

NEW IDEAS FOR HOME-BUILT SETS

Amateur Wireless

Every
Thursday 3^d

and
Radiovision

Vol. XVI. No. 403

Saturday, March 1, 1930

The "TWIN" BROOKMAN'S BY-PASS

FULL
DETAILS



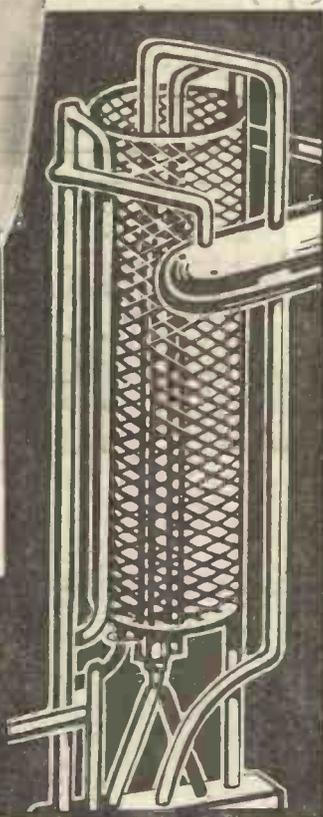
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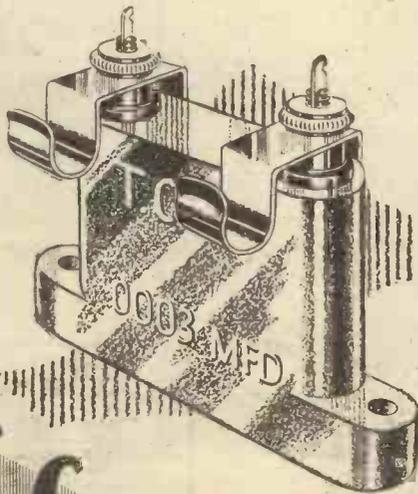
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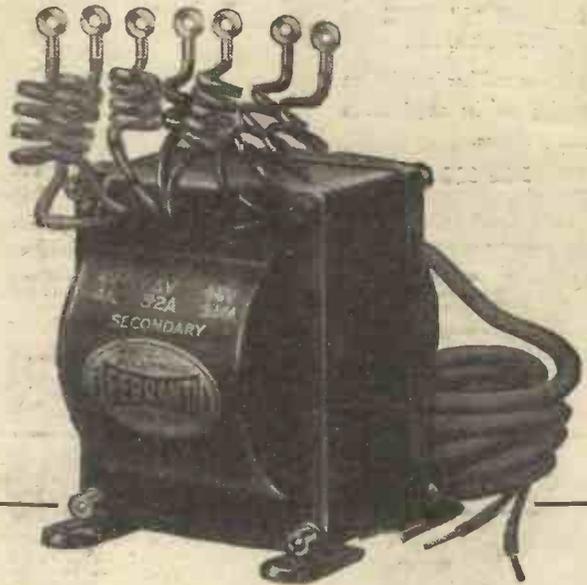
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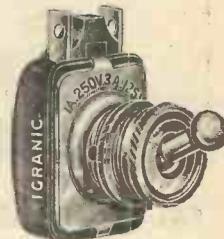
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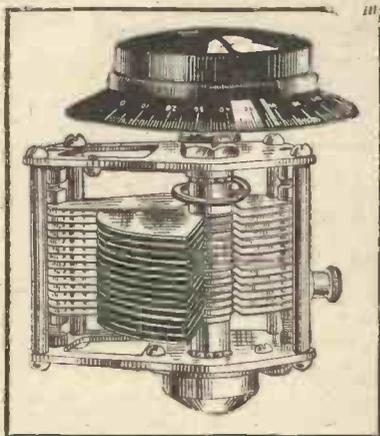
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MARCH 1, 1930

No. 403. Vol. XVI

Amateur Wireless and Radiovision

The Leading Radio Weekly for the Constructor, Listener and Experimenter

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How Do You Find It?—Those "Noises Off"—Part Songs, Please—'Phoning to Ships at Sea—The Vacant B.B.C. Chair—A New "Clarion"

How Do You Find It?—What is your reception like, these days? There are "big things" doing in the ether at present; the "B.P.'s" in this country are causing a commotion, and some of the foreign stations are constantly shifting their wavelengths and altering their power. And summer is approaching, which generally means weaker signals. Why not send AMATEUR WIRELESS a line so that your reception log can be compared with those of other readers? What is needed is not long lists of station names, but interesting facts and comparisons. This isn't a prize competition, but your experience will be appreciated by the other man!

Those "Noises Off"—General Motors, Ltd., have been doing some "top-gear" tests with a well-known car up Savoy Street from the Embankment to the Strand. This is a steep incline by the side of the B.B.C. building, so if you hear any buzzing "noises off" during a broadcast you'll know that it's the motor merchants at it again! But please don't take this leg-pull too seriously, for the studios are immune from street noises nowadays (though there was

some such trouble about a year ago), and of course these cars don't make any noise, anyway!

Part Songs, Please—If a vote of broadcast-item popularity were taken now, there is not much doubt but that, while talks would be at the bottom, good rousing songs and part songs would be somewhere near the top. So particular interest attaches to a broadcast on Wednesday next of part of the concert of an internationally-known London male-voice choir, the Lothbury. If you like "Bobby Shaftoe" and similar old favourites, then you will at least like this broadcast.

'Phoning to Ships at Sea—It isn't yet possible to lift the telephone and ring up a ship at sea, but it is possible when on board the liner *Majestic* to speak by radio and land-line telephone to all ordinary exchanges on land. Following on successful tests with the *Majestic*, which left Southampton for New York last week, a service has now been opened between the ship and telephone subscribers in this country. The service is somewhat experimental, and for

the moment it is available only for calls originating on the ship, although it is hoped to extend it on the next voyage to calls originating on shore. Rugby is used for transmission to the ship and the Baldock station for reception. These stations are connected with the London Trunk Exchange, where the service is controlled. The service will be

available for any ship on the north Atlantic route which is fitted with any suitable type of set.

The Vacant B.B.C. Chair—As we went to press last week it was announced that the Earl of Clarendon will, next January, vacate the chairmanship of the B.B.C. for the appointment of Governor-General of the Union of South Africa. We wish him the best of luck in this change, and he will carry with him the thanks of all listeners for the good work he has done for broadcasting. He has held the B.B.C. chairmanship since 1927, and this post carries with it a salary of £3,000 a year.

A New "Clarion"—What a wave of popularity was caused by our old friend the "Clarion 3"! Next week's issue will give details of a revised and up-to-date version of the "Clarion," and the "1930 Clarion 3" may turn out to be just the kind of receiver for which you have been looking. It certainly will ensure good reception throughout the long summer months, when bad reception conditions are a trial to all but the best sets.

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A "bird's-eye" view of the rapidly-growing new London B.B.C. headquarters. Work is being done night and day

NEXT WEEK: THE "1930 CLARION 3"—A New Edition of a Famous Set

The "TWIN" By J. H. REYNER, B.Sc., A.M.I.E.E.

BROOKMAN'S BY-PASS

CUTS OUT BOTH BROOKMAN'S



TRANSMISSIONS

I HAVE described in previous articles how the "Brookman's By-pass" may be used to tune to both the Brookmans Park transmissions. Two entirely separate by-passes are used, one tuned to each circuit, and it is found that the tuning adjustments on the two by-passes are quite independent.

An arrangement such as this may be made with two standard "Brookman's By-passes" or, if desired, a special twin by-pass may be made up. Such a device is an indication of what can be done in this direction.

The circuit of the arrangement is shown by the diagram, from which it will be seen that there are two by-pass circuits arranged in parallel. Each circuit is identical as far as its general arrangement is concerned. We have a standard "Brookman's By-pass" coil with windings arranged thereon and the necessary connections taken to these windings by means of crocodile clips. In series with each coil is a variable tuning condenser, the setting of which is adjusted to give the appropriate tuning for the wavelengths to be eliminated.

In making up this particular by-pass, slightly cheaper condensers have been used in order to cut down the expense. These condensers are of the paper-dielectric type and have a maximum capacity of .0005, just

as in the original "Brookman's By-pass." They take up considerably less space, however, and altogether result in a somewhat neater job.

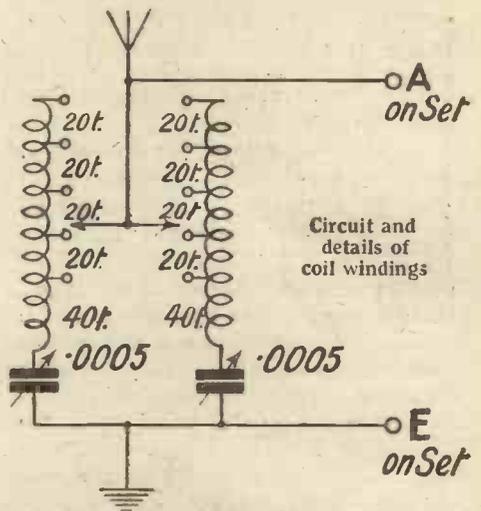
How the "Twin" By-pass is Used

Both of the by-passes are connected across the aerial and earth circuits exactly as in the previous instance, each one being independently adjusted to the wavelength to be eliminated. Thus, in the case of Brookmans Park, we have wavelengths of 356 and 261 metres to contend with. First of all, disconnect one by-pass completely by removing the crocodile clip from the windings on the coil. This leaves the other by-pass in circuit and the appropriate tapping should be chosen, having regard to the conditions under which the trap is to be used. That is to say, the closer one is to Brookmans Park, the smaller the tapping which must be used for the desired results.

Let us assume that tapping No. 3 is the most suitable, this being the general average for the greater part of London. Tune in the receiver to the 356-metre transmission and then adjust the by-pass with the appropriate condenser until the signal strength is reduced to a minimum. As I have previously pointed out, it is not desirable to eliminate the local station completely, but to cut down the strength to that corresponding to a normal station, so that it tunes out within a few degrees on either side of the actual resonance point. The tapping on the coil should be chosen to give this effect.

The second by-pass should now be connected in circuit, leaving the first by-pass connected up (do not disconnect it). Tune the receiver to the 261-metre programme and adjust the second by-pass in exact-

ly the same way. It will be found, of course, that the setting of the condenser to tune the second by-pass will be distinctly lower than on the first, owing to the smaller wavelength. Once this has been done, the two Brookmans Park transmissions will have been safely "put to bed." On tuning



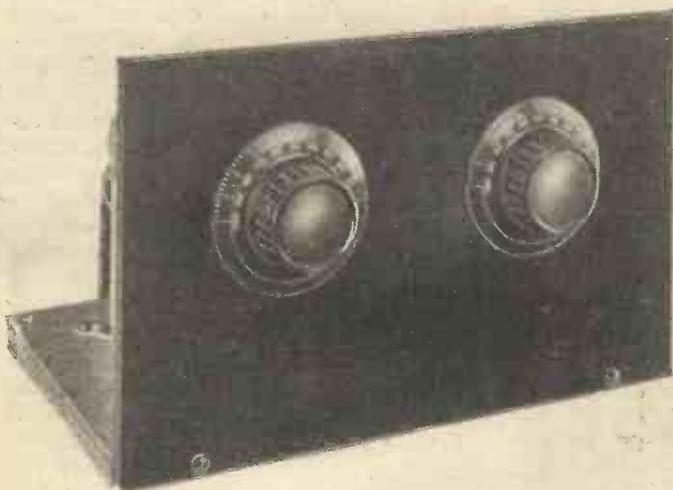
Circuit and details of coil windings

the receiver, they will come in like normal stations, but will not cause any further interference, nor will near-by foreign stations be found to be seriously affected, this being the most important property of this by-pass arrangement.

Tuning

The two operations may be carried out at different times if desired. In fact, it is perhaps convenient to adjust one by-pass to the 356-metre transmission during the earlier part of the evening when the 261-metre programme is not in operation. The adjustment on 261 metres may then be made later and this will avoid any confusion between the two. The instructions just given do not apply only to this particular form of combined by-pass described here, but are equally applicable to the use of two "Brookman's By-passes" of the original single pattern joined up in parallel, as described in earlier articles.

It should, perhaps, be emphasised once



Note the simple character of the "Twin" By-pass

again that the "Brookman's By-pass" should not be used with a circuit in which the aerial is connected directly across the whole coil. Arrangements should be made in this instance to isolate the aerial circuit by inserting a condenser of .0001 or .0002 in the aerial lead. This will minimise the variation in the tune of the receiver occasioned by the introduction of the by-pass; more particularly when receiving on the long waves.

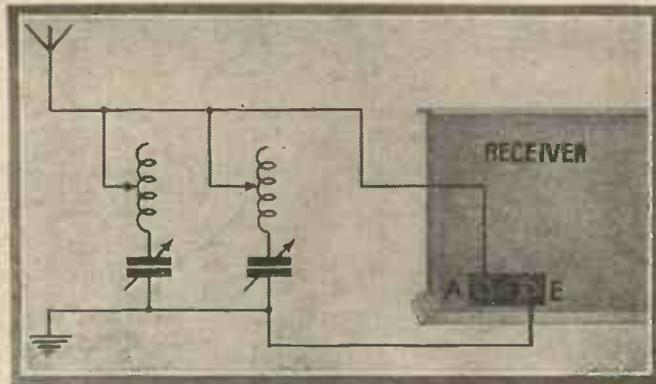
With the majority of circuits of to-day, however, the aerial is not allowed to operate across the whole coil. Either a tapped or coupled aerial arrangement is employed, or the aerial is taken through a .0001 condenser direct to the grid end of the coil. In any of these three instances, the "Brookman's By-pass" will operate with

pass, this is extremely simple. Two standard "Brookman's By-pass" coils are required and these may either be purchased from one of the various firms who are making them, or the coils may be made up according to the standard specification. For the benefit of those readers who have not the original article, this specification is repeated herewith.

The coils should be wound on a 2½ in. diameter former, of Paxolin, Pirtoid, or some similar high-grade insulating tube. A small hole is drilled at one end of the former to anchor the wire and then 40 turns of No. 26 d.s.c. wire are wound on. At this point a tapping is taken on the coil which may conveniently be done by twisting the wire for about ½ in. and allowing the twist to stand out from the winding. The winding is then continued in the same direction and a further 80 turns are wound on, tapings being taken at every 20 turns so that the whole coil contains 120 turns with tapings at 40, 60, 80, and 100 turns. A small block of wood is mounted in the base of the coil to enable it to be screwed to the baseboard and this completes the coil assembly.

The two variable condensers are mounted on the panel, single-hole fixing being all that is required. In wiring up, a lead is taken from the bottom of the coil to the fixed plates of the appropriate condenser, while the moving plates of each condenser

go to the earth bus-bar running between the two earth terminals. The aerial bus-bar, which connects the two aerial terminals, is connected to the two flex leads which terminate in crocodile clips. These clips are connected to the appropriate tapings on each coil as already described.



This picture shows how the "Twin" By-pass is used

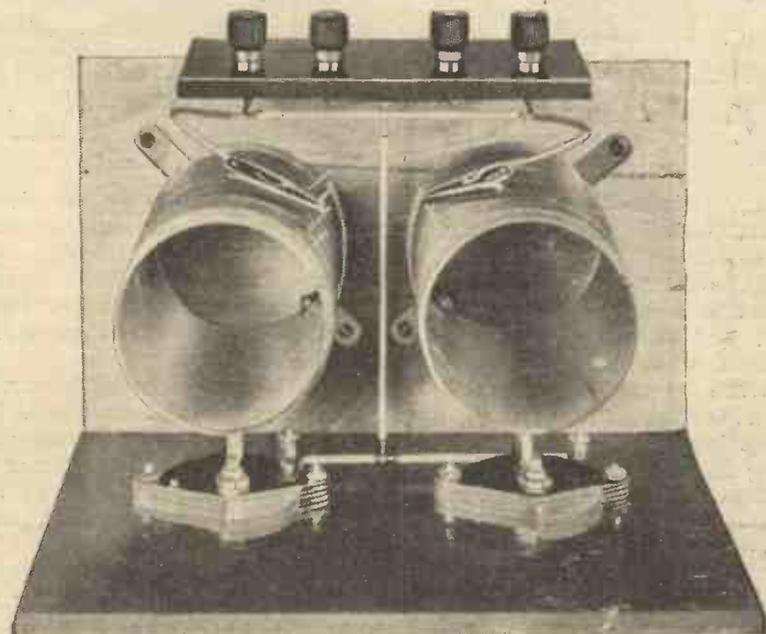
The only point to be observed is that the 40-turn section of the coil should be at the bottom end nearest the baseboard, so that when the crocodile clip is placed on the first tapping, there are still 40 turns in circuit.

COMPONENTS REQUIRED

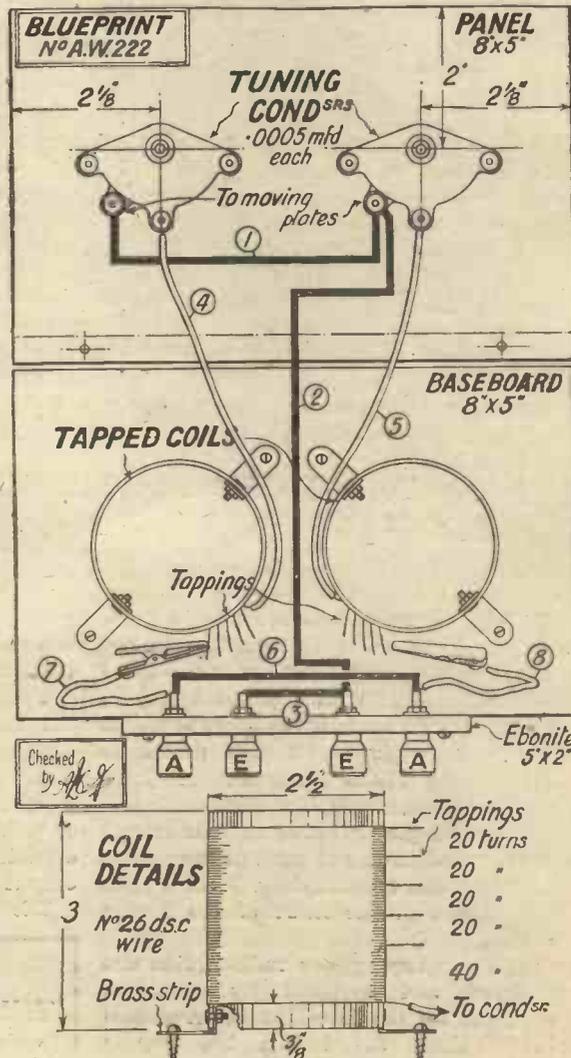
- Panel 8 in. x 5 in. (Trolitax, Camco, Lissen, Trelleborg, Becol).
- Terminal Strip 5 in. x 2 in.
- Baseboard (Pickett).
- Two .0005 midget condensers (Harlie, Ready Radio, Graham Farish).
- Two standard "Brookman's By-pass" coils (Ready-Radio, Harlie, Wright & Weaire, Keystone, H. & B., Parex, Watmel), or alternatively :
 - 2 Formers 2½ in. diameter, 3 in. long (Pirtoid, Paxolin).
 - 3 oz. No. 26 d.s.o. wire (Lewcos).
 - 2 Crocodile clips (Bulgin).
 - 2 Aerial and 2 Earth terminals (Belling-Lee, Ealex, Clix).

perfect satisfaction and will not alter the tuning, even on the long waves, by more than a few degrees; an extensive re-calibration of one's receiver is, therefore, not necessary.

With regard to the construction of the by-



This plan view studied in conjunction with the wiring diagram will make the construction quite clear



Wiring diagram. Blueprint available, price 6d.



THE MOST POWERFUL BROADCASTING STATION IN EUROPE

The pictures show : (1) The 300 ft. masts. (2) A part of the tuning system. (3) The crystal-control apparatus. The low-voltage rectifier is shown at the left and a water-cooled amplifier stage at the right. (4) The control room at the transmitting station at Santa Polomba, which is connected by wire to the studios in Rome. (5) Interior of the transmitting station at Santa Polomba.

ITALY became a leading factor in European broadcasting last month when one of the most powerful stations in the world was inaugurated with a programme from the famous La Scala opera house in Milan. The opening broadcast was personally directed by Pietro Mascagni, the noted composer of the opera, *Cavalleria Rusticana*. The transmitting plant of the new station is located at Santa Polomba, a little suburb of Rome, and connected by direct wire to the studios in the heart of the Italian capital.

This new super-power radio station was designed and installed by American engineers for the Ente Italiano Audizioni Radiofoniche, the Italian broadcasting company. Programmes of entertainment and news bulletins are to be broadcast

regularly and it is expected that the strong voice of Mussolini will be heard frequently in public messages.

The new Radio-Roma station represents the last word in broadcast transmitter development, and embodies some outstanding advances in American radio technique. While the new station is rated at 50 kilowatts in the aerial, the station is capable of reaching a peak of 200 kilowatts output during transmission.

The Roma station is the only one out-

side the United States to use 100-kilowatt transmitting valves. Constant frequency is maintained by crystal control.

The La Scala opera house has been wired with microphones, and it is planned to make broadcasts from this well-known seat of opera a regular feature.

All Italy is most enthusiastic over the quality and power of Radio-Roma. The 100-kilowatt valves have proved fully able to stand the enormous power during the modulation peaks and listeners more than 1,000 miles from Rome report clear, powerful and constant reception.

NEXT WEEK :
THE "1930 CLARION THREE"
A FAVOURITE BROUGHT
UP-TO-DATE

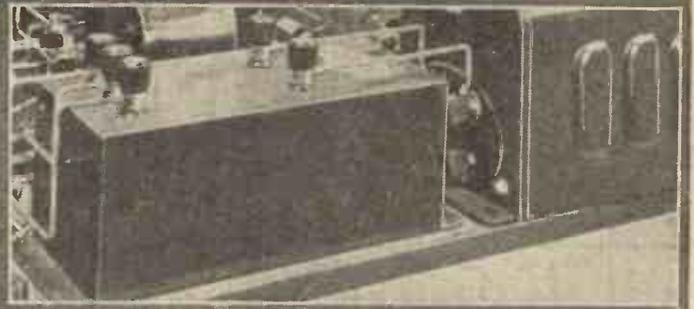
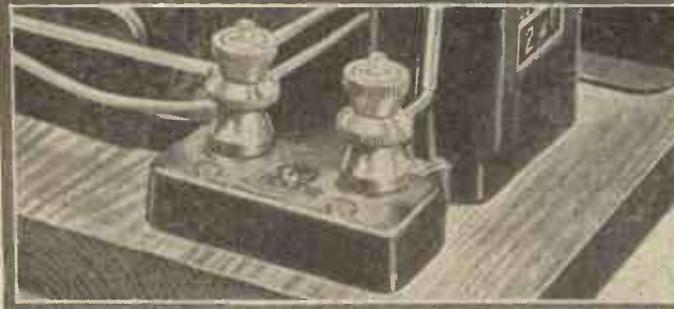
Realising the value of radio weather and crop reports to French farmers, the Ministry of Agriculture has increased its radio budget from £20,000 to £400,000.

A CHANCE remark by a corner-carriage man on the 9.15 "up," namely, that radio-set making compares with cross-words and "spotting the lady," for sheer difficulty, left a nasty impression. There are some men like that. They glance at a blueprint or peep inside a set and then snort at the possibility of their ever making anything like it; which is

Why place the panel at right angles to the board? There are variable-angle panel brackets now to be had which allow the panel to be inclined at any angle. A very slightly sloping panel gives that distinctive air to a set, and it makes tuning easy because the dials can be more easily read without the necessity for stooping over the set. There's no need to have the angle of

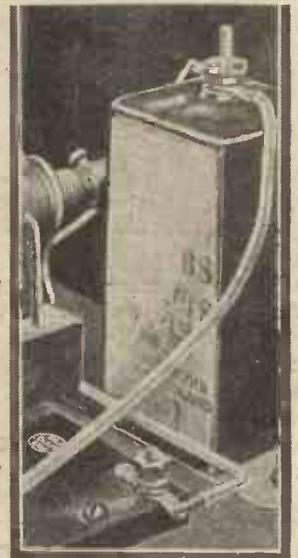
and if the whole is sloped, the set is "easy to look upon," to use an Americanism. One or two commercial set makers do this very effectively.

A good idea is to cover an ebonite panel with fairly stout copper foil, and this gives a good appearance to a receiver having a mahogany cabinet and brown-grained dials. But do be careful to *cut away the foil under*



NEW IDEAS *for* HOME-BUILT SETS

Here in this article are many novel ideas for all home-constructors. These photographs are fully explained in the text. Briefly, they illustrate the use of a "power box" or filter compact instead of separate chokes and condensers, a midget biasing cell for H.F. valves, a back-of-panel meter, and a pair of multi-connection terminals



really a very inglorious retreat from that delightful individuality of action which should be the lot of every handy-man-about-the-house!

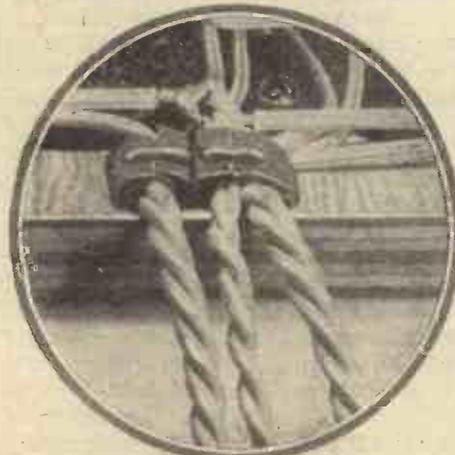
There are now on the market many gadgets and new ideas which have resulted in home radio construction being a matter of less than an hour, even for a three-valve set; not that it is ever advisable to hustle in such matters, but a measure of time does show how simple is the whole process.

The first step is to have the panel as simple as possible. Why? Because many knobs are confusing, both for the lady of the house, and for the "expert" (father), and also because a panel with only two knobs looks tidier and more up to date than one with ten. There is another reason, too, and it is that ebonite is soft stuff to drill but the average non-mechanical man fights shy of drills and prefers fixing things to a wooden baseboard with the harmless screwdriver.

If there are two variable tuning condensers, then doubtless they can be ganged, and the modern gang-control condensers are complete in themselves and are fixed by one or two bolts only through the panel.

inclination too great, or you'll make back-of-panel wiring difficult.

Nor is there any need to make the panel the real front of the set. A wood surround, having an oval hole cut in it through which the centre portion of the panel and the knobs can be seen, can be arranged to cover a portion of the front of the panel,



Terminals need not always be used. H.T., L.T. and G.B. leads can be twisted into groups and connected direct to the batteries

the dials so that it does not touch the spindles of the panel parts.

Of course, you know that on many occasions when a set is working badly the snag can be detected if a meter is handy. The latest idea is to have the meter (generally one of the triple-purpose type, measuring milliamps. and H.T. and L.T. voltage) actually in the set itself. However, there's no need to put the meter on the panel, and the only reason that this fashion arose is that meters were once about twice as expensive as they now are, and purchasers of them wanted the neighbours to know.

Joking apart, a good triple-purpose meter is very handy, and can quite well be mounted on the baseboard at the back, near the battery connections. Generally you will only need to glance at it when adjusting the H.T. and G.B. If it is mounted on the panel, then it may be necessary to hack out a 3-inch diameter hole, and this isn't easy work for a novice. Panels *do* crack.

The volume control should be on the panel front, though. Preferably you should have two volume controls, one before and
(Continued at foot of next page)

GRID LEAK OR ANODE BEND AS YOU PLEASE

GRID or anode rectification? The respective merits of the two systems have been fully discussed in the pages of this journal, and it is not within the scope of this article to inquire again into the question. It has been shown that for the

enable the change to be made, but undesirable capacity effects would be introduced where they are least wanted. In the arrangements described in this article, these disadvantages are overcome.

Fig. 1 is a diagram of a simple type of two-valve circuit into which this idea is introduced. A short flex lead fitted with a Clix or other type of plug is taken from the grid terminal of the detector valve, while the grid leak and condenser is fitted with two sockets A and B. The grid leak and condenser can by this means be put in or out of circuit. A flex lead also fitted with a plug is taken from the earthed side of the tuning coil and can be plugg-

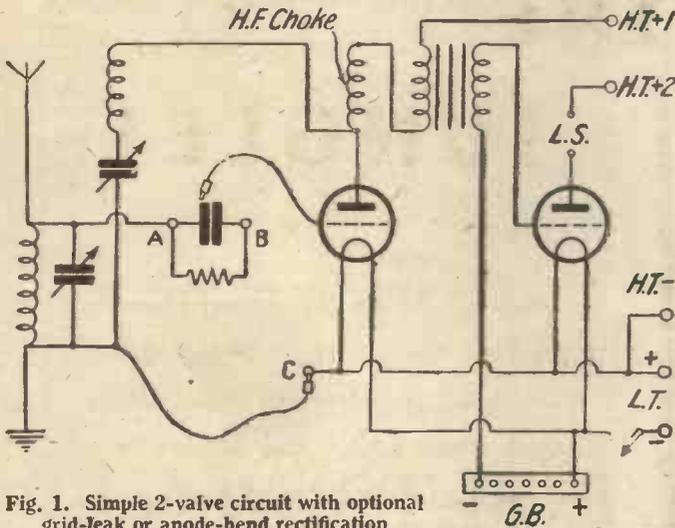


Fig. 1. Simple 2-valve circuit with optional grid-leak or anode-bend rectification

sensitivity necessary for the reception of distant stations, rectification by means of grid leak and condenser is to be preferred, but that for purity of reproduction, particularly for the reception of signals from a near-by regional transmitter, an anode rectifier, properly adjusted, is the better.

An ideal all-round receiver, then, should include the means whereby either of these two systems can be used at will with a minimum of trouble necessary for the change over. Such an arrangement could easily be fitted up by means of a switch to

ed either into socket C which is connected to the L.T. + or into the grid-bias battery.

When the grid lead is plugged into B and the earth lead into C, grid rectification is obtained.

Anode Bend

By plugging the grid lead into socket A and the earth lead into the grid-bias battery, the necessary negative bias is given to the

grid of the detector valve and the valve then functions as an anode rectifier. Suitable values of high tension and grid bias must, of course, be used.

Fig. 2 shows the detail of the arrangement. The grid leak and condenser is of the type which is fitted with terminal connections. In place of the terminal heads are fitted two valve sockets of the type which have tapped sockets, instead of tapped shanks at the base. When using a grid leak and condenser with soldering tags, two valve sockets may be mounted on a small ebonite platform and connected to the grid leak and condenser.

The writer has, with success, used this arrangement for some years and his set (two valve, detector and L.F. amplifier with throttle-controlled reaction) gives pure signals from the London regional transmitter and is also used for the more distant broadcasting stations. That no undesirable

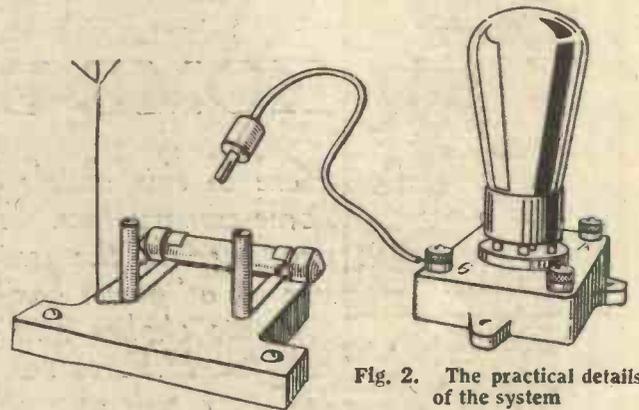


Fig. 2. The practical details of the system

capacity effects are present is demonstrated by the fact that the set will tune down to 15 metres.

E. T. B.

“NEW IDEAS FOR HOME-BUILT SETS”

(Continued from preceding page)

one after the detector. The “why” of this is that some of the locals are now so loud that the detector valve may be overloaded; a filament rheostat in the screen-grid valve L.T. circuit is the easiest wheeze. The second reason is that of course you use the set for gramo-radio, and a volume control on the low-frequency side is essential for this. A high-resistance “pot”—a potentiometer of 50,000 ohms to one megohm—is required for the L.F. strength control.

Don't bother about keeping the grid-bias battery outside the set. All the best sets have the G.B. inside the cabinet, and sometimes the panel brackets are made in the form of battery clips.

While the matter of G.B. is under consideration, don't forget to put one of those little single 1½-volt dry cells in the grid circuit of the H.F. valve. Most screen-grid

valves work better with a little negative bias.

Perhaps your set has, or will have, a wave-trap in it, particularly if you are inside the Regional circle. If so, do be careful to keep the wave-trap coil well away from the aerial or H.F. coils. The new tuning coils available have a very small external field, and so you won't need elaborate shielding.

The new idea is to use as few terminals as possible, and to take flex leads (bunched together for neatness) direct from the respective components to the H.T. and L.T. This is quite a good idea provided you use proper wander plugs, and the leads are clearly marked; but you must use terminals or sockets for the aerial and earth, and preferably also for the loud-speaker. Anyway, keep all the terminals at the back or at the sides. Terminals on the panel front are absolutely *verboten*, for this fashion prevailed in 1923!

Wiring is still done, as formerly, with rigid wire; but it is frequently easier to

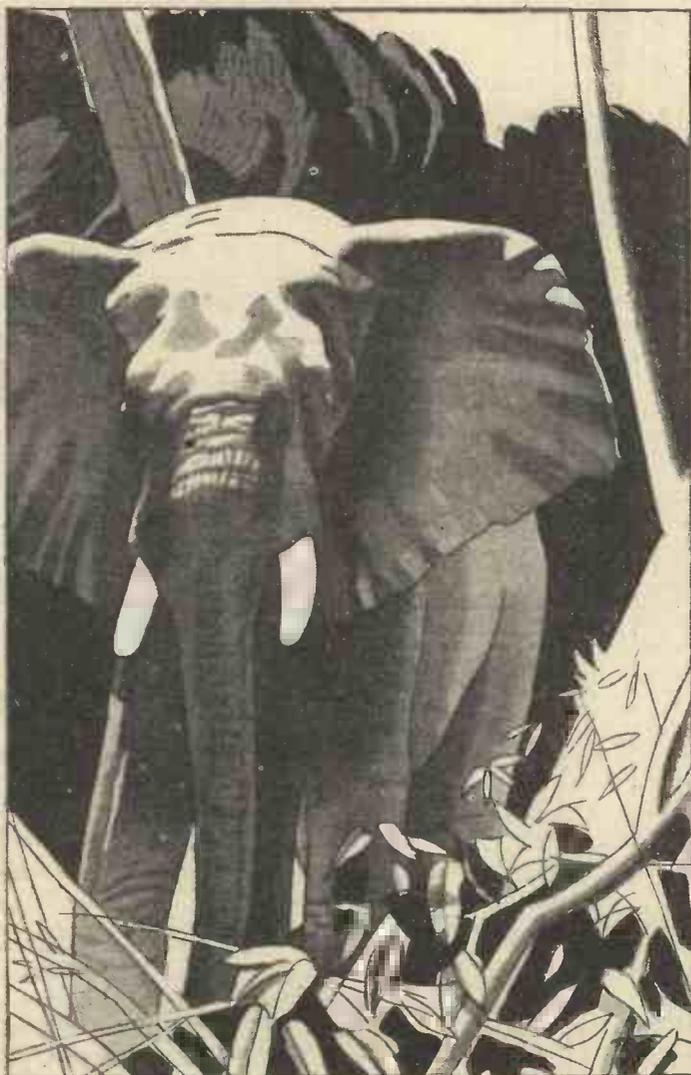
use rigid insulated wire rather than to slip insulated tubing over lengths of bare rigid wire. Always solder; this is not a new idea in construction, but a practical tip which has been put to test since the early days of radio. The point is that you can always trust a well-soldered connection, but the electrical efficiency of a screw-down joint depends on all manner of variable factors.

If the mains are to be used for H.T. or L.T., or both, then why go to the trouble of buying all the “smoothing” components separately, and of wiring them up? Blocks of mains components—containing condensers and chokes—are now available, and they have only five terminals instead of about twenty. Power boxes and filter compacts are a boon to the mains users.

KENNETH ULLYETT.

A new broadcasting station has recently been opened in Honolulu. It operates on 319 metres and the call-sign is KGU.

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On Your Wavelength!

A Change of Ether

A CHANGE of air and surroundings quicken the pulse and broaden one's outlook. It is difficult, however, for a confirmed radio fan like myself to get away from radio. Nevertheless, when one finds oneself far, far away from the nearest "local" station the radio outlook is no longer the same and the process of tuning-in various stations under new and strange conditions has a fascination of its own. I had occasion to travel northwards a few days ago, and I took advantage of several opportunities of trying out receivers in various localities.

Up in Lakeland

After spending a night at Manchester, I proceeded northwards to a spot on the border of north Lancashire and Westmorland, where there happens to be the country residence of one of my relatives. This particular spot, at the south end of Coniston Water, is situated amid most magnificent scenery, which bristles with mountains, tarns, heather—and wireless aërials. That is to say, every little farmhouse and cottage seemed to possess its aerial. I had brought a portable receiver up with me. I needn't have bothered to do so as there was radio on tap wherever I went. And no wonder! The reception conditions seemed to me to be ideal for any set with fair sensitivity and average selectivity. It reminded me forcibly of the observations made in these columns over a year ago: that the site of the B.B.C.'s official receiving station should be in north-west England. At the time I mentioned Kendal as being a good location, this town having the reception advantages of the district and, at the same time, being situated close to the trunk telephone lines communicating with all B.B.C. stations.

Good Reception

You may ask, just what is it that makes me think Westmorland the "star" county for radio reception in England. The greatest advantage of the district is its distance from busy shipping routes of the English Channel and the North Sea. Badly tuned ships' spark transmitters, broadly tuned shore stations working with ships, mush, and harmonics from commercial long-wave radio-telegraph stations and general man-made static, are always with the radio listener in the south of England. Northolt, Leafield, Rugby, North Foreland, Rame Head, Seaforth, Newhaven, and Cullercoats are typical commercial and Government stations in various parts of the country which give the local listeners a good deal of trouble. There is no station of this type in or near the county

of Westmorland. Heysham Harbour is the nearest commercial station, and this seems to give little trouble.

Now, then, given a beautiful mush-and-sparkless ether, what broadcasting do we find there? All the British stations come in loudly and beautifully spaced around the dials. Some are louder than others, of course, and the relative strengths seem to vary on different receivers in the same district. This difference is probably due to partial screening effects of some of the mountains and hills. London regional stations came in with a terrific "bump," and even in the daytime seemed louder than Manchester, the nearest local station. Langenberg, Radio-Paris, Hilversum, and the Continentals were all good, too, and fading effects were not noticeable on the long-wave stations.

Manchester

From all accounts, the radiation of the Manchester station is no better than it ought to be and not so good as it might be. Situated in the centre of the city, with the transmitter about a hundred feet above the ground, and using a fan-shape counterpoise earth, the arrangements at the transmitting station (including the choice of the site) strike rather a mediæval note. With the exception of Edinburgh, the site chosen for 2EH, I know of no worse situation for a radio transmitter. However, I won't rub it in. The B.B.C. is about to dispense with the services of both transmitter and site; Moorside Edge (*nee* Slaithwaite) will take its place.

B.B.C. Sites

Talking about the sites for transmitting stations, one cannot help marvelling at the old policy of the B.B.C. in erecting their transmitters in the centres of towns. This was rendered necessary by virtue of the "crystal-set service" for which it was designed. In some towns the best of a bad job had to be made of the hanging up of the aerial, and, considering the difficulties, the results have been creditable. Usually the aerial was suspended from the highest chimney stack near the centre of a town. In some cases that chimney was not very high, and in others the high chimney happened to be in a place with a bad earth.

Baynham Honri, who was responsible for the erection of the relay stations (and who frequently contributes to our columns), has waxed reminiscent about the difficulties he encountered. Dundee, he thinks, has the finest "chimney stack" aerial and is also blessed with a good earth. And Edinburgh has the worst. The aerial at 2EH is almost wholly screened by surrounding

buildings and the "earth" is rock. Practically no radiation could be obtained using copper-plate or water-pipe earth, and a complicated counterpoise had to be erected. And, to make things a little more difficult, the station had to be got going within a very short time, leaving few opportunities for experimental work or theorising. These bad old days are over now, however, and the B.B.C. transmitters of the future are destined for the wide, open spaces.

The Law's a Hass!

As matters stand at present, there seems to be no legal remedy against those who cause interference with the reception of broadcast programmes by means of machinery which, for want of simple chokes and shunting devices, broadcasts a medley of unpleasant noises. There are many kinds of electrical apparatus which can cause trouble in this way. Fans, vacuum cleaners, sausage machines, X-ray apparatus, talkie-film plants, trains, trams, and flashing signs are amongst the possible sources of interference.

In Other Countries

In several foreign countries legislation has been introduced which makes it a punishable offence for anyone to run any kind of electrical apparatus in such a way that it causes interference with broadcast listeners. In our country, though, the laws have not been brought up to date, and it is held that there is no existing enactment to cover this new development. I rather wonder, though, whether even the existing Wireless Telegraphy Acts could not be made use of. If I remember aright, it prohibits broadcasting by anyone who is not licensed to do so by the Postmaster-General. It seems to me that the owner of machinery which sends out interfering noises might possibly be gone for on the ground that he is broadcasting without a permit. I am no lawyer myself. Will any legal reader enlighten us on the point?

A Queer Position

Here's the kind of thing that happens. Listeners in a particular locality suddenly find that their reception has gone, if I may so put it, all to pot. They used to receive the programmes to perfection; now, except late at night, they hear them only through a barrage of rattles, taps, whines, whistles, crackles, or bangs. Inquiry shows that the beginning of the interference coincided with the installation by Mr. X, the grocer, of an electrically-driven coffee grinder. That Mr. X—or, rather, his coffee grinder—is the offender is proved

On Your Wavelength! (continued)

by the fact that the interference ceases as soon as it is switched off, which occurs at 8 p.m.

Who Pays?

The affected listeners have heard that the proper thing to do is to communicate with the G.P.O. They duly do this and an exceedingly helpful official comes down to investigate. He demonstrates to Mr. X that the interference can be cured by means of a small contraption of chokes and condensers. The cost will be a pound or two and Mr. X will have to bear it. Mr. X refuses to do so—and there we are.

Some Bad Cases

I have heard of some pretty bad cases of this noise-broadcasting from readers in many parts of the country. From Kent comes an account of the way in which reception has been ruined by the installing in a local cinema of talkie apparatus. As in the case of Mr. X, the G.P.O. man showed what could be done, proving that with his device no interference was caused. The talkie manager again refused to do anything. Here, I think, something might be done if a deputation of those affected called upon him to say that if he continued to spoil their wireless programmes they would cease to patronise his talkies. One of the hardest cases of all comes from a northern county. In this instance the trouble is being caused by a local dealer in wireless goods who has just put in a new charging plant which is playing havoc with reception in the neighbourhood. The remedy seems fairly obvious here, though one cannot understand the attitude of a person who is so ready to kill the goose that lays the golden eggs.

Write to Your M.P.

The cost of putting in a device to prevent interference from being caused by machinery is usually quite small. No hardship, therefore, would be inflicted if there were a law making its addition compulsory. After all, if your neighbour keeps a noisy dog or practises the saxophone at unearthly hours you have a legal remedy against him. Why shouldn't you have one, too, against the fellow who produces noises that spoil your wireless reception? If any readers have found the G.P.O. unable to do anything I would strongly recommend them to write to their M.P.'s urging that legislation should be introduced at an early date.

Another Theory Goes

When a scientist comes across an effect whose cause is not immediately obvious, the only course open to him is to formulate a theory which gives a fairly satisfactory explanation in the light of existing knowledge. He does not say that the theory is

final; he merely claims that it is the best that can be done at the moment. As time goes on, either the theory is proved and accepted or fresh facts show that it is no longer tenable and another takes its place. And so science proceeds until the final answer is given to some of her questions. Much of Newton's theorising had to go under the new thought of Einstein; the old conception of the jelly ether has had to be abandoned; it is by no means unlikely that the wave theory of light will be displaced by another in the near future.

The New One

In this connection it is interesting to observe that so great an authority as Sir Ambrose Fleming, the inventor of the diode valve, has thrown over the old conception of sidebands in wireless telephonic transmissions. No one can doubt that there are sidebands. Their presence is shown mathematically by Fourier's theorem and practically in various ways. What, however, many scientists now deny is that these sidebands are made use of by the wireless receiving set. They say in effect that the carrier wave itself is modulated as regards amplitude and that sidebands play no part in ordinary wireless reception, the carrier itself being entirely responsible for working our sets

A Simple Proof

Readers may remember that I have never been a very warm supporter of the sideband theory in its entirety. Here is a way in which anyone can satisfy himself with a little thought that a receiving set does not make use of sidebands, or, at all events, does not need them in order to function. At my station I receive very powerfully the programmes of 5XX, whose carrier frequency is 193,000. Under the old view, my set was dealing also with an upper sideband ranging from 193,050 to 198,000 in frequency and a lower sideband between 192,950 and 188,000 per second. So far so good. Then I also receive 5XX at times astonishingly well on his fifth harmonic. It comes in on the loud-speaker with a little careful tuning, and the quality, though not up to that of the fundamental, is quite passable.

Now, if my set were dealing with sidebands, what would happen during the reception of the fifth harmonic? Clearly, all the intervals would be displaced, and speech and music would be too appalling for words. Actually they aren't. Speech is, in fact, intelligible even on the thirteenth harmonic of this station. Another little

problem for those who swallow the old sideband theory in its entirety is just what happens in a super-heterodyne receiver! I haven't really thought this out, but it seems to present certain rather knotty points.

Negative Television Images

When watching some experimental tests made with the reception of the television transmissions quite recently, it was brought home to me quite forcibly that the question of a "negative image" must be watched very carefully by set users. I have mentioned before how this effect is brought about and also given one or two cures, but there are several others, and I felt they were worth while noting and passing on to readers. First of all, a start was made with a three-stage resistance-capacity coupled amplifier connected to a detector valve unit without reaction and working on anode-bend detection. This gave the positive image as we have learnt before. The addition and removal of one R.C. stage effected a reversal in the picture and gave the negative image.

Apart from strength, however, which, of course, is no criterion, there was no evidence that the reversal had taken place when the actual television note was listened to on the loud-speaker. A choke-coupled output circuit was then joined up to feed the neon lamp on the standard three-stage R.C. amplifier and the negative image again appeared. A two-stage low-voltage R.C. amplifier with the same type of output produced an extremely good positive picture.

A Remarkable Case

Push-pull transformer coupling, preceded by a resistance-capacity stage and having a choke-coupled output, also gave a negative image; but this was quickly altered by reversing the primary connections of the transformer. The primary of this same transformer was then fed from the valve plate by means of a 1-microfarad condenser in series with the winding and thence to L.T.—. Back came our negative again, owing to the current reversal brought about by the condenser.

Another remarkable case of a reversed image with a standard receiver was traced to a run-down accumulator. Everything was connected up for normal working, but, in spite of hurried tests, the negative persisted. A voltmeter soon showed that the L.T. supply had dropped to 4 volts instead of the scheduled 6 volts, and instead of rectification taking place on the bottom bend, it had been occurring via the top bend of the valve's characteristic. This effect must be of rare occurrence, but it did not exhaust the possible causes of reversals.

THERMION.

**LOOK OUT FOR THE
"1930 CLARION THREE"
NEXT WEEK!**



NEW PROGRAMMES— If you listen on the Short Waves

Short-wave reception conditions have improved considerably of late. This article well indicates what you are missing if you neglect this sphere of listening

WHAT is it that makes some folk "knob-twiddlers"? What is it that keeps them at the set long after the B.B.C. stations have shut down, earphones close to the ears? What is it that compels them to listen-in on into the night till they begin to see wiggly things where there are no wiggly things?

The answer, of course, is the short-wave stations. What a pity it is that to many listeners the only wavelengths which matter

enthusiast at present, then you should put the question fairly to yourself; in your case, will not the small outlay on short-wave equipment be more than repaid through the year by the greater programme scope available?

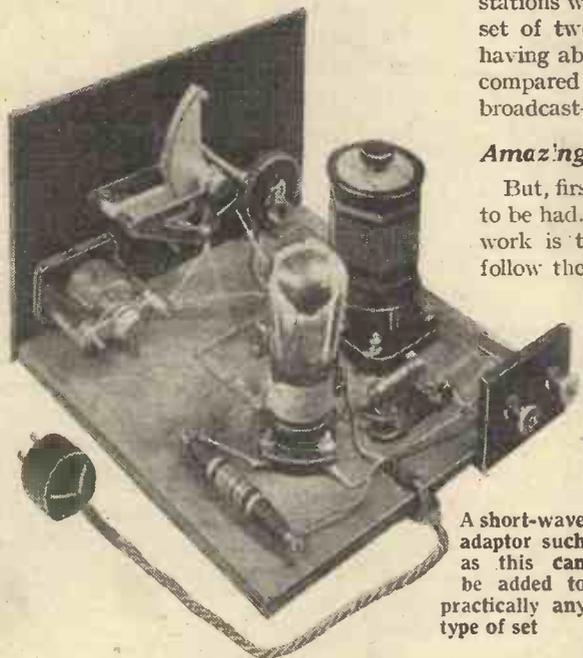
In most sets, the lowest tuning point on the medium waveband is 200 metres; sometimes it is higher than this. The 261-metre "B.P." probably comes in well towards the bottom end of the scale. The short-wave stations will come in below this, and a new set of two or three coils will be needed, having about only five to twenty turns, as compared with the 70 to 250 turns of the broadcast-band coils.

Amazing Reception

But, first consider what stations there are to be had. The amazing side of short-wave work is that the waves don't appear to follow the same laws as the longer waves.

True, freak reception, blind spots, skip effects and the like are more common, but to the "wavelets," like the moving-men, "distance is no object!" America, Canada, Australia, the Indies, all have S.W. broadcast stations, the names of some of which are almost household terms to listeners in this country.

Ask any enthusiastic neighbour who has a short-wave adaptor or set what he thinks of the Americans



A short-wave adaptor such as this can be added to practically any type of set

are those on which can be heard the Brookmans Parks, 5GB, and on the long waves 5XX and Radio Paris.

A proportion of listeners imagine that a dual-range coil, working from, say, 250 metres to 500, and 1,000 to 1,800, covers all that is necessary. To them the wave-change switch is the be-all and end-all of the wavelength scale, and that there may be good programmes and new stations to hear outside the normal wavebands doesn't trouble them.

The plain fact is, that there are new stations to be heard, and as an increasing body of listeners is having trouble with selectivity, owing to the regional scheme, the short waves will become popular, no doubt. If you are experiencing such difficulties, and you are not a short-wave

W8XK, W2XAL, W2XAC, W2XAF, KDKA, and so on, Perth (Australia), Radio LL (France), PCJ and Huizen (Holland), Bandoeng (Java), and the many others.

The generally accepted range of "short" waves extends from about 100 metres down to 15 metres or thereabouts. There are many people who listen to Schenectady, Pittsburg, short-wave Hilversum and Huizen, the C.N.R. short-wavers in Canada and similar stations as regularly as they switch on to 5GB or 5XX.

Mind you, it doesn't follow that you'll always hear the Schenectady broadcasters so clearly and with such reliability as you can get from Daventry. Some nights are better than others. Sometimes the distant station will fade from roaring loud-speaker strength to stilly silence in a minute or so, and then increase back again. On some occasions atmospheric conditions (sun-spots, as some say) appear to throttle all the short-wavers. This was the case last month, when things were very bad indeed, but they are now almost normal again.

This is a disadvantage of short-wave listening, quite frankly put. Just whether it detracts or not from the interest will depend on your personal views. Is it better to hear Australia with occasional poor periods of fading and static, or never to hear Australia at all? It's rather ridiculous when stated that way, isn't it?

So, see now what is necessary for listening on the wavelets. A special set may be needed; on the other hand, it may not, and an adaptor on the present set may suffice. A "special set" does not mean new valves, batteries, and loud-speaker, of course. The cost is limited to the panel, cabinet, and baseboard, and the few components, most of which are cheap. An adaptor may not cost more than ten shillings. If you

(Continued on page 350)



Here is a typical short-wave two-valve set—the "America Short-wave 2"

A PAGE FOR THE SET-BUYER

Pentodes in Battery-operated Sets

In this test report of the Lotus S.G.P. set, "The Set Tester" draws attention to the need for a suitable output transformer in order to get the best from a pentode output valve

milliamperes by using the small power valve instead of the pentode. As the total consumption is practically halved, one needs to consider carefully whether the extra volume given by the pentode is necessary. Unless an output transformer is used, I do

£7 12s. 6d. This is without valves.

I like the layout of the controls. The "extras" of the set are fitted to the sides of the cabinet, so that a simple-looking panel layout is retained in spite of the facilities available. The wave-change switch, the loud-speaker plug socket and the gramophone plug socket are arranged at the sides of the set. A large double drum-dial condenser occupies the central position on the panel. Once the discrepancy between the two dial readings has been found, stations can, I find, be tuned in by moving both dials with the thumb.

Many Refinements

Volume is controllable, in a pre-detector sense. The filament rheostat varies the sensitivity of the screen-grid valve, giving an excellent range of audibility. But if gramophone records are played through the detector and power valve circuit, as can quite easily be done, an external volume control is necessary for the gramophone pick-up.

I think readers will agree that volume controls are a snag in radio set design. We really need two volume controls in a modern set, one before and one after the detector valve. Perhaps we shall see this development in next year's sets. It is certainly due.

Sensitivity and selectivity, those twin requirements that always seem in conflict, are well balanced in the Lotus set. The tuning is sharp, but not "knife-edge." Brookmans Park stations do not swamp the dials. Without any great effort,

I was able to get twenty-one stations during an hour or two spent at the dials one recent evening. My idea of "getting" does not include weak and wobbling carrier-waves.

Altogether, the Lotus S.G.P. Three is a good set for the man who wants an efficient installation working from batteries.

Inauguration of two-way telephone service between Buenos Aires and New York over radio circuits established by the International Telephone and Telegraph Company is expected within the next two or three months. Preliminary tests between the Hurlingham station near Buenos Aires and the station in New Jersey have proved satisfactory.



Exceptionally handsome in appearance, the Lotus S.G.P. set has a well-arranged panel layout. Note the wave-change switch on the right. The top view shows the space available for batteries.

PENTODE valves have been responsible for one of the minor controversies of the season. Are they really greedy in anode-current consumption? Is the extra amplification appreciably greater than from an ordinary power valve? Do pentodes give quantity at the expense of quality? These questions have given amateurs plenty to think about. My experience of pentodes inclines me to say that their greediness has been over estimated; that provided a well-designed output transformer is used, the extra amplification is considerable; and that subject to this condition the quality of reproduction is not impaired.

These remarks on pentodes are prompted by a recent test I carried out with the Lotus "S.G.P." battery-operated three-valver. The makers specify a pentode valve for the output stage, preceded by screen-grid and detector valves of the normal type.

The overall amplification of this set is considerable. I found the volume more than enough on most stations. The pentode was replaced by a small power valve and although volume was appreciably diminished it was quite enough for most stations.

With a 120-volt high-tension battery of double capacity the pentode helped to give a total anode-current consumption of 19 milliamperes. This was reduced to 10

milliamperes by using the small power valve instead of the pentode.

The good high-frequency amplifying properties of the screen-grid stage in the Lotus set makes it possible to dispense with the pentode valve specified. This could not be said of all three-valve sets of the Lotus type.

Complete or As A Kit

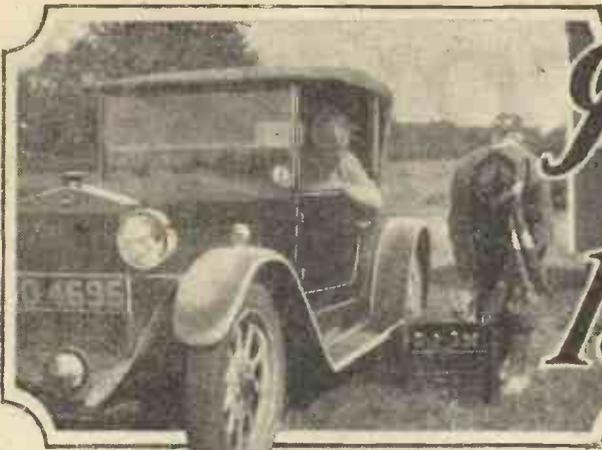
The cabinet of the Lotus set is big enough to take standard-capacity high-tension batteries, together with the filament accumulator and grid-bias battery.

Every set referred to in this regular feature by "The Set Tester" has reached a certain standard of efficiency in the "Amateur Wireless" Laboratory. Reports are not given on sets that fail to reach this standard. This will explain why reports that do appear express general satisfaction with the set's performance.

All the usual untidy battery leads can, therefore, be hidden from sight.

The appearance of the set, especially the control panel, is unusually handsome. Even now it is unusual for wireless cabinets to be of good appearance. If I saw the Lotus set in a shop window, its appearance would pre-dispose me in its favour.

The price of the set complete with valves, is £13 15s. which is reasonable. Those who prefer to take a hand in the assembly of their sets are reminded that this Lotus set can be obtained as a kit of parts for



Possibilities of the 1930 Portable



Have you considered your portable set for 1930? Increased use will undoubtedly be made of the real outdoor portable this year. Below are described by Kenneth Ulyett recent modifications making for increased efficiency and reduction of weight

PORTABLES? It may sound a little early as yet to talk about portables and out-door radio; but is it?

This issue is dated March 1. There is thus one clear month till April, and Easter is then in two weeks' time. The portable set should be ready at least a week before Easter, so that all those last-minute ideas may be tried out for rigging up aerials on the car, and so on, before the holiday week-end.

In other words, there's only just over a month to get out the old set and bring it up to date, or to build a new one. There's much to be done. The forthcoming season savours of being very propitious for portables, and though all kinds of hackneyed

phrases might be put to use regarding the great stride made since last summer, the plain fact remains that the 1930 portable set should, and will, materially differ from, and be an improvement on, its predecessors.

When portables first became popular, it was hard to tell the difference between portable sets proper which are meant for carrying about by hand, transportables which are really only suitable for moving from room to room (they are self-contained ordinary receivers, and some of them incorporate mains units), and "motorists' portables," which are a form of go-between, weight not being of so much importance. These three, light-weight portables, motorists' portables, and transportables for the house are three entirely different types, and during the next outdoor radio season you will find these types clearly defined.

Weight will be less all round, and this applies both to the new set which you may buy, to the new portable you may make up for yourself, and to the new parts with which you may attempt to rejuvenate the old friend of 1929. Time was when portables were made up like any other receiver with a heavy wooden baseboard, perhaps $\frac{3}{4}$ in. thick, and an ebonite panel. There is really no need for this, and the present idea is not to mount the valve holders and other small components on a baseboard, but on a strip of thin bakelite.

Nor is it vital to employ ordinary valve holders and terminals, for in commercial mass-production jobs it is cheaper and better to make such contacts with metal strip machine-pressed into holes punched in the bakelite. Valve holders of this type are

now available on the amateur market; it is to be hoped that other small parts, such as coil connections, grid-leak clips, and even small complete components—fixed condensers for instance—will also be manufactured in the same way, which owing to light weight is very suitable for portables.

All-round Reduction in Weight

There are other ways, too, in which manufacturers are—sometimes unintentionally—assisting you portable constructors. Variable condensers are now, generally speaking, smaller than they were; it is the fashion to have close spacing which, of course, means a smaller plate area for a given normal capacity of .0005 microfarad. Some of the new gang condensers in which both sections are mounted on a very light but rigid chassis, with which is combined a slow-motion drum control, are made with great mechanical precision, and are just the jobs you need for a portable set which has an H.F. stage in it.

L.F. transformers nowadays do not usually have old-fashion iron cores. The new alloys, although more expensive, are more efficient and so much wire has not to be used in the windings. So they are favoured by transformer manufacturers, and not least by portable-set builders, for the new jobs are small and very light.

Before going any further, it may be interesting to see just how much some of these things do weigh. A well-known L.F. transformer with a special alloy coil weighs 10 oz., whereas one of the same make and of 1927 manufacture (with an old type core) weighs 1 lb. 2 oz. A much-advertised make of dual-gang condenser weighs 15 oz. A typical H.T. battery weighs $7\frac{1}{4}$ lb.; and this is a reasonable figure considering that the battery is of 108 volts and has a normal recommended output of 9 milliamps, which most portable set users occasionally exceed by 100 per cent. A two-volt 20 amp-hour accumulator of a non-spill type and of a

(Continued on page 341)



A Marconi portable as part of the equipment of a car which took part in the recent Monte Carlo rally

Building

EVERYBODY

ALL-ELECTRIC

3

THE NEW MAINS SET *by W.*



IN laying out a mains set the parts must be so positioned that negligible hum is introduced. Failure to attend to this rather obvious point may result in poor reception, for which there is really no excuse.

The power transformer is the component to be watched, for some types have a relatively large stray field which may introduce the low-frequency currents, that we hear as hum, into the intervalve transformer circuit. A further danger point is the grid condenser and leak circuit, particularly the wire which actually connects the grid of these parts. This wire and the grid to the detector valve itself are very sensitive to stray fields and may easily collect enough disturbance to spoil the results.

Therefore the mains transformer must be kept well away from this part of the set. The illustrations show that the 'power transformer, which is included in the "power box," is well away from the low-frequency part of the set and no direct interference is, therefore, set up. Readers who propose building their own mains unit from separate parts should, however, give careful attention to this point, even going so far as to listen whilst the power transformer is turned about its normal position. The reason for taking this trouble is, of course, that with the transformer in one position a hum may be heard, whilst nothing is heard when the unit is turned into a different position.

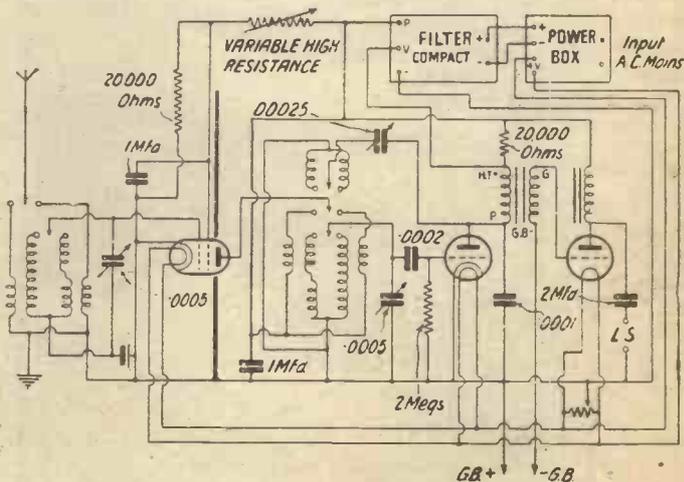
It may be necessary to earth the core of the transformer and I suggest that a wire direct from the earth terminal to one of the transformer fixing screws be used, rather than a wire from another point in the circuit.

Hum

Hum may also be due to poor filtering and in this connection I want to draw attention to the anode circuit of the detector. This includes a 20,000-ohm resistance having one end joined

to the positive terminal of the supply and its other to the terminal v, fitted to the filter unit. Inside the unit is a by-pass condenser, and this, in association with the 20,000-ohm resistance, effectually de-couples the detector circuit and also filters the supply to the detector. The detector circuit is a weak point always, for any slight A.C. voltage introduced here is magnified before reaching the loud-speaker.

Twenty thousand ohms will suit most detector valves, but it is possible that a little greater or a smaller value will be better for particular valves. This value suited the valves in my possession, but a particularly good one may tend to oscillate too freely, especially when a different make of transformer is used. It may then be



The circuit diagram of "Everybody's All-Electric 3".

advisable to include a 30,000-ohm resistance. The effect of the bigger resistance will be to lower the voltage of the anode of the detector and it will also tend further to improve the filtering.

Should the resistance be decreased in value, however, the smoothing of the supply to the detector might not be sufficient and it would be necessary to add a 2-microfarad condenser, of the ordinary type, to the circuit. It would be joined between the junction of the resistance and transformer (terminal H.T.+ in the diagram on page 302), and the cathode of the detector. With a particularly "bad" supply, even this additional condenser may be needed, even when the 20,000-ohm resistance is used.

Owing to the greater efficiency of mains detector valves, the circuit is more easily made to oscillate than when a battery valve is used. Ample tolerance is available with the values indicated, but owing to the wide differences between detector valves, some adjustment of the anode filter resistance may be necessary.

The grid leak is joined between the grid and cathode, although it is sometimes suggested that a dry cell be connected between the return end of the leak and the cathode. This is not necessary as a rule. Better selectivity and good detection are obtained by employing the direct connection.

When building the set lay the parts out according to the diagram and pay particular attention when any non-specified parts are being used. Allow adequate room for the shielded valve. Some types are larger than others; and, incidentally, the best way of getting a valve out is to press a screwdriver between the holder and the base of the valve.

Some Minor Points

Do not overlook the grid-bias cell for the shielded valve and when fitting the screen allow a space between it and the tuning condenser. The screen is earthed, but the tuning condenser is connected to earth through a grid-bias cell. Therefore, the screen and condenser should not touch. A good reaction condenser must be used. If it short-circuits no great harm will result, owing to the presence of the 20,000-ohm resistance, but the operation will be uncertain, to say the least. Although nothing

will burn out, the reception will be noisy if this part intermittently short-circuits. I advise the inclusion of a filter output circuit as indicated; it is practically an essential feature. Any good choke will do, and any fixed condensers of good make may also be used.

A reader having built the original "Everybody's 3" battery-operated receiver

aerial can be joined through a .0001-microfarad condenser to the terminal marked G. This last connection is only of value when the aerial is a very small one and selectivity is of secondary importance. One particular connection obviously cannot be the best for all sizes of aerials in all positions; therefore, for the best results try the alternatives sug-

LIST OF COMPONENTS

Ebonite or bakelite panel, 21 in. by 7 in. (Pro-litax, Camco, Lissen, Trelleborg).
Two .0005-mfd. variable condensers, with slow-motion movement (Polar "Ideal," J. B., Lissen, Dubilier, Ormond, Igranic, Lotus, Burton).
.00025-mfd. reaction condenser (Polar, type Q.J.; Lotus, Bulglin).
Variable resistance, 100 ohms to 5 megohms (Clarostat "Standard," Volustat, Regenstat).
Pair of Brookmans coils, aerial and anode (Wearite).
Upright 5-pin A.C. valve holder (W.B., Lotus, Junit).
Flat 5-pin A.C. valve holder (W.B., Lotus, Junit, Wearite).
Four-pin valve holder (Lotus, Igranic, Formo, Brownie).
.0002-mfd. fixed condenser (upright type), with series clips (Dubilier, type 620; T.C.C., Graham-Farish, Lissen).
.0001-mfd. fixed condenser (upright type) (Dubilier, type 620; T.C.C., Graham-Farish, Lissen).
Low-frequency transformer (Lissen, Varley, Telsen, Ferranti, Igranic, Lewcos, Marconiphone).
Two 20,000-ohm wire-wound resistances, with

holders (Ready Radio, Lissen, Dubilier, Varley).
Two 1-mfd. fixed condensers (Dubilier, T.C.C., Lissen, Hydra).
2-mfd. fixed condenser (Dubilier, T.C.C., Lissen, Hydra).
2-megohm grid leak (Dubilier, Lissen, Watmel).
Output choke, 20 henries, 100 milliamperes (Varley, Ferranti, Igranic, Bulglin, Wearite).
Two terminal blocks marked: Aerial and Earth, and L.S.+ , L.S.— (Lissen, Junit).
Special power box (Regentone No. 1).
Filter Compact (Regentone No. 1).
Screen, 9 in. by 6 in., with hole for S.G. valve (Parex, Ready Radio).
15-ohm baseboard mounting potentiometer (Wearite).
Panel brackets (Ready Radio).
Baseboard, 21 in. by 13 in. (Picketts).
2 yds. thin flex (Lewcoflex, Konecterkit, British Radio Gramophone Co., Ltd.).
1½-volt grid cell (Siemens, type G.T.).
Two wander plugs, marked: G.B.+ , G.B.— (Belling-Lee, Ealex, Clix, British Radio Gramophone Co., Ltd.).
Connecting wire (Glazite, Konecterkit, British Radio Gramophone Co., Ltd.).

and wishing to convert it to the A.C. pattern will see from the diagrams the circuit modifications to be made. They are not numerous. New valve holders must, of course, be fitted and the filament resistance be taken out and in its place an adjustable high resistance put in for the shield circuit.

Wiring

Then there is the potentiometer and the fixed resistances. Notice that the filament circuit does not pass through the aerial grid coil base in the A.C. pattern, as the whole of the set is controlled at the power point or light socket. The power box and filter unit should not be fitted until last. Much wiring can be carried out with the panel off. Then this should be fitted and, finally, the mains apparatus.

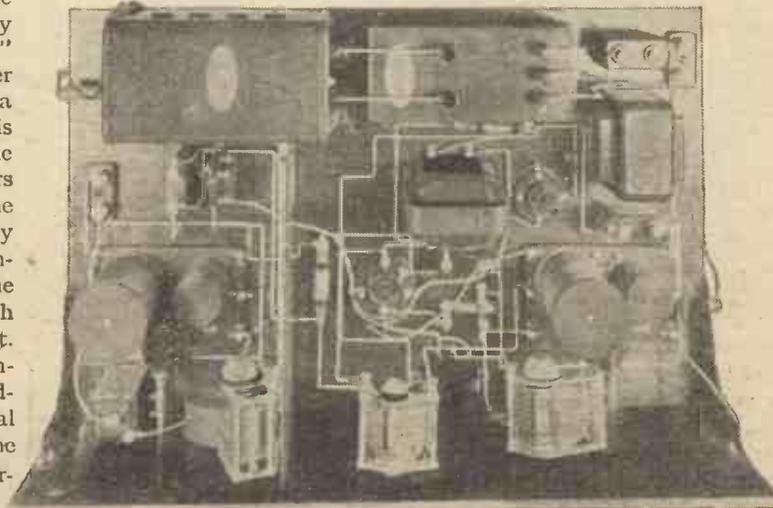
The tuning range of the set is exactly as "Everybody's 3," but the condenser dial readings are a little different. This depends upon the actual condensers used, as well as the wiring. If necessary the aerial can be connected in one of the ways explained with the battery set. That is, a fixed condenser can be included in the aerial circuit between the aerial and the terminal of the coil marked AE, or the

gested. If you want more selectivity, connect a condenser between the aerial and the terminal AE, but should the set be rather too selective for your reception conditions, join the aerial to the grid terminal through a condenser.

The set is a very selective one in comparison with other three-valve types and these changes from the standard will only be advisable under quite exceptional conditions.

First Tests

Before switching the set on, turn the adjustable resistance on the panel all in, that is, to its position of maximum resistance. This will have the effect of greatly lowering the voltage of the shield when the set is on. A few seconds must pass before



This plan view shows clearly the layout

For the Newcomer to Wireless: SCREEN-GRID AND OTHER FOUR-ELECTRODE VALVES

WHAT'S the difference between a "screen-grid valve" and a "four-electrode valve"? Surely the screen-grid is a four-electrode valve.

Well, of course, it is; but the earliest form of valve with two grids was constructed in a very different way and worked on an entirely different principle. Nowadays we generally refer to a valve of this type as a four-electrode valve, using the term "screen-grid" for one which has a grid interposed between the control grid and the plate.

Please tell me about these four-electrode valves.

In the triode a very curious effect takes place in the neighbourhood of the filament when the valve is working. You know that the filament hurls out electrons.

Yes, I know that, and these are attracted—are they not?—by the pull of the positive charge on the plate.

Yes, but don't forget that every electron exerts an enormous repellant force upon every other.

What result does that have exactly?

The electrons that have moved a little way from the filament repel

electrons that are just leaving it, and in the same way they are themselves repelled by electrons that have travelled a little further towards the plate.

I begin to see. You mean that a kind of damming back takes place owing to the repulsion that electrons exert upon one another?

Just so. And this very much decreases the volume of the electron stream. The repulsions of electrons just leaving the filament by those that left an instant earlier is known as the space charge.

Can this state of affairs be remedied?

It can; and it was to do so that the earliest four-electrode valve was developed.

How does it do this?

Between the control grid and the filament is placed a second grid, usually known as the space-charge grid. This is given a positive potential.

Which means, of course, that it attracts electrons?

That's it. It hurries away electrons that have left the filament and so prevents them from damming back the others as much as they do in the triode valve.

Are these valves still used?

They are, but not perhaps, so much as they deserve to be. One of their great advantages is that a very small plate current is required, and this makes them particularly suitable for portable sets. I have often wondered that designers do not make much more use of them for this particular purpose.

Why, exactly?

Well, you see, the high-tension battery is one of the heaviest parts of a portable set, and if you require a high plate voltage you must keep down the size of the cells in order to reduce weight to reasonable limits.

I follow. By using four-electrode valves which need a smaller plate-voltage, a high-tension battery made of far bigger cells could be employed.

That is the important point. You can obtain quite good working from these valves with an H.T. voltage of 30, and this would make it possible to use a high-tension battery of treble-capacity size, which in a set consuming 10 milliamperes would last at least four times as long as a standard capacity battery—and probably longer.

"EVERYBODY'S ALL-ELECTRIC 3" (Continued from preceding page)

the indirectly-heated valves arrive at their working temperature. Then tune to the local station to prove that the circuit is correct. You may only hear it poorly because of the very low voltage on the shield, and as the potentiometer is not set. Roughly set the potentiometer (filament circuit), and then bring up the strength by adjusting the shield circuit resistance. Now tune to a distant station and once more adjust the shield circuit resistance in order to increase the volume. Having found approximately the best setting, its position can be noted as being, say, two turns from the all-in position.

Finally, adjust the potentiometer to remove hum. This component, being now set, need not be touched again until a valve or other part is changed. It is not advisable to screw the shield resistance tightly in its position of minimum resistance, as this would apply practically the full high-tension voltage to the shield of the valve. With only about 120 volts, the danger is not great, but at the same time the control ought to be carefully used. This relatively low voltage is used in order to make the cost as little as possible. A larger unit and suitable filter may, of course, be fitted. The results, as already explained, are better than from "Everybody's 3" because of the valves used, and it is therefore possible to say that a large number of stations are

receivable at good strength. The two wave-range knobs are turned to the left for the medium waves and to the right for long

waves. The best tapping on the anode coil will depend upon the characteristics of the shielded valve used.

The tap which gives most magnification on the medium waves also broadens the tuning a little. Thus, here is a selectivity and magnification control which is very useful in that the best results are to be obtained from widely different valves. This tap is, of course, fitted for convenience between the two coils of the anode unit. A flexible wire passes from the switch through a hole in the baseboard and is connected to one of the pair of terminals, the best connection being found by trial.

All anode coils will have this alternative contact in future as there are great differences in the impedances of battery valves as well. A point not to be overlooked is that the correct input connection is made according to the voltage of the supply. A wrong connection here will have the effect of providing too little or too much output for the valves.

The existing group of short-wave transmitters at Kootwijk (Holland) is to be further augmented by the addition of another transmitter, which will use the call-sign PDL and work in C.W. on a wave of 18,700 kilocycles (16.043 metres).



A Slade cartoon of Joseph Szigeti



RIO RITA

HOW TO GET SINCERITY OF TONE

"Music whispering words of love—of Southern skies and scented nights—a flash of feeling in every bar of it, a thrill for the heart in every beat of it."

There is this and more to hear in Rio Rita when pure Lissen power is pulsing through your set. Feel the intoxication of its rhythm, urging you to dance, hear its caressing melody. Every note a cameo borne upon the silent power of Lissen, every word of vocal refrain full of emotion because of the sincerity of tone that Lissen current influences your loud-speaker to yield.

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PRICES.

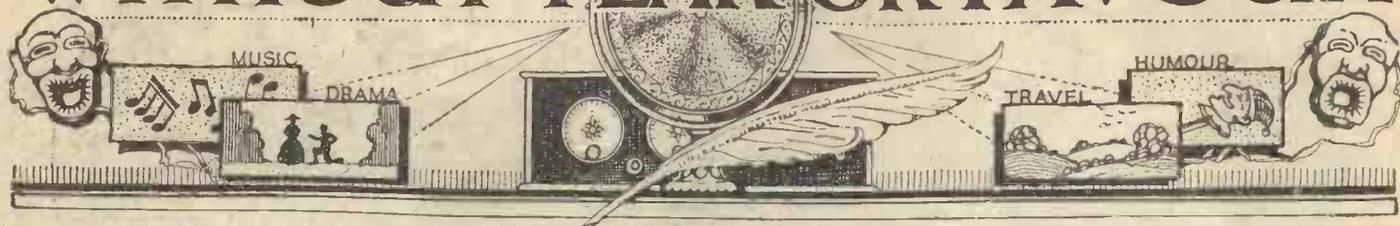
- 60 vclt (reads 66) 7/11
- 100 vclt (reads 108) 12/11
- 120 vclt 15/10
- 36 vclt 4/3
- 60 vclt: (Super power) 13/6
- 100 vclt (Super power) 22/-
- 9 vclt Grid Bias 1/3
- 4 1/2 vclt Pocket Battery 5d. each (4/6 a doz.)
- Single Cell Torch Battery 4d.



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WITHOUT FEAR OR FAVOUR



The Critic Criticised Spoilt Vaudeville

HERE are extracts from two amusing letters from listeners who criticise my recent talk. The first one, from A. M. Hankinson, of Coventry, voices what a good many other people have told me.

The talk, as other talks, "was given too early in the evening." My correspondent criticises certain talkers who "lack voice and personality, however interesting is the subject." Sometimes even when the subject is uninteresting a speaker's personality makes listening worth while.

A.M.H. thinks my appreciation of the "Request Week" programme justified.

E. M. Greenwood, of Stockport, writes a long letter which I cannot quote in full. It starts off encouragingly thus:—

"Although I have been a listener for six years, your talk was the first to be listened to from beginning to end. On all other occasions I have switched off, usually long before the talk was half-way through."

Just as I was patting myself on the back, the letter goes on to say:—

"Because I liked your criticisms in AMATEUR WIRELESS I listened to you, but I am afraid I can give you but little in the way of praise. One agreeable feature was the manner of giving the talk, your delivery being different to the others. But the subject matter—oh, my stars! I can't remember a single outstanding remark, every opinion you expressed being one that I already held. There was nothing said that was news (surprising, from a journalist) and the whole thing had no more life than a short-circuited H.T. battery."

My correspondent softens his criticism, however, by adding that my talk was one more proof, if proof were needed, that B.B.C. talks can never approach the written article.

"Here am I, a keen admirer of your weekly feature in AMATEUR WIRELESS, disagreeing with quite a number of your opinions, but so appreciative of them that I almost invariably read your page; yet if Mr. Moseley were to broadcast every night I would not listen to him. I would prefer to ask him for a written copy of his speech. I hope you may long be spared to ginger up

A Weekly Programme Criticism by Sydney A. Moseley

the B.B.C. by your AMATEUR WIRELESS articles."

An interesting letter, this, and one that ought to create discussion on whether B.B.C. talks can and do approach the written word.

I sometimes despair of those who run our vaudeville programmes. I suppose they will go on helping those who want to see the monopoly of the B.B.C. abolished. They go on gaily making the same mistakes.

I wrote before of the utter spoiling of old-time vaudeville by a chorus of confused shoutings and screamings.

With regard to Leonard Henry I have just received an observation from a correspondent:—

"Until a month or two ago, Leonard Henry was a very ordinary comedian. Now I think the funny men at the top of the radio tree should look to their laurels, because Leonard is catching up to them by leaps and bounds. I heard him the other evening, and considered his broadcast was first-rate entertainment."

Several of my friends are of the opinion



An impression of Walter Williams

A Welcome Pair The Language Lessons

that the 5GB vaudeville programmes are the poorest on record. They say that there seems to be a lack of continuity—and an absence of the spontaneous gaiety which (most times) attends the variety at London. One critic puts this down to the poorness of the supporting bands. Apparently he considers that Philip Brown's "Dominoes," who usually support these broadcasts, are good as a quartet, but not large enough for the job. A dance band, he thinks, when playing to people who are not dancing must play its tunes in a versatile manner, changing the leading instruments about, and so on.

I have a dance tune on the brain, but I am not going to advertise its name!

Gerald and Phyllis Scott are pleasing to listen to, not mainly because of their voices and choice of songs, but their intimate "presence." When the piano played the opening bars of "O'm Courtin' Sairey Green" I sat back in my chair, looking forward to hearing that whimsical rustic song; but it developed into something quite different. Perhaps they will oblige on some future occasion.

W. P. Lipscombe's little play, *The Safe*, proved to be a reasonably exciting trifle which was suited to broadcasting.

The characters were all separate entities; by which I mean that it was possible to tell from the conversation exactly who was speaking. Although the plot was not very original, it was at least adequate, and special praise is due to the actress who played "the girl."

Incidentally, what a lot of crime we're getting on the wireless these days!

We have been fortunate all along with our instructors of foreign languages. I think I have mentioned before my appreciation of Monsieur Stephan. Now another tribute; this time to Mr. Otto Siepmann. He is most painstaking and interesting, has a good microphone "presence," and is thoroughly intimate with his unseen audience—in fact, the right sort of personality where lessons are concerned.

"POSSIBILITIES OF THE 1930 PORTABLE"

(Continued from page 335)

well-known make weighs 3 1/4 lb. A typical collection of four valve holders, four valves, grid leak and three fixed condensers, weighs 1 1/4 lb. These figures will serve as a rough guide when you are estimating the weight of the new set.

A good deal of weight is unnecessarily taken up in some sets by the cabinet. If this is to be given a respectable "furniture" finish, it has to be made of heavy hardwood, for it is difficult to put a good finish on plywood. The new idea, however, of using fabric-covered wood enables the very lightest plywood to be employed for cabinet work, and if the fabric is of good quality, grained to imitate leather, then the appearance is very pleasing. It is rather to be wondered at that commercial set makers have not made greater use of papier mâché cabinets, which material, in the hands of suitcase manufacturers, is made to come a good second to real leather.

New Circuit Ideas

So far as circuit arrangements of this year's portables are concerned, both weight and space are saved by new ideas, although it is not easy in a few words to show how this is so. New S.G. H.F. valve couplings do not necessitate so much metal screening in the set, even though a frame aerial encloses the whole, and this may mean the saving of about 1/4 lb. in the weight of metal used for screens and so on.

The Regional scheme and the great power of the "B.P.'s," although a bug-bear to some home set users in the London district, is a thing which will gladden the hearts of outdoor radio enthusiasts, because undoubtedly it will help to cut down the number of valves required.

The use of a frame aerial cuts out most of the selectivity troubles which home set users are experiencing, because two good alternatives, say 5GB and one of the Brookmans Parks, are frequently at right angles, as in this instance mentioned. Of course, a frame won't separate, directionally, one Brookmans Park transmission from another. A tapped frame aerial is an advantage in this respect.

The loud-speaker is the final link in the chain and although it cannot be claimed that matters for 1930 are any better in respect of weight, (loud-speaker units are still fairly heavy if fitted with good magnets), loud-speakers, such as the new pleated-paper and linen-diaphragm types, are very sensitive and give good volume, even though the power valve isn't being overworked.

The idea last year was to make a portable set as loud as possible. "'Punch' first, and let purity come second," was the slogan, but with the more sensitive speakers this year a portable should more than ever compare favourably with a portable gramophone.



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50%

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Whatever your unit, you cannot possibly have heard it at its best, unless it has been fitted with the Wates Double Cone Chassis. New or old units can be fitted in a few minutes, and the wonderful Double Cone principle improves reception 50 per cent.

The cones are scroll cut to obviate a direct line through the sound frequencies, and specially treated to ensure constant crispness.

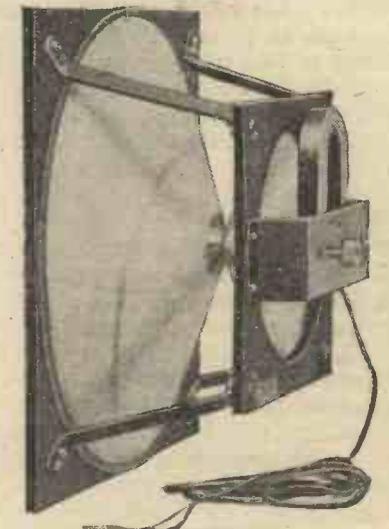
The graph clearly illustrates how the smaller cone responds to the higher and the large cone to the lower frequencies.

Give yourself a pleasant surprise. Bring your speaker right up to date, fit the Wates Universal Double Cone Chassis now.

Can be fitted with any of the following Units:
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CHASSIS

MY WIRELESS

Weekly Tips,
Constructional and Theoretical—



DEN ^B W. JAMES

For the
Wireless Amateur

Why Not Lead Leads?

I WONDER whether we shall ever use lead-covered wire for connecting the various parts of a circuit. It seems to me that certain wires will have to be shielded, particularly in multi-valve sets providing great magnification.

At the present time a shielded wire is often used to connect with the anodes of shielded valves. This wire is not expensive, and has a thick covering of cotton, over which is wrapped the aluminium strip. Thus the connection is shielded. Other wires might be similarly shielded.

Lamp Values

Someone has written me regarding a note published a few weeks ago to the effect that a lamp connected to the filament circuit of a mains set was worth while, and asks the voltage of a suitable lamp.

As the mains valves take 4 volts, a lamp of this voltage may safely be connected across one of the filaments. My correspondent said he tried a lamp, but that it burnt out. It was obviously of the wrong voltage. Types passing only .1 ampere are to be bought, but a standard bulb of, say, 5 volts, would be very suitable.

Control that Volume!

Those troubled with interference and having a set with two low-frequency stages will probably find a volume control in the low-frequency circuit of value.

This may take the form of an adjustable resistance joined across a transformer, or, when a resistance-coupled stage is used, a potentiometer-type grid leak may be fitted. An adjustable resistance ought to be connected across the primary rather than the secondary.

Improving the H.F. Stage

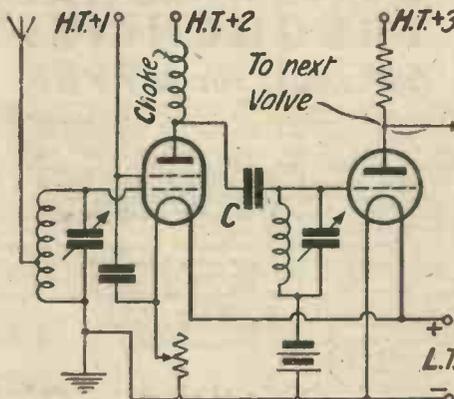
Sets having a high-frequency amplifying stage fitted with a shielded valve may often be improved by connecting a choke and a fixed condenser as indicated in the figure.

A single tuned circuit is shown herewith, and this would be a tuned anode were it joined directly to the anode of the valve. But when connected as indicated, it is called a tuned grid. The method has an advantage when anode-bend detection is used, as one end of the circuit is joined to the grid, whilst the other goes to the grid-

bias battery. Condenser c may be of .001 microfarad, although the value is not in the least critical. A good choke must be used.

A further advantage of this circuit is that high-frequency currents tend to pass from the anode to the filament circuit rather than from the anode to the high-tension supply. This is one reason why the circuit is usually more stable than the plain tuned anode.

There is another advantage, however, as the grid to filament path is practically a short-circuit to low-frequency currents. Any low-frequency that may tend to pass



This is the two-valve circuit mentioned by W. James in the accompanying paragraph

from the high-tension supply to the grid of the detector is, therefore, stopped. Motor-boating and other troubles are thus avoided so far as coupling through the high-frequency aerial circuit is concerned. Incidentally, condenser c has to withstand the full

FEATURES OF THE "1930 CLARION 3"

This new set gives amazing selectivity as a result of a special loose-coupled aerial circuit.

Choke-feed high-frequency amplification is used.

There is an H.F. volume control for limiting the strength of local stations.

A gramophone pick-up switch is incorporated. Radio or gramophone can be switched in at will.

FULL DETAILS NEXT WEEK

voltage of the supply to the anode of the valve and should be a well-made component.

Care of the Detector

If you want really good quality from a set it may be worth your while attending to the detector, particularly if this is of the leaky-grid type. Such a detector distorts by weakening the higher notes unless the right values are used.

I would suggest a grid condenser of .0001 microfarad and a grid leak of .5 megohms. Try these values, or, if a suitable condenser is not to hand, merely use a lower value of grid leak. The quality may be improved immensely.

Tuning may be broadened, however, and the reaction upset. It is possible that the improved quality may make it worth your while to alter the reaction circuit in order to obtain the correct effects.

Possibly with the values suggested the quality is not so good, due to the characteristics of the rest of the set. But, speaking generally, the tendency of high-frequency and detector circuits is to reduce the relative strength of the higher notes.

Be Generous with G.B.

A useful thing to remember when first trying a power valve is to employ rather more grid bias than the makers suggest.

This will have the effect of minimising the anode current for the time being until tests have shown that another value is better. With too much grid bias the quality is bound to be poor, but it is surprising how much grid bias can be used without the quality suffering in the least. High-tension batteries are expensive and must, therefore, be considered.

In this connection some shielded valves are very greedy, taking as much as 4 milli-amperes. This seems altogether too much for an amplifying valve. It may be reduced by using a single-cell grid bias, but the impedance of the valve will increase. Perhaps the circuit will not stand this, but at the same time, a little more anode voltage and shield voltage may correct this to a sufficient extent.

Mr. Compton Mackenzie has suggested that the price of wireless licences should be doubled. To some, of course, this will be a mere nothing.

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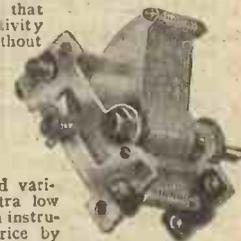


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Type A.6 The world's standard variable condenser. Low loss—extra low minimum capacity. A precision instrument brought to a popular price by skilful manufacturing methods. **4/6**

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Built as only costly Transformers are built. High inductance primary—perfect coil—highly permeable core—polished bakelite case—only Voltron could turn out such a transformer as the Dynaplus at such a price. **6/9**



Even if you already have a set you should get a catalogue of these splendid components. It is chock-full of useful data and it is free for the asking.

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"A.W." TESTS OF APPARATUS

Conducted by our Technical Editor, J. H. REYNER, B.Sc. (Hons.), A.M.I.E.E.

Mullard Condenser

MULLARD products have a good reputation for their reliability and useful service under practical conditions.



The Mullard "paper" dielectric condenser

It is interesting to note, therefore, that this firm is now marketing a "paper" condenser of rather attractive type. The model which we have received for test has a capacity of 4 microfarads and is contained in the remarkably compact space of 1 7/8 in. by 1 3/8 in. by 2 3/8 in. high. The container is of metal, and is provided with two terminals at the top which stand a further 5/8 in. above the surface.

The condenser is rated at 250 D.C. working voltage and is tested at 500 volts D.C. We tested it in our laboratories by applying a voltage of 400 volts D.C. for a period of twenty minutes, at the end of which time the condenser gave no evidence of deterioration.

The capacity proved substantially accurate, and we feel sure that this new line introduced by Mullards will find a ready market.

Colverstat Power Resistance

THERE is an increasing demand these days for resistances capable of dissipating a certain amount of heat without danger. Such resistances are known as power resistances in contradistinction to the ordinary wire-wound resistances which are only capable of carrying a relatively small current.

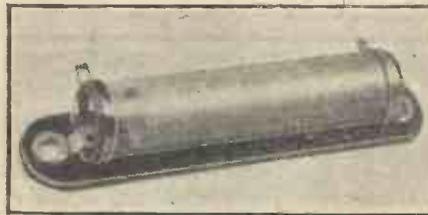
It was with interest, therefore, that we inspected a new pattern of power resistance which has been produced by Messrs. Colvern, Ltd. This resistance is wound in a single layer of very fine wire on a transparent former which appears to be made of a celluloid material. The ends of the winding are brought out to two metal clips surrounding the former, and provided with

projecting pieces on to which the connections may be soldered. The whole resistance is held on a strip of bakelised paper by two further clips.

These resistances are rated to carry 10 watts and the sample we received had a resistance of 70,000 ohms. On testing in our laboratories the resistance was found to be as stated and the component is capable of dissipating heat in a satisfactory manner.

For a resistance of 70,000 ohms, to dissipate 10 watts we must apply a voltage of 835 volts, which is a value distinctly in excess of what is normally encountered. We actually passed 9 milliamps to the resistance under which conditions the voltage developed was 650 and the power dissipated was 5.65 watts. At this figure the resistance became distinctly warm, but showed no sign of ill effect. The 10-watt rating, however, appeared a little optimistic, judging from the heat developed with 5 1/2 watts.

The resistance is cheap and compact. It



A useful power resistance capable of carrying 10 watts—a new Colvern component

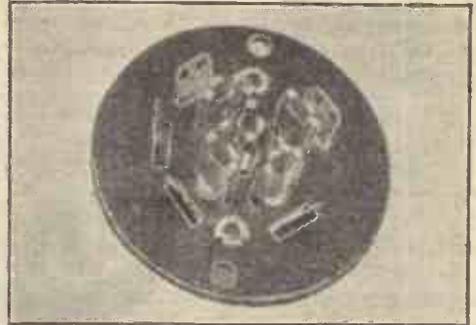
measures only 3 5/8 in. overall and is 1/2 in. wide. It can confidently be recommended to readers.

Benjamin Valve Holder

THE valve manufacturers appear to be having a private quarrel over the question of the pins. Some manufacturers make these solid, while others retain the old form of split or "banana" pin. Which ever form is ultimately adopted, there can be no doubt that a valve holder which is of the sprung socket variety is likely to be more suitable, for it will ensure good contact whichever type of pin is employed.

A very neat type of holder has been submitted for test by Messrs. Benjamin Electric, Ltd. This consists of a disc of bakelised paper having five holes in the position corresponding with the five pins of the standard modern valve. Underneath these

holes are specially shaped spring contacts, which will grip the valve pins tightly, irrespective of whether solid or not. We tried a number of valves in this holder and



A novel and highly practical valve holder introduced by Benjamin Electric Ltd.

were pleased with the result. In every case the contact was good without binding. It was possible to remove a valve without any strain and yet there is no danger of any loose contact.

This is certainly one of the nicest valve holders we have seen for some time.

A Handy Bulgin Gadget

NOW that spring is approaching, the thoughts of the constructor are popularly supposed to turn to portable sets. As a matter of fact, the portable set is no longer associated so much with the summer, for a good set is of interest all the year round.

It is well known that the frame aerial is one of the most important factors in the successful operation of this class of receiver and the effect of raising the frame windings just clear of the woodwork is very marked. In order to do this, however, the somewhat tedious process of making insulating spacers must be resorted to and, hence, the latest component marketed by Messrs. A. F. Bulgin & Co., of 9/10 Cursitor Street, E.C., will be hailed with enthusiasm.

These frame aerial spacers are of moulded bakelite and consist of a small raised fin grooved appropriately to carry the wire. There are eight grooves about 1/16 in. thick and two further grooves 3/32 in. thick, the latter two being intended for a bunched long-wave winding. The number of ways in which these spacers may be used are numerous and detailed comment is unnecessary. The merit of the components, which are put up in sets of four at the price of 1s. 3d., is obvious from the start and we can recommend readers to make use of this trouble-saving device.

The "1930 Clarion Three"

FULL DETAILS
NEXT WEEK



A SEAMAN on the s.s. *Davision* recently informed the B.B.C. that he had heard the national programmes (261 metres) at an actual distance of 2,380 miles. Up to 1,800 miles with a three-valve set he was receiving them on a loud-speaker.

Rio Grande, the first choral work in which pure jazz technique is used, will be broadcast from Belfast on March 12. An old lady who listened to the gramophone records of this Constant Lambert work, broadcast from 2LO, was heard to say: "What a pity they didn't stop the workmen hammering in the hall during the performance!" This statement summed up her impression of the passage for solo piano and percussion instruments.

On March 15 the London and Daventry 5XX stations will relay excerpts from Gilbert and Sullivan's comic opera *The Yeoman of the Guard*, which is being revived at the Savoy Theatre.

Listeners who are familiar with either the stage or broadcast version of *Journey's End* may look forward to an interesting transmission on March 25, when *Brigade Exchange*, the German war play, is to be put over the ether. The scene of the action is, as the title indicates, the dug-out of a brigade telephone exchange, and the greater part of the story is gathered from scraps of conversation heard over the "lines." It was specially written for the "mike" by Ernst Johannsen, and in Munich it was produced and broadcast by ex-service men.

Again on February 28 we are to hear sea shanties, following the dinner of the Seven Seas Club at the Hotel Cecil. Prior to the performance a short speech will be made by Captain Unwin, V.C., R.N., the commander of the *River Clyde*, which played so important a part in the Gallipoli landing.

Apparently some old songs—if old enough—are new to some listeners, for, following an old folks programme from 5GB, a listener sent an appreciative letter in which a request was made that a certain item should be repeated. From the description given the Birmingham studio staff identified it as "Annie Laurie."

Possessors of short-wave receivers should make a point of picking up the transmissions of the Zeesen (Königswusterhausen) station on 31.38 metres. The Berlin short-waver may be heard working daily from

2.20 to 3.20, 4.50 to 6.20, and from 8.20 p.m. to 12.20 a.m. G.M.T. Twice weekly, in addition to the above broadcasts, a night concert is also given.

Notwithstanding the fact that some of the Continental papers continue to publish the programmes of Radio-Luxembourg, it is definitely stated that the station has closed down for an indefinite period.

Lovers of Wagnerian opera will be interested to learn that the Vienna broadcasting station will relay from the State Opera House the four operas constituting *The Nibelungen Ring*, namely, *Rhinegold*, *Valkyrie*, *Siegfried*, and the *Twilight of the Gods*, on March 1, 2, 5, and 9.

From time to time when listening to Rome you may hear a trumpet call; this is not an interval signal, but an advertisement put out by a manufacturer of motor accessories.

The Vienna new interval signal is working well. If you hear a metronome-like ticking in groups of, say, six "ticks" you will know that there is a six minutes pause in the programme. Every minute the number of ticks is reduced by one, thus informing you how much longer you may be called upon to stand by. At the end of the period a continuous ticking indicates that the entertainment is about to be resumed. And from experience we find that you may then still wait some.

The power of the Leipzig transmitter has been raised some 30 per cent., and tests are now being carried out with the new plant. As the alterations could only be carried out at odd times when the station was "resting," there is a possibility that for the next week or so the transmissions may not appear to be at their best.

The Lodz (Poland) 2-kilowatt relay station started operations on February 1 last. As it is broadcasting on 233.8 metres, a wavelength reserved to Poland and temporarily lent to Münster (Germany), the latter station is at present without a home. The matter is to be remedied so soon as possible by the adoption of a common wave (227 metres, 1,319 kilocycles) by Cologne, Münster, and Aachen, which daily broadcast the same programme. Such an arrangement is made possible, as is the case with Berlin East, Magdeburg, and Stettin, by the quartz-crystal control system.

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LETTERS TO THE EDITOR



The Editor does not necessarily agree with the views expressed by correspondents.

Correspondence should be brief and to the point and written on one side of the paper.

"Using Different Speakers"

SIR,—Under the above heading in your issue dated February 1 we note a reply which appears to us either not quite adequate or somewhat incorrect, and we should therefore like to make the following comments:—

The point we have in mind is that one of your correspondents complains that when using a Ferranti output transformer in a certain case the current consumption increases from 10 milliamps to 16 milliamps, or, in other words, he is getting more H.T. on his valve and he should, therefore, get a much improved result.

To reduce this consumption the best procedure should be to increase his grid bias, provided, of course, that he is not using more than is recommended by the makers. The resistance of the primary winding of one of our output transformers is usually about 260 ohms, so that the voltage on the output valve may be considered to be very nearly the same as the actual total H.T. available and grid bias should be applied accordingly.

If this results in too great a drain on the battery, the best procedure seems to be to increase the grid bias, but we feel that the first recommendation should be, if possible, to use a battery of sufficient size.

The point we particularly wish to stress is that the recommendation contained in your reply to fit a choke filter to reduce the consumption can only have the effect indicated if the choke is a bad one having a very high resistance, as, if it is a good one having a low resistance, as in the case of the Ferranti output transformer, its effect on the H.T. consumption is nil.

FERRANTI, LTD.

Reaction Overlap

SIR,—In the issue of "A.W." dated February 15 Mr. Alan S. Hunter, in the article entitled "Secrets of Tuning," deals with the cure of reaction overlap. It is remarkable that he does not mention the real cure for this trouble at all, which consists of fitting a potentiometer across the L.T. battery and connecting the lead from the grid leak to the slider.

It is well known to all who, like myself, have experimented considerably upon this particular point, that the type of valve used as detector, the system of reaction control employed, the H.T. potential applied to the detector anode, the resistance of the grid leak and a number of other things, all have an effect upon

reaction overlap, and all need attention in any attempt to get rid of this trouble. When, however, all that is possible has been done in every other direction, the ideal condition in which the set glides *absolutely imperceptibly* into and out of oscillation is, in my experience, never quite attained in the absence of potentiometer control of the detector grid potential. With a potentiometer this ideal state of affairs is not usually difficult of attainment, provided that reasonable attention is given to other adjustments and with a possible exception in cases where reaction control is by means of a variable coupling device between two coils, and especially where one reaction coil has to function over both the lower and upper broadcast bands of wavelengths.

The cure recommended is cheaper than a new valve, and it may be remarked that those who adopt it will find that the setting of the potentiometer which gives absolute freedom from reaction overlap, and is ideal for searching and for the reception of very weak transmissions, differs considerably from the setting which gives the best quality reproduction when a strong transmission is being received. In the latter case the grid needs the application of more positive potential, usually somewhere about +2 volts as against +1.5 volts, or even less for the former.

J. H. S. F. (Sidcup).

SIR,—Reaction overlap is sometimes caused by an excessive positive potential on the grid of the detector valve. A potentiometer, as suggested by J.H.S.F. (Sidcup) will cure overlap so caused. This applies with considerably more force to 4- and 6-volt valves than to 2-volters. Most 4- and 6-volt valves will give smoother reaction when the grid bias is reduced. But many 2-volt valves lose in sensitivity when the grid bias is reduced below that applied with the grid leak connected to the positive side of the filament battery.

Another method of obtaining reaction without overlap is to utilise the anode-bend system for rectification. This gives wonderfully smooth reaction.

ALAN S. HUNTER (London).

The Sunday Programmes

SIR,—You will remember some time ago the anniversary programmes of St. Francis of Assasi. All-day dronings, then a children's service from St. John's, in Westminster Square, and more religion

from a Scotch church. We were all fed up, and I tried Daventry 5XX, but it was still the same old dirge. I swung the condenser to Königswausterhausen and got some lively stuff. Why not get rid of this "How happy we shall be, when we are dead" Sunday idea? Let us have some cheery items! W. M. (Glasgow).

"Raucous Reg" and "Noisy Nat"

SIR,—I should like to say I think "Thermion's" idea to remedy the mess made by "Raucous Reg" and "Noisy Nat" are fine. What about a petition to the B.B.C. asking it to reduce the power of these two stations to 6 kilowatts each? This should be strong enough to give good results, seeing how foreigners using this power come in here. Also, the B.B.C. could increase 5XX to 50 kilowatts for crystal users.

I have a "Mullard Master 3," a set which I think is as good as any made. When the above two stations are going it is fearful. I have tried all sorts of dodges to cut these out or reduce them, but it is hopeless. The foreigners are still there, but there is no attraction now in having B.P. forced through the loud-speaker.

So, if you can do anything towards getting their power reduced, which is the only remedy that I can see, you will earn the gratitude of thousands who used to listen in peace to other stations.

R. C. T. (Acton).

"Transmission Vagaries"

SIR,—"Thermion" must, I imagine, be feeling pleased with himself. The chief engineer of the B.B.C. has indeed tackled him, but has failed to prevent "Thermion" from scoring.

For one thing, the chief engineer evidently thought "Thermion's" complaint to be one of which it was necessary to take notice. And he is right. The cat is let out of the bag by the last sentence of the last paragraph of the engineer's letter. It is difficult to understand what sort of musician the man must be whose job it is to effect the "compromise" referred to. Is he an ex-Italian organ-grinder, or is he deaf? The fourth movement of Brahms's symphony, relayed from the Queen's Hall last night sounded, for the most part, as if it came from within a box covered by a blanket. It was as if the phenomenon of severe fading had attacked a 5XX transmission. It never occurs when jazz is on!

The fact is that there is never a concert transmission sent out that is not spoilt by the control-room. And another fact is that all the chief engineer can do is to ask that "anyone who can suggest a better method" should come to the rescue of the B.B.C. and do their business for them.

W. E. H. (Seaford).

The Swamp Area

SIR,—Thank you sincerely for championing the cause of the unfortunate residents in the first "swamp" area. Apart

from writing to the B.B.C. and the P.-M.G. what else can we do? I am awaiting a reply from the latter, but not expecting one from the former. Why should it worry so long as it has the monopoly? When will it realize that it is our servant and not master? Never, I fear, until the long suffering and patient listeners deluge the B.B.C. with letters of protest.

In this district both the Brookmans Park transmissions come in all round the dial at such strength that the ordinary set will neither separate nor lose them.

The B.B.C. remedies are useless except for the purposes of separating them. But I maintain that the B.B.C. should not be in a position to be able to say in effect—you must, if you listen, receive our programmes. We will not allow you to listen to any foreign stations while we are broadcasting. If you want other programmes you must scrap your existing sets and purchase much more expensive ones. Anyhow, whatever you do, you must spend some more money even to make your present sets capable of receiving one of our two programmes even though it may be inconvenient for you.

That is actually the position and will apply to probably 90 per cent. of set owners. Scandalous is a fair description of such a state of affairs. I am quite sure people are not bothering much about it yet. They may not happen to be listening

when both transmissions are going out together. But after about a week of trying to listen to one programme they will wake up.

P. E. T. (London, E.)

The B.P. Transmissions

SIR,—I have just been reading a note of "Thermion's," "How Do You Like It?" Personally, I like it very well indeed. I live within three miles of Brookmans Park and have no difficulty in separating the two transmissions. I grant that I cannot get any other station while B.P. is on.

My aerial is about 60 ft. long, rising from the lead-in to about 4 ft. at the other end. The set is an anode-bend detector with no reaction and one L.F. stage. The quality and volume in my opinion, are very good. So much for valve sets.

I have made several crystal sets and find, by using a shorter aerial—say, of 40 ft.—the two B.P.'s can be separated.

Quite a number of my friends find no difficulty in doing the same; but, on the other hand, a lot cannot separate the two programmes without a rejector or wave-trap, and some not then.

I think that in most cases in this district if persons would alter their sets to anode-bend, put a fixed condenser in the aerial, and shorten their aerials, or have indoor ones, in most cases there would be no cause for complaint. H. J. B. (Hatfield.)



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GREAT BRITAIN											
25.53	11,751	Chelmsford (5SW)	15.0	255	1,175	Toulouse (PTT)	1.5	*441	680	Rome (Roma)	50.0
*200	1,500	Leeds (2LS)	0.13	265	1,132.2	Lille (PTT)	0.7	453	662	Bolzano (IBZ)	0.3
*242	1,238	Belfast (2BE)	1.0	268	1,121	Strasbourg	0.5	*501	599	Milan (Milano)	7.0
261	1,148	London (2) tests	30.0	*272	1,102	Rennes (PTT)	0.5	LATVIA			
*288.5	1,040	Newcastle (5NO)	1.0	286	1,049	Radio Lyons	0.5	*525	572	Riga	7.0
288.5	1,040	Swansea (5SX)	0.13	293	1,022	Limoges (PTT)	0.5	LITHUANIA			
288.5	1,040	Stoke-on-Trent (6ST)	0.13	*293	1,022	Montpellier (PTT)	0.3	1,035	155	Kovno	7.0
288.5	1,040	Sheffield (6LF)	0.13	304	986	Bordeaux (PTT)	1.0	NORTH AFRICA			
288.5	1,040	Plymouth (5PY)	0.13	307.6	975	Radio Vitus	1.0	303	828	PTT Algiers	12.0
288.5	1,040	Liverpool (6LV)	0.13	311	964.5	Agen	0.25	416	720.9	Radio Maroc (Rabat)	2.0
288.5	1,040	Hull (6KH)	0.13	*316	950	Marseilles (PTT)	0.5	1,350	222.2	Tunis Kasbah	0.5
288.5	1,040	Edinburgh (2EH)	0.35	329	914	Grenoble (PTT)	0.5	364	824	Bergen	1.0
288.5	1,040	Dundee (2DE)	0.13	331.1	905	Poste Parisien	0.5	385	770	Frederiksstad	0.7
288.5	1,040	Bournemouth (6BM)	1.0	368	815	Radio LL (Paris)	0.5	445	674	Rjukan	0.18
288.5	1,040	Bradford (2LS)	0.13	*381	788	Radio Toulouse	8.0	453	662	Tromsø	0.1
*301	995	Aberdeen (2BD)	1.0	447	671	Paris (Ecole Sup. PTT)	3.0	453	662	Aalesund	0.3
*310	968	Cardiff (5WA)	1.0	468	640	Lyons (PTT)	5.0	453	662	Porgrund	0.7
356	842	Brookmans Park	30.0	1,444	207.5	Eiffel Tower	12.0	*403	608	Oslo	00.0
*377	797	Manchester (2ZY)	1.0	*1,725	174	Radio Paris	12.0	POLAND			
*390	753	Glasgow (5GC)	1.0	218	1,373	Flensburg	0.5	214	1,400	Warsaw (2)	1.0
*479	626	Daventry (5GB)	25.0	*227	1,319	Cologne	0.5	233.8	1,285	Lodz	2.0
1,564	193	Daventry (5XX)	25.0	*234	1,283	Munster	3.0	*313	959	Cracow	0.5
AUSTRIA											
*246	1,220	Linz	0.5	*239	1,250	Nürnberg	2.0	385	779	Wilno	0.5
*283	1,058	Innsbruck	0.5	*246	1,220	Cassel	0.25	*385	779	Lemberg (tests)	0.5
*352	851	Graz	7.0	*247	1,215	Kiel	0.35	*408	734	Kattowitz	10.0
*453	666	Klagenfurt	0.5	*253	1,184	Gleiwitz	2.0	1,411	222.5	Warsaw	8.0
*517	581	Vienna	15.0	*259	1,157	Leipzig	1.5	*387	775.2	Bucharest	12.0
BELGIUM											
206	1,460	Antwerp	0.4	*270	1,112	Kaiserslautern	0.25	RUSSIA			
216	1,391	Nerviers	0.25	*276	1,085	Königsberg	2.5	720	426	Moscow (PTT)	20.0
220	1,364	Charleroy (LL)	0.25	*283	1,058	Magdeburg	0.5	938	320	Moscow (C.C.S.P.)	50.0
244	1,220	Binche	0.25	*283	1,058	Berlin (E.)	0.5	1,000	300	Leningrad	20.0
244.7	1,226	Ghent	0.25	*283	1,058	Stettin	0.5	1,056	284	Tiflis	10.0
246	1,220	Schaerbeek	0.25	*315.8	951	Bremen	0.35	1,100	272	Moscow Popoff	40.0
291.4	1,029	Lige	0.1	*320	937.6	Dresden	0.25	1,100	272	Moscow Popoff	40.0
339	887	Vilthelm	8.0	*325	923	Breslau	1.5	*1,304	230	Khartoum	25.0
*509	590	Brussels	1.0	*372	806	Hamburg	1.5	1,380	217.5	Bakou	10.0
CZECHO-SLOVAKIA											
*263	1,139	Moravska-Ostrava	10.0	*390	770	Frankfurt	1.5	1,481	202.5	Moscow (Kom)	40.0
*270	1,076	Bratislava	12.5	*418	716	Berlin	1.5	SPAIN			
*293	1,022	Kosice	2.0	*453	662	Danzig	0.25	208	1,121	Barcelona (EAJ13)	10.0
*342	878	Brunn (Brno)	2.4	*456	657	Aachen	0.35	*343	860	Barcelona (EAJ1)	8.0
*487	617	Prague	5.0	*473	635	Langenberg	13.0	274	1,094	Seville (EAJ5)	1.5
DENMARK											
*231	1,067	Copenhagen (Kjbenhavn)	0.75	*533	563	Munich	1.5	426	703	Madrid (EAJ7)	2.0
1,158	260	Kalundborg	7.5	*560	536	Hanover	0.35	459	653	San Sebastian (EAJ8)	0.5
ESTHONIA											
*298	1,013	Reval (Tallinn)	0.7	560	536	Augsburg	0.25	SWEDEN			
FINLAND											
*221	1,355	Helsingfors	0.9	569	527	Freiburg	0.35	281	1,301	Malmö	0.6
*1,796	167	Lahti	40.0	*1,635	183.5	Zeelen	30.0	*257	1,100	Hörby	10.0
FRANCE											
31.05	9,479	Radio Experimental (Paris)	1.0	1,620	185.2	Norddeich	10.0	270	1,112	Trollhättan	0.04
175	1,714	Cannes (8FY)	1.0	HOLLAND							
175	1,714	S. Quentin	0.1	5120	9,620	Eindhoven (PCJ)	30.0	*322	932	Göteborg	10.5
187	1,605	Radio Flandres	0.1	*208	1,004	Huizen (through Hilversum) until 5.40 p.m. G.M.T.	6.5	332	905	Falun	0.5
195	1,539	Tourcoing	0.1	*1,071	280	Huizen (through Hilversum)	6.5	*512	689	Stockholm	1.5
212	1,415	Beziers	0.1	*1,071	280	Huizen (through Hilversum)	6.5	*770	354	Ostersund	0.6
212.4	1,412	Fécamp (Radio Normande)	0.5	*1,071	280	Scheveningen Haven	5.0 (from 10.30 a.m. to 5.40 p.m. G.M.T.)	1,200	389	Boden	0.6
238	1,260	Bordeaux (Radio Sud-Ouest)	1.0	*1,348	222.5	Motala	30.0	SWITZERLAND			
240	1,250	Nimes	0.25	*403	743	Berne	1.0	*450	653	Zurich	0.63
248	1,111	Juan-les-Pins	0.5	680	442	Lausanne	0.6	700	395	Geneva	0.25
GERMANY											
218	1,373	Flensburg	0.5	1,010	297	Baslo	0.25	TURKEY			
*227	1,319	Cologne	0.5	*1,230	243.9	Stamboul	5.0	1,552	193.3	Angora	7.0
*234	1,283	Munster	3.0	YUGOSLAVIA							
*239	1,250	Nürnberg	2.0	366.3	979.3	Zagreb (Agram)	0.7	429	698	Belgrade	2.5
*246	1,220	Cassel	0.25	574.7	522	Ljubljana	2.5	IRELAND			
*247	1,215	Kiel	0.35	ITALY							
*253	1,184	Gleiwitz	2.0	291	1,030	Turin (Torino)	7.0	NETHERLANDS			
*259	1,157	Leipzig	1.5	*330.5	907.7	Naples (Napoli)	1.5	PORTUGAL			
*270	1,112	Kaiserslautern	0.25	*355	779	Genoa (Genova)	1.0	SPAIN			
*276	1,085	Königsberg	2.5	SWITZERLAND							
*283	1,058	Magdeburg	0.5	TURKEY							
*283	1,058	Berlin (E.)	0.5	YUGOSLAVIA							
*283	1,058	Stettin	0.5	NETHERLANDS							
*315.8	951	Bremen	0.35	PORTUGAL							
*320	937.6	Dresden	0.25	SPAIN							
*325	923	Breslau	1.5	SWITZERLAND							
*360	833	Stuttgart	1.5	TURKEY							
*372	806	Hamburg	1.5	YUGOSLAVIA							
*390	770	Frankfurt	1.5	NETHERLANDS							
*418	716	Berlin	1.5	PORTUGAL							
*453	662	Danzig	0.25	SPAIN							
*456	657	Aachen	0.35	SWITZERLAND							
*473	635	Langenberg	13.0	TURKEY							
*533	563	Munich	1.5	YUGOSLAVIA							
*560	536	Hanover	0.35	NETHERLANDS							
560	536	Augsburg	0.25	PORTUGAL							
569	527	Freiburg	0.35	SPAIN							
*1,635	183.5	Zeelen	30.0	SWITZERLAND							
1,620	185.2	Norddeich	10.0	TURKEY							
HOLLAND											
5120	9,620	Eindhoven (PCJ)	30.0	YUGOSLAVIA							
DENMARK											
*208	1,004	Huizen (through Hilversum) until 5.40 p.m. G.M.T.	6.5	NETHERLANDS							
*1,071	280	Huizen (through Hilversum)	6.5	PORTUGAL							
*1,071	280	Scheveningen Haven	5.0 (from 10.30 a.m. to 5.40 p.m. G.M.T.)	SPAIN							
*1,348	222.5	Motala	30.0	SWITZERLAND							
*403	743	Berne	1.0	TURKEY							
*450	653	Zurich	0.63	YUGOSLAVIA							
680	442	Lausanne	0.6	NETHERLANDS							
700	395	Geneva	0.25	PORTUGAL							
1,010	297	Baslo	0.25	SPAIN							
*1,230	243.9	Stamboul	5.0	SWITZERLAND							
1,552	193.3	Angora	7.0	TURKEY							
366.3	979.3	Zagreb (Agram)	0.7	YUGOSLAVIA							
429	698	Belgrade	2.5	NETHERLANDS							
574.7	522	Ljubljana	2.5	PORTUGAL							

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CHIEF EVENTS OF THE WEEK

LONDON AND DAVENTRY (5XX)

Mar. 3 Vaudeville programme.
 " 4 De Courville's Hour (1).
 " 5 Czecho-Slovakian National programme.
 " 6 *The Frying Pan*, a play by C. J. Cutcliffe Hyne.
 " 7 Symphony concert relayed from Queen's Hall.
 " 8 Running commentary on Rugby International, Wales v. Ireland, S.B. from Swansea.

DAVENTRY EXPERIMENTAL (5GB)

Mar. 2 String orchestral concert.
 " 5 *Brighter Broadcasting*, a revue intime.
 " 7 Vaudeville programme.

MANCHESTER

Mar. 5 *The Greater Law*, a comedy by Leonard C. White.
 " 8 Popular orchestral concert.

A nation-wide assembly of Boy Scout patrols is being arranged co-operatively by James E. West, chief executive director of the boy scouts of America, and the Columbia Broadcasting System, so that every boy scout in America may hear President Hoover's address which will be carried over the coast-to-coast network of the Columbia system on March 10, at 9 p.m. Eastern standard time.

The Columbia Broadcasting System and the National Broadcasting Company in America have received over 40,000 letters during one week from enthusiastic radio listeners commenting on the success of the five-power naval conference broadcast from London.

BY THE WAY

Jottings From My Log

By JAY COOTE

A NOTEBOOK by the side of the wireless receiver is not a luxury, but a necessity, for it is always wise to scribble down some dial reading on which a mysterious sound has been heard or a few details regarding a transmission to be picked up.

Take, for instance, a night or so ago, when above Radio Toulouse I heard what appeared to me to be a few words in Polish. At the time I could not spare the leisure to identify the station, but I have since ascertained that it was the new Lemberg 2-kilowatt relay on 385.1 metres, which was brought into operation last month. If you do hear its call, the native name of Lvov (pronounced *Lvouff*) will be used. I understand that the plant is of a temporary nature, because this important Polish city is to be endowed towards the autumn with a "man-size" 16-kilowatt. At Warsaw also a further small station has been opened on 214 metres, to take the capital programmes. It has been installed in the city to give better crystal reception to local listeners. As, however, the two stations are working on such different wavelengths—namely, 214 metres and 1,411 metres—Warsaw is hopeful of getting alternative programmes in the very near future.

Poland has now added the eighth station to its broadcasting net, that of Lodz, a 2-kilowatt relay on 233.8 metres. In view of the fact that this wavelength, lent to Münster, is being taken up by its rightful owners, the German must find another home without delay.

Luxembourg Signs-off

By the way, if you have lost Radio Luxembourg for the last week or so don't blame the set, as this station has signed off until further notice. From what I learn unofficially, the wavelength of 223 metres was allotted to the Grand Duchy, as a State, and objection has been raised by the authorities to its use by a private transmitter. Possibly the matter may be amicably adjusted shortly, as the studio was greatly appreciated in both that little buffer State and Belgium.

On looking at my notes, I find a reference to the Belgian National Anthem, picked up from Turin—on some evenings. The explanation is a simple one: the Princess of Piedmont—you must recall the recent Italian royal wedding—is the daughter of King Albert of Belgium, and Turin is the chief city of *Piemonte* (Italy). "La Brabonconne" is played in her honour.

I was given a puzzle to solve this last week-end; it was what appeared to be an American transmission in the early part of the evening on a wavelength between those

of Munich and Ljubljana. From all accounts, it might have been a variety show, musical comedy, or cabaret, all with an audience and as interpreters true Americans with real talkie accents. It was, in fact, an excerpt, relayed by Budapest from a local cinema house of the film, *Rio Rita*. Curiously enough, some time ago Oslo carried out similar transmissions. But you must admit it's mystifying at the time.

Those Powerful Russians!

Have you noticed with what terrific power the Russian stations come in just now? Kharkov an evening or so ago gave me for some twenty minutes an excellent piano recital at full loud-speaker strength; and there appears to be no difficulty in listening to Moscow on 938 metres. You might try for that station on a Monday, Wednesday, or Saturday at 7.30 p.m. G.M.T. You will hear somewhat colourful and idealistic descriptions of life under Soviet rule broadcast in German and Esperanto. Knowing what we do—well, more than one grain of salt is needed to assist in swallowing these yarns. They are, however, peculiarly interesting.

AT THE QUEEN'S HALL

A PIANOFORTE concerto by Béla Bartók provided an educative opportunity and a contrast at the concert on February 14. The composer himself was the soloist. The B.B.C. gives us many opportunities of hearing these latest musical experiments. They are probably not great music, but they are interesting, and they are increasing our mastery of musical technique; it is proper, therefore, that they should be heard occasionally.

The rest of the programme consisted of old masters. Luckily, Brahms' "Second Symphony" was placed between Mozart and percussion. Sir Henry J. Wood was in good form and the audience showed its appreciation of this popular conductor.

L. R. J.

Leaders of the advocacy of a Scottish Advisory Board for the B.B.C. have reached the length of putting forward the names of those whom they would regard as suitable members of such a committee. One list provides for thirteen members, with Sir John Stirling Maxwell as chairman, and, among others, a Scottish law lord, two professors, the principal of the Scottish Academy of Music, two eminent medical men, the Provost of Inverness, and three ladies to deal with feminine topics.

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"NEW PROGRAMMES—IF YOU LISTEN ON THE SHORT WAVES"

(Continued from page 333)

compare the outlay with the number of new programmes available you'll find it's good value for money.

There are two things you *must* observe. The short-wave set should be fully screened, or its control will be very difficult: for the same reason, slow-motion dials must be fitted to all the condenser controls. Capacity, and not moving-coil, reaction is absolutely necessary, of course.

Ripple-free H.T.

The second point is that the high-tension supply must be quite ripple-free. Dry batteries and accumulators are usually "safe" in this respect, unless the set is too near to noisy mains leads. A few eliminators are definitely unsuitable for short-wave working, and their failing has reflected on all those of good make; hence the generally false impression that mains-users have a rough time when it comes to short-wave listening.

Now comes the all-important point, namely, the choice of the circuit and set. Presumably you will make one up, and on looking back through the issues of AMATEUR WIRELESS for the past nine or ten months, you will find many outfits which are suitable for use on the waveband below 100 metres.

Shall it be a "two" or a "three"? One-

valvers, even, are satisfactory propositions on the "wavelets," provided you don't expect too much from them. The limitations of each type are these: a one-valver will not operate a loud-speaker, even on such giant stand-by stations as PCJ and PHOHI, but it will work quite well with 'phones, if you don't mind wearing them.

Useful Pentodes

A two-valver is more useful in that it will work a loud-speaker at normal broadcast strength on about half a dozen short-wave bands; some of the Americans can oftentimes be heard at loud-speaker strength. But 'phones will also have to be used if the full scope of the set is to be taken advantage of. You can, if you like, use a pentode instead of an ordinary power valve in the low-frequency stage, and this will both increase the number of "loud-speaker" stations, and will boost up the strength of those receivable on the speaker at present. There are plenty of advantages in using a pentode on the L.F. side of a short-wave set; remember, you'll need at least 150 volts to work such a valve, though.

A three-valve set will have either two low-frequency stages and a leaky-grid detector or an H.F. stage and only one L.F. amplifier. Some two or three years ago it was considered impossible to work an H.F. valve below 200 metres, and this was probably true with the components and circuits then available: there are still

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Copies of the "Wireless Magazine" and of "Amateur Wireless" containing descriptions of any of these sets can be obtained at 1s. 3d. and 4d. respectively, post free. Index letters "A.W." refer to "Amateur Wireless" sets and "W.M." to "Wireless Magazine" sets.

AMATEUR WIRELESS 58-61 FETTER LANE LO DO I.E.C.4

"NEW PROGRAMMES-IF YOU LISTEN ON THE SHORT WAVES"

(Continued from page 350)

people who will tell you that H.F. is no good on the short waves.

That they are quite wrong is proved by the fact that in the hands of AMATEUR WIRELESS readers several sets with H.F. stages—and screen-grid H.F. stages, too—are giving excellent results. There are people who think that the only advantage of an H.F. valve at high-frequencies is to make tuning and reaction control easier than with a plain detector and aerial circuit. This advantage is gained, and with modern sets there really is an added "punch" gained from a stage of shielded-valve H.F. If possible, you should select a circuit incorporating an S.G. H.F. stage.

There should be plenty of metal about a short-waver. A metal panel is a great advantage, and the only reason that all short-wavers are not so constructed is cost and constructional difficulties. A metal cabinet, too, is very useful. If a short-waver is properly shielded and has good slow-motion controls, then it will be no more difficult to handle than a broadcast set.

Some Circuit Points

There are one or two little points, to be looked for in the circuit. So far as the circuit arrangements permit, the variable condensers should all have one side at earth potential. If you think this out, you will see that this isn't difficult to arrange. The tuning condensers always have one set of vanes earthed; the reaction circuit can be similarly wired, and an "above-earth" reaction condenser is a bad fault; with suitable coupling the H.F. tuning condenser (if one be used) can also have one set of vanes to earth.

A good short-waver will nearly always have a potentiometer by which control of the detector grid voltage is possible. If transformer coupling is used on the low-frequency side, then a stopper resistance in the grid lead to the transformer secondary is a good point. This little H.F. stopper can sometimes be so effective that an H.F. choke can be dispensed with, which is an advantage; the stopper resistance should have a value of about 100,000 ohms, but follow the circuit designer on this point.

Short Earth

Outside the set itself, you should take particular note of the aerial and earth. A good, short earth is an advantage, not so much because of the need for a low-resistance aerial-earth system for good aerial voltage (which means useful signal strength), but because a high-resistance earth places the whole set at a considerable capacity above earth, and hand-capacity effects will be a bother. If you ever do have trouble of this kind on a short-wave set—or, for that matter, with

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BROADCAST RECEIVERS. New R.A.F. 3-Valve semi-portable, 1 Det., 2 L.F., 3 anti-pong Holders, Remote Control, Variable Condenser and Rheostat and tested on Broadcast, 27/6, or with Cabinet Hornless Loud-speaker, 42/6; R.A.F. 5-Valve ditto, with Valves £3 10s.; or fitted in pol. mahogany cabinet with S.M. dials, £8 10s. 3-Valve L.F. Amplifiers, 30/-

CONDENSERS. Dabulier, .01 mfd., list 7/- each; sale, 1/8. New Sterling 2 mfd., genuine Mansbridge Condensers to 440 volts at reduced price of 2/1 only; ex. W.D., 2 mfd., 1.6. Bass Loud-speaker Condensers, .05, with 5 Taps, 5/-; Mains Smoothing 2 mfd., 1/9 Grid Condensers, any from .001 to .001, 8d. each.

HIGH VOLTAGE CONDENSERS. All guaranteed 500 volt, 4 mfd., 6/6; 8 mfd., 10/-; No. 20H, 1,000 volt .05 mfd., 2/6; 1,500 volt, 6 mfd., 12/6; No. 16B, 2,000 volt, 2 mfd., 22/6; No. 20C, 3,000 volt, 2 mfd. (oil) 45/-; No. 20FO, 10,000 volt, .0025 mfd., 3/6; No. 16A1, 20,000 volt, .002 mfd., 35/-; 1 mfd., 4,000 volts, 40/- No. 20DH, 30,000 volt, .0025 mfd., 10/- No. 16HV.

VARIA. CONDENSERS. Polar, Sq.-Law, .0003 mfd. 2/3; .0005 mfd., 3/-; list, 12/6. Atlas S.L.F. 3/8. Bebe Cydon Reaction, list 18/6. Panel 3-gang Triple, 5/6; list, 15/-. 1-hole fixing Variable Condensers, 2/-; Polar Rheo., 6d. Polar Panel 2-way Coil Holders, 2/-; list 7/6. Polar Variable H.F. Transformers; 300/500, 3/6; list 8/6. Polar Variometer and dial, list 21/- Sale 4/6. Polar Detectors, Everset, 1/-

MAINS SET PARTS. 200/250 Power Transformers with three centre-top secondaries. Hefty 200 watt H.T. and L.T. type suitable for a multi-valve set or a power amplifier. Usual price, 90/- Bargain Sale 55/- only. Small transformers, 220 v. to 3-, 5-, 8 v., 7/6 only. Small or Large Filter Chokes and Condenser Chokes at real bargain prices from stock. Mains Set Fuses, glass tube, 2 amps., 3d. each.

DYNAMOS. L.T. Charging. Aero, 12 volts, 250 watts, with auto cutout, 25/-; W.W., 20 volts 5 amps., 50/-; L., 12 volts 8 amps., 45/-; Ct., 18 volts 8 amps., 65/-; 50 volts 25 amps., £7 10s.; 80 volts 20 amps £8 10s., and Four 100 volt motors, 10/-. High Tension Charging Motor Generators 1 250 volts A.C. to 100 volts, 100 m/a., D.C., 70/-; Dynamos: 250 volts 4 amps., £3 10s.; 100 volts 4 amps., 35/-; H.T. Anode Motor Generators: 100 volts D.C. to 250 volts, 250 m/a., £10; 220 volts D.C. to 400 volts D.C., 200 m/a., £12. G.E.C. and B.T.H. 2-com. Aircraft Generators: 950 volts 60 m/a., and 8 volts 5 amps., £10; 600 volts m/a. and 8 volts 3 amps., 55/-. Fine Newton H.T. Generators, 3-kw., 2,000 volts, £30; Slow Speed Motor Generator, 1 kw., 2,000 volts, £24; 2 kw., 2,000 and 4,000 volts, £52. Large E.V. Megger Hand Generators 600 volts, £5.

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METERS. Milliammeters, B.T.H. panel, 15/-; 0 to 500, volts, 45/-. Weston Meters to 1,600 volts; Elliott and other Testing Sets, E.108, 4 ranges, amps. and volts, 45/-. G.E.C. Hot Wire, 1 amp., 4/-. Silvertown Galvos, 7/6. Relays, 7/6. Wind Speed Meters, 5/- Torpedo Gyroscopes, 15/-

TRANSMITTERS. With A.T.I. and all fittings in case, cost £15. 2-Valve Aircraft with Osram Valves, Speech or Morse, 49/-; Tapping Keys, No. 1, with massive contacts, 6/- each. Transmitting No. 51KD, with aluminium cover, double contact, fine work, 7/6 each. Morse Practice Sets, with Buzzer and Key on mahogany panel, 8/6 each. Spark Gaps, 2/-

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Parallel working. Fine adjustment. Worm driven. Coils cannot fall. Easy movement. Perfect finish. By Insured Post 4/6. Of all high class Radio Dealers, or Sole Makers:

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NO OTHER MICROPHONE OF EQUAL SENSITIVENESS KNOWN: each instrument finely black enamelled and fitted with a 3 ft. silk connecting cord. Despatched 8/6 by return post.

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almost any valve set—then suspect the earth.

The aerial should be as short as possible, for a long aerial won't tune down easily to the required wavelength. An indoor aerial is frequently sufficient. Anyway, make a test with an indoor wire before using the normal outdoor broadcast aerial, for you may find the former better.

The slogan of the short-waveite is "tune slowly." Perhaps you'll hear only one station during the first half-hour at the dials of a short-waver. The control is generally rather critical, and is a sign of a good set. The knife-edge tuning will come as a revelation to some people, and lucky is the man who can get such tuning on the broadcast band!

While the control is tricky, the actual signal strength on such stations as 5SW (except in some blind spots), PCJ and other high-power near-by stations should be considerable. The carriers should be sharp, coming quickly to a gigantic maximum and then waning almost instantaneously as the dials are turned. Don't waste time, at first, with faint squeaks; locate one or two of the big fellows, which will serve as a wavelength guide to the others.

There are new programmes to be heard on the short waves. Try a short-waver, and be convinced.

"Brookman's By-pass 3"—It should be noted that the wave-trap coil for the "Brookman's By-pass 3" should be 2½ in. in diameter, and not 2 in. as stated in the list of components.

Messrs. Tungram Electric Lamp Works (Gt. Britain), Ltd., makers of Tungram electric lamps and Tungram Barium valves, announce that from February 24, their Leeds branch was moved into larger premises at Britannia House, 74 Wellington Street (corner of Britannia Street).

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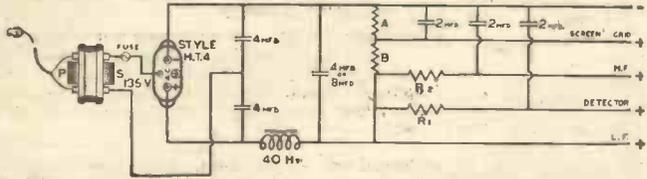
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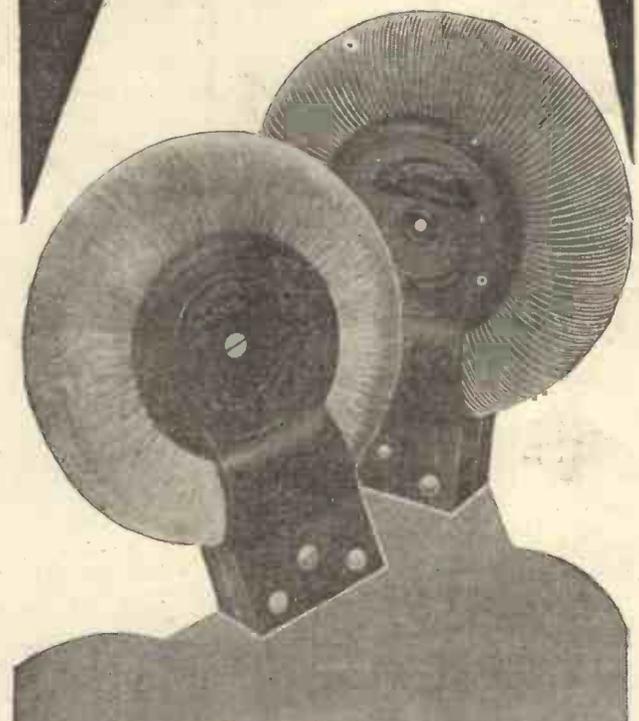
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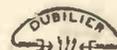


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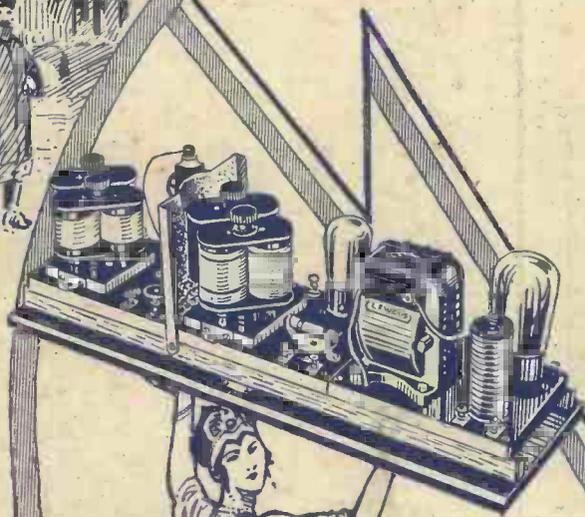
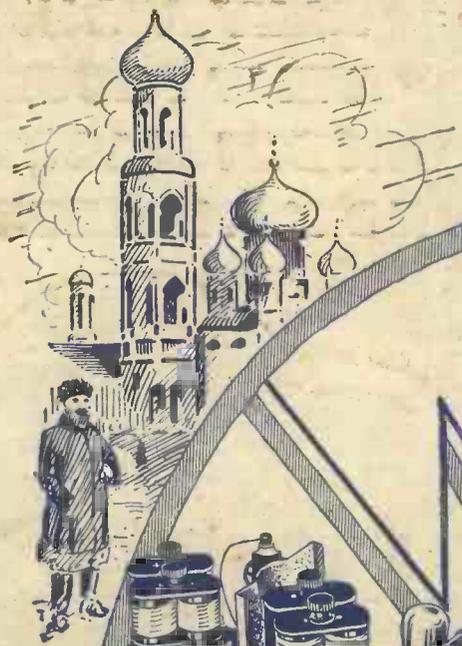
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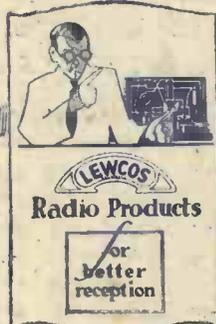
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