THINKING ABOUT PORTABLES— See Page 29

Practical and Amateur Wireless

3D EVERY WEDNESDAY

Edited by F. J. CAMM

A GEORGE NEWNES Publication

Vol. 14. No. 340. March 25th, 1939.

AND PRACTICAL TELEVISION

F. J. Camm's 50/- ALL-WAVE 3

Further Details!

EXPERIMENTAL A.C. MAINS AMPLIFIER—

See Page 36

Practical and Amateur Wireless

Edited by F. J. CAMM

Technical Staff:
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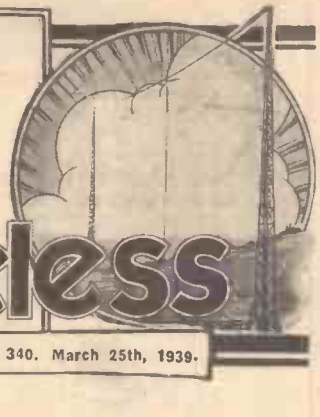


ROUND *the* WORLD *of* WIRELESS

Valve Types

THE newcomer may be pardoned for expressing ignorance concerning the appropriate type of valve to be used in a given stage of a modern receiver. Tetrodes, which at one time were only used in H.F. stages and which were otherwise known as S.G. valves, are now regularly employed in the L.F. stages, and in at least one range of valves have replaced output pentodes. Pentodes are suitable for use in any stage of a receiver, although made in different types. No doubt there will be a time when valves will be standardised and reduced to a minimum of types, but in the meantime a careful check has to be kept of new types and the passing out of old ones. In this issue we continue the details given concerning pentodes and tetrodes, and we hope this will clear up the matter for those who are finding it confusing to know just what each valve type is intended for, and will enable every constructor to select a suitable valve for any particular circuit which he may desire to make up or with which he may wish to experiment.

Television in Germany

RUMOURS have been current that the German authorities intended to close down or move the television transmitter situated on Amerika House. It is now officially stated, however, that there is no intention of closing down the transmitter, but as it does not fully serve the main part of Berlin it has been considered whether or not there is not some alternative site which would be more effective.

Broadcasting in Ceylon

THE total number of licence-holders in Ceylon is approximately 6,000, it was stated by the Minister of Communications recently in welcoming the Governor of Ceylon to the thirteenth anniversary celebrations of the Colombo Broadcasting Service.

All-India Radio Additions

NEW stations shortly to be opened by All-India Radio will be situated at Bengal, Dacca and Trichinopoly. These will be independent stations broadcasting their own sectional programmes. The establishment of a 5-kW station at Trivendram (Travancore State) to operate on the medium-waveband is also being contemplated. It is also stated that the Government of the Travancore State proposes to install 100 receivers in various State colleges and schools.

New Italian Stations

ITALY has introduced some 42-metre transmissions, operating with call-signs I2RO11, I2RO12 and I2RO13. The wavelength being used by I2RO11 is 41.55 metres.

ON OTHER PAGES

Listeners Answer Back

WHEN the B.B.C. Exhibition was at Nottingham Denis Morris, Midland Public Relations Officer, answered at the microphone a number of questions and comments by listeners. A similar idea is being tried in an outside broadcast (Midland, March 29th) from a hall in Kettering, when Mr. Morris will address a meeting there. The last few minutes of his speech will be broadcast and then listeners in the audience will have an opportunity of putting their own points of view about broadcasting at portable microphones for about a quarter of an hour. Their points and the speakers' replies will thus make the bulk of the broadcast programme. It is hoped to follow a similar procedure at one or two other places later in the year.

The Atomic World

OF special interest to technical-minded readers will be the talk to be given on March 28th (Wales) by E. J. Williams, Professor of Physics at the University College of Wales, Aberystwyth. The talk is entitled "The Atomic World."

An Hour at the Opera

THE Torquay Municipal Orchestra, led by Harold F. Petts and conducted by Ernest W. Goss, with Nan Maryska (soprano) as the soloist, will broadcast a concert entitled "An Hour at the Opera" from the Marine Spa, Torquay, on March 29th. The Marine Spa was formerly the principal concert hall in Torquay, and the concerts by the Municipal Orchestra are being held there during the reconstruction of the Pavilion, which was opened in 1912.

Il Trovatore

REPLACING "Der Freischütz," Verdi's "Il Travatore" has been scheduled as the last of the current quarter's series of full-length studio opera productions. It will be broadcast from St. George's Hall on March 31st (National) and April 3rd (Regional). During the summer, opera broadcasts are expected to be available from Covent Garden, Glyndebourne and Sadler's Wells, and Stanford Robinson, chief of the B.B.C. Music Productions Section, has therefore postponed "Der Freischütz" until next autumn.

"This and That"

PROFESSOR JOHN HILTON, one of the outstanding personalities of radio, has not been broadcasting regularly since 1937. Listeners should be interested to hear that he is returning to the microphone in a series of thirteen weekly talks to be given on Sundays. As on previous occasions his talks will be entitled "This and That," and he will be speaking on anything that has occurred to him as interesting, amusing or exciting during the previous week. Perhaps the secret of Professor Hilton's success as a broadcaster lies in the fact that there is practically nothing under the sun that he does not find interesting, and in his ability to communicate his interest in a vivid manner to his unseen audience. The first talk will be given on April 2nd.

ROUND the WORLD of WIRELESS (Continued)

Turkey Popularises Broadcasting

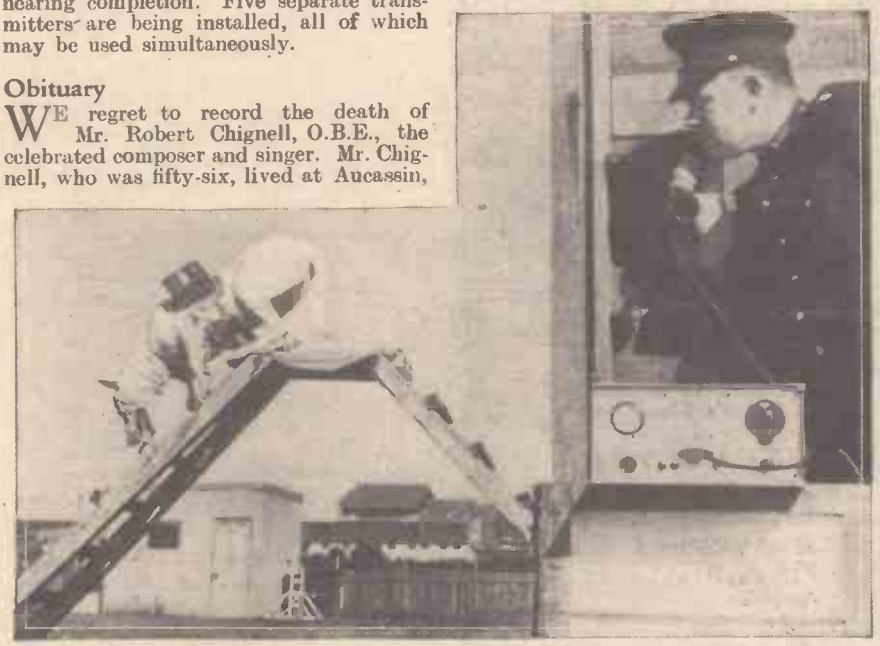
THE Turkish Government has decided to import or manufacture 50,000 wireless sets free of duty, and to distribute them to the population in out-of-the-way villages at very low prices. No licence tax, at first, will be charged, in order to encourage the people to become radio-minded. The receivers will be of such a type that the Ankara broadcasts may be heard in every district of Turkey in Europe, and Asia. The Ministry of Public Works which is sponsoring this system of education will hold the monopoly for trading in cheap receivers, leaving the private dealers to handle the more expensive sets.

Australia's New High-powered Station

ACCORDING to a recent report, the new high-powered naval radio station at Canberra, which is claimed to be the largest in the southern hemisphere, is nearing completion. Five separate transmitters are being installed, all of which may be used simultaneously.

Obituary

WE regret to record the death of Mr. Robert Chignell, O.B.E., the celebrated composer and singer. Mr. Chignell, who was fifty-six, lived at Aucassin, Horley, Surrey. The name of Robert Chignell must be familiar to all owners of radio sets, for in fourteen years no fewer than 2,500 of his works, including many special arrangements, have been broadcast. Mr. Chignell specially composed the music for the series of broadcasts of the adapted version of Victor Hugo's novel, "Les Miserables."



Zoe, a remarkable Alsatian police dog attached to the Sydney (New South Wales) police force, is here seen obeying instructions from her trainer, Constable Denholm, of the Bourke Street Police Barracks. With a miniature receiving set strapped to her back, Zoe performed numerous tricks at the direction of Denholm, who was secreted at a microphone 50 yards away. She walked up and down ladders, turned a tap on and off, put on her own collar, took it off again, and filled a billycan from a tub of water.

Fencing

CHARLES DE BEAUMONT, Epée champion of Great Britain for the last three years and captain of the fencing team which represented Britain at the Olympic Games in Berlin in 1936, will give a commentary on the Final Pool of the Foils Championship of Great Britain, which will be staged at the Salle Bertrand on March 31st. The championship is organised on the pools system, the winners of the bouts in each pool meeting until the champion is decided. This broadcast will be given in the Regional programme.

INTERESTING and TOPICAL NEWS and NOTES

City of Birmingham Orchestra

REGIONAL as well as Midland listeners will hear on March 23rd the City of Birmingham Orchestra's performance of Elgar's symphonic poem, "Falstaff," which is the chief work in their concert at the Birmingham Town Hall. Leslie Heward is the conductor.

Variety from Northampton

THE variety bill on March 29th will be broadcast from the New Theatre, Northampton, and will be heard by Regional as well as Midland listeners. The principal turns are well-known broadcasters—Anona Winn; Cavan O'Connor, The Vagabond Lover; Jack Wilson and Harry Engleman, syncopating pianists, who will be making their first appearance as a double act on the halls; and Ivan Huckerby and his Aston Hippodrome Orchestra, playing from the stage.

Bath Music Festival

PART of the programme of a concert from Bath on March 22nd will be broadcast on the Regional wavelength, when Albert Sammons will play Elgar's Violin Concerto in E minor.

Cinderella Comes to Supper

"CINDERELLA Comes to Supper" is the title of a programme of music, songs and stories in the form of a drawing-room concert, with the Cinderella of Emile Littler's pantomime at the Prince of Wales Theatre, Birmingham, as the chief contributor. The others will include Dorothy Summers, Marjorie Westbury, Cicely Gay and Stuart Vinden.

Mr. Robert Chignell, O.B.E., the well-known composer, whose death is recorded on this page.

"Music Hall" from Hull

A BROADCAST from the Alexandra Theatre at Hull will be heard on March 31st, not only on the Northern wavelength but in the Regional programme also. Besides a variety excerpt from the theatre at night, listeners at noon on the same day will be able to take a peep by radio into the theatre during a rehearsal for the evening's show.

SOLVE THIS!

PROBLEM No. 340

Houten decided to build a superhet and purchased a set of coils and I.F. transformers by a well-known maker. He found a number of useful parts in his spares box, including a superhet type ganged condenser—which he verified by checking that the vanes in one section were cut away. He built the circuit to a standard design, but found that he could not obtain satisfactory tracking throughout the entire range. He checked the wiring of the circuit and all values and found that these were perfectly in order. What was the trouble? 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. 340 in the top left-hand corner and must be posted to reach this office not later than the first post on Monday, March 27th, 1939.

Solution to Problem No. 339

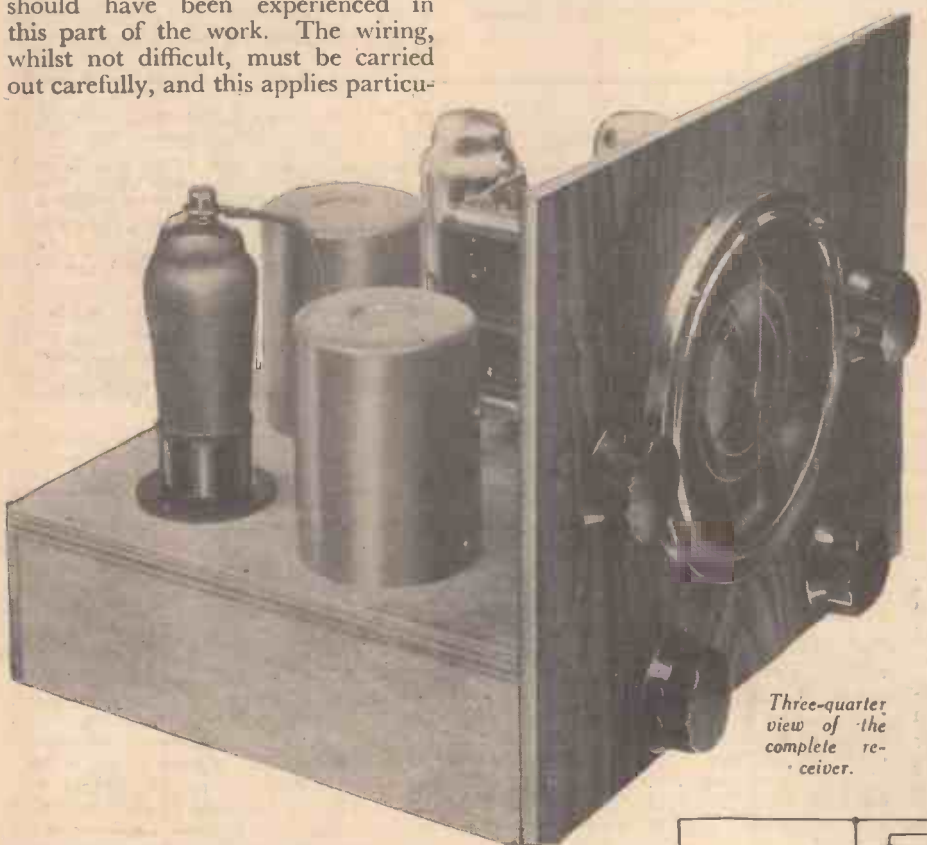
When Kennedy connected the primary winding between anode and earth he short-circuited signals and H.T. He should have taken the other end of the primary winding to H.T. positive, or choke-fed it.

The following three readers successfully solved Problem No. 338, and books have accordingly been forwarded to them: J. P. Cook, "Amtree," Chepstow, Mon; M. S. Crothall, 4, Chart Road, Folkestone; Wm. A. Geddis, 16, Rugby Terrace, Larne, Co. Antrim.

Further Details of F. J. Camm's 50/- All-wave Three

Completing the Constructional Work, and Operating Details of this Remarkable Low-priced All-wave Receiver

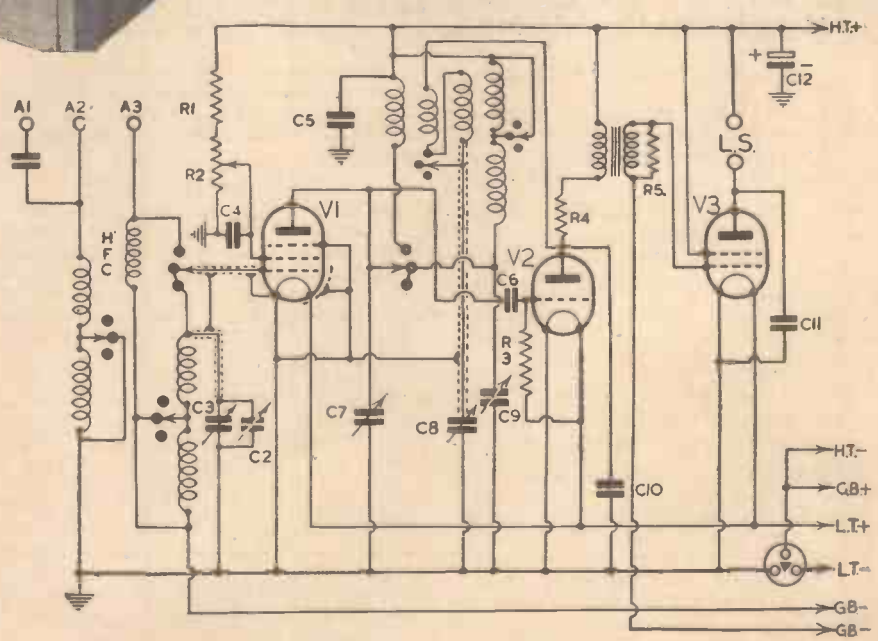
IN last week's issue we gave the main constructional details of this new receiver, and no difficulty should have been experienced in this part of the work. The wiring, whilst not difficult, must be carried out carefully, and this applies particularly to the switch unit. In the wiring diagram which was published last week the artist drew the contacts in the form of two rows, so that the relationship between them could more easily be seen. In Fig. 5 in that issue we showed a rear view of the switch and indicated how the centre six contacts related to the surrounding 18. It is thus possible to connect the first grid, for instance, to any of the internal six contacts, provided that the associated three contacts are immediately above, as shown in Fig. 5. If, however, you regard the lower row of contacts in the wiring diagram as representative of the internal row in Fig. 5, reading from left to right and starting with letter A, then the upper row, in the same order, will commence at A1 and proceed logically to F3. A good plan when wiring a switch of this type is to take one section at a time, and to check as the wiring is completed by means of a meter and battery. This avoids the necessity of taking down all connections afterwards should it be found that a mistake has occurred.



Three-quarter view of the complete receiver.

Battery Leads

There are no difficult points in wiring, other than the taking of the usual precautions to make certain that components which are held in position by wiring are rigidly attached. The short-wave choke, for instance, should be wired to the switch with fairly stout wire so that it remains up against the side runner in the position shown in the diagram, whilst the resistances and chokes should all occupy the positions shown. The use of screened sleeving should be carefully noted, and in the case of the reaction condenser the return from the moving vanes is taken via the screening of the wire for the fixed vanes. In other words, only one lead is taken to the reaction condenser, and this is for the fixed vanes, but the moving vanes are joined to earth through the screened sleeving and the associated wiring. The lead from the reaction coil and from the reaction condenser are run together near the



Theoretical circuit of the 50/- All-wave 3.

F. J. CAMM'S 50/- ALL-WAVE THREE

(Continued from previous page)

switch and the screened sleeving is there soldered together with a short length of bare wire, and this is taken through hole 5 in the chassis and returned to the moving vanes of the ganged condenser through the projecting arm on the centre plate. Battery leads are attached at the point indicated, and although these are shown projecting through the rear runner this has only been done for clarity and it is not essential to take them through this part of the chassis. In the chassis drilling details in Fig. 3 last week, we did not show a hole for these leads as it was thought desirable to leave the placing of this to individual requirements. In some cases a constructor may wish to use a horizontal type of cabinet with the speaker at one side of the set, and thus the batteries would have to be placed at the side of the set. There is ample room at hole 4 to enable all leads to be brought through at this point and this may therefore be used for the purpose. Alternatively, a clearance hole may be placed at any other part of the chassis, provided that care is taken to knot the cords or otherwise guard against their being pulled away from the point of contact when handling the plugs.

Trimming

Before testing the receiver the trimmers on the ganged condenser should be removed entirely. To do this, unscrew the adjusting nut and then carefully unscrew the small bolt which may be seen near the end of the soldering tag connection. When this has been removed the trimmer plate and mica washers may all be taken away, but the small bolt should be reinserted as it assists in holding the fixed section in place. It is preferable, therefore, to bend up the circular part of the trimmer to a vertical position and screw it back on the condenser, but do not bend the top down so that it will short-circuit to the projecting screw of the original trimmer.

When construction is completed the wiring should be carefully checked before placing valves and batteries in circuit. When quite certain that everything is in order connect the aerial and earth, using the medium-wave position for the aerial for preliminary tests. The bias applied to the first coil circuit should be 1.5 volts for preliminary tests. This may be modified as desired, the valve in that stage being a variable-mu type and increase of bias will decrease sensitivity. The bias for the output valve, with a 120-volt H.T. battery, should be 3 volts. With these bias voltages the total H.T. consumption is approximately 10 milliamps. A reduction may be effected by increasing the bias on the output valve, at the sacrifice of the power-handling capacity and quality given by the set. Next switch the set on by means of the combined volume-control and on-off switch, and turn the wave-change switch to the central position (medium waves). Stand the set on its side and rotate the main tuning condenser until the local station is heard. The two small trimmers underneath will now enable you to bring the station into line with the engraving on the dial and also to line up the two tuning circuits. When this has been done turn to a point at the top end of the medium-wave band and see if any adjustment is needed. The setting should hold good for long waves. On the short waves, of course, the trimmer for the aerial is not in circuit and the aerial is aperiodically coupled to the first valve. When satisfied that the trimming has been properly completed, the set may be turned over and is ready for installation in a cabinet. The correct impedance load for the output valve in this particular model is 16,500 ohms and the appropriate setting on the loudspeaker should be made for this value.

SPECIFICATION FOR F. J. CAMM'S 50/- ALL-WAVE THREE

One set of coils—broadcast, short-wave—and special S.W. choke (Peto-Scott), 10s. 6d.
One .00043 mfd. two-gang condenser (C3 and C7) (New Times Sales), 4s. 6d.
One slow-motion drive assembly, including scale, escutcheon, etc. (Peto-Scott), 5s. 6d.
One plain wooden chassis with 3 runners (Peto-Scott).
One multi-point switch, type S.208 (Bulgin), 3s. 9d.
One reaction condenser, type C.V.19 (C8) (Bulgin), 2s. 6d.
Two trimmers, type S.W. 99 (C2 and C9) (Bulgin), 9d.
Six fixed condensers: two .0001 mfd., type P.C.301 (C1 and C6); one .0002 mfd., type P.C. 302 (C10); one .005 mfd., type P.C. 205 (C11); two .1 mfd., type P.C. P1 (C4 and C5) (Bulgin), 3s. 3½d.
One L.F. transformer, L.F.58 (Bulgin), 4s. 3d.
One 8 mfd. electrolytic condenser, type 3017 (C12) (Dubilier), 2s.
Four fixed resistors: one 25,000 ohm 1-watt (R1); one 2,000 ohm ½ watt (R4); one 250,000 ohm ½ watt (R5); one 2 meghoms ½ watt (R3) (Erie), 1s. 3d.
One volume control with D.P. switch (R2) (Erie), 4s. 6d.
One 4-pin, one 5-pin and one 7-pin chassis-type valveholders (Clix), 1s. 8d.
Six type 8 sockets (Clix), 6d.
One component-mounting bracket (B.T.S.), 4d. (See text).
Six No. 5 master plugs (Clix), 9d.
Connecting wire, flex, one length screened sleeving, screws, etc.
One V.P.215, one D210 and one Y.220 valve (Hivac),
One 120-volt H.T. battery.
One 2-volt L.T. accumulator.
One W.B. Stentorian Junior loudspeaker.

TELEVISION FEATURES

TELEVISION DELICACY IN HONOUR OF FRENCH PRESIDENT

MARCEL BOULESTIN, the cookery expert, is devising a special television delicacy in honour of President Lebrun, who is on a State visit to this country.

M. Boulestin will describe his new dish, which he calls "Rouget Marseillaise," in the evening television programme on March 24th. "It will be patriotic—red, white and blue," says M. Boulestin. "To the red of a mullet, I shall add 'the blue of the sea,' and the bread will supply the splash of white. The whole will be perfumed with rustic poetry—and garlic."

"MAGYAR MELODY"

"MAGYAR MELODY," Eric Maschwitz's musical romance at His Majesty's Theatre, will be the first complete musical comedy to be televised direct from a theatre. Viewers will see the entire play on the evening of March 27th beginning at 8.30 p.m. and continuing with intervals until after 11 p.m.

Produced by William Mollison, the play is the work of Eric ("Balalaika") Maschwitz, former B.B.C. Director of Variety, Fred Thompson and Guy Bolton. Lyrics have been written by Harold Purcell and Eric Maschwitz, and the music is by George Osford and Bernard Grun.

The cast includes Binnie Hale, Arthur Margetson, Stella Arbenina, Roger Treville, Betty Warren, Jimmy Godden, Jerry Verno and Betty Bucknell. Walford Hyden conducts his Magyar Symphony Orchestra.

Three television cameras will be used, one being installed in a stage box for "close-ups" and two in the dress circle.

DINGHY SAILING

DINGHY sailing will be televised direct from the Thames at Putney on the afternoon of March 26th, when some thirty or forty of these small boats will come into the picture. The commentary will be given by Peter Scott, one of the outstanding dinghy enthusiasts in this country, who has represented Great Britain in dinghy races in America. Dinghy is an Indian word for "small boat." Viewers will see a large number of the twelve-foot type of dinghy assembled for a race. The boats must be passed as seaworthy, though this does not absolve the crews from acting as ballast; dinghies have no keels, and it requires some gymnastic skill to maintain stability in a squall.

"THE SWITCHBACK," A JAMES BRIDIE COMEDY

JAMES BRIDIE'S comedy, "The Switchback," which is to be televised in the evening programme on March 24th, deals with the adventures of a country doctor who believes he has discovered a cure for phthisis. But his cure is found to be based on a fallacy and the doctor after being involved in a newspaper stunt is struck off the Medical Register. It is then that his adventures begin, and he tastes the delights of freedom, described with all the fun and wisdom which are to be expected from a Bridie play.

James Gibson will play Dr. Mallaby, and the part of the errant Mrs. Mallaby will be taken by Leslie Wareing. The producer will be Moultrie Kelsall.

"The Switchback" will be repeated in the afternoon television programme on March 28th.

Thinking About Portables

"The Experimenters" Make Some Suggestions for Those Readers who are Contemplating the Construction of a Simple Type of Portable Receiver from Standard Parts

ABOUT this time of the year most constructors begin to consider the question of building a portable receiver. The object of this is usually to permit of a certain amount of experimenting out-of-doors, and partly to provide entertainment in the garden or on picnics or tours in the country. The first question concerns the type of circuit to be employed, and the second is in connection with the components to be employed.

When the constructor is prepared to spend a couple of pounds on components he can quite easily make a really compact set, using midget valves and parts, but if the idea is to employ standard parts, many of which are probably on hand from previous receivers, the matter calls for different treatment. And since rather more care is called for when making a receiver from midget parts, we propose to consider here only the construction of an outfit from standard components. It should be pointed out, however, that constructional details for a good midget portable were given in the issue of PRACTICAL AND AMATEUR WIRELESS dated March 19th, 1938, a copy of which can be obtained if desired for 4d. post paid from the Publishing Dept.

"Straight" Circuit

What kind of circuit is to be used? In general, it is better to use a simple one, unless for special reasons an attempt is to be made to receive a wide variety of programmes. In the latter case a superhet would be indicated and, if the complete set is to be really compact, a fair amount of careful experiment would probably be necessary before a suitable design were evolved. Additionally, it would be desirable to make use of a number of midget components. Our preference is for a well-made two- or three-valver. This will give good speaker reception from a couple of local stations at least, and probably from a number of others in good conditions. More depends upon the final tuning-up of the set than upon the circuit.

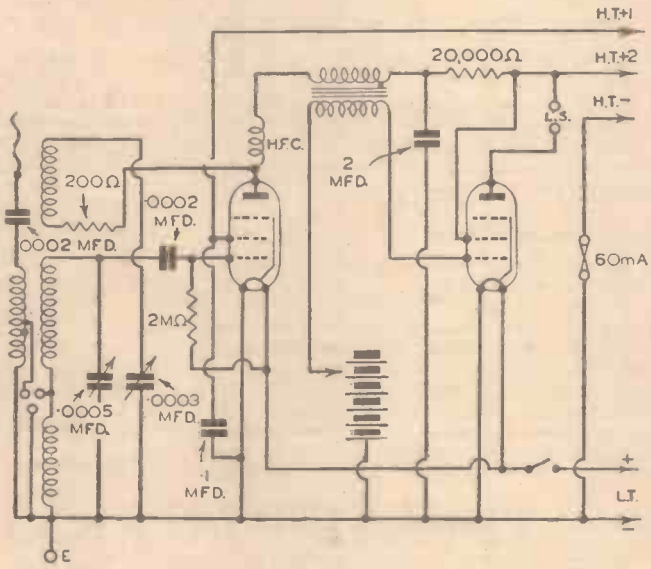


Fig. 1.—A simple type of two-valve circuit which is quite satisfactory when reception of the local station only is required, or when a low-volume output from the speaker will suffice.

Fig. 1 shows an arrangement that is both simple and effective, without being startling or original. A couple of battery pentodes are used as detector and L.F. amplifier, coupling between them being by means of a transformer; this, incidentally, can be a very small one provided that it is intended for direct feed, and that the primary will safely handle about 1.5 mA of D.C.

Smooth Reaction

It will be seen that a standard type of coil is used, and that reaction is applied to the grid circuit. Reaction is extremely important in a receiver of this type, and must be adjusted to operate smoothly. If it is "ploppy" reception is bound to be unsatisfactory on all except nearby stations. To smooth the control, a 200-ohm resistor is included in the reaction circuit. This can be rated at ½-watt or even less, since it does not have to carry any direct current. A separate H.T.+ lead is provided for the screening grid of the H.F. pentode used as detector, and the anode circuit is decoupled.

With a set of this type a throw-out aerial is a practical essential, since a frame is not sufficiently sensitive unless made very large. The earth lead is not essential, especially if a metal or metallised chassis is used, to which the L.T.— lead is connected, but reception will often be slightly improved if an earth lead can be attached. A short metal spike can be used when the set is in the open country or in the garden.

Three-valve H.F.

Before considering suitable methods of construction we might look at the other circuit shown in Fig. 3. This is similar in the main to that in Fig. 1, but has an H.F. pentode used as pre-detector amplifier, a triode detector and a power pentode in the output stage. Additionally, grid bias is obtained automatically by utilising the voltage drop across a resistor in the H.T.— lead. A 50-mfd. electrolytic condenser is used to by-pass the bias resistor, and this has a voltage rating of 12, which is ample for the G.B. voltage normally required.

It is not possible to give the value of the resistor, since it is dependent upon the total

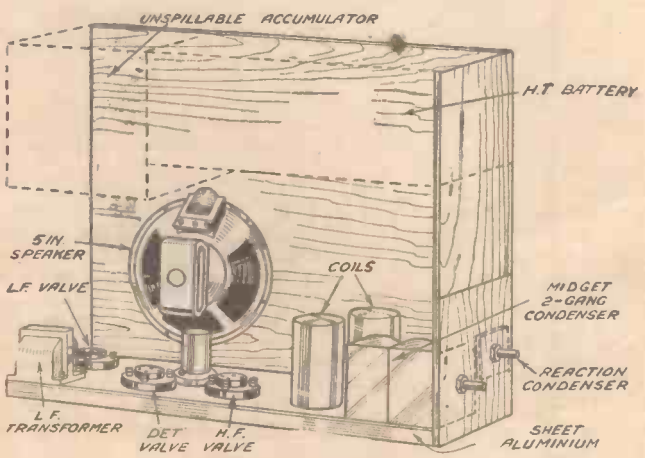


Fig. 2.—A suggested arrangement of parts when making a simple portable suitable for housing in a container similar in proportion to a gramophone-record case. The drawing on the left is not necessarily to exact scale and the lay-out is intended mainly as a suggestion. How the finished set would appear is shown on the right.

THINKING ABOUT PORTABLES

(Continued from previous page)

H.T. current consumption and the particular pentode employed. The current consumption is also governed by the voltage of the H.T. battery, of course. When the total current consumption is known, the value of the bias resistor can be calculated by dividing the G.B. voltage required by the current in milliamps, and multiplying the result by 1,000. Thus, if the total current were 8 mA and the voltage required 4, the value would be 500. As a matter of fact, this value is most frequently required.

Construction

With regard to the form of construction to be adopted, much depends upon the shape of container preferred, or upon the carrying case into which the set is to be fitted, assuming that a case is available. An old gramophone record case is often convenient, when the set can be made on a chassis built up from sheet aluminium and plywood as shown in Fig. 2. All receiver components are mounted on a strip of metal sheet made into a channel section about 2½in. wide and 10 to 12in. long. The tuning condenser, whether single or a two-gang unit, must be of the midget type and can be mounted on the metal strip. The speaker unit—a 5-in. cone would be necessary—is mounted as near as possible to the receiver components on the five-ply board, so that there is room for the batteries at the other side of the case. This general form of construction could be followed whether making a two- or three-valve receiver. It will be understood that a circular hole or a fancy fret would have to be cut in the side of the carrying case; this could be of greater diameter than the speaker cone, and could therefore be made central in the side of the carrier. A large sheet of speaker silk could be glued over the plywood board to face the hole in the container.

For an Attaché Case

If the set were to be built into an attaché case of standard proportions the arrangement shown in Fig. 4 would prove convenient. In this case it would be necessary to use two separate condensers for tuning (if the H.F. circuit were adopted) unless the case were unusually deep. Alternatively, a two-gang solid dielectric condenser might be available, although these are not now made. A solid dielectric condenser would in any event be used for reaction.

It can be seen from Fig. 4 that a complete inner frame is made for the case, this being built from plywood and aluminium sheet; this makes the complete set easily removable from the case when it is desired to modify it. The speaker is mounted on a thin five-ply sheet, which also serves to conceal the batteries. This five-ply could be held rigid by passing screws through the edge of the case into small wooden blocks glued and nailed to the plywood, or by fitting such blocks to the sides of the inner frame and passing screws into these through the plywood.

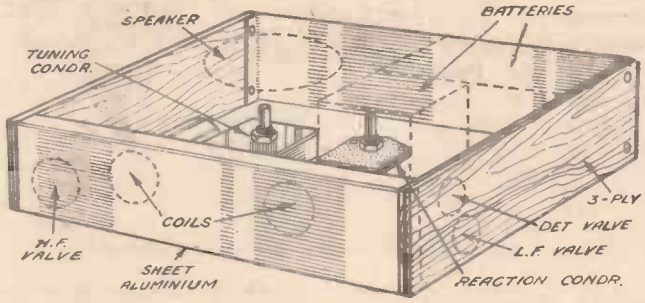


Fig. 4.—The illustration on the left gives an idea for the layout of a small portable to be carried in an attaché case of standard proportions.

Self-winding Aerial

It has been assumed so far that a throw-out aerial would be used. This is certainly recommended, partly because it is often more effective than a frame, but also because it considerably simplifies ganging difficulties. When using a frame considerable trouble is always experienced before two condensers—one acting on the frame and one on the inter-valve coil—can be made to line up; this is because of the entirely different inductive and capacitative properties of the coil and frame. If it can be arranged, an excellent idea for the throw-out wire is that shown in Fig. 5, where it will be seen that the wire is self-winding on a spool.

The spool can be built up from discs of plywood or even stout card, and is firmly fixed to a 4 B.A. or 2 B.A. threaded spindle. A coil spring is anchored to the case and a length of thin, strong string is passed from this to the mounting spindle. When the wire is coiled on the spool the spring is not tensioned, but as the wire is withdrawn the spring is stretched. Consequently, as soon as the end of the wire is released the spring rotates the spool and winds on the wire. Thin rubber-covered flex is most suitable for the aerial wire since it is easily coiled. The method of fastening the string to the spindle is to clamp it between two nuts or to tie it to a collar clamped to the spindle. It will be seen that the greater the diameter of the spool in relation to the diameter of the spindle, the greater is the length of wire that will be self-winding. Usually a few feet is sufficient, but when a greater length can conveniently be used, an additional piece can be twisted round the end of the wire of the built-in aerial. Note that the end of the aerial wire is taken through a slot in one side of the spool and soldered to the spindle. Connection to the set is obtained through a springy contact plate.

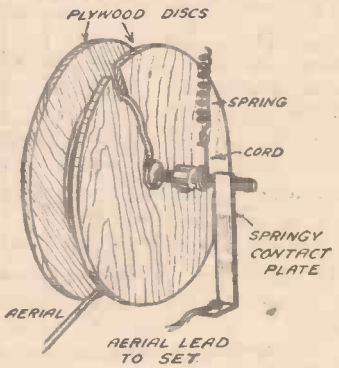


Fig. 5.—How a self-winding throw-out aerial can be made when the space permits. The "wheel" should be as large as permitted by the design of the set.

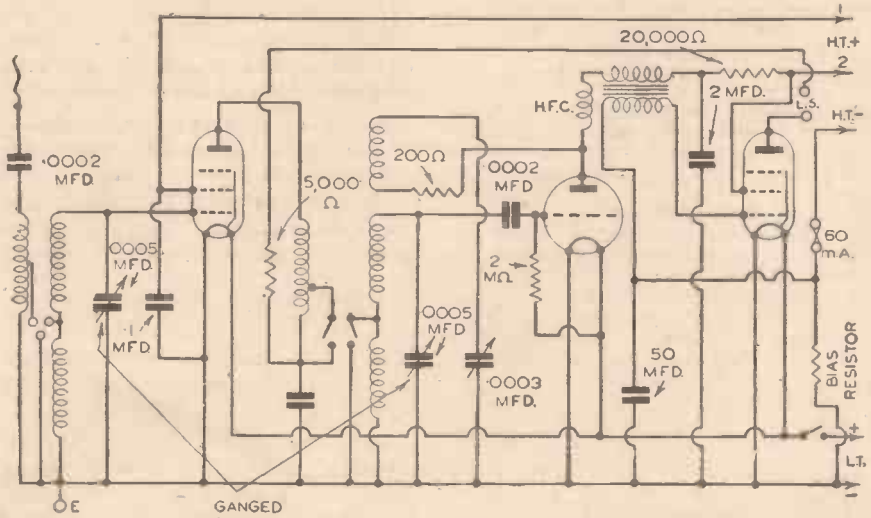


Fig. 3.—A three-valve circuit, with H.F. stage, which is more effective than the arrangement shown in Fig. 1.

Frame-aerial Data

As most readers are aware, if a frame is to be wound, the medium-wave section should consist of approximately 60ft. and the long-wave section of about 150ft. when the aerial is about 1ft. square. These lengths are given as approximate because they depend to a certain extent on the perimeter of the aerial. The lengths finally chosen must be decided by trial, arranging them so that the setting of the two tuning condensers (assuming that a separate one will be used for the frame) require to be set to about the same reading for any particular station.

ON YOUR WAVELENGTH

By Thermion

Wireless Licence Increases

THE great increase in the listeners' army goes on, for the Post Office, in February, issued 839,500 receiving wireless licences, which represents an increase of 14,409 in the number of licence holders after making allowance for expired licences and renewals. The approximate total number of licences in force at the end of February, 1939, was 8,944,300, as compared with 8,561,340 at the end of February of 1938, an increase during the year of no less than 382,960. During the month there were 375 successful wireless prosecutions. These figures seem to indicate that very shortly the wireless market must depend for its profits upon replacements, or rather the sale of replacement sets, unless, of course, someone radically changes design by discovering some new principle, or inventing some new device which will render all our sets obsolete. It seems to me that the only thing in the scientific offing which can do this is the television receiver, for sometime in the not too distant future we shall all want to own television sets. We are told that television is here, and "you can't shut your eyes to it." Remember the old sets which were sold in thousands about a dozen years ago? No one thought that they would be obsolete within a couple of years. As soon as television has become a national service, and I hope it will be soon, our present receivers will be scrapped. I feel that the sooner the B.B.C embarks upon a national television service the better. At present it is causing sales to languish, for people are awaiting its arrival, and they are afraid to purchase a new receiver lest it go out of date within a few months. When television is a national service I am certain that the licence figures will reach astronomical limits.

The Perfect Earth

BETWEEN moments of a calligraphical evisceration of my opinions, "Torch," as you know, bursts into song. I do not know whether the spring is responsible for the following, but as I should hate to think of "Torch" suffering from an ingrowing poem, once again I accord him the privilege of my space for the following:

My bomb-proof shelter has arrived;
At present it's unused,
And at such waste of useful space
I am indeed bemused.
Let's hope no swarms of foreign 'planes
Will ever cloud our skies;
And, whilst we're waiting, cannot I
Some useful end devise?

"A hen-pen for some Plymouth Rocks?"
The wife says, "Just you dare!
No beastly hens shall ever scratch
My flowers up, I swear."
"A kennel, then, for Fido?"
The wife lets out a squeal;
"My darling Fido shall not sleep
Inside those walls of steel!"

"Some flowers, then, to fill the eye
With pleasure and delight?"
"No, that's no use, for flowers need
A good supply of light."
"Well, what about a rustic bower,
In which to take our tea?"
The missus gives a nasty look,
And says: "You're telling me!"

"Then would it be of any use
To do your weekly wash?"
"The laundry, sir, takes care of that;
Why must you talk such bosh?"
"An outdoor dormitory, then,
When your relations come?"
The wife says, "Sure! You sleep in it;
I hope you'll find it fun."

* * *

Hush! Half a mo! I feel a rush
Of brains towards my head!
A length of insulated wire
To it shall soon be led.
Three feet it's buried in the soil;
At last I see its worth.
Loud cheers! Whilst waiting for the bombs,
The perfect radio earth!

The "Comb"

IN a recent case in which twelve individuals were charged with and pleaded guilty to operating wireless sets without a licence, it was stated that Government officials had toured various streets in the town with an apparatus called the "comb," which enables them to detect houses in which radio sets are being used.

I should very much like to know how this particular piece of apparatus is able to detect a non-oscillating radio set. These Post Office people are very clever, I know, and I do not have sympathy for those who try to rob the B.B.C of its small licence fee. You cannot obtain for 10s. such a service in any other industry, in any other country in the world, but my thirst for knowledge is whetted by the thought that they can detect a non-oscillating wireless set.

A Bigger and Better Radiolympia

I WAS present at a luncheon the other day where the guest of honour was Sir Stephen Tallents. He spoke on the B.B.C.'s plan to assist in making Radiolympia the biggest and best ever.

Emphasising the ambitious nature of the plans for this year's show, which will open on August 23rd, Sir Stephen said that the B.B.C. was already hard at work, in collaboration with the organisers—the R.M.A.—devising new attractions which would demonstrate to the public in a way which had never been done before the tremendous range of entertainment offered by modern broadcasting.

It was too early yet to give details of the lines on which they were working, but the B.B.C. looked forward to Radiolympia as their great opportunity and to taking a large and interested public behind the scenes of sound and vision broadcasting. He was certain that Radiolympia, 1939, would attract a record attendance to see and hear in novel form the latest developments in sound broadcasting and television.

Speaking of the R.M.A.'s plans Colonel Ozanne (Chairman of the R.M.A. Exhibitions Committee) stressed the diversity of the attractions which would be found at this year's Show. As well as being the focal point of radio interest throughout the country, Radiolympia would have something to interest everybody—young or old, technical or non-technical; the enthusiast or the occasional listener.

Radiolympia, 1939, would, of course, show the world the very latest developments in British radio and television, but it would do very much more than that. Visitors

would be able to find a whole day's entertainment, whether by witnessing the dramatisation of broadcasting technique and personnel or in the many other features that were being planned, of a kind that could not be seen or heard anywhere else.

The Show would also be designed to bring home to listeners a fuller realisation of what they were missing by continuing to use old and out-of-date sets which could not possibly do justice to the realism of modern broadcasting. Some novel ideas were being developed to help the public to recapture the thrill and the imaginative appeal of radio.

With all these attractions, and with the earlier and more extensive publicity which was also being planned, a record attendance was expected this year, and the whole exhibition was being laid out on new lines making for the greatest possible comfort of the visitors.

"Each Instrument is Heard"

I MENTIONED the other week that one of the modern slogans is that the modern set enables you to hear all of the instruments in the band. My comment was as far as jazz is concerned that it is an argument in favour of an old set. The following rhyme summarises the situation :

Do we feel much exultation when we hear
a mighty "Bong,"
When a drummer too exuberant gives a
whack at brassy gong?
Does it introduce new pleasure in the bosom
of our home,
When we hear those dirty noises played
upon the saxophone?
Are we filled with joys ecstatic when the
cornet goes "wah-wah"?
And the trombone starts its wailing like
an elephant's pa-pa?
When with tintinnabulation which is
childish and absurd,
Is there any great advantage when "each
instrument is heard"?
And is there not more solace for our tired
and weary soul
When the instruments are blended into
one harmonious whole?
When the "Uke" is heard a-wailing and
the violin a-screech,
Are we not too sadly tempted for some
hefty thing to reach
To pitch at our poor radio-set and stop
the beastly row,
Of bands and crooners making noises like
some love-sick cow?
And almost futile "Better Sets" to which
our fancies bend
Without improvement here and now—
from the "transmission end."
A better set becomes much worse! This
should not be forgotten!
When childish tintinnabulations make half
the programmes *rotten*.

Summer Use of Sets

AT the luncheon to which I have referred Sir Stephen Tallents dealt with the B.B.C. market research system which showed conclusively that in the summer months the listeners who used their sets between 6 p.m. and 8 p.m. were 60 per cent. of the maximum winter total for that period, while after 8 p.m. the percentage was as high as 85.

Notes from the Test Bench

Hum and the Pick-up

ONE of the main difficulties which confront the user of a pick-up associated with A.C. mains apparatus is hum. In many cases when an existing set is modified so that a pick-up may be used it is found that hum cannot be removed. Screening the leads and with effective earth connections to the screens fails to effect any improvement. In several cases it has been found that the trouble is not due to the leads nor to the method of connecting the pick-up. The trouble in these instances has been direct induction between the motor and the pick-up coils. Where a synchronous motor is used it may be found that if the pick-up is held just above the turntable and slowly moved towards the centre the hum will increase as the pick-up nears the centre of the table. In some cases a sheet of metal on top *of the motor-board, directly beneath the turntable, connected to earth may prevent the trouble, but several instances have been met where it has been impossible to cut out the hum unless the pick-up were changed.*

Aerial Insulation

THE efficiency of the aerial is recognised as being one of the most important points of installation by most constructors, but the method of carrying out the best arrangement from an insulation point of view is not always appreciated. In many cases a good single insulator is used and thought to be sufficient. It must be remembered, however, that when an insulator is exposed to the air, especially in big cities, it quickly becomes coated with a film of soot which is conductive, and it is thus possible for the insulator to be short-circuited. A chain of insulators, even of very small dimensions, is preferable as, although these may also become coated, they will move in the wind and the risk of a continuous conductive path between each one will thus be removed. A long leakage path is the point to aim at.

Volume Controls

THE question as to whether or not a wire-wound volume control may be used in any particular circuit is not always simple of solution. Wire-wound components may be inductive, but apart from this fact the question of the current-carrying capacity has to be borne in mind. The wattage rating of the component should, therefore, be the first consideration, and a suitable component then selected at that rating. In H.F. circuits it is generally desirable to avoid inductive components.

Sir Adrian Boult to Visit Preston

THOUSANDS of music lovers in Preston, Blackburn, the Fylde, and North-west Lancashire generally, are looking forward to March 29th as the day which will bring a rare musical "treat" and the outstanding event of the music season in the north-west—the visit of the full B.B.C. Symphony Orchestra, under its conductor, Sir Adrian Boult, to Preston to give a public concert there.

It will be the seventeenth journey into the provinces to be made by this "crack" orchestra (of 119 players) which has a world-wide reputation. Since December, 1934, when the orchestra first appeared out of London—at Manchester—it has travelled as far north as Aberdeen and Dundee, as far west as Plymouth and Swansea, as far south as Southampton, and has played at most of the important centres of the Midlands and the northern counties of England.

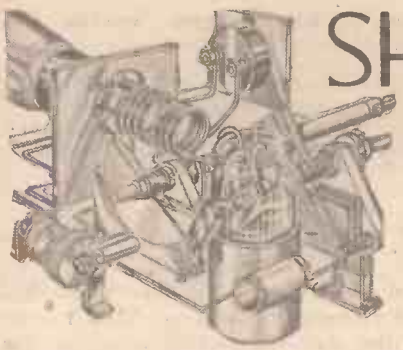
Skilled Porters' Feat

IN its travels, undertaken in pursuance of the B.B.C.'s policy of making its Symphony Orchestra a national rather than a metropolitan institution, it has also gone abroad : in 1935 it played at Brussels, and in 1936 in Paris, Zurich, Vienna, and Budapest. Its appearances at these European cities, as at the British centres, were outstandingly successful.

It is a tribute to those responsible for the orchestra's journeyings that, in all the thousands of miles it has covered, not one of the 119 players' instruments has suffered.

Toscanini's Praise

THE orchestra has also in recent years had the honour of playing under the world-famous conductor, Toscanini, who, after their first series of concerts under his baton in 1935, said : "The B.B.C. Symphony Orchestra is one of the best I have ever conducted." In 1937 the orchestra gave two more series with Toscanini, summer and autumn, and a fourth in the summer of 1938. In May this year they will once again be conducted by the maestro in seven concerts of works by Beethoven. This will be the B.B.C.'s principal contribution to the London Music Festival, and the Queen's Hall is already sold out for all the seven concerts.



SHORT-WAVE SECTION

SHORT-WAVE CIRCUIT PROBLEMS

Why Some Circuits Appear to be Better than Others, and Anti-fading Aerial Details.

By W. J. DELANEY

WE are often asked to recommend a short-wave set for a beginner, and accordingly suggest a simple detector L.F. combination. It so happens, however, that a few weeks later we may receive from the querist a glowing report of performance with two or three pages of stations which have been received, or on the other hand, a complaint that the set brings in a few stations on 50 metres and nothing below. It is, in such cases, only possible to say either that the set has been wrongly built or made from defective parts, or that it is not being used in the correct manner. There is, however, an important point in connection with short-wave receivers which is often overlooked and which is impossible to explain in every circumstance. For instance, at the time this article is being written the B.B.C. are apologising for being unable to give an American relay because "conditions are unfavourable." It will be realised that if they, with their elaborate circuits, are unable to obtain sufficiently good results to enable a station to be relayed it would be hopeless to expect a simple battery set to give readable signals. It is, therefore, important to remember when first trying out a short-waver that bad results may be due to bad atmospheric conditions. To the ordinary listener there is, unfortunately, no way of ascertaining whether it is conditions or the set which is at fault, although a very good plan is to use a 40-metre coil and endeavour to receive a local amateur transmitter. You will generally find this possible and by listening to the conversation will be able to gather whether or not conditions at the moment are good or bad.

Aerial Design

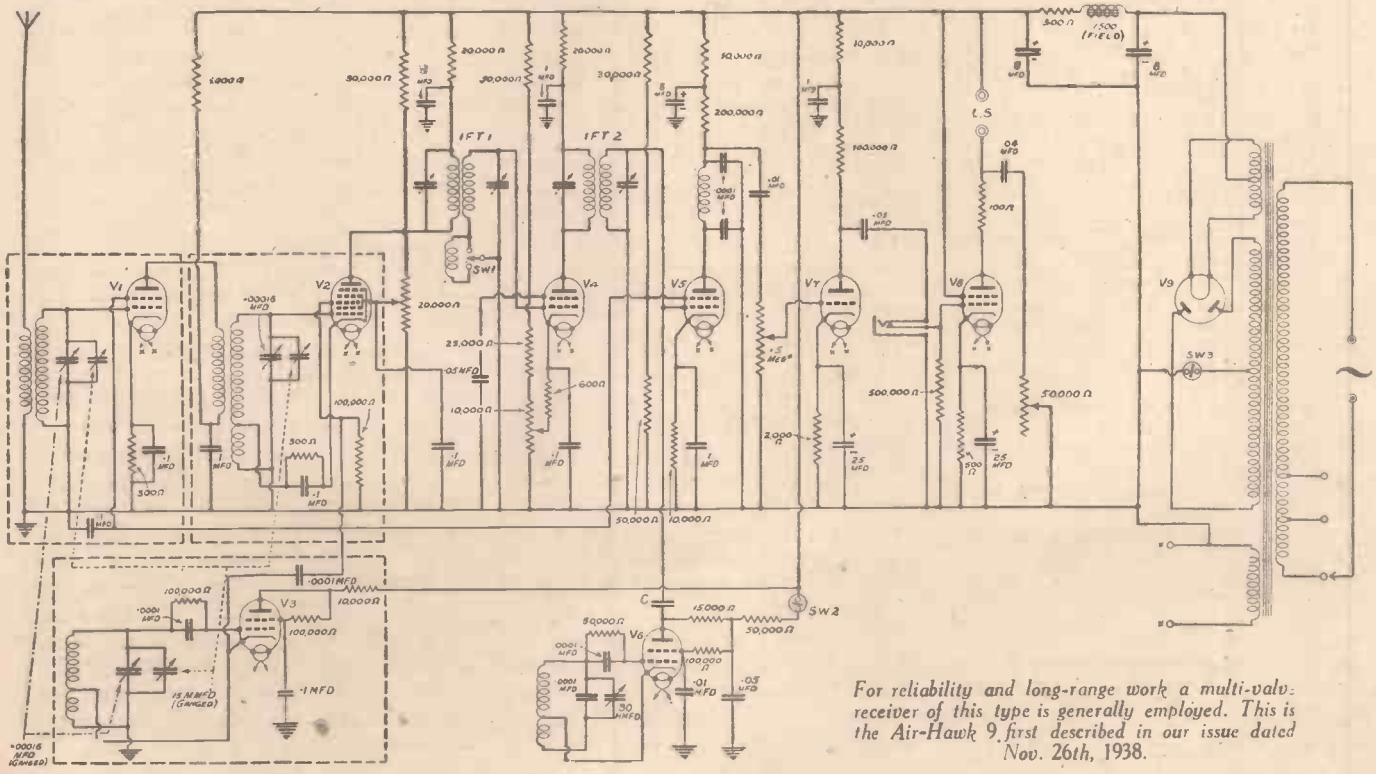
Should you hear that he is getting some good long-distance results, and you are unable to do so you will know that either your set is not being worked properly, is defective, or that your aerial is not pulling its weight. If you have built a published set from guaranteed parts, and have made a good job of wiring, etc., you can rule out the set and concentrate on the aerial. Do not make the usual mistake of the beginner in thinking that because you wish to receive stations from the other side of the world that you must put up the largest aerial possible. On the short waves you will often find that a very short wire, erected with every possible precaution from the point of view of insulation, will be better than the largest and highest aerial you can put up. Insulation is probably more important than length in this connection, although an aerial which is resonant at some point on the short waves will obviously give better results than one which is not. Although most listeners put up a horizontal aerial, it will probably be found that a vertical arrangement will be more effective, although in this connection it is found that local conditions will have a marked effect in this direction. Interference will undoubtedly be less with a vertical aerial, but it is always worth while to carry out experiments with the aerials before modifying a receiver design.

Fading

The most annoying part of short-wave reception is fading, and there are many suggestions for overcoming this trouble. The latest idea, as has already been explained in these pages, is that wherein two separate aerial systems and H.F. stages are used, arranged so that the aerials are in a certain relation to the wavelength as regards their separation, and with a form of A.V.C. to cut out amplification on the H.F. stage which receives the fading half of the signal. Is there a simpler way of carrying out this idea? Here is a good source of experiment for the enthusiastic amateur. Two aerials connected to a standard receiver will be found to give some form of fading compensation, but is there not some way by which they may be connected so that they balance one another and give the desired results? Slow fading is not so simple to overcome, but if the signals fade right out they become unreadable, whilst high-speed fading generally acts so quickly that you can read the signal through the fading. We shall be glad to receive details of any experiments which readers may have carried out on this side of short-wave work.

Adaptability

As conditions vary from night to night, one suggestion which has been made is to use a standard L.F. amplifier, with plug-on R.F. stages. When conditions are good a simple detector stage is connected, and when poor conditions are experienced, a powerful multi-H.F. unit or a superhet unit are used. Most amateurs find, however, that the superhet or multi-stage receiver gives such an increase in amplification that background noise is raised to the level where signals are not worth while. It is for this reason that many prefer the simple detector stage. It is definitely quieter, but this is only because of the lack of ampli-

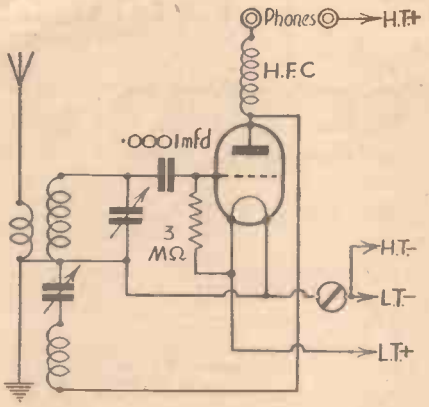


For reliability and long-range work a multi-valve receiver of this type is generally employed. This is the Air-Hawk 9, first described in our issue dated Nov. 26th, 1938.

SHORT-WAVE SECTION

(Continued from previous page)

fication and obviously signals will be weaker. When headphones are used, however, it is surprising what range may be covered, and a study of the logs which have been published from time to time on our Letters page will show that this type of circuit in the hands of the amateur gives the best results. It needs a certain amount of patience to tune in stations from the most distant parts of the world, but when conditions are right it can be done. When conditions are wrong, then it will generally be found that the multi-valver will also be found wanting. For the beginner who is anxious to carry out real experimental work, we therefore recommend the detector L.F. combination, and when this is working properly time should be devoted to aerial design, with a view to overcoming the effects of fading. A careful note should be kept of the experiments and the results obtained. Do not be haphazard in the experiments. Every change should be carefully recorded so that it is not difficult to know just what may be responsible for any change in the results obtained. Rotatable aerials; aerials with rotatable reflector systems; aerial networks and similar devices are undoubtedly the most practicable devices for the beginner, but unorthodox ideas should certainly be tried, as it is obvious that the characteristics of short waves are still only partly understood and it is often found that departure from orthodox methods usually results in discoveries which revolutionise modern practice.



A single-valve receiver is often used with good effect by the beginner, in spite of its simplicity.

The two extremes in short-vave receiver design are illustrated in this article, but it must again be emphasised that it is impossible to guarantee any particular performance for a short-wave receiver.

Leaves from a Short-wave Log

A 60-kilowatter for Lithuania

THE Lithuanian Government has earmarked in this year's budget a substantial sum of money to defray the cost of a 60-kilowatt short-wave station to be installed near the capital for the broadcast of the Kaunas radio programmes throughout the world. It is hoped to bring the new station into operation by the spring of 1940. In the meantime LYR on 32.21 m. (9.32 mc/s) is relaying these radio entertainments, but is likely to be replaced shortly by one of the following channels: LYZ2, 31.5 m. (9.523 mc/s); LYZ3, 25.21 m. (11.9 mc/s), or LYZ4, 19.61 m. (15.3 mc/s).

Albania Carries Out Further Tests

ZAA, Tirané (Albania), is trying out a series of channels; latest reports show the logging of experimental broadcasts from this station on 30.04 m. (9.987,4 mc/s) between G.M.T. 20.45-21.00. Other channels tested are 19.03 m. (15.765 mc/s); 29.71 m. (10.097 mc/s); 40.07 m. (7.487 mc/s); and 41.61 m. (7.21 mc/s).

Addis Ababa Again Logged

THE Abyssinian short-wave transmitter has been heard working on 31.06 m. (9.66 mc/s) between G.M.T. 19.00-20.00. This is the channel used by LRX, Buenos Aires (Argentine Republic).

News from British Honduras

NEWS bulletins in the English language are broadcast daily at G.M.T, 01.30 every Wednesday, Friday and Saturday by ZIK2, Belize (British Honduras), on 28.3 m. (10.6 mc/s).

Latvia Tests on 10-metre Band

LISTENERS report reception of the first ultra-short wave broadcasts from a station giving the call YL2CB, and believed to be situated at Riga (Latvia). The channel used was 28.8 mc/s in the experimental amateur transmitter band: time: G.M.T. 15.00-15.30.

Proposed Short-wave Station for Palestine

IT is stated that a new short-wave transmitter is to be erected in the immediate vicinity of Jerusalem. Although, so far, no mention is made of the channel allotted, it is expected that it will be in the region of 14.4 mc/s.

Radio Eireann Testing

THE 1½-kilowatt short-wave station erected at Moydrum, near Athlone (Eire), is carrying out test broadcasts daily on 16.82 m. (17.84 mc/s) and on 31.27 m. (9.495 mc/s). Other channels to be tried out are 25.55 m. (11.74 mc/s) and 48.47 m. (6.19 mc/s).

Proposed Iranian Broadcasting Network

A CONTRACT has been placed with a British concern by the Iran (Persian) Government for the erection of a network of short-wave transmitters, including one of 2 kilowatts, and of which the power can eventually be increased tenfold. The channels allotted to this station are 30.99 m. (9.68 mc/s) and 48.74 m. (6.155 mc/s), and the call-signs are EQC and EQB respectively.

Radio Relays from Hawaii

THE channel adopted for the relay of programmes from Hawaii, and, in particular, running commentaries on football matches played in that island, for re-broadcast over the North American networks, is KQH, Kahuku, on 20.11 m. (14.92 mc/s).

Good Signals from Mexico City

BROADCASTS from the 10-kilowatt station XEWW in Mexico City, on 31.58 m. (9.5 mc/s), are easily logged between midnight G.M.T. and 01.00, i.e., on Sunday night-Monday morning, when an educational programme is transmitted in the English language. The call is *Radio Nacional Mexicana, La Voz del America Latina* XEWW (Aykis-ay-dooble-vay). The interval signal heard consists of 4 chimes (ascending scale). The studio closes down with the call, and a message in the morse code, at about G.M.T. 05.00.

Broadcasts from China

IN addition to the transmissions made daily on 31.56 m. (9.5 mc/s), XGOY, Chunking, appears to be working also on 26.32 m. (11.4 mc/s) from G.M.T. 06.00-06.30. Listeners also state that broadcasts have been heard on 19.75 m. (15.19 mc/s). The station is on the air daily continuously between G.M.T. 21.00-23.30 with news bulletins in the English, German and French languages, and with a concert of Chinese native music.

New Swiss Radio Schedule

THE temporary 100-watt transmitter which is being tested by the Swiss Federal Communications Company (Radio Section) at Schwarzenburg (Switzerland) is now broadcasting regularly every week-day on 31.46 m. (9.535 mc/s) from G.M.T. 18.00-19.00; on 19.6 m. (15.305 mc/s) from G.M.T. 22.45-00.45, and on 25.28 m. (11.865 mc/s) from G.M.T. 01.00-02.00. Other channels to be tested are 11.7 m. (25.64 mc/s); 13.94 m. (21.52 mc/s); 16.87 m. (17.784 mc/s), and 49.55 m. (6.055 mc/s). The station will shortly be endowed with a 25-kilowatt transmitter.

Listen to Malaya

CAREFUL tuning in the afternoon hours may bring you a good programme from ZHP, Singapore, on 30.96 m. (9.69 mc/s). The studios are on the air from Monday to Saturday inclusive between G.M.T. 09.40-14.40, but the best time for reception in Western Europe is from G.M.T. 13.20 when the English news bulletin is given. If you hear our National Anthem at the close-down you may be sure of your correct identification.

Another Change in Colombia

HJ6ABA, Pereira, formerly on 48.82 m. (6.145 mc/s), then on 49.58 m. (6.054 mc/s), has reappeared in a new guise as HJ6AFC on 61.04 m. (4.915 mc/s). The call is: *Aqui la Voz de Pereira*, and a gong is heard as interval signal. Mention is frequently made in the programmes of "General Electrica." Address: Radiodifusora HJ6AFC, Señores Cesar y Mario Arango, Pereira (Republic of Colombia) South America.

A PAGE OF PRACTICAL HINTS

SUBMIT YOUR IDEA

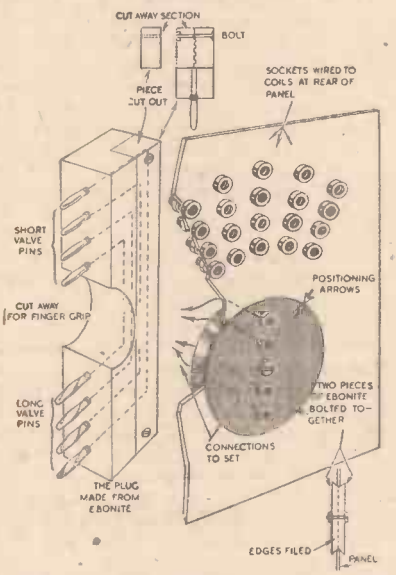
READERS WRINKLES

THE HALF-GUINEA PAGE

Wave-changing with Plug-in Coils

THIS arrangement of wave-changing possesses the following advantages: Does away with switching and coil changing, ensures better contact, short leads to coils, and covers all wave-bands. Dimensions are not given as layout of panels vary, and different types of coils can be used.

A circular hole is cut in the panel, and two circular pieces of ebonite are cut from spare, slightly longer than the hole in the panel. Both pieces of ebonite have one



A novel method of wave-changing with plug-in connectors.

edge filed away, until the filed part fits into the panel hole. A hole is bored through centre of both pieces for bolting together, and four other holes are bored in a straight line, for metal sockets. The next part is the plug, which consists of an old rectangular piece of ebonite, which has a portion cut away, and grooves cut by a hacksaw. Eight holes are bored down at right angles to the grooves, as shown in the sketch. Both the cut-away portion, and the main portion, have one hole bored at each end for bolting together. The eight holes should be bored to ensure tight-fitting of old valve pins in the base. The pins are set out, four at each end, at regular intervals, a piece being cut away to act as a finger-grip. The whole is assembled by placing the circular pieces of ebonite one at each side of the panel, and bolting them together through the centre hole. The metal sockets are inserted through the four holes and tightened. The whole should rotate easily both ways.

After the plug is complete, the end with the four large pins should be inserted in the sockets of the rotating piece on panel. The other socket holes are marked off from the four small pins on the opposite end of plug. Holes are bored according to the number of coils in use. The set is connected

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.

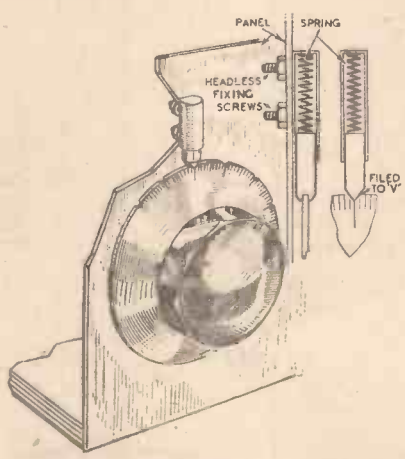
SPECIAL NOTICE

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

to the rotating metal sockets, and the coils to the metal socket in the panel, which are grouped in lines of four sockets each. Insert the plug in bottom holes, and any desired line of four sockets, and switch the set on. To change wavebands pull plug about three-quarters out and re-insert where desired. The coils can be mounted directly on the back of panel, on a spare piece of ebonite laid parallel and close to the back of panel. A small arrow is painted on the front of the rotating disc, at the top, to ensure that the disc is the right way up. —P. JOHNSTON (Jubbulpore, India).

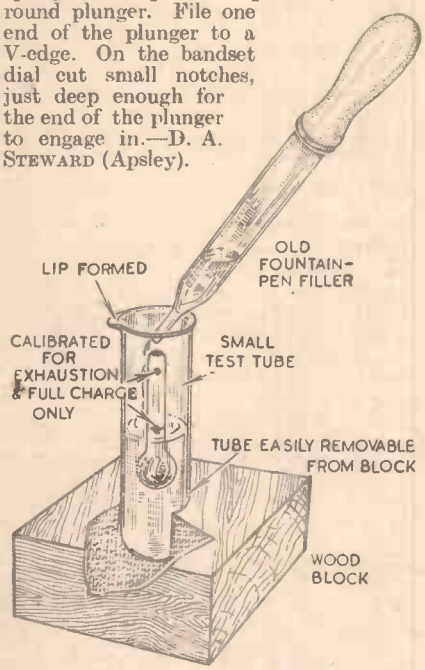
A Spring-controlled Dial Stop

I REQUIRED a ratchet stop for the band-set condenser of my home-constructed short-wave receiver, to ensure the exact stopping places on the dial, so I devised the spring stop shown in the accompanying sketch. The device can be made as follows: Obtain a wire-connecter, of white china, with a piece of hollow brass in the centre, and fitted with two grub-screws. Remove the brass and take out the grub-screws. Solder one end of the brass piece up, in place of the grub-screws, fit two brass screws with the heads removed,



A spring-controlled dial stop for a band-set condenser.

which should be long enough to go through the panel of the receiver being used. Next, obtain from a cycle store a coiled spring, as used in cycle three-speed fitments, and a small piece of round brass that will slide easily into the hollow piece of brass. The spring is first placed in position, then the round plunger. File one end of the plunger to a V-edge. On the bandset dial cut small notches, just deep enough for the end of the plunger to engage in.—D. A. STEWARD (Apsley).



A useful midget hydrometer.

A Small Makeshift Hydrometer

I RECENTLY came across a small float from a broken hydrometer, and it occurred to me that I could make a novel midget hydrometer, by either using this float again or by blowing and calibrating a new float for noting the extreme conditions of charge only.

From the appended sketch it will be seen how, by using a small test tube loosely supported in a block of wood, a little acid can be taken from the accumulator by an old type fountain pen filler, whilst the lip provided in the rim of the test tube permits the acid to be poured back quite easily.

I made another float from a length of thin glass tube, heating to melting point, and blowing the end into a bulb, this being permitted by the long tube used; finally, with a fine file, I scored round at a suitable point and snapped the tube quite neatly. The next operation was the filling and calibrating, this being done by pouring a very small quantity of mercury into the float, and with a wire dipped into a coloured enamel it was a simple matter to transfer the blob of varnish to the inside of the tube or float, finally sealing with a little sealing-wax. I have found that such a small hydrometer, and method of drawing acid with a fountain-pen filler, is particularly serviceable from the point of view of midget accumulators.—W. S. DENSON (Hythe).

An Experimental A.C

Constructional Details of the M Stand-by Amplifier Described

WHILST the amplifier previously described is admirable for the modest pocket, those wishing to take advantage of the mains for greater power, and for the convenience of operating with existing mains equipment, will find their needs better suited in a simple two-valver of the following type. The mode of construction for the battery amplifier referred to can be used again here, but there are a number of circuit considerations and constructional details which require mention so that hum tendency can be obviated.

The same style of circuit is, of course, used, the only difference being in the conversion to mains operation, and it will depend on whether it is proposed to tap off an existing smoothed supply or to incorporate the mains rectifying and smoothing section on the amplifier chassis, so far as the style of chassis is concerned.

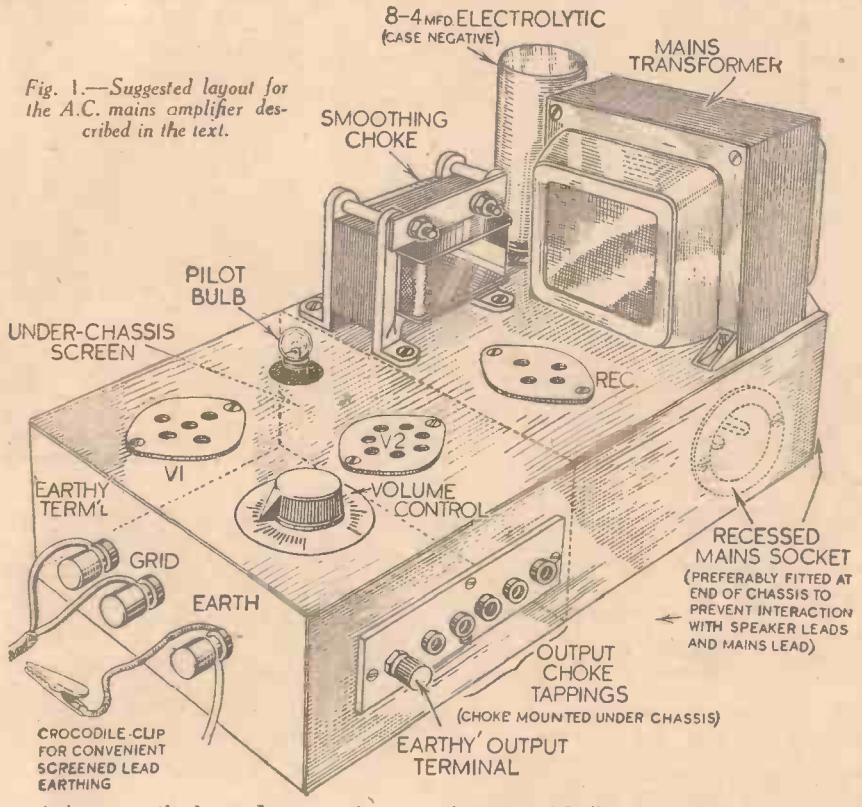


Fig. 1.—Suggested layout for the A.C. mains amplifier described in the text.

Circuit Considerations

A suitable circuit for the complete amplifier is given in Fig. 2, and the points marked by "X" will distinguish the mains and amplifier sections in view of the above alternative methods of operation. The input valve V1 should preferably be a low-impedance L.F. amplifier, but should a high-impedance valve of the detector type be to hand, there is no reason why this should not be made use of in the preliminary tests if this will save expense; adjustments will have to be made in the decoupling, of course, and in all probability it will be found more satisfactory to employ a triode power valve in the output stage, instead of one requiring a larger grid swing.

Assuming that an average supply of 250 volts will be used, the curves of the two valves it is proposed to use should be to hand to determine the necessary decoupling and total anode load and biasing values, and failing recommended operated conditions, it will be preferable to work on the straightest part of the curve consistent with the output available.

For V1 then, the only optional feature is the question of providing an open grid circuit which will permit the shortest possible connection to the chassis terminal (input), and facilitating H.F. injection, or to transfer the volume control from the output valve grid circuit; and invariably the method adopted in the circuit diagram will prove most serviceable, and will help in keeping the first L.F. "grid pick-up" tendency down, so far as mains hum is concerned.

Rectifier Output

If an existing rectified supply is to be tapped off, it should be remembered that the rectifier output D.C. voltage is entirely dependent on the overall load, and for satisfactory operation consistent with performance, the curve of the rectifier should be checked against the total consumption of the equipment to ensure that the load is within limits, but should this be slightly exceeded it may be found possible to adjust slightly the bias value on the output valve to reduce consumption here—consistent, of course, with response of the amplifier—or, alternatively, substitute a lower consumption power valve.

Valves

The valves recommended for the circuit given in Fig. 2 are (V1) the Hivac A.C.L., (V2) either the A.C.Y., A.C.Z, or another A.C.L., if only a medium output and lower anode current is desirable. The rectifying valve is of the indirectly-heated type, so that the slow heating of the cathode which results in a gradual increase in H.T. will obviate the possibility of breakdown in the smoothing condensers; the Hivac UU60/250 is recommended here.

Choke filter output is suggested so that apart from maintaining load when different speakers are connected up, provisionary taps on the choke will permit matching for different speaker impedances.

The Sound Sales P/50 is particularly suitable, providing five tappings which allows eleven different speaker-to-valve ratios to be obtained.

The mains transformer and rectifier should be closely connected and mounted so that there is no inductive coupling between the transformer windings and the output choke, whilst the smoothing choke should also be statically screened from the audio-frequency section.

Layout of Components

A suitable layout is given in Fig. 1 for this circuit, and from this it will be seen that a separate under-chassis screen is used, the chokes being mounted thus to minimise intercoupling.

For the mains transformer and smoothing choke, the X256 and the 40/H are recommended from the Sound Sales range. The

IMPORTANT B

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

Wednesday, March 22nd.—The Spirit of France, feature programme.

Thursday, March 23rd.—Band programme.

Friday, March 24th.—Orchestral programme.

Saturday, March 25th.—International Men's Hockey—England v. Ireland; a commentary on the second half of the match at Edgbaston. Association Football, Linfield v. Belfast Celtic; a commentary on the second half of the match, from Windsor Park, Belfast.

REGIONAL (342.1 m.)

Wednesday, March 22nd.—Quintette du Hot Club de France, relayed from France.

Thursday, March 23rd.—Scottish Dance Music.

Friday, March 24th.—The Grand National; a commentary on the race from Aintree.

Saturday, March 25th.—Storm in a Teacup, a play by James Bridie.

MIDLAND (297.2 m.)

Wednesday, March 22nd.—Dance Band music.

Thursday, March 23rd.—Elgar's Falstaff: Orchestral programme.

Friday, March 24th.—A Symphony Concert.

C. Mains Amplifier

Mains Version of the Battery in the issue of March 11th

smoothing choke (40/H) has an inductance of 40 henries and a D.C. resistance of 450 ohms, so when calculating the decoupling resistance values, this should be taken into consideration with the overall current consumption figure ; for example, assuming the valves consume a total current of 43 milliamperes, then the voltage drop across this choke will be 19.35 exactly : therefore the applied voltage at "X" will be 250 less this figure, i.e. (ignoring the decimal figures) 231 volts.

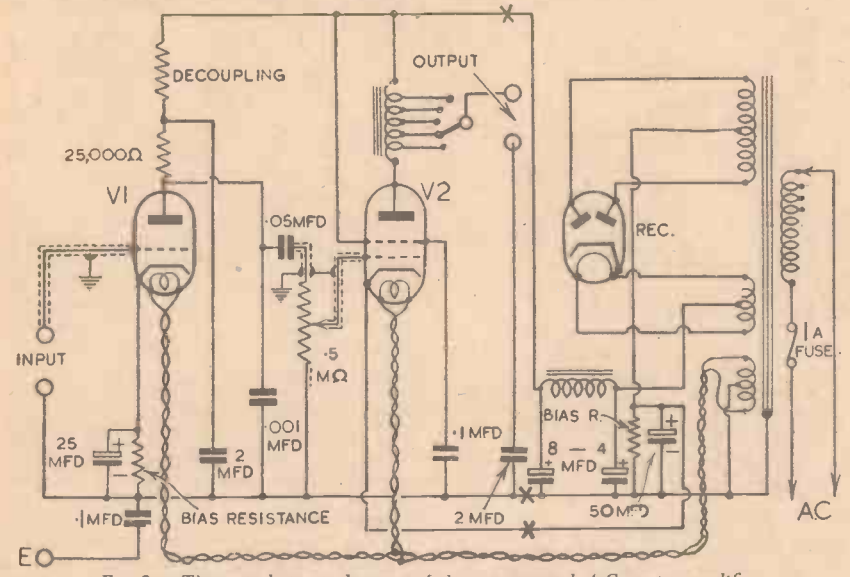


Fig. 2.—Theoretical circuit diagram of the experimental A.C. mains amplifier.

It will be noticed that the grid connections for both valves are screened ; this is, of course, advisable to eliminate another possible source of hum, and the next important consideration is the heater wiring.

As indicated in the theoretical circuit, the heater wiring should be carried out with twisted flex, and the centre of the heater winding for V1 and V2 will require to be earthed to chassis, and is mentioned here as a reminder, as this is a typical point which might be overlooked.

The volume control should be of as low an order as is permissible, otherwise the grid of the valve will be more sensitive to external hum pick up, and this applies whether the control is included in V1 grid circuit or V2.

Speaker Output Choke

If, owing to the restricted size of the chassis used, it is found impossible to mount the speaker output choke so that hum is not completely eliminated, then it may be found preferable to substitute for the time being a loudspeaker control panel of the Clix type, and directly connect the speaker, but it is doubtful if chassis limitations will be so restricting, and usually the astatic screen will overcome any trouble here, after adjusting the relationship of the components.

In the pictorial diagram, Fig. 1, it will be noticed that a seven-pin-type valve socket is shown for the output stage, but if it is intended that a triode valve be used in place of a tetrode or pentode, then a five-pin valve socket should be substituted, and the alternative connections are shown in Fig. 3.

Heater Leads

A final word on the layout : Some readers may not realise the importance of correctly positioning the heater flex leads in relation to the other components ; this is a common source of hum injection, since as a negative chassis return is not made, as in the case of battery valves, there is quite a sensitive "loop" circuit formed, even though the heater wiring is twisted to neutralise as much as possible any parasitic e.m.f.

The heater wiring should, therefore, be kept well away from the grid returns of the valves, and trial by error methods will have to be employed ; however, such experiments offer excellent opportunities for the beginner, and are necessary in even the simplest form of mains chassis.

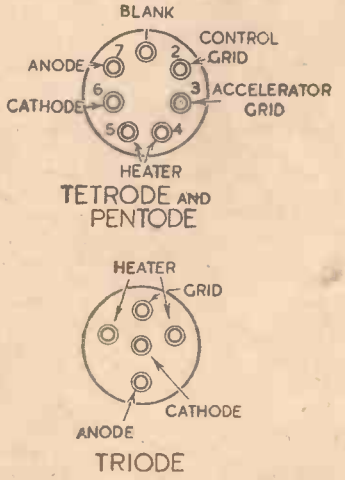


Fig. 3.—Diagram showing the valve-pin connections for a tetrode, and a triode output valve.

BROADCASTS OF THE WEEK

Saturday, March 25th.—Sport in the Midlands : The Semi-Final of the F.A. Cup and the Men's Hockey International (England v. Wales).

WEST OF ENGLAND (285.7 m.)

Wednesday, March 22nd.—A Visit to a Meeting of The Federation of West Country Farmers : a discussion held at Dorchester.

Thursday, March 23rd.—The Club of Queer Trades, by G. K. Chesterton ; episode 3, The Awful Reason of the Vicar's Visit.

Friday, March 24th.—Western Magazine.

Saturday, March 25th.—Bath Music Festival, from the Pavilion, Bath.

WELSH (373.1 m.)

Wednesday, March 22nd.—Elfed : The Rev. Elvet Lewis, a radio biography.

Thursday, March 23rd.—Cynganeddu : A Cynghanedd Competition between some of the bards of Anglesey.

Friday, March 24th.—Reiters' Latvian Choir.

Saturday, March 25th.—Light Musical programme.

NORTHERN (449.1 m.)

Wednesday, March 22nd.—Northern Notions, final edition.

Thursday, March 23rd.—Tenement, a play for the microphone by Edwin Lewis.

Friday, March 24th.—Sir Thomas Beecham conducts the B.B.C. Northern Orchestra.

Saturday, March 25th.—Headingley v. Sale : a commentary on the second half of the Rugby Union match, from Headingley Rugby Union Ground, Kirkstall, Leeds.

SCOTTISH (391.1 m.)

Wednesday, March 22nd.—Concert with gramophone records of songs in Scottish and Irish Gaelic, with instrumental music.

Friday, March 24th.—The Weird of Colbar, an opera by W. B. Moonie.

Saturday, March 25th.—Storm in a Teacup, a play by James Bridie.

NORTHERN IRELAND (307.1 m.)

Thursday, March 23rd.—The Cooneen Ghost, a dramatic reconstruction of a haunting in County Fermanagh, by N. C. Hunter.

Friday, March 24th.—The Belfast Philharmonic Society Fourth Subscription Concert of the sixty-fifth season : Part I of Mendelssohn's Elijah, from the Ulster Hall, Belfast.

Saturday, March 25th.—The Fortnight's Sport in Ulster.

THOSE PUZZLING PENTODES—2

STRAIGHT OR VARIABLE-MU ?

When an H.F. Pentode can be Used in Place of an S.G. Valve. Connections for All Types of Bases - - - By L. O. SPARKS

WITH the L.F. pentode, by virtue of its characteristic, it is possible to get a high degree of amplification at reasonable anode voltages—a great consideration with battery users—provided a little care is taken to match up the load or loudspeaker with the valve.

The L.F. pentode was followed by the H.F. type, and as mentioned in the case of the tetrodes, their construction is the same, except in the design of the electrodes.

With the H.F. pentode a very high voltage amplification is obtainable, and the actual gain which can be secured in practice depends, chiefly, on the design and characteristics of the associated coil in the anode circuit and the precautions taken against the possibility of instability, which becomes a factor when such high amplification is being given by the valve.

The tetrodes and pentodes mentioned last week can be obtained with 4-, 5- and 7-pin bases, and it is this which causes so much confusion amongst those not familiar with

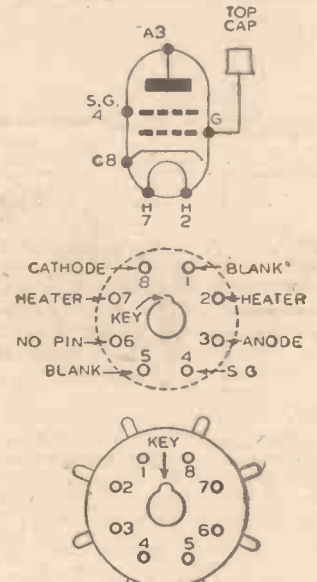


Fig. 4.—The octal type of holder, which is now widely used. Note position of key.

the standard connections adopted by British manufacturers.

The diagrams shown in Figs. 1, 2 and 3, represent the connections for the different valve bases; those shown in the dotted circles indicate the order when the valve base is viewed from *underneath*, i.e., looking at the *valve pins*. The black circle indicates an ordinary baseboard type of valveholder, and it will be noted that the connections are reversed in order, in the case of the multi-pin type, so particular care must be taken to select the correct diagram for the valveholder employed.

In view of the increasing popularity of the new types of valves available with octal bases, this article would not be complete without reference to them, so far as they apply to the valves under consideration.

Fig. 4 shows the pin arrangement of an octal base, and it should be observed that the location of the pins or the order in which they are numbered is related to the "key," a small projection on a central leg of insulating material which forms part

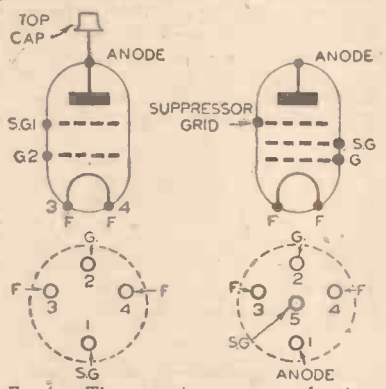


Fig. 1.—The normal connections of a 4-pin S.G. or H.F. pentode and (right) (Fig. 2), the 5-pin type of L.F. pentode.

of this type of valve base. The connections indicated are those required when viewing the *underside* of the holder.

Straight or Variable-mu Valves?

Which type to use is the question which often puzzles the beginner. Assuming that an answer free from frills is required, the following can be taken as a guide in the general sense. A screen-grid valve of the "straight" type can be considered as a very high gain amplifier which, owing to its characteristics, cannot accept a powerful signal without the risk of distortion being introduced. Another item associated with a valve of this type is that, if it is required to control the gain of the H.F. stage by operating on the valve itself, it becomes necessary to provide some means whereby the screen voltage can be varied. This, in itself, is not a difficult matter, but it is not ideal in all respects and, secondly, it means using a potentiometer between the positive H.T. supply and earth, imposing a certain current drain on the source of high-tension. For a detector stage, however, the "straight" S.G. or H.F. pentode is very satisfactory, provided that care is taken in the design of the L.F. coupling in its anode circuit and the adjustment of the screen voltage. Resistance-capacity coupling, with a high anode resistance, say, 100,000 ohms, is quite good, if leaky-grid method of rectification is employed, together with a screen voltage of, say, 30 to 40.

A variable-mu S.G. or H.F. pentode has a larger grid swing, although this again depends on the type in use, and can, therefore, handle a more powerful input without the risk of distortion. The feature most closely associated with a variable-mu valve is that its characteristics are such that its output can be controlled in a very smooth manner by varying a negative bias applied to its grid, thus allowing an effective pre-detector volume control to be obtained.

The required bias can be supplied by a 9-volt G.B. battery, and regulated by means of a suitable potentiometer connected across it, or from a source of automatic bias, as in the case of a superhet or multi-valve receiver embodying A.V.C.

Considering the two types of valves from a practical point of view, it should be noted that with the "straight" S.G. or H.F. pentode, the volume control is across the H.T. supply and has to carry the current drain thus caused, whereas with the variable-mu type, the potentiometer is only across a very low voltage, and does not run the risk of being overloaded as regards current.

S.G. or H.F. Pentode?

In most modern circuits it is generally possible to use either of these valves in an existing stage without modifying the circuit, other than changing the valveholder should the pin arrangement be different.

Many readers are under the impression that an H.F. pentode will give far better

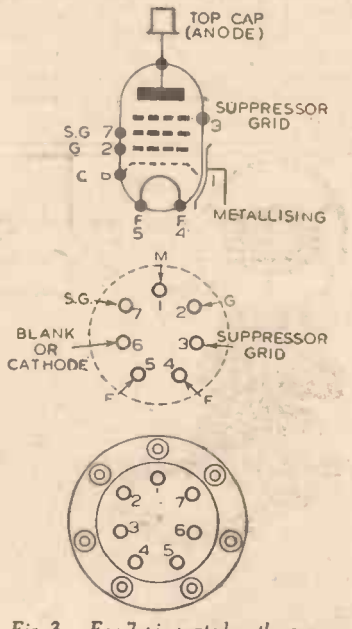


Fig. 3.—For 7-pin pentodes, the connections are arranged as shown here.

results, in a given circuit, than an S.G. valve. This is not always the case; in fact, if any great improvement is noticed when the change over is made, it is fairly safe to assume that the S.G. valve was being overloaded, or introducing distortion. The efficiency of either type, assuming operating voltages are correct, depends on the load or coupling in the anode circuit. It is essential to use coils having a high dynamic resistance, and this condition can generally by satisfied by using modern iron-cored coils, provided adequate care is taken to guard against instability.

For example, if it was a question of bringing an old receiver up to date, it would not be advisable to use the latest types of H.F. pentodes if the coils in use

(Continued on facing page.)

THOSE PUZZLING PENTODES

(Continued from previous page)

were of the early large diameter air-cored class.

Single H.F. Stage

For a single H.F. stage circuit, it is permissible to use a straight or variable-mu S.G. or H.F. pentode, as the input, unless one is living in the swamp area of a transmitter, will not be too powerful for the valve to handle. The advantages of the variable mu type should not, however, be overlooked, so far as volume control is concerned, even in a simple set of this nature, especially if powerful signals are likely to be received. In the case of a two H.F. or a superhet receiver, it would be better to use a "straight" for the first stage and a variable mu for the second, while with a superhet the variable mu would be better for any pre-H.F. stages and the I.F. circuits.

Those particularly interested in quality reproduction, using, say, a one or two H.F. plus detector unit feeding into a high grade amplifier, do not always appreciate the advantage offered by the 7-pin type of H.F. pentode which, as will be seen by the diagrams, has its suppressor grid brought out to a separate pin. For example, when receiving the local station and requiring the best quality, the full gain and selectivity of the H.F. stages is not usually required. The normal volume control can be used, but that will not have the actual effect desired in such cases, but if a negative potential is applied to the suppressor grid, not only will the efficiency of the stages be decreased, but the selectivity will also be reduced, thus allowing the reproduction to be free from any frequency cutting. The voltage will depend on the type of valve, though a maximum of 30 volts will be usually found sufficient.

MODERN PRODUCTION METHODS

ALMOST everyone is interested in mass-production methods, which are now widely applied to the construction of radio parts and receivers, but the motor industry is probably best known as the "home" of mass production.

It is fascinating to watch the assembly of a car chassis as it passes along an endless-belt conveyor. First there is the frame; then axles and wheels are attached; the engine is fitted; and so the work proceeds. The processes involved are interestingly explained in the issue of our companion journal, *Practical Motorist*, dated March 18th, now on sale. The explanation is well illustrated by photographs.

In the same issue maintenance of the B.S.A. "Scout" is fully dealt with, whilst there are many other practical articles and touring features. "Replies to Readers' Queries," "Notes from a Garage Mechanic's Diary," "At the Wheel," "Topical Notes of the Week," and "Sportfolio" are other popular items included in every issue.

PATENTS AND TRADE MARKS

Any of our readers requiring information and advice respecting Patents, Trade Marks or Designs, should apply to Messrs. Rayner and Co., Patent Agents, of Bank Chambers, 29, Southampton Buildings, London, W.C.2, who will give free advice to readers mentioning this paper.

BOSWORTH RECORDINGS

EXPERIMENTERS and quality enthusiasts will be interested in a series of records obtainable from Messrs. Bosworth and Co., Ltd., of 8, Heddon Street, Regent Street, London, W.1. These are standard 10in. discs designed for a standard playing speed of 78 r.p.m. They are designed primarily for dubbing on cine film, and to this end they all bear on the label the exact time of playing. Furthermore, in addition to standard melodies, there are a number of special recordings, such as trumpet fanfares (six to a disc); short sound titles each of .07 seconds duration; etc. Although many of the discs contain a single tune per side, there are quite a number in which two or more melodies are contained on each side and there is a short silent period between the tunes. The track is, however, continuous. We have used some of these records for test purposes and are much impressed with the wide overall frequency response and absence of surface noise. After several hundred playings one of these discs is only just showing signs of breaking down.

New Melodies

From an entertainment point of view the melodies available are a complete change from the hackneyed tunes which one now hears every day, and to assist customers to select appropriate discs the makers have prepared a useful list which bears a classified section, dividing the records into Agitatos, Furiosos, Comedy and Light Novelties, Galops, Martial, Eccentric, Grotesque, etc.

The records cost 2s. 6d. each and a descriptive list may be obtained on application to the above-mentioned address.

March 25th, 1939. Vol. 4. No. 144.

Picture Examination

THE acceptability of television pictures to the general public has been the subject of many close investigations by various scientists who have brought physical, physiological, and psychological factors to bear on the problems involved. It is open to question at the moment, however, as to whether the scientist can really interpret these matters from the point of view of the home, where individual atmosphere and environment must play an important part in assessing the home entertainment value. Even so, it is both interesting and instructive to examine the conclusions arrived at by these researches into human problems, and one of the most thorough was that undertaken in Germany where, strangely enough, no real public service of television yet exists. The results, therefore, although interesting, are not actually based on public experience, but represent the findings of an investigator who has endeavoured to place himself in the position of a domestic or family viewer. One conclusion which seems fairly reasonable is to the effect that the normal contrast range in modern television receivers using cathode-ray tubes satisfies all requirements, provided that stray light is excluded from the vicinity of the screen. Where stray light does interfere, however, then it is said that the brightness level in interlaced images is limited by flicker. This is important when it is remembered that in many households, viewing is undertaken with some of the room lighting operative. The more light present, the brighter the cathode-ray tube has to run, and the less is the contrast range in the observed picture. In dealer demonstration rooms, some have adopted the policy of having an amber coloured light during transmission periods. This avoids any groping in the dark for late comers, and in no way interferes with the picture.

Other Factors

THIS same German investigator has come to the conclusion that with a 441 line definition such as is used for the transmissions in that country, the picture size should not exceed about 12in. by 10in. There is no doubt that the dimensions of the receiver image have been the subject of many debates, and it is generally agreed here that a 15in. diameter cathode-ray tube represents a reasonable maximum for the ordinary-sized room, while the 12in. diameter tube giving a 10in. by 8in. picture is undoubtedly the most popular in the average household. The very large screens in home sets where a projection C.R. tube is employed need quite big rooms, and a long viewing distance, to do real justice to the reproduced image. Another very interesting point raised by the same investigator is to the effect that since television, in his opinion, can be considered as the optical counterpart of audio broadcasting, it calls for very high acoustical reproduction to be acceptable. The reason advanced for this is the conclusion that the success of sound motion pictures, and the justification for their existence as an entity, depend upon the quality of silent motion pictures considered by themselves. It is, of course, known that with the present B.B.C. television service the sound signals are far superior in quality to ordinary radio, because a wider sideband is permissible on the ultra-short waves.

A Limitation

IT is generally conceded that one of the limitations existing insofar as television engineering is concerned, and one which is emphasised in large-screen work, is an inherent difficulty at the transmitting end. At the moment no two television cameras are identical in all their electrical characteristics; a point brought home quite forcibly when three or four cameras are in use for a single production, and fading from one to the other is essential to give full programme entertainment. Lighting suitable for one is unsatisfactory for another camera, and rapid light changes are both difficult to achieve, and cause very unpleasant shading effects if they are introduced. Evidence of this is forthcoming whenever a feature film is shown, and the alterations in light level brought about by changes in light density destroy for a time the tonal value of the received picture. Better cameras in conjunction with improved methods for tracking, and lens focus adjustment, have helped matters considerably of late, but as programmes become more and more ambitious film studio technique will have to be studied very carefully. This again is yet another reason why the basic problems of film and television requirements should merit a closer co-operation. Any segregation of the old and new arts will only add to confusion, and it is encouraging to find that in some quarters a better understanding is prevailing, a factor which cannot fail to benefit the one who, after all, must have the final say in the matter—that is, the set user, whether domestic or otherwise.

Mr. A. P. Herbert, M.P., who is steeped in the lore of canals and waterways of England, was commentator when life on the barges was televised by the B.B.C. last week. The cameras were placed on a stretch of the Grand Union Canal, round a lock which is a favourite meeting-place for the bargees and their families. The camera is here seen televising Mr. Herbert whilst he is chatting to Mr. and Mrs. Edwards on their barge at Clitheroe Lock, Brentford.

TELEVIEWS

Signal Attenuation

ALTHOUGH as a general rule the aim of television engineers is to secure the maximum signal strength available at any given area, there are many occasions which arise in practice that call for a television signal attenuated in magnitude. When close to the transmitting station the direct signal pick-up with a normal aerial may be sufficient to overload the cathode-ray tube with normal receiver control knob settings, with the result that the gain control has to be turned back to a setting where the vision chassis is not functioning efficiently and distortion can occur. By introducing a simple combination of resistances between the feeder cable termination and the set input, the signal strength can be reduced to any desired value simply by using the correct resistance values in the attenuator pad, as it is generally referred to by most engineers. It is essential that uniformity in impedance is maintained at the input and output terminals of this resistance junction, otherwise phase reflections can occur which will mar what would otherwise be a good picture. This problem of reducing the amplitude of an available signal by a given amount is met with in other television equipment, and it was therefore interesting to find that a scheme has been proposed whereby attenuation can be carried out electronically. The signals to be attenuated are applied to a grid mesh electrode of a special type of electron multiplier in such a way that they control a stream of electrons provided by a light activated cathode. The emerging stream is magnetically directed towards another set of electrodes where the potentials applied to them are controlled in such a manner that the predetermined fraction of signal is derived from a perforated grid.

A Man of Vision

NO one can deny the sincerity of Gerald Cock for television, and his position as B.B.C. director of the service has enabled him to make some very interesting contributions to the various opinions which exist as to the best method of expanding the service. Bearing in mind the details given in various notes in these pages it is useful to know that Mr. Cock envisages a five-year plan for the expansion of television to cover the whole country. He favours the erection of relay stations which will be able to transmit the programmes provided from a central source of production, for in this way it is claimed that wasteful and expensive duplication of plant, staff and material will be avoided. The length of weekly programme desired by viewers in general is also a matter undergoing investigation at the moment. At present it averages between 19 and 20 hours per week. Although it is realised that television viewing demands concentration on the part of those looking in, this hardly seems sufficient to meet all needs. The programmes must be varied, and any extension of choice will naturally mean a longer time on the air per week. Each week it is possible to select a number of outstanding items which give remarkable entertainment value, but with a public who have been satiated with forms of amusement both radio and otherwise which give many alternatives, it seems certain that an extension of hours is imperative if more and more people are to acquire sets for home use. The problems associated with this are not easy, because of rehearsal periods, but no doubt those in authority will eventually find means for satisfying the wishes of the public.

Mr. M. M. Stockley has resigned his position as London sales manager of British Belmont Radio, Ltd.

Mr. L. Glazer, after three years' association with Philco, has left to join Arvin Electric, Ltd., as sales manager for Arvin Autovox car radio receivers.

Sir Allan Powell, the newly appointed chairman of the B.B.C., will take over his new duties on April 20th. Sir Allan, who is at present the Mayor of Kensington, succeeds Mr. R. C. Norman at the B.B.C.

The Postmaster-General has appointed Mr. D. J. Lidbury, D.S.O., Regional Director of the London Postal Region; Mr. V. R. Kenny, M.B.E., Regional Director of the North Western Region; and Mr. C. A. Taylor, M.C., Regional Director Designate of the London Telecommunications Region, to be members of the Post Office Board. The appointments will take effect from May 1st, 1939.

Items of Interest

Arthur Askey to Make Films

SO the man who kept the British Public at home on Wednesday nights is to go on the films. Arthur Askey is not the first radio favourite to be lost to listeners, and he won't be the last.

According to the well-known film critic, C. A. Lejeune, writing in this month's *Screen Pictorial*, "Big-hearted Arthur" is to make films for the next five years for

Arthur Askey in one of his characteric poses.

Gainsborough. Three film companies offered him contracts. "The first was good," he says. "The second, better, and the third, magnificent."

"The Prisoner of Zenda"

WHEN he invented the imaginary country of Ruritania, Anthony Hope, even in his most sanguine moments, can have had little idea of the world-wide success that his romance would enjoy. "The Prisoner of Zenda" has been translated into practically every language in the world, in addition it has come before the public as an operetta, a play, a silent film and a talkie, and has been the model on which countless works of the cloak and sword type have been based.

The book has been adapted by Jack Inglis as a serial play for broadcasting and nine instalments will be heard on consecutive Sundays, the first broadcast being on April 2nd, in the National programme. The two chief rôles, Rudolf Rassendyll and Colonel Sapt, will be played by Robert Douglas and Milton Rosmer respectively, and the production will be in the hands of Leslie Stokes.

Just before his sudden death recently, Robert Chignell was engaged in writing special music for this serial. He had finished a melody for the Ruritanian National Anthem, and this will be orchestrated and variations of it prepared by Leslie Woodgate. The music will be recorded by the B.B.C. Symphony Orchestra, Section C.

Crosley Corporation Applies for Television Construction Permit

THE CROSLEY CORPORATION, operators of Station WLW (Cincinnati) recently filed an application with the Federal Communications Commission for permission to construct a television transmitter in Cincinnati. The application filed is for a construction permit only. This entails building two transmitters, one for video or visual broadcasting, and the other for audio or sound broadcasting in connection with the video transmitter.

In the event of the application being granted, the Corporation has six months in which to construct the television station.

The station, according to the plan, will be of 1,000 watts power, and will operate on a frequency band between 50 and 56 megacycles. A leeway of this magnitude is necessary for television, engineers pointed out, adding that the one station would require a band six times wider than the present standard broadcasting band of from 550 to 1,500 kilocycles.

Deputy Television Announcers

WE are informed by the B.B.C. that Miss Olga Edwardes, and Miss Eileen Bennett, have been booked as deputy television announcers during the absence on annual leave of the two regular announcers, Miss Jasmine Bligh and Miss Elizabeth Cowell.

Miss Edwardes, deputising for Miss Cowell, has been booked for dates between March 30th and April 17th.

Miss Bennett, who will be deputising for Miss Bligh, will be on duty at intervals from March 24th till April 4th.

Miss Edwardes, who is twenty-two years of age, is a brunette, and is already well known to viewers as an actress, her most recent appearances being in "Condemned to be Shot," by Reginald Brooke, and Noel Coward's "The Young Idea." Beginning as a ballet dancer trained by Anton Dolin and Brigitta, she has taken both stage and film parts, her last engagement being in the film version of "The Dominant Sex." She prefers stage acting to films.

Miss Bennett, who is nineteen years of age, is a blonde, and was trained at the Royal Academy of Dramatic Art. She has had considerable recording experience in plays and sketches, and has just taken the juvenile lead in a new film, "The Trunk Crime."

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 Simple U.S.W. Adapter

SIR,—Regarding the letters of W. W. Llewellyn and T. A. Lane in the issues of February 18th and March 11th respectively, I also should like to see a U.S.W. adapter described which could be plugged into the P.U. terminals to receive the television sound, especially for mains operation. —GEO. S. COLLIE (West Looe, Cornwall).

SIR,—I follow with interest the letters from readers which appear in your journal, and I would like to say a word in favour of T. A. Lane's request for an ultra-short-wave adapter to receive television sound.

Most of the letters seem to come from short-wave enthusiasts who proudly display their various logs, but I am interested in amplifying equipment. I am also interested in Class "B" amplification. I would like to correspond with another reader interested in these subjects, preferably in the Birmingham district.—J. PARKER (40, Shakespeare Street, Stratford-on-Avon).

Sets Using Old Components

SIR,—I think the idea of describing sets to make use of old components a splendid one. We like the actual building of sets, and having many components on hand wish to use these if it can be done without spoiling the set design.

Can you give us such a one using a band-pass arrangement? Selectivity is very bad in this district on the medium band; in fact, sometimes it is impossible to hear the West or North. Wishing you increasing success.—H. EDGAR PARKER (Southampton).

Station XGOY, Chungching, China

SIR,—It may be of interest to other readers of "Leaves from a Short-wave Log" to know that on Monday, the 27th ult., I logged the station XGOY, Chungching, China. The announcer informed listeners at 22.00 hours G.M.T. that the station was inaugurated on Sunday the 26th ult., and was working on a carrier-frequency of 9.5 mc/s (31.6 m.). He then gave news of the week of this, the present capital of China, and also said that there would be English news next week at the same time. The transmission was received on a 5v. commercial set, and the signals were QSA5 R9+.

I have been an enthusiastic reader of your paper for some time, and wish it every success in the future.—ERIC H. WILLIAMS (Wallasey).

"Audible" Radiations

SIR,—I was very interested in the remarks by B. H., of Nuneaton, about radio reception from an amplifier. I have had the same experience, and found that any attempt to apply coil and/or condenser to the grid for tuning purposes simply lost the signal which came out of the amplifier L.S. These signals were received with A. and E. in the usual connection but no tuning capacity or inductance whatever. One reader suggests a pick-up as an inductance, but I possess no pick-up, so the reason is to be found elsewhere. One person said the local relay was to blame. I wonder! I agree with D'Arcy Ford who says that the output L.F. of a radio set must be half-wave H.F., and this is what the relays are putting out on their wires.—A. W. (Bridlington).

Correspondent Wanted

SIR,—I have been a regular reader of PRACTICAL AND AMATEUR WIRELESS for the past three years, and would like to correspond with any reader living abroad and interested in short-wave reception and transmission.—D. SHAFSBY (46, Bath Street, Southport).

A 5-valve Battery S.W. Receiver!

SIR,—In your issue of January 21st, 1939 you invite the opinion of readers on the suggestions of Mr. C. Heyne for a 5-valve battery S.W. receiver. I am in entire agreement as to his suggestion for a PRACTICAL AND AMATEUR WIRELESS powerful S.W. receiver, but why superhet, unless required for some particular frequency? After listening to the "cavernous" (let us call it) reception on the higher frequencies from the latest expensive "all-wave superhet" commercial receivers, it is a relief to the ear to get back to a hefty S.W. "straight" circuit even though it is composed (with the exception of modern valves) entirely from junk.—C. F. ARMSTRONG (Kenya, S. Africa).

SIR,—Mr. Heyne's letter published recently in PRACTICAL AND AMATEUR WIRELESS, and your request for opinion on the suggestion offered, encourage me to again ask that consideration be given to publishing a circuit of 6 to 7 valves for operation from a 6-volt battery.

I think, however, an all-wave receiver (9 to 2,000 metres) for broadcast reception would more meet the needs of the majority and would be particularly welcomed in this area.

We are well over 3,000 miles from the B.B.C. and the more important European stations. The set must be sufficiently powerful to give all-day reception of these particular stations.—C. R. MALONEY (St. Kitts, B.W.I.).

SIR,—Under the heading, "A Battery S.W. Superhet," I notice that C. H. Williams gives a combination of Mullard valves. I think it would be better, as the suggested circuit is for short waves, to use a Mullard FC2A, instead of FC2, for frequency changer, a Mullard VP2B, instead of VP2, as I.F. and A.F. I think that the I.F. transformers should be very carefully chosen, and would suggest Varley BP95. These have air dielectric trimmers, which reduce the losses and simplify trimming, and also the coupling between the two windings can be varied. I would like two I.F. stages. I have been a regular reader of PRACTICAL AND AMATEUR WIRELESS for years, and I think your journal gets better and better.—T. G. MITCHELL (Maidenhead).

Logged on 20 Metres

SIR,—Listening on the 20 m. band on Tuesday, February 28th, between 6.50 p.m. and 9.45 p.m., I heard the following stations:

KBY, ZS1T, SU1GP, SU1DM, HA8S, K4SAY, HA1P, SU1DF, K4FAY, CT1PM, W2EI, CT1PW W2EUI, WB1BQ, W1FMP, W1DQ, VQ1AY, W1FMP, W3AEP, W1HRC, W4DHQ, W2KFA.

I picked up these stations on a seven-valve superhet with a 35ft. outdoor vertica aerial.—VINCENT RICHARDSON (Andover).

Wind-driven Charging Plant

SIR,—May I complete the triangle with our friends in Kildare—and in Orkney—in asking you to publish an article on wind-driven charging plants. In many out-of-the-way places such plants would be a great boon. From another point of view, in these troublous times, it is almost a matter of national importance, as the dislocation of power plant, broken cables, etc., in an emergency, and perhaps the diversion of power to other purposes would make home-made current invaluable. And dry batteries might not be so easy to get; but with a few accumulators and wet H.T.—and wind cheap—the problem would be solved. As the Government will communicate, nationally speaking, through the B.B.C. network, in an emergency, I think the more we are independent of the Grid System, the less likely we are to be at a loss to maintain communications.—W. H. STACEY (Kingsbridge, Devon).

CUT THIS OUT EACH WEEK.

Do you know

—THAT when an external aerial is attached to a frame aerial the directional properties of the latter are lost.

—THAT soft copper wire may be strengthened for wiring purposes by stretching it until it gives.

—THAT wire which has been treated as above should not be used for ultra-short-wave apparatus as the surface is damaged.

—THAT stranded wire for aerial purposes should preferably be enamelled each separate strand being enamelled before twisting.

—THAT a loose flexible lead to the cap of an H.F. valve can result in erratic tuning effects in a powerful receiver.

—THAT peak or instantaneous values should be considered when calculating the rating of resistors and condensers.

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.

Radio Clubs and Societies

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

THE CROYDON RADIO SOCIETY

Headquarters: St. Peter's Hall, Ledbury Road, S. Croydon.
Meetings: Tuesdays at 8 p.m.
Hon. Pub. Sec.: Mr. E. L. Cumbers, 14, Campden Road, S. Croydon.

MEMBERS of the above society met in St. Peter's Hall, S. Croydon, on Tuesday, March 7th, to hear Mr. P. G. Clarke, the chairman, demonstrate his new high-quality apparatus. The vice-chairman, Dr. R. A. Bailey, presided. As was expected, Mr. Clarke had scorned the superheterodyne and used a straight H.F. unit, followed by a resistance coupled amplifier. He described how permeability tuning provided constant selectivity over the whole waveband. Of special interest was his use of a tone-control valve, and he made it quite clear how variation of bass and treble was effected. This valve preceded the main amplifier. The loudspeaker equipment included a large Magnavox 66 unit handling bass notes, with a Piezo electric unit for the upper ones.

Demonstrating the apparatus, Mr. Clarke secured splendid reproduction from both radio and records. He is the proud possessor of a very fine library of records, having one hundred records from which to choose on this occasion. Thanking him, Dr. Bailey said that this lecture should encourage members to persevere in high-quality reproduction, and then come forward to benefit the society with a demonstration. Next Tuesday, March 28th, is the Annual General Meeting for election of officers. The vice-president, Mr. G. S. Vellacott, will preside, and the evening will conclude with a selection of ten-minute talks from members.

THE ILFORD AND DISTRICT RADIO SOCIETY

Hon. Sec.: C. E. Largen, 44, Trelawney Road, Barkingside, Essex.

RECENT activities of this society have included a lecture by Mr. Parr, of Messrs. Ediswan, on Cathode-ray Tubes and the Encephalograph, and a lecture by Dr. F. C. Stephan, of the Telegraph Condenser Co., Ltd., on Electrolytic Condensers. Mr. Haynes, of Haynes Radio (president of the society), also gave a lecture and demonstration on Cathode Gear and Amplifiers, and a junk sale was held at headquarters, the results of which were very gratifying.

Forthcoming programme.—March 30th: Lecture by Messrs. Tungsram Electric Lamp Works, Ltd. April 13th: Transmitter demonstration by Mr. E. G. Coe. April 20th: Demonstration by Mr. H. T. Stott, Gramo. evening.

BRENTWOOD AND DISTRICT RADIO SOCIETY

Hon. Sec.: B. A. Pettit (G3VD), "The Laurels," Werrin Road, Shenfield, Brentwood.

AT a meeting recently, a lecture on Direction Finding was given, a subject of much interest to members who will be taking D.F. seriously in the coming season. Another excellent lecture by R. A. Rothermel and Co., Ltd., on their crystal products, and a lecture by the Ediswan Electrical Co., Ltd., have been recent events. A visit to the Cable and Wireless Transmitting Station at Ongar is an expedition much looked forward to, as also is a practice D.F. field day with the Romford and District Radio Society after Easter, weather permitting. It is intended to hold D.F. tests throughout the summer with the other Essex radio societies as well as individual ones using the society's transmitter G8HV (portable). Attendances at recent meetings have been poor owing to the influenza epidemic, but a revival is anticipated now that it is passing off. Meetings are held at the QRA of G8KM on the first and third Thursday of each month. Inquiries regarding the society should be addressed to the hon. secretary at the above address.

SHEPPEY AMATEUR RADIO CLUB

Headquarters: "Oddfellows Arms," Halfway, Sheerness.
Meeting Nights: Thursdays at 7.30 p.m.
Hon. Sec.: F. G. Maynard (2CVM), 160, Invicta Road, Sheerness, Kent.

THE above club held its usual meeting on Thursday, March 9th, and a very pleasant evening was spent. After the usual meeting formalities had been observed a general discussion took place concerning the new headquarters which had been obtained through the efforts of the chairman (G3GW). The headquarters are more suitable in every respect, and possess all the facilities required for transmitting and receiving, as well as being spacious enough to accommodate an increased membership and for the use of lectures.

Application to the authorities has now been made for a "full licence," and the club receiver is nearly completed.

An anonymous gift of 15s. has been received by the chairman from two friends towards the cost of a licence, which was greatly appreciated by the club. A DX Contest is now running for receiving members on the 3.5 mc/s amateur band, and results will be based upon the *best* individual DX station received (with verification). Owing to prevailing conditions on that band at the present time, it will be more or less an endurance test for careful listening, as well as efficiency of receiver and antennæ. Results will not be known until June 4th, when it is hoped a detailed report can be made.

Information regarding lectures and demonstrations from manufacturers of amateur gear, etc., will be appreciated.

Further particulars of the club can be obtained from the hon. sec., at the address given above.

ROMFORD AND DISTRICT AMATEUR RADIO SOCIETY

Hon. Sec.: R. C. E. Beardow (G3FT), 3, Geneva Gardens, Chadwell Heath, Essex.

AT our meetings held on February 21st and 28th lectures were given by Mr. Townsend, of the Hivac Valve Co., and Mr. Betteridge, of The Marconiphone Company, on the construction and uses of Cathode-ray Tubes. Our last meeting was devoted to the demonstration of an Evrizone amateur receiver owned and operated by G3CQ. A surprising amount of DX was heard under trying conditions, and we shall be looking forward to a demonstration of their latest model, which will be demonstrated by G3CQ on behalf of that firm.

THE EAST SURREY SHORT-WAVE CLUB

Meetings: Alternate Thursdays at 8 p.m.
Hon. Sec.: Leslie Knight (G5LK), 13a, Hatchlands Road, Redhill, Surrey.

ON February 16th Mr. Basil Wardman (G5GQ) gave an interesting talk on transmitter design, which proved to be very popular, as the club consists mainly of transmitters and A.A. licence-holders.

On the evening of March 2nd the club's receiver was installed, but owing to difficulty in erecting a good aerial reception was poor and members were not very successful when trying to tune in the amateur band. On the same evening G6JF introduced VU2AE from India, who is staying in this country for a short while.

The first year's balance sheet has been prepared and presented to members showing a balance in hand of over £7. The first annual dinner will be held at the "Old Wheel," Reigate, on April 13th; assemble 7.30 p.m. Dinner 8 p.m. All local enthusiasts are welcome.

SLOUGH AND DISTRICT SHORT-WAVE CLUB

Headquarters: 35, High Street, Slough, Bucks.
Meetings: Alternate Thursdays at 7.30 p.m.
Hon. Sec.: Mr. R. J. Sly, 16, Buckland Avenue, Slough, Bucks.

AT the last meeting held at headquarters on March 2nd, the club was honoured by a visit from VP6AH, who gave a very interesting talk on the difficulties of the amateur in Barbados. A very interesting time was had by members in constructing the club receiver.

The agenda for the next meeting includes a talk on microphones and amplifiers by G3XH, as well as further work on the club receiver, and the usual Morse practice.

THE MEDWAY AMATEUR TRANSMITTERS SOCIETY

Headquarters: The Navy Wives' Club Hall, Dock Road, Chatham.
Meetings: Every Tuesday at 8.15 p.m.
Hon. Assistant Sec.: R. Nicholson, 8, Pine Road, Strood, Rochester, Kent.

AT the meeting held on February 14th Mr. J. E. Bryden (2BOL) gave an interesting talk on television equipment and displayed for inspection a very fine sound and vision receiver of his own design and construction.

The president (G6NU) has commenced a series of informal technical discussions of an elementary nature for the benefit of those new members who are newcomers to amateur radio, and these are proving very popular.

Arrangements for the forthcoming Radio and Television Exhibition, which the society is organising, are well in hand, and technical details of the necessary equipment for demonstrating several television receivers, etc., are receiving the attention of the members detailed for this work.

On March 28th, Messrs. British Television Supplies, Ltd., are giving a demonstration and talk on their popular "Trophy" receivers, and 2BOL will continue his television series on April 11th. Alternate meetings are devoted to Morse code practice and informal technical discussions.

Readers of PRACTICAL AND AMATEUR WIRELESS are especially invited to meet the local hams on Tuesday evenings at 8.15 p.m. To reach the M.A.T.S. room at the Navy Wives' Club Hall, enter by the main door, and inquire of the caretaker at the buffet, who will be pleased to point out the way.

HODDESDON AND DISTRICT RADIO SOCIETY

Headquarters: Blairgowrie, Station Road, Broxbourne, Herts.
Hon. Sec. and Treasurer: T. Knight, Jnr., Caxton House, High Street, Hoddesdon, Herts.

THE society operates under call G5HO, and has a permit to operate on the 1.7, 7, 14, 28, and 56 mc/s bands as a fixed and a portable station. Gear consists of a loose-coupled Hartley plate modulator, and an M.O./P.A. with relay break-in and voice-controlled break-in (not yet working) for 160 metres. A C.O./F.D./P.A. (RFP15) for 20m. and 40m. A 56mc/s TX was built some years ago before any really suitable valves were available and then shelved in favour of 1.7 mc/s, but it is now being reconstructed, together with two receivers. A new communications receiver for the amateur bands is nearing completion.

Aerials in use are a 132ft. Marconi for 160 metres, a 40-m. doublet, and an 8JK for 20 metres.

Meetings are held every second and fourth Wednesday of each month, from 8 to 10 p.m. We have at present four members with A.A. licences, two of whom have passed the G.P.O. test.

ASHTON-UNDER-LYNE AND DISTRICT AMATEUR RADIO SOCIETY

Headquarters: Commercial Hotel, 86, Old Street, Ashton-under-Lyne.
Secretary: K. Gooding (G3PM), 7, Broadbent Avenue, Ashton-under-Lyne.

AT a meeting held on March 8th, the date of the "Hamfest" was definitely fixed for April 2nd next. An entertaining programme is being compiled, and it is hoped that all local amateurs (including non-members of the society) will give the event their full support.

The society also held their first "junk sale," and as it proved a huge success it was decided to repeat the event at future meetings.

A letter was read by the secretary from the Derby Short-Wave Society, and it was resolved to co-operate with this society on field days. On the suggestion of Mr. W. P. Green a "panel" of listening stations is being drawn up in order to provide a practically full-time listening service in connection with organised tests.

PAISLEY SHORT-WAVE CLUB

Headquarters: 2, Park Road.
Meetings: Mondays at 7.30 p.m.
Hon. Sec.: Mr. James M. Arthur, 9, East Buchanan Street.

THE above club paid a visit to the Glasgow Police Radio station on February 23rd. The system was explained in detail with the aid of maps. The Teletype rooms were visited, and messages were watched being typed out, and these, it was explained, were received simultaneously in five different districts. The answers could be seen typing themselves out. The garage also was visited, where patrol cars were inspected with great interest.

Application for a transmitting licence has been made for the club under the name of Mr. Peter P. Brown.

Wednesday nights are devoted to morse practice. Saturday nights are quite popular, being informal nights.

Membership has been steadily increasing, and now stands at about 40. The entry fee is 2s., and weekly subscriptions 6d., junior members 3d. per week. Members have their own key, and have access to the club at all times. Anyone interested will be welcomed on Monday evenings.

BRADFORD SHORT-WAVE CLUB

Hon. Sec.: G. Walker, 33, Napier Road, Thornbury, Bradford, Yorks.

ON Sunday, March 5th, another trip was taken by the members of the above club along the channels of the 1.7 mc/s band, and a call was made at one or two local stations, the farthest call was G6PY, at Barnsley. It has been decided, after one or two reports that have been received by the secretary, to rebuild the station, and this work will be in progress by the time this report goes to press.

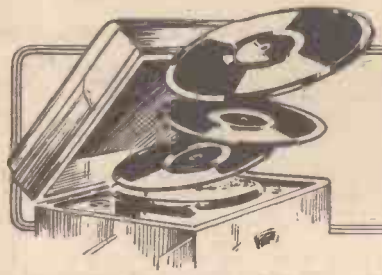
The last lecture in the winter syllabus will be given by Mr. Beaumont, of Ambassador Radio Co., Brighouse, and his subject will be "Short-wave Receiver Design." Further information of the club's activities, summer syllabus, etc., can be obtained from the secretary.

THE MERSEY-SIDE AMATEUR TRANSMITTING SOCIETY

Secretary: C. E. Cunliffe, 368, Stanley Road, Bootle, Liverpool, 20.

LAST month the above society had quite a full programme, including a lecture on all types of crystal oscillators, followed by a practical demonstration. On discussion night we cleared up many points regarding members' radio queries. We now have three more call-signs: 2BMB (Mr. Mooney) and G6PM. Mr. E. Forster is now 2FZK, while several of the A.A. members have applied for full permits. We are all looking forward to one or two field days this year, weather permitting.

If any persons, novice or expert, would care to join the society, please write to the secretary at the above address.



Impressions on the Wax

A REVIEW OF THE LATEST GRAMOPHONE RECORDS

THERE are some very attractive light orchestral records in this month's releases. The London Palladium orchestra, under Clifford Greenwood, plays a selection of Sousa Marches and "March of the Bowman" from the conductor's "Robin Hood" suite—*H.M.V. C* 3079.

Barnabas Von Geczy, one of the most famous of Continental light orchestra leaders, takes the "Lambeth Walk" and "The Donkey Serenade" and makes a fine job of them on *H.M.V. B* 8871.

Louis Levy's Orchestra gives a melodious selection of the best tunes in the latest Macdonald-Eddy film, "Sweethearts," on *H.M.V. BD* 668. His trick of giving some of the violins a sort of roving commission above the "top line" is quite fascinating. Anton and the Paramount Orchestra, with Al Bollington at the organ, give charming renderings of Elgar's morceau "Salut d'Amour" and Drdla's "Serenade"—*H.M.V. BD* 660.

Apart from the music they play, Alan Helm's Accordeon Orchestra has other points of novelty. Its 120 members are all employees of Hohner's Concessionaires, who make the instruments on which they play, and the accordeons themselves range in size from the midget to the mammoth. They play a piece specially written for them by G. S. Mathis, who conducts—a short symphonic poem, "Spring"—*H.M.V. BD* 664.

Vocal

IT is surprising that Meliza Korjus, who is such ideal material for the films, has not been seized upon and "starred" before. Her first film, "The Great Waltz," is a vehicle for the tunes of Johann Strauss in their most elaborate arrangements.

Meliza Korjus gives some amazing examples of vocal acrobatics, or, as the musicians say, coloratura singing, and these records were made direct from the sound track of the actual film. They include "Tales from the Vienna Woods"—*H.M.V. B* 8862, "One Day When we Were Young" and "There Will Come a Time"—*H.M.V. B* 8863.

Cicely Courtneidge and Jack Hulbert sing the duet "Together Again" from their sensational new show "Under Your Hat." The other side of the record carries "If You Want to Dance," by Jack Hulbert and the Rhythm Brothers, on *H.M.V.* B 8864.

For years Peter Dawson has been regarded as the ideal exponent of the hearty and forthright ballad. Of late he has shown his more serious yet equally attractive side, and these two fine examples of the English art song have figured with great success in his recent programmes. They are Elgar's "Speak, Music" and "Raun of Exile," by Bax, on *H.M.V. B* 8866.

Arthur Askey, radio's No. 1 comedian, is delightful in two of his latest absurdities, "The Cuckoo" and "All to Specification"—*H.M.V. BD* 656.

Swing Music

PROMINENT among the new records of swing music is the first H.M.V. record by Arrie Shaw and his Orchestra. In the space of only one year Shaw has risen out of nowhere to take his place as America's most popular swing band. As a clarinettist he is as at home in the classics as he is in jazz. He is also an arranger and composer for his own orchestra.

On one side of *H.M.V. B* 8869 you will hear his own arrangement of the famous "Indian Love Call" from "Rose Marie." Shaw agrees that the tune is lovely—too lovely to suffer from an occasional bit of fun such as this. So he deliberately pokes fun at the modern "swing" style of jazzing up the classics and light classics. By emphasising all the bad points in modern jazz—the introduction is nearly half the record, the men in the band sing "Cheep Cheep" for no reason at all behind the vocal; in fact, Shaw has produced a classic of better jazz phrasing. On the reverse of this record is his theme song, "Nightmare," which he composed himself.

One of the most popular of recent record issues was an actual recording of Max Miller's complete turn as it was snapped at the Holborn Empire.

It was so successful, in fact, that in response to the amazing public enthusiasm, H.M.V. have had to go back to the Holborn to make yet another set of records by the "Cheekie Chappie." Apart from his signature tune at the beginning and end, this turn is completely different from the first one recorded. Fresh songs—three complete sides of patter. *H.M.V. BD* 646-8.

Decca

AMBROSE and his Orchestra have two new records this month featuring four of the most popular tunes of the moment. "I Miss You in the Morning" is on one side of *Decca F* 6965, whilst on the reverse is "If Ever a Heart was in the Right Place"; and the other record, *Decca F* 6966, contains "I Shall Always Remember you Smiling" and "Grandma Said." The last tune looks like being a "hit."

"Romany" and "There's Something About an Old Love" on *Decca F* 6972 suit Vera Lynn perfectly. This artist is one of the "stars" of the famous Ambrose Octet.

Bob Crosby and his colleagues, with Marion Mann as vocalist, proffer first-class records. *Decca F* 6968 is a good example of the right presentation of two excellent numbers—"What Have You Got that Gets Me?" and "You're Lovely, Madame."

"The Palais Stroll" has "caught on," as it were, and here on *Decca F* 6959 Josephine Bradley presents it in strict tempo so that the ardent dancer can dance it in comfort. The coupling is a slow foxtrot, "My Own," from the film "That Certain Age."

Charlie Kunz makes yet another piano medley on *Decca F* 6971. As usual this medley contains the best of to-day's tunes.

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.

CATHODE-RAY TUBES.—Baird Television, Ltd., Szegho, C., and Tomes, G. A. R. No. 496,778.

In a cathode-ray tube of the kind having a luminescent, the screen is arranged so that light from the side which is scanned by the cathode ray may be projected or viewed through a substantially plane part of the envelope without interception by any electrode. As shown, the luminescent screen which may be translucent or transparent is formed on the plane back wall of the tube which may be provided with a reflecting backing 4 (Fig. 1) of silver, etc. The image passes through the front 5 of the tube which is plane and may be parallel to the screen. The gun 2 is displaced to the side of the tube. Specification 469,420 is referred to.

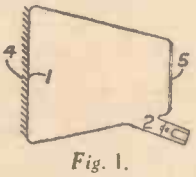


Fig. 1.

TELEVISION RECEIVERS.—General Electric Co., Ltd., and Jesty, L. C. No. 496,835.

The optical distance of an image of the reproduced picture from the screen 2 (Fig. 2), on which the picture is formed, is so varied in dependence on the optical distance of the sheet 5, which is viewed, from the screen that the image is formed on the sheet in every position of the sheet in which it can be viewed. The sheet can be viewed either in the horizontal 5B or the vertical position 5A. The screen 2 is horizontal and a mirror 7, which is inclined at 45° to the horizontal, enables the sheet in the horizontal position to be viewed horizontally and, when the sheet is vertical, deflects the optical axis through a right-angle. According to a modification, the sheet has two vertical positions and two alternatively operative mirrors deflect the optical axis through a right-angle.

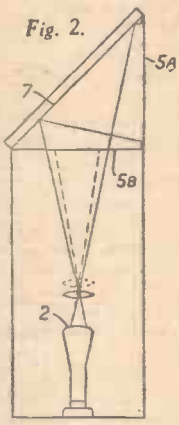


Fig. 2.

TELEVISION.—Scophony, Ltd., and Jeffree, J. H. No. 496,964.

An optical system 14 .. 20 (Fig. 3) forms on a receiving-screen 5 a cylindrical image, with definition in the direction of scanning, of modulated supersonic waves in a cell 2, and also forms a cylindrical image of the illuminated surface of a high-speed scanner 3 on the screen with definition at right-angles to the direction of the scanning-lines. An intermediate cylindrical image of an illuminated aperture 1 is formed in the cell, and a cylindrical image of the intermediate image is formed on the surface of the high-speed scanner. The direction of definition of both these images is at right-angles to the direction of movement of the supersonic waves.

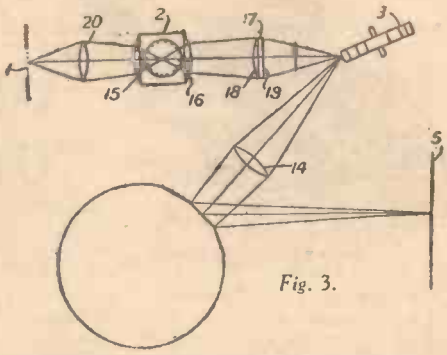


Fig. 3.

According to a modification, the intermediate image is omitted. Specifications 439,236 and 451,132 are referred to.

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 and 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 Application.

6189.—Baird Television, Ltd., and Baird, J. L.—Colour television systems. February 24.

6673.—Baird Television, Ltd., and Tomes, G. A. R.—Television, etc., systems, etc. March 1.

5974.—Duckworth, S.—Short - wave wireless receiving sets. February 23.

6067.—Fokerd, A. R.—Method, etc., for the remote control of wireless receivers. February 23.

6265.—General Electric Co., Ltd., and Clark, F.—Mounting devices for radio apparatus. February 25.

6701.—General Electric Co., Ltd., and Jones, F. R.—Tuning devices for wireless receivers. March 1.

6030.—I. M. K. Syndicate, Ltd., Nagy, P., and Goddard, M. J.—Light-modulating devices for use in television receivers. February 23.

6123.—Kallmann, H. E. — Television transmitting, etc., systems. February 24.

6240.—Monge, G. de.—Elimination, etc., of disturbing noises in the reception of radio transmissions. February 24.

6045.—Murphy Radio, Ltd., and Hawkins, G. F.—Television receivers. February 23.

6408.—Philco Radio and Television Corporation.—Remote control for radio receivers, etc. February 27.

Specifications Published.

501,042.—Radio Corporation of America.—Sound-recording.

501,043.—Radio Corporation of America. Sound-recording.

501,051.—Telefunken Ges. Fur Drahtlose Telegraphie.—Aerial systems for radio-receivers.

501,410.—Milnes, H. R., and Milnes Radio Co., Ltd.—Thermal generation of electric current.

501,411.—Milnes, H. R., and Milnes Radio Co., Ltd.—Apparatus for thermal generation of electric current.

501,348.—Marconi's Wireless Telegraph Co., Ltd., and Norwood, H. C.—Adjustment mechanisms for tuning condensers in radio receivers and for like purposes.

501,352.—Kolster-Brandes, Ltd., and Smith, K. G.—Padding condensers for superheterodyne radio receivers.

501,370.—Mitchell, F. A.—Tuning devices for radio receivers.

501,152.—General Electric Co., Ltd., and Brittain, F. H.—Loudspeakers.

501,375.—Standard Telephones and Cables, Ltd.—Television transmission tubes.

501,179.—Standard Telephones and Cables, Ltd.—Cathode-ray device.

501,251.—Telefunken Ges. Fur Drahtlose Telegraphie.—Direction - finding radio receivers.

501,254.—Marconi's Wireless Telegraph Co., Ltd.—Modulated carrier-wave 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.

TELEVISION FACTS AND FIGURES

WITH the idea of securing some concrete information concerning the present television service, the Postmaster-General was asked the following question in the House of Commons the other day: What is the present approximate number of licences in force in respect of television receivers; what is the approximate annual revenue therefrom; what has been the annual cost of the television service since its introduction, and who has borne the difference between this cost and the revenue? There is no doubt that the main idea behind this question was to ascertain some figure which could be said to represent authoritatively the number of sets sold for viewing purposes, but due to the way it was worded the P.M.G.'s assistant was able to be quite non-committal on this point. In his reply he stated what all readers of this journal know—namely that the reception of television is at present covered by the ordinary wireless receiving licence and that no special television licence is necessary. It seems certain, however, that later on a further effort will be made to obtain a figure which can represent the number of television sets sold so far by manufacturers, although it is generally accepted that this has now passed the five-figure mark and is rising rapidly. On the question of cost it is interesting to note that the amounts given by the B.B.C. for the annual revenue costs of the television service, together with depreciation on capital expenditure were: £111,500 in 1936, £277,149 in 1937, and £352,846 in 1938. This rising cost in expenditure was met by the Government returning to the B.B.C. a larger proportion of the licence revenue than had been done in the past. It emphasised that the ordinary listener is not being made to suffer on account of television, but merely that the Government is withholding less of the licence revenue than it has previously, an action which it is unlikely would have occurred but for the incidence of the television service.

QUERIES and ENQUIRIES

Microphone Transformer

"As a result of the information I have got out of your paper I have now succeeded in getting my A.A. Licence. I have built the 2½-watt transmitter but am in difficulty with regard to the microphone. Speech is in "the background," and I wonder if the connections to my transformer are correct. This is a Bulgin microphone transformer with five coloured leads and I should like to know the connections for this."—D. S. (Old Holpatrick).

THE secondary of the transformer in question has the leads coloured red and green, the latter being joined to the grid. The primary has blue ends with the centre-tap yellow. For a standard microphone you need a high step-up and therefore should use half of the primary, which will give you approximately 70 to 1 ratio. Therefore, join your microphone and battery in series across the yellow and one blue lead.

Electrolytic Condenser Connection

"I had a little difficulty in my set with an electrolytic condenser breaking down, and I saw by the case that this was two 8 mfd. units in one case. I have bought a new one and connected this up but am doubtful as to the suitability as a friend who has seen it has told me it is joined backwards. I am sending a sketch of the set and the condenser and should be glad to know whether he is right."—J. E. D. (N.W.5.)

IN the circuit you send the two electrolytic condensers are joined on either side of the smoothing choke, with a common negative lead to earth. The component you have obtained, however, has a common positive connection and thus you have joined the two condensers the wrong way round in the circuit. You will note from the marking on the condenser case that correct polarity must be observed and therefore should order an 8—8 mfd. unit, not an 8+8 unit.

Blue Glow

"I noticed something a little strange about a new American valve I purchased the other day to replace a valve in an amplifier. While a record was being played through a kind of purple band of light at the top of the valve, which appears directly the amplifier is switched on, darts and jumps about with every beat of the music, or loud passages on the record. I haven't seen one like it before and I am curious—so should be glad if you could explain it."—F. C. (Chiswick, W.4).

WHEN a standard type of valve is over-run—either by supplying too much H.T. or too little G.B., what is known as "blue glow" takes place and residual gas in the bulb glows with the characteristic colour you mention. The electronic flow in the bulb sets the gas in motion and thus causes the glow to dance or keep time with the current fluctuations. The remedy is to reduce H.T. or apply correct bias, although if this is in order, and the valve still glows it may indicate a faulty valve. Certain modern output valves are purposely provided with a gas content and may glow slightly, but it should not be of large proportions.

H.F. Pentode Connections

"In an article I read some time ago it stated that the H.F. pentode was obsolescent. Do you mean the one to be used was 4-pin in S.W. modification, or was there a 5-pin H.F. pentode with no cap at one time—the top cap being taken to a pin on the base making it a 5-pin base? Mr. Camm specifies a 4-pin H.F. pentode in the Acme receiver, and therefore it cannot be obsolescent, so I should be glad if you could explain this."—W. I. (Hull).

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.

THE H.F. pentode battery valve is available with either a 4-pin or a 7-pin base, and both types are standard and current. The 7-pin valve has the advantage that the metallising may be separately earthed when desired but in all other respects it is identical. In some cases the suppressor grid may be joined to one of the pins but this is not standardised.

Old-pattern Coil

"I am thinking of making an all-wave receiver incorporating an all-wave coil which I have. This is of the panel-mounting type and there are five coloured leads—black, red, blue, white and green. Could you tell me their actual meaning and a suitable condenser for reaction and tuning?"—A. J. K. (Bow, E.3).

FROM your description we think we recognise the component as an all-wave oscillator coil designed by Lewcos. This was intended for a superhet circuit using an I.F. of 126 kc/s and thus would not be suitable for a simple receiver, and I.F. transformers are not now easily obtainable for this frequency. Furthermore, coils (oscillator) for this frequency and superhet condensers of the same type are also now out of date and therefore we think you will find it difficult to make use of this particular component.

Transverse Current Microphone

"Would you please explain what is a transverse current microphone; the method of connecting to a receiver for home broadcast; method of connecting to a transmitting set? Is this type of microphone superior to the post office ex-telephone type largely on sale at the present time?"—A. S. (New Malden).

IN the type of microphone referred to there are two fixed carbon electrodes, the intervening space being filled with carbon granules. The diaphragm rests against these granules and thus varies the conductivity of the path between the electrodes. It may be treated in all other respects in exactly the same manner as a standard carbon mike, using a step-up transformer for matching purposes. The advantage over the type of microphone mentioned is one of quality and the sensitivity is probably not so high as the standard carbon instrument. If you intend to use the mike for transmitting purposes the transverse current instrument is definitely preferable to the simple alternative type mentioned by you.

Push-pull and Recording

"I recently built your 2½-watt amplifier. Seeing that its output is push-pull and as I wish to do some home-recording, I should like to know how I connect the pick-up to the same."—V. H. P. (Brighton).

THE method adopted for connecting a pick-up for recording purposes in a push-pull stage is exactly the same as that employed for connecting an extension speaker. A centre-tapped choke must be joined to the output terminals, the centre tapping being joined to H.T. positive. A 2 mfd. fixed condenser should then be connected to each anode and the pick-up joined to the other terminals on the two condensers. This is, in effect, an output filter circuit with the exception that two condensers are used.

Signal Strength for Recording

"I have purchased a home-recording apparatus and I am using as a cutting head an ordinary H.M.V. reproducing pick-up. This makes a perfect spiral, but without the sound waves. Do I need a special recording head?"—E. D. (Ebberston).

YOUR trouble is probably due to the fact that you are not feeding a sufficiently strong signal into the pick-up to obtain a good cut on the record. You should also use a proper cutting needle with sapphire or diamond point. You can use an ordinary playing needle (steel) provided that has been used to play one or two surfaces first, but the sapphire gives best results.

Crystal Set Results

"I have constructed a crystal set which gets the London Regional very clearly, but however much coil I put in the circuit I cannot get any other stations. Can you assist me in this difficulty?"—F. M. (Rickmansworth).

WE note that you live very close to the London transmitter, and in view of the poor selectivity of the average crystal receiver you are probably unable to reduce the spread of the station in order to hear other stations. We therefore suggest that you choose a time when London Regional is not transmitting and then make a careful search on the dial, when you will be able to ascertain whether or not any stations are within range with your particular aerial system.

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
Beginner's 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))	8.6.35	PW51
1936 Sonotone Three-Four (HF Pen, HF Pen, Westector, Pen)..	—	PW53
Battery All-Wave Three (D, 2 LF (RC))	—	PW55
The Moultor (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)	6.1.34	PW34B
Fury Four Super (SG, SG, D, Pen)	—	PW34C
Battery Hall-Mark 4 (HF Pen, D, Push-Pull)	—	PW46
F. J. Camm's "Limit" All-Wave Four (HF Pen, D, LF, P) ..	26.9.36	PW67
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) ..	—	PW35C
D.C. Premier (HF Pen, D, Pen) ..	31.3.34	PW35B
Ubique (HF Pen, D (Pen), Pen) ..	28.7.34	PW36A
Armada Mains Three (HF, Pen, D, Pen)	—	PW38
F. J. Camm's A.C. All-Wave Silver Souvenir Three (HF Pen, D, Pen))	11.5.35	PW50
"All-Wave" A.C. Three (D, 2 LF (RC))..	—	PW54
A.C. 1936 Sonotone (HF Pen, HF Pen, Westector, Pen)	—	PW56
Mains Record All-Wave 3 (HF Pen, D, Pen)	5.12.36	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 ..	13.7.35	PW52
F. J. Camm's £4 Superhet ..	—	PW58
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 ELF Three-valve Portable (HF Pen, D, Pen) ..	—	PW65
Parvo Flyweight Midget Portable (SG, D, Pen)	19.6.37	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	23.7.38	AW427
1934 Crystal Set	—	AW444
150-mile Crystal Set	—	AW450
STRAIGHT SETS. Battery Operated.		
One-valve: Blueprints, 1s. each.		
B.B.C. Special One-valver	—	AW387
Twenty-station Loudspeaker One-valver (Class B)	—	AW449
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
Fan and Family Three (D, Trans, Class B)	25.11.33	AW410
£5 5s. S.G.3 (S.G, 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)	—	WM400
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	WM391
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	WM326
Harris' Jubilee Radiogram (HF Pen, D, LF, P)	*May* '35	WM386
SUPERHETS.		
Battery Sets: Blueprints, 1s. 6d. each.		
Modern Super Senior	—	WM375
'Varsity Four	*Oct.* '35	WM395
The Request All-Waver	*June* '36	WM407
1935 Super Five Battery (Superhet)	—	WM379
Mains Sets: Blueprints, 1s. 6d. each.		
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
Experimenter's Short-waver (SG, D, Pen)	*Jan.* 19, '35	AW463
The Carrier Short-waver (SG, D, P)	*July* '35	WM390
Four-valve: Blueprints, 1s. 6d. each.		
A.W. Short-wave World-Beater (HF Pen, D, R.C. Trans) ..	—	AW436
Empire Short-waver (SG, D, RC, Trans)	—	WM313
Standard Four-valver Short-waver (SG, D, LF, P)	*Mar.* '35	WM383
Superhet: Blueprint, 1s. 6d.		
Simplified Short-wave Super ..	*Nov.* '35	WM397
Mains Operated.		
Two-valve: Blueprints, 1s. each.		
Two-valve Mains Short-waver (D, Pen) A.C.	—	AW453
"W.M." Band-spread Short-waver (D, Pen) A.C.-D.C.	—	WM368
"W.M." Long-wave Converter ..	—	WM380
Three-valve: Blueprint, 1s.		
Emigrator (SG, D, Pen) A.C. ..	—	WM352
Four-valve: Blueprint, 1s. 6d.		
Standard Four-valve A.C. Short-waver (SG, D. RC, Trans) ..	*Aug.* '35	WM391
MISCELLANEOUS.		
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 ..	*Nov.* '35	WM398
Harris Electrogram (battery amplifier) (1/-)	—	WM399
De Luxe Concert A.C. Electrogram	*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

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RECEIVERS, COMPONENTS AND ACCESSORIES

Surplus, Clearance or Secondhand, etc.

SOUTHERN RADIO: Big new bargains. Coil Units, Push-button Units and Kits.

49/6. 1939 ALL-WAVE Tuning Units. Exceptional offer. List value £4/10/0. Factory wired, tested and aligned, ready to connect to amplifier. Designed for latest octal base valves in A.C. or A.C./D.C. circuits. Comprises complete switch and coil assembly, 2 I.F. transformers, aerial and oscillator valveholders, gang condenser and de-luxe 8" slow-motion dial in one compact chassis (6" x 6" x 2½"), with full technical data. Coverage 16-50, 170-560, 800-2,000 metres.

22/6. 5-BAND 3-valve Pentode battery kits. An unbeatable bargain. Large numbers sold. Latest 1939 design. Comprises metal chassis and all accessories and hardware. Price with valves, 34/6.

10/-. A.R.P. Radio Outfits, comprising finest crystal set, pair headphones, aerial and earth equipment, switch, etc. A complete emergency installation.

3/11. A.R.P. Crystal Receivers. Finest quality with semi-permanent detectors.

5/-. SOUTHERN'S famous bargain parcels of useful radio components: coils, transformers, resistors, circuits, etc., value 21/-.

8/6. TELSEN A.C./D.C. 5-range multi-meters; 4/-. Ace "P.O." Microphones. American Type Valves, full range, 5/3 each.

2/6. ORMOND Loudspeaker Units,' new and boxed. Unshrouded type, 2/-.

3/6. TELSEN W349 Midget Iron Core coils; dual-range coils, 2/6; with aerial series condenser, W76, 3/3.

6/6. COMPLETE 2-way Morse Practice Outfits, each instrument comprising key, buzzer and code on bakelite base. Full instructions. 2/11, High-grade "Telegraph" morse keys; 1/4, Buzzers in mat bakelite cases.

10/-. PARCEL of assorted servicing components. At least 100 articles; resistances, tubulars, micas, variables, electrolytics, wire, sleeving, volume controls, etc., etc.

Terms: Cash with order or on delivery. Postage paid. SOUTHERN RADIO, 46, Lisle Street, Leicester Square, 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.

BARGAINS from 1d. to 2/6. Coils, Transformers, Condensers, Valves, Chokes, Cabinets, Speakers, Meters, etc. Stamp for Lists.—Reed, 11, Etterby Scaur, Carlisle.

NEW RECEIVERS, COMPONENTS AND ACCESSORIES

BANKRUPT BARGAINS.—List free. State requirements. All new goods. Ferguson 5v. superhet chassis all-wave, speaker and valves, 75/-. Portadyne 5v. all-wave superhets, 1939, £5/10/0. Portadyne 1939 11gn. A.C. 5v. all-wavers, £5/17/6. Portadyne 3v. 1939 battery all-wavers, 85/-. Valves, components. Repairs.—Butlin, 6, Stanford Avenue, Brighton.

BANKRUPT BARGAINS.—Brand new 1938 radio sets in makers' cartons with guarantees at less than half retail prices: send 1½d. stamp for list bargains.—261-3, Lichfield Road, Aston, Birmingham.

LOUDSPEAKER REPAIRS

REPAIRS to 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, Alma Grove, Copenhagen Street, London, N.1.

VALVES

AMERICAN Valves in Sealed Cartons, all types 5/6 post paid.—Valves, 661/3, Harrow Road, N.W.10.

PREMIER

1939 RADIO

PREMIER BATTERY CHARGERS. Westinghouse Rectification. Complete. Ready for use. To charge 2 volts at ½ amp., **10/-**; 6 volts at ½ amp., 16/6; 6 volts at 1 amp., 19/6; 12 volts at 1 amp., 21/-; 6 volts at 2 amps., 32/6.

CARDBOARD ELECTROLYTIC CONDENSERS, 4 mf. or 8 mf. 500 v., 1/6 each, 8+4 mf. 500 v., 2/3, 8+8 mf. 500 v., 2/6, 4+4+4 mf. 500 v., 2/6, 16+8 mf. 500 v., 3/6.

TUBULAR METAL CAN ELECTROLYTICS by famous makers. 4 or 8 mf. dry, 500 v., 2/6 each. 8 mf. wet, 450 v., 2/3. 8 mf. 650 v., Peak dry, 4/-.

BIAS CONDENSERS, 6 mf. 50 v., 6d.; 50 mf. 12 v., 1/-; 25 mf. 25 v., 1/-; 50 mf. 50 v., 1/9.

Premier Transverse Current Microphone, 20/-. Microphone Transformer, 6/-. Table Mike Stand, 7/6.

BRAIDED METAL SCREENED WIRE for mikes, pick-ups, etc. Single, 4d. yd.; Twin, 6d. yd.

COSMOCORD PICK-UP HEADS. Will fit any tone-arm, 4/6. Piezo Electric Pick-ups with arm. List price, **42/-**. A few only at **32/6** each.

PREMIER S.W. H.F. Chokes, 10-100 metres, 9d. each. Pie-wound, 1/6 each. Screened, 1/6 each.

SHORT-WAVE COILS, 4- and 6-pin types, 13-26, 22-47, 41-94, 78-170 metres, 1/9 each, with circuit. Special set of S.W. Coils, 14-150 metres, 4/- set, with circuit. Premier 3-band S.W. coil, 11-25, 19-43, 38-86 metres. Suitable any type circuit, 2/6.

COIL FORMERS, 4- or 6-pin low-loss, 1/- each.

UTILITY Micro Cursor Dials, Direct and 100:1 Ratios, 3/9.

PREMIER Short-Wave Condensers, all-brass construction, with **Trolitul** insulation. 15 mmf., 1/6; 25 mmf., 1/7; 40 mmf., 1/9; 100 mmf., 2/-; 160 mmf., 2/3; 250 mmf., 2/6.

TROLITUL DOUBLE SPACED TRANSMITTING CONDENSERS, 15 mmf., 2/9; 40 mmf., 3/6; 160 mmf., 4/6.

AMERICAN VALVES. We hold the largest stocks of U.S.A. tubes in this country and are sole British Distributors for **TRIAD** High-grade American Valves. All types in stock. Standard types, 5/6 each. All the new Octal Base tubes at 6/6 each, 210 and 250, 8/6 each.

EUROPA MAINS VALVES, 4v. A.C. Types, A.C./H.L., A.C./L., A.C./S.G., A.C./V.M.S.G., A.C./H.P., A.C./V.H.P., A.C./P., and 1 watt D.H. Pentodes, all 4/6 each. A.C./Pens., I.H., 5/6; A.C./P.X.4, 6/6; Oct. Freq. Changers, 8/6; Double Diode Triodes, 7/6; Triode Hex. Freq. Ch., 8/6; Tri. Grid Pen., 10/6; 3½-watt D.H. Triode, 7/6. 350 v. and 500 v. F.W. Rect., 5/6. 13 v. 2 amps. Gen. Purpose Triodes, 5/6; H.F. Pens. and Var.-Mu. H.F. Pens., Double Diode Triodes, Oct. Freq. Changers, 7/6 each. Full-wave and Half-wave Rectifiers, 5/9 each.

Premier Short-Wave Kits

Complete to the last detail including all Valves and coils, as well as theoretical and wiring diagrams and lucid instructions for building and working. Each kit is supplied with a steel Chassis and Panel and uses plug-in coils to tune from 13 to 170 metres.

1 Valve Short-Wave Receiver or Adapter Kit	17/6
1 Valve Short-Wave Superhet Converter Kit	20/-
1 Valve Short-Wave A.C. Superhet Converter Kit	22/6
2 Valve Short-Wave Receiver Kit	25/-
3 Valve Short-Wave Screen Grid and Pentode Kit	58/6

Premier Moving Coil Meters

Guaranteed Accuracy within ± 2 per cent.

Model No. 21. 3in. square case.		Model No. 311. 3½in. diameter round case.	
0-1 m/A.	18/6	0-1 m/A.	22/6
0-10 m/A.	17/6	0-10 m/A.	20/-
0-50 m/A.	17/6	0-50 m/A.	20/-
0-100 m/A.	17/6	0-100 m/A.	20/-
0-250 m/A.	17/6	0-250 m/A.	20/-

Model 311. 0-1 m/A. movement, with calibrated scale, volts-ohms-m/A., **25/-.**

VOLTAGE MULTIPLIER RESISTANCES, guaranteed accuracy ± 2 per cent. All standard ranges, 1/3 each.

TAPPED SHUNT to provide readings of 5 m/A., 25 m/A., 250 m/A., and 1,000 m/A., **5/6.**

MOVING IRON METERS. 2½ inch flush case. Milliamps ranges from 10 m/A. to 500 m/A. 1; 3; 5; 10 or 30 amps. 6 or 16 volts. All 5/9 each. 0-250 volts, **10/6** each.

Our City Branch is moving from 165 to 169, Fleet Street. You are invited to inspect the many BARGAINS at our CLEARANCE SALE—NOW ON at 165, Fleet Street, E.C.4. *Callers only.*

Have you had our 1939 Catalogue, Handbook and Valve Manual? 90 pages of Radio Bargains and interesting Data. Price 6d.

ALL POST ORDERS TO: Jubilee Works, 167, Lower Clapton Road, London, E.5. *Amherst* **4723**

CALLERS TO: Jubilee Works, or 169, Fleet Street, E.C.4. *Central* **2833, or 50, High Street, Clapham, S.W.4.** *Macaulay* **2381.**

NEW RECEIVERS AND CHASSIS

ALL ARMSTRONG Radio chassis, including Press Button models, 9 latest models, can be seen and heard at our Showrooms. Demonstrations daily. Armstrong chassis are sent on 7 days' approval, carriage and packing free. Armstrong Company have fully illustrated technical catalogue describing all models.—Armstrong Company, 100, St. Pancras Way (formerly Kings Road), Camden Town, London, N.W.1. Gulliver 3105.

SITUATIONS VACANT

TELEVISION.—All those who wish to enter this new profession should apply at once for free handbook to British Institute of Engineering Technology, 18P, Stratford Place, London, W.1.

MISCELLANEOUS

METAL chassis, panels and cabinets, from 2/6; made to your requirements. Prompt quotations and satisfaction guaranteed.—The Universal Productions, Rigby Lane, Bromsgrove, Worcs.

300 Back Issues "P. and A. W.," "P. W," "W. W." 37/6 lot.—Searle, 164, Queen Anne Avenue, Bromley, Kent.

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.

When Sonny, a bright little lad, Said "I'm making a wireless too, dad," Father answered, "All right, You can use my FLUXITE, But the boy said he already had!

See that FLUXITE is always by you—in the house—garage—workshop—wherever speedy soldering is needed. Used for 30 years in government works and by leading engineers and manufacturers. Of Ironmongers—in tins, 4d., 8d., 1/4 and 2/8.

Ask to see the FLUXITE SMALL-SPACE SOLDERING SET—compact but substantial—complete with full instructions, 7/6.

Write for Free Book on the art of "soft" soldering and ask for Leaflet on CASE-HARDENING STEEL and TEMPERING TOOLS with FLUXITE.

TO CYCLISTS! Your wheels will NOT keep round and true, unless the spokes are tied with fine wire at the crossings AND SOLDERED. This makes a much stronger wheel. It's simple—with FLUXITE—but IMPORTANT.

THE FLUXITE GUN

is always ready to put Fluxite on the soldering job instantly. A little pressure places the right quantity on the right spot and one charging lasts for ages. Price 1/6, or filled 2/6.

ALL MECHANICS *WILL* HAVE

FLUXITE

IT SIMPLIFIES *ALL* SOLDERING

FLUXITE LTD. (Dept. W.P.) DRAGON WORKS, BERMONDSEY STREET, S.E.1.

FREE ADVICE BUREAU

COUPON

This coupon is available until April 1st, 1939, and must accompany all Queries and Wrinkles.

PRACTICAL AND AMATEUR WIRELESS, 25/3/39.

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