MORE ABOUT THE "AUTO-COUPLER 3"

QUALITY—AND SELECTIVITY TOO!

Amateur Wireless

and Radiovision

Every Thursday 3d

Vol. XVI. No. 407 Saturday, March 29, 1930

Registered at the G.P.O. as a Newspaper

MARCH 29, 1930 No. 407. Vol. XVI.

Amateur Wireless and Radiovision

The Leading Radio Weekly for the Constructor, Listener and Experimenter

Editor: BERNARD E. JONES | Technical Editor: J. H. REYNER, B.Sc., A.M.I.E.E. | Research Consultant: W. JAMES | Assistant Editor: H. CORBISHLEY

Radio Dancing—At the Queen's Hall, and—These "Diversions"—Loud-speakers at Our Stations—Short-waves in the Mountains!—A Radio 'Plane

PRINCIPAL CONTENTS

Radio Dancing—There is such a boom in dancing just now that an increasing number of people are asking why the B.B.C. does not help dancers more than at present. Of course, enough time is already given to dance music; though doubtless the dance music periods could be better arranged. What is wanted is radio dancing instruction. It was the famous Santos Casani who gave the first radio lessons of all the new steps, the Charleston, the Tango, the new waltz and so on; but whether he is too busy to broadcast just now, or whether there are no new steps, we don't know! The fact remains that radio dancing lessons, which could be properly utilised in the privacy of the home, would be appreciated by millions of listeners. B.B.C. please note!

At The Queen's Hall, and—There were some good things at the Queen's Hall on March 14 as may be seen from our criticism on another page. Few people who listened to Backhaus and to Bax's masterpiece, knew that the programme was being relayed to Frankfurt. The line used was that which is now normally employed for international SB's. Nine repeater stations were used, situated many miles apart along the phone line via La Panne, Ghent, Brussels, Liége, Aachen, and Cologne. Incidentally, did you like the international broadcast on a later occasion, namely, an exchange of modernist programmes between Germany, Belgium, and the B.B.C.? Many amateur critics confirm our view that the land-line relay was wonderful, but that the modern programmes . . .!

These "Diversions"—How do you like "Diversions," the new feature which is a regular thing now in the National programme? It was appropriate that the first "Diversion" should include a microphone tour of Brookman's Park. Future "Diversions" will be on the same lines as those you have heard and will consist of one or more outside broadcasts including the relays from theatres and music halls, and a number of topical items, some with a surprise interest, the whole programme being linked together by light music from a studio. It is a sort of "The 'Surprise Item' is dead. Long Live the 'Diversions'!"

Loud-speakers at Our Stations—Several railway stations in the British Isles, notably London Bridge, have installed loud-speakers for speedy communication of traffic news to passengers. Usually one microphone is installed in the main signal box, with another in the station-master's office. Loud-speakers are installed at platform entrances and in the booking hall. On the Continent this idea is in widespread use, and at the Central Station in Amsterdam a most successful installation has just been erected.

Short-waves in the Mountains!—A short time ago, two Argentine exploration engineers went on tour in the mountains in the Dolores. They took with them a short-wave set and loud-speaker (no phones), and at heights of many thousands of feet were able to receive satisfactorily many short-wavers well known to us, including KDKA, PCJ, and WGY. They should have brought back with them some interesting sidelights on short-wave receiving at DX ranges.

A Radio 'Plane—A keen radio "fan," Mr. J. S. W. Stannage, who did good work in finding the lost 'plane *Southern Cross* in Australia some time ago, has a 'plane fitted with special radio apparatus. He has carried out many important experiments in connection with radio reception in flight. The aerial is attached to the wings, as the trailing aerial is not so satisfactory, in his opinion, as the wing method. In flight, Stannage regularly receives a number of short-wave stations.

How budding officers learn about radio! An R.A.F. wireless van in use in the Bagshot area during the London University O.T.C. field day

SHORT - WAVE enthusiasts, devotees of what a writer in AMATEUR WIRELESS recently termed most happily "the sporting side of wireless," have had a very thin time for months past. There is not the slightest doubt that the whole cause of their troubles has been the unprecedented second outbreak of sunspot activity which occurred long after the time when the period of maximum activity should have been past and done with.

Week after weary week, then, we have twiddled our dials and strained our ears to endeavour to catch faint traces of speech and music from the distant parts of the world. And our efforts have been rewarded, if one can use the term rewarded, by nothing better, as a rule, than the finding of heaps and heaps of telephony carrier waves, which no feat of tuning would resolve into sounds of music or of intelligible speech. The carrier was there, but the modulation was conspicuous by its absence.

There were brighter patches, it is true, when one found old friends coming in fairly well as regards strength, but quick fading was more often than not fatal to the quality; and atmospherics were a terrible nuisance night in, night out.

Still, we have stuck it, knowing that that state of affairs could not last and that a better time must be in store. *That time has come.* I am sure that it is no mere flash in the pan, since from about the middle of February the improvement has been slow but steady. It was during the first whole week in March that a genuine return to "pre-depression" conditions occurred.

America Again!

Early in the week I sat down to my short-wave set hoping that I might be able to pick up a station or two. The first thing that I noticed was a complete absence of atmospherics, always a splendid sign when one contemplates exploring the short waves. The dial knobs are turned slowly. One listens. A carrier is heard. Can it be resolved? Rather to my surprise, this feat proves easy, for directly the set is brought just off the oscillation point clear speech is heard with the well-known accents of America. A few fine adjustments and the strength is up to excellent telephone volume. Every word is clear and there is but little fading. A reference to the calibration chart shows that it must be W8XK, which relays KDKA. And, sure enough, in a few minutes time there came the welcome words of the announcer: "This is KDKA, the station of the Westinghouse Electric Company at East Pittsburg."

Back to the Old Form

The evening, which had started so well, bore out its early promise. Several unidentified American and foreign stations were heard—for it is very hard to keep one's list of short-wave stations and their wavelengths up to date—and then came the real triumph. The General Electric Company's station at Schenectady, W2XAF, was not working when the first search was made, and I turned back to see if he had begun. He had, and *he was coming through with all the strength and clarity which used to be his three years ago.* Such was the strength that there was no need to find the carrier wave by letting the set oscillate mildly. Actually, the transmission was picked up in the first instance with quite a loose reaction coupling. Tuning-in was easy and, once this had been accomplished, splendid loud-speaker volume was obtained. There was a little fading, but nothing very serious.

A Fine Bag

The next station well heard was W3XAU, which relays WCAU from Philadelphia. This, though quite strong on the telephones, was just not up to loud-speaker volume. Going upwards, I found W2XAL, of New York, and a little below the top limit of the coils in use W2XBH, also a New York station.

On succeeding nights all of the stations mentioned were well heard, strength being maintained and atmospherics absent. Many other stations, too, were added to the bag. W8XK was found to be coming in so well on some evenings that excellent loud-speaker reception was possible at 9.30 p.m. in the evening. On Saturday night this station was transmitting a concert by a glee party, to which it was a real pleasure to listen. Both the solos and the part songs were splendidly heard in any part of a room of average size. The other Schenectady station, W2XAD, is not, as a rule, at his best unless the transmission takes place at a time when it is daylight in one country or the other. I have not been fortunate enough to pick up this station under such conditions lately, but I have heard him quite well when darkness prevailed at both ends. Amongst other stations which should be mentioned are Winnipeg, whose call-sign is CJRX, Oakland, California (W6XN), PLF and PLE in Java, the Kenya station (7LO), and a good many transmissions from the continent of Europe. On Saturday, March 8, at least four powerful French stations were at work in the neighbourhood of 48 metres.

An Ordinary Set

Readers may wonder whether I was using some very special short-wave set in order to obtain reception of this kind. May I assure them that I was not. The apparatus was a perfectly straightforward two-valver consisting of an ordinary grid leak-and-condenser detector valve transformer-coupled to a pentode. No high-frequency amplification was employed. If I had been using a higher ratio L.F. transformer between the detector valve and the pentode (mine was only a three-to-one), or two triode low-frequency stages, I should undoubtedly have obtained a considerable number of stations at fine loud-speaker strength. As it was, the simple set sufficed to give excellent telephone reception of heaps of stations and really good loud-speaker reproduction of not a few of them.

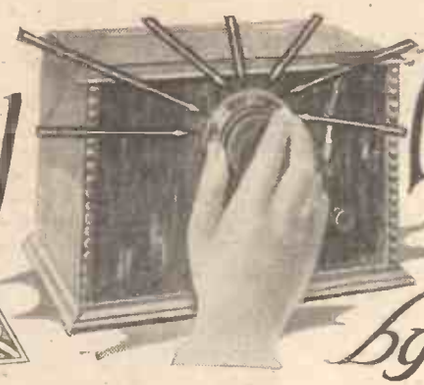
A Good Time Ahead

I believe that the short-wave transmissions are back with us once more and that from now onwards a good time awaits the man who makes use of his short-wave receiving set. This is a splendid prospect, for as the days grow longer and the nights shorter, long-distance work on the medium and upper wavebands becomes necessarily more and more difficult. The summer, though, has in past years been a good period for short-wave work, and now that solar activity is decreasing we should be able to look forward to a great period for DX work.

If you have laid your short-wave set aside in despair during the bad period, now is the time to bring it out from its resting-place. If you have not yet taken up the most sporting side of wireless, now is the time to build a short-wave receiver.

And here is a way out of his difficulties for the man who loves long-distance work, but is now prevented from indulging in his favourite hobby on the medium and upper wavebands by the regional transmitters.

How Selectivity Affects Quality



by W. JAMES

It is generally assumed that ultra-selectivity is bound to affect quality, but W. James shows in this article that this is not necessarily the case.

A RECEIVER having plenty of magnification, but poor selectivity, is of no great value in these days of numerous and powerful stations. There is no pleasure in receiving several stations at once nor, for that matter, in listening to speech or music from a set having too sharply tuned circuits.

In the first instance, too much is being passed to the detector, and in the second too little.

This first point is probably within the experience of us all. Everyone of us has, no doubt, at some time or other tried hard to separate two transmissions working on fairly well spaced frequencies, but have not succeeded in doing so. Had the stations been farther apart in their working frequencies, all would have been well. Further, the results would have been different

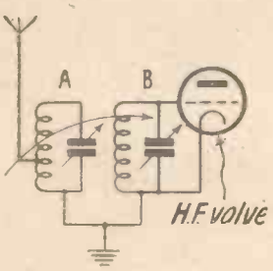


Fig. 2. A coupled aerial-grid circuit

had the relative strengths of the two stations been greater.

It is difficult to receive without interference a weak signal, say, 30,000 cycles away from the powerful local station, but probably an easy matter to hear either of a pair of weak signals having the same frequency separation. The term selectivity, whilst being understood, conveys very little. What is the selectivity of a certain set? Not so many units, but "at my house it will separate stations A and B, and is therefore selective."

That is generally how the performance of a set in regard to its tuning properties is described. The result is clearly confusion, as what one person considers to be very selective another will class as only moderately selective, according to previous experience.

What is needed is a tuning system which passes the whole of the broadcast from one station to the detector, excluding all signals outside this range. This brings us to the second point mentioned above, that too little may be passed to the detector.

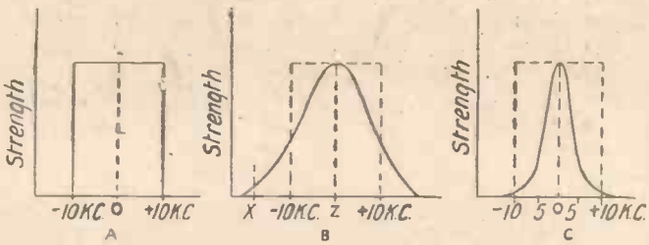


Fig. 1. Various tuning curves

A broadcasting station, according to the accepted theory, sends out a band of frequencies. The central frequency is the carrier, and is the one quoted in tables giving the frequencies of stations.

When a station is switched on, but is not actually broadcasting, only the carrier or central frequency is being radiated. But when a note having the frequency of, say, 1,000 cycles is produced before the microphone, two further waves are created. The frequency of one is 1,000 cycles more than that of the carrier, whilst that of the other wave is 1,000 cycles less than the carrier frequency. Musical frequencies cover a range of from below 50 cycles to 10,000 cycles or more; therefore, these frequencies may be present in a transmission when a band 20,000 cycles wide would be taken up.

In practice, the band may not be quite

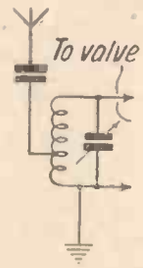


Fig. 4. An ordinary aerial circuit having a tapped coil and series condenser

so wide as this, but the point is that the tuning circuits of the receiver should be so constructed that the complete band of frequencies which is transmitted be passed to the detector.

If the overall tuning curve of the set had the shape of Fig. 1a the selectivity would be perfect, and given H.F. valves suitably adjusted an undistorted signal would be applied to the detector. This curve indicates that the tuned circuits pass equally well all currents having frequencies of up to 10,000 cycles above and below the carrier, whilst currents outside this range are not passed at all. Therefore a powerful station only 20,000 cycles away from the central frequency of Fig. 1a would produce no effect whatever.

The tuning curve of ordinary receivers is usually very different from that of Fig. 1a. Some have a tuning curve as indicated in Fig. 1b, whilst others have a curve more nearly like Fig. 1c.

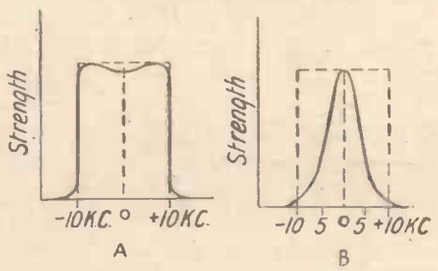


Fig. 3. (A) Tuning curves of properly adjusted coupled circuit. (B) Curve of a single circuit

Curve B is much wider across its base than curve A, but is not so wide at the top. Actually, the relative strength of the higher notes is less, and a powerful station having the frequency x may be heard as well as the station with the frequency z.

The amount of the relative reduction in the strength of the higher notes which can be tolerated depends upon several factors, but this curve is fairly good as regards quality. The higher notes are not weakened by tuning to any material extent in curve B, but the quality from a set having the tuning curve of Fig. 1c might be poor. Here a 5,000-cycle note has only one-quarter of its correct strength and the higher notes are proportionately weaker. The tuned circuits are reducing the higher

(Continued on next page)

notes, with the result that speech will sound boomy and music hollow and low-toned.

This shape of curve may be a result of too much reaction, and is evidently to be avoided in the interests of good quality of reproduction, besides which the selectivity is not so good as that indicated by curve A. The base of curve C is broad, but it is pointed.

Probably many sets are so adjusted that a curve of this shape would be produced by plotting the results of a test giving the input to the detector over a range of frequencies. Unfortunately, a single tuned circuit without reaction has a curve like Figs. 1B or 1C, according to its construction. With a very low-loss coil curve C would be obtained.

Effect of Adding Tuned Circuits

If there were two circuits, one being in the aerial circuit and the other in the anode circuit of a high-frequency amplifying valve, for example, the results would be better if the circuits separately had curves as Fig. 1B, for the effect of the two circuits would be to improve the selectivity without materially reducing the strength of the higher notes.

Two circuits having separate curves as Fig. 1C would tune very sharply, but the quality would be poor. The effect of adding tuned circuits is to reduce the width of the curve, and therefore, by using several tuned circuits having separately the curve of Fig. 1B, the resulting curve of the set may become far too narrow.

This effect is to be avoided by increasing the resistance of the separate circuits or by using correctly constructed band-pass filters.

With a number of tuned circuits of the right resistance a curve of approximately the ideal shape may be obtained. But it is probably cheaper to use a band-pass filter or several of them if the best selectivity and quality are desired.

A single-stage filter comprises a pair of coils and tuning condensers properly coupled together. The coupling may be magnetic or capacitative, or direct coupling may be used. A simple coupled circuit is illustrated by Fig. 2. Here the two coils are coupled, and in practice the position of one with respect to the other is adjusted until the right results are obtained. A coupled circuit may be included between the H.F. and detector valves, and it will, when adjusted, have a good tuning curve.

A typical curve is shown by Fig. 3A, whilst Fig. 3B is the curve of one of the circuits taken by itself. The curve of the coupled circuit is much wider at the top than Fig. 3B, and but for the slight dip and the rounded bottoms would be as Fig. 1A. It is much superior to the single circuits, but will only be so when the coupling is correct.

Few Controls

Thus, if the coils are too far apart the curve would be pointed, whilst if they are closer together than necessary to provide the band-pass effect a pronounced double hump appears. The best results would, no doubt, be obtained by making provision for adjusting the coupling as in the sets of five and six years ago; but this would, no doubt, be objected to in these days, when the number of controls is reduced to the minimum.

Fortunately, it is possible to use a twin condenser instead of the two separate ones of Fig. 2 and to find a value of coupling that holds good over the medium broadcast range. Thus, the coupled circuit is as easily handled as an ordinary single circuit, but it provides much better selectivity and a great improvement is to be noticed in the quality of the reproduction.

Voltage measurements show that strength may be lost, but, owing to the fact that the tuning curve has a good shape as compared with usual circuits, the reduction is not very marked. A filter circuit may show half the voltage across coil B that there is across coil A, Fig. 2, but as adjusted in practice the loss is not so great.

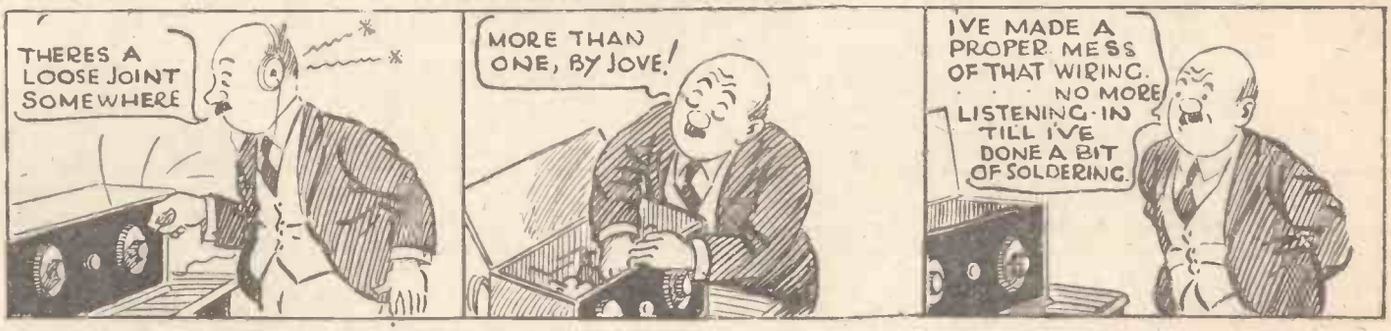
Normally a fixed condenser is used in the aerial circuit, as in Fig. 4. This may actually reduce the voltage to much less than that across coil B, Fig. 2. The tapping point in Fig. 4 would also most probably be lower than in Fig. 2 in order to improve the selectivity. This again reduces the strength, with the result that the actual output from the filter may exceed that which would normally be obtained from the tapped aerial coil of Fig. 4.

Advantages of the Filter Circuit

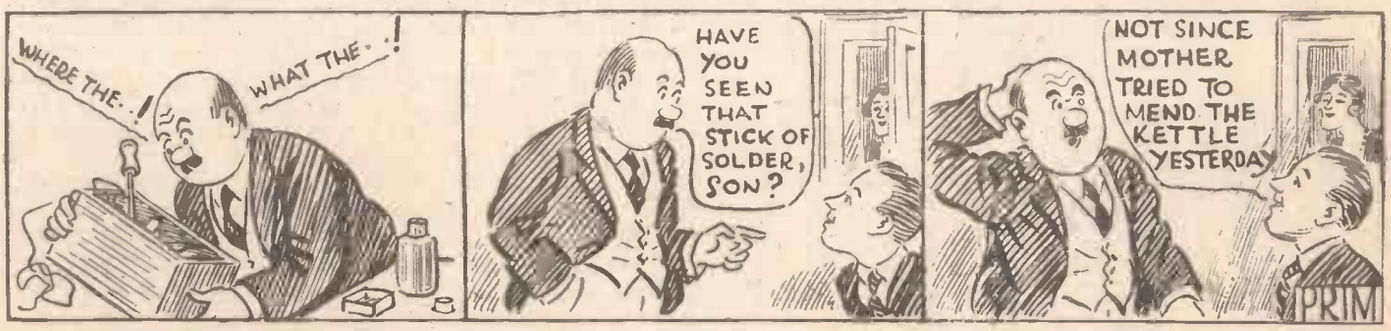
The chief advantage of the filter circuit is its selectivity which approaches the ideal. There is no difficulty in separating the twin transmitters of Brookmans Park, for instance, at a place four or five miles away and using a 100-ft. aerial; and, further, there is a wide space between. Next week a filter will be described and actual tuning curves given.

According to reports, mains receivers outnumber battery-operated sets in New York City by more than 30 to 1.

MR. FLEX SAYS HE'LL DO A LITTLE SOLDERING—

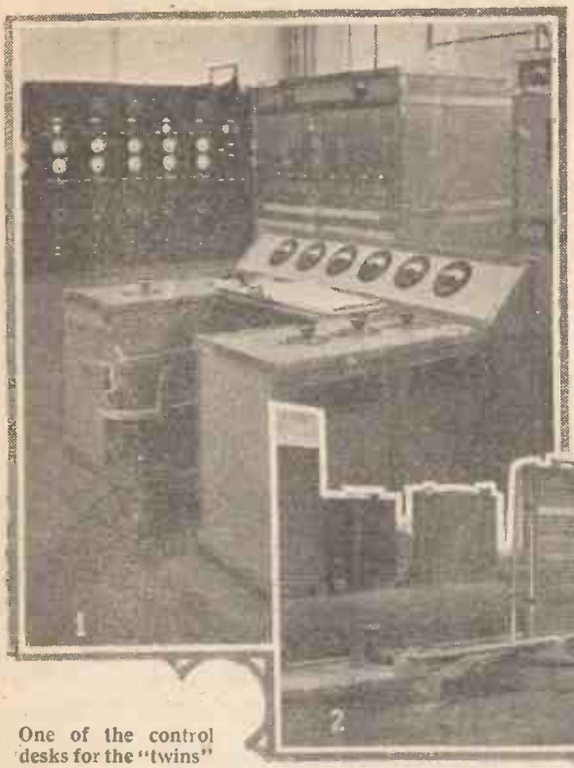


—BUT IT'S EASIER SAID THAN DONE.

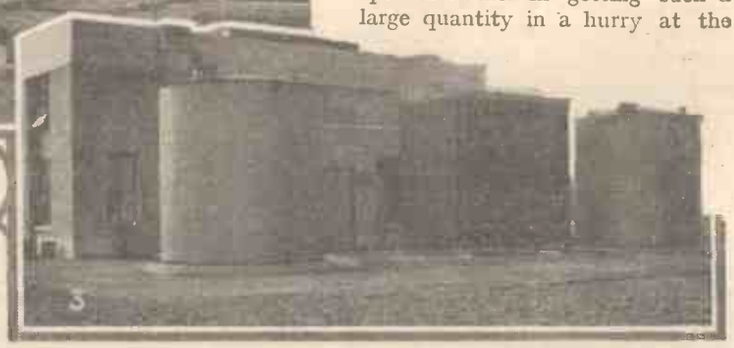


BEHIND THE SCENES AT BROOKMANS PARK

The accompanying photographs show unusual "peeps" which have been taken at Brookmans Park. When you tune in to-night, try to think, not of the stereotyped pictures which have been published, and which give a good general idea of the station, but of these views behind the scenes



One of the control desks for the "twins"



The radiators for the valve-cooling water

Where the power comes from—the oil storage tanks

MANY, many years ago, I remember accidentally barging into the studio—the one and only studio—of the first 2LO. It was in the morning, when the programme for the following day was being made out.

An old friend (I think it was "Uncle Arthur" Burrows) had hauled a desk into the studio and was struggling with correspondence. Two singers were rehearsing with a man at a piano, a row of other people were sitting round the room waiting for rehearsals, two or three engineers were fixing a cardboard horn on a microphone hung on the back of a chair, and somebody else was taking measurements of the room!

This unusual peep into 2LO was so vivid—and broadcasting was new to us all, then—that I oft-times deplore the arrival of the new and ordered regime, in which originality and enterprise seem often woefully lacking.

Let's start at the back of Brookmans Park, at the "high-tension" end. About as much power is needed for the twin B.P.'s as for a small town, and there are in the engine room four 300-h.p. Diesel engines. What 300-h.p. means it is a little difficult to convey in words, but the cylinders of the engines seem to tower above you, and I have always a horrible fear that one might burst!

Out at the back of the engine room are two tanks, the size of young gasometers, in which is stored the heavy oil for the engines. Between them is a tower with sides like Venetian blinds, and the whisps of steam appearing above it leave no doubt as to what it really is—the cooling tower for the circulating water in the Diesel plant. Somehow this end of Brookmans Park seems to have not the remotest connection with a broadcasting station.

3,000-volt Grid Bias!

Generators in a row do not convey very much to the average man; but when an engineer re-introduced part of the generator room to me recently, and pointed to a 3,000-volt *grid-bias* generator and a 10,000-volt high-tension supply, it wasn't easy to connect such things with the 120-volt H.T. and 9-volt G.B. at the typical receiving end. Filament leads 2 in. thick are rather amusing. So, too, is the 2,000-ampere-hour emergency accumulator.

Cooling the Valves

Most people know that all large transmitting valves are cooled by running water. This is a big business at B.P. Out in the grounds are two large frames some eight or ten feet high and consisting of lengths of tubing arranged as in a lorry radiator. These frames are actually the radiators for the valve-cooling water. Water is sprayed over the outside of these tubes to keep them cold. The two big radiators stand on concrete slabs in a miniature "duck-pond" formed by the water which is sprayed on them outside.

The cooling water which circulates round the valve anodes actually never leaves the cooling system, and so distilled water can be used, having a much lower conductivity than tap water. This is rather important because the cooling water which touches the anodes is at H.T. potential, and if the water had a low resistance then all manner of curious leaks would cause trouble; but distilled water *is* used (after a spot of bother in getting such a large quantity in a hurry at the opening of Brookmans Park) and so there is no such trouble.

There is something very Robot-like about the two control desks in the main hall. One evening when both the 365- and the 261-metre transmitters were going, I happened to glance into the hall. It was lit partly by the weird glow of the valves on the panels down the two sides of the hall, and partly by the lights on the huge switchboard at the end. The high-pitched, almost "electrical" hum of the valves, combined with the feeling of the immense power in the air increased the futuristic impression of the scene.

At a control desk facing the 365-metre transmitter on the right of the hall sat one engineer, intently watching the row of six dials in front of him, and at the 261-metre transmitter control on the other side of the room sat another engineer. Occasionally a hand went to one of the five large knobs to the left and right, when a needle wavered slowly on one of the dials.

The instruments on the main switchboard at the end of the hall show the constants in practically every circuit of the two transmitters. Occasionally one of the control engineers would glance at the board and jot down a few figures. Each man wore phones, which give a rough idea of the

(*Continued in third column of next page*)

A PAGE FOR THE SET BUYER

WHEN REACTION IS NOT NEEDED

There is no reaction control in the Columbia five-valve set, tested and reviewed in this article by "Set Tester." Because there are three stages of high-frequency amplification, reaction is not needed

In appearance the Columbia model 304 set is no more complicated than a gramophone. Note the robust tuning controls

MANY of our sets *do* need reaction, because they have such a small reserve of power. A two-valve set without reaction is fairly useless. Even a three-valver with a stage of screen-grid high-frequency amplification has a limited range without reaction. I have nothing against reaction; properly used, it is a cheap and effective way of increasing the high-frequency amplification of a set. Unfortunately, the control of reaction is not nearly so simple as its application. Plenty of non-technical listeners positively loathe reaction and would willingly do without it.

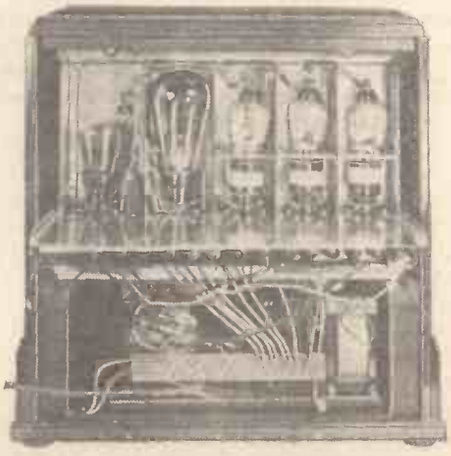
Our set manufacturers have not done much to eliminate reaction from factory-built sets. On the contrary, they have placed considerable reliance on reaction. Most of the medium-power sets I have tested really need reaction when receiving anything but the local station. Until mass-production radio is adopted in earnest by British set-makers, we shall have to put up with this state of affairs.

The only way to cut out reaction without losing range is to increase the number of high-frequency valves. Very few manufacturers can do this at the present time except by producing an extremely costly set. We want five-valvers with two or three stages of high-frequency amplification. And we want them for not much more than £20. Otherwise we cannot afford to cut out reaction.

From the Columbia Graphophone Company comes signs of a new crusade; in favour of multi-valve, reaction-less sets of moderate price. "New to radio" is a Columbia slogan coined with considerable justice. I have been revelling in a test of the Columbia model 304 five-valver. This set can be driven from A.C. or D.C. mains or batteries. Its price is £33. I tested the model 304 for A.C. mains.

This set has three screen-grid high-frequency valves, followed by an anode-bend detector, which is coupled to a super-power output valve by the resistance-capacity method. Single-control tuning of four separate tuning circuits is a notable feature. A volume control, a wave-change switch, and a mains on-off switch are the only "extras." There is no reaction. That is the most important feature of all, in my opinion. Here is a set which, because it has three stages of high-frequency amplification, really does *not* need reaction.

Every set referred to in this regular feature by "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.



The five valves of the Columbia 304 all-electric set are completely screened from the rest of the equipment

The Continent Without Reaction!

All the hazards of reaction control are eliminated. It is an intensely pleasing experience to tune in distant foreign stations without having to worry about reaction. I have spent many pleasant evenings with this Columbia set, roaming through the highways and byways of the European ether. If everyone had a set like this, the B.B.C., like reaction, would be unnecessary!

Another thing that is not needed with this Columbia set is a wavetrap. The filtering effect of the four tuned circuits gives knife-edge tuning even on strong local transmissions. Tuning is a simple process. There are two large thumb-controlled scales calibrated in wavelengths. Each scale can be moved independently of the other. But one must be held while the other is moved, otherwise they both go round together. After a preliminary adjustment of the two scales they can be moved simultaneously. They keep in step nearly all the way round on both medium and long wavelengths.

The volume control had to be used on most of the strong signals. Many of the more powerful foreign stations came in with almost local-station intensity. The volume control provides a wide range of audibility. From the immense volume of sound possible at its maximum setting I found it possible to control the output right down to a whisper.

Quality of reproduction with this set is of a kind not entirely "new to radio," but certainly rare. The combined effect of the good high-frequency tuning, the anode-bend detector, and the super-power output valve working from the mains supply, results in exceptionally good quality. I tried the set in conjunction with a Magnavox X-core moving-coil loudspeaker. One could hardly wish for anything better in quality.

"BEHIND THE SCENES AT BROOKMANS PARK"

(*Continued from preceding page*)

quality, but it is to the dials that they turn when there is any question.

A very unique peep at Brookmans Park is that to be had from the air. I *have* been over Brookmans Park, but that was in the War time, before the Regional Scheme was dreamed of! Our photographer recently took an aerial photograph, and it shows that the general shape of the station is strikingly like the letter H.

A photographer who was "down below" with me at the time, was invited to go up one of the masts and take a snap from the top, but he said, "No, thanks very much"! I sneaked away before the invitation was extended to me, because clambering up a 200 ft. tower in a high wind is a discomfort not to be repaid even by such a unique peep at Brookmans Park!

KENNETH ULLYETT.

On Your Wavelength!

Horn or Cone?

THE moving-coil driven cone loud-speaker is not the be-all and end-all of real quality reproduction at the present moment. There is a rapidly-growing school of thought which considers that the horn loud-speaker will return to favour. The disciples of this creed point out that the best quality results in the sound reproduction of talking films are obtained with the use of exponential horn loud-speakers placed behind the screen. This is a convincing argument, and it must be admitted that, so far as speech is concerned, at any rate, the exponential horn gives a crisp and clear-cut result which cannot be obtained with moving-coil driven cone loud-speakers.

Cone Defects

The disappointing performance of the latter is probably due to the usual resonance in cone loud-speakers in the region of 100 cycles per second, which gives speech a rather unpleasant boominess when reproduced at great strength. These boom tones tend to mask out the higher frequencies and the sound is delivered in a somewhat "mushy" condition. In the case of sound reproduction in a small room, however, the interference effect of this low resonance is not noticed to anything like the same extent.

Moving Coils

But the horn loud-speakers used in the leading talking-picture theatres are an entirely different proposition from the type of horn loud-speaker used in the home and for public-address systems a year or so ago. For one thing, the "driving system" is invariably of the moving-coil type and the shape of the horn follows out certain logarithmic laws without the usual compromises in regard to economic cost and maintenance, or amount of space occupied. The forerunner of the super-quality horn loud-speaker was the Marconi model designed by Captain H. J. Round, an instrument that was introduced about five years ago and used for public-address work.

Moving-coil Horn Speakers

I remember hearing one of the first Marconi-Round loud-speakers some six years ago. This was quite a small instrument, with a long, curly horn, and the closed end of the horn opened very gradually, but with increasing diameters until the flare was reached; at the time this design seemed revolutionary, but it is now to be seen in almost all "hornless" gramophones. The quality of sound reproduction from this speaker was excellent, and it more than did justice to the microphones and amplifiers available at that time. Electrically-recorded gramophone records were then in a very experimental stage, but the results were quite good when the speaker was worked from an electric gramophone pick-up, also a revolutionary idea at that time.

Converting Old Types

Going back still farther, many readers will remember the loud-speakers of the first days of broadcasting in this country. For several months the only loud-speakers available were the earliest models of Brown, Western Electric, Magnavox, and one or two other makers. Some of the most elaborate receivers made use of a microphone relay following two L.F. valves; an extraordinary way of doing things, in the light of modern practice! The Magnavox loud-speakers were of the moving-coil type and required a heavy polarising current. The moving coil in this case worked an aluminium diaphragm at the base of a horn and the loud-speaker was capable of delivering considerable volume. Many of these early moving-coil horn speakers have now been converted by the owners into cone speakers, complete with baffle boards.

Medium-wave Foreigners

On the medium-wave or broadcast band reception is certainly a great deal better now than it has been for some time. What one notices particularly is that transmissions are becoming much steadier. One does not get those huge variations from night to night, or perhaps from hour to hour, that were so noticeable at the beginning of the year. Further, a great many stations that seemed to have retired into the background have now come back and can be logged. Amongst these are Budapest, Vienna, Cologne, Schaerbeek, Bratislava, and Langenberg.

Less Strength, Better Reception

The Daventry station, 5GB, was at one time a bit of a nuisance in my locality owing to the strength at which it was received. It gave one, in fact, one's first taste of the difficulties in obtaining good-quality reception from a high-powered station at moderate range. But now that 5GB has become glorified into the Midland Regional transmitter, or something of that kind, certain changes have been made, I understand, in his aerial system, with the result that his signal strength is now considerably reduced. And my reception of him is not worse, but better. There is not the slightest difficulty about getting good loud-speaker strength, and one is no longer troubled with the harshness that used to be characteristic of this station's transmissions unless special precautions were taken. For really good quality give me medium power every time.

Are You Guilty?

Here is a little question for you, sir, and you, madam. When did you last renew your grid battery? "Oh, not very long ago; why, it must have been towards the end of last year. Now let me think. I believe I bought a new one in June. . . ." Yes, I thought so. You are forgetting your little half-yearly dose. Just because it looks such a simple affair, the poor grid battery is too often forgotten and is left in position long after it has ceased to be able to do its work properly. Unless you use grid batteries built of large cells, you should make a solemn vow, promise, and covenant to spend eighteenpence or so on a new one every six months, for there are very few that are to be depended upon beyond that time. Don't trust the voltmeter when a battery is six months old. The G.B. may show quite a good voltage at that age and "go" quite suddenly without any warning just a little later on.

The Harm that is Done

And if a battery does give out, you are asking for trouble, for it may prove quite costly. "Oh, well, mine's a mains-operated set," you say, "so I can't damage a high-tension battery even if I do have an overload, due to a run-down grid battery." Perfectly, but what about your output valve, dear reader? Let us suppose that you are using a super-power valve with a plate voltage of 150. In the ordinary way you will have a negative grid bias of about 10½ volts, which means that the current passed will be of the order of 18 to 20 milli-amperes. If the grid battery goes "phut," what happens? Up goes the emission to 50 milliamperes (yes, *fifty*) or more and if you happen to put a finger on the valve you will probably withdraw it saying "tut" or "blow" or "bother," for the bulb will be quite nicely heated up. It does not take many minutes of this treatment to destroy the emission of a brand new super-power valve, and power valves do not grow upon every gooseberry bush. "And when," asks the reader mildly, "did *you*, my dear Thermion, last change *your* grid battery?" Well, er—that's to say—anyhow, I am just going to get a new one.

Talkie Faults

Too many people are inclined to condemn talkies altogether because they have heard one or two bad ones. It may be the apparatus which is at fault, or it may be the recording—and it is really surprising what an atrocious amount of bad recording there is with some of these small alleged

On Your Wavelength! (continued)

comedy films and things of that nature. In quite a number of cases, however, the trouble lies in the apparatus, for I have heard excellent films completely spoilt by the bad reproduction of the apparatus on which it was shown. Here, again, one can find a parallel in the early days, where the smaller and less well-equipped cinemas were avoided by sensitive people because they could not show films which did not flicker badly. This difficulty has been overcome, even in small cinemas, and we must look forward to the time when talkie equipment is in the same position.

Steady Improvement

The technique of talkies is rapidly developing and there is not so much of the interminable manœuvring for another song which used to be so painfully obvious in the earlier films. Better use is made of the dialogue and the plots are at last beginning to combine the undoubted advantages of the screen with the beauty of the spoken word. Therefore, those who have condemned talkies as a result of a poor demonstration should go to see a good film at a good theatre.

The argument that the talkie had destroyed the beautiful silence of the films is a very woe-begone sort of plea. Actually, the cinema is usually filled with hideous noises coming from either an alleged orchestra, which is painful to listen to, or from an enormous orchestra which could play nicely if it wanted to, but which is occupied in producing a shattering din the whole time. I suppose the answer is that you need not listen to it, whereas you must listen to the talkie in order to follow what is happening, but I personally would rather listen to something reasonably intelligible than have to suffer the feeling of vague discomfort which is often associated with the presentation of a silent film.

A Two-way Television Problem

This week I came across rather a remarkable point in connection with two-way television, and since it emphasises a phenomenon which is likely to arise when the science has developed to embrace this application generally, it warrants attention. By two-way television we mean the simultaneous reception and transmission of signals such that if two persons are put into visual and aural communication with one another, they can not only carry on a conversation, but see images of each other at the same time. Demonstrations of this character have been given with varying success by the Bell Laboratories in the U.S.A., the German Post Office at the Berlin Radio Exhibition in 1929, and also by the Baird Company. In the case of the last-named, a step forward was made in so far that the person was scanned by infra-red rays or, in other words, it was two-way noctovision. The problem that arises is whether the two people concerned can look straight at each other as they normally would do if carrying on a conversation. With existing arrangements this does not seem possible.

Image Effects

At each end of the line we shall have a person sitting before the dual transmitter and receiver, the one revolving disc serving the double purpose. Assuming vertical scanning, we shall have the neon on, say, the right-hand side of the disc and the projector lamp behind the disc on the left-hand side. If the person looks direct into the transmitting beam of light he can really only see the image received from the other end out of the corner of his eye. On the other hand, if he looks direct at the image of the person he is speaking to, then his resultant image will appear side face at the other end.

The same situation would arise with horizontal scanning, for the person would then appear to be looking over the other's head or down at his chest, as the case may be. The two people could, of course, take it in turns to look at the transmitting side and the receiving side of the disc. Unless some form of mirror arrangement can be devised which will "turn the image," so to speak, it is difficult to see how an exact replica can be secured of what would normally take place if two people carried on a telephone conversation within the normal vision range of their own eyes.

German Colour Television

I see that Alexander Ahronheim, a German engineer, has been credited with a television invention which, if it can be perfected, should be a great advance. He is said to have devised a system of transmitting tone films in colours which would supersede the present process of disc scanning through colour filters. He makes use of the fact that ordinary white light is made up from a variety of colours (violet, indigo, blue, green, yellow, orange, red), and each of these has a separate wavelength or frequency. The inventor goes on farther to say that with his system it will be possible to project the picture on to the largest screen, while the actual cost of the necessary receiving apparatus will compare favourably with that of a good wireless receiving set. Up to the present no exact details appear to be available.

Outdoor Sets

Americans who visit this country are always surprised at the comparatively small use made of receiving sets out of doors. The proportion of licence holders who own portable sets is probably very much larger here than in the States, but with us they are used much more in the house than out of it. In America, for example, quite a number of recent models of motor-cars have receiving sets built into them as a standard fitment, and this year something of the same sort has been seen in the newest types of motor-boats. The reason why Americans do use their sets out of doors and we don't is not, I think, far to seek. Most of their big stations give interesting programmes between noon and six o'clock, providing just the right sort of entertainment for picnics and so on. Our stations, on the other hand, relapse into silence between 2 p.m. and 4 p.m. during the summer holiday months and at other times of the year seem to fill in most of that period with the kind of stuff to which no one wants to listen when he is out to enjoy himself.

The Output Problem

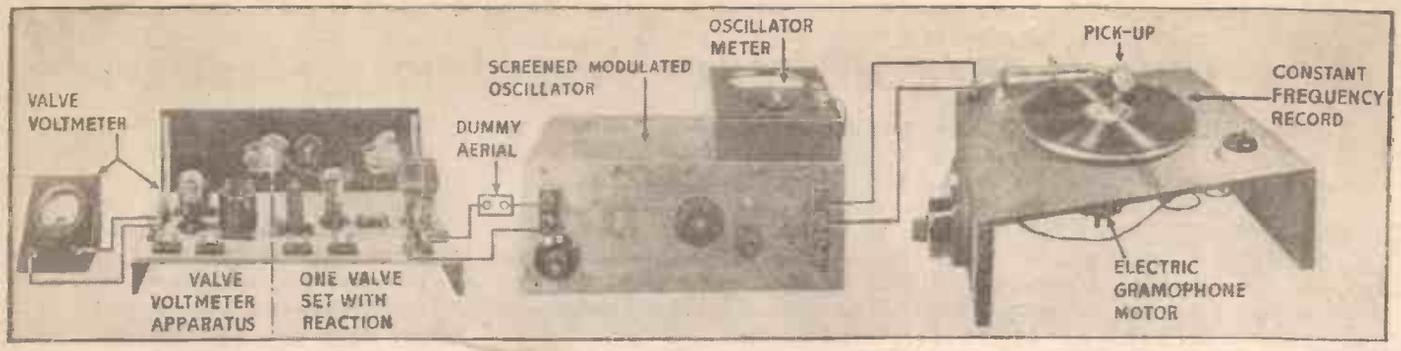
One of the troubles about loud-speaker driving units, whether of the diaphragm, reed, or balanced-armature type, is that there is unfortunately at present no standard resistance for the windings and no standard impedance at, say, a thousand cycles. Now, with all drives, particularly with those of the balanced-armature pattern yoked to a small cone, it is essential for the best results that the impedance of the output valve should be matched to that of the windings. We get over the difficulty to some extent by the use of an output transformer with a tapped secondary, which enables high, low, or medium output resistance to be used. But here again we are up against other problems, for different transformer designers do not always mean the same thing by high resistance or low resistance, and it is really largely a matter of luck whether the secondary of the output transformer, if not specially made for the job in hand, will match the windings of a particular loud-speaker.

I am of the definite opinion that there would be a big opening if some enterprising manufacturer would put on to the market not only a first-rate balanced-armature drive, but also a transformer whose secondary was exactly matched to it and whose primary was tapped so as to suit output valves of various kinds.

A Reminder

During the winter most of us don't bother about earthing our aerials before we go to bed or keep them earthed when the set is not in use. Now that spring has nearly settled into its stride and summer is not far away it is just as well to begin to make a habit of so doing. During a spell of warm weather thunderstorms do occasionally brew up quite suddenly, and it is not at all conducive to peace of mind to be caught with an unearthed aerial.

THERMION.



IS THE GRID-LEAK POTENTIOMETER WORTH WHILE?

Following a series of experiments in the "Amateur Wireless" Laboratory, our contributor, Alan S. Hunter, tells some interesting facts about the grid-leak potentiometer

IN the course of an article on tuning, published in a recent issue of AMATEUR WIRELESS, I mentioned some cures for reaction overlap. A reader reminded me in a subsequent letter of a cure I omitted to mention. He referred to the use of a grid-leak potentiometer. Instead of taking the grid-leak to low-tension positive, it can be taken to the slider of a potentiometer shunting the low-tension battery. In this way, the positive bias on the grid, with respect to the negative end of the filament, can be varied.

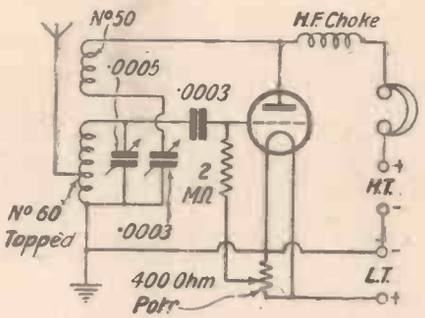
Sets without a stage of high-frequency amplification need a *very* smooth reaction control if long-distance reception is wanted. When reaction overlap is present, a simple set cannot be worked at its maximum efficiency. The symptoms of overlap are easily noted. Oscillation does not stop at the same point on the reaction dial as it starts, but at a lower reading. Moreover, the incidence of reaction is accompanied by an unpleasant "plop." The tuning adjustment is very difficult when there is overlap.

Steady Reaction Essential

When a weak signal is brought in on a simple set, it can only be held if the reaction is steady and is applied almost to the point of oscillation. Because a smooth application of reaction is so necessary in a simple set, we are naturally interested in every way of ensuring this condition. It is true that the value of the anode voltage on the detector and the value of the grid-leak affect the smoothness of reaction. But very often alterations to these values do not cure reaction overlap.

The use of a potentiometer to control the positive bias on the detector grid has often been advocated as a means of ensuring smooth reaction. Two or three years ago many AMATEUR WIRELESS designs using this control were published. But modern valves do not seem so prone to cause reaction overlap. The question arises whether a potentiometer is worth while nowadays. The diagram shows a one-valve detector circuit with capacity-controlled magnetic reaction. The end of the grid-leak is shown connected to the slider of a potentiometer.

By reducing the positive bias on the grid, smoother reaction is obtainable. In a footnote answer to our correspondent's letter, I suggested that this smoothness of reaction was only obtained with a loss of sensitivity. Because I was not entirely satisfied with this generalisation, I have



One-valve reaction circuit with potentiometer grid-leak connection

carried out an experiment to determine what does actually happen.

It is questionable whether maximum sensitivity in the detector valve is not offset by the disadvantage of "ploppy" reaction. I suggest that a weak signal is probably more susceptible to reaction than to detector sensitivity. A strong signal may be obtained, not because the detector valve is working at its maximum efficiency, but because the reaction is smooth. Most readers who have experimented with grid-leak potentiometers know that the ultimate signal strength depends upon a compromise effected between maximum sensitivity and smoothness of reaction.

It must be clearly understood that a detector circuit is not necessarily working at its maximum efficiency simply because reaction is smooth. But on the other hand, a detector circuit, however efficient in itself, must have smooth reaction when receiving a distant station.

When a grid-leak potentiometer is used, as shown in the diagram, the reduction of positive grid-bias causes a reduction in the damping effect of grid current on the tuning coil. Up to a point, this reduction of damping increases the overall sensitivity of the arrangement, especially if the coil is a low-loss one.

Measuring Sensitivity

Any measurement to determine how the sensitivity varies with different values of positive grid-bias must take this fact into consideration. For the experiment in question, I used a special screened modulated oscillator, developed for the AMATEUR WIRELESS Laboratory by J. H. Reyner. With a Parlophone constant-frequency record, in conjunction with this piece of apparatus, it is not difficult to generate a steady oscillation of constant modulation.

A pick-up was connected to the input of the modulated oscillator, the output of which was connected through a dummy aerial to a one-valve set, having the circuit shown. In the anode circuit of this one-valver (shown on the right of my "hook-up") was arranged a simple valve voltmeter. This is simply an anode-bend detector, biased so that any change in its grid voltage causes an increase in anode current, indicated by a very sensitive meter in the anode circuit. For the test, a 0-to-1-milliampère Ferranti meter was used.

The oscillator, modulated by the constant-frequency record through the pick-up and modulator valve, gives a very good imitation of a normal broadcast signal. The imitation signal has the advantage of being constantly modulated. Measurements can, therefore, be taken that are impossible with a normally-received signal.

As the one-valve set was tuned to the wavelength of the oscillator, about 300 metres, the anode-current variations induced voltages through the transformer to the valve voltmeter. As the modulation was constant, the deflection of the voltmeter needle remained steady. Had an ordinary signal been received, the needle would have varied in accordance with the varying modulation. The reading was

(*Continued on next page*)

For the Newcomer to Wireless: "GETTERING"

I HAVE often wondered why the bulb of a valve is silvered inside like a looking-glass.

There is a coating of metal on its inner surface, though actually it isn't silver.

What does it do and why is it there?

Here's a very old valve—actually it dates from 1921. You will see that the bulb is perfectly clear. To use a technical term it has not been "gettered."

Please explain.

Early valves were practically all hand made, for which reason they were very expensive. One of the difficulties that makers had, was that it was exceedingly hard to produce a valve that would maintain under working conditions the necessary high degree of vacuum.

Why was that?

These valves with their bright filaments operated at a very high temperature—in fact the bulbs might become so hot that one could burn one's fingers upon them. Now, all metals have the curious quality of embracing and holding on to molecules of gas. If you pump out a metal container its walls will always cling to a certain amount of gas, which is said to be occluded.

Does the gas remain where it is?

It will do so unless the metal is heated. Heat causes the release of the gas.

There are a good many metal parts within the bulb of a valve.

Exactly, and unless these are thoroughly "cleaned up" and made to give up their occluded gases during the process of manufacture they will release them later on when the valve is warmed up.

Then the vacuum must suffer?

It certainly would if "cleaning up" were not properly carried out. In fact it did in the time of some of the old valves.

How were they cleaned up?

The filament was run at a very high temperature and a big potential was applied to the anode during the process of pumping. The occluded gases were released and drawn off.

Can't that be done now?

Well, you can't run a dull-emitter filament at a very high temperature without ruining it. What happens to-day is this. Before the electrodes are put into the bulb a little piece of magnesium is spot-welded on to the plate. The bulb is pumped to a high degree of vacuum and is then sealed off.

What about the magnesium?

The valve is now placed in a powerful high-frequency field, which sets up eddy currents in the metal parts within it. These are brought to a high temperature, thus driving out the occluded gases. When the temperature reaches a certain point the magnesium is volatilized. Each of its atoms picks up a molecule of gas and settles down on the inside of the bulb, holding it firmly embraced. Since the bulb never gets very hot, the gases caught up by the magnesium are not given up and the vacuum remains.

I suppose that this is a cheaper process than the old one?

It is. For that reason and because it is more thorough it is adopted in modern valve manufacture.

CURIOUS USES FOR RADIO

THE B.B.C. has given us radio noises from a diver at the bottom of the Thames, from the London Zoo, from a theatre queue, from the footplate of an express train, and from a hundred and one other curious sources; but, to use an Americanism, this has "nothing on" some of the curious uses to which radio is put.

A few months ago Messrs. J. Lyons installed L.F. amplifiers and loud-speakers in some of the big Corner Houses, so that "Nippies" could speak from, say, the cooking end of the kitchens to the ice-cream department; and that without effort.

Now we have a well-known West End shoe store making use of radio low-frequency amplification to facilitate departmental ordering. Formerly messengers had to run from one department to another in order to keep salesmen in constant touch with "Stores," and the installation of a moving-band-type conveyor to speed up the delivery of shoes from the stores to the shops only made the means of verbal communication more difficult.

A two-valver in use in a shoe store

A solution was found, as you may see from the accompanying photograph, in a simple two-valve L.F. amplifier. This was rigged up in one of the showrooms, together with a little "microphone" on a stand, so that the salesmen have no need to speak too close to the mouth-piece, as in an ordinary telephone. The loud-speakers are in the stores. The whole can be operated from the electric-light mains, so that the equipment is entirely self-contained.

K. U.

"IS THE GRID-LEAK POTENTIOMETER WORTH WHILE?"

(*Continued from preceding page*)

noted and the grid-leak potentiometer then moved from its positive end to negative.

As a result of a number of tests on these lines, a general tendency was indicated. As the potentiometer was moved towards negative, the voltmeter reading increased until at about a third of the way towards negative, a maximum reading was obtained. After this, a progressive fall in the reading was noted until at the extreme negative end the reading was very small.

Really smooth reaction was only obtained when the grid-leak potentiometer was adjusted to a position about two-thirds negative. At this point, the sensitivity, as indicated by the voltmeter, had fallen to a value below that recorded with the full positive bias. With several of the coils tested, the maximum positive bias, as is normally obtained when the grid-leak is connected to low-tension positive, causes some loss of sensitivity due to grid current damping. The inclusion of a potentiometer, adjusted to the smooth reaction point, while not helping to increase sensitivity, does not materially decrease it, owing to the reduction of damping. At the same time, the increased smoothness of reaction does, in practice, give the same effect as increased detector efficiency.

The general conclusion I arrived at is that a potentiometer is worth while if reaction is "ploppy." If the positive bias is not reduced too much, the loss of sensitivity is not marked.

BROADCAST ARTISTES IN PICTURE

JACK RICKARDS.—This clever entertainer was one of the earliest of broadcasters; known also to Palladium and Alhambra audiences. His sketch, "The Scandalmongers," was one of the best heard.

CONSTANCE IZARD.—A violinist who has been heard at most of the big London concerts, Miss Izard plays with a broad, full tone, and finished technique marks her performance.

J. H. SQUIRE.—The Celest Octet has become a household name for real music and picked musicians. Mr. J. H. Squire is musical adviser to many theatrical interests.

CORA ASTLE.—A clever pianist, Miss Astle has a wide repertoire of classical works and a reputation for artistic interpretations.

TOM PURVIS.—This well-known tenor has figured prominently during this last year in numerous B.B.C. concerts, and studio performances of well-known musical plays.

DOROTHY HELMRICH.—A brilliant Australian mezzo-soprano frequently heard at the Queen's Hall Promenade concerts.

LEONARD COWINGS.—His richness of tone, coupled with absolute clarity of diction, make him an ideal singer for concert platform, broadcasting and recording.

GLADYS NOON.—A clever violinist, Miss Noon has broadcast on many occasions, chiefly through 5GB.

SANDY ROWAN.—The Scottish humourist, who is not above cracking a joke at his own countrymen, but always in perfect taste.

SYDNEY MOSELEY'S WEEKLY PROGRAMME CRITICISM

WITHOUT FEAR OR FAVOUR

Improved Sunday Programmes

de Courville's Hour

B.B.C. Vocalists

Dance-band Time

NO one can grumble at the choice of programmes on Sunday now, and they start at half-past three.

Still, there are many gaps in this, the only day on which many listeners can take the fullest advantage of broadcasting.

◆ ◆ ◆

Of the three programmes provided on a recent Sunday, I switched on first of all to Sandler, and having heard the old musical gymnastics I immediately switched back to the London Regional and heard an orchestral concert by the Northern Wireless Orchestra, conducted by T. H. Morrison. A really fine orchestra, with a refreshing selection of items.

I must admit one gets rather tired of Sandler and the remarkably spontaneous applause—they won't even wait until the thing is through.

◆ ◆ ◆

While the Northern Wireless Orchestra were playing from the studio one could enjoy the music without interference. Leila Megane is a pleasing soprano, and she sang that deeply moving and majestic "Agnus Dei," by Bizet. The orchestra played from Massenet, Coleridge-Taylor, Dvorák, Weber, and Tchaikovsky. Not too highbrow, either. Incidentally, there was a fine announcer. Sorry he must remain anonymous.

◆ ◆ ◆

Those who heard Sir Josiah Stamp must have marvelled, for this distinguished economist did *not* have the Oxford accent!

◆ ◆ ◆

I hear varying reports concerning de Courville's hours. Many of the views are in agreement with my own, which is that they are not as bright and as fresh as some of those were last year.

Isn't it rather a mistake, by the by, to fix up a series before being certain that it is the sort of thing we want. Leonard Henry is all right, but, somehow, he, too, seems to give one the feeling of being repressed.

Some of the sentimental songs gave me a pain in the "gizzard," and the wit generally was on a very low level.

◆ ◆ ◆

I have received a long letter from E. A. Colat, of Hyde Park, who, like many listeners, does not like any but first-rate singers of any type. The poor vocalists come in for bad handling.

"Why, in the name of mercy, does the B.B.C. insist on throwing such singers into a good orchestra? Surely we get enough of these in our drawing-rooms, where they do not wait to be asked. They don't offend, even; they *hurt*." (Nasty, this!)

My correspondent, too, has hard things to say about Mr. Toubas.

◆ ◆ ◆

As regards dance bands, he (I *think* it is *she*) thinks that there is an improvement generally. "Ray Starita's band plays well, so does the B.B.C. dance band."

He makes the interesting suggestion that they should play dance music only, and not other music.

Incidentally, my correspondent hopes I shall be spared many long years "to carry on with the good work." I am afraid the people whom I criticise will hardly echo his devout wish.

◆ ◆ ◆

"B.G." writes:—

"Is Tommy Handley getting too off-handed before the microphone? I heard him the other evening give a chat on Bridge. He seemed a little too familiar, and although I must say his gags were as funny as ever, it struck me that there is a little too much 'take it or leave it' about him these days."

◆ ◆ ◆

Philip Ridgeway scored a distinct success with his "Music Hall of 1909"; that is to say, the proceedings were jolly and went with a swing. But the back-chat and comments were, to my mind, rather overdone. In fact, the silly-ass woman who kept up a rapid fire of "funny" questions in a shrill voice was a nuisance to the nth degree.

George Clarke and Cyril Smith could to advantage appear more often before the microphone. They made themselves quite at home and I enjoyed their turn. They wound up with a funny "running commentary," of which the climax was the only weak spot in a first-rate performance.

◆ ◆ ◆

A correspondent who signs himself by that highly original pseudonym, "A Jazz Fiend," tells me that he lost his sleep one night over Jack Payne.

He stayed up to hear the band from the studio from 10.25 onward, and he heard what he terms "Payne's Pantomime Methods," which shocked his "rhythmical" soul.

"What is the use," he asks, "of giving nearly two hours' so-called dance music when it can't be danced to? Practically all the numbers were given at break-neck speed and were totally useless from the dancing point of view. These gallops were interspersed with silly songs, based on puerile statements, such as 'He's from the south because he's got a cigar in his mouth'! When, at rare intervals, they played a fox-trot, at a decent tempo, it was spoilt by flourishing introductions and long-drawn-out dramatic endings, which took all the rhythm out of the thing."

My correspondent seems to think that Payne's band may be all right for demonstration purposes, but as a dance band it is useless.

◆ ◆ ◆

What a mixed bag we get from Jean Melville! When she sings those inane songs about being blue, etc., I groan inwardly and keep on listening—hoping that something better will come from her soon.

The next moment she is giving a diverting little monologue by A. P. Herbert.

A moment later we are shown that she is a fairly capable pianist. And so on. All this, I suppose, helps to create "variety."

An Impression of Horace Kenny

With the addition of WGST, Atlanta, to its chain, the Columbia system now has a national network of 73 stations.

The National Broadcasting Company of America in 1929 added 14 stations to its network, 54,000 miles of wire to its wire lines, received more than a million letters from listeners; increased its personnel from 558 in 1928 to 917; and added 60 hours of programmes a week to its schedule.

WOR, Newark, U.S.A. has entered the short-wave field and is erecting a new transmitter, the call letters of which will be W2XCX.

Experiments With The HARTLEY CIRCUIT

The simplest is often the best. Read this interesting article on a well-tried circuit

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

ALTHOUGH the Hartley circuit is a very old arrangement, it is surprising how effective it is, even in these days of super-selectivity and regional stations. I have had occasion lately to experiment with this form of circuit, and I was agreeably pleased with the result. It occurred to me, therefore, that some comments on the operation of this circuit would be of interest to AMATEUR WIRELESS readers.

The simple Hartley circuit is shown in Fig. 1. A centre-tapped coil is used, tuned with a variable condenser in the customary manner. One end of the coil is connected to the detector through the customary condenser and leak, while the filament is not connected to the other end of the coil, but to the centre point. The bottom end of the coil is now connected through a small condenser on to the anode of the valve. This simple arrangement tends to oscillate very readily, and the reaction effect is controlled by varying the condenser in the anode lead. Usually quite a small condenser is sufficient. The maximum value of the condenser should not exceed .0001, and for many purposes a neutralising condenser will be found quite suitable.

Hand Capacity

There is liable to be a slight hand-capacity effect, and this may be obviated by interposing an earth screen of metal or copper foil between the panel and the condenser itself. Care must, of course, be taken to see that the foil which is connected to L.T.— does not touch any metal parts on the condenser itself, as otherwise a short-circuit will result.

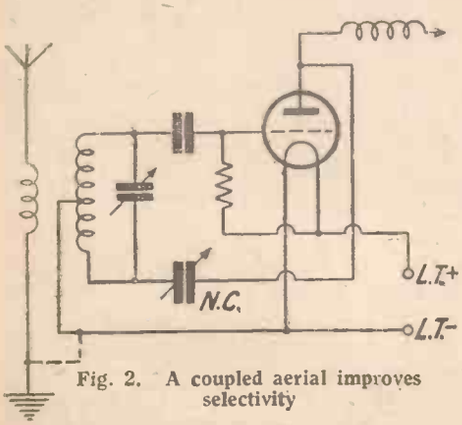


Fig. 2. A coupled aerial improves selectivity

The aerial is coupled through a small condenser (which may be either a .0001 fixed condenser or a pre-set condenser) on to the grid end of the coil, while the earth connection is taken to L.T.—, as shown in the figure. Such a circuit will be found to give a good bag of stations if one lives at a distance from a regional station, while if one is close to it, it will be found to be sufficiently selective to separate the two transmissions, and also to obtain 5GB without any interference. This is, at any rate, what it will do at Elstree, which is particularly good going.

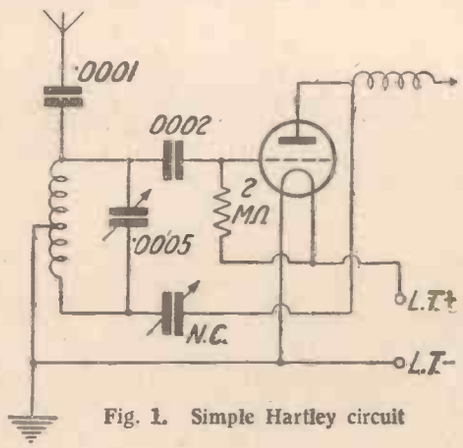


Fig. 1. Simple Hartley circuit

Selectivity

One of the disadvantages of this type of circuit is the pick-up which is obtained on the long-wave scale from the local station. We all know that very annoying difficulty experienced when the local transmission comes in over the first 40 or 50 degrees of the long-wave dial. Testing this receiver out at Elstree, I found that the Brookmans Park transmissions came in over the first 170 degrees of the dial, or somewhere about that figure; so that I simply could not receive 5XX at all. The difficulty was immediately obviated by connecting a "Brookman's By-pass" across the aerial; and, indeed, for the reader living quite close to a local station this is the best solution of the difficulty.

The alternative is to use a coupled winding as shown in Fig. 2. This should have approximately half the number of turns of the main tuned secondary coil, and, of course, it must be changed when the secondary coil is changed.

For example, on the short waves one might use a 60- or 75-turn coil for the secondary coil, in which case the coupling coil would have to be a 30-turn coil. On the long waves one would use a 200-turn coil with a coupling coil of 100 turns. The signal strength of this coupled arrangement will be found to be less than the .0001, but the local programme certainly does not come in on the long waves to anything like the same extent. The earth is connected, of course, to one end of the coupling coil, and it may also be connected to L.T.—, as shown dotted in Fig. 2, if desired. There is little to choose between the two possible connections, it being a matter of personal preference.

Improving the Circuit

A method of avoiding the hand-capacity effect on a Hartley circuit is shown in Fig. 3. Here we have, to all intents and purposes, the same circuit as was shown in Fig. 1. From the anode of the detector valve, however, a .0005 condenser is connected to earth, as shown by C in the figure. The larger the condenser is made, the more the energy is by-passed, and consequently the less the reaction effect. The full .0005 is necessary to stop the oscillation on the long waves, but a very much smaller value is necessary on the short waves.

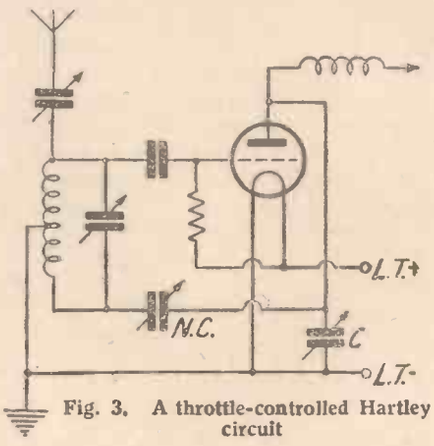


Fig. 3. A throttle-controlled Hartley circuit

The setting of the neutralising condenser should, of course, be chosen to give the best results. If it is found that the

(*Continued on page* 479)

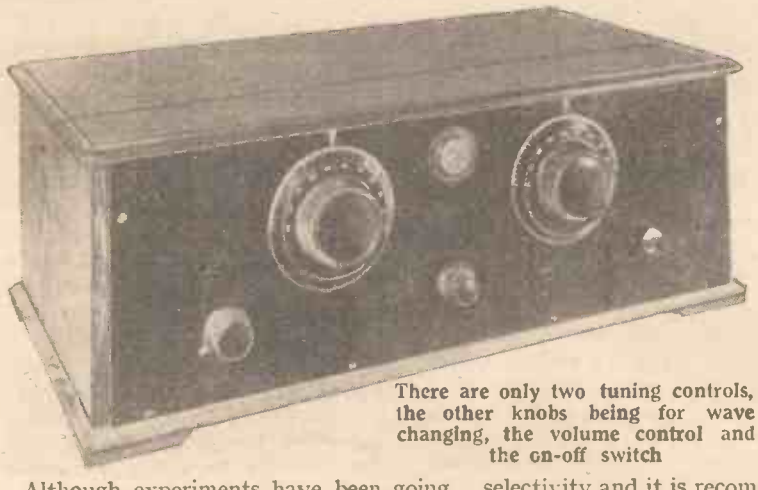
More about The Auto-coupler

IN last week's issue of "A.W." the constructional details and general working of the "Auto-coupler 3" were discussed. This week it is proposed to deal rather more fully with the actual operation of the receiver, and its capabilities on actual test.

First of all, however, it must be emphasised that it is not claimed that the auto-coupling system is new. Actually this form of coupling has been incorporated in commercial amplifying apparatus for some two or three years, and this quite long enough for those who have been interested to prove to their own satisfaction that the idea is sound.

A Well-tried System

Our claim in the development of the system is that relating to the tappings on the choke, which give a variable transformation ratio and a variable tone control.



There are only two tuning controls, the other knobs being for wave changing, the volume control and the on-off switch

Although experiments have been going on with this system for the past six months it is not claimed that finality has been reached. There is still room for experiments. Different values of anode resistance for different valves can be tried, also various values of coupling condenser. The tapped choke, too, can possibly still be improved upon or even made smaller, provided that the inductance is maintained. The inductance, by the way, should be in the region of 100 henries. More tappings could be added to the choke to give a finer variation in the tone control and also a greater range of transformation ratios.

Using the Set

The system, so far as it has been developed, is highly satisfactory and those readers who, even if they have not made up the receiver described last week, but have tried out, say, one stage of the coupling in their own particular sets, have no doubt proved this to their own satisfaction.

In use, the "Auto-coupler 3" proves to be very simple to tune. The selectivity is also very good, considering that just a single tuned circuit is employed.

Daventry 5GB, for instance, can be "lost" a degree either side of the actual maximum condenser setting. With the Brookmans Parks, it is rather a more difficult matter; but even so, it is quite easy at roughly 20 miles from the transmitting aerial of the B.P.'s, to cut out interference and get Toulouse with remarkable volume. To get this degree of selectivity it is necessary to have the series fixed condenser, in the aerial lead, in circuit. The tapping on the primary of the Binowave coil also assists in selectivity and it is recommended that this tapping be plugged into the socket nearest to the long-wave coil, when looking at the base.

A list of the stations that have been received is given overleaf. All these stations have been received at fair to good loud-speaker strength. Phones have not been used. The stations, as received, were listened to on the speaker and items clearly followed. The volume in all cases was sufficient to fill a room some fourteen feet square.

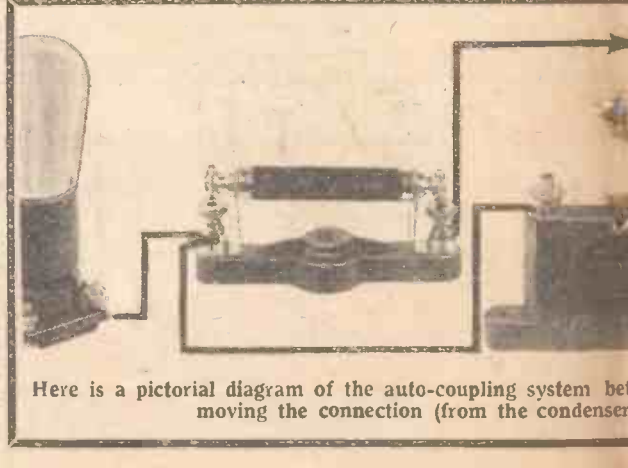
After having tuned in a powerful station, the centre knob on the panel should be adjusted to give maximum signal strength.

It will probably be found, when adjusting this, that the set may go into oscillation. Be very careful in this respect and do not be too ready to suspect that it is H.F. oscillation or regeneration. It may possibly be L.F. oscillation. If the pitch of the whistle cannot be varied by rotation of the aerial tuning condenser or the reaction condenser then the whistle is due to L.F. oscillation.

It should be cut out by screwing down the anode-resistance volume-control knob

COMPONENTS REQUIRED

Ebonite panel, 21 in. by 7 in. and two strips, one 3 in. by 2 in. and the other 9 in. by 2 in. (Trolitax, Lissen, Becol).
Baseboard, 21 in. by 10 in. (Camco, Pickett).
Panel brackets (Bulgin, Lissen, Ready-Radio).
.0005-mfd. variable condenser (Igranic, Lotus, Lissen, Burton, Ready-Radio, Dubilier, Formo).
.0003-mfd. variable condenser (Igranic, Lotus, Lissen, Burton, Ready-Radio, Dubilier, Formo).
Variable resistance 0-500,000-ohms (Clarostat "Volume control," Harlie, Regenstat).
Push-pull filament switch (Bulgin, Lissen, Benjamin, Lotus, Junit, Keystone).
Panel-mounting milliammeter, 0-50 milliamperes (Bulgin DM 19).
1930 Binowave coil, type C (Wearite).
Three valve holders (Formo, Burton, Brownie, Junit, W.B., Trix, Lotus).
High-frequency choke (Lewcos, Keystone, Lissen, Tunewell, Watmel, Varley).
Fixed condenser .01-mfd. (T.C.C., Lissen, Watmel, Dubilier, Graham-Farish, Atlas).



Here is a pictorial diagram of the auto-coupling system be moving the connection (from the condenser

AUTO-COUPLER 3

AN "A.W." INNOVATION IN RECEIVER DESIGN—

By L. A. CHAPMAN

ever so slightly. A point will be found where the set will appear almost to "ring." This denotes that the receiver is in a "lively" state and what is more, the amplification will be at its best.

FOR "AUTO-COUPLER 3"

Fixed condenser .005-mfd. (T.C.C., Lissen, Watmel, Dubilier, Graham-Farish, Atlas).
Fixed condenser .0002-mfd. (T.C.C., Lissen, Watmel, Dubilier, Graham-Farish, Atlas).
Fixed condenser .0003-mfd. (T.C.C., Lissen, Watmel, Dubilier, Graham-Farish, Atlas).
Two 2-mfd. fixed condensers (Lissen, Dubilier, T.C.C., Hydra, Ferranti).
2-Megohm grid leak (Lissen, Dubilier, Watmel, Ediswan, Graham-Farish).
One 30,000-ohms and one 100,000-ohms resistance with holders (Graham-Farish, Lissen, Dubilier, Ferranti, Ready-Radio).
Two auto-couplers (Wearite).
Output choke (Ferranti B.1., Varley, Lissen, Igranic, Bulgin, Formo).
Eleven terminals marked: Aerial, Earth, H.T.+, H.T.—, L.T.—, L.T.+, G.B.—1, G.B.—2, G.B.+, L.S.—, L.S.+. (Belling-Lee, Burton, Eelex).
Connecting wire (Glazite).
One yard of thin flex (Lewcoflex).
Two dial indicators (Bulgin).
Two 4 in. dials (Ready-Radio, Trolite, Keystone).

Do not continue to operate the set too near to the "ringing" state, as otherwise the signals that are being received may tend to set the receiver "ringing" or "whistling" continuously.

Having adjusted the variable anode resistance to its most sensitive position it will be possible to try for other stations. Reference to the list of dial readings for the stations already received in the tests will be a satisfactory guide in this respect. Remember, however, that to bring in the stations satisfactorily it is necessary to adjust the tuning condenser knob and the reaction condenser knob simultaneously. This keeps the set on the verge of oscillation. A few minutes' trial in this way of operating the receiver will be sufficient for most amateurs.

When once the set has been roughly calibrated and it is known where to find a particular station when wanted, most users will return to one of the local stations and attempt to improve quality. If the volume from the local station is too great it can be reduced either by screwing down or unscrewing the knob of the anode resistance.

The latter is the best course to adopt because it gives a better degree of control by gradually reducing the voltage being applied to the anode of the first L.F. valve. If the set has been used for the reception of the local station and it is desired to change to a more distant station then remember to readjust the volume control to its loudest-signal position before altering the tuning controls.

It has already been stated that by varying the transformation ratio it is possible to vary the pitch or tone of reproduction.

First of all, arrange the flexible tappings A and B on the tapped chokes exactly as shown in the blueprint. This will be the usual, or "stand-by" position. Should it be desired to raise the tone of reproduction, then disconnect the flexible wire A from terminal No. 2 on the first choke and connect it to terminal No. 3 on this same choke. The tone can be further slightly varied by rearranging flexible wire marked B, taking it to terminal No. 1 or to terminal No. 3 on the second choke.

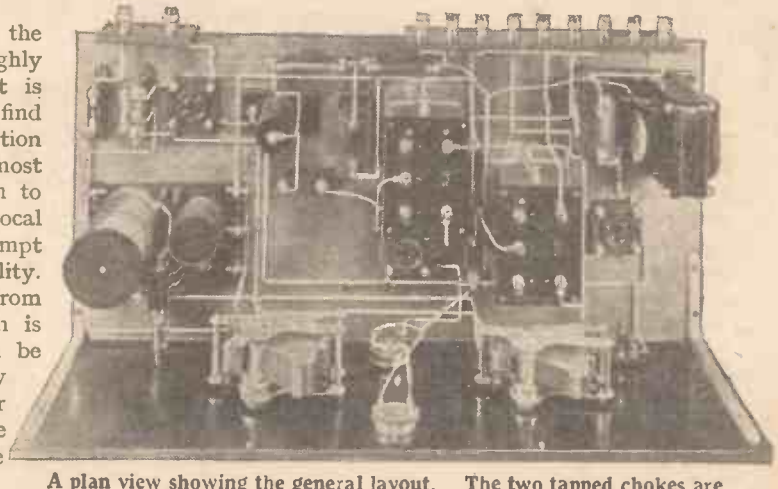
Cutting Out a Valve

If, at any time, it is wished to cut out one valve completely then this is quite easy. To simplify the job, however, it would be advisable to incorporate a switch in the filament lead to the middle or first L.F. valve. Wire No. 15 should be disconnected from the valve holder and taken to one side of the switch. The other side of the switch should be connected to the terminal of the valve holder to which wire No. 15 originally made connection.

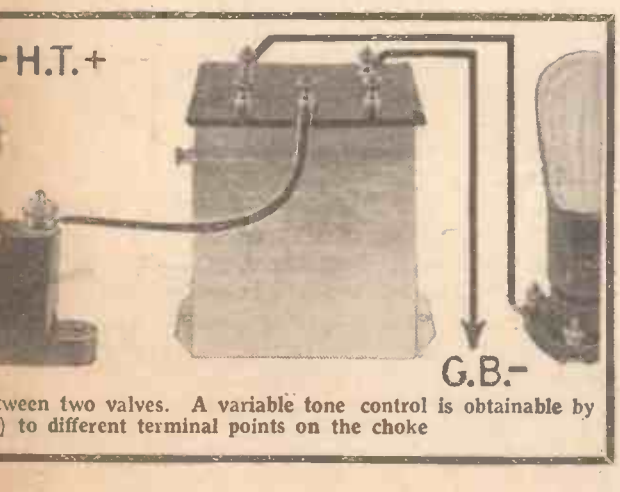
Now, to cut out the first L.F. valve, break the filament circuit to this valve by means of the switch and take flexible wire marked A to terminals 1, 2, or 3 as required, on the second choke unit. It will be necessary, of course, to disconnect the flex B from the second choke unit. To prevent any damage being done, this wire should be turned back out of the way to the terminal of the .01 microfarad fixed condenser, to which the other end is already connected.

With the wiring altered as explained, there will be only two valves in circuit, namely, the detector and the power valve. When employing this method of cutting out one of the valves there is no need for alteration of the grid-bias, H.T. voltage, nor filament current, except in so far as cutting off the supply to the first L.F. valve is concerned.

So far, nothing has been said in regard to the most suitable valves to employ, except that in last week's issue the most suitable impedance values were mentioned. As this question of impedance seems to be rather a



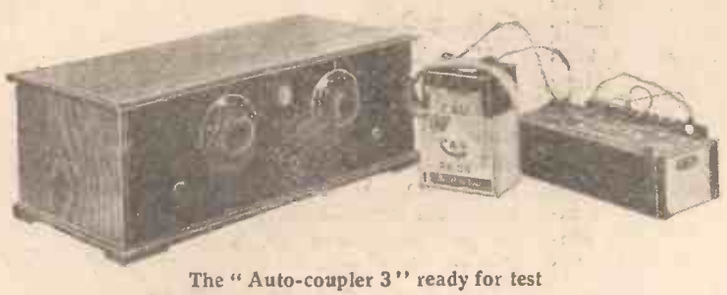
A plan view showing the general layout. The two tapped chokes are clearly shown



tween two valves. A variable tone control is obtainable by) to different terminal points on the choke

"THE AUTO-COUPLER 3" *(Continued from preceding page)*

bugbear with some constructors, a list of suitable valves has been compiled and is given herewith Two-volt valves were used in all of our tests with this set and quite a variety of makes and types were tried out. The list is for 2-volt valves. Should any reader wish to use 4-volt or 6-volt valves, it will be found that in the majority of cases by substituting a figure 4 or a figure 6 in place of the designation 2 appertaining to each valve type specified, the proper type valve will be indicated.



The "Auto-coupler 3" ready for test

Suitable Valves

For the detector position, any of the following valves will be suitable, Six-Sixty 210HF, Marconi or Osram HL210, Mullard PM1HF, Dario Super HF, Lissen or Mazda HL210, Cossor 210HF. In the first L.F. stage any of the following are to be recommended, Six-Sixty 210LF, Cossor 210LF, Marconi or Osram L210, Mullard PM1LF, Six-Sixty 225D, Mullard PM2DX, Lissen L210, or Mazda L210. Suitable valves for the power stage are Marconi or Osram P215, Six-Sixty 220P, Lissen P220, Dario SP, Mullard PM2, Cossor 220P, or Mazda P220. No super-power valves have been specified in this list, because to operate such valves successfully it is rather essential to have something more than a dry-cell H.T. battery.

Even with the valves specified, it will be very advisable to use a triple-capacity dry-cell H.T. battery for satisfactory service and long life. Some constructors may be content to use a double-capacity dry-cell H.T. battery and such a battery will give good service for possibly three or four months.

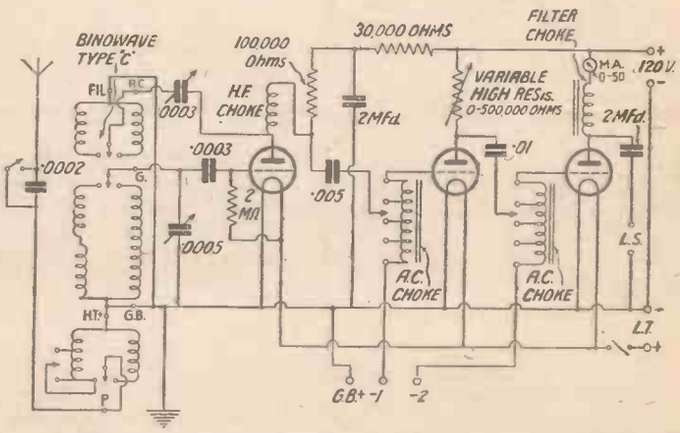
The set has been tested out on a mains unit supplying up to 20 milli-amperes at 120 volts and there was never any difficulty in regard to motor-boating or mains hum. Super-power valves can be used to give the extra volume provided that there is adequate H.T. current supply available. Current supply is a requirement very distinct from voltage. It is possible to have 120 volts or more from a standard capacity dry-cell H.T. battery, yet such a battery generally has a maximum discharge rate of 6 to 7 milliamperes and is, therefore, not capable of supplying the current required for even a small power valve, let alone the two other valves in the three-valve set.

The great feature of the "Auto-coupler 3" is the L.F. valve coupling. The design on the cover of this issue shows the system pictorially

List of Stations Received on "Auto-Coupler 3"

	Dial
Medium Waves	
Midland Regional (5GB)	127
Rome	114
Toulouse	89
London Regional (2LO)	85
Breslau	73
Turin	60
Kaiserslautern... ...	50
National	45
Nürnberg	29
Münster	15
Cork	5
Long Waves	
Huizen	148
Radio Paris	134
Daventry (5XX) ...	116
Eiffel Tower	102
Hilversum	50

In giving the list of stations received no attempt has been made to see how great a number of stations can be received. The list is sufficient to show that something like a dozen alternative programmes are available from the set when used in conjunction with a reasonably good aerial at a fair distance from the local station.



TAPPING INDUCTANCES

IN order to reduce the number of tapping points on an inductance winding to a minimum, whilst at the same time allowing for maximum choice in the number of turns which can be brought into circuit, the following rule should be followed.

With a total of N turns, first subdivide into sections each having the square root of N turns. Then tap the last section at each turn. For instance, a coil of 16 turns should be tapped at every fourth turn, and the last section tapped at each turn. This allows any number of turns from one to sixteen to be selected at will. B. A. R.

"REVERSED" DIALS

SO long as one is tuning in wavelengths, it is natural to use a condenser scale which shows a higher reading as the capacity in circuit and therefore the wavelength is increased and *vice versa*. When, however, one is tuning in kilocycles, it is somewhat confusing to go from a lower to a higher frequency by "reducing" the reading on the dial. In the Navy this difficulty is overcome by graduating the dials in reverse fashion to that normally used, so that when an operator is told to increase frequency, he moves his dial to a higher reading. This results in reducing the capacity, because the maximum scale reading corresponds to zero capacity in circuit. M. B.

NEXT WEEK:
AN EASY-TO-TUNE AND CHEAP TWO-VALVER WITH CONSTANT COUPLING

RADIO AND OPTICS

IN his presidential address to the Optical Society, Mr. F. Twyman pointed out that some of the more recent developments in radio were of special interest to those familiar with the study of optics. Visible light, as well as infra-red, ultra-violet and X-rays were at one end, and radio waves at the other end of the same spectrum.

The polarisation of radio waves is a subject of increasing importance, particularly in directional wireless and in systems for preventing "fading." Interference effects, similar to those known in light, are now being utilized in determining the height of the Heaviside layer. Finally the principles of the well-known optical diffraction grating have recently been applied to the design of aerial systems for "beam" signalling. M. A. L.

MY WIRELESS DEN

By W. JAMES

Weekly Tips, Constructional and Theoretical—

For the Wireless Amateur

Those Curves

THE amplification curve of some transformers is nice and flat over the whole range of audio-frequencies when the correct amplifying valve is used, but some of the cheaper types have a pronounced rise in the curve in the upper frequencies.

This rise is due to the capacity of the transformer and the parts associated with it, and also the inductance of the transformer. When the primary and secondary coils are not very tightly coupled there is usually an appreciable leakage inductance, and it is this in association with the capacity which resonates at a fairly high audio-frequency and produces the peak in the curve.

A small rise is not harmful in the least, but when the bass is weak and the peak is pronounced the quality of the reproduction is bound to be poor, owing to the distortion. The height of the peak may always be reduced by connecting a grid leak across the secondary. A useful value to try is .5 megohm, but in bad cases a lower value, such as 100,000 ohms, may have to be used. The curve may also be improved by fitting an amplifying valve having a lower impedance, as this will improve the bass.

Three H.F. Stages!

Now and again an amateur writes asking me how to connect three high-frequency stages and an anode bend detector. The accompanying diagram gives the connections when shielded valves are used.

There are several points of interest. The first is the resistance-condenser filter in each shield circuit, and in each anode circuit. These parts are of great importance and effectually prevent high-frequency currents from passing into the high-tension battery and from one circuit to another.

Resistances R and R1 may be of 1,000 ohms each and the condensers C and C1 of 1 microfarad each. Provision is made for biasing the valves and also for controlling the amount of the amplification. Resistance R2 is joined to the filaments of the first two valves; therefore these valves have a negative bias equal to the voltage drop across the resistance. A 10-ohm resistance would be suitable.

For the third valve a single dry-cell is used, as at G.B.1. Naturally a much larger bias is needed in the grid circuit of the detector, as indicated at G.B.2. There are no real difficulties in putting together an amplifier of this type provided the coils are well shielded and the filters are used.

Changing the Tone

In sets having a stage of resistance-coupled L.F. amplification the higher notes are often reduced in relative strength owing to the anode resistance being of high value.

Valve and circuit capacities, combined with the capacity of a by-pass condenser or reaction condenser, produce a value which, shunted across the anode resistance, may seriously reduce the impedance connected in the anode circuit at the higher frequencies.

The remedy is obvious. Either the value of the anode resistance must be reduced or the amplifying valve must be changed for one of lower impedance. A certain amount of relief may sometimes be obtained by employing a valve with a lower amplification in the succeeding stage but this may not be necessary.

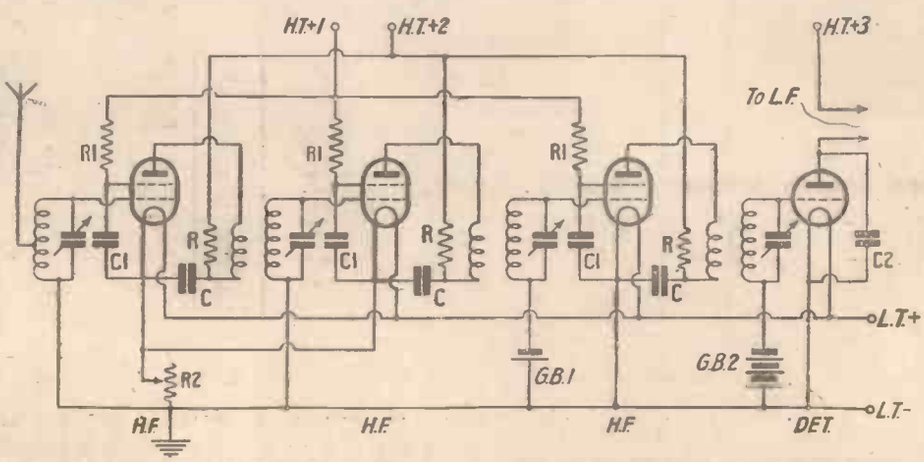
It is the better plan to lower the value of the anode resistance and, if necessary, to fit an amplifying or detector valve of lower impedance in the stage. As the value of the anode is reduced the anode current rises, with the result that the impedance of the valve is lowered. The effect is, therefore, likely to be pronounced. Some strength may be lost, but no doubt the better quality more than compensates for this.

Is There a "B.P." Problem?

I wonder how much of the "Brookman's problem" which one hears so much about is really due to the fact that many sets do not tune down to a sufficiently low wavelength.

A proportion of the sets that I try do not, even at the present time, give the correct results, all because the lowest wavelength is about 250 metres instead of 200. If your set tunes the 261-metre Brookmans station around 5 degrees on the dial, probably much better results would be obtained by removing a few turns from the coil. The tuning is always broad about the minimum of a tuned circuit, and this will be corrected to an extent by lowering the inductance of the coil.

I would rather do this than fit a new tuning condenser having a lower minimum capacity. The new condenser would allow of lower wavelengths being tuned, but would not improve the selectivity.



H.F. Amplification is very popular nowadays owing to the need for selectivity. This circuit shows how three H.F. stages can be used, and the various points are explained in the accompanying paragraph

---

The following fourteen American cities are now operating a police radio service under licence of the Federal Radio Commission: New York, Baltimore, Seattle, Wash.; Harrisburg, Pa.; Greensburg, Pa.; Butler, Pa.; Reading, Pa.; Wyoming, Pa.; Hyland Park, Mich.; Belle Isle, Mich.; Framingham, Mass.; Indianapolis, Ind.; Dallas, Tex.; and Cleveland, Ohio.

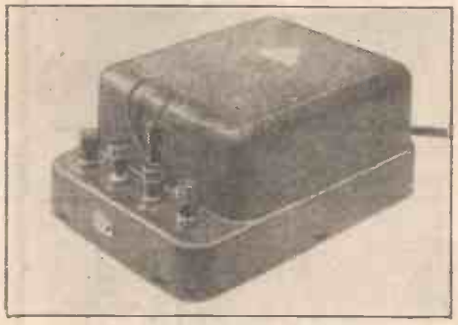
"A.W." TESTS OF APPARATUS

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

Te-ka-de H.T. Eliminator

DOCTOR NESPER, Ltd., the manufacturers of Tekade apparatus, have submitted for test this week a Tekade H.T. eliminator, which is particularly interesting both in design and appearance. The layout of the apparatus is neat and compact, for the eliminator is completely enclosed in a metal case, measuring 8 in. by 5 in. by 3½ in high. No refinements have been omitted from the design and as the results show, the smoothing is as perfect as one would expect.

The voltages and current obtainable from this eliminator are entirely suitable for British valves. There are two separate H.T. positive tappings, but in addition the total voltage obtainable from the eliminator can be adjusted by placing a wander plug to one of three sockets marked A, B, and C. In socket A the maximum voltage obtainable is 120 with 5 milliamperes flowing from tap A2 and 50 volts with 5 milliamperes flowing from tap A1. With the adaptor in socket B, the maximum voltage had risen to 150 at 10 milliamperes, and approximately 100 volts at 20 milliamperes, or 50 volts and 10 milliamperes from the second tap With the wander plug in socket C it rose to 200 available at 10 milliamperes, 150 at 20 milliamperes, and 100 at 30 milliamperes, the other output tap correspondingly increased. From these figures it will



A Te-ka-de battery eliminator

be seen that the maximum output is quite adequate for working a modern super-power valve.

We connected this eliminator up in conjunction with a three-valve set (screen-grid, detector, and L.F.), connecting the screen-grid and detector on the lower tap, with a super-power valve in the final stage. The voltage of the final valve, and the anode of the screen-grid was 150, while the voltage on the detector and screen was 100. The set worked quite well during this test and we found there was almost a complete absence of any hum.

In addition to the H.T. tappings, two grid-bias terminals are provided. Grid bias varies according to the anode current consumed, but with a three-valve set, the maximum grid bias obtainable was approximately 11 to 12 volts on the one tapping, and from 3 to 5 on the second tapping. It might perhaps have been desirable had there been greater control of grid bias voltages or alternatively a larger number of tappings, but these values will do quite well for ordinary practice.

The eliminator submitted worked from 240 volts A.C. and is fitted with a particularly neat type of metal rectifier, which moreover, can be readily replaced if a breakdown occurs.

A Useful Switch

INCREASING ingenuity has lately been shown in the design of switches for wireless work, proving that there is a large demand for good-quality and fool-proof switches. Messrs. L. Person & Son, who market Eureka components, have sent us an attractive anti-capacity double-pole throw-over switch, having one or two distinctly novel features. The action is certainly novel and comprises a system in which a piece of rectangular bakelite is caused to move from side to side by the operation of a cam, rotated by an insulated knob. There are three positions to this switch. In one position the bakelite strip forces two metal springs to make contact with two other springs. In the middle position, all contacts are broken, while in the other position two different sets of contacts are made.

With such a system the motion is particularly smooth and pleasant to operate, while excellent electrical contact is assured. This switch is strongly made, the contact springs being wedged in a strong piece of ebonite, to which the framework carrying the operating spindle is firmly fixed.

This switch appeals to us as a thoroughly practical proposition, both electrically and mechanically.

Premier Transformer

AMONG the test apparatus this week is a Premier transformer made by the Premier Radio Co., of Birmingham. This is an inexpensive instrument selling at the modest price of 5s. 6d. The windings and iron core are housed in a metal container, having overall dimensions of 3 in. by 2½ in. by 2 in. high. The primary and secondary terminals are mounted on either side near the bottom, but are quite accessible.

"A.W." Solves your Wireless Problems

Although with an instrument of this kind, having a step up ratio of 3 to 1, a high primary inductance is hardly to be anticipated, the figures obtained on test were reasonably good, and in fact, the inductance rose with a small polarising current, showing that under operating conditions the figure is likely to be a maximum. The test was conducted as in other low-frequency transformer tests, with a small A.C. current flowing through the primary winding in addition to the normal D.C

A neat L.F. transformer—the Premier

polarising current; the object of this procedure is to duplicate the results obtained in actual practice.

With a D.C. polarising current of 2 milliamperes through the primary, the inductance proved to be 11 henries, and on increasing this figure to 5 milliamperes the inductance fell to 8 henries. One would, therefore, have no hesitation in using the transformer after an H.F. or L.F. valve. With a low-impedance valve preceding the transformer, it should give a reasonably good amplification of the lower audible frequencies. It can be recommended to readers.

Regentone Combined H.T. Mains Unit with L.T. Charger—In the Regentone advertisement on page 401 of our issue dated March 15, the price of the new Regentone combined H.T. mains unit with L.T. charger was not clearly given. The figure should have been £5 17s. 6d. This useful mains eliminator gives H.T. at 120 volts 15 m.a., with variable tappings, and a trickle-charge supply for 2-, 4-, and 6-volt accumulators. It is extremely compact, measuring only 9 in. by 5 in. by 3½ in., and is metal-cased and shielded to prevent stray electrical fields. It is thus equally suitable for home sets, transportables, and portables.

RADIOGRAMS

THE Governor-General of the French Colony of Algeria has decided to erect a 6-kilowatt broadcasting station at Oran, to relay the wireless entertainments transmitted by the Algiers studio. Work is to be begun at once in order that the station may be in operation this summer and so take part in the Colony's Centenary celebrations.

Some weeks ago radio listeners in Innsbruck (Austria) went on strike and refused to pay their licence fees so long as the reception of the wireless entertainments was marred by the electric trams in the city. A similar strike has broken out at Graz, on the official announcement being made to the effect that it is to be a relay station and in future will not broadcast independent programmes.

The new 10-kilowatt transmitter erected at Pasila, a suburb of Helsingfors (Finland) has started its initial tests on 221.4 metres. The power can be increased to 15 kilowatts in the aerial. At Tammerfors, a 700-watt relay station, constructed in Finland, is now taking the capital programmes. The original plant used at Helsingfors is being transferred to Ulea (Uleaborg) in the northern part of the country. The number of licensed listeners on January 1, last, was 90,232, of which 77,248 are interested in the Finnish transmissions; the balance, 12,984, speaking the Swedish language only.

Violet Loraine, the star of *The Bing Boys*, will be heard again on April 1, in a new revue specially written for broadcast by "Eric Little" a pen name which hides a Fleet Street celebrity.

Philip the King is the title of a thrilling play from the pen of John Masefield; it will be given to Regional listeners on April 1, and broadcast through the National station on the following evening.

On April 4, Philip Ridgeway will present a vaudeville programme, in which he will revive the songs popular at the London music halls during the period of the Great War.

In the National programme on April 11 will be found a new play written for the microphone by Tyrone Guthrie; it bears the strange title of *The Flowers are Not for You to Pick*. The story is also of an unusual character.

You Ought to Go on the Wireless, or *A Revue of Awe-ditions*, will be broadcast on March 31 from Midland Regional; it has been compiled by Graham Squiers.

In view of the number of requests received from listeners, *Down in the Canebrake*, a plantation programme, devised by Derek McCulloch, will be given a repeat performance on April 26.

Under the title of *Any Rags*, Jean Harley and George Barker, assisted by the Dominoes Dance Band, will interpret a second saga of syncopation to be transmitted by the London and Midland stations on April 8. It will illustrate the history of ragtime from its earliest invasion of Great Britain.

Broadcasting station WLW, Cincinnati, is to have one of the largest organs in the world installed. The organ has been designed especially for broadcasting. Instead of the ordinary arrangement of pipes in the organ chamber, the pipes will be placed in the chamber in relation to their broadcasting properties, small pipes being placed at the front of the chest together with those of the larger pipes to which the microphone is least sensitive.

The French private short-wave station styling itself *Paris Radio Experimental*, which has nightly broadcast on 31.65 metres, has decided to lower its wavelength to roughly 29 metres, in order to avoid interference with existing transmissions. The daily broadcasts begin at 10 p.m. G.M.T. and the power has been increased to 1,200 watts. It is now proposed to carry out simultaneous broadcasts on 40 or 72 metres, and in the near future to transmit on 400 metres.

Listeners in the north of France complain that the London National broadcasts interfere with their reception of the Lille programmes; as this station contemplates increasing its power to 20 kilowatts, it is expected that an application may be lodged for an alteration in its wavelength.

On 1,200 metres the Etablissements Belin at Rueil, Paris, nightly effect a series of picture transmissions on the Belin system. The call sign is F8BO.

The transmissions from Almeria (Spain) are now heard nightly from 10 p.m. G.M.T. on 250 metres. The announcer refers to the station as *Almeria la Ploca*.

Both Radio Paris and Radio Alger (Algiers) have increased their power to 16 kilowatts in the aerial.

Interesting experiments in the transmission on short waves of finger-prints have been carried out between Nauen (Germany) and Monte Grande (Buenos Aires).

RANDOM FLIGHTS

Jottings From My Log

By JAY COOTE

THE Rome station appears very frequently on my log, mainly for the reason that since its advent, the programmes offered to listeners have been of such a high quality.

Opera, as we all know, is a regular feature of all the Italian stations, but Rome, Milan and Turin are particularly favoured, inasmuch as between the three they possess perhaps the best singers in Europe. The relay system is being rapidly developed, and on many occasions you will hear the calls of Milan coupled with Turin and that of Rome with Naples.

On a recent evening in contradiction with the official programme which promised a musical comedy, Rome took from the San Carlo Theatre at Naples an act of Puccini's posthumous opera *Turandot*. I should not have known it but for the fact that the golden voice in the Italian capital called: *Eh-yar, Radio Roma e Napoli.*

Without doubt, the arrival on the scene of a 50-kilowatter will give us many opportunities of hearing good programmes from Naples, Turin, Milan and Genoa which is shortly to be linked up with the S.B. system.

Vienna's New Signals

Although I had been informed that Vienna had definitely adopted a new interval signal, I have not heard it every time I have tuned in that station, and it would seem that the new gadget is only being tested now and again. The idea is an excellent one, for the mere monotonous ticking of a metronome apart from irritating the nerves of the listener gives no clue as to the length of the interval. The instrument to be used by Vienna does supply the information. For instance, if you hear groups of, say, four ticks, you will know that there are as many minutes to wait. Each minute the number of ticks in the group is reduced, and at the end of the determined period, a continuous "tock-tock" warns you that you may stand-by for a resumption of the broadcast at any moment.

By the way, just as Riga some little time ago suddenly loomed up larger on the radio horizon owing to its increased power, so now we shall be given a good opportunity of hearing Helsingfors direct. This station has blossomed out as a 10-kilowatter, and will transfer its original plant as a relay to Ulea, better known, perhaps, as Uleaborg.

On 436 metres, you will now pick up the test transmissions of the new Stockholm 60-kilowatt giant, which is almost ready to take over its daily duties. There is little doubt that its broadcasts should reach us as easily as do those from Oslo, but with Rome as its immediate neighbour—well, I am rather anxious to see what will happen. But I should like to know what Sweden proposes to do with Motala.

LECTURE TO KENSINGTON RADIO SOCIETY

AN exceedingly interesting lecture was given last week by Mr. H. de A. Donisthorpe, of the G.E.C., Ltd., to the members and friends of the Kensington Radio Society. The Kensington Radio Society is a very active society of radio "fans," and Mr. Donisthorpe was the first president. The lecture, "Radio Past, Present and Future," traced the progress of radio from its earliest days. The future was symbolised by a most interesting demonstration of a Baird Televisor.

It is being remarked in Scotland how seldom characterisation is more than amateurish in radio plays, stories, and sketches, particularly of the comedy type. Only occasionally, it seems, can one expect to listen to the right voice, the right tempo, and that "cute turn of the tongue."

"EXPERIMENTS WITH THE HARTLEY CIRCUIT"

(*Continued from page* 469)

condenser C will not stop the oscillation, then the setting of the neutralising condenser should be reduced slightly until the oscillation ceases. A reduction in the value of the condenser C will then cause the circuit to start oscillating again, and the control can thus be obtained in a smooth and easy manner. This circuit has the additional advantage that it provides a by-pass for the high-frequency currents after they have passed the detector, and this is now regarded as sound practice. The efficiency of the circuit is thereby increased so that we have improved the circuit from two points of view.

Needless to say, if desired, this throttle-control arrangement can be used with the coupled circuit shown in Fig. 2, and various other modifications of the simple idea will suggest themselves to readers. Considering the simplicity of the circuit and the small apparatus that is necessary to connect it up, it is surprising that more use is not made of it. It will certainly provide an evening's enjoyment when one feels disposed to carry out a little experimenting.

AT THE QUEEN'S HALL

SIR HENRY WOOD conducted the first performance of Arnold Bax's Symphony No. 3 on March 14. I confess to having found it difficult to follow, but the composer's own programme notes were helpful, and I shall be surprised if this symphony is forgotten.

Before the interval there was the overture to *Der Freischutz*. This charming piece of Weber has very vivid associations of Teutonic magic, and the B.B.C. Orchestra gave a sympathetic rendering. And then Backhaus played the "Emperor Concerto." L. R. J.

Plans for the installation of a radio brokerage office on board the *Carronia*, in the New York – Havana service have been announced.

In the recent disastrous floods in the southern districts of France, the P.T.T. Toulouse broadcasting station was placed at the disposal of the civil and military authorities for the transmission of official communications to outlying districts which could not be reached by telephone and telegraph.

The Radio Communication Board of the Philippine Islands at a recent meeting declared that during this year, seven new short-wave stations of the Bureau of Posts operating on wavelengths from 54.5 to 66.5 metres will be completed.

Italy's new broadcasting station at Santa Palomba, near Rome, was installed by the Radio Corporation of America at a cost estimated at £150,000.

BROADCAST TELEPHONY

Broadcasting stations classified by country and in order of wavelengths. For the purpose of better comparison, the power indicated is *aerial energy*.

Metres	Kilocycles	Station and Call Sign	Power (Kw.)
GREAT BRITAIN			
25.53	11,751	Chelmsford (5SW)	15.0
*200	1,500	Leeds (2LS)	0.13
*242	1,238	Belfast (2BE)	1.0
*261	1,148	London Nat.	30.0
*288.5	1,040	Newcastle (5NO)	1.0
288.5	1,040	Swansea (5SX)	0.13
288.5	1,040	Stoke-on-Trent (6ST)	0.13
288.5	1,040	Sheffield (6LF)	0.13
288.5	1,040	Plymouth (5PY)	0.13
288.5	1,040	Liverpool (6LV)	0.13
288.5	1,040	Hull (6KH)	0.13
288.5	1,040	Edinburgh (2EH)	0.35
288.5	1,040	Dundee (2DE)	0.13
288.5	1,040	Bournemouth (6BM)	1.0
288.5	1,040	Bradford (2LS)	0.13
*301	995	Aberdeen (2BD)	1.0
*310	968	Cardiff (5WA)	1.0
*356	842	London Reg.	30.0
*377	797	Manchester (2ZY)	1.0
*399	753	Glasgow (5SC)	1.0
*479	626	Midland Reg.	25.0
1,554	193	Daventry (5XX)	25.0
AUSTRIA			
*246	1,220	Linz	0.5
*283	1,058	Innsbruck	0.5
*352	851	Graz	7.0
*453	666	Klagenfurt	0.5
*517	581	Vienna	15.0
BELGIUM			
206	1,460	Antwerp	0.2
216	1,391	Verviers	0.25
220	1,364	Charleroy (LL)	0.25
239	1,256	Binche	0.25
244.7	1,226	Ghent	0.25
246	1,223	Schaerbeek	0.25
337.4	889.2	Forest	8.0
*509	590	Brussels	1.0
CZECHO-SLOVAKIA			
*263	1,139	Moravska-Ostrava	10.0
*279	1,076	Bratislava	12.5
*293	1,023	Kosice	2.0
*342	878	Brunn (Brno)	2.4
*487	617	Prague (Praha)	5.0
DENMARK			
*281	1,067	Copenhagen (Kjobenhavn)	0.75
1,153	260	Kalundborg	7.5
ESTHONIA			
*296	1,013	Reval (Tallina)	0.7
FINLAND			
*221	1,355	Helsingfors	10.0
*1,796	167	Lahti	40.0
FRANCE			
29	10,350	Radio Experimental (Paris)	1.2
175	1,714	Cannes (8FY)	0.2
175	1,714	St. Quentin	0.1
187	1,605	Radio Flandres	0.25
195	1,539	Tourcoing (F8BH)	0.2
210	1,410	Radio Savoie	0.3
212.4	1,412	Fécamp (Radio Normandie)	0.5
219	1,370	Beziers	0.1
235	1,274	Bordeaux (Radio Sud-Ouest)	1.0
240	1,250	Nimes	0.25
248	1,411	Juan-les-Pins	0.5
255	1,175	Toulouse (PTT)	1.5
265	1,132.2	Lille (PTT)	0.7
268	1,121	Strasbourg	0.5
*272	1,102	Rennes (PTT)	0.5
286	1,049	Radio Lyons	0.5
*286	1,049	Montpellier	0.3
293	1,022	Limoges (PTT)	0.5
304	986	Bordeaux (PTT)	1.0
309	970	Radio Vitus	1.0
*316	950	Marseilles (PTT)	0.5
329	914	Grenoble (PTT)	0.5
331.4	905	Poste Parisien	0.5
345	869	Shasbourg (tests)	15.0
368	815	Radio LL (Paris)	0.5
*381	788	Radio Toulouse	8.0
447	671	Paris (Etat)	3.0
468	640	Lyons (PTT)	5.0
1,444	207.5	Eiffel Tower	12.0
*1,725	174	Radio Paris	16.0
GERMANY			
*218	1,373	Flensburg	0.5
*227	1,319	Cologne	4.0
*234	1,283	Münster	3.0
*239	1,256	Nürnberg	2.0
*246	1,220	Cassel	0.25
*247	1,215	Kiel	0.35
*253	1,184	Gleiwitz	2.0
*259	1,157	Leipzig	2.0
*270	1,112	Kaiserslautern	0.25
*276	1,085	Königsberg	2.5
*283	1,058	Magdeburg	0.5
*283	1,058	Berlin (E.)	0.5
*283	1,058	Stettin	0.5
*315.8	951	Bremen	0.35
*320	937.6	Dresden	0.25
*325	923	Breslau	1.5
*360	833	Stuttgart	1.5
*372	806	Hamburg	1.5
*390	770	Frankfurt	1.5
*418	716	Berlin	1.5
*453	662	Danzig	0.25
*456	657	Aachen	0.35
*473	635	Langenberg	13.0
*533	563	Munich	1.5
*560	536	Hanover	0.35
560	536	Augsburg	0.25
569	527	Freiburg	0.35
*1,035	183.5	Zeesen	30.0
1,635	183.5	Norddeich	10.0
HOLLAND			
£1 28	9,590	Eindhoven (PCJ)	30.0
*298	1,004	Huizen (through Hilversum) until 5.40 p.m. G.M.T.	0.5
*1,071	280	Huizen (through Hilversum)	0.5
*1,071	280	Scheveningen-Haven (from 10.30 a.m. to 5.40 p.m. G.M.T.)	5.0
*1,875	160	Hilversum (through Huizen)	6.5
HUNGARY			
210	1,430	Budapest (Csepel)	
550	545	Budapest	20.0
ICELAND			
*1,200	250	Reykjavik (under construction)	16.0
IRISH FREE STATE			
*225	1,337	Cork (1FS)	1.0
*413	725	Dublin (2RN)	1.0
ITALY			
291	1,030	Turin (Torino)	7.0
*332	905	Naples (Napoli)	1.5
386	776	Genoa (Genova)	1.0
*441	680	Rome (Roma)	50.0
453	662	Bolzano (IBZ)	0.3
*501	599	Milan (Milano)	7.0
LATVIA			
*525	572	Riga	7.0
LITHUANIA			
*1,935	155	Kovno	7.0
NORTH AFRICA			
364	824	Algiers (PTT)	16.0
416	721	Radio Maroc (Rabat)	10.0
1,250	240	Tunis Kasbah	0.5
NORWAY			
364	824	Bergen	1.0
385	779	Frederiksstad	0.7
445	674	Rjukan	0.13
453	662	Tromsö	0.1
453	662	Aalesund	0.3
453	662	Porsgrund	0.7
*493	608	Oslo	60.0
POLAND			
214	1,400	Warsaw (2)	2.0
234	1,283	Lodz	2.0
*313	959	Cracow	0.5
*335	896	Posen	1.2
385	779	Wilno	0.5
385	779	Lemberg	2.0
*408	734	Kattowitz	10.0
1,411	212.5	Warsaw	8.0
ROUMANIA			
*394	761	Bucarest	12.0
RUSSIA			
824	364	Moscow (PTT)	20.0
938	320	Moscow (C.C.S.P.)	100.0
1,000	300	Leningrad	20.0
1,056	284	Tiflis	10.0
1,100	272	Moscow Popoff	40.0
*1,304	230	Kharkov	25.0
1,380	217.5	Bakou	10.0
1,481	202.5	Moscow (Kom)	40.0
SPAIN			
206.8	1,124	Barcelona (EAJ13)	10.0
*340	860	Barcelona (EAJ1)	8.0
368	815	Seville (EAJ5)	1.5
426	703	Madrid (EAJ7)	2.0
459	653	San Sebastian (EAJ8)	0.5
SWEDEN			
231	1,301	Malmö	0.6
*257	1,160	Hörby	10.0
270	1,112	Trollhättan	0.04
297	1,010	Falun	0.5
*322	932	Göteborg	10.5
*436	689	Stockholm (tests)	60.0
*542	554	Sundsvall	0.6
*770	389	Ostersund	0.6
1,240	241.8	Boden	0.6
*1,348	222.5	Motala	30.0
SWITZERLAND			
*403	743	Berne	1.0
*459	653	Zurich	0.63
680	442	Lausanne	0.6
760	395	Geneva	0.25
1,010	297	Basle	0.25
TURKEY			
*1,230	243.9	Stamboul	5.0
1,961	153	Angora	7.0
YUGOSLAVIA			
308	973	Zagreb (Agram)	0.7
431	695	Belgrade	2.5
574.7	522	Ljubljana	2.5

All wavelengths marked with an asterisk have been allotted according to the *Plan de Prague*.

CHIEF EVENTS OF THE WEEK

NATIONAL (261 and 1554 metres)

Mar. 31 Orchestral concert, relayed from Queen's Hall.
April 1 De Courville's Hour (5).
" 2 *Philip the King*, a play by Masefield.
" 4 Symphony concert, relayed from Queen's Hall.
" 5 Running commentary on Association football match, England *v.* Scotland, relayed from Wembley Stadium.

LONDON REGIONAL

Mar. 30 Orchestral concert.
" 31 *You Ought to go on the Wireless*, a revue of aweditions, by Graham Squiers.
April 1 *Philip the King*, a play by Masefield.
" 2 *I Pagliacci*, opera, by Leoncavallo.
" 3 Royal Philharmonic Concert, from Liverpool.

MIDLAND REGIONAL

Mar. 31 *You Ought to go on the Wireless*, a revue of aweditions, by Graham Squiers.
April 2 *I Pagliacci*, opera, by Leoncavallo.

MANCHESTER

April 2 A request programme.
" 5 Eye-witness account of Liverpool *v.* Sheffield Wednesday football match (from Liverpool).

BELFAST

April 5 Concert by prizewinners of Belfast Musical Competitions, 1930.

The Irish Free State Government has sanctioned plans for the erection of the high-power transmitting station at Athlone at a cost of £70,000. There are already two broadcasting stations in the I.F.S., one at Dublin and the other in Cork. The licence revenue amounts to £13,000 per annum, which would be insufficient to meet expenses, were it not for the thirty odd thousand pounds derived from duties on imported sets. etc.

A RADIO REVERIE

By G6FA

I GOT badly bitten by the "Wireless Bug" in the early part of 1911. There were not many cases of the disease in those days, but they were severe.

I suppose in all there were a hundred or two of us scattered over the country; in my district there were three.

Permits to carry out experiments in wireless telegraphy were obtained from the then Postmaster-General with much less difficulty than is now the case. This, of course, applies only to experiments in transmission.

We were pioneers in an almost unknown land, and no doubt the Post Office considered us quite harmless and they never guessed that the movement would grow to the extent it has.

We struggled hard against difficulties which appeared almost insuperable, but we won through, and now we can smile at our early efforts.

Looking back, I sometimes wonder if the present, with all its pleasures of DX (long-distance communication), its splendid gear all ready to hand in the shops—we made all our own gadgets then—and its almost innumerable concerts, is really any more enjoyable than the yesterday, when we were thrilled to reach a fellow-experimenter only a mile or two distant.

Our experiments were supposed to be conducted only with certain definite stations duly enumerated on our permit.

No general contacts were officially allowed.

There was, of course, no "fone" then. (Thank goodness, say some of us! Shades of Sunday mornings!) No B.B.C. to make quiet hours necessary. We could pound away all day; *and* on spark, too. Old motor-car ignition coils were in great demand.

A bit of silicon crystal and a pair of headphones, a coil of wire wound on a cylindrical cardboard tube, with a slider attached, made our receiver. With these we spent hours searching the ether for signals that were none too plentiful.

But we built better than we knew, for many of us found our knowledge and experience of the greatest value when war came.

How many now remember the thrill of old FL's (Eiffel Tower) majestic splutter? I have by me now a letter in the handwriting of General Ferrie, Major then and Chief of the French Military Wireless Service, written in 1912 in connection with a report I sent to him. That was a treasure indeed. The shrill scream of German Norddeich or the beautiful musical notes of Clifden and Poldhu sending their Press far out across the Atlantic. Night after night we waited and listened to them, and no one who did, even though possessed of only the least imagination, will surely ever forget the romance and magic of it.

I recently visited the site of MPD (Poldhu), now dismantled and almost forgotten. Progress, perhaps, but still the passing of an old friend.

August, 1914, and war marked the end of that stage. Our stations were closed down and permits withdrawn. The Post Office took all our apparatus into its custody "for the duration." It was returned eventually. I think mine came back in 1920, considerably the worse for storage; but it didn't matter, for things had progressed so far that it was all hopelessly out of date. Valves had been introduced, and we came back to a new era; one totally different from that we had left behind.

Telephony—a dream before—was now an accomplished fact, though broadcasting as we know it now had not yet commenced. The new system of generation of continuous waves altered all our conception of distance, and wavelengths we had considered it impossible to use had been brought into service. So it still goes on. Who knows to what end?

Television—a phantasy in 1911—awaits only development, and we know not what else may follow.

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.

American Receivers Again

SIR,—Since reading the letter of P. R. L. I have had an opportunity of carrying out various tests on most of the popular and widely advertised American sets, and on the average they are not, valve for valve, nearly as efficient as British sets. There is one set, however, which exceeded all expectations, a 6-valver, all-mains with three controls, selector, volume control, and on-off switch. It can be easily adapted for our voltage and the primary input is but 50 watts.

The price in America is about 120 dollars and it can be bought in this country for thirty guineas. Such stations as Münster .5 kilowatt, Toulouse (PTT) 1.5 kilowatt, Naples 1.5 kilowatt, and Ecole Supérieure .8 kilowatt can be received at good loud-speaker strength. I admit this is unusual for an American set.

S. C. O. (Southampton).

The Regional Scheme

SIR,—I read with great interest "Thermion's" article in AMATEUR WIRELESS of March 8, on the Regional Scheme, but as an average listener whose woes he attempted to express, I unfortunately fail to agree with him.

In the first place, the average listener does not require that degree of selectivity which he says he does.

He is, I believe, fairly satisfied with the alternative programmes, so far as they are alternative, and doesn't worry much if the station can be heard through 20 degrees of the tuning condensers, or that it is impossible to tune, say, the 356-metre transmitter completely out, before hearing the 261-metre transmitter.

I know he will say that such a state of things should not be and I agree, but it does not alter the fact that the average listener is content to let it be so rather than spend time and usually money in alterations.

In my opinion, the percentage of knob twiddlers and ether searchers for foreign programmes, is not so high as he suggests it is.

C. G. (Catford).

The B.B.C.'s Crystal Complex

SIR,—I am a regular reader of your excellent publication and heartily agree with the vigorous campaign of "Thermion" against the Regional Scheme. I may add, for my part, it does not appreciably interfere with my reception. This scheme, the outcome of the B.B.C.'s crystal complex, is ill-conceived and the balance to its credit is so very much inferior to its various deficiencies in the nature of interference, cost and nuisance to the many that it is hard to see how it will survive the test of time without modification, i.e., reduction of power, etc. Then, again, such a disturbance of the ether is simply asking for the inevitable retaliation, not least, from the C.W. telegraph transmitters which seem to have increased their power since the advent of the full working of the twins at Brookmans Park.

E. F. (London, W.).

The Baird Televisor

SIR,—With reference to your article on our Baird Televisor receiver, which appeared in a recent issue of your paper, will you very kindly note that the retail price of the instrument is 25 *guineas*. We consider that the figure of *approximately* £21 in your article might mislead the public.

We take this opportunity of informing you that the Televisor Receiver is being produced in several other finished colours, besides that of the black crystalline supplied to you, and this is another point that might be of interest to your readers.

BAIRD TELEVISION DEVELOPMENT CO., LTD. (London).

The Regionals in the North

SIR,—In AMATEUR WIRELESS, dated March 15, "Thermion" says in "On Your Wavelength": "The Home Counties are at present the only ones affected."

He evidently has no experience of we poor Northern listeners; all the papers talk of separating the Brookmans twins, but what about separating Brookmans and Manchester on 356 and 377 metres, respectively, at three miles from the latter? That is a more difficult job than 261 and 356 metres.

I cannot do it with a proprietory wave-trap, but intend to make and try the Brookman's By-pass; my present wave-trap cuts both these stations out or leaves them both in.

Previously I could get foreign stations all the way up to just below Manchester; now I get interference on Hörby and Leipzig, Toulouse PTT, Kaiserlautern, Rennes, Barcelona EAJ13, are cut out completely, so that my foreigners are lost from about 257 metres to 290, and then 300 to 400 metres.

The 261-metre programme is no use, because Manchester swamps it, and I

(*Continued on next page*)

FULL-SIZE BLUEPRINTS

When ordering, please send Postal Order, NOT STAMPS

CRYSTAL SETS (6d. each)

B.B.C. Brookman's Park Set AW206
Regional Crystal Set WM177

ONE-VALVE SETS (1s. each)

B.B.C. Official One AW208
A.1 .. .. WM153

TWO-VALVE SETS (1s. each)

Loud-speaker America Two AW190
Talisman Two (D, Trans) AW194
Hyper-selective Two (D, Trans) AW198
Pentector Two (P. det, RC) AW213
British Broadcast Two (D, Trans) AW215
Clipper Two (D, Trans) WM135
Ether Ranger (D, Trans) WM156
Brookman's Two (D, Trans) WM168
A.C. Two (D. Trans) WM175
Programme Two (D, Trans) WM177
New Crusader (D, Trans) WM182

THREE-VALVE SETS (1s. each)

Broadcast Three (SG, D, Trans) AW192
All-wave High-mag. Three (D, 2 Trans) .. AW199
Knife-edge Three (D, RC, Trans) AW201
Talisman Two-three (D, RC, Trans) AW203A
Wide World short-wave Three (HF, D, Trans) AW207
Everybody's Three (SG, D, Trans) AW209
1930 Ether Searcher (SG, D, Trans) AW211
New All-Britain Three (HF, D, Trans) .. AW214
Best-by-Ballot Three (SG, D, Trans) Price 4d. free with copy of "AW" AW217
Brookman's By-pass Three (D, 2 Trans) .. AW220
Everybody's all-electric Three (SG, D, Trans) —A.C. AW221
1930 Clarion Three (SG, D, Trans) AW223
Auto-coupler Three (D, 2LF) AW225
Standard Coil Three (HF, D, Trans) WM117
Lodestone Three (HF, D, Trans) WM129
At Home Three (D, 2RC) WM141
Short-wave Link (D, RC, Trans) WM142
Binowave S.G. Three (SG, D, Trans) WM152
Fanfare (D, 2 Trans) WM157
Brookman's Three (SG, D, Trans) WM161
Community Three (D, RC, Trans) WM164
New Q3 (SG, D, Pentode) WM167
Brookman's Push-Pull Three (HF, D, Trans) 1/6 WM170
Celerity Three (SG, D, Trans) WM173
All-nations Three (D, 2 Trans) WM178
Inceptordyne (SG, D, Pentode) WM179
Brookman's A.C. Three (SG, D, Trans) 1/6 .. WM184

FOUR-VALVE SETS (1s. 6d. each)

Clarion All-electric Three (SG, D, Trans—A.C. Rectifier) AW200
Music-Lover's Gramo-radio (SG, D, RC, Trans)—1s. 6d. AW202A
Music-Lover's Gramo-radio (Loud-speaker)—1s. AW202B
Standard-coil Four (HF, D, 2RC) WM122
Dominions Four (2SG, D, Trans) WM134
Short-wave Adaptor for Dominions Four .. WM140
Music Player (HF, D, RC, Trans) WM144
Arrow (SG, HF, D, Trans) WM154
1930 Monodial (2SG, D, Trans) WM158
Electric Four (All A.C.—SG, D, RC, Trans) .. WM162
Outpost Four (SG, D, 2 Trans) WM165
Brookman's Four (2SG, D, Trans) WM174
Transportable Four (SG, D, 2 RC) WM180

FIVE-VALVE SETS (1s. 6d. each)

All-wave Lodestone Five (HF, D, RC, Push-pull) WM146
1930 Five (2HF, D, RC, Trans) WM171
Dual-screen Five (2SG, D, RC, Trans) .. WM185

AMPLIFIERS (1s. each)

A.W. Gramophone Amplifier AW205
Beginner's Amplifier (1v.) 9d. AW210
Brookman's Separator (HF Unit) AW212
Two-valve Amplifier AW216
"Mag" Gramo Unit AW224
Concentrator H.F. Unit WM169
Radio-Record Amplifier (DC Mains) WM183

MISCELLANEOUS (1s. each)

Short-wave Adaptor (1 v.) AW183
High-tension Battery Charger AW191
Simplest H.T. Unit AW197
By-pass Unit (Wavetrap) AW218
Home-constructors' Loud-speaker (pleated paper) AW219
"Twin" Brookman's By-pass (6d.) .. .. AW 222
James H.T. Unit for D.C. Mains WM133
Two Ampere Low-tension Unit WM147
A.C. Mains Amplifier WM149
A.C. Mains Unit for All-wave Lodestone Five WM151
H.T. Unit for A.C. Mains WM159
"W.M." Linen-diaphragm WM172
Trimmer (Selectivity Unit) (6d.) WM181
Brookman's "Wipe-outs" WM186

PORTABLE SETS

Arcadian Portable (SG, D, 2 Trans) with Linen-diaphragm Loud-speaker (half-scale) AW177 1/6
Holiday Portable Three (D, RC, Trans) AW188 1/-
Music Leader (SG, D, RC, Trans) with copy "AW" .. .. AW203 -/4
Wayfarer Portable (Super Het) WM139 1/6

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 LONDON, E.C.4

"LETTERS TO THE EDITOR"

(*Continued from preceding page*)

receive both programmes at the same time.

You might say, go to 5GB which has usually the same programme as on 261 metres, but the quality of 5GB is usually so poor that one does not want to listen to it. It usually sounds as though the broadcasters had plums in their mouths.

During experimenting hours we have not noticed it so much, but now that it is in full swing, ones does not know whether to persevere to separate it, or to scrap the lot.

NORTHERN SUFFERER (Manchester).

Brookmans at Three Miles

SIR,—I have followed with great interest "Thermion's" remarks during the past week or two regarding the new twin transmitters at Brookmans Park. What has amused me most is the statement by the Hatfield listener who can separate both stations without wave-trap or any other device on either valve or plain crystal set. You thought that by these remarks that Hatfield may be a dead spot for reception, and that the strength of the twin transmitters which are three miles away are not giving good signal strength in this area.

This is not so and I feel sure if you could hear what some say about the volume and nuisance you would blush.

In my case, I have a three-valve set of the same circuit as the Mullard Master Three Star set, which was a good set, that is, considering it is only a detector and 2 L.F stages. It was possible to get at least twenty stations on the loud-speaker with this set. I am now cut down to the reception of two, the Regional twins and only these with a wave-trap.

It is a great hardship to those who have scraped to get together the parts to build up a receiver and now find it obsolete. My aerial is about 25 ft. high at both ends and the earth is a water tap.

W. (Hatfield).

Another Hatfield Experience

SIR,—I was very surprised to read in "Thermion's" notes that he thought the results of H. J. B. (Hatfield) were exceptional.

Among a small band of "anode-bend" enthusiasts who are content with two programmes of good strength and quality, it is quite a usual thing here. As to "Thermion's" explanation that signal strength is poor in this locality I would like to say that "Reg" and "Nat" can be received at good 'phone strength on a frame aerial and a crystal.

Furthermore on an all-mains set (2S.G. det. and 1 L.F.) using no reaction and a small frame aerial it is possible to receive at least a dozen stations on a moving-coil loud-speaker at surprising strength in spite of "Reg" and "Nat" doing their worst; and one of them is Toulouse.

R. A. C. (Hatfield)

OUR BLUEPRINT SERVICE

Constructors of receivers described in this journal should make full use of our Blueprint Service and avoid all risk of failure.

MORE RADIOGRAMS

A DRAFT decree was recently published, showing that Portugal intends making radio-telegraphy, radio-telephony and broadcasting a state monopoly.

The new Austrian Electricity Act contains clauses which have been drafted for the protection of radio listeners against interference caused by electrical apparatus.

The Great Western Railway Company is considering the construction of a beam radio beacon to assist the navigation of its steamers in Plymouth Sound during fog.

The Italian Minister of Communications has been authorised to grant the sum of 500,000 lire as the Government's contribution towards the cost of installing the Vatican's wireless station.

In Germany the *Reichspostamt* has decided to erect a new high-power transmitter at Heilsberg, East Prussia. The prospective power is 60 to 100 kilowatts, with two aerial wood latticed masts 325 ft. high.

More than twenty high-seas fishing steamers are now equipped with two-way radio sets, giving direct communication between owners and captains at a minimum distance of 200 miles.

The British Broadcasting Corporation's accounts with the Post Office show cash receipts for wireless receiving licences as £1,358,187. Of this the B.B.C. receives £887,616, the Post Office (for expenses), £178,686, and the Treasury £291,885.

A Cabinet sub-committee in Australia has been appointed to consider the whole position of wireless and to make suggestions for its reorganisation.

A daily telephone service has now been instituted from shore subscribers to the liner *Majestic* between the hours of 12 noon and 6 p.m. The minimum charge is £4 10s., covering three minutes' conversation, and £1 10s. per additional minute or fraction thereof. A "report charge" of 10s. is payable (in place of the nominal charge) when for any reason beyond the control of the Post Office the person asked for cannot be found and connected up with the caller. A similar service will be available to and from any ship on the North Atlantic route which is fitted with a suitable type of wireless telephone apparatus.

Short-wave enthusiasts who find morse transmissions a useful aid in calibrating their sets should note that the following naval stations have been allotted new wavelengths, in addition to those already in use: GYC (Horsea, Portsmouth), 33.11 metres; GYG (Bermuda Dockyard), 34.30 metres; GYU (Gibraltar), 34.42 metres; and GZP (Matara, Ceylon), 34.07 metres.

The Automobile Association has been officially informed that tourists may take wireless sets into France. Duties and taxes must be paid and no refund will be granted on re-exportation. The duty on British sets is 22 per cent. *ad valorem*, and in addition there is a luxury tax on sets and on loud-speakers.

"Amateur Wireless and Radiovision." Price Threepence. Published on Thursdays and bearing the date of Saturday immediately following. Post free to any part of the world: 3 months, 4s. 6d.; 6 months, 8s. 9d.; 12 months, 17s. 6d. Postal Orders, Post Office Orders, or Cheques should be made payable to "Bernard Jones Publications, Ltd."

General Correspondence is to be brief and written on one side of the paper only. All sketches and drawings to be on separate sheets. **Contributions** are always welcome, will be promptly considered, and if used will be paid for. **Queries** should be addressed to the Editor, and the conditions printed at the head of "Our Information Bureau" should be closely observed. **Communications** should be addressed, according to their nature, to The Editor, The Advertisement Manager, or The Publisher, "Amateur Wireless," 58-61 Fetter Lane, London, E.C.4.

PREPAID ADVERTISEMENTS

Advertisements under this head are charged THREEPENCE PER WORD, minimum charge THREE SHILLINGS.

DEPOSIT SYSTEM

As the Publishers cannot accept responsibility for the bona fides of advertisers in this publication, they have introduced a system of deposit which it is recommended should be adopted by readers when dealing with persons with whom they are unacquainted. It is here explained.

Intending purchasers should forward to the Publishers the amount of the purchase money of the article advertised. This will be acknowledged to both the Depositor and the Vendor, whose names and addresses must necessarily be given. The deposit is retained until advice is received of the completion of the purchase, or of the article having been returned to and accepted by the Vendor. In addition to the amount of the Deposit, a Fee of 6d. for sums of £1 and under, and 1s. for amounts in excess of £1, to cover postage, etc., must be remitted at the same time. In cases of persons not resident within the United Kingdom, double fees are charged.

The amount of the Deposit and Fee must be remitted by Postal Order or Registered Letter (Cheques cannot be accepted), addressed to

"AMATEUR WIRELESS," ADVERTISEMENT DEPARTMENT, 58/61 FETTER LANE, LONDON, E.C.4

DOUBLE CHASSIS for 22 in. by 22 in fabric speakers, strong oak, cut to exact sizes, 8 supporting brackets, tube liquid glue, drilled ready for assembling with screws provided, cannot possibly go out of shape when fabric is fixed; 6/-, complete assembly; c.o.d., carriage paid; trade inquiries solicited.—W. T. Tucker, 2, Vincent Street, Moseley Road, Birmingham.

DOUBLE CONE CHASSIS (new), in oxidized copper drum, with polished fretted front, circular seamed cones, only wants hearing; sent on 7 days' approval against cash; cost 32/6, sell 13/6.—Brew, Pytchley, near Kettering.

500 COMPONENTS SALE: FREE LIST. Write for it! Chokes, Transformers, Coils, Condensers, etc. FROST, 54, Clerkenwell Road, E.C.1

CHARGING PLANTS, Engines and Dynamos stocked. Please state requirements. MOORE'S, 246 Thimblemill Road, Smethwick.

UNWANTED RADIO PARTS taken in part payment for brand new. Important: state lowest price acceptable for your goods and prices of new goods required. Ryalls Radio, 182 Kennington Road, London.

WIRELESS OPERATING APPOINTMENTS: fees payable after qualifying (for boarding students). Morse classes. Wireless School, Manor Gardens, Holloway, N.7.

BANKRUPT BARGAINS. Falco L.F. transformers 2/9. .0003 S.M. variable 3/6. H.F. chokes 1/6. Cone units 4/-. .0003 fixed and grid-leak 10d. Bullphone R.C.C units 3/-. EKCO All-power units D.C., C2A £3/15/0. Gambrell All-mains set, complete valves S.G., D. and P., D.C. £12. List free. BUTLIN, 143b Preston Road, Brighton

AMPLION HORN TYPE SPEAKERS. Original cost, £5. 16/6 complete. Army Mark III 2 valve sets, 22/6. 1 kilowatt transformers, 25/-. Aerial test sets, 10/-. Ex-Government single phones, 1/-. X. Ray valves, 7/6. 2 mfd. condensers, 1/3. Veeder counters, 1/-. Microphone buttons, 6d. 500 ohm chokes, 6d. Also transmitting gear, cheap, etc. Plus postage. CAMDEN SURPLUS MART, 25, King Street, Camden Town, N.W.1.

REPAIRS

Any make of L.F. Transformer, Loud-speaker or headphones repaired and dispatched within 48 HOURS—TWELVE MONTHS' GUARANTEE with each repair. 4/- Post Free.
Terms to Trade

TRANSFORMER REPAIR CO.
"Service" Dept.
214 High Street, Colliers Wood, London, S.W.19

EASY TERMS

We SPECIALISE in the supply of all Good Quality Radio Sets, Components and accessories on Easy Terms. We will give you efficient service. Send us your list of requirements and a quotation will be sent by return.

LONDON RADIO SUPPLY COMPANY
11, Oat Lane, Noble St., London, E.C.2
NATIONAL 1977

GRAMOPHONES LATEST HORNS AND PARTS
CATALOGUE FREE. CASH OR TERMS.
BUILD £12 MODEL FOR £3. INSTRUCTIONS 3d.
W. BURT, 185 High St., Deptford, London, S.E.8

Amateur Wireless COUPON Available until Saturday **APRIL 5, 1930**

Printed in England. Published by Bernard Jones Publications, Ltd., 58/61 Fetter Lane, London, E.C.4.
Sole Agents for South Africa: Central News Agency, Limited. Sole Agents for Australasia: Gordon & Gotch, Limited. Saturday, March 29, 1930.