation. The circuit arrangement is of the conventional superhet type, but rather distinctive features are incorporated in the oscillator circuit in the form of permeability tuned inductances. The push-button control is also an improvement on the early models, as the set is automatically switched on when any one button is pressed. Three controls are provided, the volume and tone controls being combined and operated by concentric knobs. The wavelength coverage of this receiver is from 13.8 to 50 metres, 195 to 580 metres, and 726 to 2,000 metres. Provision is made for pick-up and extension loudspeaker, the latter embodying a simple switching arrangement which enables the receiver speaker to be silenced if so desired. The undistorted output is rated at 3 watts, while the mains consumption is in the neighbourhood of 65 watts.



The new G.E.C. Four-valve All-wave Superhet, Model 4066.

G.E.C.

The details to hand from the G.E.C. deal with their models 4066 and 4040. The former is classified by the makers as being the aristocrat of the battery range of receivers. It is of the four-valve all-wave superhet type, housed in a superb walnut cabinet of modern design. Push-button control of any eight chosen stations, and also for waveband switching is provided, and the manufacturers have been wise enough to allow ample room for an extra large H.T. battery, which ensures an outstanding all-round performance with the output and tone of quality of a mains receiver. The specification is completed with a tone compensating stage, the station-name dial illuminated for manual tuning, tone control, and provision for pick-up and extension speaker. The price of this model is 11½ guineas. The 4040 model is for A.C. mains operation, and employs five valves in a superhet circuit. Instantaneous push-button control for six stations is provided and the makers claim that the choice of programmes on the medium and long-wave bands is unlimited.

The set and speaker are housed in a most attractive moulded cabinet. "Thermometer" tuning is provided on a flood-lit dial with a moving column of colour to show the station setting at a glance;

McMichael Table Radiogram Model 903.

The new G.E.C. Five-valve Superhet with "Thermometer" tuning. Model 4040.

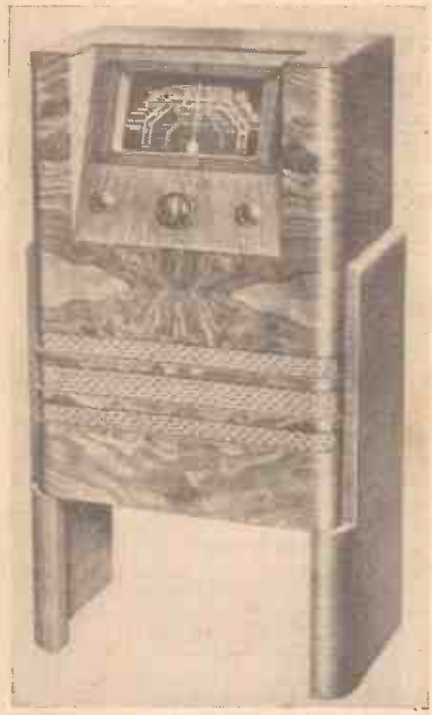
four watts undistorted output, tone control and provision for extension speaker. The price is 8½ guineas.

For those on D.C. mains, it is interesting to note that the counterpart of this model, namely, 4045, is available at 9 guineas.

McMichael

The McMichael model No. 903 is of the table radiogram type, and bearing in mind its very reasonable price of £14 7s. 6d., it certainly represents an attractive proposition.

The circuit employed in this receiver is



The Cossor model 62—an A.C. all-wave console.

of the seven-stage all-wave superhet type, the wavebands covered being 18.5 to 50 metres, 190 to 550 metres, and 850 to 2,000 metres. The valve arrangement is triode hexode frequency changer; I.F. amplifier, double diode tetrode for detector, A.V.C. and output, and an indirectly heated H.T. rectifier. The receiver is, of course, for A.C. operation and has a rated output of 5 watts. Four main controls are provided, two on each side of the scale, and these act as volume-on-off, tone, wave-changing, and tuning. An additional radiogram switch is conveniently mounted on the motor board. A special point which will appeal to quality enthusiasts is that when the circuit is switched over to pick-up, a special

(Continued on page 520)

Practical Television

August 12th, 1939. Vol. 4. No. 164.

Still a Stalemate

ONE is reminded of that elusive character called the Scarlet Pimpernel created by Baroness Orczy whenever consideration is given to the long-promised television report from the Postmaster-General. The latest Parliamentary question put to the P.M.G. asked him directly if he was in a position to state what were the main recommendations of the Television Advisory Committee with regard to the extension of the television services to the provinces, and when he was expected to make a complete statement on the whole subject. The chief of the Post Office shows no inclination to be hurried, however, and on the surface displays little sympathy with those multitudinous interests who have so much at stake in connection with this development. The Assistant P.M.G. in his reply to the inquiry admitted that his chief had received the report and said that among other things it dealt with the question of extending television to the provinces. Careful consideration was being given to the matter —other people would suggest the word tedious instead of careful—and consultations were now in progress with the Treasury. Perhaps this is where the hitch is occurring, for unless wrapped up in the term "armaments" little sympathy seems to be given to any monetary proposal in the present state of things. The P.M.G. was quite adamant in stating that he was not yet in a position to give an approximate date when a Parliamentary statement will be made, and in the meantime it is not his intention to make any statement about the recommendations of the committee. In other words, the signals are still set at "go slow" in spite of the proximity of the radio show and all its repercussions for the radio industry, and the fact that it is over four-and-a-half years ago since the original committee produced its report and imbued the trade with a wave of optimism.

Picture Adjustments

ONE of the advantages associated with the television camera using an image dissector tube for picture synthesis is the fact that through the medium of the focusing adjustment it is possible to produce electrical enlargements of any section of the picture with ease and so give the effect of a close-up without fading over to a second camera or making adjustments to the optical lens focus. This is due to the magnetic focus and electrostatic image acceleration from the photo-electric cathode to the target plane of the scanning aperture. Similar effects are possible if a cathode-ray tube is used as a form of electron microscope and under certain circumstances the user of a television receiver has felt the desire to enlarge his television picture so that he can concentrate on one section which is made to fill the rectangular mask to the exclusion of other parts of the scene. Within certain limits this can be done by adjustments to the line and frame amplitude controls normally provided at the back of a modern receiving set. For example, in the case of an electromagnetically-operated cathode-ray tube, these controls alter the resistance of a potentiometer in the anode circuit of the back coupled oscillator valve and so reduce or increase the measure of electron sweep in the line or frame direction. If these limits were to be extended, then enlargements of any section of the received picture could be undertaken to a greater degree, and if there was a demand for such a feature there is no doubt that manufacturers would take steps to fit such controls for the user to operate when he so desired.

German Progress

THE German Radio Exhibition which opens in Berlin at the end of July has been planned to show further progress in television's development in that country. Contrary to public expectation, the promised inauguration of an extensive high-definition service has been postponed repeatedly, but according to present plans the Brocken station should become operative by Christmas. Field tests have already been undertaken and a service radius of about sixty miles is anticipated, although figures have not yet been furnished for the Feldberg installation. This, of course, is additional to Berlin's own transmitter which, however, has a rather restricted range owing to the relatively low aerial. It is known, however, that engineers are actively engaged in locating further sites for other stations. What is regarded as an important innovation is the proposed introduction of a "People's Television Set." This was done with ordinary radio some time ago but did not meet with the success expected, and the experiment in television will be watched with interest, for similar proposals have been made in other countries, only they were not received with enthusiasm. According to the first reports this standard form of set has been built to designs worked out by the five main firms of the German wireless industry, and will cost between £30 and £35. The tube face is said to be quite flat, and this provides the greatest deviation from normal cathode-ray tube practice, although, of course, the "straight through" projection tubes used for large pictures have always employed an optically ground glass face, but this seldom exceeded 7ins. in diameter. The set is a table model with the loudspeaker on the left of the picture mask, which measures approximately 9ins. by 7½ins.

An American Delay

THERE are seven 6-megacycle channels available for television working, and both the audio and vision carriers are located in each band. Up to the present, the plans for receiver production embrace five of the bands from 44 to 90 megacycles. The whole problem of television transmission and reception in the U.S.A. differs fundamentally from that in this country, for it would appear that at almost every point the Americans have chosen standards which differ from ours. The line definition and frame frequency are higher, modulation is negative, the radiated vision carrier wave is horizontally polarised, and single sideband is employed. The results of these radical differences will be studied with care, and it is conceivable that if they show material improvements over what is done in this country, then the whole position may be reviewed when the present statutory period has elapsed.

Mr. Lawrence Wright, the famous musical composer and theatre showman, with Miss Evelyn Laye, the well-known musical comedy actress, and members of Mr. Lawrence Wright's "On With the Show" company, taken on the occasion of Miss Laye's visit to "On With the Show" at the North Pier, Blackpool. In the illustration are also seen the well-known artists Frank Randle, Lance Fairfax, Tessa Deane, Sutherland Felce, Wheeler and Wilson, and Bram Martin.

ON YOUR WAVELENGTH

By Thermion

This Year's Radiolympia Poster

IN previous years I have severely criticised the wireless posters. Last year a jaundiced representation of a diseased ear and a weird combination of an astigmatic eye, in symbolic combination to represent wireless and television, was futuristically used to draw attention to the wireless show. You remember what I said about it. It resembled a fried egg, the yolk of which had burst away from the white. It was a waste of money to have put that poster out.

I want this year to congratulate the R.M.A. on putting out a sensible poster bearing the slogan, "Let's All Go To the Radio Show." I like the poster because I want you all to go to the radio show too. This poster, based somewhat on theatre lines, although much more attractive, details some of the attractions which you will see there. Thus, those who run may read that at the show there will be a radio theatre and four shows daily, that the visitor may see television in the making, that the Kentucky Minstrels will be there, as well as a cinema, that you may go behind the scenes at and with the B.B.C., that there are G.P.O. exhibits, a model factory, your favourite stars will be there, that there will be a variety entertainment, that the admission price is 1s. 6d., from 11 a.m. to 10 p.m. daily, and from August 23rd to September 2nd. This is a plain but attractive poster, and I hope that for future shows a similar layout will be used.

Many hundreds of my readers have asked me for those gum-on labels to stick on the back windows of their cars; if they would care also to exhibit one of these posters, I shall be glad to let them have one. Just drop a postcard to me marking it "Poster."

One more thing before I forget it. I want each reader of this journal to persuade as many friends as possible to go to the wireless show. My object here is purely altruistic, for I am so enthusiastic about this year's exhibition that I feel I am putting you on to a good thing. I could not have written that with sincerity about some of the previous shows. This year, however, it is a sincere invitation.

The Quondam Smith

YOU remember Smith, of course, of the anonymous ilk. He apparently presumes that with a name like Smith his identity is complete, even without initials, or address. Several readers, however, have eviscerated the said Smith. Most of them prefer theoretical diagrams, not wiring diagrams. Many suggest that he should take up gardening. I suggest that he should learn to write his address.

Death of Famous Soviet Scientist

SOVIET science has suffered a great loss in the death on July 17th of Professor M. V. Shuleikin, member of the Academy of Sciences of the U.S.S.R. and Chief Engineer of the Department of Communications of the Red Army.

Professor Shuleikin had spent thirty years of strenuous work in the preparation of numerous scientific workers in the field of radio-communications and in the development of Soviet radio-technics. He commenced his scientific and teaching career in 1908 after graduating from the St. Petersburg Polytechnical Institute. Soon after the Revolution he removed to Moscow, where he worked in the Red Army on the development of military communications. As a result of this work he was successful in solving many complex problems; he produced numerous valuable works dealing with the strengthening of the country's defence capacity. At the same time, Professor Shuleikin was engaged in extensive educational work. He gave all the principal courses in radio-technics at the former Moscow Higher Technical School, at the Military Electro-Technical Academy, at the Institute of National Economy, and at the Moscow Electro-Technical Institute of Communications.

The last six years of Professor Shuleikin's activities were closely connected with the Academy of Sciences of the U.S.S.R. In 1933 he organised the work at the Academy relating to electro-communications. Under his guidance this work helped to solve a number of problems connected with the diffusion of radio waves, the maintenance of regular communications on the main radio services, and also the adoption of measures to combat magnetic storms.

Professor Shuleikin was elected a member of the Academy of Sciences of the U.S.S.R. at the beginning of this year. He threw himself with still greater energy into the work of solving the complex problems relating to modern radio-technics and the working out of material for a general plan of development of communications in the Third Five-Year Plan. He also took part in the building of the Palace of Soviets in Moscow, in the capacity of chief consultant on questions relating to communications.

Who Is My Benefactor?

CONGRATULATIONS to the police on their perspicacity, perspicuity, sagacity, diagnosis, and acumen.

Someone who evidently wanted me to have, or do something with, a portable set, parcelled it up, addressed it to Thermion, and left it in the Sydenham Public Library. There was no address on the package, but such is fame that the Sydenham police were soon on the telephone to me asking me if I would have it collected. The set now reposes in my office, and I am wondering what to do with it. If this paragraph should catch the eye of the kind reader who left it there, I hope he will let me know what he wishes me to do with it.

The Dial Change

THERE are many who feel that I should change my dial which, as everyone knows, is the colloquialism for the physiognomy which supports my olfactory organ; that feature of mine which, as

Margot would say, is more of a limb than a feature. However, you will all have to change yours next March, owing to the new wavelength changes. The question of dial replacement is now agitating the grey matter of the set makers. I understand that new dials will be available at a small charge for fitting; you may thus purchase a new set at Radiolympia, and ignore the pending change.

The owners of old sets will be in a more difficult position, and it seems to me that many of them will have to devise their own dials. This will not be a difficult matter, but I suggest that some wise firm might market dial blanks to suit the usual range of receivers. The readers could thus calibrate their own sets.

Why does not someone market a dial on the vernier principle? This would be immediately adjustable and take care of any future changes. I do hope, however, that this time they have finished messing about with wavelengths, and I hope also, that the pirate stations will be brought to book. It is damnable that rotten little countries should be allowed to upset broadcasting arrangements because they will not conform to international broadcasting arrangements. These stations are usually those which run commercial programmes. They are not a bit interested in listeners, but in fat fees from opulent corporations. There should be some diplomatic means of putting a stop to them, or making them come into line.

Cleaning the Market

CONGRATULATIONS to the group of French radio manufacturers on their campaign for purging the French radio market. They published a series of advertisements containing the signatures of various firms warning purchasers of wireless sets against those dealers who offer receivers whose performance could not be supplied at the prices quoted. They have in view, of course, the lying style of advertisement. When the customer complains the dealer blames it on local conditions.

The Ordinary Listener and His Set

THE purpose of a talk on the Ordinary Listener and his Set, to be broadcast on August 17th by R. A. Watson Watt, is to point out that the ordinary listener may not be getting the best possible reception from his set. There may be two main reasons for this. In the first place, the listener may be slack about operating the controls, and the speaker, by means of ingeniously contrived records made at Broadcasting House, will underline this point. If, on the other hand, the set is wearing out and parts of it, or the set itself, are in need of renewal, the listener will have an opportunity of comparing it with the new sets which will be on exhibition at this year's Radio Show. The various kinds of electrical interference with which listeners are afflicted will also be discussed with the help of records, and means of eliminating the trouble will be illustrated.

Incidentally, the ordinary listener will find that all the troubles likely to crop up with his set, and the best methods of dealing with them, have been discussed in the pages of PRACTICAL AND AMATEUR WIRELESS from time to time.

Notes from the Test Bench

An Unusual Fault

ONE of those least expected faults was experienced the other day, when a commercial A.C. operated receiver was under test. While admitting that the actual trouble was, in itself, quite simple, its nature was such that many valuable minutes were wasted before it was finally located.

When the receiver was switched on, it soon became apparent that the mains transformer was overheating, and as no appreciable H.T. was present at the normal points in the circuit, it was naturally assumed that a short-circuit was present in the high-tension supply. Tests revealed that the rectifier and its circuit was O.K. so far as the mains transformer was concerned.

Condensers Were Suspected

THE smoothing condensers, therefore, came under suspicion but, much to the surprise of the tester, after disconnecting all condensers across H.T. supplies and breaking the supply to the actual receiver circuit, the short was still there.

An examination of the theoretical circuit, as shown in the service manual for the set concerned, did not show any other possible paths for short-circuit; therefore, it only remained for a further inspection of the set.

The speaker was of the energised type; the speech coil was connected in series with a hum-bucking coil which, as readers are aware, is wound on or adjacent to the energising coil.

Hum-bucking Coil

FURTHER investigation showed that one side of the hum-bucking coil was connected to the common negative earth line by means of a fifth lead to the speaker, but this was not *shown on the theoretical diagram.*

As the energising coil was being used as the smoothing choke, and as it was in series with the positive H.T. supply, it and the hum-bucking coil were subjected to careful tests. The results revealed the fact that the insulation had broken down between these two windings, thus allowing the H.T. to be shorted to earth via the h.b. coil and its earthing wire. As mentioned at the start, the actual trouble was not serious so far as it would take to locate normally, but what led the tester up the garden path was the fact that no sign of such earthing arrangements was shown in the service manual.

Silly Season

THE "silly season," from the point of view of the Press and, incidentally, the public, is the month of August. It is at this time that stories are liable to creep into the newspapers about a very large carrot at a flower show or the unfortunate and quite unforeseen immersion into salt water of a bathing belle. Robert Barr, the author of "Silly Season," to be broadcast on August 12th, is an experienced journalist. He has invented the Gosapher of Glenbogie which, as a news story, would make the Loch Ness Monster sound like a kipper. The Gosapher is a strange Scottish ghost which, when interviewed, knows all the "winners" and gives sound Stock Exchange tips. For a time he hits the front page of every paper in the country, but, with the silly season over, he is no longer news. The irony lies in the fact that he really exists.

Crime Is On the Air

"WHAT Price Crime" seems to suit the public taste; the B.B.C. have extended the contract of radio's real-life detective, ex-Divisional Detective-Inspector Jack Henry, so you will be hearing these exciting "true-to-life" crime plays until the end of September. Henry has already captured the interest of many thousands of listeners at home and overseas; his fan mail increases daily.

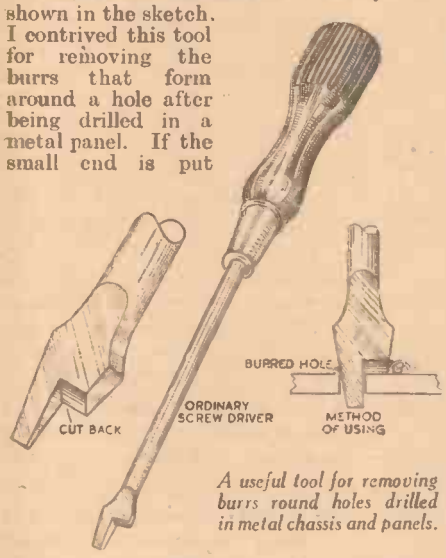
Besides preparing his future broadcasts, he is writing a film script, which will bring "true-to-life" crime to the screen.

A PAGE OF PRACTICAL HINTS

SUBMIT YOUR IDEA — READERS WRINKLES — THE HALF-GUINEA PAGE

A Handy Burr Remover

THIS useful tool is made from an ordinary screwdriver, with the end filed down on one side at an angle, as shown in the sketch. I contrived this tool for removing the burrs that form around a hole after being drilled in a metal panel. If the small end is put down in the hole and pressed tightly, and the handle turned round two or three times, it will take the burrs off flush with the metal.—D. ROBINSON (Carnalea, Co. Down).



A useful tool for removing burrs round holes drilled in metal chassis and panels.

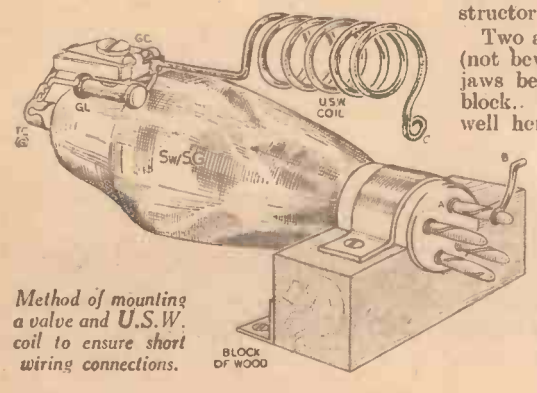
A Hint for U.S.W. Coil Wiring

WHEN carrying out some tests on the high-frequency bands round 10 metres, I experienced some difficulty in preventing signal attenuation and frequency drift, due to the rather long wiring resulting from the use of a short-wave type S.G. valve which has the grid brought out at the top cap.

On referring to the accompanying sketch, it will be seen how, by horizontally mounting this valve on a block of wood, the wiring was maintained rigid and short.

A portion of the block is spoke-shaved out to accommodate the ceramic base of the valve, which is secured by a clamping strip of aluminium; the whole fitment then being screwed to the chassis by an aluminium angle strip.

The grid condenser (G.C.) and grid leak (G.L.) were very closely coupled, as shown, the coil being directly connected with the anode end (as in the case of a Hartley circuit) wired in series with a reaction condenser and anode (B and C). Other circuit arrangements lend themselves to this method just as well, and the tuning condenser, which is wired closely and directly across the inductance, together with the reaction condenser, are mounted in close proximity to the assembly.—R. J. LENWOOD (Ledbury).



Method of mounting a valve and U.S.W. coil to ensure short wiring connections.

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.

SPECIAL NOTICE

All wrinkles in future must be accompanied by the coupon cut from page iii of cover.

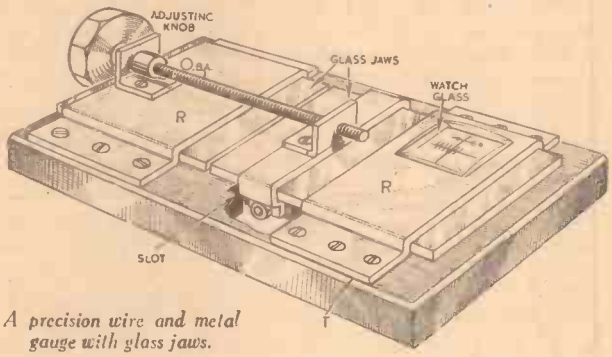
A Precision Wire and Metal Gauge

RECENTLY I decided to attempt the construction of a precision gauge for both wire and sheet metal, and after a good deal of pondering, I hit upon the idea of using glass, as this offered a greater degree of accuracy which could be relied upon so far as burring, expansion and mis-alignment are concerned, at any rate from the point of view of the home constructor.

Two accurately cut sheets of thick glass (not bevelled) were purchased, these glass jaws being mounted on a heavy wooden block. An electrician's block does quite well here, provided the surface is made very smooth. The moving jaw assembly differed only from the fixed jaw assembly by the clamping strip which comprises a 14-gauge aluminium strip bent to the glass size, then under, sufficient length being allowed to provide lugs for the 6 BA fixing rod and nuts passing under the board or wood base.

The two aluminium glass retaining pieces "R" were made the same size, but to allow the free movement of the sliding jaw, a thin piece of tin strip is positioned between the block and each flange; this is depicted by "T." Before mounting the moving jaw, the glass was calibrated in millimetres, this proving a useful measurement for comparison with gauge tables, although other constructors may desire to calibrate directly in gauge. A watch glass was then marked with a hair line, all the markings being carried out with indian ink and a mapping pen.

The watch glass was cemented into a square hole cut in the aluminium and slightly filed under, giving a thin aluminium serration which helped in the fitment of the glass. The cement used was of the type employed for setting microscope slides. The rest of the construction is clearly indicated in the illustration and needs no further explanation.—W. R. Leath (Scunthorpe).



A precision wire and metal gauge with glass jaws.

Criticism, Chat and Comment

PROMENADE CONCERTS

Our Music Critic, Maurice Reeve, Discusses the Programme for the Opening Week of the Promenade Concerts

TO use a seasonable metaphor, H. J. Wood will walk to the wicket and open the innings for his side in the great fixture "Musicians *v.* Public," on Saturday, August 12th, at precisely 8 p.m. Doubtless, as in the forty-four previous seasons that he has played in this match, he will promptly dispatch the first ball he receives to the boundary with one of those beautiful wristy strokes with uplifted bat that he has made so particularly his own during his long career. Doubtless, too, he will be sending shots to all parts of the field, giving the fielders no rest (and incidentally no chance!) until he finally carries his bat out on October 7th. All bowling will come alike to him, and no change of weather between now and then will affect him in any way. In other words, as my readers have doubtless guessed already, Sir Henry Wood opens the forty-fifth season of Promenade Concerts on that Saturday evening. This and subsequent articles are intended to recommend the special features of each programme likely to prove most popular to my readers.

Could a more suitable name than Elgar's be chosen for the first item on the programme, the work being his "Introduction and Allegro" for strings? Another popular Prom. item is Kodaly's suite, "Hary Janos," which gentleman was a champion of Hungary against the Turks quite a few years ago. It is full of those haunting gipsy strains and rhythms which make Liszt's rhapsodies so universally popular. The centre-piece of this first concert is, perhaps, Rachmaninoff's dazzling Rhapsodie on a Theme of Paganini, for pianoforte and orchestra, which will be played by, probably, the most popular of all Prom. artists, Moiseiwitsch.

Monday, the 14th, is the first of the traditional Monday Wagner nights, containing excerpts from the Master's operas: "Parsifal," "Siegfried," and "Götterdämmerung." It opens with the Tannhauser overture, and the vocalists entrusted with the task are Florence Austral, Mary Garred, and Norman Allin.

The programme on Tuesday, the 15th, looks one of the best of the season. And when I tell you that the one and only Tauber is singing three Schubert songs in addition to arias by Mozart and Weber, I don't suppose mere listening will be good enough for you. Also Louis Kentner, one of the very finest of present-day pianists, is playing a Liszt concerto. Other works down for this evening are Schubert's Ninth Symphony, in C and Rosamunde Overture, and Butterworth's wholly delightful English Rhapsodie, "A Shropshire Lad." Butterworth lost his life in the Great War, and there is no doubt England lost some original music thereby. I strongly recommend this programme: classical and brilliant, but nowhere highbrow.

Wednesday, the 16th, is devoted to that Euclid or Sir Isaac Newton of music, J. S. Bach. Bach is not everyman's meat, and if it should turn out to be a hot night you won't offend your correspondent if you prefer a game of tennis instead. But he is enormously popular with Prom. audiences, and it is practically the only opportunity we have of hearing many of his rarely-performed works. For instance, to-night a concerto for no fewer than *four* pianos and orchestra will be played! Also the popular D minor for two violins; whilst the suite in B minor for flute and strings is exquisite. There is also something for the organ and arias for singers—a regular musical salad. Old man Bach wrote so much of everything, and so much of it has to be studied by the serious student, that here is your opportunity, those of you who prefer "Bach to Butter."

Thursday's programme, the 17th, is chiefly modern, including the first performance of a pianoforte concerto by Arthur Bliss, who wrote the rather tin pan-ny music for the film "Things to Come." Perhaps this was one of the things. Solomon will sit at the piano, but not very idly, I'm thinking. There is the charming "Bartered Bride" overture, by Smetana, and don't miss the Fifth Symphony by that colossus of the North—Finland, to be precise—Sibelius. Sibelius is one of the giants of all time, and a liking for his music should not be difficult.

On Friday, the 18th, we pay homage to the great master of them all, Beethoven, and I have no doubt that the audience will, as usual, be the biggest of the week. The centre piece is the "Eroica" Symphony, written originally in honour of Napoleon, but with the dedication afterwards changed "to an immortal hero" when Beethoven learned that the "little corporal" had assumed the Imperial purple. Music knows no greater symphony, unless it be Beethoven's own ninth, and it will never cease to cast its spell on all music lovers. There is also the charming and rather Mozartian first, chronologically the second, piano concerto, and the overture to "Fidelio."

Saturday is always a "popular" as opposed to a "highbrow" night, and to-night's programme is entirely devoted to Tschaikowsky, Cossack Dance from "Mazeppa," the Violin Concerto, played by Eda Kersey, Lenski's Aria from Eugene Onegin, sung by Francis Russell, the Rococo Variations for 'Cello and Orchestra, played by Thelma Reiss and the Sixth Symphony, together with smaller works, is a huge meal. The Sixth is the Master's finest symphony by miles. Alternating fits of brooding and fierce passion characterise this work, sometimes known as the "suicide" symphony because Tschaikowsky took his own life shortly after its completion. It is packed with thrills and ends on a poignant note. A lovely work.

And so ends the first week of the Proms. Next week I will tell you about the second week's programme, from the 21st to the 26th, inclusive.

PROGRAMME NOTES

Recital of Brahms Lieder

MARY HAMLIN (soprano) will broadcast a recital of Brahms Lieder on August 11th. She sings in eight languages, including Latvian and Estonian, and has always been interested in the songs and music of other lands.

"General Release"

THE next of the "General Release" programmes of songs from current films will be compèred by Hugh Morton. As usual it is arranged by Reginald Burston, who will conduct the Midland Revue Orchestra on August 9th. The vocalists will be Francis Walton and the Rhythmettes. Mr. Walton has taken a leading part in all the North Staffordshire Amateur Operatic Society's productions.

Victorian Ballad Days

ONE of the most popular of musical broadcasts has been the series entitled "Ballad Days," in which Helen Drever brings to life again a musical evening of Victorian times. Miss Drever bases her characters on memories of people whom she and her parents knew. On August 11th, listeners will hear, from Aberdeen, a repeat performance of "The Croquet Party," which has been requested by many listeners.

Sibelius for Strings

THE Newcastle String Players are in the Northern programme from 9.30 to 10 p.m. on August 10th, with four Sibelius items, including the suites "Champetre" and "Rakastava," and the Elegie from "King Christian II" suite.

Recital on Two Pianofortes

MARGARET HARRIS and Edgar Glasspool, who have broadcast together on many occasions, will be heard again on August 12th, in a recital on two pianofortes. In 1936 they went to Norway to broadcast a recital of British music, and they have also taken part in radio programmes from Dublin. They will include in their programme Variations on a Theme by Haydn (Brahms), Organ Trio in C minor (Bach, arranged Becket Williams), and Le Reveur, by Arensky.

"Ask Aspden"

WILLIAM ASPDEN'S broadcast talks are to take a new form on August 9th, when he is to answer the questions of Leslie Hawkin, a rambler whose walks in August have raised a number of questions on which he wants some information. Northern listeners will hear Aspden replying to Hawkin's "What I want to know."

Fleetwood Marine Hall

TOM SMITH'S Orchestra is to broadcast from Fleetwood Marine Hall on August 10th. The orchestra is now in its third season at the Hall, and for its special Sunday evening concerts the personnel of the orchestra is augmented to eighteen musicians.

The British Long-Distance Listeners' Club

Owing to Holidays, We Have Asked a Guest Contributor Who Follows the Activities of the B.L.D.L.C. most keenly, to Assume that He is the Usual Writer of this Page, and to Express His Views in General Relating to the Movement

THEY say that a change is as good as a rest. Well, as everyone seems more concerned about holidays at this time of the year than anything else, let's make a thorough job of it and have a change as well.

I mean to say, one can't go on talking about practical things week in and week out. No one, however enthusiastic they might be, wants to go on building or rebuilding their apparatus or station continuously, so leave your bench and all the gear for a few minutes, bag your favourite armchair and let us have a good old chinwag.

You know there is nothing like a spot of frank talking once in a while to clear away any cobwebs and to open up fresh avenues of thought which are so often passed by by most of us through being too deeply engrossed in one particular subject.

Have you ever noticed how continuous the conversation can be when several enthusiasts who have something common with each other get together and discuss their activities. Have you noticed, also, how the whole interest of the proceedings depends on each member of the friendly group contributing his part to the general conversation. Each one taking his part in the debate. Each putting forward his own particular view or suggestion with the result that someone, if not all, gathers a fresh spot of information or knowledge, while everyone is thoroughly pleased with the discussion and sorry when the time comes to part.

That is all very well. In fact, it is approaching the ideal, but the whole thing takes on a very different aspect if it is left to one member of the group to maintain and prompt all the conversation. Someone is going to get bored. Others are going to say, "Why, he has nothing new to talk about." While some of those with still less foresight will, no doubt, stop attending the little meeting, which soon loses the friendly and intimate atmosphere so essential for the furtherance of the ideals they have in common.

You agree with this, don't you? You have, I expect, experienced all that has been said above. Good, but now tell me, were you the one that did the talking, or were you one of those who just drifted away from the group, because, as such a person would put it, there was no further interest there. Just think that over for a minute.

I wonder if you have ever realised that the writer of this page is in the same position as the fellow who has to do all the talking. In fact, I have often wondered why it is that you never take part in the conversation in so far as making your suggestions, taking part in a general debate, or letting the writer know what you are doing.

No, just as I thought! You had never thought of it in that light, though it is highly probable that you have had your little grouse about B.L.D.L.C. affairs.

Well, that's that. I said in the opening paragraph that a frank talk is good for all, so, if you have anything to say, let's hear from you so that we can refresh the friendly spirit and co-operation and have more intimate chinwags more frequently.

Olympia

Within a couple of weeks, Olympia, London, will be opening its doors on yet another radio exhibition, and once again the manufacturers will be striving their utmost to tempt the public with their new season's wares.

A corner of Mr. Jackman's wireless den.

How will the constructor be considered? I wonder whether we shall see any concrete signs of more interest in their welfare or whether the stands will be too crowded with elaborate pieces of cabinet work, each of which, according to the individual salesmen, will contain the last word in push-button cabinets, super-thingummy-bobs, to allow a few components to peep out for the benefit of the pioneers of radio, namely, the constructor.

What I like in particular about the exhibition is not the wonderful displays, the free television shows, or the fighting for refreshments, but the fact that it does provide one chance in the year to meet old friends. Each year the same old faces come around. The smile and happy greetings still there. No one seems to change unless, perhaps, a keen eye would note another wrinkle here and there and perhaps a few grey hairs to tell of the passing years.

Will you be there? If so, don't forget that a warm welcome awaits you on Stand No. 9. Remember that it is not possible for the usual writer of this page to meet you all during the rest of the year, so if you can attend the show, just pop along to Stand No. 9 and tell him what you think of things.

Speaking of the exhibition and the fact that it denotes the passing of another year, what have you achieved in your radio activities in the past twelve months? Have you done something worthwhile with your radio experimenting or listening? If so, why not let us hear about it, as other members will, no doubt, be interested, especially if it has a general appeal.

Shacks

I notice that Thermion asked for photos of dens and shacks quite recently, and I hear that while the response was quite good, the photographs received from B.L.D.L.C. members were not exactly in the majority. Surely you have a station to be proud of! It does not mean that a den has to be super-posh to prove that it is well-designed or efficient. The things that matter are the equipment, the general layout, and the results achieved, and these all reveal the care, thought and ingenuity on the part of the owner.

I visit many shacks during the course of my business, and it is really surprising how they vary. Some are neat and tidy, everything shipshape, and all the gear and tools to hand, while others are just the opposite with everything straggling all over the place, and nothing to hand unless one starts digging away the accumulation of years. What is yours like?

The photo on this page proves the writer's contention that a station does not have to be large and built up with elaborate racks and switch panels to be efficient and smart. Mr. Jackman, the owner of the neat little outfit, makes the following remarks, so it is up to some of you to make contact with him:

> "Being a regular reader of your very fine paper for the past two years, I shall be glad to exchange my S.W.L. card with other readers of PRACTICAL AND AMATEUR WIRELESS anywhere in the world; also letters as well. I have a pen pal in U.S.A., Alabama, named Jack Wells, who receives a copy of your paper from me every week and he is very pleased with it.
>
> "I enclose a photo of my den, showing at the top an 0-v-1 battery set with six-pin coils. The second set is an 0-v-1 battery receiver, using two-pin coils, and covering 8 to 16 metres. On the left is a one-valve amplifier, and on the right is seen a mains unit. All these, including the rack, are home built, mostly from junk parts. My best QSLs include: VP6MR, VP6YB, VK5AF, PSH, VUD2, LU8AB, VQ7LO, LU3HA, PY2BH, and PY1GR. I have heard all continents, QSLs 59, and 29 countries."

Mr. Jackman's address is: "Cairntorr," 32, North Denes Road, Gt. Yarmouth, Norfolk.

This Short-wave Business

A continuous controversy appears to be ranging round the ideal short-wave receiver. Taking the views of the hundreds who have written expressing their opinion on this subject and analysing them most carefully, it is very surprising to find that those in favour of a superhet receiver just about balance out those who still stick to the good old straight circuit. One cannot deny that a superhet scores as regards selectivity,

(Continued on page 520)

THE KESTREL SHO

A Short-wave Receiver of the to Satisfy the Needs of thos an Efficient yet Sir

By L. O.

MANY have been the requests for a superhet receiver designed for battery operation and for short-wave reception. According to the opinions given by numerous readers, it would seem that nothing short of an elaborate communication receiver would satisfy their requirements, but on the other hand, the fact that they stipulate low cost as one of the essential features renders it very difficult for a receiver to be produced which would fulfil all the demands.

When all the suggestions were analysed, strange as it may seem to those who want the last word in design, it was found that quite a goodly number still favour a good straight receiver something along the lines of what is often affectionately called by the old timers as "old faithful" or, in other words, a circuit of the single H.F. type followed by an efficient detector and one or two stages of L.F. amplification according to individual requirements.

A circuit of this type has much to recommend it for every short-wave enthusiast's consideration; it is invariably reasonable as regards price, simple to construct, and once its operating characteristics have been rendered more or less perfect, quite pleasant to operate and reasonably consistent in performance.

Those who have handled an efficient two-valver of the short-wave type know from experience what can be logged on the headphones, and it does not take a great deal of imagination to appreciate that the addition of two valves employed as, say, H.F. and L.F. stages, would make the original outfit into a very satisfactory installation. The writer is not overlooking the fact that in these days of station-swamped ether, one has to face the ever-increasing problem of selectivity, and he fully realises that the superhet plus or minus a crystal gate goes a very long way towards eliminating the bugbear of interference. While giving all due respect to these items, it cannot be denied that such outfits are not within the range of every reader's pocket, and it would not be any exaggeration to say that the mass of short-wave listeners have to be content with something rather more modest than a receiver embodying all the refinements suggested above. It is, therefore, in an endeavour to provide a good all-round receiver that the Kestrel has been designed, and as it can be built in two stages, the necessary expenditure can be spread over a period to suit the constructor.

Provided a station owner is prepared to take the trouble to see that his aerial equipment is as efficient as possible from the point of view of sensitivity and selectivity, and spends a little time getting the hang of this receiver, there is not the slightest doubt that he will be able to swell his log and make contacts hitherto unobtainable on more modest or less efficient receivers.

The Circuit

This week we are only concerned with what we will term the first stage of the receiver; therefore, the theoretical diagram shown in Fig. 1 depicts only a three-valve circuit, the fourth valve, which will be added at a later date, will act as an aperiodic or tuned H.F. stage, about which more will be said later.

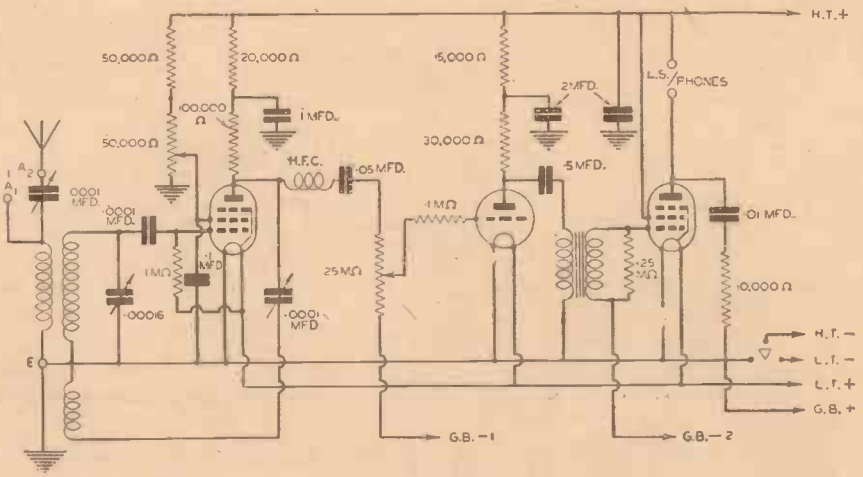


Fig. 1.—Theoretical circuit diagram for the first part of the Kestrel S.W. Four.

The initial aerial circuit consists of an Eddystone three-winding coil, one of which is used for aerial coupling, another for the grid input circuit, and the other one for the reaction. It will be noted that no band spreading, in the ordinary sense, is provided. This was found to be unnecessary, as the special type of mechanical drive used in the slow motion tuning gear provides an identical effect with the advantage of definite dial recordings.

The grid coil, which is tuned by an Eddystone .00016 mfd. variable condenser, type No. 1131, feeds the detector via the usual leaky-grid coupling condenser. As sensitivity and gain are important factors, it was decided to use an S.G. valve in this position as it not only gives a greater output on a weak signal, but it also allows a very efficient form of reaction to be obtained.

The output from the detector is fed into the first L.F. stage by means of a resistance-capacity coupling, and it will be noted that a volume control has been fitted across the grid circuit of the first L.F. to enable the ultimate output volume to be regulated so that headphones or speaker can be used as desired.

The coupling between the first L.F. valve and the output stage is provided by an L.F. transformer of the Varley Niclet type, but to prevent the primary receiving an excessive current load, it is arranged in the normal parallel-feed method which, incidentally, also provides a certain degree of decoupling.

The output valve is a Cossor 220 H.P.T. pentode, which is quite capable of providing adequate output for all normal purposes, and provided the volume control is used in the manner intended, it will handle all the input necessary for full output.

It will be seen from the above description that there is nothing fanciful about the circuit, and that no unnecessary components or gadgets have been embodied, therefore it should present no difficulties to any enthusiast as regards its construction; in fact, it is quite a safe proposition for a keen beginner to consider.

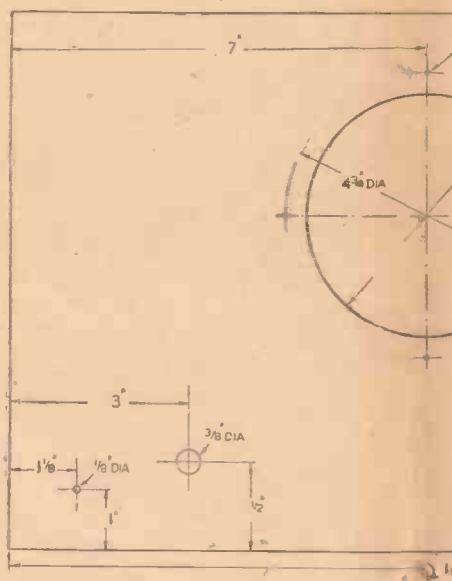


Fig. 2.—Drilling dia

Layout

The plan drawing of the chassis, Fig. 3, shows that a very clean and clear layout has been obtained, and it should also be noticed that no attempt has been made to sacrifice space to make the overall dimensions smaller.

The main tuning condenser, together with its mechanical band-spreading drive, is located in a dead central position, which not only gives a pleasing appearance to the panel, but also allows the controls to be placed at the most convenient operating points.

As a steel chassis was used in the original model, it was decided to use the special low-loss baseboard-type valve holders pro-

ORT-WAVE FOUR

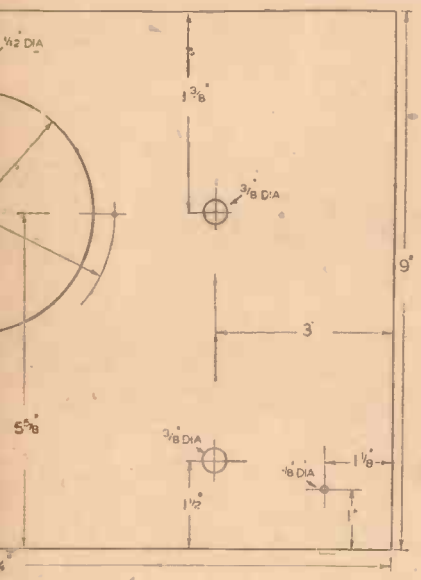
e "Straight" Type Designed e Enthusiasts who Require mple Installation

SPARKS

duced by Eddystone, and as each valve-pin socket on these holders is made in one piece, the possibility of contact noises is considerably reduced.

By employing a chassis the majority of the components are housed out of sight and well protected, while the wiring is considerably simplified, as is evident by the plan drawing of the underside of the chassis.

To avoid the use of plugs and jacks the special Clix switching output panel is employed, and for convenience sake it has been fitted on the right-hand side of the chassis when it is viewed from the front. This simple device allows a most rapid change over to be made from headphones to loudspeaker, and when housing the completed set in a cabinet, no difficulty should be experienced in making a suitable aperture for access to this component.



cm for the panel.

Assembly

Before proceeding with any drilling, lay out the components to be mounted on the top of the chassis, on the actual metal, and carefully mark off the exact positions for the holes to be drilled, after making *quite* sure that all the components are in the positions indicated by the plan drawing. After drilling, clear all holes of burrs, and then repeat the procedure for those parts which have to be mounted inside the chassis. Don't attempt to fix anything down until all drilling is finished, otherwise damage might be caused to certain components which will not only spoil the appearance of the completed assembly, but also possibly affect the efficiency.

Particular care must be taken when setting up the bracket which supports the main tuning condenser and the locating and fixing of the slow-motion drive. Don't try to rush this part of the work. Remember that the drive is dead central along a horizontal line of the panel, and that the distances of its fixing and that of the condenser bracket from the front panel are very important.

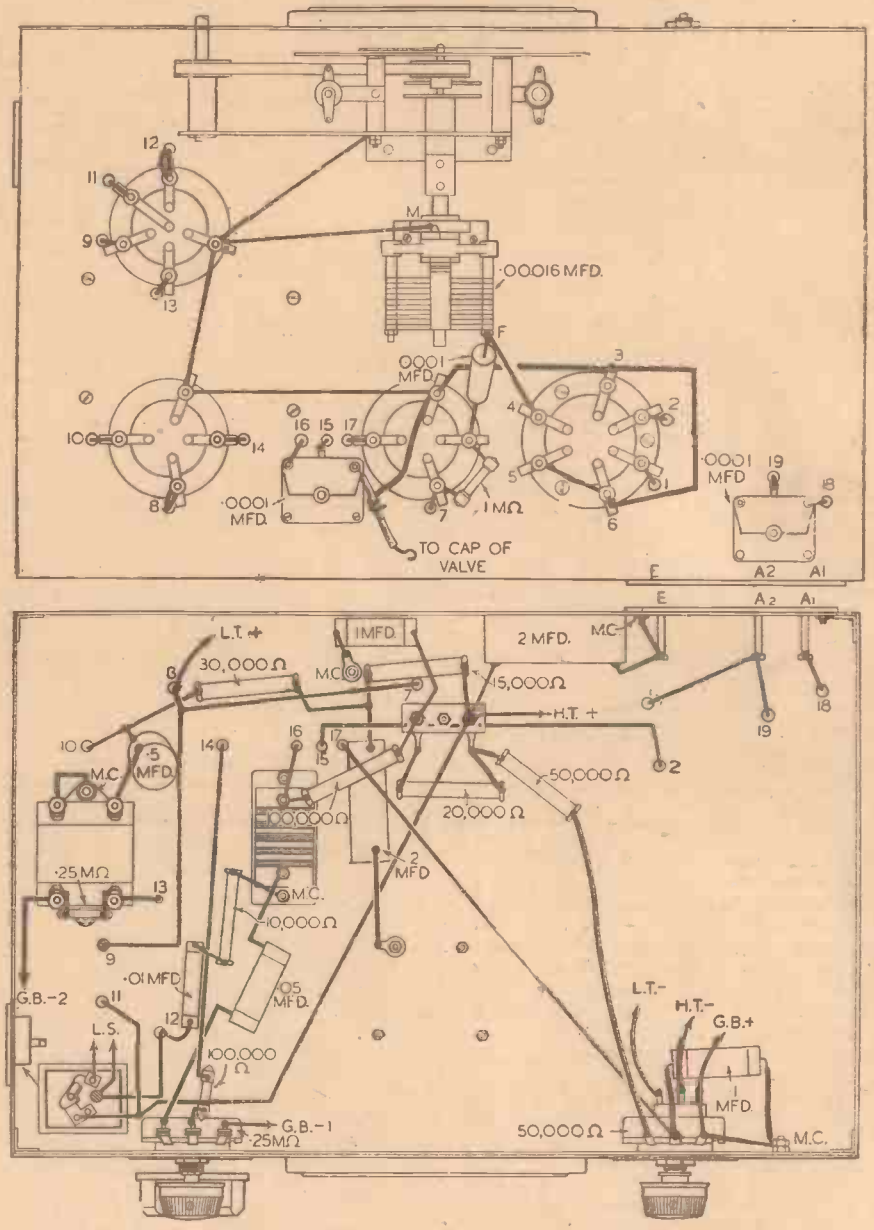
For satisfactory fixing of all parts bolts should be used, and for a thorough job use shakeproof washers under each nut.

The Panel

This can be purchased, the same as the chassis, from Messrs. Peto-Scott ready drilled, but if you wish to do it yourself, check all drilling points before starting that operation (see Fig 2). The large hole for the dial should be scribed on the metal and then cut out with a fretsaw, the edges being smoothed off with a small file. When handling this part of the assembly, see that the bench is free from all metal filings and covered with two or three layers of stout paper, otherwise the fine polished finish of the panel will soon be marred. It is attention to these little details which makes all the difference in the appearance of the set when completed.

Details of the wiring and operation of this section of the Kestrel will be given next week, together with the layout of the H.F. stage and its associated switching, which allows it to be used as an aperiodic or tuned stage, according to the waveband being received.

Fig. 3.—WIRING DIAGRAM OF THE FIRST SECTION OF THE KESTREL S.W. FOUR.



Radio and Television Demonstrations at Radiolympia

WE are informed that demonstrations on Exhibitors' Stands will be permitted from the input provided by the Central Distribution System; this input will be provided for as large a proportion as is possible of the hours during which the Exhibition is open. Transmissions will be provided which simulate as exactly as possible the signal strength, quality of transmission, and freedom from interference which one may expect at a good location at about twenty miles from a B.B.C. Regional or television transmitter; these transmissions are intended solely for demonstration purposes, and the programme matter will be specially selected so as to give the exhibitors the best chance of displaying the features of their receivers, rather than to give entertainment as such to the visitors to the Exhibition.

Sound Demonstrations

A medium-wave "transmitter" is provided, feeding the exhibitors' stands, through a system of concentric cables which are terminated on the stands by outlet networks designed to reproduce the electrical characteristics of an average outdoor receiving aerial. Receivers must be connected to the outlet boxes by the special screened cables provided; in the past some exhibitors have failed to do this and have been seriously troubled by interference picked up on their unscreened wiring.

The medium-wave transmission is on 800 kilocycles per second (375 metres), and the signal strength at the outlet-box terminals is approximately 20 millivolts. Every attempt will be made to maintain these values accurately, but under exceptional conditions it may be necessary to depart slightly from them. Only one signal will be distributed, and exhibitors are asked to refrain from attempting to receive transmissions from other stations, in the interests of their neighbours.

No other connections of any sort may be made to the sockets of the outlet boxes, or to the distribution wiring itself. Exhibitors are particularly warned not to let their stand-lighting wiring (which is a very common source of interference) touch, or come closer than within an inch of, the distribution wiring.

Television Distribution

A television (sound and vision) transmitter is provided, distributing to exhibitors' stands signals which correspond as closely as possible with the standards of the London television service. These programmes will in part be the programmes of the London television station at Alexandra Palace, originating in the Alexandra Palace studios, or the Radiolympia studio; but for the rest there will, for the first time, be programmes specially prepared for the exhibition and produced in the Radiolympia studio and not radiated to the public through the Alexandra Palace transmitter.

The frequencies of the transmitters will be approximately 45 mc/s for the vision transmitter and 41.5 mc/s for the sound transmitter. Exhibitors should note that the frequency of the Radiolympia Television sound transmitter will be a little different from the Alexandra Palace sound transmitter (about 15 kc/s), but the difference will be inappreciable on any normal receiver. The Alexandra Palace sound transmitter will generally not be distributed over the system at a high enough intensity to be useful to a normal receiver; exhibitors should tune to the much louder Radiolympia transmitter immediately adjacent to it. By this means they can ensure that the vision sound programme will always be on the same frequency, so that exhibitors will not have to re-tune their receivers in any way when the transmission is changed from a relay of Alexandra Palace to a local "Radio-Show-Special" programme.

Receivers are to be connected to the distribution system only through the screened leads provided; no other equipment is to be connected to the distribution system. The signal strength at the output ends of the cables is 3 millivolts (peak-white) approximately, and the output impedance is 75 ohms, unbalanced.

Exhibitors are warned against causing any interference with nearby receivers; they should remember that the receivers in the Exhibition are closer together than they usually are under domestic conditions, so that interference which normally passes unnoticed may cause trouble when the next set is but a few feet away. This applies particularly in the case of sets installed in Television Avenue.

Technical Advice

In case of difficulty, exhibitors should get in touch with the Technical Officer, who is appointed by the R.M.A. to attend to any technical matters arising among the exhibitors. If you are experiencing interference, or if you feel that a neighbouring exhibitor is creating a nuisance, or if you feel that the transmissions are at fault, he will be able to investigate and take steps to remedy your trouble. Telephone the R.M.A. offices and ask for the Technical Officer, or call at his office on the ground floor of "Alexandra Palace," in Olympia. Do *not* get directly in touch with the staff of the transmitters. In fairness to all exhibitors the staff take their instructions only from the R.M.A. officials.

IMPORTANT BROADCASTS OF THE WEEK

NATIONAL (*261.1 m. and 1,500 m.*)

Wednesday, August 9th.—It's that Man Again, light entertainment programme.
Thursday, August 10th.—Lucky Dip, a weekly magazine programme.
Friday, August 11th.—The Old Ladies, a play (Hugh Walpole).
Saturday, August 12th.—Schubert Concert.

REGIONAL (*342.1 m.*)

Wednesday, August 9th.—Francois Couperin (1668-1733): Organ recital from Brompton Oratory.
Thursday, August 10th.—Undergraduate Summer, feature programme of Oxford University life.
Friday, August 11th.—Concert Party programme from Torquay.
Saturday, August 12th.—Opening Night of the forty-fifth season of Promenade Concerts from Queen's Hall, London.

MIDLAND (*296.2 m.*)

Wednesday, August 9th.—Variety from the Opera House, Cheltenham.
Thursday, August 10th.—Undergraduate Summer, feature programme of Oxford University life.
Friday, August 11th.—Earning a Living: I Make Glass Eyes, a talk.
Saturday, August 12th.—The Malvern Festival, first week impressions.

WEST OF ENGLAND (*285.7 m.*)

Wednesday, August 9th.—Quayside Nights: Falmouth, a picture of the port, past and present.
Thursday, August 10th.—Variety programme from the Hippodrome, Bristol.
Friday, August 11th.—Concert Party from the Princess Pier, Torquay.
Saturday, August 12th.—A recital on two pianofortes.

WELSH (*373.1 m.*)

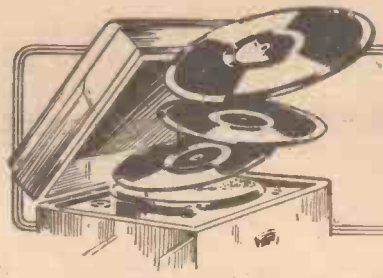
Wednesday, August 9th.—Messiah, Handel, Part I. from the Royal National Eisteddfod of Wales at Denbigh.
Thursday, August 10th.—The Chairing of the Bard at the Royal National Eisteddfod of Wales at Denbigh.
Friday, August 11th.—A chat with some National Eisteddfod visitors.
Saturday, August 12th.—Blue Riband Concert from the Royal National Eisteddfod of Wales at Denbigh.

NORTHERN (*449.1 m.*)

Wednesday, August 9th.—August out of Doors, a talk.
Thursday, August 10th.—The Rydal Sheep Dog Trials.
Friday, August 11th.—Camp Fire Sing-Song at the King George V Jubilee Camp at Hawthorne Tower, Co. Durham.
Saturday, August 12th.—Mr. Mike walks in, first of a new series of microphone tours of ordinary people's homes.

SCOTTISH (*391.1 m.*)

Wednesday, August 9th.—Antrim Days: A reminiscent programme of events in Scotland during the year.
Thursday, August 10th.—Learn Young, Learn Fair, or Calum's Sweetheart, a play by Angus MacDonald (in Gælic).
Friday, August 11th.—Orchestral programme.
Saturday, August 12th.—Scottish Dance Music.



Impressions on the Wax

A REVIEW OF THE LATEST GRAMOPHONE RECORDS

Decca

THIS month Decca issues the first recorded performance of the splendid violin concerto of Vaughan Williams. This concerto was published under the title of Concerto Accademico. As this title does not seem to be clearly understood, the publishers of the printed music and Decca persuaded the composer to simplify the title by naming the work Concerto in D Major for Violin and String Orchestra (Concerto Accademico). Dr. Vaughan Williams emphasises that the Concerto is a work on a smallish scale such as written by Vivaldi and other eighteenth-century Italian composers, and that the Concerto is not a big-scale work of the Beethoven, Brahms and Elgar type.

The Concerto is in three contrasted movements. The solo part is played by Frederick Ginke, supported by The Boyd Neel String Orchestra, *Decca X* 248-9.

The same orchestra also play one of the jolly short symphonies of J. C. Bach on *Decca M* 486.

Then there is a brand new recording of Brahms Fourth Symphony with Victor de Sabata conducting the Berlin Philharmonic Orchestra on *Decca LY* 6171-6. Another record you should hear is the new recording of "Hansel and Gretel" Overture played by the Berlin State Opera Orchestra on *Decca LY* 6177.

Dance Music and Vocal

AMBROSE heads the new dance records again with four records. Of these, I particularly recommend his performance of "Ain't Cha Coming Out." This story of the lover who was no Romeo and, when he came to serenade his love, could only repeat the question in the title of this nonsense song, is sung by Evelyn Dall, and is coupled with the haunting "My Prayer," on *Decca F* 7107.

Another record from Ambrose contains "I Paid for the Lie I Told You" and "Angels Never Leave Heaven"—*Decca F* 7115. Vera Lynn sings on the first side and Denny Dennis on the second.

Incidentally, both of these vocalists are now making solo records. This month Vera Lynn has recorded "Wishing" and "My Prayer," on *Decca F* 7120; while Denny Dennis—he comes from Derby, but has the Hollywood touch—sings "A New Moon and an Old Serenade" and "Angels Never Leave Heaven," on *Rex* 9592. Adelaide Hall is again accompanied by Fela Sowande at the organ in "Don't Worry 'bout Me" and "T'ain't What You Do"—*Decca F* 7121.

Lovers of Hawaiian guitars will find two new discs to their fancy in "Hula Blues," played by Sol Hoopu's Novelty Orchestra, on *Decca F* 7125, and in "Heaven Can Wait" and "Wishing" by Roy Smeck and his Hawaiian Serenaders, on *Rex* 9582.

A newcomer to the Decca list this month is Paulo, the Romantic Singing Clown, who sings "Over and Done With" and "You Grow Sweeter," on *Decca F* 7123.

Brunswick

SCARCELY a month has passed since the news of the death of Chick Webb, the favourite coloured drumming band-leader and composer of "A-tisket, A-tasket," yet in that time Brunswick have prepared an album of his records that form a worthy memorial to the great little man.

He was thirty when he died of tuberculosis of the spine. It was the famous Duke Ellington who secured for him his first engagement as a band leader. But it was on records he was most at home, and through records that his fame spread from New York's Harlem all over the world.

Brunswick have coupled ten of his greatest performances on five double-sided discs, numbered from *Brunswick* 02792-6 inclusive, and published them in a handsome album with notes. The total cost is 17s. 6d.

Bing Crosby has made two new records this month featuring songs from his latest film "East Side of Heaven." Coupled with the theme song, it has the same name as the film, is "Sing a Song of Sunbeams" on *Brunswick O* 2786. Bing's other songs from the film are "That Shy Old Gentleman from Featherbed Lane" and "Hang Your Heart on a Hickory Limb" on *Brunswick O* 2787.

Connie Boswell digs up an old favourite for her latest recording "You've Got Me Crying Again" on *Brunswick O* 2785. The coupling is "You Grow Sweeter as the Years Go By."

Dance music is supplied by Guy Lombardo and his Royal Canadians with "That Shy Old Gentleman from Featherbed Lane" and "East Side of Heaven"—*Brunswick O* 2790, Woody Herman and his Orchestra who play "Blues Downstairs" and "Blues Upstairs," *Brunswick O* 2788, and finally Paul Whiteman and His Swing Wing Group, who play "Hooray for Spinach," from the film "Naughty but Nice," coupled with "Step Up and Shake my Hand" on *Brunswick O* 2774. Both tunes feature the Four Modernaires.

Rex and Vocalion

PRIMO SCALA'S Accordion Band play "The Great Waltz" selection, with vocals by Jack Cooper, on *Rex* 9591, introducing "There Will Come a Time," "Only You," "I'm in Love with Vienna," "The Revolutionary March," "Tales from the Vienna Woods," "One Day When we were Young," and "Polka."

Billy Cotton and his Band play "Over and Done With," coupled with "Don't Worry 'bout Me" on *Rex* 9588, whilst another popular band, Jay Wilbur and his Band, play "Our Love" and "If I Didn't Care" with vocals by Sam Costa, on *Rex* 9589.

Trixie Smith indulges in some blues singing with orchestra accompaniment with "My Daddy Rocks Me" (parts 1 and 2) on *Vocalion S* 235, and finally we have Floyd Ray and his Orchestra playing "Love is Simply Grand" coupled with "Jamin' the Blues" on *Vocalion S* 234.

TELEVIEWS

Sound Without Vision

THERE are a large number of television set owners who take full advantage of the radiations from either the London Regional or National programmes on the television sound wavelength, because of the improved quality when compared with that of an ordinary set which is hidebound by sideband restrictions on the medium and long wavelengths. Many sets incorporate a switch which enables the sound section to be operative while the vision side is dead, and under these conditions the cathode-ray tube and associated valve equipment is not subjected to any wear at all. In the case of those receivers devoid of this feature, however, the tube life will be but little affected if the brightness control is turned back to its minimum position. The ageing of a tube as a general rule arises from a loss of cathode emission or defects in the screen brought about by too intense an electronic bombardment from the beam. A reduction of brightness to zero, however, means that the static negative bias applied to the modulator electrode is increased and this cuts down the magnitude of the electron stream which reaches the screen. Of course, the cathode is still emitting electrons, and the valves in the power packs, E.H.T. unit, time base generator and vision receiver are working, but these, as a rule, have a very long life. The value of ultra-short-wave sound reception alone, however, has come to be more generally recognised, and most of the new sets have a suitable switch provided to enable this to be undertaken without bringing any other part of the apparatus into action.

Olympia Plans

ALTHOUGH there is to be a wide diversity of interests for the public at this year's Radiolympia, there is no doubt that, as on previous occasions, television will play an important part by furnishing an interesting attraction. Apart from the two dozen or so stands on which receiving sets will be shown in operation, there is to be a mass demonstration of sets in a special television section. This will provide a long-needed want, for prospective purchasers will in this way have an opportunity of examining the performance of individual makes under conditions which are the nearest approach to equality of signal feeding. Tube colour, whether the individual picture lines are really interlacing all the time or whether pairing keeps occurring, degree of linearity, balance of contrast and brightness, comparative sizes, limiting angle of vision, and so on, are but a few of the points that a future set user will be able to compare from set to set as he passes along the row of individual makes. Having drawn up a short list of possibilities he can then at leisure visit the chosen manufacturers' stands, and sit in comfort before coming to the all-important decision regarding the set which suits his own particular needs in the best manner. The input conditions to each receiver shown have been made to more nearly approach those found within a reasonable distance of Alexandra Palace, although the signal strength of 3 millivolts which is to be supplied is still regarded as very high in comparison to the sensitivity of many makes of sets. Satisfactory pictures with 200 microvolts are quite common now, but care has then to be taken to ensure the complete absence of any interfering electrical signals. The aerial and amplifier employed for distribution will be of a similar character to last year, but the total number of working sets available for viewing purposes is known to be in excess of the 1938 figure. This should augur well for increased sales, and a step nearer to that mass production condition which will expedite provincial television extensions.

Inferior Quality

EACH morning from 11 a.m. to noon, the B.B.C. transmits from Alexandra Palace the same film which has been in use now for over two years. It is explained carefully that the morning radiation is essentially for test purposes, *i.e.*, for manufacturers and dealers, and not for home viewing purposes. It frequently occurs, however, that through force of circumstances these pictures have to be used for demonstrations, and all too frequently it is found that the quality of the transmission is very inferior when compared with the television pictures seen at the afternoon and evening performances. It is difficult to see how the B.B.C. can justify these lapses from the standards they ordinarily employ and unless a dealer or engineer is truly knowledgeable concerning the fundamentals associated with the radiated signal, he is apt to blame a receiver for faults which all the time are present in the radiated picture. For example, the usual flares associated with tilt and bend difficulties in the camera are at times very prominent and this, to say the least, is very disconcerting. Again, flyback lines become visible even with normal picture brightness owing to an apparent inadequacy of the frame black-out pulses. While it is appreciated that the B.B.C. during this morning period have their staff engaged on important work associated with the day's programme, it is felt that a careful check should be kept on picture quality during the course of this morning film transmission, otherwise its true value is likely to be lost.

BRITISH LONG-DISTANCE LISTENERS' CLUB

(*Continued from page 515.*)

but there are still many old-timers who are always ready to show what a simple straight circuit in capable hands can do as regards range and signal-to-noise ratio.

In this issue details are given of a straight short-wave receiver, The Kestrel, which will, ultimately, employ four valves, and it is going to be very interesting to see what those constructors who make this receiver think of its performance, compared with the reports received from those using, say, the Air Hawk 9.

Masts

It was very interesting to note the recent article on masts and the remarks of the writer. One has only to take a short trip round the suburbs of any of our large towns to see what atrocities are erected as so-called masts.

Admitted there is no law to prevent the skyline being distorted and rendered hideous by some of the things which are erected to support an aerial, but I think it is one of the first signs of a good or otherwise installation. It seems impossible that a man who takes any pride in his station should disfigure his own garden and his neighbours' outlook by using some leaning, bending, wobbly wisp of a post as a mast.

Short-wave enthusiasts should pay particular attention to the aerial system, as so much depends on this part of the installation if one is really interested in logging the long-distance transmissions. Height and freedom from screening are the main essentials, and it is not a difficult matter to secure a 30ft. or 35ft. straight scaffold pole at a very reasonable cost, if one does not fancy making one of the more elaborate arrangements. While speaking about masts, let the writer add a word of warning prompted by his own sad experiences. His aerial equipment was erected in a hurry, and for hoisting halyards, good sash-line was used. This, unfortunately, while being quite strong, does not resist weather conditions, and a few days ago one end of the aerial complete with three large shell insulators came crashing down and narrowly missed someone who happened to be in the garden. In future, wire is going to be used for all halyards and guys.

Well, as space is limited, it appears that this little chinwag must come to an end, but don't forget the opening remarks and don't leave the usual writer of this feature to do all the talking. Let's hear from you.

NEW SEASON'S MODELS

(*Continued from page 509.*)

selective negative feed-back circuit is introduced, compensating for deficiencies in recording whilst special circuit precautions enable the receiver to be used at maximum sensitivity, with the minimum of mains interference noises.

Cossor

The Cossor model 62 shown on page 509 is an A.C. five-valve all-wave superhet. The tuning system covers 16 to 52 metres, 190 to 580 metres, and 840 to 2,150 metres, manual tuning being employed. A large edge-lit tuning dial is provided and the energised moving coil speaker is of the 8in. type, having a very wide frequency response. The valve combination is triode hexode frequency changer, variable-mu I.F. amplifier, double-diode-triode detector, amplifier, and a power triode output stage. Full A.V.C. is, of course, incorporated. The price of this model in a very handsome, well-finished console cabinet, is 11 guineas.

BOOK RECEIVED

FIRST STEPS IN MACHINE DRAWING AND DESIGN. By L. A. Johnson, M.I.E.C. Published by Pitt's Popular Publications. 80 pages. Price 1s. 6d.

THIS handbook is intended primarily to assist apprentices and others who are beginning their first study of machine drawing and design. The book is divided into two sections, the first one dealing with Machine Drawing and Design, and Simple Fastenings, the second section covering very fully Materials of Construction. The book is illustrated throughout with clear line drawings, and some useful tables of tangents, sines, etc., are also included.

SHOOTING ELECTRONS

The Construction and Working of the Electron Diffraction Camera is Briefly Described in This Article

IT is one of the facts in the life of a scientist to-day that science is moving too fast for him. Discoveries are being made here, there, and everywhere, and it is not surprising that he should find it difficult to keep pace with the work of his colleagues all over the world. But if the pace is too great for a scientist, then what of the average man who only hears of a new discovery when it flows across the headlines of his newspaper or weekly journal?

The electron diffraction camera, for instance, is a case in point. How many readers of this journal have ever heard of the apparatus? And yet it has been discovered exactly ten years and has been probing into the unseeable to provide information of the greatest importance to every one of us.

A Fascinating Invention

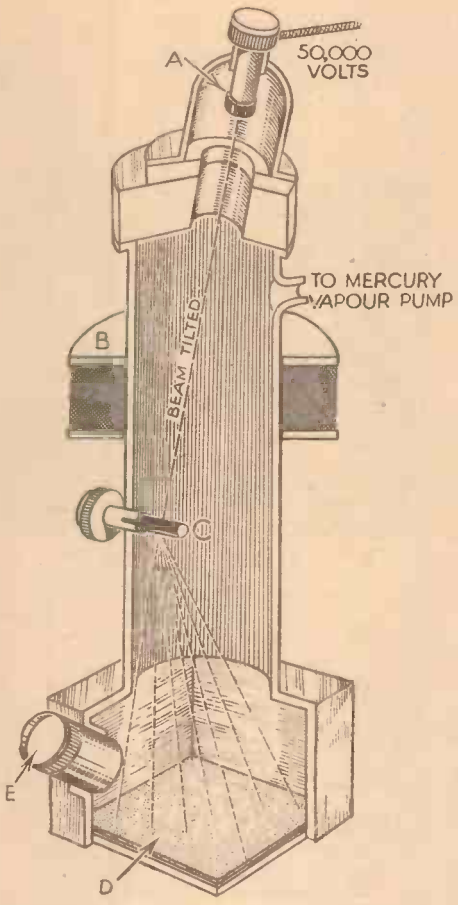
When X-rays were employed to examine materials in the engineering world, everybody thought: Well, this is the limit of man's eyesight, surely. X-rays could reveal the structure of, say, a piece of metal down to its atoms. But it now appears that X-rays are only the beginning of a voyage of exploration into the unseen, which may ultimately lead man to a complete understanding of living matter, and what is more important, an understanding of diseases. The electron diffraction camera is a fascinating invention, both from the scientific point of view and from that of the amateur mechanic. Quite simple in its construction, the work it accomplishes is really astonishing.

In appearance it is in no way like the popular conception of a camera. It is called a "camera" because it has a section in which photographs can be taken. It resembles a small, iron pillar standing on a box-like base. Reference to the illustration will show the principle on which it is constructed, the whole apparatus being about 6ft. high and about 9in. wide at the middle. For simplicity, some of the accessories, such as the mercury vapour pump, have been left out of the diagram, because they do not directly concern the working of the "camera."

The Use of the Camera

Now before describing how it works a word of explanation is necessary about what it is used for. All substances in nature, whether they are metallic or otherwise, are made up of atoms. Usually, these atoms are arranged in the material in a definite way. Thus they may be in neat rows or in some more complicated, but nevertheless symmetrical, arrangement. In a particular material the atoms will always be arranged by nature in the same way. Its arrangement, in fact, determines the appearance of the material, so that if we are examining with the naked eye a cube like crystal of rock salt, for instance, we can say that the atoms within the crystal are arranged in rows parallel to each other, so that they make up a cube.

If we shoot particles of a sufficiently small size at such a lattice of atoms the particles will strike the atoms, and, so to speak, bounce off or in technical terms be "diffracted:" The trouble is that the atoms are only of a billionth of an inch in size, and, therefore, we must have something correspondingly small which will bounce off the atom when it strikes the latter.



Sectional view of an electron diffraction camera, showing the interior construction.

X-rays

X-rays are really tiny wavelets which behave like corpuscles, and if they are shot like bullets at the lattice of atoms in the rock salt, they are deflected by the atoms as desired. If we catch them on a photographic plate as they bounce off, and develop the plate, the result is a striking pattern of lines, circles or dots. This was the way in which scientists explored the atomic structure of materials up to 1929. But it became increasingly clear that X-ray waves were not quite fine enough to detect all atoms. Our knowledge would have stopped at that point, but the surprising discovery was made of a way of shooting electrons like bullets.

Electrons were much smaller than X-rays, and so an apparatus was built to shoot them like a gun, at materials to find out how the atoms were arranged in the latter. The result was the electron diffraction camera, as shown in the accompanying illustration.

At A is a cathode, maintained at about 50,000 volts. This ejects electrons which hurtle down the path shown by the dotted line, at the phenomenal speed of nearly 100,000 miles per second. The beam of electrons has to be directed on to the material which it is desired to examine, and for this purpose field coils are built around the outside of the apparatus at B. These focus and can move the beam to any desired position by suitable alteration of the magnetic field.

Electrons Deflected

Having been duly focused, the beam then strikes the specimen of material held in the holder at C. The electrons strike like bullets the atoms in the material, and are deflected. They pass down to the bottom of the apparatus and are caught on a photographic plate at D. The whole process is, of course, carried out in the darkness of the apparatus, and when the photographic plate is developed, a beautiful pattern of spots, stripes or circles is revealed.

So that the scientist can examine the results of the collision of the electrons with the atoms, a fluorescent screen is sometimes placed in front of the photographic plate. By looking down through the port-hole at E, carrying a glass window, he can see the pattern which is going to be obtained on the plate, on the screen beforehand. The electrons having passed through, or over the surface of the specimen at C, strike the fluorescent screen, which glows just where the electrons strike it, so producing a pattern which can be studied at leisure.

This pattern tells the scientist exactly how the atoms are arranged in the material he is examining. You will say: "But how does that help us?" It tells us practically all we want to know about the process. For example, we can discover whether the atoms in, say, a piece of iron, have shifted after heating.

If they have, we know that the iron will have different properties which can be predicted. Thus is such information valuable to engineers. Then, again, by watching the movement of the atoms in the material that has been corroded we can learn a great deal. And when it is known that corrosion of one sort or another costs man millions of pounds in wastage a year, the importance of knowing all about this will be realised.

Perhaps the most wonderful contribution to knowledge, however, made by the electron diffraction camera, is the curious behaviour of aggregates of atoms, that is to say, molecules, and here the apparatus will help to unravel the mystery of diseases. As it is, a mass of information about substances has been built up by the use of these "electron bullets" which can be fired at any desired speed. In truth, we can say that the diffraction camera is a milestone in the march of science into the unknown.

Radiolympia News

Jessie Matthews for Radiolympia

MR. JACK SWINBURNE, Producer of Variety at Radiolympia this year, has announced the following plans for the opening day of the Exhibition, Wednesday, August 23rd.

From 8 to 9 p.m. on the first day, the B.B.C. will broadcast an ambitious Variety show from the "Hollywood Bowl" theatre, where an audience of 3,000 people will watch a programme featuring leading film, radio and variety stars.

For this first programme, Mr. Swinburne has signed up Jessie Matthews and Sonnie Hale, Scott and Whaley, Standford and MacNaughton, Adelaide Hall, Ike Hatch, Bobby Howell and his Band, Nosmo King and Hubert, and a Male Voice Choir of 60.

Subsequently, shows will be presented four times daily, and in most cases will be either broadcast or televised by the B.B.C. On some days Variety shows will be presented, on others special shows; every day will see a big all-star feature.

Big Fashion Parade for Television

ON the opening day of Radiolympia, and again on Thursday, August 31st, the B.B.C. will televise a programme from the "Hollywood Bowl" theatre (3 to 3.30 p.m. on both days).

Mr. Jack Swinburne has devised a magnificent Rayon Fashion Parade, in which 20 of London's most beautiful mannequins will wear the latest creations of London, Paris and New York. Televiewers will see the whole show, will watch the 20 girls led by 18-year-old Rene Morris (chosen from 500 applicants as this year's "Rayon Queen") parade in a spectacular floodlit modern setting, the colours specially blended to suit the critical television cameras. Miss Morris, slim and attractive, is a brunette, and comes from Flintshire.

In the same programme will be 14 Gordon Radiolympia Girls, Bobby Howell's band, Mr. Noel Gay, and "Miss Radiolympia," who is yet to be chosen.

Mr. Swinburne has persuaded Mr. Gay to appear in the programme. The composer of the famous "Lambeth Walk" will play his latest composition, "Let's All Go to the Radio Show," while "Miss Radiolympia" sings the chorus, accompanied by Bobby Howell and his Band.

B.B.C. "Picture Page" from Radiolympia

ARRANGEMENTS have also been completed for the televising of the B.B.C.'s famous "Picture Page" feature from the theatre at Radiolympia. Joan Miller and Leslie Mitchell will be featured, the broadcast taking place from the "Hollywood Bowl" revolving stage, before an audience of 3,000.

Title Wanted for Radio Show

THE producer thinks that "Variety from Radiolympia" is a bit ordinary, and to the person who suggests a better title, which is eventually used, he offers two seats for the opening night, with maybe a chance to meet the stars in person.

No A.R.P. at the Show

WE understand that the R.M.A.'s plan for a special A.R.P. exhibit at Radiolympia will not now go forward. The whole question of including such a display in the exhibition, in view of the unsettling effect it might have on the public mind has been reconsidered.

Miss Radiolympia

THE search of Britain for Miss Radiolympia, 1939, is being conducted by 21 concert parties in resorts on the east and south coasts. James Komisarjevsky, who is conducting the contest, is receiving wholehearted co-operation from all parts of the country.

The object is to find a girl with a perfect personality for both radio and television, and at the same time to make the vast audiences who throng the seaside concert parties "Radiolympia conscious."

The winner of the first heat in the search of Britain for Miss Radiolympia, 1939, at Clacton is Miss Irene Flack, of Leytonstone, who is a comptometer operator. The contest, which is being held over a period of five weeks, is of especial interest to Irene, as she helps her fiancé with his radio business at East Ham. Our illustration shows Miss Flack testing a set.

TELEVISION FEATURES

"FOX IN THE MORNING"

HELEN HAYE, Jessica Tandy and Marjorie Mars took leading parts in "Fox in the Morning," a new play which was televised in the evening programme on July 30th. The author is Lionel Brown, who wrote "Square Pegs," a comedy which—by general consent—has been one of the most successful yet televised.

The scene of the comedy is a racing stud in Berkshire which is run by Frances Brunell, an enterprising widow (played by Helen Haye). Alan Brunell, her son, undecided as to whether he shall adopt the same business as a career, proposes marriage to the family secretary, Barbara Scott. But before anything is settled, President Raymon Valdazar and his daughter, Judy, arrive to buy some horses to take back to South America. Judy, perceiving that Alan Brunell is likely to inherit the estate, determines to marry him, and the comedy goes with a swing when Alan's mother discovers the state of affairs. By a clever subterfuge she deceives her would-be daughter-in-law, and many surprises are in store before the curtain is rung down on this light-hearted comedy.

The distinguished cast included Felix Aylmer, D. A. Clarke-Smith, Gray Blake and Harvey Braban.

"Fox in the Morning," which will be repeated in the afternoon programme on August 10th, will be produced by Fred O'Donovan.

PROGRAMME FOR THE YOUNGER VIEWER

FOLLOWING the experimental programmes on July 19th and August 5th, another television transmission of special interest to younger viewers will be given on August 11th, when five puppet troupes will take part in a Puppet Parade variety show, with contributions from the Ebor Marionettes, the Hogarth Puppets, the London Marionette Theatre, the Studio Theatre, Chiswick, and Cliff Hunter. A cartoon film will be included, and the programme will continue with Harcourt Williams telling children's stories, a Zoo film, animal drawings by Arnrid Johnston, and a news reel.

"LOVE IN TWENTY LESSONS"

JACK MELFORD will star in the comedy, "Love in Twenty Lessons," by Delano Ames, which is to be televised in the evening programme on August 11th. The scene is set in Vezier, a resort in the Pyrenees, where Allen Grey (Jack Melford) is in pursuit of Elizabeth, believing her to be the daughter in the Coulton household. Posing as Alphonse Duval, a French professor, he arrives to take up his duties, only to find that his pupil is an objectionable schoolgirl. Knowing hardly a word of French, he must carry out his contract of teaching French in twenty lessons, but once inside the Coulton household he continues his pursuit of Elizabeth who realises his deception, and appears to be furious with him.

The comedy is full of amusing scenes, and perhaps the fortissimo of laughs is reached in a café where Allen has tea with the two girls and is unable to understand the waiter's French. Viewers who wish to know whether all turns out well in the end can tune in either on the evening of August 11th, or for the repeat performance in the afternoon of August 15th.

"Love in Twenty Lessons" will be produced by Eric Fawcett.

Leaves from a Short-wave Log

Broadcasts from Hawaii

KHE, Kahuku (Hawaii), on 16.69 m. (17.98 mc/s), 40 kilowatts, transmits a radio entertainment every Sunday morning from B.S.T. 01.15-02.00 for the benefit of U.S.A. listeners. Reception also has been made of these broadcasts in the British Isles.

Powerful Signals from South America

LOUD signals from a new station in Peru have been recently logged; they emanated from OAX4R, Lima, *Radio Nacional*, on 19.8 m. (15.15 mc/s). On the same evening a long programme was well received from ZPI4, Villarica (Paraguay), on 25.58 m. (11.73 mc/s), the studio giving the call: *La Voz del Corazon de Sud America, Radio Cultura*, through a woman announcer. Listeners should also try for CB970, Valparaiso (Chile), a new 7-kilowatter working on 30.93 m. (9.7 mc/s), and LRA1, Monte Grande (Buenos Aires-Argentine Republic), on 30.96 m. (9.69 mc/s), both of which can now be tuned in at good volume after midnight B.S.T.

Radio Ibero-Americana

THE Madrid transmitter EAQ, calling itself *Transradio Español*, now broadcasts daily in English and Spanish for listeners dwelling on the two American continents between B.S.T. 22.00-00.30; every Saturday from B.S.T. 01.30-02.30. The wavelength is 30.43 m. (9.86 mc/s) and the power 20 kilowatts.

Japan's 50-kilowatters in Operation

DAILY at B.S.T. 21.35, Tokio broadcasts news-bulletins in the French and English languages through the two 50-kilowatt short-wave transmitters JLG3, 25.63 m. (11.705 mc/s), and JLT2, 31.1 m. (9.645 mc/s).

Luxembourg Tries out Short-waves

RADIO-LUXEMBOURG is carrying out broadcasts on 31.49 m. (9.5275 mc/s) between B.S.T. 17.00-19.00. Identification is facilitated by the fact that the call and announcements are given out in French, German, English and Italian or Spanish.

Bagdad Again at Work

HNF, Bagdad-Chiftlig (Iraq), on 30.98 m. (9.683 mc/s), is reported to be transmitting again in the evening hours.

Alter in Your List

XEYU, Mexico City (Mexico), formerly on 31.32 m. (9.58 mc/s) has been taken over by the National University of Mexico City, and will now work on 31.25 m. (9.6 mc/s) with a power of 250 watts.

More Channels for Denmark

THE short-wave transmitter at Skamleback (Denmark), in the near future will use: OZ13, 16.82 m. (17.835 mc/s), 5 kilowatts; OZ12, 16.84 m. (17.81 mc/s), 5 kilowatts; OXY3, 48.62 m. (6.17 mc/s), 6 kilowatts; and OXY2, 49.65 m. (6.045 mc/s) with the same power.

New Stations in French Indo-China

THE *Etablissements Coppin, Tran-Hoa et Bret* at Saigon advise that they are shortly opening the following 500-watt transmitters: 25.45 m. (11.786 mc/s); 60.8 m. (4.934 mc/s); 88 m. (3.409 mc/s) to relay the radio programmes broadcast by a new medium-wave station operating on 206.9 m. (1,450 kc/s). The 12-kilowatt station owned by the Société Indo-Chinoise de Radiodiffusion will be working on 25.47 m. (11.78 mc/s); FZ83, 31.19 m. (9.62 mc/s), and 49.05 m. (6.116 mc/s).

And in Brazil

IT is reported that a 20-kilowatt station is being erected at Rio de Janeiro (Brazil). The following channels have been reserved to this station: 16.82 m. (17.835 mc/s); 19.52 m. (15.37 mc/s); 19.81 m. (15.145 mc/s); 25.23 m. (11.89 mc/s); 25.37 m. (11.825 mc/s); 25.362 m. (11.71 mc/s); 31.25 m. (9.6 mc/s); 31.36 m. (9.585 mc/s); 31.56 m. (9.505 mc/s), and 48.39 m. (6.2 mc/s).

Also in Haiti

RADIO Haiti, at Port-au-Prince, has been allotted the following wavelengths for the new 25-kilowatt transmitter HHK now under construction: 13.84 m. (21.67 mc/s); 16.81 m. (17.85 mc/s); 25.38 m. (11.82 mc/s), and 31.19 m. (9.62 mc/s). It is proposed to build the station in such a manner that the power may eventually be increased to 50 kilowatts.

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 S.W. Superhet!

SIR,—As a regular reader of your excellent journal for nearly five years, I have gathered from it numerous instructive and constructive ideas which proved to be very useful. I am also a proud owner of some of your well-known books, including "Everyman's Wireless Book."

I noticed many readers' requests for a good circuit of a S.W. superhet set to be published in your pages. May I also join in the request for this set. Please let us have a really "hot" series of articles, and a fairly simple circuit on the subject, taking into consideration, of course, the parts that could not be obtained in some places of the British Empire. (In this case substitutes have to be found.)—LIM CHOW HOE (Johore Bahru).

The Air-Hawk Nine

SIR,—I have been a reader of your excellent journal now since No. 10, and I congratulate you upon the fine standard of the paper, both from the practical and theoretical point of view. I have recently constructed your Air-Hawk 9 receiver, and as I have seen no comment as to its performance by other readers, I send my 14 mc/s log, for Saturday, July 22nd, between 9 p.m. and 12 p.m. All stations being on 'phone and received on the speaker: W1JFG, 1AWB, 1DQ, 1DLP, 1BXZ, 1ADM, 1CMD, 1CMT, 1AVF, 1FMP, 1AW, 1VR, 1DQ, 1BG, 1KIB; W2DST, 2HHK, 2USA, 2BRI, 2DIZ, 2DRI; W3BT; W5AGQ, 5AVP; W8DLP, 8LR, 8NFZ, 8GLC, VK4AM, VK3CR, LU7AG, LU3DF, CN5BB, VE5HR and K4RJ.

This log, of course, does not include European stations received, which number about 50. Practically all these stations were received at above Q5.R7. I have incorporated an American 6E5 visual tuning indicator, working off a separate diode detector, and find it very useful. —J. A. CARR (Leamington).

Correspondent Wanted

SIR,—I am a new reader of your journal, PRACTICAL AND AMATEUR WIRELESS, and shall be glad to get in touch with another wireless enthusiast residing in the Bradford Moor district.—DAVID CARR, Park Royd, First Avenue, Bradford Moor, Bradford.

Proposed S.W. Club

SIR,—I am a regular reader of PRACTICAL AND AMATEUR WIRELESS, and am contemplating the formation of a short-wave club in the Kimberworth district of Rotherham. Will any interested readers residing in the locality please get in touch with me at the address given below.—H. G. SWAN, 452, Wortley Road, Kimberworth, Rotherham.

A 20m. Long from Ilkeston

SIR,—Some weeks ago you published a letter of mine in which I gave a DX log at this QRA. Here are a few of the stations received here since then, also at times received.

20m. Phone: CO8JK (23.00); K4FAY (22.30), FKC (23.50); KA7EF (22.05), LU5CZ (22.50); PY2AC (23.10), 4CT (22.35), 7AI (20.00). SU5BO (19.50), KP (23.30); VK4PF (22.25); VQ4CRE (20.30); VS2AK (19.00); VU2JG (19.40); W5BEK (07.05); FIY (07.00), GU (16.20); ZB2B (19.30).

The receiver is a 4v. superhet., and the antenna is a 60ft. inverted L. I have recently received a S.W.L. card from a Californian S.W. enthusiast who has asked me to pass his QRA along, which is as follows: Bob Larson, 618, North June St., Hollywood, California.—A. HART (Ilkeston).

CUT THIS OUT EACH WEEK

Do you know

—THAT now is the time to carry out a complete overhaul of your aerial system and make sure that all rigging is sound and that insulators and wire are above suspicion.

—THAT it is advisable to take your accumulators to the charging station before going on holiday so that they can be cleaned out, refilled with fresh electrolyte and re-charged ready for your return.

—THAT the aerial should be connected to the earth wire when leaving the installation for a long period. Aerials can collect quite a large charge of static electricity during summer lightning storms.

—THAT it is not unknown for the earthing wire to corrode to such an extent that it becomes detached from the actual earthing plate or tube. Pay particular attention to this item when examining the external equipment.

—THAT if you are interested in S.W. reception, it is worth while taking a small S.W. receiver with you if you are going into the country for your holidays as the results might be vastly superior to those you normally obtain in the town.

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 Newnes, 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.

Exchanging QSL Cards

SIR,—I have been a reader of your very fine paper for quite a number of years, and would like to exchange my QSL and/or photo, with any S.W.L., A.A., or fully-licensed amateur throughout the world. I will guarantee a reply to every card or photo.

I have your "Wireless Transmission for Amateurs" and "Television and Short-wave Handbook," and find them invaluable. —H. V. UPTON, 9, Belle Vue Terrace, Whitby, Yorks.

Miss W. I. Haward has been appointed by the B.B.C. to the North Regional staff as programme assistant at Leeds from August 28th. Miss Haward was formerly a history lecturer at Bedford College, London. From 1931 to 1933 she worked in New Zealand in various capacities, including the broadcasting of travel and history talks from local stations. From 1933 to 1935 Miss Haward was a teacher and organiser for adult education at the University College of Hull, and more recently she has been associated with the University College of Nottingham. She has also run a tourist business in York, and has done work in connection with broadcasts in America sponsored by the Travel and Industrial Development Association of Great Britain. In her new post Miss Haward will be mainly concerned with the collection and production of talks material.

Mr. R. W. Reid has been appointed B.B.C. Press Officer, North Region, from September 4th next. Mr. Reid is a journalist who contributed as a free-lance to the *Yorkshire Evening Argus*, Bradford, before his appointment to the staff of the *Yorkshire Observer*, Bradford, in 1924. In 1933, he joined the *News Chronicle* at its Leeds office, and was transferred to Manchester as deputy Northern news editor in 1936.

As Press Officer, North Region, Mr. Reid succeeds Mr. G. W. Talbot, who has transferred to the Midland Region as Public Relations Officer.

Mr. R. G. D. Holmes, Burndept's chief research engineer, has again been placed first in the British Isles zone of the recent British Empire Radio Union contest for short-wave transmission and reception. Two years ago Mr. Holmes not only won the British Isles zone, but was placed first in the whole contest. This year Mr. Holmes was placed sixth in the order of world precedent.

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.

Special Notice: Will club secretaries please send in reports in the form they appear on this page.

SOUTH LONDON DISTRICT RADIO TRANSMITTERS SOCIETY

Secretary: E. Ilott, 36, Montana Road, Upper Tooting.

Meeting Place: The Brotherhood Hall, W. Norwood. First Wednesday every month.

AT the July meeting of the above society, Mr. Nixon of the General Electric Company showed a film illustrating some of the more intricate phases of valve construction. Following the film, he demonstrated the use of cathode-ray oscillographs in wave form analysis, and the control of street lighting by gas-filled relays.

All interested amateurs are welcome. The possession of a transmitting licence is not necessary.

WATFORD AND DISTRICT RADIO AND TELEVISION SOCIETY

Hon. Sec.: P. G. Spencer (G8MH), 11, Nightingale Road, Bushey, Herts.

AT the meeting held on the 17th July Mr. A. Gardner (G5RD) and Mr. A. Birt (G3NR) demonstrated their 56 Mc. receivers (straight and superhet, respectively). G5RD also demonstrated a portable crystal-controlled transmitter for this band.

At the next meeting on August 21st in the Carlton Tea Rooms, 77a, Queens Road, Watford, at 8 p.m., Mr. A. W. Birt will give a short talk on the C.W.R.

SLADE RADIO

Headquarters: All Saints Parochial Hall, Broomfield Road, Slade Road, Erdington, Birmingham.

Hon. Sec.: L. A. Griffiths, 47, Welwyndale Road, Erdington, Birmingham.

Meetings: Alternate Thursdays; 8.30 p.m.

THE meeting held on July 20th was the 500th and therefore a red letter day in the annals of the society. We were favoured by the company of Mr. A. R. Burr through the courtesy of Messrs. Mullard Wireless Service Co., Ltd.

The subject discussed was "E" type valves, and a very interesting description of the construction, and other features was given. The speaker made clear that the low noise level, comparative freedom from drift, small size and robustness made these valves suitable for modern S.W. receivers, and car radio. The lecture proved interesting and many questions were raised and answered.

PINNER AND DISTRICT RADIO AND TELEVISION SOCIETY

Headquarters: 419, Station Parade, Rayners Lane Pinner.

Secretary: J. F. Lavender, 53, Ivy Close, S. Harrow, Middlesex.

THE above society met on Tuesday, July 25th, and had a most successful evening. There were 25 present, including several visitors. Mr. Halligay (G8PJ) gave a very interesting talk on frequency control which was followed by a television demonstration. Membership of the society to date now numbers 24. Anyone interested, please communicate with the sec., J. F. A. Lavender, at the above address.

COXHOE AND DISTRICT AMATEUR RADIO SOCIETY

Headquarters: Slake Terrace Inn, West Cornforth.

Secretaries: D. F. Chatt (2HKJ), 23, North View, Sherburn Hill; and R. Bowes (2DTA), 10, Blackgate, Coxhoe.

Meetings: Tuesdays, 7.30 p.m.

A MEETING of the society was held on Tuesday, July 25th, at the above headquarters. Morse practice was carried on as usual, as were the usual group discussions by members. Construction of the members' own short-wave sets was followed with interest.

Those members interested in transmission, discussed various topics concerning A.A. permits. Mr. Bowes (2DTA) demonstrated his new "Howard 460" communication receiver to some of the members, this receiver attracting great interest. The matter of permanent headquarters is progressing satisfactorily, and we hope to be settled down shortly.

SALE AND DISTRICT RADIO SOCIETY

Headquarters: St. Mary's Schools, Barkers Lane, Sale, near Manchester.

Secretary: S. C. O. Allen (2FCQ), 31, Ennerdale Drive, Sale.

Meetings: Weekly, on Thursday evenings, at 7.30 p.m.

AS nearly all members of the society now intend to apply for full or artificial aerial transmitting licences, it was decided at the meeting on July 20th that, in future, additional Morse tuition would be available, and that further lectures should give instructions in electricity and high-frequency communication. It is hoped that members will be able to obtain both Morse proficiency and technical knowledge on which to base their applications for licences.

There will be three Morse Code classes, the object being to provide instruction for beginners, those with some knowledge of the Code, and a final class for members who have to sit for the Post Office Morse test.

G4ND continues his slow Morse transmissions at 9 p.m. on Wednesday evenings. The frequency is 1,915 kilocycles, and the service should be of assistance to learners of the Code in the Sale and south-east Manchester area. Mr. Robinson (G5UP) also gives Morse practice on Sunday afternoons on the 7Mc. band.

The secretary will be pleased to hear from any readers interested in becoming members of the society.

ASHTON-UNDER-LYNE AND DISTRICT AMATEUR RADIO SOCIETY

Hon. Sec.: K. Gooding (G3PM), 7, Broadbent Avenue, Ashton-Under-Lyne, Lancs.

Headquarters: 17a, Oldham Road, Ashton-under-Lyne.

DESPITE the summer months, activity is still high, and two new licences are reported: Mr. E. J. Wellman (2HJT) and Mr. J. Spence (2HMF). G3PM spent a holiday in July at Weston-super-Mare and received a real "ham" welcome from G3KX, G3NB and G5TN. Unfortunately 3PM was unable to attend the Sunday morning rag-chew on 1.7, and CW QRM prevented any QSO's with home members on the 7 mc. band.

The society's 56 mc. Field Days proved very popular, and it is hoped to have a 1.7 mc. D.F. contest later in the year.

On comparing notes after the 56 mc. events, the following conclusions were arrived at: (1) An Rx with an H.F. stage is definitely the "goods," ; (2) Too many stations are still using "quench" Rxs. and (3) Very few stations appear to search the H.F. limits of the band. In support of this latter contention G3BY (who was working on 59,212 kc/s.)' remarks that he often had to call stations about half-a-dozen times before they came back, and then their report was often RST 599! G6DV has removed to a new QRA, and is endeavouring to work DX with a temporary antenna about 10 feet high.

On the 26th July Mr. W. P. Green gave a lecture and demonstration on "trouble-shooting." 2HJT provided the Rx for post-mortem, and was quite pleased when the chairman's analyzer sorted out all the faulty condensers.

NOTES FROM THE TRADE

TWO accessories which were primarily introduced for use with television receivers, but which are now proving very popular with the owners of ordinary table radio receivers, are the walnut tables produced by H.M.V. shown below. Model No. 14, which is listed at 3 guineas, and the smaller one at 2½ guineas are, while being most robust, beautifully finished and form quite attractive pieces of furniture.

Exide for New Ekco Receiver

THE Chloride Electrical Storage Co., Ltd., makers of the well-known Exide batteries for radio, announce details of a new accumulator specially produced for the Ekco P150 receiver.

It is a 2 volt accumulator in a celluloid case, measuring 2 5/16 in. wide by 2in. long by 5 13/16 in. high. The capacity is 10 ampere-hours, at the 20 hour rate of discharge, and the charging rate is .75 amperes. The cell is known as CYU3K and costs 9s. 3d. uncharged.

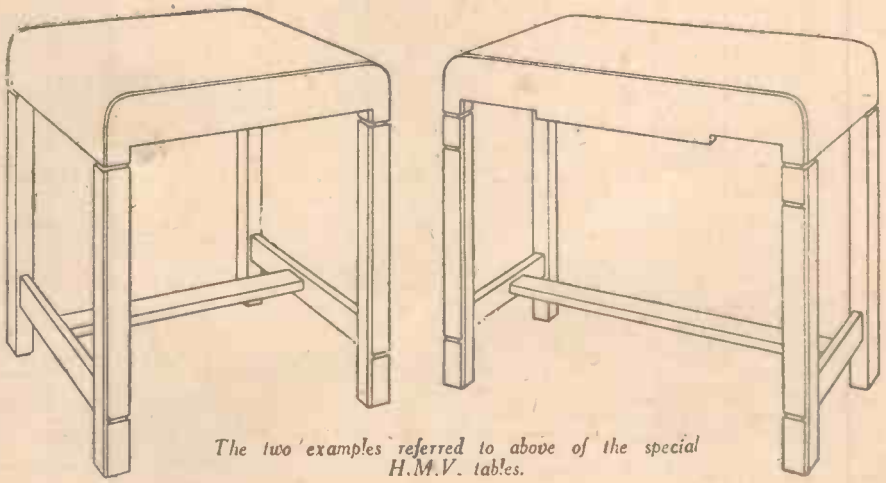
New G.E.C. Mains Conversion Unit

A NEW conversion unit designed to enable A.C. mains receivers to be operated where only D.C. mains are available, has been introduced by the General Electric Company, Ltd.

Primarily, it is designed for use overseas with large G.E.C. radio receivers, although there are a number of purposes to which such an appliance can be put here at home.

The unit, comprising a vibrating reed, and the necessary filter apparatus, takes the form of a metal container suitable for mounting inside a receiver.

It can be used on D.C. mains, ranging from 200 to 250 volts. The maximum A.C. power output of the unit is approximately 160 watts. The metal case measures 15½ins. long, 3½ins. high, and 2⅝ins. wide. The price of the unit is 5 guineas.



The two examples referred to above of the special H.M.V. tables.

LATEST PATENT NEWS

Group Abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, either sheet by sheet as issued on payment of a subscription of 5s. per Group Volume or in bound volumes price 2s. each.

Abstracts Published.

TRANSFORMERS AND INDUCTANCES.—Aladdin Radio Patents, Ltd., and Hebard, H. C. No. 503236.

In a H.F. inductance having a movable iron dust core 4 (Fig. 1), adjustment of the core is effected by means of a sleeve 10 having helical cam surfaces 11, 12 at its ends and a rod 9 formed with lugs 13, 14 which engage the cam surfaces so that rotation of the rod causes axial movement of the core which is attached to the rod. A further fixed core part 5 may be provided, this being located so that the amount of coupling between the main windings 1 and a coupling coil 3 is not effected by adjustment of the core 4 to vary the inductance of the winding 1. The sleeve 10 is constructed in two parts

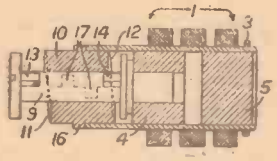


Fig. 1.

having locating lugs 17 and held together by a ring 16. After an adjustment is effected the rod 9 may be fixed by means of fusible plastic material.

ADJUSTING WIRELESS APPARATUS; INDICATING-APPARATUS. Telefunken Ges. Fur Drahtlose Telegraphie. No. 504190.

The tuning knob 4 (Fig. 2) of a radio-receiver or other high-frequency electrical apparatus, is provided internally with a lamp 6, light from which passes, directly and by reflection from the inner walls of the knob, through a coloured transparent insert 12 to illuminate the tuning pointer 8 and the adjacent part of the tuning scale 9. Further coloured inserts may be provided in other apertures in the member 3 supporting the removable knob 4 to illuminate other parts of the dial. The invention is particularly useful for wireless sets used in night-flying aeroplanes where the various control knobs may have an insert of distinctive colour.

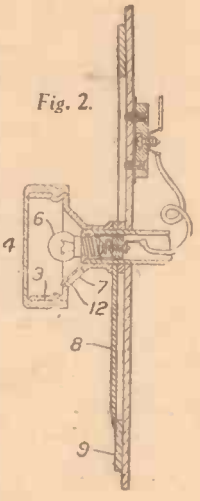


Fig. 2.

ADJUSTING WIRELESS APPARATUS.—Hromadko, J. F. No. 503596.

A tuning indicator for a radio-receiver comprises a band or strip wound from one roller or drum on to another in accordance with the tuning adjustment, a tuning shaft driving one or other of the rollers through gearing including ratchet or clutch mechanism in accordance with the direction of rotation thereof. The tuning knob 10 (Fig. 4) drives through gearing 19 . . . 25, a shaft 26, a helically splined portion 31 of which drives the condenser (not shown) through gears 32. The gear 25 also drives through 27, 28, 33 . . . 37, a

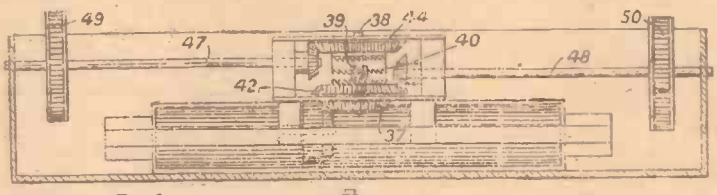


Fig. 3.

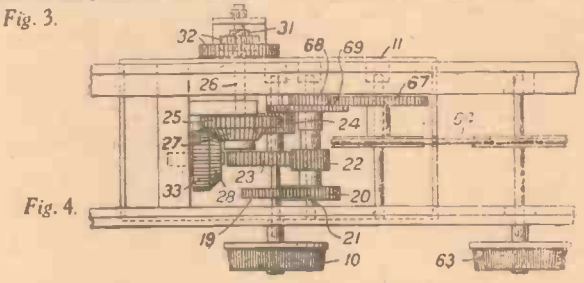


Fig. 4.

shaft 38 (Fig. 5), a helically splined portion 39 of which carries a double ratchet element 40 so that according to the direction of rotation of the tuning knob 10 the ratchet element 40 is moved axially and drives one or other of the gears 42, 44, which drive the respective indicator drums 17 (Fig. 5), through shafts 47, 48, (Fig. 3) sprocket wheels 49, 50, and chains such as 51. The band 15 carrying the station, wavelength indications in columns, is kept taut by spring-pressed arms 57 bearing on the flanges of the drums 17 and is viewed through an aperture 16 in the casing 12 and a corresponding aperture in the receiver cabinet. A moving mask controlled by the wave-change switch may be used to obscure all but the appropriate column of indications, or the various columns could be selectively illuminated under the control of the wave-range switch. In the embodiment shown, however, the appropriate column of indications is brought into register with the panel viewing aperture by sliding the upper casing 12 relative to the lower casing 11

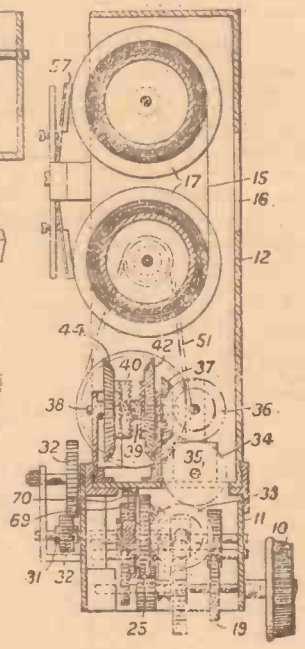


Fig. 5.

secured to the receiver chassis. This is effected by the wave-change-switch knob 63, through a cord drive 64, gearing 67, 68, 69 and a rack 70 on the casing 12.

NEW PATENTS

These particulars of New Patents of interest to readers have been selected from the Official Journal of Patents, and are published by permission of the Controller of H.M. Stationery Office. The Official Journal of Patents can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, price 1s. weekly (annual subscription £2 10s.).

Latest Patent Applications.

20628.—Bosch Ges., R., and Rosney, W. C. V.—Wireless receiving-apparatus. July 15th.

20989.—Fabbrica Italiana Magneti Marelli.—Wireless receiving-apparatus. July 19th.

20844.—General Electric Co., Ltd., and Peters, W. H.—Tuning arrangements for wireless receivers. July 18th.

20575.—Monge, G. de.—Television. July 14th.

20445.—Murphy Radio, Ltd., and Hawkins, G. F.—Control of cathode-ray tubes in television apparatus. July 13th.

20841.—Scophony, Ltd., and Rosenthal, A. H.—Television receivers. July 18th.

20423, 20743.—Thornton, A. A. (Philco Radio and Television Corporation). —Radio receivers. July 13th.

Specifications Published.

509414.—Telefunken Ges. Fur Drahtlose Telegraphie.—Tuning indicators for wireless receivers.

509426.—Kolster-Brandes, Ltd., and Smith, K. G.—Radio receivers.

509438.—Marconi's Wireless Telegraph Co., Ltd.—Aerial systems for radio receivers.

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at the uniform price of 1s. each.

QUERIES and ENQUIRIES

Transmitting

"Being a newcomer to 'Practical and Amateur Wireless,' I have, no doubt, missed many articles of which I am in need. As I wish to take up short-wave transmission in an elementary form, could you possibly inform me where I could obtain particulars on how to build a simple morse transmitter and give me some details concerning the requirements of the G.P.O. regarding the necessary licence."—H. G. T. (Shepton Mallet).

AS you state in the first part of your letter, you have missed a complete series of articles on Amateur Transmitting, but as the subject is still being covered by a fairly regular series of articles which now appear under the title "Transmitting Topics," you will, no doubt, be able to make up for lost time. Bearing in mind all your requirements, we would strongly advise you to secure a copy of our latest handbook, "Wireless Transmission for the Amateur," price 2s. 10d. post free, as this contains all the information you mention, including a very efficient one-valve battery-operated transmitter. Complete details regarding the necessary licence can be obtained from the Engineer-in-Chief, Radio Section, G.P.O., Armour House, London, W.C.

Car Radio

"I should be obliged if you would answer the following questions. Has an article appeared, or is one contemplated, dealing with the building of a low-priced car radio receiver? Could any circuits previously published in blueprint form be used as a car radio and, if so, which one? How could a vibrator unit be introduced into a small battery-operated set for conversion for car use? If none of the foregoing is practical would you please publish, in the near future, constructional details and circuit diagrams of a car radio for operation off a 6-volt car accumulator, suitable for small car and smaller purses?"—A. L. H. (Sherwood).

TO commence with, A. L. H., you ask exactly double the number of questions permitted under our Query Service rules. However, in this instance we will try and satisfy your demands, although as space is limited, our answers must of necessity be brief. In our issue for November 20th, 1937, we published an article giving details of a car radio receiver, including theoretical circuit. We would not advise the conversion of an ordinary set for such purposes. See the article in the issue for June 24th, 1939, which stresses the snags. An H.T. vibrator can be used quite easily with most battery sets; simply connect it to the L.T. source and take its H.T. output to the set in the ordinary way. We do not contemplate publishing the constructional details of a complete car radio in the near future; some of the reasons are given in the June article mentioned above.

Morse Code

"Two or three friends and myself are trying to master reception of Morse Code signals and, apparently, we all have different ideas as to the best way to improve our speed. Can you give us any advice on the matter and tell us if there are any special short-cuts to perfection, as we are all beginning to lose heart a little because we can't seem to get above 10 words per minute? We spend, on an average, two evenings a week, and we have now been at it for six weeks. Can you help us?"—T. J. P. (Chatham).

SORRY, T. P. H., we can't offer you any easy path to mastering the Morse Code. There is only one way of reaching the top of the ladder as regards reception speed and that is practice, practice, and then some more practice. Two evenings a week is all right in its way, but it would be far better to try and arrange half an hour a day so that you are keeping at it, so to speak, and, eventually, you will find your speed creeping up. Don't worry or lose heart at not being able to pass 10 words per minute. We all go through that stage; it often takes quite a time to get beyond a certain speed, but you will get over the hill one of these evenings and then your reception of higher speeds will be like going down hill. Stick at it, it's well worth the slogging.

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 Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2. The Coupon must be enclosed with every query.

Crystal Receiver

"I am trying to find a very simple and compact crystal set for use with headphones when I am away from home. Have you anything to offer of the midget type as space is a serious consideration owing to the fact that I have to travel with the minimum of luggage."—R. B. (Basingstoke).

MOST certainly we have something to offer you. The Stand-by Crystal Set, which is fully described in our issue of May 13th, 1939, is the ideal receiver for the work you have in mind. It is both compact and efficient, but the specified coil is only designed for the reception of the medium-wave stations. This, however, so far as the numerous reports go, is not in any way detrimental.

Model Control

"I am interested in operating or controlling a model steamboat by wireless and although I feel that I shall be able to construct the necessary equipment, I am not too happy about the G.P.O. licence question. No one seems able to tell me anything definite. I have not yet written to the P.M.G. as I thought I would ask your advice first. What is the position?"—D. E. C. (Catford).

THE position is this. The P.M.G. does not insist upon a licence being taken out for transmitting apparatus which is used solely for the wireless control of models, but he does make it quite clear that such equipment must not, on any account, be used for the purpose of sending or receiving messages, and this part is very important—the apparatus must be such that it is not capable of causing any interference to broadcast listeners.

When such privileges are used, therefore, it is up to the operator to either use the wireless control during the hours when the local broadcasting station is not working or keep the power output very low.

Adding an H.F. Stage

"I have a three-valve short-wave set which I built myself. It incorporates resistance-capacity-coupling in the first stage and transformer coupling in the second.

"I would like to know how I can make it into a four-valve set. Could you give me any hints on how to improve the circuit for the reception of the American stations?

"I wait up every night until twelve o'clock to try and get them, but only twice have I managed to pick up Schenectady, My short-wave coil tunes from 20 to 80 metres."—F. P. (Glasgow).

AS your receiver already embodies two stages of L.F. amplification, we can only suggest that you consider adding a stage of tuned or untuned H.F. amplification in front of the existing aerial coil. Suitable circuits have been described in past issues; the H.F. stage which was designed for use with our "Prefect" receiver would, no doubt, suit your requirements. This is fully described in our issue dated June 27th, 1936. Regarding the reception of the more distant transmissions your trouble might be solely due to local conditions or your aerial arrangements, therefore, we can only suggest that you pay particular attention to the latter, and try a coil which will cover from 15 to 25 metres.

Meter Conversion

"I wish to convert my 0-50 milliamperes meter into reading volts, and wonder if you can help me as to what resistances I shall need to do this. I have drawn a rough sketch of what I think is a suitable circuit. Do you think this will be O.K.?"—D. C. P. (Corringham).

AS it is only necessary to include suitable series resistances to enable the meter to be used as a voltmeter, the circuit you show will be quite in order. The values of the resistances can be calculated by applying Ohms Law. As your meter has a maximum scale reading of 50 mA, and you wish it to read 10, 120, 250, and 500 volts at full scale, you will have to use the following series resistances: 2,000 ohms, 24,000 ohms, 50,000 ohms, 100,000 ohms, approximately.

The coupon on page iii of cover must be attached to every query

Practical and Amateur Wireless
BLUEPRINT SERVICE

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 .. .. 7½d. " "
Wireless Magazine .. .. 1/3 " "

The index letters which precede the Blueprint Number indicate the periodical in which the description appears: Thus P.W. refers to PRACTICAL WIRELESS, A.W. to *Amateur Wireless*, P.M. to *Practical Mechanics*, W.M. 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.

PRACTICAL WIRELESS.	Date of Issue.	No. of Blueprint.
CRYSTAL SETS.		
Blueprints, 6d. each.		
1937 Crystal Receiver	—	PW71
The "Junior" Crystal Set ..	27.8.38	PW94
STRAIGHT SETS. Battery Operated.		
One-valve : Blueprints, 1s. each.		
All-Wave Unipen (Pentode) ..	—	PW31A
Beginners' One-valver	19.2.38	PW85
The "Pyramid" One-valver (HF Pen)	27.8.38	PW93
Two-valve : Blueprints, 1s. each.		
Four-range Super Mag Two (D, Pen)	—	PW36B
The Signet Two (D & LF) ..	24.9.38	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)	—	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	PW18
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	PM1
Cameo Midget Three (D, 2 LF (Trans))	—	PW51
1936 Sonotone Three-Four (HF Pen, HF Pen, Westector, Pen)	—	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) ..	14.8.37	PW64
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))	18.2.39	PW72
The "Rapide" Straight 3 (D, 2 LF (RC & Trans))	4.12.37	PW82
F. J. Camm's Oracle All-Wave Three (HF, Det., Pen)	28.8.37	PW78
1938 "Triband" All-Wave Three (HF Pen, D, Pen)	22.1.38	PW84
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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)	—	PW34B
Fury Four Super (SG, SG, D, Pen)	—	PW34C
Battery Hall-Mark 4 (HF Pen, D, Push-Pull)	—	PW16
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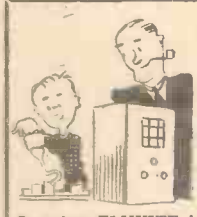

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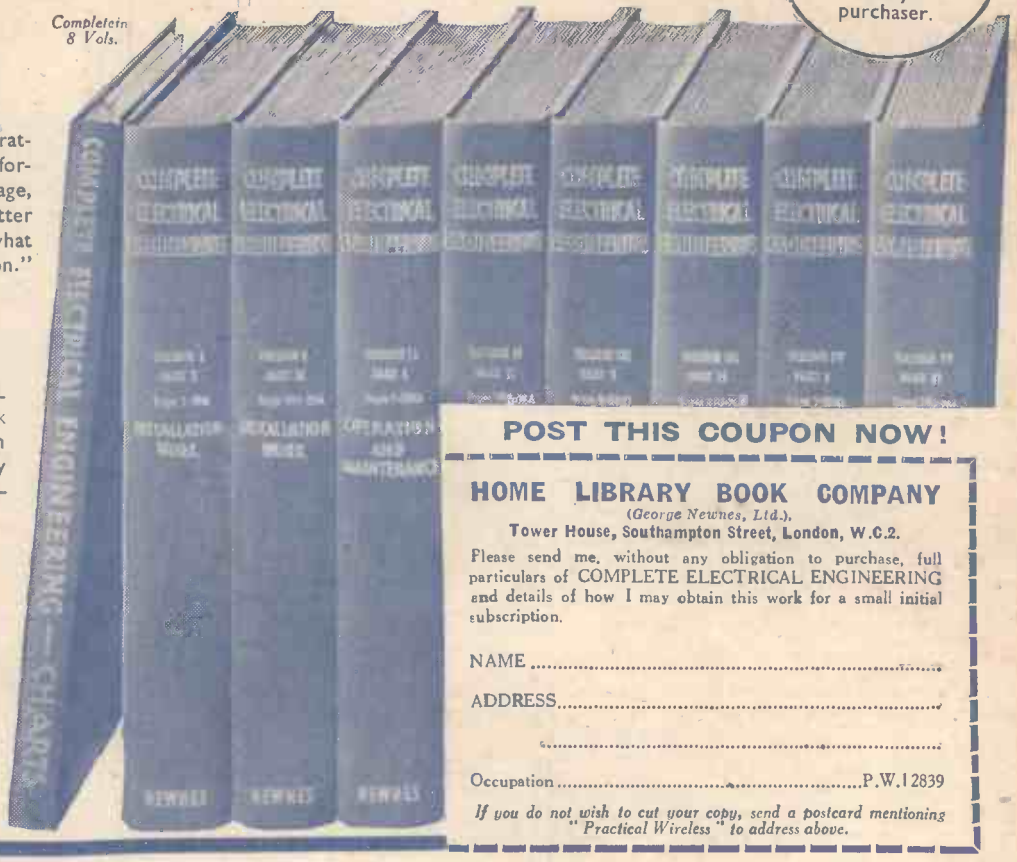

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THE NEW "PRACTICAL WIRELESS" NEXT WEEK — See Inside.

Practical and Amateur Wireless

3D. EVERY WEDNESDAY

Edited by F. J. CAMM

AND PRACTICAL TELEVISION

A GEORGE NEWNES *Publication*

Vol. 14. No. 361.
August 19th, 1939.

RADIOLYMPIA

Advance Details

EXPERIMENTING ON THE SHORT WAVES—See Page 533

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. XIV. No. 361. Aug. 19th, 1939.

ROUND *the* WORLD *of* WIRELESS

Radiolympia

FOUR days to go. Four days which will fly past far too rapidly for those connected with the preparation of this year's Radiolympia, which, if forecasts prove correct, intends to make an even bigger splash than any before.

Although the average constructor is naturally interested in all the various items which go to make an exhibition, he is primarily concerned with the exhibits dealing with the science or hobby in general; therefore, as in previous years, we offer to our readers all the details of the new season's products as soon as they come to hand. Owing to the hush-hush methods employed by many manufacturers, it is not always possible to get information concerning every new line in advance, so we are only able, in this issue, to deal with those products of which details are available at the time of going to press.

Owing to the exceptional demand which is always experienced for our issue containing a most comprehensive guide to the Show, it is advisable to make quite sure that your order is placed for next week's issue, which will contain all the worth-while information relating to Radiolympia, 1939.

Italian Television

IT is reported that Italy's regular television transmissions, which have just been inaugurated, will be given from the ultra-short-wave transmitter at Monte Mario, near Rome. The programmes, which will be broadcast daily from 8.30 to 10 p.m. G.M.T., will be radiated on 6.8 metres (vision) and 7.4 metres (sound). The aerials are situated at the top of the 150ft. metal tower from which experimental U.S.W. transmissions have been radiated for some time.

Indian Broadcasting

WE understand that the Government of the State of Baroda, India, has placed a contract with the Marconi Company, for a 5 kW. medium-wave broadcasting transmitter complete with studio equipment.

Liege Exhibition

ACCORDING to a report, an International Congress of Post, Telegraph and Telephone staffs will be held at the Liege International Exhibition of 1939, on August 24th, 25th and 26th.

County Cricket

RICHARD RICKETT, a knowledgeable watcher of cricket, and Stephen Fry, former Hampshire player and son of "C.B.," will be heard discussing the second day's play in the Warwick v. Gloucester match at Edgbaston (Midland). They broadcast in the same informal kind of commentary from Trent Bridge on Whit Monday. Mr. Rickett is a keen follower of Surrey.

Organ Recital

DUDLEY SAVAGE will broadcast an organ recital from the Royal Cinema, Plymouth, on August 25th (Western). Last year he broadcast several times on the B.B.C. Theatre Organ in National and Empire programmes, and he has toured Great Britain as the "Cornish Wonder Boy Organist." His signature tune, the "Floral Dance," is appropriate as he is Cornish by birth.

Brahms Half-hour

FISHER MORGAN (baritone) and Hubert Pengelly (pianoforte) will give a Brahms Half-hour on August 20th (Welsh). Hubert Pengelly is the official accompanist of the B.B.C. at the Cardiff studios. Fisher Morgan is a nephew of Llewelyn Miles, soloist with the famous "Tom Stephens" Male Voice Choir at the first World's Fair in Chicago. Fisher Morgan's career started with the Porthcawl Operatic Society at the age of seventeen, in which he took leading parts in Gilbert and Sullivan operas. For the last three years he has been studying singing at Trinity College of Music.

Canal Journey

WITH the aid of recordings made on the Leeds and Liverpool Canal, Olive Shapley is presenting a sound picture of life on this inland waterway, which will be broadcast in the Regional programme on August 25th and in the Northern programme on August 26th. Bargees and their families will be among those contributing.

Story of a Lighthouse

GIRDLENESS Lighthouse, set on the rugged fringe of the North-East coast near Aberdeen, is the subject of a Scottish broadcast on August 17th. Mr. Magnus Wyllie will show listeners, in imagination, over the lighthouse, and there will be interviews as well with his wife and family. Mr. Wyllie will conduct his party to the top of the lighthouse, about 140ft. above the ground. He will explain how the light works. A descent will then be made to the engine-room, where air is compressed for blowing the siren which can be heard, in favourable weather conditions, about 40 miles away. Listeners to the Children's Hour will have a preview of the lighthouse at Girdleness if they care to join Geordie Broon and Peggy Wilson on their visit of inspection.

ROUND the WORLD of WIRELESS (Continued)

New Indian Broadcasting Stations

NEWS from India indicates that the installation of the 5 kW. transmitter at Dacca is progressing according to schedule. The building in which the transmitter is to be housed has already been constructed and the installation of the transmitter equipment is also nearing completion. When put into service, this station will, it is expected, provide an excellent service to East Bengal. Work on the new broadcasting station at Hyderabad Deccan, is also nearing completion.

INTERESTING and TOPICAL NEWS and NOTES

Radio Vatican's Vacation

IT is announced that there will be no transmissions from the Vatican broadcasting station during the present month. When transmissions from this station are resumed in September, a new schedule will be published.

A well-known Welsh radio amateur, G. R. Silverthorne, of Abertillery, has made a transmitter suitable for working in a car for Air Raid Precaution exercises. It is only nine inches by eight by eight, and has been used in conjunction with the Abertillery A.R.P. tests. It was demonstrated to a Home Office expert in Cardiff recently. Our illustration shows Mr. Silverthorne testing his set.

Swiss Wired Wireless

ACCORDING to a report from Switzerland, that country intends shortly to introduce high-frequency-wired wired wireless, use being made of the telephone lines. Towards the end of this year, tests are to be made at Berne on five frequencies, viz., 172, 208, 248, 270, and 300 kc/s.

Northern Concert Parties

THE Regional series, "Round the Concert Parties," will include further Northern contributions on August 22nd and 25th, respectively. Neil and Claxton's "Revelry" are broadcasting from the New Central Pier, Morecambe, on the 22nd, and "The Rolling Stones," will be heard from the Floral Hall, Scarborough, on the 25th.

Variety from Torquay

RONALD FRANKAU, Renée Roberts, and Tommy Handley will take part in a variety programme to be broadcast from the stage of the Pavilion, Torquay, in the series "Theatres of Variety," on Wednesday, August 23rd. Ronald Frankau and Tommy Handley will be heard as Mr. Murgatroyd and Mr. Winterbottom, and it is hoped that Renée Roberts will be persuaded to compère the act; all three artists will also be heard in single acts.

"Cabarette"

LESLIE BRIDGMONT will present "Cabarette" on Monday, August 21st, when the artists will be White and Woodman "In original songs at the piano," Arnie Kitson, "Xylophone and Marimba," and Ruby Taylor and Frances Keyte, "Four hands and two pianos."

Brass Band Concert

METROPOLITAN Works Band, which was the first to broadcast from Birmingham in the early days, will be heard on August 21st in a popular programme, conducted by Harry Heyes. It did well in Crystal Palace competitions. All the members are employees of the Metropolitan Carriage and Finance Company.

Scarborough Night

A "SCARBOROUGH NIGHT" programme, consisting of a microphone tour of the resort's entertainment centres, will be broadcast in the Northern programme on August 24th. It will include "The Bouquets" Concert Party, from the Spa Theatre, Oscar Rabin and his Romany dance band, from Gala-land, and "The Vanities," from Arcadia. Victor Smythe and Richard North will act as compères.

Slavonic Dances

THE B.B.C. Northern Orchestra, conducted by Joseph Lewis, are to broadcast nine Slavonic dances, by Dvorak in the Northern programme on August 19th.

Bournemouth Municipal Orchestra

THE Bournemouth Municipal Orchestra, leader, Harold Fairhurst, conductor, Richard Austin, will broadcast from the Pavilion, Bournemouth, on August 20th, when the soloists will be Robert Easton (bass) and Percy Whitlock (organ). Percy Whitlock is well known to listeners as a composer of church organ and orchestral music, and as a recitalist both from Bournemouth and London. Robert Easton sang as a special soloist in the Coronation ceremony at Westminster Abbey.

Indian Queen's Prize Silver Band

ON Thursday, August 17th, a programme will be broadcast by the Indian Queen's Prize Silver Band. The strange name of "Indian Queen" is reputed to have been given to the village on account of the story that a young Indian queen was hidden there, many years ago, to escape her pursuers. The Band was founded in 1856, with a membership of five and a repertoire of three "tunes."

Amateurs at Sea

IN the "Seeing Life" series of talks, Richard F. N. Bass, of Nottingham, will contribute on August 18th (Midland Regional), an account of a sailing trip from Ireland to Brittany. Mr. Bass last broadcast on sand-yachting, in which he and his brother are expert. He has also had considerable experience of canoeing in Continental rivers.

SOLVE THIS!

PROBLEM No. 361

HINKS recently moved into a house fitted with an A.C. electric supply, so he decided to convert his three-valve battery receiver to A.C. mains operation. He took great care to fit such new parts as were necessary and decided to use a valve rectifier for the H.T. supply. On completion of the modification he tested the H.T. supply at sundry points and found all to be in order. On connecting the aerial and earth, however, he was very disgusted to find that no signals came through. He then applied current tests and found that the total consumption was apparently correct. The output and H.F. valves were drawing normal current but nothing was registered when the meter was placed in the anode circuit of the detector valve. On test all components in that circuit were found to be in order. What was wrong? Three books will be awarded for the first three correct solutions opened. Entries must be addressed 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. 361 in the top left-hand corner and must be posted to reach this office not later than the first post on Monday, August 21st, 1939.

Solution to Problem No. 360

The modifications would have been in order if Roberts had made quite sure about the 50 mfd. condenser. The one he secured was faulty; it provided a short circuit of the biasing resistance which resulted in the output valve consuming excessive current which, in turn, caused the remainder of the circuit to be starved.

The following three readers successfully solved Problem No. 359 and books have accordingly been forwarded to them:

R. Grant, South View, North Lopham, Diss, Norfolk; C. E. Knight-Clarke, 19, Countisbury Avenue, Bush Hill Park, Enfield; H. Bristo, 27, Bradley Fold Road, Ainsworth, Nr. Bolton, Lancs.

THE KESTREL SHORT-WAVE FOUR

All the Essential Details of the Wiring of the Three-valve Section and Full Information Concerning the Addition of the H.F. Stage are Given in This Article

By L. O. SPARKS

BEFORE proceeding with the addition of the fourth valve which is to form the H.F. stage of the circuit being described, a few words are necessary concerning the wiring of the three-valve section, shown in the issue of last week, and one or two points relating to the actual construction.

It is hoped that the more experienced constructors will appreciate that some of the suggestions which follow are not intended for them, but are included for the sake of the beginner and those less experienced.

In case it is not too clear on the chassis drawing, it should be noted that the Bulgin H.F. choke is actually supported off the chassis by means of small distance pieces slipped over the bolts before securing the component. The writer used some spare insulating heads off H.T. wander plugs, but small pieces of tubing or washers can be used if so desired.

Attention should also be paid to the fixing of the small pre-set condensers used for the aerial series condenser and that in the reaction circuit. Although reasonable clearance is provided, the constructor should see that all metal parts are quite clear of the chassis when the components are bolted in position. Similarly, it would be advisable to make quite sure that the small two-contact strip which is used to form anchoring points for the H.T. wiring is perfectly insulated from the fixing bolt and the chassis.

The one specified is, of course, quite safe, but as a similar item could be constructed from many parts which will be found in most spares boxes, the little word of warning given above is thought to be necessary.

When the time comes to bolt down all the components, it is best to leave off the tuning condenser, otherwise there is always the risk that it might be damaged during the manipulation of the chassis in the wiring operations.

The Wiring

The filament circuits can be wired right through even to the point of including the flexible leads for the accumulator. The next item should then be all the connections to the coil holder, the aerial and earth sockets, the series condenser, the reaction condenser and the screened lead for the detector anode, not forgetting to earth the metallised sleeving. One side of the grid condenser can be secured in position together with one side of the grid leak, the other side of which is then anchored under the positive filament terminal of the detector valveholder.

When the wiring of the components inside the chassis is commenced, pay particular attention to all wiring and components in any of the H.T. supplies. Do see that good connections are made and that all live parts are firm enough to prevent them from moving and coming in contact with the chassis or any other wiring at a lower potential.

The loudspeaker switching panel might at first appear a little confusing, but if the drawing given in the previous issue is examined, no trouble should be experienced.

Operation

In this particular circuit the reaction is produced by a combination of the usual condenser controlled reaction circuit, together with a variation in the operating conditions of the detector valve set up by varying the H.T. voltage applied to the screening grid. The latter can be controlled at will by the potentiometer which is fitted in the bottom left-hand corner of the panel.

With the coil in position, aerial, earth, batteries and 'phones connected, and with the reaction condenser at its minimum, turn the screen control potentiometer to a position just past half of its travel and, with the volume control somewhere near its maximum, listen for the rushing sound which usually indicates if a circuit is alive. If this effect is not audible, increase the capacity in the reaction circuit by turning the moving vanes of that condenser into the fixed section. This operation is best carried out with a long piece of thin wood shaped off at the end to fit into the slot provided. If all operating voltages are correct, the adjustment of the reaction condenser should soon produce audible sounds of the circuit being alive, and when that setting has been reached, additional regeneration will be possible by turning the screen potentiometer nearer maximum setting.

It must be remembered that the most sensitive point of a circuit of this type is just below the point of oscillation, and when searching for stations, it should be kept in this condition but not *actually oscillating*.

The degree of selectivity and, incidentally, complete reaction control, will be governed by the setting of the aerial series condenser, so for any given aerial arrangement experiments must be carried out with the aerial series condenser in and out of circuit to determine the most satisfactory arrangement.

Adding the H.F. Stage

An examination of Figs. 1 and 2 will show what modifications are necessary to add the fourth valve as an H.F. amplifier. Bearing in mind that the receiver is such that it can be built as a three or four-valver, very few alterations have to be made, but to avoid any possibilities of mistakes creeping in, careful checking is advisable when it

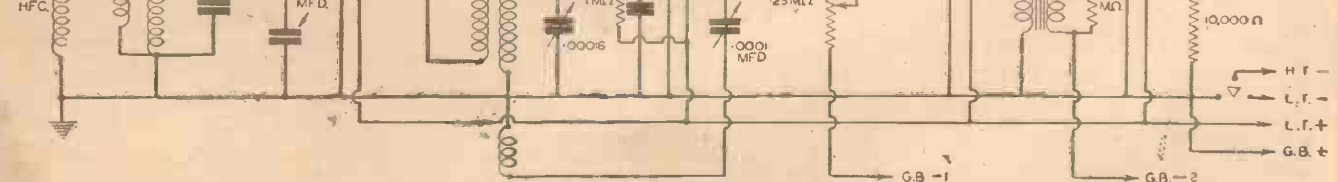


Fig. 1.—The theoretical circuit of the complete four valve receiver. It should be noted that the condenser across the aerial coil is, of course, a variable, and not a fixed as shown.

THE KESTREL SHORT-WAVE FOUR

(*Continued from previous page*)

comes to the point of wiring the extra components.

The change over can be made in a way to suit individual conditions. For example, when the receiver is in operation as a three-valver, the additional parts can be secured and fixed in position whenever desired, without putting the set out of service. When, however, all parts have been fixed, then it is advisable to make one complete job of the wiring alterations, thus reducing considerably the period when the set is off the air.

New Layout

An examination of the drawings, Fig. 2, shows that another four-pin valeholder, a six-pin coil holder and another .00016 mfd. variable condenser, of the same type as the previous one, have been added so far as the upper part of the chassis is concerned. Inside the chassis, another H.F. choke of the S.W. type, a rotary switch, two fixed resistances and another fixed condenser have been added. The manner in which these parts are embodied in the complete four-valve circuit is shown in Fig. 1, while Fig. 2 shows that the additional tuning condenser has been so located that it does not upset the symmetrical appearance of the panel.

The object of including the switch, H.F. choke and additional coil in the aerial circuit is to enable the H.F. valve to be used as a tuned or untuned stage. The switch transfers the aerial and the grid of the H.F. valve to the upper end of the H.F. choke when an untuned circuit is required, or switches them over to the grid circuit of the aerial coil when it is desired to tune the aerial input to the grid.

Space does not permit any discussion about the pros and cons of tuned or untuned H.F. stages in this article, but it is generally recognised that very little benefit can be obtained below 40 metres by the tuning of such circuits. With the method shown, therefore, it is possible to have the switch in the untuned position and carry out all station selection by the simple adjustment of the very fine mechanical band-spreading tuning control provided. Once the signal is received at its best, a flick of the switch will enable the H.F. stage to be tuned and greater efficiency and selectivity obtained according to the frequency of the transmission being received. It is obvious that this makes for simplified tuning, elimination of ganging troubles over the various wave-bands covered by the average short-wave receiver, and easy identification or dial logging by means of the main tuning dial.

Below 40 metres, appreciable gain is not likely to be experienced by tuning the H.F. stage, but this does not mean that the H.F. valve becomes merely a passenger. It serves a very useful purpose as a buffer between the aerial system and the grid circuit of the detector, and it will be found that this tends to increase efficiency, selectivity and general reaction control, to the extent of eliminating blind spots.

Wiring

Particular attention should be paid to the alteration of the wiring to the coil which was originally the aerial coil but which now becomes the H.F. transformer forming the coupling between the H.F. valve and the detector. Instead of the primary being connected to aerial and earth, it now has to be connected to the anode of the H.F. valve and the positive H.T. supply, so be sure to remove the original connections to this winding, particularly the earth side. The grid and reaction windings remain unaltered.

The connections from the aerial-input sockets now go to the primary winding on the new coil via the switch. The grid of the H.F. valve is also taken to one section of the switch to enable it to be connected to the new H.F. choke or the grid winding of the coil mentioned above.

At a later date it is hoped to publish a complete report of an evening's work with this receiver on the air when operated by a constructor having, shall we say, an average experience of short-wave work.

LIST OF COMPONENTS

(Three-valve Section)

One Eddystone type No. 1131, 160 m.mfd. var. condenser.
One Eddystone type No. 969 six-pin coilholder.
Two Eddystone type No. 949 four-pin valveholder.
One Eddystone type No. 950 five-pin valveholder.
Two J.B. .0001 mfd. var. condenser, type No. 2146.
One Bulgin H.F. choke, type No. H.F.3.
Fixed condensers—Dubilier: Type 4601/S: One .0001 mfd.; one .01 mfd. Type 4602/S: One .05 mfd. Type 4603/S: One 0.1 mfd. Type 4608/S.: One 0.5 mfd. Type 4609/S: One 1 mfd. Type 3016: Two 2 mfd.
One chassis (Peto-Scott), 14 x 9 x 3.
One panel (Peto-Scott), 14 x 9.
Fixed resistances—Erie. ½ Watt: One 1 meg., one 0.25 meg., one 10,000 ohm; one 0.1 meg., one 50,000 ohm, one 20,000 ohm, one 100,000 ohm, one 15,000 ohm, one 30,000 ohm.
Potentiometers—Erie: One 0.25 meg., one 50,000 ohm, with switch.
L.F. transformer. One Varley Niclet D.P.21.
L.S. panel (Clix).
A1, A2, and E socket strip (Clix).
Valves. Cossor 210 S.P.T., 210 H.L., and 220 -H.P.T.
Coils—Eddystone: 22-47 metre, No. 959.6Y.

Additional Parts for the H.F. Stage.

One Eddystone coil-holder, No. 969.
One Eddystone var. condenser, No. 1131, 160 m.mfd.
One Eddystone valveholder, No. 949, four-pin.
One Eddystone H.F. choke, No. 1010.
One Bulgin rotary switch, No. S.203.
One Erie ½ watt 100,000 ohm fixed resistance.
One Dubilier 0.1 condenser, type No. 4603/S.
One Eddystone coil, No. 959.6Y.

WIRING DIAGRAMS FOR THE COMPLETED KESTREL SHORT-WAVE FOUR

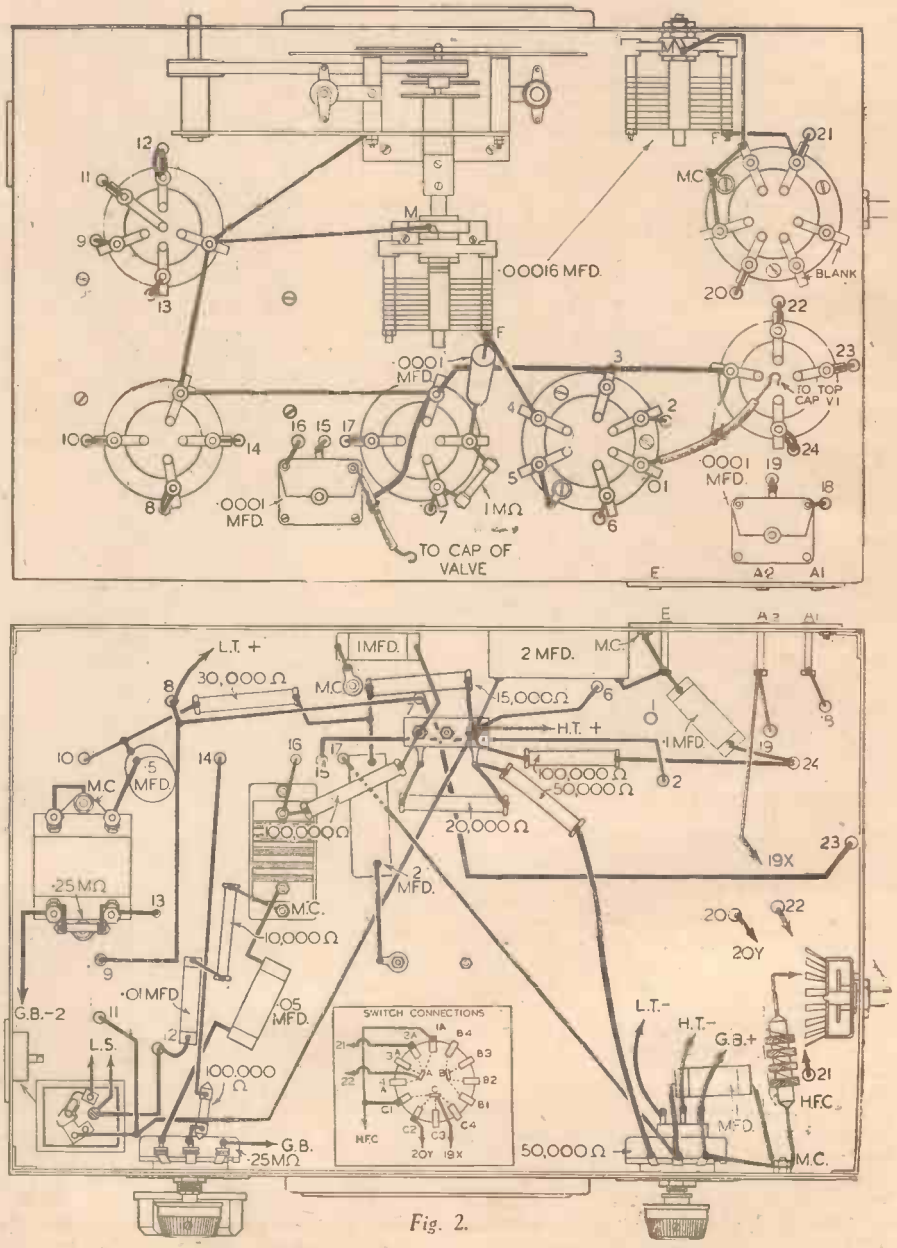


Fig. 2.

SHORT-WAVE SECTION

THE EXPERIMENTER ON SHORT WAVES

"The Experimenters" here give some hints to readers who propose to carry out experiments on short waves. A simple type of efficient circuit is also given.

WE have been asked why, in view of the immense popularity of the subject, we do not devote more of the space allotted to us to short-wave work. One reason is that a good deal of the material in our articles is applicable almost equally to broadcast bands and to short waves; another is that it is better that the many articles on this or any other subject should be written by different authors, each of whom has a different point of view and different hints and advice to offer. In spite of this—or because of it, for we have not devoted an article entirely to short waves for some time—we propose this week to show how the amateur can usefully and advantageously carry out some simple short-wave experiments.

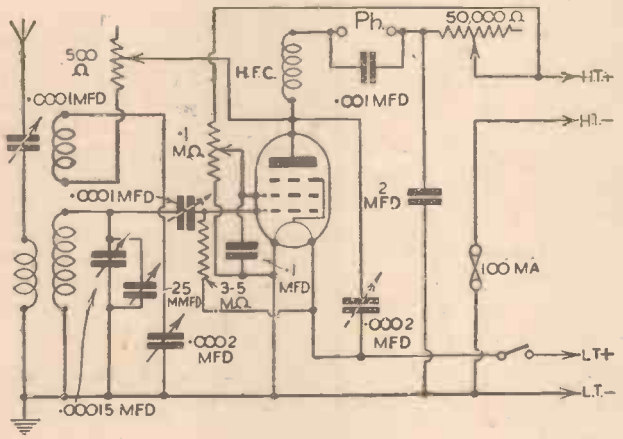


Fig. 1.—An excellent single-valve circuit for experimental use and general long-range reception.

The First Circuit

It should first be pointed out, however, that the particulars which we gave two weeks ago concerning a good experimental single-valve receiver are directly applicable to a short-wave set. Apart from the values of the components specified and the coil type, the circuit given can well be used for a really good short-waver. In Fig. 1 we show another circuit, similar in main details to that just referred to, which provides a good starting point for S.W. experiments. It will be seen that we have not shown the connections for meter jacks, but these can be included in exactly the same manner as for the previous single-valve outfits.

An H.F. pentode valve is shown, because we are very partial to this type of detector in a receiver which is to be as sensitive and simple as possible. A triode or S.G. valve could be used instead, when the circuit would be conventional, apart from the variable resistor in the reaction circuit; this is useful for obtaining the reaction characteristics best suited to any valve and any type of coil. In Fig. 1, however, we have also shown a 100,000-ohm potentiometer for feeding the screening grid of the valve. This provides a convenient means of supplying the most suitable voltage to the screening grid, and is an excellent form of vernier reaction control.

Vernier Reaction Control

The chief advantages of the potentiometer control it that is does not affect tuning to any extent, whereas slight alteration of reaction-condenser capacity can shift the tuning over a band of several kilocycles. If it is possible to determine settings of the reaction condenser, 500-ohm variable resistor and .0002-mfd. anode by-pass condenser with which the set can be maintained on the point of oscillation over the whole tuning range by adjustment of the potentiometer, it will be found that operation of the set is very easy. This is because signal strength can be varied while tuning without upsetting the tuning condenser.

It was explained a fortnight ago in connection with the one-valve broadcast set that really good reaction control is the most important factor in ensuring optimum results from a simple receiver. This is even more true where short waves are concerned for the sensivitivity of the receiver is increased a hundred-fold by bringing the detector valve right on to the "edge" of the oscillation point. Thus, if you build a receiver round the diagram given in Fig. 1 (the form of construction given for the broadcast receiver can well be followed) the first experiments should be in connection with reaction control. All of the experiments previously described can be tried with the present set, whilst it will pay to spend some time in becoming thoroughly familiar with the operation of the reaction-volume potentiometer.

Tuning

As those who are not new to S.W. work are fully aware, tuning is always critical, and therefore it is well worth while to employ a form of bandspread tuning. The simplest method is to connect a small-capacity (say 15 to 35 m.mfd.) slow-motion tuning condenser in parallel with the main .00015-mfd. condenser. Another method is to use one of the special mechanical bandspread condensers where the drive is geared very low and there are two tuning pointers—one traversing the complete scale ten or more times, while the other makes only a single "journey."

Another method which is worthy of trial although not recommended by us, is to take about six tappings from the grid winding of the coil, bring these out to a rotary switch and use only a single, low-capacity tuning condenser. Bandspread in one form or another is a practical necessity in a successful short-waver, for there are now so many stations that it is simply impossible to separate them with a single condenser of normal capacity.

Selectivity Problems

This brings us to the question of selectivity. It is often thought, because stations can be picked up and lost again by turning the tuning knob through a very small angle, that the selectivity problem simply does not exist on short waves. That is far from true, and the average S.W. receiver of simple type is certainly not selective enough for efficient use on the more crowded bands. The degree of selectivity can be increased to a considerable extent by careful setting

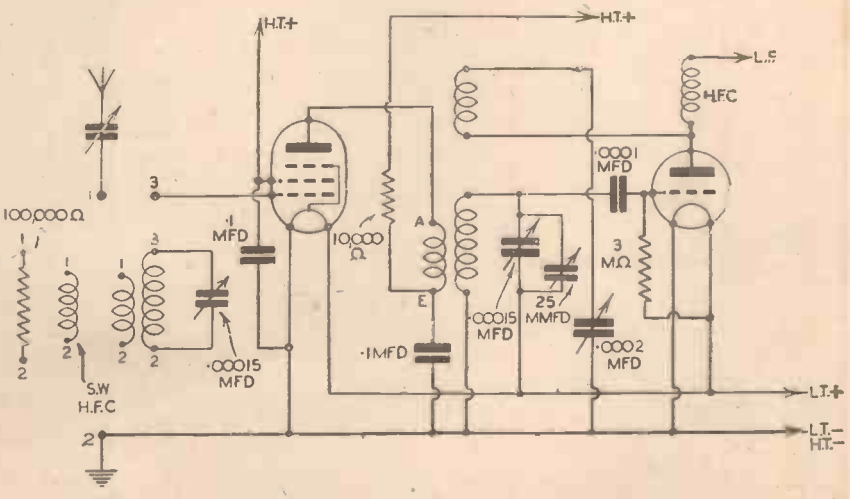


Fig. 2.—Connections for an H.F. amplifier with alternative aerial-circuit connections. Aperiodic tuning is provided by the resistor or H.F. choke, whilst a four-pin coil and variable condenser give better selectivity.

SHORT-WAVE SECTION

(*Continued from previous page*)

of the variable aerial series condenser and by the choice of the most suitable type of aerial (of which more anon), but it is certainly desirable to go further than this.

One good method is to employ a separate coil for the aerial winding, and to mount this in line with the axis of the grid and reaction windings in such a manner that it can be moved either in line with the main coil or round a pivot so that its coupling is varied. For experimental purposes it is often a good plan to use separate plug-in coils for aerial, grid, and reaction; the aerial and reaction windings can then be mounted on pivoted or movable holders so that different positions can easily be tried. Once the best settings have been found, the coils can be fixed. When building a finished receiver for reception, as opposed to experimenting, it is difficult to beat the four-pin or six-pin plug-in coil for convenience and general efficiency.

H.F. and Superhet Tuning

Should it be decided to carry out a few experiments in connection with selectivity, a good plan is to add a simple H.F. stage, as shown in Fig. 2. It will be seen that the H.F. valve feeds into a detector stage similar in essentials to that shown in Fig. 1, and that the aerial-grid tuner is used as an H.F. transformer. Note that the "earthy" ends of the aerial and grid windings are disconnected one from the other, to prevent short-circuiting the H.T.

Having rigged up an H.F. stage, you can try the effect of using a tuned aerial circuit by means of the two-winding coil and .00015-mfd. condenser shown, or an aperiodic circuit by connecting either an S.W. high-frequency choke or a 100,000-ohm non-inductive fixed resistor between aerial and earth. The connection numbers given are arbitrary and do not refer to any terminal numbers which might be on the coil. When using aperiodic coupling the circuit points marked 1 and 3 should be joined together.

The very same arrangement can be used with a superhet, applying the band-spread tuning system to the oscillator section of the frequency-changer valve only. When using a superhet the need for aerial tuning, as far as selectivity is concerned, is not usually as great as with a "straight" circuit.

Aerial Types

It always pays to spend time experimenting with aerial systems, for the aerial is of the utmost importance on short waves. We generally find that the simple doublet is the best of the easily-erected types, especially if the two halves are of the most suitable length—for most purposes a length of about 33ft. for each half is very satisfactory. A vertical aerial of the rod or wire type is also a very good "collector," partly because of its omni-directional properties, and because it can generally be erected very easily even in confined spaces. It is, however, worth while to experiment with the simpler types of directional aerial, some of which were described in the issue dated August 5th. In addition to giving improved signal strength they are helpful in assisting selectivity.

Screening

There is a good field for experiment in connection with screening. With an advanced superhet there is no doubt that complete screening is of decided advantage, but with the simple type of receiver we should not care to be dogmatic. A screened panel often helps to minimise hand-capacity effects, but over-screening might bring about a fall in sensitivity due to its damping effect. Simple screening can be tried by covering the front of the panel with copper, aluminium or tin foil, taking care that none of the "live" panel components is earthed by it, and that the screen is properly connected to the earth terminal of the set.

It is often found that a sufficient degree of screening is provided by arranging the wiring so that a number of earthed leads run close to and parallel to the panel or front of the set, and by earthing component mounting brackets and condenser drives. In any case, it is seldom satisfactory to use screened wire for connecting up, for it is inclined to introduce too many losses unless used very judiciously. If coils are to be screened, care should be taken that the screening is not too close.

Although we have stated that we prefer the H.F. pentode type of valve for regenerative detector, we suggest that experimenters should try other types. Most triodes are satisfactory, but the special detector type is generally to be preferred; on the other hand an "H" type sometimes proves better, whilst there are many who are in favour of the L.F. or small power valve. It is best to try as many patterns as are available and draw your own conclusions.

IMPORTANT BROADCASTS OF THE WEEK

NATIONAL (261.1 m. and 1,500 m.)
Wednesday, August 16th.—Up with the Curtain, a variety entertainment.
Thursday, August 17th.—Golden Rose, a musical romance, by Henrik Ege.
Friday, August 18th.—Concert Party programme.
Saturday, August 19th.—Paganini, a feature programme.

REGIONAL (342.1 m.)
Wednesday, August 16th.—Radio Drama from Europe—No. 2, Out of the Past, by Ingrid Norby.
Thursday, August 17th.—The Parnell Commission, a reconstruction of the judicial investigation of 1888-1889, by Denis Johnston.
Friday, August 18th.—Promenade Concert (Part 1), from the Queen's Hall.
Saturday, August 19th. — International Swimming (England v. Denmark).

MIDLAND (296.2 m.)
Wednesday, August 16th.—Shrewsbury Floral Fête; followed by an account of the Flower Show by C. H. Middleton.
Thursday, August 17th.—Festival Variety at Cheltenham.
Friday, August 18th.—Seeing Life—Amateurs at Sea; Ireland to Brittany, by R. F. N. Bass.
Saturday, August 19th.—Orchestral programme.

WEST OF ENGLAND (285.7 m.)
Wednesday, August 16th.—The Star Child, a play by Oscar Wilde.
Thursday, August 17th.—Band programme.
Friday, August 18th.—Humour in Music, orchestral programme.
Saturday, August 19th.—Instrumental and Vocal programme.

WELSH (373.1 m.)
Wednesday, August 16th.—An instrumental recital.
Thursday, August 17th.—Concert Party programme from the Amphitheatre, Rhyl.
Friday, August 18th.—We Came, We Saw . . .? A discussion on North Wales.

DARTMOUTH ROYAL CENTENARY REGATTA

THE Dartmouth Royal Centenary Regatta is one of the oldest fixtures in the West of England. It was inaugurated in 1834 and has continued without a break except during the period of the Great War. At first it was confined almost entirely to yachting, but it has since included rowing and many other events. This year, in addition to the usual features, a public luncheon, an official reception, a complimentary ball and a united open-air service are being held to celebrate the event. On August 24th (West and Regional) a commentary will be broadcast on the Kingswear Challenge Cup race and the United Universities Coronation Cup race.

Saturday, August 19th.—A Welsh Sea Rover, a talk.

NORTHERN (449.1 m.)
Wednesday, August 16th.—Once Upon a Time, fairy tale fantasies from Grimm, Andersen and others.
Thursday, August 17th.—Blackpool Hour, a tour of its places of entertainment.
Friday, August 18th.—Grasmere and Lake District Athletic Sports, a recorded story.
Saturday, August 19th.—What I Want to Know; a young amateur puts questions about outdoor photography.

SCOTTISH (391.1 m.)
Wednesday, August 16th.—Variety from the Summer Show at the Palladium Theatre, Edinburgh.
Thursday, August 17th.—Piping by Donald R. Stewart.
Friday, August 18th.—Charles the Third, a play by Donald Carswell.
Saturday, August 19th.—Feature, Seawanhaka Cup.

NORTHERN IRELAND (301.1 m.)
Wednesday, August 16th.—Variety from the Empire Theatre, Belfast.
Thursday, August 17th.—The Parnell Commission, a reconstruction by Denis Johnston.
Friday, August 18th.—Instrumental programme.
Saturday, August 18th.—Reading, or Recording of the Ulster Grand Prix.

ON YOUR WAVELENGTH

By Thermion

The Fourteenth Radio Show

THE stage is all set for the best wireless exhibition of the whole series of fourteen. I have told you in previous issues the reasons which will make it this. Now, the manufacturers and the exhibition organisers have done more than their utmost, if that is possible, to make it a really worth-while, packed with interest, outstanding exhibition. They have set the stage, the curtain is about to go up, the orchestra about to play the overture, and the actors about to occupy the stage. However well produced a play may be, its success must ultimately depend upon the audience. Actors loathe playing to Mr. and Mrs. Wood, which I believe is the professional term for empty seats. It is your turn to play your part. You do not have to pay heavy prices, nor be segregated according to the depth of your pocket to the stalls or to the gallery. There are low prices, no social distinctions, and all may see the play for a mere pittance. I have been privileged to watch this new conception of Radiolympia grow, I have seen it brought to fruition. I want the auditorium packed. I have already arranged to take parties on particular days because I feel that those who have visited previous shows may feel that it will be no different from the rest. I can assure every reader of this paper that it will be entirely different. It has been architecturally designed, there is adequate seating accommodation, better catering arrangements, a succession of sideshows each day, worth-while television on almost every stand, your radio personalities in the flesh, a fine stage show—these are but a few of the things which will make you want to go to Radiolympia more than once. I am an old hand at radio, but I am looking forward to this year's show with greater keenness than ever before. I shall see there most of the improvements which I have been advocating for many years on behalf of the very large following I fortunately possess. Will you, my readers, and my masters, help to fill that auditorium?

The New "Practical Wireless"

WITH this new conception of Radiolympia it is appropriate to announce a new PRACTICAL WIRELESS. The Editor tells me that next week this journal will appear in an attractive new cover, that it will contain many new features, and enter a fresh period of usefulness to the experimenter, the enthusiast, and the manufacturer.

An augmented staff of contributors will in future provide you with your weekly fare. The contributors you have liked in the past will continue to serve you. A well-built house looks all the better for a fresh coat of paint and a fresh internal scheme of decoration. The main structure remains as solid, notwithstanding the new coat of paint. Or, if you prefer another simile, a new rig-out of clothes has a remarkable tonic effect upon the system. Ask any lady!

I am as keenly anticipating the new PRACTICAL WIRELESS as you are. Do not forget, therefore, to obtain next week's greatly enlarged new PRACTICAL WIRELESS.

I Am Not Discovered!

I REFERRED in a recent issue to my Kew A. watch. A reader thinks that, because the Editor of this journal also owns a Kew A. watch, that he and I are the same person. That is flattering for me, or insulting to the Editor, whichever you prefer. We both have Kew watches. Let us leave it at that!

No Beards, Please!

I MUST have my annual growl about the Show. Will all those people who own beards please get them shaved off, or keep out of my way when the trumpets sound the fanfare indicating my appearance at the Show? I don't like beards on old men; on young ones they look absurd and insipid. I know that there are people who grow the hair down one side of the face in order to hide a scar, and I can understand that. By inference, therefore, a young man who grows a beard does so to hide a vacuous and vapid face. The time has gone when a beard on a person associated with radio suitably impressed a gaping public who knew little about radio. I want to see none of the strutting bearded youths on radio stands, aping the professor in his laboratory. Last year I counted fifteen people with beards at Radiolympia. I hope those fifteen will not be at the exhibition this year unless they have shaved.

He Stole a Microphone

I EXPECT you read in the paper the other day of the youth who went for an audition. Whilst he was awaiting his turn back-stage he saw a microphone and made off with it. Maybe he intended to do the public a good turn. He probably was an anti-crooner, and thought that it was high time that the public heard the crooner's voice as it really is. What a crooner would do without a microphone I do not know. I can imagine them herding together like sewer rats, and diving down the nearest drain.

What is Tripe?

E. H. M., of Bournemouth, wishes to dally words with me because I used the word tripe twice in a recent paragraph. Never having tasted that dish, which seems to be peculiar to the Mancunian, I am prepared to believe that it may be a delectable dish. However, in Fleet Street the term is used to describe a concatenation of words without meaning. The dictionary says that it is the paunch and smaller reticulum of cattle or sheep prepared for food. However, I was criticising poetry, and I mentioned the tautological drivel or tripe of Gray's and Tennyson's. This has produced some real poetry from our friend "Torch," who indites the following:

'Twas inventors and crooners once raised Thermion's ire,
But now it's the poets he brings under fire;
He says they are kidding, when twanging their lyre,
And proves, by examples, he's right!
Sloppy poems on Nelson, that "bit of a lad,"
And guff about Wellington, driving one mad;
And old Thomas Gray, in his churchyard so sad—
Why should they be painted so white?

Why should they indeed ? And why should we funk
At speaking the truth when we read all such bunk ?
We know that the most of it's insincere punk
Yet " Cultshaw " demands that we learn it !
Says Thermion, " Be hanged to that for a yarn,
If you don't know a line you won't suffer much harm ;
So when highbrows recite it, just answer them ' Garn ! '
And for something more useful let's spurn it."

Six Hundred Suggestions for Radiolympia Show

SIX HUNDRED people have suggested titles for the hour's Variety Show which the B.B.C. will broadcast from Radiolympia on the opening day of the Exhibition, August 23rd.

Mr. Jack Swinburne, Variety Producer at Radiolympia this year, has chosen what he considers is the best title submitted. If the B.B.C. approves, the title of the show will be " Radiolympia Calling ! "

For suggesting this title, Mr. Jerry Kenton, of South Close, St. Andrews, Slough, Bucks, will receive two front row seats for the opening night. He will also have an opportunity of meeting such famous stars as Jessie Matthews, Sonnie Hale, Nosmo King, and Scott and Whaley.

Sixty people suggested the title " Varadiolympia," which Jack Swinburne decided was too complicated. Other suggestions included " Radiolympics," " Stars on Paradio," " Variopia," " Varadio " and other variations. Two hundred and sixty-three suggestions came from the North of England, 337 from the South ; 90 came from the Manchester district.

To what other districts would you expect free seats to appeal ?

Conventions

THE Radio Manufacturers' Association, with the assistance of the trade and technical journals, the Dealer Organisations and other bodies, have organised a series of Conventions for Radiolympia, 1939.

These will take place in the Convention Hall, and many well-known speakers have promised to take part. All the meetings will afterwards be thrown open to discussion.

Admission to the Dealers' Convention is by dealer season ticket, or by special invitations to be obtained on request from the Secretary of the R.M.A.

The other meetings are by special invitation only.

Details, as far as available are as follows :—

Thursday, August 24th, 3.30 p.m. : Dealers' Television Convention. Chairman : Mr. J. H. Thomas, Chairman of the R.M.A. Other speakers : Dr. E. V. Appleton, Sir Stephen Tallents, Sir Noel Ashbridge, and Mr. C. O. Stanley, Chairman of the R.M.A. Television Development Sub-Committee.

Monday, August 28th, 3.30 p.m. : Popular Technical Convention on " British technical progress and some comparisons with America." Chairman : Major Peter (vice-president, R.M.A.). Speakers : Mr. T. E. Goldup, Mr. G. Parr, Mr. M. G. Scroggie.

" Quality Reproduction "

TUESDAY, August 29th, 3.30 p.m. : Popular Technical Convention on " Quality reproduction and what it means to-day." Speakers : P. G. A. H. Voigt, G. A. Darden, and A. V. Souter.

Wednesday, August 30th, 3.30 p.m. : Dealers' Convention on " Retail sales promotion." Chairman : Sir Cecil Graves. Speaker : Mr. Cecil Taylor. 6 p.m. : Popular Technical Convention on (1) " Short-wave tuning systems " (2) " Methods of band spreading " and (3) " Short-wave frequency-changers."

Thursday, August 31st, 3 p.m. : Dealers' Convention on " Wavelength changes." Chairman : Sir Herbert Morgan. Speaker : Sir Noel Ashbridge. 6 p.m. : Popular Technical Convention on " Television." Speakers : Owen Harries, and T. C. Macnamara.

Notes from the Test Bench

Screened Sleeving

SOME troubles seem to crop up in periods ; at the time of writing, the chief delight of many constructors appears to be the lack of attention to the ends of metallised sleeving and, believe it or not, actually connecting the sleeving to the conductor which normally passes through the centre of the insulating tubing inside the outer metal covering.

Such little pranks can prove quite expensive, apart from the fact that the circuit is likely to be struck dumb, while the tester or constructor will give vent to his feelings in a more expressive manner.

When metallised sleeving is used, and in a modern high-gain receiver it is employed quite a lot, do make sure that the ends are at least ⅜in. away from the ends of the insulating sleeving and that they are securely bound with thread, folded back on itself and soldered neatly, and covered with insulating tape or, better still, a short length of systoflex or valve rubber tubing such as used on most cycle tyres.

Unless you are asking for trouble, don't leave frayed ends on metallised sleeving.

S.G. Detectors

WHEN many constructors switch over for the first time from an ordinary triode to a screened grid detector, they are often very disappointed with the results. Under correct operating conditions an S.G. or H.F. pentode valve will give increased gain when used in the detector position, but where so many constructors slip up is in the value of applied H.T. voltage to the screen.

In the majority of cases quite a low voltage will give the best results, an average value being in the neighbourhood of 30 to 36 volts.

Speech Coil Centring

A COMMON fault with M.C. speakers which have been in use for a considerable period, is the movement of the speech coil, due generally to the loosening of the spider locking bolt. The speech coil may be recentred by means of small spacers placed at three points round the edge, thin card being cut in strips for the purpose. Special ivorine gauges are available for the purpose, but ordinary post card and similar material may be used for a makeshift, the coil being held in position whilst the lock-nut is tightened. Messrs. Holiday and Hemmerdinger can supply the special gauges, packed in a neat pocket envelope.

Practical Television

August 19th, 1939. Vol. 4. No. 165.

A Bold Outlook

THE N.A.T.K.E. is a body which held its annual conference in London recently, and embraces both theatrical and cinema employees. As was expected, one of the subjects to which a great deal of attention was given was television. To enable these delegates, who came from all parts of the British Isles, to secure first-hand knowledge of cinema television, the Baird Company arranged a short talk and technical lecture at the New Victoria Cinema, this being followed by half an hour's big screen demonstration. This created an enormous amount of interest, and enabled the 80 to 100 delegates to continue their discussions in the light of modern results. During his opening address to the main conference, the President voiced the opinion that the teacher of the future would not rely on dusty books of history to teach his pupils, but would use televised recordings of actual happenings of generations past so that the students would see what happened years ago. He then went on to say that the development of television was the most important issue affecting the entertainment industry to-day. Each branch would be influenced in a different way and it might lead to the subordination of one or other of the present-day forms of organised entertainment. On the other hand, it might strengthen them, and the entertainment world should not be too severely criticised if at the moment they inclined to the opinion that the public rediffusion of television was regarded more in the form of a menace. They intended, however, to prepare intelligently to adapt themselves to whatever the future had in store and by maintaining a bold outlook and a co-operative spirit there is no doubt that the pace of development could be kept abreast with.

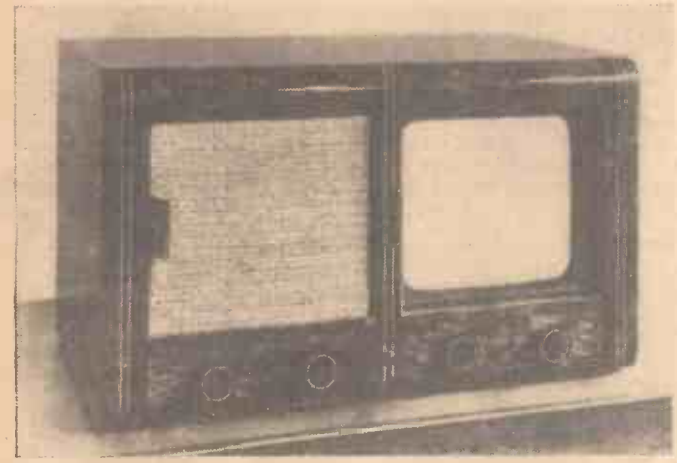


Fig. 1.—The People's Television Receiver shown for the first time at the Berlin Radio Show.

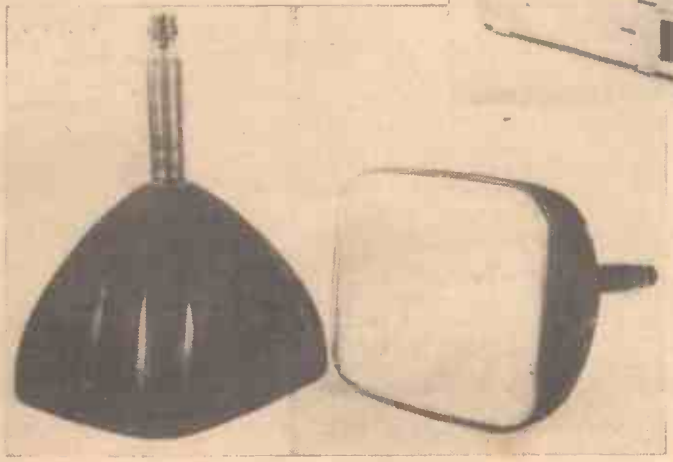
A Standard Television Receiver

AS was mentioned in a recent issue of this journal one of the most important events in connection with the Berlin Radio Show was the introduction of a standard television receiver. About a year ago a meeting of five firms, namely, Telefunken, Fernseh, Lœwe Radio, Lorenz and T.K.D., was arranged, under the auspices of the research department of the German Post Office, and by careful collaboration it was found possible to pool resources and solve the problems associated with a standard set both from the technical and commercial point of view. Unfortunately, this set will not be available to the public until the end of the year, the delay in mass production being attributed in some quarters to a lack of raw materials. The set is very compact (about 25in. by 14in. by 14in.) and has been produced as a table model, as shown in Fig. 1. When not being used for picture reception, the tube face is covered by a cloth grille, which is pulled across into position by the small handle seen on the central dividing fillet. Four controls are available—contrast, brightness, volume and tone—and only fifteen valves have been used. The price of the receiver is 650 R.M. (about £55 at the present rate of exchange) and this reduction in cost from the 1,000 R.M. level of previous sets is attributed to circuit simplification, centralisation of component production, and the introduction of special valves. There is no doubt that the point of greatest interest is the development of a short cathode-ray tube having a rectangular screen with an almost flat face. This is seen very clearly in Fig. 2, the tube bulb being covered with a thick striped shroud. It is 15in. long, and focusing, together with line, frame and deflection, is undertaken electro-magnetically. Full screen deflection is obtained with about 50 volts, while the anode volts are 6,000 at maximum brightness.

Technical Details

THE technical details of the set are quite interesting, and show a deviation in certain respects from the practices adopted in the modern British set. The compact chassis layout is revealed in Fig. 3, and it is stated that the black-and-white picture is freer from the distortion evident in the older forms of tubes used by the Germans. The input sensitivity for satisfactory pictures is of the order of 200 microvolts, while the number of amplifier stages is reduced to four, compared with the seven of last year. This is attributed to the use of high slope low capacity valves. The 6,000 volt high-tension supply for the tube anode is produced in the line scan transformer circuit by making use of the voltage peaks generated during the flyback periods. A special E.H.T. supply unit is therefore not required. The total mains consumption for picture and sound is 185 watts, while for sound alone this is reduced to 60 watts. A standard dipole television aerial has been developed for use with the set, and this is said to be suitable for normal wireless reception as well. Picture and sound can be switched on separately and externally the

(Continued overleaf)



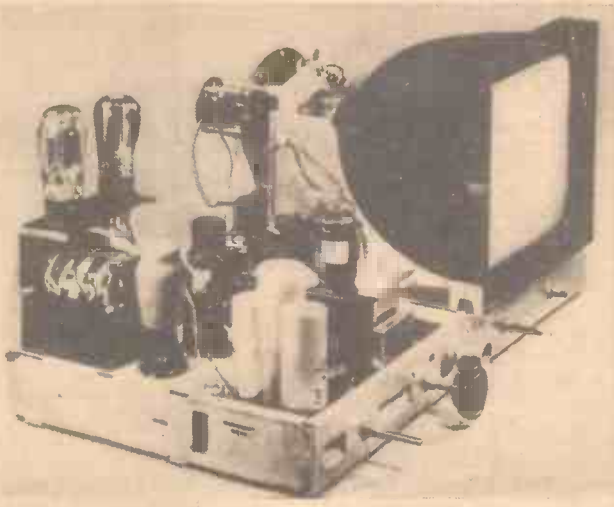


Fig. 2 (left).—The new type flat-faced short length C.R. tube used in Germany.

Fig. 3 (above).—The complete chassis assembly showing the compact layout of components.

PRACTICAL TELEVISION

(*Continued from previous page*).

set is smaller than many ordinary radio receivers. With a normal viewing distance of 6ft. it is hoped that the receiver will be generally available to the public so as to synchronise with the introduction of the proposed public service of television transmissions at the end of the year.

A Brighter Picture

IF a television set of a three- or four-year-old vintage was put side by side with a modern one, the most outstanding development observable would be in picture brightness. The flicker associated with a sequentially scanned 25 picture per second transmission was hardly observable on the old set, but with present models flicker would be most disconcerting to the eyes. The achievement of bright pictures can be attributed to a variety of causes such as higher accelerating anode voltages, better screen material, thinner screens, improved vacuum technique, and so on, but in order to secure even brighter pictures still, changes in tube design have been suggested. In one of these it is proposed to improve matters by making use of the principles of secondary emission. A cylindrical glass vessel has mounted at one end a uniform secondary emissive surface and this is scanned by an oblique beam of modulated electrons emerging from the normal electrode system. The modulated electron impact traced over this surface as a picture scan produces secondary emission so that there is a multiplication factor of the order of 8 to 10. The reinforced electron stream is now accelerated and focused on to a fluorescent screen at the remote end of the cylindrical bulb. Both the increased electron density and velocity of impact is evidenced as a very bright observable picture, and it is claimed that by using this method there is less distortion because of the flat screen on which the final picture is traced out.

TELEVIEWS

The Extension Riddle

IT is very gratifying to find that Mr. Ogilvie, the present Director-General of the B.B.C., is so keen on the development of television, and even went so far as to say that the louder the shout made by Manchester for television facilities, the better pleased he would be. What is very disturbing, however, is the apparent technical deadlock over the merits and demerits of a cable versus a radio link for joining up the provincial cities to the London station. Three or four months ago Colonel Angwin, then appointed to Engineer-in-Chief of the G.P.O., inferred that cable would be employed, and visualised from ten to twenty transmitters for the purpose of serving the whole population of Britain. He said that the coaxial cable was ready, and tests had shown that it was capable of handling the enormously high-frequencies present in a modern high-definition television picture. Mr. Ogilvie also said recently that the odds were that the existing cable between London and Birmingham would be employed, although the final decision would depend on the rental charges made by the Post Office. The saving of ether space is one strong argument put forward in favour of the cable, but annual rental charges would very soon total to the amount involved in building and installing radio links. The problem surely goes a little deeper than that, and in some quarters the suggestion is made that the desire of the G.P.O. to press forward cable claims is so as to maintain any television distribution network under their own jurisdiction and assure a substantial income. The micro-wave directional link stations can be built quite cheaply, and maintenance costs would be negligible, so that after the first charge the B.B.C. would not be called upon to make a heavy annual disbursement. The industry demands a quick solution to the problem, otherwise the home trade will become stagnant, and the anticipated overseas export trade in sets fail to materialise.

Colour Television

THE change from monochromatic pictures to colour in the film world has been a long and gradual one, and it is conceivable that a similar position will arise in the case of colour television. Irrespective of this, however, it is always interesting to record stages in this aspect of television's progress, for it is known that work is being undertaken in the various laboratories throughout the world. The most recent demonstration was that provided by Mr. Baird in his Sydenham laboratories on July 27th. Eleven years ago, colour television was first seen when Baird showed tiny flickering images at a British Association meeting, while last year 12ft. colour pictures were shown at the Dominion Theatre, when a rather heavy and complex mechanical apparatus served as the receiving equipment. In the more recent receiver, however, a cathode-ray tube was used for the first time as the modulated light source. It is well known that by combining the three primary colours of blue, green and red, it is possible to reproduce the many different colours visible to the human eye. Instead of using these three separately, however, the apparatus works with blue/green and orange/red filters.

The opening ceremony of the German Radio Show being televised for the first time, at the Funkturm Exhibition Halls in Berlin.

Apparatus Used

A MECHANICAL form of transmitter is employed, this being situated at the South Tower of the Crystal Palace, and the transmitted signals are transferred by an ultra-short-wave radio link. In this transmitter is a drum with 34 mirrors, and this revolves at 6,000 r.p.m. in conjunction with a slotted colour filter disc revolving at 500 r.p.m. An arc lamp beam is focused on to a fixed slot before which the disc revolves, and the resulting moving light area is focused by a lens on to the mirror facets where it is reflected so as to scan the object or person being televised. The light reflected from the object during the whole period of the spot's traversal is made to activate the cathode surfaces of photo-electric cells, made sensitive to the whole colour spectrum as far as is possible. This actual scanning differs from the simple interlace method now used by the B.B.C., for the primary scan of 34 lines is interlaced three times to give a total picture definition of 102 lines (vertical scanning) at a fundamental picture speed of 16⅔rds per second. Since there are six revolutions of the mirror drum for each individual picture, this corresponds to 6 x 34 = 204 lines, with the result that the observed picture has 102 blue/green lines, and 102 orange/red lines superimposed on each other at each complete picture traversal. At the receiving end, the picture signal modulation is applied to a projection-type cathode-ray tube, and although the picture on the fluorescing screen face is black and white, a disc having identical colour filters to that at the transmitting end, and synchronised with it, is revolved in front of the tube face. The result of this is a colour picture back projected on to a remote screen between two to three feet wide. Due to the use of a mechanical transmitter, and vertical scanning, the lines of the picture are visible at about 12ft. from the screen, while there is an occasional hunt noticeable in the picture. In spite of this, however, the results shown are good, and mark an important stage in the progress of colour television processes. Several suggestions have been made for domestic colour television receivers, and interesting developments are on the way.

A PAGE OF PRACTICAL HINTS

SUBMIT YOUR IDEA

READERS WRINKLES

THE HALF-GUINEA PAGE

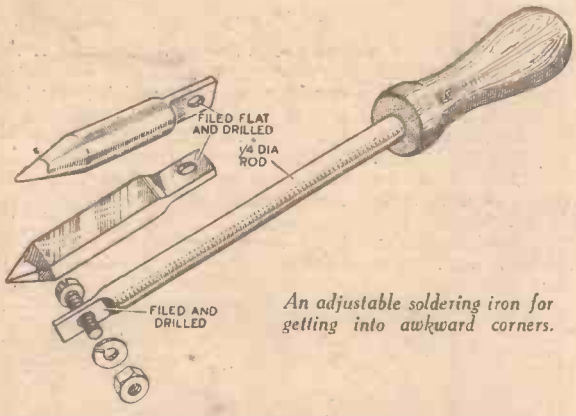
An Adjustable Soldering Iron

IT is sometimes very awkward when soldering connections in a set to get into awkward corners, so I devised this soldering iron to facilitate matters.

It consists of a wooden handle fitted on to a metal rod, one end of which is flattened and drilled as shown.

The bits are made of copper, one being round and the other flat. They are fastened to the rod by a nut, bolt, and split washer.

When soldering the bit can be turned to any angle required.—LESLIE MORGAN (Churchdown, Nr. Glos).



An adjustable soldering iron for getting into awkward corners.

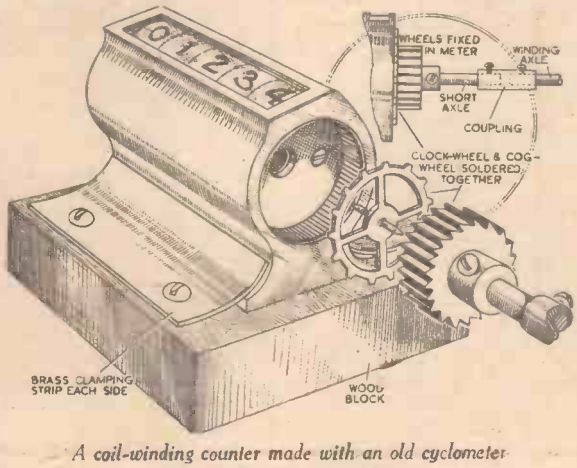
A Coil-winding Counter

FINDING myself with an old cyclometer, from which the "star" had been broken, I thought I would convert it into a recorder for counting the turns while winding coils and transformers. I unscrewed the plate from the end opposite that of the "star," and removed the double cog-wheel, the small brass concentric wheel, and the spindle running through the meter.

The escapement wheel from an old clock was filed down a little so that it would fit tightly into the end ring of figures in the meter; before fixing it in permanently, however, the clock-wheel was soldered to the face of a small brass cog-wheel.

A short axle, about 1in. long, was fixed to the cog-wheel and this was connected to the main winding spindle by a brass coupling.

The counter was fixed to a wooden block of suitable height by means of two brass strips, so that when it was necessary to remove the counter, the axle coupling and the brass clamps had only to be slackened, and the counter drawn away from the winding spindle. It is pointed out that the clock-wheel should *not* be soldered to the internal ring in the counter.—JAMES HUTCHINGS (Tufnell Park).



A coil-winding counter made with an old cyclometer

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.

SPECIAL NOTICE

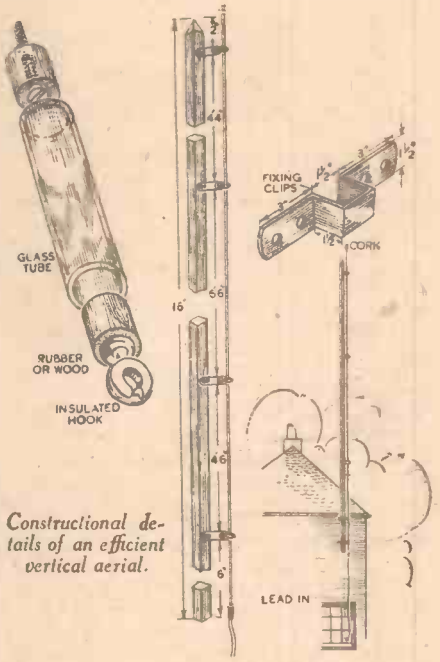
All wrinkles in future must be accompanied by the coupon cut from page 546.

A Vertical Aerial

AFTER reading several times of the advantages, as far as short waves are concerned, of the vertical aerial, I decided to make one for my own use. I obtained an 18-ft. length of D.C.C. copper wire 3/16in. in diameter, and a piece of scrap wood, 16ft. by 1½in. by 1½in.

First of all I made four stand-off insulators, as shown in the sketch. They are 3in. long and ¾in. in diameter, and in each end I placed a rubber plug, of the internal diameter of the glass tube, and ½in. long. In one plug I screwed a small insulating hook, and the other was fixed to the pole 2in. from the top, the other three being fixed at various distances apart, as indicated in the sketch.

I then assembled the insulators complete and fixed the wire into the hooks, making sure it was a good fit. If the wire is at all loose small wooden wedges can be used to make it secure.



Constructional details of an efficient vertical aerial.

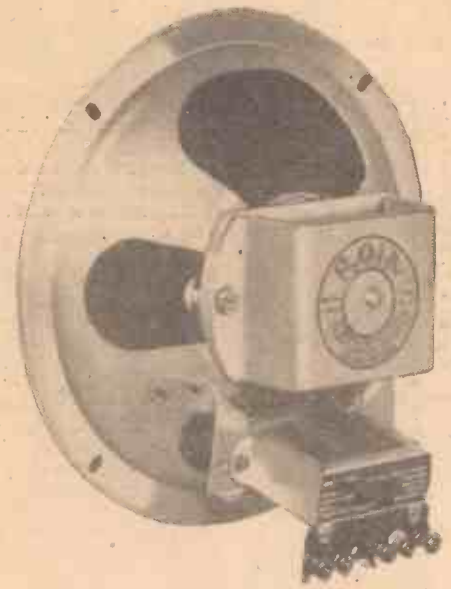
Before finally assembling the aerial I soldered the lead-in to the bottom end, and covered the joint with Empire tape, fixing it with a little Chatterton's Compound. The finished aerial and its supporting mast is fixed to the wall at the highest point I could reach. To do this I made two steel clips from ⅛in. strip material, as shown in the sketch. Having fitted up the aerial securely the lead-in was then taken down to the lead-in tube.

The finished job is very stable and I was surprised at the reception I obtained.—JOHN G. JACKSON (Rugby).

RADIOLYMPIA—A

Brief Details of Some of t at the Radio Show wh

EACH post is now bringing fresh batches of leaflets, photographs, and beautifully illustrated brochures from the various manufacturers who are exhibiting at Radiolympia. As fast as the material comes to hand, it is given a most careful examination and a selection is made of representative items for inclusion in these pages. As much as we would like to give mention to all the notable features embodied in the new season's products, the limitation of space renders this impossible, so it is hoped that the details here given, and in the following issue, will be sufficient to arouse the reader's interest to the extent of making him want to examine the actual models at Olympia.



One of the new season's Rola P.M. speakers, Model 8Z 6.5.

A careful analysis of the details received, reveals very definitely that television has made amazing progress since the last show, and that it will undoubtedly prove one of the main attractions.

Another development which strikes us as being well to the fore is that of the portable and midget receiver, while, of course, push-button tuning has now had sufficient time to consolidate its position in the public's favour, as will be evident by the number of sets incorporating this feature.

Television

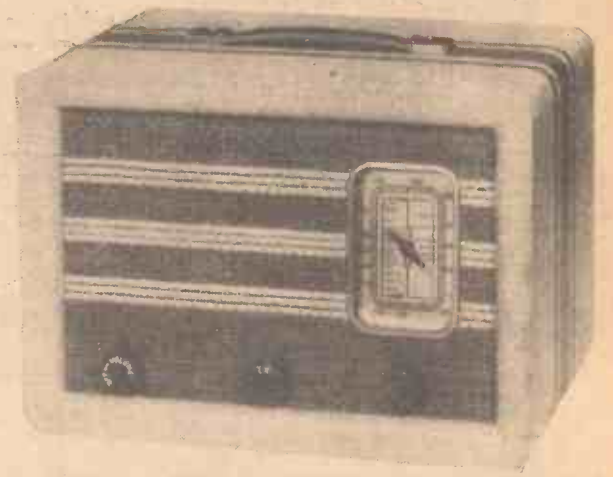
Even a brief examination of the television receivers shown in these pages will give a very good idea of the general improvement as regards appearance of the complete installation.

No longer is the apparatus housed in rather bulky cabinets; reduction in the overall size of the cathode-ray tube and other developments have rendered it possible for them to be made in more compact forms, which allows them to harmonise more readily with modern furnishing. Unlike the early days of radio, when developments were more or less strikingly obvious in an outward sense, the progress of the television receiver, and associated radio apparatus, is now more concerned with circuit details relating to increased efficiency and reliability. For example, the ease of operation of this season's television receivers is a notable feature, while the general detail and brilliancy of the picture is, most certainly, a great improvement over what the viewers saw at Radiolympia last year.

An item which will have a very wide appeal is the reduction in cost of such apparatus, and it is now possible to obtain a thoroughly reliable installation at a cost very little in advance of a good radio receiver. Very attractive table models will be in evidence which are not only designed for television reception, but also for the reception of ordinary broadcast programmes on short, medium, and long waves.

A Decca 4-valve superhet table radiogram for A.C. mains.

Two of the latest portables—an Ekco (left) and a Decca. The former is an 8-stage battery model, and the latter a 4-valve superhet battery model.



Portables

At last the designers and manufacturers are producing portable receivers in the true sense of the word. Gone are the cumbersome cases which housed apparatus and batteries which, together approached the 40 or 50 lb. mark, as regards weight. In their place we now find most compact and light receivers well under 12 in. in their greatest dimension.

In spite of the fact that weight and size have been reduced so considerably, the efficiency of the modern portable has risen beyond all early expectations, this being, no doubt, due to the fact that the majority of them now incorporate a superhet receiver.

The development of the valves which only require a dry battery for their filament heating, has made it possible for designers to eliminate the L.T. accumulator, and thus

DVANCE DETAILS

the Exhibits you will See ich Opens Next Week

still further reduce the weight. With quite a modest dry battery designed for the filaments of these valves, it is possible to obtain an average of 240 working hours before a battery replacement is necessary. Moving-coil speakers have now become a standard fitting in the majority of portables which, together with the improvement in circuit design, allows a most satisfactory tonal response to be obtained. Considerable attention has also been given to the location of the tuning control and the provision of a sensible carrying handle

A new H.M.V. television receiver giving a picture size of 11⅝ in. by 9⅜ in.

which does not detract from the general appearance of the receiver.

Apart from the outdoor appeal of a receiver of this type, it cannot be denied that they form a most useful asset in the home for use as a second receiver, and particularly in cases of emergency.

Radiograms

It would appear from many of the manufacturers' details that considerable interest is being shown again in radiogramophones, and some striking examples of the developments in this section will be on show on many of the stands.

Whether it is due to the limited space of many of the modern homes, or whether it is due to the cost of manufacture one cannot say, but it is interesting to note that the general development seems to be to make the modern radiogram much smaller in size than its predecessors; in fact, very compact table models will be available for those who have to consider space.

For those who wish to have a really complete installation, it should be noted that several models will be available incorporating a radio receiver, turntable and pick-up equipment, together with the sound and television apparatus for the reception of the programmes from Alexandra Palace.

Speakers

It would appear that moving-coil loudspeakers are approaching the point where little can be done as regards improving their over-all efficiency, as many of the manufacturers are continuing their existing lines, and only introducing one or two new items.

The position can readily be appreciated when it is realised to what degree of perfection the modern moving-coil speaker has reached, therefore, the main improvements which will be visible will deal with actual construction, and methods of protecting the cone and speech coil from damage by dust, atmosphere, and careless handling.

Baird's new television receiver, Model T.25, giving a picture size of 10in. by 8in.

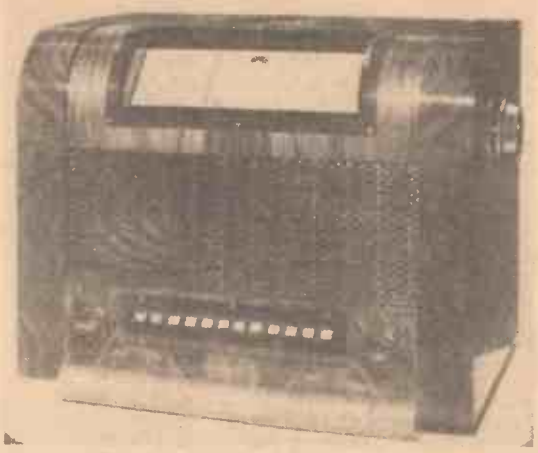
The range of extension speakers available will, no doubt, attract attention by virtue of their compactness and cabinet design, and as the majority of the receivers now incorporate sockets for easy connection of an external speaker, it is becoming increasingly popular to wire the house for use of extension speakers at many points.

Components

It is rather unfortunate that we are not able to illustrate many components in this issue, but this must not be taken as a sign that such manufacturers have not been doing their share towards the development of the constructor's hobby.

From the lists to hand it is evident that

(*Continued on page 549*)



This new H.M.V. push-button all-wave receiver incorporates all the latest refinements, and has an output of 10 watts.

This Ferranti model T9 all-wave televisor also has a picture size of 10in. by 8in.

Criticism, Chat and Comment

Listening to the Proms.

Our Music Critic, Mr. Maurice Reeve, Discusses the Week's Musical Programme at Queen's Hall

THE programme which is most likely to appeal to my readers this week is, I think, Saturday's. There is an excellent menu down, ranging from Glazounow's pianoforte concerto, to one of the very greatest works in any orchestra's repertoire—Elgar's "Enigma" variations.

Each of the variations in this glorious composition portrays one of the composer's friends, and bears at its head either the friend's name, initials or nom-de-plume, such as "Nimrod." The "Enigma" is supposed to lie in the master having told a friend that "another tune" could be played with the theme which forms the basis of the work—in counterpoint. "A famous tune," he called it. Much research having failed to produce this satisfactory combination, it is now assumed that the "missing" theme is life—the enigma of life. Don't miss this superb work. So long as an Englishman can write music like "Enigma" and 2,000 people pack Queen's Hall to listen to it, then so long can we rebut the charge of being an unmusical nation.

The Glazounow concerto is superficial music by comparison, but very brilliant and attractive. It only contains two movements, the second being the unusual one, for a concerto, of a theme and variations. Don't compare them with the "Enigma" set—it wouldn't be fair! They are bound to be "done proud" by that very efficient and well-established pianist, Pouishnoff. Another of the most famous of modern compositions is also down—Debussy's "The Afternoon of a Fawn," which displays not only its composer's gifts, but the whole of French culture, at its very best. Neither of these works is modern, really. Both are just about 40 years old. Unfortunately there is no one writing music to-day half as great as either Elgar or Debussy—Sibelius having seemingly dried up. The programme opens with Weber's ever-popular Oberon overture and closes with the stirring march by Berlioz, from "The Damnation of Faust," which used to be played at the old Austrian Imperial Court.

Wagner

Monday's Wagner programme contains excerpts from "The Flying Dutchman," "Parsifal," "Lohengrin," "Mastersingers," "Rheingold" and "Twilight of the Gods." Klingsor's Magic Garden and Flower-Maiden's Scene, from "Parsifal," is one of my favourites out of all Wagner.

Tuesday is Haydn and Mozart. The eighteenth century personified — powdered wigs and patches, masques and fans. And, certainly, no music more typifies its age than this. There is an aria from "The Seraglio," sung by Noel Eadie, and one from "The Creation," sung by Norman Walker. Brosa and Bernard Shore are doing Mozart's Symphony Concertante for violin and viola; also the first performance, later on in the evening, of another work in the same form by Delannoy—presumably French, but unknown to me. The symphonies are Haydn's in B flat, No. 102, and Mozart's No. 35—the Haffner.

Wednesday is a Brahms night. I don't intend to recommend it to you. Those who are not yet acquainted with this formidable giant must please themselves whether they will experiment on him to-night. Few musicians have provoked fiercer controversy. His admirers swear he is infinitely greater than Beethoven. Whilst his detractors . . . ! The fact is he is one of the great composers, and the Promenade will be packed with Brahms worshippers. There are three of his major works on the bill: the variations on a theme of Haydn, the third symphony, and the violin concerto. The concerto is a magnificent work, and all who enjoy the finest fiddle playing should not miss hearing Telmyani in this to-night. Brahms can be dull and academic at times, but his pages have some beautiful melodies and scores of those Hungarian dance rhythms which are so attractive when elegantly handled.

Mixed Fare

On Thursday there is a very mixed hotch-potch. After one of Strauss' symphonic poems and an aria from Mozart's "Magic Flute," sung by Heddle Nash, the evergreen Moiseiwitsch is playing the very rarely heard first concerto of Rachmaninov. A new nocturne by Honneger should be interesting, and possibly amusing, and the symphony is our own Vaughan Williams' new No. 4 in F minor. Personally, I much prefer his early "London," a work which has always had a strong hold on my affections, with its taxi horn, Big Ben and Cherry Ripe. I find this one strident and harsh, but very original and characteristic. Evidently the "London" is being given a rest after having been a great favourite of Sir Henry's and his audiences for many years.

And so we arrive once more at the Friday Beethoven night. Ernest Newman once characteristically remarked that Beethoven wrote supremely great symphonies when he gave them odd numbers. This is very largely, though no doubt unintentionally, true. This evening we have two of the even numbered, the second and the fourth. So that after the "King Stephen" overture, and some of the Prometheus ballet music, we can say that the chief item is the violin concerto, being played by that great English master, Albert Sammons. Comparisons are always odious, but this truism has never prevented the Beethovenites and the Brahmsites throwing each one's violin concerto into the ring to fight it out. Both works have similarities at more than one point, including the identical key of D major. Although I can state with authority that most violinists plump for the Beethoven, as do most musicians other than fiddlers, the two taken together are without doubt the two finest examples of violin music. Listen to both if you can, and do some comparing for yourself. There is one thing certain. Beethoven wrote his work between fifty and sixty years before Brahms started his; in fact, Brahms wasn't born then. So if one was influenced by the other, we know which way round it was.

The fourth symphony and the concerto are contemporary works, and were written when Beethoven's genius was overflowing with masterpieces as fast as he could put them down on paper. The adagio of the symphony is one of his loveliest movements, whilst the finale is a veritable "perpetuum mobile." The concerto is an even greater work.

PROGRAMME NOTES

"Humour in Music"

KENNETH ELLIS (bass), the B.B.C. West of England Singers, and the Clifton Light Orchestra will broadcast on Friday, August 18th, a programme under the title "Humour in Music." The programme will be conducted by Reginald Redman.

A Leicester Choir

LEICESTER ORIANA CHOIR, which has won over forty first prizes at festivals in the last twenty-two years, will be conducted by Aubrey Bland in a programme of part-songs from the Midland Regional on August 23rd. It gave the first provincial performance of Constant Lambert's "Rio Grande" in 1932, the composer conducting. Between the groups of songs, Dorothy Dandison, of Nottingham, will play 'cello solos.

English Folk Music

USING old folk tunes as a basis, Gerrard Williams has written a series of compositions which have already been broadcast. Another of these programmes will be heard by Midland and Regional listeners on August 24th, including the story of tunes and songs used and some notes on how they were collected. Eric Warr will conduct the B.B.C. Midland Singers, and Vida Harford will be the vocalist. Miss Harford was the first girl student to conduct opera at the Royal College of Music. In Dresden she played Regan in a burlesque of "King Lear" by her teacher, Herr Strobach. One of her recent broadcasts included two songs in Norwegian by Edward Grieg.

Modern French Songs

CLAIRE CROIZA, distinguished French soprano, will broadcast a recital of modern French songs by Ravel and Roussel on August 26th (National). She has for many years been considered one of the finest interpreters of modern French song.

TELEVISION IN PUBLIC

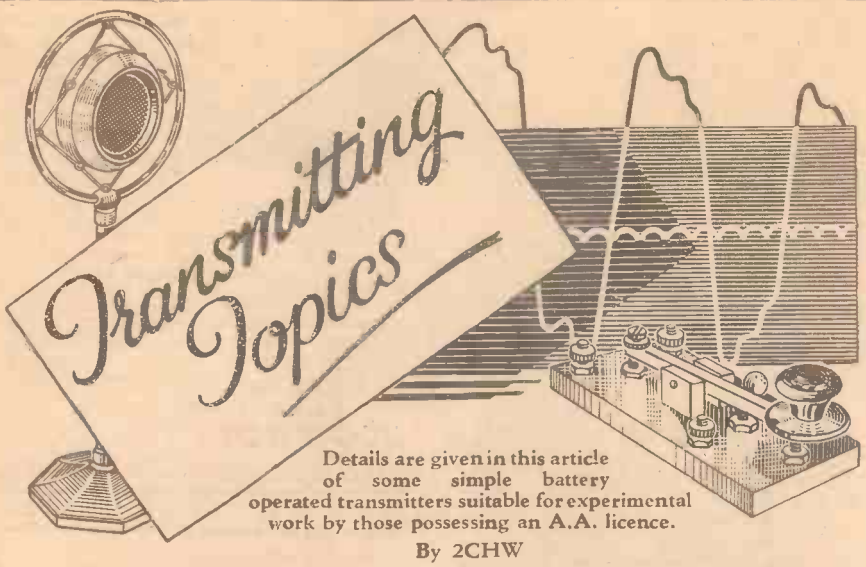
A New Cinema Development

IT is generally accepted that the storage type television camera as exemplified by the iconoscope, or emitron, is an ingenious device which has produced television results in advance of the most sanguine expectations of the original inventors. In its conventional form there are admitted defects which become all too apparent on certain forms of transmission. There is not a true linear relationship between the light input to the signal mosaic and the final output current which represents the television signal. Again, as has been mentioned before in these columns, the effects of secondary emission cause an uneven shading which has to be corrected manually, but even so, the spurious signal is visible when the correction is not applied with especial care. To maintain a sharply focused beam of scanning electrons over the obliquely mounted signal plate, the electron velocity is high, with the result that there is a large secondary emission taking place. Some of these secondary electrons do not reach the collecting anode so as to constitute the television signal, but redistribute themselves over the mosaic surface. This redistribution is not uniform owing to potential differences over the mosaic, and also because of non-uniformity of the secondary emission factor. It is this rather random effect which gives rise to the unevenness in background shading which is so often complained about in certain televised transmissions. From reports which have appeared recently, the R.C.A. have been investigating these special points, and the result is the development of a new form of television camera. Apart from its ingenious working characteristics the most important feature revealed is that low velocity electron scanning replaces the high velocity methods of the original iconoscope developed by Zworykin. The uneven shading brought about by the secondary emission of electrons at the signal plate is therefore eliminated, while it is also claimed that there is a true linear relationship between output current and input light. There are inherent difficulties with this new device, which has been named the Orthicon, but these are being overcome in turn during the experimental development of the tube. For example, a low velocity electron scanning beam can be subject to very severe defocusing unless it makes a perpendicular impact on the mosaic signal plate. Again, it is very subject to the effects of stray electric or magnetic fields.

Public Television Entertainment

AN increasing number of cafés and public-houses are installing television receiving sets for the entertainment of their patrons while partaking of refreshments. There is no doubt that this is a very sound policy, for it brings home to the masses in no uncertain manner how good are the programmes, and helps to make everyone television minded so that ultimately sets are installed in the home. The whole position is being very carefully watched by licensing authorities, and the C.E.A. state that the arguments which they have advanced against the showing of films in places other than cinemas should apply with equal force in the cases of television. The point of view is advanced that while there may be no danger from fire, a panic might be caused if anything went wrong. It is for this reason that consideration is being given to the drawing up of regulations which can apply to public television displays. The big-screen installations in cinemas already conform to the existing regulations of local authorities, so they are in no way affected

Girls wearing the latest in bathing dresses and beach wraps were televised recently at the Roehampton Club's swimming pool. In the illustration, Miss Jasmine Bligh, the television commentator, is seen in a red beach suit while describing the various fashions.



Details are given in this article of some simple battery operated transmitters suitable for experimental work by those possessing an A.A. licence.

By 2CHW

IN spite of the fact that the 2½-watt battery-operated transmitter, originally described in the issue for Dec. 26th, 1936, is a most satisfactory transmitter of its type, it cannot be denied that it does not lend itself too readily to certain experimental work.

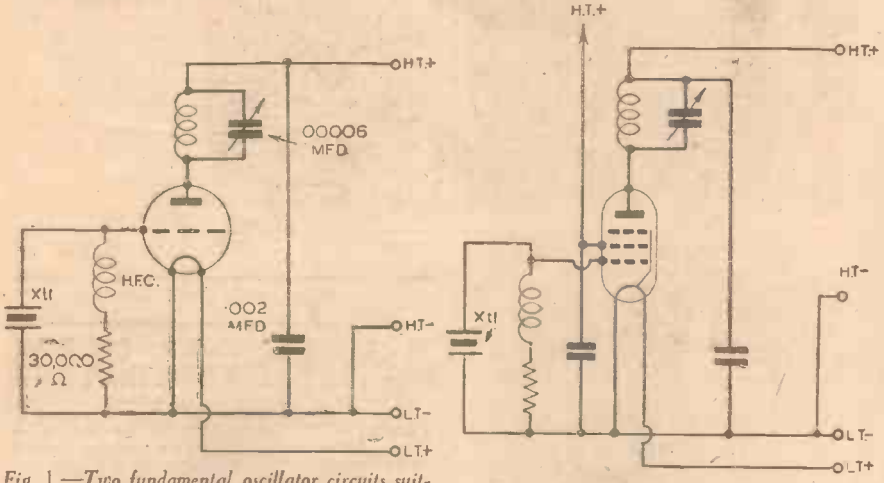


Fig. 1.—Two fundamental oscillator circuits suitable for general experimental use.

This does not reflect on the efficiency of the design; it is simply due to the fact that the specified valve, a Class B output valve, limits one's activities as regards circuit manipulation and wiring. For example, owing to it consisting of two triodes in a single bulb, it is not an easy matter to carry out experiments with, say, frequency doubling, P.A. work or various forms of modulation.

When considering power amplification, in the transmitting sense, it is very essential to prevent any form of feed-back between the grid and anode circuits of the P.A., and between the P.A. and the oscillator circuits. The same applies, in a slightly lesser sense, to frequency doubling while, as regards modulation, one is prevented from trying the very popular arrangement known as "suppressor-grid modulation."

These defects, if they can be called such, bearing in mind the general application of the 2½-watter, can, of course, be overcome by using separate valves for the individual sections according to requirements.

Suitable Alternatives

A standard triode or pentode of the L.F. type can be used for most positions; the larger the valve, i.e., the greater its rated anode dissipation, the greater will be the output, but always remember that an increase in power will also result in an increased current drain on the H.T. supply.

Those who obtain this from an efficient A.C. rectifying circuit will not be so seriously troubled by such demands, but to those who have to rely on dry H.T. batteries, the item becomes one of great importance.

The question of power also raises the oft debated point about, "is a high output necessary?" Personally, I think that far more fun can be obtained from a low-powered rig, when one is in the A.A. class—and, for that matter, in the "full" licence grade—by going all out to see just what can be done with a minimum of power. When one has unlimited watts to play with, one is apt to get very careless over matters which, in a low-powered rig, would have to be studied most carefully if the maximum output was to be obtained.

With all due respect to the "big fellows" it is generally admitted that skill is definitely called for to achieve *something* with only a wattage of from one to, say, five watts.

In view of this, let the "little fellow" take fresh heart and appreciate that the privileges granted with an A.A. licence are something to be valued and provide the means whereby some very interesting and instructional work can be undertaken.

The Oscillator

Two standard fundamental crystal-controlled oscillators are shown in Fig. 1. They are really self-explanatory, one being a triode arrangement while the other makes use of a pentode. The former is quite satisfactory on low power, but care must be taken with the layout of the components to prevent any interaction between the grid and anode circuits externally. The pentode circuit, shown on the right of the diagram, has certain features in its favour. It is more consistent, it causes less strain and heating to be imposed on the crystal and, for given operating conditions, it can produce a greater output than the triode.

Both of these circuits are quite satisfactory for experiments relating to oscillator behaviour, L/C ratios, output efficiency and numerous other tests. All the components can be mounted on quite a small chassis or baseboard and, as the number of components required is very small, the expenditure is not heavy.

Adding a Frequency Doubler

The time is bound to come when experi-

(*Continued on facing page*)

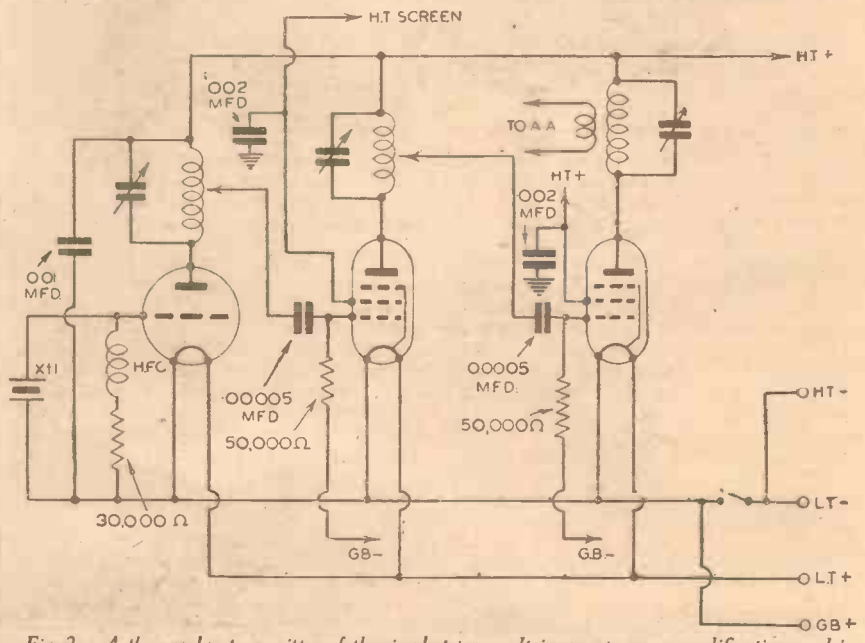


Fig. 2.—A three-valve transmitter of the simplest type. It is open to many modifications and is ideal for the A.A. licence holder.

TRANSMITTING TOPICS

(*Continued from facing page*)

ments with frequency doublers are required. If the single valve oscillator stage is made up as a single unit, the additional gear can soon be mounted on separate baseboard and arranged alongside the former. The circuit is shown as the first two valves in Fig. 2, where all values are given for general requirements, but it must be appreciated that the values for the tuned circuits will depend on the frequency of the crystal and the final frequency.

Remember, when using a circuit of this type, the anode of the oscillator is tuned to the fundamental frequency, i.e., that of the crystal, while the anode circuit of the frequency doubler is tuned to twice that frequency for simple doubling or halving of the wavelength of the radiated signal.

P.A.'s

For the benefit of those who wish to make up a transmitter consisting of C.O., Doubler and P.A., a fundamental arrangement of three valves having this combination is shown by the complete circuit of Fig. 2. A triode has been used for the C.O. and pentodes for the two remaining stages, as these reduce the possibilities of instability and, if the valves are effectively screened internally, eliminates the need for neutralisation.

For this circuit, it would be better to build up the complete arrangement on one baseboard or chassis. Plywood will be quite satisfactory providing reasonable care is taken to see that adequate spacing between each section is provided and that the connections to the common negative line are made to one point for each circuit and then coupled together by a wire of, say, 16 or 18 S.W.G.

Modulation

As many experiments related to modulation should be carried out as possible, as each method has its own individual characteristics and, in view of this, the subject can prove most interesting.

Space does not permit giving details of suitable modulators but, generally speaking, any good L.F. amplifier, providing it is suitable for microphone work, can be brought into service. Remember, that there is such a thing as *over modulation*; so don't think that the more L.F. power pumped into the circuit the better. Far from it.

Another point to remember when applying modulation is that the final frequency, i.e., the frequency of the generated carrier wave, must be reached before the L.F. signals are applied. For example, don't attempt to use a frequency doubler after the modulated stage.

Always make good use of a 'phone monitor when carrying out any tests relating to modulation. Suitable apparatus has been described in past issues, and there is no need to construct complicated equipment for this purpose. A simple tuned circuit used in conjunction with a diode detector or metal rectifier will prove quite satisfactory and allow an accurate check to be kept on the quality of the output.

A feature of the Berlin Radio Show is a radio-gram utilising a 24ft.-long film band on the surface of which the music to be reproduced is cut.

Leaves from a Short-wave Log

Radio Sofia

LZA Sofia (Bulgaria), which for some time has been working on a frequency outside the broadcast band, namely, 8.465 mc/s (35.44 m.), is now radiating programmes daily according to the following schedule : B.S.T. 11.00-13.00 and 16.00-23.00 (Monday, Wednesday, Friday and Saturday) ; 19.00-21.00 (Tuesday and Thursday), and on Sundays from B.S.T. 06.30-14.00 and from 16.00-22.30. The call is given out by a woman announcer, and particulars of the entertainments as well as future transmissions are stated in the Bulgarian, French, German, and, not infrequently, English languages.

The new Decca Brunswick all-wave five-valve superhet with press-button tuning. It is priced at 10½ guineas.

Listen to Bolivia

THE *Radiodifusores Illimani*, two 1-kilowatt stations installed at La Paz, capital city of Bolivia, by the Compania Radio Boliviana, use the following channels : CP5, 49.34 m. (6.08 mc/s), and CP7, 19.61, m. (15.3 mc/s). This organisation has also established a broadcasting service at Oruro (125 miles S.S.E. of La Paz) through CP9 operating on 50 m. (6 mc/s), and at Sucre through CP1, on 30.33 m. (9.89 mc/s).

Broadcasts from Dutch Guiana

AT Paramaribo, the *Algemeene Vereeniging Radio Omroep*, is reported to have suspended its transmissions through station PZH; hitherto working daily on 42.08 m. (7.088 mc/s), and to have replaced them by one established by the local Government through PZ1AA, on 21.47 m. (13.975 mc/s).

The Radio Stations of Peru

IN addition to a number of medium-wave transmitters, Lima possesses the following short-wave stations : OAX4Z (15 kW.) ; OAX4T (10 kW.) ; OAX4R (5 kW.), operated by the State on 49.33 m. (6.082 mc/s), 31.37 m. (9.562 mc/s), and 19.8 m. (15.15 mc/s), respectively. There are also three privately owned stations in this capital, namely, OAX4G, *Radio Grellaud*, on 48.15 m. (6.23 mc/s), 250 watts, and *Radio Internacional*, which radiates programmes through OAX4I, 31.51 m. (9.52 mc/s), 200 watts, and 32.15 m. (9.33 mc/s). Broadcasts are also made through OAX4D, a 3-kilowatt commercial transmitter on 51.9 m. (5.78 mc/s). At Chiclayo, in the northern portion of the country, OAX1A is stated to be working on 47.39 m. (6.33 mc/s), with a power of 200 watts. *Radio Universal* has also opened at Ica (some 170 miles S.S.E. of Lima), OAX5C, on 31.28 m. (9.59 mc/s), 150 watts ; and OAX7A, *Radio Cuzco*, in the city of that name, is a small 100-watter broadcasting on 48.96 m. (6.128 mc/s). At Trujillo, 310 miles N.N.W. of the capital, there is a 250-watt transmitter, OAX2A, *Radio Rancho Grande*, on 25.44 m. (11.79 mc/s), and one of the same power, *Radio Andina-Junin*, on 50.27 m. (5.968 mc/s) at Huancayo (Central Peru).

Sweden's New Short-wave Stations

SINCE June 1st the Stockholm broadcasts have been relayed through the newly installed Motala short-wave stations SBT, and SBU, on 19.8 m. (15.155 mc/s), and 31.46 m. (9.535 mc/s) with a power of 10 and 12 kW., respectively. The old Stockholm transmitters have now closed down.

Relays from Manchukuo

IT is reported that the Hsinking (Shinkyo) broadcasting station is daily transmitting a special radio programme for European listeners between B.S.T. 21.00-21.50 ; the channel used is 25.48 m. (11.775 mc/s).

"FANTASY"

MOST of us can find a thrill in reading about the unknown, and although once there was a fashion for stories of the supernatural, now the craze is for fiction of a very different type.

"Science-fiction," which is only another name for the scientifically-based romance first made famous by such master minds as H. G. Wells and Jules Verne, has been booming in America, and is now sweeping this country in the shape of a new quarterly magazine called *Fantasy*.

The stories in *Fantasy* are frankly astonishing, but they can neither be lightly dismissed nor forgotten. General interest in scientific investigation and invention has never been greater, and it may be that the dreams of the writer to-day may become the facts of to-morrow. Many of our readers will be interested in this magazine.

The British Long-Distance Listeners' Club

Let's All Go!

NO, I am not referring to a once-popular song, but to the slogan which is being used to publicise the Radio Show, which, incidentally, is going to prove a "real big do" if only half of what I hear is correct.

Apart from the very tempting displays which the exhibitors will be making, there are other attractions which will really be worth seeing, so I don't think that there is the slightest need for the enthusiastic listener and constructor to wonder whether a visit to Olympia this year is going to be worth while.

One outstanding spot of news is that which tells me that we constructors are being catered for in quite a reasonable manner, though I doubt if we shall see as much as we would all wish of the numerous items which go to make our receivers, amplifiers, transmitters and the other apparatus so widely used amongst amateurs. However, the great thing is that the manufacturers of the components which have become household names so far as we constructors are concerned, are really making a good show of their new lines; and, speaking from past experience, I have that feeling that a nasty strain is going to be placed on our exchequers when we come to handle and examine some of the new parts.

By the way, if you call in at Stand No. 9 before you start on your trip round Olympia it is quite possible that those present might be able to save you many miles of tramping by telling you where the high lights of the show are situated, apart from having a little chin-wag.

What About This?

Some very interesting figures have recently been made public by the Union International de Radiodiffusion concerning the number of listeners in the world. From the following, it would appear that we have got to buck our ideas up a little. Great Britain has been transferred to the *fifth* position with only 193 receivers per thousand head of population. Now then, B.L.D.L.C. members, what are you going to do about it?

The approximate figures are really amazing. It is claimed that there are 312,000,000 listeners in the world, but it should be noted that no official returns have been made by Russia, China and Brazil. Other figures reveal the fact that there are 38,600,000 receivers in Europe and 28,000,000 in America, but as there is no licensing system in the United States of America the figure has only been arrived at by estimating.

Denmark takes second place; New Zealand third, and Sweden fourth, while Germany comes tenth on the list.

For those members who are good at statistics and, incidentally, arithmetic, now is the chance to work out how much money is circulated by the purchase and manufacture of radio apparatus. No prizes are offered for this, and don't ask me to check your answers.

Your Views Welcomed

A very interesting letter, representing the views of three members, has been received from J. W., of Purley, and in view of their remarks, other members comments or suggestions will be welcomed.

"I have read your excellent magazine for three years, and have been a member of the B.L.D.L.C. for some time, and I would like to submit the following suggestions regarding the activities of the Club.

"I understand that there are 6,000 members, and I presume that the majority are interested in S.W.L. on the amateur bands. I suggest that you give half a page of interesting DX news supplied by members and that you set listening periods of, say, one week, to see who could obtain the best logs. This would create additional interest and, at the same time, give you more material for publication; in fact, we would all benefit. Have you the support. Why not ask your readers? You certainly have ours."

We most certainly have the support, but whether all members would be keen on the suggestions contained in the above letter, we can only find out by doing as J. W. suggests, namely, asking you.

CATHODE-RAY TUBE FOCUSING

A POINT which needs careful watching in the design of a cathode-ray tube is the maintenance of constant spot size when the modulation varies. In many cathode-ray tubes the size of the spot tends to increase when the beam current increases, so that black parts of the image become defocused, giving a blurred effect.

One method which has been adopted to overcome this trouble, when the beam is focused magnetically, is to cause the focusing field to vary in accordance with the level of the signals received, in such a way as to keep the spot size constant. This may involve disadvantages, however, on account of the comparatively large amount of iron usually associated with such a magnetic field, which introduces a time lag before the correction can operate. An improved method is, therefore, to use an auxiliary focusing system, with its circuit connected up in the same sense as above, so as to oppose the variation of spot size. This auxiliary system may be either electrostatic or electro-magnetic. In the former case it takes the form of an additional electrode disposed, for example, between first and second anodes, or before the first anode, and supplied with potentials taken from the modulating potential. In the latter case the auxiliary system is a coil supplied with current from the modulating circuit, and having a core of the comminuted compressed iron type. The correction with such an auxiliary system will operate instantaneously.

"Swinging" the Voltage

Where the focusing is entirely electrostatic, it is also possible to perform the necessary correction by "swinging" the voltage on the cathode in rhythm with the modulation, the swing being correctly adjusted as regards amplitude and phase so as to maintain the spot diameter constant. In operating this method, it must be taken into account that the effective absolute voltage of the second anode of the cathode-ray tube will be altered as the cathode potential varies, so that the potential applied to the cathode must be sufficient to cause alteration in the focusing ratio, which varies with the modulation potentials. Moreover, the amplitude of the signal applied to the control electrode must be suitably increased to take account of the change of cathode potential. In some cases it is desirable to swing the potential on the accelerator electrode in the same rhythm.

Tapped Load Resistance

A practical way of applying the above idea is to supply the driving voltage for the tube across a tapped load resistance; the top of this resistance is connected through a suitable source of bias to the grid of the tube, and the tapping point is connected to the cathode, the point being chosen so as to obtain the desired relation of voltage swing between cathode and grid. Another alternative would be to have the load resistance in the form of a potentiometer, with the grid and cathode connected respectively to two sliders ganged together. The modulation, or contrast, is then controlled by adjusting the distance between the two sliders, while the best focus may be found by sliding the two in gang, thus adjusting the potential of the cathode with respect to the first anode.

RADIO CLUBS & 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.

SALE AND DISTRICT RADIO SOCIETY

Headquarters: St. Mary's Schools, Barkers Lane, Sale, near Manchester.
Secretary: S. C. O. Allen (2FCQ), 31, Ennerdale Drive, Sale.
Meetings: Weekly, on Thursday evenings at 7.30 p.m.

MORSE instruction is now proceeding satisfactorily, and it is expected that several members will apply for full transmitting licences in the next few weeks. A receiver is to be constructed for 56-m/c work, amplification to be provided by the A.F. stages of the club's broadcast receiver.

Mr. Marshall (G4ND) continues slow morse transmissions on Wednesday evenings. The frequency is 1,915 kilocycles. Some extension of the "service area" of the station is anticipated when a new transmitting aerial is installed.

A Greetings telegram, worded in "ham" language, was sent by the society to one of the members—Mr. Ashton—on his wedding day.

To provide for additional morse instructional facilities two more keys have been obtained; buzzers are also being purchased. The society will be glad to consider applications for membership from any readers of PRACTICAL AND AMATEUR WIRELESS who are interested.

BETHNAL GREEN RADIO CLUB

Hon. Sec.: R. T. Bell, c/o The Institute, 229, Bethnal Green Road, E.2.
Meetings: Tuesday and Thursday, 8-10 p.m.

THE above club has just completed a fairly successful season, and is now closed for the summer vacation. At the last meeting, held on June 29th, the following members were elected to the committee: Hon. Sec., R. T. Bell; Asst. Sec., T. Greenwood; Treasurer, M. Morris; Technical Adviser, D. A. Ball.

Particulars of the club's programme for next season, commencing Sept. 26th, will be published in due course. The Hon. Secretary would be pleased to correspond with other radio club secretaries with a view to exchanging information re lectures, visits, field days, etc.

A.V.C. Improvements

A Method of Reducing Changes in Input Capacity of Gain-controlled Valves

LISTENERS with very selective receivers of the communication type will have noticed, especially when receiving weak stations, that operation of the control which varies the gain of the valves by biasing the control-grids, causes the receivers to be detuned. In particular, when the automatic gain control is in operation a certain amount of distortion produced when the station fades is due to this detuning. The cause of the trouble is that the input capacity of the valves varies with the bias potential. An R.C.A. engineer, Mr. W. R. Ferris, has devised a circuit for overcoming the detuning effect.

Referring to the accompanying illustration, there is shown a valve 1 of the screen-grid type. The input circuit 2 comprises a coil 3 and condenser 4 which are resonant to a desired wave frequency. The coil 3 can be coupled to any desired source of signal waves: for example, these waves may be in broadcast band of 500 to 1,550 kc/s. The present arrangement is employed with advantage in the 60 to 200 megacycle band. The valve 1 includes a cathode 5, a signal control-grid 6, a screen-grid 7 and a plate 8. The signal output circuit 9 may feed further amplifier stages; in fact, the use of a large number of amplifier stages is desirable with this arrangement, since the amplification in each stage varies only as the square root of the applied direct current voltage.

Control-grid

The numeral 10 denotes a source of direct current employed to energise the various electrodes; the resistor 11 is shunted across source 10 to provide a low resistance bleeder. The cathode 5 is connected to an intermediate ground point on the bleeder; while plate 8 may be connected to the positive end thereof. Condensers 12, 13 and 14 are the usual radio frequency by-pass condensers. The control-grid 6 is connected to the high alternating potential side of input circuit 2, while the low potential end of the input circuit 2 is connected to a tap 15 which is slidable usually along that portion of bleeder 11 which is negative with respect to ground.

The control-grid voltage is denoted by the symbol Eg. The screen-grid 7 is connected by tap 16 to any desired point of bleeder 11 which is positive with respect to the grounded cathode. The symbol Es denotes the voltage applied to the screen-grid electrode. The control-grid to cathode capacity C_i, or input capacitance, is shown by dotted lines, and is effectively in shunt to the tuning condenser 4. The control-grid to screen-grid capacity C_o is shown by dotted lines. The fundamental improvement in gain control provided by this arrangement resides in the fact that the frequency of input circuit 3-4 is independent of amplifier gain adjustment if the ratio of Eg to Es is kept constant; this follows from the fact that in the latter case $C_i + C_o$ is constant.

Variations in Input Capacity

It is well known that the input and the output capacity of an electron discharge tube depends upon both the geometry and the potential distribution of the elements. The usual volume control circuits operate by applying a variable negative bias to the signal control-grid of an amplifier valve, usually with the other voltages held substantially constant. This results in a serious change in the input capacity of the amplifier. For example, in the case of a 57 type valve, the change in input capacity is about 1 mmf., as the bias is varied from its normal value to cut-off. This necessitates the use of large padding condensers in receiver circuits, which reduce the possible gain to less than one-half of its value if such padding were not necessary. Particularly in the case of receivers equipped with automatic volume control is the change in input capacity of the controlled tube a disadvantage. In the case of the high trans-conductance valves intended for television use the change in capacity is several micro-micro-farads.

It can be demonstrated that the change in input capacity of a valve of the screen-grid type may be expressed by the following relationship:

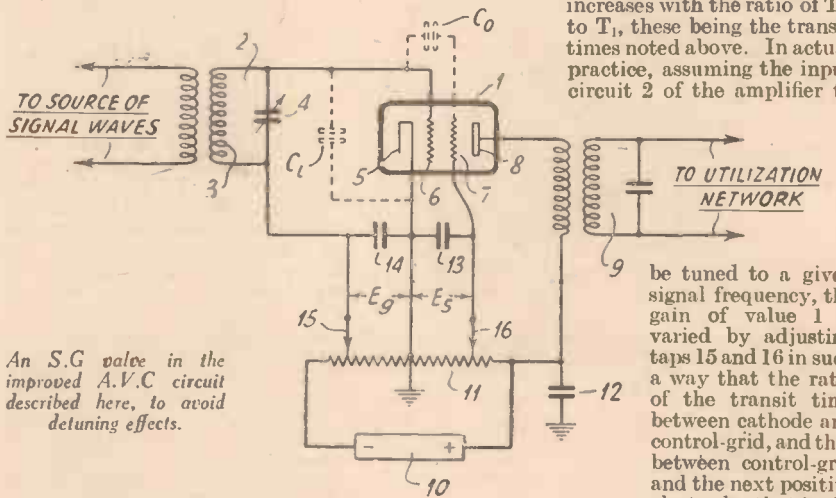
$$\Delta C = \frac{C_o}{3}\left[1+4\frac{T_2}{T_1}\left(1-\frac{1}{k+1}+\frac{1}{3(k+1)^2}\right)\right]$$

where ΔC is the change in capacity from its value at cut-off to its value at any given set of operating voltages; T_2 is the transit time from control-grid to screen-grid; T_1 is the transit time from cathode to control-grid; k is the square root of the ratio of the effective voltage at the screen-grid to that at the control-grid; and C_o is the capacity between such sections of control-grid and cathode as are in the electron stream.

It will, therefore, be seen from the above relationship that if the ratio of the effective voltage at the screen-grid to that at the control-grid is kept constant, the ratio $\frac{T_2}{T_1}$ is also constant, and, therefore, ΔC is maintained constant. This is realised, as shown in the drawing, by varying the voltages applied to the screen-grid and control-grid in such a manner as to satisfy the relations noted. It is assumed that the contact potential of the control-grid is zero, or has been balanced out by a fixed bias battery or similar means. As a matter of fact, an auxiliary bias battery can be employed in the signal-grid circuit to balance out the effect of contact potential, the initial velocity of electrons, thermo-couple effects, and gas ionisation effects. With such effects balanced out, the effective grid bias voltage of the grid 6 is then the value E.

Positive Electrode Voltage

The present gain control arrangement is applicable to any amplifier in which the amplifier valve employs a cathode, signal-grid, and at least one positive electrode adjacent the signal grid. The essential relation involves maintaining the positive electrode voltage to effective grid bias voltage ratio constant, thus maintaining the input capacity constant. This is readily shown to be the case by observing the input capacity values and positive electrode current under a given set of conditions, and then increasing the positive electrode voltage by a factor N. The control-grid voltage is then varied until the positive electrode current increases by $N^3/^2$. It can also be stated that the input capacity increases with the ratio of T_2, to T_1, these being the transit times noted above. In actual practice, assuming the input circuit 2 of the amplifier to be tuned to a given signal frequency, the gain of value 1 is varied by adjusting taps 15 and 16 in such a way that the ratio of the transit time between cathode and control-grid, and that between control-grid and the next positive electrode, that is the plate or screen-grid, shall have a constant value. If the tap 15 is adjusted away from the grounded cathode-tap, then the slider 16 is adjusted away from the cathode-tap. The gain is increased with such adjustment whereas moving them towards the cathode decreases the gain. If both taps were set positive with respect to the cathode, adjustment of both taps to the right of the cathode increases gain without change in input capacity. After the range of gain control which is desired has been decided upon, and assuming that adjustment of the control grid tap 15 is being depended upon for gain control variation, the adjustment of tap 16 can be made conjointly with adjustment of tap 15, and in accordance with the relationships given above, so as to maintain the tuned input circuit independent in frequency of the amplification control.



An S.G valve in the improved A.V.C circuit described here, to avoid detuning effects.

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).

An Amateur-band Tuner

SIR,—I have noticed in your columns requests by readers for an amateur-band tuner. I think that a cheap but sound design could be published on the following lines.

Coils wound on ⅝in. diameter fibre formers which could be mounted round, and integral with, a Yaxley type multi-contact wave-change switch. I suggest that tuned H.F., first Det., and separate oscillator stages be used and that small capacity tuning condensers of about .0001 mfd. be employed with the coils to give a frequency coverage of the five amateur bands only, after the manner of a well-known American tuner.

A good slow-motion drive should be provided in conjunction with a dial that could be hand calibrated when the tuned circuits have been correctly ganged and aligned. An advantage would be to provide the tuner in a separate chassis with rubber suspensions in order that it may be mounted in the approved style.—B. EYDEN (Hanwell).

SIR,—With reference to the letter of Mr. Soones, published in the August 5th issue of PRACTICAL AND AMATEUR WIRELESS, I heartily agree with him that a good design on the lines suggested for an amateur band tuner are needed.

I am afraid he is rather optimistic as regards the price of such a unit.

Of course, a saving in cost could be made by assembling one's own coils, but the other components must be grade 1 articles, as the unit must give good results on 28 mc/s.

If cheap components are used results can be very bad on even the lower frequencies, as every experimenter must have experienced at some time or another.

I would like to hear other readers' views on this subject.

As a reader of PRACTICAL AND AMATEUR WIRELESS since No. 1, I wish it every success in the future.—W. F. JENKINS (Canterbury).

Reaction Circuits

SIR,—I wish to thank you for the most interesting and useful book presented to me for solving Problem No. 358. PRACTICAL AND AMATEUR WIRELESS is really an excellent weekly and I find it very helpful.

I wonder if it would be possible to include an article in the near future on reaction circuits in straight sets, e.g., potentiometer methods of controlling the feed-back, and also reaction in the R.F. stage.—E. J. PREECE (Cambridge).

[*The subject mentioned has already been covered, but in due course it will be dealt with again.*—ED.]

Correspondents Wanted

SIR,—As a regular reader of PRACTICAL AND AMATEUR WIRELESS, and being a short-wave enthusiast, I shall be glad to get in touch with another reader who is interested in transmitting and short-wave receiving.—RONALD WILLIS, 153, Creek Road, March, Cambs.

* * *

MR. E. CROUCH (B.L.D.L.C. No. 5306), of 25, Alexandra Road, Winshill, Burton-on-Trent, would like to exchange Q.S.L.'s with local members.

* * *

SIR,—I have been reading your magazine for two years now, and I should like to exchange cards with S.W.L.'s or hams anywhere in the world.—A. V. OGLESBY (G53A1), 81, Stockton Lane, York.

A 14 mc/s Log From Rochdale

SIR,—I have been a regular reader of your fine paper for over a year now and am interested in amateur short-wave radio.

I submit my log of 14 mc/s for the week July 30th-August 5th.

W1 (10), W2 (5), W3 (3), W4 (3), W5 (5), W6 (2), W8 (3), OH (2), EA (2), ES5C, HA (3), LA4AW, LY (2), CT (9), and SM (3).

Among the DXers were PY7AI, PY2BH, PY2BA, VE1DQ, K6NYB, K6OIQ, VK3IG, VK5IQ, HC1FG, W7EGV, W7PVO, CO2WM and YV1AG.

The RX is a 0-v-1 portable ('phones) used with 25ft. high vertical antenna.—T. OWEN (Rochdale).

Exchanging S.W.L Cards

SIR,—I would be greatly obliged if you would let readers know through the medium of your paper that S.W.L. cards from Billy Epps, Texas, America, may be had by sending an S.W.L. card to me at the address given below. All cards will be sent on to Mr. Epps.—T. H. PLATER, 14, Littlegarth, Saffron Lane, Leicester.

CUT THIS OUT EACH WEEK

Do you know

—THAT the anode circuit of a detector invariably requires the greatest decoupling in any given circuit.

—THAT in an L.F. power amplifier, the stage giving the highest gain will require the most careful attention as regards anode decoupling.

—THAT in a high-gain circuit, pronounced hum can often be traced to the unsatisfactory location of biasing components with relation to the heater wiring.

—THAT it is very difficult for one to judge quite large variations in output of an amplifier by ear. With many listeners it is possible to make an increase or decrease of 30 per cent. of the output without it being noticed.

—THAT it is not the slightest use making a high-quality amplifier unless due consideration is given to the acoustic properties of the room in which the apparatus is to be used.

—THAT it is very desirable to fit tone-controls capable of varying both high- and low-note response. Simple correctors which cut off top-note response are not always satisfactory.

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 Newnes, 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.

RADIOLYMPIA—ADVANCE DETAILS

(*Continued from page 541*)

quite a number of the existing lines will be continued, but, together with the introduction of several new items, many improvements have been made to eliminate little difficulties in operation or fitting.

The chief developments are connected with transmitting and short-wave apparatus, two sections of radio which are so rapidly increasing in popularity. New types of variable condensers will be in evidence; special switches having high insulating factors for H.F. work; transmitting racks at reasonable prices, high-voltage transmitting variable condensers, and special types of fixed condenser for use in the tropics, will also be amongst the items to attract the eye of the constructor.

Test Equipment

The enthusiastic constructor and, of course, the service engineer, is always interested by the display of test equipment, and it is very obvious that they will not be disappointed this year. When one remembers some of the apparatus of the early days which had to be used for test purposes, and the time and trouble involved in connecting it to the apparatus under test, the modern equipment will appear to be something of an Aladdin's lamp, as it would seem that it is almost possible to determine any fault in a receiver by a simple flick of a switch or the pressing of one or two buttons.

Separate units in the form of oscillators, valve testers, condenser analysers, and cathode-ray oscilloscopes will be available for those who require individual apparatus for specialised work.

General Summary

To summarise the various manufacturers' programmes, we would say that prices are going to remain sensibly constant with those of last season, but it cannot be denied that the value offered to the purchaser is, undoubtedly, the best yet.

Particular attention has been paid to cabinet design, finish and construction, and while the numerous types follow modern lines, there is nothing grotesque or freakish to mar the furnishing scheme of any household.

Many new features have been embodied in push-button control systems, and the use of permeability tuners has eliminated many of the minor snags associated with the early forms of this type of control.

LATEST PATENT NEWS

Group Abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, either sheet by sheet as issued on payment of a subscription of 5s. per Group Volume or in bound volumes price 2s. each.

Abstracts Published.

SPAN-ACTION SWITCHES; WIRELESS RECEIVING-APPARATUS.—British Thomson-Houston Co., Ltd. No. 502452.

A switch especially suitable for use in a volume-control system comprises contact pieces on a sliding member attached to a leaf spring which is pivoted at its ends between two points the distance between which is less than unstressed length of the spring, one pivot consisting of a movable member having portions engaged by an actuating member. In the arrangement shown (Fig. 2) the contact piece 30 bridges terminals 25 carried in slots in an insulating casing 4, which is also formed with slots in which slides a member 31 carrying the contact piece 30. The spring 29 engages with an opening in the piece 31 and is pivoted at one end in a notch 21 in the casing 4. At the other end the spring is engaged by a bent sheet metal member 32, pivoted in a rounded notch in the casing 4 and provided with pieces 12, 13 which project beyond the casing and can be engaged by an actuating member. The spring should be about 5 per cent. longer than the distance between its pivots and the member 31 should be not more than 30 per cent. of the length of the spring from the end thereof. The application of the invention to a double-contact switch and to a switch controlling two circuits is also described. Fig. 1 shows the switch applied to a volume control, the casing 4 is secured to the back plate 9 of a rheostat and the pieces 12, 13 project into the path of a piece 7 which also forms the wiper of the rheostat so that the piece 7, after coming into contact with the piece 12 and closing the switch, passes on over the rheostat; on returning it opens the switch by means of the piece 13.

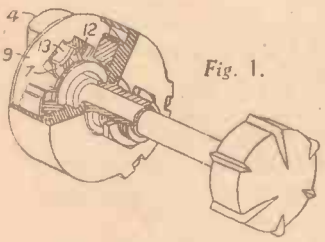
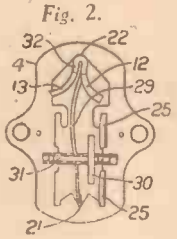


Fig. 1.

Fig. 2.



ADJUSTING WIRELESS APPARATUS.—Parrish, H. J. No. 503133.

The spindle carrying the movable plates of a variable condenser is held in any position to which it is adjusted by an electro-magnetic-brake and upon de-energisation of the latter is returned by a spring to a predetermined or normal position. In Fig. 3, the moving plates 9 are normally held in the mid-position, in which they half-overlap the fixed plates 1, by a spring 12, secured to the rotor shaft 8, and having its ends 10, 11, engaging opposite sides of a pillar 5. The rotor is adjusted by a knob 13 and held in adjusted position by a pot-magnet 16, secured to the spider 7, attracting a disc 17 rigid with the rotor spindle. A pin 18 rigidly connected to the disc 17 and rotor spindle 8 engages one or other of the ends 10, 11, to stress the spring 12 as the rotor is moved from normal position, movement of the rotor being limited in either direction by a stop disc 14, rigid therewith, co-operating with a fixed pin 15, and the spring returns the rotor to normal immediately the magnet is de-energised.

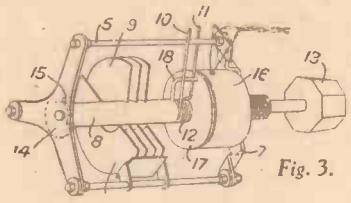


Fig. 3.

The condenser may be used for "side tuning" the local oscillator in a superheterodyne receiver at any desired station setting, the magnet 16 being de-energised automatically to return the condenser to normal as the main tuning device is operated to select another station, for example, by means of a switch opened by pulling or pushing the main tuning knob prior to rotation.

NEW PATENTS

These particulars of New Patents of interest to readers have been selected from the Official Journal of Patents and are published by permission of the Controller of H.M. Stationery Office. The Official Journal of Patents can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, price 1s. weekly (annual subscription £2 10s.).

Latest Patent Applications.

21390.—Barnett, J. H.—Wireless receiving-apparatus. July 24.

21418.—Belling and Lee, Ltd., and Hodby, A. L.—Means for attaching radio aerials, etc., to supporting structures. July 24.

21477.—General Electric Co., Ltd., Julian, T. A., and Shaw, H. J.—Short-wave wireless aerials. July 24.

21167.—Jodet, A. E. L.—Antennæ for radio receiving-sets mounted on board vehicles, etc. July 21.

21152, 21153.—Philips Lamps, Ltd.—Wireless receivers. July 20.

21475.—Philips Lamps, Ltd.—Receiving-apparatus. July 24.

21476.—Philips Lamps, Ltd.—Radio-receivers, etc. July 24.

21211.—Radio Gramophone Development Co., Ltd., and Parkinson, W. R.—System for controlling radio-receivers. July 21.

21506.—Scophony, Ltd., Okolicsanyi, F., and Gale, A. J.—Television, etc. systems, etc. July 21.

21286.—Telefunken Ges. fur Drahtlose Telegraphie.—Short, etc., wave radio aerial systems. July 21.

Specifications Published.

509494.—Blue, A. H.—Radio valve.

509766.—Scophony, Ltd., and Rosenthal, A. H.—Cathode-ray tube apparatus for television and like systems. (Cognate Applications, 14171/38, 14806/38, 14807/38, 20278/38, and 20636/38.)

509715.—Scophony, Ltd., and Okolicsanyi, F.—Television receiving apparatus.

509509.—Marconi's Wireless Telegraph Co., Ltd., and Bell, D. A.—Preselective tuning mechanisms for radio-receiving systems and the like.

509844.—Marconi's Wireless Telegraph Co., Ltd., and Wells, N.—Radio aerial installations.

509511.—Cole, Ltd., E. K., and Bradfield, G.—Tuning of radio-receivers.

509814.—Cole, Ltd., E. K., and Jarvis, H. G.—Press-button tuning receivers.

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at the uniform price of 1s. each.

NEWS AND NOTES

Broadcast Developments in Algeria

STEPS are being taken in Algeria to extend the present broadcasting system by erecting a high-power medium-wave station and a short-wave transmitter. Until stations can be installed in other parts of the country it is proposed to open studios at Oran, Bone and Constantine and link them up with Radio-Algiers.

The 1940 Olympic Games

IT has now been decided that the following countries shall relay the running commentaries on the various sporting events in connection with the Olympic Games to be held at Helsinki (Finland) next year: Belgium, Denmark, Germany, Estonia, Great Britain, Holland, Italy, Yugoslavia, Lithuania, Norway, Poland, Sweden, Hungary and the United States of America. The high-power broadcasting station at Pori will be completed in time for the opening of this International fixture.

New Interval Signal

RADIO-MONTPELLIER (France), the privately owned 2-kilowatt station working on 309 m. (968 kc/s), has adopted a special signature tune; it is a short phrase taken from a song by one of France's most famous folklore poets, Mistral, and is entitled *Coupo Santo*.

Radio Seville Advertises Again

AS of all the Spanish radio stations Seville is the one best heard on the North African coast, the studio has resumed its sponsored broadcasts and advertising puffs.

Proposed Station for the Sudan

IT is reported that a scheme is under consideration for the installation of a small broadcasting station at or near Khartum (Anglo-Egyptian Sudan). In connection with the installation the plan calls for a short-wave receiving station in order that the British population may be able to listen also to the B.B.C. Empire programmes.

QUERIES and ENQUIRIES

Piezo Electric Pick-ups

"I have just purchased a pick-up and the necessary volume control, which is separate, and I am not sure how to connect these together with the gram. terminals of the receiver. It is a Piezo electric pick-up, with a 500,000 ohm volume control. Would you please furnish me with the necessary connections?"—G. H. B. (Newcastle-on-Tyne).

IN a general sense the connections for the pick-up of this type do not vary from those used with an ordinary electro-magnetic component. There is one point, however, which is vital, and that is a volume control must be connected across the Piezo Electric pick-up to enable a grid return to be obtained for the associated valve. It must be appreciated that the crystal prevents the flow of D.C. current, therefore, unless a path is provided by a volume control or fixed resistance, the grid will not receive its correct bias. The value you mention is satisfactory, but if you wish to reduce the bass response then a control of 250,000 ohms or even 100,000 ohms can be used.

Telsen Coils

"Being a constant reader of 'Practical and Amateur Wireless' since '33, I have never written to you before, but I see by your paper that you reply to quite a lot of questions. I have a pair of band-pass coils of the Telsen make, Type W.290. I do not know the connections and if these coils could be used as H.F. and Det. with a two-ganged condenser .0005 mfd., or alternatively to use them as a band-pass, and please tell me what other coil I could use with them in a set which I would like to build."—T. L. (Co. Dublin).

WELL, T. L., we do not know whether you are expecting a circuit diagram of the coils in question, but as we do not undertake to do this, details of the connections must, therefore, suffice. The coils were originally designed for use in a band-pass circuit employing capacity, inductive, or a mixed coupling. The numbered terminals indicate the various connections on the completed coil. No. 8, grid end of medium-wave section; No. 3, to one side of wave-change switch; No. 6, the low potential end of the long-wave winding; while Nos. 2 and 5 represent the coupling coil. You could experiment with them in a straight circuit using reaction, in which case, the coupling coil could be used for reaction purposes. If a pair of them are used in an aerial band-pass circuit, in a receiver employing one stage of H.F. amplification, then any dual range coil could be used between the first and second valves.

Receiver for India

"I am on leave from India and wish to build myself a good wireless receiver to take back with me and work off A.C. mains. I wonder if you, or one of your readers, can put me on to a circuit that will give excellent results. Most of the receivers in use in India are of the commercial type, Phillips, G.E.C., and several American models being most common, but as an old reader of your journal and a keen constructor, I would much prefer to build my own set. I should, of course, require the receiver to work a loudspeaker and with a wave-range from 13 to 500 metres. I should be very grateful if you can advise me."—W. B. (Weston-super-Mare).

WHILE we fully appreciate your requirements, we are afraid that in this instance we have not a great deal to offer you. The fact that you only wish to cover a wave-band of 13 to 500 metres rules out most of our designs, as the majority of these are for normal broadcast reception, namely, 200 to 2,000 metres, or short-wave reception. The latter would be more suited for the work you have in mind providing efficient plug-in coils are used. The only recent A.C. model we have described is the Air Hawk 9, which would be ideal from the point of view of range, providing it is not larger than you require. Some of the firms who specialise in the production of short-wave equipment might be able to assist you, and to mention but one name we would suggest that you communicate with Stratton and Co., of Eddystone Works, Bromsgrove Street, Birmingham.

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 Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2. The Coupon must be enclosed with every query.

Transmitting

"Being a regular reader of your paper, I wonder if you could help me out with my problem. I wish to obtain a book on transmitters, as to how they work and so forth, also a blueprint of a circuit of same, not a high-powered set, but an ordinary straightforward transmitter. Hoping you can help me in the matter in the near future."—R. M. N. (Reading).

WE can help you quite easily, by suggesting that you secure a copy of "Wireless Transmission for Amateurs" which can be obtained from these offices, price 2s. 10d., post paid. This book will not only give you complete constructional details of a very efficient 2½ watt battery operated transmitter and a 10 watt A.C. operated outfit, but much valuable information concerning the fundamentals of transmitting and all the essential codes used by short-wave transmitters.

And Another One

"We are regular readers of 'Practical and Amateur Wireless' and would like your help. We wish to build a two-valve transmitter; could you forward us a blueprint number for a set which would be simple and cheap to build? Also could you recommend a good book on transmission?"—T. O'C. and B. M. (W.9).

AS we have not issued any blueprints showing the constructional details of transmitting apparatus, we can only refer you to the reply given above to R. M. N. (Reading).

Guaranteed Performance

"I am thinking of constructing a crystal receiver, but before purchasing the parts and devoting the time necessary to its making, I wish to ask you if you can give a guarantee regarding the range of reception of the crystal receivers mentioned in your list of blueprints?"—T. L. S. (Bromley).

WHILE all the designs of the crystal receivers given in our blueprint list are very efficient, we are afraid that you are asking rather too much by requesting a definite guarantee regarding their effective range of reception. In the early days, one used to think of 10 or 15 miles as being a reasonable range for the reception of telephony, but nowadays, with the modern high-powered transmitters, this distance is, of course, greatly increased. With a crystal set, so much depends on local conditions, the aerial system and even the crystal detector, but when these factors are satisfactory, a distance of 50 miles would be quite feasible although, naturally, the closer one is to the station the more powerful the results.

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.

T. H. (Harringay). If the circuit already embodies two stages of L.F. amplification, we would not advise the modifications you suggest. Why not concentrate on H.F. stage? This would improve range and selectivity.

B. G. F. (Boscombe). Messrs. Bulgin, of Abbey Road, Barking, Essex, can supply all the parts you require. The circuit is quite satisfactory.

E. S. (Manchester). The valve can be obtained in four or seven-pin types. If you do not wish to go to the trouble of fitting a new holder, then we can only suggest that you secure a valve with a four-pin base.

P. G. (Stratford). It would appear that the cathode circuit is faulty. Have the valve examined by the actual makers.

R. M. (S.W.19). If you require a real communication receiver, might we suggest that you make sure of getting a copy of our Special Show Number which will be on sale August 23rd, as it will contain details of a design which should appeal to all S.W. enthusiasts.

W. E. R. (Burnley). The chassis and panel ready drilled can be obtained from Messrs. Peto-Scott. It would be safer to use the specified components.

L. P. (Sheffield). A simple tone corrector can be formed by connecting a 10,000-ohm resistance in series with a .02mfd. condenser between the anode of the L.F. valve and earth.

T. J. (Poole). It would be best to use the largest L.F. choke of those you have on hand. We cannot determine the inductance from the details you supply.

H. Y. (Finchley). Try to arrange matters so that the aerial is kept as remote as possible from the side of the house. Height plays a very important part, so if it is feasible for you to fit a short light mast on the stack, we would advise you to do so.

K. G. (Bromley). No. All blueprints are now out of print. A modern coil can be used, provided the circuit is modified according to the coil-makers' wiring instructions.

The coupon on page 546 must be attached to every query

Practical and Amateur Wireless
BLUEPRINT SERVICE

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 .. .. 7½d. ,, ,,
Wireless Magazine .. .. 1/3 ,, ,,

The Index letters which precede the Blueprint Number indicate the periodical in which the description appears: Thus P.W. refers to PRACTICAL WIRELESS, A.W. to *Amateur Wireless*, P.M. to *Practical Mechanics*, W.M. 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.

PRACTICAL WIRELESS

	Date of Issue.	No. of Blueprint.
CRYSTAL SETS.		
Blueprints, 6d. each.		
1937 Crystal Receiver	—	PW71
The "Junior" Crystal Set ..	27.8.38	PW94
STRAIGHT SETS. Battery Operated.		
One-valve : Blueprints, 1s. each.		
All-Wave Unipen (Pentode) ..	—	PW31A
Beginners' One-valver	19.2.38	PW85
The "Pyramid" One-valver (HF Pen)	27.8.38	PW93
Two-valve : Blueprints, 1s. each.		
Four-range Super Mag Two (D, Pen)	—	PW36B
The Signet Two (D & LF) ..	24.9.38	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)	—	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	PM1
Cameo Midget Three (D, 2 LF (Trans))	—	PW51
1936 Sonotone Three-Four (HF Pen, HF Pen, Westector, Pen)	—	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) ..	14.8.37	PW64
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))	18.2.39	PW72
The "Rapide" Straight 3 (D, 2 LF (RC & Trans))	4.12.37	PW82
F. J. Camm's Oracle All-Wave Three (HF, Det., Pen) ..	28.8.37	PW78
1938 "Triband" All-Wave Three (HF Pen, D, Pen)	22.1.38	PW84
F. J. Camm's "Sprite" Three (HF Pen, D, Tet)	26.3.38	PW87
The "Hurricane" All-Wave Three (SG, D (Pen), Pen)	30.4.38	PW89
F. J. Camm's "Push-Button" Three (HF Pen, D (Pen), Tet)	3.9.38	PW92
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)	—	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
All-Wave "Corona" 4 (HF, Pen D, LF, Pow)	9.10.37	PW79
"Acme" All-Wave 4 (HF Pen, D (Pen), LF, Cl. B)	12.2.38	PW83
The "Admiral" Four (HF Pen, HF Pen, D, Pen (RC)) ..	3.9.38	PW90
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) ..	7.1.39	PW35C
D.C. Premier (HF Pen, D, Pen) ..	—	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, 2 LF (RC))	—	PW54
A.C. 1936 Sonotone (HF Pen, HF Pen, Westector, Pen) ..	—	PW56
Mains Record All-Wave 3 (HF Pen, D, Pen)	—	PW70
All-World Ace (HF Pen, D, Pen) ..	28.8.37	PW80
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
A.C. All-Wave Corona Four ..	6.11.37	PW81

SUPERHETS.

Battery Sets : Blueprints, 1s. each.		
£5 Superhet (Three-valve) ..	5.6.37	PW40
F. J. Camm's 2-valve Superhet ..	—	PW52
F. J. Camm's "Vitesse" All-Waver (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
Four-valve : Double-sided Blueprint, 1s. 6d.		
Push-Button 4, Battery Model .. Push-Button 4, A.C. Mains Model }	22.10.38	PW95

SHORT-WAVE SETS

One-valve : Blueprint, 1s.		
Simple S.W. One-valver	9.4.38	PW88
Two-valve : Blueprints, 1s. each.		
Midget Short-wave Two (D, Pen)	—	PW38A
The "Fleet" Short-wave Two (D (HF Pen), Pen)	27.8.38	PW91
Three-valve : Blueprints, 1s. each.		
Experimenter's Short-wave Three (SG, D, Pow)	30.7.38	PW30A
The Prefect 3 (D, 2 LF (RC and Trans))	7.8.37	PW63
The Band-Spread S.W. Three (HF Pen, D (Pen), Pen) ..	1.10.38	PW68

PORTABLES.

Three-valve : Blueprints, 1s. each.		
F. J. Camm's E.L.F. Three-valve Portable (HF Pen, D, Pen) ..	—	PW65
Parvo Flyweight Midget Portable (SG, D, Pen)	3.6.39	PW77
Four-valve : Blueprint, 1s.		
"Imp" Portable 4 (D, LF, LF (Pen))	19.3.38	PW86

MISCELLANEOUS.

S.W. Converter-Adapter (1 valve)	—	PW48A

AMATEUR WIRELESS AND WIRELESS MAGAZINE CRYSTAL SETS.

Blueprints, 6d. each.		
Four-station Crystal Set	25.7.38	AW427
1934 Crystal Set	—	AW444
150-mile Crystal Set	—	AW450
STRAIGHT SETS. Battery Operated.		
One-valve : Blueprint, 1s.		
B.B.C. Special One-valver ..	—	AW387
Two-valve : Blueprints, 1s. each.		
Melody Ranger Two (D, Trans) ..	—	AW388
Full-volume Two (SG det, Pen) ..	—	AW392
Lucerne Minor (D, Pen)	—	AW426
A Modern Two-valver	—	WM409
Three-valve : Blueprints, 1s. each.		
Class B Three (D, Trans, Class B)	—	AW386
£5 5s. S.G.3 (SG, D, Trans) ..	2.12.33	AW412
Lucerne Ranger (SG, D, Trans) ..	—	AW422
£5 5s. Three: De Luxe Version (SG, D, Trans)	19.5.34	AW435
Lucerne Straight Three (D, RC, Trans)	—	AW437
Transportable Three (SG, D, Pen)	—	WM271
Simple-Tune Three (SG, D, Pen) .	*June* '33	WM327
Economy-Pentode Three (SG, D, Pen)	*Oct.* '33	WM337
"W.M." 1934 Standard Three (SG, D, Pen)	—	WM351
£3 3s. Three (SG, D, Trans) ..	*Mar.* '34	WM354
1935 £6 6s. Battery Three (SG, D, Pen)	—	WM371
PTP Three (Pen, D, Pen)	—	WM389
Certainty Three (SG, D, Pen) ..	—	WM393
Minitube Three (SG, D, Trans) ..	*Oct.* '35	WM396
All-Wave Winning Three (SG, D, Pen)	—	WM403
Four-valve : Blueprints, 1s. 6d. each.		
65s. Four (SG, D, RC, Trans) ..	—	AW370
2HF Four (2 SG, D, Pen) ..	—	AW421
Self-contained Four (SG, D, LF, Class B)	*Aug.* '33	WM331
Lucerne Straight Four (SG, D, LF, Trans)	—	WM350
£5 5s. Battery Four (HF, D, 2 LF)	*Feb.* '35	WM381
The H.K. Four (SG, SG, D, Pen).	*Mar.* '35	WM384
The Auto Straight Four (HF Pen, HF Pen, DDT, Pen)	*Apr.* '36	WM404
Five-valve : Blueprints, 1s. 6d. each.		
Super-quality Five (2 HF, D, RC, Trans)	—	WM320
Class B Quadradyne (2 SG, D, LF, Class B)	—	WM344
New Class B Five (2 SG, D, LF, Class B)	—	WM340

Mains Operated.

Two-valve : Blueprints, 1s. each.		
Consoelectric Two (D, Pen) A.C.	—	AW403
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
Mantovani A.C. Three (HF Pen, D, Pen)	—	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	WM329
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.		
Heptode Super Three A.C. ..	*May* '34	WM359
"W.M." Radiogram Super A.C. ..	—	WM366

PORTABLES.

Four-valve : Blueprints, 1s. 6d. each.		
Holiday Portable (SG, D, LF, Class B)	—	AW393
Family Portable (HF, D, RC, Trans)	—	AW447
Two H.F. Portable (2 SG, D, QP21)	—	WM363
Tyers Portable (SG, D, 2 Trans) ..	—	WM367

SHORT-WAVE SETS—Battery Operated.

One-valve : Blueprints, 1s. each.		
S.W. One-valver for America ..	15.10.38	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
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)	22.7.39	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." 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.

S.W. One-valve Converter (Price 6d.)	—	AW329
Enthusiast's Power Amplifier (1/6)	—	WM387
Listener's 5-watt A.C. Amplifier (1/6)	—	WM392
Radio Unit (2v.) for WM392 (1/-)	*Nov.* '35	WM398
Harris Electrogram battery amplifier (1/-)	—	WM399
De Luxe Concert A.C. Electrogram (1/-)	*Mar.* '36	WM403
New Style Short-wave Adapter (1/-)	—	WM388
Trickle Charger (6d.)	*Jan.* 5, '35	AW462
Short-wave Adapter (1/-)	—	AW456
Superhet Converter (1/-)	—	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/-)	—	WM408

Miscellaneous Advertisements

Advertisements are accepted for these columns at the rate of 3d. per word. Words in black face and/or capitals are charged double this rate (minimum charge 3/- per paragraph). Display lines are charged at 6/- per line. All advertisements must be prepaid. All communications should be addressed to the Advertisement Manager, "Practical and Amateur Wireless," Tower House, Southampton Street, Strand, London, W.C.2.

RECEIVERS, COMPONENTS AND ACCESSORIES

Surplus, Clearance or Secondhand, etc.

SOUTHERN RADIO. All goods previously advertised still available. —Southern Radio, 46, Lisle Street, London, W.C. Gerrard 6653.

VAUXHALL.—All goods previously advertised are still available; send now for latest price list, free.—Vauxhall Utilities, 163a, Strand, W.C.2.

CONVERSION UNITS for operating D.C. Receivers from A.C. Mains, 100 watts output, £2/10/0.—150-watt Model for operating Radiogramophones, £3/10/0. Send for lists.—Chas. F. Ward, 46, Farringdon Street, London, E.C.4. Tel.: Holborn 9703.

LOUDSPEAKER REPAIRS

REPAIRS in Moving Coil Speakers, Cones and Coils fitted and Rewound. Fields altered. Prices Quoted, including Eliminators. Loudspeakers Repaired, 4/-; L.F. and Speech Transformers, 4/-, post free. Trade invited. Guaranteed. Satisfaction, Prompt Service, Estimates Free.—L.S. Repair Service, 5, Balham Grove, London, S.W.12. Battersea 1321.

LOUDSPEAKER repairs, British, American, any make. 24-hour service, moderate prices.—Sinclair Speakers, Pulteney Terrace, Copenhagen Street, London, N.1.

NEW LOUDSPEAKERS

3,000 SPEAKERS from 6/6 each, P.M. and energised 4in. to 14in., including several Epoch 18in.—Sinclair Speakers, Pulteney Terrace, Copenhagen Street, London, N.1.

NEW RECEIVERS AND CHASSIS

ARMSTRONG. For details of the new 1940 range of Armstrong Chassis see August 26th issue. Something entirely new, look out for it.—Armstrong Mfg. Co., Warlters Road, Holloway, London, N.7. North 3213.

MISCELLANEOUS

THERE'S MONEY IN RADIO!—If you understand radio you can make substantial profits in spare time. For hints and ideas get MONEY-MAKING MADE EASY, by L. Harvey Wood. Available from all booksellers, 2/6 net, or by post, 2/10, from the Publisher, C. Arthur Pearson, Ltd., Tower House, Southampton Street, London, W.C.2.

"THE OUTLINE OF WIRELESS," by Ralph Stranger. Fifth Edition, 8s. 6d.—This book, which covers the subject from A to Z, is to be recommended to all who desire to master the theory of Modern Wireless. At all Booksellers and Newsagents, or by post 9s. from George Newnes, Ltd. (Book Dept.), Tower House, Southampton Street, Strand, London, W.C.2.

THE PRACTICAL MOTORIST'S ENCYCLOPÆDIA, by F. J. Camm, 3s. 6d. net. A lucid exposition of the principles, upkeep and repair of every part of the car. 442 illustrations. From booksellers everywhere, or by post 4s. from George Newnes, Ltd. (Book Dept.), Tower House, Southampton Street, Strand, London, W.C.2.

EVERYMAN'S WIRELESS BOOK, by F. J. Camm, 3s. 6d. An invaluable book of reference, explaining the operation, upkeep and overhaul of all types of wireless receiver. 200 illustrations. From all Booksellers and Newsagents, or by post 4s. from George Newnes, Ltd. (Book Dept.), Tower House, Southampton Street, Strand, London, W.C.2.

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RADIOLYMPIA—Complete Guide to the Show

A NEWNES PUBLICATION

Practical Wireless and PRACTICAL TELEVISION

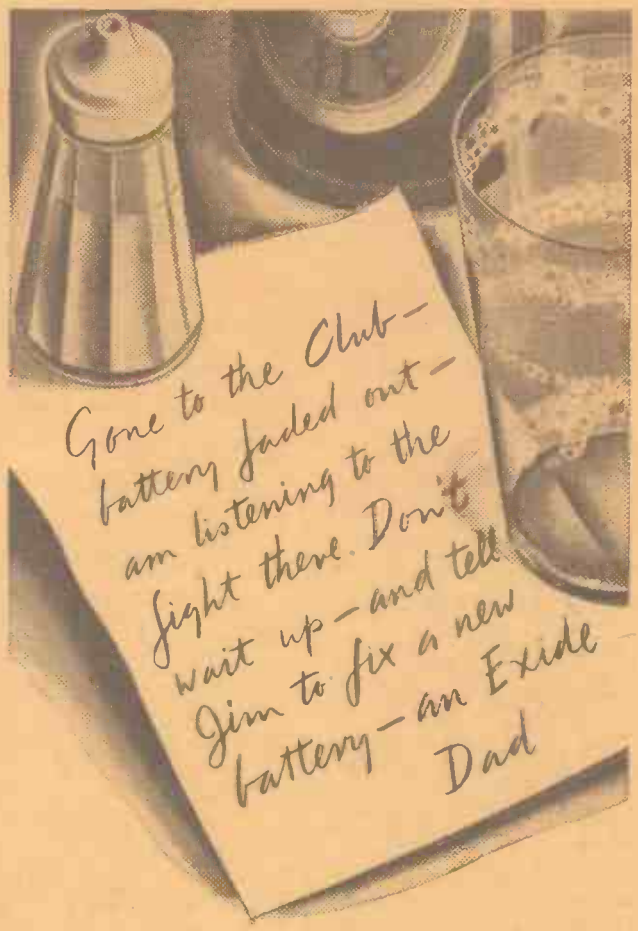
3D

EVERY WEDNESDAY

Edited by F. J. CAMM

Vol. 14. No. 362. August 26th, 1939.

Contents



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STAND 108

Practical and Wireless
PRACTICAL TELEVISION
EVERY WEDNESDAY.
Vol. XIV. No. 362, Aug. 26th, 1939.
EDITED BY F. J. CAMM
Staff: W. J. DELANEY, FRANK PRESTON, H. J. BARTON CHAPPLE, B.Sc.

ROUND THE WORLD OF WIRELESS

The New "Practical Wireless"

AS announced last week, this issue marks the first of the new series of PRACTICAL WIRELESS. It will be noted that it appears in a new and more attractive cover, and that many new features are to be introduced. We have considerably augmented our staff of contributors, with the object of still further improving the service we provide for our readers. A large proportion of our space this week is devoted to that important event Radiolympia, and thus many of the new features are unavoidably held over.

The great success of this journal since it was introduced seven years ago is one of the romances of journalism. It entered a field in which there was fierce competition for the readership of keen and intelligent experimenters all over the country. We introduced the solus policy of specifying only those parts actually used in receivers described; we backed up our claims regarding our sets with a guarantee of free service; we undertook to answer readers' letters free of charge; we produced a series of practical volumes dealing with all aspects of wireless construction to make good the lamentable omission which existed prior to the publication of this journal. In these and many other ways we leapt into the lead and remained there.

Most of our competitors in the particular field for which we cater have gone. For so many old established competitors to have fallen by the wayside, and for the last in the field to remain, is an almost unparalleled romance of Fleet Street.

The improvements it is our intention to effect are a gesture to those many thousands of loyal readers who have faithfully joined our ranks and remained there. We shall continue our policy of catering for the keen experimenter; we shall continue to service sets and to answer readers' queries free of charge; the editorial policy will be enlarged to cater for the many new aspects of radio and television which have come into existence during the past five years. The price of this journal and its publishing day remain unchanged—threepence every Wednesday.

Thus, for the same price readers of PRACTICAL WIRELESS will receive a greatly improved and even more attractive journal—an even better technical and news service. We ask our readers to help us to make this important change known by telling their friends about it.

Please write and tell us what you think of PRACTICAL WIRELESS in its new form.

Indian Broadcasting

AN increase in the number of licensed listeners in British India is reported. At the end of May the figures were 75,524, representing an increase of over 21,000 during the year.

High Efficiency Mark

THE S.P.I.R. of France has announced a scheme to give purchasers an indication of the standard of receivers on sale. Those which obtain a required standard of efficiency in selectivity, sensitivity, and power and tonal quality will in future be given a special "quality" mark.

Editorial and Advertisement Offices: "Practical Wireless," George Newnes, Ltd., Tower House, Southampton Street, Strand, W.C.2. 'Phone: Temple Bar 4363. Telegrams: Newnes, Rand, London. Registered at the G.P.O. as a newspaper and for transmission by Canadian Magazine Post.

European Exchange

A EUROPEAN exchange of old airs and dances between Sweden and Scotland will be broadcast on August 30th. Scotland's contribution will be made by the Strings of the B.B.C. Scottish Orchestra, led by J. Mouland Begbie and conducted by Kemlo Stephen. These European exchanges have become more and more a feature of current broadcasting. Only a month ago the Stockholm Y.M.C.A. Male Voice Choir broadcast from Edinburgh. As a rule, nationals and friends of nationals living in Edinburgh are invited to come to the studio to see and hear the broadcast. Such broadcasts have excellent entertainment and cultural value and should help, in time, to develop friendliness between countries.

Jack Wilson and His Versatile Five

ON Saturday evening, September 2nd, Jack Wilson and his Versatile Five will play light music. Solo parts will be taken by Jack Wilson (piano) and Fred Adcock (violin). Formed over four years ago, this combination has had many broadcasts for Midland, National and Empire; and several of its members are also well known on the air as solo broadcasters.

Variety at Home

DAVID PORTER is producing another "Variety at Home" programme for Northern listeners on August 28th. It will include songs written and rendered by Diana Morrison, accompanied on the piano by Norman Whiteley; Roy Davey, the boy xylophonist; Taylor and Sharp (songs in harmony); and Les Crossley and his Harmonica Rascals. Henry Reed's Miniature Variety Orchestra will, as usual, provide the incidental and linking music.

A Concert of Elizabethan Music

A CONCERT of Elizabethan Music will be broadcast on September 1st (Regional) in which the B.B.C. Singers, under their conductor Leslie Woodgate, and Audrey Rowton (harpsichord) will take part. The programme includes madrigals from "The Triumphs of Oriana," sung by the B.B.C. Singers, and harpsichord pieces by William Byrd and John Mundy.

Motor-cycle Grand Prix

THAT legion of listeners who are motor-cycle enthusiasts will have an opportunity, on August 26th, to hear described the thrilling race for the motor-cycle Grand Prix, run over the road course at Donington Park. In this enclosed circuit, which possesses all the characteristics of a road, many of the most famous motor-cycle competitors will take part for the "blue riband" of the motor-cycling world.

ROUND THE WORLD OF WIRELESS—Continued

Belgian Medium-waver on Two Channels

RADIO ARDENNES, a small privately-owned broadcasting station at Libramont, in the Ardennes, transmits programmes in the French language daily from B.S.T. 07.00-0900 on 267.4 m. (1,121.6 kc/s), and from B.S.T. 17.00-19.00 on 208.6 m. (1,438 kc/s).

Finnish Life-savers Use Radio

ON the seaside beaches in Finland the Government has installed loud-speakers for the broadcast of radio entertainments; they are also brought into action to warn bathers who may be seen venturing too closely to the breakwaters or, if non-swimmers, who are likely to get out of their depth.

An Interesting Tour

MR. H. V. KALTENBORN, one of the foremost representatives of the Columbia Broadcasting System, is reported to have started out from New York on an aeroplane tour of the most important Western and Central European cities. He is due to be back in America on September 1st. In the meantime, he proposes to visit London, Paris, Brussels, The Hague, Berlin, Danzig, Warsaw and Geneva, for the purpose of securing microphone interviews with leading statesmen in the individual countries. The conversations will be transmitted to the United States, and relayed throughout the network of the Columbia System, including the short-wave stations.

Lucerne Broadcasts to the World

ON the occasion of the Lucerne (Switzerland) Music Festival the concerts will be rebroadcast by Great Britain, Belgium, Denmark, Estonia, Finland, Hungary, Lithuania, Luxembourg, Norway, Poland, Sweden and the National Broadcasting Company of America. Listen to them on August 23rd, 27th and 29th.

"Let the People Sing"

THE speaker chosen to read the second and nine subsequent instalments of J. B. Priestley's specially commissioned novel, "Let the People Sing," is Kevin Fitzgerald. Mr. Fitzgerald has made frequent appearances at the microphone; in addition to giving readings, he has prepared and broadcast several amusing talks, including a series entitled "Domestic Dramas." The first instalment of the novel will be read on September 3rd by the author, who will also read the final instalment on November 19th.

Flying to the Cape

AFTER learning to fly five years ago, Joan May Parsons, of Leamington, flew to the Cape and back last summer, taking three months in all. She had many adventures. Having to land at Victoria West on the outward flight, she hit a barbed wire fence which tore the plywood and wrapped itself round the propeller shaft; the plane had to go to Capetown for overhaul. On the return she lost her way and had to come down in the middle of an African forest. Her talk on August 28th (Midland) is recorded for repetition the following afternoon.

Motor tuning control units being tested at the Ekco works.

The North Stars

VIOLET DAVIDSON will present the North Stars, a programme of reminiscences of the old Beach Pavilion, Aberdeen, on September 2nd. Taking part in the programme will be Dan Williams, comedian, Juliette McLean (soubrette), Willie Johnson (tenor), Billy Gordon (musical entertainer), Robertson and Pirie (cross-talk), The Albury Singers, Flossie Davie at the piano and Violet Davidson herself.

The "Twin Miracle," something new in portables introduced by Pilot Radio. It automatically changes from mains to battery working without a break in the programme!

Phantom Engine

A SHORT story by a new radio author, Alfred C. Lamb, of Hebden Bridge, Yorkshire, will be broadcast by W. B. Mercer in the Northern programme on August 27th. The story, called "Locomotive No. 832," is about a "rogue" engine—a murderous machine which brought about the death or injury of a score of railway men before its own destruction in a Great War air raid. Even after that, it continued to haunt the railroad, and its sudden apparition one day almost, though not quite, caused a large-scale accident.

"Cabarette"

ARTISTS in "Cabarette" to be broadcast on Tuesday, August 29th (Regional), will be: George Sheering, "Syncopating pianist," Evans and Monelle, "In original songs at the piano," and Arnie Kitson, "Xylophone and marimba." The programme will be presented by Leslie Bridgmont.

Organ Music from Bristol

REGINALD FOORT will be heard at the organ of the Colston Hall, Bristol, in the Western programme, on Sunday, August 27th.

Variety at Home

DAVID PORTER is producing another "Variety at Home" programme for Northern listeners on August 28th. It will include songs written and rendered by Diana Morrison accompanied on the piano by Norman Whiteley, Roy Davey, the boy xylophonist, Taylor and Sharp (songs in harmony); and Les Crossley and his Harmonica Rascals. Henry Reed's Miniature Variety Orchestra will, as usual, provide the incidental and linking music.

Melodies from the Comedies

EARLY on Sunday evening, August 27th, Martyn Webster compères another of the "Melodies from the Comedies" series in which he and Reginald Burston, who conducts the Midland Revue Orchestra, co-operate. The artists for this one are Marjorie Westbury, Ronald Bristol and one other vocalist.

The Tourist Trophy Race

THE Tourist Trophy Race at Donington Park now annually attracts the greatest drivers in the world, and from a broadcasting point of view provides, owing to its restricted circuit, and admirable field for commentary.

In any one circuit there is seldom a time during which the listener cannot hear a competitor racing around this difficult natural track at very high speeds.

The track has outstanding features, which have clear names, and by this means commentators keep listeners posted as to progress, approach and passage of competitors.

An Open Letter to Our Readers and the Trade

By THE EDITOR

GENTLEMEN,

You have earned my congratulations, because of the efforts you have made collectively and individually to make Radiolympia not only the best of the series, but *different*. My knowledge of what you have done assures me that the Exhibition will be successful from every aspect. You will not deny that previous exhibitions have been waning in popularity. In the boom years you relied too much upon the novelty of radio to sell your sets, and too little upon encouraging public confidence. In those days your successes were of the same order in which a good horse makes a good jockey. Many firms flattered themselves that they were Big Business Men because the public would purchase almost anything. The Captains of many of these industries have, however, departed to the obscurity whence they came. The inevitable law of supply and demand and saturation point has purged your industry of the undesirable elements and cleansed the Augean stables. Your industry is largely dependent upon a replacement market, for most people by this time own a wireless set. It may not be so easy to persuade them to scrap a set which is a few months old ; the public to-day will buy new sets purely on merit. I am quite satisfied that your industry is now running on sound, business-like lines, for only the fittest survive, and you have survived the vicissitudes of the past five years, largely brought about by the exploitation of adventurers who believed in anything for money instead of value for money.

You have tackled the job of organising Radiolympia this year on extremely sound and business-like lines. You have, I understand, issued instructions that announcements are not to be sent to the Press giving fantastic sales and attendance figures. Some of the stories, indeed, which appeared in the newspapers in previous years must have done your industry grave harm, for they were just stupid prevarications, which would not mislead a schoolboy.

You have reinstituted the cabaret show. In previous years I have questioned the wisdom of this, because I have felt that it attracted the wrong type of visitor to the Show. It is one thing to attract a gate, and another to create sales. This year, however, I waive my objections because the new layout of the Show, the imminence of television throughout the country, and the many other innovations at Radiolympia, render it imperative for you to attract to Radiolympia the largest possible number of visitors. I believe that many will go to the Show to see the Cabaret and be so interested in the exhibits that they will *see* the Show. You are justly proud of the world-wide pre-eminence of television, and you want the public to see it. You are equally proud of the high standard of merit which your wireless receivers have attained. I believe that you will attract to this Show all those who relinquished their annual visits to it about five years ago. I am glad to know that you have provided adequate seating accommodation, and that the catering arrangements are to be adequate. It pleases me to think that radio has gravitated towards standardisation as far as standardisation is possible in an industry of wizardry. You are not producing new sets just for the sake of producing them. Your policy is not to institute changes until such are necessary. Your customers will appreciate the fact that to take care of the wavelength changes, which will occur in March, 1940, you have already instituted arrangements to supply dials which align with the new wavelength allocations.

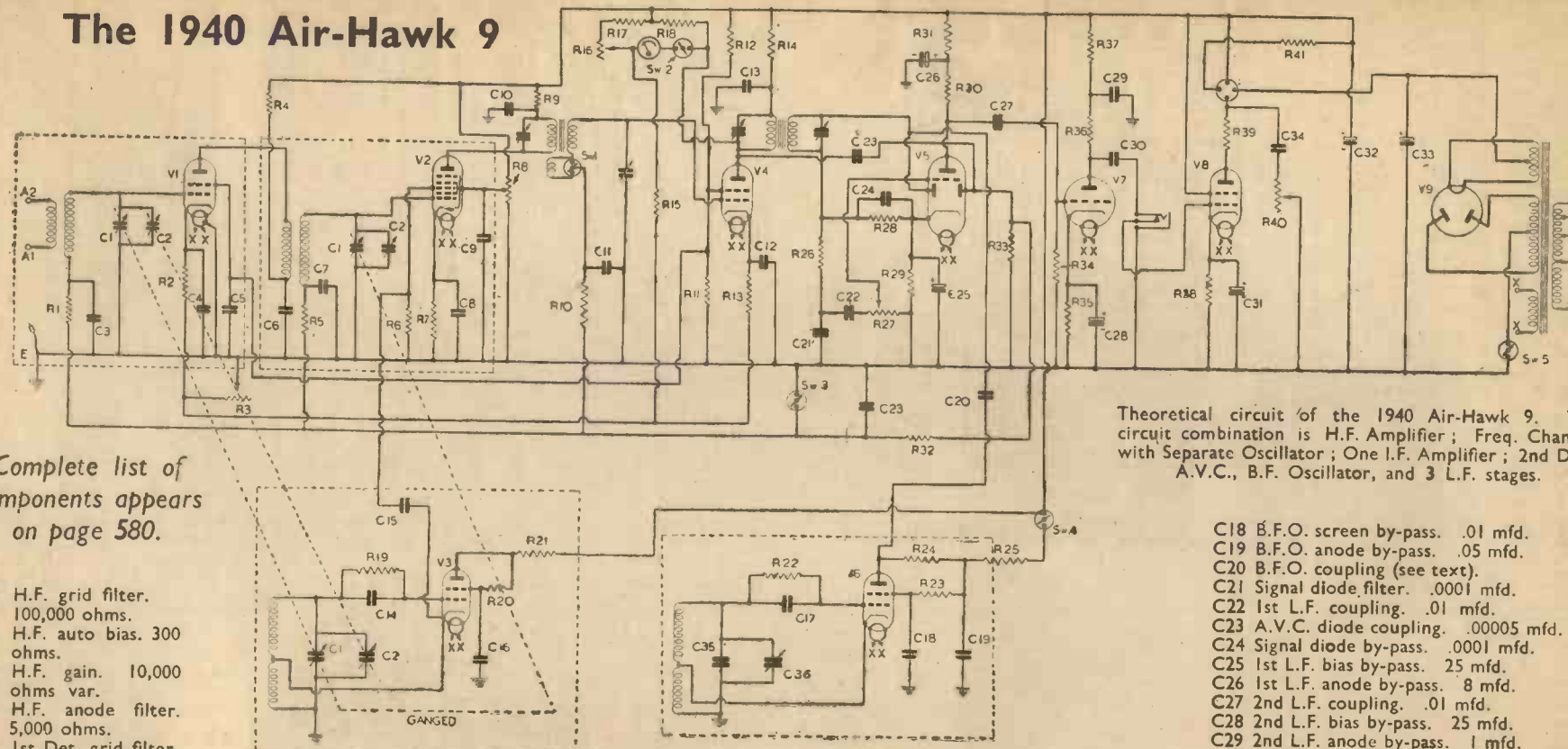
I am glad to observe that you have not neglected the experimenter and constructor, for I am certain that you are not unmindful of the services these rendered to you when your industry was but a foundling laid at your doors by Providence. You wanted people with a knowledge of this new science, and it was from the ranks of experimenters that you found them. Most of your important positions are occupied by those who were originally keen amateurs. It was not right that as in previous years you should bite the hand which fed you. This year, I see, you have catered specially for the constructor, and I thank you for it. The new presentation in which this journal appears should convince you that the constructor market is not dead, for publishers, like wireless manufacturers, are business people who do not fan lost causes. I hope as a result of the interest which will undoubtedly be displayed in the technical section of Radiolympia, and also because of the confidence which the proprietors of this journal repose in the future of the constructor market, many of your members may be persuaded to return to a market which they have sadly neglected. You are making a special appeal to women to visit the Show. I think again that you are wise in your generation in doing this, for motor manufacturers realised years ago that man proposes and pays, but it is the woman who chooses.

I welcome the encouragement you are giving to dealers and others to form parties, and your formation of a Bureau operating from 59, Russell Square, London, to handle that. A good move ! Your literature this year, including your posters, leaves no room for reproach. The success which you earned will be yours.

Yours faithfully,

F. J. CAMM

The 1940 Air-Hawk 9



Theoretical circuit of the 1940 Air-Hawk 9. The circuit combination is H.F. Amplifier; Freq. Changer with Separate Oscillator; One I.F. Amplifier; 2nd Det., A.V.C., B.F. Oscillator, and 3 L.F. stages.

Complete list of components appears on page 580.

R1 H.F. grid filter. 100,000 ohms.
R2 H.F. auto bias. 300 ohms.
R3 H.F. gain. 10,000 ohms var.
R4 H.F. anode filter. 5,000 ohms.
R5 1st Det. grid filter. 500,000 ohms.
R6 H.F. oscillator filter. 100,000 ohms.
R7 1st Det. auto bias. 600 ohms.
R8 1st Det. screen potr. 15,000 ohms.
R9 1st Detector anode filter. 2,500 ohms.
R10 I.F. grid filter. 100,000 ohms.
R11 H.F.-I.F. screen filter. 30,000 ohms.
R12 H.F.-I.F. screen filter. 20,000 ohms.
R13 I.F. auto bias. 300 ohms.
R14 I.F. anode filter. 1,000 ohms.
R15 S meter bridge. 50,000 ohms.
R16 S meter balancing. 1,000 ohms var.
R17 S meter bridge. 1,000 ohms.
R18 S meter bridge. 2,000 ohms.
R19 H.F. osc. grid leak. 100,000 ohms.
R20 H.F. osc. screen filter. 100,000 ohms.
R21 H.F. osc. anode filter. 10,000 ohms.
R22 B.F.O. grid leak. 50,000 ohms.
R23 B.F.O. screen filter. 100,000 ohms.
R24 B.F.O. anode. 15,000 ohms.

RESISTANCE AND CONDENSER LIST

R25 B.F.O. anode filter. 50,000 ohms.
R26 Signal diode filter. 50,000 ohms.
R27 L.F. gain. 500,000 ohms potr.
R28 Signal diode load. 250,000 ohms.
R29 1st L.F. bias. 1,500 ohms.
R30 1st L.F. anode. 100,000 ohms.
R31 1st L.F. anode filter. 50,000 ohms.
R32 A.V.C. filter. 1 meg.
R33 A.V.C. load. 1 meg.
R34 Second L.F. grid leak. 250,000 ohms.
R35 Second L.F. bias. 800 ohms.
R36 Second L.F. anode. 50,000 ohms.
R37 Second L.F. anode filter. 10,000 ohms.
R38 Output auto bias. 500 ohms.
R39 Output stabiliser. 100 ohms.
R40 Tone control. 50,000 ohms var.
R41 Series H.T. filter. 300 ohms.

C1 .00016 mfd. tuning.
C2 .000015 mfd. band spread.
C3 H.F. grid filter. .1 mfd.
C4 H.F. bias by-pass. .1 mfd.
C5 H.F. and I.F. screen by-pass. .1 mfd.
C6 H.F. anode by-pass. .1 mfd.
C7 1st Det. grid filter. .1 mfd.
C8 1st Det. bias by-pass. .1 mfd.
C9 1st Det. screen by-pass. .1 mfd.
C10 1st Det. anode by-pass. .1 mfd.
C11 I.F. grid filter. .1 mfd.
C12 I.F. bias by-pass. .1 mfd.
C13 I.F. anode by-pass. .1 mfd.
C14 H.F. osc. grid. .0001 mfd.
C15 H.F. osc. coupling. .0001 mfd.
C16 H.F. osc. screen by-pass. .1 mfd.
C17 B.F.O. grid. .0001 mfd.
C18 B.F.O. screen by-pass. .01 mfd.
C19 B.F.O. anode by-pass. .05 mfd.
C20 B.F.O. coupling (see text).
C21 Signal diode filter. .0001 mfd.
C22 1st L.F. coupling. .01 mfd.
C23 A.V.C. diode coupling. .00005 mfd.
C24 Signal diode by-pass. .0001 mfd.
C25 1st L.F. bias by-pass. 25 mfd.
C26 1st L.F. anode by-pass. 8 mfd.
C27 2nd L.F. coupling. .01 mfd.
C28 2nd L.F. bias by-pass. 25 mfd.
C29 2nd L.F. anode by-pass. 1 mfd.
C30 Output L.F. coupling. .002 mfd.
C31 Output bias by-pass. 25 mfd.
C32 H.T. mains filter. 8 mfd.
C33 H.T. mains filter. 8 mfd.
C34 Tone control. .04 mfd.
C35 B.F.O. padder. .0001 mfd.
C36 B.F.O. tuner. 65 mfd. var.

Sw. 1—Variable Selectivity.
Sw. 2—Meter on/off.
Sw. 3—A.V.C. on/off.
Sw. 4—B.F.O. on/off.
Sw. 5—Stand-by.

V1 H.F. amplifier.
V2 1st Det.
V3 H.F. oscillator.
V4 I.F. amplifier.
V5 2nd Det., A.V.C. and 1st L.F.
V6 B.F. oscillator.
V7 2nd L.F. amplifier.
V8 Output stage.
V9 Rectifier.

The 1940 "Air-Hawk" 9

An Improved Version of the Communications-type Receiver Which was Introduced Last Year - - By W. J. DELANEY

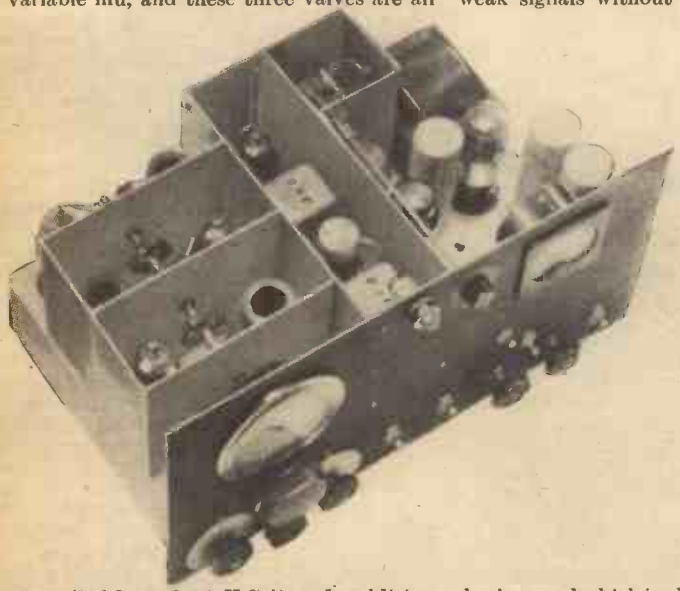
MANY visitors to Radiolympia last year showed considerable interest in the 9-valve amateur receiver which was on view on our stand, but from the remarks which were passed during the exhibition period, it proved that there was a demand for a still more elaborate type of circuit—especially among amateur transmitters. Accordingly, when the Air Hawk was described in November last year, we stated that the receiver would be "hotted up" at a later date, and the accompanying illustrations and circuit show the new version of this popular receiver.

As will be seen from the circuit, the main arrangement has been retained, but the improvements consist in the introduction of A.V.C., signal meter, variable B.F.O. adjustment and slight changes in the remaining circuit details. The introduction of A.V.C. was requested by many listeners, although on the higher frequencies a satisfactory A.V.C. circuit is not simple to find. On 20 and 40 metres the arrangement used does, however, compensate for normal QSB, but in the case of bad or high-speed fading, very little advantage is obtained. However, as A.V.C. has to be cut out when the B.F.O. circuit is in use, a switch has been provided, and it is a simple matter to cut out the A.V.C. circuit, with a slight gain on very weak stations.

A three-quarter rear view of the receiver showing the B.F.O. condenser and extension operating rod.

Circuit Arrangement

The first valve is used as a straight R.F. amplifier, and is of the variable-mu type. The first detector is also of the variable-mu type, but the regenerative circuit previously employed has been dispensed with so that A.V.C. can be applied to this valve for improved results. The I.F. stage is also a variable mu, and these three valves are all controlled from the A.V.C. line. In addition, a separate gain control is joined in the cathode circuits of the R.F. and I.F. stages and thus it is possible to use manual control on these when required. The use of this control will be explained later on. The H.F. oscillator remains as before, as also does the B.F.O. The original pre-set condenser has, however, now been replaced in the B.F.O. stage by a 65-mfd. midget variable, operated through an extension rod from the panel. This provides a very extensive variation in note—from below 1,000 c.p.s. to above 5,000 c.p.s., and is most effective in use. By using the numbered dial provided with the condenser pre-arranged settings may be obtained if desired for test purposes. The second detector is a double-diode-triode of the low-gain L.F. type, and the maker's recommended circuit has been adopted. Instead of coupling this stage to the output valve, as in most commercial models (in which a second I.F. stage is generally employed), a low-gain L.F. stage is interposed, and this provides the necessary increase in gain on weak signals without providing the noisy background which is obtained with excessive I.F. gain.



A view of the chassis of the Air-Hawk showing the effective screening arrangements.

Results Obtained

As a result the receiver is very quiet in use, and if the R.F. gain is adjusted to avoid overload on powerful stations, it is possible to listen in perfect comfort to American amateur stations almost as well as locals on a quality receiver. Some idea of the sensitivity of the receiver may be gained when it is stated that during one week when the receiver was in use in a North-west London suburb, every continent was covered, and VE's, VK's, all W divisions, and ZL's ('phone) were tuned in direct on the loudspeaker with the L.F. gain-control advanced only one-third. This was on the 20-metre band and between the hours of 6 p.m. and 3 a.m. As the 'phones are included after the first L.F. stage, they may be worn for searching purposes without risk of damage to your ear-drums should you strike a powerful station, but if a weak station is picked up, it may generally be put on the speaker merely by removing the 'phone plug. In most cases, provided the signal is audible in the 'phones, it may be put on the speaker for better readability.

The signal meter arrangement finally adopted is a bridge circuit with the meter fed from the I.F. anode. It will be found that powerful short-wave broadcast stations will send the needle right over and thus care is needed when scanning the band. As, however, the meter would be damaged if left in circuit when the set is first switched on, due to the excessive current flowing through the bridge until the valves have heated up, a switch has to be included to open the meter circuit. Care should therefore be taken always to have this off unless a reading is required. The remaining switches are for the B.F.O., selectivity, A.V.C., on/off and stand-by.

Constructional Details

If you have the original model and wish to bring it up to date a new panel will have to be obtained, as the speaker has now been separated so that maximum output may be obtained without risk of microphonic feed-back. The connections to the 2nd detector valveholder must all be removed (with the exception of the heater) and new connections made to suit the D.D.T. valve. The top-cap lead from the I.F. transformer is not now needed and must be cut off, with a new hole drilled in the chassis to take the lead to the top cap of this valve—which is now the grid of the triode section of the D.D.T. The selectivity switch is trans-

(Continued on page 580)

A CONSTRUCTOR TOURS RADIOLYMPIA

The Writer of this Article Conducts You to Those Stands of Special Interest to the Constructor, and Pleads for More Support From the Radio Industry. By L. O. SPARKS

THE advance details of the exhibits at Radiolympia are always awaited with the greatest interest and anticipation. The general listening public shows, on the whole, more than a passing exhibition enthusiasm. Their interest each year is, no doubt, rekindled by the publicity given to Radiolympia, and the rather intriguing, if not always technically perfect, descriptions given by some of the newspaper reporters and columnists of the outstanding features of the new season's programme.

One of the new types of Dubilier condensers.

It is left, however, to the constructor—by which I mean the listener who would rather construct his own equipment than buy a complete commercial receiver — and his co-partner the amateur transmitter, to show the technical interest, and the keenest appreciation of even the most minute improvement in all apparatus and accessories associated with his hobby.

Many would have us believe that this enthusiasm on the part of the amateur is no longer with us. That the constructor movement is as dead as the dodo, and that the introduction of the low-priced receiver, having in most instances a remarkable specification, has tolled the death knell over those who would construct a receiver at home.

While admitting that there are quite a number who would not shed tears if such misconceptions were true, it becomes really amazing to think that anyone who has any connection at all with the radio industry can blind himself to the most obvious signs that the constructor movement is very much alive. Fortunately this year the R.M.A. has taken steps to interest the constructor.

Licence Figures

According to the latest figures available, it is estimated that there are 9,009,750 licensed listeners in this country. This figure does not necessarily include all those who buy component parts. If one assumes that, say, only 10 per cent. of those people are constructors, and that they spend the very conservative sum of £5 per annum on their hobby, well, that amounts to £4,500,000, which, in the idea of the writer, seems to represent a contribution to the radio industry worthy of, at least, some little consideration and trouble.

It will, no doubt, be stated most emphatically that this amount never reaches the pockets of the British manufacturers. That the figures look very well on paper, but beyond that they do not exist in hard cash so far as the industry is concerned. To such remarks I must agree, provided that the manufacturers will take off their dark glasses through which they appear to examine the constructor market, and admit that the reason why they don't get the business is simply due to the fact that the thousands of would-be buyers of British components have been forced to buy imported products, due absolutely to the short-sightedness of a few to whom the constructor looked to supply their wants.

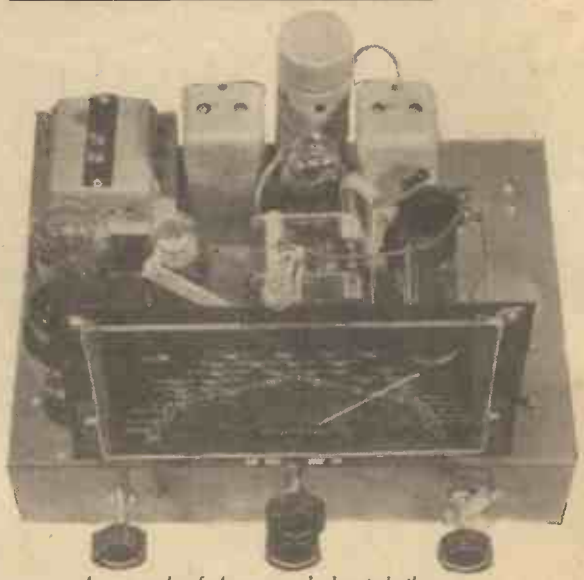
Constructor Movement Activity

The progress of PRACTICAL WIRELESS is but one indication that sustained support is available from the constructor movement to those who offer, consistently, the right goods at the right price, and back them with a service worthy of the name in its truest sense. Many are now doing so.

The examination of the list of the exhibitors at this year's Radiolympia is not, so far as enthusiasts are concerned, a very cheering proposition. One cannot help being struck by the number of absent ones when one compares the list with that of, say, 1937, or even last year. Many names, names well known in the constructor world, no longer appear on the list, and I am sure that they will be missed by thousands who used to take the keenest interest in their products. The fact that they are not exhibiting does not mean that all of them are no longer in business; but the fact that they are not there to meet us is due, no doubt, to individual reasons and, perhaps, being too busy with Government contracts.

Supposing we start from the stand which will be the meeting point of all enthusiasts, namely, No. 9.

All Constructors Should Visit Us on Stand No 9, Ground Floor.



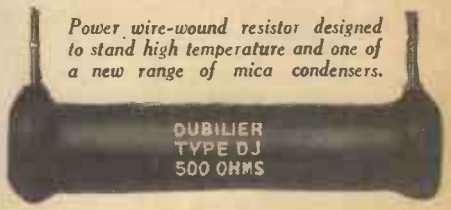
An example of Armstrongs' chassis-built receivers.

Turning right from here to Stand No. 10, Messrs. Antiference, Ltd., have quite a number of items of particular interest to those who are interested in the design, construction and erection of efficient dipole receiving aerials, suitable for television and ultra-short-wave reception.

Servicing Equipment

Servisol, Ltd., on No. 11, will attract the attention of all interested in servicing and associated equipment at most reasonable prices, while next door, on No. 12, the range of items produced and offered by Norman Rose (Electrical), Ltd., are really too numerous to mention, but many items of interest to the amateur and professional will tempt one to linger a while.

For all information about Erie resistors, fixed and variable, or all types and sizes, one need not go farther than to the next stand, namely, No. 13, before being attracted by the Admiralty stand, No. 15, on the other side of the gangway.



Power wire-wound resistor designed to stand high temperature and one of a new range of mica condensers.

Doubling back in our tracks, we soon come to No. 17, which displays the products of Ferguson Radio Corporation, Ltd., and, speaking from past experience, a halt will have to be made here to examine all the items exhibited, before turning down the intersecting gangway to pay a visit to the makers of the Westinghouse Rectifiers on Stand No. 30. Here will be found all the standard lines of this company and, of course, quite a large percentage of them will appeal in particular to the constructor. By the way, don't forget to get a copy of their latest booklet before leaving to go over to No. 19, Messrs. Goodmans Industries, Ltd., to have a good look at their most interesting range of loudspeakers, baffles, and flares or horns.

Continuing down the main side gangway we shall come across No. 22 and, at the back of that, so to speak, we shall find No. 28, which will most certainly take up a goodly portion of our allotted time. On that stand will be found all the numerous items produced by those famous condenser people, Messrs. Dubilier, Ltd. It would be hopeless to try to enumerate all the various types, sizes, and ratings of their condensers, let alone the fixed and variable resistances. Some of the new types are particularly interesting, and the increase in operating voltages of certain kinds is really amazing.

Loudspeakers

The island forming Stands 23, 24, 25, and

(Continued on page 589).

ON YOUR WAVELENGTH

By Thermion

The Show Is Here!

THE publication of this *new* PRACTICAL WIRELESS coincides with the first day of the Show. Radiolympia is going to be a staggering affair, and attendances will be enormous. I hope that every reader of this journal will make a point of visiting the Show at least once, and taking at least one friend with him—or her! A suggestion has been made that readers should get together parties and visit the Show in groups. This is usually a more interesting method of visiting an exhibition than to go solus. There is pleasure in discussing the exhibits, talking about old times, and having a sort of annual lunch or dinner at the Show.

If you are one of those who last visited the Radio Show some years ago, you must come this year to note the vast difference.

The constructor this year has not been ignored, as he was in connection with previous shows. You will not have to delve amongst odd corners to find the components. The experimenter has been catered for in a special section, and this year for the first time Radiolympia is to have a model factory showing various processes of manufacture being carried out under working conditions. You will be able to see coil winding, wire joining, grid making, helical coil spring making, R.F. coil adjusting, test and assembly of receivers, resonance tests, impedance comparison, inductance comparison, engraving, chassis wiring, gang condenser testing, wire covering, cutting and forming wires of tubular condensers, dry battery manufacture, and in addition there will be a battery of 16 revolving drums showing the complete chassis of many of the leading manufacturers' sets.

Make a Party of It

A SPECIAL Party Bureau to be run in conjunction with this year's Radiolympia has been inaugurated by the R.M.A. at their headquarters at 59, Russell Square, London, W.C.1, to help dealers and others to organise parties to the Exhibition. Considerably reduced fares by road and rail are obtainable for both large and small parties; catering and hotel accommodation are also obtainable at reduced rates, and special party tickets are being issued at half price. Also, wherever possible the Bureau is arranging seats in advance for suitable performances in Radiolympia's broadcast and television theatre.

The Radio Theatre

FOR the first time in the history of the world a theatre has been specially built for broadcasting and television. It has been designed and constructed as a replica of the famous Bowl Theatre in Hollywood at a cost of over £5,000, with a semi-circular revolving stage that will hold over 300 performers, and an auditorium to enable 2,500 visitors to hear perfectly and obtain a clear and uninterrupted view of every part of the stage. The auditorium partly encircles the stage.

The new Hammond Organ will be seen for the first time in this country at Radiolympia.

Come and be Televised

YOUR one opportunity of being televised will be provided at Radiolympia. All you have to do is to go to the Television Studio between 11 a.m. and noon and ask them to televise you—and they will. Bring your friends too, and ask your friends at home, if they have a television receiver, to see how you "come over."

Miss Radiolympia

I AM certainly keenly looking forward to seeing Miss Radiolympia, just to satisfy myself that the judges have picked the right type of girl! Visitors at many leading coast resorts this year have been assisting the R.M.A. in selecting a girl with a perfect radio and television personality to be presented at the Exhibition. The finals will have been held in London, Birmingham, Folkestone and Nottingham before you read these notes.

Architect Designed

THE Exhibition itself differs from any of the preceding shows. It has been architect designed. One end of the Exhibition represents the television tower at Alexandra Palace, and the other Broadcasting House. There is ample room, adequate seating and catering accommodation, and most of the personalities of radio will be there. There will be television demonstrations on dozens of stands, and every reader who has not done so, if for no other reason, should visit Radiolympia to witness the high state of perfection which television has reached.

So you must go to the Radio Show!

Wireless Licences

THE Post Office issued 363,114 wireless receiving licences during July, 1939. This figure represents a net increase of 20,640 in the number of licence holders during the month after making allowance for expired licences and renewals.

The approximate total number of licences in force at the end of July, 1939, was 9,030,950, as compared with 8,657,100 at the end of July, 1938, an increase during the year of 373,850.

During the month there were 495 successful wireless prosecutions.

Poetic Piffle

ONE or two readers have written regarding my justifiable criticism of Tennyson's and Gray's tripe, suggesting that I should make due allowance for poetic licence. The only thing which I would do to all poets is to take their licences away. They are nearly always lazy individuals who explain their laziness away by stating that they are waiting for the divine afflatus. No man who does so little worthless work has a right to be considered famous. One reader thinks because I do not enjoy poetry and crooners (I put them in a class together) I can only enjoy something hard and cold such as calculus and geometry.

Another quotes a poem about the deep deep sea. Perhaps you can tell me how deep is a deep deep sea, and how it differs from a shallow deep sea, or a deep shallow sea, or a shallow shallow sea. The rhyming word in nearly every case provides the thought in poetry, and having composed some snivelling line the poet finds some word which will rhyme with its last word. I still hope that some variety artiste will make a speciality sketch with suitable "noises off" of some of the alleged epic poems.

The New Wavelength Allocations

THE new wavelength allocations take place in March, 1940. The manufacturers have agreed on a policy concerned with changing receiver dials to suit the new wavelengths. Procedure as to how the new dials will be fitted, supplied and charged for, falls under three main heads, and it will be seen that this relates to the age of the receiver. It has been agreed that all sets supplied after January 1st, 1940, will be fitted with new dials, or with a dial as spare. In the latter case, the old dial will be changed free of charge by the dealer at the appropriate time. The dealers are to be supplied with new dials for 1939-40 sets, in readiness for the change.

Sets supplied in the autumn of 1939 will be charged for at the rate of 2s. 6d. per dial plus the cost of fitting by the dealer. All sets prior to the 1939 Exhibition catalogue will have dials available back to those listed in the 1937 Exhibition catalogue, and the charges will be 4s. for 1938-39 sets, and 5s. 6d. for 1937-38 or earlier sets. In each case if these dials are fitted by a dealer an extra charge will be made and fitting prices have not yet been standardised.

Press-button Receivers

THE readjustment of sets provided with push-button tuning has also been considered, although it has not been found possible to standardise prices. The readjustment of such receivers should be a comparatively simple matter.

Radiolympia Television Broadcasts

SPECIAL television transmissions from Radiolympia will be radiated daily by Alexandra Palace, and thus dealers should be able to provide on their demonstration screens a useful advertisement for the Show. The programmes will be taken from the Radiolympia theatre and also from a special studio. It is proposed to interview visitors to the Show in the latter, and an hour's transmission will be provided every morning from 11 a.m. to 12 noon in place of the film.

Notes from the Test Bench

Test-bench Layout

WHEN a great deal of receiver servicing has to be carried out, various meters are called for. In most cases these are stacked on a shelf and taken down as required. Multi-range meters have to be adjusted according to the range required, and thus test work is not exactly simple and straightforward. A suggestion has been made to facilitate this work by mounting all meters permanently and using extension leads, external switches and sockets or flex leads attached to the bench top. A number of sockets could be wired in parallel and sunk flush with the bench top and lengths of flex lead provided with clips and/or plugs could then be connected to the appropriate parts of the circuit, plugged into the sockets and the meter thereby introduced. The appropriate range selector could be placed on the bench, and where a large 0-1 milliammeter could be obtained and mounted on the back of the bench, the single dial would be suitably calibrated and testing simplified.

Mounting Components

WHEN mounting components on some types of receiver, nuts and bolts have to be employed, but difficulty is experienced in attaching the nuts to the bolts owing to the proximity of components. Box spanners are, of course, invaluable in such cases, and where these are not available, makeshift spanners may be made by taking a length of thin tubing and hammering it round a nut of the size required. The tubing may not remain very rigid, but if a shakeproof washer is placed over the screw the nut will not have to be turned very tight and the spanner may thus be used with satisfactory results.

Leading in Devices

WHEN leading the aerial lead into a room, the usual scheme is to drill the window frame. For transmitting purposes, however, greater insulation is required and the window glass itself is usually drilled and special lead-through insulators fitted. To avoid the trouble of drilling the glass, however, a good idea is to lower the window, where the ordinary sash type of window is fitted, and place a length of board along the upper part of the window. This may be drilled and the insulators mounted in the usual way. Where ordinary casement windows are found, however, the alternative is to remove the glass pane and replace with a shorter pane and a length of wood.

The Flying Announcer

MICHAEL HINN, WLW announcer, circled his 'plane over Watson Airport, Cincinnati, recently and waited for the arrival of an ambulance and the fire department. The landing gear on his machine was broken.

Hinn has been flying for three years and only last month purchased his own 'plane. The other night he took his 'plane for a trial spin before taking his friends aloft. Just as he left the ground there was a sharp report of snapping steel, and Mike felt the 'plane take a slight dip down. Safely off the ground he began to look around for the trouble and sickened at the sight of only one wheel on his landing gear.

Airport officials kept him aloft while they summoned the fire department and an ambulance, for Hinn's 'plane lands at high speed. But the service of neither was necessary. Hinn came down unhesitatingly, slowed his landing speed below normal, touched the good right wheel to the ground, cut the ignition switch, pushed up his goggles, covered his face with one arm and held the stick with the other hand. The 'plane came straight down the field, lost speed quickly, dipped to its injured side until the wing tip touched the ground, then nosed up slightly, stopped and settled back.

"The landing was distinctly to Hinn's credit as a flyer," declared airport officials. "I felt funny waiting up there for the ambulance," said Hinn.

"Bon Voyage"

BETWEEN eighteen months and two years ago, while Stanford Robinson was touring the operatic centres of Europe to study technique and production methods, he heard a performance of Kunneke's "Gluckliche Reise" and liked it so much that he decided to arrange a broadcast of the work, one day, to British listeners.

Now, as Music Productions Director of the B.B.C., he is to fulfil the promise he made to himself, for he has scheduled the work for production on September 5 (National) and September 6 (Regional). The title has been translated to "Bon Voyage," and the performance will be produced by Gordon Crier, who is being "lent" by the Variety Department to the Music Productions Section for the occasion.

PRACTICAL TELEVISION

Aug. 26th, 1939. Vol. 4. No. 166.

Film Transmissions

IN the original B.B.C. schemes for transmitting talking films by television, advantage was taken of the storage principle exhibited by the signal plate of the electron camera. That is to say, the pictures of each individual film frame were projected on to the mosaic and the electrical potential acquired by each small element was then analysed by the scanning beam during the period when the optical picture was cut off. After a long period of trial and much adverse comment, this method has now been abandoned and Mechau film projectors installed, so that by an ingenious cam-operated mirror mechanism the picture has continuous movement in lieu of a shutter device. The Americans realised quite early that the storage principle had drawbacks, and devoted a considerable time to research into non-intermittent motion systems. Rocking mirrors and other devices were tried, but serious optical and mechanical difficulties were encountered so that ultimately a reversion to intermittent motion was made by the R.C.A. A modified form of a standard projector was used, however, and in actual practice the film picture, focused on to the mosaic, is chopped sixty times per second by a rotating shutter in order to make the apparatus conform to the American television picture standard of 60 frames per second interlaced to give 30 pictures per second. In the case of the Columbia Company, however, a non-intermittent film scanner was developed, employing an image dissector tube together with electronic compensation, and the only moving component is a slotted shutter. A form of chasing motion is employed, and the prime difficulty seems to be associated with variable film shrinkage, but this is compensated by lens focus adjustment which is scaled in terms of shrinkage.

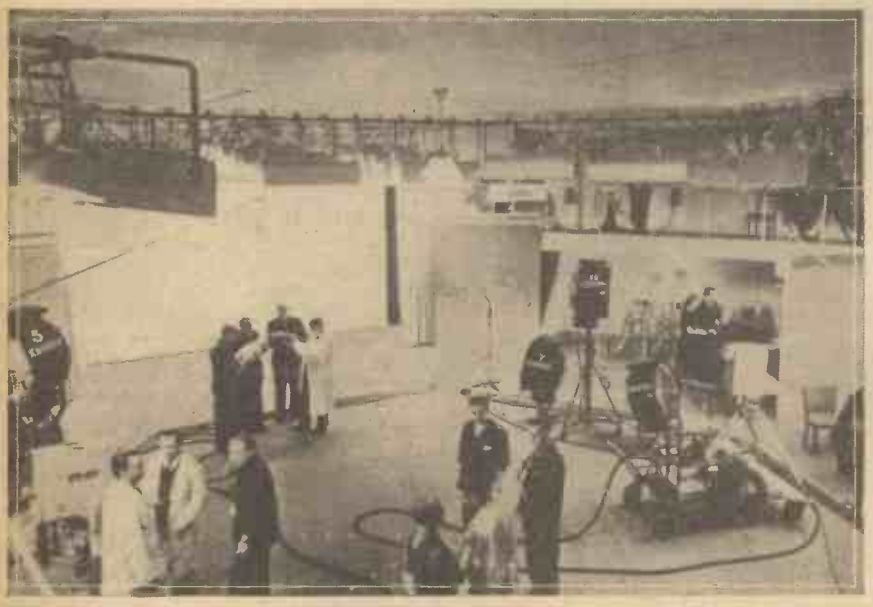
An International Conference

DURING the first two weeks in September an international physics conference is to be held in Zurich, when eminent physicists from all over the world are expected to be present. The work of organisation is being undertaken under the auspices of the Physical Society of Zurich, and the Swiss Ecole Polytechnique Fédérale, and everything will be sectionalised. Naturally, the subject of television is being given due prominence, and the arrangements so far concluded show that papers will be presented by Dr. Zworykin of R.C.A., A. D. Blumlein of E.M.I., Dr. Muller, of Fernseh, Barthélémy of France, Dr. Okolicsanyi of Scophony, Dr. Schroter, of Telefunken, and Prof. Kapfinuller, of Siemens Halske. This international interchange of ideas and opinions on television is an admirable scheme, and it is a pity that some of the learned societies in this country do not adopt a similar policy.

High-voltage Precautions

THE use of high voltages in cathode-ray tube receivers, especially those employed in big screen projection work, calls for certain precautions in order to obviate picture defects arising from corona discharges or scanning distortion due to an accumulative charge on the inner coating of the glass bulb. This, of course, is additional to the normal precautions undertaken to prevent any voltage shock due to mishandling of the equipment. For example, all sharp edges or points are reduced to the barest minimum to prevent any corona or spark discharge. In one case where there is an inner metallic or colloidal graphite coating, a perfectly smooth guard-ring is incorporated in close proximity to the sharp edges, and contact is maintained with the coating by springs. In this way corona discharge is eliminated. Any spark discharges evidence themselves on the picture screen as light splashes, bearing some resemblance to motor-car ignition interference. Any accumulation of charge on the tube's internal coatings will bow the scanning lines so that they take up a curved path instead of the required straight one. Deflection of the field so that it loses its picture mask centring can also occur, and such charges have to be neutralised to restore the picture to normality.

Girls in the latest bathing dresses posing while being televised recently at the Rochampton Club' swimming-pool.



The television transmission room at the Berlin-Witzleben station, the transmissions from which can be picked up with the new television set which was shown for the first time at the Berlin Radio Show.

SPECIAL NOTE.

Owing to pressure on our space many of our Regular Features are held over this week.

The 1940 All-wave Three

An Efficient 3-Valve Receiver designed for Four-wave-band Reception. Built On Our New Transparent Chassis!

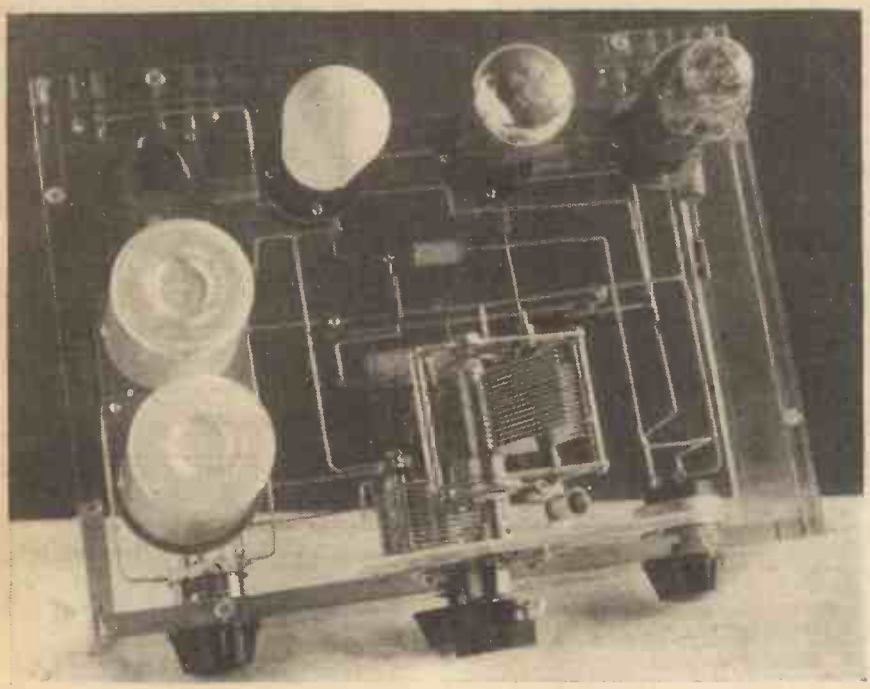
THERE is always a great demand for an efficient receiver which will receive a reasonable portion of the short-wave transmissions plus the usual medium- and long-wave programmes which are invariably required for home entertainment. To satisfy this demand would not be difficult were it not for the fact that many other requirements are always specified. For example, the receiver must be simple to construct and operate, low in price, free from complicated adjustments and, according to the majority, for battery operation.

To satisfy all the requests, therefore, it becomes necessary to produce a design which, while being quite simple, must have a reasonable degree of efficiency over the wavebands concerned. A superhet or H.F. type of circuit is ruled out of the question on account of controls and costs, so one is only left with a straight arrangement to secure satisfactory range and volume. With the receiver about to be described, we have limited the valves to three, and followed a perfectly orthodox arrangement of detector followed by two stages of L.F. amplification.

This, in itself, may not seem particularly striking, but by embodying the Bulgin coil type No. 56 and by using resistance-capacity coupling throughout, we have been able to obtain a circuit which gives four distinct wavebands and a high degree of tonal quality with ample volume for normal domestic requirements.

In many all-wave receivers of the simple type the wide waveband usually associated with that type of receiver is often obtained by using plug-in coils. This certainly eliminates switching problems and wiring, but it is not convenient when the receiver has to fulfil the dual requirements of home entertainment and short-wave listening.

In the 1940 All-Wave Three, wave changing is merely a matter of a turn of the special Bulgin switch which enables one to cover 15 to 35 metres, 30 to 85 metres, 200 to 550 metres, or 1,000 to 2,000 metres at will, and, owing to the design of the coils and switch the wiring is reduced to a minimum and all the troubles usually associated with such switching completely eliminated.



Plan view of the receiver, which has been built on Catalin to reveal all details.

The Circuit

An examination of the theoretical circuit on p. 566 will reveal the fact that the aerial circuit is formed by a simple single tuned grid coil, the aerial being connected to the top end. As many readers are no doubt aware, such an arrangement does not give one an exceptionally high degree of selectivity; therefore, to improve matters in this direction, alternative aerial sockets are provided, which enable the .002 mfd. variable condensers to be brought in series with the aerial if so desired. Under normal conditions, and providing an aerial of reasonable length is used, the degree of selectivity is quite satisfactory; in fact, it is surprising what separation can be obtained by judicious use of the aerial series condenser and reaction control.

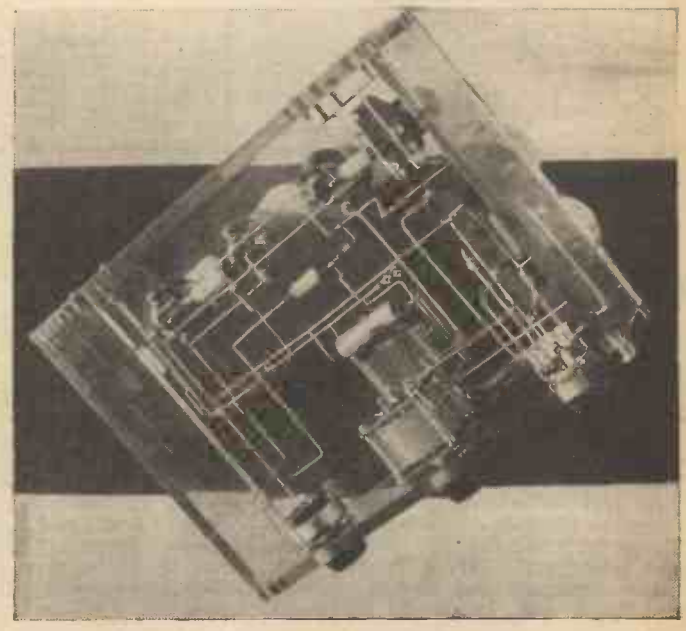
Speaking of the reaction control brings into prominence the fact that the coil is so designed that the reaction winding is increased or decreased, by the same switch as that used for wave changing, according to the waveband being covered, thus allowing a very smooth reaction control to be obtained over the complete wave coverage of the circuit.

A standard leaky grid detector employing a triode valve is used as this, together with two stages of L.F. amplification, was found to provide ample volume and sensitivity.

In place of the usual H.F. choke in the anode circuit, a 10,000-ohm resistance has been used as an H.F. stopper, adequate by-passing of the H.F. currents being provided by one section of the differential reaction condenser.

The L.F. Side

The anode load for this valve is formed by the 50,000-ohm resistance which receives its H.T. via a further 20,000 ohms inserted to obtain, together with the 2 mfd. condenser, a satisfactory degree of decoupling to prevent undesirable feed-back through the H.T. supply. The output from the detector is fed to the grid circuit of the first L.F. via a coupling condenser of .01



Another view of the completed receiver.

THE 1940 ALL-WAVE THREE

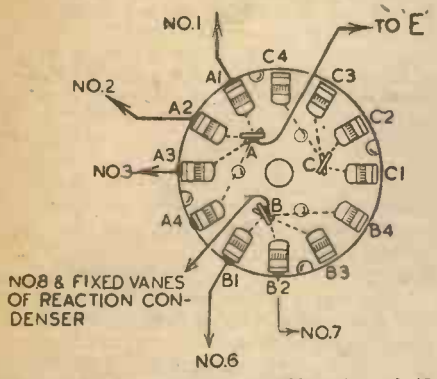
(*Continued from previous page.*)

mfd. and an H.F. stopper of .25 megohms.

As it is highly probable that the first two valves would overload the 220HPT when receiving a powerful signal, a volume control has been provided in the form of a variable grid leak for the first L.F. valve.

The remaining L.F. coupling is secured by the normal resistance capacity method plus an additional H.F. stopper in the grid circuit of the 220HPT, and to correct the tonal response of the pentode a simple fixed tone corrector is connected between the anode of the output valve and the common negative earth line.

By a careful selection of components, and through using R.C. coupling, the actual wiring of the receiver is reduced to a minimum and rendered very simple and thus easy to follow.



Wiring of the switch contacts. Note A1 and A2 do not refer to aerial sockets.

Construction

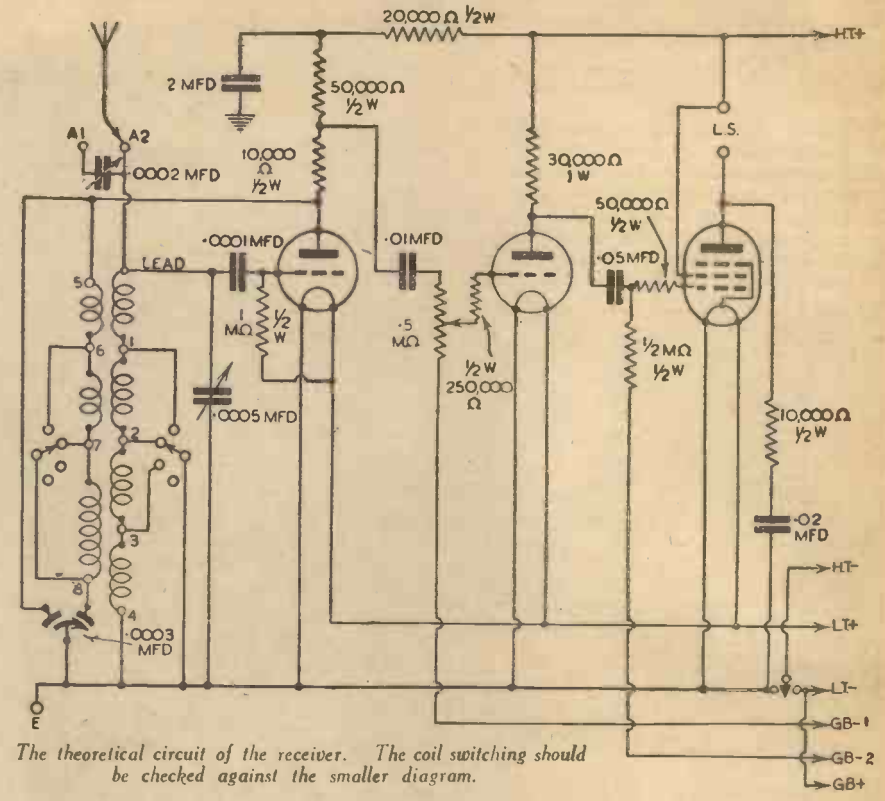
It is not possible in this issue to give the constructional details of the receiver, owing to space limitations, but such details will be given in next week's issue, together with a complete plan drawing showing all wiring.

When examining the photos of the receiver it will be noted that for exhibition purposes the set has been constructed on a glass-like chassis which enables every wire and connection to be seen at a glance, but it must be appreciated that this form of chassis is not intended for normal constructional work. An ordinary Metaplex chassis, which can be obtained from Messrs. Peto-Scott, is quite satisfactory.

One other item connected with the construction and which should be duly noted is the fact that it is really essential for the majority of the connections to be soldered, as it is not possible to fit a switch or coils of the types specified with terminals.

Cost

An item which is quite worthy of attention is the very low cost of the essential components of this receiver, and when it is realised that the complete kit of components, less chassis and valves, can be purchased for £2 7s. 3d., it will be appreciated that it is not a costly matter to obtain an efficient all-wave receiver.



The theoretical circuit of the receiver. The coil switching should be checked against the smaller diagram.

LIST OF COMPONENTS FOR THE 1940 ALL-WAVE RECEIVER

	s.	d.
One variable condenser .0005 mfd. J.B. Popular Log	5	6
One variable condenser .0003 mfd. J.B. No. 2,048.	4	9
One variable condenser .0002 mfd. J.B. No. 2,095	2	6
One slow-motion dial. J.B. Type No. S.L.3.	5	9
Two four-pin valveholders. Clix Type No. X.111	0	10
One five-pin valveholder. Clix Type No. L.111	0	6
One A.1, A.2, and E socket strip. Clix No. X.382	0	6
One L.S. socket strip. Clix No. X.380	0	5
Fixed condensers (T.C.C.): One .0001 mfd. Type No. 300 (1s.) One .01 mfd. Type No. 300 (1s.) One .02 mfd. Type No. 300 (1s.) One .04 mfd. Type No. 300 (1s.)	4	0
One 2 mfd. Type No. F.T.	2	3
Resistances (Erie). All ½ watt type: One 20,000 ohm. (3d. each) Two 50,000 ohm. (3d. each) Two 10,000 ohm. (3d. each) One 1 megohm. (3d. each) One ½ megohm. (3d. each) One .25 megohm. (3d. each)	2	0
One 0.5 megohm potentiometer with switch (Erie)	4	0
Coil, four-range. Type No. 56 (Bulgin)	10	6
One wave-change switch. Type No. S.203 (Bulgin)	2	9
One 210 H.F., one 210 H.L., and one 220 H.P.T., valves (Cossor).		
Chassis, 12 x 9 x 3 inches, Metaplex (Peto-Scott).		
Batteries—one 9-volt G.B. and one 120-volt H.T. (Drydex): one 2-volt accumulator (Exide).		
Speaker: P.M. moving-coil (W.B.)		

IMPRESSIONS ON THE WAX

RECORDS that will be eagerly sought after this month are two new recordings of this year's Aldershot Tattoo. The first record—*H.M.V. C* 3108—opens with the reception given to General Gamelin when he visited Aldershot. Other items that have been snapped in sound on this record is a stirring rendering of the "Marseillaise" and Schubert's "Serenade" played by the massed bands.

The other Tattoo record—*H.M.V. C* 3109—starts off with such popular songs as "The Lambeth Walk" and "The Chestnut Tree" and passes on to a recording of the re-creation of Queen Elizabeth's visit to Tilbury in 1588; the part of the Queen being played by Miss Marda Vanne.

Peter Dawson's deep baritone voice is particularly well suited to an organ accompaniment and the ballads he has recorded this month, "Drink to me Only" and "Roses of Picardy," are really excellent—*H.M.V. B* 8932.

On the lighter side attention must be drawn to the playing of Alfredo Campoli's Orchestra of an old American dance tune "Turkey in the Straw," and Ronald Gourley's "Dicky Bird Hop" on *H.M.V. BD* 724.

Louis Levy and his Orchestra play "Smilin' Through" and "Smoke gets in Your Eyes" in most attractive arrangements which should give these melodies a new lease of popularity—*H.M.V. BD* 723.

Although the Bickershaw Colliery Band from Leigh, in Lancashire, was only formed a few years ago, they have won 350 prizes and broadcast many times. Last year they were runners-up in the National Brass Band Festival. They have chosen two popular marches, "Blaze Away" and "Washington Greys," for their latest recording on *H.M.V. BD* 726.

Reginald Foort is in great form on his Moller Concert Organ. He plays the famous "Wee Macgregor Patrol" and couples it with "Rustle of Spring" on *H.M.V. BD* 725.

Songs from the Films

Dorothy Lamour, who starred in "Hurricane" with great success, has followed it with a film called "Man About Town." The two hits from this film, "Strange Enchantment" and "That Sentimental Sandwich" have been recorded by her on *H.M.V. B* 8940.

TROPHY "6"

NEW COMMUNICATION Receiver

All-British!

You must see your Dealer about it NOW

A HIGH-EFFICIENCY ALL FEATURE RECEIVER PRICED AT ONLY 9½ GUINEAS

THIS new All-British Junior Communication A.C. Receiver is of interest to the Amateur Transmitter and all Short-wave Listeners. The TROPHY "6" has a wave-range of 6.5 to 545 metres and incorporates all essential refinements for efficient operation. In its class, the TROPHY 6 is the finest receiver obtainable for general use and wherever dependable all-World reception on the high-frequency bands is desired.

Specification includes 6 Valves, Separate Dial Electrical Bandspreading, Directly Calibrated Frequency Scale, A.V.C. and Beat Frequency Oscillator On-off Switches, Send-Receive Switch, Single-wire or Doublet aerial inputs, Built-in Speaker and 'Phone Socket. A set which merits the complete confidence of every short-wave enthusiast.

GUARANTEE! All TROPHY instruments are covered by a special 12 months' guarantee, which includes all valves. *All models available on Deferred Terms.*

Other TROPHY Successes

TROPHY 8.—Communications-Type receiver for serious short-wave work. Principal features : 8 valves, 5 Bands —7 to 550 metres, R.F. on all Bands, continuous Bandspread tuning, separate Oscillator, switchable B.F.O. and A.V.C. Pitch Control. Doublet or Single-wire inputs. Send-Receive switch, speaker and 'phone sockets. A.C. mains 200/250v. **Price 12 Gns.** High-fidelity Speaker in cabinet to match, 2 **Gns.** extra.

TROPHY 3.—This supremely efficient receiver of the regenerative type brings short-wave listening within the reach of all. Very simple tuning. Specification and performance unsurpassed. Wave-range 6.2 to 550 metres. Built-in speaker. One user states : " . . . the most amazing Short-wave receiver I have ever handled . . . sensitivity extraordinarily high."
A.C. mains model : **6 Gns.**
BATTERY model : **£5 15/-**, less batteries.
Supplied with self-locating inductors for 12 to 52 metres.

2-Stage PRE-SELECTOR.—A Radio Frequency Amplifier with " E " series valves and a continuous wave-range of 7 to 550 metres. For use with existing receivers where it is desirable to provide increased range, selectivity, sensitivity and—for the superheterodyne—reduction to a minimum of second-channel interference. Two R.F. stages provide an exceptionally high gain, and in operation the Pre-selector is both positive and noise-free. **PRICE £6 15/-.**

PSE ELECTRICAL INSTRUMENTS

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● ***TROPHYs*** are obtainable from all good Dealers

Scottish readers note:
All TROPHY Short-wave instruments are available from Messrs. CLYDESDALE SUPPLIES—all branches

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Visitors' Guide to the Exhibitors

Arranged Alphabetically for Your Convenience. The Exhibits are Similarly Reviewed in this Order on pages 570—578. For List of Specialised Non-proprietary Exhibits, see page 573

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Armstrong Mfg. Co., Walters Road, Nags Head, N.7 ...	69
Balcombe, A. J., Ltd., 52, Tabernacle Street, E.C. ...	37
Baird Television, Ltd., Crystal Palace, Anerley Hill, S.E.19...	27
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Brit. Insulated Cables, Ltd., Prescott Lancs	20
Brit. Pix Co., Ltd., Pix Works, Lillieshall Road, S.W. 4 ...	64
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A. F. Bulgin, and Co., Ltd., Abbey Road, Barking, Essex...	62
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Marconiphone Co., Ltd., 210 Tottenham Court Road, W.1	36
Mercantile Credit Co., Ltd., 39-45, Finsbury Square, E.C.2	67
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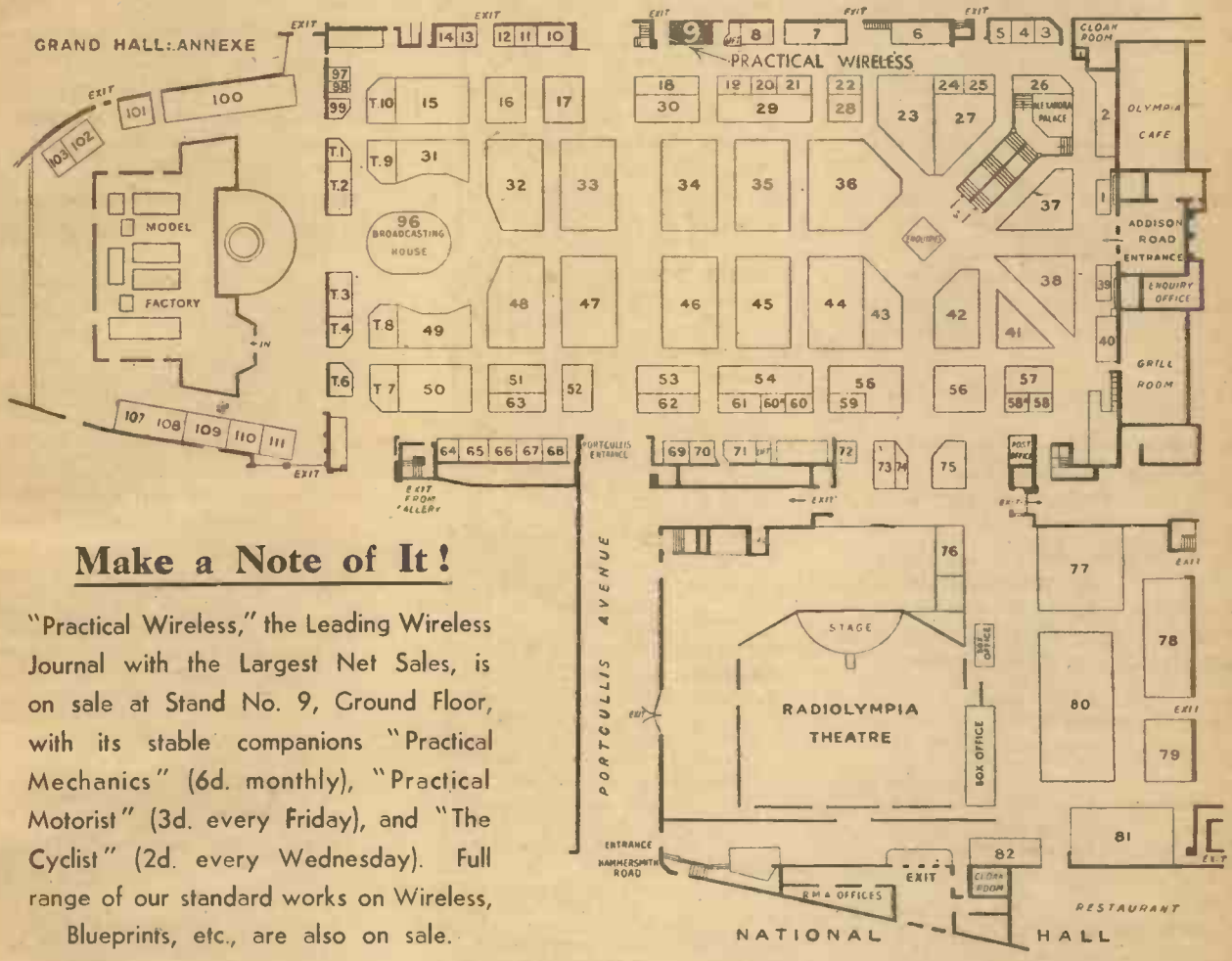
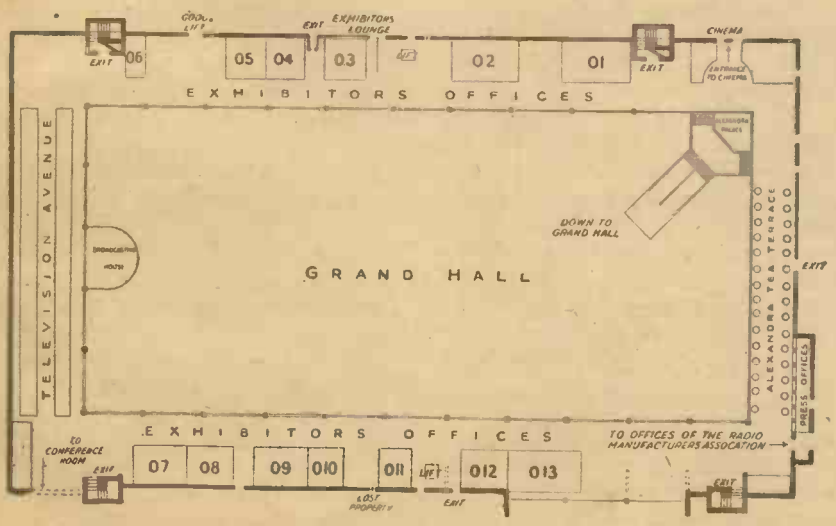
Complete Guide to Radiolympia

For Detailed Guide to Each Exhibit, See Pages 570 to 578



Make a Note of It!

"Practical Wireless," the Leading Wireless Journal with the Largest Net Sales, is on sale at Stand No. 9, Ground Floor, with its stable companions "Practical Mechanics" (6d. monthly), "Practical Motorist" (3d. every Friday), and "The Cyclist" (2d. every Wednesday). Full range of our standard works on Wireless, Blueprints, etc., are also on sale.



NEXT WEEK!

Complete Stand-to-Stand Report. All the Latest News and Notes of the Trade.

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An ABC Guide to the Exhibits

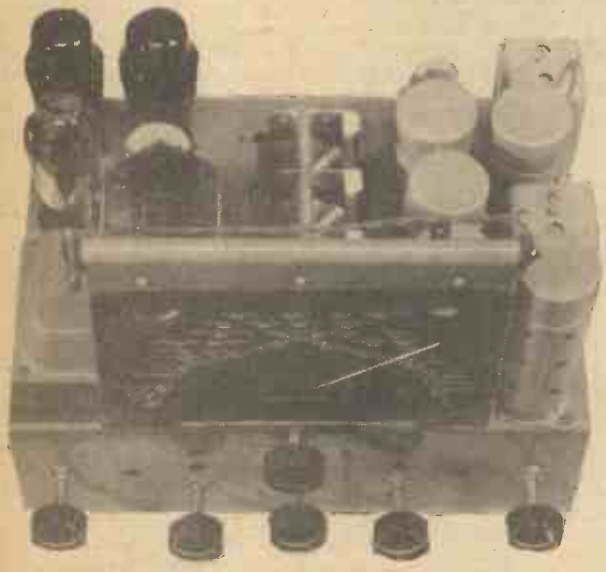
In a few cases details of exhibits have not been released at the moment of going to press.

AERIALITE, LTD., Castle Works, Stalybridge, Cheshire. STAND No. 60.

THIS exhibit will consist of various types of aerial, aerial wire, and similar items. Special types of aerial of the dipole variety, developed to give improved results on the short waves, and for use with all-wave receivers, will be seen.

ANTIFERENCE, LTD., King's Yard, Bayham Place, N.W.1. STAND No. 10.

ON this stand there will be twelve different types of television aerial. These cover every conceivable type of mounting including one wall-mounting dipole for only 16s. 6d. These aerials are available with steel or aluminium rods, and with or without reflectors.



A fine example of an Armstrong chassis. This is a 10-valve (including cathode-ray) superhet-straight all-wave radiogram at £12 12s.

ARMSTRONG MFG. CO., Walters Road, Nag's Head, Holloway, N.7. STAND No. 69.

THIS firm specialises in receivers in chassis form and a representative selection will be seen on their stand. All-wave chassis in various valve combinations will be featured, including all the latest refinements.

BAIRD TELEVISION, LTD., Crystal Palace, Anerley Hill, S.E.19. STAND No. 27.

THE television receivers exhibited on this stand are of the cathode-ray type and are notable for the brilliance of the received picture. Among the popular models are T.25 at 47 gns. and T.26 at 40 gns. The former is a combined all-wave radio and television receiver, giving radio on three wavebands, 16 to 51, 198 to 560 and 850 to 2,000 metres. Model T.26 is for television only, and has only two controls. The most noticeable feature is the high quality of reproduction.

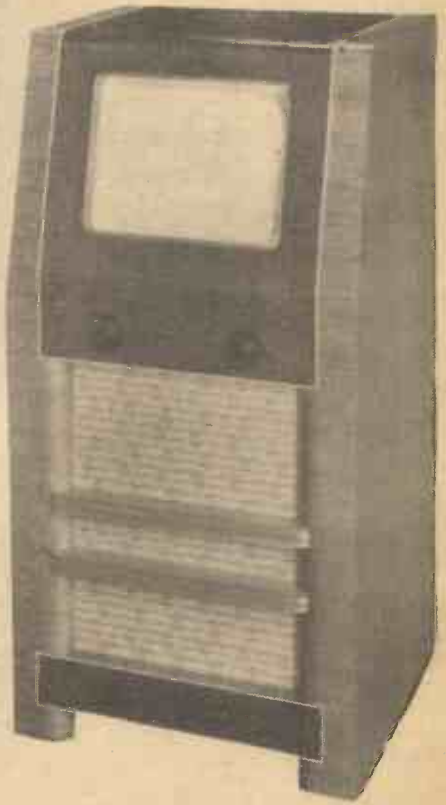
A. J. BALCOMBE, LTD., 52-58, Tabernacle Street, E.C.2. STAND No. 37.

A WIDE range of receivers will be seen on this stand under the name Alba, and of these the 3-valve battery portable at 6 gns. is probably the most popular at the moment. At the other end of the range is an 8-valve "Prestotune" superhet radiogram, providing 16 watts undistorted output and costing 28 guineas. Among other models to be seen are a 4-valve A.C./D.C. superhet transportable, table models, and radiograms.

Floor plan appears on page 569.
Complete Show Report Next Week.

BELLING & LEE, LTD., Cambridge Arterial Road, Enfield, Middlesex. STANDS Nos. 3 and 26.

MANY small items, primarily for the manufacturer, but also of great use to the home-constructor, will be seen here, together with the special Sky-rod aerial. This is intended for use in restricted areas, and for districts where there is considerable interference. It is mounted on the chimney stack or roof.



The Baird 40-guinea television console, giving television (sound and vision) programmes only.

BRIT. INSULATED CABLES, LTD., Prescot, Lancs. STAND No. 20.

IN addition to various types of cable and wires, this exhibit will also include meters, condensers, and solder. A new flux-cored solder is a special product, and contains a patented non-corrosive flux. The range of condensers is increased by a special tropical type condenser, hermetically sealed in a moulded tube and designed to operate satisfactorily in extremely arduous conditions of temperature and humidity. Four sizes are available in various capacities and working voltages. Some "Dwarf" condensers will also be on show.

New Belling-Lee all-wave receiver mains connector for suppression of interference.

BRITISH PIX CO., LTD., Pix Works, Lillieshall Road, London, S.W.4. STAND No. 64.

THE range of Pix products to be seen on this stand includes resistors, paper and electrolytic condensers, the self-fitting Gripon aerial, the Pix aerial device and Pix valves. The Gripon aerial will be seen in a new and improved form, but the original Pix remains unchanged. A small holder is available for fixing the Pix to a receiver or window-ledge. Among other exhibits on this stand will be the Pix metallised earth, Modula armchair control, a lightning arrester, and the well-known Pix aerial of the adhesive "tape" type.

A "Tropical" condenser designed and produced by Brit. Insulated Cables to avoid troubles in extreme climatic conditions.

BRITISH ROLA, LTD., Minerva Road, Park Royal, N.W.10. STAND No. 24.

ON this stand will be 28 models of the popular Rola speaker, ranging from 5in. to 12in. units. The speakers will be seen in permanent-magnet and energised types, and also in cabinets designed for extension listening purposes. Prices of the Rola speakers range from 19s. 6d. to £5 5s., and the new models embrace the 5in., 6in. and 12in. dustproof designs. The G.12 model which has retained its popularity for a long time will be seen, and should be inspected by all who are interested in quality reproduction.

BROWN BROS., LTD., Gt. Eastern Street, E.C.2. STAND No. T.8.

THIS is a Trade exhibit, and among the wide range of commercial apparatus exhibited will be the special range of accumulators marketed under the firm's trade name "Duco." These accumulators are available in celluloid or glass containers.

BULGIN, A. F., & CO., LTD., Abbey Road, Barking, Essex. STAND No. 62.

CONSTRUCTORS need no introduction to this firm, and as in previous years the exhibit will consist of an extremely wide range of constructor aids. Among the many new items which are being introduced and which will be seen for the first time are television aerials, pilot bulbs, anti-break-through choke, unit coils from 7 to 2,600 metres, turntables, new fuses, connector strips, signal lamps, bushes, etc., etc. A new catalogue will be introduced at Olympia, and including nearly 300 new articles, and every constructor should obtain a copy and inspect the wide range of components.

BURNDEPT, LTD., Light Gun Factory, Erith, Kent. STAND No. 54.

MESSRS. BURNDEPT will be showing a wide range of receivers of all types, including portables, table models and radiograms. As usual, the receivers will be of specialised design and possess many attractive features.

One of the Duco accumulators marketed by Brown Bros.

BUSH RADIO, LTD., Power Road, Chiswick, W.4. STAND No. 34.

THE receivers to be shown on this stand will be of the all-wave type, with push-button tuning and other attractive modern features. Large open tuning scales and rapid tune devices will enable the operator to locate any desired station quickly and with certainty.

CARR FASTENER CO., LTD., Stapleford, Nottingham. STAND No. 66.

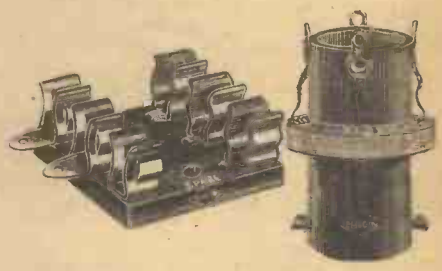
PRIMARILY of interest to the manufacturers, this exhibit will display various types of mounting strip and soldering lugs and similar items intended for chassis-mounting by means of rivets. In addition the range of Benjamin valve-holders will be on view, and these include chassis-mounting types for English and American valves.

CELESTION, LTD., London Road, Kingston-on-Thames. STAND No. 25.

THE wide range of Celestion speakers, extending from small portable models to public address units, will be seen on this stand. Many new features will be seen in the speakers, and there is a model for practically every need. The speakers are available as chassis models, or in cabinets for separate use.

CHLORIDE ELECTRICAL STORAGE CO., LTD., 231, Shaftesbury Avenue, W.C.2. STAND No. 2.

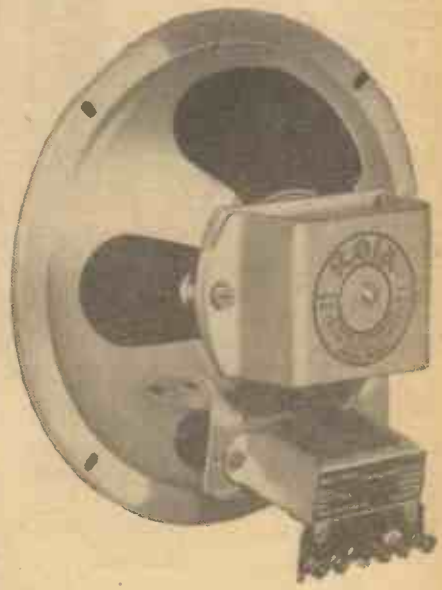
THE popular range of Exide accumulators, and the Drydex batteries will be seen on this stand. Accumulators are available in all types from the small celluloid models for portable and deaf-aid apparatus, to the large glass containers used for power work. H.T. accumulators in block units may also be seen. In the Drydex range there are all types from small 1.5 volt units up to large H.T. blocks for the most powerful receivers. Among the new lines are the special batteries used for portable receivers incorporating the dry-battery L.T. supply.



Two new Bulgin lines—on the left, a fuse-holder with clip for spare fuse, and on the right, one of the new unit coils for covering from 6 to 2,600 metres.

COLE, E. K., LTD., Ekco Works, Southend-on-Sea, Essex. STAND No. 47.

THE range of Ekco receivers to be seen on this stand features the new high-speed "radio brain" and solo-touch press-button tuning. Big improvements are to be noted in the mechanical and electrical details of the receivers as well as some new receiver models. Particular attention has been paid to cabinet design and the L.F. circuits to improve the quality of reproduction. On the television side some new add-on units for television reception will be found, including one model at 22 gns. An unusual feature of these receivers is the chassis design, built up on a tubular steel scaffold.



One of the new season's Rola P.M. speakers Model 8Z 6.5.

COSMOCORD, LTD., Cambridge Arterial Road, Enfield, Middlesex. STAND No. 72.

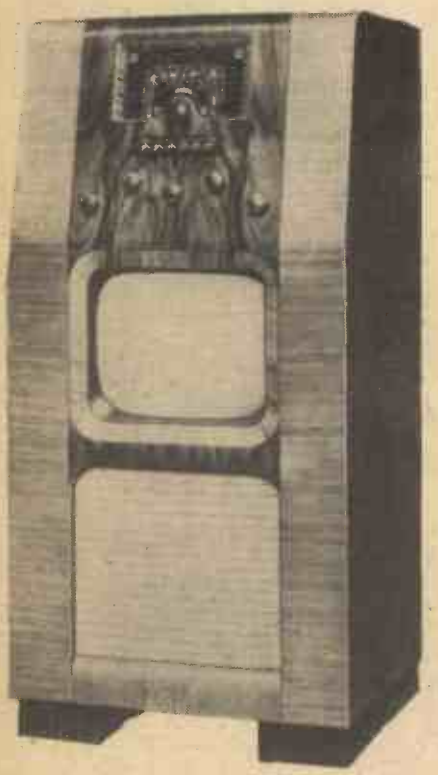
THERE will be seen pick-ups, pick-ups and tone-arm assemblies, and gramophone units for use with existing receivers. Full details of the range have not yet been released.

COSSOR A. C., LTD., Cossor House, Highbury Grove, N.5. STAND No. 48.

A LARGE part of the Cossor exhibit consists of receivers of all types, and the rest of their exhibit consists of valves and C.R. tubes, together with various servicing test apparatus. In the receiver ranges are table models and console designs, ranging from a 3-valve battery to a 5-valve A.C. console. A new 4-valve battery portable is included, and push-button tuning is featured on several of the receivers. The new Cossor Car Radio receiver will also be seen, and in the television receivers the most interesting model is undoubtedly Model 1210 in which a picture size of 12in. by 10in. is provided direct on the end of a C.R. tube. This receiver provides a brilliant flickerless picture having an area of 120 sq. in. and incorporates also an all-wave de-luxe superhet radio chassis. At 53 guineas this will undoubtedly be one of the main attractions on the stand. The extensive range of valves will also attract considerable attention on the part of constructors.

DECCA RADIO & TELEVISION, LTD., 1-3, Brixton Road, S.W.9. STAND No. 44.

IN the range of receivers to be seen here, a novelty is the simple-to-adjust push-button mechanism, whereby stations may be changed merely by manipulating the push-button. A push-button portable will be seen, and the receivers include battery and mains models. Two television receivers will also be seen, one model providing television only and the other including radio in the form of an all-wave press-button chassis. The picture size in both models is 10in. by 8in.



A press-button all-wave radio and combined television receiver by Decca at 46 guineas. Picture size is 10in. by 8in.

This 4-valve Portable by Cossor is a battery receiver with single knob tuning, auto grid bias, and employs a straight T.R.F. circuit arrangement.

DEPARTMENT OF OVERSEAS TRADE, 35, Old Queen Street, S.W.1. STAND No. 74.

A useful electric soldering-iron produced by A. C. Cossor, Ltd.

DEW, A. J., & CO., LTD., 33, Rathbone Place, W.1. STAND No. T.10.

THIS is a trade exhibit, and as such will display a representative collection of proprietary lines, with special attention to television.

DUBILIER CONDENSER CO. (1925), LTD., Ducon Works, Victoria Road, North Acton, W.3. STAND No. 28.

A COMPREHENSIVE selection of the wide range of condensers and resistances manufactured by Dubilier will be found on this stand, including many new and interesting developments to meet modern requirements. Ceramics, paper, electrolytics and special mica condensers will be seen, as well as the popular insulated metallised resistances in various types. Volume and tone controls, and mercury switch relays and similar items complete the exhibit.

DYNATRON RADIO, LTD., Perfecta Works, Ray Lea Road, Maidenhead. STANDS Nos. 1 and 39.

AS in previous years this exhibit will embrace really high-quality apparatus, in which Dynatron Radio specialises. Performance is considered before price in these receivers and some of the interesting details are being kept secret until the show opens. A television receiver with a 12in. tube will be seen, and every receiver to be shown incorporates a whistle filter. The most comprehensive model on view is the Ether Emperor IV, a television radiogram utilising 45 valves and delivering 18 watts output. It includes an autochanger and costs 175 guineas.

The Ekco Add-on television unit, giving a picture 7½in. by 6in.

EASTICK, J. J., & SONS, 118, Bunhill Row, E.C. STAND No. T.7.

THIS is a Trade exhibit.

EAVESTAFF & SONS, LTD., W. G. Autoplayer Factory, Ashfield Road, N.4. STAND No. 73.

THE miniature piano is the main feature of this exhibit.

ECONASIGN CO., LTD., 92, Victoria Street, S.W.1. STAND No. 14.

EDISON SWAN ELEC. CO., LTD., 155, Charing Cross Road, W.C.2. STAND No. 23.

MAZDA cathode-ray tubes, television valves and radio valves are shown on this stand and a special feature is the new Mazda battery valve for dry-cell operation. All have the Mazda octal base. A novel feature of the stand is the "Electro-encephalograph," which may be described

The Ekco "Pick-me-up" portable—an 8-stage superhet setting a new standard in portable performance.

popularly as a receiving set for tapping in to the brain activity. In addition to television there will also be seen here the B.T.H. R.K. speakers, headphones and pick-ups.

This Dynatron television receiver has a 12in. tube, and has been installed satisfactorily in various counties.

ELF, GORDON, LTD., 55, Rathbone Place, W.1. STAND No. 21.

E.M.I. SERVICE, LTD., Sheraton Works, Hayes, Middx. STAND No. 100.

THIS exhibit will comprise dealers' service equipment, television aerials and accessories and special products such as deaf-aid apparatus, bell-chiming apparatus, L.F. distribution systems, etc.

ERIE RESISTOR, LTD., Carlisle Road, The Hyde, N.W.9. STAND No. 13.

HERE will be seen the wide range of ceramic resistors with wire ends, available in various ratings and in all values. In addition the popular volume-controls in all types and patterns, with special models for dealers and servicemen's use, will also be seen. Special kits of the Erie components are made up for dealers and greatly simplify distribution.

FERGUSON RADIO CORPORATION, LTD., 105-109, Judd Street, W.C.1. STAND No. 17.

THE range of Ferguson receivers, which are of the all-wave type, includes push-button tuning, and a feature of these models is the high-quality output. By using push-pull stages, in conjunction with a good speaker and special cabinet design, the receivers are capable of a really fine output, even in the small table models. All the Ferguson models give a high standard of performance on the short waves.

FERRANTI, LTD., Radio Works, Moston, Manchester, 10. STAND No. 41.

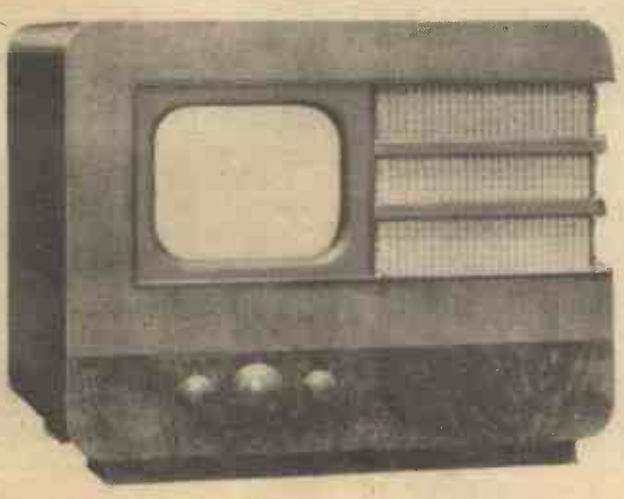
ON this stand will be featured broadcast receivers, car radio receivers and television apparatus. Several new models are to be seen in the receiver range, and included in these is a dry-battery model, in which the usual accumulator for L.T. has been dispensed with. The car radio is of the two-unit type, and requires no suppressors of similar apparatus. Two types of car aerial will be seen. In the television range the T.8 is probably the most interesting model, providing a picture 10in. by 8in. and using an 8in. speaker with special arrangements to deliver the best quality obtainable on these high frequencies. Only three controls are provided, and the price is 40 guineas.

GARRARD ENG. & MFG. CO., LTD., Newcastle Street, Swindon, Wilts. STAND No. 56.

HERE will be seen a comprehensive display of automatic record changers, radiogram units and motors (spring and electric), together with tuning motors and selector units designed for push-button tuning purposes. A particular feature will be the new record-changers R.C.10 and R.C.50, the former a popular-priced unit and the second a modified version of the original R.C.4 playing mixed records.

NON-PROPRIETARY EXHIBITORS

NAME	Stand No.
Admiralty	15
B.B.C.	76, 78, 79, 96
Brit. Railways, Ltd., Euston House, Eversholt St., N.W.1	4
G.P.O.	80
R.A.F.	50
War Office	77



A table televisor by Ferranti, giving a 7in. by 5¼in. picture. This gives television only—sound and vision.

THERE are 59 of the latest television receivers in Television Avenue all working at once.

* * *

THERE are hundreds of others throughout the Exhibition. Don't just look in at the Exhibition. Go there to "look in."

* * *

THE Royal Navy, the Army, the Royal Air Force, and the Post Office Exhibits will consist of actual working models showing the way these national institutions are making use of radio.

* * *

AND you must be televised. You merely go to the television studio in Radiolympia between 11 a.m. and noon, and they will televise you free of charge. You must bring a few friends to be televised, too, and ask those at home to see how you "come over."

* * *

THERE are four performances daily in the theatre, providing you with an opportunity of seeing Mr. Middleton, the Kentucky Minstrels, Harry S. Pepper, Doris Arnold, C. Denier Warren, Leslie Mitchell and Joan Millar, Adelaide Hall, Murray and Mooney, Ike Hatch, Scott and Whaley, Nosmo King and Hubert—to mention but a few of the celebrities who will be there.

* * *

FAMOUS bands, too, are well represented in the Radio Theatre. Bobby Howell and his band of 11, Troise and his Mandoliers (playing banjos!), plus the Kentucky Minstrels.

* * *

THE girls are peaches! The singing and dancing will be taken in hand by the Gordon Ray Radiolympia Eight, while Miss Radiolympia 1939 will give you an idea of what the people of this country, as well as the judges (well-known radio critics, actors and actresses), think is the perfect radio and television personality. All of these appear daily in the Radio Theatre.

* * *

EACH performance lasts a little over an hour, and almost every day at least one performance is to be broadcast or televised by the B.B.C.

* * *

THE performances start at 2.30, 4.30, 6.15 and 8 o'clock, and full details of each individual performance will be found in the Souvenir Programme which is on sale at the theatre at the price of 3d.

* * *

THE four programmes are arranged each day into an half-an-hour fashion parade, half-an-hour of the Television Picture Page, an hour of variety, including Charles Austin's version of the B.B.C. feature "I Want to be an Actor," an hour of the Kentucky Minstrels, with a repeat performance later in the day of either the Kentucky Minstrels or the Variety Performance. There may be slight variations from day to day.

* * *

OVER 1,000 seats are available at 1s. 3d. each, there is comfortable standing room for over 500 visitors at 6d. each, while a few front stalls may be specially reserved at 2s. 6d. and 3s. 6d. each.

GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2. STAND No. 35.

IN addition to the wide range of receivers in table and console types to be seen here, the well-known Osram valves and the wide range of G.E.C. batteries will also be

displayed. Full details of their exhibits have not yet been released.

GOODMANS INDUSTRIES, LTD., Lancelot Road, Wembley, Middlesex. STAND No. 19.

GRAMOPHONE CO., LTD., 108, Clerkenwell Road, E.C. STAND Nos. 46 and 53.

HERE will be seen the extensive range of H.M.V. broadcast and television receivers. The broadcast models include popular-priced radiograms, table models, a battery portable, and at the other end of the scale elaborate auto-radiograms. In the television models the new large screen console model at 45 guineas will no doubt prove an attraction. A simple television receiver of the table type giving vision and sound and having only two controls is available at 31 guineas.

F. C. HEAYBERD & CO., LTD., 10, Finsbury Street, London, E.C.2. STAND No. 57.

ON this stand is shown a comprehensive range of battery-chargers, rectifying equipment, and transformers. The battery-chargers, incorporating metal rectification range from the Tom Thumb battery-charger which charges a 2v. cell at ½ amp., price 12s. 6d., up to large multi-circuit models for installation in large service stations. An outstanding feature on the Stand will be a range of A.R.P. Emergency Lighting sets. for lighting industrial and public shelters. The rectifying equipment displayed covers a wide field and illustrates the growing use of this means for A.C. to D.C. conversion. The transformers shown range from small models for kit construction and conversion of mains, up to models with a current carrying capacity of 7.5 kva.

This H.M.V. table model incorporates push-button tuning and wavechange, cruiser tuning, and other refinements, and is rated at 10 watts output. It costs 19½ guineas.

Above is the 4-valve AC / DC Midget straight receiver in the Invicta range. On the right is the novel Imhof packing for the long-playing needle.

One of the popular Heayberd chargers—Model A03.

HOBDAY BROS., LTD., 21, Great Eastern Street, London, E.C. STAND No. T.6.

THIS is a trade exhibit.

HOLSUN BATTERIES, LTD., Neville House, Page Street, S.W.1. STAND No. 40.

IMHOF, ALFRED, LTD., 112, New Oxford Street, W.C.1. STAND No. 70.

ON this stand will be featured the special I.M. long-playing needle designed to prevent record wear. They are sold in boxes of 10 for 2s., and 10 needles play 500 records.

INVICTA RADIO, LTD., 203, Old Street, London, E.C. STAND No. 16.

A WIDE range of receivers will be seen here, and push-button tuning is featured on some of the models. An interesting point is the large open tuning scale, and model A.46/PB is a four waveband model with a special trawler band indicated on the tuning scale, which is a six-colour glass assembly.

LUGTON & CO., LTD., 203, Old Street, London, E.C.1. STAND No. T.9.

THIS is a trade exhibit.

McMICHAEL RADIO, LTD., Wrexham Road, Slough, Bucks. STAND No. 38.

AMONG the many new receivers to be shown by McMichael, the table radiogram at £14 17s. 6d. in which a seven-stage all-wave radio chassis is incorporated will undoubtedly prove the most interesting. Full details of the remaining range have not yet been released.

MARCONI-EKCO INSTRUMENTS, LTD., Electra House, Victoria Embankment, London, W.C.2. STAND No. 109.

THIS exhibit consists of specialised instruments developed for specific technical work.

MARCONIPHONE CO., LTD., 210, Tottenham Court Road, W.1. STAND No. 36.

THE Marconiphone range of receivers includes battery, table, console, and radiograms, as well as specialised models and television receivers. Push-button tuning is featured together with a specially developed tuning circuit to ensure that accurate adjustments are made when the push buttons are manipulated. Another novel feature is the automatic dial selection for manual operation. A point of interest in the receivers is that the short-wave range tunes down below 15 metres on some of the models. The television receivers are available in several patterns and these include the simple sound and vision unit as well as combined television and radiogram apparatus.

MERCANTILE CREDIT CO., LTD., 39-45, Finsbury Square, E.C.2. STAND No. 67.

MULLARD RADIO VALVE CO., LTD., Century House, Shaftesbury Avenue, London, W.C.2. STAND No. 55.

HERE can be seen the extensive range of Mullard valves and cathode-ray tubes amongst which the specially developed E series of valves will no doubt create wide interest. The special "silent" H.F. valve is used in a number of commercial receivers for short-wave reception. In the cathode-ray tubes the small 3in. tube is now being extensively used for oscillographs and other similar test equipment.

MURPHY RADIO, LTD., Broadwater Road, Welwyn Garden City, Herts. STAND No. 33.

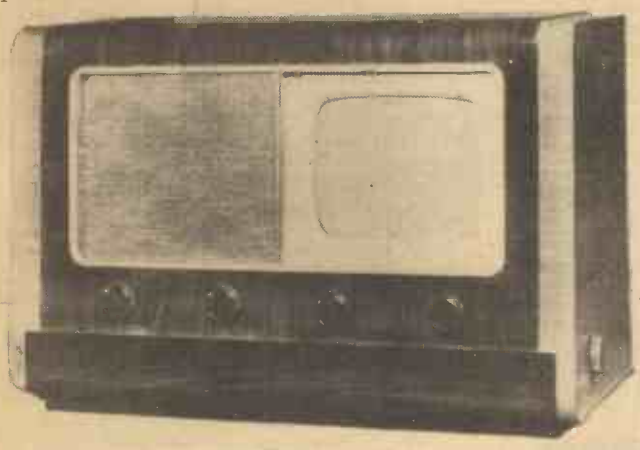
THE main feature of the Murphy range of receivers is the particularly pleasing cabinet designs in both the broadcast and television ranges. A push-button unit is available, and one of the console receivers has a sliding loud-speaker "fret."

A distinctive cabinet design in the Murphy range of receivers.

NEW ERA PUBLISHING CO., LTD., 12, Newton Street, London, W.C.2. STAND No. 5.

NEW LONDON ELECTRON WORKS, LTD., East Ham, London, E.6. STAND No. 59.

A WIDE range of wire and specialised aerials may be seen here including a special dipole for use with all-wave receivers which is both simple to erect and low in price.



SOME interesting developments have been made in the new Philips broadcast and television receivers. The push-button mechanism is very ingenious and operates in conjunction with the newly developed "push-in" spiral tuning condenser. A small tool is kept in an accessible position on the rear of the cabinet and it is only a moment's work to change stations, and in the case of three of the buttons, to change the wave-range (medium to long). The Philips MotoRadio will also be on view.

A new table televisor in the Philips range. Picture size is 7¼in. by 5¾in. and the price 32 gns.

PHILIPS LAMPS, LTD., Century House, Shaftesbury Avenue, London, W.C.2. STAND No. 45.

NEWNES, LTD., GEO., Tower House, Southampton Street, Strand, London, W.C.2. STAND No. 9.

WE shall be showing on this stand our complete range of technical and wireless books. In addition to the various books on sale, blueprints for almost any type of receiver may be obtained. PRACTICAL WIRELESS, *Practical Mechanics*, *Practical Motorist* and *The Cyclist* are a few of the leading journals which will be on view. Our comprehensive range of handbooks, including the "Wireless Constructor's Encyclopaedia," "Everyman's Wireless Book," "Television and Short-wave Handbook," "Sixty Tested Wireless Circuits," "Wireless Coils, Chokes and Transformers," "Practical Wireless Service Manual" and "Wireless Transmission for Amateurs" will be on sale, and models of the receivers described in this issue will be available for inspection. Mr. F. J. Camm and the technical staff will be available to answer readers' queries free of charge. Call and see us.

PHILCO RADIO AND TELEVISION CORPORATION OF G.B., LTD., Perivale, Greenford, Middlesex. STAND No. 31.

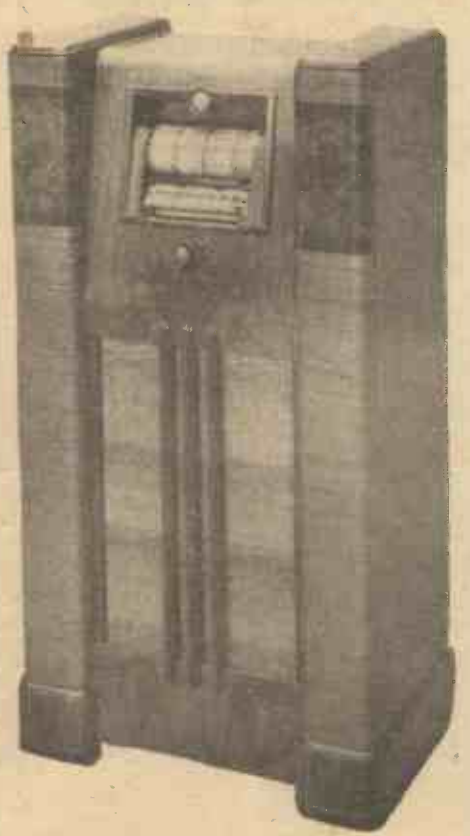
ONE of the most interesting receivers on the Philco stand will be Model A.7, a 15-guinea seven-valve all-wave superhet for A.C. use. This incorporates a built-in wavetrap on long and medium waves, audio-degeneration with push-pull output, push-button tuning, corrugated cone speaker, and the usual refinements found in a luxury instrument. All the other receivers on view will repay inspection.

PILOT RADIO, LTD., 31-33, Park Royal Road, London, N.W.10. STAND No. 42.

ON this stand Messrs. Pilot will be showing one of the British midget mains receivers of the type which has proved so popular in the U.S.A. Weighing only 8lb. the Little Maestro measures only 7½ins. high by 11¾in. wide and 5½in. deep, and may be connected to A.C. or D.C. mains. It delivers an output of 2½ watts. Organ key "push-button" tuning and tone control is a feature of other models and a very novel curved open scale tuning dial facilitates tuning on all wavebands.

PLESSEY CO., LTD., Vicarage Lane, Ilford, Essex. STAND No. 68.

THIS exhibit will consist mainly of components and radio chassis designed for manufacturers, but will reveal a number of interesting points for the constructor.



This view of the Pilot receiver shows the novel rotating full-vision dial which is a feature of the Pilot receivers.

DON'T forget to visit the Model Factory showing various processes of manufacture including coil winding, wire jointing, grid and spring making, coil adjusting, test and assembly, resonance test, impedance and inductance comparisons, engraving, chassis wiring, gang-condenser testing, wire covering, dry-battery manufacture, etc.

* * *

DON'T omit to visit Stand No. 9, which is our stand—same site as last year. On it you may inspect a full range of standard wireless books, current technical periodicals, also the new receiver built on the Catalin transparent chassis.

* * *

THERE will be a battery of sixteen revolving drums showing the chassis of many of the leading manufacturers' sets.

* * *

READERS and dealers wishing to organise a party may take advantage of the catering and hotel accommodation at reduced prices, the reduced fares by road and rail, and the special party tickets issued at half price. Full details from the R.M.A. Party Bureau, 59, Russell Square, London, W.C.1.

* * *

THE Bureau will also undertake to book seats for suitable performances in Radiolympia's Broadcasting and Television Theatre in advance.

* * *

THIS year, for the first time, the exhibition has a special export section. Overseas visitors should obtain one of the special export catalogues issued in connection with this section.

* * *

AN exhibit of special interest to listeners without mains supply is the vibrator, a small, self-contained component which enables the user to step up a D.C. battery supply of anything over 2 volts, to anything up to 250 volts A.C. It is not only intended for use for motor-car receivers, but for battery users and those with private country-house lighting plants of 24 or 32 volts D.C.

* * *

THOSE troubled with interference from run motors, refrigerators, etc., should examine the claims made for the numerous noise suppressors and anti-interference aerials on show. Some of these will not only eliminate most of the interference, but will extend the range of the set very considerably.

* * *

THIS is the first time in the history of the world in which a theatre has been built specially for broadcasting and television. The Radio Theatre at Olympia is a replica of the famous Bowl Theatre in Hollywood. It has cost £5,000 to build, and has a semicircular revolving stage that will hold over 300 performers.

* * *

THE auditorium will enable each of 2,500 visitors to hear perfectly, and obtain an uninterrupted view of every part of the stage.

* * *

IF in doubt on any problem, call at our Stand No. 9 and consult the Editor or a member of his staff.

PYE, LTD., Radio Works, Cambridge. STAND No. 32.

THE new Baby Q portable will attract considerable attention here, and will have as a rival the Mite, which is a tiny A.C./D.C. receiver even smaller than the Baby Q. Push-button tuning is featured on some of the remaining Pye models and the international console which incorporates bandspread tuning in an eight wave-band circuit, will undoubtedly be a

The Pye Baby "Q"—a 4-valve battery superhet at 8½ guineas.

highlight of the stand. All the principal short-wave stations are actually named in their correct positions on the dial and can be tuned as quickly and accurately as the locals.

RADIO GRAMOPHONE DEVELOPMENT CO., LTD., Globe Works, Newtown Row, Birmingham. STAND No. 29.

THE range of receivers here embraces six- and fourteen-valve models, priced from 16 guineas to 110 guineas. The latter is a fourteen-valve auto-radiogram with a fourteen-way motor-driven push-button tuning system. A cruising device facilitates manual tuning. All of the R.G.D. receivers

In the R.G.D. range, this console has some interesting points. All controls are hidden when the cabinet is closed.

are in the luxury class. An all-wave aerial at 35s. will also be on view on this stand.

REPRODUCERS AND AMPLIFIERS, LTD., Frederick Street, Wolverhampton. STAND No. 111.

THIS stand will consist merely of an office and shop window as Reproducers and Amplifiers are now concerned solely with the manufacture of speakers, etc., for set makers.

ROSE, NORMAN (ELECTRICAL), LTD., 43, Lamb's Conduit Street, W.C.1. STAND No. 12.

THIS firm specialises in service equipment, and accordingly the exhibit will consist of service aids and test equipment. In the former class will be various replacement components.

R. A. ROTHERMEL, LTD., Rothermel House, Canterbury Road, London, N.W.6. STAND No. 71.

ON this stand will be an extensive range of small items such as Piezo-electric microphones, pick-ups, etc. Various types of volume controls and small items suitable for home constructors will also be seen, but full details of the exhibit have not yet been released.

SCOPHONY, LTD., Thornwood Lodge, Campden Hill, London, N.W.8. STAND No. 49.

SCOTT INSULATED WIRE CO., LTD., Queensland Works, Westmoreland Road, N.W.9. STAND No. 103.

VARIOUS types of wire will be seen on this stand, including a new material marketed under the name "Manganamron." This is a British drawn-wire embodying the essential characteristics of Manganin.

SELECTA, LTD., 81, Southwark Street, S.E.1. STAND T.2.

THIS is a trade exhibit.

SELMER, HENRI & CO., LTD., 114, Charing Cross Road, W.C.2. STAND No. 99.

IN addition to certain electrically amplified musical instruments on this stand, some portable amplifiers, suitable for band-repeating or public address work, will also be seen.

SERVISOL, LTD., 74, Renshaw Street, Liverpool. STAND No. 11.

A SPECIAL servicing aid for cleaning switch contacts and similar moving parts will be prominently featured on this stand, together with other service aids.

SIEMENS ELECTRIC LAMPS & SUPPLIES, LTD., 39, Upper Thames Street, E.C.4. STAND No. 52.

FULL O' POWER radio batteries and Tungsram valves are the main items to be seen on this stand, and in the former range are types for all purposes, from an inexpensive 120-volt H.T. unit at 6s. to super types for powerful multi-valvers. The new all-dry combined L.T. and H.T. batteries will also be on view, together with torch and similar cells. Of outstanding interest in the valve range are the new 1.4 volt economy battery valves, which enable the L.T. accumulator to be dispensed with and dry batteries used for the L.T. supply. A new type of valve in the "E" range is the E.F.M.1 which is a combined variable-mu L.F. pentode and Magic-Eye Tuning

This television receiver in the R.G.D. range has a 9in. tube, and the picture is inclined for easy viewing.

indicator. The E.L.L.1 is a combined push-pull double pentode for vibrator supply sets, and is also of interest.

STEATITE & PORCELAIN PRODUCTS, LTD., Stourport-on-Severn, Worcs. STAND No. 61.

HERE will be seen the many developments in steatite production, valve-holders, coil formers and the various other items used in modern H.F. apparatus.

STERLING BATTERIES, LTD., Sterling Works, Dagenham, Essex. STAND No. 65.

A WIDE range of batteries for all modern radio purposes may be seen on this stand.

The Pye International Model—an 8 waveband superhet at 16½ guineas.

TAYLOR ELECTRICAL INSTRUMENTS, LTD., 45, Fouberts Place, Regent Street, London, W.1. STAND No. 101.

COMPREHENSIVE service test equipment such as signal generators and universal meters will be seen on stand No. 101. A de luxe valve tester, which gives accurate measurements of mutual conductance on any type of valve and which incorporates 15 different valveholders will also be seen. This valve tester also measures cathode leakage up to 10 megohms and checks all valves for short-circuits. Other items include cathode-ray oscilloscopes, and a comprehensive range of meters.

(Continued on page 578.)

TELEGRAPH CONDENSER CO., LTD., Wales Farm Road, Acton, London, W.3. STAND No. 63.

HERE may be seen fixed condensers of every description, including paper, mica, wet electrolytics in aluminium cans, dry electrolytics in cartons, metal boxes and aluminium cans, low and high voltage electrolytic types in tubes. Non-inductive paper tubular condensers and moulded mica condensers, etc., for use in radio receivers, amplifiers, telephone and telegraph circuits. High frequency and high voltage smoothing condensers for transmitting stations and jelly impregnated condensers for television circuits. Static

The Vidor self-contained all-battery portable, employing the latest 1.4 volt valves.

condensers for power factor correction. condensers and special units for suppression of interference with radio reception, including special types for use in vacuum cleaners, refrigerators, electric sewing-machines, hair dryers and similar apparatus. Suppression condensers for car radio work. Special ranges of condensers for use in high temperatures incurred in the tropics. Ignition condensers. Silvered mica precision condensers and in ceramic materials, and an air spaced trimmer having straight line adjustment and low temperature coefficient suitable for pre-set push-button sets.

TELEGRAPH CONSTRUCTION & MAINTENANCE CO., LTD., 22, Old Broad Street, London, E.C.2. STAND No. 22.

THOMPSON DIAMOND & BUTCHER, LTD., 34, Farringdon Road, London, E.C. STAND No. T.3.

THIS is a trade exhibit.

ULTRA ELECTRIC, LTD., Western Avenue, Acton, W.3. STAND No. 43.

PUSH-BUTTON tuning will be featured on the Ultra receivers to be seen on this stand, and all-wave tuning is a prominent point in certain models. Full details have not yet been released.

VACUUM SCIENCE PRODUCTS, LTD., 166, Weir Road, Balham, London, S.W.12. STAND No. 18.

HERE may be seen various types of photo-cell and similar types of apparatus used for television and associated equipment.

VARLEY (OLIVER PELL CONTROL), Cambridge Row, Burrage Road, London, S.E.18. STAND No. 108.

ALL the well-known Varley components will be open for inspection on this stand and at the time of going to press no details have been received of any new lines for the home constructor. The Varley range includes, of course, tuning coils in all patterns, wire-wound resistances, power potentiometers, L.F. chokes, mains transformers, and thermal delay switches.

VIDOR, LTD., West Street, Erith, Kent. STAND No. 51.

THE "Good Companion" portable will be the high spot on this stand, and will, no doubt, vie for popularity with the Vidor Model 320, which is a portable employing the new Economy valves operating with dry battery L.T. supply. In addition to other receivers, Messrs. Vidor will be showing batteries for practically every type of receiver, as well as small cells for cycle lamps, etc., and a number of domestic electric appliances.

WAVERLEY BOOK CO., LTD., 96, Farringdon Street, E.C.4. STAND No. 8.

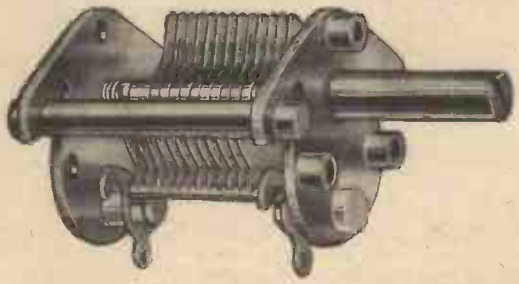
HERE will be seen a range of technical, educational, and standard publications.

WESTINGHOUSE BRAKE & SIGNAL CO., 82, York Way, King's Cross, London, N.1. STAND No. 30.

A FULL range of Westinghouse metal rectifier units for all purposes in radio and television will be on view. These include the high tension and low tension types for mains units, battery charging, and loudspeaker field supply; "Westectors"—the high-frequency rectifiers for detection, automatic volume control, battery economy, etc.; "H" and "J" types for television purposes—H.T. supply to cathode-ray tubes, time base, picture shift circuit, etc. A full range of commercial battery chargers will be on view, one of which, the R.G.C.10, will be working to demonstrate the flexibility and ease of operation. All the standard models of this year will again be available for the coming season. In addition, there will be interesting exhibits of metal rectifiers, large and small, as supplied for broadcasting and other telecommunication purposes, such as those supplied in large quantities to the G.P.O. for amplifier equipment, etc.

WINGROVE & ROGERS, LTD., Mill Lane, Old Swan, Liverpool. STAND No. 110.

IN addition to the majority of the Polar and Polar-N.S.F. components, which



A miniature U.H.F. condenser in the Polar range. Ideal for transmitters or receivers.

are already well known, a number of short wave condensers, suitable for transmitting and receiving, will also be on view on this stand. These condensers will be available in single or gang types designed for working up to 1,500 volts. The Polar-N.S.F. range of volume controls, resistors, and condensers will also be on view along with the Polar drives, gang condensers, trimmers, etc.

WRIGHT & WEAIRE, LTD., 740, High Road, Tottenham, London, N.17. STAND No. 102.

THE exhibits of this stand fall into three main classes, namely, coils, transformers, and switches. Amongst the coils, special attention should be paid to the permeability press-button tuners available in several types, and in the switches the ceramic type of switch is also well worth attention. The transformers are available in various patterns for all branches of radio construction, and input voltage selectors are fitted now as an integral part of the covers.

SHOW SNIPPETS

YOU must make a special visit to Television Avenue whether you live in the present Television reception area or not. You will be astonished at the degree of perfection attained by modern television receivers.

* * *

THE theatre auditorium is built in a semi-circle around the stage on the Bowl or Saucer principle.

* * *

THERE is a special section of interest to constructors—a veritable knob-twiddlers' section.

* * *

THE new Hammond Organ will be seen for the first time in this country at the Radio Theatre. It is capable of producing 800 different effects, such as a symphony orchestra of 30 players, and a full band of Hawaiian steel guitars, mandolins, violins and banjos.

* * *

ADD to this a staff of nearly 400 people including world famous radio stars, television camera and microphone operators, lighting engineers, stage and front-of-the-house staff, and a salary bill of over £6,000 a week. The lighting bill is larger than that of half of London's West End theatres put together.

* * *

IF you are interested in "radio" novelties, don't fail to visit Stand No. 23 and see the "Electroencephalograph." This was designed by Mr. Grey Walter, a physiologist, who has spent many years in special study of the brain. There is a "clinic" on the stand and working models to tell you all about it.

* * *

WHAT happens when you ring up a friend in some part of our far-distant Empire? This and other secrets of the Post Office radio system will be revealed in their special exhibit. They will also show you how they track down unlicensed transmitters and receivers.

* * *

HOW is the picture obtained inside the cathode-ray tube? This is a mystery to many of our non-technical friends. Take them to Radiolympia and show them "how it works."

* * *

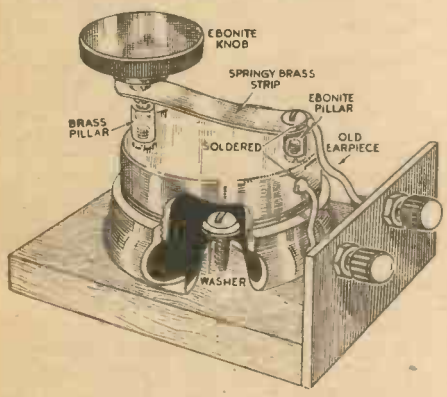
HAVE you tried to tune-in stations on some of the receivers fitted with very high-geared dials? All the tedious knob-turning has been done away with in some of the new season's models, and a motor turns the control for you whilst you stand by ready to push a switch and stop the dial when the station you want has been reached. This is not push-button tuning, but "cruiser" tuning.

Practical Hints

A Simple Tapping Key

RECENTLY I have become interested in the subject of amateur transmitting, and as I needed a key to practise the morse code I made one as shown in the accompanying sketch.

I removed the magnet and coil from an old earphone case, and screwed a brass pillar on the chromium top, at one end, and an ebonite pillar at the other. Then I fastened a springy brass arm at one end into the ebonite pillar and soldered a wire

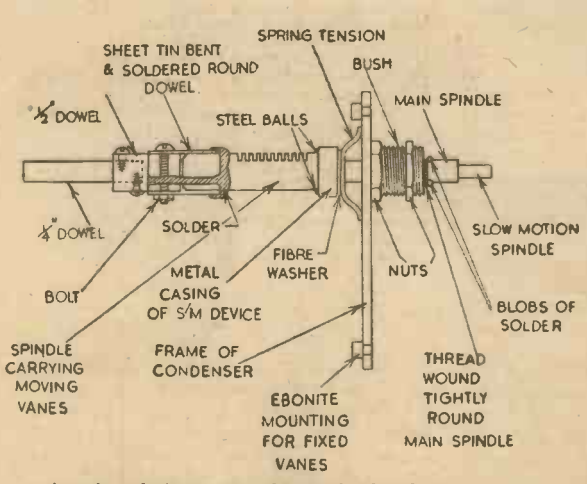


An old earphone case is used as a base for this simple tapping key.

to it. This went to one of the two terminals on the terminal strip. At the other end was fixed an ebonite knob. A wire was then soldered to the metal part of the case and taken to the second terminal on the strip. These were then connected up in series with a battery and buzzer.—H. SPEED (Tollerton).

An Adapted Slow-motion Driving Head with Extension Rod

BEING in need of a low-ratio slow-motion head for driving the tuning condenser of a tuned high-frequency stage in my short-wave receiver, I pressed into service an old all-brass air-spaced Ormond variable condenser complete with integral slow-motion device, large degree-marked control knob and smaller slow-motion driving knob. The sketch shows how the adaptation was successfully accomplished. The condenser was first entirely dismantled, the fixed-vane assembly being removed complete, and the moving vanes wrenched out with pliers from the slots on the moving spindle. Only the front frame of the condenser with the bush, moving-spindle assembly and slow-motion device were retained for use. The necessary pressure of the steel balls in the large moving-vane spindle against the inside of the circular metal casing of the slow-motion device was achieved by holding the assembly in the left hand, exerting a firm inward tension of the moving spindle with the left thumb, and soldering two small blobs of solder on diametrically opposite surfaces of the main spindle in front, close to the front edge of the fixing bush. The tension was then further increased, and in the small space between the front edge of the bush and the blobs of solder ordinary black cotton thread was wound tightly several times round the main spindle, and knotted. This resulted in quite sufficient pressure to operate the slow-motion device. An extension-rod assembly was next attached to the large rear moving spindle by taking a short length of ¼in. diameter dowel-rod and bending round it a short length of sheet tin, securing the latter to the rod by a bolt and nut through holes drilled in the tin and the rod, and to the moving spindle by soldering. The junction of the piece of sheet tin was soldered along its length as shown in the sketch. Finally, a length of ¼in. diameter dowel-rod was forced into a hole drilled in the back of the ½in. diameter rod and secured with a trace of glue and two small screws. The extension-rod assembly was then painted with grey "Bakelite" enamel to give a finished appearance. The drive is connected to the tuning condenser by the usual insulated flexible coupler, and is working with complete satisfaction.—GORDON BIRRELL (Angus, Scotland).



An adapted slow-motion driving head and extension rod.

THAT DODGE OF YOURS!

Every Reader of "PRACTICAL 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 hint 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 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 "Practical Hints." DO NOT enclose Queries with your hints.

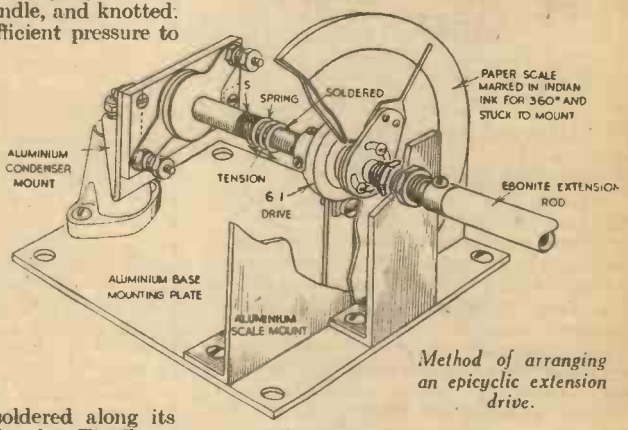
SPECIAL NOTICE

All hints must be accompanied by the coupon cut from page 584.

An Epicyclic Extension Drive

REQUIRING a means for determining various adjustments of pre-set condensers employed in neutralising series aerial and padding circuits, etc., I devised the simple but effective arrangement illustrated. It will be seen that coupling to the ebonite screw adjuster on the condenser had to be made so that during the rotary action of the drive the screwing action, as indicated by the arrow under the spring, would be effective.

To this end, then, I used a medium-tension spring, one end of which I bent in to engage in the slot "S" of the condenser adjusting screw, the other end of the spring being soldered to the short length of quarter-inch brass rod fitted into the end of the epicyclic drive. Aluminium of 16 S.W.G. is used throughout for the mounting, but to prevent the capacity of the condenser being exceeded, this mounting bracket, as depicted by the dotted lines, does not cover the back plate of the condenser. The rest of the details are, I think, self-explanatory. — R. L. JEFFERSON (Forest Gate).



Method of arranging an epicyclic extension drive.

Leaves from a Short-wave Log

New Uruguayan Stations

THE *Servicio Oficial Difusion Radio-electrica* of Montevideo (Uruguay) announces that the construction of its 5-kilowatt short-wave stations is nearing completion, and that very shortly they will carry out their initial tests. They are CXA4, 48.98 m. (6.125 mc/s), which has already been reported to be working; CXA10, 25.22 m. (11.895 mc/s), and CXA18 on 19.61 m. (15.3 mc/s).

W6XBE Extends its Broadcasts

THE 20-kilowatt transmitter W6XBE installed at San Francisco (Cal.) is now working to the following time schedule: B.S.T. 05.00-09.00; 13.00-16.00 with a transmission to Asia on 31.48 m. (9.53 mc/s), and from B.S.T. 00.30-04.00 to South America on 19.57 m. (15.33 mc/s).

Another Station for Manchukuo

ACCORDING to reports from the Far East the Japanese are erecting a new 10-kilowatt transmitter near Shinkyo (Hsinking), the capital city of Manchukuo; it will work on 49.98 m. (6.125 mc/s); 31.73 m. (9.454 mc/s); 60.73 m. (11.66 mc/s), and 19.74 m. (15.2 mc/s).

No More League of Nations Broadcasts!

IN view of the fact that the Schwarzenburg (Switzerland) short-wave transmitter was destroyed by fire, negotiations are taking place between the Federal Government and the League of Nations to take over the latter's stations situated at Prangins. If, and when, the sale is carried into effect, they will be used for the re-broadcast of the special Berne, Zurich and Lausanne programmes destined to Swiss nationals overseas.

Another Mexican Station Logged

XEXA, Mexico City, on 48.92 m. (6.133 mc/s), 100 watts, was recently heard relaying a programme from the medium-wave studio XEDP in that city. The station opens with a melody, *The March of the Toys*, and is on the air daily between B.S.T. 14.30-16.30; 20.30-22.30, and from 01.00-06.00 on weekdays, and on Sundays from B.S.T. 01.00-06.00 only. Address: Estaçiones XEDP y XEXA, Departemento Autonomo de Prensa y Publicidad, Mexico City.

Radio Signals from Newfoundland

G8XY and G8XZ are the call-signs of a transmitter established by the Expedition of the Public Schools Exploring Society at the southern end of Grand Lake, Newfoundland. Transmissions will be made daily until September 6th on two channels, namely, 42.22 m. (7.104 mc/s) and 117.55 m. (2.552 mc/s), between B.S.T. 22.00-24.00.

Sunday News Bulletin from Denmark

AT B.S.T. 19.00, every Sunday, OZH2, Skamlebaek (Denmark), broadcasts a news bulletin and talk in the English language; the channel is 19.58 m. (15.32 mc/s).

Will Italy Broadcast Outside the Band?

LISTENERS state that they have been hearing tests of musical broadcasts from IRW, Rome-Torrenova (Italy), a 30-kilowatt commercial transmitter usually operating on 15.37 m. (19.52 mc/s).

More 50-kilowatters for Japan

RECEPTION of broadcasts from Dairen (Kwantung), China, has been made in the British Isles through the new 50-kilowatt Tokio transmitters JVZ and JVZ2 on 25.39 m. (11.815 mc/s) and 25.37 m. (11.825 mc/s) respectively.

CHILDREN'S HOUR

MIDLAND provides the second part of Children's Hour for all regions on Friday, September 1st. The programme will consist of folk songs and country dances; and the contributors will be the Norris Stanley Sextet, Bob Arnold, the Farmer's Boy from Oxfordshire, who was first discovered in one of the "Roving Reporter" series; and the Castle Bromwich School Bamboo Pipe Band, which, under its conductor, A. H. Blewitt, has given some twenty-five demonstrations in the Midlands.

THE "AIR-HAWK" 9

(*Continued from page 559*)

ferred to the underside of the chassis to facilitate connections and balance the panel layout, whilst the R.F. gain control is transferred to a position between the two band-set controls. The meter balancing control is mounted on the chassis near the tuning dial, where it is easily placed and adjusted, a slot being cut in the spindle end for this purpose before mounting. The lead for the R.F. gain is taken round the chassis edge and under each of the screens, and to save dismantling the chassis the corners of the screens are simply forced out by means of a screwdriver and the screened cable threaded through.

To enable an existing cabinet to be used to house this particular model, the original top screens all had to be cut down, but, of course, if the receiver is just being made up, the sizes of the screens should be selected accordingly. They will be given next week. The larger size of panel now specified enables this particular cabinet to be used. The signal light has been fitted to avoid the risk of leaving the set switched on when not required, the silencing switch being rather a snare in this direction. When the latter is in the "off" position the set is silent, although the heaters are all on. Consequently, there is a risk of leaving the set in this condition unless some visible indication is provided. The signal light is the new type, visible from all positions, and is wired to the heater circuit, and thus shows instantly whether the set is switched on or off. A complete list of components is attached and next week we will give details of the chassis and screen constructional work.

LIST OF COMPONENTS FOR 1940 "AIR-HAWK" 9

Three .00016 mfd. Trolitul condensers, Type Tro. 160 (Premier).
Three .000015 mfd. ditto, Type Tro. .15 (Premier).
Two Epicyclic Drives (Premier).
One Mains Transformer, Type A.C.9 (Premier).
One Model 21, 0-1 milliammeter (Premier).
One full-vision Dual-speed drive, Type 1070 (Eddystone).
Three couplers, Type No. 1009 (Eddystone).
Three extension controls, No. 1008 (Eddystone).
One six-pin coil holder, Type 964 (Eddystone).
Two miniature dials, No. 1099 (Eddystone).
Two stand-off insulators, No. 1028 (Eddystone).
Set of coil formers, four and six pin (Eddystone).
One Midget condenser, Type 1013 (65 mmfd.) (Eddystone).
Five switches (four Type S.80T and one Type S.81T) (Bulgin).
One Mains connector, Type P.20 (Bulgin).
One top-cap connector, Type P. 20 (Bulgin).
Five top-cap connectors, Type P.96 (Bulgin).
One shaft-coupler, No. 2005 (Bulgin).
One shaft-coupler, No. 998 (Bulgin).
One pointer knob, Type K.58 and reducer to 3-16th in. (Bulgin).
One 9in. length of round rod, 3-16th in. (Bulgin).
Panel bush 2007 (Bulgin).
Panel bush 1048 (Bulgin).
One signal lamp, Type D.45, and bulb BL630 (Bulgin).
Two four-pin ceramic valve-holders (B.T.S.).
One component mounting bracket (B.T.S.).
One B.F.O. coil, Type P. (Wearite).
Two I.F. transformers, B.P.122 and B.P.124 (Varley).
Four volume controls, 1,000 ohms, 10,000 ohms, 50,000 ohms and .5 megohms (Erie).
One 100 ohm 1 watt resistor; Two 300 ohm 1 watt resistor; One 500 ohm 1 watt resistor (Dubilier).
One 500 ohm 20 watt resistor, Type PR2 (Bulgin).
One 600 ohm 1 watt resistor; One 800 ohm 1 watt resistor; Two 1,000 ohm 1 watt resistors; One 1,500 ohm 1 watt resistor (Dubilier).
One 2,000 ohm 1 watt resistor; One 2,500 ohm 1 watt resistor; One 5,000 ohm 1 watt resistor; Two 10,000 ohm 1 watt resistors; One 15,000 ohm 1 watt resistor (Dubilier).
One 15,000 ohm 20 watt resistor, Type PR12 (with extra clip) (Bulgin).
One 20,000 ohm 1 watt resistor; One 30,000 ohm 1 watt resistor; Six 50,000 ohm 1 watt resistors; Seven 100,000 ohm 1 watt resistors; Two 250,000 ohm 1 watt resistors; One 500,000 ohm 1 watt resistor; Two 1 meg. 1 watt resistor (Dubilier).
One .00005 mfd. Type 690W. condenser; Six .0001 mfd. Type 690W. condensers; One .002 mfd. Type 4601/S condenser; One .05 mfd. Type 4602/S condenser; One .04 mfd. Type 4601/S condenser; One .01 mfd. Type 4601/S condenser (Dubilier).
Three .01 mfd. Type M condenser (T.C.C.).
Twelve .1 mfd. Type 4603/S condensers; One 1 mfd. Type 4609/S condenser; Three 8 mfd. Electra. Condensers, Type 0281 (Dubilier).
Three 25 mfd. 25 v., Type F.T. (T.C.C.).
Nine Octal valve holders, Type X.128 (Clix).
One A1, A2, E Socket strip, Type X.382 (Clix).
One chassis type four-pin holder, Type X111 (Clix).
One aluminium chassis, 16 S.W.G., 16in. by 10in. by 3in. (Peto-Scott).
One black crackle panel, 17in. by 9½ in. (Peto-Scott).
One metal cabinet, Type T.8 (Peto-Scott).
Nine valves—one X.64, two W.63, two Z.63, one DL.63, One L.63, one KT.63 and one U.50 (Osram).
Supply of 16 S.W.G. aluminium sheet for screens.
Connecting wire, nuts, bolts, shakeproof washers, flex and screening sleeving.
One plug and jack (Igranic Electric Ltd.).
One special energised loudspeaker, 1600 ohm field, Type A.C.9 (W.B.).

The TRIO-PEN THREE

An Efficient Short-wave Receiver Using a New Circuit

THE advantages in short wiring, low admittance capacity and H.F. losses realised in the use of a triode-pentode valve for the combined functions of an untuned R.F. stage and detector circuit, prompted the writer to carry out the various improvements on the original triode - pentode short - wave receiver detailed in the November 12th and 19th, 1938. issues of PRACTICAL AND AMATEUR WIRELESS in this new three-valve trio-pen circuit.

In the first place it was intended that the basis of the design should be such that more accurate tuning and logging should be possible, regardless of the number of panel controls.

The same circuit sequence is employed, but on referring to the circuit diagram in Fig. 1, it will be seen that advantage is taken of the variable-mu characteristic in the pentode portion of the TP230 in the conventional manner; consequently, owing to the appreciable gain developed prior to the detector, quite a useful degree of sensitivity control is obtainable by the potentiometer P1.

Owing to the direct connection of the aerial pillar to the top cap, which is the grid of the pentode. it will be apparent that an efficient aerial input is obtainable.

Variable capacity coupling is provided in the earth end of the aperiodic winding of the coil, instead of the anode feed end, the 100 mmfd. condenser control being brought out to the front panel. This method provides a greater degree of H.F. stability and more effective control.

Leaky grid detection is employed, and freedom from aerial resonance and the silky reaction obtainable is quite marked.

Owing to the use of a copper bus-bar for all earth returns, and due to all moving vanes of the variable condensers being at earth potential, the operation of the receiver is completely free from noises and hand-capacity effects.

Bandspreading

For bandspreading, a precision Eddystone instrument dial and drive was chosen. the provision of vernier adjustment with this dial facilitating operation considerably; the correct use of this vernier movement will be dealt with later.

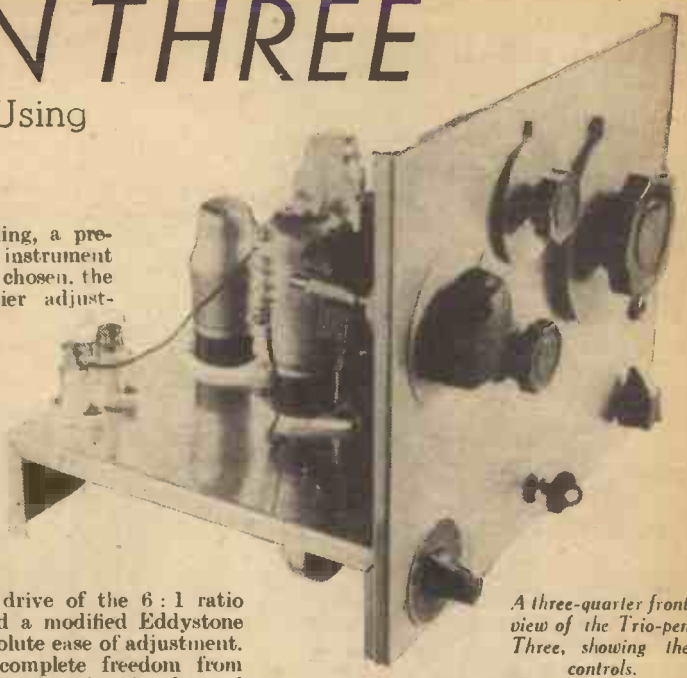
For bandsetting an 18 mmfd. condenser was decided upon, a reduction drive of the 6 : 1 ratio epicyclic type, and a modified Eddystone dial providing absolute ease of adjustment.

Owing to the complete freedom from backlash and slip in the bandspread control, it will be found possible, after a little experience, to tune-in accurately otherwise difficult signals without at times resorting to the use of the bandsetter, but on the higher-frequency bands this condenser will be found essential for logging.

Resistance capacity coupling is employed between the detector and the first L.F. stage, volume control, necessary when using the phones, being effected in the normal manner.

A further stage of L.F. amplification was desirable for both speaker reproduction and as a means for extending DX. logs. Filter-feed coupling is again used between the two L.F. stages. and owing to the by-pass capacity being provided between the first L.F. anode and earth through the transformer winding and G.B.. it was found unnecessary to include a further resistance or choke for grid stopping in the output stage.

The complete freedom from any H.F. component straying into the L.F.. circuits



A three-quarter front view of the Trio-pen Three, showing the controls.

results in the stability of operation previously referred to, and it was found unnecessary to include a further by-pass condenser in the output stage, the anode choke HFC4 sufficing in this respect.

Again, for logging purposes, another modified Eddystone dial and epicyclic drive is used for the reaction condenser control, whilst the variable-mu bias potentiometer P1 and the aperiodic coupling condenser C6 provide both extra fine adjustment and appreciable gain control.

Chassis Layout

It will be apparent that very short wiring is facilitated by the two functions in the TP230 (V1), a comparatively simple component layout being achieved.

The coupling condenser C6 only is fitted with a flexible coupling and a ⅜in. x ¼in. diameter brass rod, this rod protruding through a large diameter clearance hole in the front panel and being fitted with an Eddystone fluted control knob of the miniature pattern.

Both bandset and variable coupling condensers C4 and C6, respectively. are fitted to an aluminium mount: this was necessitated by the relationship of the condensers on the front panel, and extra rigidity is provided by fixing this mounting bracket to both chassis and front panel.

The 6BA. countersunk bolt securing the mounting plate to the front panel is hidden from view by the bandset condenser dial. Both potentiometers are furnished with 2in. shafts, and these lengths were retained in order that the wiring could be kept reasonably short.

Bulgin universal brackets of the E.H.9 type were employed for fixing the potentiometers, but they required cutting down to 1¼in., so that they could be accommodated under the chassis. The shafts in each case pass through ⅜in. brass bushes which also serve to clamp the front panel to the front chassis runner.

The key-switch likewise clamps the front panel and runner, and a point can be waived here with regard to the type of on-off switch desired, the drilling being the

(Continued overleaf)

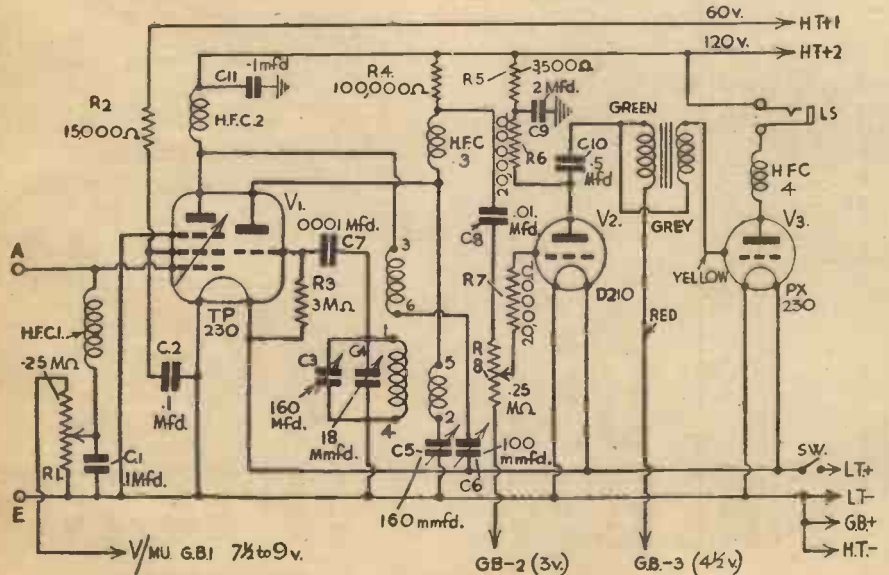


Fig. 1.—Theoretical circuit diagram of the Trio-pen Three.

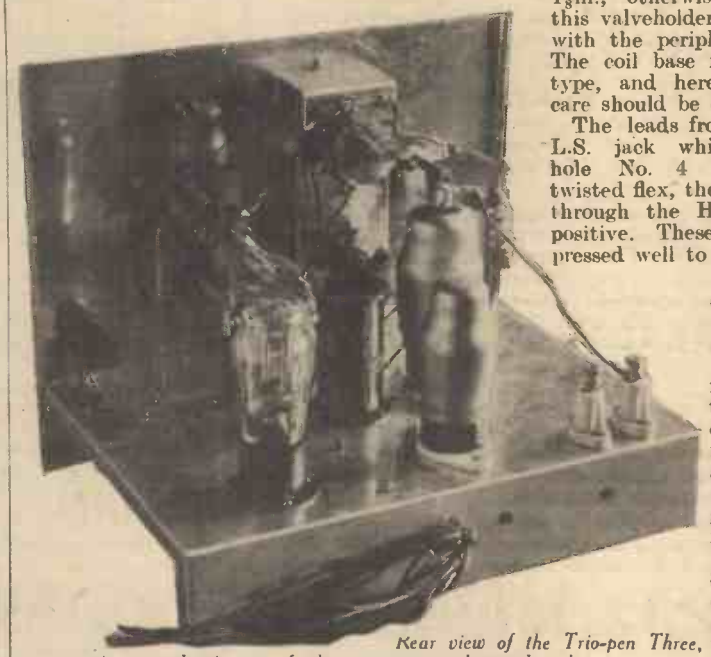
THE TRIO-PEN THREE

(Continued from previous page)

same for the more usual toggle-type Bulgin switch.

The copper bus-bar comprises simply a ½in. strip of thin copper foil folded over once or twice, and 6½in. in length; the ends being soldered finally to one bolt securing the reaction condenser mounting bracket and one of the bandspread condenser mounting bracket-fixing bolts.

FULL-SIZE BLUEPRINTS OF ALL OUR RECEIVERS ARE AVAILABLE



Rear view of the Trio-pen Three, showing the layout of the components above the chassis.

A. and E. Connections

For aerial and earth connections, insulating pillars of the 1in. type S.S. (Raymart) are used, a hole being necessary in the chassis and located immediately in the centre of the earth pillar for connection through the chassis to one side of the condenser C8; the aerial connection is taken immediately from under the nut of the pillar to the grid end of the H.F. choke (HFC1)—this is the top cap of V1.

Ceramic valveholders are used throughout, and particular care should be taken with drilling and filing the hole for V1 to see that the diameter, in relation to the two fixing holes, is consistently 1⅛in., otherwise the sockets of this valveholder may short-circuit with the periphery of the hole. The coil base is of the bakelite type, and here again the same care should be exercised.

The leads from the 'phone or L.S. jack which pass through hole No. 4 should comprise twisted flex, the H.T. side passing through the HFC3 to the H.T. positive. These leads should be pressed well to the chassis.

Chassis Construction

18 S.W.G. aluminium is used throughout, but to obtain rigidity the front panel as well as the chassis is flanged. This gauge will be found far easier to "work" than 16 S.W.G., and full construction and operating details will be given in our next issue.

LIST OF COMPONENTS

RESISTORS (Fixed) (A. F. Bulgin & Co. Ltd.):
One type HW8, 3,500 ohms, ½ watt.
One type HW17, 15,000 ohms, ½ watt.
Two type HW19, 20,000 ohms, ½ watt.
One type HW25, 100,000 ohms, ½ watt.
One type HW35, 3 megohms, ½ watt.

POTENTIOMETERS:
Two type "M".25 megohm. (Erie Resistor Co.)

CONDENSERS (Fixed):
One type CM4 .0001 mfd. (mica). (A. F. Bulgin and Co., Ltd.)
One type 451 .01 mfd. (tubular). (T.C.C.)
Three .1 mfd. (tubular). (Polar N.S.F.)
One .5 mfd. (tubular). (Polar N.S.F.)
One 2 mfd. (paper). (T.C.C.).

CONDENSERS (Variable) (Stratton & Co., Ltd., "Eddystone."):
One type 1094, 18 mmfd. (max.).
One type 1130, 100 mmfd. (max.).
Two type 1131, 160 mmfd.

H.F. CHOKES:
Three type 1010. (Stratton and Co., Ltd.).
One type CHP. (G5NI "Raymart.").

VALVEHOLDERS (B.M.P. "Clix"):
One No. X147 9-pin, with soldering terminals.
Two No. X147 4-pin, with soldering terminals.

REDUCTION DRIVES:
Two type ERD (Epicyclic). (G5NI "Raymart").

INSULATING PILLARS:
Two 1in. type SS. (G5NI "Raymart.")

DIALS AND KNOBS (Stratton & Co. Ltd., "Eddystone"):
One type 1085 (Dunte) precision slow-motion.
One type 1027 (Osko) dial, complete with drive.
One type 1097 (DINJP) and Vernier. (Direct drive dial.)
One fluted control knob (1⅛in. dia.) only.
One 2in. dia. knob as for TRIMT unit.
Two type K92 instrument knobs (A. F. Bulgin and Co., Ltd.)
One type IP8 dial. (A. F. Bulgin and Co., Ltd.)

JACKS:
One jack (midget). (Igranic Elec. Limited.) type P71

JACK PLUGS:
One type P38. (A. F. Bulgin and Co., Ltd.)

COILS (G5NI "Raymart."):
One type CA, 11 to 25 metres.
One type CB, 20 to 45 metres.
One type CC, 44 to 100 metres.
One type CD, 80 to 180 metres.

VALVES (High Vacuum Valve Co.)
One TP230.
One D210.
One PX230.

TRANSFORMER:
One type LF33. (A. F. Bulgin and Co., Ltd.)

SWITCH:
One type S24. (A. F. Bulgin and Co., Ltd.)

BATTERY CABLE AND WIRING (A. F. Bulgin and Co., Ltd.)
One type BC5 battery cable.
Two yards twin flex.
One 3ft. coil (WS2) screened flex.

BRACKETS:
Two type EH9 universal. (A. F. Bulgin and Co., Ltd.)
Two type 1007 insulated brackets. (Stratton and Co., Ltd.)

PLUGS AND SPADES (B.M.P. "Clix"):
Seven No. 3 Master plugs (engraved): H.T.+1, H.T.+2, H.T.—, G.B.+, G.B.—1, G.B.—2, and G.B.—3. Type MP1
Two No. 14 spade terminals (large), red, black. Type R415

FLEXIBLE COUPLERS:
Two type FC. (G5NI "Raymart.")

BATTERIES:
One 120v. H.T. battery. (Exide Ltd.)
One L.T. accumulator (2v.). (Exide Ltd.)
One 9v. grid-bias battery. (Ever-Ready or Exide)

LOUDSPEAKER:
One W.B. Junior cabinet speaker. (Whiteley Elec. Radio Co.)

PHONES:
One pair of Brown's type "A" headphones (S. G. Brown, Ltd.)

MISCELLANEOUS:
6BA nuts and bolts. (A. F. Bulgin and Co., Ltd.)
One gross 6BA shakeproof washers, No. P917. (A. F. Bulgin and Co., Ltd.)
18 S.W.G. Aluminium chassis and cabinet. (Paroussi.)

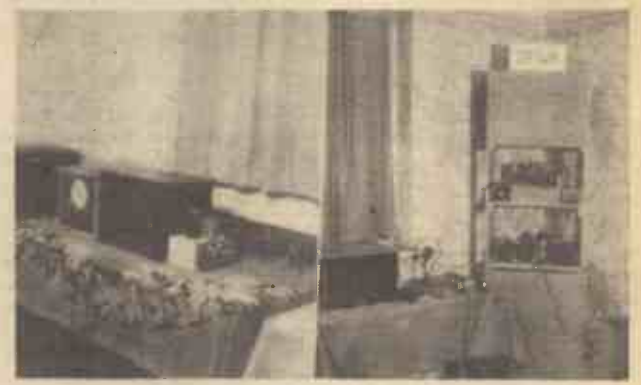
Open to Discussion

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 Reader's Den

SIR,—I enclose two photographs and a short description of my gear, which may prove interesting to other readers. The receiver on the left-hand side of the window is a 2SG-v-1, built in three units. The first is a two-stage pre-selector, consisting of two fully tuned H.F. stages using Hivac SG220 S.W. valves. The centre unit is the detector stage, using a PM2DX. The L.F. amplifier is on the right, the valve being an HL2, biased at -1½ v. Various four- and six-pin S.W. coils (Eddystone) can also be seen in this photograph.

The other photograph shows the apparatus on the right-hand side of the window. The original "Simplex Three" is on the left, with the log-book, mike, key, and 'phones by the side of it. The transmitter in the rack is just a C.O.-P.A. (crystal frequency 7,048 kc/s). The P.A. is anode modulated by means of a two-stage modulator. I am only using battery valves at the moment (with a mains unit), but I've got an APP4G and an 0.15/400, so I'm hoping to get a mains TX going very shortly. My power now is only about 1 watt, so there's room for improvement!—S. E. JONES (Croydon).



Two views of Mr S. E. Jones's wireless den.

An Efficient S.W. Set for the Beginner

SIR,—I am a new reader of your excellent journal and I have made many of the smaller articles described in its pages. I am only a beginner and I am not yet very far advanced in the science of radio. I have always been interested in short-wave work and I should like to build a small short-wave set. I would, like many other readers I know, be very grateful if you could start us on short-wave reception with a one- or two-valver. Being unable to get much elaborate apparatus, the simpler the set the better, and it should employ home-made coils of the plug-in type. I would also like to add that I have just finished making your S.S. one-valver, and I am very proud of its performance.—J. K. SMITH (Droitwich).

[*The Simplest Short-wave Two, using a home-made coil, and described in the April 3rd, 1937, issue, should suit your requirements.*—ED.]

A 20-m. Log: Correspondents Invited

SIR,—I append my log on 20 metres, being the best DX heard here during the past month.

CM2WD; K4DUZ, 5AG, 6BAZ, CGK, LKN, NYD, PHD, PLZ; OQ5AU, AV; PK1OG; UK5HA; VE4GN, 5AAD, AHP, AZ, GI, GC, HR, VO; VK2ACX, IE, UD, 3BC, DP, VJ, XB, QK, RC, CZ, VU, WL, 5LL, WR, TX; VQ3HJP; VQ2AG; VU2FO; 70 W6's, including QQL (Nevada), PFL and QAP (Arizona); 18 W7's; ZE1JI; ZL2CI, QY, 3DJ, 4AQ.

At present I find the best times for DX listening to be between 07.00 and 09.00 B.S.T. in the morning, and 18.00-20.00 B.S.T. in the evening.

QSL cards have recently been received from TG5JG, VP1WB, VK7CL, ZS3F, (for reception in December, 1937), VE5DD, TI2LR, all 20-m. 'phones, and from D4FND W7GPT, TF5M for 20-m. C.W. Also from W3GZZ, C.W. on 40 m.

The aerial in use here is a very ordinary inverted L, 40ft. long, 20ft. high, E.-W., but I hope to put up something a little more efficient in the near future, probably a directional beam, thanks to your article! The receiver is a battery-operated 0-v-2 with headphones, and has brought in a total of 107 countries on the amateur bands, with 99 on telephony. Every band is covered from 1.7 mc/s-28 mc/s.

Any S.W.L.s who might care to correspond with me can be sure of an early reply.—L. SINGLETARY (6, Verdun Road, Wisbech, Cambs).

Prize Problems

Problem No. 362

PETERS made a four-valve battery set and decided that 'phone plug-in connections should be used. After trying the set and finding it to work satisfactorily, he purchased a standard type plug and jack, and mounted this on his panel so that 'phones could be used as desired. When he switched on, however, he was surprised to find that he could not obtain signals, although the connections from the anode circuit of his output valve to the jack appeared to be quite in order. What was wrong? Three books will be awarded for the first three correct solutions opened. Entries should be addressed to The Editor, PRACTICAL WIRELESS, Geo. Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2. Envelopes must be marked Problem No. 362 in the top left-hand corner and must be posted to reach this office not later than the first post on Monday, August 28th, 1939.

Solution to Problem No. 361

When Hinks made his circuit modifications he omitted to complete the cathode circuit of his detector stage, thus preventing this valve from functioning.

The following three readers successfully solved Problem No. 360 and books have accordingly been forwarded to them: N. Alison, 149, Sravington Road, Maida Hill, W.9; W. H. Godfrey, Elwin Road, Tiptree, Essex; R. L. Evans, Gerlan Farm, Bethesda, N. Wales.

Criticism, Chat and Comment

Promenade Concerts

Our Music Critic, Maurice Reeve, Discusses the Week's Concerts

I WILL start off my article this week in a slightly different format, which will make it read something like the menu at one of London's most patronised restaurants. When we pick up the said menu in the said haven of appeasement, we find this notice staring at us from its midst: "The Chef's own Lunch." And whether we like it or not, we give it our most careful consideration through the very force of circumstances. Therefore, here are the "chef's own lunches," or, in more reverent language, the works that your correspondent will make special endeavours to listen to next week:

MONDAY.

Good Friday Music (Parsifal) and Siegfried's Journey to the Rhine ("Twilight of the Gods"): Wagner.

TUESDAY.

Two Pianoforte Concertos, Mozart in C minor, and Schumann. Pianist: Solomon.

THURSDAY.

Richard Strauss's Symphonic Poem, "Ein Heldenleben" ("The Life of a Hero").

FRIDAY.

Beethoven's sixth (Pastoral) Symphony and Coriolan Overture.

SATURDAY.

Beethoven's fourth Pianoforte Concerto, pianist, Myra Hess. Another of Strauss' Symphonic Poems, "Till Eulenspiegel's Merry Pranks"; Elgar's Sea Picture Songs, sung by Mary Jarred; and César Franck's Symphonic Variations for pianoforte and orchestra, also played by Myra Hess.

Piano Concertos

The week is particularly rich in piano concertos. It is as impossible to say whether Mozart's C minor is greater than the one in A as it would be to choose between Beethoven's fourth and fifth. As a matter of fact, they form two very interesting pairs for comparison. Whilst Beethoven's fifth, or Emperor, can be considered his "Hamlet," the fourth is most certainly his "Midsummer Night's Dream." He never wrote anything more brilliant, sparkling and teeming with pianistic virtuosity. The slow movement is one of music's miracles. The Mozarts are the other way round. The A major is the brilliant, dazzling favourite, but the C minor has a strain of wistful sadness which is entirely captivating. The third movement is a beautiful theme and variations.

The Schumann needs no recommendation from me. Not only is it the only work of its kind that he wrote, but it is universally considered his finest composition. Following the precedent founded by Beethoven in his fourth, it opens with a very dramatic passage for the solo instrument which ushers in the principal subject, on the orchestra. The resources of the piano are exploited to their fullest limits and the ear is charmed with a succession of beautiful melodies treated with the utmost skill.

The Franck Variations are in many ways unique amongst works for a solo instrument and orchestra. Their title conveys that they are a set of variations on a given theme within the framework of a symphonic movement and not separate movements. The form of the work is precisely the same as that of any classical "first movement." There is no brighter and more vivacious work in the pianist's repertory, and it abounds with the Gallic musical genius at its best. After eight bars of orchestral introduction, the piano states the principal theme—one of the utmost charm tinged with sadness. Listen to it most carefully, and try to spot it as it recurs throughout the work in its various guises and metamorphoses. In its final representation—in what corresponds to the recapitulation section of a first movement—it is jazzed, or syncopated, with the most delightful effect. You will be intrigued when you realise how many ways a tune can be served up, and how different it can be made to appear each time. This culminating section is of dazzling brilliance, and never fails to arouse the greatest enthusiasm. Myra Hess is sure to give it handsome justice.

Beethoven's Symphony

The Pastoral Symphony is Beethoven's great hymn of praise to Nature. Designed as a piece of programme music, he himself said it was "the expression of feelings rather than painting." The titles of the movements are, in themselves, sufficient description of the spirit that pervades throughout this exquisite work: 1. Awakening of happy feelings on getting out into the country. 2. By the brook side. 3. Merry gathering of the country folk. 4. Thunderstorm. 5. Shepherd's song: happy and thankful feelings after the storm. Retractors say that the representation of the cuckoo, nightingale and quail, at the end of the third movement, are difficult for the native countryman to recognise, and that, in the thunderstorm, the thunder sometimes precedes the lightning. Programme music was never meant to be other than impressionistic, and, as the two passages in question are monumental in their musical and constructional significance, those who expect Beethoven to give them a sixth-form natural history lesson are rather exceeding their commissions. We get up from listening to this great symphony better and refreshed, *and* entertained. I wouldn't recommend anything that didn't entertain, at least, not without specifying it.

These are the "chef's own lunches" for the week. Let us now briefly run through the remainder of the programmes. Elgar's "Sea Pictures" are glorious visions of Britannia's Realm, "Where Corals Lie" being my favourite. "In Haven" and "Sabbath Morning at Sea" are the others. Mary Jarred sings them on Saturday. Schumann's fourth symphony—Tuesday—is, I should say, for the musical archæologist, rather than he who seeks entertainment. Wednesday is the Bach night again. You should enjoy the Brandenburg Concerto for Strings and the Piano Concerto in D minor. Both are in the old man's brightest vein. The fourth suite in D, the Violin Concerto in E and the church cantata, "All Praises to the Lord," are also among the tit-bits for that evening. Ravel's Spanish Rhapsodie—Thursday—is a classic example of the modern school of the exotic and sophisticated, whilst Saturday's programme, in addition to what has already been signalled out, has Wagner's "Rienzi" overture, and the ever-popular "Largo al Factotum," sung by Dennis Noble.

R.S.G.B. EXHIBITION

THE following companies have accepted an invitation to take part in the R.S.G.B. Exhibition to be held at the Royal Hotel, Woburn Place, London, S.W.1, during the period fixed for the 14th Annual Convention (September 21st-23rd).

Stand 1. Webb's Radio.
" 2. Stratton and Co., Ltd.
" 3. Peto-Scott Co., Ltd.
" 4. Radiomart G5NI (Birmingham), Ltd.
" 5. Taylor Electrical Instruments, Ltd.
" 5a. Wingrove and Rogers, Ltd.
" 6. Hamrad Wholesale, Ltd.
" 7. ———
" 8. N. E. Read.
" 9. The General Electric Co., Ltd.
" 10. Voigt Patents, Ltd.
" 11. Denco.
" 12. The Quartz Crystal Co., Ltd.

The chief events fixed for the Convention are as follows:—

Thursday, September 21st.—Visits to (a) Broadcasting House, (b) Dollis Hill G.P.O. Research Station, (c) Alexandra Palace Television Station. Music-hall performance in the evening, followed by Code Contest.

Friday, September 22nd.—Visits to (a) Radio Research Station, Slough, (b) Alexandra Palace Television Station, (c) Tatsfield B.B.C. Station. Conversazione, Technical Discussions, and Code Contest in the evening.

Saturday, September 23rd.—Meetings in the morning, Technical Lecture in the afternoon. Annual Dinner in the evening.

THE FOUR FEATHERS

PETER CRESWELL, who will produce this first broadcast version of A. E. W. Mason's famous thriller, has been busy adapting the book as a radio serial, the first instalment of which will be broadcast on September 3rd. The recent film version stressed the story's elements of adventure on a grand scale, but there is in addition a more intimate side to the story which may be somewhat lost on the big canvas of a screen epic but to which broadcasting can do ample justice. It is on this aspect that Peter Creswell has decided to concentrate, though that is not to say that adventure has been neglected.

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.

Special Notice : Will club secretaries please send in reports in the form they appear on this page.

SLOUGH AND DISTRICT SHORT-WAVE CLUB

Secretary : 16, Buckland Avenue, Slough, Bucks.
Meetings : Alternate Thursdays at 7.30 p.m.

AT the last meeting held on Thursday, August 3rd, the chief item was a very interesting talk by Mr. Paine (G6PR) on "Building and Operating a Station for National Field Day." It was decided that a series of lectures should be given on "Measuring Instruments and Test Gear for the Amateur." We are still searching for a new QRA for the Club due to the continuous growth in membership.

The agenda for the next meeting includes a demonstration of a super-regenerative receiver designed and operated by Mr. Paine (G6PR). A junk sale will be held in addition to all the usual features.

Members of the Ashton-under-Lyne and District Radio Society, who took part in the 56 mc. contest on July 30th at Cown Hill, nr. Glossop, Derbyshire, 1,250 ft. above sea level.

THE MEDWAY AMATEUR TRANSMITTERS SOCIETY

Headquarters : Naval Wives' Club Hall, Dock Road, Chatham.
Meetings : Tuesdays, 8.15 p.m.
Asst. Sec. : R. Nicholson, 8, Pine Road, Strood, Rochester, Kent.

THE M.A.T.S. is still forging ahead, and now boasts an active membership of nearly fifty, and twenty-one of these hold transmitting licences. General club activity is at the moment rather low due to the summer holidays, but an interesting programme of experimental work, lectures, etc., is now in preparation for the autumn and winter sessions.

A number of members are active on 56 mc/s, and a portable station was on the air during the R.S.G.B. Field Day.

It is hoped to hold a 1.7 mc/s D.F. field day towards the end of August, and preparations for this are well in hand. The weekly meetings continue, and are proving very interesting for those members able to attend during summer, as some very lively informal debates and discussions have been taking place, as well as morse and technical instruction.

A cordial invitation is extended to everybody in the district interested in radio to come along and meet the local hams on Tuesday evenings.

ASHTON-UNDER-LYNE AND DISTRICT AMATEUR RADIO SOCIETY

Headquarters : 17a, Oldham Road, Ashton-under-Lyne.
Hon. Sec. : K. Gooding (G3PM).

WORK is progressing smoothly with the new club-room—it has been redecorated, and by the time this note appears the antenna will have been erected. The power pack for the club receiver has been built, and the design for the receiver having been decided upon, steps are being taken to get it finished as soon as possible. Mr. A. Wilkie reports that he is now licensed as 2HMA, and Mr. J. Phillips (2CPP) is now awaiting his full ticket.

The 56 m/c Field Days have stimulated new interest in this band, and several receivers are under construction. Mr. Simpson (2HAP) has volunteered to assist G3FF by taking over the morse instruction class held on Friday evenings.

Mr. W. Taylor is arranging for a visit to the Aerialite Works very shortly, and members are again requested to watch the Notice Board !

NORTH MANCHESTER RADIO AND TELEVISION SOCIETY

Hon. Sec. : R. Lawton, "Gratton House," Whalley Road, Whalley Range, Manchester, 16.

THE above society this year is again having a stand at the Manchester Radio Exhibition, to be held in the City Hall, Manchester, from September 26th to October 7th. Much short-wave gear and amateur constructed receivers and transmitters, etc., will be displayed on the stand, and also the society is endeavouring to make a display of as many photos and snaps as possible of amateur transmitters, and listening corners, shacks, etc. Anyone who has a photo of their listening corner, or transmitter, etc., they would like included in the display, should send it at once direct to the secretary. Although it is yet too early to make any definite statements, the society hopes to be able to arrange two or more lectures, etc., on amateur radio and short-wave radio, etc., to be given either in or near the Exhibition Hall during the exhibition. Further details will be given at a later date in the next issue of this journal. Up-to-the-minute details will also be available from the secretary of the society after September 1st.

GLOSSOP AND DISTRICT RADIO SOCIETY

THE last meeting of the above society was held at the new headquarters, 152, Station Road, Hadfield, Manchester. There was a full attendance of members of the society, which has been in existence ten months. At present there are five A.A.'s in the Society—2AJP, 2DXA, 2FLI, 2FXW and 2HBX. Regular morse instruction is a feature of the society, and is given weekly by 2FLI. A lecture was given at this meeting by 2FXW on the subject of "Artificial Aerials, Their Purpose and Methods of Coupling." A series of lectures has been arranged for the winter months. The society would welcome visits from any neighbouring ham. Communications should be addressed to the secretary, K. C. Sidebottom, at the above address.

A group of members of the Glossop and District Radio Society at a meeting held in 2FLI's shack on July 2nd.

A CONSTRUCTOR TOURS RADIOLYMPIA

(Continued from page 560).

27, cover at one sweep, Messrs. Edison Swan, who have an exhibit well worth seeing—if you can get near it; Messrs. Baird, of television fame; Messrs. Rola and Celestion, both of which will be tempting all of us with their new loudspeakers. Personally, I never go to a show without wanting far more speakers than, apparently, I shall ever be able to secure. When you hear about the characteristics of the latest models, it always makes one doubt if the quality of reproduction of one's own speaker is as perfect as it might be.

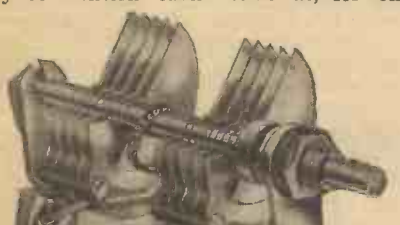
When you have been able to get around or away from No. 26, the Alexandra Palace stand, pop over to No. 2 and see what Exide have to offer you—and they have some new lines—before working your way round to No. 41, which houses all the Ferranti temptations, ranging from tele-

New black bakelite highly polished engraved instrument knobs by Bulgins.

vision and ordinary receivers, to a most extensive range of meters, which, I think, are items dear to the heart of every constructor. Opposite this stand will be found Heayberds, No. 57, and their display of charging and mains equipment certainly warrants a stop to examine the sound construction of all of their products, which are obviously built to give service without sacrificing finish and appearance. Continuing along the same aisle, as fast as the attractions and crowds will allow, Mullards, No. 55, and Cossors, No. 48, at the other end, so to speak, will supply you with all the information and leaflets you require concerning their valves. With the numerous types now available, it behoves all constructors to keep their valve literature right up to date, so don't miss this opportunity.

Bulgin Components

When you have rested awhile, pass into the next gangway, that is the one nearest the side of the hall, and make your way to No. 62 where you will find a very old supporter of the constructors' movement, namely, Messrs. Bulgin. I am not going to try to mention their items as, for one

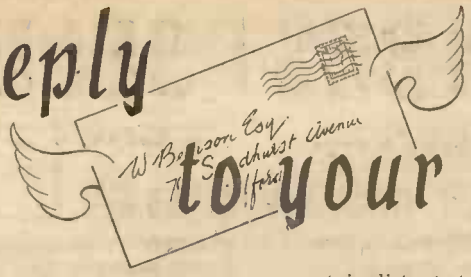


S.W. enthusiasts will find many interesting variable condensers on Polar's stand.

thing, they are too well known and, secondly, they are far too many to talk about; besides, they can supply such a wonderful catalogue that there is no need for you to forget what you see on their stand when you get back home.

In this same gangway will also be found Messrs. T.C.C. stand, No. 63, so once again you can settle any queries you have about condensers of every size and type.

In reply to your letter



Reaction Effects

"I recently built a one-valve set of the straightforward type. The set works quite well, with one exception. When I tune to a very distant station it is naturally very weak, and as soon as I adjust the reaction to bring up the strength the station goes. I can find it again, however, by adjusting the tuning control. Does this indicate that the set is not working properly?"—L. F. (Barnsley).

WITH quite a number of reaction arrangements, adjustment of the reaction circuit does affect the tuning setting. This is on account of the fact that the damping on the grid circuit is changed, and accordingly the tuning characteristics of the coil are also changed. In other cases the trouble may be due to the fact that the reaction coil is so placed in relation to the grid winding that capacity coupling is rather large. The ideal arrangement is, of course, inductive and not capacitive coupling. Therefore, you may be unable to modify the effect in your case without changing the coil.

Loudspeaker Design

"I have an old balanced-armature speaker in a box, and this seems to me to give all that I require in the way of quallty. I have been told, however, that a moving-coil speaker would be a great improvement, but I hesitate to spend extra money if this is not likely to be the case. Could you please confirm or otherwise?"—M. Mc. F. (Carlisle).

WHILST it is quite true, as a general rule, that a moving-coil speaker of modern design will give much better reproduction than an early type of moving-iron speaker, it must be borne in mind that the speaker only delivers an output dependent upon its input. That is to say, you might buy the best speaker in the market but it would not give any improvement on your present speaker, due to the fact that the general circuit design of your receiver is such that the quality is not very good. The main feature of the modern speaker is the improved bass response, but if this is lacking in the receiver there is no object in using a speaker to reproduce it.

Microphony

"My receiver is a commercial model, 6 valves, with self-contained speaker. I find, however, that on the local stations before I can get maximum volume out of it there is a terrible howl which comes up and grows in volume till I have to switch off. Can you tell me how to cure this?"—D. W. E. (Barnsley).

THERE may be no actual fault in the receiver, as the trouble mentioned could be caused by endeavouring to push volume beyond the capabilities of the output stage. You may find that the output stage is overloaded before the howling point is reached and therefore should not advance the gain control beyond the distortion point. On the other hand, a microphonic valve can give rise to the trouble, but it would no doubt be present on certain distant stations also where a fair volume was obtained. Tap the valves gently and see if any particular one gives off a ringing sound, and if so, have it tested in case it is faulty.

Prefixes

"I am a newcomer to radio, and am rather confused by some of the terms used. I am not quite clear concerning the microhenry and the millihenry, and should be glad if you could tell me what the prefixes mean, as I see that they are also used in conjunction with other standards used in modern apparatus."—L. van F. (Hove).

THE prefix "milli" means one-thousandth, and the prefix "micro" indicates one-millionth. A milliamp is, therefore, one-thousandth of an amp. In modern condensers a capacity rating of so many micro-microfarads is often used, and this is generally expressed mathematically as follows: 10^{-12}

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 WIRELESS, George Newnes, Ltd., Tower House, Southampton Street, Strand, London, W.C.2. The Coupon must be enclosed with every query.

Valve Characteristics

"I have found in my spares box a valve marked Pen1340. I have lost the slip of details, and should be glad if you could tell me what the valve is and its working data."—G. E. (Lowestoft).

THE valve is a D.C. output pentode with a 13-volt 0.4 amp. heater. H.T. anode and screen voltages are 200, and the grid-bias is 7.45 volts. The normal anode current is 31mA., and the optimum load resistance is 5,800 ohms. The rated output is 2.5 watts. The valve is, of course, a Mazda product.

Voltage Adjustment

"I wish to carry out a number of experiments with S.G. and similar valves, but find great difficulty in arriving at the voltage used on the screens. I have already made a few tests, with ordinary potentiometers, but the trouble is to measure the actual voltage, or the value of the tapping on the potr. after the tests have been made. I only have simple measuring instruments and wonder whether you can offer any suggestion for carrying out the idea more effectively without undue expense."—R. S. A. (N.W.1).

PROBABLY your simplest method is to obtain a calibrated potentiometer. If your existing component is of the simple type you could make a sub-divided scale having equal divisions and thereby gauge the amount of resistance on each side of the arm. A better plan would be to obtain one of the Bulgin 60-watt indicator resistances, available in values of 0 to 10,000 ohms and 0 to 50,000 ohms. These have a sliding contact running on a calibrated bar and thus enable you accurately to calculate the resistance in use. The price is 11s. 6d. each in either value.

Top-cap Connections

"I have just tried out a circuit published in your pages, but it does not work. I have checked and re-checked all connections, which are soldered, and have had practically every component tested by friends who have sets. I enclose a diagram of my wiring, and wonder if you can suggest why it fails to work as you claim."—P. E. (Bedford).

THE diagram appears quite in order, but there is just one likely point which is causing all your trouble. The valve has a top cap, and in some makes of valve this is a grid, whilst in others it is the anode. You have not indicated the type of valve you are using, and we think it most probable that you are using a valve of the opposite type to that originally used. Check the connections to the top cap by reference to the valve-maker's data sheet.

Coil Connections

"I have an old dual-range coil by Telsen, type 76, and should like to try this in a set I am making up. Could you give me the the connections to the 8 terminals on the base please?"—G. B. (Wealdstone).

THE aerial may be joined to either terminal 1 or 2, the latter bringing into circuit a small condenser mounted on the coil for aerial damping adjustment. Earth should be joined to terminals 7 and 6; grid to terminal 8; reaction condenser to terminal 5, and a 3-point wavechange switch should be joined to earth and terminals 4 and 3. The tuning condenser is, of course, joined across 8 and 6. In the event of any medium-wave breakthrough at the lower end of the long-waveband, connect a .0003 mfd. fixed condenser across terminals 4 and 7.

50/- All-wave Three

"I am about to construct this receiver, described in the issues of March 18th and 25th. On looking over the wiring diagram I cannot see any indication of an L.T. lead, although it is, of course, shown on the theoretical diagram. May I take it that if I make a connection on to the wire which connects valves 1 and 2 to R3 it will be correct?"—W. J. H. (Rhyl).

YES, the connection will be in order. In our issue dated April 1st—page 64—we published a corrected diagram of the circuit, showing the L.T. lead and also a modification in the connection to condenser C11. You should obtain this before wiring the receiver.

The coupon on page 584 must be attached to every query

N.T.S. BARGAIN BEST SELLERS

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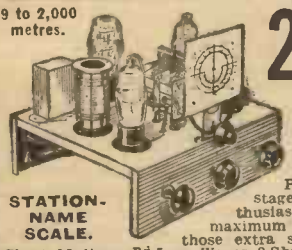

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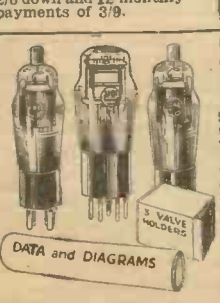

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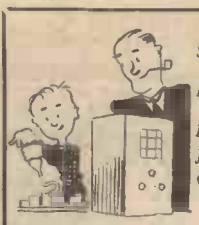

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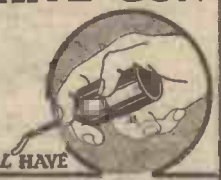

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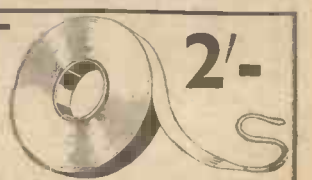

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