Greatly Enlarged Christmas Number

Practical and Amateur Wireless

AND PRACTICAL TELEVISION

4d EVERY WEDNESDAY

Edited by F. J. CAMM

Vol. 13. No. 324.
December 3rd, 1938.

A GEORGE NEWNES Publication

SPECIAL XMAS FEATURES

Party "Television" Tricks
Records for Xmas
Radio Revels
With Mike and Pick-up
Radio Xmas Presents
and
All the Regular Features!

EASILY-MADE AMPLIFIERS—See Page 297

Practical and Amateur Wireless

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Vol. XIII. No. 324. December 3rd, 1938.

Round the World of Wireless

Greetings!

ONCE again the time has arrived for us to convey to all our readers the compliments of the season, and our best wishes for a really enjoyable Christmas. It is the custom in the printing trade to produce Christmas numbers in advance of Christmas week, and in the case of the hobby followed by readers of this paper, it is just as well. We are able to give details in this issue which will enable every reader to make use of his radio for adding to the enjoyment of the parties which are held at Christmas-time, and there is plenty of time left in which to make modifications and obtain the additional parts needed so that the various ideas which are given may be put into effect. All tastes are catered for in the feast of articles included in this issue. Suggestions are given for Christmas presents—either to be given or received—and it should not be forgotten that books are a most lasting gift and we publish a large selection from which to chose. To all those readers who have been with us from No. 1, as well as to all new readers, we again repeat, a Merry Christmas.

World Broadcasting

THE Bureau of the International Union of Telecommunications announces that broadcasting stations throughout the world numbered 1,550 at the end of 1937.

Continental Exhibitions

DATES have already been fixed on the Continent for next year's shows. The Berlin Radio Exhibition will be held in the Exhibition Halls from July 28th to August 6th. The Paris International Trade Fair will be held from May 13th to 29th. All dates are inclusive.

Radio Cinemas

A CHAIN of cinemas is to be built in France in which radio and the film will be combined for entertainment purposes. The first of these theatres was opened on November 2nd in Place Clichy, and is known as Ciné Paris-Soir-Radio 37.

Amateur Football Critics

THE B.B.C. announces that "bob" spectators, the mainstay of most football clubs, are to be given a chance to say what they think of matches in which their clubs are playing on December 24th, the day on which the Christmas holiday programme begins. Four of them will be chosen at random from matches in Scotland, Wales, the North of England, and London, and they will be asked to broadcast their impressions of the games during the Fourth News bulletin, at 10 o'clock that night.

Indian Licence Fee Reduction

IN order to try to increase the popularity of radio in India, the Government have reduced the annual licence fee from Rs. 10 to Rs. 8. This is the equivalent of a reduction from 15s. to 12s.

American Radio Amateurs

AT a recent meeting, the Chairman of the U.S. Federal Communications Commission, the Hon. Frank R. McNinch, stated that of the world's amateur transmitting stations, America possessed 80 per cent.

Strange Story of a Dance Record

SPIKE HUGHES has specially composed his own music for the "What Happened at 8.20?" variety-mystery that he has written for broadcasting on December 2nd, in the National programme. It was almost essential to do so, because the curious story of a dance record upon which the show is based has an original twist to which the music—one piece in particular—contributes. The scene of the affair is in a London recording studio. Production will be by Ronald Waldman.

The Editor and Staff Join in Wishing Every Reader an Enjoyable Xmas

Variety from the Embassy, Peterborough

THEATRE variety will be broadcast for Midland and Regional listeners from the Embassy Theatre, Peterborough, on November 30th. The Embassy was opened in November last year, and is one of the most up-to-date theatres in the provinces.

International Amateur Boxing

INTERNATIONAL amateur boxing, Ireland versus England, will be described in a running commentary by Raymond Glendenning, from King's Hall, Balmoral, Belfast, on December 5th.

One-woman Band

A REVUE containing eight important characters will be broadcast from Aberdeen, yet there will be only one woman at the microphone. Addie Ross, well known both as a radio actress and as Miss Mouse of the Aberdeen Animals, is performing several parts in "Femme Seule," a one-woman revue. Among parts she will portray are an old woman, with counterparts from Buchan, Glasgow, and Lancashire, a small boy, a small girl, a singer, and a young woman. This is not all. The programme announcement concludes demurely, "Other parts played by Addie Ross." Alan Melville will be in charge of the production.

A Newcomer in 25-metre Band

LISTENERS report hearing a new call from South America in this portion of the short waveband; it would appear to emanate from ZP14, Villarica (Paraguay), which, hitherto working on 48.78 m. (6.15 mc/s), has now started transmitting on 25.59 m. (11.725 mc/s) with a power of 300 watts. The call heard is *Estaciones ZP14 y ZP15, La Voz del Corazon de Sud America*, or alternately simply *Radio Cultura*, without giving the call-letters.

New Stations in Peru

OAX2A, *Radio Rancho Grande*, is the call of a 250-watt short-waver at Trujillo (Peru); the channel adopted is 25.44 m. (11.796 mc/s). So far, no further details regarding its broadcasts have been received. In addition to its transmitter OAX5A, on 25.42 m. (11.8 mc/s), 100 watts, *Radio Universal*, at Ica (Peru), has brought into operation OAX5C, 31.28 m. (9.59 mc/s), 150 watts, which was previously working on 50 m. (6 mc/s). Address: *Radio Universal*, Apartado Postal, 112, Ica, Peru (South America).

ROUND the WORLD of WIRELESS (Continued)

INTERESTING and TOPICAL NEWS and NOTES

Walking-stick Radio Sets

A RADIO receiving set concealed in the head of a walking-stick has been designed by a Russian inventor. The iron tip of the stick serves as an earth connection. These tiny receivers are to be mass produced for military purposes.

"After Dinner" Comes Back

"AFTER Dinner," the radio cabaret show with which the North did well last year, is back in the programme again and is to be held on Regional during Tuesday evening, December 6th. David Porter will again be the producer, and the artists include the Three Semis, Violet Carson, and Don Bamford and his band.

Concert from Bradford

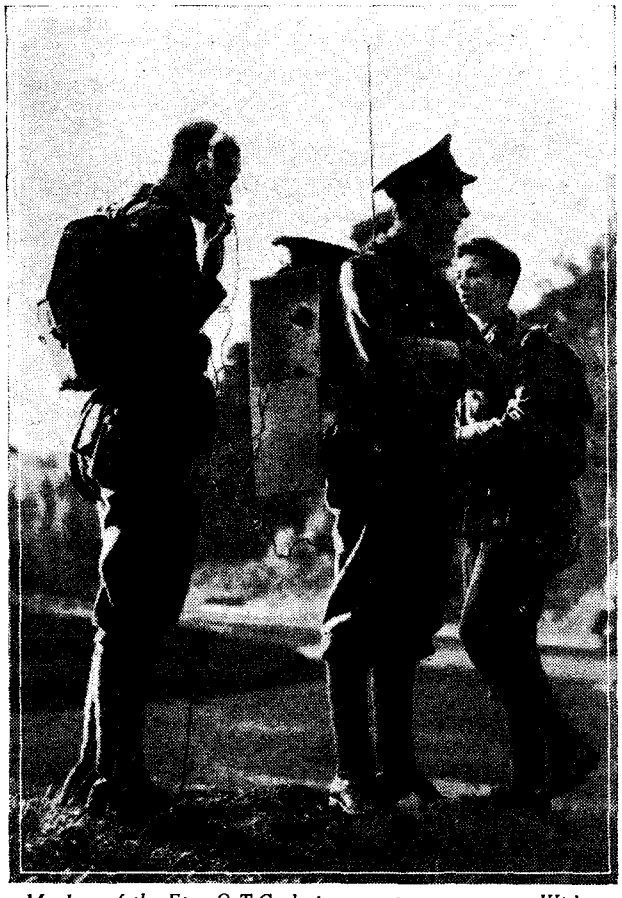
LISTENERS in the Bradford district of Yorkshire will have a special interest in one of the North Regional programmes on Wednesday evening, December 7th: the first part of Handel's "Samson." The broadcast will be of a concert of the Bradford Festival Choral Society from the Eastbrook Hall in that city. With the Northern Philharmonic Orchestra, led by Edward Maude, and the Bradford Festival Chorus, will be four well-known soloists—Florence Austral (soprano), Edith Coates (contralto), Walter Widdop (tenor), and Norman Walker (bass). Dr. Malcolm Sargent will be the conductor.

Radio Tripoli

ITALY'S new 50-kilowatt transmitter erected at Zanzur (North Africa) will shortly be inaugurated. It will work on 271.7 m. (1,104 kilocycles). Another Italian station of a power of 3 kilowatts will also be working within a week or two at Catania (Italy). It will share the Palermo (Sicily) channel, namely, 531 m. (565 kc/s).

Broadcasting Programmes By Telephone

THE Leningrad department of the Soviet Institute of Research in Communications has constructed a new apparatus which will make it possible to receive up to ten relayed broadcasting programmes on the systems of the automatic telephone exchanges. A dynamo with an amplifier will be connected to the ordinary automatic telephone receiver. A subscriber will be able to choose any of the relayed programmes he desires. In the event of his being rung up during the course of the programme, the relay is automatically interrupted, and automatically reconnected at the conclusion of the conversation. A similar system of relay at the automatic telephone exchanges is extensively used in Switzerland. The Soviet device is of original design.



Members of the Eton O.T.C. during recent manœuvres on Witley Common. The boys make their own radio at the school, and the illustration shows a portable set in use.

Normandy Will Change Wavelength

THE *Radio Normandie* station at Louvetôt started up on 274 m. (1,095 kc/s) on October 28th last, and has since that date been testing daily between G.M.T. 11.00-14.30, and from 18.00-21.00. Other programmes have been maintained on 212.6 m. (1,411 kc/s). It is understood that when the high-power transmitter is in perfect order all Radio Normandy programmes will be made on the higher channel; the daily transmissions will be continuous from G.M.T. 06.30-01.00.

Extra Sunday News Bulletin

WE are informed that as from Sunday, January 1st, 1939, the B.B.C. have decided to include an extra News Bulletin in the Sunday programmes. This will be broadcast at 6 p.m. on the Regional wavelength, and the existing bulletin, at 8.50 p.m., will be confined to the National programme.

In response to listeners' requests, the weather and shipping forecasts, which were formerly given in the Regional programme at 10.30. a.m. each day, will be reinstated as from Monday, December 12.

"Music Hall"

COMEDY, melody and harmony are represented by some of the best-known variety names in the "Music Hall" bill which B.B.C. Variety producer John Sharman will present on the National wavelength on December 3rd.

Mamie Soutter, "The Modern Bunch of Mirth," will open the show, and she will be followed by Albert Sandler, the celebrated violinist, who will be accompanied by Arthur Spinak and Joseph Pacey ('cello); George Robey, "The Prime Minister of Mirth"; the Duncan Sisters; and Tommy Trinder, whose particular brand of humour has won him enormous popularity. Charles Shadwell will conduct the B.B.C. Variety Orchestra.

Opera

ACTS 1 and 2 of "Madame Butterfly" will be broadcast from Sadler's Wells in the National programme on December 3rd, and Acts 3 and 4 of Verdi's "Don Carlos" will be broadcast from the same theatre on December 6th (National).

Sweet Serenade

IN "Sweet Serenade," a potpourri of romantic tunes will be played by the Seven Serenaders, and sung by Eileen Vaughan (soprano) and the Three Nomads on November 30th. The programme will again be presented by Leslie Bridgmont.

Concert from Bristol

THOSE taking part in a Choral and Orchestral Concert to be broadcast from the Colston Hall, Bristol, on December 1st will be: Frank A. Tayler (organ), the Whitecroft and District Male Voice Choir, and the Clifton String Orchestra, led by Joan Allen and conducted by Reginald Redman.

SOLVE THIS!

PROBLEM No. 324

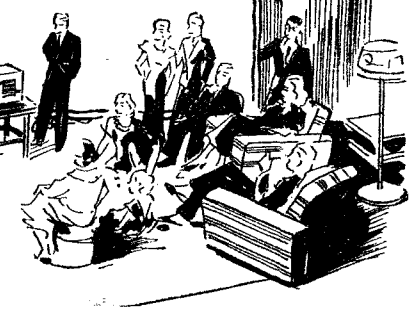
Smith had a battery three-valve set consisting of detector and two L.F. stages, and to enable him to carry out some home broadcasting at Christmas-time he purchased a pick-up. He knew this had to be joined across the grid circuit of the detector valve, and to avoid tampering with the receiver he decided that the easiest method of connecting the pick-up was to join it to the aerial and earth sockets. He did this, but failed to obtain results. Why was this? Three books will be awarded for the first three correct solutions opened. Address your envelopes to The Editor, PRACTICAL AND AMATEUR WIRELESS, Tower House, Southampton Street, Strand, London, W.C.2. Envelopes should be marked Problem No. 324 in the top left-hand corner and must be posted to reach this office not later than the first post on Monday, December 5th, 1938.

Solution to Problem No. 323

When Johnson calculated the total anode current he overlooked the fact that his H.F. valve screen was fed from a potentiometer across the H.T. supply and this added a further drain on the battery. He should, of course, have used a larger battery.

The following three readers successfully solved Problem No. 322 and books have accordingly been forwarded to them: J. M. Atlee, 54, Lynedoch Street, N. 1; J. G. Picot, 18, Castle Road Luton, Chatham; F. Gresty, 214, Park Road, Timperley, Cheshire.

With Microphone and Pick-up



How to Carry Out "Home Broadcasting," and Suggestions for Mixing and Fading Microphone and Pick-up Outputs

THE majority of standard broadcast receivers may be used for gramophone record reproduction, and there is very little difference between the connections needed for this and those required for the use of a microphone. At Christmas time particularly, it is very useful to be able to use these components, as by their aid you can produce your own programmes, giving musical items for dancing or for games, and interspersing remarks to add to the enjoyment of the party. In general it may be stated that the pick-up or microphone has to be connected to the grid of one of the L.F. valves, although with suitable modification the detector valve may be used—provided there is not too much L.F. amplification following, which may give rise to troubles due to overloading. One side of the pick-up or mike is, therefore, joined to the grid and the circuit is completed by connecting the other side of the component to the grid-bias battery. Where a mains valve is in use, the other side of the component is joined to the earth line, and the bias for the valve is obtained by connecting a resistance in the cathode lead in the usual way. If the detector valve is being used as the input valve, then the grid leak in the case of the mains valve is joined direct to the cathode and the bias is thereby automatically obtained when the pick-up or mike is in use.

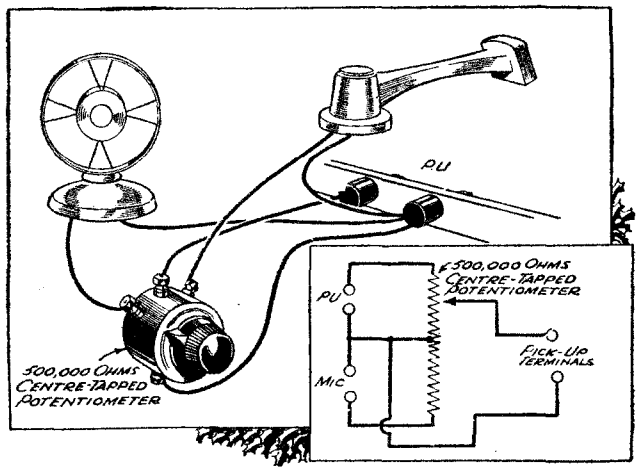


Fig. 1.—Controlling pick-up and mike with a single "fader" control.

Combined Circuits

These are the main details, but there are one or two points which have to be borne in mind. Firstly, if a carbon or similar microphone is used, a transformer will have to be joined between it and the valve, and a ratio up to 100 to 1 must be used. A volume control may be incorporated if desired. A pick-up will not need the transformer, but it also may be provided with a volume control. The circuits accompanying this article show various combinations of the two instruments which will enable full programmes to be given through your loudspeaker. As it will be necessary to vary the volume of music or speech, we will take the case of a simple mike and pick-up and for these a centre-tapped potentiometer, or fader as it is usually called, may then be used. The connections will be as shown in pictorial and theoretical form in Fig. 1. With this arrangement the speech or music may be gradually faded out to inaudibility and then the other items gradually introduced. They cannot be "mixed" by this type of control. However, it is ideal for a play, for instance, where a preliminary announcement has to be made, and then music faded in, after which the music may be faded out and the words of the play introduced. If a background of music is required whilst an announcement is made, or if you desire to give sound effects as a background to speech during a play, for instance, then two separate controls will have to be used, and these should be arranged as shown in Fig. 2.

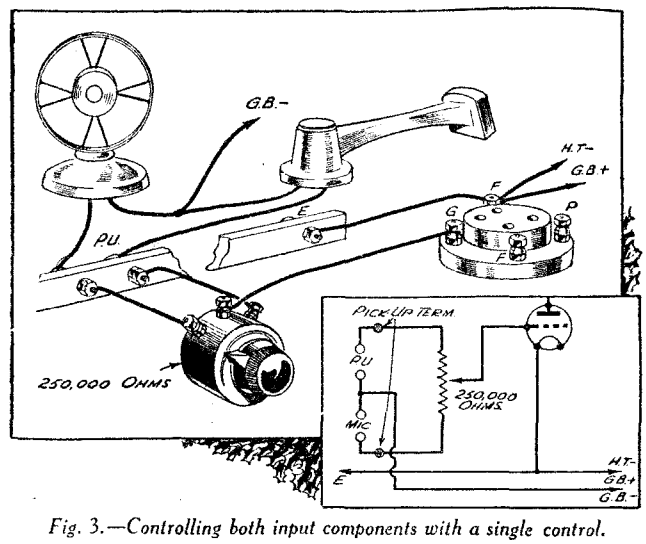


Fig. 3.—Controlling both input components with a single control.

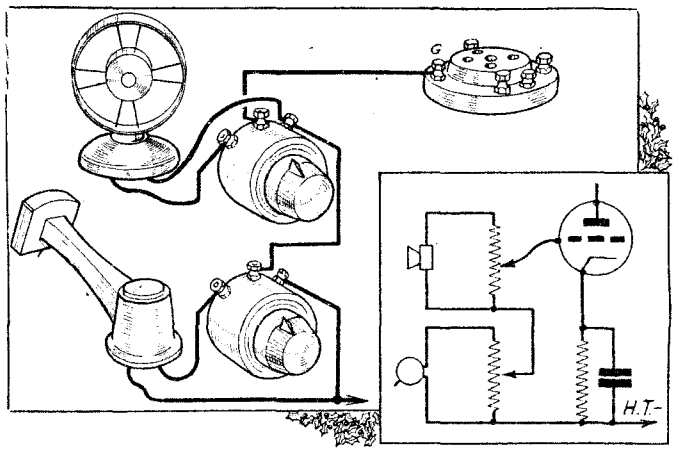


Fig. 2.—How to connect a "mixer" circuit made up with two separate volume controls.

The two controls may be operated independently, and will enable any desired degree of mixing to be obtained.

Single Controls

Where simplification is desired a single control may be used to control both the pick-up and the microphone, by wiring this

as shown in Fig. 3. Both components will be in circuit all the time, but the total output is controllable. To enable varying degree of volume from each to be obtained (after the same style as with the two mixer controls), each component may be provided with its own volume control, and then by careful operation of the three controls any desired mixing may be obtained. Fig. 4 shows the same arrangement when used with a mains valve, and these two circuits will show clearly how the components are joined to any receiver—the method of obtaining bias being clearly indicated. In both of these illustrations the normal pick-up terminals are indicated, and may, of course, be used with a single component such as a pick-up or microphone.

There are on the market certain combined controls, consisting of two volume controls as one unit, with a single control knob. These may be used for controlling a pick-up and mike as shown in Fig. 5, the arrangement being then very similar to the Fig. 3 and 4 circuits.

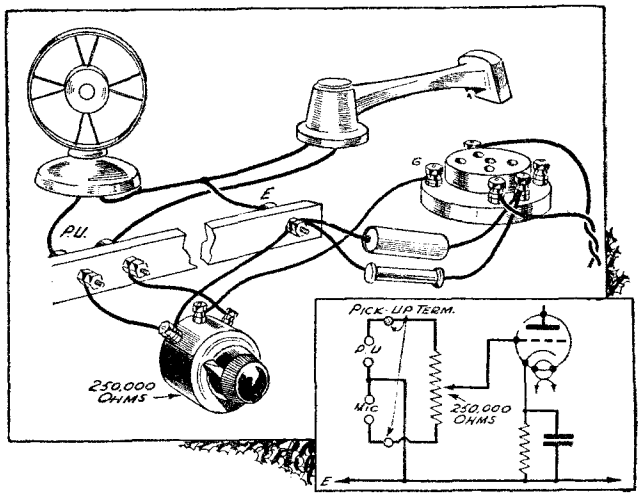


Fig. 4.—Circuit similar to Fig. 3, but for mains valves.

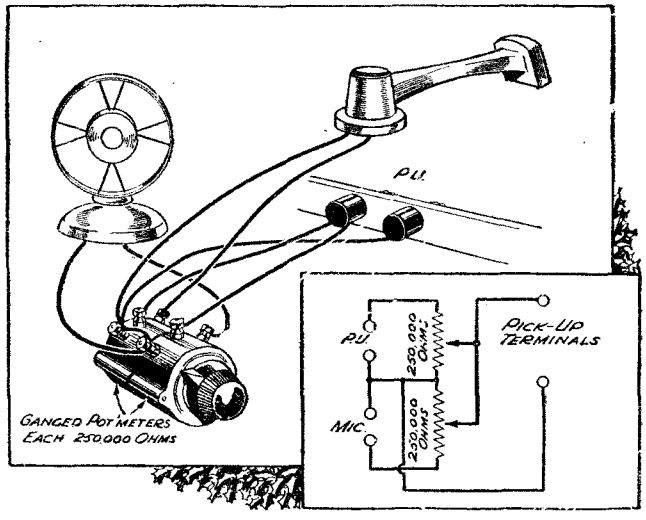


Fig. 5.—Two separate controls in "ganged" formation may be used as shown here.

Without a Fader

It should be remembered that the pick-up will only deliver sounds through the receiver when it is placed on a record, and similarly, the microphone will only give results when it picks up sounds. Accordingly, it is not strictly essential that a fader or mixer be employed, as by placing the pick-up on a record only when music or sound effects are required, and by masking the mike so that it is "dead" until speech is desired, the two components may be permanently connected. Fig. 6 shows this arrangement, and if the pick-up has a volume control built in, the pick-up may be placed upon a record and the volume reduced to the desired level when a play is being enacted so that a background of the desired level is obtained.

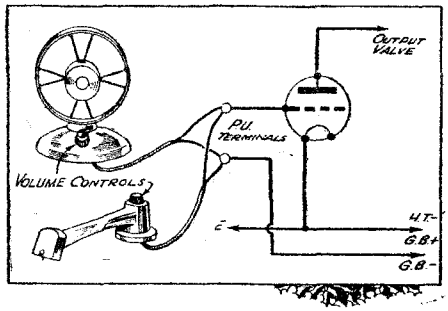


Fig. 6.—How to connect a mike and pick-up without an input control.

It will thus be seen from the above notes that with a microphone and pick-up you can produce any desired play through your loudspeaker, and some of the most elaborate effects are possible. Records of bells, orchestral instruments, sound effects, and similar items are obtainable and may be blended with a play. Where suitable sounds are not obtainable on records, you may replace the pick-up by another microphone and make your own sounds in front of this instrument whilst the other is used by the players. It will, of course, be necessary to place the two mikes apart so that the sounds are separately controlled. For best results, the receiver should be placed close to the microphones and pick-up, with the audience in another room into which an extension loudspeaker is placed. It may be masked or placed behind a small stage cut-out, or even behind a cinema screen so that you can make your own sound effects or dialogue for a home-cinema film. There are endless possibilities with these components, and it should be a simple matter from the details which have been given for everyone to give some sort of a home-broadcast this Christmas.

Impressions on the Wax

(Xmas Records, see also page 307).

It is only when turning its pages, there are 480 of them, that one realises the immense wealth of fine music that has been recorded. The full repertoire in the catalogue runs to some 7,000 records, and it would take several months to play them all. The choice runs from traditional folk music to works by Bliss and Vaughan Williams; from the film song to the classic song in its highest form.

In addition to this mass of skilfully-indexed material, covering the General, Connoisseur and Historic collections, as well as a résumé of the company and limited editions from their commencement, there are such useful adjuncts as a pronunciation guide, glossary of musical terms, suggestions for record collections, and illustrated biographies of famous H.M.V. artists.

A charge of sixpence is made, which it is obvious covers only a proportion of the cost, and everyone who likes to choose the music he wants to hear should obtain a copy of this new edition.

Decca and Rex

A NOVELTY record is introduced by the Decca company this month. C. L. Hermann's ballroom novelty "The Chestnut Tree" ('Neath the Spreading Chestnut Tree) played by Ivor Kirchin and his Orchestra on *Rex* 9434. On the reverse side of the record Adele England tells you how to dance the Chestnut Tree.

Charlie Kunz, the popular pianist, revives some old tunes in "Kunz Revivals No. 6" on *Decca F* 6864. The hit tune of the moment, "Music, Maestro, Please," has been recorded by "The Street Singer" on *Decca F* 6863. The coupling is another popular tune "Red Maple Leaves." Billy Cotton and his Band play a "Ragtime Medley" on *Rex* 9405 and "The Mountains of Mourne" and "Christopher Robin is Saying his Prayers" on *Rex* 9406.

H.M.V. Catalogue

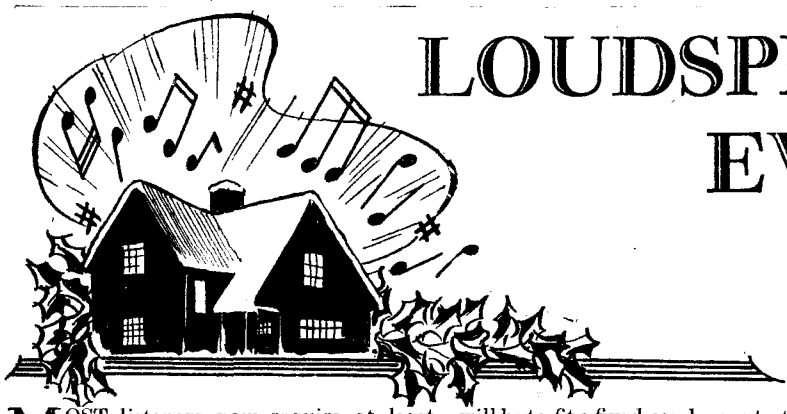
THE appearance of the new H.M.V. record catalogue, just issued, seems to prove the correctness of the report that people are buying more records.

Parlophone

Reginald Foort's popular radio combination "The Organ, the Dance Band and Me" have recorded "In a Little Toy Sailboat" and "There Goes My Affection" on *Parlophone F* 1247, whilst another famous organist, H. Robinson Cleaver, playing on the new Studio Organ, features "Bolero" and "Jealousy" on *Parlophone F* 1248.

Attractive piano solos are supplied by Patricia Rossborough with "A Bouquet to Irving Berlin," a medley of some of this composer's early song hits, on *Parlophone F* 1249, and Billy Thorburn has made a medley on *Parlophone F* 1242.

A new band is featured for the first time this month — Victor Silvester's Harmony Music, who have recorded "Liebestraum" and "The Teddy Bears' Picnic" on *Parlophone F* 1241.



LOUDSPEAKERS IN EVERY ROOM

How Extension Speakers may be Connected to a Receiver, and Methods of Silencing Individual Models

MOST listeners now require at least one extension loudspeaker so that they may listen to a programme in another room. The majority of commercial receivers now produced are provided with a pair of "Extension" sockets, sometimes marked "E.S.," and sometimes "Extl." The first point of importance here is that these sockets will have been designed for a speaker of a definite impedance, and this may be high or low. The ordinary type of loudspeaker as sold is provided with an input-matching transformer, and is of the type known as High Impedance. In some cases there are several terminals on the speaker, and these are marked Power,

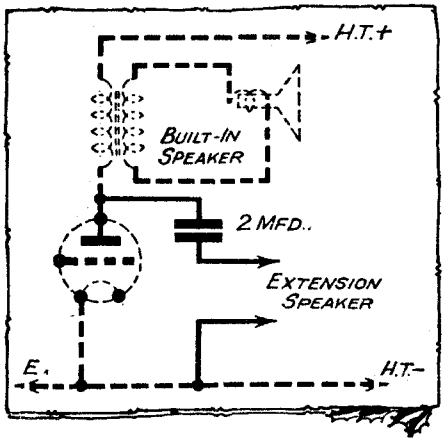


Fig. 1.—Standard output arrangement for a single extension speaker.

Pentode, Super-power or Push-pull. These are all high impedance points and can only be used with high-impedance output sockets. The speech coil on the modern speaker is of low impedance, and, therefore, if a low-impedance output circuit is provided it will be necessary to disconnect the speech-coil from the transformer secondary and connect the ends of the coil to the low-impedance sockets. Alternatively, a step-up transformer will have to be joined between the set and the speaker, but the introduction of additional iron in the output circuit is not desirable. Matching is of importance, and if a low-impedance output is provided this will generally be suitable for a value from about 5 to 10 ohms, and, therefore, the length and gauge of wire used for the extension leads must be considered as this may easily be more than the resistance of the speech coil, and this will mar the results.

Connections for Speakers

Where no such sockets are fitted arrangements will have to be made to use an external speaker, and in the majority of cases all that will be necessary will be to fit a fixed condenser to the output anode terminal and join the other side of this condenser to one of a pair of terminals or sockets mounted in a convenient position. The other socket should be joined to the earth line. These connections are shown in Fig. 1. Care must be taken to trace out the correct position for the fixed condenser, but usually this will not be found difficult. If it is desired to avoid the expense of the condenser, or if a condenser is not available and a rapid addition is required, the speaker may be joined in parallel with the existing speaker, as shown in Fig. 2, but this is not a recommended arrangement except for emergency use. To avoid the losses occasioned when the two speakers are connected in parallel in this manner, a change-over switch may be joined to the anode, as shown in Fig. 3, but it is essential to remember that when this is done the H.T. must be switched off before the switch is operated, to avoid breaking the H.T. circuit. A special plug and socket device is obtainable from Messrs. Clix, known as the "Clix L.S. Control Panel," and this may be used to carry out the idea shown in Fig. 3. The wiring for this device is shown in Fig. 4.

Connecting Leads

To run between the various rooms where listening is desired ordinary bell-wire is quite suitable, and it is worth while fitting special plugs and sockets to these points so that risk of connecting a speaker to a mains socket is avoided. Messrs. Belling-Lee supply some special plugs and sockets of either the flush or wall-mounting type which may be recommended, whilst Messrs. Bulgin also supply suitable sockets and inter-connecting wire. The wire may be taken beneath floor-boards or run round the picture rail or top of the skirting-board. It is important also to remember that as one side of the external speaker (when connected as shown in Fig. 1) is joined to the

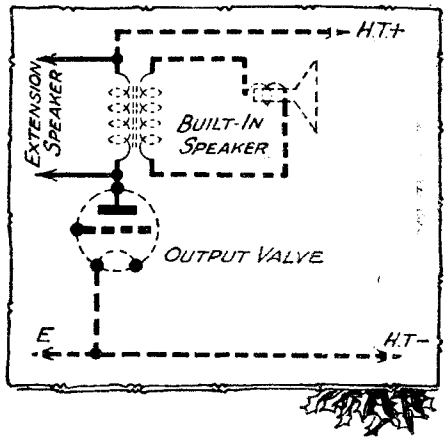


Fig. 2.—An alternative connection to that shown in Fig. 1.

H.T. negative line, which is also earthed, one wire between the rooms may be saved by connecting the speaker direct to the nearest earthed point in the room. In this case single bell-wire may be used from point to point.

Silencing the Built-in Speaker

When an extension speaker is in use it is often found desirable to silence the speaker which is used with the receiver, and the arrangement in Fig. 3, of course, enables this to be done, although with this arrangement both speakers cannot be used together. When the extension speaker is in circuit the only way of silencing the built-in

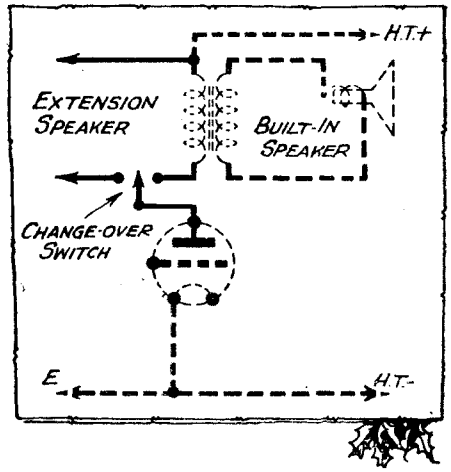


Fig. 3.—A change-over switch may be wired as shown here, to change from built-in to extension speaker.

speaker is to open the secondary circuit, as the transformer primary is then acting as a choke for coupling purposes (See Fig. 1). To open the secondary circuit an ordinary toggle switch may be used, connected in one lead, and this means that the lead from the cone to the speaker-transformer secondary will have to be cut or unsoldered, as shown in Fig. 5. The switch may be mounted on the speaker chassis, or at a convenient point on the cabinet. If it is desired not to interfere with the speaker, the only alternative, where the straightforward coupling of Fig. 1 is employed, is to replace the speaker transformer by an iron-cored choke, and this will mean that a double-pole change-over switch will have to be used to change from choke to transformer. This is additional and unnecessary expense, and provided that care is taken when disconnecting the speech-coil lead no damage should occur. The switch used for silencing may, of course, be of the simple push-pull type if desired, and this could be operated from the panel or front of the cabinet by attaching a length

(Continued overleaf)

LOUDSPEAKERS IN EVERY ROOM

(Continued from previous page)

of rodding tapped to screw on the shaft of the switch.

Volume Control

The question of controlling the volume is a rather difficult one, especially where more than one extension speaker is being used. The simplest and usual system is to connect a control across the speech coil of the speaker, and thus a low-resistance control is called for. Generally something between 5 and 20 ohms will be found suitable and will not affect the working of the speaker. The control should, of course, be mounted on the extension speaker cabinet. Where something more reliable than this is desired the W.B. Long-Arm device may be called into use. This is a complete long-distance relay which enables the receiver to be switched on and off from the extension listening point, and a special form of volume control is provided so that maximum results may be obtained. A push-switch enables the set to be operated through a special relay.

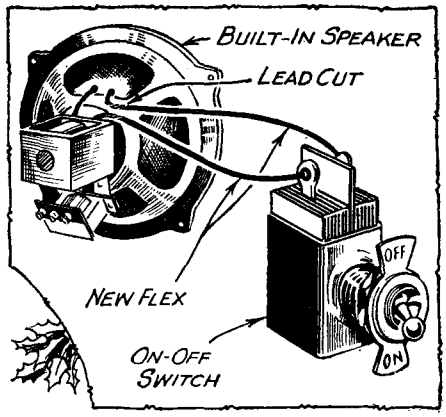


Fig. 5.—How to silence a built-in speaker.

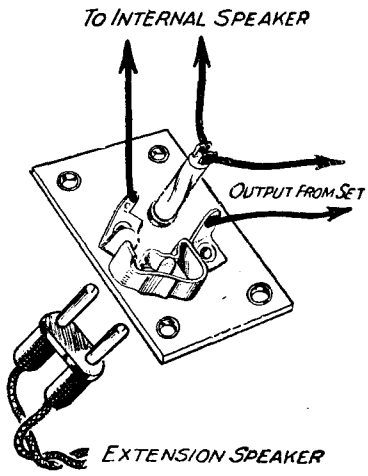


Fig. 4.—The Clix loudspeaker control panel.

Special Notes

In connection with the question of extension loudspeakers it should be remembered that the use of two speakers widely separated may be used to give added realism to reproduction. For instance, if a speaker is placed in each of two rooms, and the doors are left open, it will be possible to sit in either room, and by adjusting the level of the volume in the room in which you are sitting, it will be possible to arrive at a point where it is impossible to tell where the music is coming from and due to the natural time delay in the sound from the distant speaker arriving at your ear, a "solidity" is given to the music and a depth which is most realistic, especially where the set or amplifier feeding the speakers is of the "high quality" type. A somewhat similar, though not so enhanced, effect is obtainable if the two speakers are placed wide apart in one room, but the farther apart they are the greater the time factor and the greater the realism.

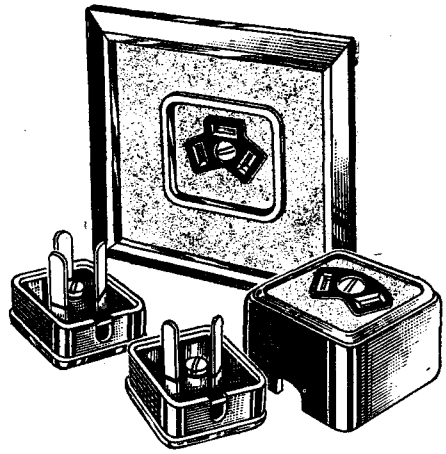


Fig. 6.—Here are two of the Belling Lee wall-plugs and sockets.

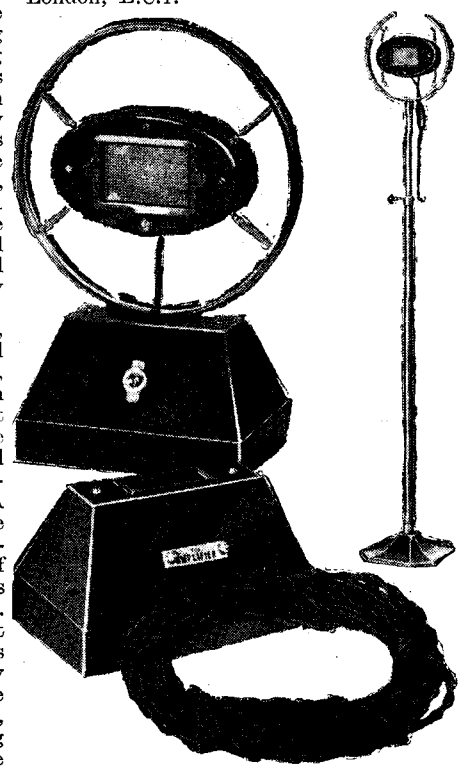
INEXPENSIVE P.A. EQUIPMENT

Details of the Peto-Scott Mikes and Amplifiers

THE accompanying illustrations show the amplifier and two of the microphones which are now obtainable from Messrs. Peto-Scott for public-address work. The mikes are of the transverse-current type and the small moulded base which is provided will house the matching transformer and/or a suitable biasing battery. The Professional floor model costs 42s., and the table model is 25s. The switch on the table model enables the battery to be disconnected and output terminals are provided so that it may be connected to the line cord, amplifier, or even to the pick-up terminals of a standard radio receiver. The mikes are supported by shock-proof mounts and give very good quality even on loud items such as dance bands. They are not unduly directional.

The amplifier is of the A.C. type, completely self-contained, and utilising a push-pull output circuit, for which a speaker with a push-pull transformer must be employed. Full-wave rectification is adopted, and the input circuit incorporates a volume control. A 4-pin socket is fitted for the connection of the loudspeaker, which must be of the energised type, and this also is supplied by Messrs. Peto-Scott. The rated output is between 6 and 7 watts and several speakers may be fed satisfactorily. The price of the amplifier is £3 10s., and this, as well as the remaining parts of the equipment, may all be obtained on the hire-purchase system if desired. Details of these, as well as of other interesting Peto-Scott equipment, such as complete Replacement chassis of battery and mains-operated all-wave superhets, may be obtained from Messrs. Peto-Scott. Leaflets describing them will be sent free on request to 77, City Road, London, E.C.1.

The neat and compact design of the amplifier.



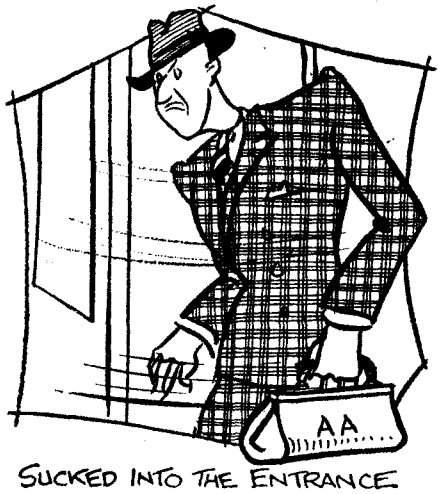
The table and stand microphone.

Lunacy's Greatest Addict is At It Again

By ARTHUR ASHDOWN

THE Christmas festivities were approaching with verve, pep and vim when I received the fateful telegram. "Come with all haste," it read, "staggering Christmas sensations for the Great British Public, Battisin Belfry."

To those members of the Great British Public who have not met Battisin, this sort of telegram may have come as a welcome surprise and one simply loaded with



SUCKED INTO THE ENTRANCE

promise. The majority of the G.P.B. who have been introduced to Battisin's "staggering Christmas sensations" for the past few years will appreciate the terrific depths of despair into which I was plunged on the receipt of the veiled command.

Battisin Belfry, let me hasten to add, is an extremely nice bloke—a good scout—one who has the well-being of the public at heart. Whilst, however, he is able to live up to the above—he is also very capable of living up to his name—for no bat in any belfry could contrive to outclass this inventive master of lunacy. One has only to recall his "Santa Trap" and "Crooner Choke" in order to appreciate the mental hairpin bends of which his mind is capable.

The telegram had been received and the die was cast. "Why not," you may ask, "send a telegram stating that your grandmother was extremely ill and ask to be excused?" My more polite reply to such a query would be, "Meet Battisin and see," whilst a less polite, tactful (but perhaps more human) rejoinder would be, "Don't be a gump!" Battisin's slightest wish is a command, and his telegram is a threat full of malevolent portent. And so I departed for Battisin's (private) home with all haste, as requested.

His country seat at Colney Hatch has now been transferred to the wilder parts of Dartmoor (Gossip writers, please copy), and it was thither that I found myself hurtling on that early November morn. The fog swirled with lustful grace about the trap which had been sent to fetch me from the station, and it was with a sense of impending doom that I alighted at the portals to the "home." The knocker echoed with reverberative persistence into the silent house, and eventually the revolving door gyrated on its pivots, and before I could say "Jack Robinson," "Adolph Hitler" or "Old Mother Riley," I found myself sucked into the entrance hall.

"You wish to see who?" a loudspeaker queried at my elbow, and before I could state my business into a convenient microphone, the floor slid from under my feet and transported me (*via* seven escalators) to a door marked "Strictly public, No Hawkers, No Circulars, No Good Coming in here—Please Knock." Screwing up my courage to the highest common denominator I rang the bell and entered.

It would be useless for me to describe the welcome which Battisin can afford. On this particular occasion the welcome afforded was stupendous and left me an easy victim to his powers of narration. Far into the night he talked of his new Christmas inventions whilst I made rapid notes on whatever happened to be handy. The variety of subjects on which he talked left me somewhat jaded, and I have decided to adopt the "Beeton" method of formulæ which was used to describe his inventions last year. So here goes!

Recipe No. 1
Radio Nutcrackers

Ingredients.—One portable radio set, 12in. by 12in. by 8in. One mahogany table. One pulley block, with screw. One length of rope.

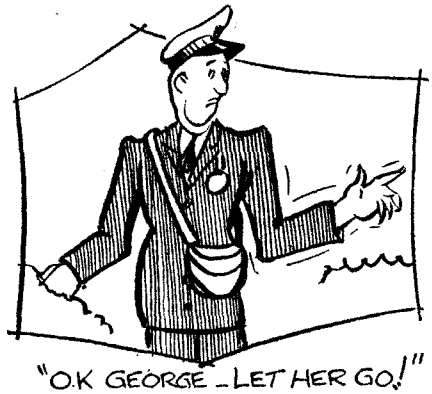
The Mixture.—Screw the pulley-block firmly into the ceiling and place the table directly under it. The portable radio set is now attached to the rope which, in turn, is threaded through the pulley. The nut (or nuts) is now placed in the dead centre of the table after the radio set has been raised to ceiling height. By releasing the rope suddenly the set crashes down on the nut (or nuts).

Result.—The nut (or nuts) is (or are) cracked; in fact, they are usually found to be in smithereens.

Recipe No. 2
Programme Eliminator

Ingredients.—One radio set in working order. One aerial lead. One bus conductor named George.

The Mixture.—The radio set is duly installed in any convenient position with the aerial lead in close proximity. The



"O.K GEORGE—LET HER GO!"

bus conductor (named George) is now induced to clutch the aerial lead with one hand and the aerial terminal on the set with the other. The set is switched on, the programme is transmitted via the loudspeaker. When the programme becomes too dull for endurance, one just shouts, "O.K.

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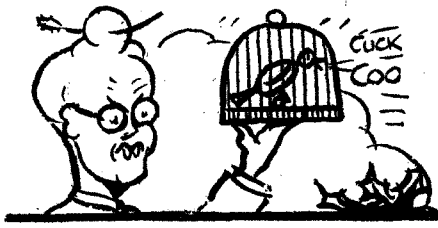

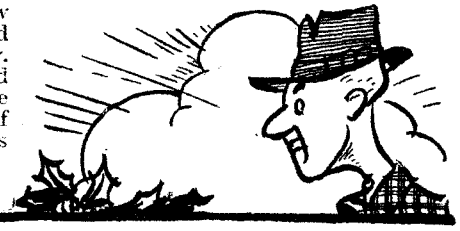

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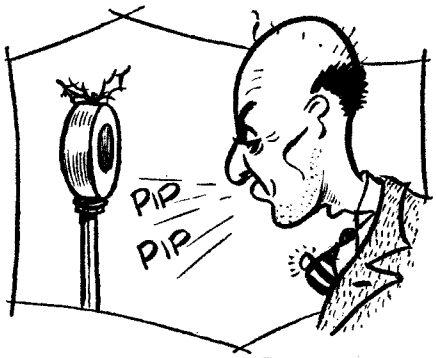
George—let her go!" and George drops the aerial lead.

Result.—The programme is immediately eliminated.

Recipe No. 3

A Radio Raisin Pipper

Ingredients.—One box of tin-tacks. One magnet. One gill of glue. One radio receiver.



UTTERS SIX PIPS

The Mixture.—Heat the glue and spread it thinly (but firmly) on a table. Sprinkle the raisins on top of the glue before it sets. The magnet should now be tied to the diaphragm of the loudspeaker and the latter connected to the radio set. We now come to the delicate portion of the operation. Grasping a tin-tack, firmly, but delicately, between the thumb and forefinger, we pierce the raisin and drive the point of the tack into the pip. This procedure is adopted for each raisin and the table-top eventually bristles with tacks. The radio set is now switched on and tuned in to a station which incorporates a brass band in its programme. The loudspeaker is held over the tin tacks and the magnet makes contact with them. The brass-band vibrated diaphragm dithers in and out with tremendous gusto and thus the tacks are withdrawn. To the end of these we find the raisin pips adhering with sullen tenacity.

Result.—Raisins are de-pipped painlessly and permanently.

Note.—The raisins should be washed in a solution of caustic soda in order to obviate gluey taste in puddings, etc.

Recipe No. 4

Misleading Time-signal

Ingredients.—One microphone. One amplifier. One despondent gentleman. One screen.

The Mixture.—This particular recipe has been especially designed for bringing into use when one wishes to rid oneself of unwanted guests. The microphone is hidden behind the screen and connected to the amplifier, whilst the despondent gentleman is induced to take up his position in front of the microphone. When the guests have outstayed their welcome the despondent gentleman is given a kick on the shin. His despondent state has caused him to have the pip and thus the unprovoked assault causes him to utter six pips. The host immediately says, "By jove! Eleven o'clock—so sorry you have to go."

Result.—The unwanted guests tear off for the last bus many hours too soon.

Recipe No. 5

Balloon Inflator

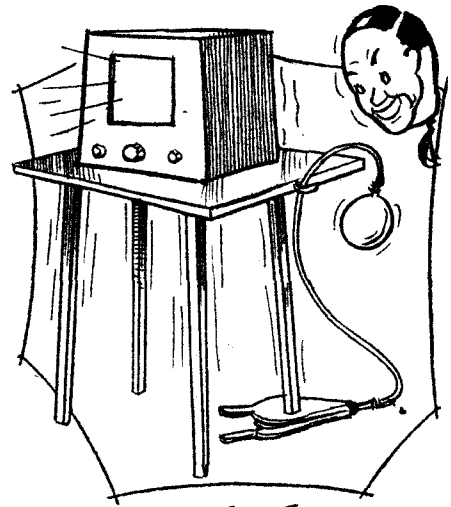
Ingredients.—One powerful radio receiver. One unstable table, with one leg shorter than the others. One pair of bellows. One length of rubber tubing.

The Mixture.—The powerful radio set is perched on the table whilst the body of the bellows is placed under the short leg. One end of the rubber tubing is connected to the nozzle of the bellows, whilst the balloon is tied to the other end. The radio set is now turned on to maximum volume and this oscillates the table, which in turn works the bellows up and down.

Result.—The balloons are inflated ever so nicely.

* * *

The above are but a few of the staggering radio sensations which Master Belfry has in store. Those readers who wish to tempt



OSCILLATES THE TABLE

Providence may get in touch with him direct, marking their postcards "Bats" in the top inside corner. The Editor has asked me to state that, whilst he is overwhelmed by the subtlety of the inventions, he can hold himself in no way responsible for the mental condition of any poor gump who experiments on them.

IMPORTANT BROADCASTS OF THE WEEK

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

Wednesday, November 30th.—Scotland, 1938, a programme for St. Andrew's Day.

Thursday, December 1st.—Kentucky Minstrels programme.

Friday, December 2nd.—National Dances of Europe: Band programme.

Saturday, December 3rd.—Madame Butterfly, acts 1 and 2, from Sadler's Wells.

***REGIONAL* (342.1 *m.*)**

Wednesday, November 30th.—Variety from the Embassy Theatre, Peterborough.

Thursday, December 1st.—British Heavyweight Boxing Championship: Harvey v. Phillips, from Harringay.

Friday, December 2nd.—Variety from the Palace Theatre, Burnley.

Saturday, December 3rd.—Death of an Artist, by Norman Edwards; and Arrested Development, by Anthony Gittins: Two short comedies.

***MIDLAND* (297.2 *m.*)**

Wednesday, November 30th.—Variety from the Embassy Theatre, Peterborough.

Thursday, December 1st.—English Folk Music: a programme of music by Gerrard Williams.

Friday, December 2nd.—Orchestral concert.

Saturday, December 3rd.—All Down for the Finale, musical comedy feature.

***WEST OF ENGLAND* (285.7 *m.*)**

Wednesday, November 30th.—The Use of the Land—8, The Nationalisation Policy, a discussion.

Thursday, December 1st.—Choral and Orchestral Concert, from the Coston Hall, Bristol.

Friday, December 2nd.—Mid Somerset Musical Festival Children's Concert, from the Pavilion, Bath.

Saturday, December 3rd.—Soldiers Tales—2, true stories of Army life.

***WELSH* (373.1 *m.*)**

Wednesday, November 30th.—Choral programme from Grove Park (Wrexham) School.

Thursday, December 1st.—Where We Came From, more recollections of the trek to South Wales—5, Men of Llanelly.

Friday, December 2nd.—Wrexham Football Club Feature.

Saturday, December 3rd.—Chamber music.

***NORTHERN* (449.1 *m.*)**

Wednesday, November 30th.—Music in Ripon Cathedral.

Thursday, December 1st.—Halle Concert from the Free Trade Hall, Manchester.

Friday, December 2nd.—The Spot Page, a variety magazine.

Saturday, December 3rd.—String Orchestral programme, from the Milton Hall, Manchester.

***SCOTTISH* (391.1 *m.*).**

Wednesday, November 30th.—Scotland, 1938, a programme for St. Andrew's Day.

Thursday, December 1st.—Nor' East Sidelights, a magazine of "sound" entertainment.

Friday, December 2nd.—Scottish Dance music.

Saturday, December 3rd.—Choral and orchestral Union of Glasgow Concert, from St. Andrew's Hall, Glasgow.

***NORTHERN IRELAND* (307.1 *m.*)**

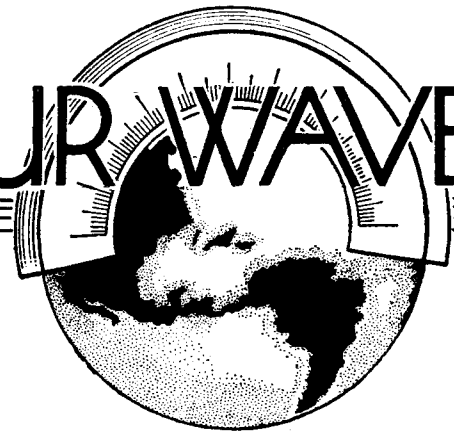
Wednesday, November 30th.—Organ recital from Armagh Cathedral.

Thursday, December 1st.—Orchestral programme.

Friday, December 2nd.—Inter-School Spelling Bee: Portora v. Inst.

Saturday, December 3rd.—Equity follows the Law, an Ulster play in a prologue and two acts by Louis J. Walsh.

ON YOUR WAVELENGTH



By Thermion

FOR the sixth year I avail myself of the special privilege (and I do so regard it) of greeting my readers on the advent of the festive season—good will to all men, a Merry Christmas and a Bright New Year. There is no means of conveying in print the sincerity behind those wishes, which run the risk by frequent repetition of becoming hackneyed and expressionless, like "Good Morning" or "Good Night." But I want to assure you that I do express that feeling with more than ordinary fervour, especially at a time when the world seems drenched in crises, threats of war, jazz and crooning. I have enjoyed writing this feature from its first issue, and although I cross swords with readers and draw their fire it is in the spirit of burlesque that I mostly write.

I suppose that my post from readers is larger than that of most feature writers, and I enjoy a correspondence which reaches me from practically every country in the world. Some of the letters are mildly chiding, some of them submit me to verbose flagellation, some are flatteringly approving, some mildly critical. I reply facetiously only to those who write in that strain.

Once again, therefore, seasonal Good Wishes to my readers in all parts of the world.

A Curious Clubman

I RECEIVED a letter the other day from the secretary of a club who, in sending in his report of his club's activities for the week, asked me if I would publish it on this page instead of on the usual Club Page, because he thought my page was read and the club feature was not. This is indeed a curious viewpoint, and quite naturally I declined the request. We have extended the courtesy of free insertion of club notices in every issue of this journal to all club secretaries from the first issue, and it is a bit of a shock to find that a club secretary is dissatisfied with this generous treatment. The suggestion that I should use part of my space to give publicity to what is, after all, a piece of purely local news only of interest to readers in that particular district strikes me as being distinctly quaint.

No one can accuse this journal of neglecting the club movement. It is the only one which has regularly kept such a feature running, and I have on more than one occasion done my best to encourage the formation of new clubs. The first Directory of Wireless Clubs was compiled by me and published in this journal.

Many periodicals make a charge for inserting such notices, and I am sorry that I am unable to use my space for club notices. If I made an exception in one case all of the clubs would expect me to do the same, with the inevitable result that this feature would be converted into a club news feature.

Overseas Problems

THE difficulty of designing a set which will please all readers is shown by the following letter from an overseas reader living in Bengal:

"I had been looking forward with great interest to the waverange coverage of your latest receiver, 'Push-Button 4,' but I was somewhat disappointed to learn from PRACTICAL AND AMATEUR WIRELESS of October 22nd that the waverange is practically identical with many of the previous all-wave receivers described in this journal. You will realise our position here in India, as all the short-wave stations use the 61-metre band and as such, these receivers, admitting that they will bring in the whole world, will fail with the Indian short-wave transmitters. Again, we are not much interested with the long-wave band, as there is no such station nearby. India will enthusiastically welcome a set designed by a master designer covering two short-wave bands extending up to 90-100 metres, and the medium-wave band of 180 to 500 metres. As a matter of fact, almost all the commercial sets marketed here cover such waveranges, with no long-wave band. May we in India expect such a set to be described in PRACTICAL AND AMATEUR WIRELESS?

"Both battery and A.C. mains versions should be given, and the price of the components should be kept as low as possible, consistent with the quality for which your sets have made a name. I write this from my personal experience after building four sets from your designs—one battery, two A.C. and one A.C.-D.C., and the results in all cases have been quite remarkable, although I had to use substitutes here and there, as all of the specified parts could not be obtained from the local markets.

"Wishing your very useful paper every success."

I merely ask, how many Indian readers would build such a set? And would it interest English readers?

Our Transmitting Articles

WE have been publishing articles on transmitting for a long time, but one of my readers has encountered a snag on which you may care to debate. Here is his letter:

"I feel compelled to let you know that I sincerely appreciate your articles that have and are dealing with TX topics; to me they have been of great assistance. For four months, inspired by your articles, I studied keenly the subject of short waves and amateur radio, and eventually applied for the A.A. licence; after a period of three months of correspondence with the G.P.O. Engineer-in-Chief's Department, I was informed that a licence could not be granted. I was bitterly disappointed, as I had furnished them with all the matter they required, and each reply built up my hopes until the last request, which was followed shortly afterwards by the letter of rejection. I furnished them with my original birth certificate and several good references which were definitely genuine; also, I am emphatically a British subject; also my parents and ancestors ages back.

"Soon after the G.P.O. rejection I left the town with my parents, and here in a strange place of several months' duration I am without a pal or friend, or even acquaintance, who is interested in amateur radio.

"Through the courtesy of a local radio store's manager I respectfully

begged the privilege of paying a visit to a local TX amateur, and here is his reply : ' I have my friends and do not care for any visitors.' I was disgusted and said to the manager, after his reply to my inquiry : ' What friendly spirit ! And amateur radio is supposed to be akin to Freemasonry.'

" I inquired of more local amateurs, and made another visit, the third, but during my short stay I just sat and was like a component on his shelf. He had his pal there, and all they did was to talk of what they had done and were going to do. Twenty minutes went by and I took my leave, begging pardon for my call.

" In view of my experience I have come to the conclusion that too much superiority complex exists in the amateur radio sphere, and unless one is lucky enough to get into these cliques one had better plod along on his own.

" Another point is, having been rejected by the G.P.O., should I relinquish my one and only interest (apart from an occasional visit to cinema) ? I am of the opinion, definitely no ! For what reason should I ? I was honest enough to apply for the licence, and feel confident of my humble capabilities of keeping within the law regarding such a licence.

" In respect of amateur radio, I am equipped with the knowledge of the various codes, and can read morse and write same without difficulty. I should add that I read radio morse signals without difficulty, and know the amateur international language pretty well.

" Lately, thanks to the great assistance of your articles, I have been very successful with my A.A. experiments, carried out strictly within the law of the licence.

" It is not for me to say whether the rules of such a licence should be made easier, or, in view of the so-called ' pirates,' made more difficult, but I do say that the G.P.O. should provide other means of testing applicants other than just the forms. Many cannot put into writing their knowledge of those things they can expertly do in a practical manner.

"What with amateur radio snobbishness and the unfairness of the G.P.O., the learner has a lot to put up with.

" Very best wishes, sir, and more strength to your pen."

Death of a Zealous Listener

MR. HERBERT GRANVILLE DYSON, of Timperley, Cheshire, whose death occurred on November 15th, might justly be described as the North Region's " No. 1 listener." For years he had, day by day, and quite voluntarily, performed, a much appreciated service by not only listening to almost all transmissions, but reporting on them to the B.B.C.

Early in 1923 Mr. Dyson became keenly interested in broadcasting and took pains to give careful and systematic reports of the daily programmes. Through this interesting work he became closely associated with the programme and engineering staffs at Broadcasting House, Manchester, and he was esteemed not only for the help he gave, but for the friendship which he extended.

He often spoke of how, in the early pioneering days, he noticed some fault in the transmissions and reported it to the B.B.C. An engineer would go out to his house, confirm the report, and telephone the transmitter, asking for certain adjustments to be made. From those early days until the middle of last week Mr. Dyson made a call at the B.B.C. offices every morning with a typewritten report on the previous evening's programmes. He made these reports with such regularity that if for any reason he was unable to listen for a day or longer, he would warn the B.B.C. in advance.

Notes from the Test Bench

Condenser Connections

A NUMBER of readers have tried to use old-pattern tuning condensers in short-wave receivers, and these possess both advantages and disadvantages. Many of these old components have wide spacing, which has certain merits, whilst the method of assembly also enables them to be dismantled so that they may be modified from the capacity point of view. The main disadvantage is that the moving spindle is generally provided with a friction contact to the appropriate terminal, the latter generally being mounted on the metal end-plate and a ball or other friction device making contact between spindle and end-plate. This may give rise to noises on short waves, and this may be overcome by soldering a short length of insulated flex to the spindle or bottom spacing washer and joining this to the terminal. Just sufficient wire to enable the condenser to move over the required range should be used, and a large amount of wire coiled into a spiral should not be employed as this will prove troublesome.

Plug-in Short-wave Coils

THE standard six-pin short-wave coil has three windings, grid, primary and reaction. It should not be overlooked that in certain circuits it may prove worth while changing round the primary and reaction windings. The positions of these as well as the size of the windings often provide alternative results which in some circuits may prove well worth while. Added to this, the inclusion of a small condenser in the aerial lead provides yet a further range of tuning or adaptability which will prove of value to the experimenter.

Finishing Flex Ends

WHEN making battery connections or other wiring in which standard flex is employed it is generally found that the ends of the silk covering frays and presents an untidy appearance. There are several methods of avoiding this, the simplest of which is to slip a short length of ordinary cycle valve-rubber over the end. The frayed ends may be singed away with a match, and this alone often gives the desired clean appearance, but it should not be forgotten that special sticky thread is now on the market by means of which the end may be very neatly whipped. Where much movement is to be given to the end it is desirable to take steps to prevent the wire from being fractured, and a short length of insulated sleeving should therefore be slipped over the end to give the desired rigidity.

" The Best Set I Ever Built "

I HAVE received very many interesting entries in this competition, and hope to publish the results next week. In the meantime I offer another six books for the six best entries in my new Essay Competition. Write an essay not more than 250 words in length entitled " My Favourite Circuit." Send entries in an envelope marked " Circuit " in the top left-hand corner not later than December 17th.

One Year of Radio Variety

IT is interesting to note that for a period equivalent to more than two whole months of seven-day weeks, and twenty-four-hour days, nothing but variety programmes were being broadcast by the B.B.C. during the past year, from London alone. That is one of the remarkable facts revealed by analysis of a statistical review, just completed, of the output of the Variety Department. The twelve months covered by the report were from October, 1937, to September, 1938.

Some 1,756 " live " shows were staged in that time by 24 producers —a figure that is, perhaps, more surprising when it is realised that a very large number of the broadcasts were at once " first nights " and final performances. To that total may be added 714 gramophone record variety shows.

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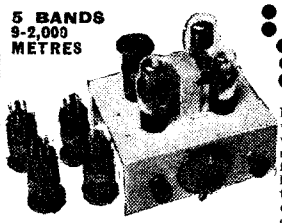
5 BANDS 9-2,000 METRES



- Short-Wave Adaptor
- Short-Wave Converter
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For efficient short-wave or all-wave work. 3 Short-wave ranges. Employs famous B.T.S. self-locating 6-pin inductors with wave range of 9-2,000 metres. Kit comprises slow-motion tuning and reaction condenser, L.F. transformer, all-wave and short-wave chokes, fixed condensers, ready drilled steel chassis with all holders fitted, engraved slow-motion dial, coils and all instructions. 3 matched British battery valves comprising highly efficient Detector and L.F. and Pentode output given FREE. List value £4/10/0.

BARGAIN 42/- or 2/6 down and 12 monthly payments of 3/9.

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VALVES FREE.—The number of N.T.S. Bandspread Short-Wave Kits now in use throughout the world has almost reached the hundred thousand mark. No kits have ever before experienced such amazing popularity. N.T.S. Bandspread Short-Wave Sets for loudspeaker and headphone work give full highly efficient results on 12-94 metres and at only slightly extra cost additional low-loss Coils are available for the complete coverage of 9-200 metres. With every Kit we present you with matched and tested valves, absolutely free.

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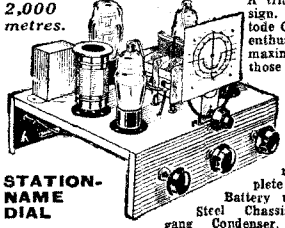
LIST VALUE £4/15/0 **BARGAIN** CASH C.O.D. **29/6**

MATCHED VALVES FREE!

9 to 2,000 metres.



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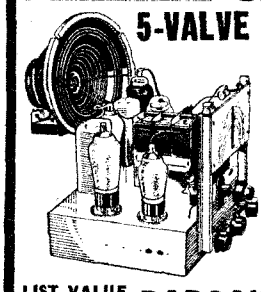
LIST VALUE 15/- **6/6** POST FREE

Limited stocks now, you must hurry. Brand new COSMOCORD highly sensitive pick-ups, complete with **Arm Rest** and **Screened Lead.** Only an exceptional purchase allows us to offer at **less than half price.** An excellent opportunity for you to fit an improved pick-up for electrically reproducing your gramophone records. A real bargain at **6/6, cash or C.O.D.**

BRAND NEW CHASSIS BARGAINS FULLY TESTED

5-VALVE A.C. S/HET. ALL-WAVE CHASSIS



- 7-stage s/het. circuit.
- All waves 18-2,000 metres.
- Station-name dial.
- A.V.C. and tone control.
- 3 Watts output.
- Fully guaranteed.

LIST VALUE £8.18.6 **BARGAIN £4.17.6**

This 1939 7-stage **all-wave superheterodyne** provides wonderful selectivity and quality reproduction on radio and gramo. 3 waveb ands 18-2,100 metres. Illuminated station-name dial, similar to illustration. A.V.C., Tone Control, 3 watts output. Size 11½" l., 8½" h., 8½" deep. Pick-up sockets. Complete with all valves, knobs and escutcheon. For A.C. mains 200/250 v., 40-100 cycles. ***Yours for 5/- down and 18 monthly payments of 6/3.***

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All waves, 16-2,000 metres. Latest circular full-vision station-name dial. P.U. sockets. Efficient 6-valve superhet circuit. Over 3 watts output. Brand new, ready for fixing in your own cabinet. Size 11in. wide; 7¾in. deep; 8¼in. high. **Complete with 8in. cone Celestion speaker and valves.** List value £9/19/6. **BARGAIN £6.6.0,** or yours for 5/- down and 18 monthly payments of 7/11.

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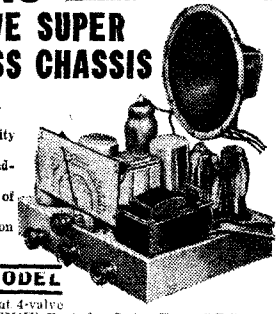

- Battery and A.C. Models.
- Amazing selectivity and sensitivity.
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Powerful and efficient 4-valve circuit comprising VMHF Pentode, Det., Class "B" drive and Class "B" output stages. Volume equal to mains set (very low H.T. consumption). Wave range 200-2,000 metres. Chassis size 11½" w., 7½" h., 9" deep. Fully tested, complete with 4 valves, less speaker.

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Amazing offer which should not be missed. Highly efficient S.G. Bandpass arrangement providing over 3-watts output. Marvellous station-getter on 200-2,100 metres, P.U. sockets. Size as above. Fully tested, complete with 4 valves. For A.C. mains 200/250 volts. Less speaker.

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SPEAKERS. SPECIAL OFFER moving coil, famous makes, P.M.'s and Mains energised types for above Battery and A.C. chassis, 12/6 each. **ONLY WHILE STOCKS LAST.**

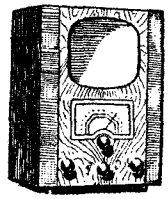
3 MATCHED BATTERY TYPE VALVES WITH 3 VALVEHOLDERS BRAND NEW

AN investment for every set owner and constructor. 3 matched, brand new world-famous Philco 2-volt valves, comprising 2 S.G. H.F.'s and 1 Output Pentode, packed in original cartons. Three different valve types indispensable for modern constructors' circuits available on request, using any number of valves, invaluable also for replacement purposes. Offered to you at a fraction of manufacturing cost. Impossible to repeat once present stocks are cleared.

LIST VALUE 35/- **BARGAIN** POST FREE **5/6**

BATTERY ALL-WAVES S.G.3

A SPLENDID XMAS OFFER YOU MUST NOT MISS



Another special purchase of these **PETO-SCOTT** 1938 battery all-wavers allows us to offer at less than cost price wave-range 18-2,100 metres. Amazingly efficient circuit comprising UMHF, Det. and Harries distortionless output pentode. World-wide short-wave and broadcast reception, station-name dial. Concert-grand Moving-Coil Speaker. Superb contrastingly-veneered walnut cabinet. Guaranteed fully tested by makers and supplied in sealed cartons.

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ALL-WAVE S.G.3 CHASSIS

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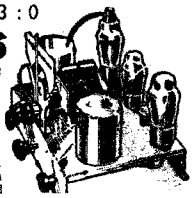

less valves or 2/6 down and 12 monthly payments of 2/6. **Final clearance** of these popular chassis. Efficient S.G. Det. and Pentode output circuit. Wave-range 18-2000 metres. Calibrated scale 200-2000 metres. Ideal spare battery set for the home, providing a wide choice of British and Continental stations and world-wide reception on the short waves. Chassis size: 10" w., 8" h., 7½" deep. 3 British matched valves comprising S.G. Detector and Pentode 13/9 extra.

ONLY 17 TO CLEAR—ORDER EARLY.

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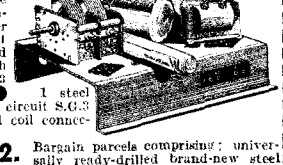
Offer No. 1 LIST VALUE 35/- BARGAIN **6/11**



Comprising ● 2 brand new screened Iron-cored Dual-range coils, each size 3in. by 2½in., with solid contacts and leads. ● 1 brand new 2-gang bar type .00043 mfd. condenser for broadcast or all-wave sets. ● 1 brand new shrouded L.F. transformer with terminals. ● 2 valve-holders. ● 1 steel chassis. ● Tested circuit S.G.3 diagram showing all coil connections.

OFFER No. 2. Bargain parcels comprising: universally ready-drilled brand-new steel chassis, transformer, 6 resistances, fixed condensers, 2- or 3-gang tuning condenser, reaction condenser, potentiometer, and coil; for **battery** or **mains** sets. State which when ordering. Amazing value for constructors and servicemen: will save you £ £ £'s. Yours for **4/11,** post 9d. **4/11**

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Party Television Tricks

How to Arrange Make-believe Television Demonstrations for the Christmas Party

THE party spirit which prevails at this time of the year gives an excuse for many things, and considerable amusement and interest may be aroused if at your party this year you announce that you are going to give a television demonstration. Television is now becoming very popular, but there are many who cannot afford a receiver or who are unable at the moment to obtain one, and therefore added interest will be given when you proudly announce that you will give such a demonstration. Most amateurs are familiar with the "stunt" whereby a mike is connected to a broadcast receiver and during a broadcast programme the music is faded out and an S O S or similar message is heard for a member of the party—this message, of course, being given by somebody in another room. If you do not know how to do this, read the article on page 283. Well, "cod" television broadcasts may be given in a very similar manner and there are several ideas which may be adapted for the purposes—depending upon the facilities available and the ability of the reader.

One of the best ideas forms the subject matter of our cover illustration this week, but it is, unfortunately, only applicable to those houses where communication between two rooms is effected by means of a folding door. These are fairly common in houses of a certain age, although some modern houses are being made with a similar idea carried out in glass. In some modern houses a serving-hatch is fitted in the wall, and could be used on similar lines.

Illumination and Screens

As may be gathered from the illustration, the guests sit in one room, which is darkened, and the "performer" is situated in the other room, the entire doorway being masked by means of heavy light-proof curtains. An opening of any desired size is left between the curtains, across which is stretched a sheet of Cellophane, glass or semi-transparent material. If now the performer is brightly illuminated, he will be seen "on the screen" and may give any desired performance. For best results the performer should be provided with a dark backcloth, the guests should be in total darkness, and illumination for the performer should be provided by bulbs placed on each side of the screen. If the latter is of glass this gives a most realistic appearance. Alternative ideas will suggest themselves regarding the material from which the screen is made, the disposition of the guests and performer and lighting. A remarkably realistic "fade-in" device may be obtained if lamps are placed on both sides of the screen, and those on the performer's side are switched off. The front lamps should, of course, be masked so that they do not dazzle the guests, and if a good dimmer is connected in circuit it will be possible to switch out gradually, or fade out, the lamps on the guest side at the same time as those on the performer's side are faded in, and the variation in double-sided illumination gives a very realistic fade-in of the image.

To complete the "picture" sound is, of course, necessary, and a mike and loud-speaker may be placed in a convenient position so that the guests may hear words and music. A mixing circuit with pick-up for a musical background and the microphone through which the performer may sing will add realism. The method of connecting these items will be found on other pages.

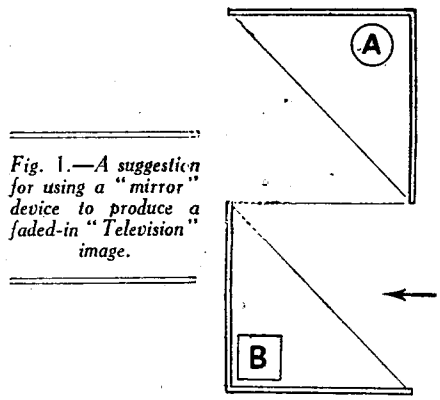


Fig. 1.—A suggestion for using a "mirror" device to produce a faded-in "Television" image.

Fig. 2.—How to arrange for a fake Television demonstration.

Other Ideas

There are several other schemes which may be adopted for fake television, many of which will no doubt occur to the reader. The home-cinema may be brought into use, and a cabinet may be built, or an existing radio cabinet modified so that a small rectangular opening is provided across which ordinary frosted glass or grease-proof paper may be placed, and a projector mounted in the cabinet and focused clearly. A mike may be used and speech may be synchronised, or if a travel picture or other similar type is projected ordinary broadcast music or gramophone records may be played as a background and will "fit in."

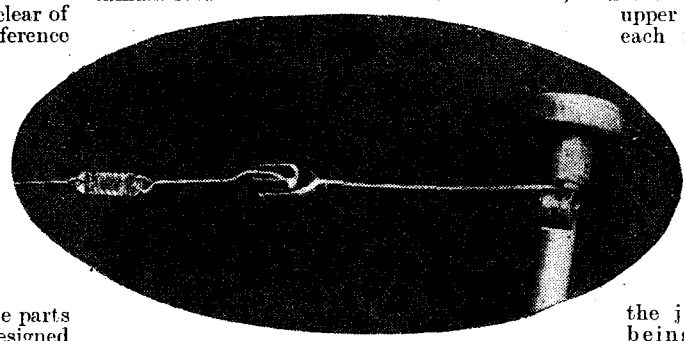
Further, it is possible to obtain rectangular reducing glasses which lend themselves very readily to "fake" television. One of these may be mounted in the front of a cabinet placed against the aforementioned open doors, the remaining opening being screened by light-proof curtains. If now the rear room is fully illuminated, and the "lookers" are in the dark or subdued lighting, it will be possible to see practically the whole of the lighted room in the reducing glass, on a small scale just the same as a television image in the end of a cathode-ray tube. A suitable size for the glass is 6in. square, and the slight curvature of the surface resembles very realistically the front of the standard C.R. tube. These glasses are obtainable from any good opticians or scientific appliance stores. A 6in. square glass of the type mentioned may be obtained for 5s.

Finally, it may be possible to adopt the idea known as "Pepper's Ghost." In principle this is arranged as shown in Fig. 1. A double box has two sheets of plain glass arranged as shown, and in normal use the object at B is illuminated whilst the object A is in darkness. A backcloth of dark material is used in both sections. If, however, the lights at B are switched off the dark background will give to the glass a mirror effect, and then if A is illuminated it will be seen when looking in the direction of the arrow as in a mirror. Thus two objects may be made to change places. By projecting a picture on to the glass or backcloth at A it may be seen from the front and no doubt modifications will occur to the reader on the basic idea.

Our New Aerial

Details of the New Array Which has been Erected over our Laboratories

FOR some time the ideal situation offered by the tower at the top of our new building has suggested that we could take advantage of an improved aerial system, so that maximum results could be obtained clear of the interference which is normally experienced in a busy area such as this. Accordingly, a twin-mast system was planned, and all the parts were designed and made in our own workshops.

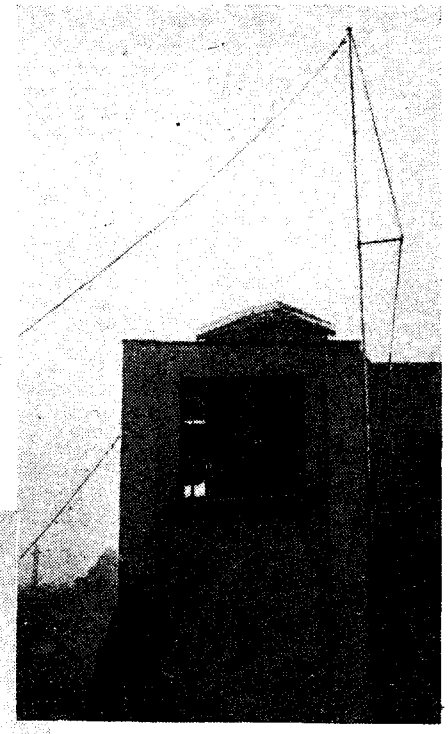


The pulley and method of attaching aerial to halyard.

The accompanying illustrations show the two masts and give some idea of the situation. An indication of the relative height of the aerial may also be judged from the illustrations, in one of which Nelson's Column may be seen, and which is considerably lower than the aerial. The Clock on the Shell-Mex building, a familiar landmark, may also be seen, and is also below the aerial level. The masts were made from galvanised heavy-gauge conduit, and special pulleys were made up and mounted at the top, as shown in the upper illustration. By this means an internal halyard may be used, and there is no risk of it slipping over the pulley—a trouble which is often experienced with the standard type of pulley. The steel halyard was sweated into phosphor-bronze stirrups which were riveted into stout insulators, and the top of the upper section of each mast was capped. Two separate lengths of tubing were employed for each mast and were of different sections, the junction being effected by reducing sockets turned from steel and pinned to prevent rotation of the upper section. To these reducing pieces horizontal lengths of tubing were welded, the ends being slotted to carry supporting guys, as shown. The upper mast, on top of the tower, projects 15ft. above the roof, and the supporting halyard for the lower mast, which is attached to the wall outside the laboratory, is carried down inside the mast and is provided at the bottom with a heavy weight so that the aerial is "floating." To reduce the interference experienced on our other aerials, an anti-interference aerial system has been erected on these masts and is giving very good results.

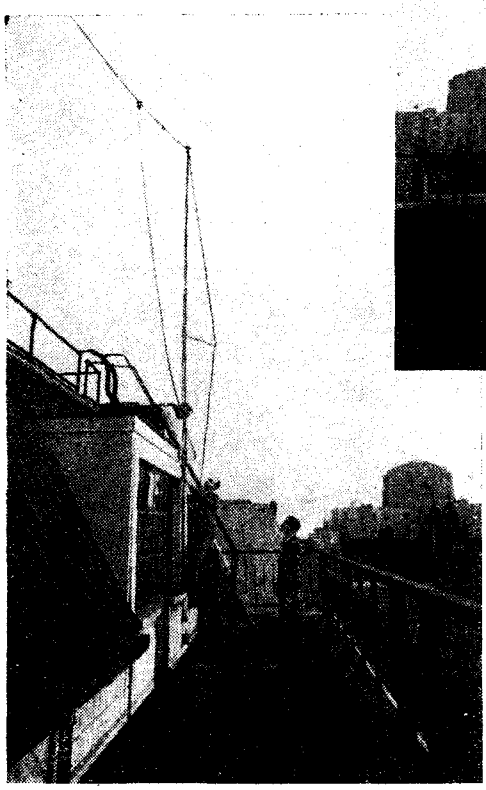
For experimental and test purposes we now have a most comprehensive aerial array, including short-wave aerials of various types and standard television aerials. We are thus able to test all receivers, either designed in our laboratories or sent in for servicing by readers, on various aerial systems, and are thereby able to judge of the performance under all the conditions which may be met by the user.

All initial tests with new receivers are, of course, carried out on a small aerial arranged to resemble as closely as possible an "average" aerial, and for special results or tests the remaining aerials are brought into use.



This view shows the upper mast and on the left may be seen Nelson's Column.

This view gives a good idea of the height of the aerial above the surrounding buildings.



This shows the lower mast attached to the wall of the laboratory.

The upper mast being fixed in position on the tower.

THE "AIR-HAWK" 9

How to Make the Chassis and Screens, and Main Constructional Details of this New Receiver

By W. J. DELANEY

ALL the main essentials of this amateur receiver were given last week, and all that remains now is to describe the constructional work. For the chassis, 14 gauge S.W.G. aluminium sheet should be cut to the shape and dimensions shown in Fig 2. If desired, ½in. may be left at the sides so that they may be turned and bolted, or alternatively short lengths of brass angle may be cut and bolted to give greater rigidity. Alternatively, of course, the chassis may be purchased from Messrs. Peto-Scott ready made up. If you construct it yourself, carry out all the drilling shown in Fig. 2 before bending down the sides, as by this means cleaner holes may be cut. For the large holes an ordinary carpenter's centre-bit is best, the tracing point being permitted to cut partly through from one side, and the chassis is then turned over and the cut completed. In this way the cutting edge of the bit will not be damaged, and it may still be used for ordinary woodwork. It should be noted that only the main holes have been shown in Fig. 2, in order to prevent complication. There are several more holes required, but these are, with two exceptions, only ⅛in. in diameter, and are for inter-connecting leads. The two remaining holes are ⅜in. in diameter. Their exact positions will be found from the wiring diagram which will be given next week, and they may be left until then.

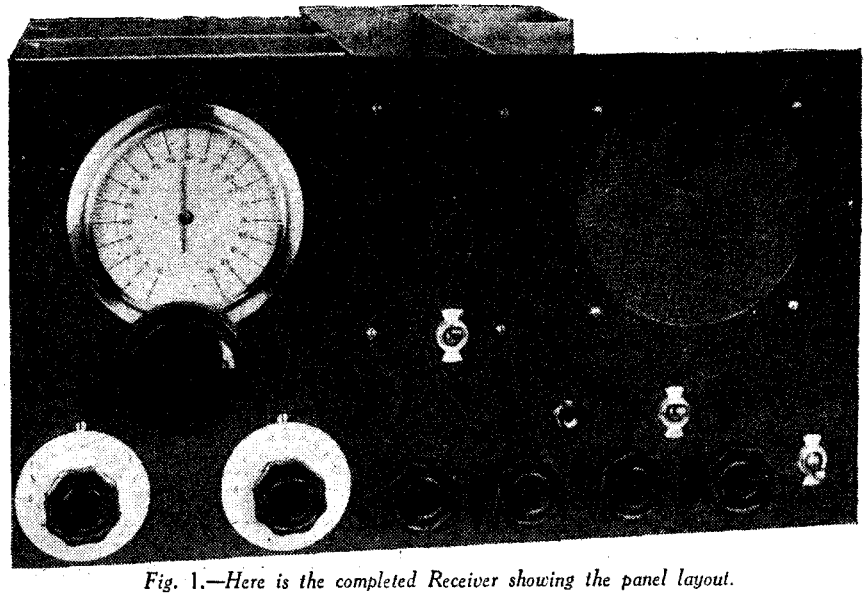


Fig. 1.—Here is the completed Receiver showing the panel layout.

The Screens

The next part of the work to be undertaken is the cutting and bending of the screening partitions. This is a rather tricky piece of work, as not only must they all be cut accurately to enable them to be bolted up neatly, but the various fixing holes must be accurately aligned, as in some cases top and bottom screens are bolted through the same holes, and in others the screens are held together by bolts which obviously must register. The dimensions given in the illustrations of these screens are taken from 16 gauge aluminium, but any variation in thickness will necessitate a readjustment of the measurements. All of the turns are ⅜in., and the drawings have been made to show the direction of the bends and turns. Care is necessary here, as should a bend be made in the wrong direction the piece will undoubtedly be wasted, as the bend cannot be turned right back without breaking the metal, or at least seriously weakening it. Cut the pieces to the full size, being careful to add on the ⅜in. bends and then mark off the holes. Next with a steel straight-edge score along the lines for bending, making the score on the opposite side to the direction of the bend. I used a wood-carver's "V" engraving tool and hammered the metal in the same direction so that the "V" was closed on the inside, but this does not appear to be the simplest way of doing the work, provided that the score is not made too deep. The result with the "V" cut inside is certainly the neatest, but if you can obtain two lengths of stout angle-iron and clamp the metal in a vice between these quite a neat edge may be made with the ordinary score cut with, say, a blunt penknife blade.

To ensure accurate registration of the fixing holes it is preferable to cut the three top partitions upon which the band-spread condensers are mounted, and to drill all holes in these. Next cut out the two narrow pieces which join these together on the outside, and mark off the holes in these from the previous pieces. Now cut out the three under-side partitions, and place these in position under the chassis and make certain that the fixing holes for the top screens, the holes in the chassis and your markings on the under partitions agree. A good plan is to mark the holes on the under pieces through the holes in the chassis. Next cut the two long partitions for the top, and again mark off the side holes in the left-hand partition from the holes on the ends of the three partitions already made. It is, in fact, a good plan to bolt in position each partition as it is made, and proceed to build up the chassis in this manner, although it will have to be taken to pieces before the set is made. It is worth while taking great care with all this metal work, as the finished result must be neat and rigid and there is nothing more disappointing to find, when attempting to assemble the various parts that

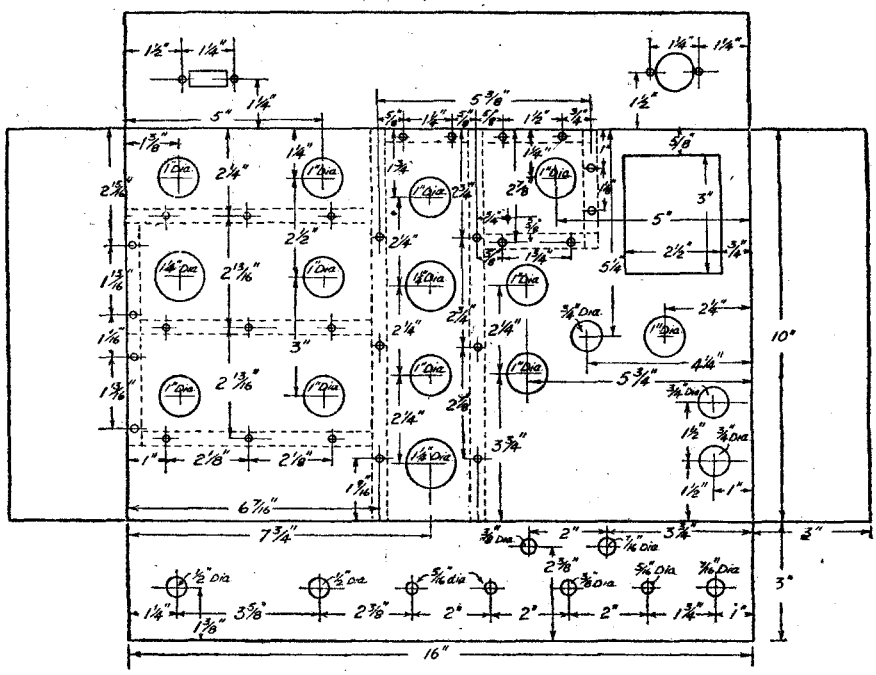


Fig. 2.—Drilling and cutting dimensions for the chassis of the Air-Hawk 9.

they will not fit and fresh holes may have to be drilled in such a position that the drill will run into previous holes and make it almost impossible to obtain a rigid job.

Assembly

The large hole for the mains transformer is best cut out with a metal fret-saw blade, or alternatively by drilling a series of holes, knocking out the piece and filing up the edges. When the partitions are finished, place them on one side, and then place the various valveholders and coilholders in position and drill through the fixing holes, attaching these components by bolts with shakeproof washers on the under-side. An important point here is that the coil-holders in the front section and the rear section must be raised up from the chassis, so that the sockets will eventually clear the condensers underneath. A nut between

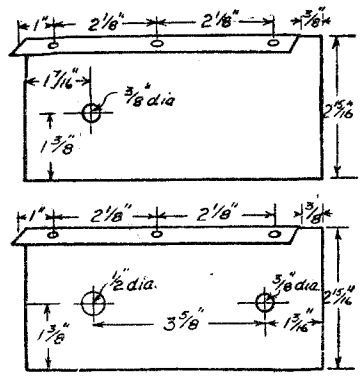


Fig. 3.—The above are two of the under-side partitions separating the band-setters. The third partition is shown in Fig. 10. The upper unit is placed nearest the rear of chassis, and the lower is mounted next to it.

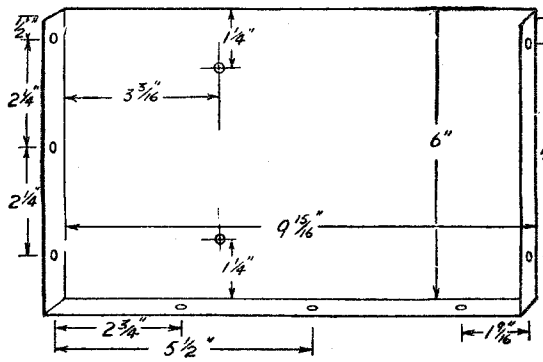
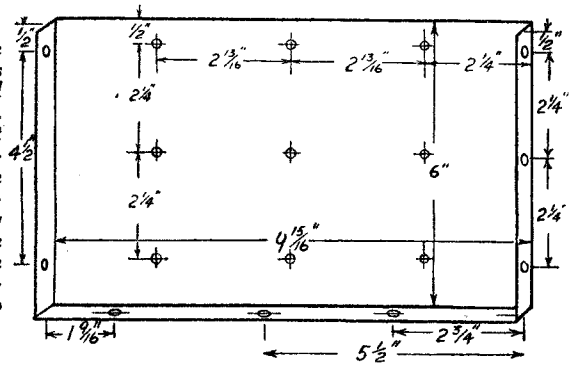


Fig. 4.—These are the two long partitions enclosing the I.F. and second detector stages. The unit on the right is bolted to the partitions separating the band-spread condensers. Note carefully the direction of the turned-up edges. The two-hole turn is attached subsequently to the panel.



chassis and holder should suffice. Now comes the difficult part. On each of the top condenser partitions mount one of the band-spread condensers, making quite certain that the lock-nut is tight and that all condensers are exactly in the same position; that is, with the fixed plates towards the bottom. Do the same with the band-setters, noting their position from the illustrations given last week, and then

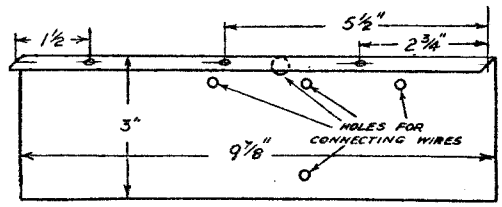


Fig. 5.—This partition is for the underside of chassis and separates the band-setting condenser from the remainder of the wiring.

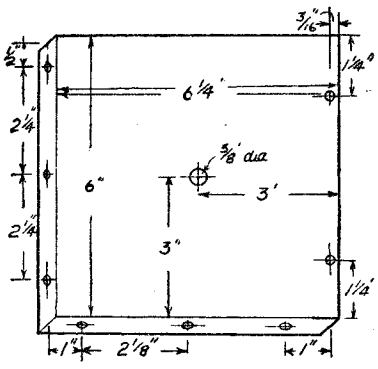


Fig. 6.—These are the supports for the band-spread condensers. Three of these have to be made, and all are identical. The central hole must be exact to enable the condensers to be mounted in line.

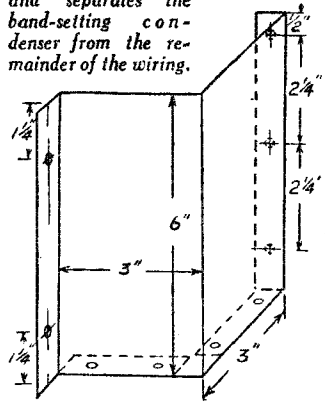


Fig. 7.—This is part of the B.F.O. screen. It is attached to the right-hand screen in Fig. 4 and at the rear to Fig. 8.

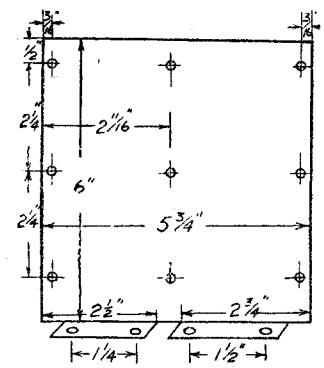


Fig. 8.—This section encloses the rear of the I.F. screens (Fig. 4) and is also attached to Fig. 7.

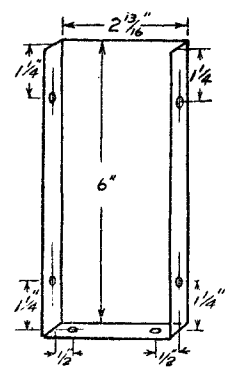


Fig. 9.—Two units as above are required and are used to bond together the three screens shown in Fig. 6.

proceed to erect the screens, starting from the panel and locking top and bottom units together with shakeproof washers to avoid any risk of subsequent loosening. As one screen is placed into position, a coupler must be attached to the spindle of the condenser on the upper side, and the extension rods and couplers on the under-side. It is difficult to explain every point here, but with the parts in hand the method of procedure will become apparent, and

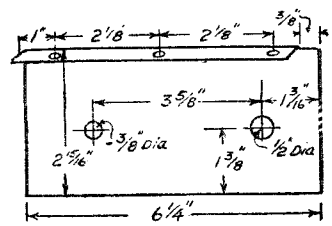


Fig. 10.—This is the remaining under-chassis screen and is placed nearest the panel.

when these screens and associated parts have been found to fit perfectly, the band-setting condensers should be removed so that wiring may be carried out. This method is recommended to avoid the difficulty of having to take down the screens due to failure of the spindles to line up on either side.

Extension Controls

The two extension controls used for the band-setters must be cut down as follows: Remove the grub screw and then the brass ring at one end of the paxolin tube on each of these, and cut down the tube in one case to 1⅞in., and in the other case to 3in. The brass rod which fits into the extension control must then be cut in one case to 1⅛in. and in the other case to 2in. Now if the brass ring is placed over the cut end of the paxolin and the hole placed in line with the remaining grub screw, a hole may be pierced in the paxolin, the inner edge scraped with a penknife to remove the "burr" and the grub screw placed in position. The shortened length of rod may now be placed right down the tube whilst the other end of the control is attached to the condenser spindle in each case, after which, with a thin-nosed pair of pliers the rods may be withdrawn and pushed into the slow-motion drive in one case and into the flexible coupler in the other case. The appropriate grub screws are then tightened.

The long top partition is then placed in position and bolted up with the under unit corresponding to it; the I.F. transformers are then placed in their respective places, and the right-hand top partition bolted up with its rear plate. The B.F.O. screens are then placed in position and locked, after which the wiring may be commenced.

Easily-made Amplifiers

Essential Details of a Few Simple Types of Amplifier for Battery and Mains Use. The Units Described are Intended only for Temporary Use and are not "Quality" Amplifiers

By THE EXPERIMENTERS

THERE are innumerable uses for a simple amplifier, especially at Christmas time when microphones, pick-ups and similar devices are being employed. For many of the various forms of radio amusements described elsewhere in this issue it is convenient to have a small amplifier unit additional to the broadcast receiver, because both amplifier and receiver will often be needed together.

At the same time, it will seldom be considered worth while to go to the expense of building a "pukka" amplifier unit for occasional use in this way. Also, it is by no means essential that the temporary amplifier should come within the description of "high fidelity." Clearly, the simplest type of unit that could be made is one with a single battery-operated valve. It can be built on a very small baseboard or in a compact wooden box, and can be carried about very easily. Small batteries can be housed within the container, so that the only external connections required are those to the microphone or pick-up and those to the loudspeaker.

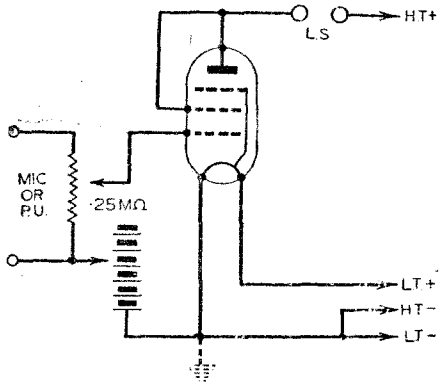


Fig. 1 (Left).—One of the simplest single-valve battery amplifier circuits.

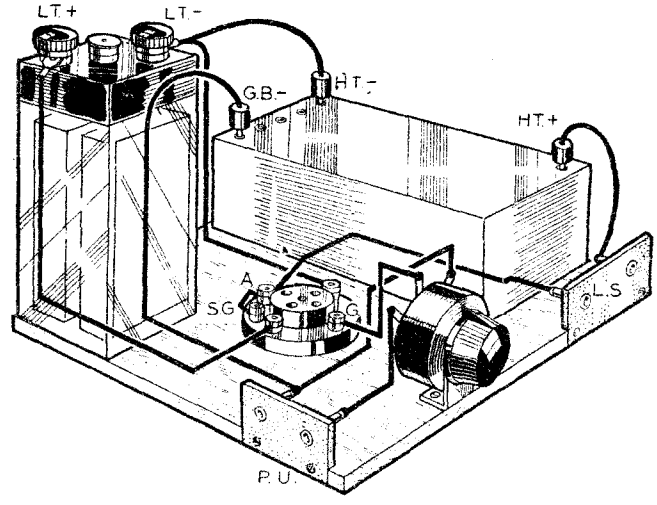


Fig. 2 (Right).—A practical arrangement of the circuit shown in Fig. 1. Layout is optional, but the component positions shown are as good as any.

Single-Pentode Unit

A circuit for a unit of this type is given in Fig. 1, where it will be seen that the valve is a pentode, and that the connections are very few in number. The only component additional to the valveholder is a .25 megohm volume control potentiometer. Fig. 2 shows the few connections in pictorial form. In this illustration the dry battery is of the type for both H.T. and G.B., and it should have a total voltage of 120 if a moderate output is required. A small accumulator is used for low-tension current, but a three-volt dry battery with a 5-ohm resistor in series could be used if desired. The available output for the speaker will, naturally, be small, but will be adequate for many requirements. At any rate, if the pick-up or microphone is of a sensitive pattern the amplifier will give an output falling not far short of that given by the average battery set.

The most suitable type of valve is one such as the Cossor 220PT or Hivac Z220 (this is a tetrode, of course). These have a rated maximum undistorted output of 1,000 milliwatts, and will handle a fairly heavy input from the pick-up or microphone.

We do not show the set built into a carrying case, but such an arrangement could easily be provided by mounting a couple of terminal-socket strips on the side of a small wooden box or old attaché case. It would probably be found convenient to allow room in the container for a microphone and its transformer and energising battery.

Greater Amplification

If the input device were known to be somewhat insensitive, it would be better to use a couple of valves—a triode and an output pentode or tetrode—in a circuit similar to that given in Fig. 3. The maximum permissible output would be the same as that from the simpler unit, but that output could be obtained when the input was appreciably less. A circuit of this type is often more satisfactory than a single-valve one even when the microphone is of a very sensitive type, because it allows the microphone to be "throttled down" so that there is less chance of instability and back-coupling between the microphone and speaker. It is frequently the case that the most pleasing reproduction is obtained when the microphone volume control is turned well down or when the energising voltage applied to the microphone is reduced to 1½-3 volts, instead of the more usual 4½-6 volts.

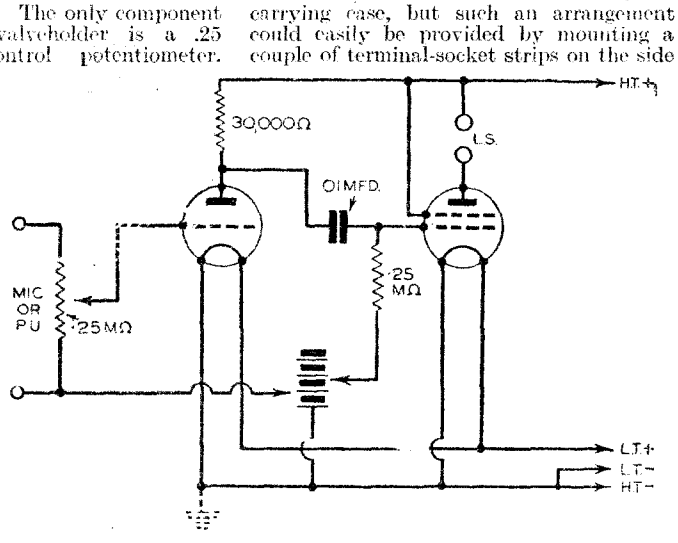


Fig. 3.—This two-valve battery-amplifier circuit is efficient and inexpensive to build. At the same time it will give a satisfactory output when fed from a microphone or pick-up of fairly low sensitivity.

Earthing

It will be seen that in both circuits dealt with the earth connection is suggested by broken lines. Very often it will not be required, but on the other hand there are many instances in which it will be found to improve results. When the microphone speaker lead is screened, the screening braid should in any case be connected to the earth terminal, whether an earth lead is also joined to it or not.

Two Triodes

A slightly more elaborate two-valve battery circuit is shown in Fig. 4. In this case, two triodes are used, the first being an L.F. or general-purpose type and the second a power-valve of the Cossor 230XP, Hivac PX230, Osram P.2 or Mullard PM202 pattern; the bias voltage must, of

(Continued overleaf)

EASILY-MADE AMPLIFIERS

(Continued from previous page)

course, be regulated to suit the valve chosen. The battery must be of 16 volts maximum rating when using a 120-volt H.T. battery unless a battery with suitable H.T. and G.B. tappings is employed. When using a couple of valves, especially if the second takes .3 amp. L.T., an accumulator is essential for L.T. supply. To ensure that the output valve can be fully loaded a transformer is used to couple the two valves, and this should have a step-up ratio of about one to 3.5. Decoupling is also shown in the anode circuit of the first valve, although this might not be essential; it is desirable, however, when using transformer coupling. Another minor refinement is an electrolytic condenser between the lower end of the input volume control potentiometer and the "earth line." This can often be omitted without affecting results in the slightest. Nevertheless, it is sometimes useful in improving stability and helping the quality side. It need have a working voltage of no more than 12 if used.

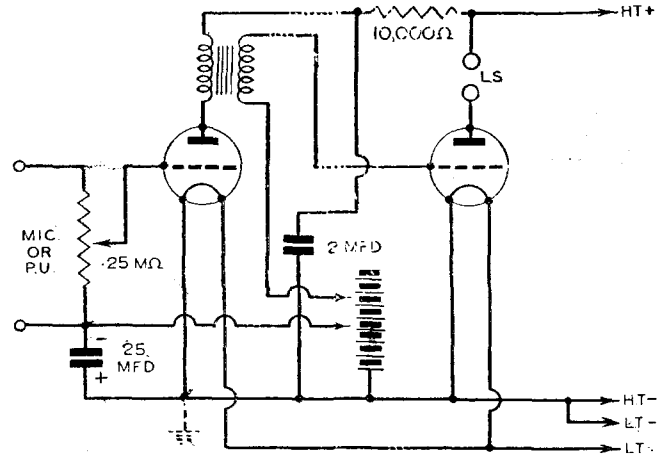


Fig. 4.—This battery amplifier employs a pair of triodes coupled together by means of an L.F. transformer, which may be a fairly small and inexpensive component. The anode circuit of the first valve is decoupled.

A.C. Amplifiers

Those who always use a mains-operated receiver will probably favour a mains-type amplifier. This is capable of giving a greater output, of course, and is better in many respects—generally too good for present requirements. It will cost a good deal more to build, whilst it is less likely that the requisite parts can be obtained from the junk box. But for those who prefer a set of this type we give a circuit in Fig. 5. It will be seen that the usual A.C. mains transformer is omitted for simplicity, a half-wave rectifier being included in the H.T. positive feed line.

Many will point out that this arrangement is not in accordance with I.E.E. regulations, but it is that which is used in many universal receivers and has been proved to be satisfactory. A single 40-volt, .2 amp. tetrode is used, the circuit being similar in all important respects to the battery version shown in Fig. 1. To drop the mains voltage of about 230 to the 40 volts required by the valve heater, a 40-watt lamp bulb is wired in series; this could be mounted on top of the container and used as a "silence" signal to warn the "broadcaster" that the amplifier is alive.

The smoothing choke need not be an expensive one, provided that it will carry up to about 50 mA and that it has an inductance of not less than 10 henries at that current. Additional smoothing is provided by a pair of 4 mfd. electrolytic condensers, although the capacity of these can be increased to 8 mfd. if the larger condensers are more readily available.

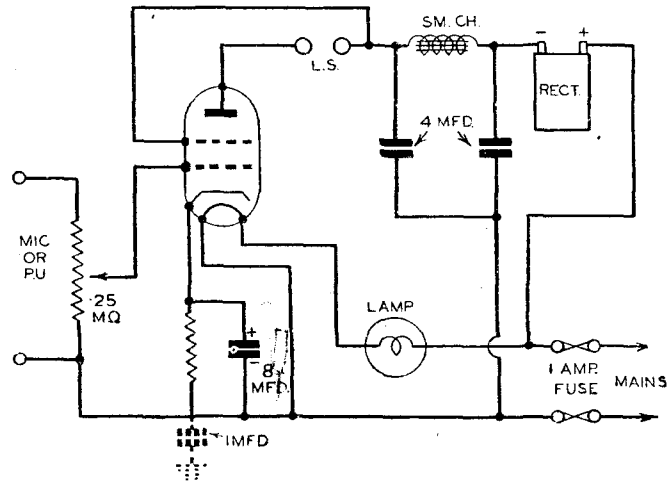


Fig. 5.—This simple mains amplifier can be operated from either A.C. or D.C., and can be built cheaply using standard components, many of which the constructor will already have on hand.

With regard to the rectifier this could well be a Westinghouse style H.T.10, which has a maximum D.C. output of 200 volts at 100 mA. This rectifier also has a low resistance, so that the maximum output can be obtained with an input of 250 volts. Assuming that a Cossor 4020 tetrode valve were used the bias resistor would require to have a value of 150 ohms and could be rated at 1 watt.

It would be an easy matter to modify this simple basic circuit to include a second (input) valve of the ordinary L.F. type, since the rectifier would provide an ample amount of current. Coupling between the two could well be as shown in either Fig. 3 or Fig. 4.

Of course, the output of any valve used in this circuit would be less than the maximum rated output due to the fact that applied H.T. voltage would not be more than about 170, and because the heater current would be rather less than the rated current of .2 amp. unless the lamp used as a resistor were replaced by a barretter or by a wire-wound resistor. Another point that should not be overlooked is that if two valves were employed a different resistance lamp would have to be used. Thus, if the mains voltage were 240, one 220-volt, 40-watt lamp would be suitable with a single valve, but if two valves were used—the first taking .2 amp. at 13 volts, and the second .2 amp. at 40 volts—it would be correct to use a 200-volt, 40-watt lamp. In both cases, the heaters would be slightly, but only slightly, underrun. Of course, a .2 amp barretter rated at 120-200 volts would be equally suitable whether there were one, two or three valves in the circuit.

Hints On Use

Points to remember when using amplifiers of this type with a microphone and speaker are that the two should be as far apart as possible, preferably in different rooms. If they must be fairly near, arrange them so that they are not facing each other and/or place a screen of cardboard or paper between them. The leads from the two should be kept apart and, where possible it is better to have a separate earth connection to the screening braid of the microphone lead if this is more than about 25ft. in total length. With a mains-operated amplifier it is essential that the containing case, when used, should be perforated to permit of ample air circulation round the valves and rectifier so that over-heating is avoided.

TELEVISION and CRIME

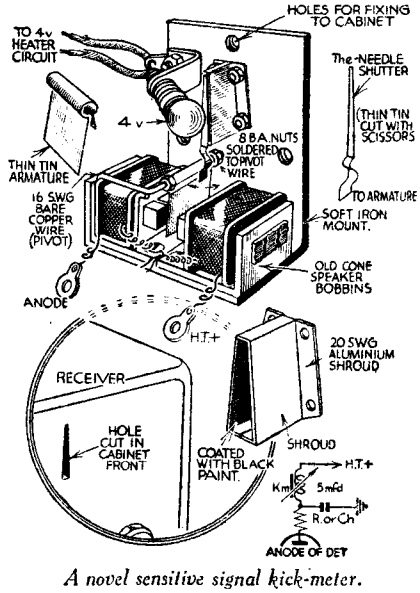
IT has frequently been suggested that television in one form or another can undoubtedly prove an aid to the police for detecting crime, and apprehending criminals more speedily than by standard methods. It is known that officials of the Police Force are interested in the science, and one or two tests have already been undertaken, although not on any ambitious scale. During an experimental transmission in one of the London streets last year a fake theft was staged, and one viewer who was looking in at the time 'phoned Alexandra Palace and clearly stated all he had seen. With the many outdoor television broadcasts now being undertaken, a separate camera panning on the crowds with a good telephoto lens could be used so that the pictures transmitted were watched only by the police on their own receiving sets. Pickpockets or any sign of disorder would be readily revealed and steps taken at once to apprehend the wrongdoer. It has been left to Germany, however, actually to employ television in order to assist the police in a real murder mystery. Unfortunately for them there are no commercial sets in the hands of the public.

A PAGE OF PRACTICAL HINTS

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

A Sensitive Signal Kick Meter

FOR some time now I have wanted a sufficiently sensitive "kick" meter for use on the short-wave bands, and it occurred to me that with a couple of old cone (moving-iron type) speaker bobbins, a good needle fluctuation could be obtained



A novel sensitive signal kick-meter.

with about 2 milliamps flowing in the anode of the detector valve. The assembly I have adopted is clearly shown in the accompanying illustration, and the mode of operation is as follows.

The needle shutter, which is constructed from thin tin, serves effectively to block out the light from a 4v. bulb centralised behind the needle and shroud. Any movement of the tin armature will allow the penetration of the light either side of the needle, the intensity and duration being governed by the strength of the current flowing in the bobbins. No grease or lubricant of any sort should be applied to the pivot assembly, and it is necessary to ensure absolute alignment of the needle with the shroud aperture in the normal unoperated position.

To prevent any possible instability of the detector stage which may arise in the fitment of this type of unit, the resistance or choke impedance should not be broken at the anode end, but at that of the H.T., with a suitable by-pass condenser of about .5 mfd., this value depending on the value of the resistance, when such is used. I have kept the unit independent of the chassis proper so that apart from being able to use same in different "hook-ups," the vibration of the speaker, which constitutes part of the chassis, cannot upset my observations on very weak signals. This piece of apparatus can be used for numerous other circuit functions, such as wavemeters, B. F. oscillators, and signal generators of modest design.—C. J. WELSBROOK (Shrewsbury).

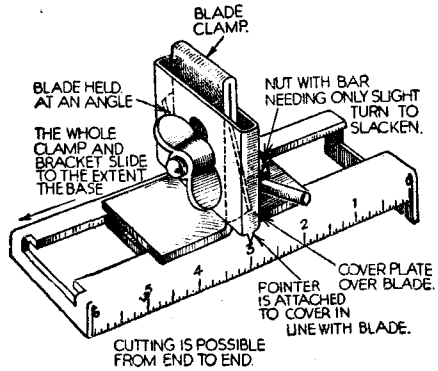
THAT DODGE OF YOURS!

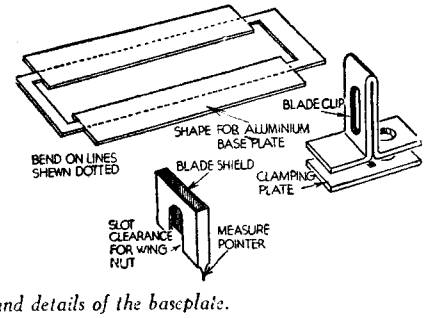
Every Reader of "PRACTICAL AND AMATEUR WIRELESS" must have originated some little dodge which would interest other readers. Why not pass it on to us? We pay £1-10-0 for the best wrinkle submitted, and for every other item published on this page we will pay half-a-guinea. Turn that idea of yours to account 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 307.

A Scoring and Cutting Tool

THIS handy scoring and cutting tool is very useful for chassis construction. By careful adjustment the depth of the cut, as well as the width from the edge, can be accurately ganged. The illustration





A scoring and cutting tool, and details of the baseplate.

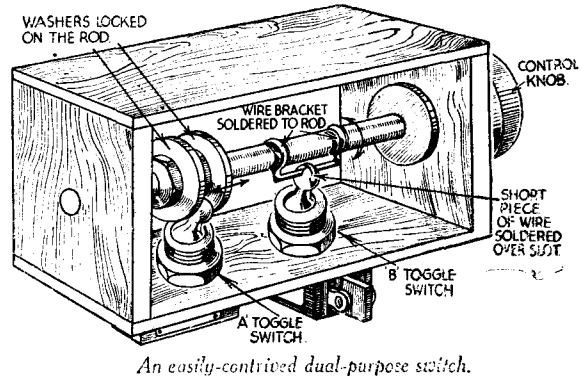
shows how this adjustment is made. The end of the base plate is left slightly longer, so that by placing this part of the tool on the edge of the work a regular and straight cut is made.

The base of the tool is made of aluminium sheet of about 18 gauge, and if number punches are not available a 6in. rule can be screwed to the side of the base, and scraps of sheet aluminium can be used for the clamp and the razor-blade cover, which carries a pointer on the bottom edge, in the dead centre, for indicating the measurement required. As this pointer is in direct line with the blade, accurate marking is obtained. When assembled, the clamp, with the blade and cover, will slide right through the channel in the base plate. A nut with a short bar tightens the clamp and clamping plate sufficiently, without the necessity of dismantling the tool for adjustment.—JOHN DENBY (Erdington).

A Dual-purpose Switch

HAVING built a mains amplifier for a set with battery radio-frequency stages, I needed a switch which could perform the following operations: 1. Switch set and amplifier off; 2. Switch set and amplifier on; 3. Switch amplifier on only (for gramophone).

The switch shown in the sketch is designed to do this job, using two ordinary Q.M.B. toggle switches. Constructional details are clearly shown. On pushing or pulling the knob, switch A is actuated only, since the arm operating B just slides in the groove in the switch dolly. On turning the knob, switch B is actuated by the arm soldered to the spindle, resting in a groove as mentioned. (The switches had already had this groove cut in them, but any switch "dolly" can easily be adapted.) By means of this arrangement any combination of the two switches is available simply by pushing or rotating the knob. In order to restrict the turning motion, a piece of wire is soldered over the groove in the arm of switch B, after the wire bracket operating the switch has been put in position. The assembly can be claimed to be universal, in so far as various combinations of switching arrangements can be obtained. Toggle type switches are made in many forms from the simple "on-off" to more elaborate multi-contact patterns, thus allowing a very wide choice of components and, incidentally, unlimited applications of the main idea.—F. GIRLING (Slough).



An easily-contrived dual-purpose switch.

The Open Mike

A Comedy-Thriller Specially Adapted for Home Broadcasting from the Play "On the Amateur Band"

By L. ORMOND SPARKS

Production commences with a record playing "Fingal's Cave." Fifteen seconds later, fade down music to form soft background to the following announcement.

ANNOUNCER: "*Ladies and Gentlemen, we are presenting this evening "The Open Mike," a comedy-thriller based on the experiences of two amateur transmitters. The chief characters are: Jack Wainwright and his wife, Ann; Sir John Budleigh and his son, Douglas (an amateur transmitter); Victor Jones, a draughtsman in Sir John's firm of aircraft manufacturers and designers; Nip Ranigan, a crook; Bill Hayman, another amateur transmitter. Other players taking part are the landlord of the "Three Stones" a small inn on the borders of Dorset, Gaffer and yokels, policemen and Bill's father.*

Ladies and Gentlemen . . . "The Open Mike." (*Fade up music and superimpose morse buzzer, sending dah dit dah dit, dah dah dit dah. Repeat four times, then fade out music and morse. Fade in sound of burr of a motor-car. After five seconds, fade down soft background.*)

JACK: My heck! Just look at those clouds. Not a trace of the moon. There's an A.A. sign, see if you can pick out its wording, Ann. (*Sound of car easing up.*) Got it?

ANN: Yes, it says Hilbury one mile, so we are all O.K. (*Bring up car speed.*)

JACK: How's the time? Are we keeping up our average?

ANN: Twenty minutes past nine. You are three miles up on the last hour and still have five minutes to go, so what about that spot of food?

JACK: Ah! good idea. I vote we drop anchor at Hilbury, and raid the local pub and see what we can scrounge in the way of good old Dorset vit'als. It's time poor "Old Faithful" had a breather. She has done darn well so far . . .Er . . . touch wood.

ANN (*enthusiastically*): She's a marvel. Folks can say what they like about her looks, but she certainly gets us places *and* back again. I should hate to part with her. Wouldn't you?

JACK: Of course I would, but (*thoughtfully*) if we did win the Pool, I suppose we should fall for a modern sports model, and then (*wistfully*), well, poor "Old Faithful" would become just a happy memory.

ANN (*emphatically*): Oh no she wouldn't. I would hate to part with her. I would have her all poshed up and pension her off. (*Sound of car changing to lower gear.*)

JACK (*laughs*): No, but seriously, what would you choose if you had the chance?

ANN: What would I choose! Why one of those sporty little "Humbos." (*Sound of dog barking in distance.*) You know, Jack, the dinky two-seater model. Who . . . a' what was that?

JACK: (*Sound of changing to top gear.*) Great Scott, did you see it? It was a fox or something bunking into the hedge. We should be in Hilbury in a couple of ticks. (*Sound of rising wind.*) By the look of things, we are in for a fine old storm, and the sooner we find an inn the better. (*Sound of wind increasing.*)

ANN: There is something down there on the left. Can you see it? It has got a light over the porch and . . . yes, it is an inn, I can see a sign swinging about.

JACK: You're right. I've spotted it. (*Sound of engine slowing down.*) My heck, hardly a Ritz is it? Still, any port in a storm. (*Sound of car slowing down to a standstill and engine stopping.*) Shall we chance it?

ANN (*emphatically*): Of course. I'm starving and half frozen, and judging by the glow coming from those quaint little windows, it looks a mighty sight warmer in there than out here. (*With determination.*) Come on big boy, we are going to sample mine host's hospitality and . . . shush, listen (*Fade in sounds of country folks singing a chorus*), and have a spot of cabaret as well. (*Click of car door opening, crunch of feet on road and the slamming of the car door.*)

ANN: (*Sound of wind howling.*) Oh . . . it's a bit breezy isn't it? I'm as stiff as a poker. Hi . . . wait a tick. . . .

JACK: Come on, you are all right. Here comes the rain. (*Sound of patter of feet as they dash to the inn porch, and then swirl of wind and rain.*)

ANN: Phew! . . . What a corker. Here, let's get inside. (*Sound of yokels' chorus ending.*) The show's over, so in we go.

JACK: (*Click of latch; as door opens fade up noise of yokels in bar parlour.*) After you, madam. (*Side whisper.*) Crumbs! Bit foggy isn't it. (*Aloud.*) Mind the step.

LANDLORD: (*Fade down noise.*) Good evening lady. Good evening zur. Getting a bit gusty like ain't it. (*Sound of heavy gust of wind and rain.*)

JACK: Er . . . Yes, there is a nice breeze. But, tell me landlord, what's it like when it blows down here if that . . . (*Sound of another gust.*) is only gusty?

LANDLORD: Ah . . . I see you bain't used to it. We down yere don't take no notice on't. Leastways, not at this time of yur. Why last yur now. . . .

LANDLADY: Garge . . . Garge, why don'ty see to the lady. Let'en her stand thur all cold and wet like when thurs a lovely roaring fire o'er thur. Wur be your manners, man?

ANN: That's all right thank you. I was just admiring your room. It's like stepping back into the past. The low ceiling, the quaint old beams and that wonderful log fire. It's so lovely and cosy in here after the stor . . . the slight breeze outside.

LANDLORD: I'm downright zorry, lady. You see I wern't expecting visitors to-night. (*In loud voice.*) Now then Ben Bobbin, Charles Weatherell and you Gaffer, make way by the fire thur and let the lady and gent warm theirselves a bit.

VOICES: All right, Garge. Yer you be lady. Come over and sit'e down. (*Sound of shuffling feet, etc.*).

LANDLORD: "Now, zur. What can I be offering to'e.

JACK: Well, we are not expecting a meal at this time of night, but could you fix us up with a bite of food, one of those pewter pots of your best ale and a very nice glass of wine.

LANDLORD : Zurtn'ly zur. I expect as'ow we've got summat in the larder that'll tempt'e. Martha ! . . . Martha ! run and see what'e can do while I see to the drinks.

JACK : Good evening all. Quite a merry party.

VOICES : Good evening, zur.

JACK : Didn't we hear you enjoying yourselves as we pulled up ?

GAFFER : Eh ! zur, Ben was giving us a bit of a song. Sort of getting ready for Christmas y'know.

JACK : Good idea. Don't let us upset the proceedings. We enjoy a song as much as anyone. Won't someone else take the floor and oblige ?

VOICES : Come on Ben, let's yur another'-un.

Go on man, do'e stuff, the lady wants'e to sing.

What about you, Gaffer ? You ain't done nuthin' s'evening.

GAFFER : Not so fast thur, not so fast. I'd sing to the lady and gent, but I ain't so young as I were and my throat gets all dry and tickly like. (*Yokels, Jack and Ann laugh.*) What be'e all laughin at . . . ?

ANN : (*Sidewhispers to Jack.*) " Your cue big boy. Fill up their pots. "

JACK : Well, gentlemen, as Gaffer says, no one can sing with a dry throat, so all have a drink with us. Landlord, hi ! . . . Landlord, fill them all up and have one yourself.

VOICES : Murmurs of approval and thanks. (*Rattle of glasses and tankards.*)

GAFFER : Well, well, thank'e kindly, zur. Yurs to the very good 'ealth of yur both, and may'e have a very 'appy Christmas.

VOICES : Yur . . . yur, etc.

Come on then, Gaffer, that thur throat of yourn bain't be dry and tickly now. Get on wi'it."

GAFFER : Not so fast. Let I get up first. Where's that darn stick of mine. Ah ! . . . (*Grunts and puffs.*) That's better.

VOICE : What's it going to be Gaffer ?

(*Gaffer sings suitable country songs and all join in chorus. Insert items to suit own requirements.*)

JACK : (*After songs, etc.*) Well, gentlemen, as much as we enjoy your company we must be getting on. What do you say, Ann ?

ANN : (*Sighing.*) " Um . . m ! I suppose we must, but it's rather hard to leave this lovely fire for those bleak roads. (*Shuddering.*) Bu . . . rr.

(*Sound of shuffling feet as Jack and Ann prepare to leave.*)

JACK : Well, landlord, what's the damage ? We must be on our way.

LANDLORD : Let I zee now, there was . . . (*They move away from the mike.*)

GAFFER : Which way be'e going lady ?

ANN : Devonshire way. 'Er. . . . Mr. Gaffer.

GAFFER : Oh. . . . Then you'll have to go up Chain Hill and pass Bill Hayman's place on the edge of the moor at top of the 'ill. You'll find it powerful bleak and windy up thar to-night.

ANN : Do you think the storm is going to last.

GAFFER : I don't suppose it'll blow 'erself out afore dawn. But you'll be all right unless it turns to snow, then I doubt if you'd get through. A car tried last year, on just such a night as this (*Sound of wind still blowing*), and she run off the road and got all smashed up. Still, don't 'e worry. . . .

JACK : Are you all O.K. Ann. Fasten up your coat collar. Well, good night folks and thank you for the pleasant time.

ANN : Good night everyone, thank you so much and . . . a happy Christmas to you all.

VOICES : Good night, lady. Good night, zur. 'Appy Christmas. (*Sound of shuffling feet and click of the latch. Fade down noise of yokels, etc., and fade UP noise of storm and rain as door is opened.*)

LANDLORD : Come back, Rover. Come back, will'e ? (*Sound of Rover barking.*) You bain't going out in this. Come back, zur.

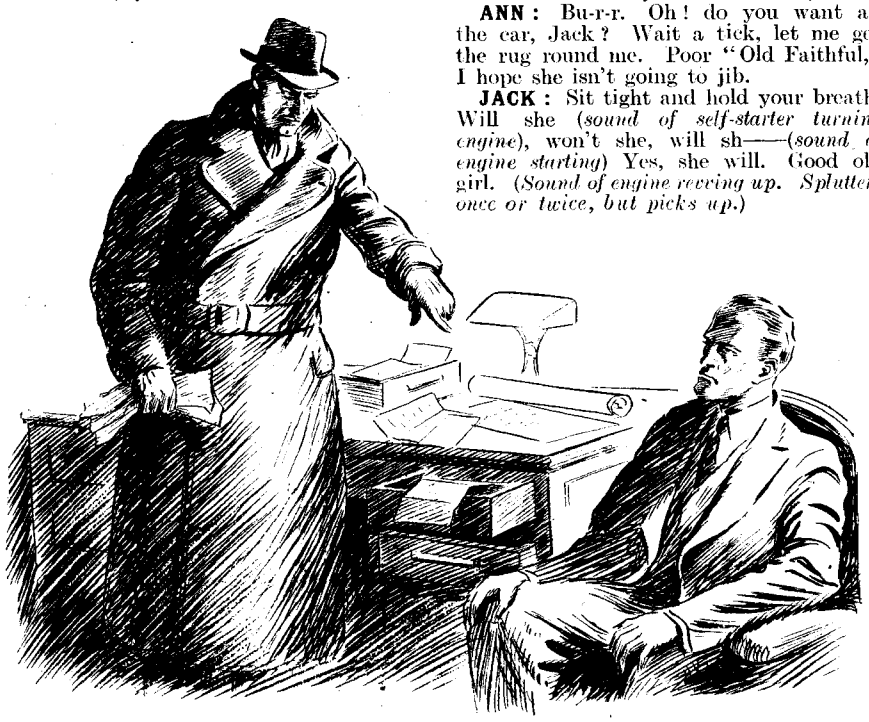
JACK : Make a dash for the car, Ann. Go on . . . I'm coming. Good night, landlord. (*Sound of dashing feet.*)

LANDLORD (*faintly, as if drowned by the noise of wind and rain*) : Good night, zur. Safe journey.

(*Sound of inn door being slammed and then the two doors of the car in turn.*)

ANN : Bu-r-r. Oh ! do you want all the car, Jack ? Wait a tick, let me get the rug round me. Poor " Old Faithful," I hope she isn't going to jib.

JACK : Sit tight and hold your breath. Will she (*sound of self-starter turning engine*), won't she, will sh——(*sound of engine starting*) Yes, she will. Good old girl. (*Sound of engine revving up. Splutters once or twice, but picks up.*)



" So you are getting reasonable at last, eh ! Sir John ? "

ANN : Home, John. And, by the way, according to our cheerful Mr. Gaffer, keep a sharp look-out for avalanches, icebergs, one or two landslides and a few hurricanes. Otherwise. . . . Shush . . . Listen, they are at it again.

(*Sound of engine revving, gear being engaged and the car slowly moving off.*) (*Fade in faint sound of yokels singing Christmas carol and then fade down again as the car moves away and the wind comes up.*)

(*Fade in music. After ten seconds superimpose morse code. Keep both going for a further ten seconds, then slowly fade out.*)

(*In Bill Haymans' transmitting den.*)

BILL HAYMAN : Hullo ! G9XY, GP2S here. I got your report O.K. Many thanks for tip about the P.A. stage. I'll try that out as soon as I can. My leg is going on all right, but I still have to use a stick and hobble around like an old man. I've put up the gain on the modulator, so I'll come back to you for your remarks. GP2S to G9XY and standing by for you, old man. Over to you.

DOUGLAS BUDLEIGH (*heard through the loudspeaker of Bill's receiver*) : All O.K., GP2S, G9XY here. Your speech is R7. Regarding my new shack. You remember my gov'nor was having a change round with his study. Well, I managed to take over his old room for my den, so now I have a posh place instead of the old shack. You know where his place used to be. It was built out from the west wing. He has shifted round to another room leading into the conservatory. I have left all the Tx gear down in the shack and rigged up remote control. How are you standing the storm ? It's pretty bad here. The 'phone lines are down. How are your masts sticking it ? I'll come back to you now, let me know if you have heard from the rest of the boys. G9XY going over to GP2S and standing by. Over.

BILL : GP2S here, Doug. Don't talk to me about the storm. It's enough to blow the insulators off the aerial. You're a lucky blighter, aren't you ? The poor old masts are sticking it so far, but I'm sweating on the top line about the guys. Hang on, I can see them from the window. Lordy, one is jerking about with every biff of the storm. Let's hope she weathers it. I say, Doug. I just caught sight of a car's headlights cutting the blackness. Phew. . . . Poor blighters being out in this. They are just starting the climb up the old hill. Well, G9XY, I think I'll be calling it a day, so I'll just come back to you for your final remarks before closing down. This is GP2S going back to G9XY for final report before closing down and signing off. Over to you, Doug.

DOUG. : G9XY here, Bill. I may have a punt around up on the twenties later on. I don't envy the folks in the car you mentioned. I am quite content indoors to-night. Nice and warm and all secure. I—— (*Excitedly.*) Hi ! What's the game ?

RANIGAN : Stick 'em up, boy ! Come on. This isn't no Christmas play acting. Stick 'em up, damn you, and keep your mouth shut. Turn round. Got the gag, mate ? Frisk him and then lash up that mouth of his. Come on, make it snappy.

DOUG. : What in the hell is your game ?

RANIGAN : Stow it, or I'll——

JONES : Just a minute. Perhaps

he can save us a bit of trouble by telling us where Sir John is.

RANIGAN : Huh. . . . Yea. . . . Well, just keep it quiet and don't get yelling your answers.

DOUG. : You can go to hell as far as I am concerned. Do you think I am going to STAND BY and see a couple of crooks swipe up all they want ? Rats.

RANIGAN : Aw, quit your blasé talk and get down to business. Now, youngster. where is the old man and where would he keep those plans. Spill it and cut out all the boloney.

DOUG. : You swines. Do you think my father tells me of everything he brings home and where he puts it ? In any case, my father is out. He has gone over to Bill Hayman's place to GET HELP for—— (*Sound of struggle.*).

RANIGAN : You poor sap. (*Sound of fist striking face.*) Then take that.

DOUG. : Ow . . .ur'r. (*Sound of thud as Doug. falls to floor.*)

JONES : My heck. You brute, Ranigan. You've knocked the kid right out.

RANIGAN : Now cut it, what do you expect me to do, kiss the kid ? Come on. get that gag on and tie his wrists and ankles. I know what I'm doing. That sock won't hurt him. He'll be round in a few ticks. (*Grunts and sound of Douglas being tied up.*) *Slight pause. Fade in wind.*)

BILL HAYMAN : Good God. (*Sound of feet rushing to door.*) Dad ! Dad, here, quickly. (*Sound of footsteps as Bill's father comes into the room.*)

FATHER : What in the world be up, lad ?

BILL : I was listening to Douglas Budleigh up at Moorside Towers, giving me a final report, when I heard him held up by burglars. They are after Sir John and some plans or something. Douglas managed to give me the tip to stand by and get help. What in the devil can we do on a night like this ? I can't go with this damned leg of mine ?

FATHER : Lawks a massey. Burglars at the Towers, the scoundrels. 'Ere, I'll go down to the village and get help.

BILL : No, dad, it would take ages to reach the village to-night. Besides. . . . (*Excitedly.*) Here . . . there was a car starting to climb the hill just now. He can't have passed yet, go out and hold them up.

FATHER : Right, son, give me that torch. I'll stop 'em if they bain't gone by already. (*Sound of footsteps and the click of the door latch. Bring up storm sound as Bill's father goes out into the night, and then slamming of the door.*)

BILL : The blackguards. I only wish I could go over. 'Phone lines down. I daren't put out a call as I feel certain Doug. meant me to stand by. If that car isn't—— (*Break in sound of grunts coming through Bill's speaker in the form of morse code.*) (*Excitedly.*) It's Doug. G9XY calling GP2S. (*Softly.*) Hullo, G9XY. Bill here ; take it easy and give me details. I heard the hold-up. Trying to get help. Over. (*Grunting morse starts again. Hold it for five seconds and then fade over to Jack and his wife in car plugging up Chain Hill. Sound of storm gets worse as they reach the top.*)

JACK : Come on, " Old Faithful," keep it going. I say, Ann, what a blinking hill ; it's like trying to climb a corkscrew, what with the gradient and the bends. Are you all right ?

ANN : Yes, I'm all right ; you carry on.

JACK : I can make out the top of the hill.

ANN : Go on, old girl. only another lap. . . . (*Excitedly.*) There it is, Jack ! I can see the lights over there. That must be the house Gaffer spoke about. Hurrah, we've made it. Good " Old Faithful."

JACK : Thank heavens for that. Great Scott ! What in the devil is that ? There's somebody waving a light about like mad.

ANN : Oh, lordy. I hope it's all right. Perhaps he wants help though, Jack.

JACK : Ah, that's better. He is in the beam of the headlights now and is holding up his arms for us to stop. (*Sound of car coming to a standstill, but engine keeps running slowly.*)

JACK (*heard faintly above the wind*) : What do you want ?

BILL'S FATHER : It's all right, zur. Zorry to trouble you, but can you come into my house and see my son ? There's been burglars at Sir John's. Will 'e come in and see if you can do owt ?

JACK : Well, my hat. Who said the days of adventure were past. Come on, Ann, we must at least see what's wrong. (*Sound of car doors opening and closing, steps on road, and engine being switched off.*) Right, lead the way then, old man, only make it snappy. (*Sound of opening house door, barking of dog and then fade down storm.*)

BILL'S FATHER : Bill, Bill, here's the folks. Quiet, Prince, back, boy. (*Cut out dog barking.*) (*Sound of morse coming through Bill's speaker.*)

JACK : Shush. . . . (*Quietly.*) He is taking down a message.

BILL : (*Morse stops*). O.K., Doug. Message received. Stand by, old man. (*To Jack*). Thank heavens for the hill, and that we have been able to stop you. There's trouble over at Sir John's place. Two scoundrels are after plans of the new aeroplane. Can you help us out ?

JACK : Phew. . . ! What is it, fifteen miles away. Um-m. Two of 'em, you say. Have you got anything in the way of a gun ? They are bound to be armed.

BILL : Yes, a good idea. Dad, get our two shot-guns and a few cartridges. You've got some pluck, sir, but what about the lady. . . ? Will she wait here ?

ANN : Certainly not. If you are going, Jack, then so am I.

BILL'S FATHER : Here you are, zur. Two of the finest double-barrelled shot-guns ever made.

JACK : Right, now give me details.

BILL : Sir John's room is at the rear of the house which can be entered through a conservatory. Keep straight along the road you are on ; you can't mistake Sir John's place, as the entrance to the drive is flanked with two large stone pillars.

JACK : Right, come on, Ann, we have got to move if we are going to see any of the fun. Try and make contact with the police.

BILL'S FATHER : Take care, won't 'ee, zur. Let 'em have both barrels and then ask afterwards. (*Sound of storm as Jack and Ann go out. Rushing feet and then the slam of the car doors. Sound of self-starter and engine picking up. The car moves off. Introduce gear changing from bottom to top.*)

JACK : Come to glorious Devon for a nice quiet holiday. I didn't bargain for any shooting. Still, variety is the spice of life.

ANN : No, be serious for a moment ; let's get this thing framed up properly —I mean to say, we can't just go dashing in there.

JACK : You are a blighter for convention, Ann, you needn't worry. I shall knock at the door and ask if I . . . . Ow !

ANN : Rats. I mean to say, we must make a plan of attack.

JACK : I've got it. Stone pillars flank the drive. It's ten to one the crooks came down by car and will have their bus near the house. If there are any gates to the drive we will shut them, but if not, we must place poor " Old Faithful " across the entrance. I'll go up to the house and try and scare them out, and, hopeful little lad, get the drop on them with this double-barrelled cannon. You, Ann, had better find some shelter near the drive entrance, then if the crooks should get into their car and make a dash for it, they will be baulked by " Old Faithful."

ANN : Ye . . . e, that sounds all right . . . but . . . Jack, don't be too rash will you. . . . You know I couldn't. . . . (*Fade out and fade in soft music to form a background to.*)

VOICE : GP2S calling GQ3T calling CQ3T GQ3T (*Repeat this several times.*) (*Fade down into music only and after five seconds bring in.*)

VOICE : GQ3T replying to GP2S GQ3T replying to GP2S GQ3T is standing by, so come in GP2S (*Fade up music again for a few seconds and then bring in.*)

VOICE : Hullo. GQ3T, this is GP2S calling. There are burglars at Moorside Towers, Sir John Budleigh's place. contact the police and get help. Very urgent. All 'phone lines down in this area. GP2S going over to GQ3T and standing by.

(*Fade up music for five seconds and then bring in.*)

VOICE : GQ3T replying to GP2S. Your message all O.K. Will contact police at once. Good work, old man.

(*Fade up music and hold it for fifteen seconds.*)

Sir John's Study.

RANIGAN : So you are getting reasonable at last, eh, Sir John ? Well, it was either the plans or your daughter. I thought we could break your cussed determination if we turned to your gal. . . .

SIR JOHN : You fiends. Don't think you will get away with this. You damned traitors.

RANIGAN : Aw' cut the cackle and just open up that wall safe. . . . No, don't trouble to open the door. My mate can do that. I ain't green. You might have a gun in there. Stand back again. Now then, buddy, see if they are in there. Ah ! . . . is that them ? Good, now we are all O.K. (*Shuffling of feet as they move towards door.*) Unlock the door and put the key in the other side. Well, Sir John, we've got a date to keep, so we must toddle along.

(*Fade in quickly the sound of the french window being kicked open, the breaking of glass and shriek of Sir J's daughter.*)

JACK : Drop that gun, you rat.

RANIGAN : Like hell I will. (*Two cracks of automatic pistol.*) The LIGHTS . . . quick. (*Crash of shot gun. Click of switch going off. Shuffle of feet, door slams, click of key, and then rush of feet and slam of hall door.*)

JACK (*faintly through door*) : Switch on the light, Sir John, and follow me to the drive through the conservatory. They've locked that door.

(*Sound of car door slamming, self-starter, whirr of car engine, and then shriek of tyres as the car rushes down drive.*)

JONES (*Excitedly*) : Hell, there's a car across the gateway. Look up !

RANIGAN : Give her the gas. Go for the gap. We've got to get through. (*Terrific crash as car fouls one stone pillar and skids round broadside into Jack's car.*)

(Continued on page 316)

Practical Television

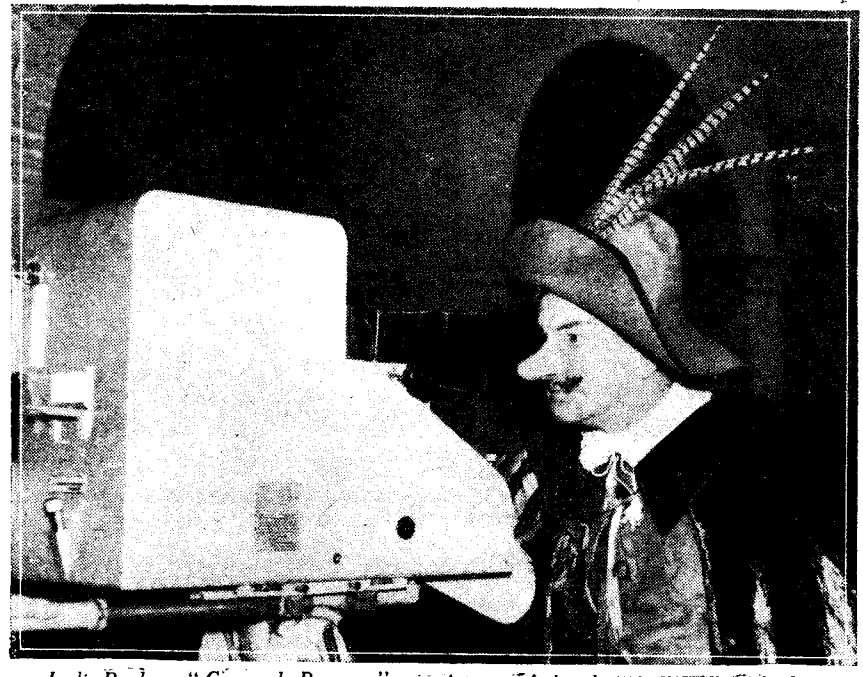
December 3rd, 1938. Vol. 3. No. 128.

Improved Big Screen Television

THE televising of the Lord Mayor's Show and the Armistice Service at the Cenotaph served to feature the improved Baird big screen television equipment which has been installed in the Tatler News Theatre, London. The cinema was closed to the public for four days to allow the apparatus to be installed and tested, and the large audiences of several hundreds paid tribute to the big improvements in the results obtained. Unfortunately, the sky was very overcast for the Lord Mayor's Show, with the result that the pictures had a somewhat foggy appearance at the sides, but this was due entirely to the transmitted signal. This was proved very clearly by the remarkable results seen on Armistice Day, when the better weather conditions enabled the B.B.C. to radiate really excellent pictures that did credit to their service in every way. For the latter occasion three of the improved electron cameras were in use and their greater sensitivity made the work easier except when directed on the face of Big Ben, where the sun got into the lens, and made the clock face almost indecipherable. A new form of projection cathode-ray tube is employed and this is mounted on a projector unit accommodated in the centre of the front row stalls but set farther back from the screen than the original equipment. A much larger diameter lens is employed and the resultant brightness of the picture as seen on an 8ft. by 6ft. screen represents a great improvement on what has hitherto been achieved. If this rate of progress in the improvement of big screen television is maintained, and there seems no technical reason why such should not be the case, it will not be long before the television pictures will equal in brightness those seen in any West End cinema. For full cinema screen size, however, the line definition standard of 405 needs to be increased if complete justice is to be done to the televised picture, and there is no doubt that as the art progresses, this will take place.

The Public and Big Screens

UP to the present there has been a definite ban on the showing of the B.B.C.'s outside broadcast television pictures in places of public entertainment. On the occasion of the Armistice service, however, permission was granted for cinemas to be open to the public so that the broadcast could be seen. Difficulty in obtaining any sanction for big screen television demonstrations has so far centred on the question of copyright. The ruling of the B.B.C. on this occasion, however, was that as the Armistice ceremony at the Cenotaph was a national event, copyright questions were not involved. It would be an advantage if a general ruling was made that all similar national events that occur during the course of the year—State Opening of Parliament, Trooping of the Colour, Lord Mayor's Show, and so on, should be made available at cinemas *via* big screen television. Following on this it is possible that satisfactory negotiations could be initiated to meet such cases as the Boat Race, notable football matches, boxing events, etc., where copyright difficulties could be surmounted by the payment of a fee to those holding the copyright. That events such as these would be an additional box office attraction, especially in the case of News Theatres, is a foregone conclusion. After all, commercial interests are involved in so far as the equipment is concerned at both the transmitting and receiving ends, and it is only right that they should be given an opportunity to reimburse themselves for the expenditure of such large sums in developing the equipment to such an advanced stage. That there is public entertainment in big-screen pictures has been proved quite conclusively on many occasions, and there would be an added incentive to stimulate further progress if questions of this nature were amicably settled.



Leslie Banks as "Cyrano de Bergerac" noses into one of the television cameras at the dress rehearsal of the play which was broadcast recently from the Alexandra Palace Studios.

'Ware Dust

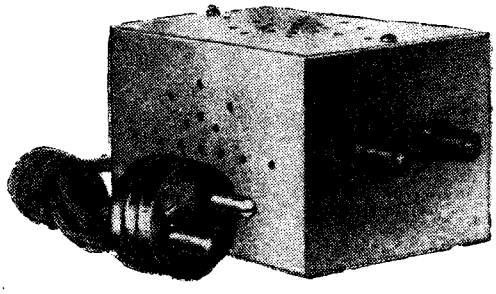
IT is not always realised by the average viewer that the presence of dust can mar what would otherwise be a very satisfactory television picture. In many cases when a picture is viewed directly on the cathode-ray tube screen, the tube face is protected by a sheet of glass so that it will not receive accidental knocks and cause the tube to crack. Dust will collect on both the inner and outer faces of this glass window, as well as on the C.R. tube face, and the result is a partially dimmed and somewhat blurred picture. Cleaning the glass thoroughly but carefully with a chamois leather will make a remarkable difference to picture clarity and should be carried out wherever this is possible. The same thing happens with indirect viewing except that there is now an additional surface for collecting dust provided by the mirror reflector. If not surface silvered this can be cleaned in the normal manner, but when a surface silvered reflector has been provided it will be ruined if cleaned with an ordinary polishing rag. As a rule the manufacturer furnishes careful instructions for this work, and they should be strictly followed, otherwise the reflector can be ruined.

Looking Ahead

BEFORE the Tatler Theatre big-screen demonstration on the occasion of the televising of the Lord Mayor's Show, Mr. Baird made a few remarks which reflects the pioneer's ideas concerning big-screen work generally. He felt that the time was not far distant when the television screen would be taking its place as a permanent adjunct to the cinema screen. Its initial use would be for portraying topical events, but as development takes place the television screen would slowly but surely supplant the present form of cinema screens. Eventually stage plays, topical events and cinema films would be broadcast from selected studios throughout the country to television projectors in every place of entertainment. This would effect large cinema savings in the cost of circulating films in addition, of course, to the great step which will have been taken in enabling audiences to see events at the instant they occur.

XMAS PRESENTS

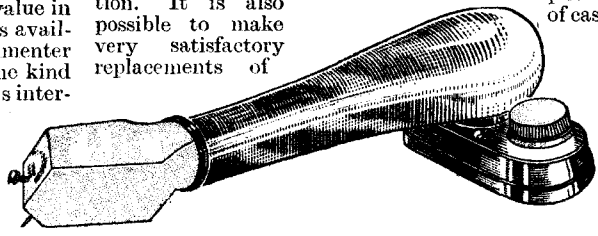
THERE is a very wide range of components and accessories from which the keen hobbyist may choose a suitable item for either a gift to another fan or which he may wish to receive himself from someone who is anxious to make a gift in this form. Such items range from the smaller components, costing only a few pence, up to complete units costing pounds. It would obviously be impossible to deal with everything which is available, but a guide will no doubt prove of great value in view of the very wide range which is available. For instance, a keen experimenter would no doubt find a meter of some kind very useful, whilst an amateur who is interested in short-wave work would undoubtedly find very acceptable a pair of good sensitive headphones. There are many listeners who are using battery receivers but who have mains facilities available, and to these a good battery charger will make a very useful present, enabling the user to keep his battery in good condition. Similarly, a mains unit may be obtained in various forms and will enable the H.T. battery to be dispensed with.



Here is a typical trickle-charger—a Heayberd—costing 12/6.

There are also still many listeners using their radio receivers only for broadcast reception, and in nearly every case a pick-up may be used. Therefore, a good pick-up will make an ideal present and add to the range of entertainment which the radio set provides. A pick-up may be obtained as a simple unit for as low as 5s., or as a complete self-contained unit, with carrier-arm and volume control in various forms.

Among other useful items for presents are loudspeakers—either chassis models or complete cabinet models—microphones, batteries, valves and sundry accessories. Many an old receiver may be improved by re-valving, and a set of valves to-day is not an expensive proposition. It is also possible to make very satisfactory replacements of components, such as coils and tuning condensers, which will improve many an old receiver. Cabinets, of which such a wide range at very reasonable prices are now available form a particularly useful gift as they not only provide means of making an attractive installation out of a receiver and/or gramophone, but they also form, in the majority of cases, a useful piece of furniture. A modern "rack" assembly is always acceptable to the owner of an A.A. or full transmitting licence, while a quartz crystal, complete in holder, will always be appreciated by those interested in this side of radio. These suggestions are naturally rather brief, but a perusal of our advertisements, and perhaps of the catalogues of several of the well-known firms will enable one to select suitable items for Christmas presents.



A pick-up is an ideal present. Models are available from 5/- *upward. The above is a Cosmocord piezo-electric model costing* 30/-.

A good pair of head-phones may be obtained at a reasonable figure and will please many amateurs.

BROADCASTING HOUSE, GLASGOW

A Brief Description of the New Scottish Broadcasting Headquarters at Kelvinside

THE new Broadcasting House, Glasgow, which has been in partial operation since May, 1938, was officially opened by Mr. Walter Elliot, M.P., Minister of Health, on Friday, November 18th.

The premises acquired by the B.B.C. for conversion into the new Glasgow studio centre were formerly occupied by Queen Margaret College, a training centre for women students which was part of the University of Glasgow. The site is on the banks of the Kelvin, adjacent to the Botanic Gardens, Kelvinside. The original College buildings have been considerably modified internally to suit the varied needs of broadcasting, and two new blocks have been built in a style which harmonises with them. The total ground area occupied by the buildings is now actually greater than that covered by Broadcasting House, London.

The Building

The original B.B.C. premises in Bath Street, Glasgow, contained one studio only, which was brought into use in 1923. In 1924 these were superseded by new premises in West George Street and the number of studios was increased to four. There are ten studios in the new Broadcasting House, of which No. 1, the large orchestral studio, has a volume nearly fifteen times that of the largest of the old studios. The new premises are fitted with the most up-to-date technical equpment, which has been developed by the B.B.C. as the result of the experience gained over more than fifteen years of broadcasting.

The Studios

The acoustic treatment of the studios is designed to give the best conditions for the type of programme for which they are to be used. To achieve this result the walls, floor and ceiling of a studio are covered with materials which have certain sound-absorbing properties.

Above the dados are blankets of rock wool one inch thick, arranged either in panels or in horizontal strips, alternating with plaster surfaces. Panels of acoustic felt are fixed to the ceiling. The wood panelling absorbs energy at the lower frequencies, due to resonance, while the rock wool and acoustic felt absorb mainly the higher audible frequencies. The required reverberation time at the different frequencies is secured by correctly proportioning the areas covered by the different materials. The floor coverings of these studios are of narrow oak strips laid on battens which are in turn fixed to the concrete floors.

The walls of the Talks and Gramophone Recitals studios and of the Narrators' studio used in conjunction with Studio 1 are panelled in wood up to within two feet of the ceiling, leaving a frieze which is filled with rock wool and building board. The floors of these studios are carpeted and the ceilings are of ordinary lath and plaster.

Of the two Drama studios, one is acoustically almost completely "dead," the walls and ceilings being covered with rock wool and the floor completely carpeted. The other has a reverberation period of 0.3 seconds brought about by the introduction of a dado of lath and plaster four feet high and a normal lath and plaster ceiling.

The Dramatic Control Room

Associated with these studios is a Dramatic Control Room containing a twelve-channel Dramatic Control panel. The fade controls on this panel to which the studios are connected, operate relays when they are faded up, which break the loudspeaker circuit of the studio concerned and prevent a "howl-back." Provision is made for the addition of artificial "echo" to the output of any studio by means of "echo" rooms situated in the basement. An echo room is simply a bare room containing a microphone and loudspeaker. A portion of the studio output is fed to the loudspeaker and, after being picked up by the microphone complete with "echo," is added to the studio output in the required proportion. The operation of connecting a studio or "echo" room to the panel is performed in the Dramatic Control room itself, thereby enabling changes to be made without involving the Control room. Signalling keys on the panel operate green cue lights in the studios and return lights are fitted so that the studio can indicate that all is ready. A "talk-back" circuit enables the producer in the Dramatic Control room to speak into a microphone connected to the studio loudspeaker for giving instructions during rehearsals. On transmission, the programme cannot be interrupted and the talk-back microphone is then connected to headphones only in the studio.

Adjoining the various studios are listening rooms wherein the control of the volume range of programmes originating in the studios may be carried out. The acoustic treatment is identical to that of the talks studios, and a glass window is provided between each studio and its listening room to permit a view of the studio from the control position. The equipment includes a fading and mixing unit for selecting or combining the outputs of the various microphones in the studio, a loudspeaker and headphones on which the studio programme can be heard and a visual volume indicator in the form of a "programme meter."

Control Room

In the Control Room, programmes originating in the studios or incoming by line are passed from a distribution desk to control desks where the monitoring and amplitude control is carried out. The (controlled) signals are then fed to another switching desk equipped for sending programmes to outgoing lines to the transmitters or other studio centres. Immediately behind the row of desks is a large amplifier rack containing high-gain microphone amplifiers, control amplifiers to compensate for the attenuation caused by the mixing and control channels, and incoming and outgoing line amplifiers. These latter adjust the volume level for sending to line or alternatively compensate for the drop in volume of the signals coming in from Outside Broadcasts or other studio centres.

The Control Room of the new Broadcasting House, Glasgow.

The actual switching is done by punching keys operating 24-volt relays. Each studio is tied to a microphone amplifier, and it is the output of these amplifiers which is connected to the input-switching relays of the control amplifiers. The gain of the control amplifiers can be adjusted by potentiometers on the desks in the control room, in the studio listening rooms, or in special control cubicles provided for the purpose. The control potentiometers on the control room desks and in the studio listening rooms are connected in series. Whichever one is not in use for controlling must, therefore, be faded right up. Some indication is desirable and this is given by lamps which glow brightly until the control is fully faded up and are then dimmed by the action of a relay circuit.

Xmas Records

WITH the approach of Christmas one thinks of parties and entertaining friends, and one of the best forms of entertainment is undoubtedly the gramophone. Although the various companies have not yet released their Christmas records, there is a wide selection of interesting items in the latest releases.

For the music-lover the Parlophone Company have issued an ideal Christmas gift consisting of a complete recording of the opera "Turandot." It is recorded on sixteen 12in. double-sided records, complete in two handsome art albums, with libretto (in Italian) for £4 16s. The cast taking part are Gina Cigna (Turandot), Franco Merli (The Unknown Prince), Magda Olivero (Liù), L. Neroni (Timur), A. Poli (Ping), A. Zagonara (Pang) and G. Del Signore (Pong). The numbers of the records are *Parlophone R* 20410 to *R* 20425; single records 6s. each.

Richard Tauber has chosen two well-known songs "Sylvia" and "Trees" for his latest disc, *Parlophone RO* 20426. He sings both songs in English, and it is definitely an outstanding record.

A 14-year-old Singer

ONE of the most interesting records this month features a fourteen-year-old girl soprano, who records for the first time. She is Millicent Phillips, and was discovered and trained by Mavis Bennett, the distinguished singer. She has been advised to go to a London college of music to complete her training, but her father cannot afford the fee, so Millicent's career is therefore in jeopardy.

If her records sell she will have a chance to complete her musical education—if not, England may lose a brilliant little singer. Her recorded titles are "Il Bacio" and "Voices of Spring," sung to the accompaniment of a full orchestra. I hope readers will make a point of hearing this record—*Parlophone R* 2589.

Miss Phillips has not appeared in public, but was given a broadcast in "Band Waggon" on November 2nd, and received an ovation.

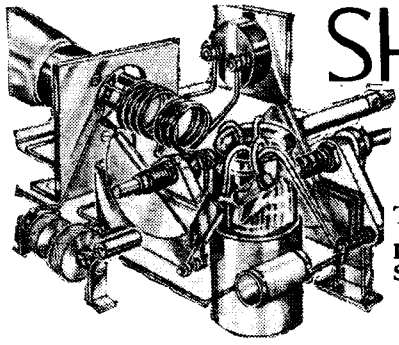
Variety

LESLIE HUTCHINSON (Hutch) has two records this month, "Cinderella Sweetheart" and "A Garden in Granada"—*Parlophone F* 1268 and "Change Partners" coupled with "I Used to be Colour Blind" from the film "Carefree" on *Parlophone F* 1269.

Medley records should prove popular at Christmas parties, as everybody can join in the choruses. Ivor Morton and Dave Kaye on two pianos with string bass and drums have made "Tin Pan Alley Medley No. 12" on *Parlophone F* 1270, and they introduce several of the latest hit tunes.

Ideal dance records in strict dance tempo are supplied by Victor Silvester and his Ballroom Orchestra. They are "Change Partners" and "The Night is Filled with Music" on *Parlophone F* 1263, and "Cinderella Sweetheart" coupled with "Is That the Way to Treat a Sweetheart?" on *Parlophone F* 1264.

A humorous recording is supplied by Douglas Byng, the popular comedian, with "I'm a Bird" and "The Mayoress of Mould-on-the-Puddle" on *Parlophone F* 1277.



SHORT-WAVE SECTION

THE CHOICE OF L.F. COUPLING

Points to be Considered in the Choice of Suitable L.F. Coupling in S.W. Receiver Design are Discussed in this Article.

OF the many problems which face the constructor in the course of designing a new receiver, that concerning the choice of L.F. coupling requires considering both as an individual function and again in conjunction with the H.F. section of the circuit.

The simplest form of coupling, and one which is favoured particularly for circuits working on the higher frequencies, is the resistance-capacity method, and although this undoubtedly provides the better quality, whilst being the cheaper way, the alternative systems of transformer and choke coupling, including such as filter feed, have their merits in other directions.

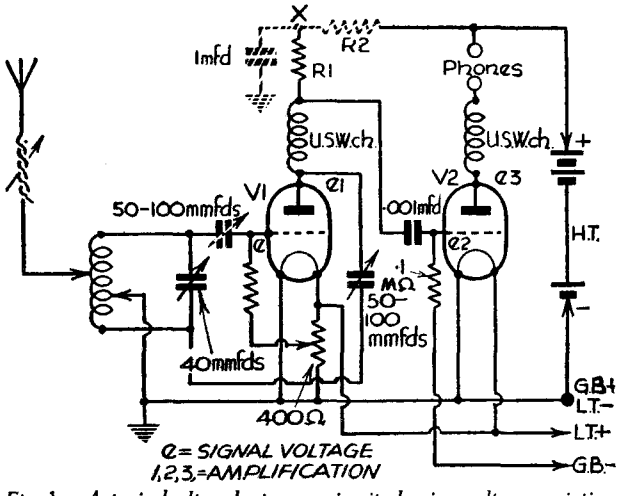


Fig. 1.—A typical ultra-short-wave circuit showing voltage variation from stage to stage.

The points which arise with short-wave receiver design concern primarily the effects of decoupling and H.F. feed-back, or "break through," and the ultimate possibilities regarding instability in badly-arranged transformer coupling.

For a practical example reference can be made to Fig. 1 which shows in theoretical form a commonly used ultra-short-wave circuit. Now in the first place the received signal voltage "e" at the grid of the detector is increased by the amplification of this valve, and becomes "e1" at the anode, but in view of the alternating character of this signal and the lack of decoupling in the way of a by-pass condenser to earth, some of the H.F. signal will most certainly find its way back to earth through the H.T. battery, as this constitutes the shortest path of resistance. This condition of feed back causes L.F. instability through difference in the phase relationship of "e" and "e3" with ultimate loss in amplification.

Counteracting Feed-back

To combat this deficiency, it is necessary to introduce a shorter path to earth for the H.F. signals "e1" and this brings one to the question of reactance.

By fitting a large-capacity condenser at the junction "X," whilst splitting the anode resistance, as shown by the dotted lines, the signals arriving at this junction have the option of two paths to earth, the shorter of these being governed by the reactance of the condenser at the actual frequency of these signals. To make this clearer one should consider the meaning and method of determining this value; and below is given the formula for this in respect of condensers.

$$\text{Reactance (in ohms)} = \frac{1{,}000{,}000}{6.28 \times f \times C}$$

Where f equals the frequency (calculated usually between 50-100 cycles), and C equals the capacity in mfds.

Example:

$$\frac{1{,}000{,}000}{6.28 \times 50 \times 1} = 3{,}184\ \Omega$$

From this formula it will be apparent that the value of the resistance on the H.T. side of the condenser should be made so that for the frequency response, the reactance of the condenser will always be less, thus offering a shorter path to earth.

Voltage Drop

The next point which arises concerns the voltage drop which will result in the use of resistances in the anode circuit, thereby necessitating the employment of a larger H.T. battery than would be deemed essential for the satisfactory operation of the particular valve used in the detector stage.

To meet this condition, an alternative method would be achieved by using a directly-coupled transformer (see Fig. 2), this arrangement permitting the by-pass condenser return to be made more direct whilst the voltage drop through the resistance of the transformer primary is very much lower than that in Fig. 1, at the same time the signal voltage at the injection grid of V2 has been boosted by the step-up characteristic of the transformer secondary, unless, of course, a ratio of 1 : 1 is being used.

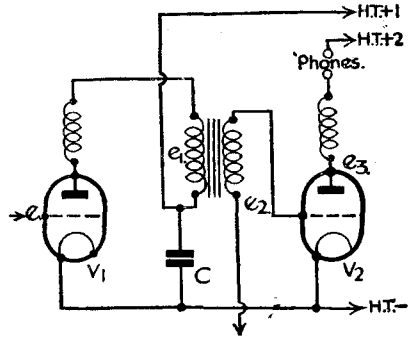


Fig. 2.—Circuit diagram incorporating a directly coupled transformer.

This may seem a comparatively sound solution to the problems, but whereas in a fairly simple detector L.F. broadcast circuit instability through H.F. feed-back might not be apparent to such an extent that reproduction is marred by "motor boating," this arrangement when used indiscriminately for short or ultra-short-wave work can cause endless trouble in the nature of loss of amplification and hand-capacity effects through the output stage.

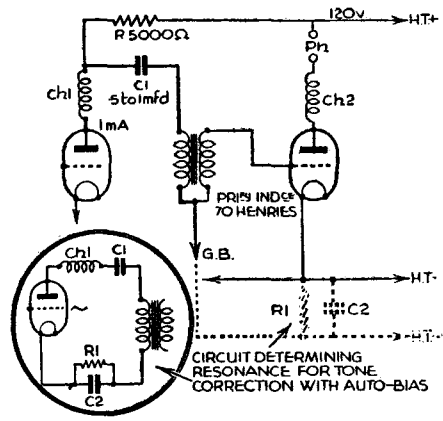


Fig. 3.—Circuit diagram of a filter-fed transformer system.

Filter for Transformer Coupling

One must now look to the method which will still permit the retention of the major benefits obtained in transformer coupling; thus we get the well-known filter-fed transformer system.

In Fig. 3 is depicted a method which, whilst requiring the use of a resistance of, say, 5,000 ohms for the detector H.T. decoupling, will cause only a negligible drop of about 5 volts, assuming the anode dissipation to be in the neighbourhood of 1 milliamp.

The by-pass condenser now serves to return some of the H.F. signals to earth through the grid-bias battery, or if automatic bias is being used, as shown by the dotted portion, through a low bias resistance and another by-pass condenser C2.

In this circuit another condition arises which must be taken into consideration, namely the resulting resonance of the inductance/capacity circuit, and this will naturally mean that any variation to either inductance or capacity will result in tonal

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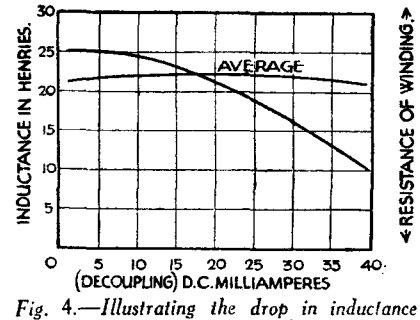


Fig. 4.—Illustrating the drop in inductance resulting in a badly designed choke using thin high-resistance windings.

(*Continued from opposite page*)

variation; thus with different ratios of transformer and capacity coupling, bass and treble can be accentuated as desired. This condition, however, is not so vitally important when dealing with small short-wave circuits where only one or perhaps two stages of L.F. amplification are in evidence, but proves an asset in powerful receiver design.

One of the advantages in using filter-fed transformer coupling, so far as short-wave circuit design is concerned, lies in the smallness of such transformers specially designed for this coupling. It will be apparent that the primary winding of these transformers is not called upon to carry any appreciable current, therefore the use of finer wire is permitted, but without detriment to the response to the frequencies it is to handle.

Due to the high permeability of the metal used in the construction of such transformers, it is possible when the anode current of the preceding valve does not exceed the manufacturer's limits, for direct transformer feed to be employed, and with excellent results, and from the point of view of short-wave design, the overall dimensions of the average filter-fed transformer are such that a very small field is offered; this means that H.F. influence externally is reduced to a minimum, whilst compact component lay-out is permitted. Screening between the H.F. and L.F. portions, whilst helping to cure instability, can if badly arranged, cause damping, and should the earth connections to the screen be in any way deficient, it is quite possible for some of the H.F. currents to be "deflected," thus influencing any adjacent component, particularly of an inductive nature, and giving rise to either parasitic oscillation or instability.

In the case of a tuning inductance or, say, an H.F. choke, the reactance of this component can be effected with consequent loss at certain frequencies, and again in the instance of a detector anode choke, resulting in the complete cessation of either reaction or regeneration.

Permeability

The permeability of a choke or transformer is important when considering reactance in direct-fed amplifying stages, inasmuch as the decoupling is concerned, and a typical example of a choke which depreciates in inductance value with the increase in anode current can be graphically illustrated, as in Fig. 4.

The reason for this falling off at the end of the curve can invariably be traced to the inferiority of the winding, this being usually due to the employment of a much thinner gauge of wire. The formation of the laminations of the choke or transformer constitute another cause for depreciation, although this will not have anything to do with curve given. The "curve" should be very nearly "straight" to represent the desired response in a good choke.

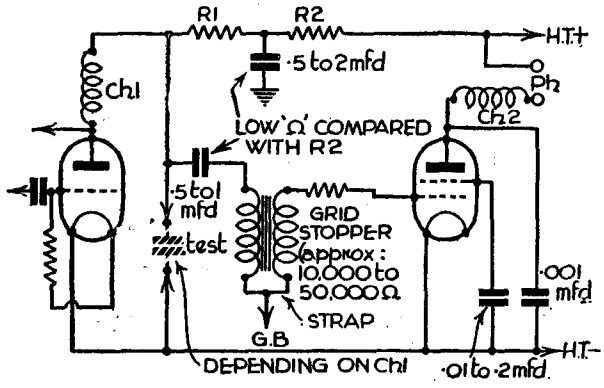


Fig. 5.—Suitable values for the various components are given in this illustration.

Considering the foregoing notes, it will be clear that for preference, the resistance capacity method of decoupling should be used in short-wave work, and it is generally well worth while sacrificing a little H.T. in the interests of the points mentioned.

The merits of transformer and filter-feed coupling should be applied after at least one stage of R.C., and it is bad policy to try to boost up signals by resorting to more than one stage of direct transformer coupling, even if the system is to be such that the first stage of amplification is carried out by filter feed, and followed by direct transformer coupling.

Space will not permit further notes on the prevention of parasitic oscillation, but there are a few final remedies which can be found in grid and anode stopper resistances or H.F. chokes, not forgetting the free use of anode by-pass condensers under extreme conditions. These condensers can be so arranged that the by-pass capacities for each individual stage of amplification are of different value, thus filtering more effectively the stray H.F. signals at each point of amplification. The reactance of these condensers at these different frequencies varies the path of resistance to earth irrespective of the actual component resistance. Figs. 5 and 6 outline in a self-explanatory way the considerations just made, and should the reader try out the effects of different capacities from anode to earth, the leads of any condenser pack, or test box, should be unscreened, and as short as possible; the best method, of course, is actually to solder the condenser into the receiver in each case, noting the response.

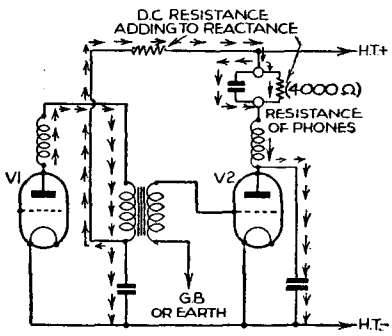


Fig. 6.—This diagram shows the main direction of current flow as explained in the text.

Leaves from a Short-wave Log

Short-wave Broadcasts from Switzerland

PENDING the bringing into operation of special transmitters, the Swiss Broadcasting authorities are transmitting radio programmes at regular intervals through the Prangins (League of Nations) stations. Every Monday at G.M.T. 23.45 HBL, on 32.1 m. (9.34 mc/s), and HBP, on 38.48 m. (7.79 mc/s), broadcast to North and South America respectively. In addition a series of transmissions are made on the first Saturday in each month through HBO, on 26.31 m. (11.4 mc/s), at G.M.T. 07.45 for Southern Asia, Australia and New Zealand, and through HBJ, on 20.64 m. (14.53 mc/s), at G.M.T. 12.45 for the Far East, with a further transmission at G.M.T. 16.45 destined to African listeners.

Another Broadcaster in Cuba

COCA, Havana, habitually used for the relay of radio programmes to the United States, may now be picked up on 32.97 m. (9.1 mc/s). Address: Avenida de Italia, 102, Havana (Cuba).

Short-wave Programmes from Iraq

PENDING the opening of the proposed short-wave Baghdad-Chiftlig transmitters a small experimental station is now relaying programmes from the local medium-wave studio. The channel is 41.67 m. (7.2 mc/s). Times: G.M.T. 13.30-20.00 daily.

Radio in French Cameroons

FOR the relay of the news bulletins from Radio-Mondial (Paris), and also for the broadcast of local news and announcements, the French Colonial P.T.T. have placed a short-wave transmitter at the disposal of the authorities. Most broadcasts are made on 26.62 m. (11.27 mc/s), on a power of 800 watts through station FIA6 at Douala.

For Ultra-short-wave Listeners

HERE are a few calls of the U.S.A. Police Headquarter transmitters working on the 8 and 9 metre bands: WQID, Reading (Mass.), 7.916 m. (37.9 mc/s); WQIJ, Hackensack (N.J.), 8 m. (37.5 mc/s); WQJG, Wellesley (Mass.), 8.357 m. (35.9 mc/s); WQIP, Boston (Mass.), 8.451 m. (35.5 mc/s); WQIK, Eaglewood (N.J.), 8.955 m. (33.5 mc/s); WQIY, Atlantic City (N.J.), 9.063 m. (33.1 mc/s); WPFA, City of Newtown (Mass.), 9.44 m. (31.78 mc/s); WQJF, Chicago (Ill.), 9.646 m. (31.1 mc/s); WQIE, Newark (N.J.), 9.772 m. (30.7 mc/s).

Music-hall of the Air

UNDER this somewhat misleading title—at least, to British ears—W3XL, Boundbrook (N.J.), on 16.87 m. (17.78 mc/s), 35 kilowatts, now re-broadcasts from WJZ, New York (U.S.A.), abbreviated performances of Grand Opera every Sunday from G.M.T. 17.00.

Boston's Test Transmissions

WIXAL, Boston (Mass.), U.S.A., is trying out the new 10-kilowatt transmitter on 13.98 m. (21.46 mc/s). During October a special experimental broadcast was made daily at G.M.T. 15.00, and intended for European reception. Other channels used by this station are 19.67 m. (15.25 mc/s), 25.45m. (11.79 mc/s), and 49.67 m. (6.04 mc/s).

Televiews

A Successful Experiment

"I HAVE always held strongly to the view that it is folly to oppose the march of progress," were the words spoken by Basil Dean, the theatrical producer, at the conclusion of a very successful television experiment recently. It was the occasion when J. B. Priestley's Yorkshire farce "When we are Married" was televised direct from St. Martin's Theatre, and received on home screens with a clarity which rivalled many Alexandra Palace studio programmes. It was a lead which Britain gave to the television world, and a rough estimate states that more than 25,000 people saw and heard the play; the biggest audience ever known for a stage play. Mr. Dean is to be admired for his courage and foresight, and in emphasising that the new medium of entertainment furnished by television should be encouraged, pointed out that the theatre has no reason to be afraid, for the legitimate stage will never die. No doubt others will take the cue from this producer, and co-operate in a manner hitherto thought dangerous to their own interests. For the purpose of the experiment there was a general deepening of the make-up used by the actors, while more intensive lighting was provided round the stage and in the boxes. Three cameras, one at each end of the stalls and another in the circle, enabled the whole action of the play to be followed clearly, while the atmosphere of the theatre was provided by the large audience in the seats, the rise and fall of the curtain, and the usual ten-minute interval. It would appear that the cast of the play seemed encouraged, rather than upset, by the unusual conditions operating and they acted with great vivacity, entering into the spirit of television adventure in a manner which called for praise. Anyone desirous of making a comparison with viewing the play from the auditorium and the pictures provided on the television screen could adjourn to an upstairs lounge where a television set enabled the rich humour of the play to be enjoyed. Signals were fed through to the cable ring which runs through the heart of London, and seemed to lose nothing in their quality when judged in comparison with direct studio material. It is hoped that this experiment will presage the inauguration of other play transmissions of a similar nature.

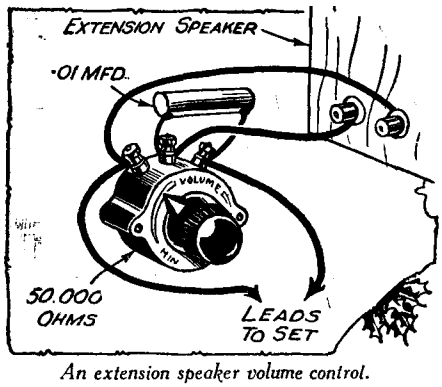
Television and the Planets

IN some quarters it was wondered why the B.B.C. did not make any attempt recently to televise the eclipse of the moon. The reason given was that the light of the moon was insufficient for television, but that as soon as the anticipated sun spots appear the B.B.C. may try to reproduce them on home television screens. The question of using electronic methods in relation to the study of the planets in the heavens has quite often been raised and, strictly speaking, there should be no prime difficulty in this connection. First of all, it is known that large electron microscopes have been built, these being capable of giving magnifications of several thousand diameters; in any case, considerably in excess of any standard optical means. Is it not possible, therefore, for an image of any one planet to be focused on to the screen of an electron telescope in spite of the very low light value of the object? This could then be scanned, and the signal reproduced electrically after amplificaton by established methods. The resultant picture should then possess sufficient brightness and contrast to be focused on to an electron camera for subsequent reproduction as a television image. The results would be more certain if any intermediary scanning could be avoided as this may complicate the arrangements and necessitate elaborate synchronising arrangements. It is certain, however, that very soon the principles of television, or better still electronic engineering, will be harnessed to the needs of astronomy, and when this occurs it is equally certain that remarkable additions to our knowledge of the stars will materialise.

RADIO REVELS

How to Use Your Radio to Add to the Party Spirit

WHEN the party spirit is beginning to flag and you have exhausted all the usual indoor games, it should not be forgotten that the radio receiver may be turned to good account and will provide considerable entertainment, apart from its normal function of providing speech or music for listening purposes. If you have a microphone or pick-up you can add still further to the many ideas which may be employed in making your set take its part in the festivities. There are many versions of Musical Chairs, such as Musical Arms, where the players link arms instead of sitting down when the music stops, or where a paper hat is passed from one head to another whilst the players stand in a ring, the players upon whose head the hat rests going out when the music stops. Other ideas may be used, and by making use of a radio-gram, the record may provide the music and the pick-up may be lifted to stop the music or a switch may be included in the circuit to produce the necessary silencing effect. If you want to make the game more interesting the pick-up may be in another room, and the reproduction carried out through an extension speaker. The latter may be silenced or controlled by means of a standard volume control across it as shown below, and the record may thus be left in place through the entire record.



An extension speaker volume control.

Guessing games may be introduced by playing short extracts from records, placing the needle at the beginning and switching in at odd places for just a bar or two. Alternatively, by making another hole in the record, separated about $\frac{1}{8}$in. from the original hole, the record may be played eccentrically and this will make it very difficult to identify a tune or voice.

Playing Records Backwards

Another interesting idea is to play a record backwards, driving it by pressing it against the edge of the turntable, round which a length of adhesive tape has been affixed. Care must be taken to place the pick-up in the correct position so that the needle does not dig into the record. Special records are also supplied by the well-known record companies in which race games or medleys are provided.

By interrupting the output circuit you can also introduce some good competitions. The two leads normally taken to the extension loudspeaker should be disconnected, and the single lead from the output filter condenser should be attached to some metallic body which is in contact with the speaker, whilst a large number of leads should be bunched together and attached to some non-metallic object. Included amongst these leads should be one which is joined to the nearest earth point (or to the remaining extension lead). If now any of the bunched leads are touched to the remaining speaker terminal nothing will happen, but if the earthed lead is placed there the signals will be restored. Versions of Hunt the Slipper, Blind Man's Buff and other party games may be introduced, by giving each player a lead or letting them select one, and the player who finds the "live" lead is the winner.

Various "gambling" games may be made up with these loose ends, attaching them to a board of plywood and arranging for various metallic objects to be moved over it. Drawing-pins may be used as contact points, and coins could be thrown on the board, the arrangement of the points being so made that certain combinations which can be bridged by a coin will complete the circuit. Alternatively, a map of Europe may be used and various towns connected to the points, and the players have to identify the towns when called out and thereby complete the circuit. Journeys from one place to another may be made in this manner, the pair completing their journey first being declared the winners.

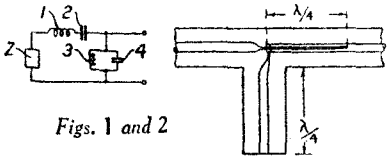
The ideas given above should give everyone some indication of the various uses to which the receiver may be put, and no doubt many interesting versions will suggest themselves when once the main ideas have been grasped.

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.

WIRELESS SIGNALLING.—Cork, E. C., and Pawsey, J. L. No. 490449.

An aerial or other load impedance, the effective resistance of which varies with frequency in a parabolic manner over the range of frequencies to be handled and the reactance of which varies linearly is associated with shunt and series reactances



Figs. 1 and 2

which render the resistance and the series reactance substantially constant over said frequency range. In one embodiment, when the resistance of an impedance Z, Fig. 1, decreases with variation from a fixed frequency in the range, a series resonant circuit comprising inductance 1 and capacity 2 compensates for said decrease and a parallel resonant circuit 3, 4 connected across the combination 1, 2, Z compensates for the variation in susceptance. The parallel circuit may be tapped to form an auto-transformer. The lumped reactances may be replaced by quarter wavelength transmission line sections. A similar arrangement is described for the compensation of a resistance characteristic which rises on each side of a fixed frequency in the range to be used. Reference is made to Specifications Nos. 451494 and 469245.

WIRELESS SIGNALLING.—Lorenz Akt.-Ges., C. No. 490485.

To enable a superheterodyne receiver to receive signals simultaneously on two wavelengths, the intermediate frequency is arranged to be the same frequency as that of the wanted transmission and a single aerial is coupled to both the heterodyning part of the receiver and the *i.f.* amplifier. As shown the heterodyning part 1 of the receiver is coupled to aerial A by coupling 4, the *i.f.* signals being fed to the *i.f.* amplifier 2. The aerial is also coupled to the *i.f.* amplifier directly by coupling 5 through rejector device 3 which is provided to prevent back-coupling. The apparatus is intended to be used for the receipt of distress signals, the intermediate frequency being equal to that on which distress signals are broadcast.

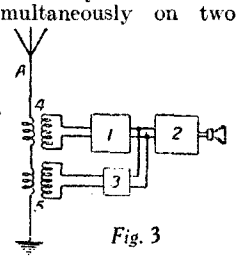


Fig. 3

AERIALS.—Cork, E. C., Manifold, M. Bowman, and Pawsey, J. L. No. 490414.

A capacity-loaded aerial is formed by severing two twisted lengths of wire 1, 2 alternately as indicated at 3 and 4 respectively. The wires are mutually insulated by enamel or cotton covering 5, and a rubber sheath 8 and a suitable core 7, which may be reinforced to assist suspension of the aerial, are provided. Fig. 4.

Fig. 4

NEW PATENTS

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

Latest Patent Applications

32445.—Antenne and Kabel Akt-Ges.—Frame antenna arrangement for non-directional reception. November 8.

32096.—British Thomson-Houston Co., Ltd., and Kinman, T. H.—Radio interference suppression devices. November 5.

32581.—Edwards, B. J., Jackson, D., and Pye, Ltd.—Scanning, etc., devices for cathode-ray tubes. November 9.

32040.—Garrard Engineering and Manufacturing Co., Ltd., and Offen, F. J.—Pick-up control mechanism for automatic gramophones. November 4.

32025.—Hazeltine Corporation.—Television scanning systems. November 4.

32197.—Ideal Werke Akt.-Ges. fur Drahtlose Telephonie.—Motor control for the tuning means of broadcast receivers. November 7.

32031.—Kolster-Brandes, Ltd., and Smyth, C. N.—Sound-reproducing apparatus. November 4.

32393.—Lorenz Akt.-Ges., C.—Television transmitters. November 8.

32362.—Scruby, B., and Roberts, A. J.—Method for receiving inaudible sound vibrations. November 8.

32388.—Standard Telephones and Cables Ltd.—Systems of exploration for picture transmission. November 8.

Specifications Published

494857.—Pinsch Akt.-Ges., J.—Electromagnetic resonators for use in radio or like apparatus.

494967.—Fernsch Akt.-Ges.—Television and like apparatus.

495035.—British Thomson-Houston Co., Ltd., and Eade, S. R.—Illuminating systems for optical-projection apparatus.

495066.—Metcalfe, C.—Radio and like receiving apparatus.

494979.—Strafford, F. R. W., and Belling and Lee, Ltd.—Radio-frequency receiving systems.

494939.—Aga-Baltic Radio Aktiebolag.—Arrangements for automatically controlling the volume in radio receivers.

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

BOROUGH POLYTECHNIC'S NEW LECTURER IN RADIO ENGINEERING

A NEW appointment of Lecturer in Radio Engineering has recently been made by the Governors of the Borough Polytechnic. This is a full-time appointment necessitated by the developments which have recently taken place in the Department, including courses for the new National Certificates in Radio Engineering, and those in Radio Service Work, and additional Day Courses in Radio Communication.

Mr. S. N. Ray, M.Sc., A.M.I.E.E., A.Inst.P., has been appointed to fill the post. In addition to holding a first-class honours degree in Physics of Calcutta University, Mr. Ray obtained an Honours Degree in Electrical Engineering at London University.

TELEVISION AT CHRISTMAS

SOME good fare is promised for the festive season when an interesting programme opens with Gordon Daviot's historical drama, "Richard of Bordeaux," in the evening of December 18th, with Gwen Ffrangçon-Davies in her original part as the Queen. The play will be produced by Michael Barry. On the following afternoon, Stephen Thomas will present "The Knight of the Burning Pestle," by Beaumont and Fletcher, an Elizabethan comedy which stages a play within a play, with interruptions from the audience. A high-flown drama of thwarted love is thus reduced to something which has been described as "period panto."

In the evening of December 19th, Reginald Smith will present "Review of Revues," featuring Phyllis Monkman, Edward Cooper, Queenie Leonard and other stars of the "Re-view" shows, which have now reached their seventh edition.

Edgar Wallace's exciting detective play, "The Ringer," will be televised in the afternoon of December 21st, and evening of December 27th. In the evening of December 21st, Spike Hughes's burlesque pantomime, "Cinderella," will be presented by Dallas Bower. This was originally broadcast last Christmas.

In the evening of Christmas Day, Noel Coward's comedy, "Hay Fever," will be presented by Reginald Smith, with Kitty de Legh, playing Marie Tempest's original part of Judith Bliss.

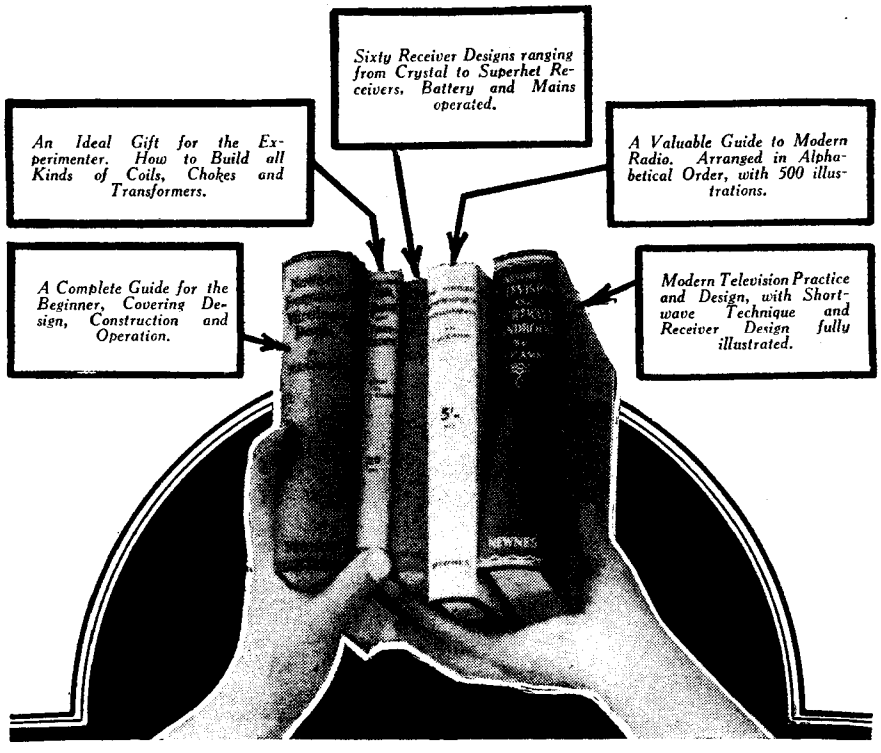
In the afternoon of Boxing Day, "Once in a Lifetime," the brilliant comedy of Hollywood life by Moss Hart and George Kaufmann, will be presented by Eric Crozier, with Joan Miller and Charles Farrell in the leading parts. This is the first television play to run into five performances.

Denis Johnston will present his own play, "The Moon in the Yellow River," in the afternoon of December 28th.

Books for Christmas

BOOKS are, of course, the most acceptable of gifts at any time, and for the wireless amateur there is a wide range of technical books available from this office. We show below a reproduction of five of these, and from the complete list it will be possible to select a volume which will appeal to every type of listener. For the beginner, for instance, there is the *Wireless Constructor's Encyclopædia*, now in its sixth edition. This costs 5s. (5s. 6d. by post) and deals with the subject of radio on the lines of an illustrated dictionary. If, for instance, you come across some term in an article in these pages which is not clear to you, turn it up in the Encyclopædia, and you will find not only a description but, in many cases, practical illustrations or applications of the device or circuit referred to. There are 394 pages and nearly 500 illustrations.

Another very good book for the beginner is *Everyman's Wireless Book*. This is so arranged that even a schoolboy will be able to follow the subject, and it forms a very good guide to modern radio, dealing with various items of equipment, making testing apparatus, and so on. It shows how to build a receiver and how to trace and check faults which might arise. Details are given on selecting loudspeakers, and so on. This costs 3s. 6d., or 3s. 10d. by post.



For the Advanced Amateur

The keen experimenter or advanced amateur is catered for by several text books such as the *Service Manual*, *Transmission for Amateurs*, *Workshop Calculations*, and others. For practical work there is *Sixty Tested Wireless Circuits* and *Wireless Coils, Chokes and Transformers*. The former, as its name implies, gives sixty circuits, ranging from simple crystal sets to multi-valve superhets, and lists of parts and lay-outs are given. In the case of some of the receivers described, full-size blueprints are available at 1s. each. This book costs 2s. 6d. (by post 2s. 10d.).

Wireless Coils, Chokes and Transformers gives detailed instructions for making short-wave and broadcast coils, L.F. and mains transformers and various types of choke. Wire tables and all relative matter is included in the 172 pages, and the cost is 2s. 6d. (post 2s. 10d.).

The *Service Manual* tells you in simple language how to service a modern receiver, and in addition to a description of the various faults commonly met with, there is some valuable data on the construction and use of various types of testing equipment. There are 288 pages and the cost is 5s. (5s. 6d. by post).

Transmission

For the amateur who is interested in radio transmission, there is an interesting volume dealing with the subject from the theoretical and practical point of view. In addition to a description of the various pieces of apparatus needed at a transmitting station there are descriptions of transmitters and how to use them. The price is 2s. 6d. (post 2s. 10d.).

Workshop Calculations

Finally, for the keen handyman *Workshop Calculations, Tables and Formulæ* will be found of the utmost value, giving such details as workshop mathematics (square root, cube root, progressions, weights and measures, etc., etc.) with valuable tables. This is 3s. 6d. Uniform with this is *Practical Mechanics Handbook*, 400 pages, covering mechanical drawing, tool-making, lathe equipment, soldering and brazing, blue-prints, mechanical drawing, polishing and finishing metals, casting, battery charging, etc. This costs 6s., or 6s. 6d. by post.

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).

Correspondents Wanted

SIR,—I have been a reader of your invaluable paper for about three months. It was the Short-wave Section that caused me to become interested. I would like to correspond with an overseas reader about my own age (17½ years) who is also interested in short-wave listening.—N. G. REYNOLDS, 71, Checketts Road, Belgrave, Leicester.

SIR,—I should be very pleased to correspond with one or two readers, either in England or abroad, who are interested in short-wave listening. I am only a raw beginner, but find your splendid journal very interesting.—F. SWINDEN, 112, Westborough, Scarborough, Yorks.

Another Prizewinner's Thanks

SIR,—May I express my appreciation of of the W.B. Stentonian Junior Speaker which I was fortunate enough to win in your recent Radiolympia Competition. I have it in use as an extension speaker for a 4-v. A.C. superhet, and it is certainly "doing its stuff"; in tone and sensitivity it is truly amazing.

May I also thank yourself and staff for the fine journal "P. & A. W." has become.—P. W. DUFFY, Reading.

A Push-button Set in 1923!

SIR,—I first became interested in wireless in 1917 when doing guard on a wireless station in Peshawar, N. India, and then I transferred to the Signals to get a proper training. My present job is that of a chauffeur-mechanic, and I believe I have one of the first car radios, and also a "push-button" set in 1923. The car set is an H.F. D. and L.F.(2) with car batteries tapped at 6-volts for L.T. and two high-capacity H.T. batteries for H.T. The plug interference I overcame by "Eureka" wire resistance wound on ⅜in. ebonite rod, and placed between plug terminal and lead, and a fixed condenser in the earth return. The "push-button" unit was made up with "Formodensors" and small knife switches, and I made it for a gentleman friend of my employers who had the misfortune to be blind.—T. BROMLEY (Sheffield).

A DX Log from Cheshire

SIR,—I append my log of the best DX stations received here from the 31st of October to the 5th of November, inclusive, on 10-metre 'phone and CW. The time of reception is G.M.T. I have omitted all W districts except the 6th and 7th. All are 'phone except where otherwise stated.

W6MLS (18.15) W6ONQ (18.00), W5AH (16.40), W6MYS (CW, 16.45), W6GOS (17.05), W7GGG (CW, 16.15), W7AFS (CW, 16.25), W7GG (14.30), HH2J (13.55), VP6YT (18.10) ZE1JA (14.35), VQ4CRE (CW, 13.35), VU2AN (CW, 13.40), VK2T1 (CW, 13.55), VK5IT (CW, 10.30) In addition there were scores of the other W districts. The Rx is det., L.F., push-pull, operated off an eliminator. The antenna is a 20-metre dipole with the feeders connected together and taken through a pre-set to a four-pin coil. All reception was on headphones, although most of the stations were R7-9—K. KILBURN (Wirral, Cheshire).

Back Number Wanted

SIR,—I shall be glad if you could put me in touch with a reader who has a back number of P. and A. W. dated September 26th, 1936, to spare.—T. A. ROBERTS, 148, Stokesay, Craven Arms, Salop.

CUT THIS OUT EACH WEEK.

Do you know

—THAT a small rigid cone cemented in the centre of an existing large-cone speaker will improve top-note response.

—THAT matching of screened coils may be effected by moving the end turn or two on one or more of the coils.

—THAT a panel-mounted trimmer is often of great use in a ganged receiver when tuning-in distant stations.

—THAT the performance of multi-waveband receivers is often improved by using a multiple aerial array.

—THAT in severe cases of picked-up interference, after aerial and earth are removed, the bottom of a chassis may be closed in with a sheet of metal.

—THAT care is necessary to ascertain the current which is passed through the small L.F. transformers, where good reproduction is required.

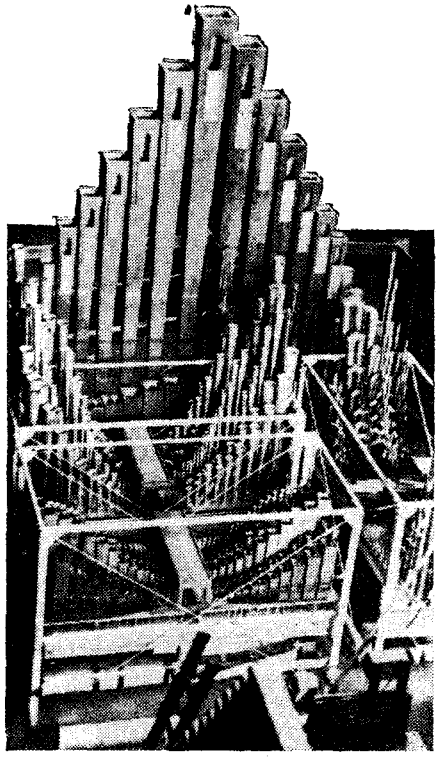
The Editor will be pleased to consider articles of a practical nature suitable for publication in PRACTICAL AND AMATEUR WIRELESS. *Such articles should be written on one side of the paper only, and should contain the name and address of the sender. Whilst the Editor does not hold himself responsible 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.

A Mammoth Stage Organ

Details of the New Instrument Which is Being Introduced by Reginald Foort

EVERY listener knows that Reginald Foort left the B.B.C., where he had been the official organist, in order to adopt a stage career, and for this he has had a mammoth organ built in America. It would be impossible to give all of the technical details in the space available in these pages, but the accompanying



Here is a section of Mr. Foort's new stage organ, taken during manufacture.

illustration shows one section of this wonderful instrument. We were privileged to inspect this at its inauguration, and it outclasses anything which has previously been attempted on the stage. It incorporates in a single instrument a full theatre organ as well as a cathedral organ. The swell-box occupies the rear of the stage and is in four sections, the illustration showing one of these. The total height is 18ft. and the length 42ft. In addition to this there is a complete percussion unit giving all the usual devices such as drums, cymbals, tympani, xylophone, etc. The console is very similar to that seen in the normal cinema, and is of the four manual type. This, as well as all the remaining sections, takes down into separate units, and all are packed for travelling purposes in four large vans which will no doubt soon be a feature of our roads as the organ travels from one town to another. Extensive advertising is carried on the vans as well as Mr. Foort's name.

Driving Power

To operate the organ a 30 horse-power blower is used, and this is housed at the side of the stage and connected to the organ through a pipe resembling that used in a modern building provided with air-conditioning plant. It is about 2ft. in diameter. The organ was built in America by Moller, and shipped to this country in special oak packing cases which alone cost over £200. A staff of organ engineers is travelling with Mr. Foort, and it is estimated that it will take about 10 hours to assemble the organ, although when experience has been gained this may be reduced to about eight hours. To dismantle it will occupy about four to six hours. The total weight is in the neighbourhood of 20 tons, and there are hundreds of miles of wire used in the electrical system.

The pipes of the organ range in size from one large enough for three men to stand inside, end to end, to the smallest which is smaller than a lead pencil. All of these pipes are controlled by 259 stop tablets on the console. There are 125 combinations controlled by pistons from the console, and the tonal design permits an inexhaustible range of tone combinations, estimated to be over 5,000. To operate the electrical section of the organ a special relay had to be built and there are over 200 ounces of sterling silver used for the various contacts. Two D.C. generators are employed to operate the electric action.

The organ may be heard this week at the Empire Theatre, Stratford, and next week at the Hippodrome, Portsmouth.

THE OPEN MIKE

(Continued from page 302)

RANIGAN (*Hoarsely*): Oh! . . . My God. Come on, get out, and make for the road. My door's jammed.

JONES (*Gasping*): The wheel's . . . caught me . . . help me out.

RANIGAN: Move, for heaven's sake. They're coming down the drive.

ANN (*Firmly*): Stand where you are, hold your hands high. I couldn't miss a haystack at this distance.

JONES: Well, I'm damned.

(*Sound of running feet as Jack and others come down drive.*)

JACK: Thank heavens you are safe, Ann. I've got 'em covered. Hi, don't point that darned thing at me. Your finger might be shaking a wee bit too much.

SIR J.: Let's take them up to the house. We can hold them there until the police arrive. I've got the plans. By Gad, sir, you've got a damned plucky lady for a wife.

ANN: Oh, Jack . . . just look at poor "Old Faithful." She looks as though her days are over at last.

(*Fade into Sir John's room. Knock at door; butler enters.*)

BUTLER: Two police offiers to see you, sir.

POLICEMAN: What's all the trouble sir? We had the information from an amateur transmitter that something was wrong.

SIR J.: Well, officers, we have certainly had a spot of trouble, but thanks to our friends we managed to get the better of our visitors. You'll find them in the stable under a pretty strong guard.

POLICEMAN: Right, sir, we'll see to 'em.

SIR J.: Now, Mr. . . .

JACK: Wainwright's the name, sir.

SIR J.: Now, Mr. and Mrs. Wainwright, I can't thank you enough for what you have both done. You have rendered not only me but the country a very great service.

JACK: Well, to be quite frank, we've enjoyed the little adventure. Poor "Old Faithful" had the run of her life. If you could let your chauffeur run us over to our friends, we will see about clearing the wreckage later.

SIR J.: But, surely, you don't intend leaving us to-night. You can't possibly carry on through this storm.

JACK: It's awfully good of you, sir, but we shall only be causing a whole heap of worry if we don't arrive at our destination. You know what folks are, sir!

SIR J.: Well, well. You young folks are very determined, I must say. But about your car. You must let. . . . What's that, Douglas? Ah . . . a wonderful idea, my boy. Mr. and Mrs. Wainwright, will you come with me through to the garages?

ANN (*Aside to Jack*): What's the big idea? Isn't he a charming old boy?

SIR J.: Ah! . . . Here we are. You have the key, Douglas. There, step inside, Mrs. Wainwright. After you, sir.

ANN: Oh! . . . Jack, it's one of our dream cars. A sporty little "Humbo." *Oh*, what a beauty. You are surely not sending her out in this weather, just for us, are you?

SIR J.: Well. . . . I'm not, but you say you must continue your journey, and I am sure poor "Old Faithful" wouldn't have her successor jib at a little rain.

(*Fade in music—superimpose morse code—then slowly fade out.*)

THE END.

RADIO CLUBS & SOCIETIES

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

THE CROYDON RADIO SOCIETY

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

THE Croydon Radio Society had a Questions Night on Tuesday, November 15th, in St. Peter's Hall, Ledbury Road, S. Croydon, with Mr. P. G. Clarke in the chair. He said this was an occasion whereat the society's knowledge was pooled, and so everyone could benefit from the lucky dip. He himself started the ball rolling with a discussion on phase reversal methods in push-pull amplifiers, pointing out how recent quality demonstrators to the society had used different systems for phase reversal. This topic lead to tone compensation, and inevitably to testing for high quality, or to be more exact, natural reproduction. The tester must have a tester's ear, as each instrument in an orchestra must be separately identified. For example, there were the violas, 'cellos and violins, while instruments such as the bass drum, piccolo and horn could not be mistaken. Perhaps the superheterodyne was unduly blamed, for the majority of commercial sets used this principle and the manufacturer was forced to give the public what it wanted, namely a nice "mellow," booming thump! Thus it must be realised that much remained to be done in educating the public as to what was and what was not good reproduction.

THE EXETER AND DISTRICT WIRELESS SOCIETY

Headquarters : Y.W.C.A., 3, Dix's Field, Southernhay, Exeter.
Meetings : Mondays at 8 p.m.
Hon. Sec. : Mr. W. J. Ching, 9, Sivell Place, Heavitree, Exeter.

AT the meeting of this society held on Monday, November 14th, Mr. D. R. Barber, B.Sc., F.R.A.S., of the Norman Lockyer Observatory, gave an illustrated lecture entitled, "Radio and the Moon."

Mr. Barber entertained his large audience with a lucid and clear discussion of conditions, so far as we know them to be, on the moon itself, and in the course of his talk] demonstrated that the moon has no atmosphere, and that its gravity is of the ratio 1 to 6 compared with the earth. There are great variations of temperature on the moon's surface, the temperature falling as low as 80 degrees Centigrade in the middle of the lunar night. Numerous slides of the moon's surface were shown and an illustration given of how the moon affects tides and even the atmosphere of the earth itself.

Graphs were also shown, compiled from lunar eclipse data sent to Mr. Barber by local members of the Radio Society of Great Britain, but it is still not safe to say that radio reception is affected by the moon. Numerous questions were asked the lecturer and a hearty vote of thanks was proposed to Mr. Barber for his kindness in giving up his time, and in taking so much trouble.

BRADFORD SHORT-WAVE CLUB

Headquarters : Bradford Moor Council School, Leeds Road, Thornbury, Bradford.
Hon. Sec. : G. Walker, 33, Napier Road, Thornbury, Bradford, Yorks.

ON November 13th the second of the Sunday meetings was held. The club's transmitter was on the air from 10.30 to 15.30, and quite a number of interesting QSO's were obtained on the 160-metre band.

The morse class is steadily progressing under the personal supervision of Mr. Myers, who has kindly offered his services to the club as morse instructor. A very interesting lecture on Aerials was given to the club on Friday, November 11th, by Mr. F. W. Garnett (G6XL). A good deal of information was derived by members from this talk, and it is hoped that two or three of the licensed amateurs who heard this address will be busy with the erection of a new antenna system at their stations. Quite a considerable interest was aroused by the W8JK beam aerial.

Friday, December 9th, is the date reserved for the annual social and pie supper, and the following Friday a talk will be given by Mr. Mallinson, of Truechorde Radio; the subject will be "Mains Transformers."

The secretary will be pleased to receive reports on the club's transmissions, and] all reports will be acknowledged with the usual QSL card. The call is G3NN. Any further information can be obtained from the secretary at the above address.

RADIO, PHYSICAL AND TELEVISION SOCIETY

Headquarters : 72A, North End Road, West Kensington, W.14.
Meetings : Friday evenings.
Hon. Sec. : C. W. Edmans, 15, Cambridge Road, North Harrow, Middx.

AT a meeting of this society held on Friday, November 18th, Mr. Hamlett lectured on "Radio Activity in Medicine." Modern methods of aiding the treatment of cancer were described, particular attention being paid to a new treatment which may possibly supersede the present method of using radium needles. The treatment consists mainly of injecting into the blood stream radio-active potassium, and has the advantage that there are no needles to be extracted at the conclusion of the treatment. Moreover, the path of the radio-active potassium through the body may be traced by the use of photographic plates. As a matter of general interest it may be also mentioned that the same principle can be applied in the vegetable as well as the animal kingdom.

Replies in Brief

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

R. C. S. (Bristol). You may be receiving signals radiated from a local aerial used in an oscillating condition. Your dealer may be able to help you if you tell him how the set is behaving.

J. J. M. (West Grinstead). The Pyramid One-Valver should be quite suitable for your requirements.

W. F. L. (Chertsey). As the set is a commercial model we suggest that you have it examined by the makers or their nearest local service agent.

P. J. R. (Portrush). We regret that there is no receiver in our range which would meet your special requirements.

R. R. S. (Sunderland). We have no details of conditions in the country mentioned and therefore cannot advise definitely. We think, however, a good short-wave set tuning from 13 metres up to 150 or so, would be most suitable. There is nothing in our blueprint list which we could recommend in this case.

J. M. (Rowley). We cannot send C.O.D., but if you will let us have a remittance in respect of the blueprints or copies you require, they will be sent by return.

C. O. B. (S.E.13). We would suggest the "Imp" or the Two H.F. Portable in your special case.

F. H. (King's Heath). We have not used the combination mentioned and therefore cannot recommend a particular set.

L. J. (E.1). We have published designs of several test instruments, but cannot recommend one without full details of your requirements.

T. J. L. (Chelmsford). We cannot supply blueprints of commercial receivers. We are unable to insert your request as we should be inundated with similar requests from other readers, and we can only suggest that you insert a small advertisement.

T. R. T. (Aberdeen). We see no reason for the particular type of coil mentioned. Why must this be used? Can you supply further details.

H. J. T. (Plymouth). There is no set on the market of the type mentioned, but you could mount any good set in a horizontal plane to bring the controls and dials on the top board. Alternatively, you could fit the set in the usual way and use remote control, or flexible drives.

M. R. (Winchester). Our "Wireless Constructor's Encyclopædia" would be most suitable for your purpose, read in conjunction with the various articles published in these pages.

R. H. C. (Manchester). Grid condenser should be .0001 mfd. and band setter is of the same capacity. Band-spreader is 15 mmfd. or modified .0001 mfd. stripped down to the desired capacity. H.F. choke should, of course, be in anode circuit.

N. McC. (Co. Donegal). All parts are obtainable from Messrs. Peto-Scott.

J. W. (Greenford). We cannot supply circuits to individual requirements, and we have nothing in our lists which would be suitable for you.

P. C. M. M. (Achnashellach). You could use the Centaur circuit with your coil—the only difference being that the primary is centre-tapped in the Unigen model. We have no details of the other type of coil mentioned.

D. P. (Dorchester). The valves are special components, and upon receipt of a stamped and addressed envelope we will send you the maker's characteristics and connecting details.

W. H. T. (S.W.12). The Television and Short-wave Handbook gives circuits and details which will be useful to you.

L. J. (Enfield). The transformer may be faulty, or your ribbon may not be properly disposed in the gap. We cannot advise definitely from the details given.

C. H. (Taunton). We published an article on the subject in our issue dated March 20th, 1937.

J. W. (Elmham). The voltage on your mains does not affect the pick-up in any way. It will affect the design of an amplifier for use with it, but a good battery amplifier would give fair results on 100 volts. Alternatively, you may be able to convert the output to high-voltage so as to use mains equipment.

C. H. G. (S.E.15) and others. The point had already been noted and a correction appears in our issue dated November 26th.

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 " "

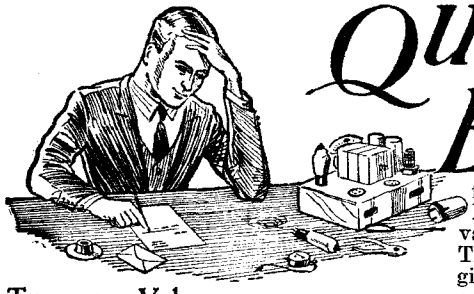
The index letters which precede the Blueprint Number indicate the periodical in which the description appears: Thus P.W. refers to PRACTICAL WIRELESS, A.W. to *Amateur Wireless*, P.M. to *Practical Mechanics*, W.M. to *Wireless Magazine*.

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	9.1.37	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)	24.1.37	PW2
Selectone Battery Three (D, 2 LF (Trans))	—	PW17
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 Monitor (HF Pen, D, Pen)	—	PW61
The Tutor Three (HF Pen, D, Pen)	21.3.36	PW62
The Centaur Three (SG, D, P)	14.8.37	PW64
F. J. Camm's Record All-Wave Three (HF Pen, D, Pen)	31.10.36	PW69
The "Colt" All-Wave Three (D, 2 LF (RC & Trans))	5.12.36	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	16.7.35	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	—	WM400
Three-valve: Blueprints, 1s. each.		
Class B Three (D, Trans, Class B)	—	AW386
New Britain's Favourite Three (D, Trans, Class B)	15.7.33	AW394
Fan and Family Three (D, Trans, Class B)	25.11.33	AW410
£5 5s. S.G.3 (SG, D, Trans)	2.12.33	AW412
Lucerne Ranger (SG, D, Trans)	—	AW422
£5 5s. Three: De Luxe Version (SG, D, Trans)	10.5.34	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
"A.W." Ideal Four (2 SG, D, Pen)	16.9.33	AW402
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, 2LF)	*Feb.* '35	WM381
The H.K. Four (SG, SG, D, Pen)	*Mar.* '35	WM384
The Auto Straight Four (HF Pen, HF Pen, DDT, Pen)	*Apr.* '36	WM401
Five-valve: Blueprints, 1s. 6d. each.		
Super-quality Five (2 HF, D, RC, Trans)	—	WM329
Class B Quadradyne (2 SG, D, LF, Class B)	—	WM344
New Class B Five (2 SG, D, LF, Class B)	—	WM349

Mains Operated.		
Two-valve: Blueprints, 1s. each.		
Consoleelectric 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.		
Midget Class B Portable (SG, D, LF, Class B)	20.5.33	AW389
Holiday Portable (SG, D, LF., Class B)	—	AW393
Family Portable (HF, D, RC, Trans)	22.9.34	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)	20.6.34	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, RC, Trans)	—	AW436
Empire Short-waver (SG, D, RC, Trans)	—	WM313
Standard Four-valver Short-waver (SG, D, LF, P)	*Mar.* '35	WM383
Superhet: Blueprint, 1s. 6d.		
Simplified Short-waver 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



QUERIES and ENQUIRIES

Tungsram Valves

"Please could you give me the address of the Tungsram valve company and also the price of the Tungsram valve VP4B (mains)?"—P. W (Hill, nr. Rugby).

THE address is Tungsram Electric Lamp Works (Gt. Britain), Ltd., 82, Theobald's Road, London, W.C.1. The valve in question costs 10s. 6d.

Substitute Components

"I wish to build a set in which a Graham Farish S.W.2 valve and a Max Transformer are specified, but as they do not make these I should like to know what I could use in place of them. Also where could I get two short-wave condensers? Please could you also tell me the address of the Eddystone firm?"—E. T. (Bristol 6).

IN place of the valve mentioned you can use the Hivac type D.210.S.W., but there is no equivalent for the special transformer mentioned. You can, however, use any standard L.F. transformer in a parallel-fed circuit, and a standard ratio of 4 to 1 is quite suitable. The short-wave condensers may be obtained from such firms as Raymart, Premier or Webb's Radio and their addresses will be found in the advertising columns of this paper. Eddystone components are manufactured by Messrs. Stratton and Co., Bromsgrove Street, Birmingham 5.

A "Straight" Three

"Is it possible to supply me with a blueprint of a circuit described in 'Sixty Tested Circuits'? The circuit is on page 62, Fig. 53."—C. E. L. (Chiswick).

WE cannot supply a blueprint of the exact arrangement shown in this particular circuit, but we have a similar one in the Rapide Three, Blueprint No. P.W.82. This is a detector and two L.F. stages, but in place of the two transformers in the circuit you refer to, the Rapide has one Resistance-capacity stage and one transformer stage.

Greenwich Mean Time

"As a beginner in wireless I am writing for information regarding G.M.T. All short-wave programmes are given by such method and I should like to know if there is any object in it. I have been working this time on a 24 hour consecutive dial. When one obtains such a mark as 00.00 is this 12 p.m. (midnight)? There is also G.S.I., G.S.O., G.S.F., etc. What are these?"—T.McG. (Co. Antrim).

THE letters G.M.T. stand for Greenwich Mean Time, which is a standard of time used all over the world. In America, for instance, there is Eastern, Central, Mountain and Pacific Standard Time, varying from 5 to 8 hours behind G.M.T. There are also other time factors which, if given in lists of short-wave stations would be confusing to English listeners, and therefore all times of broadcasting given in this country are reduced to our standard, G.M.T. The 24-hour clock system is used, 1 p.m. being 13.00 hours and 24.00 is not given, as after 23.59 the figures 00.00 are used to indicate our 12 p.m. The other letters, G.S.F., etc., are the call letters of our B.B.C. short-wave Empire transmitters and different letters are used for the different zones, that is, those transmissions used for various colonies—these having to be transmitted at various times of the day to coincide with evening periods in the colonies.

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.

Unmatched Speakers

"I recently bought a loudspeaker for use with my commercial set and on fitting this to the extension sockets I find that it is much quieter than the built-in speaker, and also that the total volume seems less when this one is added. Can you help me to overcome this trouble or explain to what it is due?"—L. E. (Perth).

THE output sockets are intended for a definite impedance and you are probably using the wrong type of speaker. When two speakers are in circuit the maximum current will naturally flow through the lowest resistance and this could account for the variation in volume. The fact that total volume is reduced would tend to indicate that a high-resistance speaker should have been used, but you are using a low-impedance model. You should, therefore, inquire from the makers of your set what impedance is needed and obtain an appropriate speaker or transformer to match it.

Dial Lights

"I recently fitted a clip on my tuning dial and mounted a bulb on it to illuminate the dial as in commercial sets. I find, however, that my accumulator now needs charging much more often and wonder if I have wired it wrong. I took two leads from the bulb holder down to the filament terminals on the valveholder (output). I am sure there are no short-circuits as covered wire is used and the connections are efficiently made at each end."—M. T. (Cardiff).

THE connections were quite in order, but you have probably used a high-consumption pocket-lamp bulb. Special low-consumption bulbs are generally employed for dial-lights in battery receivers, but as the light is only needed when tuning to a station it is recommended that an on/off switch be connected in the lamp wiring so that as soon as a station is tuned-in the switch may be operated and the light turned off. This will avoid unnecessary drain on the accumulator.

Television Projection

"I noticed an illustration in your paper a little while ago of a television set with a very large screen attached to the lid. Could you tell me how the big pictures are obtained, as I thought that the cathode-ray tube was now used for television."—O. S. (Gloucester).

IN the majority of modern "big-screen" domestic television receivers the screen is generally of a semi-translucent type, and arranged in such a manner that the screen rises into a vertical position on lifting the receiver lid. With the tube and lens mounted vertically, the actual picture traced out in miniature on the tube face is focused on to an inclined mirror, which in turn reflects it back on to the rear of the main viewing screen. Another idea which is finding favour in some quarters is to make the C.R. tube in such a way that its screen is not at right angles to the scanning beam. Normally, this would produce a keystone distortion, but by applying a correction to the line scan deflection this is rectified.

The coupon on page 307 must be attached to every query.

Miscellaneous Advertisements

Advertisements are accepted for these columns at the rate of 3d. per word. Words in black face and/or capitals are charged double this rate (minimum charge 3/- per paragraph). Display lines are charged at 6/- per line. All advertisements must be prepaid. All communications should be addressed to the Advertisement Manager, "Practical and Amateur Wireless," Tower House, Southampton Street, Strand, London, W.C.2.

RECEIVERS, COMPONENTS AND ACCESSORIES

Surplus, Clearance or Secondhand, etc.

RADIOMART

THE SHORT-WAVE SPECIALISTS

MICROVARIABLES.—All brass construction, latest ceramic insulation. The finest condensers made: 15 mmfd., 1/4; 40 mmfd., **1/7**; 100 mmfd., **1/10. Transmitting Type.**—.070in. spacing, 15 mmfd. (neutralising), **2/9**; 40 mmfd. Tuning, **3/6**. These are quality.

PUSHBACK Wire, 6 yds., **6d.**, heavy, **9d.** Resin-cored Solder, 6ft. **6d.**; Screened Flex, single, **6d.** yd.; twin, **9d.** yd. Assorted Solder Tags, **6d.** packet. Humdimmers, **6d.** each.

SPEAKERS.—We carry large stocks. **Magnavox**, 10in. energised 1,000 or 2,500 ohms, **19/6**. **Jensen**, 8in., 2,500 ohms, with transformer, **7/6**; energised 8in., 1,200 ohms with transformer, **6/11**.

UTILITY 7/6 Famous Micro Dials, **3/9**; Radiophone, 0.00016 Short-wave Condensers, **3/6**. Short-wave H.F. Chokes, 5-100 metres, **9d.** Centralab Pots, all sizes, **1/6**; switched, **2/-**; 20,000 ohm Pots, **1/-**. Tubular Glass Fuses, **2d.** Milliammeters, 25 m.a. upwards, **5/9**; super, **6/9**.

SPECIAL OFFERS.—Class B Kit, worth 30/-, comprising Driver Transformer, Valve and Holder, **5/-**. Dozen wire-ended assorted resistors, **1/6. Order 5/-, post free.**

W B. 8in. Permanent Magnet Speakers at one-third Cost. Extension Type (no Transformer), **7/6**; Standard Type (with Transformer), **12/6**.

ALL interested in the **"AIR-HAWK"** 9-valve communication type receiver should send at once for **THE NEW RAYMART CATALOGUE** of Short-Wave Components. It is yours for 1½d., post free.

A splendid range of short-wave components is always ready for immediate despatch. The right goods at the right prices.

RADIOMART

44, HOLLOWAY HEAD, BIRMINGHAM, 1

SOUTHERN RADIO'S Xmas Radio Bargains. Send for complete lists to-day. Terms: Cash with order or C.O.D. post paid.

50/-. SUNBEAM 4-valve A.C./D.C. superhet. table receivers. Last few at fraction of cost. Brand new in sealed cartons. 2 watts output. Full size speaker and cabinet. Wonderful performance. A full size set bargain. Not a midget.

22/6. 5-BAND Pentode Battery Kits. Southern's wonderful new kit bargain. Complete 1939 all-wave kits with metal chassis and panels. 10-2,000 metres. World-wide reception guaranteed. Works speaker or phones. Band-spread, new super-regeneration circuit, etc. The season's best value. Illustrated leaflet on receipt of stamp. Price with valves, 34/6.

10/-. A.R.P. Radio Outfits. Comprise high-grade crystal receiver, pair headphones, aerial and earth equipment. A complete emergency radio installation.

3/11. A.R.P. Crystal Receivers in attractive bakelite cases. 4/11 High-grade headphones. 2/11 cheaper pattern.

5/-. SOUTHERN'S famous bargain parcels of useful components. Bigger value than ever. Value over 20/-. 6/-, American valves, all types.

2/-. LOW-LOSS Short-wave Condensers, .0001, .00015 and 5-50 m.mfd.

1/8. SOUTHERN'S special new high-performance miniature plug-in coils, 4-pin. 10-21, 20-35, 31-75, 70-150 metres, 250-500, 1,200-2,000 metres, 2/-. 10d. miniature short-wave chokes. 1/- ditto Long-wave.

3/6. TELSEN Midget Iron-core coils, W349; dual-range coils, 2/6; with aerial series condenser W76, 3/3; triple-gang superhet W476, 14/6; triple band-pass W477, 14/6; twin-gang W478, 9/-.

8/6. TELSEN A.C./D.C. Multimeters, 5 range. Ganged Radiogram Units, brand new, 42/-.

2d. STAMP brings complete lists by return post. Remember Southern Radio for the biggest and soundest bargains.

SOUTHERN RADIO, 46, Lisle Street, Leicester Square, London, W.C.1 (Dept. W). Gerrard 6653. Open Saturdays to 9.0 p.m.

CONVERSION UNIT for operating D.C. Receivers from A.C. Mains, improved type, 120 watt output at £2/10/0. Send for our comprehensive list of speakers, resistances and other components.

WARD, 46, Farringdon Street, London, E.C.4. Telephone: Holborn 9703.

PREMIER

1938 RADIO 1939

COLLARO AC37 ELECTRIC GRAMO MOTOR with Auto-Stop. Full 12in. Table. 100-250v. A.C., **30/-.**

COLLARO U.36 A.C./D.C. MODEL, 45/-.

COLLARO AC37 GRAMO UNIT, comprising Electric Motor, Pick-up and Vol. Control; Auto-Stop and Start; 100-250v. A.C., **45/-.** U.36 A.C./D.C. model, **67/6.**

COSMOCORD GRAMO UNIT, comprising Electric Motor, Pick-up and Vol. Control, Auto-Stop and Start; 100-250v. A.C., **35/9.** Universal Model for A.C. or D.C., **49/6.**

COSMOCORD PICK-HEADS, 4/6 each.

SPECIFIED FOR THE "AIR HAWK 9"
3 Premier Trolitul Condensers, .00016 mf., at **2/6** each. **3 Premier Trolitul Condensers,** .000015 mf., at **1/6** each. **2 Premier Epicyclic Drives** at **2/3** each.
1 Premier A.C.9 Mains Transformer, 14/6.
Get our quotation for the complete Kit.

PREMIER SHORT-WAVE KITS

NEW 1-VALVE SHORT-WAVE RECEIVER OR ADAPTOR KIT. 13 to 86 metres without coil changing. Complete Kit and Circuit, **12/6.**

VALVE GIVEN FREE!

DE LUXE MODEL, 14 to 170 metres, complete Kit with Chassis, 4 Coils and all parts, **17/6.**

NEW 2-VALVE S.W. KIT, 13 to 86 metres without coil changing. Complete Kit and Circuit, **19/6.**

VALVES GIVEN FREE.

DE LUXE MODEL, 14 to 150 metres, complete Kit and Circuit, 4 Coils and all parts, **25/-. VALVES GIVEN FREE.**

HIGHLY SELECTIVE S.W. S.G.3. KIT. Pentode-H.F. Detector and Pentode. 14 to 170 metres. Complete Kit with 3 Tested Valves. **58/6.** Metal Cabinet, **7/6** extra. Ideal for Amateur Reception.

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