LATEST TELEVISION NEWS INSIDE!

Practical and Amateur Wireless
Edited by F.J. CAMM

EVERYMAN'S WIRELESS BOOK
By F. J. CAMM (Editor "Practical and Amateur Wireless," etc.)
A Radio Consultant for the Listener, Expert and Amateur Constructor, explaining the Operation, Upkeep and Overhaul of all Types of Wireless Receivers, with Special Chapters on the Principles of Radio Telegraphy, Installation, and Systematic Fault-finding.

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NOVEL TUNING DIALS—SEE PAGE 231

**Practical and Amateur Wireless**

*Edited by F. J. CAMM*


ROUND the WORLD of WIRELESS

An Automatic Radio Transmitter

A BALLOON equipped with recording gear and an automatic radio transmitter has been developed by the Franklin Institute to provide data of cosmic rays at extreme heights.

Bombay Police Radio

THE Bombay City Police are to be provided with radio for use in times of disturbance. A wireless transmitter and associated equipment is to be installed at Police Headquarters, and two mobile receivers are to form the initial installation.

U.S.S.R., Television

IT is reported that the high-definition television transmitter will be ready for service in Moscow at the beginning of next year. The present test transmissions are stated to be satisfactory, and a regular service is now being planned.

American Wind Charger

AN American company has placed on the market a battery charger operated by the wind. A fan turns under the influence of the slightest breeze and generates 7 amps, under average wind velocities.

Czechoslovakian S.W. Station

A NEW S.W. transmitter is nearly ready for use at Podbrad. Test transmissions are at present being carried out on 10.06, 25.51 and 40.06 metres.

K.B. Sets in the Air

SIX of the aeroplanes owned by Plane Advertising, Ltd., have been fitted with Kolster Brandes receivers so that the pilots may pick up the weather reports as soon as they are sent out.

Queer Fault

FROM Dublin we hear that a Cossor receiver, which was sent for servicing, was found to contain a dead mouse with the H.T. leads in its mouth. When removed, the set still refused to function, but a further test showed that the speaker (which was enclosed in a dust bag) had half the cone eaten away and was filled with pieces of newspaper shredded up. It had served as the nest for the mouse!

Marconiphone-Arsenal P.A.

THE newly-installed public address equipment at the Arsenal Stadium is a great success. This is the largest equipment ever fitted in a football ground.

The microphones are used for addressing the crowd from the directors’ boxes and by the police for crowd control, stand packing, and S.O.S. purposes. There are 17 loudspeakers.

Town Planning

“Belfast—An Industrial Capital” is the sub-title of the second in the series of talks on Town Planning to be broadcast by E. Maxwell Fry in the Northern Ireland programme on November 10th. He will deal with such questions as how Belfast as a city has developed, and how its future development should be controlled so as to secure wise planning, healthy buildings and congenial conditions for the citizens, and he will deal with both the artistic and economic aspects of town planning in a large industrial city.

Radio Pie

FOR the last six months the Two Leslies, Leslie Sarony and Leslie Holmes, have allotted considerable time to the preparation of their first radio revue, christened “Radio Pie.” Many listeners do not realise how many hours’ preparation these top-of-the-bill artists have to give to a radio production. As far as they are concerned, it must be successful, so no pains or effort are spared to obtain a laugh or a telling point in every line.

At the moment the Leslies are feeling confident over a new song, “Long Live the King,” which they have written for their Coronation Palladium appearance. In “Radio Pie,” “Long Live the King” will be heard for the first time, and the chorus will be sung by Steffani and his Twenty Singing Scholars and the B.B.C. Revue Chorus. “Radio Pie” will be a fast-moving revue, having a strong cast including the Two Leslies, Tommy Handley and Mario de Pietro. Incidentally, this will be the first time Mario de Pietro has spoken over the air. A discovery of considerable interest is the “Singing Portico.” Recently, while the Leslies were having tea in a large Manchester store, the Entertainments Manager told them they had a singing porter and brought him up, complete in uniform, to sing with the orchestra. He was so good that the Leslies are bringing him south for “Radio Pie.” Other members of the cast of “Radio Pie” are Tessie O’Shea, whose first appearance this will be since her return from New York, Hugo, and Anne Ziegler, the well-known radio artist. The broadcast takes place from the London Regional on November 9th.

Another Broadcaster of War News

E.D.Z.-EAF, Madrid-Vallalobs (Spain), a 15-kilowatt station previously solely used for commercial telegraphy and telephony with the Argentine Republic, has now been appropriated twice daily by the Madrid Government for the transmission of news bulletins in Spanish and other languages at G.M.T. 12.00 and 20.00. The wavelength is 31.65 m. (9,480 kc/s).

From the Canary Islands

E.H.Z, el Tablero, on 28.03 m. (10,370 kc/s), which serves as the official mouthpiece of the Radio Club de Tenerife, can be readily identified by the fact that nightly at G.M.T. 20.40 it closes its broadcast by playing the two German National Anthems (Deutschland ueber Alles and the Horst Wessel March), followed by the Italian Fascist hymn (Giovinezza) and two Spanish patriotic marches.

Malign Power for Ruysselede

TO increase the range of the Brussels broadcasts on 29.04 m. (10,330 kc/s), the Belgian Government is erecting at Ruysselede (near Bruges) a 40-kilowatt transmitter to take the place of the 9-kW station at present used for the transmission of the daily French and Flemish programmes.
THE PICK of the PROGRAMMES

"Laburnum Grove"

J. B. PRIESTLEY'S comedy of suburban life, which enjoyed a successful run at the Duchess Theatre two years ago, should prove ideal material for adaptation as a broadcast play. It will be heard on the London Regional on November 3rd, and from the National on November 6th.

MUSIC HATH CHARMS

It is to be hoped that McMichael lived up to their slogan "Never lets you down," when this portable was demonstrated at Bertram Mills's circus by a McMichael dealer in Truro recently.

A Flying Lesson

IN "How and Why," a programme entitled "How an Aeroplane Flies," will be broadcast on November 11. The B.B.C. Mobile Unit has visited Castle Bromwich aerodrome to take recordings which will assist in building up an impression of a flying lesson. Flying Officer J. K. Rotherham, of 605 (County of Warwick) Bomber Squadron of the Auxiliary Air Force, will be the speaker in the studio, and will link up the recorded material. The Squadron has a distinguished record; it won, and still holds, the Essex Cup.

Variety from Cheltenham

THE first broadcast of a variety bill from the Opera House, Cheltenham, on November 10th (Midland) will include Leon Cortez and his Stage Band. David Grettton is the commentator for these outside broadcasts. The Opera House was opened in 1891. Cheltenham was a notable dramatic centre over a hundred years ago, and was visited regularly by Sarah Siddons, the Kembles, and the Keens.

The Younger Generation

DURING September, Francis Bolton, the R.B.C.'s variety talent-spotter, made a tour of the North Region, giving auditions in ten big Northern towns to people from the surrounding districts. Over a thousand men, women and children availed themselves of the opportunity. There was a large proportion of children—or, at least, of juveniles, that is to say, boys and girls with ages ranging from twelve to sixteen. Having received further auditions at the studios, half-a-dozen of the more talented of these juveniles are to broadcast a special variety programme from Manchester on November 13. Further details are not yet available.

Melody and Mirth

ON November 9th Archie Campbell com- pires a Midland programme entitled "Accent on Melody with a Break for Mirth." The melody is provided by Vincent Ladbrooke and his augmented dance band, known as The Cosmopolitan Orchestra. Mr. Ladbrooke only entered the dance band business a little over two years ago, and now controls seven or eight bands in the business a little over two years ago, and still holds, the Foster Cup.

Variety from Chester

THE first broadcast of a variety bill from the Opera House, Chester, on November 12th. The remainder of the bill, from which excerpts will be chosen, will include: Arthur Pond (comedian); Helen Mitchell and Dad; The Brommins (comedians); Elsie Sterndale (Lancashire comedienne); Fisher and Ariana (solo violin and Italian prima donna); and Adrian et Audrique (comedy specialty act).

"Aida" from Leeds

A CONCERT version of Verdi's opera "Aida," as performed by the Leeds Choral Union, will be broadcast from the Town Hall, Leeds, on November 10th. The Northern Philharmonic Chorus and Orchestra will be conducted by Norman Stradford and the soloists will include Ina Lipton (soprano), Catherine Webster (contralto), Alec John (tenor) and William Parsons (baritone). F. H. Shera, Rosseter Professor in the University of Sheffield, will give the "During the Interval" talk.

Evre of Armistice Day

ON November 10th an Armistice Commemoration will be broadcast from the Scottish National War Memorial, Edinburgh. The programme is the same as that broadcast a year ago, which was then said to be one of the most moving programmes heard in the Scottish Region. As listeners may remember, it consists of appropriate dialogue, readings and music.

U LVERSTON Marigems Hiring Fair

ULVERSTON Marigems Hiring Fair begins on November 14, and on the preceding night some of the people who frequent it are going to the Northern microphone to tell listeners all about the fair. Ulverston is in Furness, Lancashire, and the fair is one at which farmers find farm servants, and at which farm servants get jobs. The speakers will include a farmer, a farm labourer, the secretary of the local branch of the National Union of Farmers, and a local parson. One of the speakers will tell of the fair as it was some forty years ago, when the workhouse master used to bring down often boys from the workhouse and hire them out to the fair.

"Question Time"

THE second of the series of monthly broadcasts in which Leslie Heward, with the B.B.C. Midland Orchestra, answers questions which have been sent in by listeners regarding orchestral matters, will be given on November 9th. A number of the questions received concerned the contribution which certain instruments made to the whole. Some of these have already been answered but others relating to the violin family have yet to be answered. Henry Riddell, Announcer, represents the average listener.

SOLVE THIS!

PROBLEM No. 216

Ellison's receiver suddenly stopped functioning, and when voltage tests were made it was found that no voltage was registered at the anode of the triode valve. Further tests indicated that there was continuity between the detector anode and H.T. +, and the resistances in this circuit had the correct value. What was the fault? Two books will be awarded for the first three correct solutions opened. Address your solutions to the Editor, PRACTICAL AND AMATEUR WIRELESS, Leonard Street, London, E.C.2. Envelopes must be marked Problem No. 216 in the bottom left-hand corner, and must be posted to reach this office not later than the first post-Monday, November 20th.
BEARING in mind that every set maker endeavours to interpret the exact requirements of the listener, it is interesting to consider some of the main ideas embodied in commercial tuning dials, and one of the main snags of accurate and fine tuning adjustment, has largely been obviated by careful attention to the fit, alignment, and the automatic "taking up" of wear on the various spindles employed. The usual friction action of the tuning control knob directly driving the main dial on the edge of an inside slot on the latter has largely been superseded by more ambitious schemes.

Owing to the inclusion of short-wave features in receivers of the all-wave type the necessity for a slow-motion movement, spindles taking up "friction" with really accurate maintenance of calibration in the main drum and at the ends of the cords and drums similar to winches. Convolutions of the cords are taken up by contraction springs fitted inside slot on the latter has largely been obviated by careful attention to the fit, alignment, and the automatic "taking up" of wear on the various spindles employed.

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and coil and condenser constants to the usual inexpensive receiver standards. At certain settings of the cursor or pointer it was found that the scale lagged and at other settings was in advance of the actual transmissions for which it was marked. The control knob actuating the drum, cord and cursor, which in the normal manner transmits an equal movement to the latter, is allowed to do so also in this case, but the cursor, instead of travelling on level supports, is made to ride on a spring which can be distorted to produce troughs and hills by means of numerous grub screws or stops pressing on to it. On the test bench in the factory and by creating the usual artificial signals, the operator undertaking the calibration can quickly ascertain whether the calibration is in advance of the cursor, in which case a "hill" is provided at that point. On the other hand, where the cursor itself is in advance of the appropriate calibration, the former can be retarded by a trough and so on.

Making Your Own Dial

Those readers of Practical and Amateur Wireless who are sufficiently keen to construct their own tuning dials should find enough material from the foregoing descriptions to evolve designs which embody all the salient features of each type mentioned. Unless a reliable wave-meter is available, it will be necessary to start with a "blank canvas," which can be marked with an arbitrary scale and later filled in with the names of known stations under operating conditions. The most simple and satisfactory arrangement is to provide a circular dial at least six inches in diameter, although preferably larger. An opaque celluloid material can be employed so that the calibration may be illuminated by two or three flashlamp bulbs mounted in small clip-on holders, the bulbs being connected in parallel with the L.T. or 4v. A.C. heater supply. Where a full 360 degree scale for each wave range is required, the cursor will need to be geared 2 to 1 to the main tuning condenser spindle, as the latter normally only moves through 180 degrees. A better scheme is to employ a direct drive by clamping a double-ended cursor or pointer very firmly on the main spindle and using mains static suppression. The top half of the dial can then be used for, say, medium and long waves (one scale being under the other) and the bottom half of the dial for two short wavebands. Parallel errors can be avoided by making the double pointer from a transparent and fairly thick celluloid and marking hair lines at each end, the lines to be on the surface of the pointer, which is to be nearly touching the actual scale, or in other words, the thickness of the pointer material must not intervene.

Marking the Scale

Rigid and central mounting of the opaque scale is essential, but it should preferably be detachable, as it can be calibrated with a sharp but soft pencil in position on the set and later removed for permanent marking with indelible ink. A material having fine eggshell surface finish is required, because a glazed celluloid transparency will not easily mark.

The mechanical operation can be on the cord and drum principle, especially as errors cannot occur due to the direct cursor coupling. A 10 to 1 reduction for broadcast wavelengths is ample, and can be obtained by coupling a control knob working a 1.5in. diameter spindle to a 2jfin. diameter drum mounted on the main condenser spindle behind the dial plate. The cord should be of woven silk or similar material, and it must be wound around the spindle at least twice to ensure a proper purchase. Constant tension can be assured by bringing the cord ends inside the 2jfin. drum and attaching them to contraction springs (initially drawn out). Collars or lips on both spindle and drum will guard against the driving cord slipping off.

For short-wave purposes a reduction drive of 100 to 1 is desirable, and is best obtained by providing a further 10 to 1 reduction scheme on the control knob itself. It can take the form of a friction gear, the short-wave knob being mounted on control knob. Alternatively, an entirely separate "S.W." knob can be provided and worked by a friction drum on the main control, on an extension of the spindle beyond the point where the cord grips.
Fitting the Set in its Cabinet

Methods of Drilling the Cabinet, of Using a Separate Panel, and of Fitting a New Set into an Old Drilled Cabinet

By FRANK PRESTON

MORE cabinets than one have been spoiled due to carelessness in drilling for the control spindles, or due to lack of knowledge of the proper procedure to adopt in carrying out the work. It is usual to-day to dispense with a panel as part of the receiver unit, since the front of the cabinet replaces it, and although this is excellent in many respects it is inclined to cause certain difficulties. When dealing with a receiver of which constructional details have been given in this journal, the drilling of the cabinet should be a fairly straightforward job, due to the fact that front-of-set dimensions are always given. In consequence, it should be possible simply to make a paper template from the dimensioned drawing and to use this for marking out the cabinet. The first trouble arises, however, due to slight inaccuracies in construction, which throw the dimensions slightly "out."

A Template

One simple method of overcoming any such trouble is by first marking out the positions from the front elevation (a typical one is shown in Fig. 1) on a sheet of stout paper or thin card, and then making holes one at a time to fit the spindles. The procedure is first to pierce the paper at the point corresponding to the position of the longest spindle. Slip the card over that point, and then make holes in turn. When the cabinet can be laid down in this manner, a block of wood should be held firmly against it by an assistant. In making the smaller holes with a twist drill, go about half-way through from the front and then finish from the inside.

Drilling the Holes

The next step should be to drill the holes partly through the wood from the outside. For all holes over 1⁄4 in., the best tool is a centre-bit held in a joiner's brace (Fig. 2), whilst for smaller holes a twist drill can be used in a mechanic's brace. Best results can be obtained with the centre bit when it is applied to the front face only until the bounding circle of the hole has been traced and the surface fibres cut through. After that the cabinet can be laid on a flat, smooth board of soft wood until the holes are completed from the inside. Where the cabinet is too large to be split or cracked.

Care must be taken that the drill is not forced, for that might cause the front facing of the plywood (which is generally used to-day) to be split or cracked.

Fig. 2.—After making small centre holes from the inside of the cabinet full size holes should be traced out on the front, using a centre bit.

Drilling for the control spindles, or wires, coils, and condenser vanes can be a serious matter. Examination of commercial sets will show that many manufacturers adopt this course!

Marking Out from the Set

When a template cannot well be used, a similar method to that described above can still be followed, although the work takes up rather more time. The idea is to place the set approximately in position in the cabinet, and then carefully mark the position of the tip of the longest spindle. A small hole can then be made at this point and afterwards...
FITTING THE SET IN ITS CABINET
(Continued from previous page)

enlarged round the spindle will slip through. The centre of the next-longest spindle can then be marked and the hole drilled in similar manner (see Fig. 3); the process can be continued until all of the holes have been made. In this way absolute accuracy should be ensured.

In every case, however, care should be taken not to apply too much pressure to the drill, and to see that the drill or bit is perfectly sharp. It is also wise to have a firm support behind the hole which is being drilled, so that there can be no danger of splitting the wood or splintering the edges of the holes.

Experimental Receivers
When the set is an experimental one and might be modified or replaced, it is always better to employ a panel—either plywood, metal, or laminate—and to cut an opening in the cabinet to accommodate the controls (see Fig. 5). The opening can be made most satisfactorily by first drawing the shape on a sheet of paper and then lightly gluing this to the inside of the cabinet, and drilling holes near the corners. These should first be run through with a small drill and then enlarged to half-inch in the manner described above. After that, the holes can be joined up by means of a pad-saw, or key-saw, as it is sometimes called. In sawing, keep to the outside and holding the file at a sharp angle to the edge which is being filed, then go on this, and the paper can be rubbed off when the colour is dry.

Do the same on the inside, always applying the pressure on the forward stroke only, and finally remove the rounded ridge by filing from the outside and holding the file at a sharp angle to the edge which is being filed.

Another point is that care should be taken to avoid splintering, and it is best to tilt the file, as shown in Fig. 4, and to go right down to the line on the outside, Do the same on the inside, always applying the pressure on the forward stroke only, and finally remove the rounded ridge by filing from the outside and holding the file at a sharp angle to the edge which is being filed.

With a linen rag or with a brush, but the former is generally easier to use, because with a brush there is a tendency to over-run the edge. This can be prevented by lightly brushing a length of gummed paper against the edge of the hole on the outside of the cabinet; the excess of Japan will then go on this, and the paper can be stripped off when the colour is dry.

Renovating the Edges
If the cabinet is polished, as it probably will be, the next problem concerns the method of colouring and polishing the raw edge which is left. An attempt to match the colour and finish of the cabinet will generally result in failure, but if the edge is blackened with good black japan a good job can be made of it. The Japan can be applied running the glass-paper from end to end of the edge. Incidentally, the same method can be followed in making the opening for the tuning-dial escutcheon plate.

Preparation of the New Panel
If a cabinet has already been drilled and it is wished to fit a new set with different control positions, the method just described can still be followed. Another one is to fit a plywood panel over the front of the cabinet. Before adopting this method, however, make sure that the spindles are long enough to pass through this as well as through the cabinet front with sufficient length to spare to permit of the knobs being fitted. The new panel can first be drilled—before polishing—by one of the methods described above. After that the surface should be well glass-papered, working in the direction of the grain, and the edges slightly rounded over with fine glass-paper. This panel can then be stained and polished on the front surface and round the edges. Here again, it is better for the amateur to use a contrasting colour than to attempt to match that of the cabinet. If the cabinet is of light oak, use an oak-faced plywood panel and finish this in a dark-brown colour by applying a mixture of black lacquer and ammonia—one part ammonium to two of lacquer. This can be applied with a brush and then rubbed over with a non-fluffy rag. Incidentally, the application should be made where there is a good draught of air, because ammonium fumes are far from pleasant!

A final polish, with prepared wax or linseed oil will give the desired effect.

When the cabinet is of dark oak or walnut it will be found better to leave the panel a light shade. It can be simply well rubbed down with glass-paper and waxed, or it might be given a couple of coats of shellac varnish, well glass-papering between the two.

Use this panel as a template, and attach it to the front of the cabinet with neat screws (chromium plated or bronzed), and then drill the holes through the cabinet front. A modern finish may be obtained by blackening the panel and fitting chromium control knobs or a white panel with black controls.

NEW RECEIVERS AND AN EXTENSION SPEAKER

A large clock-face full-vision dial is an important feature of this new R.C.G. receiver.

For use as an extension speaker this Rola Model, with special input transformer, will prove very satisfactory. It may be obtained in a cabinet if required.

Some novel features are to be found in the tuning arrangements of this new C.A.C. receiver.
A Common Mistake

A conversation was overheard the other day in which two people were discussing the subject of television. One was endeavouring to explain to his friend some of the problems associated with the provision of a public service, and stated that undoubtedly one of the most difficult things was to achieve synchronism between sound and vision.

not only as an entertainment in the home, but as a means of appealing to the masses when an important decision has to be made. Blind oratory does not sway a crowd as hearing his voice at the same time, and this is an incident so well portrayed in the film itself. Wells is outstanding as a writer with a vivid imagination, but we have often wondered how much of the television side of "Things to Come" was a direct outcome of conversations between Baird and Wells in 1931. These two men met on a liner on a trip of this nature (an eventful one as far as Mr. Baird was concerned, for he married in New York in the same year), many friendships are made, and the possibilities of television were no doubt outlined to good effect by these two outstanding personalities.

A Reverse Process

The development of radio and television, although akin in many respects, can be regarded as starting in opposite categories. Radio started its career as a commercial proposition for the establishment of communication between distant places not linked by telegraphic means via a cable. It was only many years later that its benefits spread to the world of entertainment with the vast ramifications of the present day. Television, however, seems to be destined to start as a service providing a new entertainment medium. It is certain, however, that its use in commercial, naval and military life will very readily make itself manifest, but it is curious that the beginnings of the two subjects should be just opposite to one another.

Similarly, with television, the scene to be radiated is converted electrically and optically into a somewhat similar modulating signal to be radiated by the electromagnetic carrier wave for reconversion at the receiving end by the picture reproducing device into a visual replica in miniature of the original scene televised. Both the sound and light conversion to electrical signals take place simultaneously and travel through space at identical rates. Synchronism between sound and vision is therefore quite automatic and needs no human agency to rectify it. The process bears no relation to seeing a lightning flash and hearing a second later the noise of this electrical discharge. With television neither light nor sound travels through the ether, but two quite separate, although synchronised, modulated electromagnetic ultra-short carrier waves.

Sport and Television

The B.B.C. seem to be fully alive to the possibilities of portraying nearly every phase of sport by means of television. Not only is it intended to see games of all types, but lessons of all the most popular forms will be featured. A taste of what is to come was given when Archie Compton demonstrated strokes and putting on a green quite close to the Alexandra Palace station, so that the Emitron camera could televise the scene in the usual manner. Compton himself was amazed at what he saw on the receiver screen when a man drove from the tee and made approaches to the green. He commented on the clearness of the picture and ventured to suggest that we were living in the age of miracles. Boxing has also been featured, and the whole work serves to recall some of the earlier television experiments, especially those in multi-zonc television where the scheme was regarded as one solution to the provision of much higher definition than the thirty-line standard then being featured. In one case a three-zonc experiment giving a total of

(Continued overleaf)
Television and Photography

During the last two or three years the Royal Photographic Society has included an exhibit showing the close relationship between photography and certain sections of the television processes. This year the results shown dealt with the actual recording of television pictures on standard 35 millimetre film by means of the intermediate-film projection receiver. A standard of 25 frames per second was employed with 240 line definition. In addition to films showing the good results that can be obtained, selections were included to illustrate certain faults which have to be cured.

One of these was the picture resulting from over modulation, while another demonstrated very clearly the effects of hum or mains ripple induced into the cathode-ray tube time base. In either case the quality of the picture is ruined, but both these defects can be rectified by a proper attention to equipment design and layout.

Speed of Electron Beam

The electron beam of a cathode-ray tube when receiving high-definition television, travels at an average speed of approximately 4,600 miles per hour, although during the fly back from one line to the next it attains a speed of more than 50,000 miles per hour.

Air Pressure Inside a Cathode-ray Tube

For all mechanical considerations the air pressure inside a cathode-ray tube may be considered negligible, which means that the screen of the 12in. variety is subjected to an atmospheric pressure of some three tons, while the atmospheric pressure on the whole tube is anything between ten and fifteen tons, according to its shape.

The Television Film, November 2nd

"Television Comes to London" was by Cecil Lewis, and the narrator was the television announcer, Leslie Mitchell. The photography, has been carried out by Major L. G. Barbrook and James Carr.

Marconi’s Original Mast

On the roof of Radio House’s headquarters of Marconiphone, is now in position a 60 ft. mast consisting of main mast and topmast, and carrying a gaff with a Union Jack at the peak. This mast has a unique history, inasmuch as it is the same as that used by His Excellency the Marchese (then Signor) Marconi during his early experiments in the Isle of Wight.

It stood in the grounds of the Royal Needles Hotel, Alum Bay, Isle of Wight, and carried an aerial with which Marconi succeeded in establishing communication over a distance of several hundred yards. He increased this to two miles and then moved to Niton, eight miles away, taking the mast, which took two days to transport, owing to its size and weight. He erected it in a field quite near to where St. Catherine’s Lighthouse now stands, and established communication with the mainland after further experiments.

Altogether, Marconi used this mast for three years in the Isle of Wight, and at the end of that time he was convinced that the time had come for his big onslaught on the Atlantic. The mast (at that time 100 feet in length) was reduced to 60 ft.—its present length—and was used to carry a flag in the garden of a lady’s house on the Island. Last year it was bought by Marconiphone and shipped to England. It now carries the first Television aerial in the West End of London to be erected for the purpose of supplying programmes for public demonstration and experiment. Thus, the very old mast meets the very new with considerable benefit to everyone.

Some advance details of this mast were given in our issue dated Oct. 24th, and the accompanying illustration shows the mast being given a final overhaul after its installation on Radio House.

IMPORTANT TELEVISION EVENTS OF THE WEEK.

Tues. " Pageant reconstructing Lord Mayor’s Show.
Thu. " International Poultry Show.
Fri. " Operatic excerpts.
Sat. " Veteran Cars Parade.

PRACTICAL AND AMATEUR WIRELESS
November 7th, 1936
HIGH FIDELITY PICK-UPS

Designed by engineers who understand the meaning of fidelity in reproduction . . . . .

THE SENIOR PEZOLECTRIC DE LUXE
Improved crystal ensures longer life. Twelve months' Guarantee

B.T.H. PEZOLECTRIC POWER PICK-UP AND ARM
Rising bass characteristic below 200 cycles. Output up to 6 volts. 97% perfect tracking. Imped. 250,000 ohms. Capacity .002 mfd. Price 35/-

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Practical linear response. Sufficient rise at lower end of characteristic. The alternative to the Pezolectric when lower output is required. Price with 100,000 vol. con. 40/-

B.T.H. MICROPHONES
A beautifully finished instrument in Cellulose black with chromium-plated grille, ideal for public address work, etc. It is very sensitive and has an excellent frequency response curve. It may be used with any suitable amplifier by connecting in series with a 6-volt battery capable of giving 20 milliamps and the primary of a 30-1 step-up transformer.

Microphone - - £2.12.6
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B.T.H. MINOR PICK-UP AND ARM
Sensitive from 50 to 6,000 cycles. Arm and pick-up moulded as one. 30,000 ohm matched volume control incorporated in pedestal. Price 17/6

B.T.H. HEAD TELEPHONES
A newly designed light-weight unit of great sensitivity, giving excellent reproduction, even of weak signals. Easily adjustable moulded ear-pieces, chromium-plated headband and stirrups, fitted with approximately 5 feet of cord with pin tips. Weight 8 oz. Resistance 4,000 ohms. Price - - - - 12.6

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Distributors for The British Thomson-Houston Co. Ltd., Rugby.
The D.C. AvoMinor

Current
0-6 m/amps
0-30 m/amps
0-120 m/amps

Voltage
0-6 volts
0-12 volts
0-240 volts
0-600 volts

Resistance
0-10,000 ohms
0-60,000 ohms
0-1,200,000 ohms
0-3 megohms

D.C. VOLTS
0-75 millivolts
0-2.5 milliamps

A.C. VOLTS
0-5 volts
0-25 volts
0-100 volts
0-500 volts

MILLIAMPS
0-1 amperes
0-10 amperes
0-100 amperes
0-500 amperes

RESISTANCE
0-20,000 ohms
0-500,000 ohms
0-1,000,000 ohms

Can you trace the faults that cause noise, distortion or breakdown? Yes! — if you have an Avo-Minor! It is easy to track down trouble with either of these combination meters, for they cover all test measurements of current, voltage and resistance. And the important point is that they are high-precision meters — made by the makers of the famous Avo-meter. With either model you can quickly diagnose all faults in valves, circuits, components, batteries, power units, etc.

Both models of the Avo-Minor are complete with leads, testing prods, crocodile clips, and Instruction Booklet.

AT ALL GOOD DEALERS

WRITE FOR DESCRIPTIVE FAMPHLETS

Your radio has no secrets from the Pifco Radiometer. Anyone, however inexperienced, can trace faults with this wonder instrument. Any radio set can be tested—either A.C. or D.C., Mains or Battery operated. Solidly constructed, with fine bakelite case, the Pifco Radiometer has readings for high and low voltage, milliamperes, continuity test, and a special socket for testing valves.
On Your Wavelength

By Thermion

"Knowledge of Music Not Essential"

S0 many readers are expecting a weekly comment on jazz that I must not disappoint them. May I, therefore, direct their attention to the following advertisement which appeared in a South Wales newspaper:

"An amateur band in—require instrumentalists, string or piano-accordion; knowledge of music not essential. Apply—".

I am obliged to a reader for this cutting, which proves up to the hilt, without dubiety, beyond equivocation, and Q. E. D., that my remarks against jazz are more than justified. The reader says that he has taken a band of fourteen players, none of whom had ever performed or rehearsed with the others, and put over a full programme, not only without the public detecting that they had been un-rehearsed, but with rapturous, cataclysmic, spontaneous, and resounding applause (cheers). He says that the only essential to jazz is a good sounding applause (cheers).

I agree with S. T. P., of Bethnal Green, as to the ease of building up a circuit on the baseboard, but once you have your circuit, try it on a chassis and after a little shifting and changing about you will find it even better.

Another curious result of constructing your own sets is the sentimental attachments to various components which are used and have done good service. I look at a coil or transformer, which has served me well and feels it a shame to put it in the junk box. I feel like framing it or crowning it with laurels and standing it on the mantelpiece! Then a set becomes associated with important events in our lives, and it is difficult to put them on one side. The first set I made up after I was ordained in 1929, and I felt it quite a wrench when I pulled it to pieces. In fact, I still use the same baseboard, panel, valveholders, condenser, etc.

There is a romantic side to wireless besides the so-called romance of big business.

"I must finish by saying how much I enjoy the paper. I really look forward to it each week."—L. G. (Hovingham).

Back Numbers for Readers

M. R. W. MORRIS, 5, Corser Street, Smethwick, Staffs, says that he has back numbers of this journal dating from September 28th, 1935. If any reader would like them he can have them for the price of postage. Remember—first come, first served.

"Where are the Clubs?"

I REALLY must find room, too, for the following epistle, missive, or letter:

"Dear Thermion,—In reply to

Here is E. P. R., of Royston, who says:

"Dear Thermion,

—May I have a word to say in this 'baseboard versus chassis' controversy? I have constructed a few circuits on the baseboard, and it has many advantages, being very easy to get at, and therefore different components may be changed with ease. But for neatness and compactness give me the chassis, which must be the better of the two, otherwise the best designers would not use it.

I have not seen anything referring to the cycle radio lately, but I did try one set out on the wheel. It was a two-valver with a frame aerial mounted on the handlebars, but was not an entire success, owing to the directional properties of the aerial. I should like to hear of other readers' results in this line.

Thank you for 'On Your Wavelength,' and I think you get more interesting as the weeks roll by.'

Another reader contributes the following views to the problem:

"Dear Thermion,—I have been a reader of your articles for a long time—they are always the first I turn to.

I have been very interested in your remarks about the baseboard versus chassis controversy. Personally, I have always used the baseboard; in fact, the one I started with in 1929 is still doing yeoman service. Before I came here, eighteen months ago, into the country I was curate in one of the poor parishes in Sunderland. Most houses, of those of the unemployed, had some sort of wireless, and as I was interested, too, I had many conversations about it. I gathered that many men make up a set, using cheap parts to begin with, and then, later on, they may be able to afford a better component or pick one up secondhand. Most of us have some of last year's valveholders, etc. One important point I don't think you have mentioned is this: I think the baseboard construction has a better educational value. I first made up sets from the pictorial diagrams, and then with the theoretical circuit in my hand I have sat gazing at the set for a long time on many days, comparing the set with the circuit. I now find that I can read a theoretical diagram fairly well, and can build a "time set from one.

Another curious result of constructing your own sets is the sentimental attachments to various components which are used and have done good service. I look at a coil or transformer, which has served me well and feels it a shame to put it in the junk box. I feel like framing it or crowning it with laurels and standing it on the mantelpiece! Then a set becomes associated with important events in our lives, and it is difficult to put them on one side. The first set I made up was after I was ordained in 1929, and I felt it quite a wrench when I pulled it to pieces. In fact, I still use the same baseboard, panel, valveholders, condenser, etc.

There is a romantic side to wireless besides the so-called romance of big business.

"I must finish by saying how much I enjoy the paper. I really look forward to it each week."—L. G. (Hovingham)."
your query, Where are the Clubs? I am writing you a long-threatening letter. I have read your article, regularly, with approval or criticism, as the case merited. Crooners, I detest, but baseboards every time for short waves. To return to Clubs, we have been running ours nearly a year, and are getting healthier. Not a big cash balance, all money goes in gear. Tri-tet TX and regen. received under one instruction note, and besides this, the best crowd in the district all ready for a chin-wag. Mansfield started a club about a month ago, and both clubs are working with a view to co-operation in experimental transmissions. Stand by for reports in your club columns.

—H. D. (Notes).

Television Public Address!

On Thursday, October 22nd, the world's first Public Address Television job was carried out by Marconiphone.

The work was undertaken on behalf of the Society of Motor Manufacturers and Traders, and took place in the Exhibitor's Club at the Motor Show, Olympia. The occasion was the television broadcast by Sir Malcolm Campbell of a description of each of twelve cars selected by the S.M.M.T., and four Marconiphone "701" Television receivers were installed in the Exhibitor's Club to convey to a selected audience Sir Malcolm's gestures and remarks.

The S.M.M.T. invited members of the Press, the directorate of each of the firms whose cars formed the subject of Sir Malcolm's broadcast, the President and Executive of S.M.M.T., and other prominent members of the Motor Trade.

Altogether, about 120 people witnessed the reception, each of whom saw everything perfectly. This is the largest number of persons ever to witness a regular television programme.

New Home of the B.I.E.T.

I am interested in the great strides which have been made by the B.I.E.T., which was originally located at Shakespeare House, Leicester Square, on the site now occupied by the Leicester Square Theatre. But a growing business demands space, and the Institute was moved to Shakespeare House, Oxford Street. It occupied one floor, but within one year a second floor was taken over; then a third; next a fourth; then the volume of business burst over the banks, so to speak, and additional accommodation was found in Soho Square. This proved inadequate, and finally the Institute has spilled down in the large building upon the corner site of Oxford Street and Stratford Place. This large building, the work of independent architects and the professional staff of the Institute, houses every modern efficiency device, and the new Shakespeare House is now as up-to-date as money and brains can make it. From the time an order for the prospectus is received right through the process of advising and conducting the student's studies and piloting him through his selected examinations, an efficient organisation ensures the successful termination of his studies. They have an electrically-operated postal machine and a printing factory, and many publishers have placed commissions with the Tutors of the Institute for technical books. I wish the Institute well.

The Post-War Generation

WHICH reminds me that never was it more necessary that youth should absorb in such easily-assimilable form the world's heritage of knowledge. Unfortunately, the War upset the mental balance of the world. Before the War, young men were trained in the arts and the professions; they had to serve an apprenticeship of from five to seven years; to start work at six o'clock in the morning, and to work for a modest wage. Moreover, they had to pay a premium before they could become indentured. At the end of their period of apprenticeship they put it in a further year or so as improvers, and by that time were highly skilled. The apprenticeship system has completely broken down, and never has the need for skilled labour been greater. The very skill which created machinery has died off, and no one seems willing to become apprenticed. Some of them will tell you, somewhat tragically, that they are prepared to do anything, which is precisely what they cannot do. A man who says that he can do anything can usually do nothing. The radio trade is no exception. It does not take apprentices. How does it expect to get skilled labour? Does it think that individuals are born with specialists' knowledge?

Correspondence schools are performing a national useful work in bringing their country back to a knowledgeable state.

Speaker Field Windings

When a set is fitted with a permanent magnet speaker it is a fairly easy task to find a suitable substitute when a replacement is necessary. In most cases it is only necessary to find a speaker having the correct ratio output transformer attached, and, as most speakers of the permanent magnet type are fitted with multi-ratio transformers, no trouble need be experienced. When the speaker is of the energised type, however, substitution cannot be so easily effected - the field winding has now to be considered. Speaker field windings are made in several standard resistance values, the most common being 1,250 ohms, 2,500 ohms, and 6,500 ohms.

Importance of Resistance

The first type is generally used in quality receivers having a high anode current consumption, the field winding being connected in the common H.T. lead, either in the positive or negative line. If this type of speaker were incorrectly replaced by a high resistance type, too great a voltage drop would occur across the winding, and the valve anodes would be starved. The 2,500 ohm type is commonly connected in the same manner as the 1,250 type, but in lower power receivers. If the low resistance type were fitted in this case, excessive voltage would be applied to the valve anodes. The 6,500 ohm speaker is generally energised direct from the 200-250 volt D.C. supply, or the field winding is connected across the rectifier output circuit. A low resistance winding connected in the latter position would become damaged, and, what is more serious, the rectifying valve would also be damaged.

Extension Speakers

The addition of an extension speaker is also a matter which cannot be tackled haphazardly. The extension speaker 'sockets' on some sets are connected to the speech coil of the set speaker. When this is the case the extension speaker should be of the low-resistance type (between 2 and 15 ohms approximately), and if a high-resistance type is used a step-up matching transformer should be connected between the extension sockets and the extra speaker.
IT PAYS TO USE EDDYSTONE

Get your copy of the 1937 EDDYSTONE SHORT WAVE MANUAL

From your RADIO DEALER, W.H. SMITH, or in difficulty POST FREE 1/-

INTERCHANGEABLE COILS

New low loss formers of DL-9 high-frequency insulation. Rigidly made and each coil matched. First-class results assured.

4-pin coils have two windings, 6-pin three windings.

No. 959 6-pin Set of 4 12-170 metres Price 16/-
No. 932 4-pin Price 14/-

MIDGET INSULATOR

Made from Frequentite for high frequency work, with N.P. metal posts. Overall height. No. 1019. Price 4/6d. each.

FLEXIBLE COUPLER

Free from backlash but very flexible, this coupler banishes alignment troubles. DL9. insulation. For fine spindles.


AIR TUNED I.F. TRANSFORMER

Compact unit with high efficiency air trimmer and genuine DL9 formers. Total tuning coverage 400 to 500 Kc/s.

Covers high stage gain with approximately 9 Kc/s bandwidth. No. 1014. 450 Kc/s. Price 13/6.

UNIVERSAL S.W. VALVEHOLDER

A low loss holder for above or below baseboard use. The valve enters the contacts from either side. There is no measurable increase of self-capacity to that already in the valve base. DL9. H.F. dielectric, one-piece noiseless contacts.

No. 1015. 4-pin, 1/3. No. 1016. 5-pin, 1/5.

No. 1024. 7-pin, 1/8.

BANDSPREAD TUNING OUTFIT.

Devised to simplify station selection.

The Tank condenser "unit has a capacity of 10 x 14 mfd. Achieved by a patented step by step device. Complete with scale and knob.

Tank Unit: Cat. No. 1042. Price 6/-. Complete with dial.

Improved MICRODENSER

No. 98. For ultra H.F. and general S.W. use CALIT insulation, low series resistance, noiseless movement, extended 1" spindle for ganging.

20 m.mfd., 3/9; 40 m.mfd. 4/3; 100 m.mfd., 5/-.

Bandspread Tuning Outfit.

Devised to simplify station selection.

The Tank condenser "unit has a capacity of 10 x 14 mfd. Achieved by a patented step by step device. Complete with scale and knob.

Tank Unit: Cat. No. 1042. Price 6/-

The Ediswan Type 12H tube has a screen diameter of 12" giving a television picture 10" x 7½" without distortion.

The screen is of special material giving a close approximation to a black-and-white picture.

Specification:

Indirectly heated high vacuum tube. 2nd Anode Volts - - - 1200
Heater Volts - - - - 2.0
1st Anode Volts - - - - - 150-400
3rd Anode Volts (Max.) - - - - - 6000
Sensitivity(mm.pervolt)950/V* +V=final anode volts

List Price £15. 15. 0

ENTIRELY BRITISH MADE

EDISWAN

RADIO VALVES

THE EDISWAN ELECTRIC CO. LTD. 135 CHARING CROSS RD. LONDON. W.C.2

USED BY ALL GOVERNMENT DEPARTMENTS
A NUMBER of listeners bemoan the fact that they are using a 2 watt valve in their output stage, the volume which they get is far less than one watt. Similarly, others who do not understand the meanings of the various valve terms, purchase a valve for the output stage which is of the L.F. type and of low price and then wonder why they cannot obtain more than a very weak signal without severe distortion. As a matter of fact it may rightly be stated that the output stage of a receiver is the most important, and should receive more care and attention in its design and in the voltages applied to it than any other part of the ordinary receiver. First of all it must be remembered that the loudspeaker can only deliver what is fed to it, it cannot amplify, although a poor speaker will not deliver the maximum signal voltage which is applied to it. Assuming, however, that the speaker is a good one of sound design then it will deliver a faithful replica of the signal fed to it, and the makers will state the maximum signal which it will handle without distress. For the battery user this figure will not be of much importance as it is very unlikely that it will be able, with battery supplies, to obtain a sufficiently powerful signal to overload the speaker. In the case of a mains receiver, however, it may be possible under certain conditions to obtain a signal in excess of that which may be handled by the speaker and thus this point should be studied.

Pentode or Triode?

Many listeners purchase a pentode valve in the understanding that it will deliver a greater volume than a simple power valve, and when the change is made in the receiver find that in some cases the volume is not so great as with the original valve. This may be due to two reasons—either the extra anode current taken by the pentode results in a loss of voltage to the remaining valves owing to the fact that the H.T. battery or mains unit will not deliver the extra current, or the input voltage is not so great as with the original valve.

This may be due to two reasons—either the extra anode current taken by the pentode results in a loss of voltage to the remaining valves owing to the fact that the H.T. battery or mains unit will not deliver the extra current, or the input voltage is not so great as with the original valve.

Some Important Points Regarding the Output Stage are Explained in This Article and Some Doubtful Points Cleared Up.

By W. J. DELANEY

Some amateurs appear to be under the impression that if the speaker is designed for use with a pentode no tone correction is required, but the fact that the speaker will be suitable for use with a pentode concerns its impedance or resistance, and not its tone of reproduction.

In designing the output stage the maximum volume which is desired should be considered first, and one should then work backwards to the remainder of the circuit. For the battery user a maximum of 2 watts should be considered for normal circuits, but, of course, this will need a very efficient H.T. supply, and will be expensive to maintain. With a single valve a maximum of 11 watts only is available.

The mains user, on the other hand, can obtain a single valve to deliver an output of 15 watts. Valves of this type are, however, in many cases, subject to the same limitations as the pentode valve; namely, their inability to handle a very large input. The amplification factor is high, and thus they need only a small input in order to deliver the maximum output. The range of the input signal may be ascertained from the grid bias figures. If a valve is rated for 3 volts grid bias it will only take half the signal that a valve requiring 6 volts grid bias will accommodate. Thus, if designing the output stage for a simple receiver without any L.F. amplification between it and the detector one would select a valve with the highest possible amplification factor, and with a low grid bias figure. On the other hand, if one is designing a very powerful receiver to use an output stage delivering 10 watts or so, with a high amplification factor output valve with a very high value of grid bias, and each intervening L.F. stage would have a higher amplification factor and lower grid bias.

Push-pull and Parallel

The push-pull stage will handle just slightly more than double the signal which the single valves will handle, and thus such a stage could be used where overloading takes place with the single valve. Obviously, however, the additional anode current and L.T. current drain must be considered at the same time, or the existing supplies may be found inadequate, with the result that the additional gain will not take place. The parallel stage, on the other hand, will not have any more than the single valves, but the amplification will be greater. Assuming, therefore, that we have a receiver which provides very poor volume,
Grooving Machine for Ribbed Formers

This simple machine can be made quite cheaply and can be used for cutting spiral grooves on any size of former. The pitch of the grooves depends on the number of threads per inch on the shaft.

The former is held on the threaded shaft by a cone cut from spent wire bobbins and secured with locknuts. The spindle may be bent into a crank handle at one end.

The steel springs at each end engage with the thread of the spindle, and as it is rotated the spindle and coil-former moves forward. The hack-saw blade is held against the former with sufficient pressure to cut the grooves to the required depth.

This machine can also be used for space-winding coils by substituting a slotted opening for the hack-saw blade.

A simple device for grooving ribbed formers.

Multi-purpose Testing Unit

Looking for a multi-purpose testing unit, and not wishing to go in for an expensive commercial model, I utilised a good voltmeter of the pocket type which I had by me. This is mounted on a polished brass post, size about 51 in. by 4 in. by 2 in., and which terminates in prods or clips as desired.

The terminals of the meter are thus left free to main circuits on meter. The sockets may be coloured if desired, but a numbered code as indicated is all that is necessary. Sockets are, of course, simpler and speedier than terminals.

W. C. English (Newcastle-on-Tyne 4).

A Self-adjusting Aerial

The accompanying sketches illustrate a method of self-adjustment for tension of an aerial suspended from a tree that may swing in the wind. The lead pipe may be replaced by any other weighty object as counterweight, but the lead pipe looks the tidied. This method is far more practical than springs, which are susceptible to the vagaries of the weather and there is also a limit to their movement, which, of course, does not apply in this case.

E. W. Furbank (Bromley).

A Switching Stand for a Soldering Iron

The accompanying sketch shows a device which I have made and find most useful. It operates the switching of the current to my electric soldering iron simply by the removal or replacement of the iron itself.

It will be seen by the sketch that when the iron is replaced the point is pushed against the contact and so switches on the electricity. If the operator desires to switch off, the iron itself engages in the "V" slot in the plate and by pulling the switch is thrown in the off position. The device should be firmly mounted upon the soldering bench and the sliding plate well greased so as to ensure its easy action.

G. W. Arnold (Ilford).

Ideal for the Beginner

F. J. Camm's Everyman's Wireless Book

2nd Edition.

283 Pages and over 200 Illustrations. Now 3/6, or 3/10 by post from George Newnes, Ltd., 8-11, Southwark Street, Strand, W.C.2.
THE instructions given last week terminated at the point where the wiring was completed with the exception of the battery leads. Included in these are the leads to the loudspeaker, and it will be seen from the latter three leads are required in this particular design in order to simplify the general receiver wiring. In addition to the usual anode and H.T. positive lead to the speaker, the additional lead is employed in order to convey to the screen of the output pentode the necessary H.T. positive potential. No confusion should arise from this scheme, however, as in the blueprint the lead from the screening terminal on V3, marked L.S.2 and the lead from the loudspeaker terminals in the usual way. The lead from condenser C11, marked L.S.1, is then connected to the loudspeaker terminal to which is joined the lead marked L.S.1 on condenser C11 to the centre valve leg on V3, taking a lead from this point for connection to the loudspeaker.

The Battery Leads
There are nine battery leads, and lengths of ordinary flex may be used, or a nine-way battery cord may be purchased. For the three grid-bias leads the length of lead may be about 6 in., but for the H.T. and L.T. a length of about 12 in. will be required. Bare a distance of about half an inch at each end of these leads and attach to one end of each one of the Bowspring wander-plugs or spades. The lead marked L.T.1 should be joined to the filament socket on V3 furthest from the panel, and L.T.1 to one of the switch contacts on the combined volume-control and on-off switch. To the remaining empty terminal on the detector valve being plugged into the holder next to the coil unit, the detector valve in the centre holder and the pentode in the remaining holder. A short flexible lead should now be joined to the anode terminal on V1 and taken down and connected to the terminal on the H.F. choke to which is connected condenser C7 (2000 mfd). Connect the L.T. negative and positive spades to the negative and positive terminals on the accumulator and invert the G.B. positive plug into the H.T. battery, G.B.2 should be inserted into the other end of the G.B. battery at 4.5 volts, and G.B.1 into the 4.5 volt socket. The latter voltage may be modulated subse- quently when the receiver has been put into correct working order. H.T.1 should be inserted into the 84 volt socket on the H.T. battery, H.T.2 into the 60-volt socket, and H.T.3 into the 20-volt socket. Again it may be found subsequently that H.T.1 and H.T.2 may be modulated in order to provide a maximum of operating conditions.

Connect the earth lead to the socket marked E on the rear of the coil unit and the aerial lead into the socket marked A2. Turn the reaction condenser to its maximum position in an anti-clockwise direction and set the control knob on the wave-change switch so that the orange-coloured spot is on top. This sets the coils to the medium-wave band from 200 to 550 metres. Turn the right-hand control slowly to its maximum position, and the receiver will then be in its most sensitive position and the local station should be heard. Turn the main tuning control until the signal is picked up, or until any signal is heard, and in the case of a listener situated in the London district, for instance, the London National should be heard at a setting about one-third of the way from the lower end of the tuning dial. To ensure that the minimum wavelength of 200 metres is tunable, the trimmers on the three gang condenser must be correctly set.

The receiver is now ready for test, and before plugging in the valves the wiring should be very carefully checked by the blueprint. If you have a meter it is advisable to make a voltage test to ensure that the valves will not be burnt out due to a mis-taken connection. For this purpose the H.T. and L.T. batteries should be connected up as described in the next section and the switch placed to the "on" position. The voltmeter should then be applied to the filament sockets on the valveholders and the reading should not be greater than 5 volts.

LIST OF COMPONENTS FOR F. J. CAMM'S RECORD ALL-WAVE THREE.

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
<th>Supplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>L.F. transformer, type J, ratio 3.5 to 1</td>
<td>1</td>
<td>Niclet</td>
</tr>
<tr>
<td>All-wave H.F. choke, type H.F.15</td>
<td>1</td>
<td>纸质</td>
</tr>
<tr>
<td>Fixed Condensers:</td>
<td>1</td>
<td>Value</td>
</tr>
<tr>
<td>.0005 mfd. type 670 (C8)</td>
<td>1</td>
<td>Belling Lee</td>
</tr>
<tr>
<td>Three-gang condenser, type K (.00025+.00025±.0005 mfd.) (Cl, C3, C4)</td>
<td>3</td>
<td>Belling Lee</td>
</tr>
<tr>
<td>All-wave Coil Unit</td>
<td>1</td>
<td>Graham Peto</td>
</tr>
<tr>
<td>H.T. lead to L.T. and L.T. leads</td>
<td>2</td>
<td>Graham Peto</td>
</tr>
<tr>
<td>H.T. - F. 1, H.T. 2, H.T. 3, G.B.+</td>
<td>4</td>
<td>Graham Peto</td>
</tr>
<tr>
<td>One 2 megohm (R.2)</td>
<td>1</td>
<td>Bulgin</td>
</tr>
<tr>
<td>One 50,000 (R.1)</td>
<td>1</td>
<td>Bulgin</td>
</tr>
<tr>
<td>One 1 MFD. 250 volts (C12)</td>
<td>1</td>
<td>Bulgin</td>
</tr>
<tr>
<td>One 3 MFD. 500 volts (C13)</td>
<td>1</td>
<td>Bulgin</td>
</tr>
<tr>
<td>Three .1 mfd. type B.13. (C9, C10, C11)</td>
<td>3</td>
<td>Graham Peto</td>
</tr>
<tr>
<td>One .0001 mfd. type 670 (C11)</td>
<td>1</td>
<td>Graham Peto</td>
</tr>
<tr>
<td>One 5-pin socket G.B. (type 15)</td>
<td>1</td>
<td>Graham Peto</td>
</tr>
<tr>
<td>One &quot;Record&quot; Cabinet</td>
<td>1</td>
<td>Graham Peto</td>
</tr>
</tbody>
</table>

The battery and L.S. leads are not shown in this illustration in order to avoid confusion.

The trimmer on the section furthest from the panel should be uncrewed to its minimum setting, and that on the next section should be set as near the minimum position as can be obtained, and this will be accepted.

SIMPLE TO CONSTRUCT: EASY TO OPERATE

NO TRICKY TRIMMING ADJUSTMENTS

A TESTED AND PROVED CIRCUIT

OPERATING AND ADJUSTING

F. J. CAMM'S SPECIAL

All-wave Three

The Completion of the Building Instructions and the Various Operating Adjustments are Explained in This Article.
OPERATING AND ADJUSTING

F.J.CAMM'S

Special

All-wave Three

The Completion of the Building Instructions and the Various Operating Adjustments are Explained in This Article

Preliminary Adjustments

If this is order is the valves may be inserted, the H.F. valve being plugged into the holder next to the coil unit, the detector valve in the centre holder and the pentode in the remaining holder. A short flexible lead should now be joined to the anode terminal on V1 and taken down and connected to the terminal on the H.F. choke to which is connected condenser C4 (20,000 mfd). Connect the L.T. negative and positive spades to the negative and positive terminals on the accumulator and insert the G.B. positive plug into the positive socket on the G.B. battery. G.B.2 should be inserted into the other end of the G.B. battery at 2 volts, and G.B.1 into the 4-5 volt socket. The latter voltage may be modified subsequently when the receiver has been put into correct working order. H.T.1 should be inserted into the 8-5 volt socket on the H.T. battery. H.T.2 into the 60-volt socket, and H.T.3 into the 120-volt socket. Again it may be found subsequently that H.T.1 and H.T.3 may be modified in order to provide the maximum operating conditions. Connect the earth lead to the socket marked E on the rear of the coil unit and the aerial lead into the socket next to A2. Turn the reaction condenser to its maximum position in an anti-clockwise direction and set the control knob on the warm-up switch so that the orange-coloured spot is on top. This sets the coils to the medium-wave band from 200 to 550 metres. Turn the right-hand control slowly to its maximum position, and the receiver will then be in its most sensitive position and the local station should be heard. Turn the main tuning control until the signal is picked up, or until any signal is heard, and in the case of a listener situated in the London district, for instance, the London National should be heard at a setting about one-third of the way from the lower end of the tuning dial. To ensure that the minimum wavelength of 200 metres is tunable, the trimmers on the three gang condenser must be correctly set.

The battery and L.S. Leads are not shown in this illustration in order to avoid confusion.

The trimmer on the section furthest from the panel should be uncoupled to its minimum setting, and that on the next section should be set as near the minimum position as can be obtained, and this will be accentuated.

LIST OF COMPONENTS FOR F. J. CAMM'S RECORD ALL-WAVE THREE.

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>All-wave Coil Unit</td>
</tr>
<tr>
<td></td>
<td>2.5 in. and 6 coils, 6 in. and 8 in.</td>
</tr>
<tr>
<td>2</td>
<td>Electrolytic Condenser, Type 3. 2 (10,000 mfd.)</td>
</tr>
<tr>
<td>3</td>
<td>0.0015 mfd. NaCl (C1)</td>
</tr>
<tr>
<td>4</td>
<td>0.0005 mfd. NaCl (C2)</td>
</tr>
<tr>
<td>5</td>
<td>0.001 mfd. NaCl (C3)</td>
</tr>
<tr>
<td>6</td>
<td>0.00025 mfd. NaCl (C5)</td>
</tr>
<tr>
<td>7</td>
<td>Slow-motion Drive (type 2135) including 50,000 mfd. trimmer (C2)</td>
</tr>
<tr>
<td>8</td>
<td>30,000 mfd. NaCl (C9)</td>
</tr>
<tr>
<td>9</td>
<td>300,000 mfd. NaCl (C10)</td>
</tr>
<tr>
<td>10</td>
<td>300,000 mfd. NaCl (C11)</td>
</tr>
<tr>
<td>11</td>
<td>Rectifier mounting 200-2000 watt, 2.5 in. and 2.5 in. (E)</td>
</tr>
<tr>
<td>12</td>
<td>0.0005 mfd. NaCl (C5)</td>
</tr>
<tr>
<td>13</td>
<td>0.00025 mfd. NaCl (C3)</td>
</tr>
<tr>
<td>14</td>
<td>30,000 mfd. NaCl (C9)</td>
</tr>
<tr>
<td>15</td>
<td>300,000 mfd. NaCl (C10)</td>
</tr>
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<td>16</td>
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</tr>
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<td>17</td>
<td>Rectifier mounting 200-2000 watt, 2.5 in. and 2.5 in. (E)</td>
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<tr>
<td>18</td>
<td>0.0005 mfd. NaCl (C5)</td>
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<tr>
<td>19</td>
<td>0.00025 mfd. NaCl (C3)</td>
</tr>
<tr>
<td>20</td>
<td>30,000 mfd. NaCl (C9)</td>
</tr>
<tr>
<td>21</td>
<td>300,000 mfd. NaCl (C10)</td>
</tr>
<tr>
<td>22</td>
<td>300,000 mfd. NaCl (C11)</td>
</tr>
<tr>
<td>23</td>
<td>Rectifier mounting 200-2000 watt, 2.5 in. and 2.5 in. (E)</td>
</tr>
<tr>
<td>24</td>
<td>0.0005 mfd. NaCl (C5)</td>
</tr>
<tr>
<td>25</td>
<td>0.00025 mfd. NaCl (C3)</td>
</tr>
<tr>
<td>26</td>
<td>30,000 mfd. NaCl (C9)</td>
</tr>
<tr>
<td>27</td>
<td>300,000 mfd. NaCl (C10)</td>
</tr>
<tr>
<td>28</td>
<td>300,000 mfd. NaCl (C11)</td>
</tr>
<tr>
<td>29</td>
<td>Rectifier mounting 200-2000 watt, 2.5 in. and 2.5 in. (E)</td>
</tr>
<tr>
<td>30</td>
<td>0.0005 mfd. NaCl (C5)</td>
</tr>
<tr>
<td>31</td>
<td>0.00025 mfd. NaCl (C3)</td>
</tr>
<tr>
<td>32</td>
<td>30,000 mfd. NaCl (C9)</td>
</tr>
<tr>
<td>33</td>
<td>300,000 mfd. NaCl (C10)</td>
</tr>
<tr>
<td>34</td>
<td>300,000 mfd. NaCl (C11)</td>
</tr>
<tr>
<td>35</td>
<td>Rectifier mounting 200-2000 watt, 2.5 in. and 2.5 in. (E)</td>
</tr>
<tr>
<td>36</td>
<td>0.0005 mfd. NaCl (C5)</td>
</tr>
<tr>
<td>37</td>
<td>0.00025 mfd. NaCl (C3)</td>
</tr>
<tr>
<td>38</td>
<td>30,000 mfd. NaCl (C9)</td>
</tr>
<tr>
<td>39</td>
<td>300,000 mfd. NaCl (C10)</td>
</tr>
<tr>
<td>40</td>
<td>300,000 mfd. NaCl (C11)</td>
</tr>
<tr>
<td>41</td>
<td>Rectifier mounting 200-2000 watt, 2.5 in. and 2.5 in. (E)</td>
</tr>
<tr>
<td>42</td>
<td>0.0005 mfd. NaCl (C5)</td>
</tr>
<tr>
<td>43</td>
<td>0.00025 mfd. NaCl (C3)</td>
</tr>
<tr>
<td>44</td>
<td>30,000 mfd. NaCl (C9)</td>
</tr>
<tr>
<td>45</td>
<td>300,000 mfd. NaCl (C10)</td>
</tr>
<tr>
<td>46</td>
<td>300,000 mfd. NaCl (C11)</td>
</tr>
<tr>
<td>47</td>
<td>Rectifier mounting 200-2000 watt, 2.5 in. and 2.5 in. (E)</td>
</tr>
<tr>
<td>48</td>
<td>0.0005 mfd. NaCl (C5)</td>
</tr>
<tr>
<td>49</td>
<td>0.00025 mfd. NaCl (C3)</td>
</tr>
<tr>
<td>50</td>
<td>30,000 mfd. NaCl (C9)</td>
</tr>
<tr>
<td>51</td>
<td>300,000 mfd. NaCl (C10)</td>
</tr>
<tr>
<td>52</td>
<td>300,000 mfd. Nacl (C11)</td>
</tr>
<tr>
<td>53</td>
<td>Rectifier mounting 200-2000 watt, 2.5 in. and 2.5 in. (E)</td>
</tr>
<tr>
<td>54</td>
<td>0.0005 mfd. NaCl (C5)</td>
</tr>
<tr>
<td>55</td>
<td>0.00025 mfd. Nacl (C3)</td>
</tr>
<tr>
<td>56</td>
<td>30,000 mfd. Nacl (C9)</td>
</tr>
<tr>
<td>57</td>
<td>300,000 mfd. Nacl (C10)</td>
</tr>
<tr>
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<td>300,000 mfd. Nacl (C11)</td>
</tr>
<tr>
<td>59</td>
<td>Rectifier mounting 200-2000 watt, 2.5 in. and 2.5 in. (E)</td>
</tr>
<tr>
<td>60</td>
<td>0.0005 mfd. Nacl (C5)</td>
</tr>
<tr>
<td>61</td>
<td>0.00025 mfd. Nacl (C3)</td>
</tr>
<tr>
<td>62</td>
<td>30,000 mfd. Nacl (C9)</td>
</tr>
<tr>
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<td>300,000 mfd. Nacl (C10)</td>
</tr>
<tr>
<td>64</td>
<td>300,000 mfd. Nacl (C11)</td>
</tr>
<tr>
<td>65</td>
<td>Rectifier mounting 200-2000 watt, 2.5 in. and 2.5 in. (E)</td>
</tr>
</tbody>
</table>

FOUR WAVEBANDS WITHOUT COIL CHANGING

14-30, 27-60, 200-550 and 850-2,100 Metres

SIMPLE TO CONSTRUCT: EASY TO OPERATE

NO TRICKY TRIMMING ADJUSTMENTS

A TESTED AND PROVED CIRCUIT

THE instructions given last week terminated at the point where the wiring was completed with the exception of the battery leads. Included in these are the leads to the loudspeaker, and it will be seen from the latter three leads are required in this particular design in order to simplify the general receiver wiring. In addition to the usual anode and H.T. positive lead to the speaker, the additional lead is employed in order to convey to the screen of the output pentode the necessary H.T. positive potential. No confusion should arise from this scheme, however, as in the blueprint the lead from the screening terminal on the output valveholder is marked L.S.1 and the lead from the anode L.S.2. These are both joined to the loudspeaker terminals in the usual way. The lead from condenser C1, marked L.S.1, is then connected to the loudspeaker terminal to which is also joined the lead from the screening-grid terminal on V3, and thus the two L.S.1 leads are joined together. This is therefore quite simple, but if for any reason the individual constructor desires to dispense with the third lead on the
by the spread covered by the concentric trimmer on the slow-motion drive. When a station has been tuned, therefore, adjust the trimmers as near to the minimum setting as possible and swing the trimmer to make certain that no further improvement is obtained. Then turn to a position at the opposite end of the tuning scale, and again swing the trimmer to make certain that the correct band is covered.

The Short Waves

The reaction control should, of course, be adjusted to strengthen those stations which are not normally sufficiently powerful to provide adequate loudspeaker signals. The change from one waveband to another is carried out by means of the wave-change switch mounted on the coil unit, the colour of the spot which is uppermost showing the actual setting which is in use. The Green spot signifies the lowest waveband from approximately 14 to 30 metres, the Red spot the next short-wave band from 27 to 60 metres, the Orange spot the medium waves as above-mentioned, and the Blue spot the long waves from 850 to 2,100 metres.

These ranges are, of course, only approximate, and will be modified according to the setting of the trimmers and to the aerial with which the receiver is employed. The modification of the aerial lead, by inserting it into either socket A1 or A2, will also modify the range and, furthermore, will be found essential to obtain smooth reaction on the short waves. The selectivity is best when terminal A1 is in use, but, naturally, a slight loss in signal strength is then obtained. When transferred to A2 the selectivity will be poorer, but better signal strength will be obtained. The adjustment of the volume control will also be found to modify slightly the selectivity as well as the sensitivity, and thus it will be necessary in some cases to make use of the transfer-aerial tapping, the volume control and the reaction condenser in order to obtain a signal free from interference. For instance, it may be found at some parts on the dial that a station may be heard at full volume with reaction at zero and with the volume control in...
its maximum position. But there may be a background from some other more powerful station on an adjacent wavelength.

Selectivity Control

In such a case the following procedure would be adopted. Firstly, the aerial lead would be transferred to terminal A1 and the panel trimmer adjusted for correct tuning. If interference still continues, the H.F. input lead would be transferred to terminal A2 and the same procedure repeated. If signals should then be restored to the original strength by turning up the reaction control, the adjustment of the panel trimmer might then be desirable in order to keep the circuits accurately in tune. This method of balancing the volume control against the reaction control will be found to enable any desired selectivity to be obtained, but the panel trimmer will have to be operated in order to keep the H.F. and detector circuits in step.

On the Short Waves

On the short waves the aerial will generally speaking, have to be connected to socket A1, but this will depend upon the aerial system. If possible, a separate short-wave aerial should be erected in order to obtain maximum results on the short-waves, although an aerial system of the all-wave type will be found quite effective. Naturally, in order to obtain the best results, a standard full-length outdoor aerial would not be the best arrangement, and each listener should try for himself the various schemes which have been detailed in these pages from time to time so as to obtain the maximum performance on every waveband.

Next week further operating instructions will be given.

MARVELS OF MODERN SCIENCE

B. F. 1. C. G. N.

The world-wide appeal of the Practical Mechanic and other illustrated science news stories for boys and their parents, too, is something of wonder to scientists describing the wonders of television, history and geology, and its far-reaching power for modern living, modern pattern by telephone, etc. Petrol at all stations. S.B. set or D. pat. free.


LOCAL STATION INTERFERENCE CUT OUT COMPLETELY

PETO-SCOTT Suppressors are in the most inexpensive and efficient form for local R. F. I. L. suppressor. Wavewound coils on low-loss former, screened by a metal box equipped with a baffle, and one for earth. WOOLSEY, "A." For suppressing Draughty wall mounts for R.F. station.

MODEL "A." Bla


NEW AND DIFFERENT! PETO-SCOTT 1937 SHORT-WAVE ADAPTOR - CONVERTER KIT 13-74 METRES Convert your existing set to A.C. or D.C. and obtain a short-wave receiver with the very desirable addition to the original set. To be added in your own workshop. Two stages are all that is needed to full-size the time of wave-length operations. No special equipment is required. A ready-made black steel chassis and panel is supplied.

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POST THIS COUPON NOW


LOCAL STATION INTERFERENCE CUT OUT COMPLETELY

PETO-SCOTT Suppressors are in the most inexpensive and efficient form for local R. F. I. L. suppressor. Wavewound coils on low-loss former, screened by a metal box equipped with a baffle, and one for earth. WOOLSEY, "A." For suppressing Draughty wall mounts for R.F. station.

MODEL "A." Bla

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[ ] RADIO EQUIPMENT
[ ] RADIO SERVICING AND SALESMANSHIP
[ ] WIRELESS ENGINEERING
[ ] EXAMINATION (state which)

Name
Age
Address

Random Jottings

By JACE

“Extremes Meet—Which Music?”

It is time to consider the relative merits of different kinds of music. It may be said that music is not as important as it is to-day, and the Western Amenity Council might deal with this question at its meeting on November 9th. Listeners will hear the views of the serious and the practical, with the most technical of his customers. Whatever they decide, the discussion should at least be spirited and the participants well-informed.

Anatomy of Swing

“Swing: Music?” has always been well represented in the Northern programme. “Swing” gramophone records have become a feature, and the Northern Revue Orchestra has usually included a proportion of “swing” numbers in its programmes. Now, Henry Reed, the well-known Manchester pianist and composer, is forming a special dance orchestra which will broadcast nothing but “swing” music. In a series of four or five concerts, it is proposed to give a really practical illustration, some idea of the part played by each individual instrument in the swing ensemble. The opening concert, on November 13th, will be in the nature of an introduction, showing the whole orchestra in action. Subsequent instalments will be devoted to individual sections of the orchestra.

Money for Jam

A student of music, with the conventionally impossible story, has fallen from the pen of Max Kester, of the B.B.C. Light Entertainment Department. His musical collaborator, Peter Mendoza, is responsible for the music and lyrics. The story hinges round two young men who, having lost all their money on slow horses, determine to recover their fortunes in the marriage market. One bets the other that not only will he marry a rich woman, but the first girl he asks will say “yes.” She does. Her father owns a jam factory, and the young man, unable to suppress his “brilliance,” invents a liqueur chocolate. All the customers become habitually inebriated. The young man is sacked, ends up in prison, is rescued by an American cabaret star, and so the plot goes on.

The cast includes Tommy Handley, Trudi Gordon, Eddie Pola, C. Denier

What for Wheesie Whassie?

This programme for the Scottish Children’s Hour on November 9th consists of rhymes and stories from Orkney, prepared by Ann Scott Moncrieff: “The Cairn of the Lovers”—a tale of the Findhorn by Helen Drerger—and songs by John Tainsh. Writers and singers are all well known to Scottish listeners.

Arias by Isobel Baille

ISOBEL BAILLIE, the famous soprano who lives in Manchester, is to broadcast for Northern listeners a recital of arias from famous operas and oratorios on November 8th. Her programme will include works by Offenbach, Puccini, Handel, Bizet, and Verdi.

Facility Testing

HAVING used a D.C. eliminator constructed simply on a baseboard, and without the necessity of a panel for separate H.T. tapping, I thought that other readers may find the principle I employed of use for “quick test” purposes. The illustration shows clearly that sockets are simply screwed to the existing screw terminals of the component being used, in this case a condenser.—E. R. WATSON (W.C.2).
The general trend appears to be to do things in a violent hurry, overlooking the fact that there is a vast difference between a hook-up and a "lash-up." Even an experimental receiver should be built as a finished job, devoid of time considerations.

Whilst chassis construction is in some instances not in favour, a metal panel or some form of screening is used, and thus the earth potential sides of the tuning condensers are earthed directly. This is a great advantage, yet it is offset by the extra amount of metal panel which is necessary, due to the comparatively large baseboard. In deciding one's policy, so far as experimental work is concerned, is it not advisable to follow current practice, bearing in mind that there must be a reason for the present trend, and that increased efficiency must be obtained?

Otherwise, designers and manufacturers are wrong; and if this is so, there must be, one would imagine, millions of sets which are not as they should be. Clearly such reasoning is unsound.

Standard Circuits

Let us examine and discuss the matter from an entirely different but most practical viewpoint. We will not take into consideration modern receiving circuits of the tuned radio-frequency and superheterodyne types, but the simple straight circuits of the 0-V-1 and 0-V-2 types, because they were originally used for S.W. reception, and are still deservedly popular.

During the early days, receivers employing the above types of circuit were built on baseboard lines. The foil-lined baseboard was unknown, metal panels were also unknown.

All points at earth potential were taken directly to the earth terminal of the receiver. Thus a considerable amount of wire was in circuit, and comparatively long leads were common due to this, and the fact that all components were mounted above the baseboard.

The result was instability, poor sensitivity and volume due to excessive damping. Whilst valves and components as used in those days left much to be desired.

Chassis construction enables most of the smaller components to be placed underneath out of sight and this gives a neat appearance to the receiver.

Chassis construction was far ahead of the original in every way.

(Continued overleaf)
Benefits of Modern Components

Nowadays we have available special components in which losses have been reduced to a minimum. And, therefore, in order to obtain the last ounce of efficiency, it is advisable to adopt modern methods of construction. To do so, it is wise to introduce avoidable complications. The advantages of the chassis method of construction are many, and entirely underneath the chassis, it is possible to decouple to the minimum, and, due to the fact that decoupling components, R.C.C. components, G.B. batteries, etc., can be fitted under the chassis, it is possible to build short-wave receivers in compact form without fear of interaction.

In the writer's opinion, the advantages of chassis construction are many, and entirely offset the featuring of inaccessibility as a colossal disadvantage. Whether our receivers are permanent or experimental, we must choose wisely, and in deciding as to the form of construction to be adopted, ask ourselves this question: Which is to be preferred, a high standard of efficiency, or, an imagined, taken type for type, that there are some circuits which function when built in practical form, and others which do not. The beginner is usually positive about it, and that, is he thinks big. For example, how many who read this, build and use experimental or sponsored two or three valvers to suit their pockets, yet have visions of one day building a seven valve superheterodyne?

Whilst ambition is commendable so far as the experimenter is concerned, and may, in due course, be realised, it is better to start in a modest way and progress in easy stages. It will be found that during the early part of an experimental career, the realisation that all circuits do not work as well as one knows how and why, and you do not seem to get away with it, comes to the fore.

It is much better to start with simple circuit receivers and get used to them fully. By doing so, when the big receiver is about to become a realisation, its construction will be easier and its good points more easily appreciated.

DURING the past fortnight conditions have so much improved for the reception of DX programs that the early afternoon the listener may now sit near his wireless receiver with the assurance that broadcasts from distant stations overseas can be tuned in at good strength. The volume of the signal increases with the advent of dusk, and by tea-time, as a rule, he should, without difficulty, be able to lock on to any required programme from the globe. As is usual at this period of the year, the reception of broadcasts on the 30- and 40-metre bands is rapidly becoming pleasanter; atmospherics have greatly decreased and stations which a month ago offered but a mere whisper are now producing signals at good readable strength.

Careful Tuning Necessary

If there is to be missed, tuning must be carried out very carefully, and, provided the listener resorts to true "slew motion" when handling the detector controls, he will be daily enriched by many entries.

Signals from the West

There are a number of broadcasts on channels between 31.00 m. (9,600 kc/s) and 31.37 m. (9,620 kc/s), a section of the band much favoured by transatlantic studios, and a little patience should bring you clear speech and music from the United States, Brazil, Argentine Republic, and others. The number of transmissions in the Spanish and Portuguese language found in this band will surprise you if you can carry out your search on this section between G.M.T. 21.00 and 24.00. LRX, relaying LRI, Radio el Mundo, Buenos Aires, on 31.32 m. (9,590 kc/s), is a regular performer every evening; it has been logged on a channel slightly above CT1AA, Lisbon (31.97 m., 9,565 kc/s), with which it should not be confused. Between the latter's 31.85 m. (9,570 kc/s) and Panama City (31.22 m., 9,610 kc/s), and more frequently HJ1ABP, Cartagena (Colombia), on 31.25 m. (9,590 kc/s), the listener can hear the English channel CT1AA, which, when carefully cleared, reveals PRE, Rio de Janeiro (31.85 m., 9,570 kc/s), and LSI, BUENAVISTA, Cartagena (Colombia), at a later hour.

i.e., sensitivity, stability, average selectivity and volume, or accessibility?

To the serious methodical experimenter, the correct answer will be obvious. Modern components and modern applications go hand in hand. To recognise this fact means proving that one's early listeners will never be anything else but experimental.

Don't Be In a Hurry

In any case, whatever changes are necessary, do not depend upon working to a strict schedule of time. Make sure that when testing on actual short-wave signals it is necessary to make quick changes appear to be weak, and does not take into account that signal volume may increase or decrease considerably during even a quick change of components such as resistances, condensers, etc.

During experiments of the kind in which alternative valves are to be compared, a simple modulated oscillator is advisable. With a constant signal available, the time factor does not arise. If an output meter of the most simple type can be made up, so much the better.
The Low-frequency Amplifying and Output Stage; Triode and Pentode Valves; Low-frequency Volume Control; Tone Correction

Grid Voltages

As was previously explained in connection with the H.F. valve, fluctuating voltages are applied to the grid, and these cause greater fluctuations in the voltage developed across the anode circuit " load. " The voltages led to the grid of the output valve are, naturally, considerably greater than those previously dealt with, so that the valve has to operate differently. It is easily possible to " over load " the wrong type of valve, and this is an important aspect of the question. It is evident that the most important factor is that the valve must not cause any distortion—or at least, the minimum amount of distortion. This means, in effect, that it must respond proportionately to signal voltages of every value. Put another way, it means that the change in anode current produced by varying the grid voltage from three to four must be the same as that when the signal voltage varies between half and one and a half.

The Characteristic Curve

This brings us to an important matter concerning any valve: its grid voltage-anode current characteristic curve. The same sounds rather formidable, but it should not be difficult to understand the meaning of this curve of which a typical example is given in Fig. 1. This curve applied to a typical small battery power valve, and it can be seen that when 120 volts is applied to the anode the " curve " is straight between about eight and zero grid volts. If we are to obtain the kind of working mentioned above, the valve must be used so that the grid voltage is always between these two limits. This means that a steady voltage must be applied to the grid in addition to the signal voltages, for these become positive and negative in turns. And if a positive potential were actually applied to the grid, part of the

![Fig. 1.-Anode current-grid volts characteristic curves for a typical small power valve. Straight portions of the "curve" are shown heavier to simplify reference.](image)

H.T. current from the filament to the anode would flow to the grid instead, resulting in several peculiar effects which would give rise to serious distortion. Additionally, of course, the H.T. current passed by the valve would be excessive, and probably more than the H.T. battery could supply—certainly more than the valve could stand without its being damaged.

Maximum Signal Voltage

Theoretically, the steady grid voltage (grid bias) which should be applied ought to be such that, when signals are not being received, the valve operates at the centre of the straight portion of the "curve"; 4 volts in curve B in Fig. 1. This would enable the valve to handle a maximum signal voltage of eight (four on each side of the centre), before distortion sets in. In practice, a valve of this type would never require to deal with a signal voltage anything like as high as this, and so the grid bias voltage can be increased, in order to ensure more economical H.T. consumption. The signal voltage would not normally exceed two, and so a G.B. voltage of seven could be used. Batteries are not tapped at 7 volts, and so we should employ either 75 or 6 volts. The higher figure would be maintained if this did not result in distortion causing the reproduction to become "thin," and the smaller one if this were found to give a marked improvement.

H.T. Voltage Variations

If the signal voltage exceeded 4 volts—and it would not in a circuit such as that taken as an example—the G.B. voltage could be reduced with advantage to reproduction, or the H.T. voltage could be increased. The better and more correct method would be to increase the H.T., so that a longer straight portion of the "curve" would be available, as can be seen in curve A in Fig. 1; the G.B. voltage could then be increased to 7 to 9. Before leaving this question of the characteristic curve, it should be mentioned that a reduction in the H.T. voltage reduces the length of the straight portion, making it necessary to use a lower G.B. voltage, and also making distortion far more probable; this an important reason for reducing G.B. voltage as the battery runs down, and for obtaining a new H.T. battery when distortion sets in.

Amplification Factor

A valve having characteristic curves similar to those shown in curve A in Fig. 1 would have an amplification factor of about 9 (at 150 volts H.T.). This means that a

(Continued overleaf)
connection, whilst the screening grid is normally connected (inside the valve) to the filament. Most battery pentodes and of the five-pin type, the auxiliary grid being joined to the centre pin, although there are still pentodes available in which this grid is connected to a terminal on the side of the base. The latter type is becoming obsolete, and the former is always recommended for this reason, and because it is more convenient in use.

In Fig. 4 the auxiliary grid is shown as simply being connected to a tap on the biasing (generally about 20 volts below maximum) on the H.T. supply, but a rather better method is to connect it to the maximum tapping through a fixed resistance of a variable-mu valve, and connections for control, in addition to that acting on the slope valves, because the characteristic curve rises more rapidly. Valves of this type have an amplification factor of about 15, and can successfully be used in a simple H.F.-Det.-L.F. three-valve circuit. But even then overloading might occur on the local stations, especially if a good aerial system were employed. This explains why it is often necessary to turn down the volume control to avoid distortion.

The Harries Valve
A valve of fairly recent introduction, which is in many respects a simple mechanical device, is the Harries output valve. This valve contains only the auxiliary grid, and has been mounted on this paper in the opinion of the writer, to be an admirable triode replacement. Its inherent advantages are its simplicity, economy of parts, and its ease of manufacture. Most of these advantages are due to the use of a single tone-correction filter to cut the response to the higher sound-frequencies. This filter is derived from what has been written above, for it causes the exact bias voltage to vary in sympathy with the H.T. voltage. Thus, as the battery voltage is reduced, it permits the use, where necessary, of a voltage different from that which can be obtained from a battery which is tapped in W volt-steps only.

(To be continued)
Aerial Efficiency

We have received some interesting information from Mr. Harold Leigh regarding aerial experiments. This communication has been written as a result of the request made in our issue dated October 24th last regarding some of the results which have been experienced with special aerials designed for short-wave reception. Here is Mr. Leigh's communication:

"I have given this subject much attention and herewith give some details. My aerial system consists of three separate aerials, all using 14 gauge copper wire.

1. 66 ft.
2. 164-164 ft. Dipole (with twisted feed in)
3. Broadcast aerial.

(See attached sketch.)

The "lead in" comes through glass tubing.

The 60ft. aerial is certainly a good all-wave aerial, but on the 20-metre band when there has been a complete absence of signals, I have switched over to the Dipole and managed to hear one or two. Another advantage of the Dipole is that during broadcast the tone of the letter in your paper of October 17th by E. de Coltignies (Prittlewell), and most strongly disagree re 'QSL collectors.' I wonder how many of these Mr. Coltignies possesses (as he mentions "QSL", and which are of no DX value at all). I have been a steady listener on 14-mos, etc., bands for 2-3 years and have on file here many letters from American and other 'hams,' thanking me for my very EB and useful reports (and which were not QSA5, B9, etc.; as QSA5 B9 signals must be heard all over and outside the house before I'll call any signal that). Re SUTCH's remarks re S.W.L., I was quite aware of these (probably before Mr. de Coltignies). In any event Egyptian 'hams' are not very important DX. But I most heartily agree with E. R. Crane's letter in your same issue, and will go further and say that a good detailed report (sent to a real DX station) should be worth a QSL, whether a reply coupon is sent or not. Total QSL's here, 1,215 from 79 countries, all on 'phone or music, so I should know a little about DX'ing and S.W.L."

[Mr. Everard was, incidentally, the winner of the B.L.D.I.C. DX contest.]

OPEN LETTER TO MR. SOMEBODY AND HIS SON

DEAR SIR,—The natural desire of most parents is to give their children a fair chance in life in the form of a good College Training, also there are many young men who would like to go to College but for some reason are not able to do so. Let us tell you here and now you can get a Complete College Training without having to go anywhere, and at a reasonable monthly fee for tuition. For well over 20 years we have been training students for all the Key positions, by post, in all parts of the world. Distance is nothing when you are studying by your own brains.

The nature of our business makes us keep in touch with employment requirements, therefore we specialise in preparing students for the good positions which we know exist, and for all the worthwhile examinations.

Write to us for FREE particulars of any subject that interests you, or if your career is not decided write and tell us of your likes and dislikes, and we will give you practical advice as to the possibilities of a vocation and how to succeed in it. You will be under no obligation whatever, it is our pleasure to help.
BATTERY CHARGER!

This remarkable mains battery charger measures 2½ x 3 x 1½ ins. and incorporates a METAL RECTIFIER, and will charge a 2-volt accumulator at ½ amp., for LESS THAN 1d. PER WEEK. Insist on-

RADIO CLUBS AND SOCIETIES

The Short-wave Radio and Television Society (Thornton Heath)

A MEETING of this Society was held on Tuesday, October 6th, at St. Paul's Hall, Norfolk Road, Thornton Heath. Mr. R. G. O. Milnes, the inventor of the unit, found that if four nickel-cadmium cells were connected in series they would give an output of 6 volts, and if the four cells were connected in parallel with 6 volts lead-acid accumulator, current would flow from the latter into the former and continue to flow until they were equal.

The Hon. Secretary of the Society is Mr. J. A. M. Webber, of 368, Brigstock Road Thornton Heath.

The Croydon Radio Society

The Croydon Radio Society was honoured on Tuesday, October 6th, by the presence of Mr. Frank Davey, M.A., of E.M.G. Hand-made Granophones, Ltd., in St. Peter's Hall, Ledwould Road, S. Croydon. His subject was: "Some points in Quality Design," and firstly came views on tuned circuits. He then came to the aspects of the right magnification, and Mr. Davey went on to criticise push-pull and other difficulties, giving a very interesting suggestion, but there were inherent disadvantages such as ageing of valves, and difficulty of keeping the apparatus correctly matched. He prepared a triode output valve with choke capacity filter output. Finally, Mr. Davey deplored the exaggerated high note response of some loudspeakers, as he wanted reproduction with neither top nor bass more conspicuous than the original.—Hon. Pub. Sec., E. L. William

FOR UP-TO-THE-MINUTE KITS, SETS, COMPONENTS on GENEROUS EASY TERMS

REPLIES IN BRIEF

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

W. H. T. (Riddlesworth). Your receiver is not one of our designs, but think the S.W. converter-adaptor shown in blueprint P.W. 48A will function satisfactorily with your receiver to order to make quite certain.

W. B. H. (Bodsmith, Bristol, 3). We have no details of a converter at the prices mentioned. The best unit of this description is the Aeroplane P.W. 22, but it costs much more than the figure named.

W. N. (Scalby). The receiver in question is not one of our designs, but think the S.W. converter-adaptor shown in blueprint P.W. 48A will function satisfactorily with your receiver to order to make quite certain.

R. H. F. (Daglan). The coils cannot be identified by us. There were numerous coils turned up by the manufacturers named and each differed so much that the pin connections were different on the lines mentioned. The local radio dealer should be able to trace the connections and you could then employ the coils in any desired circuit.

J. W. (Gorb). There are dozens of faults which could result in the trouble named. The receiver may have had a broken connection, or a valve or some other component may have broken down. With regard to your other query we advise you to have the receiver examined by a local service agent of the manufacturer.

J. D. (Glasgow, S.W.2). The charging rate is generally that given by the rectifier, and the local radio licence authorities give voltage ratings are obtained by series resistances. Therefore, although a low voltage cell is joined to a high-voltage unit, there will be no substantial rise in voltage, but there will be a great risk of damage to the rectifier.

A. D. (Wavertree). You should write to the makers for a complete list of the faulty receiver and obtain advice regarding the correct impedance to use as an additional speaker, and what the correct input resistance should be in order to preserve the correct load on the output valve.

A. F. (Oxford). It is possible for certain short-wave stations, and the effects of the longer distances are no doubt mainly to blame for your trouble. The remedy is to make a more selective circuit. A smaller diameter cell would not be of any material use, but some form of small series coupling coil should be fitted, with the facilities for changing the coupling to suit different conditions.

L. N. S. (Tilty). You must measure the resistance of the cell before condemning it to use. A meter and voltage in series will enable this to be done. We have no data of the speaker, but generally the makers could assist you. We suggest you communicate with them.

F. R. (Langley). We cannot give coil-winding data for any receiver that has been made, but will supply the lines mentioned on the Croydon Wide-Angle (Rowlett) receiver, and the Appendix of a reply. We refer you to the article concerning the construction.

W. B. (Lympne). If the speaker is in order the trouble may be due to the wiring of the connections. Your apparatus were formerly repaired by the speaker, and the more faithful reproduction obtained from your new speaker shows up the faults. The L.F. circuits should be improved. Attend to the H.T. and G.B. voltages correctly matched.

R. S. (Hull). The receiver in question is not one of our designs, but we believe it was described in one of our contemporaries.

S. N. W. (Kilmarnock). We regret we cannot give instructions for modifying our published circuits. The makers' instructions can be followed regarding the fitting of coils and valves. If sufficient interest is shown, we may issue a special article on the same subject at some future date.

A. R. (Wellington). Although a device of the type mentioned could be used, you would obtain much better results by using a better loaded superhet. This is addressed in front of your valve and would change the result of the measurements. Blueprint P.W. 48A described a unit which may be used either as a converter or adapter, without alteration, and we recommend this.

S. W. W. (Kilmarnock). There is no unit of the type mentioned. You could build a magneto, however, to suit your purpose. The L.F. amplifier to include with a pick-up, or why not use your present wireless set? It will contain any alteration to this and the radio reproduction or operation will be possible.

W. V. T. (Shepherd's Bush). The new valve probably has a higher noise constant than the old one. Alternatively, it may have taken very much more anode current and thus prevent the H.T. supply from being divided; the output circuit may be altered to operate another receiver.

J. W. (Dundee). There are possible explanations for the effects described. A good radio receiver was brought in with the station, and removal of the earth wire, and the tuning of the receiver is the cause or it was introduced into the receiver by induction.
COMPONENTS TESTED IN OUR NEW LABORATORY

Belling-Lee Set Suppressor

INTERFERENCE which is carried by the mains leads is not very difficult to eliminate, and in many home-built receivers a suitable input filter is permanently connected to the mains input circuit. In some commercial receivers this factor is missing, perhaps on account of the fact that no interference is experienced when the apparatus is first installed. In the event of interference arising, and the source being traced to the mains, the insertion of an interference suppressing device is not a difficult matter nowadays, as there are several suitable components already produced for this particular purpose. In this column is illustrated a device of this nature manufactured by Messrs. Belling-Lee, and it will be seen that it consists of the necessary filter components and mains fuses incorporated in an insulated case, with an earthed terminal and a mains plug ready mounted on a chassis (either metal or wood) and it is intended for inclusion between the detector and the first L.F. stage. The price is 10s. 6d.

The Belling-Lee set suppressor, type 1211, which costs 17s. 6d.

Lissen Rotary Coil Unit

ALTHOUGH a superhet is looked upon as the only receiver which gives trouble from whistle interference, a well-designed quality receiver will also be found troublesome from the same cause. This is due to the heterodyning of the carriers of many stations arising, and the source being traced to the mains. This will depend upon the design of the superhet circuit. The Sound Sales component illustrated on this page consists of a choke with parallel condenser, the two being combined to form a neat and compact unit. The choke is a special bobbin-winding, and the inductance value has been so chosen that the tuning is quite sharp, and the attenuation at 9,000 c.p.s. is of the order of 50 decibels, but at 8,000 c.p.s. it is only 7 decibels. Therefore, the musical quality is not unduly marred by the suppressor, although an interposing heterodyne whistle is completely suppressed. The unit is provided with a threaded bolt so that it may conveniently be mounted on a chassis of enamelled wire and it is intended for inclusion between the detector and the first L.F. stage. The price is 10s. 6d.

A 9,000 c.p.s. whistle suppressor from the Sound Sales range of components.

THIS FILTER UNIT IS FITTED BETWEEN DET. AND I.F. STAGE.

Lissen Hi-Q 4-range S.W.

Many listeners find difficulty in deciding upon a suitable short-wave circuit on account of the coil-changing difficulty. Although it is possible to build a short-wave coil unit in which wave-change switches are incorporated, the efficiency is obviously not so high as when separate coils are used for each separate waveband, and there have been several suggestions for designing a coil-changing unit for use on the short waves only. The latest component of this type is illustrated on this page and is one of the new Hi-Q devices produced by Messrs. Lissen. It is a four-range tuner, in which separate coils are employed to cover the range from 4.8 to 91 metres, and each coil is wound in the most effective manner according to the range covered. Thus, the highest range is covered by means of a simple solenoid of enamelled wire on a paxolin former, whilst the lowest range employs a self-supporting thick wire coil mounted on a ceramic base. The latter coil may be seen at the top of the unit, whilst one of the higher range coil is seen at the bottom. The diagrammatic sketch shows how the coils are connected to the four terminals, and it will be noted that a series condenser is included on one range, whilst on another a transfer aerial tapping is included. Thus, maximum efficiency may be expected on every range covered by the tuner. The switch contacts are solid nickel and are of the self-cleaning type, whilst each position is accurately registered. No noises will arise due to poor contacts, and the tuner may be incorporated in practically any type of short-wave apparatus, including transmitters, converters, superhets, straight receivers, etc. The price of the tuner complete with four coils is 15s. 6d., but in addition an extra coil may be obtained to cover the range from 75 to 175 metres at 2s. 6d., and an unwound former, for those who wish to wind special coils may also be obtained for 9d.

New Varley Coils

A NEW series of iron-core coils has been produced by Messrs. Varley, reference numbers BP.111, 112, 113, and 114. These are available in two-and three-gang units and may be used in straight or superhet receivers. The coils are wound to the standard inductance values: medium waves 175 microhenries and long waves 2,000 microhenries. There is a special coil for oscillator circuits having inductance values of 126.9 and 1,056 microhenries, and this may be used with the other types of coil and tracked with a condenser designed to provide an intermediate frequency of 110 k.c/s. For 465 k.c/s there is another oscillator coil wound to inductance values of 85 and 490 microns. BP. 111 is a three-gang unit comprising a band-pass pair with a 110 k.c/s oscillator coil; BP. 112 is a single and 465 k.c/s oscillator coil; BP. 113 is a band-pass and H.F. transformer; and BP. 114 is an oscillator and H.F. transformer. The prices are as follows: BP. 111 and BP. 112 cost £1 1s. each, and BP. 112 and BP. 113 cost 13s. 6d. each.

LATE-WORK FOR AMATEURS

by F. J. CAMM

1p or 1/2 by post from Geo. Newnes, Ltd., 8-11, Southwark Street, S.E.1.
LETTERS FROM READERS

The Editor does not necessarily agree with opinions expressed by his correspondents.

QSL Cards and Reports

SIR,—I have read with interest the many letters you have published referring to QSL cards, and in particular that from G6JI I should like to make a few points clear for his benefit.

In his letter, he explains the experience of W. T. Cooper. I quite agree in the case he has quoted, but has this any bearing on the title at the head of his letter which reads "Reports and Postage"? In every case none of the reports received included postage, and the majority of complaints published deal only with reports sent without postage. Therefore it is clear that G6JI is "barking up the wrong tree." I suggest that he ignores all useless reports sent without postage. Even when a report is useless, it is only decency to use any postage sent, if only to tell the sender that his report was received.

As to amateurs being wealthy men, I am well aware that this is not the case. I happen to be radio 2 AFO, and even though my income is not large, much, especially as I am none of the few "wealthy" men among amateurs. I resent all amateurs must spend money on anything of a show out of my hobby. Like anyone else I do not want to throw money away on useless articles. Hence my comment about my Reply Coupon.

Can any reader tell me what happens to reports and postage that are not required? Let me once again remind readers that it is the postage that all these letters are about, not mere QSL collections.

I might add that although only a working man earning an average wage of 45s. per week, I shall be very pleased to answer all reports on my transmissions, when I get published, providing postage is sent. That is all that is asked of all amateurs.—N. OWEN (2AFO) (Kettejeng).

Mr. Cooper Replies

SIR,—With reference to the question of QSL cards, there appears to be a great misunderstanding by most of the readers who have replied, whose letters you have been good enough to publish. As I am the original writer, may I ask you to publish another letter in the hope that the majority of complaints would be appreciated by your readers.—R. STAGG (Wood Green).

[What other letters think of this suggestion — Ed.]

Back Numbers Wanted

SIR,—I have followed your all-wave battery set, and it gives great interest, but may I suggest that the main edition would be appreciated by your readers.—R. STAGG (Wood Green).

Reports and Postage

SIR,—May I be allowed to encroach further on your valuable space in order to reply to Mr. E. R. Crane, who by his letter in your issue of October 17th appears to have overlooked the main point in my previous letter.

In attempting to justify the indiscriminate circulation of the large number of fictitious and exaggerated reports, he quotes a few cases of transmitters reporting "A.C. Hall Mark Four," which appeared in January, 1933? I will, of course, return the issue promptly and refund any expense incurred.—R. A. MARWOOD (2, Blandford Road, Lower Compton, Plymouth).

From an American Reader

SIR,—In a recent issue you ask for information regarding COQQ. This station relays the programme of CMQ, not CMQX. The correct frequency is 9,750 kc/s, or 30.75 m., and the QRA, Calle 26, No. 445, Havana, Cuba. They send two ver's. South American stations are noted for their drifting habits, so that Mr. Coaling is probably right. OOCX, 11.55 m., Havana, relays CMX (Say Emmay Eoks). QSA5 R8, 4 p.m. E.S.T. (16.00-10.00 G.M.T.), announces in English and Spanish, and uses a series of gongs. Another is D.B. HIN (N, Nebraska), Trujillo City Voice of the Republic of Peru ("Peruana Radio "), II m., QSA5 R8, also on 6.26 m. They stated they would verify reports to G3MB, G3XM, and G4AN, but that West, South America, will soon be testing, as also CBE6G, Santiago, Chile. Another good catch for DX-ers is ZP0, Ascension Island. I am G3WJD, Eastbourne, October 17th, 1936. My QTH is 256 Hove, near Brighton.

Doyoukio

—THAT a frequent cause of hum in an A.C. receiver is the unbalancing of a heater winding due to uneven wiring.
—THAT trouble from the above cause may be removed by using a Hum-drum or Hotdog transformer across the winding instead of using the centre tap.
—THAT the scheme recently mentioned for obtaining an artificial centre-tap in a push-pull input transformer cannot be adopted for the output component.
—THAT a portion of a speaker cone may be filed for better modulation purposes by painting with shellac.
—THAT the characteristics of most valves are taken at certain definite voltages, and in the case of battery valves with 150 volts, etc., the trouble may be due to difficulty owing to the presence of the earthed screening near to some inductive component.

PRACTICAL AND AMATEUR WIRELESS

November 7th, 1936

PRACTICAL AND AMATEUR WIRELESS, George Newton, 9,750 kc/s, or 30.75 m., and the QRA, Calle 26, No. 445, Havana, Cuba. They send two ver's. South American stations are noted for their drifting habits, so that Mr. Coaling is probably right. OOCX, 11.55 m., Havana, relays CMX (Say Emmay Eoks). QSA5 R8, 4 p.m. E.S.T. (16.00-10.00 G.M.T.), announces in English and Spanish, and uses a series of gongs. Another is D.B. HIN (N, Nebraska), Trujillo City Voice of the Republic of Peru ("Peruana Radio "), II m., QSA5 R8, also on 6.26 m. They stated they would verify reports to G3MB, G3XM, and G4AN, but that West, South America, will soon be testing, as also CBE6G, Santiago, Chile. Another good catch for DX-ers is ZP0, Ascension Island. I am G3WJD, Eastbourne, October 17th, 1936. My QTH is 256 Hove, near Brighton.

Doyoukio

—THAT a frequent cause of hum in an A.C. receiver is the unbalancing of a heater winding due to uneven wiring.
—THAT trouble from the above cause may be removed by using a Hum-drum or Hotdog transformer across the winding instead of using the centre tap.
—THAT the scheme recently mentioned for obtaining an artificial centre-tap in a push-pull input transformer cannot be adopted for the output component.
—THAT a portion of a speaker cone may be filed for better modulation purposes by painting with shellac.
—THAT the characteristics of most valves are taken at certain definite voltages, and in the case of battery valves with 150 volts, etc., the trouble may be due to difficulty owing to the presence of the earthed screening near to some inductive component.

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The Monitor

I wish to build the Monitor 3 for bed-side use and want to use headphones whilst listening at night, yet be able to use a speaker when my people are out. What alteration will have to be made for this purpose? I have some headphones with a resistance of 2,000 ohms. Will these be suitable? I have no aerial in the bedroom and wonder, therefore, if a Pix invisible aerial would do, as our house is surrounded with trees. Finally, the aerial would be built out of doors, and I can't solder. — P. F. R. J. (Redhill).

The Monitor should be quite suitable for your requirements, and good results should be obtained from an indoor aerial of the type mentioned. Headphones could be connected in place of the loud-speaker, but to avoid the difficulty of disconnecting the speaker each time a change-over switch could be employed, with a silencing switch on the speech coil of the speaker. The headphones in this case would be filter fed, the speaker transformer acting as a choke. If volume is too great on the headphones, you might find it worth while to include the 'phones in the analog circuit of the detector valve, a fixed condenser feeding the 'phones direct from the detector anode circuit, and the other side of the 'phones connected to earth. A simple on-off switch between 'phones and earth would enable you to switch out the 'phones when using the loud-speaker.

Replacing a Frame Aerial

I have a four-valve S.G. receiver with M.C. speaker and have always had good results on both long and medium-waves. The set has an internal frame aerial, which of late has been fraying and breaking with the result that I cannot possibly repair any more. In any case I want to dismantle it and work the set with an outside aerial and earth and have tried this but cannot get signals. What alterations are necessary to achieve this? I enclose a circuit of the receiver. — J. Mcl. (Glasgow, N. W.).

It would appear from the diagram that the input circuit consists of a tuning coil to which is coupled a small aerial. If this is the case, it should only be necessary to connect a standard aerial to the point marked A, and a standard earth to the point marked E. If, however, the diagram is only schematic, and the grid circuit consists of a standard frame aerial, it will be necessary to replace this by a standard dual-range broadcast coil, to which an aerial and earth should be joined in the usual way. In any case, as the present frame has broken, we suggest you remove the leads now joined to the fixed and moving vanes of the tuning condenser, and join these to the appropriate terminals on a modern coil. (The correct terminals will be shown on the maker's leaflet supplied with the set.) If possible, you should get a coil similar to that now used between the H.F. and detector stages, but if this is not possible, it may be worth while replacing this also by a modern coil, obtaining a

Small P.A. Amplifier

I should be grateful if you could supply me with constructional particulars of a D.C./A.C. amplifier for use with a gramophone pick-up and microphone. This should be of about 6 watts output and intended for use with an audience of approximately 100 persons. — H. A. N. (Yeovil).

The only small P.A. amplifier designs we have capable of the output mentioned are designed only for A.C. mains operation. It might be possible to modify these in order to utilise the high-voltage mains valves with the standard arrangement of a rectifier for A.C. use, but we cannot supply instructions for so modifying our receiver designs. Our Univer-

Winding a Resistor

I wish to wind one or two resistors for a power amplifier. The total current carried is about 1 amp., and I should like to know if there is a gauge of resistance wire which has an even value of resistance. It would facilitate the working out of my various items. What wire do you recommend, and what is the price? — F. E. R. (Highbury).

Ordinary nickel-chrome, 24 S.W.G., will carry 1.3 amps. in a solenoid winding and has a resistance of approximately 4 ohms per yard. This should be quite suitable for your requirements. We do not know the purpose of the resistors but the fact that a simple solenoid of wire has inductance should not be overlooked by you, and you may find it desirable in most cases to double the required quantity of wire and wind the resistor with the double wire to avoid the inductance. The wire in question, enamelled, will cost 4s. 6d. per ounce, and there are approximately 228 yards to the lb.

Simplified Construction

I am anxious to build a receiver of the superhet type, but I wish to go down to the short-waves. I know that multi-range coils are on the market, but I am rather afraid of the trimming and matching difficulties. Is it not possible to have this carried out by some firm so that it is accurately tuned. Also, can a ready calibration be obtained for such a receiver? — G. T. (Edgeware).

Why not make use of one of the ready tuned and assembled units? These contain the tuning condenser and aerial and oscillator coils, together with valve-holders, and are ready ganged. A four-range tuning dial is also fitted. The unit needs only the trimming of the L.F. and output stages, in which the trimming is very simple. Such a unit may be obtained from the Raymart Manufacturing Co. for £5 10s.

The coupon on page iii of cover must be attached to every query.


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November 7th, 1936

(Continued from foot of column over)

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November 7th, 1936

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ELIMINATING HUM — See Page 275

Practical and Amateur Wireless
Edited by F.J. Camm

A GEORGE NEWNES Publication

Vol. 9, No. 217
November 14th, 1931.

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A Radio Consultant for the Listener, Expert and Amateur Constructor, explaining the Operation, Upkeep and Overhaul of all Types of Wireless Receivers, with Special Chapters on the Principles of Radio Telephony, Installation, and Systematic Fault-finding.

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As illustrated. 5 valves (inc. Rectifier), Automatic Volume Control. 8-inch M.C. Speaker. For A.C. Mains 200/250 volts (adjust) 40/100 cycles.

PRICE... £9 ½ GNS

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As Model 375, but for D.C. 200/250 volts (adjust) and A.C. 200/250 volts (adjust) 50/100 cycles.

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Not illustrated. 5 valves (including Class "B" output). Automatic Volume Control. 8-inch Moving Coil Speaker. Cabinet accommodates Batteries.

PRICE... £8 ½ GNS
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London N.S.
Radio in Italy

At the recent Radio Exhibition at Milan the tendency of modern design was towards five-valve receivers of simple design. In the luxury class superhet for all-wave use, with visual tuning indicators and other refinements, were featured.

Changes in Ireland

The B.B.C. announces that Mr. G. F. Combe, previously an announcer at the North Ireland Regional, has been appointed Outside Broadcasts Assistant, for the Northern Ireland Region.

Would You Believe It?

A PRESS notice received from Italy says: "The furniture of these sets are of special material resistant against the devastations of insects and in such a way also the other organisms have been examined in order to resist against the African temperature."

Making a Motor-car

An interesting programme has been prepared for the Midland Regional programme by the B.B.C. mobile unit. This has been recorded at one of the leading Midland motor works and will be a study in mass production.

From a Glider

We have had broadcasts from practically every form of transport and to-day (November 14th) an account of a flight is to be broadcast from a glider. This will be a first-hand account of a novice's sensations in his first glide and should prove very entertaining.

Ultra-Short Dangers

The effects of ultra-short-wave radiations have already been dealt with by us, and the curative effects have been mentioned in connection with modern surgery. We have now heard that in experiments abroad sausages have been cooked by U.S.W. radiations, and from Belgium we now hear that experiments in magnifying the image have been completely successful and in conjunction with the famous lens manufacturers (Zeiss) projected images from the cathode-ray tube have been made possible.

More Invisible Rays

Experiments in Germany regarding the use of invisible rays and their detection by television apparatus may lead
THE PICK of the PROGRAMMES

Concert from Plymouth

On November 12th, in the Western programme, a concert will be given by the Band of His Majesty's Royal Marines, Plymouth Division (by permission of Brigadier H. C. Grant, Commanding Royal Marines, Plymouth), conducted by F. J. Ricketts, Director of Music, Royal Marines. This concert will be broadcast from the Abbey Hall, Plymouth, and Glyn Eastman (baritone) will be the vocalist.

Variety from Exeter

A SO in the Western programme, a number of variety acts will be broadcast from the stage of the Theatre Royal, Exeter, on November 12th.

Midland Symphony Concert

THIS Symphony Concert by the City of Birmingham Orchestra, conducted by Leslie Heward, will be heard on November 19th from the Town Hall, Birmingham. Beethoven's No. 5 will be the chief work in the first half of the programme, and Busoni's Fantomte Concerto in the second. Professor Hely-Hutchison in his interval talk, will describe the latter which has only been performed three or four times in this country. Egon Petri, who was a pupil of Busoni, will be the pianist, and for the choral section in the last movement the singers will be the male chorus of Birmingham Festival Choral Society.

Organist from Ripon

AN organ recital by Charles H. Shoddy will be broadcast from Ripon Cathedral on November 17th, his programme including Tchaikovsky's "Nachtspiel," and "Phantasse in A, Op. 188," by Rheinberger.

The Clifton Light Orchestra

A CONCERT by this popular orchestra, conducted by Reginald Redman, will be broadcast from the Western Regional on November 15th. Frederick Harvey (baritone) will be the vocalist.

Variety from Coventry

COVENTRY Hippodrome Theatre can usually be relied on to provide a strong bill to the series of Variety Outside Broadcasts, and this one on November 17th will be no exception. David Gretton will be the commentator.

Birmingham Town Hall Concert

PART of a concert by Birmingham City Police Band and City Police Male Voice Choir, with Muriel Sotham, contralto, will be heard from the Birmingham Town Hall on November 13th. Richard Wassell will be the conductor. The Police Band is to play a selection from "LIKE TIME" and other items, and the Choir will sing Sir Edward German's "O Peaceful Night," and Root's "There's Music in the Air."

Black Dyke Band

THIS famous Yorkshire brass band will broadcast a special concert in the Regional programme on November 19th.

MAKE THESE DATES WITH YOUR RADIO

This will form part of a series of brass band feature concerts. Under the direction of the B.B.C. Outside Broadcast Director, "Oliver Cromwell," and the "Nocturne March," from the "Moonrise Suite" of Holst.

Organ Recital from Belfast

HAROLD RAMSAY, well known to thousands of listeners for his organ recitals from the Granada, Tooting, will broadcast again in the Northern Ireland programme on November 16th from the new Ritz Cinema, Belfast. The organ is similar to the new B.B.C. organ at St. George's Hall, and cost £10,000 to build. Harold Ramsay was one of the four organists who took part in the first broadcast of the B.B.C. Theatre Organ on October 20th.

Variety from Carlisle

AN excerpt from the variety bill at Her Majesty's Theatre, Carlisle, will be broadcast to Northern listeners on November 18th.

The Bath Pump Room Orchestra

LISTENERS will remember that the opening concert by the Bath Pump Room Orchestra was broadcast in October. On November 12th there will be a similar broadcast by this orchestra, conducted by Maurice Miles, and will be heard from the Pavilion, Bath. The artist will be Bratza (violin).

Gliding Programme

THE B.B.C. Outside Broadcast Director, Mr. Joly de Lotkiniére, recently visited Dunstable Downs to test the entertainment possibilities of gliding. Although the day was unfavourable, he persuaded the authorities to take him up in a two-seater glider, and was duly impressed by the thrill obtained by an amateur on his first gliding flight. Mr. de Lotkiniére will come to the microphone on November 14th and will describe to listeners of the National programme some of the sensations of a novice during his first gliding flight.

Midland Ballad Concert

THREE well-known artists are to appear in the ballad concert on November 15th. The tenor will be Parry Jones, who is to sing three solos, and duets with May Huxley, the soprano, who will also sing four solos. W. H. Squire, the composer and cellist, who is a native of Herefordshire, will play two groups of solos, including two of his own compositions.

Newcastle Dance Band

JOSEPH Q. ATKINSON and his fire-piece dance band will broadcast from the Newcastle studios on November 21. Four of the players come from Newcastle; the fifth is a Manchester man.
IT will be assumed that the receiver has been tested out of its cabinet in order to enable all parts to be readily accessible, and if all tests have been concluded satisfactorily it only remains now to install the receiver in the cabinet. A ready-drilled cabinet for this receiver is supplied by Messrs. Peto-Scott, and is illustrated on page 211 of our issue dated October 31st last. It will be found that the chassis of the receiver will slip neatly into place and the escutcheon supplied with the condenser drive should be first attached to the cabinet front. The speaker should be attached at the rear of the speaker opening, taking care not to use long screws or they will project through the front of the cabinet.

The necessary batteries may be accommodated on the shelf inside the cabinet, and the lengths of battery lead mentioned last week will be found ample to enable this to be done. The receiver is then in its finished condition, and may be left without any further modification.

Times of Listening

To anticipate any difficulty regarding short-wave reception it must be emphasised that it is essential that the correct times of listening are chosen when using the short-wave bands. These wavelengths are affected by the sun and darkness, and it will be found, for instance, that late at night the lower part of the lowest short-wave band may be quite dead and during the middle of the day the lower part of the second short-wave band may prove equally unproductive of signals. No set rules can, however, be laid down, as the short waves are notorious for their erratic and peculiar behaviour, but much waste of time and disappointment will be avoided if certain wavebands are selected according to the time of day or night, and some signals may then be assured. Thus, the lowest wave-range should be employed mainly for use from early morning until about three hours after sunset. From this time onwards the next part of this wave-range, or the lower part of the second short-wave band will prove more lively, and as the hours of darkness extend so the higher short-wave ranges will provide better results.

It must also be remembered that certain stations may be found to come in strongly one night, but the next night it may be found impossible to hear them, and, therefore, the circuit should not be tampered with if this is found to be the case, as on the following night the signals will probably be heard again. The same difficulty sometimes occurs during the course of one evening, a station coming in strongly one moment and then perhaps disappearing for minutes at a time.

The Earth Connection

Remember that the earth is an important part of the installation, and do not spare any pains in trying different arrangements in an endeavour to obtain the best possible arrangement. This may not be the best broadcast earth, and to ensure maximum results on all wavebands it is well worth the trouble of trying various combinations. The same remarks apply to the aerial, and obviously maximum results will be obtained if an all-wave aerial system is employed. Such an arrangement may be obtained from various firms who advertise in this journal.

For some of the weak short-wave stations headphones may be found preferable, and, naturally, many more stations will be heard by this means than through the loudspeaker. The 'phones may be connected in place of the loudspeaker.

If your cabinet is not drilled, use this dimensioned sketch to position the various holes.
Modern Cabinet Making

Cabinets of All Types in the Present-day Styles May be Easily and Cheaply Made at Home. Some Suggestions Concerning this Branch of Radio are Given in this Article.

By W. J. DELANEY

The modern tendency in furnishing design is to avoid excessive embellishments and mouldings which at one time were so popular. To-day the styles followed are very similar to architectural designs, the general aspect being often called "severe." At any rate, plainness is one of the main features, and an endeavour to approach what is often called "streamline" outlines is made by many cabinet makers. The result of this trend in design is that the home carpenter will find it quite easy to build a cabinet, suitable either for a simple table model or for an elaborate radiogram, with the minimum of labour and at a minimum of cost. It is now unnecessary to possess an elaborate workshop, and the simplest of tools will enable a cabinet to be constructed which will bear comparison with a factory-made article. The work may be marred in the finishing, unless some special type of finish is adopted. But the many aids to the woodworker which are now obtainable should enable the handyman to follow practically any particular idea, and the following notes of some of the materials now available, and the methods of using them, will no doubt be found of great assistance. It might be mentioned that the writer has just completed the construction of a radiogram cabinet of modern design, the overall measurements being 3ft. wide by 2ft. deep and 2ft. 9in. in height. The carcase is constructed from 3-in ply (tin. material), and the top of the lid is in 7-ply. A large rectangular speaker opening is employed for twin speakers, and contrasting strips of wood are halved into this opening. The total cost of materials including stain and French polish, was under 30s. This will give some idea of the cheapness of construction of these modern types of cabinet.

Materials

Apart from the various thicknesses of plywood which may now be obtained, and which are, of course, preferable to plain wood for the carcase, owing to the fact that they will keep dead flat, there are now obtainable from timber merchants various thicknesses of plywood which are faced with various fine woods, such as mahogany, burr walnut, sapele, oak, etc. The oak and walnut-faced ply may be obtained in ready-made panels in various sizes, ranging from those suitable for a small table model up to a large radiogram, with either plain or quartered faces. These panels are finished quite square and require no working whatsoever except for the finishing, and even then only a rub with a fine glasspaper is needed before polishing.

For those who are unable to use woodworking tools these panels are obtainable with speaker openings ready made, and, if required, with an opening for a radio-control panel, behind which a plywood or ebonite panel may be accommodated. As an indication of the price of this type of material, a 3-in. panel of quartered burr walnut, measuring 3ft. by 2ft., costs 6s. This would be adequate for the front of a radiogram, and panels for the sides, measuring 2ft. by 14in., cost is. 7d. in the same material.

Cabinet Edges

In place of the usual type of sharp or square edge to a cabinet, appearances are improved if a rounded edge is employed. Such an edge may be obtained in several different ways. In Fig. 1 the arrangement adopted is to glue and screw a thin batten against the edge of the front of the cabinet, and to attach the sides a short distance from the edge, but to the same batten. The intervening space is then filled by a length of quadrant (or quarter-round moulding), which may simply be attached by thin cabinet pins and glue. As the edges of the ply panel are cut dead clean, and as the quadrant is also machine cut, no gaps should show, and no risk of untidy edges will be present due to uneven working. An alternative scheme is to employ grooved corner mouldings, such as are shown in Figs. 2, 3 and 4. In the arrangement in Fig. 2, the moulding is grooved to accommodate the panel, and it may be obtained in various designs. In the Fig. 4 arrangement the two edges are butted inside the moulding, and a triangular fillet is glued or nailed inside to strengthen the corner. The corner shown in Fig. 3 will finish the same as the Fig. 1 arrangement and will be quite flush. The same arrangements may be adopted for the lid of a radiogram and also for the edges of a speaker fret opening.

Chromium and Ebony

A very modern tendency is to employ chromium and ebony as contrasts in a cabinet, and such an arrangement may quite easily be employed by the home constructor. Wood may be obtained in varying widths, on which is a fine chromium overlay or plate. It is easily cut and may be attached to a cabinet front by glue, thus avoiding any marks on the chromium surface. To go with this type of inlay, chromium-domed control knobs may be obtained from Messrs. Bulgin, and they look very neat on a panel or cabinet front which is stained black and polished. If the cabinet is large and incorporates a large

(Continued on page 286)
Lack of Skilled Labour

I MENTIONED the other week that one could not be surprised at unrest among artisans and craftsmen, whilst people without any musical education or training could command £1,000 a year by making weird noises on comic instruments. A reader asks me, what has this got to do with dance music? Everything. I have witnessed in my brief stay on this earth enormous changes in the public outlook. Before the War the apprenticeship system ensured that there was adequate supplies of skilled labour, but mass production has been responsible for the creation of machinery which has destroyed the hand which made it. To-day you cannot get skilled labour for money or the other stuff. The incentive for the youth of to-day to convert himself into a skilled man has gone. Most youths wallow about in blind alley jobs, hoping to be able to get a man's wage for boy's work. One of the causes of this lack of incentive has been the changes in public tastes in entertainment. Jazz music is now at a premium, and those who can write the merest doggerel can earn high salaries, and so-called instrumentalists can make easy money for a few hours' work a week. I say that such a state of affairs destroys perspective, and there is no wonder that people are refusing to go through the rigours of an apprenticeship of at least five years' duration in order to quality for a salary of a few pounds per week.

The "Situations Vacant" column of our daily papers are packed each day with requests for skilled labour. Firms cannot get it. When all the old craftsmen have died, craftsmanship may come back into its own and command the salary which the skilled deserve. The man who makes a saxophone can usually play it, but he does not get £1,000 a year.

of the first to introduce television in the London suburbs, whilst Thomas Wallis and Co., of Holborn Circus, have also installed television equipment. Kennards, of Croydon, have bought a receiver, and are giving demonstrations daily. This is bound to result in public demand, and public demand must eventually mean cheaper television receivers.

It seems a far cry to the days when I regularly looked in on a 30-line cathode-ray tube receiver, but actually it is about two years ago. The new high-definition television, of whatever make, is in an advanced state, and I portend that it will change the entire technique of radio.

A Suggestion?

T. R. D., of County Antrim, writes:—

"Dear Thermion,—This effort should be addressed to the P.M.G., who most probably would never read it. No, I am not suffering from an inferiority complex, but happen to have had some correspondence with Government offices before. They have a nice little stock of postcards to acknowledge letters received. Something about receiving attention.' Then silence.

"The fact that I have to pay 10s. a year annoys me, especially when we hear there are so many millions of pirates sucking in the sweet music from the air and paying nowt to the G.P.O.

"Why not try (the Government, I mean) the same stunt as the gun licence? A man cannot buy a gun or ammunition without producing his licence. Ditto for a set or valves, say I. Oh, yes, he could build a crystal or magnetic detector set and so dodge the valve issue. I have not heard of any sportsman using bow and arrow to dodge the ammunition column.

"Now suppose the P.O. were closed, or in a remote part of town. In this case the trader could issue a temporary receipt for 10s., which
Component Shortage

What is wrong with your radio dealers? There was a time when you flirted with, and even courted the home constructor. Today when he calls upon you to buy a variable condenser, a set of coils, or a potentiometer, you shake your head sadly and imagine the poor fellow has gone wrong in the head. You wistfully cast a sideways glance at your large stocks of commercial receivers, and do your best to sell one of them. This is all wrong. Unfortunately the conditions are very little different when the constructor decides to buy direct. He is often kept waiting for weeks. I understand that there has been a shortage of coils for the Limit Receiver recently described in this journal. It really is too bad. I saw a letter of bitter complaint from a reader the other day who said that he had waited for three weeks. Neither of the firms specified could give a delivery date. Messrs. Peto-Scott Co., Ltd., could not supply because of this, and the reader had been kept waiting for over three weeks. Under the circumstances I can sympathise with his sentiments when he says that he proposes to patronise one of the junk shops; he may not obtain such good results, but he will have saved some cash and retained his temper. Perhaps some of the manufacturers can tell me the reasons for these persistent delays, after assuring designers that adequate stocks are available. If you are a fellow sufferer, write to your Uncle Thermion and tell him about it.

Spectacles for Television

The disadvantage, if you call it a disadvantage, of the television receiver is its bulk, which would dwarf the average small sitting-room. Whilst we are using large tubes there is no satisfactory remedy, for even when the tube is disposed vertically, and the image viewed in a reflecting mirror in the lid, the apparatus is still large. I am interested, therefore, to see that an inventor has patented (No. 457886) a device which would enable a small tube to be used—one which, in fact, would have a screen only 1 in. square. It could be held either in the hand or even fitted on the head like a pair of spectacles. A magnifying lens would be included in the eyepiece to increase the size of the picture; thus, the television receiver itself could be of very small proportions, for it would merely have to house the time-base and mains apparatus. Flexible leads would connect to these eyepieces. A pair of headphones would, of course, be used to provide the sound; hence, if stereoscopic television is developed, a pair of binocular type eyepieces could be used producing the solid effect. This strikes me as being a brainy wheeze and one which is not cranky, for it is practicable.

Interference-free Aerials

I have recently taken the opportunity of testing and comparing a number of the new types of anti-interference aerial systems. The results have been interesting and illuminating. All of the aerials I tested—both as inside and outside types—proved remarkably successful in eliminating interference of a “local” character. Contrary to expectations, I found that some of them actually gave increased signal strength, presumably due to the more accurate matching provided by the H.F. transformers incorporated. This suggested to me that in many cases the matching between the aerial-earth system and the input tuning circuit of the receiver is far from correct.

These special aerials should, and I think will, come into more general use, especially if the manufacturers can produce them rather more cheaply than at present. I am surprised that more listeners do not take advantage of these special aerials, even though legislation will eventually come into force to prohibit the use of electrical apparatus which radiates interference.

Television Queue in Kingsway

The first television programme broadcast on Monday, November 2, was demonstrated by the G.E.C. at their offices in Kingsway, W.C.2. So many members of the public wished to see the demonstration that some time before 3 p.m., when the broadcast began, a large queue stretched down Kingsway. Public demonstrations are being given daily (at 3 and 9 p.m.) at the G.E.C. offices until further notice. The Company tells me that it has already sold a number of sets and is able to offer immediate delivery.
Do you smoke NAVY CUT?

Player's Airman Navy Cut

Airman Navy Cut, like other tobaccos in the famous Airman range has set an entirely new standard in pipe tobaccos selling at a moderate price. Quality in the leaf makes the value exceptional.


A HOME MECHANIC BOOK

I always get Drydex now. It has Exide's name behind it.'

Drydex DRY BATTERIES FOR RADIO

'Still keep going when the rest have stopped'

DX15

Obtainable from all reputable dealers and Exide Service Stations.

Exide Batteries, Exide Works, Clifton Junction, near Manchester. Also at London, Manchester, Birmingham, Bristol, Glasgow, Dublin and Belfast.
YOU CAN TRY YOUR LUCK but when you need condensers it's as well to remember that T.C.C. HAVE MADE CONDENSERS — AND NOTHING BUT CONDENSERS FOR OVER 28 YEARS

T.C.C.
ALL-BRITISH CONDENSERS

THE TELEGRAPH CONDENSER COMPANY LIMITED.
WALES FARM ROAD • N • ACTON • LONDON • W.3

THE RECORD
ALL-WAVE THREE

CHOSEN AGAIN!

Two Jackson Bros. components, a three-gang condenser and the Horizontal Drive, have been chosen by Mr. F. J. Camm for his great new set, the "Record All-Wave Three." Mr. Camm knows that for faultless performance and unfailing reliability, components by J.B. are renowned the world over. You, too, must specify J.B. for your set, and you cannot fail to get good results.

The 3-gang condenser specified is the 'K' model (.0005 + .00025 + .00025 mfd.). Price 15/-

Horizontal slow-motion drive.
Cat. No. 2135. Type 619. Price 6/6

CONDENSERS AND DIALS
JACKSON BROTHERS (London) Ltd.,
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LRS For UP-TO-THE-MINUTE KITS, SETS, COMPONENTS on GENEROUS EASY TERMS
WRITE STATING REQUIREMENTS and kites quotation will be sent BY RETURN.

McCarthy RF6AW All-wave CHASSIS
9/6d. 7/6d. 10 of 36/6

B.T.H. Pace Electric Pickup
20/- 10 of 15/10

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4/- 6/- 10 of 4/-

Garrard A.C. 4 Gramo Motor
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Eliminations of all well-known makers from the scope. Terms
inquiries and orders to Mr. Frank Spring on BEST TERMS.

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ALL GOODS CARR. 7D. CASH or C.O.D. orders by return.
Full makers lists supplied on request.

THE POLYTECHNIC
A Special Course of Eight Lectures on THE CATHODE RAY TUBE AND ITS APPLICATIONS will be given by Mr. G. PARR On Mondays, commencing 23rd November, 1930 8.30 to 9.30 p.m.
Fee for the course of eight lectures—10s.
Syllabus on application to the Director of Education.

PATENTS AND TRADEMARKS.
A Simple Microphone

The following dodge might interest readers who have constructed a microphone from a telephone earpiece. Remove the stalloy diaphragm and in place of this, cut a circle of mica. Next cut out a piece of tin or tinfoil (not aluminium), about 2 in. square, and glue this to the centre of the mica. The middle of the cap should be removed with a fret-saw to within 2 in. from the flange. The mica diaphragm must then be replaced with the mica next to the mica. Solder the pieces together. The screw constitutes one method of contacting with the solidified silver paper.

Small Condenser Construction

While experimenting with small condensers and resistances, I hit upon the idea illustrated. It will be seen that the only requirements for the construction of a number of condensers of different values are as follows:

1. A few short lengths of different gauge bare copper wire.
2. A length of glass tubing (internal diameter, 1/4 in. approx.).
3. Some silver paper, and a few small wood screws.

When the silver paper has been compressed—by the aid of a nail or strand of 16-gauge wire—heat the tube and silver paper until red hot, care being taken to see that it does not bend or warp, allow it to cool and complete by winding the wire and soldering same to short all the turns together. The screw constitutes one method of contacting with the solidified silver paper.

Great care should be exercised when compressing the paper to ensure that no cut fingers are sustained through slipping.

—W. R. HOBBS (Ilford).

A Telescopic Dipole Aerial

The accompanying sketches give details of an efficient telescopic dipole aerial which I have recently constructed, and which should prove of interest to other short-wave enthusiasts. The aerial consists of two camera tripod legs fixed in opposite ends of an insulating rod. This rod is a 4 in. length of 1 in. to 1 in. fibre or ebonite. A hole ¼ in. diam. and 1 in. deep is drilled in each end of it, and the sides of these holes are drilled and tapped. The top ends of these two 2 B.A. terminals which serve the double purpose of connectors and clamping screws for the legs, from the ends of which the paint must be removed.

This makes an efficient dipole for 5-metre fieldwork, etc., but when the aerial is used for the television wavelengths, the legs must be lengthened, to provide a total length of a little over 10 ft. This is done in the following way. The spiked ends of the legs (a) are removed and the spikes cut off. The remainder of the ends are drilled and tapped for 2 B.A. bolts, which are screwed in so that on replacing the ends, the threads project, as indicated at (6). Suitable lengths of 1 in. copper tubing are tapped to screw on to the 2 B.A. bolts, and the result is a dipole which has proved very efficient on the television sound transmissions. It has the advantages of portability and cheapness, and it can be tuned to any wavelength by adjusting its length.—A. D. HASTINGS (Highgate).

Preserving an Aerial Mast

Aerial mast embedded in concrete is, in a high wind, extremely likely to in to us addressed to the Editor, "PRACTICAL AND AMATEUR WIRELESS," George Newnes, Ltd., 111, Southampton Street, Strand, W.C.2. Put your name and address on every item. Please note that every motion sent in must be original. Mark envelopes "Radio Wrinkles." Do NOT enclose Queries with your Wrinkles.

THAT DODGE OF YOURS!

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—W. R. HOBBS (Ilford).

A Telescopic Dipole Aerial

The accompanying sketches give details of an efficient telescopic dipole aerial which I have recently constructed, and which should prove of interest to other short-wave enthusiasts. The aerial consists of two camera tripod legs fixed in opposite ends of an insulating rod. This rod is a 4 in. length of 1 in. to 1 in. fibre or ebonite. A hole ¼ in. diam. and 1 in. deep is drilled in each end of it, and the sides of these holes are drilled and tapped. The top ends of these two 2 B.A. terminals which serve the double purpose of connectors and clamping screws for the legs, from the ends of which the paint must be removed.

This makes an efficient dipole for 5-metre fieldwork, etc., but when the aerial is used for the television wavelengths, the legs must be lengthened, to provide a total length of a little over 10 ft. This is done in the following way. The spiked ends of the legs (a) are removed and the spikes cut off. The remainder of the ends are drilled and tapped for 2 B.A. bolts, which are screwed in so that on replacing the ends, the threads project, as indicated at (6). Suitable lengths of 1 in. copper tubing are tapped to screw on to the 2 B.A. bolts, and the result is a dipole which has proved very efficient on the television sound transmissions. It has the advantages of portability and cheapness, and it can be tuned to any wavelength by adjusting its length.—A. D. HASTINGS (Highgate).

Preserving an Aerial Mast

Aerial mast embedded in concrete is, in a high wind, extremely likely to in to us addressed to the Editor, "PRACTICAL AND AMATEUR WIRELESS," George Newnes, Ltd., 111, Southampton Street, Strand, W.C.2. Put your name and address on every item. Please note that every motion sent in must be original. Mark envelopes "Radio Wrinkles." Do NOT enclose Queries with your Wrinkles.

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 £150 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., 111, Southampton Street, Strand, W.C.2. Put your name and address on every item. Please note that every motion sent in must be original. Mark envelopes "Radio Wrinkles." Do NOT enclose Queries with your Wrinkles.

—J. SMITH (St. Leonards-on-Sea).
Cosmocord Radiogram Units

Many listeners already own a standard broadcast receiver in which no provision is made for the reproduction of gramophone records. It should be remembered that there is not the slightest difficulty in incorporating the pick-up in the standard wireless receiver, and it is not even necessary to alter the wiring of the receiver in order to do so. A simple adapter may be included merely by removing a valve from the valveholder, plugging the adapter into the valveholder and then replacing the valve in the adapter. Terminals on the latter device enable the pick-up to be connected, and to prevent the radio signals from being heard the set may simply be detuned. This is, of course, the cheapest and simplest modification, and to keep down the cost a simple, cheap portable gramophone of the acoustic type may be employed, with the ordinary soundbox replaced by a simple pick-up. A unit of this nature may be obtained for 8s. and is illustrated in Fig. 1. This Cosmocord pick-up is fitted with a tone arm adapter with clamping screw, which enables it to be fitted to practically any standard tone arm, and a 24in. length of silk connecting cord is fitted. The response curve of this little unit is remarkably good.

Dearer Models

Where an attempt is being made to erect a more substantial type of radiogram, a good electric motor should be obtained, and incorporated into the combined apparatus. Then a better type of pick-up, preferably one incorporating a standard tone arm, and a 24in. length of silk connecting cord is fitted. The response curve of this little unit is remarkably good.

Details of Some Useful Accessories for the Reproduction of Gramophone Records

are four other models in the Cosmocord range. Two single pick-up heads, similar to Fig. 1, are obtainable at 10s. and 15s. 6d.

In our issue dated September 26th last issue a free blueprint was presented. It appears that there is some difficulty in obtaining the coils which were specified for this receiver, and in order to assist those constructors who are ready to proceed with construction except for the coils, we have carried out some tests with a view to finding suitable coils as alternatives. As a result of these tests we have decided that the new Varley coils, type BP.114, will form excellent substitutes, and the arrangement of the terminals on this unit is just right for the Limit receiver without calling for the necessity of any alteration to the instructions which have already been given, or for the chassis itself.

It will be noted that the earth connections from the ganged tuning condenser and from point C and point I are made to the metalised chassis surface.

THE LIMIT ALL-WAVE 4

The accompanying illustration shows the coil unit in position on the chassis of the Limit, and the reference numbers to the diagrams are numbered as on the blueprint, and are also positioned exactly as in the original diagram. A separate terminal is, however, provided, and numbered as on the blueprint, and are also positioned exactly as in the original diagram. A separate terminal is, however, mounted on the chassis. This is in direct contact with the metal framework of the coil unit, and is internally connected to one end of certain of the coils inside. Thus it is certain that a sound earth connection be made in order to maintain high efficiency in the tuning circuits via the chassis. The ends of the wires from these points should be well cleaned and turned beneath the flange of the coil unit before this is screwed tightly down. Finally, a separate wire may be joined between the earth terminal on the coil unit and the earthing socket on the rear of the chassis.

Cosmocord company, in which the lower part of the cabinet (which resembles the standard radiogram cabinet) is used as a storage cupboard, and the playing desk forms the upper portion, upon which the usual table model radio receiver may be placed.
OUR FREE CATALOGUE SERVICE

To ease readers' trouble we undertake to send an catalogue of our own production. Merely state, on the coupon or the reverse, what you require catalogue, and address it to "Catalogue, Practical and Amateur Wireless, George Newnes, Ltd., 31, Southampton St., Strand, London, W.C.2. Where advisable make charge, or require postage, this should be enclosed with applications for catalogue. No other correspondence whatever should be enclosed.

NEW EDISWAN BATTERY CATALOGUE

A very comprehensive 56-page catalogue is now available to the public, containing the exclusive range of Edison "Cataloue" Accumulators for motor-cars and cycles, radio sets, commercial motors, electric trucks and vehicles, train lighting, etc. To those concerned with the supplying of replacement batteries for old and new types of car, it constitutes a handy book of reference. Prices of spare parts, replacement batteries for various well-known radio sets pre also included. The sections of the catalogue dealing with our own radio batteries are being published separately for general distribution.

NEW EDISWAN BATTERY CATALOGUE.

The new complete catalogue of "His Master's Voice" records, which has just been issued, runs to 460 pages, and contains particulars of over 6,000 records. Although these cover every kind of music (as well as speech) it is interesting to see what an immense repertoire there now is of what, for want of a better term, one calls "high-class" music. Symphony and Concerto form the "beauvisage layer," with Opera, good songs and Ballet Music as a lighter relief.

Through the generous consent of the proprietors of the "HIS MASTER'S VOICE" RECORDS.

This closely-packed volume is more than a catalogue, it is a compendium of recorded music. It is divided into three main sections. First, the general alphabetical list, comprehensively cross-indexed so as to ensure the greatest number of opportunities of tracing a work. This is followed by the now famous Composers' Guide, which, running the Historic Section, taking us back to the days of Patti, Santley, and Tamagno. There is a special section of Illustrated Biographies of many famous artists, as well as a glossary of musical terms, and a pronunciation guide, which will enable the shyest enquirer to get away with such phrases as "Gounodize". These are really quite easy to say (with the aid of the English tongue).

The majority of the records are, of course, made by modern processes, but it is well that some of the older records have been retained for the purpose of comparison and interest, particularly of National interest. Requests by members of the Royal Family now occupy a whole page, and include H.M. The King's broadcast message to the Empire shortly after his Accession. You cannot hear what Gladstone said in 1872, but there is no mistake as to what Lloyd George said about his 1909 Budget. Shackleton, Peary and other explorers tell of their adventures, and you can still hear the late Earl of Mexborough describe the genesis of the Empire Day Movement.

EKKO RADIO.

The complete range of EKKO receivers and radio-grammaphones is described in a number of folders and booklets we have received from E. E. Cole, Ltd. The leading manufacturers of these sets are keen on radio-grammaphones securing several important features, including an automatic mechanism. "Wartime Records," reproduced phonographs, record playback, "Ultra-ACCURACY," and "graceful motion," noise suppression. This luxury model is priced at 29 guineas. Other new models described include a A.C. nine-stage Superhet, with "Ray Tuning" and "Press Button" noise suppression.

A fascinating new hobby for the winter evenings—BUILDING your own PERIVALE Electric Clock. Complete parts (nothing else to buy) of an attractive Electric Clock with Coin bronze dial 5ins. square, with chapters and modern hands finished in an attractive shade of green. Full instructions and chart of parts given with every kit—follow the simple directions and you can't go wrong. No shock, no soldering iron necessary. You can fit one in your radio, table light, table bookstand, etc., or you can use the clock separately as a mantel clock or Boudoir clock—there are a number of places where you can put a PERIVALE Electric Clock to increase the beauty of your home. Every part is made to fit and when correctly assembled it is guaranteed to be an accurate and reliable timekeeper for years. For A.C. mains 200v. to 250v.

PERIVALE Electric Clock.

From your usual dealer and leading stores: If unobtainable from your local dealer send P.O. or Cash, plus 6d. postage, direct to THE LONDON ELECTRIC CLOCK Co. Proprietors: G.M.T. Ltd. (Dept. 12), 15, PARK STREET (Off Upper St.), ISLINGTON, N.1. NORH 1967.

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Specifications

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Kit No. 1A. Same as above, but dial is punched with holes in corners for mounting on cabinets, etc.

Complete Clock

Complete clock as described in Kit No. 1, with adapter and length of arm for use as mantel clock.

GET YOUR KIT-SET TODAY

Kit Set No. 1 and No. 1A = = = 25/-

Complete Clock = = = 35/-

From your usual dealer and leading stores: If unobtainable from your local dealer send P.O. or Cash, plus 6d. postage, direct to THE LONDON ELECTRIC CLOCK Co. Proprietors: G.M.T. Ltd. (Dept. 12), 15, PARK STREET (Off Upper St.), ISLINGTON, N.1. NORH 1967.

Trade Enquiries Invited

Build your own PERIVALE ELECTRIC CLOCK.

November 14th, 1936

B.B.C. MUSIC PROGRAMME GUIDE

In response to the widespread desire on the part of listeners to know as much as possible about music to be broadcast, the B.B.C. have recently issued a Music Programme Guide in the form of a pamphlet, containing details of advance music programmes and general information regarding music to be broadcast during the season. The pamphlet, which can be obtained free, on application by post to the British Broadcasting Corporation, Publishing Department, 35, High Street, Marylebone, or by personal application to Broadcasting House, will be a guide to all the chief musical activities of the B.B.C. and will contain detailed programmes wherever possible, and the dates of some of the more important musical events to be broadcast on all wavelengths.

BOOKS RECEIVED.

B.B.C. MUSIC PROGRAMME GUIDE

In response to the widespread desire on the part of listeners to know as much as possible about music to be broadcast, the B.B.C. have recently issued a Music Programme Guide in the form of a pamphlet, containing details of advance music programmes and general information regarding music to be broadcast during the season. The pamphlet, which can be obtained free, on application by post to the British Broadcasting Corporation, Publishing Department, 35, High Street, Marylebone, or by personal application to Broadcasting House, will be a guide to all the chief musical activities of the B.B.C. and will contain detailed programmes wherever possible, and the dates of some of the more important musical events to be broadcast on all wavelengths.
Let Us Send You This 40-Page Booklet—Free

The World Friendship Society of Radio Amateurs

This Society was founded by three Radio Amateurs in April, 1925, and celebrated its First Anniversary on April 22nd last. It is a world-wide organisation run entirely on voluntary lines, and there are no fees or subscriptions. All that is necessary to become a member is to sign and honor a simple pledge. Certificates of Membership are supplied free to all accepted applicants.

Since its inception the Society has made considerable progress and is fast making friends. Radio G6AQ has now been officially appointed to act as Hon. Secretary for the newly-formed British Section, and he is desirous of placing the names of as many British Amateurs as possible on the Roll of Honour.

Further information will be gladly supplied on request, and any help or suggestions welcomed.

Applications should be addressed to: Mr. Arthur H. Bird (G6AQ), Hon. Secretary, World Friendship Society of Radio Amateurs, Expanders Ltd., Station 36, Bellwood Road, Waverley Park, Nunhead, London, S.E.15.

Wirral Amateur Transmitting and Short-wave Club

The usual meeting was held at the King's Square Cafe, Birkenhead, on October 28th, when the Secretary expressed his satisfaction with the excellent progress of the club and the record attendance.

Mr. Brunwell, G2RF, gave a lecture on 3-metre transmission and reception, and his talk was noteworthy for its clearness and intelligence. Mr. Brunwell went on to conclude with details of low-loss construction, aerials, receivers, and transmitter design. The next meeting will be held on the last Wednesday in November, when there will be a junk sale. Membership is still increasing but there is room for plenty. All details from the Hon. Sec., B. O'Brien, "Caldy," Irby Road, Heswall, Cheshire.

Short-wave Radio and Television Society (Thornton Heath)

The weekly meeting of this Society was held on Tuesday, October 27th, at St. Paul's Hall, Norfolk Road, Mr. R. E. G. Rice presided.

Mr. E. Cholot was again the lecturer, and on this occasion produced a number of Hi-Q components, the products of Messrs. Lissens, Ltd., in confection with short and ultra-short-wave reception. Mr. Cholot gave a detailed description of each component and explained its function in the receiver.

The Hon. Secretary is Mr. J. J. Webber of 398, Briggate Road, Thornton Heath.

The Croydon Radio Society

The Croydon Radio Society's first short-wave meeting of this session took place on Tuesday, October 20th, in St. Peter's Hall, Ledbury Road, S. Croydon, when Mr. B. R. Bettridge, of the Marconi Phone Co., Ltd., spoke on "Valves and Reception" and "Short-wave Work." Actually, he said, H.F. problems on short waves were the same as those in a.m. on medium waves. Such features as inter-electrode leakage capacities coils, and even the leads within the valve must be looked after. The H.F. pentode was preferred to the screen-grid valve for short-wave working, on account of its extra grid. Mr. Bettridge showed the society the acorn valve, no larger than a thimble, but having a perfectly normal "shunt," being very suitable for ultra-short waves.

In wide-band transmission, such as for television, the tuning was different, bond circuits being used. He insisted that H.F. amplification was worth while on ultra-short waves, and went on to demonstrate the uses of the super-regenerative and super-heterodyne on these frequencies. Finally, a modern television receiver, having six straight high-frequency stages, proved a particularly absorbing topic. Television problems were also dealt with at the meeting on Tuesday, November 10th, when the Mullard Wireless Service Co., Ltd., demonstrated "Cathode-ray Tubes, Their Construction and Use," with lantern slides.

The Hon. Secretary is Mr. E. L. Cumbers, Maycoart, Campledon Road, S. Croydon.

Southend and District Radio and Scientific Society

An interesting demonstration of Lissen short-wave receivers was given before this society on Friday, October 16th, at the new headquarters, Grendon, Cockes, Chalkwell Avenue, Westcliff-on-Sea. The circuits were described by means of lantern slides and members listened with an opportunity of testing the various instruments shown.

On Sunday, October 18th, a very successful Field Day was held, the transmitter (using the call sign G5QKF) operating on a wavelength of 165.5 metres being concealed in a lane near Barnig, Essex. Four of the eight parties which started were successful in locating the transmitter, and an enjoyable tea-party subsequently assembled at the Belfairs Tea Rooms, Leigh-on-Sea. Despite the wintry weather, it was unanimously agreed that a further Field Day should be held in the immediate future on similar lines.

Details of the society's activities may be obtained from the Hon. Secretary, P. S. Adams, "Chippenden," Eastern Avenue, Southend-on-Sea.

Newbury and District Short-wave Club

This club held another successful meeting on October 19th. The members, who are steadily increasing in number, spent a very pleasant evening, thanks to a local radio firm, who lent the club an all-wave receiver.

Newcomers will be welcomed to the club, so prospective members please apply to R. King, Hon. Sec., 55, Mill Lane, Newbury.

Exeter and District Wireless Society

On October 5th Mr. Cholot, of Messrs. Lissenns, gave a demonstration of their "Hi-Q" short-wave components and also their receiver, model No. 8114, which is a very sensitive all-wave instrument priced at 17 guineas.

On October 12th Mr. Gibbs of Messrs. Cossor, gave a talk on "Amateur Short-wave Work." He was able to show a number of his new all-wave models.

All meetings are held at the Y.W.C.A., 3, Dix's Field, Newbury, at 8 o'clock. A. T. Batten, 115, Chiffon Street, Exeter, Devon.
USE THE NICORE COIL UNIT FOR THE "LIMIT FOUR"

Mr. F. J. Cann, for the "Limit All-wave Four" has recently introduced the Varley BP114 Nicore Coil Unit. This Unit is one of a new range which are already famous for their wonderful reliability and the way in which they "pop up" a straight or superhet circuit. Incorporate the BP114 in your "Limit Four." We are confident that you will be most agreeably surprised at the result.

This new range of coil units is fitted with high efficiency iron-cored coils, comprising a three-gang unit for superheterodyne receivers with an intermediate frequency of 110 K.C. and a two-gang unit for a superheterodyne receiver with an intermediate frequency of 220 K.C. For straight receivers there is a three-gang unit for receivers using band-pass tuning before the H.F. valve and a two-gang unit for superhet receivers with an aerial coil before the H.F. valve.

The prices are as follows:
- List No. BP111 (illustrated on left)  £1 0
- BP112 (illustrated above)  £1 0
- BP113 (on left)  £1 0
- BP 114 (above)  £1 0

OLIVER PELL LTD.
Bloomfield Road, Woolwich, S.E.18.

No fiddling!

THE 5-PIN CONNECTOR THAT FINDS THE WAY HOME

At last you can give up improvising and using valveholders for couplings. No longer is it a job fiddling about, trying to get the pins the right way round.

This 5-pin connector is keyed in such a manner that no single connection can be made before the parts are in position. You can do it with the eyes shut.

Use it for connecting power to chassis, amplifier to receiver, etc.

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Please send, free, "Radio Connections" folder.

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November 14th, 1936
PRACTICAL AND AMATEUR WIRELESS

REPLIES IN BRIEF

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

H. R. F. (Stourbridge). The subject is dealt with in this week's Leaflet from a Short-wave Log.

L. M. R. (Cambridge). The arrangement would be of no use in removing static, but the circuit described is to be preferred and will give less signal loss.

J. K. J. (Belfast N.1). We cannot give instructions for modifying commercial receivers, and suggest you get into touch with manufacturers.

D. K. (Birkenhead). Write to the makers of your set for full instructions.

A. W. P. (Dagenham). We have no blue-print of a receiver of the type mentioned. A short-wave converter could be used in connection with your receiver, but we have not described such a converter which would tune as low as the range mentioned.

C. O. L. (Dublin). 25 volt working test is needed for the condenser as a test. The meter is connected in the anode circuit of the I.F. valve it will only function if the A.V.C. circuit is fitted. Without this there is nowhere in this particular set where a tuning indicator could be fitted.

W. G. W. (Birmingham). The primary would carry 40 m.a., but the inductance would not be more than about 30 henries at this figure. It should be suitable for the valves mentioned, as they are in push-pull and the question of D.C. saturation does not arise.

L. M. (Widnes). A Cossor Neon Stabiliser may be used to keep the output of the mains unit substantially constant with the valve in question.

P. B. (Blackpool). We think you will find that Messrs. B. T. S. make a suitable resistance for your needs.

J. M. R. (W). We suggest you try the effect of reversing the leads to terminals 1 and 3 on the B.P. 90 coil.

G. W. (Thores). The coils are not home-made, but are obtainable from Messrs. B. T. S.

K. B. (Petersham). There are two or three amplifiers in our blue-print list, but you do not state whether you require battery or mains apparatus.

W. R. (Bury). We cannot give instructions for modifying commercial receivers, but the transformer may be used in conjunction with your receiver.

A. W. P. (Dagenham). We have no blue-print of a receiver of the type mentioned. A short-wave converter could be used in connection with your receiver, but we have not described such a converter which would tune as low as the range mentioned.

G. M. R. (Steerwells). The price is as follows:—
- List No. BP111 (illustrated on left)  £1 0
- BP112 (illustrated above)  £1 0
- BP113 (on left)  £1 0
- BP 114 (above)  £1 0

OLIVER PELL LTD.,
Bloomfield Road, Woolwich, S.E.18.

(Wood 2345)

Accessories."
Variable Selectivity I.F. Kit

FROM the Raymart Manufacturing Company we have received an interesting kit of I.F. transformers. As has already been pointed out in our pages, in a superhet the degree of selectivity in the I.F. stages is governed by the separation of the primary and secondary windings of the I.F. transformers. Thus the selectivity may be modified in a superhet by altering the relation between the two windings, and in some modern components provision is made for this alteration by including some form of movable coil. In this new Raymart kit a different principle is adopted and the two transformers comprising the kit are shown in sectional form below. It will be seen that one of these (that on the right) follows normal design, the primary and secondary windings being given normal spacing on a cylindrical former, and the two trimmers being mounted on a ceramic base. Flexible coloured leads are brought out for connection. In the second transformer in the kit an iron-cored assembly is employed and the primary and secondary are given an unusually wide separation. An additional winding is, however, overwound on the primary, and this consists of a very few turns of wire, connected in series with the primary. One end of this winding is brought out in a coloured flexible lead, whilst the other end is anchored to one end of the primary, the junction point carrying also a connecting lead. The primary trimmer is joined permanently to the anode side of the primary (to which a connecting lead is attached), and the other side of the trimmer is brought out to a further connecting wire. Thus there are six connecting leads to this transformer, and a switch is used in conjunction with the leads attached to the primary and separate coil so that the latter may be included or excluded from the primary circuit.

The result of this arrangement is that there are two separate degrees of selectivity available, the coupling in one case being exceptionally loose and in the other very tight. The result of this arrangement is that a switch only is required for varying selectivity, and the band-width afforded by the two arrangements is 9 kc/s and 2 kc/s. The coils are enclosed in rectangular aluminium screens to the lower edge of which short bolts are riveted. Holes in the top enable the trimmers to be adjusted. The price of the pair is 12s.

Oldham Super-plus Accumulators

THE new series of I.F. type accumulators to be marketed by Messrs. Oldham & Son, Ltd., will bear the name Super-plus. These are big type cells with interleaved plates and the capacity-indicating clock fitted on one side. The result of the new arrangement of plates is that many extra hours of useful life are available and the accumulator is designed in such a size that it may conveniently be incorporated inside most modern receivers. There are three models, type OLG3 suitable for 3-valve receivers and costing 8s. 6d.; type ZLG3 for 4-5 valve receivers, costing 10s. 6d., and type SLG4 suitable for 6 and 7 valve receivers. The cost of this large cell is 12s. 6d.

Bulgin Television Coil

THERE are various circuit features suitable for inclusion in an ultrashort-wave superhet designed for the reception of the television programmes, and each has its merits. Some experts favour the transformer coupling, others the choke coupling, and yet others the simple tuned-anode arrangement. Components for each type of coupling are available, and the accompanying illustration shows a tuned-anode arrangement which has included an Oldham Super-plus range of television components. This consists of a small coil tuned by a micro-dielectric trimmer, the two components being rigidly held together and suspended inside an aluminium screening can of standard design. The anode connection is attached directly to the trimmer condenser and brought out through a hole in the top of the can and a further lead is attached to the same point and brought out at the bottom of the screen, together with a lead from the other side of the coil, a red and green lead being employed for each point to identify the separate ends. These connecting points are mounted on a paxolin disc, and two mounting bolts are also attached to the lower end so that the component may be mounted on a metal or wooden chassis. These bolts are firmly attached and prevented from turning by means of shake-proof washers and lock-nuts, but undue force should not be used in tightening these because should they become loosened it will not be possible to make a rigid attachment to the chassis. The base is eyeletted to the upper part of the screen.

The result of this arrangement is that a switch only is required for varying selectivity, and the band-width afforded by the two arrangements is 9 kc/s and 2 kc/s. The coils are enclosed in rectangular aluminium screens to the lower edge of which short bolts are riveted. Holes in the top enable the trimmers to be adjusted. The price of the pair is 12s.

MODERN CABINET MAKING.

(continued from page 264).

To relieve a light finished cabinet block banding may be obtained for inlay purposes in widths up to 1in., and is quite cheap. For the larger types of massive radiogram ornamental corner feet, such as those shown in Fig. 5, are also obtainable ready-made and fitted with screws for attachment. These may be modified by removing the top portion if they are too high. The standard size is 5in. high with 3½in. by 1½in. sides, and they cost 4s. per pair, or 7s. 6d. per set of four.

The remarkably fine curve of the Goodman 12 in. high-fidelity twin-diaphragm Auditorian loudspeaker.
THE BRITISH LONG DISTANCE LISTENERS' CLUB

Too Many Stations

The usual seasonal complaint is now making its appearance, due to the growing number of stations making their signals heard. There appears to be an immense increase in signal strength at this time of the year, and in many unselective receivers this results in great difficulty in separating stations, especially when it is desired to hear a really long-distance station. The remedy is obvious, but it is not always a simple matter to decide upon the best method of retting about the difficulty. Where a receiver is so satisfactory in all other directions that it is felt that any alteration may spoil things, an external wavetrap is undoubtedly the best arrangement to adopt. This may easily be placed in a small box and stood upon the receiver and by using a plug-and-socket aerial and earth connector, a quick change may be made if desired so as to exclude the trap.

Remember that although an ordinary simple plug-in coil of the old-fashioned type will suffice for a wavetrap coil, it is necessary, in order to get the best out of the device, to use a sharply-tuned circuit. Thus a modern iron-core coil is called for, and by using a dual-range coil it is possible to cover both medium and long wave ranges. Morea Wearite sell a neat small dual-range coil unit especially for the purpose and this may be made up, with a bakelite dielectric condenser for tuning, into quite a small and compact unit and results in a very economical arrangement.

CLUB REPORTS

Veri's from U.S.A.

A MEMBER, Mr. C. Mallanby (No. 3134), has received an interesting communication from W211Q of New Jersey, in response to his report of phone signals on 57,000 k.c.s. He says that W211Q will reply to every English short-wave listener who sends a report on the 56-megacycle transmissions.

He asks English listeners to listen for his transmitter, which he is at present erecting for a 5-metre aerial system. His transmitter will consist of a modulated power amplifier with a master oscillator of 10 watts with a frequency doubler. Thus a modern iron-core coil is called for, and by using a dual-range coil it is possible to cover both medium and long wave ranges.

Mr. A. KINGSBURY (G6SS), in a letter of the 21st October, says that he has received a report of a signal on 57.500 k.c.s., which he thinks might also be a phone signal.

A Correction

In your paper dated October 24th, 1936, you published my letter giving details of the times of broadcasting of the Japanese stations. Instead of JUH, etc., the call signs should have read JYH, JYN, etc.

The North Manchester Radio Society

Northern Headquarters, British Long Distance Listeners' Club.

On Wednesday, November 11th, 1936, the above society is holding a meeting and supper at the Mayfair Cinema Café, Bury Old Road, Whitefield, near Manchester, commencing at 7.30 p.m. The evening will commence with a short talk, then the remainder of the evening will be spent in an entertaining and sociable way. Ladies are also invited on this evening. The usual meetings of the society are held every other Friday at 8 p.m., at the British Legion, Elm Street, Bury New Road, Whitefield, near Manchester. Further particulars can be obtained from the Secretary, Mr. R. Lawton, 10, Dalton Avenue, Thatch Leach Lane, Whitefield, near Manchester.

NOT MUCH DOING ON THE RADIO IS THERE? COME ROUND FOR A GAME OF CARDS?"
LETTERS FROM READERS

The Editor does not necessarily agree with opinions expressed by his correspondents.

Amateur Transmitting Circuits

SIR,—I have recently been looking through back numbers of PRACTICAL AND AMATEUR WIRELESS issues of about a year ago, and I noticed a good many requests for articles on amateur transmitting circuits, etc. I also noticed that no articles have since appeared in response to these requests. I question why the Editor and his staff have not tuned into the possibilities of Artificial LICENCES, and those which would be A.A. men? In order to gain experience and knowledge on this subject, we can only look to those American publications which are so hard to understand when one compares with English components.—N. OWEN (Kettering).

Experimental Station W1XGT

SIR,—It may be of general interest that an experimental station, W1XGT or W1XJT, is testing daily from approximately 16.00 to 19.00 G.M.T. on 31.6 megacycles, or 9.5 metres. He unfortunately, heterodyned most of the time by another experimental transmitter on the same frequency.—E. DE COLIGNIES (Prittlewell, Essex).

A Reader's Thanks: An S.W. Log

SIR,—Many thanks for the "Wireless Constructor's Encyclopaedia," which I recently received. I must say that it is a very expensive publication, and should be in the possession of everyone interested in wireless, as it offers very valuable information to beginners.

I have not seen in PRACTICAL AND AMATEUR WIRELESS a log of short-wave stations in this district, so I am enclosing mine, which is as follows:

14 mc.: VK3MX, VK3NY, VK2FX, ZL2GO, WJW1R, W5FNN, VK5AB, VK3WY, W5FRL, W5GEM, W5GSK, W5DNV, VK2SK, ZL2AB, VK2WQ, W7AEM, W2V4W, VK3QW, ZL2AO, HC1CF, SUKN, ZAFLW, ZL3AX, W5AKZ and VK2QR. NY3AE was received on "phones," and all the above stations were logged during last month.

Altogether I have about 700 QSL cards from amateurs in all parts of the world, and have always sent a reply coupon for one. My motto is: "A good detailed report deserves a card," and I think this holds good with a great number of amateurs.—F. G. SADLER (2ASA) (Stamford Hill, N.16.)

Back Numbers

SIR,—Please accept my thanks for inserting my request for back No. 180 of PRACTICAL AND AMATEUR WIRELESS in your valuable and esteemed paper. I have been interested in wireless, which has been my hobby for the past six years, and have my PRACTICAL AND AMATEUR WIRELESS every week. This has been my first experience of requesting a back number, and I have received over thirty copies, and wish to thank all readers who did not enclose name and address. I wish to point out that in future readers who want back numbers request the Editor to insert their wants in PRACTICAL AND AMATEUR WIRELESS, so that no copies be sent. Readers could advise applicant by postcard where copies were available, then applicant could get in communication with one reader which would fulfil his needs. A mutual understanding could prevail among readers that all offers, though not acknowledged or accepted, would be none the less appreciated. In my case 80 per cent. were returnable, so you see it is rather an expensive business apart from the time spent in replying to readers, and also wrapping up copies.—J. B. LOTHIAN (Edinburgh).

Those QSL's!

SIR,—I have been very interested in the various letters from readers dealing with QSL's, black-listing, etc., which have appeared in recent issues of your fine journal. As regards the "hooch" as one reader put it. I have noted that SUICH and SM5SSX are given as examples by readers. I have QSL's from both these stations: SUICH on 29.5/26.3-26.36 and SM5SSX for 4.6/36 (both received some time ago). It also believe that many S.W.L.'s are "short-winded" in waiting for QSL's—"No notion's, no hooch" as one reader put it. While writing I venture to give a few of the QSL's I recently received.

Cut this out each week.

A Good Log from Londonderry

SIR,—Not having seen any DX reports from this city, I appeal to a list of stations I have heard recently on an 0-1 receiver with headphones. W2VA, W5FWK, W3GGZ, W5KX, W5WV, SUICH, W6LX, W6IY, W5SRL, E6CQ, W5TTI, W5HCE, W6WC, W5ZAT, W5XCA, W9KXN, W5CH, W5VOC, W5K9C, W5KRA, ONV4K, ON4CH, SU1H. I received these QSL's at R6 on 64 and to 144 metres B.S.T. on Thursday, October 1st. They are all amateurs on the 14 mc. band. The broadest stations, received before 1:30 hours since the end of September, or the same receiver, are as follows:—W6XK (19, 25 and 49 metre channels), W2EU, K6EJN, W6MR, W2XAD, WX2AF, WXAF (19 and 25 metres), CF5, CF7, TFL, WPD, W2FWK, W2CRA, J6AEE, W2NR, W2GZZ, W2ETI, W2CIC, W2F5C, W2PBI, W2XK (19, 25 and 49 metre channels). My antenna is of the standard dipole type, and the receiver in use is a 1-v-2, battery operated.—C. T. F. FAULCH (Brighton, Sussex).

The Cyclist

2d. Every Wednesday.
A Selectivity Problem

"I should be glad to know if the Record All-wave 3 is really selective or does the local swamp the dial. Is it possible to cut out one valve on the Record 3 with a switch, or one or two valves on the Limit 4?"—W. W. (Rickmansworth).

The circuit employed in the Record All-wave 3 provides a sufficient degree of selectivity to answer all normal requirements. At your locality you could not expect a simple three-valver of this type to enable you to receive Fecamp, for not expecting a simple three-valver of this degree of selectivity to answer all normal requirements.

W. W. (Rickmansworth).

THE receiver in question is now out of date, and we regret that both the blue print and the issues in which construction was described are out of print. The oscillator coil is designed for use with a separate triode oscillator, and we have no details of a receiver now available of this type.

S.W. Converter for Superhet

"Would you please inform me if you have a blueprint of a Short Wave Converter for an all-mains Superhet, D.C."—E. D. (Merthyr Tydfil).

We have several times mentioned the difficulty concerning the use of a superhet S.W. converter with a superhet receiver. If the latter is a straightforward circuit there should not be any difficulty, although under some conditions there may be two or three extra whistles caused by the radiation from the frequency changer. The greater problem arises, however, if the superhet already incorporates some aerial selectivity device which is fitted to prevent second-channel whistles, and it is then found that this sometimes is of such a nature that it prevents the converter from functioning. As we have no circuit details of your set we cannot say whether or not it is suitable, and therefore you should communicate with the makers and obtain their approval for the use of a converter. If it is in order, the unit which is the subject of our blueprint P.W. 48A will prove suitable, as this may be used for a battery or mains receiver.

The coupon on page iii of cover must be attached to every query.
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November 14th, 1936

PRACTICAL AND AMATEUR WIRELESS

Miscellaneous Advertisements

Advertisements are accepted for these columns at the rate of 3d. per word. Words in the form of proper names and capital letters are charged at double this rate, minimum charge 3/- per line. Full details are charged at 5/- per line. All advertisements must be sent to the Advertising Manager, regarding which all communications should be addressed to the Advertising Manager, 

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They shall grow not old, as we that are left grow old; nor shall the young, aged.

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We can best remember them by offering the hand of friendship to their comrades who survived, so many thousands of whom, because of sickness or poverty they are growing old, are today in dire need of help.

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Erecting Dipole Aerials—See Page 311

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Everything about—Drums, Mirror Scans, Scanning Discs and other Scanning Systems, Neon Lamps, the Cathode-Ray Oscillograph. How to build Short-Wave Receivers; How to build Ultra-Short-Wave Receivers, straight and Superhet types.

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Radio Stars and New Shops

A POPULAR feature to-day seems to be the official opening of new radio studios at which well-known stars appear. The latest firm to carry out this feature is Smart's Radio, where, at the opening of a new branch at Romford recently, the well-known stars Elsie & Doris Waters attracted huge crowds.

A Spider-web Aerial

THE RADIO CORPORATION OF AMERICA have been developing an interesting all-wave aerial system, and the peculiar arrangement of the many wires has led to the name "spider's web aerial." It includes a long, horizontal aerial and numerous dipole arms hanging from it, typically forming the spider's web pattern made by Mears, Holiday and Hemminger to be used whilst the bells are away.

Radio from the Past

IT is accepted that radio signals go on for ever, gradually getting weaker but never actually dying out. Attempts have been made in a Continental laboratory to endeavour to distinguish between present signals and those of the past, but so far without particular success. This raises the old television problem of the ghost images, namely, are the ghosts reflected images, or is the reception of a signal after it has once traversed the globe?

Harry Evans and His Band

LATE night dance music for Regional listeners will be supplied by Harry Evans and his band from the Grand Hotel, Torquay, on November 18th. Listeners will remember that the band made their debut in a programme of late night dance music in July; there are eight musicians who for the past five years have specialised in hotel entertainment. In addition to playing dance music, they also give performances as a straight orchestra.

Service for Home Constructors

THE Mullard Wireless Service Co., Ltd., are inviting home constructors to make the fullest use of their Technical Service Department. A postage-saving scheme is about to be launched, and a large number of dealers throughout the country will be co-operating. Home constructors may approach these dealers—many of whom will be displaying a special poster—in connection with any problems appertaining to home constructed receivers, particularly with regard to valves. Where dealers cannot provide the required information on the spot, they will pass the enquiry to Mullards who will supply the necessary data within twenty-four hours.

New Radio Actors

THE short play, "Linseed," which is to be broadcast from Manchester on November 23rd, will be presented by a cast of seven male players, none of whom has broadcast before. The normal practice in the North Region is to try out new actors in relatively unimportant parts, where they are supported by experienced broadcasters. Latterly, however, Jan Bussell, the Regional dramatic producer, has been experimenting by putting on a number of short plays and sketches presented entirely by newcomers to the microphone. "Linseed" has been written by Edward Hay, and tells of a linseed importer in Manchester, who, unwittingly, bought a cargo in which were concealed large quantities of cocaine. Police and customs officials figure in the sketch, which is by way of being a "thriller."
THE PICK of the PROGRAMMES

"The Importance of Being Earnest"

A CAST of quite outstanding importance has been collected for the forthcoming production of Oscar Wilde's sparkling comedy, "The Importance of Being Earnest." The play, depending as it does upon verbal wit rather than complicated situations, is ideal for the microphone. Ronald Squire, whose intimate manner has already stamped him as an ideal broad-

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TELEVISION AT THE ALEXANDRA PALACE

World premiere of "The Importance of Being Earnest"

"The Importance of Being Earnest" will be world premiered at the Alexandra Palace on November 21st, 1936. The performance will be televised live from the Palace, with a camera televising a close-up of a singer.

VOCALIST WILL BE ESME WEBB (CONTRALTO)

Vocalist will be Esme Webb (contralto). The performance will be conducted by Reginald Redman. The orchestra will be led by Maurice Alexander from The Victoria Rooms, Studios in May of this year, will broadcast in a broadcast concert from the Bristol Symphony Orchestra.

"Il Trovatore"

THE William Rees Concert Society is presenting a concert version of Verdi's opera "Il Trovatore" on November 28th, which is to be broadcast from the

HALLÉ CONCERT

Sir Henry Wood will conduct the Hallé Orchestra on November 26th. Part of the concert, including "Symphony No. 2 in D" by Sibelius, will be broadcast from the Free Trade Hall, Manchester.

"Theatres of Variety"

BOCOMBE will be visited in the programme entitled "Theatres of Variety," on November 24th, when a broadcast of Robert Macthe's Revue, "Now and Then," will be heard from the Hippodrome.

Concert from Torquay

LAELIA FINNEBERG (soprano) will be the artist at the concert by The Torquay Municipal Orchestra, conducted by Ernest W. Goss, to be broadcast from The Pavilion, Torquay, on November 24th.

Dance Music Old and New

JACK McCORMICK and his Ambassadors are to broadcast old-time and modern dance music from the Rialto Ballroom, Liverpool, in the Northern programme, on November 26th.

Orchestral Concert from Plymouth

THE Plymouth Orchestra, conducted by Walter P. Weekes, will broadcast a concert from The Guild Hall, Plymouth, on November 25th. Laelia Finneberg (soprano) will be the soloist.

SOLVE THIS!

SOLVE THIS!

SOLVE THIS!
A HANDY DEVICE FOR USE WHEN SOLDERING

A simple relay for use with an A.C. eliminator.

1. With the three-wire system, the H.T. was easily switched on or off in either kitchen or bedroom, and I then concentrated on the L.T. switching. All difficulties have been overcome by use of a relay which has the following advantages:
   (1) Has no separate batteries.
   (2) Can be used any distance away from the receiver.
   (3) Cost of working is about one penny per year when used three hours nightly.

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 £1.00 for the best wrinkle submitted, and for every other item published in this page we will pay 10 guineas. Turn that idea of yours to account by sending it in to us addressed to the Editor, "PRACTICAL AND AMATEUR WIRELESS," George Newnes, Ltd., 811, Southampton Street, Strand, W.C.2.

D. Clare (Hallam).

Efficient Short-wave Coils

The accompanying sketch shows how a combined wave-change and "on-off" rotary switch can be made from an old volume control. First, remove the resistance winding and fit two connecting wires of No. 18 gauge insulated copper wire. Remove the insulation from the ends of these wires, and bend the ends to a semi-circular shape so that when the slider passes over them they will make good contact with the latter. The sketch clearly shows the connections to the L.T. supply, etc. I have had this switch in use in my set for some time, and have found it quite reliable.—R. Goldridge (Midsummer Norton).

A Dual-purpose Rotary Switch

The accompanying sketch shows how a combined wave-change and "on-off" rotary switch can be made from an old volume control. First, remove the resistance winding and fit two connecting wires of No. 18 gauge insulated copper wire. Remove the insulation from the ends of these wires, and bend the ends to a semi-circular shape so that when the slider passes over them they will make good contact with the latter. The sketch clearly shows the connections to the L.T. supply, etc. I have had this switch in use in my set for some time, and have found it quite reliable.—R. Golldridge (Midsummer Norton).

A Relay for A.C. Eliminators

Using an eliminator for H.T. and an accumulator for L.T. supply, I was desirous of fixing an extension speaker and remote control "on-off" switch in a bed-

room. With the three-wire system, the H.T. was easily switched on or off in either kitchen or bedroom, and I then concentrated on the L.T. switching. All difficulties have been overcome by use of a relay which has the following advantages:

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A handy device for use when soldering.

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Ferguson All-wave Receivers

The illustration shows the general appearance of the Ferguson All-wave Superhet Models 378 A.C., and 378 Universal Superheterodynes. These models are designed to cover all the popular short and broadcast wavelengths. Each circuit is employed on similar lines, and the main circuit features are identical except in so far as concerns the rectifier and input circuit employed. In the 378 A.C. model the standard A.C. rectifier and input circuit is employed, whilst in the 378 Universal model two bivalent valves and the D.C. rectifier are employed. The two receivers may thus be considered together, especially as, on test, it was found that both gave identical results and are operated in the same manner.

The Controls

There are four controls in addition to the mains tuning unit, one for volume, one for sensitivity, one for wave-changing, and one combined on/off switch and tone control. The tuning scale is of the full vision type, with the four separate wavebands arranged in two concentric circles, the outer ring carrying, in addition to the long and medium wavelengths, the names of the more important European stations. A double-ended pointer travels round the scale, which is continually illuminated when the set is switched on. The only indication of the wave-range setting of the set is given by engraving on the wave-change control knob, and this is turned so that the desired range is uppermost on the knob.

At the rear of the chassis sockets are provided for gramophone pick-up, external loudspeaker, and mains voltage selection. A four-pin socket is also fitted to the rear of the chassis into which a four-pin plug is inserted to feed the speaker and connect the speaker field in circuit.

Test Report

Both models were tested on our standard scale and were found to give identical results. Hum is practically negligible, although as generally found in a Universal model, when this was used on the A.C. supply, a reversal of the mains plug in the socket resulted in more hum being obtained one way round than the other. This point should therefore be watched when using this model. The sensitivity, with sensitivity control in the maximum position, is very high, and this particular control was found extremely useful in obtaining a setting which gave a distant station free from surrounding noises. Selectivity is very good and very little difficulty was experienced in obtaining practically any desired station free from interference. It was found that in some cases a judicious balance of the tone and sensitivity controls enabled weak stations to be heard clear of interference, and this was especially so in the case of some of the long-distance short-wave stations. The output was more than adequate for the home, and it appeared that the full 8 watts mentioned by the makers was obtained. At maximum output the tone was quite satisfactory with the tone control in the midway position, and no troubles were experienced due to the vibration or vibration of any of the valves or other components. No doubt the exceedingly well-made cabinet contributes to this feature, and the large Relay speaker, when fitted, handles the volume very well indeed. All of the controls are set in a satisfactory manner and are free from backlash or other defects.

On the shortest wave-band (from 12 to 30 metres) most of the American stations could be tuned in late in the afternoon at quite satisfactory volume, and the dual speed control knobs enabled tuning to be very accurately carried out. The receiver may, therefore, be considered as a very good example of modern design, and is good value at the price of 164 guineas.

THE CYCLIST

2d. EVERY WEDNESDAY

The Great New Weekly. Packed with interesting touring and technical articles—lately illustrated. Get a copy to-day!

Published by George Newnes, Ltd., 8-11, Southampton Street, Strand, London, W.C.2.
Silent Radio

I HAVE been reading details of the Dictograph Silent Radio, by means of which it is claimed that one can listen while others sleep, read, or talk, thanks to the Acousitone Magic Ear. It brings to the listener the opportunity to enjoy by himself, without headphones or anything that is worn, music or speech in the radio, while others in the same room need not be disturbed unless they wish to hear. The Magic Ear is a tiny tonal fork, tucked away beneath the pillow or on the back of an armchair. It enables even those who are hard of hearing to listen as well, claim the makers. I shall be interested to have further details of this.

A Question of Degree?

R. J. R. (Clapham) brings up a belated rearguard to the problem of baseboard versus chassis. He says:

"Dear Thermon,— Once again I put down my soldering-iron and pick up my pen to write to you. I note that the old controversy of chassis versus baseboard is raging in your columns, and, with your permission, I propose to add my say.

"Surely this question is one of degree. The baseboard is eminently suitable for small sets, and particularly battery sets, but imagine a large mains set built in this manner. Apart from the question of the size of the baseboard that would be required, think of the danger of putting one's hand in the innards when the set is switched on to make some minor trimming adjustment and touching one of the numerous live spots there would be. I have a home-made 4-valve mains set on which it is impossible to touch a "hot" spot anywhere except underneath the chassis. ('What about the S.G. anodes?' says Mr. Smart. I use Yank 'toobs,' which have the grid brought out to the top cap.)

"Baseboards may be all right for those lucky enough to possess a 'den,' but I live in a flat, and my set has to act as a family set and a piece of furniture when the kitchen table is not available for experimenting.

"I have noticed several requests for back numbers in your pages recently. I have 124 copies of PRACTICAL AND AMATEUR WIRELESS, the complete series from March 24th, 1934, to August 1st, 1936 (except Nos. 99 and 130), complete, I believe, with blueprints as published, which I am prepared to dispose of for the sum of 5s. the lot. This sum would include carriage if the purchaser lived within a reasonable distance. I shall be glad if you will publish this offer as I would rather they fell into the hands of an amateur who might point out that ZBW3 has been tried out, and at present ZBW4 is being tested. The times are the same as those given in my last letter, or as shown in PRACTICAL AND AMATEUR WIRELESS, August 15th. The Nanking transmitter which was "crashing" the 31-metre band has now gone up to about 43 metres; the tone is something terrible.

"Here is some more news about the cost of parts. The Chinese are now going mad about home construction of superhets. Four hundred and sixty-five kc/s transformers are being produced by the thousand at a cost of about 1s. 6d. Mains transformers are on the market for about 4s. The cost of five American 'toobs' for such a superhet is 9s. Five of them for 9s; no wonder English valves are not sold to any great extent here. An English pentagrid costs about the same as the whole five put together. Personally, I prefer to use English valves, not because they are cheaper, but because they are good. It is very difficult to get all types of valves here, whereas my suppliers always have any type you require. Only to-day I rang up the agents here and asked them if they had a double-diode-triode in stock, and I was informed that I was the first person in three years to ask for such a valve! It does not pay them to bring out valves like that as the public will buy the American 'toob' anyway.

"I wish I could have been at the Exhibition. We had a kind of Exhibition here two years ago, and I am telling you the truth when I say that I have never been to a deader thing than that Exhibition. The place was practically empty between 6 and 7 o'clock in the evening when I went. Of parts there was very little to be seen. This was before the Chinese and the Japs were on the market. One Chinese firm here which is turning out scores of parts knows how to charge, and the majority of their stuff is just junk. The Japanese are far better, and their parts are very reliable, but I don't think that the Chinese will ever reach the stage where they can compete in quality with the Japanese. The Japanese have even got a better idea of how to make a mains transformer than the Yanks have, and that's saying something.
“Television is out of the question in China at the moment. They haven’t got the sound part anywhere near perfect yet, without starting to look in.”

“It has struck me with regard to your friends (?) the crooners that while the Eastern races are doing their best to ape the Westerners, Europeans are doing their utmost to do the reverse as far as some singing goes. To me, a crooner is similar to a Chinese professional waiter at a funeral procession. What it will be like to see a crooner as well as hear him, I don’t know. The twisting of the mouth muscles must look terrible. Under your column I have noticed that you do not like the names of some of the dance band leaders. We had one in Shanghai who went by the name of Al Uhles.

“PRACTICAL AND AMATEUR WIRELESS dated October 3rd has just arrived, and I am surprised at the attitude some of your correspondents take with regard to baseboard sets and chassis sets. I have never seen anything more unpresentable than a baseboard set. I suppose you remember the terrible long wires that had to be trailed all round the set in order that somewhere or other they might be taken to earth. How much simpler is the metallised chassis. Constructors out here don’t look at baseboards; the Chinese make all sets on chassis. Of course, if some people will put the components in such a position under the chassis that they cannot get at them when things go wrong, that’s their fault, not the fault of the chassis.

“I have an idea which may interest you, regarding the life of valves. Many people think of the life of a valve in terms of months or years. I think in terms of hours. For those who would like to take the trouble the idea is this: A small book is kept into which is entered daily the idea is increased at Worcester and shown the figures at the first book. At the end of each month I have great fun in entering up all these figures!"

Multiple Switches

MULTIPLE switches and potentiometers have given radio manufacturers more trouble in the past than any other component. Numerous types of switches have been tried, but it would seem that the rotary type (the one most commonly used today) has come to stay. This consists of one or more circular plates mounted on a common spindle. Each plate can be made to effect the necessary switching in one stage, sufficient distance being provided between the plates to prevent interaction between the leads and switch tags associated with each stage. In commercial receivers this spacing of the leads is carefully attended to before the receiver leaves the factory. But in the home-constructed receiver the constructor has to attend to this, and we have found that the instability experienced in home-made all-valve sets is often due to lack of attention to this detail. A number of the designs recently published in PRACTICAL AND AMATEUR WIRELESS have incorporated the rotary type of switch and, therefore, constructors are warned to take particular care with the disposition of the leads joining the coils and gang-condenser sections to the switch plates.

H.F. Lead Screening

ALTHOUGH it is often found necessary to screen the leads to the grid and anode of the H.F. and I.F. valves, excessive screening can cause poor results. The leads must be kept as short as possible, otherwise the high capacity between the lead and its screening cover will upset the ganging of the tuned circuits.

Correspondence Closed

HERE is the last letter I shall publish on the subject of baseboards and chassis. Everything worth saying has been said, and readers should please note that this correspondence is now closed. This letter comes from H. D., of Tongham:

“Dear Thermion,—I have been studying your pages for the last few weeks and there are one or two components I should like to take. Firstly, I notice you don’t like jazz music. Well, I and a few of my friends have a small band, and I can say I would prefer listening to a programme of jazz any time than I would to classical music, which gives me a pain in the neck. Secondly, concerning baseboards v. chassis, I prefer chassis. Baseboards were out of date years ago. My job is assistant radio engineer, and my experience has been solely with chassis. Also H. D. (Notts) remarks that he prefers baseboards for short waves. I think nothing can touch a circuit built on a metal chassis correctly matched and screened. I may be wrong, as I am only eighteen years old, but I have worked for three years with a highly experienced amateur.

“Any readers requiring back numbers of PRACTICAL AND AMATEUR WIRELESS, particularly those between March, 1934, and the present day, are invited to apply for copies through the Editor.”

The First Woman Announcer

MRS. DE A. DONISTHORPE, the wife of Captain Donisthorpe, so well known in the trade for his association with Osram Valves, took part in the first of the “Picture Page” Television programmes. The broadcast took the form of an interview between Mrs. Donisthorpe, as the first woman announcer in radio broadcast service (Captain and Mrs. Donisthorpe inaugurated such a service for troops at Worcester in 1917), and Miss Elizabeth Cowell, the first B.B.C. woman television announcer.

Mrs. Donisthorpe related her experiences at Worcester and showed the early microphone and valve used on that occasion.
The Value of Home Construction

An Article Setting Out Clearly the Advantages of Home Construction

By RADIO ENGINEER

It is sometimes said that the main attraction of building one’s own set is the thrill of achievement when the receiver is first switched on and works, and it is suggested that this thrill eventually palls. Thrill there certainly is; that it ever palls is very much open to doubt; but even if it does, thrill is far from being the main factor in the popularity of home construction.

Then there is the suggestion that a large proportion of amateur set-makers are motivated only by the desire to save money, a home-built set being, it is stated, somewhat cheaper than the commercial article. This may be true in some instances, but it does not account for more than a very small proportion of the total amateur output of receivers. Indeed, there is a very substantial number of amateurs whose home-made sets actually cost more than a professionally made model of similar specifications. No, the urge to build sets must be explained otherwise than by novelty or economy.

Let us set down a few of the points on which the home constructor scores, without in any way attempting to treat the subject exhaustively. In order to do so, it is only necessary to introduce components or methods of construction which leave but little margin for unexpected happenings. The home constructor, on the other hand, can economise without risk. He can, for example, build a simple but entirely reliable set at low cost, and add to it from time to time as his means allow. Or he can, if he is handy and knowledgeable, make for himself many of the components—wind his own coils and transformers; contrive switches and other small parts from scrap material and employ components taken from some previous set, thus saving money without risking an element of unreliability.

The Specialist

Another point, very much bound up with the question of cost, is the risk of obsolescence. Nothing is more vexatious—and it has happened so often to so many listeners—that to spend a very considerable sum of money on a new receiver, only to find a few months later that some new development has taken place which, if not rendering the set obsolescent, dates its performance. The home set-builder, however, can at any time dismantle or partly dismantle his set in order to modify the design to include the latest developments, an undertaking which is almost impossible in the commercially produced set.

Next we must consider what may be termed the "specialist listener," who may be a quality enthusiast, a DX fan, or a short-wave expert. For such, the ordinary general purpose commercial receiver is of very little use. If it is sufficiently advanced or complex in design to meet his requirements in his own line of specialisation, it will probably be too expensive for him, and in any case he will be paying heavily for some features for which he has little, if any, use. Take, for example, the quality lover, requiring high fidelity reproduction of half a dozen of the best programmes at the most. This he can obtain with a comparatively

An up-to-date example of a home-made backboard receiver—The Record All-wave Three.

(Continued overleaf)
THE VALUE OF HOME CONSTRUCTION

(Continued from previous page)

simple home-built set in conjunction with a high-grade speaker. To obtain comparable a reasonable price he can only obtain from a first more; simple home-built set in conjunction with a sensitivity and range to an extent that there are many special circuits and devices which increase sensitivity and range to an extent which is impossible of achievement in mass-produced sets for normal family use.

Short Waves

Probably in no other respect does home construction offer the amateur so great an advantage as in the field of short waves. The home-builed set makes no provision for permitting the knowledgeable man to dissect and determine the technical performance of the set. Other instances of the way in which home construction permits individual requirements to the present perfectly and, with greater efficiency than in a general purpose shop set could be modified almost indefinitely, but space forbids. But one other very valuable point must be mentioned in conclusion. It is that, by home construction, can the amateur attain that familiar and intimate knowledge of both the theory and practice of radio which, at one time, is so fascinating and useful. The conscientious and keen amateur is, of course, anxious to know the "whys" and "hows" and, although much may be learned from books and articles, there is nothing like practical work to impress it on the mind. But, apart from this, it must be remembered that the radio industry is largely and ever growing one, in which there is always room for good, keen men, in factories, on the test bench, in repair shops and laboratory, as well as on the commercial side.

It must also be remembered that the development of radio itself was largely the result of the experiments and researches of amateur radio operators. The broadcasting industry was mainly recruited from the ranks of amateurs and that even to-day, other things being equal, the man who, has, through experiment and home construction, become intimate with principles and practice, the use of his tools and instruments and skilled in detecting and repairing faults, has a better chance of obtaining a post in radio engineering than a mere novice.

Multiple Coils

But the amateur need have no difficulty in constructing a short-wave receiver, either as a complete set or as an adaptor or converter unit, which shall have a far higher sensitivity than the short-wave section of any ordinary all-wave. Moreover, he will not be limited to the wavebands arbitrarily selected by the set manufacturer, provided he knows about the frequency range into a scale corresponding to the single complete operation of the tuner. Again, by means of multiple coils he can divide the short-wave range into as many bands or sections as he desires; and by the use of an additional cutting or band-spreading arrange- ment the frequency range of each coil can be further sub-divided, giving that accuracy of tuning which is essential to the reception and identification of the almost unlimited number of stations receivable.

Another important point in favour of home construction is the fact that, except for visual tuning indicators, the sets the present manufacturers' set in the knowledge that the set is behaving, his information on this point being obtained only by ear. But the home-builed set makes no provision for permitting the knowledgeable man to dissect and determine the technical performance of the set. Other instances of the way in which home construction permits individual requirements to the present perfectly and, with greater efficiency than in a general purpose shop set could be modified almost indefinitely, but space forbids. But one other very valuable point must be mentioned in conclusion. It is that, by home construction, can the amateur attain that familiar and intimate knowledge of both the theory and practice of radio which, at one time, is so fascinating and useful. The conscientious and keen amateur is, of course, anxious to know the "whys" and "hows" and, although much may be learned from books and articles, there is nothing like practical work to impress it on the mind. But, apart from this, it must be remembered that the radio industry is largely and ever growing one, in which there is always room for good, keen men, in factories, on the test bench, in repair shops and laboratory, as well as on the commercial side.

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THE BEST WEEKLY FOR CYCLISTS

THE CYCLIST

2d. WEEKLY

"Passing It On"

MANY readers, anxious to please the Editor, will often express their appreciation of the journal and by saying that they always pass their copy along to another constructor. Ungracious though it may sound, this does not always operate to the best interests of a journal. Some journals have been killed by their own popularity; they have an enormous reading public, yet do not attain to Olympian figures in circulation. The reason is, in the case of, say, a boys' paper, that one copy is purchased in a form and passed round. When you buy a ticket for the cinema, or the theatre, or a boxing match, or a football match, it entitles per person to enter; it does not enable you to pass your ticket on to your friends in the stands. A journal is in much the same position. When you pay your 3d. for PRACTICAL AND AMATEUR WIRELESS you have purchased a ticket for three pennyworth of radio entertainment, and it is rather unsporting of other people to expect you to give it to them free of charge. If you feel so appreciative you should persuade your friends to purchase copies, not to enjoy the journal at your expense. By giving your copies away you are destroying possible sales. Mean people ought not to be encouraged. If they cannot afford 3d. a week they have no right to be termed "readers." Quite a number of these parsimonious people have the unbounded cheek to use the coupons of journals which have been presented to them in order to take advantage of the "Free Advice Bureau." The reader must note that this service is available to regular readers, and by readers who are purchasers, not the "snappers up" of mean advantages. If readers wish to dispose of their copies they might at least tear out the Query Coupon. A letter the other day from one of these so-called "readers" frankly informed us that he never bought the paper, but had it given to him every week. He proceeded to ask at least a dozen technical questions, and ended by asking us to send him, under our free Catalogue Service, all of the catalogues issued by the component industry. Quite obviously he thought we were a philanthropic institution, for he omitted the various small sums which some advertisers charge for their catalogues. I hope these "ghost readers" will take this hint. - Thermion.
The new combinations of coils produced by Messrs. Varley lend themselves admirably to circuits of modern design, and the makers are issuing interesting details of receiver designs which may be built up to incorporate these coils. On this page four such circuits are reproduced, and these incorporate each of the four new types of coil, BP. 111, BP. 112, BP. 113, and BP. 114. The first circuit, shown above, embraces the BP. 114 unit, and this consists, as may be seen, of an aerial and inter-valve coil suitable for "straight" circuits, or those incorporating a simple H.F. stage. The aerial coil unit consists of an aerial and grid coil, with wave-change switching arranged on each section, whilst the inter-valve unit consists also of a primary and secondary with the addition of a reaction winding. This is split and provides maximum coupling on both medium and long-wave sections of the secondary coil, thus ensuring that reaction will be smooth and adequate on the full range of the coils.

The wave-change switching in this unit is across the secondary only, but the windings have been so designed that maximum results are obtained on the two ranges. It will be noted that the screens are interconnected to the coil and thus the addition of the earth lead effectively earths the secondary as well as the screens and ensures stable working.
Electrical apparatus such as fans, lifts, etc., demonstrated.

The installation is so novel and up to date that we are sure readers will be interested in the technical details, and a description of the methods adopted for providing this service.

A Surprise Item

The inaugural ceremony arranged for the official opening of the B.B.C. television service on November 2nd at Alexandra Palace, went off without a hitch. Both the Baird and Marconi-E.M.I. systems televisual the programme in turn, and this enabled viewers to make a direct comparison between the two systems. Each showed their advantages and disadvantages, and the general consensus of opinion among those who were able to watch the television pictures was to the effect that there was little to choose between the results observed, and a "draw" was awarded a very fitting result to a controversy of such nature. The remarks of Lord Selsdon were of great importance, for he indicated that after a suitable test period the advisory committee over which he presided would make certain recommendations concerning such standards as the degree of definition, pictures per second, ratio of picture height to width, and the proportion of mechanism alloted to the voice and synchronising signals. When this is done, television receiving sets will be simplified in construction, and development will be even more rapid. At the end of five minutes some who brought or built receiving sets now found that an instant adjustment would make for at least two years. Ground-day sets are therefore to be seen in the Alexandra Palace transmission for at least that length of time.

The intermittent type camera, with its turret of lenses and film chamber, is visible on the left, and below the panning film frame. The film used is 17.5 mm. To photograph the film frame. The film used is 17.5 mm. To photograph the film frame for sound-reproducing apparatus, he dummied something like an ordinary showbox, even make-up, have to be undertaken. Of experiments on lighting and focusing, or factory results. The intermittent type camera, with its turret of lenses and film chamber, is visible on the left, and below the panning film frame. The film used is 17.5 mm. To photograph the film frame.

Screened Co-axial Feed

The most interesting feature now follows. The outputs from the two separate amplifiers are now conveyed to a single cable, which is of the H.F. co-axial type, and this single cable is taken down through the building and is fed to each of the seventy-three flats in the building. Special allocation circuits are provided at each junction to render each point quite distinct and prevent loss of interaction. In each panel the output from this is also conveyed to a distributor box.

Guarding Against Breakdown

The two amplifiers are switched on and off automatically through the medium of time switches, which are electronic, controlled to avoid stoppage due to a temporary interruption of the mains supply. The broadcast amplifier is switched on at 8 a.m., and off at midnight, while the television amplifiers are operated half an hour earlier. In this way a loss of vision is prevented.

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large block of modern flats such that we are sure readers will be interested in

The main part of the installation consists of a telephone circuit covering roughly from 200 to 2,000 metres, and the output from this is conveyed to one of the distributor boxes. The television amplifier is finely tuned over two separate channels, one for sound and a much

A Surprise Item

THE inaugural ceremony arranged for the official opening of the B.R.C. television service on November 2nd at Alexandra Palace, went off without a hitch. Both the Baird and Marconi-E.M.I. systems televised the programme in turn, and this enabled viewers to make a direct comparison between the two systems. Baird showed their advantages and disadvantages, and the general consensus of opinion among those who were able to watch the televised pictures was to the effect that there was little to choose between the results observed, and a "draw" seemed a very fitting result to a ceremony of such a nature. The remarks of Lord Selsdon were of great importance, for he indicated that after a suitable test period the advisory committee over which he presided would make certain recommendations concerning such standards as the degree of definition, pictures per second, ratio of picture height to width, and the proportion of modulation allotted to the voice and synchronizing signals. When this is done, television receiving sets will be simplified in construction, and development will be even more rapid. The output from the microphones is conveyed to a single cable, which is provided with an efficient aerial system possible. After passing through the processing tanks, the film is dried, washed, and rendered ready for use. The film used is 17.5 mm., and this is shown to be of value in many respects. The sound-reproduction is very clear and distinct, and the sound of the transmission is of high quality. The film used is 17.5 mm., and this is shown to be of value in many respects. The sound-reproduction is very clear and distinct, and the sound of the transmission is of high quality.

Guarding Against Breakdown

When a "dummy" is employed for television experiments, it is always necessary to have a "subject" to observe. This is sometimes difficult to arrange, especially if a number of experiments on lighting and focusing, or on any standard broadcast or television receiver, and, if the receiver ever fails, plug his aerial and earth leads into the aerial and earth sockets on the panel, when he is immediately provided with the most efficient aerial system possible. Similarly, the television receiver is plugged into the special aerial socket, and is provided with a plug and is again provided with a mains plug and earth socket.

In each case a dummy is employed, the aerial and earth leads into the aerial and earth sockets on the panel, when he is immediately provided with the most efficient aerial system possible. Similarly, the television receiver is plugged into the special aerial socket, and is provided with a plug and is again provided with a mains plug and earth socket.

The two amplifiers are switched on and off automatically through the medium of time switches, which are electrically controlled to avoid stoppage during a temporary interruption of the mains supply. The broadcast amplifier is switched on at 6 a.m., and off at midnight, whilst the television amplifier is turned on and off at various hours before the television transmissions commence, and shortly after they end. An ingenious relay system simulates any defective to the head-quarter's office.

Operating the Baird intermediate-film equipment, which was employed for the television experiment at the Alexandra Palace on November 2nd, is shown here.

Screened Co-axial Feed

The most interesting feature now follows. The outputs from the two separate amplifiers are now conveyed to a single cable, which is of the H.F. co-axial type, and this single cable is taken down through the building and is fed to each of the seventy-three flats in the building. Special attachment circuits are provided at each apartment to render each point quite distinct and prevent leads and interference. In each case the amplifier is switched off. An ingenious relay system simulates any defective to the head-quarter's office.

Television Notes

In the evening programme of the opening day a surprise item was included, this being a repetition of Lord Selsdon's speech together with his accompanying picture. This was only made possible by the fact that his efforts in the afternoon were televised by the Baird intermediate-film equipment. This equipment is shown in the accompanying illustration and has outstanding advantages where special programs are desirable for one route or another. The intermittent type camera, with its turret of lenses and film chamber, is visible on the left, and below the picture camera is the television head camera. The intermittent type camera is housed in the Science Museum, South Kensington, and is a repetition of Lord Selsdon's speech. The intermittent type camera is housed in the Science Museum, South Kensington, and is a repetition of Lord Selsdon's speech.
ready nicknamed "Television Tilly." Owing to the heat of the arc lamps the dummy is not made of wax. No doubt this dummy will become as famous as Mr. Baird's original "Stookie," which was the head of a ventriloquist's doll, and is shown in the accompanying illustration mounted on a tripod for daylight television experiments on the roof at Long Acre. Sometimes an ordinary enlarged photograph was substituted for the dummy, and in the early thirty-line definition days the Prince of Wales was the subject of the popular picture seen so often by lookers-in. When the Emitron camera is being tested at Alexandra Palace a rather weird animal's head, specially drawn on a flat board for the purpose, is featured. It is not intended to represent a real animal head, the markings being of such a character that any defects which may arise in the transmission are detected immediately. For the Baird telecine scanner an endless loop showing the head and shoulders of Madeleine Carroll from the film, "I Was a Spy," is radiated. The detail in the hair and jumper of distinct squares enables the looker-in to see at once whether his receiver is reproducing the frequency band-width necessary to show all the detail in the hair and jumper of Madeleine Carroll from the film, "I Was a Spy," is radiated. The detail in the hair and jumper of distinct squares enables the looker-in to see at once whether his receiver is reproducing the frequency band-width necessary to show all the character of the short length of film.

**Weather Charts by Television**

In Berlin experiments have been carried out with a view to transmitting weather charts to pilots of aeroplanes by means of high-definition television. If this proves successful, the visual information conveyed to the pilot will be of inestimable value, and may be the means of arduous accidents being averted. An idea of the amount of information which can be disseminated in the form of a television picture weather chart can be gauged by the system now being adopted by the B.B.C. at Alexandra Palace. The demonstration, which is an admirable one, and will demonstrate very forcibly the scope of the work which can be carried out by means of combined vision and sound transmissions.

**Demonstrations**

ALTHOUGH the B.B.C. abandoned their original idea of setting up special television demonstration rooms in selected parts of London, it is now quite an easy matter for any interested member of the public to see pictures on television receivers during the Alexandra Palace service periods. The manufacturers of complete receivers have all fitted up offices or rooms complete with one or more sets, and either casual callers or people by appointment can view the results on standard sets. Then again, all the leading radio dealers and large London stores are featuring daily demonstrations, together with certain hotels and cinemas. Finally, at Waterloo Station and the Science Museum, South Kensington, there are sets in operation. This method of showing the results of the new service to interested members of the public is an admirable one, and will enable the Television Advisory Committee to reach definite conclusions as to public needs for an extended or modified service. The question of Sunday television programmes has been raised already, and although this is not likely to be an immediate development, such a contingency has not been lost sight of.

**Spot Size**

In discussing the suitability or otherwise of a cathode-ray tube for the portrayal of television pictures on its fluorescent screen, one factor is very frequently overlooked, namely, the size of the spot of light made visible on the screen as a result of the high velocity with which the electrons constituting the beam inside the tube strike the screen material. The brightness of the spot is a factor dependent on the magnitude of the positive voltage applied to the orificed anode, but the spot area of fluorescent screen is governed by several factors which have to be studied carefully if the best results are required. With low-definition television, spot size was not an important factor, for the picture width was only divided into thirty strips, the degree of definition then existing in the radiated picture. In the case of high-definition television, however, with a minimum of 240 lines occupying the picture height, quite a different situation has to be met. Assuming that the edges of each line traced touch their immediate neighbours, then for a picture 9in. high the spot size will be 3/80in. Any size greater than this will result in overlap and bring about a loss of picture detail and sharpness. If made smaller than this there will be unmodulated spaces between the lines, but this effect is to be preferred to the former, and is soon lost on the observer when he views the picture from a distance of 3 or 4ft. The 9in. picture depth is derived from a tube with a 18in. diameter screen, and on the score of expense it is anticipated that many home sets will use tubes much smaller in diameter, although then spot size becomes extremely important.
Misleading Call-letters

Although 31.65 m. (9,480 kc/s) is the channel allotted to EDZ- EAH, Madrid-Valencia (Spain) if you listen to the war news you will be given by the announcer the call-letters UOT, which are those normally used by the news-broadcasters by the Madrid authorities. The broadcasts of war news bulletins are not made strictly at a time schedule, but usually take place towards midday, and again at about G.M.T. 19.00.

Ever Heard Siamese Music?

HS8PJ, Bangkok (Siem), is testing out three channels on which broadcasts are being very well received in the British Isles. Try for 32.09 m. (9,350 kc/s), HS62, 19.32 m. (15,530 kc/s), or HS62, 15.78 m. (19,016 kc/s) between G.M.T. 13.00-15.00. Announcements are made in Siamese, French and English; the interval signal consists of three chimes (G, C, F or C, F, G) and a profile bell in English is usually timed to start at G.M.T. 14.15. The difference in time is seven hours—approximately a day. When the Bangkok station opens at G.M.T. 13.00 (10.00 p.m.) in Bangkok, the announcer bids you "a very good night from Siam."

U.S.S.R. Time Signals

On 28.14 m. (10,690 kc/s) you may happen to pick up a series of dashes and dots which emanate from the Moscow R.K.D station relaying a time signal from the Observatory of Borodino, and the signals are repeated four times daily, namely, at G.M.T. 03.56, 05.56, 11.56 and 13.56, terminating with three sets of six-dots and six seconds similar to the Greenwich "pips," the last dot indicating the completion of the full minute. The time indicated, in consequence, is respectively G.M.T. 04.00, 06.00, 12 (noon) and 14.00.

In a similar way, R.G.M, Tashkent, on 31.88 m. (9,999 kc/s) gives a time signal at G.M.T. 17.00. Mention has been made of these transmissions as some readers have been puzzled by the dashes and dots heard, and have been misled into believing that they constituted a television broadcast or a radiotelegraphic transmission of pictures.

Changes in Colombia

JH4ABC, Cartagena, La Voz de los Laboratorios Fuentes, which had closed down, is again on 31.58 m. (9,999 kc/s) with a much more powerful plant. In the call you will notice that frequent references to El Pueblo are made, which would seem to be the name of the newspaper sponsoring the programme. The interval signal is the same as used by the station at no great distance from Cartagena, and which operates on 41.67 m. (7,200 kc/s); it is on the air daily from G.M.T. 23.30-01.00. HJ4ACB, Medellin, is another station on this wavelength which the signals may be logged most of the nights. The wavelength is 48.9 m. (6,394 kc/s). Do not miss the call of HJ4ACB, Pereira, which shared the same channel, must have moved.

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Compares with the best of its kind. Built for building, with discretion, assembly and operating instructions, less cabinet.

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1 VALVES. OUTPUT PHONES. CONTROL TO CABLE. 40 VALVES. OUTPUT PHONES. CONTROL TO CABLE. 40 VALVES. OUTPUT PHONES. CONTROL TO CABLE. 40 VALVES. OUTPUT PHONES. CONTROL TO CABLE.

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Built with all high quality components, including Peto-Scott Moving-Coil Speaker, SCREENED COILS. ANTI-DISTORTION Volts mid cabinet. 4 valor. Kit of parts. 10 monthly payments of 3/-. Ready assembled. Price £2:12:6

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HEAR AMERICA DIRECT with this famous unit. AS a rule the stations close down at G.M.T. 03.30 with the playing of the William Tell Overture. HJ4ABC, Pereira, which shared the same channel, must have moved.

D.T.A. T.S.

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Let Us Send You
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Car Radio for Motor Cycles

The increasingly popular car radio has now invaded motor cycling, and the first radio-equipped sidecar outfit was exhibited on the stand of a leading maker of luxury machines at the recent Motor Cycle and Cycle Show at Olympia. The manufacturers of this machine, the Vincent H. R. D. Co., Ltd., of Stevenage, Herts, feel that with the increasing demand for high-class motor cycles there are many who will welcome the innovation.

As a result of their collaboration with Philco Radio they included in their exhibits one of their Comet models with a Swallow side-car, fitted with a Philco car radio. Visitors to the show took such a keen interest in this machine that a minor boom in radio-equipped motor cycles is anticipated.

American Praise for British Radio

PRAISE for British radio set design as being the most advanced and efficient in the world is forthcoming in the current issue of one of the leading American radio magazines, published recently. Contradicting the popular opinion held in this country that British set designers follow American tendencies, the magazine states that this year’s Radiolympia revealed novelties in English sets which are of great interest to American set makers as indicating possible future trends in their own designs.

"Two features deserve special comment - the new sets with a single knob," stated this American authority, "and the models with movable dials which can be swung into vertical or horizontal position, so that the dial can be tuned from the front or top without stooping." The British sets which received special praise in this transatlantic commentary are the Philips receivers, which incorporate the two features named above, and it is suggested that American listeners in a year or two's time may be able to have receivers equal to those now on the British market.

The Late Sir Newton Moore

We regret to announce the death, which took place in a nursing home in London after an operation on October 28th, of Major-General the Hon. Sir Newton Moore, at the age of sixty-six.

Sir Newton Moore, for many years a director of the General Electric Co., Ltd., was born at Bunbury, Western Australia, and was throughout his life an ardent Australian imperialist. Educated at Adelaide, he took up the profession of a surveyor and civil engineer, but early in life engaged in active politics. He was only thirty-five when he joined the Western Australian Cabinet, and thirty-six when he formed a ministry of his own. In 1915 he was elected Premier, and his services to his State and to the Empire were recognised by a C.M.G. being conferred upon him in 1908, with promotion two years later to K.C.M.G.

He came to London as first Agent-General for Western Australia in 1911, a post he held until 1918. From 1915 to 1917, during the war period, he occupied the exacting position of General Officer Commanding the Australian Imperial Forces in Great Britain.

Following his retirement from the Agent-Generalship he continued to live in this country, and in 1918 was elected Unionist M.P. for St. George’s, Hanover Square, and later for North Johnston. In 1924 he was returned for Richmond, Surrey, and sat until February, 1932.

On giving up active politics, he devoted himself to business interests, and his wide experience and knowledge proved to be of very real service wherever he applied them. His genial personality and open-handed hospitality endeared him to many people. All who knew him extended to Lady Moore and her family the deepest sympathy in their bereavement.

Jack Hylton listening to a test pressing of one of his new H.M.V. recordings on the "All-voice Autoradio-gram."
A Non-Parallax Tuning Scale

MOST modern condenser drives have celluloid scales, held in position on the drive by four bolts, while the pointer moves across in front of the scale. There is inevitably a parallax error with this type of scale, and to avoid this it will be found very convenient to replace the celluloid scale with a mirror, carrying the wavelengths and names on it. Either a steel or glass mirror may be used, but the latter method has several advantages, in that it can be adapted for illumination by one of the methods described in the issue of this journal dated May 9th last, and it is much easier to work.

If a steel mirror is used, first cut it to size and drill it to correspond with the fixing bolts used for the celluloid scale, which may be used as a pattern. Now prepare a template from a piece of thin card, such as a postcard. This template should be cut so that a needle can move round in the slots to cut a waxed surface beneath. Then cover the plate with a thin coating of wax (candle-wax will do), and lay the template on it. With a sharp needle, cut the wax underneath. Now paint over the wax, and in the slots formed, with a paint such as the new 'bakelite' kind. This template is shown in the above diagram.

The method of etching the scale and other features is shown in the above diagram.

and lay the template on it. With a sharp needle, cut the wax underneath. Now paint over the wax, and in the slots formed, with a paint such as the new "bakelite" kind. When this has thoroughly dried, remove the wax by placing the scale in hot water and washing. The letters and wavelength will be left in the scale in very fine lines. The scale is now fixed to the drive in place of the celluloid scale. It has the advantage of being stronger than glass.

Using a Mirror

With a glass mirror, prepare a cardboard template in the same way, and wax the front of the glass. Now construct a leaden trough, or dish, a shade smaller than the glass which has to rest on it (the glass is not yet cut to size). Lead must be used, as only this metal, chromium, and the rare metals are resistant to the acid. Alternatively, a chromium plated trough may be used, but this is much more expensive. Into this bath place about 1 oz. of calcium fluoride, obtainable at most chemists, and add to it, in with rare concentrated sulphuric acid. To find approximately how many ounces of acid are required, multiply the length in cms. by the breadth in cms., and by the height, approx. 1 cm. Then double this result as the acid is nearly twice as dense as water. 1 cc. of which weighs 1 gramme (1 oz. is, approximately 28 gms.).

Gently warm the acid and calcium fluoride by a candle or a Bunsen burner, as shown in the sketch. Hydrofluoric acid will be evolved and calcium sulphate (gypsum) will be left after the action. Hydrofluoric acid will attack glass readily, but not wax, so the exposed part of the glass will be eaten away, the depth of the etching being determined by the length of exposure. Be careful not to breathe any of the poisonous fumes, and wash the hands well after the etching has been completed. Remove the wax as before, and cut the scale to size carefully.

Two supports will be required, as indicated in the sketches, and they may be constructed from tin-plate as glass cannot easily be drilled.—A. M. WILDING (Wallesey).

THE ONLY STANDARD WORK!
WIRELESS CONSTRUCTOR'S ENCYCLOPÆDIA.

Housework is monotonous for one reason only—it requires little concentration, and so leaves the mind unoccupied.

What a difference when work is accompanied by the morning broadcast entertainments! The dance music and talks make the mornings a pleasure, and tasks are finished—thoroughly—before they've had a chance to pall. There's a lady in your house who will bless you daily for fitting a 1937 Stentorian in her kitchen!

Any model from 23½ upwards suits any set. Models range from 17½ to 63½ in chassis or cabinet. Hire purchase terms from 39½ upwards, 7½ deposits. If you fit a Long Arm remote control as well, you can switch the set on or off from any room.

1937 STENTORIAN
The Perfect Extra Speaker for ANY Set
WHITELEY ELECTRICAL RADIO CO. LTD. (Technical Dept.), MANSFIELD, NOTTS.
Components Tested In

Sound Sales Push-Pull Transformer

The output transformer is one of the most important components in a receiver, and when much care has been devoted to the design of a receiver it is essential that the method of connecting the receiver to the loudspeaker should be studied just as carefully. A component designed for this purpose is illustrated below and is a Sound Sales product. It is a push-pull output transformer, but has a tapped primary to enable two different types of valve to be employed while maintaining the correct ratio for feeding a 15-ohm speach coil. The impedance provided at the two primary terminals is 6,000 or 10,000 ohms, and thus the transformer may be used to connect a 15-ohm speaker to a pair of PX4’s or a pair of PX25’s working in push-pull. This transformer has a very high primary inductance, the rating being over 70 henries. The method of winding the transformer and the general features of design have resulted in a very remarkable characteristic being obtained with this particular component, and the variation from 20 to 30,000 c.p.s. is not greater than .5 db. (plus or minus). This is an unusually good performance for a component of this type, and it may be obtained in all values up to 60,000 ohms, and cost 9s. The intermediate sizes are proportional in cost. The makers are Radio Resistor Co., Ltd., 1, Golden Square, W.1.

Solon Pencil-bit Soldering-iron

In many modern receivers the amount of space available is very limited, and it sometimes becomes difficult to replace a broken lead, or even to connect a lead in a new receiver, without damaging some component owing to the heat of the ordinary type of soldering-iron. For such cases the new Solon iron will be found indispensable, as its main feature is an exceedingly thin copper bit sufficiently long to enable it to be inserted into the ordinary receiver without risk of damage. The main part of the assembly is more or less identical with the standard 65 W. industrial model, but the bit holder is designed with a stainless steel grub screw to accommodate a bit of only .5 in. diameter. This is inserted into the holder and leaves a total length of 1.5 in. projecting. The hand mix of insulating material with a bakelite connecting box into which the three-way rubber-covered cable is inserted, and the body of the iron is connected to one of the inner leads to enable it to be earthed in the standard manner by the use of a three-pin mains plug. The bit is removable, and replacements may be obtained when one is worn out for 6d. The cost of the complete iron is 10s. 6d. The makers are Solon Pencil-bit Soldering-iron, W.I.

Lathe-Work for Amateurs

Bulgin Suppressor Adapter

The removal of interference caused in the vicinity of the powerful television transmitter is a simple matter if one of the special Bulgin suppressors is fitted. This consists of a simple five-pin plug in adaptor with split grid socket, and the centre of the adaptor is turned down and a small choke winding placed on it, connected at one end to the grid pin and at the other to the grid socket. Thus, by removing a valve from the existing valveholder and inserting the adaptor in its place, afterwards inserting the valve into the adaptor, the choke becomes automatically connected in the grid circuit. It must be emphasised that this device is intended for use in the detector grid circuit, and in view of some misapprehension which appears to exist in the article on Break-through which was published in our issue dated October 31st, we would reform that this type of suppressor is perfectly effective when used in a standard detector circuit. The makers point out, however, that in the event of severe breakthrough on the medium-wave range, it may be found necessary, in addition to the suppressor, to fit a suppressor, also to screen the detector valve. A simple metal can, such as is used for coil screening, may be employed for this purpose, but a metalised valve should be just as effective, provided that the detector valve is not of the G.S. type with exposed cap. In ninety-nine cases out of a hundred, however, the mere inclusion of a suppressor in the grid circuit will effectively prevent the breakthrough of the television signal. The reference number of this device is H.F.25 and the price is 2s. It is fitted with five pins and sockets, but if a 4-pin valve is in use the centre pin and socket may be removed simply by unscrewing the pin. The makers are Bulgin and Co., Ltd., Abbey Road, Barking, Essex.

PRACTICAL AND AMATEUR WIRELESS

November 21st, 1936

F. J. CAMM

1/- or 1/2 by post from

George Neunes, Ltd., 8-11, Southampton Street, Strand, W.C.2.
THE BRITISH LONG DISTANCE LISTENERS' CLUB

QSL Card Controversy

MR. E. DE COTTIGNIES takes up the challenge again and writes: "May I, too, be allowed to encroach again on your space, in order to reply to the protestor and defend myself. In PRACTICAL AND AMATEUR WIRELESS I have entered the question, so I may well say that, after a period of listening and reporting Everard's satisfaction, I may well say that, the extent of my own collection hardly enters into the question, the mania for collecting QSL cards. There are people about who are not S.W. or thereof, does not seem to appreciate that there are about people who are not S.W. or DX fans, but are simply seized with a mania for collecting QSL cards. I have met some in my own town, and don't know The extent of my own collection hardly enters into the question, but, for Mr. Everard's satisfaction, I may well say that after a period of listening and reporting extending just over two months, I received eighty cards and numerous letters from 'hams,' station-managers, ships' operators, etc., from all continents; this being but a fraction of the number I could have had if I had written to every one I had heard!"

"Granted that 'G' cards have no DX value, but they are tokens of appreciation in return for reports which were evidently of some value to the 'hams' in question."

"I, too, have been a S.W. listener and constructor since 1929, but have not bothered about QSL's till quite recently, mainly because I hope to be 'on the air' myself soon. My aim in collecting, as a BIG, is the 'Verified All Continents' Certificate. Finally, Mr. Everard says that 'FB' reports should be worthy of a QSL. Did I not say in my letter (on the 17th) that 'FB' reports always produced one?"

Mr. Dennis, however, enters the lists and gives us some details of his methods. He says:

"It is with great interest that I have read the articles by your readers on the subject of QSL cards. Perhaps my own methods and experiences may be of interest to others. When reporting on a transmission, I state time of reception (E.S.T. and G.M.T.) and date, wavelength, details of programme received, description of my receiver and antennas, weather conditions for the day transmission was received and also the 'QSA,' 'B,' 'T' and 'QRM.' With every report I send I enclose a reply coupon (which in many cases has been returned to me with a card). In your issue of November 7, 1936, Mr. J. W. Ismay (G6JI) states: "'If the Q.S.L. card was plain and not a work of art, the situation would never have arisen. Admittedly, this applies to the collector who sends in a report as follows: 'I heard you on such and such a date, QSA5, R8-9,' and then wonders why he does not receive the 'pretty card,' which he had hoped to flaut amongst his equally inexperienced friends. I can assure Mr. Ismay that my interest does not lay in the pictorial design of the card alone—in fact, some of my best bags are quite plain—and I maintain that a good report is well worthy of a card, providing a reply coupon is enclosed to defray postage expense. To boil matters down, I am of the opinion that a good percentage of the trouble lies in the fact that many would-be reporters are ignorant of the correct way of making out a report, and I think that if you published a sample report in your excellent paper, showing listeners exactly how a report should be made out, and stressing the importance of the reply coupon, much would be done to enlighten the would-be short-wave reporter, who in ignorance, is creating an important stir in the short-wave world. In conclusion might I add that I am open to correction and suggestions from any of your readers?"

A Log from No. 1

SIR—As I have not seen a log of short-wave stations from this part of the country, here are mine: W2XAF, W2XAD, HJ1ABB, YV4RC, W8XF, W1IXK, VK2ME, VK3ME, VK3IR, and dozens of others; my amateur log stands at forty verified, the best of these being VE2CA, YR1CN, VE1GL, VP6YB, W3HAY, SM6SX, PY1CK ON4MJ, and my only Australian fone, VK2MH, of Sydney. I have sent reports and International Reply Coupons to the following amateurs, but have had no reply: SU1RK, VP3BG, K4DDH. The following log may interest readers; the amateur stations were all on fone and none below R7. Canadian, VE1JA, VE2BG; American, W3MD, W6CIN; Havana, C02KL, C02RX; South American, CE2DW, YV5AN, L2U2AD, PY2CK, HB7G and Yu7DX, of Yugoslavia. Owing to the great number of American amateurs I have only included two of the best ones received here. My receiver is a 4-valve with a 60ft. Zeppe running north to south.—A. T. Bowes, Member B.L.D.L.C. No. 1.

SHERLOCK HOLMES SAYS...

"Don't guess at the trouble TEST WITH PIFCO RADIOMETER"

PIFCO goes straight to the heart of the trouble. testing sets, valves and components with equal ease and speed. Any radio set can be tested, either A.C. or D.C. Mains or Battery operated. Solidly constructed with fine bakelite case, the PIFCO Radiometer has readings for high and low voltage, milliamperes, continuity test and a special socket for testing valves.

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The "ALL-IN-ONE" RADIOMETER for A.C. or D.C.—For testing electric or battery radio sets. Absolutely essential for use with this wonder instrument. Finished in black bakelite. Size of dial, 1½in. By Jpn, complete with leads. Price £2

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Address enclose 3d. stamps.

To Messrs. A. F. BULGIN & Co., Ltd.,
on medium satis-
also most aerial
aerial is the
with metal end -caps
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12 down -lead transposition blocks, 120 ft, wire, etc.

For reception on wave-

List No. S.W.61
with 7m. TUNING COIL

For 4.5-45 metres.

This low -loss U.S.W.

PRACTICAL AND AMATEUR WIRELESS

November 21st, 1936

REPLIES IN BRIEF

The following replies to queries are given in alphabetical order, either in the form of non-compliance with your request, or in the form of a non-workable solution.

L. S. (Dobell). The trouble is incompletely due to a loose connection and we advise you to have the set examined by the agent of your local firm.

R. E. A. (Rest). The H.T. voltage should not exceed 250 volts. If at this figure the valve will be working all right, then it is likely to be of a very good valve. If the value shows high, follow the valve makers instructions regarding the correct H.T. and battery voltage to be used.

W. R. (Falkirk). The meter may be giving a false reading owing to the fact that the meter is not accurately adjusted. If this is the case, the rectifier is faulty, but we doubt this in view of the deferred test.

J. H. (Newtownards). We cannot give transformer without a guarantee concerning the output voltage.

R. P. (Tunbridge). We regret that we have no blue-

List No. H.F.21, 1/3 each.

OFFICIAL RADIO SERVICE HANDBOOK


A LITHOGRAPHICALLY printed work in which the essential parts of the service procedures are entirely new. This book contains comprehensive information on the latest developments in the art of radio servicing, and is the most up-to-date work of its kind.

BULGIN

RADIO COMPONENTS

ULTRA-SHORT-WAVE H.F. CHOKES

This low-loss U.S.W. Choke has situated windings and is of new design. It is fitted with metal end-caps, and is suitable for use on medium wave bands

2400A D.C. max., c. choke 0.05mH.

For 4.5 to 45 metres.

SW. CONDENSERS

Suitable control knobs from 4d. to 6d. each.

List No. S.W.60 ( Illustrated), 1/6 each.

List No. S.W.61 (with reed), 1/9 each.

TUNING COIL

A single but efficient low-loss tuning coil for 5-6 watts working, supplied with or without metal end-cap.

List No. C.V.4 Price 2/9 ea. in vib.

C.V.6 Price 9d.

EPICYCLIC DRIVE

This Epicycl drive

DOUBLE AERIAL

For reception on wave-

List No. C.V.6 Price 9d.

List No. K.E.6 Price 8d. each, stand-in and pointer.

(See also above)

To Messrs. A. F. BULGIN & Co. Ltd.,

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Please send Post Free a copy of your Complete Catalogue No. 156 (second edition), for which I enclose 5d. stamps.

NOW

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N (PLEASE USE BLOCK LETTERS)

SEND THIS COUPON
Radio, Physical and Television Society

The third meeting of the season was held recently at the society's head-quarter, 7th North End Road, West Kensington, when Mr. Dedman, of the Quartz Crystal Co., Ltd., lectured to members on the production processes of quartz crystals.

Touching briefly on the sources of supply and the methods used in the recovery of quartz from mother earth, the lecturer described his early experiments to find the best methods of cutting this substance.

The talk was illustrated with actual crystals in various stages of production. The lecture concluded with a description of the apparatus used for checking the finished article to within one part in five millions.

An interesting series of weekly lectures has been arranged to take place on Fridays at 8 o'clock at the society's head-quarters, and the committee hopes to welcome more readers of this journal. Further details can be had from the Hon. Sec., Mr. M. E. Arnold, 12, Nassau Road, S.W.13.

HARCO Radio Club (Greenwich)

This club has now been formed, and meetings are held every Tuesday at 7.30 p.m. in the Canteen Lounge of G. A. Harvey and Co., Ltd., Woolwich Road, Charlton, S.E.7. The club has its own clubroom, and incidentally a refreshment bar and free car park. Trams Nos. 36, 38, and 40, and buses Nos. 55, 153, and 108 pass within a few yards. More information is given every evening and arrangements are being made for the club to possess its own transmitter and receiver. All inquiries should be addressed to the Secretary, C. W. Kemp, Dept. HRC, 124, River Way, Greenwich, London, S.E.10.

OPEN LETTER TO MR. SOMEBODY AND HIS SON

DEAR SIR,—The natural desire of most parents is to give their children a fair chance in life in the form of a good College Training, also there are many young men who would like to go to College but for some reasons are not able to do so. Let us tell you here and now you can get a Complete College Training without having to go anywhere, and at a reasonable monthly fee for tuition. For well over 30 years we have been training students for all the Key positions, by post, in all parts of the world. Distance is nothing when you are studying by your own schedule.

This nature of business enables us to keep in touch with employment requirements, therefore we specialize in preparing students for the good positions which we know exist, and for all the worthwhile examinations.

Write to us for FREE particulars of any subject which interests you, or if your career is not decided tell us of your likes and dislikes, and we will give you practical advice as to the possibilities of a vocation and how to succeed in it.

You will be under no obligation whatever, it is our pleasure to help.

DEAR SIR,—

The British Short-wave League is the largest radio-amateur organisation in the world. It has a membership of some 375 members situated in Great Britain, France, U.S.A., Canada, Palestine, South Africa, Australia and Egypt.

Features of the League's "Review" are "The latest articles by G.M.T. and G.P.D." amateur station station, conducted by R. D. Everard; lists of members' "captures"; the "black list" — a most controversial subject; S.W. broadcast station news; news of the latest QSL cards; photos of members, and many other fine features.

Although, as stated previously, the League is primarily a listeners' organisation, it has been realised that the demand for practical articles on transmitting is becoming very great, and so the November issue of the League's publication will contain instructions on the building and operation of a low-powered artificial aerial transistor.

From November 1st to the end of January 1937, a membership contest is being held with valuable prizes.

The League welcomes to membership anyone, anywhere, who possesses an interest in short-wave reception and transmission, and the membership application forms may be had from F. A. Beane, British Short-wave League, Ridgewell, Halstead, Essex. A specimen copy of the "Review" will be sent on receipt of a 2d. stamp.

Accomplishments

1. Examination in Art. of City & Guilds of London.
2. Army Certificates.
4. Road Engineering.
5. Professional examinations in various stages of production.
6. MORSE INSTRUCTION IS FREE.
7. Courses on the Theory and Practice of Short-wave Transmitters and Receivers.
8. FREE particulars of any subject which interests you, or if your career is not decided, tell us of your likes and dislikes, and we will give you practical advice as to the possibilities of a vocation and how to succeed in it.

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DEAR SIR,—The natural desire of most parents is to give their children a fair chance in life in the form of a good College Training, also there are many young men who would like to go to College but for some reasons are not able to do so. Let us tell you here and now you can get a Complete College Training without having to go anywhere, and at a reasonable monthly fee for tuition. For well over 30 years we have been training students for all the Key positions, by post, in all parts of the world. Distance is nothing when you are studying by your own schedule.

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PRACTICAL AND AMATEUR WIRELESS

November 21st, 1936

LETTERS FROM READERS

The Editor does not necessarily agree with opinions expressed by his correspondents.

Baseboards: A DX Log

SIR,—I am glad to see that baseboards are coming into their own again. I have been a reader for nearly a year now and like the paper very much, particularly the 'Readers' Wrinkles', S.W. section, and Letters from Readers.

I enclose my DX log of stations heard here in Douglas between 07.25 hours. COCH, VK2ME, VUB, SUZ, JVH, JVM, PM, PRF5, TFJ, and GB7T (Normandy).

On 14 m/c phone: HITG, SU1ISG, KG, CH, LY1J, COKY, PK4AU, and UIASD (Eclipse Expedition). An 80 m/c receiver with phones was used. I would very much like to correspond with any reader, preferably in French.—L. Szeporecz (Hilary Mount, Poplar Road, Douglas, L. of M.).

COCX (Cuba)

SIR,—Mr. Lillywhite who, in your October 31st issue, mentions reception of that Cuban mystery, COCX, may be interested to hear that this station is again enjoying a good reception period.

I last heard it on the mornings of September 24th and 25th, between 00.05 and 00.07, but it has an evening schedule, since I logged a ragged but unmistakable signal at 22.00 G.M.T. on October 30th.

By the way, I can’t find station CSW listed, so I presume it’s a new one. It works 30.21 m. with 5 kW between 9 p.m. and midnight. Address given as "National Broadcasting Co., Lisbon, Portugal." It relays the National programme. Has anyone else logged this station?—L. Birc attaches (Highams Park).

A Good Log from Letchworth

SIR,—I enclose my short-wave log for the last few months which may be of interest to other S.W.L.s.

Commercial: W3XAD, W3XAF, W8XK, W1XK, W3XAL, W3XAI, W6XAI, WVQ, FEF, EUR, JBM, VUB, Rome, Moscow, Daventry, Zeessen, etc.

Amateurs: On 40 m.: 83 English, also PAOEQ, PAOJO, PAOAU, PAOAT, F3DI, F3FN, FBW, ES5, ON5SW, and numerous Spanish stations broadcasting war news.

Amateurs on 20 m.: 81 U.S.A., VE1BR, VE1VX, VE2BR, VE2DI, VE2DC, VE2CA, VE3M, VE3EO, VO4Y, PY2EJ, LUIE, COHY, COKY, H14F, SU1KG, LAUR, LAZY, FS8J, F8VM, G3GJ, GH9S, G8BD, G8ZK, G8DR, GW9D, and FSUP.

My receiver is a simple home-constructed two-valve, made entirely from "junk." The aerial is a horizontal one, 35ft. long, 12ft. high, lying roughly NNW. I am only fourteen years old and first started on the short-waves less than six months ago with a 0-v-0. I greatly appreciate the short and ultra-short-wave articles in Practical and Amateur Wireless, and wish for the continued success of the paper.—L. Knight (Letchworth).

QSL Cards and Reports

SIR,—I wish to most strongly deny the statements made by W. T. Cooper (GB8S) and J. W. Ismay (G6II) that QSL cards are not collecting, and that the QSL cards have got to a stage similar to collecting cigarette pictures. I have always made a practice myself (and have also asked the 350 odd members of my club, the British Short-Wave League) to send in really detailed reports and only to stations at least outside of Europe. I know that a good number of them have a fix on stations and have been heard on stations from the States who only use 10 watts. Other QSLs I possess stating I was the first British or European 'phone report, and when he only used 20 watts; also VE2BU, again, who only uses 10 watts. Other QSLs I possess stating I was the first British or European 'phone report, and when he only used 20 watts: also VE2BU, again, who only uses 10 watts.

Finally, I have logged GB8S on 160 metres, but have not bothered to send him a report as he is not DX. I have had some experience of G stations, as when I first started S.W.L. I sent out very good and detailed reports with specially drawn S.W.L. cards, and return postage, each to over thirty G stations (phones) and every QSL I sent was at least stamped. So I have a good idea of the QSLs I got back was six ! Anyway, stations do not interest me at all.

R. Everard (Sawbridgeworth).
**All-wave Aerial Kit**

"I have an old component at home called an Anti-mobo, but I cannot find this in any catalogue and do not know what it is intended for. Could you please help me to know the meanings of the terminals on it marked H.T., R.1, R.3, H.T.-and X? I also have a coil type 485, but cannot trace the connections or circuit. Can you also help me in this case?" — F. S. (New Mill).

**T**he aerial kit referred to is a Ward & Goldstone product, and is sold complete at £1. 6d. It consists of two 20ft. horizontal aerials, a 25ft. length of twin feeder downlead, together with the aerial separator and insulators. A special receiver coupler with a 3-position tapping switch is also included and the necessary staples for erection. If a longer feeder cable is required, such as would arise when the aerial has to be erected a long way from the receiver sit in order to avoid interference, a 100ft. length of cable may be obtained with the kit, and the price then is increased to 25s.

**G**oldstone product, and is sold complete at 17s. 6d. 

**D.C. Mains Supply**

"I have an old component at home called an Anti-hobo, but I cannot find this in any site in order to avoid interference, a 100ft. length of cable may be obtained with the kit, and the price then is increased to 25s. The aerial is effective from 15 to 2,100 metres and thus is admirably suited for an all-wave receiver. The aerial kit referred to is a Ward & Goldstone product, and is sold complete at 17s. 6d."

"I am building the £4 Superhet 3, and would like your advice on the following point. I have a nearly new ordinary H.F. pentode valve and should like to use this for the time being in place of the variable-mu I.F. valve. Am I correct in omitting the 8 megohm resistor R5 and the 01 mil. condenser C8 and joining the G.B. lead from the I.F. transformer to the earth line? I note that this does not hold for the Record All-wave Three but may obtain no signals. Therefore, this resistor must be left in position. Condenser C8 may, however, be omitted, although it acts as a H.F. by-pass from the arm of the volume control to earth and is a refinement well worth retaining. Therefore, the only change worth making in the valve modification suggested, is to join the G.B. lead from the first I.F. transformer direct to earth. Condenser C8 should be joined direct to the arm of the volume control.

**Anti-mobo Unit**

"I have an old component at home called an Anti-mobo, but I cannot find this in any catalogue and do not know what it is intended for. Could you please help me to know the meanings of the terminals on it marked H.T., R.1, R.3, H.T.-and X? I also have a coil type 485, but cannot trace the connections or circuit. Can you also help me in this case?" — F. S. (New Mill).

**C**oil-winding Data

"I have the blueprints for the 150 mile Crystal set and the B.B.C. Official One-Valvew. I should like to know the gauge and kind of wire for the coils of these two sets, as the blueprint only shows the size of the coil former and the number of turns." — F. G. N. (Aldershot).

"I have a nearly new ordinary H.F. pentode valve and should like to use this for the time being in place of the variable-mu I.F. valve. Am I correct in omitting the 8 megohm resistor R5 and the 01 mil. condenser C8 and joining the G.B. lead from the I.F. transformer to the earth line? I note that this does not hold for the Record All-wave Three but may obtain no signals. Therefore, this resistor must be left in position. Condenser C8 may, however, be omitted, although it acts as a H.F. by-pass from the arm of the volume control to earth and is a refinement well worth retaining. Therefore, the only change worth making in the valve modification suggested, is to join the G.B. lead from the first I.F. transformer direct to earth. Condenser C8 should be joined direct to the arm of the volume control.

**DR** elimination.
Three-valve: Blueprints, 1s. each.

Two-valve: 1s. 6d. each.

Mains Operated.

Superhet.

Blueprints, 1s. each.

Self-contained sets.

Short-wave sets.

Complex knowledge of wireless sets.
**PRACTICAL AND AMATEUR WIRELESS**

November 21st, 1936

**3 BRAND NEW BARGAINS**

**New Times Sales Co.**

Two Guinea Sales Co. S.G. 3 CHASSIS

Including 3 British Valves with TWO YEARS guaranteed life.

Each chassis brand new and tested on British and Foreign Broadcasts before dispatched to you.

CIRCUIT COMPRISES: 2-Gang Air Dielectric Condenser, Metal grid, 1% each, 0.00015 reaction, 2/9; 2/9 each.

**LIST PRICE: £8.12:6**

Cash or C.D.O. Carriage Paid. Or £2 down and 12 monthly payments of 65/-.

**BARGAIN: £5:12:6**

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(Continued from foot of column one)

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**VALVES**

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DENSERS, 8-1-8+4 50 mfd. 12 volt working CONDENSERS. manufacture, 8 mid. and 4 mfd. ELECTROLYTIC
DITTO, two short bands, medium and long, 11-. LISSEN ALL-WAVE COILS, type, intact and the glass is not broken when returned to us.
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TUNED AERIAL SYSTEMS

Amateur Success

Further evidence regarding the peculiar behaviour of the short-wave transmitters has now come to hand. A South African experimenter has successfully received a signal from America on a wavelength of 5 metres. The total distance worked was 7,000 miles, the previous record being 200 miles for this particular wavelength. As the amateur in question had no transmitter available for this particular wavelength he was unable to reply, but he successfully received the entire message sent out by the American.

Miniature Transmitter

The N.B.C. of America have now perfected a miniature transmitter for use in relaying outdoor events. The entire transmitter is contained in a three-inch cube, and two ten-inch rods are used for the aerial. Acorn valves are used, and it weighs less than one pound. Successful relays have been carried out over distances of four miles.

Valves Withstand Typhoon

During the typhoon which recently struck Hong Kong the China Navigation Company's steamer Sunning was driven ashore and was torn almost in two against the rocks. Throughout the terrific buffeting the vessel was sending out S.O.S. calls from its radio equipment, whilst the Mojave Desert signals are thought to be due to emanations from the Milky Way.

Entirely Automatic

The automatic radiogram still suffers from the defect (if such it can be called) that needles have to be changed periodically. An inventor in France has, however, succeeded in designing and building an automatic needle-changer, in which the needles are fed up from below the motor-board in a belt, and as the pick-up returns to the starting position a needle is driven up into a self-gripping chuck, whilst the old needle falls out.

U.S.A. Television Transmitters

America is now taking up the television challenge and it was recently announced that four transmitters are to be ready next year to provide a public service. It is so far announced that a definition of 441 lines is to be aimed at. It will be remembered that the British systems employ 240 lines (Baird) and 405 lines (Marconi-E.M.I. interlaced system).

Controlling Wireless Traffic

The station recently described by the Postmaster-General as the "policeman of the ether" is engaged regularly in measuring the frequency of broadcasting stations and its duty is to inform a transmitter when he wanders from his allotted frequency. As some readers may wonder why the postal authorities attend to this work, it may be mentioned that under the International Regulations the General Post Office is responsible for all British stations, and this traffic station is known all over the world for the good work which it carries out.

Televising "Coronation Procession"

Although no plans have yet been made to televise the Coronation procession in May next, an interesting "pre-view" will be picked up by television receivers on November 28th, when a working model of the procession will be transmitted in "close-up," so as to provide a life-size impression of the Coronation coach and the troops on the march. Constructed by two brothers, Mears, Edward and Frank Offord, the model is 15ft. in length and nearly 3ft. high. When it is set in operation a 150yd. section of Westminster is shown, with soldiers lining the pavement and dense crowds behind. In a few moments, to the accompaniment of martial music, the procession comes into view—bands, infantry, Life Guards, and finally, the Royal coach, with the King's Watermen bringing up the rear.

B.B.C. Pianos

Following the exhaustive piano tests recently carried out by a panel of expert judges, the B.B.C. has decided to use, as a general rule, the following pianos for broadcasting purposes:

- Pianos, 8ft. long and over—Bosendorfer.
- Those less than 9ft. but over 7ft. 6in.—Steinway and Challen.
- Those under 8ft. 6in. and over 6ft.—Bosendorfer.

These three classes correspond to the needs of broadcasting studios, and most of the pianos in use are in the second class.
Chamber Music from Totnes

A CHAMBER Music Concert, in which Chilton Alan (harpsichord) and Eva Heinitz (viola da gamba) will be the artists, will be broadcast from Dartington Hall, Totnes, on November 5th, in the Western programme.

Flute Recital

E DIITH PENVILLE, who is one of the most accomplished flautists of the day, is to give a recital in the Midland programme on November 30th. She toured as soloist with Mme. Tetrazzini, has appeared at the Proms, and was congratulated by the late Hans Richter for her performance of a work by his friend Doppler, the Hungarian composer. The first piece in her programme is the Sonata in B flat by Quantz, who instructed Frederick the Great in flute-playing.

Concert from Torquay

JOHN MCKENNA (tenor) will be the soloist in the concert by the Torquay Municipal Orchestra, conducted by Ernest W. Gose, to be broadcast from the Pavilion, Torquay, on December 1st.

Tango Programme

On November 29th Midland listeners will hear Harry Engleman's Quintet with Thomas O'Hara (piano-accordion) in a Tango Programme. A Tango Serenade by O'Hara, and a medley for two pianos arranged by Engleman, are included. Both are well-known broadcasters.

Music Items

MEMORIES of the Diaghileff Russian Ballet will be revived on November 27th (Regional), when Constant Lambert will conduct a programme of Russian Ballet Music, consisting of Balakirev's "Tamara" and the Bolshoi Dances from "Prince Igor."

The following day (Regional), Rimsky-Korsakov's Symphony, Antar, will be played by the British Women's Symphony Orchestra under the direction of Boyd Neel. This will be their first broadcast under their newly-appointed conductor.

"It Has Been Announced"

THIS is the title of an interesting series of news reviews which seek to give a short account of some of the more outstanding events in the West Country, the first number of which was heard on October 26th. The second number will be broadcast on November 27th.

A Tchaikovsky Concert

On December 5th Leslie England will be the solo pianist for the Concerto in B flat minor, given by the City of Birmingham Orchestra, at the Birmingham Town Hall concert. Leslie Heward will conduct.

Midland Song Recital

THREE songs by Quilter and two by Grieg will be broadcast from "Prince Igor." JOSEPH DEL MERO/ian, the well-known baritone, for "Calling All Stars."

Military Band Concert

The Adamson Military Band, winners of the Military Band Contest held at Belle Vue, Manchester, on October 10th last, and which is to give a concert from the Manchester studios on November 29th. The Band has for some time been under the direction of Daniel Adamson, the promoter of the Manchester Ship Canal scheme. The broadcast concert will be conducted by W. Petcher.

"A Ship is Built"

On December 2nd, from the Northern Regional, a special feature programme有关 will be "A Ship is Built" and it is being broadcast describing the whole process of building a great liner. The title of the programme will be "Solve Problem No. 218."

Solve THIS!

Problem No. 219

Wyndham's A.C. mains receiver broke down and when tests were made it was found that the L.F. valve was not passing anode current. The voltage on the anode proved to be adequate, however, and the valve was in order. What was the fault? Three books will be awarded for the first three correct solutions. Address your solutions to the Editor, PRACTICAL AND AMATEUR WIRELESS, Grocers' Yard, 11-13, Southampton Street, Strand, London, W.C.2. Envelopes must be marked Problem No. 219. The form of hand-paper must be used to reach this office no later than the first post on Monday, November 30th, 1936.

The lack of signals was due to the use of a non-excessive antenna. When the earth plug was removed the damping effect of the aerial-earth system was considerably reduced. Detectors oscillation was thereby produced and signals became audible.

The following three readers successfully solved Problem No. 217: Mr. W. J. Tonsin, no. 326 Road, Gillingham, East A. Goodin, 222, Stanley Fields Road, Wealdy Hill, Birmingham; J. M. Shirley, 29, Marchall Drive, Glasgow, S.W.2.

The Arcadian Follies

THIS well-known concert party, which is especially popular with visitors to Blackpool, is to give an entertainment from the Empire Theatre, Peterborough, on December 1st. Ernest Binns will present the Arcadian Follies, who are a well-balanced company of singers, dancers, and entertainers, with Harry Korris as comedian in-chief. The Empire, Peterborough, is an independent theatre which provides variety for a large clientele in the East Midlands.
Although tried and tested circuits are always to be preferred for reliable and consistent results, there is much to be gained from a trial with a novel circuit. By novel, I refer to unorthodox arrangements, and for those to whom this type of circuit is not familiar reference may be made to the circuits which we have already published under this title. An instance is the adoption of the two elements of a Class B valve as a separate detector and amplifier, or the combined Class B and driver valve to make up a three-valve circuit with reflex working.

The experimenter is always trying out new arrangements, and no doubt many novel schemes are invented from time to time. The super-regenerative circuit is one which has always been a favourite, especially with the short-wave listener, and the merits of this circuit are already well known. A version of this circuit which has been developed in Australia is shown in Fig. 1, where it will be seen that the modern triode-hexode valve (used for frequency-changing in the superhet) is pressed into service for a single-valve receiver.

Super-Regeneration

In this valve the various elements are used in such a manner that they function as two separate valves. The normal rectification is carried out by means of the pentode section of the valve, whilst the triode portion is employed for the quenching oscillator. The standard coils may be employed for tuning, reaction, and quench coils. These may be home-made, or the standard commercial coil units. The H.T. applied to the oscillator section may be found critical, and a suggestion is made to use an entirely separate battery for the purpose. In this case the two negative terminals should be joined together and to earth. Obviously, the circuit is an experimental design with which considerable latitude is possible, and some adjustments may be found very critical.

Volume Expansion

A circuit which is receiving much attention on the other side of the Atlantic is known as automatic volume expansion, and this aims at restoring the correct level or balance of volume. It does not appear to be popular in this country, and some valves which were formerly developed especially for the purpose in England have now been withdrawn by the manufacturers on this account. In America, however, a new valve has been introduced recently, and takes the form of an hexode valve. With the aid of this valve several interesting circuits are possible, and two suggestions are given in Figs. 2 and 3. In Fig. 3 two additional valves are required for the complete circuit, which is the design incorporated in certain Radio Corporation of America receivers. All values recommended by this company are shown on the diagram, and it will be noted that in addition to the volume control a separate control for the degree of volume expansion is included.

The input is fed to both the control grid of the special valve mentioned as well as to the triode valve, the grid of the latter being joined to the arm of the expansion control. Thus any desired degree of input

Fig. 1.—A suggested form of super-regenerative receiver employing a triode-hexode valve.

Fig. 2.—Another American circuit, known as a programme expander. The arrangement is shown diagrammatically in Fig. 4 overleaf.

Fig. 3.—A novel circuit used for volume expansion. This arrangement is now being incorporated in certain American receivers.
SOME UNUSUAL CIRCUITS
(Continued from previous page)

The relative merits of transformer and resistance-capacity coupling are still matters of serious controversy. Some few years back R-C coupling was unquestionably superior, but the great improvement in transformer design in recent years leaves little to choose between the two. Nevertheless, a properly designed R-C circuit usually stands the test as the response curve is practically straight, apart from the inevitable tailing off in the extreme bass and treble. There are certainly no resonances which, however slight, are inseparable from even a first-class transformer. The chief requirements of any L.F. stage are good amplification and a faithful reproduction of the original signal.

No Step-up

With an R-C stage we must remember that there is no transformer step-up; consequently, the theoretical voltage magnification can never exceed the amplification factor of the preceding valve, and in practice it is, of course, very much less.

Fig. 1 shows the basic circuit where \( V_1 \) is the input signal, \( R_1 \) the voltage source, \( C_1 \) and \( C_2 \) the coupling capacitors, and \( V_2 \) the output signal. In order to obtain the maximum voltage step-up, the anode load \( R_1 \) must be as high as possible, and theoretically an infinite resistance would give the maximum step-up equal to the valve amplification factor. In practice it is not possible, from a quality standpoint, to exceed 25,000 ohms, even though this may mean a loss. The self-capacity of the resistance together with the associated wiring may be considered as a condenser in parallel with it, and if we use a high value of resistance, the reactance of the capacity in the extreme treble may be comparable with the resistance itself. The anode load is thus reduced, and the amplification of the higher audio-frequencies suffers. If, however, we keep the coupling resistance low, the by-passing effect of a small capacity is unimportant, and is only noticeable at a point well outside the audio-spectrum. Similarly, one should never choose a value of coupling condenser which necessitates a high-resistance grid-leak.

Signal Loss

Unfortunately, only part of the signal appears at the grid of the following valve. The coupling condenser and grid-leak form a potentiometer, and only the voltage developed across the resistance is accepted by the L.F. valve. At low frequencies the resistance of the coupling condenser increases, which in effect means a lower voltage developed across \( R_2 \). In order that amplification shall not suffer in the bass, therefore, the grid-leak should be as high as possible and the coupling condenser large, but there are two important reservations. As pointed out above, \( R_2 \) must be kept reasonably low to avoid high-ohm noise. The second reservation needs more investigation.

After each successive wave-train the grid potential of the L.F. valve must return to its normal value, i.e., as determined by its normal negative bias. One of the functions of \( R_2 \) is to allow the charge to leak away sufficiently quickly to attain this desirable state. Unfortunately, the condenser takes a very definite time to discharge, which is determined by its own capacity in microfarads multiplied by the leak resistance in megohms. The result, the time-constant, the product of the condenser and indicates the required interval for the condenser charge to fall to 37 per cent. of its initial value. The discharge curve is as shown in Fig. 2.

Avoiding Distortion

In order to avoid the distortion known as "grid-blocking," indicated by a strangeling effect, it is important that the time-constant shall be short compared with the shortest interval likely to be experienced between two successive peaks. As modern amplifiers and speakers often show a good response as high as 12,000 cycles, the problem is not an easy one.

In practice it is customary to tolerate a little grid-blocking in order to preserve the lower frequencies; furthermore, this trouble is rarely noticed when the signal is loud and the time-constant very high. A good rule is to choose a value of leak and condenser which will give 99 per cent. of the theoretical amplification at 60 cycles. Such a combination will have a time-constant of approximately .0006, and any values of leak and condenser may be chosen to give this product, with the reservation as to too high a resistance.

\[
C = \text{inft}, \quad R = 12
\]

Fig. 1. The basic resistance-capacity circuit.
A Short-wave Choke and Former

This accompanying sketch shows how I made an efficient short-wave H.F. choke and former. The former is made out of an old coil former of the six-pin type which most readers, no doubt, have in their junk box. It will be seen from the sketch that three portions are cut from the old coil former by means of a hacksaw, and then placed together. A small cork placed in the middle will assist in holding the parts together while the choke is wound. The winding of the choke consists of 120 turns wound in eight sections of fifteen turns each. The wire can be anchored at each end in the usual way.—LEWIS JONES (Holyhead).

Automatic Switching

The following idea may be of interest to those with straight receivers not fitted with A.V.C., such as Det. and 2LF; H.F., Det., Pen., etc. It consists of a couple of automatic switches, cut out of circuit at will, which insert a parallel resistance across aerial and earth when the dial is moved to either London National or London Regional. This is useful when tuning in foreigners, with a consequent full setting of the reaction control, as it prevents the terrific volume of locals when tuned in and out.

The accompanying sketch will make the principle clear. The contacts each consist of soft copper foil woven through the top layer only of two layers of thin paxolin or fibre screened to the wall of the condenser assembly. Before fitting these contacts, it is best to fix the layers and the wiper arm first and note the positions of the latter when the locals are tuned in.

The foil is brought out between the corners of the fascia board. This part of the arm is given a half twist, and is drilled, to hold the spring which causes the switch to resume its normal position when the lid is opened. In my case, I used the switch to work the dial-light, a 18-watt 220-volt bulb, and two 15-watt bulbs concealed in the two front corners of the fascia board. When it is necessary to operate the set, immediately the lid is opened a suffused glow of light spreads over the fascia board, and the dial lights up; when the station is tuned in the lid is closed and the lights go out.—H. M. MORGAN (Dublin).

S.G. Valve Screened Lead Improvement

The accompanying sketch illustrates an efficient screened lead, which can be made up quite simply, and has the advantage that the actual connecting wire is well spaced from the metal screening surrounding it. The meshed wire covering from ordinary screened flex is utilised, but the actual diameter of the meshing is increased by the simple process of pressing inwardly (as shown by arrows in sketch). As this tends to shorten the meshing, a length twice to three times that actually required should be taken, and the mesh opened out sufficiently to take a length of insulating sleeving. This is cut about 1/4 in. longer than the sleeving and is bound at intervals to act as spacers. A length of thin gauge silk or cotton covered wire is used for connecting purposes.—R. L. GRAPER (Gillingham).
Mechanical Systems

The U.I.T.E. number of people are still pinning their faith to mechanical systems for the reproduction of high-definition pictures on home receiver screens. No modification of disc scanners is capable of giving the results desired, but the application of mirror drum scanners is being pursued by inventors who see in this method a way to produce projected pictures. The bare principles seem to be based on two rotating members with the required number of reflecting facets. One of these corresponds to the line frequency and the other to the frame or picture frequency. Sometimes an echelon or staggered formation of reflecting mirrors is included to reduce the number of actual rotating facets. The modulated light source is an improved form of Kerr cell which proved so popular in the days of low-definition television. One of the greatest drawbacks to any mechanical form of receiver is the existence of two standards of picture transmission, and some designers have already stated that sets of this type will not be marketed until the Television Advisory Committee have made their promised recommendations for a single picture standard, a point alluded to by Lord Selsdon in his speech at the opening ceremony.

Television Rediffusion in Miniature

For the purpose of the television demonstrations at Radiolympia this year, the E.M.I. Service Company tried out a scheme which proved very satisfactory. For receiving the signals radiated from the Alexandra Palace, a single half-wave dipole extending from the top of a mast on the roof of the building was used. The eight separate bowls in which were installed the television receivers were fed via short lengths of feeder cable from a central distribution amplifier. It was this amplifier which was the subject of the supposed sabotage two or three days prior to Olympia's opening, and since this coincided with the temporary breakdown of the ultra-short-wave radio transmitter on the occasion of the Press visit for a preview, the opinions then expressed were not as favourable as they should have been. During the whole of the Exhibition period, however, this miniature rediffusion scheme worked quite well, and a few days ago a direct development of this arrangement manifested itself in a block of Mayfair flats, the full details of which were given in last week's issue.

A New Outlook

A close study of the activities of the cinema industry shows quite clearly that they are very much alive to the development of television, and are taking steps to see that where possible the advantages of the new science are incorporated in their own designs. For example, all new cinemas now being erected or contemplated are having much larger projection boxes than before. This is for the purpose of installing big-screen television projectors, it being felt, although no concrete plans have been formulated, that the equipment essential for this purpose will be of the front projection type and can be accommodated side by side with the standard film machines. At the moment the development of the intermediate-film projection receiver seems to be the most likely to fit in with this scheme, and it is already being asked whether equipment of this nature will be available in time for cinema patrons to see the proposed televising of next year's Coronation. Another way in which the so-called "challenge" of television is to be met is to give added importance to the degree of comfort, luxury, and attractive appearance as far as the actual cinema building itself is concerned. In this way the architect feels he will be able to offset the temptation of people to stay at home by the comfort of their own fireside.

Public Television Shows

The publicising of television shows by the installation of sets in restaurants, cinemas, stations, etc., is proceeding along normal lines, but it is now learned that the Performing Right Society is endeavouring to claim fees for this. They maintain that any place where television is used to attract the public should be compelled to pay the society a fee for the privilege. The enforcement of such a rule would make a very material difference to the feature of television in certain places. It only applies, however, where the public pay either directly or indirectly to be entertained, so that stores and free exhibitions should be exempt.

The illustration shows a cathode-ray receiver, and the right-hand illustration is a mechanical receiver, no details of which have, however, been released by the makers.
The Component Shortage

SOME chance remarks of mine in a previous issue on the shortage of components, or rather the difficulty which constructors experience in purchasing locally, have elicited a lengthy letter from a wireless dealer who, being in the business, thinks that he is able to discern the wood from the trees. I imagine that he must be a somewhat disgruntled dealer who has been unable to persuade his customers that "something just as good" will suit a particular circuit in place of the specified parts the receiver requires. He thinks that designers and the suppliers created this artificial shortage is deliberately specified components. He thinks that an artificial shortage is deliberately created by the set designer and the suppliers. He thinks that designers barter their specifications in exchange for advertisements. This is such a common supposition that I propose to deal with it in some detail. It is a libel on journalism to make such a wild suggestion. This journal specifies only the parts used by the designer. We do not say that no other parts will work. We know that with the specified parts the receiver will do all that we claim for it, and that is why the Editor is able to guarantee the performance. He could not do so if he told his readers to go round to any junk store, buy any old parts, sling them together, ignore the design of construction, and generally allow himself to be "stung" by the many unscrupulous dealers who do not understand the first thing about wireless but are permitted to stock wireless parts. You can see why some of these so-called dealers get annoyed when they open their copies of wireless journals, and find that a range of components is specified which they do not stock. They think that any old thing will do, and never hesitating to display their ignorance, rushing where angels fear to tread, give further exhibitions of their lack of knowledge and intelligence.

The Dealer and Home Construction

THE dealer to-day does not seem to care two hoots about home construction; he wants the parts to be ordered and he will take about a fortnight to get them for you. Quite often his wholesaler is reluctant to supply owing to an outstanding account. The dealer will tell the constructor that the makers cannot supply. Any dealer worthy of the name should stock his shelves with the well-known components and thus take an ordinary business risk, rather than sit back trying to back the winner. There is another aspect of this dealer question. Many of them get a little bit more discount on some of the parts which they think are as good as any other. No one knows why they should think so. Examine their equipment and in many cases you will find that it merely consists of a cheap voltmeter of foreign manufacture. Ask them to back their opinion that one component is as good as another by demonstrating it to you. Not only could they not do so because of lack of knowledge, but also because they lack the necessary instruments. When a set is planned it is part of the duty of a technical paper to satisfy itself that stocks are available. An advertiser whose business after all depends chiefly upon advertisements will naturally book space in order to emphasise the importance of the specification. Where a large demand exists for a particular circuit, quite often the supply runs short. Readers who are unable to obtain parts locally adopt an parochial outlook of thinking that their district constitutes the whole country. You cannot expect a manufacturer to continue to waste the time of his travellers by calling upon unresponsive dealers, who expect to sit back and take orders. Everyone can be in business on those lines. You merely open a shop, stock a few junk bits, and tell your customers that you are temporarily out of stock but will obtain the part in a few days. You will not remain in business very long, however.

Old-timers

TO return to the letter I have received from a dealer, he says: "Designers should remember that most of the people who to-day construct their own sets are old-timers, and it is almost an insult to their intelligence to tell them, in effect, that although in last week's issue only 'X' condensers are permissible if the set is to work, this week 'Y' must be used." Sheer nonsense; how could we guarantee any receiver if a reader elects to take the advice of a dealer? If the set fails to work, he would promptly send the set to us. We should find the defect, and refer the matter back to the dealer. It is thus in the latter's best interests that we should insist upon specified parts, for the responsibility is then ours and not his. There are not so many makes of wireless components that a range of each could not be stocked. When made according to the specification we have a standard of performance and are able to assist readers from a description of any trouble they may experience. With any old parts we should be unable to tell them what was the cause of the trouble. This dealer obviously expects the technical press to operate in such a way that he can sell his customers anything he chooses.

Specified Values of Components

AS far as this journal is concerned, he is going to sell them what we choose, or lose a customer. I do, of course, sympathise with the genuine dealer such as my correspondent undoubtedly is. He thinks that all designers should get together and agree merely to specify values of components, leaving the reader and/or the dealer to sort them out. The inevitable result of such a system

On Your Wavelength
would be that we should be inundated with letters from dealers who know nothing of the subject asking us to specify names. I namer insist we save the dealer this trouble. One other point—if all constructors are old-timers, they should know sufficient of the subject by this time to know when and where to substitute. If he is an old-timer a customer does not need to be told by the dealer what to buy, nor does the customer insist upon the specified parts if he knows all there is to know about wireless. In fact, he would design his own sets, and construct to his own specifications.

I admit that some dealers have had a raw deal at the hands of the manufacturers, but you must also remember that all manufacturers have had a raw deal at the hands of some dealers. They are naturally cautious. When a customer complains the dealer merely refers him to the makers, and the poor constructor takes the part of the shuttlecock between dealer and maker. The very shortage of components and the difficulty in obtaining them has been created by the dealer himself, and there is little wonder that mail order houses with business acumen and foresight have stepped into the breach and undertaken to supply by return of post what a dealer often cannot supply in a month. If this dealer intends seriously to cater for the home-constructors, I personally will undertake to see that all of the supplies he requires are readily forthcoming. If he merely wishes to await the publication of a circuit and the arrival of customers before he orders, I can do nothing for him. I make my offer; will he accept it? There is an acid test.

All of the blame, as I have said, does not attach to the dealer. Many manufacturers are negligent; they do not get down to the job soon enough, and then find that they are inundated with orders which they cannot fulfil without delay.

Skilled Craftsmen

S. J., of Eccles, gives me an example where he ordered a coil from a manufacturer; he waited two weeks and then wrote. He received a reply but no coil. He waited a further week and wrote again; and then another week, and then another letter. By this time the coil had cost him 6s. 2d. The various postages. This reader tells me apropos my recent note about skilled craftsmen that he is a press toolmaker; he can work a lathe, and work to close limits. He is expected to work for 47 hours for the munificent sum of £3 2s. 6d. He agrees that the scale of values is upside-down. His sight has failed, he is out of a job, but because he has a daughter who is a schoolgirl, he gets nothing. I am much obliged to this reader for the kind remarks he has to make about my feature. I hope his luck will change. He certainly deserves it.

Cronners Again

SCHOOLBOY," of Rochford, writes: "May I wish you the best of luck in your anti-crooner campaign? These arch-nuisances should be painfully exterminated, or at least put away under medical supervision. I live in an institution where one must bow to public opinion, however perverted (let me hasten to assure pro-croners that the said institution is a school), and I suffer very much from this form of mental torture. However, let me make a confession. I have a distinct weakness (may the hand wither that writes this) for the trumpet (and even the singing) of such artists as Nat Gonella, Louis Armstrong, and often listen to the same with great relish, but the sentimental tripe (and this is you may be surprised to hear the opinion of an adolescent) poured forth by the majority of croners ought to be suppressed."

I know, I know! F. H., of Copnor, also supports my campaign against croners. They shatter his G-string, and cause his epiglottis to miss on all cylinders. They even cause violent reaction in his cat, who, when he hears a crooner open the throttle immediately goes outside and gives the jolly old welkin what-for just to get his own back. He thinks all croners should be inoculated with a 28b. hammer on the hair parting. This, he thinks, should be done in the cause of humanity, and would do a great deal towards bringing about that world peace one hears so much about.

Quick Strides

I WAS present the other day at a demonstration staged by Marconi-R.M.I. in which a block of flats in the centre of London was installed with a series of television receivers in a number of rooms, all fed from a central aerial. The pictures were extraordinarily steady and clear, and give rise to the thought that the progress of television will be more rapid than was the case with radio. It only now requires a few component manufacturers with commercial pluck and vision to make the parts for the home-constructor to be in on the ground floor. The designs are ready.
Don't Miss These FLYING THRILLS!

FACING DEATH IN AUSTRALIA
THE BOMBING OF ADRIANOPEL
BRIGHT MOMENTS IN A TRAINING SQUADRON
CRAZY CARGOES
ATLANTIC FLYING BOATS
And many other Air Features in the December Number.

A valve saved... distortionless detection and automatic volume control gained. A

WESTINGHOUSE WECTECTOR
saves in first cost and H.T. and L.T. consumption

Full technical details and circuits are given in "The All Metal Way, 1937."
Send 3d. to Dept. Prac. for a copy.
Westinghouse Brake & Signal Co., Ltd., 82, York Road, King's Cross, London, N.1.
Approximate Voltage Readings

<table>
<thead>
<tr>
<th>Voltmeter</th>
<th>to E</th>
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<tbody>
<tr>
<td>+ to 1</td>
<td>60 volts.</td>
</tr>
<tr>
<td>+ to 2</td>
<td>120 volts.</td>
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<tr>
<td>+ to 3</td>
<td>60 volts.</td>
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<tr>
<td>+ to 4</td>
<td>115 volts.</td>
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<tr>
<td>+ to 5</td>
<td>120 volts.</td>
</tr>
<tr>
<td>to a and b</td>
<td>2 volts.</td>
</tr>
</tbody>
</table>

Approximate Current Readings

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<th>Milliammeter Connected at</th>
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<tbody>
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<td>at x₁</td>
<td></td>
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<tr>
<td>at x₂</td>
<td>1½ mA.</td>
</tr>
<tr>
<td>at x₃</td>
<td>10 mA.</td>
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</table>

Approximate Resistance Readings

<table>
<thead>
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<th>L.F. Transformer</th>
<th>Ohmmeter Connected across G and GB = 4,000 ohms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P and HT = 750 ohms</td>
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ABC of the Modern Receiver—10

Further Details of the Frequency-changer and Intermediate-frequency Amplifier, with Reference to A.V.C. and Second Detection

By FRANK PRESTON

The main principles of the superhetodyne-frequency-changer were described in the last article of this series, so we may now turn to the more practical aspects. There are, of course, a few different types of frequency-changer valve—pentagrid or heptode, hexode, triode-pentode, and triode-hexode changer valve-pentagrid or a practical series, so we may now turn to the more typical example, since this is most widely used. The basic circuit was given before, but a more complete one is given in Fig. 1, taking the KGB-system, as shown in Fig. 1, taking the oscillator section to operate in every respect to use a potentiometer. This is a very simple and satisfactory arrangement, for the double control has a very pronounced effect, and permits of a very wide range of input to the second detector. In connection with the V.M. volume control, it should be noted that each valve is decoupled by means of a .1 megohm resistance, and before, but no reference was made to the condenser and leak in the grid circuit of the oscillator portion. Theoretically, these are not necessary, and it is actually possible to obtain results without them. They do, however, assist in ensuring steady oscillation over the tuning range by causing the triode oscillator section to operate at the most suitable point on its characteristic curve. To enter into this matter in detail would lead to complication, so readers are asked to accept the facts as given. Most suitable values for the condenser and leak depend largely upon the particular valve employed, but a .001-mfd. and 100,000 ohms (or .1 megohm) are nearly always satisfactory figures.

H.T. Supply

The two screening grids of the pentagrid are joined together inside the valve and brought out to the same pin, as shown in Fig. 4, and require an H.T. voltage of rather less than half the voltage applied to the main anode. It so happens that a similar voltage is required by the screening grid of the H.F. pentode used as intermediate-frequency-amplifier, and for this reason it is usual to employ a common supply line. One method of feed is to join the screening grids together and to a wander plug which can be inserted into a suitable socket on the H.T. battery. This is not the best arrangement, however, because there is no decoupling, and because an extra H.T. lead is required. It is better in every respect to use a potentiometer system, as shown in Fig. 1, taking the leads to the two valves from this through a pair of 1,000-ohm resistances. The potentiometer is fixed and might well consist of two fixed resistances in series. As an alternative, the potentiometer can often be successfully replaced by a single 10,000-ohm resistor, as shown in the simplified circuit in Fig. 5.

The connections shown in Fig. 1 are better, especially when the two 1-mfd. screening-grid by-pass condensers are mounted as close as possible to the screening-grid terminals of the respective

(Continued overleaf)
ABC OF THE MODERN RECEIVER
(Continued from previous page)
valveholders. The anode of the oscillator section generally requires a voltage equal to about two-thirds of that applied to the main anode. For this reason, a fixed resistance is connected in series with one end of the "reaction" winding of the oscillator coil and H.T. +. The value of this is generally very critical, but 25,000 ohms suits most valves of this type. This resistance also is by-passed by means of a .1-mfd. non-inductive condenser, so that any "stray" high-frequency currents are led away to earth, where they cannot interfere with the operation of the rest of the receiver. The idea of all voltage developed across this rectifier and the 100,000-ohm "load" resistance. And as the positive terminal of the rectifier is connected to earth, the other end is at a negative potential (or voltage) in respect of earth. Thus, if a connection is taken from the negative end of the rectifier, that connection can be used to provide negative grid bias voltage for the grid of the preceding valve. In practice, this lead is joined to the ends of the two bias decoupling resistances shown in Fig. 1, so that the potential difference can be removed.

It might not yet be clear how this system of connections can provide automatic volume control. The chief point is that the voltage developed across the "Westector" load resistance is proportional to the output of the detector. Thus, as the output increases, the voltage employed as grid bias increases. And as the sensitivity of a variable-mu valve is increased, the grid-bias voltage that is required to maintain this sensitivity is increased. As the sensitivity is made less as the output from the detector is reduced, the voltage decreases. In consequence, when a powerful signal is received, grid bias is less, and vice versa. Thus, the sensitivity is made less as the output from the detector is reduced.

This is not how it all works. The "Westector" is a rectifier, and so changes the alternating or low-frequency current into D.C., so that there is a certain amount of current there is always a certain amount of current that is not used to provide grid bias for the detector valve. In practice, this lead marked as going to the L.F. amplifier is taken from the negative end of the rectifier, the other being used for grid bias. The lead marked as going to the H.F. amplifier is used for A.V.C. grid voltage.

The use of special "A.V.C." or double-control valves is not widely used. This is not because it is unsatisfactory, but because the same result can be obtained more easily by other methods. The simplest of all these is by using a "Westector" in place of both the second detector valve and the A.V.C. unit. Typical connections are shown in Fig. 5, where the I.F. and frequency-changer valves are also shown to make the A.V.C. connections more readily understood.

The secondary of the second I.F. transformer is connected directly to the positive terminal of the rectifier and to earth, whilst leads are taken from the negative end to the L.F. amplifier and to the grid bias circuits of the "controlled" valves. This will be also be shown that a 0.001-mfd. fixed condenser is connected in parallel with the rectifier, that connection can be used for this purpose by including a "Westector," a "stopping" condenser, and a "load" resistance, as shown in broken lines in Fig. 3.

It is this, stage which separates the audio-frequency voltage appearing in the "side-tracked," passes through the .001-mfd. fixed condenser and "Westector" load resistance is proportional to the strength of the incoming signal. In practice, this idea of the signal is never quite achieved, but by using three or more "controlled" variable-mu valves the result is near enough to the ideal. On! speaker is tuned in a greater value of G.B. voltage, so that the receiver is made more sensitive when the signal is weak (after all, the system is not entirely to the signal voltage forming the output of the detector). Thus, the sound from the speaker remains sensibly constant irrespective of fluctuations in the intensity of the signal picked-up by the aerial.

As the sensitivity of the valve is increased, the voltage employed as grid bias increases. And as the sensitivity is made less as the output from the detector is reduced, the voltage decreases. In consequence, when a powerful signal is received, grid bias is less, and vice versa. Thus, the sensitivity is made less as the output from the detector is reduced.

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Music of the Hours
On November 30th, in the second of his Midland series of talks on current music on the wireless, Walter Pitchford will deal with those of Gloucester Cathedral. Records of four of these chime tunes have been specially made by the B.B.C. Mobile Unit and will be used to illustrate the talk. The age of the tunes, which are played by chime bars, ranges from 150 to 250 years.

Dance Cabaret from Bristol
On December 4th, Western listeners will hear a dance cabaret programme which will be broadcast from the Coliseum, Bristol.

Tommy Finnigan and His Band
This dance band will broadcast again in the Midland Regional programme on December 3rd. The chief vocalist, Ted Butler, known as "The Top Hat Troubadour," was discovered by Tommy Finnigan on his American tour. The leader himself was drummer to the Liverpool Municipal Orchestra at fourteen, and had his own band before he was twenty.

"Westector" Second Detection
As mentioned above, this method of second detection and A.V.C. is not widely used. This is not because it is unsatisfactory, but because the same result can be obtained more easily by other methods. The simplest of all these is by using a "Westector" in place of both the second detector valve and the A.V.C. unit. Typical connections are shown in Fig. 5, where the I.F. and frequency-changer valves are also shown to make the A.V.C. connections more readily understood.

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The Cossor A.C. Mains Superhet
(Model 375)

SPECIFICATION
Cossor A.C. MAINS SUPERHET, with fully delayed A.V.C.,
including:

- Illuminated scale, combined gramophone and radio volume control,
tone adjustment, provision for pick-up and extension speaker.
- 8-in. moving coil loudspeaker. Walnut cabinet 19½in. high, 14½in. wide, 11½in. deep, for A.C.
mains only. 200-250 volts, adjustable 40-100 cycles.
- Price 9½ guineas, or on Hire Purchase Terms.

This illustration of the new Cossor A.C. Mains Superhet—Model 375—shows the neat appearance of the cabinet and simple controls.

The Circuit
Describing the circuit in logical sequence, attention is first of all directed to the aerial circuit, which is an inductively coupled band-pass arrangement with a specially designed bucking transformer to the I.F. amplifier, a variable-mu screened pentode, which in turn is coupled to the second detector by a high gain I.F. transformer. It is interesting to note in passing that the primary of the I.F. transformer is shorted when the set is switched to the gramophone position to prevent "break through."

The second detector is a double-diode triode controlling a very carefully designed A.V.C. system that controls the gain on both the pentagrid and variable-mu pentode. The signal half of the diode is, of course, coupled to its triode section by the usual resistance, which is arranged with its mid-point earthed so that the volume control increases volume on radio and gramophone by rotation in opposite directions.

The triode section of the second detector is resistance coupled to the output valve, which is a power pentode working into a load designed to be purely resistive, taking the form of an 8-in. moving-coil loudspeaker shunted with a resistance of optimum value.

The power pack is built around a Cossor 442 B.U., a double wave rectifier capable of an output considerably larger than that required by the receiver. The mains transformer is of heavy design, as also are the smoothing arrangements.

Tuning Scale and Controls
The general appearance of Model 375 can be seen from the accompanying illustration; the walnut veneered cabinet is particularly well finished, and is rich in colour and not too dark. The tuning escutcheon and "speaker frame" are a single die-casting sprayed brown; the whole appearance is very restrained and dignified.

The scale is calibrated in both metres and station names and is illuminated, the deep coffee colour preventing the glare that is so unpleasantly obvious in many receivers. In addition to the simple controls on the front, there is a tone control at the rear intended to be treated as a preset adjustment.

Performance
Selectivity is of a very high order, permitting almost all European stations of any consequence to be readily tuned in, a procedure that is greatly facilitated by the very high over-all gain of the receiver. The amplification is, in fact, remarkable, allowing quite weak stations to be pulled in on a very short aerial; combined with such high selectivity this sensitivity is exceptional.

Quality is also very good and sidebands—and consequently brilliance of reproduction—are well preserved, particularly when the limitations imposed by high selectivity are taken into account.

The complete absence of accentuated frequencies shows that the output circuit has sensibly similar impedance over the whole musical scale.

The signal-to-noise ratio is very high, and even on relatively weak stations the background is favourably low. The automatic volume control arrangements were found to be very satisfactory, and here alone the high over-all gain proved its use.

The efficiency of any A.V.C. system is, of course, limited by the maximum amplification of which the set is capable.

Gramophone reproduction reached a similar high standard. The tone adjustment, when adjusted to suit the average ear on radio, effected a reasonable needle scratch-cut on records; the volume control was smooth, and the ability to reproduce music at low volume without deadness was manifest.

The Cossor A.C. mains superhet Model 375 is suitable for A.C. 200-250 volts (adjustable by three tap-pings) 40-100 cycles and consumes approximately 85 watts. Provision for gramophone pickup takes the form of a pair of sockets, similar arrangements being made for an extension loud-speaker.

The price is 9½ guineas, or it may be had for a deposit of 17s. 6d., and twelve monthly payments of 17s. 6d., or a deposit of 17s. 6d., and eighteen monthly payments of 12s. 6d.

A FINE BOOK FOR THE BEGINNER!
AND A USEFUL PRESENT
EVERYMAN'S WIRELESS BOOK
(2nd Edition)
By F. J. CAMM

The Morse Code is considered the Morse Code, as it is not the slightest use in conjunction with the theory and construction of transmitters until a determined state has been made towards mastering the code. It will take, at least two to three months of diligent practice to become reasonably proficient, therefore, as a sound basis for the design of Morse is essential for the licencing tests, no time should be lost in making up Fig. 1 and getting down to practice.

The complete instructions of the Morse Code are set out on that page, and it will be seen that the letters of the alphabet, numbers, punctuation, and abbreviations are formed by various arrangements of "dots" and "dashes." Various articles have appeared in past issues, explaining how to learn the code, therefore, it is only necessary to emphasise once more that the requirements have not been removed.

Always think of a "dot" as "dit," and a "dash" as "dash." Always think of saying "dot dash" for A; "dash dot dot" for B and so on, and you will eventually, recognise letters by their result, not so much by so many "dots" or "dashes." Note that capital letters cannot only of "dots," while others are formed by "dashes," and that the letters S, L, N, M, and Q are "dots." There are several letters which have opposite abbreviations.

There is no need to fear that expenditure will be too high to allow the necessary gear to be purchased. A great number of constructors are using "kits" which are very difficult to get out of the habit when you reach the transmitting stage, and other amateurs will report that your signals are not readable. Practice, practice, and then more practice.

The amateur who intends to take up transmitting, however, after finding that it is not too easy to write all the necessary abbreviations, would-be amateur transmitter is prepared to devote a reasonable amount of time and study to the subject, to enable him to overcome the difficulties and to proceed with the Morse Code without reference to the instructions.

Preliminary Concerns Regarding the Application

An application form, obtainable from the Engineer-in-Chief, Radio Section, L.C.C., Armour House, London, E.C.1, is the only way to master the whole thing. Don't lose heart, as you will find that it is not quite so difficult after all, and you will be able to read Morse transmissions without undue concentration. Don't worry about speed, get letter perfect first.

The Morse Code.

Note of Interrogation - -

Note of Exclamation - -

Apostrophe

Fig. 1.-A simple Morse practice circuit employing a 10,000-cycle per second L.F. oscillator. Note of Exclamation - -

The cost of an A.A. licence is the same as for a full licence, and that of an A.A. licence, as it is highly possible that some little time will elapse between application and the granting of the official licence. There are two forms of licence, the A.A. or artificial aerial, and the full licence.

Licences

Licences are handled under this heading and the Morse Code is essential for the licencing tests, as it is not the slightest use in learning to apply for a transmitting licence. As it is not the slightest use in learning to apply for a transmitting licence. As it is not the slightest use in learning to apply for a transmitting licence.

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Artificial Aerial

The licence granted under this heading covers the use of transmitting apparatus for amateur use only. That is not so in fact. A great number of contractors are using "kits" which are very difficult to get out of the habit when you reach the transmitting stage, and other amateurs will report that your signals are not readable. Practice, practice, and then more practice.

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The Morse Code.

Note of Interrogation - -

Note of Exclamation - -

Apostrophe

Fig. 1.-A simple Morse practice circuit employing a 10,000-cycle per second L.F. oscillator. Note of Exclamation - -

The cost of an A.A. licence is the same as for a full licence, and that of an A.A. licence, as it is highly possible that some little time will elapse between application and the granting of the official licence. There are two forms of licence, the A.A. or artificial aerial, and the full licence.

Licences

Licences are handled under this heading and the Morse Code is essential for the licencing tests, as it is not the slightest use in learning to apply for a transmitting licence. As it is not the slightest use in learning to apply for a transmitting licence. As it is not the slightest use in learning to apply for a transmitting licence.

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Artificial Aerial

The licence granted under this heading covers the use of transmitting apparatus for amateur use only. That is not so in fact. A great number of contractors are using "kits" which are very difficult to get out of the habit when you reach the transmitting stage, and other amateurs will report that your signals are not readable. Practice, practice, and then more practice.

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The quicker the groundwork is done, the as well scrap the idea of ever becoming the to devote a reasonable amount of time and facilities satisfied. equipment must not transmitters suitable for amateur use, but to reverse the procedure, and take part in a time when he has a great desire to be able describe, it is not too easy to secure all the necessary out of wireless, enjoying it to the full, owners are getting ninety-nine per cent. all transmitters, irrespective of nationality distances varying between a few miles and on the short waves, listening to amateur-transmitters working other stations over...

The Morse Code is set out on that page, and it will be seen that the letters of the alphabet, numbers, punctuation and abbreviations are formed by various arrangements of "dots" and "dashes." Various articles have appeared in past issues, explaining how to learn the code, therefore, it is only necessary to emphasise once or twice requirements have been satisfied.

This is not only far the sake of conforming to regulations, it is also to protect the facilities already granted to other transmitters as a whole: and it is up to every one who is at all interested in the subject to see that their actions do not endanger—by illegal use of such equipment or the abuse of the licence—the privileges so vital to the welfare of the whole.

To avoid any misunderstanding, I would like to make it quite clear that, unless the

Fig. 1.—A single Morse practice circuit employing

is the only way to master the whole thing. Don't lose heart, as you will find that it

the Morse Code, as it is not the slightest use proceeding with the theory and construction of transmitters until a determined state has been made towards mastering the code.

It will take, at least two or three months of diligent practice to become reasonably proficient, therefore, as a sound knowledge of Morse is essential for the licensing tests, no undue hastening must be had in making up for lost time. (Fig. 1) and get to the point.

The complete inter.

tion begins when you reach the transmitting stage, and other amateurs will report that your signals are will suddenly become quite clear, and you

W. C. BURCH, \( E \).

would-be amateur transmitter is prepared to devote a reasonable amount of time and study to the subject, to enable him to over.

Preliminary Details Concerning Morse Practice. Licences. Artificial Masts and Cost are dealt with in this First Article of the Series.

Licens.

Fig. 4.—A reliable transmitter in use by a radio society on one of their field days.

Fig. 3.—A group of QSL cards.

Fig. 2.—A corner of the amateur transmitting station, G.S.C., operated by Mr. Leslie Cooper, of East Molesey, Surrey.
**SHORT WAVE SECTION**

**TUNING THE AERIAL**

Various Methods of Improving Short-wave Reception are Dealt With in this Article. By A. W. MANN

**Selectivity Problems**

Before going further, let us take into consideration the common defects associated with the straight regenerative short-wave receiver, and the tuned radio frequency type. Selectivity is mediocre in both instances compared with that of the superheterodyne. I do not mean to infer that short-wave receivers other than the superhet are useless, because the degree of selectivity obtainable when using either a regenerative detector or T.R.F. receiver depends upon its general design, lay out, wiring, and efficiency, or otherwise, of the tuning coils used. Not must we overlook the importance of the aerial and earth system used in conjunction with it; also aerial coupling arrangements. This brings us to a very important point often ignored when discussing short and medium-wave selectivity problems. It is that, in many instances, poor selectivity is the price paid for simplicity of control. Take for example single and two H.F. stage T.R.F. type receivers. The aerial circuit is usually made aperiodic, and thus receives all signals at equal strength.

Thus we have the desired and undesired signals picked up and passed on to the first H.F. valve and amplified, causing cross modulation when band-pass or variable mu are not features of design.

**Using a Wave-trap**

This state of affairs, however, may be overcome in a very simple manner. Fig. 1 shows in theoretical form a rejector wave-trap fitted in series with the aerial. All that is required is a .0003 mfd. variable condenser, a coil mounting, a medium-wave coil, and three or four single-winding short-wave coils, which may be of the now obsolete two-pin type.

The idea is an old one, but, when used in conjunction with short-wave receivers, serves a number of different purposes. It can, of course, be used as a wave-trap on all bands, and will prove worthwhile.

When inter-station interference is experienced, the unwanted signal may be tuned in at full volume on the receiver, and then reduced to the minimum, or completely cut out with the trap circuit, after which the set should be re-tuned to the desired signal.

The writer has always been, and still is, a strong advocate of tuned aerial systems. Quite apart from man-made static and background noise, we experience natural static or background noise.

Background noises are experienced by everyone to a greater or lesser degree, and the same applies to integral receiver noise, but man-made static is not universally experienced.

**Reducing Interference**

If man-made static is experienced, there are special aerial systems which may be used in order to reduce such interference, but there is no system available which will totally eliminate it, and one must be prepared to sacrifice a reduction in signal volume to some degree and view the subject from the point of clearer signals due to the reduction of interference of the man-made variety originating close to the lead in. Should such interference be a quarter of a mile away, things are pretty hopeless.

Natural static or background noise external to the set is, however, a different proposition altogether, and not only can it be considerably reduced, and completely eliminated in certain instances, but so also can signal volume be increased at one and the same time.

For example, whilst it may appear paradoxical, natural static may be experienced on a particular frequency, which in itself is free from interference, such interference being spread over from adjacent frequencies. Our receivers discriminate between wanted and unwanted signals, therefore we must arrange matters so that the aerial system will discriminate between wanted signals and unwanted interference.

Providing that we can accomplish this most desirable state of affairs, sufficient voltage will be obtained to totally override noise, and by tuning the aerial system to resonance we can achieve our objective—This is not high sounding theory, but a fact all too little appreciated.

(Continued on opposite page)
The interchange of programmes between the U.K. and the U.S.A. is gradually assuming larger proportions and when searching for a wanted broadcast a transmission may occasionally be found on one channel which does not tally with any of the regular and better known short-waves. Germany, in this respect, is particularly noticeable in addition to the ordinary stations in use at Zeessen, which broadcast the overseas programmes, frequently brings into action her special point-to-point transmitters for relays to a foreign country. The following are those mostly used: Zeessen, DZG, 19.53 m. (15,900 kc/s); DZQ, 30.75 m. (14,460 kc/s); DZP, 24.73 m. (12,130 kc/s); DJB, 25.31 m. (11,750 kc/s); DZL, 29.50 m. (10,045 kc/s); DZA, 31.08 m. (9,675 kc/s); and DJM, 45.35 m. (6,079 kc/s). The League of Nations transmitter at Pongins (Switzerland) in addition to its official work, is also sometimes called upon to act as the short-wave "ether" link of a neighbouring country such as France, Belgium, Yugoslavia, and so on.

Aerial Resonances

There are various methods, complicated and otherwise, from which to choose. Using the aerial and tuning condenser arrangement described is the most simple, and does not make for tricky operation. For example, suppose we tune the set to any one of the regular and better known short-waves. In conclusion, it should be understood that reports of reception should be forwarded to Dr. Tuilio Castaneda, Emisora HRR, La Voce d'ltalatiana, La Ceiba (Honduras). The channel was found to be 48.11 m. (9,235 kc/s), according to filter checks, this power being given as 250 watts. This studio is on the air daily from G.M.T. 01.00-04.00, with a spend and a half and ends on Sundays between G.M.T. 21.00-23.00.

Although a full address was not supplied, it is understood that reports of reception should be forwarded to Dr. Tuilio Castaneda, Emisora HRR, La Voce d'Italatiana, La Ceiba (Honduras).
Bird Songs

When written to illustrate varied aspects of bird life is to be found in the works of many composers, but a complete composition created to represent the song of many birds is rare indeed. The most notable example is the "Bird" Quartet of Haydn, Op. 33, No. 3, which deals with bird life as exemplified in the reproduction of the nightingale, the cuckoo, and a number of other birds.

The finale is supposed to be a bird concert, in which the cuckoo undoubtedly holds his own. The Roth String Quartet have recorded this fine composition on three records, Columbia LX 536/40.

In the past, recorded music from a harpsichord has been on a seventeenth-century basis. Yella Pessl, however, has recorded a number of extremely fine harpsichord solos on Columbia DX 752. They are Handel's Fantasia in C and Capriccio in G minor, and Purcell's Prelude, "The Queen's Dolor," and a Hornpipe.

Girl-School Humour

By his girl-school impressions Arthur Marshall has not only established himself as a wireless favourite but has created a unique brand of humour which is highly appreciated. His first record for the Columbia Company—"A School Girl's Story" and "The Head Mistress"—was refreshingly original.

He has now made a recording of "The Hostess" coupled with "A Nature Walk," on Columbia DB 1657. They are clever impressions of a smug, talkative "School-marm" that are extremely humorous.

Tommy Handley's "Chicken Song"

Tommy Handley's "Chicken Song" (Have You Seen My Chickens?) which he put over on the "air," appears in the new Columbia releases sung by Handley himself, assisted by his wife, Jean Alliston. They sing this quickfire song with great gusto, peppering it with humorous "cluckings" and it is as nice a piece of catty social gossip as you could wish. On the reverse side is their famous rustic duet "Oh Sarah! Oh Jeremy!" with plenty of shy "Oo-oos" from this lovesick pair. It's rather a catchy song, too. The number is Columbia FB 1518.

A Business Course

Harry Tate has broken out in a new phase. After educating motorists with his classic sketch "Motoring," he has revived one of his most successful wartime sketches, which he claims can be regarded as a complete course of business training. "Running an Office" is the title of the sketch which appears on Columbia DX 253. The record is on the usual hilarious Tate lines, and the engagement of an office boy, the equipment of the office, and the reception and interview of a mysterious inventor make up a sketch that may easily surpass in popularity the never-to-be-forgotten "Motoring."

Request Titles

As a compliment to his innumerable admirers, Turner Layton has just recorded a batch of "request" titles in the new Columbia list. They are a two-part selection of "Poor Little Rich Girl"—Columbia FB 1514, "Until the real thing Comes Along" and "Is it True What They Say about Dixie?"—Columbia FB 1515, and "South Sea Island Magic," coupled with "Me and the Moon—with, of course," his own piano accompaniment.

The Ink Spots, an American coloured combination, make their first recording on a Columbia record this month. The outfit consists of four boys, three of whom sing and play guitars, and one bass vocalist. The solo guitar comes out clear and strong in the two titles they have chosen—"Stompin' at the Savoy" and "Keep Away from My Doorstep"—Columbia FB 1519.

Our illustration shows Yvor Noello, Dorothy Dickson, and Olive Gilbert recording excerpts from "Coraline Rapture," the show which is enjoying a successful run at the Drury Lane Theatre, London.

New Organ Style

Quentin Maclean, on the organ of the Trocadero Cinema, London, has sprung a surprise in his latest record. He plays "Free," the song from the Palladium show "O-Kay for Sound," not as a dance-band version, but in a straightened-out interpretation so unusual that it might almost be called an organ curiosity. The result is very fascinating and a further tribute to Maclean's versatility. It is coupled with "Night Must Fall"—Columbia FB 1525.

"Transatlantic Rhythm" Hits

It is noteworthy that the much-publicised London show, "Transatlantic Rhythm," has produced a couple of records by artists connected with the production. First, the composers—Irving Caesar and Ray Henderson—who play on two pianos a selection of some half-dozen of their hits from the show on Columbia FB 1518, and secondly, Buck and Bubbles, the vocal and instrumental pair, who sing "Breakfast in Harlem" and "Lady Be Good." Buck is recognized as one of the greatest of swing pianists, while his partner is well known for his singing and drumming. They are assisted by Dave Rakish, the famous clarinettist. The number of the record is Columbia FB 1524.

Variety

On Columbia this month, in the 1s., 6d. variety series, appear a fine selection of records that would make an interesting "variety hour." First we have a "Yeomen of the Guard," which Harry Robins solos on Columbia FB 1509, followed by Albert Sandler and his Orchestra playing "A Little Love, a Little Kiss" and "Because" on Columbia FB 1510. Nobody can play the Hawaiian guitar better than Len Pillin, who, on Columbia FB 1526, provides two lovely solos—"Swanee Moon" and "An Old Hawaiian Guitar." The xylophone is so rarely recorded that Harry Robins's solos on Columbia FB 1508 will be welcomed. And, of course, we must have a laugh, so Norman Long is there, cheerfully funny.
New Belling-Lee Suppressor

A NEW suppressor for use in a flex lead has been submitted for test by Messrs. Belling & Lee. This consists of a barrel-shaped bakelite casing divided into two parts and held together with two locking screws. At the end of the main portion two insulating straps are fitted, and are intended to anchor the leads. The main assembly consists of a 2,000/µH choke (D.C. resistance 3.33 ohms) and two fixed condensers, one having a capacity of .1 mfd.

The leads to any electrical apparatus such as vacuum cleaners, fans, etc., are cut and the suppressor inserted as shown in the theoretical diagram below. The complete unit is neat and weighs only 4 ozs. There is no risk of shock as all metallic parts are covered and the ends of the leads are completely enclosed when the two parts of the device are screwed together. The makers recommend that it be fitted as near to the appliance as possible, in which case it will be quite out of the way and free from risk of damage. The component parts of this particular device are rated at ample values for the powercoil which may be connected thereto.

The whole is mounted on a neat polished base, with base underlay to avoid scratching any polished surface upon which the instrument may be placed. The model is fitted with a mica diaphragm and costs £8. 6d. A suitable transformer costs £3. 6d.

New G.E.C. Loudspeaker

The General Electric Company has now added a high-impedance extension speaker to its range. This is designed specially for use with G.E.C. or similar receivers which are fitted with high-impedance extension speaker sockets. It is a permanent magnet model, with a nickel aluminium magnet of high permeability, giving a large magnetic density, and is of high sensitivity. Three tappings are provided, namely, 3,000, 6,000 and 9,000 ohms. The chassis is mounted in a handsome cabinet of wood with chromium relief, and the price is £2. 6d.

Edystone Split Stator Condenser

A NEW condenser has just been introduced by Messrs. Stratton and Co. and is shown in the accompanying illustration. This is a solidly-built component with heavy brass vanes with polished edges, all metallic connections being soldered to ensure the minimum of losses and a reduction in H.F. resistance. The bearings are additionally strengthened and non-inductive pigtail is employed to the moving section. The minimum capacity formed by the rotor and one side is 5 m.mfd., and the maximum capacity 40 m.mfd. With the two sides in parallel the minimum is 10 m.mfd., and the maximum 80 m.mfd. When used as a series gap component the minimum capacity is 3 m.mfd., and the maximum 20 m.mfd. The price is £12. 6d.

New Tungsram Valve

A SPECIAL valve which has been developed by the Tungsram company for the Post Office is now made available to the public. This is the type APP4g, and is a triple-grid output valve with an indirectly-heated cathode rated at 4 volts 2 amps. The maximum anode volts are given as 250 and a similar value is specified for the screen. The normal anode current is 35 mA, and the normal screen current 5 mA. This valve is ideal for television receivers and similar apparatus where a wide frequency band has to be handled, and the suppressor grid is brought out to a separate connecting point instead of being internally connected as is usual. With an output of 4.8 watts, this is a Class A output valve and is a triple-grid output valve with an indirectly-heated cathode rated at 4 volts 2 amps. The maximum anode volts are given as 250 and a similar value is specified for the screen. The normal anode current is 35 mA, and the normal screen current 5 mA. This valve is ideal for television receivers and similar apparatus where a wide frequency band has to be handled, and the suppressor grid is brought out to a separate connecting point instead of being internally connected as is usual. With an output of 4.8 watts, this is a Class A output valve.
Let Us Send You This 40-Page Booklet—Free

THE BRITISH LONG DISTANCE
LISTENERS' CLUB

W2XE Signal Strength

We have now received from Mr. Barrs his chart of the above station for September. He says that as he did not receive enough data on W1CCZ (14 m), he has not sent any report in of this. Here is his letter:

First of all, you will notice in the graph that W2XE was very powerful during the early part of September. I believe they increased power about this time, and I think it was due to conditions that W2XE became weaker during the last few days of the month. The aerials used were the same as for W8XK, i.e., inverted “L” type on the average. The average signal strength in N, S, E, and W were as follows: N, R5-R7; S, R6-R8; E, R3-R7; W, R5-R7.

The graph of W2XE prepared by Mr. Barrs for the peak period, 21.00 to 22.00 B.S.T. for September.

The graph shows the average strength of W2XE (19.65 m.) in Great Britain for the month of September, 1936, the time is the peak period daily, i.e., 21.00 B.S.T. - 22.00 B.S.T. That finishes the data for W2XE.

Now for the next test I would appreciate reports of LRU (19.62 m.), for the month of November, 1936, and W3MD (14 m) for the month of December, 1936, reports of both stations to be at my address, 4, King’s Road, Enham, Andover, Hants, by January 9th, 1937.

Local Branches

Several readers are anxious to form local branches of the B.L.D.L.C., and perhaps members living in the East Sheen district and in the Stanford-le-Hope district of Essex who are interested would get in touch with Mr. D. Jones, of “The Retreat,” Temple Sheen, East Sheen, SW14, and Mr. J. F. West, of “St. Austill,” St. James Avenue West, Stanford-le-Hope, concerning the proposed branches. A weekly or monthly meeting and a comparison of notes and exchange of ideas is, of course, one of the best ways of increasing knowledge and increasing the interest which may be gained from your hobby.

The Radio Club of Tenerife

Mr. C. MELLANBY, of Pwllheli, asks us to point out that his name was wrongly spelt in our issue dated November 14th, and sends the following correction concerning the call sign of the American amateur referred to in that issue:

This should be: W3JCY and not W2IHIQ, as the latter uses 70w SB Mikes -57-56-45’s.

A Correction

Class B XMTR: XTAL 6L6-6L6-P. S01’s. W3JCY is the ham who is putting up a special 5W antenna and would like it “noised” around in this country that he is carrying out tests at 16.30 E.S.T. (15.30 G.M.T.) on Saturdays and some days at 17.30 E.S.T. (16.30 G.M.T.) Sunday morning. His freq. is very close to 85 m. He should be received over here very well as I have had him confirm further reports I have sent him. He will QSL 100 per cent. G reports as well.

By the way, W3JCY is increasing his wattage to 70 from 60.

Station Checking

With regard to the scheme recently proposed and put into working by Mr. Barrs, another member has suggested that two stations be taken for checking purposes. He says:-

I think it would be a good idea to name two stations, one that is fairly well received in this country, and one that isn’t, thus providing for two types of listeners, one who don’t bother about chasing after elusive stations, and the other who’s never content unless he’s digging up something anyone else has never heard of.
The Croydon Radio Society

The Croydon Radio Society’s Gramophone Pick-up night is a well-established and popular feature among the programmes, and there was no exception on Tuesday, October 27th, in St. Peter’s Hall, Ledi bury Road, S. Croydon. The technical adviser was in charge of the comparisons, and a record of a heavy passage of an orchestra showed that no pick-up was going to have an easy time. An even sterner test than music was available, as the output voltages were measured at varying frequencies on a frequency record, and toward the end of the evening each curve was put on the blackboard and critically examined. For instance, Mr. Mason’s crystal pickup, after a slight peak at 200 cycles remained level to 2,000 cycles, then rose at higher frequencies. The technical adviser’s Magnetic model peaked at 200 and 4,000 cycles, and Mr. Roland’s had a very level response, if rather low.

Another short-wave evening took place at the Croydon Radio Society’s meeting on Tuesday, November 3rd, in St. Peter’s Hall, Ledi bury Road, S. Croydon. Mr. H. L. Pulman’s lecture-demonstration on “My Experiences in Short-wave Reception,” was given by Mr. R. P. Jonas, hon. librarian, as Mr. Pulman could not be present.

After admitting some short-wave disabilities, he stressed the romance of them in exploring the world, and went on to mention the various bands allotted to broadcasting and amateur transmitters. Mr. Pulman ventured to think that a separate receiver was best for short waves, and we spent a happy time discussing his early sets, leading up to his latest, a five-valve superheterodyne. Most members had long spells at the controls, and even on the strange aerial and earth, many stations were heard. The chairman, in thanking Mr. Pulman, said that his lecture, brimful of practical experience, was yet another example of good work having been done by an amateur. On Tuesday, November 24th, there was a lecture by “Amphion,” of The Croydon Advertiser, on “The Emotional in Music.”

Exeter and District Wireless Society

HAND capacity with short-wave receivers was the subject of discussion on Monday, November 2nd. Mr. A. T. Batten demonstrated his receiver (untuned H.F., det., and L.F., built on a baseboard), and explained how he laid, by careful thought and experiment, made it free of hand-capacity effects. The results were certainly excellent.

Mr. C. L. Wood (6SWY) also spoke and stressed the need for a good earth, and the control of H.F. He gave many valuable tips.

On November 23rd, Mr. Stanley Brown, A.M.I.W.T., of the Chloride Chemical Co., Ltd., lectured on “Modern Radio Batteries and their Operation.” All interested are invited to attend our meetings, which are held every Monday at the W.W.C.A., Dick’s Field, Southernhay, at 8 p.m.

The Cardiff and District Short-wave Club

At the last meeting of the above Club, held on November 8th, G8AM gave a description of his transmitter which was on view at the clubroom. The talk was thoroughly enjoyed by all present, and gave one a good idea what can really be done on low power, as G8AM used only 4.75 watts to work HB9AB one evening. More practices were again continued, and it was noted with interest that several persons were able to send and receive at speeds varying from twelve to twenty words per minute. These practices are being continued at all meetings, with sections for the beginner.

At the next meeting a talk will be given by the secretary, 2BQB, on “Artificial Aerials,” and this will be followed at weekly intervals with other lectures, and demonstrations.

International Short-wave Club (London)

There was an interesting demonstration of television reception at the London Chapter of this organisation on Friday, November 20, at 8.15 p.m., held in the R. A. C. S. Hall, Cavendish Grove, Wandsworth Road, S.W.8.

A copy of the “News Letter,” a booklet published by this Club at 2d. per copy, and containing interesting information for the short-wave listener, will be forwarded to any reader enclosing a 1d. stamp.

THE RECORD ALL-WAVE THREE

Again!

Two Jackson Bros. components, a three-gang condenser and the Horizontal Drive, have been chosen by Mr. F. J. Camm for his great new set, the "Record All-Wave Three." Mr. Camm knows that for faultless performance and unfailing reliability, components by J.B. are renowned the world over. You, too, must specify J.B. for your set, and you cannot fail to get good results.

The 3-gang condenser specified is the 'K' model (0005 + 00025 + 00025 mfd). Price 15s.

Horizontal slow-motion drive.
Cat. No. 2135. Type STL 9. Price 6½x6

CONDENSERS AND DIALS

JACKSON BROTHERS (London) Ltd.
79, St Thomas St, S.E.1.

TELEVISION, A GUIDE FOR THE AMATEUR. By Sydney A. Moseley and Herbert McKay. 144 pp., 50 line drawings and 31 plates. Price 5s. Published by Oxford University Press, London.

The principles of television, from the simple mechanical scanning systems to the modern electron image camera, are fully and simply explained in this interesting publication. In addition to all the main features, specialised details are given of the modern Baird and Marconi-E.M.I. transmitters, and details of the modern cathode-ray receiver and problems of light control are dealt with. The book is up to date and includes photographs of rehearsals in progress at the Alexandra Palace, and concludes with a short glossary of television terms.


This book is intended, firstly, to meet the requirements of all engineers who wish to become conversant with wireless practice, and secondly to cover the ground required by students who are preparing for university degrees and other wireless examinations held under the auspices of the City and Guilds Institute. It starts from the very beginning of the theory of radio communication explaining the principle of wave motion and proceeds steadily through the entire art, all the details of the work of the modern equipment, such as valves and special components, such as valves and operated tools and appliances; photo-cells, public address and talkie gear; microphones; measuring instruments; telephones; and switchgear. A leaflet enclosed with the sale list gives particulars and prices of a useful range of Morse-transmitting keys.

SERVICE AND PUBLIC ADDRESS

A HANDY booklet issued by Holiday and Hemminger, Holme Works, Doefield, Manchester, 3, gives particulars of their unique servicing activities in addition to their public address equipment. Their servicing department is fitted with modern testing equipment, and there is also a library of 10,000 circuit diagrams of English and foreign sets. Amplifiers, receivers, and microphones for public address have a line of their own, and gramophone recording units and accessories are listed, together with making transformers, valves and other transformers. A list of American Valves is also included in the booklet.
PRACTICAL AND AMATEUR WIRELESS

November 28th, 1936

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.

H. T. B. (Northampton). The adaptor in question may certainly be used with a battery valve. The sketch in your letter is correct. You may find it impossible to pick up the television programme at your address.

H. G. (Bath). If your tests are quite in order the coils must be responsible for the trouble. We presume you are quite certain of the switch connections.

J. H. P. (Messrs. Mullard) can supply you with the information and now make a special feature of this service as you will see from a recent issue of this paper.

T. G. D. (Catterick Camp). We have not tried out the circuit shown by you, but you will see a similar arrangement in the issue in the article "Unusual Circuits." The arrangement may work well, and reports from the country of origin show that the scheme is preferable to the standard one-valve arrangement. The reason for the improved signal strength in your other problem may be that instability arose when the earth was removed and this boosted the signal.

H. G. (Farnborough). The energising current should be adequate, but perhaps it would be worth while communicating with the makers of the set and receiving their approval of the scheme.

A. B. (Nantwich). Resistance Rs should be 50,000 ohms and Rs is 2,000 ohms. Rs is 100,000 ohms. Rs should, of course, be Rs. The arm of the volume control is connected to the Input terminal, not the metalised surface. We remark the errors, but, of course, the theoretical diagram should make it quite clear.

A. C. S. (Derby). We regret that we cannot insert requests for bulk numbers.

N. H. (Widnes). We cannot supply designs for individual requirements, and we have no blueprint of a unit of the type mentioned. We cannot recommend the operation of this receiver from the type of mains mentioned and suggest you wait for a design of a mains receiver which would be more suitable.

S. H. (Preston). We are not clear from your letter whether the trouble has always existed or has recently arisen. In any case, it appears to be due to the mains unit, and we suggest you try the set with ordinary dry batteries for a trial. We regret the errors, but, of course, the theoretical diagram should make it quite clear.

L. M. (New Walden). We cannot advertise for the particular unit mentioned in your letter. If you require these you should insert a small advertisement in our advertising columns, but we do not think that you would now be able to obtain the parts.

L. A. G. (Southminster). We regret that we cannot trace the address of the firm in question for the English Agents. The firm, of course, of German origin.

W. S. A. (Kirkby). We do not know which mains unit you are using, and therefore cannot advise definitely. You may, however, be over-running it as the current from the push-pull stage is on the high side and this, plus the remaining valves, may be more than the unit is rated to give.

E. T. M. (Kilmarnock). There should be no delay in obtaining the parts and Messrs. Pettis Scott can supply you with any further information.

V. D. (Cowdrey). We cannot recommend any particular unit and cannot give instructions for building one. There may be difficulty with hum when using the short-wave ranges unless a special unit is employed and this may mean that the circuit will require modification.

H. R. (Swansea). Our blueprint P.W.48A should prove suitable, but the issue describing the construction is now out of print.

J. W. H. (Bingley). Special arrangements are necessary when using a small H.T. unit with a Class B amplifier. A Neon stabiliser should be used, and the peak current of the amplifier should not exceed that which the unit will deliver.

E. G. P. (Liverpool). You can use the valve in a circuit of the type mentioned, but owing to the small amount of H.F. amplification there would be a very poor A.V.C. action. You could use the valve as a detector and then the present detector could be used as an additional L.F. stage. This will give louder signals and probably better quality due to the diode rectifier.

G. J. (Loughborough). The firm in question is no longer active and we cannot assist you to obtain a blueprint. We could not recommend any of our blueprints in which to incorporate the parts.

R. E. M. (Elston). We are not familiar with the servicing difficulties of commercial receivers and we suggest you communicate direct with the makers. There may have been a defect in the set originally, and perhaps the screen was shorting one of the connecting leads.

M. D. (Upton Park). You could add a further H.F. or L.F. stage, but there may be some difficulty due to the modified layout or from overloading. In such cases we do not favour the modification.

A. J. R. (Clacton on Sea). Perhaps you could give some indication of the type of interference you experience in order that we may recommend a suitable supplement or other device.

R. J. W. (Chatham). Our P.W.48A describes a unit which may be suitable, but you should consult the makers of your receiver whether a standard short-wave arrangement would satisfy you satisfactorily so that you only have one whistle suppressor or other device which will prevent satisfactory operation of a converter.

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A HEAD of their time—that's how we class this New Coil Units of ours. We sincerely believe that they will make a good deal of difference to any home-conceived set. And to build a set round one of the Nicore Units is to open the door to Radios' best. For your special benefit we have recently published four broad-spectrum circuit blueprints, which are giving excellent results with these ganged units. No. 1 (BP.111) Mains superhet for 110 K.C. No. 2 (BP.112) Battery superhet for 465 K.C. No. 3 (BP.113) 3-valve mains receiver with band-pass tuners. No. 4 (BP.114) S.G. Battery 3 with Pentode. You can have one of these blueprints (and they're really worth having) for 6d. (The BP.114 is 3d.) The postage is free.

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Send for free copy of "Eliminoise" leaflet.
Our All-wave Battery Sets : Mains Version

SIR,—Referring to R. Stagg's letter re all-wave battery sets, I, too, would greatly welcome a mains version.

A. V. GRAVES (Hounslow).

SIR,—I should very much like to endorse Mr. Stagg's suggestion. What we want is a good all-wave set for A.C. mains, with all the up-to-date refinements, and an output of about 4 watts. What about a "Super Beord All-wave A.C."?—BERNARD T. P. Wigg (Streatham).

SIR,—In R. Stagg's letter in PRACTICAL AND AMATEUR WIRELESS, I, for one, would like to have mains editions of your all-wave sets. I would suggest A.C./D.C., as such would be useful to every mains user, and also in view of the fact that there are still a very large number of districts still on D.C.; as in this district, for instance.—F. THOMAS (Ballards Lane, N.3).

Logged on our Two-valve Short-wave

SIR,—During the last few weeks I have seen two logs sent in by readers who have constructed the simple two-valve described in the issue for July 18th. I also made up this set, and I must report wonderful results. I am using the pentode output, and my home-made coils are 4-pin. The aerial is just an ordinary inverted-L, and can work with either 'phone or speaker. I am using an inside aerial in an east and west direction. In the past two and a half months I have sent out sixty-one reports to amateur stations and received thirty-five cards in return (about 57 reports have been sent out). Each report was complete, and here is where I cannot fully agree with Mr. E. de Colignies, of Bittrell's, in saying that he would greatly welcome a mains version. I list the following: Time of receptions, location (in latitude and longitude), elevation, make of receiver, type of aerial, giving its length, direction, type of feed in, and its length, weather conditions, signal strength, quality of signal, if any QSB, QRN or QRM, the approximate time of arrival if 'phone, or CW. In each report return postage is enclosed. I also report if he is heard frequently by me, or if he is talking to, and about that. Also, if there is fading, the strength of each transmission.

In my opinion, the reason so many SWL's do not receive very cards is the transmitter reads the report and puts it away and forgets about it until some time when he is not at home.

The popular receiver here is a 5-tube (or valve, as you choose to call them) superhet, with A.C. and B.F.O. By a switch I can go from 16.5 mega. to 545 kc/s, and can work with either 'phone or speaker. I am using an inside aerial in an east and west direction. In the past two and a half months I have logged seventeen different countries, in all the daytime.

What I am trying to do is this: to get a QSL card from each state in the U.S., including one from the capital district, Washington, D.C., also one from each of the eight districts in Canada, and the three in Mexico, on the 20 metre band. So far, out of a possible sixty, I have twenty-one returns, with fourteen more that have not yet sent a card. This brings my total up to thirty-five.

If there are any SWL's amongst your readers who do not have the QBA of American hams, and they care to send me their report, I will see that the report reaches the proper place.

I would appreciate it very much if any of your readers would drop me a line, as I would be glad to correspond with anyone I list anywhere throughout the English-speaking world.

CUT THIS OUT EACH WEEK.

Articles on Amateur Transmitting

SIR,—With regard to the letter of Mr. Owen in your November 14th issue, may I add my support to his view, and ask you to give articles and circuits for A.A. licence-holders and intending holders? I have wanted, for some time, to start amateur transmitting, but have been unable to obtain the necessary knowledge of the circuits and their working.—F. P. CASON (Southampton).

SIR,—I do not wish to discourage R. Stagg (Wood Green), but may I point out that there are hundreds of small crofts in Scotland where a simple-to-construct economical three-valve battery set would be welcome—anyone who knows the mind you. Such a set would, I think, be a winner.—W. SPENCE (Aberdeen, Scotland).

Back Numbers Wanted

SIR,—Since Mr. Ismay's reply to my letter I have received two more 'scalps,' as he so kindly puts it. One was from W6HCY, Charlotte, North Carolina, who wrote, "Thanks for your nice letter. Any time you hear me I would appreciate you dropping me a line."

The other was from PY2EJ, of Brazil, who writes, "Many thanks for your report and the most useful information you gave me."

If this does not prove that SWL's reports are appreciated, what does?—E. R. CLANE (London, W.)

An All-wave Superhet Converter!

SIR,—I was interested to receive in the October 10th issue details of the Add-on Superhet unit. This brings a mind to suggest a modification I have harboured for some time. There are undoubtedly many A.C. sponsored and commercial receivers in use of the tuned radio-frequency type which, if so selective as concerned, are comparatively poor, but so far as reproduction is concerned are satisfactory. Such receivers are owned by people who build out the box one because it is felt to do otherwise, and I think that an all-wave superhet converter would be much appreciated. This could be of a type which, in addition to medium and long waves, would tune from 16 metres to above 80 metres on the short waves. I offer the suggestion for what it is worth. There are, I know, difficulties, but think they could be overcome. I suggest mains and battery-operated types, and I think that a unit of this type, if covering up to 160 m., would also attract the amateur fraternity.—A. W. MANX (Middlebrough).

Simple Three-valve Battery Set Wanted

SIR,—I do not wish to discourage R. Stagg (Wood Green), but may I point out that there are hundreds of small crofts in Scotland where a simple-to-construct economical three-valve battery set would be welcome—anyone who knows the mind you. Such a set would, I think, be a winner.—W. SPENCE (Aberdeen, Scotland).

[Such a set will be described shortly.—Ed.]
Connecting Dipole Aerial

"I am going to use a dipole aerial but am not certain how to join the two ends of the feeder lead. Are these to be connected to the two aerial terminals on my set, or do I have to use a special connector?" — G. T. A. (Belfast)

THERE are special connectors for the purpose, but the only requirement for this type of aerial is that the ends of the feeder lead are joined to the grid coil. If your circuit employs an aerial coil coupled to the grid coil, then the ends of the feeder may be joined to the two ends of the aerial coil, in other words, to aerial and earth terminals.

If no aerial coil is in circuit, and the aerial and earth are joined directly to the ends of the coil, a small coupling coil should be wound and suspended either outside or inside the coil former to provide the required coupling.

A Dual-range Coil

"I wish to wind a Dual-range coil. I have two bakelite formers 5 in. long by 3 in. diameter across the ribs. Will you please let me know how many turns to put on and also gauge of wire for this purpose?" — D. E. W. (Ashdon)

It is difficult to give exact coil winding data in view of the fact that you do not state the type of coil you require. For a normal circuit we suggest you wind the medium-wave coil by winding eighty-two turns of 36 D.S.C. wire, and cut four slots at one end in which to wind the long-wave loading coil. This may consist of forty-five turns of 36 D.S.C. in each slot. These turns must be continuous and should be in series with the medium-wave winding. For reception the slot should be cut at one of these two sections and wound with sixty-five turns of 36 D.S.C. These turns must be continuous and should be in series with the medium-wave winding.

If no aerial coil is in circuit, and the aerial and earth are joined directly to the ends of the coil, a small coupling coil should be wound and suspended either outside or inside the coil former to provide the required coupling.

Winding Frame Aerial

"Could you let me know the measurements of the frame for the long- and short-wave windings for the blueprint H.17, as I am making my own cabinet and no mention of size is given on the blueprint?" — A. H. (Marrow)

It is not essential to build the frame to any particular dimensions, and as you are building your own cabinet you can make the frame to suit. It should, however, be made with sides 12 in. or more in length to obtain efficient working, and for the medium-wave winding 75% of wire should be used. For the long waves a total of 250 ft. are needed, the additional 175 ft. of wire being wound as a separate section spaced about 1 ft. from the end of the former winding. Generally the medium-wave section is wound with 22 or 24 gauge D.C.C. wire and the remainder with a finer gauge. A reaction winding may be wound in the intervening space, the position of this winding being found by experiment, as one quantity of wire has to serve both bands. Thirty feet of wire may be used and it may be slid about on the former to find the best position. It should be closer to the long-wave winding.

Megasycles and Kilocycles

"I have noticed in your Short-Wave Log recently a reference to me, which I am told by a friend stands for megacycles. I am not clear regarding the term and should like to know whether it is in any relation to kilocycles, and why the latter is nearly always given in your paper as kcs, whereas in American papers I have seen it written kc. Perhaps you can explain this difficulty for a beginner?" — D. E. B. (Dalwhie)

THE terms referred to are the frequencies of the various stations referred to. As you probably know, the carrier-wave of the station consists of an oscillation, superimposed upon which are the speech or music oscillations. Thus to tune a station, the tuning circuit in your receiver must be adjusted to the same period of oscillation. There are two ways of measuring this oscillation, one by measuring from the top of one crest to the top of the next, and the other by counting the number of waves in a second. The former measurement gives the wavelength and the latter the frequency, and you will see that the time factor must be taken into account in this measurement, as otherwise the frequency will be taken as zero or anything. Consequently, a wavelength of 300 metres is equivalent to a frequency of 10,000 megacycles per second, or 10 megacycles per second. One kilocycle equals 1,000 cycles and 1 megacycle equals 1,000 kilocycles. The abbreviation for per second is kcs, but the abbreviation for megacycles per second is kc.

Variable I.F. Transformers

"I have an old pair of I.F. transformers in which the primary and secondary coils are wound on bakelite bobbins mounted on a pillar and they can be moved in relation to one another. At the bottom of these transformers there is a lever on each side for adjusting the trimmer condensers. Can you tell me the correct position for the coils and how the levers work?" — J. Maedt (Belfast)

THE upper coil of the two referred to may be placed close against the lower one or taken right to the top of the supporting pillar. In the latter position selectivity will be best, but making the signal strength will be very weak due to the poor coupling. On the other hand, when the coils are close together the coupling is strongest and selectivity is thus less, but it is not necessary that this will give the greatest signal strength. The two levers will increase the capacity of the trimmer when pulled in a clockwise direction looking down on the transformer. A position roughly in the centre should be taken and the levers then moved to either side in order to balance the various circuits.

Failing Valve

"I have had my mains set now for eighteen months, and I have now noted that volume has fallen off since it was first installed. What now happens when I switch on is that there is a slight hum for a few seconds and then a ringing and sort of tearing noise for a time before volume comes up. Then generally as soon as it is nearly loud enough it dies away again for a second or two and then comes back again as at first. Can you tell from this what is wrong and how to remedy it?" — E. D. (Aberdeen)

THE trouble will almost definitely be found to be a failing rectifier valve in the mains section. If you listen near this whilst the set is heating up you will no doubt find that the ringing and tearing noise mentioned may be actually heard near the glass bulb.
Practical and Amateur Wireless
BLUEPRINT SERVICE

Three-valve : Blueprints, 1s. each.

Four-valve : Blueprints, is. each.

PORTABLES.

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MISCELLANEOUS.

S.W. Converter-Adapter (1 valve).

AMATEUR WIRELESS AND MECHANICAL CRYSTAL SETS.

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Mains Operated.

Two-valve : Blueprints, 1s. each.

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Main Switch : Blueprints, 1s. each.

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