A NEW LOUD-SPEAKER FOR YOU TO BUILD

THE "BROOKMAN'S BY-PASS" IN A SPECIAL "THREE"


# Amateur Wireless

and Radiovision

Every Thursday 3d

Vol. XVI. No. 400 Saturday, February 8 1930


## TWO GREAT FEATURES!

## A NEW SPEAKER & Brookman's By-pass 3

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

FEBRUARY 8, 1930 No. 400. Vol. XVI

# Amateur Wireless and Radiovision

The Leading Radio Weekly for the Constructor, Listener and Experimenter

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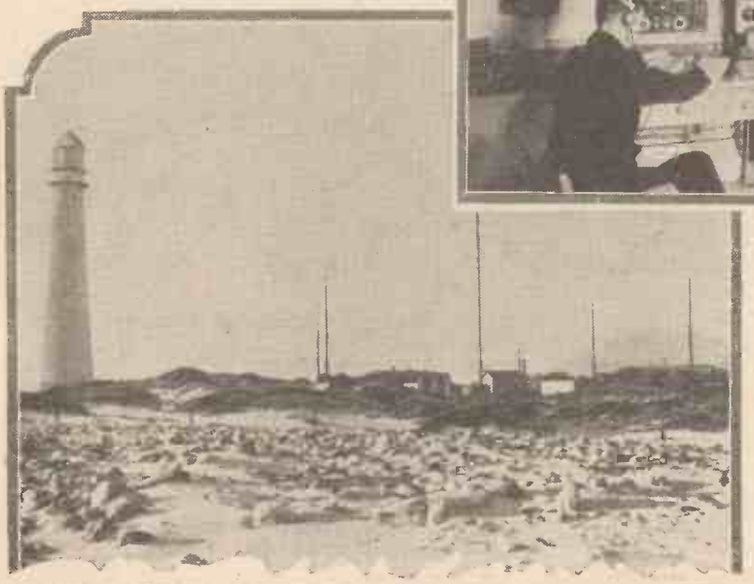
## *Waking 'em Up!—The B.B.C. Helps!—Suggestions, Please!—The R100 in Fog—Inside the Atom—A Radio Questions Bureau*

***Waking 'em Up!***—We enthusiasts should really try to find pity for listeners whose sole interest in radio begins and ends with the L.T. switch! Fortunately, there are not many of these folk, for of such are innocent oscillators made. Anyway, they are getting a jolt now that the Regional Scheme is going. We have come across listeners who normally leave their sets tuned in to, say, London for months at a time, and who are now blaming the B.B.C. for "switching about" with the wavelengths! How difficult it is to explain to such listeners even a simple job like putting a "three-oh's-one" in the aerial circuit to restore selectivity.

***The B.B.C. Helps!***—And, while on the subject of getting good results from one "B.P." without the other chirping in, it is interesting to note that the B.B.C. is endeavouring to help listeners. The following notice has been issued by the technical department at Savoy Hill. "Any listeners who have difficulty in receiving the National programme transmitter or who find that their receivers cannot separate the two programmes are invited to address a post card to the Chief Engineer, B.B.C., Savoy Hill, London, W.C.2. Information will then be forwarded to them. Post cards should be marked 'B.P.' in the top left-hand corner." And we proudly remind you, don't forget what AMATEUR WIRELESS is doing in this good cause. Our "Brookman's By-pass" and "Brookman's By-pass 3" are effective palliatives. Try them before you add to the worries of the B.B.C. Chief Engineer!

***Suggestions, Please!***—What a pity that there is not a more useful co-operation between the B.B.C. and the Postmaster-General in the matter of issuing radio licences. If there were better liaison, then we might copy the example set by the Danish authorities. In Denmark, when you apply for a licence, you have to send along an opinion of the available broadcasts, and suggestions if possible! Presumably if the comments are not kindly you still get your licence! But what a glorious opportunity it would be, welcomed by thousands, to grouse at the B.B.C. through the medium of the P.M.G.! The broadcasting authorities in Denmark seem to be in the fortunate position of receiving no grouses, and they have to ask for them.

***The R100 in Fog***—Radio "D.F." as an assistance to the navigation of aircraft again proved its value during the recent third test flight of the R100. The airship left the hangar in the morning and did not return until about twelve hours later. Explaining the prolongation of the flight in a press interview, Sir Dennistoun Burney said that the airship ran into a thick fog an hour after leaving Cardington and did not get out of it until night. Those on board could obtain only occasional brief glimpses of the ground, and were unable to determine their whereabouts until they established communication with Croydon and Pulham by wireless, enabling bearings to be taken on the Marconi direction finders at these stations.



(Left) The radio set in this lighthouse on a southern point of South Africa is in daily touch with the Antarctic exploration ship "Discovery," described recently in "A.W.," and the radio cabin of which is shown above

***Inside the Atom***—The National Lectures may not make a vast appeal, but an epoch-making broadcast was that made recently by Sir J. J. Thomson, the man who, with his pupils, discovered the electron. As he is undoubtedly one of the greatest living scientists, and has contributed a large quota towards the progress of radio, probably many enthusiasts endeavoured to translate his thoughtful speech into everyday meaning. The gist of many of his remarks was that we are now concerned with the *inside* of the atom, the world outside being already well known.

***A Radio Questions Bureau***—A novel scheme has been mooted by an American broadcaster. KSAC, Manhattan, broadcasts a special programme to help amateurs with their radio sets. During the Radio Fans' Programme radio questions are answered, special talks on reception problems are given and current news of the industry is dispensed.

**NEXT WEEK: FIFTY BEST BROADCASTING STATIONS, Wavelength, power and how to identify them**

# G.P.O. PICTURE TRANSMISSIONS

*You can now telegraph photographs to the principal towns in this country and the Continent. This article by Kenneth Ullyett explains the method used*

Inserting a picture before "running"

MOST AMATEUR WIRELESS readers will have noticed that all the important papers nowadays make use of "telegraphed" pictures whenever any distant event has to be photographically illustrated without delay.

What is not, perhaps, so generally realised is the vast organisation behind this newspaper radio picture scheme, and also the fact that the British G.P.O. has now started a system of picture transmission on similar lines. It is possible for anyone to send pictures by land line to all the chief Continental capitals, at low cost. Doubtless it will not be long before it is equally possible to transmit pictures on this system by radio—perhaps even via Rugby.

The Siemens-Halske engineers some two years ago perfected an arrangement for the transmission of photos by land line, and a rough instrument was erected—almost a laboratory model—in the offices of the British branch in the West End of London. Important newspapers—the *Daily Mail*, the *Daily Mirror*, the Allied Newspaper group, the *Glasgow Herald*, and the *Manchester Guardian*, to mention but a few—had arranged to have machines installed when the deliveries commenced.

Switching on the "juice" before transmitting a picture

To ensure that the London offices of these papers should have a telegraph picture service at once, the rough model was used and an upper room of the Siemens office, near the Winter Garden Theatre, was converted into a kind of editorial sanctum, with runners carrying the telegraphed pictures to and from Fleet Street!

This lasted for about eight months, and now, at the time of writing, the whole country and the Continent is covered with a network of lines by which pictures are sent from London to Berlin, from Glasgow to Rome, from Manchester to Milan. There is practically no limit to this giant Siemens chain. An accompanying map gives a rough idea of the lines.

### *The G.P.O. System*

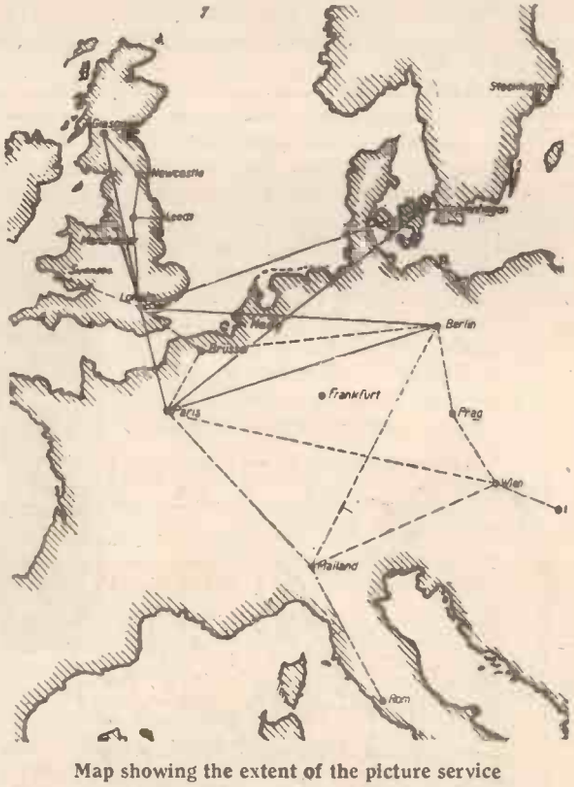
Now the G.P.O. has taken up the system, and it is possible for anybody to have a drawing or photograph flashed from the G.P.O. headquarters at St. Martin's le Grand, in London, to almost any Continental capital.

The Post Office has taken up picture telegraphy in a creditably thorough manner, and when I was invited to inspect the apparatus in action at St. Martin's le Grand, I was convinced both that the engineers have conducted practically every conceivable experiment and that there is no reason why every commercial concern should not make use of the picture service to the Continent.

The Siemens apparatus is very ingenious, yet simple to understand in general principle. Let us suppose you want to send a picture from London to Berlin.

On receipt of the print (no negative is needed) it is clamped to a vertical cylinder in the transmitter and the engineer rings through the ordinary 'phone lines to Berlin. These lines are underground, and are in pairs. There is not an earth return. When the line is made and the transmitter and receiver motors are started, London impresses its synchronising frequency on the cable. This is obtained from a tuning fork housed in a padded cylinder, and its temperature is carefully maintained by a thermostat and electric heater.

Berlin receives this synchronising signal, and the receiver is adjusted till it is "in tune." The operation, to some extent, is like the synchronising of a televisor. Visual evidence of the synchronism is given by means of a stroboscopic disc illuminated by a neon lamp in the plate circuit of the receiver amplifier.




Map showing the extent of the picture service

Not only must London and Berlin be in synchronism, but they must be also in isynchronism—that is, the receiver and transmitter drums must run at the same speed and must *start and stop at the same point.* The isynchronism is also indicated

(*Continued at foot of page* 206)

# The HOME CONSTRUCTOR'S PLEATED-PAPER LOUD-SPEAKER

*The pleated-paper loud-speaker at one time was immensely popular, and that was before actuating units were brought to the degree of perfection that has now been attained. Readers who make the instrument described below and fit a modern unit will be agreeably surprised with the volume and quality*

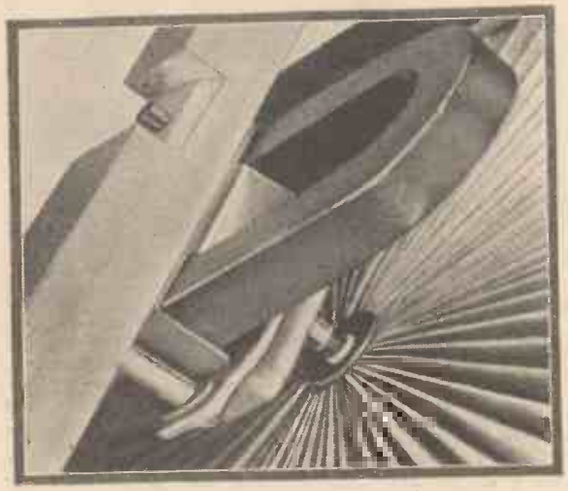
THERE is a demand for a loud-speaker which can be easily made up at home, which will cost but little in addition to the cost of the unit itself, and which will give reproduction at least equal to some of the medium price commercial loud-speakers.

Off-hand, one would say that this is not easy to achieve, for in a loud-speaker the skill with which the assembly is made plays a large part in the final success obtained, and it is in the matter of assembly that amateurs and non-experienced constructors are likely to go wrong.

Well, now, this loud-speaker has been designed so that it can be made up in half an hour or so, by anyone who can handle a screwdriver and a pair of pliers. No doping or other constructional difficulties have to be contended with, and any novice can set about its construction knowing full well that he will get good results.

The basic principle of this new instrument is that it employs a circular diaphragm of pleated paper. The design brings to mind other types of pleated-paper loud-speakers which were developed by the AMATEUR WIRELESS Constructional Department in the early days of broadcasting. These were highly successful and were leaders at their time. They were, however, limited by the type of loud-speaker drive then available.

Modern balanced armature and similar loud-speaker drives will give vastly improved results even with old type diaphragms, and in addition there is practically no connection between any previous type of pleated-paper diaphragm and the present one, which has been developed during the past few months at the "A.W." offices.



This photograph shows how the unit driving rod is attached to the diaphragm

### Simple Construction

A good general idea of this present loud-speaker can be obtained from the accompanying photographs and from the reproduction of the blueprint. This small reproduction is made as large as conveniently possible on the pages of AMATEUR WIRELESS. It is not, however, so useful as the full-size blueprint, which we strongly advise you should obtain before commencing to make up the loud-speaker. The blueprint can be obtained, price 6d., from the blueprint department. No correspondence is necessary; simply ask for Blueprint No. 219, and make sure that your inquiry is addressed to the blueprint department.

You will see that the essential arrangement of the loud-speaker is that a circular diaphragm is mounted in a semi-floating fashion between rubber strips, and is driven at the centre by a large loud-speaker drive. The whole diaphragm is mounted on a baffle board which can conveniently form the front of the loud-speaker cabinet. The drive unit is screwed to a batten which is supported on distance pieces also from the back of the baffle.

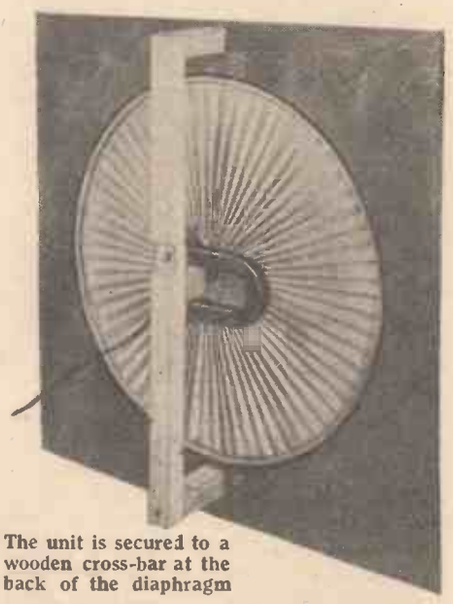
The first constructional operation is to make up the diaphragm from pleated paper. The type of paper used is known as Kraft, and is the type of "stoutish" brown paper used for wrapping up small parcels. The important part is the pleating, and we strongly recommend that this should not be done by hand. Almost any firm of cloth pleaters will undertake the small job, and, of course, diaphragms can be obtained ready made.

The pleated strip is folded to form a circular diaphragm and the two edges should be joined firmly together with seccotine or glue. The type of glue we recommend for this operation, and also for that to be described next, is known as Le Page glue, and is obtainable in small-size tubes at most ironmongers and hardware merchants. The centre of the diaphragm should, when the join is quite dry, be smeared with Le Page's glue and the driving "button" attached.

This button is made up in a very simple manner from an ordinary Clix socket and two ivorine washers as used for marking terminals. One washer is slipped over the Clix socket, the socket pushed through the glue-moistened centre of the diaphragm, and the second washer and the securing nut of the Clix socket put in place.

### The Drive

If the type of drive shown on the blue print is to be used, which is the one receiving our strong recommendation, then the Clix socket should be tapped 4B.A. (before the socket is secured to the diaphragm centre of course) and an ordinary loud-speaker cone chuck will then screw firmly into it. The fixing of the button and chuck to the centre of the diaphragm should be done very thoroughly and the diaphragm should be put aside until the glue is quite dry.



The unit is secured to a wooden cross-bar at the back of the diaphragm

In the meantime one part of the rubber

surround can be secured to the baffle board, using ¼ in. tacks.

The rubber surround is of a special type for loud-speaker construction and resembles rubber draught stopper strip. It is called Hookite and is marketed by Messrs. David B. Hooke, of 4 Queen Street Place, Upper Thames Street, London. E.C.4. The Hookite should be secured around the edge of the hole in the baffle board, forming a continuous resilient support. The diaphragm should then be placed (it does not matter which way up, if the cone washer chuck is not yet attached) on the circular strip of Hookite, and should be quite concentric with this circle.

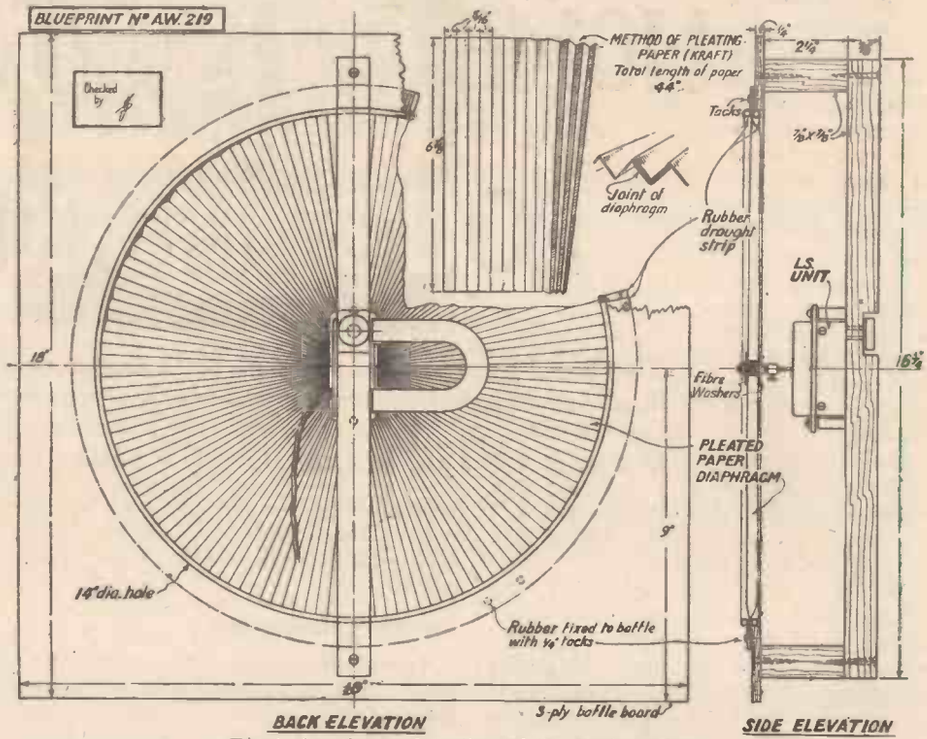
This will leave a narrow margin of rubber all round the outer edge of the diaphragm, so that, when the second layer of Hookite is put on, the securing tacks will pass only through the rubber and will not touch the diaphragm itself. This is very important.

The mounting of the loud-speaker unit itself on a batten, and the mounting of the batten on distance pieces at the back of the baffle board appears so simple that there are one or two points which may be overlooked. The whole of this assembly must be very rigid, and the batten and distance pieces should be screwed and not nailed into position. If there is any looseness here, the volume may suffer and you may get vibration on a strong signal. A Blue Spot unit is shown in the photographs but other makes, such as the Watmel and Goodman, will answer equally well.

An even more important point is to note that when the driving rod is secured to the loud-speaker chuck the screw is tightened without causing the diaphragm to pull or push on the rod. We have already referred to one method of securing the diaphragm to the rod, namely by means of the loud-speaker chuck screwed firmly into the 4B.A. tapped Clix socket.

An alternative method is to pass the driving rod right through the Clix socket, if it is long enough to do so, and to secure it by means of nuts and washers on each side.

If made up exactly according to the foregoing description, this new pleated-paper speaker will be found to have a wonderful tone. Speech is particularly good—which, after all, is a true test of reproduction.




**Front elevation and section of the loud-speaker**

## "G.P.O. PICTURE TRANSMISSION"

(*Continued from page* 204)

by the neon lamp. No other synchronising is needed during the run of a picture, which usually takes about twenty minutes over a long cable.

The transmitter drum carrying the print is then started rotating and, of course, the receiver drum is started at the same instant, automatically.

The print is "explored" by a spot of light in somewhat the same way that the stylus of a Fultograph traces the drum. The pencil of light passes through a ring-shape photo cell on to the drum, and the reflection of varying light from the photograph causes the usual current variations in the photo cell.

Only a two-stage amplifier is necessary between the photo cell and the normal line amplifiers. The power for all the amplifiers at the London end is obtained from banks of accumulators in a separate battery room. The "juice" is therefore quite steady.

At the Berlin end the receiver is working in the following manner. A special powerful electric bulb passes a pencil of light on to a sensitised negative clamped to the drum, and the light point is arranged to trace a spiral round the whole cylinder. Were the light not interrupted, the whole negative would be "white" at the end of the run, but before it reaches the drum the light pencil passes through a Kerr cell connected to the receiver amplifier, and this causes the light to vary.

The Kerr cell is really a small condenser, with the two electrodes immersed in nitro-benzole, and contained in a glass cell, through which the light passes. As the current changes (the applied voltage is in the neighbourhood of 700) the light beam is deflected in exact proportion, without noticeable time lag. The effective light falling on the cylinder, therefore, is varied in response to the current changes.

It remains only for the cylinder to be removed at the end of the run and for the negative to be developed and printed off in the usual way.

At the London G.P.O. headquarters there is a very efficient dark room arrangement which can deal with an almost unlimited number of cylinders at a time. Doubtless this will be used for newspaper Press work in the near future. Experiments are on hand in transmitting Press messages by picture telegraphy instead of on the usual telegraph lines.

From personal observation I have no hesitation in recommending any prospective commercial users to take advantage of the new G.P.O. service. The charge is only 2½d. per square centimetre, with a low minimum charge of £1. A Post Office pamphlet states that blueprints cannot be sent by wire, but this appears incorrect.

As the 'phone lines are extended over the Continent, the utility of the picture service will undoubtedly be increased. We are fond of dubbing the G.P.O.'s Rugby station a "white elephant," but the new picture transmission service shows every sign of rapidly becoming a valuable public service.

**Removing the negative from the receiver**

# Does The Screen-grid Pay?

***"Does the screen-grid valve pay?" is a question many wireless enthusiasts are asking themselves. It is important to find a satisfactory answer to it, for these valves cost a great deal more than triodes and have a similar working life. You will be interested in the opinions expressed by R. W. HALLOWS***

IN one way, the screen-grid valve is a distinctly disappointing affair. Many of the well-known makes designed for battery operation have magnification factors of the order of 200, and the factor for valves designed for alternating-current filament heating may run to six times as much. But you cannot get an actual amplification of 200, or even 100, out of the battery valve, and you certainly don't go far into three figures with the A.C. pattern with the best of modern circuits.

### *Amplification Comparisons*

On the broadcast band the magnification obtainable from screen-grid valves with circuits of good average efficiency is not, as a rule, greater than about 40. Both A.C. valves and battery-operated valves used in special circuits may provide a good deal more. Probably 80 is the top limit for the battery pattern and something less than double this figure for the A.C.

Now, modern three-electrode valves of good design can be made in a carefully neutralised circuit, provided with low-loss coils and efficient variable condensers to furnish an amplification of 40 in a single high-frequency stage.

If the magnification of the screen-grid valve is little greater than that which can be obtained from a triode, where is the advantage of using the more expensive type? A little thought will show that the screen-grid valve really does score.

A magnification of 40 with the triode is to be obtained only by the use of a very carefully designed and a very well-made transformer, which would take a considerable time to build or cost a good deal of money to buy. To obtain an equal amplification from the screen-grid valve, using the parallel-feed circuit, all that is required is a high-frequency choke and the simplest of coils. The choke need not be an expensive component and the coil is the kind of thing that anyone can make at home in half an hour or so at a cost of a few pence only.

Again, the triode must be neutralised, unless we are going to be content with a very small amount of high-frequency amplification from it. Neutralising adds to the complication of the transformer, and means also that a miniature condenser is required. Further, if the circuit is a really sensitive one, the neutralising adjustment may be somewhat critical; it may alter as the high-tension battery grows older and the condenser will almost certainly have to be reset if a new valve is fitted.

No neutralising is necessary in the screen-grid valve so long as we do not demand from it a greater amplification than the 40 or so mentioned. If we do neutralise the screen-grid valve—a not very difficult business—we can use highly efficient coils with it and obtain a much higher degree of magnification.

### *The Question of Expense*

So far, then, we must agree that in the average receiving set the screen-grid valve can provide the same degree of amplification as the triode with far greater freedom from trouble. As regards expense, the extra cost of the screen-grid valve is at least offset, and probably more than offset, by the cheapness and simplicity of the components required to couple it to the following valve.

One very strong point of the screen-grid valve which is not always realised is this. Owing to the very small capacity that exists between its grid and plate, it is much more difficult for impulses to travel from its plate circuit to its grid circuit than is the case in the triode. Thus, when you have a triode as high-frequency amplifier and let your set oscillate, you can be perfectly sure that you are disturbing everyone within a wide radius, for the aerial is energised owing to the feed-back through the valve from plate to grid.

Now consider the circuit in which a screen-grid H.F. amplifier is followed by a detector valve, with reaction arranged between the plate and the grid of the latter. Experiments show that the detector can be made to oscillate without causing radiation to any appreciable extent to take place from the aerial. Thus, not only does the screen-grid valve produce a more stable receiving set, but it also quite definitely diminishes one's liability to cause interference with others. When screen-grid valves become universal as high-frequency amplifiers the howling nuisance should cease to exist.

It is sometimes objected that the screen-grid valve requires a higher plate voltage than the triode used for high-frequency amplification. Battery users maintain that this means a bigger H.T. battery, and therefore greater expense. This argument is not quite fair. The screen-grid valve will work perfectly well with a plate voltage of 120, and very few small power valves nowadays can operate a loud-speaker properly with less than this. At least 120 volts, therefore, must be provided in any case where good quality of reproduction is desired. Nor need the screen-grid valve be very much more expensive in its H.T. current requirements than the triode used as a high-frequency amplifier.

### *H.T. Requirements*

As a matter of fact, we don't always realize just how much H.T. current a three-electrode H.F. valve can get through. The average medium-impedance (20,000 ohms) valve with 100 volts on its plate and no grid bias will draw from 2 to 3½ milliamperes from the high-tension battery. The best screen-grid valves pass a total of no more than from 3 to 4 milliamperes for both the plate and screen-grid circuits.

### *Running Costs*

In the matter of H.T. costs, then, there is very little to choose between the triode and the screen-grid. Be careful, though, if you are working from dry batteries to choose a screen-grid valve that is economical in its high-tension current requirements. Some patterns may draw as much as 8 milliamperes in the plate and screen-grid circuits together.

In my view, the screen-grid valve pays handsomely. Where only a single H.F. stage is employed, the simplest of circuits can be used with just a vertical copper screen. Where a set is required that will provide the very highest amount of H.F. amplification that can be used, two screen-grid stages in cascade will answer every need.

What the screen-grid valve has done is to simplify what was previously one of the most difficult parts of the wireless set—the part which deals with high-frequency amplification.

# My Wireless Den

*Weekly Tips—Constructional and Theoretical—by W. JAMES*

### *Use a Fuse*

ONE of the reasons, I think why fuses are not more often included in receivers for the purpose of protecting the valves is that reliable types are not available at low prices, or perhaps, I had better say, were not until recently.

Everybody is ready to admit the soundness of employing suitable fuses for the simple reason that the filaments of the valves take from 2 to 6 volts, while the high-tension used is generally at least 120. Some amateurs use a suitable flash-lamp bulb and obtain protection. There are types which blow at about 100 milliamperes and have quite a low resistance.

Only a few days ago I saw a set so fitted. This bulb glowed for a moment when the set was switched on. It was joined in the high-tension negative wire, and therefore carried the momentary heavy flow of current into the condensers when switching on.

A fuse of too low a value here would have blown, although it would have carried the normal high-tension current with ease. This is a little point to remember, as one might well consider the set faulty were the fuse to blow.

### *What is Good Reproduction?*

I have always held the view that comparatively few people enjoy good reproduction, and this is strengthened from time to time by various exhibitions of reproduction, which are usually described as perfect. "My set gives me perfect reproduction," says someone. Another will boldly state that his loud-speaker is dealing with the broadcast without distortion.

In many instances the trouble really is, that the listener has become so used to his own particular reproduction that flaws are not heard. A stranger may spot them at once. It's no good asking a musician friend for his views, because he may hear what is not there, in fact, musicians, by whom I mean the smaller fry, are as easily led astray as ordinary folk.

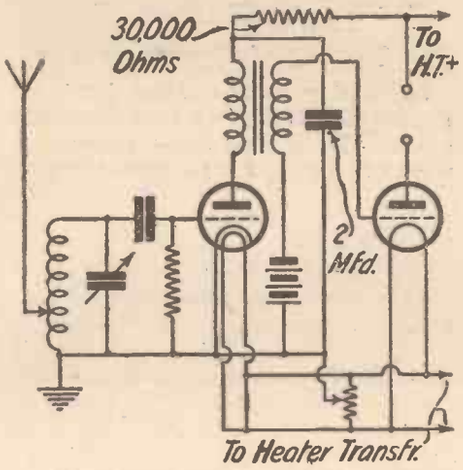
If you want to learn what your reproduction really is like, ask someone who has the opportunity of hearing and comparing all sorts of sets and loud-speakers, and if you yourself wish to judge the merits of a new loud-speaker, keep it for a week or so. When first it is connected, you may not like it, but after awhile its real qualities may be discovered.

### *"Slow-motion" Filaments*

The accompanying circuit diagram is of a two-valve set, arranged for running from the mains, the valves being of the indirectly-heated type.

In the anode feed circuit of the first is a resistance of 30,000 ohms and a 2-microfarad condenser. Now let us consider what happens from the moment of switching on. The cathode of the valve is cold. It gradually warms up. Meanwhile, the full high-tension voltage is applied to the valve. None is lost in the 30,000-ohms resistance, because there is no emission.

Gradually the cathode warms up and the current increases. At the same time the




**A typical two-valve A.C. receiver. An interesting point regarding this is raised in the accompanying paragraph**

voltage of the anode decreases because volts are being lost across the resistance. When the cathode has reached its normal temperature, the anode current, too, is normal, with the result the voltage of the anode is correct. The full high-tension voltage may be 150 and the normal current 2 milliamperes. Therefore, the drop in the 30,000 ohms resistance is 60 volts, from which it follows that the anode voltage is 90, less what small loss there may be in the transformer.

My point is that until the cathode has reached its normal working heat, the anode voltage is greater than normal. The question therefore arises as to whether this is harmful. Inquiries seem to show that no harm results, but the point is interesting. Incidentally, the condenser has to withstand practically the full voltage when first switching on.

### *Automatic Volume Control*

At intervals during the last few weeks I have been trying a so-called automatic volume control, about which more at a later date. At the moment, I am not very sure about it.

An extra valve is needed and it takes current, besides which it wants properly setting up. The subject is interesting, however, even though of no immediate practical value. When my experiments are carried a stage further, I shall have something to tell you about this.

### *Drop Me a Line!*

During the week-end I read, in my Sunday newspaper, that one of the big companies is selling its £75 radio-gramophone set at the rate of 2,000 per week. If this is true, and there is no evidence to the contrary, surely it is, to say the least, remarkable.

Seventy-five pounds is a lot of money. Granted that the set is worth that to those who cannot make their own. The reproduction is excellent.

But what I immediately thought of was how many readers of AMATEUR WIRELESS would be prepared to make a really first-class set. A three-valve one is all very well, but I myself used, years ago, to build five and six-valve affairs which were greatly superior to the present day three-valve sets. How about it? I wonder how many readers would like a really good five-valve set, two high-frequency, detector and push-pull, running off batteries of up to, say, 160 volts? *Write and let me know.*

### *Those Fallen Aerials!*

I wonder how many aerials were blown down during the recent gales. Mine came down, not altogether unexpectedly.

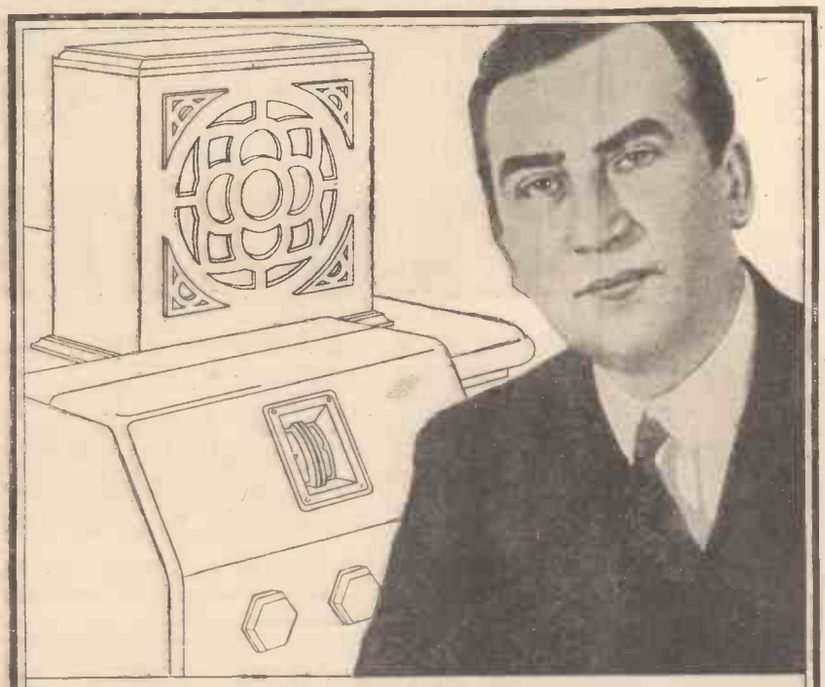
But I cannot complain as it has stood for years with but little attention. Actually, the rope at the pole end broke. Now I am wondering how best to repair the damage.

Presumably, someone will have to climb to the top to fit a new rope through the pulley, as the bottom of the pole is very firmly fixed. The best plan, no doubt, will be to place two ladders against the pole, as they will tend to take the strain, rather than the pole.

Meanwhile I am testing my new set, "Everybody's Three," arranged for alternating current mains, with an indoor aerial, and very good I find it, too.

# ALBERT COATES

## *tests the tone!*



*"To make the fine thread of a piccolo obbligato shine through the harmony," says Albert Coates, the famous conductor of the London Symphony Orchestra, "to keep the thunder of the double-basses in proper relation to the melody — these are tests which the Marconiphone passes with honours."*

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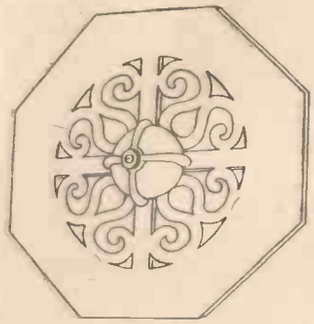

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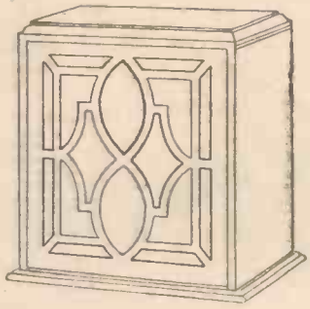

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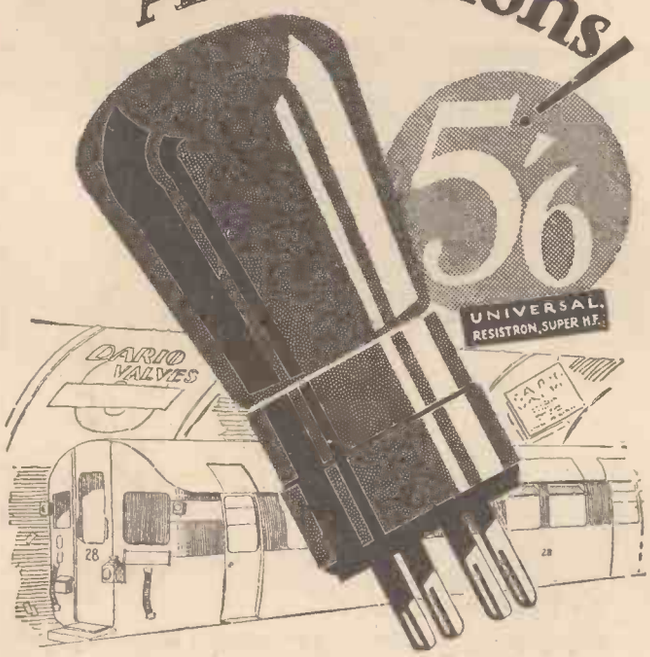


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| Super H.F. | .15 amps 5/3 |
| Super Power | .18 amps 7/6 |
| Hyper Power | .3 amps 9/6 |

| FOUR VOLT | Prices |
|---|---|
| Universal | .075 amps 5/6 |
| Resistron | .075 amps 5/6 |
| Super H.F. | .075 amps 5/6 |
| Super Power | .1 amp 7/6 |
| Hyper Power | .15 amps 9/6 |

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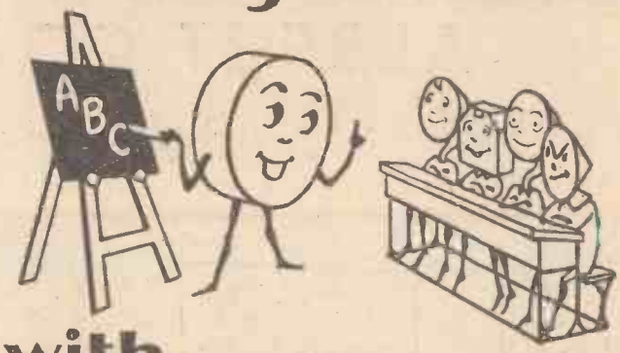


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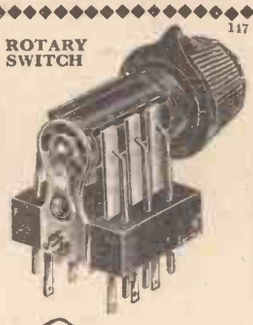

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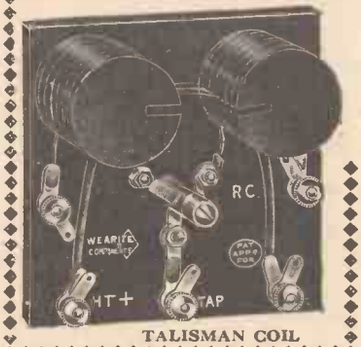


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# On Your Wavelength!

### Do They Realise?

IT is surprising to find how many people possessed of receiving sets, bought or made last year or the year before, and now completely unable to separate the two Brookmans Park transmissions, are content to suffer in silence. So far as I can make out, not one listener in twenty whose set—often an expensive one—is rendered completely useless by the twin transmissions makes any kind of protest in writing. Now, my experience is that a very large proportion of sets of quite good quality, with a single H.F. stage, if made before the opening of Brookmans Park, are completely unable to separate the two programmes properly within a range of from ten to fifteen miles of the transmitter. This takes in a very large part of West Hertfordshire, Essex, Middlesex, and North London. There must be literally tens of thousands of sets which gave perfectly good service a few months ago that will be suitable only for the scrap heap when both stations are giving full programmes. And let not those who live at some distance from London accuse those who are now being swamped of selfishness. The turn of many of them will come when the other giant regional twins are erected.

### Quality

Within the "swamp area" reception conditions are far from ideal, quite apart from the wipe-out question. Signal strength is so enormous that it is most difficult to avoid overloading the rectifier. Even a small aerial is shock-excited to some extent, with the result that the transmissions come in all over the place. Worse still, background noises, due, apparently, to microphone hiss and to generator hum, are very noticeable. The shorter wave station has the worst wipe-out, as might be expected, since less capacity is in parallel with the inductances when it is tuned in. Even when using, in both the first and second tuned circuits, efficient coils specially designed to meet the requirements of the regional scheme, I find that the wipe-out of the 261-metre transmission extends from, roughly, 220 to 300 metres.

### Is it Worth While?

One does not mind suffering in a good cause; but, honestly, I don't think that this is a good cause. The programmes of the old 2LO were well heard all over the country from 5XX, and I can't see that very much has been gained by radiating them also on a shorter wavelength with such power that only specially designed receiving apparatus can deal with them properly. Please, don't think that I am grumbling on my own account. I am lucky enough to have a goodish stock of components and to possess a workshop in which I can make up anything that I especially want. Myself, I have no difficulty in obtaining the two Brookmans Park programmes clear of one another, or even in hearing numbers of foreign stations on wavelengths between 261 and 356 metres. I have, though, to use a set which would cost something pretty considerable to build or to buy, and it is not the kind of thing that the beginner could handle very easily. What I am trying to do is to put in a word on behalf of those unfortunate listeners with no technical knowledge who, after spending quite a bit on sets that were excellent for ordinary reception conditions, now find themselves unable to hear anything but two programmes at once when both stations are working.

### Will the Super-het Return?

The only set easy to manipulate that will deal with regional stations at short range and also bring in a large number of foreigners is, I think, the super-heterodyne. At present one sees very few of these in this country, though abroad they are immensely popular. The super-heterodyne appears to have been originally a French invention, though most people, if asked, would say that it came from America. In France it has been developed into a very remarkable piece of apparatus, though over here we have neglected it since the types that we tried a few years ago were often not very satisfactory. A good modern super-heterodyne can be a perfect marvel. I know one which gives reproduction of perfect quality from the local station and, at the same time, brings in almost anything that is going on the Continent at full loud-speaker strength. The hiss, the noisiness, and the instability of the original super-heterodyne receiving set are things that can be overcome, as they have been in the particular set that I have in mind. It is not a bit of good writing to ask me for a circuit diagram, since this was made not by myself, but by a very distinguished electrical engineer, and is the only one of its kind in existence.

### Sound Policy?

Some years ago *Punch* had a joke which rather tickled me. A mother, busy about household duties, was saying to her fourteen-year-old daughter: "Go and see what baby's doing, and tell him not to." From the tenor of his recent paper, I somehow get the impression that this is rather Sir John Reith's attitude towards the British public. He tells us—and I am not saying that there is not a good deal in what he says—that you must never give the public what the public wants. I will put it in another way and say that it would be quite wrong for the head of the B.B.C. to give the whole listening public what that small part of it that writes to the B.B.C. demands. Your cranks, your irresponsibles, your illiterates, your grousers, your fanatics, your very highbrows, and your very lowbrows will seize pen and paper and indite letters upon the smallest provocation. But the mighty army of middlebrows are extremely bad starters in the letter-writing stakes, and they probably form at least 80 per cent. of the great army of listeners. I imagine that the letters received by the B.B.C., vast though their number may be, are representative of only a minute proportion of the total number of those who hold wireless licences. Therefore, though I don't agree with Sir John that the public is no judge of what is good for it, I do agree with him that he must not base his programmes upon the criticisms and demands of those who write to him and to some of the lay papers.

### A Suggestion

I do believe, though, that if only the whole of the listening public could be induced to express its desires and its dislikes, a way might be found of providing programmes which make a much wider appeal than those that we have at present. One very good suggestion is that at the back of every receiving licence there should be printed a table enabling the licensee to record his vote for or against any particular kind of item. When handing in his old licence in exchange for a new one he would record his votes on the back of the former. The opinion of every listener would thus be obtained, and if these were balloted I am sure that they would be most valuable. I am quite convinced that plebiscites in the form of competitions are completely useless.

### The Sunday Question

We had quite a little correspondence on the question of Sunday programmes in AMATEUR WIRELESS. I am not at all satisfied that the programmes on the first day of the week are what they should be. It is rather a difficult subject to write upon, and I don't want to tread on any corns. My own view is that if you are one of those who desire to take part in church services, your only excuse for hearing one in your own house instead of in church is that you are ill or otherwise prevented by some other equally good reason from attending a place of worship. If you are ill, I don't

# On Your Wavelength! (continued)

think, somehow, that you will find the best time for services and the like between 8 p.m. and 9 p.m., for you will probably be too weary by then to listen. You will, I think, prefer to have your service in the morning; and, for the life of me, I can't see why the broadcast services should not take place at this time. This would also fit in very well with the arrangements of those who are prevented by other causes from going to church. I am quite sure that a very large number of those who have been to church or chapel in the evening don't want the broadcasting of services to continue until nine o'clock.

Probably the majority of listeners don't want to see anything like the Continental Sunday programmes in this country. I think, though, that most of them would like to have more genuine entertainment of a kind suited to the day. I can't see why we should not have some cheerful music at lunch time. I can't see why none of our stations should start to transmit until 3 p.m. or why others should be silent until an hour and a half later. I can't see why the working man who has to be up early on Monday morning should have to wait until nine o'clock for his Sunday evening music.

### *Television Experts Differ*

The successful demonstration of television by the Baird Company in the U.S.A., which I described last week, has revived the dispute concerning the imminence of practical commercial television broadcasting in that country. Previously the prime factors in this situation were the difficulties of synchronisation between the transmitter and receiver motors, the limitations of the present standard 9-kilocycle channels now used for sound broadcasting, and the requirement of a special receiving set for the television signals if the short waves are employed. Coupled with this, we have the wide difference of opinion among experts as to what constitutes satisfactory quality for the beginning of experimental broadcasting to the general public.

For example, Dr. Goldsmith, of the Radio Corporation of America, states that he does not see television as suitable for broadcasting until it has achieved a continuing entertainment value to the average man comparable in quality of definition and brilliance to the present-day home cinema. Mr. Replogle, of the Jenkin's Television Corporation, maintains that television in a beginning stage is ready for the experimental public, but only on the short waves. But the demonstration of television by British engineers has rather cut the ground from under the feet of most of the Americans and somewhat astounded them as to its nature and quality, and surprised them considerably in connection with the automatic synchronising.

### *Photo-electric Cell Improvements*

On the whole, little has been said of late concerning the progress which has been made, but from my own investigations I find there is much going on behind the scenes. I was able to witness, thirty miles outside London, reception of the normal daily B.B.C. television transmission a day or so ago, and, really, the results were extremely good. It seemed veritably uncanny to watch the movements of people who I knew to be seated before the transmitter at Long Acre, while the automatic synchronising lived up to its name in every sense of the word. It was only when signals were artificially made very weak that the mechanism showed signs of not holding; and, after all, this is only to be expected.

### *Transmission Advantages*

Then, again, considerable advance has been made at the transmitting end, especially in connection with the photo-electric cells. Some of the new types are particularly sensitive to the infra-red and red rays of the spectrum. It seems to make practically no difference whether a person is scanned by a visible spot of light or an invisible one, provided the screening off of the actual light spot is done through an ebonite sheet which only allows the infra-red rays to pass through.

Furthermore, I have learned that experiments are in hand whereby a full-sized image of a person will be seen on a screen, although, naturally, this is not intended for home purposes at the moment, but for public demonstration work. All these factors point to activity and progress.

### *Moving-coil Current Surges*

When moving-coil speakers first came into use we always used to put a buffer resistance across the field coil to take care of the voltage surges due to the collapse of the field on breaking the energising current. They do not seem to be much used now, and I sometimes wonder if those who use these excellent speakers realise how great the current surges are. The other day, having to test a speaker with a 12-volt field winding, I connected it to the appropriate accumulator through a switch made for use on 100-volt D.C. mains. This had a neon tube across the field coil terminals to act as a buffer. I did not expect it to flash, and it didn't for some time. Suddenly, on one break, it flashed feebly. Experiment showed that it would flash about once in every ten breaks of the current. A test showed that the ignition voltage of this particular tube was 148, so that probably the voltage surge was always over ten times the normal for the coil, and occasionally rose to over twelve times.

### *A Curious Breakdown*

Talking of moving-coil speakers reminds me of a curious breakdown that came to my knowledge a short while ago. A speaker sent out by a reputable firm gave perfect results for about three hours after it had been connected to the receiver. Then it ceased work. Nothing was wrong with the set nor the field winding. Investigation showed that the speech coil was scratched right across and that at least one turn of the high-resistance winding was cut completely through. During assembly a careless workman had allowed a sharp tool to slip, and this had scratched the interior surface of the pole piece. An almost invisible sliver of iron had been turned up, projecting just far enough to scratch the speech coil, which it continued to do until it cut right through the very thin wire.

### *Meters*

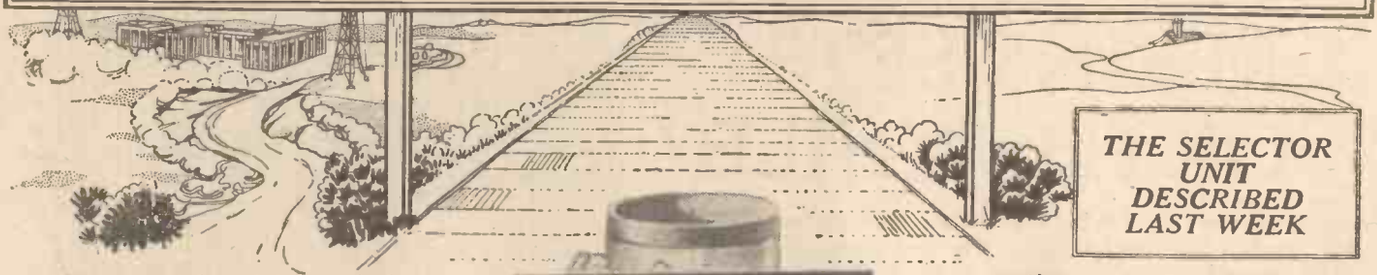
The meter seems to be coming into its own. Months ago, I told you of the luxury receiver that I dream about, with its grid-current meters, milliammeters and voltmeters. Since that time I have come across home-constructed receivers which have had one or two meters in addition to the all-important milliammeter in the plate circuit of the L.F. amplifier. This particular measuring instrument, the milliammeter, may almost be said to have become a standard attachment on really up-to-date sets.

### *The Facia-board*

There certainly is a great fascination in the row of meter dials often to be seen on the facia-board of a sports model motor car. Speedometers, clocks, revolution counters, galvometers, thermometers, and so on add 50 per cent. more enjoyment to the life of the keen sports motorist. And in the same way, a row of instrument dials on the front of a well-constructed receiver give to it a certain air of "dignity." Plate milliammeters in the H.T. feeds to the H.F., the detector and the L.F. valves are important, and then come the filament voltmeter, the galvo. in the grid circuit of the last valve (for detecting grid current), and the thermo-milliammeter in the loud-speaker output leads. By the way, if a milliammeter is in the plate circuit of the last L.F. valve, this stage may be converted into a rough-and-ready valve voltmeter. The grid should be biased sufficiently for no feed to be registered when no signals are being applied to the last stage. When signals are tuned in, the milliammeter needle will kick upwards, and the amount of "kick" will depend on the strength of the signal. Thus, if the B.B.C. broadcast their pure-tone "squeak," a response curve could be made for a receiver in the same way as such curves are obtained for L.F. transformers.

THERMION.

# USING "BROOKMAN'S BY-PASS"



THE SELECTOR UNIT DESCRIBED LAST WEEK

***The essential usefulness of a by-pass of this nature is perhaps not fully appreciated. It is not solely of interest to readers who wish to obtain distant reception. . . . It reduces the strength of the local station so that it will not overload the detector . . . It is, in fact, an ideal method of volume control***

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

THE constructional details of the "Brookman's By-pass" were given last week, together with general instructions as to how to work the device. It is proposed, now, to give further details as to how the best results can be obtained.

As was explained in the last article, the principle of operation of this by-pass is that it shall short-circuit the aerial to earth at the particular frequency to which it is tuned. The device is therefore adjusted so that this frequency coincides with that of the local station to be eliminated. A little way on each side of the tuning point the impedance of the by-pass rises very rapidly to a high value, so that the signal strength of near-by stations is not seriously affected. In order to make the tuning as sharp as possible, the state of affairs required is a high inductance and a small capacity. Generally speaking, therefore, one should always use the largest possible tap which gives the most satisfactory results.

### *Using the Taps*

I recommended last week that the taps should be put into operation by using the smallest tap first. This was because the trapping action on the largest tap is so sharp that it can easily be missed, and I felt it desirable to start with the greatest by-passing in order that the effect might be observed. Once the reader has become accustomed to the handling, he can gradually increase the inductance of the circuit in order to obtain just sufficient by-passing action for his requirements.

This raises the question immediately as to what a by-pass of this nature should do. Is it necessary to cut out the local station entirely? The answer is "No." To devise a circuit which is capable of doing this is wasteful, for if one is to drain away all the energy received from the local station it stands to reason that one must of necessity affect neighbouring wavelengths to a greater extent than if one merely reduces the strength to some suitable value. Generally speaking, therefore, the function of a by-pass should be considered as that of reducing the energy received from the local station to a value comparable with that of any reasonably good alternative or foreign station.

### *Adjustments*

This should be borne in mind when adjusting the device. Tune your receiver in to the local station and then tune the by-pass until the strength is reduced to a comfortable value. Then tune the receiver to ascertain how easily the local station can be tuned out. The ideal to be arrived at depends largely upon the conditions. If, for example, one's local station usually spreads over 50 or 60 degrees on the dial, then if one can reduce the tuning band to, say, 10 degrees on each side of the tuning point, one has increased the selectivity considerably and opened up a greater field of reception.

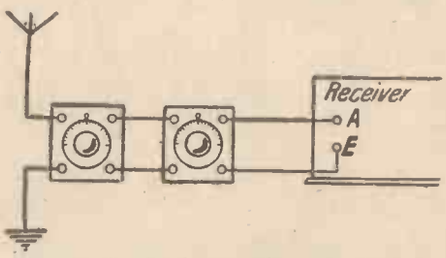



**Diagram showing how two by-pass units may be used at the same time**

If, on the other hand, one's local station is not too serious a proposition in the ordinary way and usually occupies 20 degrees on the dial, then the by-pass may be used to reduce this to, say, 4 or 5 degrees on the dial only. The adjustment is entirely a matter for the user to decide, having regard to his local conditions, the guiding principle being that the signal strength from the local station should be reduced in intensity to what may be considered a normal signal. It should not be completely eliminated or even reduced to a whisper, as this is a wasteful procedure.

The essential usefulness of a by-pass of this nature is perhaps not fully appreciated. It is not solely of interest to those readers who wish to obtain distant reception. In a large number of cases, readers who obtained satisfactory quality before the advent of the Brookmans Park stations will have discovered that now they cannot tune their set in properly owing to overloading. I have dealt with this point before in these columns. The use of the "Brookman's By-pass" will be found invaluable in these circumstances. It reduces the strength from the local station to a value which will not overload the detector valve, in consequence of which the quality is sweeter at once.

### *A Volume Control*

It is, in fact, a true method of volume control. Any receiver having a high-frequency stage usually incorporates a volume control actually in the high-frequency valve, so that the input supplied to the detector may be kept within safe limits. In the case of the simple detector circuit this is not possible, because one has no means at one's disposal for cutting down the energy. The use of a by-pass such as this immediately solves the problem, for it acts as a volume control. It can even be used on distant stations, if desired, for it will cut down the strength of any station to which it happens to be tuned.

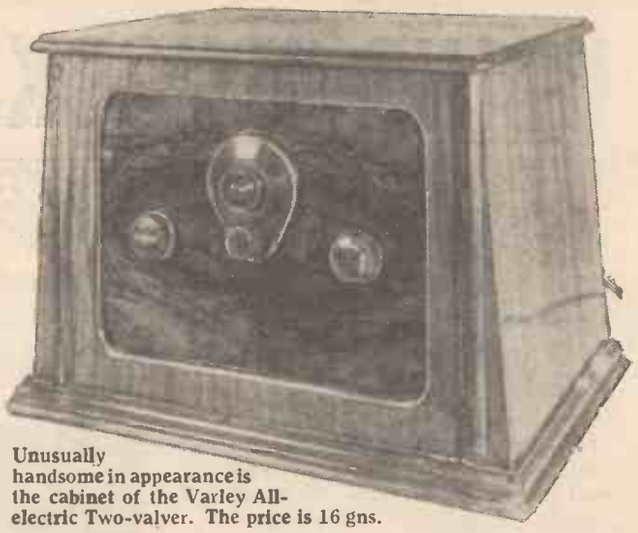
I mentioned last week a most important aspect of the by-pass, namely that two or more such by-passes may be used, tuned to different stations. When the "Brookman's

(*Continued on page 226*)

A PAGE FOR THE SET-BUYER

# ARE TWO-VALVE MAINS SETS WORTH WHILE?

***A recent test of the Varley All-electric Two-valver for A.C. mains prompts our contributor, "The Set Tester," to ask this question—and to answer in the affirmative.***



**Unusually handsome in appearance is the cabinet of the Varley All-electric Two-valver. The price is 16 gns.**

IS the expense of mains equipment justifiable with a simple two-valve set? After all, a two-valver can be run quite cheaply from a small dry high-tension battery and a 2-volt accumulator. The total current consumption is very low.

To buy a set working from the mains, especially if these are A.C. mains, is quite a costly business. But after testing the Varley two-valve set, I feel bound to say that I think the extra expense *is* worth while. In this all-electric set, which derives high-tension, low-tension and grid-bias from the mains, two indirectly-heated mains valves are incorporated. These valves are much more efficient than ordinary battery-heated valves.

It is because of this greatly increased valve efficiency that a mains-operated two-valver is worth while. No battery-operated two-valver could compete in performance with this Varley set.

The quality of reproduction with this set would be sufficient reason to justify its expense. The set is very "lively" and its performance is not confined to the reception of the local station.

One thing about this Varley set that will appeal strongly to the discriminating set buyer is its unusually handsome appearance. The cabinet work is excellent. Set manufacturers have not all accepted the idea that a wireless set should be pleasing to look upon. I see no reason why a modern set should not look just as attractive and as unscientific as a gramophone.

### *A Distance Getter*

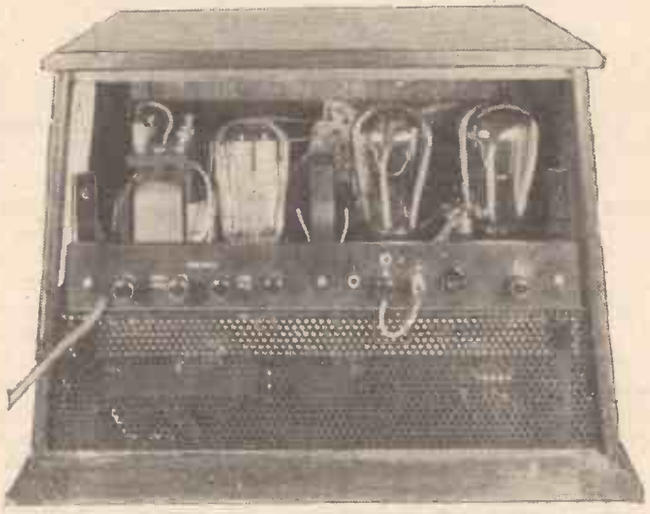
As the circuit embodied in the set is a straightforward arrangement consisting of a detector valve with reaction and a transformer-coupled low-frequency amplifier, the distance-getting properties depend upon the efficiency of the detector in use.

The well-designed tuning coils, designed for medium and long waves, give the detector valve a good chance to do itself justice. The medium-wave coil is wound in a very efficient way. Besides both Brookmans Park stations and Daventry 5GB, I was able to get four foreign stations at good loud-speaker strength on the medium waves during a half-hour's test. On the long waves, Radio-Paris, Hilversum, and 5XX were all well received.

For this test I used an outside aerial having a total length of 65 ft. Because of its shortness, I did not have much trouble with Brookmans Park. I used the middle aerial terminal of the three alternative aerial terminals provided. This gave a happy compromise between selectivity and volume.

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

As the set has a good amount of sensitivity, a short aerial can be used without greatly reducing the range of reception. Whatever is lost in range is more than compensated for by increased selectivity.



**The accessibility of the receiving valves and valve rectifier is clearly shown in this view of the back of the Varley All-electric Two-valve set.**

By a suitable plug arrangement, the two valves can be used as amplifiers for the reproduction of gramophone records through a pick-up. When the pick-up plug is inserted, the detector valve is automatically negatively biased to make it suitable for low-frequency amplification. As a mains-driven A.C. amplifier, the Varley set impresses me. Quality of reproduction is good. A high-class loud-speaker is justified.

The two sets of loud-speaker terminals are an unusual provision. High- or low-resistance loud-speakers can be used as desired. I found the low-resistance output very useful for headphone reception. The volume is cut down to a reasonable strength and practically no hum is audible during headphone reception. There is no danger in this practice because the output is entirely isolated from the rest of the set.

The set is good to handle. The slow-motion tuning knob, the clearly-engraved wave-change switch and the reaction knob are all of sturdy construction. In my opinion the Varley set is well worth its 16 guineas. Set buyers who have a D.C. mains supply will be interested to know that a similar set, also priced at 16 guineas, is available for D.C. mains operation.

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A super-power station, using from 60,000 to 100,000 watts power, is being planned in Russia. It will be the highest power used regularly in the world

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Military forces in the vast stretch of the French Sahara Desert are finding radio an invaluable aid in regulating the movements of widely scattered posts and relaying important messages. Throughout this arid section twenty-seven wireless stations have sprung up.

# Choosing a Loud-speaker

***Those who have tried numerous loud-speakers will agree that there is more in making a suitable selection than might appear from a hasty consideration. In this article W. JAMES explains among other things, how the set with which a speaker is to be used has an important bearing on the matter***

A BY no means uncommon occurence is that with a certain loud-speaker the results are not pleasing when it is connected to one set, but are satisfactory when tried with a different set.

The reverse results may be obtained from another loud-speaker. Perhaps a fairly strong resonance at about a certain frequency or another peculiarity may be responsible for the results. Those who have built loud-speakers and tried various diaphragms and units, and having keen ears, are probably able to detect all manner of differences which escape the notice of less experienced or less critical listeners. In fact, it is surprising what small defects are spotted by careful observers.

Testing is naturally easier when suitable apparatus is available. Personally, I employ a generator of low-frequency currents specially designed for testing purposes. This apparatus is built to provide a practically pure range of alternating currents of substantially uniform strength of from a few cycles to more than 10,000 cycles per second.

By turning a knob, therefore, the whole range of speech and musical frequencies is covered as rapidly as desired. The output, suitably adjusted in strength, is applied to a power valve representing the last valve of a receiver and to this valve the loud-speaker to be tested is connected. When testing, one notes the frequency range over which sounds are heard and their relative strengths.

### *Frequency Range*

Some loud-speakers produce no sound for frequencies below about 150 cycles. They reproduce the low tones badly, others provide a weak output of the higher frequencies and most have more or less pronounced resonances. I well remember testing a particular moving-coil loud-speaker having two very bad resonances, one in the lower and the other in the higher frequencies. The lower one was so strong that the cone vibrated violently. Of course, it was a faulty specimen.

Resonances are produced by various factors and in normal use the reproduction is coloured if it is not definitely poor.

The above test is all very well, of course, but as many sets distort, it is necessary to judge the worth of a speaker on the set with which it is to be used, as all that really matters is the final result—what we actually hear. Some sets reduce the relative strength of the higher notes, for instance. A good loud-speaker—by which I mean one providing a tolerably uniform output of sound over a wide range of frequencies—would show this.

If the loud-speaker used happened to emphasize the higher notes, however, the result might sound acceptable. That is my point. We should have distortionless sets and loud-speakers, but as distortion in one form or another is often present in sets, the most pleasing results may be obtained from a reproducer which, taken by itself, distorts.

### *Reasons for Poor Quality*

It is a fact that different persons do not agree about the quality of the reproduction. I dare say that many of us have had described as "perfect," reproduction with obvious flaws. The chief fault may lie either in the set or loud-speaker, and be easily remedied. Sometimes the driving unit is out of adjustment, or there may be a worn-out grid battery. Much poor quality is due to overloading the detector. Its anode voltage should be raised and the input decreased to reasonable proportions.

Condensers (fixed)

Maybe it is the last valve that is being supplied with too strong a signal. Some speakers show up defects of this nature more clearly than others; in fact, not a few types owe their popularity to masking the effects of overloading. The sounds are tolerable, even though the set is quite out of adjustment and wrongly used.

### *How to Make Comparisons*

When comparing instruments a throw-over switch ought to be used, in order that a quick change may be effected. Points to look for are roughness at the volume which would normally be expected in clarity of speech and the tone of music. Roughness is particularly annoying, and most listeners like clear speech which is not low toned and drummy. Cone types usually have a strong resonance about 2,000 cycles and without it would be less sensitive. Speech would probably not be so clear and "forward." Those who have experimented with various reeds are aware of the great differences produced by reeds of various natural frequencies.

The cones, too, are important, or the diaphragm of a linen type speaker. Modern cones are often ribbed in order to provide a better output over a wider range of frequencies than was possible with the flat-sided types.

Others have strengthening pieces, light in weight, of course, for the purpose of removing undesirable resonances and increasing the output. Small cone speakers are probably best for sets having an ordinary power valve in the output stage with about 120 volts high tension. They are usually very sensitive to weak inputs, but may be overloaded by really strong signals.

Some linen-diaphragm loud-speakers that I have heard are very good reproducers, being sensitive and providing a pleasing output. They seem able to deal with weak or strong signals, and I have used a medium-size one for a long while. The larger sizes

(*Continued in third column of next page*)

# WHEN—AND WHEN NOT—TO USE A PICK-UP

*Some Gramo-radio Points. By A. G. McDONALD*

IT is frequently found that a radio user is uncertain whether or not to invest in the extra equipment, gramophone motor, supporting arm, and pick-up, so that his existing apparatus can be used as an electric gramophone.

Under the best of circumstances electrical reproduction from a gramophone record reaches a very high level indeed and will stand comparison with the original sound. It may, therefore, prove of interest to indicate the results that may be expected with different types of equipment.

First, and foremost, the possessor of a moving-coil loud-speaker and, of course, a suitable amplifier, stands to gain most. Reproduction from gramophone records with such a speaker is practically as good as it can be, and by the simple addition of the apparatus enumerated above, the equipment becomes similar to proprietary electrical gramophones, for which prices are asked ranging from 50 guineas upwards.

The possessor of a good cone-speaker equipment is very nearly in the same fortunate category as the foregoing. The frequency characteristic of several cone speakers is almost as good as that of a moving-coil speaker, the only difference between the two being that the moving coil usually can handle more power. Musical reproduction bears the same relation to the original sound as a photograph to a scene. It is not desirable at home, for instance, to reproduce an orchestra or a military band at a power comparable with its true volume, and consequently a cone speaker, although its power-handling capabilities are limited, can nevertheless give entirely satisfactory service as the reproducer of an electric gramophone. On speech and solo instruments its rendering can be of decidedly lifelike proportions.

### *Sound Box v. Pick-up*

With both of the above types of loud-speaker reproduction from a gramophone record through the medium of a pick-up is better than an acoustic or soundbox gramophone. With horn speakers, however, except those having long exponential horns, the reverse condition holds good.

### *Exponential Horns*

Both the frequency range and the volume from such a speaker are less than the corresponding frequency range and volume from a sound-box gramophone. With a short horn speaker the additional apparatus is scarcely worth while, as the reproduction from the ordinary gramophone sounds rather better and is not a lot more expensive to instal. The exception in the horn class is the long exponential horn speaker, equipment of which type can have as good a frequency characteristic as that of the cone type. The possessor of a short-horn loud-speaker having an axial length of less than 5 ft. who thinks of using his amplifier and speaker for reproduction from gramophone records would be well advised to add at the same time an exponential horn.

# "CANNED" BROADCAST

*By JAY COOTE*

PERSONALLY, I welcome the inclusion of gramophone record transmissions in a number of Continental programmes. In some instances it has added variety to what might have proved heavy entertainment; in others it has done more—it has turned poor programmes into good ones. And this is particularly the case with some French stations. For some time, from a few of these studios we have heard a number of French comic songs, or jerky tangos, and other dances played on a squeaky concertina. To-day, for instance, Radio Paris has broken away, in some degree, from this principle and now gives its listeners, at fixed times and on fixed days, an excellent musical programme. Canned music, it is true, but of greatly improved quality, and far more refreshing and entertaining than the fare provided by its regular studio trio—or is it quartet?

On Sundays, Radio Paris now offers several recitals, namely, from 1 to 2 p.m. a short series of records of French origin, at 5 and 7.15 p.m., and again at 10 p.m., a top-hole concert offered by a well-known London hotel. The lunch-hour transmission is also sponsored by a British firm, and in both cases the announcements are made by French and English speakers. At the end of the noon broadcast the name of the firm offering the concert is given out in notes on the piano—D, E, C, C, A—a very novel form of advertisement. As a distinctive call for the late British transmission a "fade in" and "fade out" of Liszt's "Liebestraum" is used, in the course of which both announcers give some interesting information.

It is a new form of publicity likely to spread over a portion of the Continent, but it is not in any way as irritating as the blatant puffs put out by other studios.

Huizen, on 1,875 metres, also gives us a generous supply of gramophone broadcasts. You may pick them up on most days between 5.40 and 6.30 p.m., and again, as a final half-hour or hour, at the end of the evening programme. Recently an announcement was made to the effect that all titles would be given in Dutch and English, in view of the interest displayed by listeners in the British Isles. The Dutch station broadcasts the latest hits, and I might add that on more than one occasion I have heard novelties through Holland before they had gained popularity on this side.

Gramophone records to-day as we know, are worthy of criticism, and their inclusion in the wireless programmes has greatly benefited a number of radio entertainments.

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## "CHOOSING A LOUD-SPEAKER"

(*Continued from preceding page*)

have a deeper tone and are able to deal with considerable volume.

Really good loud-speakers, such as the moving-coil types cannot be described as suitable for all types of sets for the reason that distortion would be heard in many instances. Such loud-speakers respond fairly well to the currents they receive from the set. Hence, if the set distorts, the reproduction will be poor.

A less perfect loud-speaker is the better one to use when the set is of moderate size, as it will probably be a little more sensitive and not so liable to show up minor distortions. The better the set, the more perfect should the speaker be for all-round results.

Given a good set, even a poor reproducer may sound fairly well, but the reverse is hardly true, a first-class loud-speaker and a moderately good set is a relatively poor combination although naturally much depends upon the particular faults of each. It is possible that a fault in one may offset a defect in the other, with the result the reproduction is acceptable.

PROGRAMMES BY BALLOT

NO THANKS TO THE B.B.C.!

HOLIDAY PROGRAMMES

THOSE READINGS

# SYDNEY MOSELEY'S WEEKLY PROGRAMME CRITICISM

# WITHOUT FEAR OR FAVOUR


SEVERAL correspondents have written to me regarding a suggestion made in these columns—a suggestion which I believe is of supreme importance. It is that the Post Office should issue a form with every wireless licence so that the listener could say what sort of broadcast he likes best.

◆ ◆ ◆

Mr. Drew, of Walton, Liverpool, in agreeing with this proposal, thinks it would "stop a lot of grumbling." He detests symphony concerts, chamber music, and long plays, and says that at the place where he is employed about 42 listeners all want dance music, musical comedies, popular operas, military bands, and good comedians.

◆ ◆ ◆

Mr. Drew likes these articles, but thinks I am a highbrow!

On the other hand, I am quite certain that highbrows think I am lowbrow—so that honours are even.

◆ ◆ ◆

A correspondent, writing from Swansea, says: "You will probably be interested to learn that your suggestion *re* a vote for every listener was advocated by me in a letter to the B.B.C. some nine months ago."

He says he received the usual polite acknowledgment and believes that "it was pigeon-holed."

I feel sure, however, that the scheme will be considered by the B.B.C.

His idea differs from mine in this respect: He advocates a large post card, on one side of which would be the notification of expiration of licence, etc., and address. The reverse side would be in a form of voting paper of types of broadcast, for which the listener would be invited to vote in numerical order. The post card would then be retained at the Post Office by the officer when application was made for renewal.

My correspondent adds: "What is wanted is that one of our national newspapers should take the matter up and ask its interested readers to bombard the B.B.C. for their rights—an annual vote. The man who 'pays the piper' should call the tune—not the paid piper imposing his will on the man who pays."

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A retired colonel, who writes to me sometimes giving me his views of programmes, is very wrath. He wants to know what have we "once more done to be inflicted with the hopelessly inane and utterly incomprehensible talks? As they say from 2LO, it is now 10.30 p.m. and your 'livery, retired colonel' is retiring with his whisky peg to cheer his nobbly liver after a quarter of an hour of undiluted misery."

◆ ◆ ◆

What I cannot understand is why my livery, retired military friend endured it for a quarter of an hour. After all, he was not bound to.

◆ ◆ ◆

I am sorry I have fallen behind again with some interesting letters. Here they are in brief:—

H. Irwin, writing from Rumney, near Cardiff, says: "I read your article last, but not least; often twice. I agree with about 75 per cent. Hope you had a jolly New Year. We did. Had a party and danced from seven to twelve."

Having read this with interest, and just as I was thinking "Praise be to the B.B.C. dance bands!" my correspondent adds: "No thanks are due to the B.B.C. for the dance music. *We had a gramophone and a good five-valve set, and got our music from foreign stations.*"


**Lissenden's idea of Miss Clara Evelyn**

Apparently this correspondent does not want to "sit around listening to B.B.C. parties." He wants Jack Payne-Padbury and hotel dance bands. He will accept concert parties, but they are best listened to and enjoyed when "only one, two, or three are gathered around the loud-speaker, and silence reigns supreme." On holidays he thinks dance music is welcomed by thousands.

My readers know I am not a dance fan, but there is something in what this correspondent says: that normally, during the high jinks of the holiday period, it is impossible to concentrate in a crowd.

◆ ◆ ◆

Then there is John Morris, of Aberystwyth, who does not care for talks. He prefers reading books or the daily paper. He does not mind, however, listening to eminent men on special occasions, such as the Prince of Wales, Lloyd George, Philip Snowden, Arthur Henderson, Ramsay Macdonald, Winston Churchill, etc.

"Most of the talks by women," he says, "are difficult to follow, since most of them appear to drop their voices and one misses the final consonants." I don't think, however, that this is generally so.

◆ ◆ ◆

E. A. Colat (Hyde Park) writes: "I enjoy reading your weekly page in AMATEUR WIRELESS, and I agree with 'Harold' that there is no dance band (except one) worth tuning into these days, not even Jack Hylton's. I prefer Bertini's Orchestra—or, rather, band—from Blackpool. And they know how to play a waltz."

My correspondent thinks that the concerts broadcast by the Orloff Sextet and the Parkington Quintet from the regional transmitter, after 2LO has closed down, splendid. "They send one to bed happy."

Thank heaven for a satisfied listener!

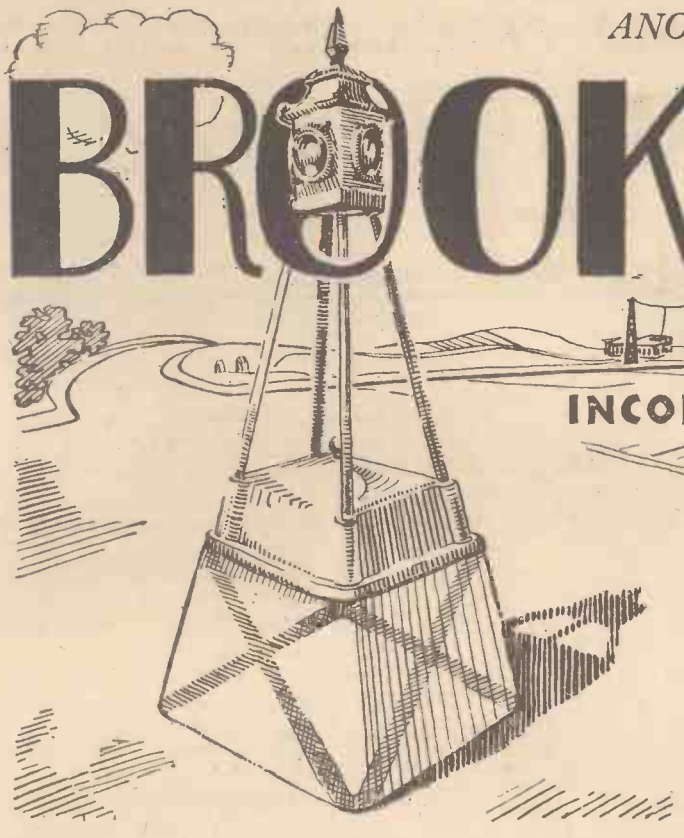
◆ ◆ ◆

Hearing that there was a "special programme" at 2 o'clock on Sunday, I finished the meal early and—all I got was a reading. But don't worry. The next Sunday we got back to the usual half-past four stunt. Is this a deliberate flouting by "programmes" of public opinion? There has been an outcry for "more Sunday programmes," in reply to which the B.B.C. deliberately gives us less. What is the idea?

*ANOTHER UP-TO-DATE THREE-VALVER WIT*

# BROOKMAN'S B

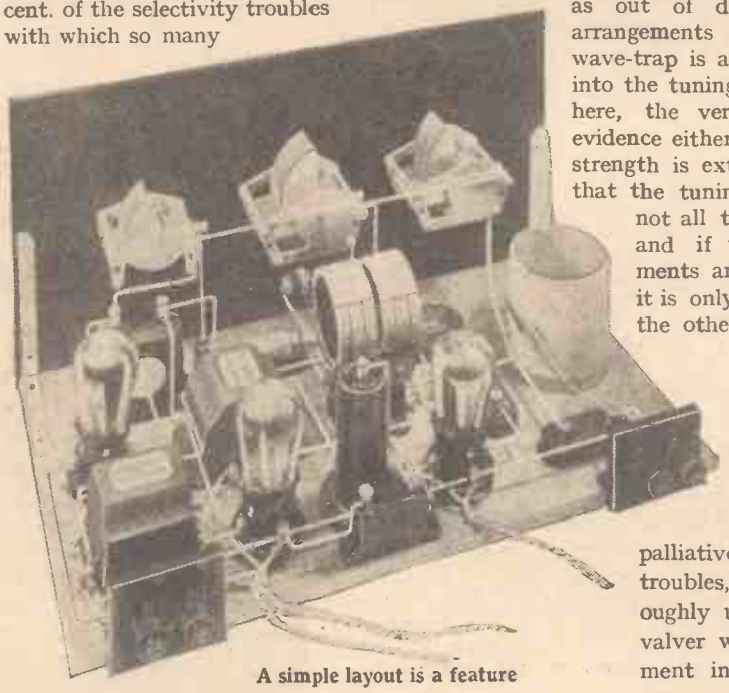
## INCORPORATING ITS OWN WAVE-TRA



OUR Technical Editor described last week the construction of a revolutionary "gadget" for getting selectivity, and elsewhere in this issue he gives further notes on its various phases of utility. This type of wave-trap is one which has received considerable attention at the Furzehill Laboratories, and AMATEUR WIRELESS has no hesitation whatsoever in presenting this unit as a solution of 90 per cent. of the selectivity troubles with which so many listeners nowadays have to contend.

In order to facilitate the construction of this already simple unit and to ensure that no novice shall have any difficulty in making it up, we gave away in last week's issue a free full-size blueprint. So there is no excuse for anybody who feels that a really good wave-trap will bring forth that much-desired knife-edged tuning and who hesitates to make up the "Brookman's By-pass."

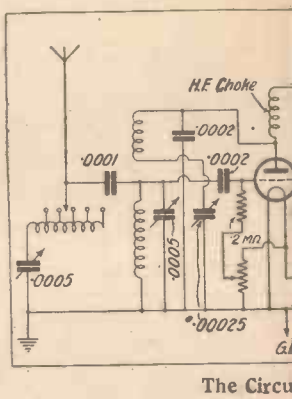
There is only one point about this wave-trap business, however, and it is a point which "gives one furiously to think." If the presence of a wave-trap in your existing set is necessary, then is it not possible also that other portions of the circuit are as out of date as the tuning arrangements must be? Unless a wave-trap is actually incorporated into the tuning circuit, as is done here, the very presence of it is evidence either that the local field strength is extraordinarily high or that the tuning arrangements are not all that they might be; and if the tuning arrangements are out of date, then it is only logical to examine the other features of the set for snags.



A simple layout is a feature

### *A Palliative*

We offer the "Brookman's By-pass 3," therefore, not only as a palliative to selectivity troubles, but also as a thoroughly up-to-date three-valver which is an improvement in very many respects upon sets of an older type. The circuit has been so designed that it is extraordinarily simple to get the set working. For instance, transformer coupling is used throughout on the low-frequency side, and the choice of battery values is therefore perhaps not so critical as if even one stage of resistance-capacity low-frequency amplification were employed.




The Circu

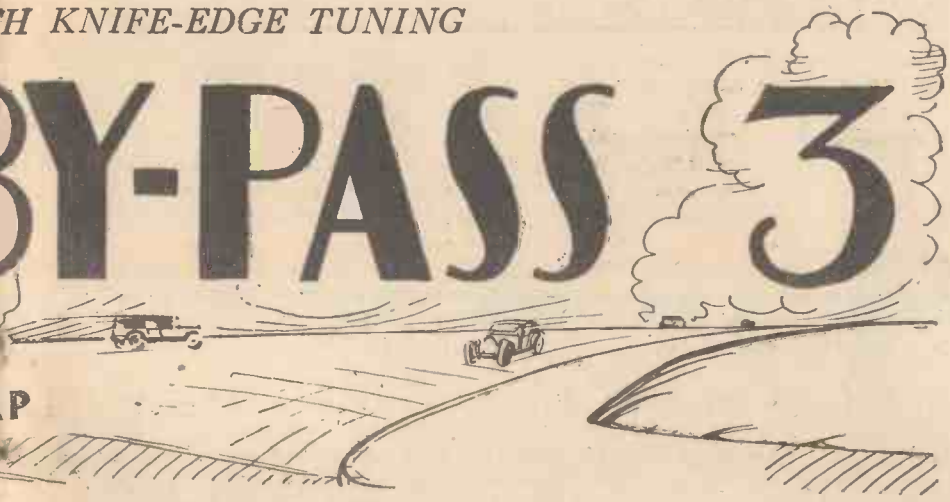
The essential part of this receiver is, of course, the incorporation of a wave-trap of the "Brookman's By-pass" type into the actual tuning circuit. This has two immediate results. The set has a tidy appearance, for added-on units can never be tidy, owing to the extraneous wiring. The wave-trap condenser is mounted on the panel at the side of the main tuning condenser and the job of cutting out one or other of the stations can be done without any "fiddling." A further point is that the inclusion of the wave-trap into the receiver itself makes for short leads, neatly spaced wiring, and, of course, efficiency.

The "heart" of the re

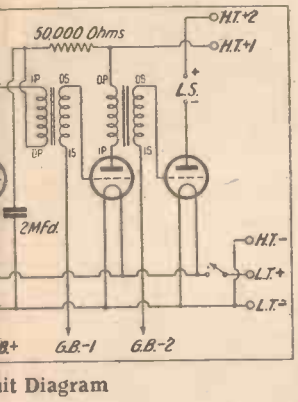
The accompanying photographs give a good general idea of the "Brookman's

*H KNIFE-EDGE TUNING*

# BY-PASS 3



By-pass 3." It is a very simple receiver to construct, one of the reasons being that there is ample space on the panel and baseboard, and even the veriest beginner will have no difficulty in making the connections neatly.




it Diagram

In a panel on page 222 is given a list of the components required for building up the set, and you will find on perusal that the list is not lengthy nor is the overall cost high. In certain directions have economies been effected; one point that might be mentioned is that no terminal strip or terminals are necessary for the battery leads, all connections being made direct by means of lengths of flex from the respective components.

ceiver is the by-pass coil

It is perhaps hardly necessary to add that no deviation is advised from the aforementioned list of components. The original components specified, and the alternatives suggested, are given with due consideration to efficiency, ease of construction and price. All the alternatives given will be found to fit into the set without serious alteration having to be made to the original design, but if you choose components other than those specified, then you may have trouble; and, incidentally, the AMATEUR WIRELESS Technical Staff can take no responsibility whatsoever for the results obtained with a set not made according to specification. This is the only reasonable view to take, and it is necessary to emphasise this ruling.

### *Other Features*

To revert, however, to the consideration of the technical features of the set: the theoretical diagram is given herewith, and you should for convenience study this in conjunction with the photographs.

A striking feature is that plug-in coils are used. We know, of course, that there are arguments put forward both for and against plug-in coils. In this particular receiver we consider that their use has many advantages, not the least of which is their low cost. The coil sockets are arranged approximately in the middle portion of baseboard so that when you lift the lid of the cabinet to change the coils you will have no trouble in locating the sockets.

### *Anti-mobo Unit*

As has been said, the low-frequency amplification is carried out with transformer coupling, and the Cossor special core type is specified. A simple anti-motor-boating unit is included in the anode circuit of the detector valve—that is, in series with the primary of the first transformer. Doubtless this will be an improvement over your old set, which may have no anti-motor-boating unit fitted, and may therefore be prone to low-frequency instability.

The form of reaction employed is very efficient, consisting of a semi-Reinartz coupling utilising a plug-in coil in series with a variable condenser having a maximum value of .00025 microfarad. Note, too, the .0002-microfarad by-pass.

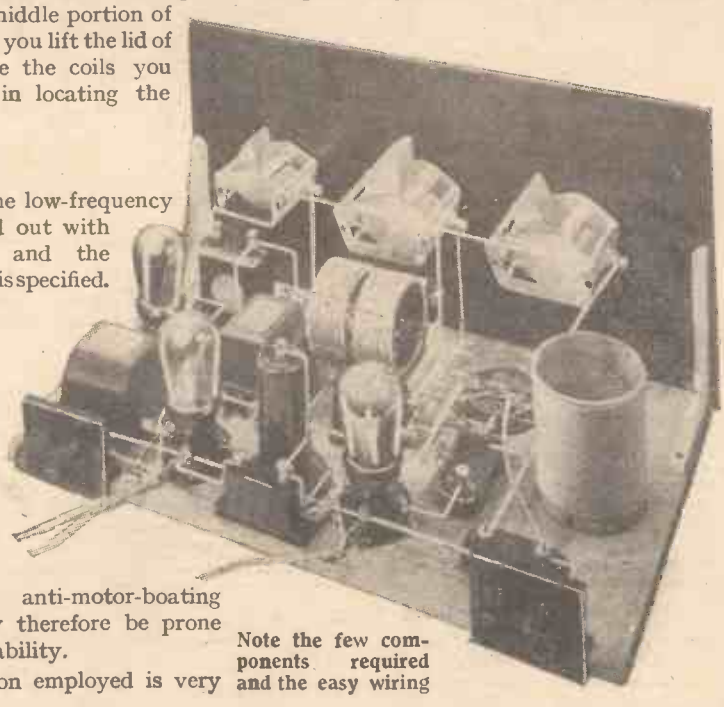
The grid circuit arrangements of the detector deserve more than passing notice. The grid condenser has a value of .0002 microfarad and the grid leak is one of 2 megohms. This combination has been found to be very suitable, and is a useful compromise between the values best suited for sensitivity and those best suited for volume.

### *Detector-Potentiometer*

You will see from the circuit that the best operating point of the detector valve is not left to chance, but is determined by means of a potentiometer, to the slider of which is connected the end of the grid leak remote from the grid.

Note the way in which the "Brookman's By-pass" wave-trap—that is, the special coil and the .0005 variable condenser on the panel—is coupled to the grid end of the tuning coil through a .0001 condenser. The construction of this section of the receiver, together with other constructional notes, will be given next week.

In the meantime, before commencing construction operations, you should "arm" yourself with a copy of the "Brookman's By-pass 3" full-size blueprint. The blueprint is No. 220 and can be obtained, price 1s., post free, from the Blueprint Department, AMATEUR WIRELESS, 58-61 Fetter Lane, London, E.C.4. To avoid delay, take particular care that your inquiry is addressed specially to the Blueprint Department, and do not enclose



Note the few components required and the easy wiring

# "THE BROOKMAN'S BY-PASS 3" (Continued from preceding page)

any irrelative correspondence with your blueprint inquiry.

Do not forget, too, that, as is the case with other AMATEUR WIRELESS receivers, Selfridge windows before you proceed with the construction, then we advise you to do so.

Next week will be given constructional notes which, in conjunction with the blueprint now available, will enable you to make up the set, even if this is your first acquaintance with radio construction.

Particulars will be given also of the most suitable valves and batteries to employ, and full operating instructions. It is as simple to operate as to build.

The complete "By-pass 3"

the "Brookman's By-pass 3" is now on view in the Somerset Street windows of the radio department of Messrs. Selfridge and Co., Ltd. If you can conveniently take the opportunity to see this set in the

### LIST OF COMPONENTS

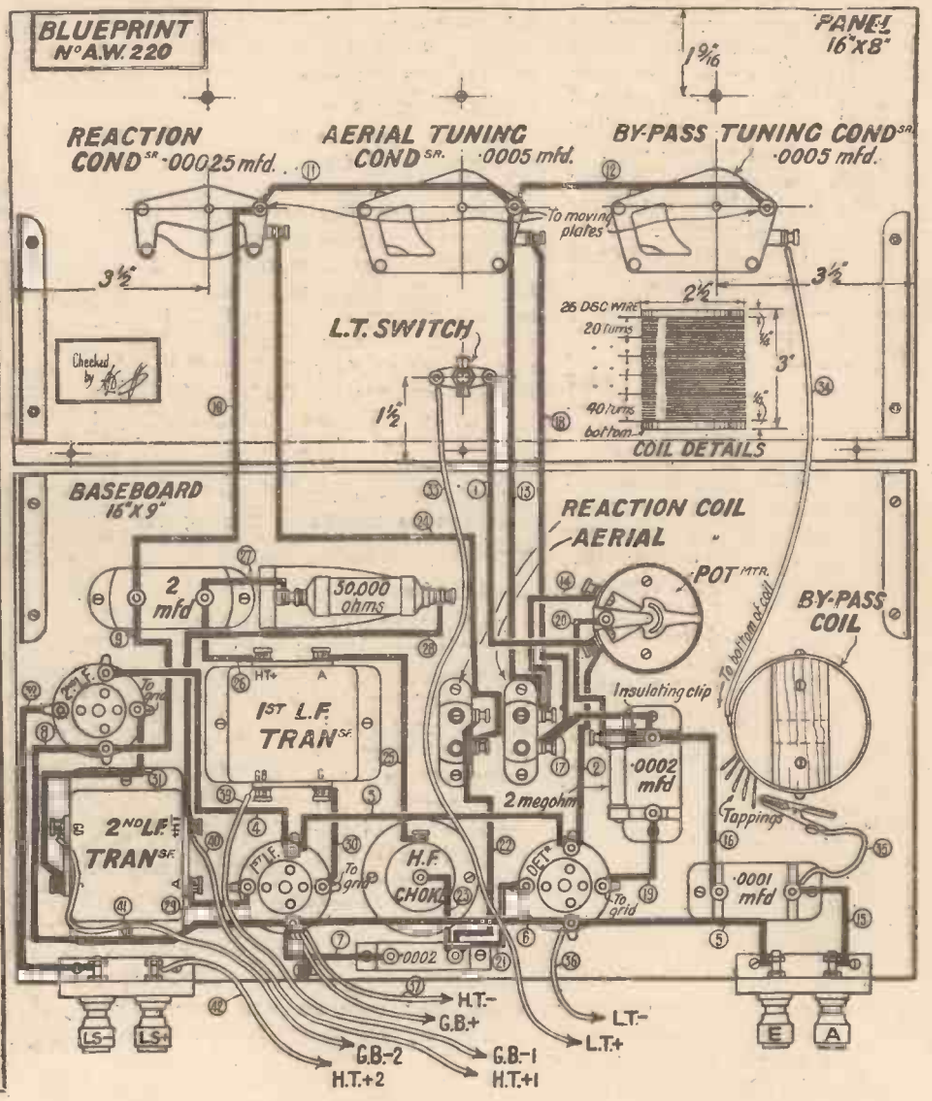
Ebonite panel, 16 in. by 8 in. (Raymond, Lissen, Trolitax, Trelleborg, Becol).
Baseboard, 16 in. by 9 in. (Pickett, Raymond).
Two .0005-mfd. variable condensers, with dials (Polar, Burton, Lotus, Lissen, Dubilier, Igranic, Formo).
.00025-mfd. reaction condenser (Polar, Burton, Lotus, Lissen, Dubilier, Igranic, Formo).
Three valve holders (Lotus, Trix, Benjamin, Formo, Igranic, Brownie, Wearite).
Two single coil holders (Lissen, Lotus).
2-megohm grid leak (Dubilier, Graham-Farish, Lissen, Watmel).
400-ohm baseboard-mounting potentiometer (Lissen, Igranic, Varley, Wearite, Sovereign).
.0002-mfd. fixed condenser, with series clip (Dubilier, T.C.C., Graham-Farish, Lissen, Ormond, Watmel).
.0001-mfd. fixed condenser (flat) (Dubilier, type 610; T.C.C., Graham-Farish, Lissen, Ormond, Watmel).
.0002-mfd. fixed condenser (upright) (Dubilier, type 620; T.C.C., Graham-Farish, Lissen, Ormond, Watmel).
Filament switch (Benjamin, Bulgin, Junit, Lotus, Igranic, Claude Lyons).
High-frequency choke (Bulgin, Lissen, Lewcos, Tunewell, Sovereign, Wearite, Varley, Ready Radio, Polar).
Two low-frequency transformers (Cossor, Lewcos, Lissen, Varley, Lotus, Marconiphone, Brownie, Telsen, Igranic, Ferranti).
50,000-ohm wire-wound resistance, with holder (Lissen, Bulgin, Ready Radio, Ferranti, Graham-Farish, Dubilier).
2-mfd. fixed condenser (Lissen, T.C.C., Dubilier, Helsby, Hydra).
Panel brackets (Lissen, Bulgin, Keystone, Raymond, Camco).
Two terminal strips (Junit, Lissen, Keystone, Raymond).
Four terminals Marked: Aerial, Earth, L.S.+, L.S.— (Belling-Lee, Eelex, Clix).
Coil former, 2 in. diameter and 3 in. long (Pirtoid or Paxolin).
Two ounces of No. 26 d.s.c. wire (Lewcos).
Complete by-pass coil (Ready Radio, Wright and Weaire, Keystone, H. & B., Harlie, Parex).
Connecting wire (Glazite).
Eight yards of thin flex (Lewcoflex).
Six wander plugs marked: H.T.—, H.T.+1, H.T.+2, G.B.—1, G.B.—2 (Belling-Lee, Eelex, Clix).
Two spade terminals marked: L.T.+, L.T.— (Belling-Lee, Eelex, Clix).
Crocodile clip (Bulgin).
Three dial indicators (Bulgin).

## COMBINATION AERIALS

THE use of a "double" aerial consisting of a vertical wire surrounded by a horizontal loop has been found to give good results in preventing fading on short-wave signals. Fading is to a large extent due to changes in the plane of polarisation of the signal wave as it is reflected from the Heaviside layer.

The combined aerial is effective because it picks up both of the reflected components. The horizontally-polarised wave (with the magnetic field oscillating vertically) is received by the horizontal loop, whilst the vertically-polarised wave is picked up by the upright wire. The voltages induced in both aerials are combined in a common receiver, so that the received signals are maintained at a uniform average strength.

M. A. L.



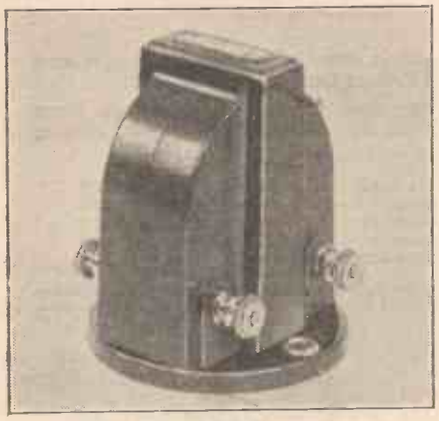

The various components listed will be recognised in this wiring diagram. Full-size blueprint is available, price 1/-

# "A.W." TESTS OF APPARATUS

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

## *British General Transformer*

THE British General midget transformer, samples of which we have tested this week, is a component which commands attention on account of its unique size. The windings and iron core are housed in a bakelite container, having a base measuring only 1⅞ in. diameter. The total height is 2 in. From these figures some idea of the exceptional compactness of the component will be realised. This compactness, however, is not obtained, as one might suppose, by reducing the inductance of the windings,



**A compact small-size L.F. transformer—the British General**

but by utilising a new metal for the iron, having an exceptionally high permeability and therefore providing a high inductance with a small number of turns.

These transformers are made in two ratios, 2½ to 1 and 4 to 1. The former is most suitable in the first stage where it may follow a medium-impedance valve, whilst the second transformer which has a somewhat lower primary inductance, is preferably used after a lower impedance valve.

The inductance tests on the primary winding were taken under actual operating conditions: ¼ milliamp A.C. current was passed through the winding in addition to varying values of D.C. In the case of the 2.5-to-1 transformer, the inductance was 35 henries without polarising current and 33 henries with 1 milliamp flowing through the windings. This had fallen to 18 henries with 3 milliamps, but with a detector valve of average impedance the anode current rarely exceeds 1 milliamp, so that the inductance is ample for giving good quality reproduction.

The inductance of the 4-to-1 ratio transformer was 16.5 henries without D.C. current, but this rose to 26 henries with 1 milliamp flowing. It therefore follows that, used after a detector valve with a moderately small H.T. voltage, it can be arranged that the inductance will be at its highest value. If, however, the D.C. current increases to 2 milliamps, the inductance falls very heavily to 11.5 henries, after which it remains moderately constant and with 5 milliamps D.C. flowing, the inductance is 9 henries.

These figures give some idea of the efficiency of this component, which, on account of its small size and weight and low cost of 11s. 6d., should prove an attractive proposition.

## *A Pentode Output Transformer*

ONE of the latest components in the extensive Varley range is their pentode output transformer. This component is provided with two step-down ratios, one of 2.25 to 1, suitable for the standard high-resistance speaker, and the other of 45 to 1 for a low-resistance speaker. The component is housed in the standard Varley case which is of the customary attractive finish, all the terminals being clearly marked.

The primary inductance is rated at 28 henries when carrying a current of 20 milliamps. On test we found that this value was substantially correct, the inductance at 20 milliamps being 24.2 henries. This was measured at a frequency of 50 cycles with an A.C. component of 0.5 milliamps flowing.

The primary inductance may appear, at first sight, to be on the low side, for the impedance at 100 cycles is only 15,000 ohms, but it must be remembered that a pentode cannot be treated in the same way as an ordinary valve where the external impedance should be between two and four times that of the valve itself. Such a procedure with the pentode would give rise to dangerously high voltages.

On test we tried the transformer following a number of pentodes and found that the quality was distinctly improved, while in some cases, the strength was increased as a result of the more correct matching of the speaker to the valve.

## *Ultra Linen Speaker*

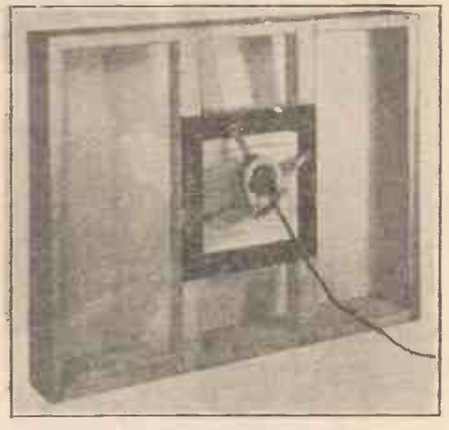
THE linen-diaphragm loud-speaker has firmly established itself with the listening public, who realise that it has set a new standard of reproduction for cone speakers.

Messrs. Ultra Electric have sent to us for test and report, a double-diaphragm linen speaker housed in a wooden chassis of attractive appearance, having a diameter of approximately 15 in. square. The diaphragm sizes are 12½ in. and 5½ in., and consist of stretched and suitably treated linen.

The apexes of the diaphragm meet at a point which is clamped to the reed driven from a balanced armature unit. A centring device is fitted for the adjustment of this armature should the necessity arise when steady anode current passes through the winding. It is recommended by the makers that a choke output or transformer be employed to prevent the passage of this steady current.

Although a larger diaphragm is employed in some of the speakers made by the Ultra Electric, Ltd., yet the results obtained from this model were very pleasing in reproduction, both of speech and music. There are only two major resonances on the range, and these are due to the diaphragms alone. The larger diaphragm responds to the lower frequencies and the smaller diaphragm is the better reproducer of the higher frequencies: it is thus possible to obtain an admirably balanced tone.

On test, we noticed a boominess on speech due, perhaps, to the natural period of the larger diaphragm. This did not, however, seem to detract from the clearness of speech. The quality of reproduction on music was decidedly good and most pleasant to listen to: both the high and low frequencies were in evidence although in the latter case, probably the lowest frequencies, such as those of a drum, could be heard on a harmonic of their actual frequency, but the



**One of the range of Ultra linen-diaphragm loud-speakers**

ear is such a deceiver that one would believe the reproduction to be on its natural frequency.

We have no hesitation in recommending this speaker.

# RADIOGRAMS

ON February 18 the vaudeville programme from the Birmingham studio will be a particularly attractive one. Amongst the artistes contributing to the entertainment are Wish Wynne in character sketches, Sandy Rowan, David Jenkins and Suzette Terri (light songs), Patricia Rossborough and Norman Hackworth (syncopated duets on the piano), Emile Clare (entertainer), Alfred Kirby (banjoist), and Philip Brown's Revellers Band.

Dale Smith will give a recital of H. Fraser Simson's songs, with the composer at the piano, from 5GB on February 20. The programme will include excerpts from *Our Nell*, *The Street Singer*, *The Southern Maid*, as well as Mr. Simson's settings of A. A. Milne's *Christopher Robin* verses and a new cycle, *The Hums of Pooh*, broadcast for the first time.

Another light concert entertainment is to be relayed from Kingsway Hall on February 15. Comedy will be provided by Leonard Henry and Will Gardner. Howard Fry (baritone), Megan Thomas (soprano), and Margaret Balfour (contralto) will sing well-known airs. The programme also includes solos on the piano and on the grand organ.

*The Dawn*, a short one-act play by Naomi Jacobs, is down for broadcast from all stations on February 12; it will be produced at the Glasgow studio. The story deals with a mythical return of Bonnie Prince Charlie.

Captain H. B. T. Wakelam will be responsible for the running commentary on the International Rugby Match, England *v.* France, to be transmitted through 2LO and 5XX on February 22.

Annually a commemoration service is given at Bridlington in memory of the seventy fishermen who lost their lives in the great gale of 1871. It will take place on February 29, and will be attended by the Mayor and Corporation of Bridlington, lifeboatmen, coastguards, the rocket brigade, and local fishermen. The broadcast will be heard through 5XX only.

***NEXT WEEK:***
***FIFTY BEST STATIONS***
***and how to identify them***

The French Colonial Post Office authorities have decided to erect a broadcast transmitter in the neighbourhood of Antananarivo, on the Island of Madagascar, with a view to supplying the entire district with musical programmes and news bulletins in various languages. Owing to the great size of the island—the area is estimated at some 228,000 square miles—a transmitter possessing a minimum energy of 15 kilowatts will be needed.

The Polskie-Radio, in co-operation with the Polish Ministry of Posts and Telegraphs, is undertaking an energetic campaign against wireless pirates. Roughly, 800 persons have been prosecuted during the past few weeks.

It is reported that the Radio Luxembourg broadcasting station has been compelled to close down temporarily.

Belgium now possesses a new experimental station at Verviers, which broadcasts every Friday evening at 8.30 p.m. G.M.T. on 216 metres. The call is: "*Ici Radio Ottomont, Andrimont-Verviers.*" It opens and closes the transmissions with a few bars of the Belgian National Anthem. The station is owned and operated by the local wireless club.

The new Turkish broadcasting station erected at Ankara (late Angora) has started regular nightly tests.

"*Ici Huit-ka-o* (8KO) *Asnieres,*" is the call of a new transmitter erected by a French manufacturer in the neighbourhood of Paris. Broadcasts of gramophone records are made every Saturday at 10.30 p.m. G.M.T. on 540 metres. The power of the transmitter is, roughly, 1 kilowatt in the aerial.

The latest census shows that Canada possesses eighty-one licensed broadcasting transmitters, of which eighteen are phantom stations, namely, associations broadcasting through a common transmitter. Most of the stations are owned by private companies.

The Italian broadcasting authorities have transferred their headquarters from Milan to Turin. For the benefit of listeners a descriptive newspaper is published daily.

Work is rapidly progressing on the construction of the new Bordeaux-Lafayette (France) broadcasting station; it is hoped that it may be officially inaugurated in July next. Its power is 15 kilowatts.

According to a U.S. Government report, radio regulations and legislation ending the fiscal year June 30, 1929, in that country cost more than £125,620.

## "USING 'BROOKMAN'S BY-PASS'"

(*Continued from page* 215)

By-pass" was first contemplated the possibility of using a number of such arrangements was foreseen, and experiments were made to see which forms of circuit were the most suitable in this respect. The adoption of the present circuit was largely influenced by the fact that it possesses this very valuable property, namely, that a number of such by-passes may all be connected across the aerial and earth system, independently tuned.

Suppose, for example, we wished to reduce the intensity of both Brookmans Park transmissions. This is really a necessity for anyone living relatively close, in order to avoid interference. The two by-passes are both connected across aerial and earth, as shown in the diagram. It is then simply necessary to adjust one by-pass to one station and the other to the second. It will be found that both circuits can be tuned independently without affecting the other and both stations can be reduced to a proper intensity. *It is not necessary to switch over from one to the other*, an important point in many instances.

In many cases, readers living in provincial districts experience interference from certain foreign stations. Langenberg, for example, can be very troublesome on 5GB. The "Brookman's By-pass" will be particularly suitable for a case like this. The maximum tapping should be used to give the sharpest possible tuning, and if the by-pass is adjusted to Langenberg, it will be found that 5GB can be received quite clear. As has already been pointed out, the tuning on this largest tapping is very sharp, so that the dial must be rotated very slowly in order not to miss the tuning point altogether.

It is not necessary, of course, for both the by-passes to be adjusted on the same tapping. If one of the stations to be cut out is stronger than the other, then a lower tapping must be used on the first by-pass than on the second. Altogether, the system is so delightfully flexible that it is bound to come into considerable use.

One final point concerns the receiver tuning. This will be found to be practically independent of the by-pass setting. Hence, if one is not correctly tuned to the local station when adjusting the by-pass, the results are just the same. Indeed, one can adjust the arrangement by setting the receiver 10 degrees off the tuning point and then adjusting the by-pass until the residual signal is cut out altogether. Then, on tuning the receiver correctly, the local station will, of course, come in; but one knows that it will be cut out 10 degrees on either side of the tuning point. This valuable property of independent tuning is one of the distinctive features of the "Brookman's By-pass."

# 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 (2) tests | 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 | Brookmans Park | 30.0 |
| *377 | 797 | Manchester (2ZY) | 1.0 |
| *399 | 753 | Glasgow (5SC) | 1.0 |
| *479 | 626 | Daventry (5GB) | 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 | 0.4 |
| 217.1 | 1,382 | Charleroy (LL) | 0.25 |
| 244 | 1,229 | Ghent | 0.5 |
| 250.9 | 1,196 | Schaerbeek-Brussels | 0.25 |
| 280 | 1,071 | Liége | 0.1 |
| 310 | 968 | Arlon | 0.3 |
| 339 | 887 | Velthem | 8.0 |
| *509 | 590 | Brussels | 1.0 |
| **CZECHO-SLOVAKIA** | | | |
| *263 | 1,139 | Moravska-Ostrava | 10.0 |
| *279 | 1,076 | Bratislava | 12.5 |
| *293 | 1,022 | 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 (Tallinn) | 0.7 |
| **FINLAND** | | | |
| *221 | 1,355 | Helsingfors | 0.9 |
| *1,796 | 167 | Lahti | 40.0 |
| **FRANCE** | | | |
| 31.65 | 9,479 | Radio Experimental (Paris) | 1.0 |
| 176 | 1,714 | S. Quentin | 0.1 |
| 214 | 1,400 | Fécamp (Radio Normande) | 0.5 |
| 220 | 1,364 | Beziers | 0.1 |
| 238 | 1,260 | 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 |
| 293 | 1,022 | Limoges (PTT) | 0.5 |
| *293 | 1,022 | Montpellier (PTT) | 0.3 |
| 304 | 986 | Bordeaux (PTT) | 1.0 |
| 308 | 973 | Radio Vitus | 1.0 |
| 311 | 964.5 | Agen | 0.25 |
| *316 | 950 | Marseilles (PTT) | 0.5 |
| 329 | 914 | Grenoble (PTT) | 0.5 |
| 331.1 | 905 | Poste Parisien | 0.5 |
| 363 | 828 | Algiers | 12.0 |
| 368 | 815 | Radio LL (Paris) | 0.5 |
| 375 | 803 | Caen | 0.5 |
| *381 | 788 | Radio Toulouse | 8.0 |
| 411 | 729.5 | Radio Maroc (Rabat) | 2.0 |
| 447 | 671 | Paris (Ecole Sup. PTT) | 3.0 |
| 468 | 640 | Lyons (PTT) | 5.0 |
| 1,444 | 207.5 | Eiffel Tower | 12.0 |
| *1,725 | 174 | Radio Paris | 12.0 |
| **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 | Kiel | 0.35 |
| *246 | 1,220 | Cassel | 0.25 |
| *253 | 1,184 | Gleiwitz | 2.0 |
| *259 | 1,157 | Leipzig | 1.5 |
| *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 |
| 570 | 527 | Freiburg | 0.35 |
| *1,635 | 183.5 | Zeesen | 30.0 |
| 2,100 | 142 | Norddeich | 10.0 |
| 2,200 | 131 | Norddeich | 10.0 |
| **GRAND DUCHY** | | | |
| 223 | 1,346 | Luxembourg | 3.0 |
| **HOLLAND** | | | |
| 31.4 | 9,554 | Eindhoven (PCJ) | 30.0 |
| *298 | 1,004 | Huizen (through Hilversum) until 5.40 p.m. G.M.T. | 6.5 |
| *1,071 | 280 | Huizen (through Hilversum) | 6.5 |
| *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** | | | |
| 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 |
| *330.5 | 907.7 | Naples (Napoli) | 1.5 |
| *385 | 779 | Genoa (Genova) | 1.0 |
| *441 | 680 | Rome (Roma) | 50.0 |
| 453 | 662 | Bolzano (1BZ) | 0.3 |
| *501 | 599 | Milan (Milano) | 7.0 |
| **YUGOSLAVIA** | | | |
| 308 | 973 | Zagreb (Agram) | 0.7 |
| 431.1 | 695.8 | Belgrade | 2.5 |
| 570 | 527 | Ljubljana | 2.5 |
| **LATVIA** | | | |
| *525 | 572 | Riga | 3.0 |
| **LITHUANIA** | | | |
| *1,935 | 155 | Kovno | 7.0 |
| **NORWAY** | | | |
| 361 | 824 | Bergen | 1.0 |
| 387 | 775.2 | Fredriksstad | 0.7 |
| 4 5 | 674 | Rjukan | 0.18 |
| 453 | 662 | Tromsö | 0.1 |
| 453 | 662 | Aalesund | 0.3 |
| 453 | 662 | Porsgrund | 0.7 |
| *493 | 608 | Oslo | 60.0 |
| **POLAND** | | | |
| *313 | 959 | Cracow | 0.5 |
| *335 | 896 | Posen | 1.2 |
| 385 | 779 | Wilno | 0.5 |
| 385 | 779 | Lemberg (tests) | 0.2 |
| *408 | 734 | Kattowitz | 10.0 |
| 1,471 | 204 | Warsaw | 8.0 |
| **ROUMANIA** | | | |
| *394 | 761 | Bucharest | 12.0 |
| **RUSSIA** | | | |
| 824 | 364 | Moscow (PTT) | 20.0 |
| 938 | 320 | Moscow (C.C.S.P.) | 50.0 |
| 1,000 | 300 | Leningrad | 20.0 |
| 1,056 | 284 | Tiflis | 10.0 |
| 1,103 | 272 | Moscow Popoff | 40.0 |
| *1,304 | 230 | Kharkov | 12.0 |
| 1,380 | 217.5 | Rakou | 10.0 |
| 1,471 | 204 | Moscow (Kom) | 12.0 |
| **SPAIN** | | | |
| 251 | 1,193 | Almeria (EAJ18) | 1.0 |
| 268 | 1,121 | Barcelona (EAJ13) | 10.0 |
| 314 | 956 | Oviedo (EAIJ9) | 0.5 |
| *349 | 860 | Barcelona (EAJ1) | 8.0 |
| *368 | 815 | Seville (EAJ5) | 1.5 |
| 403 | 743 | San Sebastian (EAJ8) | 0.5 |
| 426 | 703 | Madrid (EAJ7) | 2.0 |
| **SWEDEN** | | | |
| 231 | 1,301 | Malmö | 0.6 |
| *257 | 1,160 | Hörby | 10.0 |
| 270 | 1,112 | Trollhättan | 0.45 |
| *322 | 932 | Göteborg | 10.0 |
| 332 | 905 | Falun | 0.5 |
| *436 | 689 | Stockholm | 1.5 |
| *542 | 554 | Sundsvall | 0.6 |
| *770 | 389 | Ostersund | 0.6 |
| 1,200 | 250 | Boden | 0.6 |
| *1,348 | 222.5 | Motala | 30.0 |
| **SWITZERLAND** | | | |
| *403 | 743 | Berne | 1.0 |
| *451 | 653 | Zurich | 0.63 |
| 680 | 442 | Lausanne | 0.6 |
| 700 | 395 | Geneva | 0.25 |
| 1,010 | 297 | Basle | 0.25 |
| **TURKEY** | | | |
| *1,219 | 246 | Stamboul | 5.0 |

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

## AT THE QUEEN'S HALL

MR. BASIL CAMERON was engaged at very short notice to conduct the second B.B.C. concert of this year.

The programme included one great piece of music—Mozart's Prague symphony, the last he wrote before his final tremendous activity, and a perfect work. Mr. Cameron hurried the *allegro* part of the first movement, but the lovely *andante* was faultlessly played.

Moseiwitsch gave a distinguished performance of a Rachmaninoff concerto, but I wish this gifted pianist would keep to the classics.

L. R. J.

The announcing staff of WJJD, Chicago, go through a rehearsal before broadcasting. They talk into a machine which records their voices on wax records. After listening to the reproduction, they make any change they think necessary.

Thousands of American children, just before their mothers tuck them up for the night, wait until Ella Potter leads them in prayer from WJJD, Chicago. Little Miss Potter, of Mooseheart, Ill., kneels before the microphone of WJJD every evening at 8.30.

## TUBE "NOISES"

A HIGH-RESISTANCE, such as a grid leak, in the input circuit of a valve will often produce a steady "rustling" noise in the phones, for no apparent cause. Recent research has shown that the effect is, at least in part, due to a kind of spontaneous motion of the electricity in the high resistance, caused by thermal agitation or movements of the constituent molecules. For instance, if the resistance is heated, the rustling noise definitely increases in volume.

A second source of tube "noise" is the so-called Schottky or "small shot" effect which has been traced to fluctuations which occur in the space-current of the valve, particularly when the filament is being slightly under-run. Both effects set a definite limit to the degree of amplification which can be applied to signals before they are finally "swamped" by the rising level of tube noise.

M. A. L.

## SIDE-BAND TELEPHONY

THE system of transmitting wireless-telephony messages on a single side-band, as used in the transatlantic service, not only results in an economy in power, but also saves valuable space in the over-crowded ether.

Instead of radiating the carrier wave and both side-band fringes as usual, only one side-band is sent out, the other frequencies being eliminated by a "balanced" modulator and suitable filter circuits. At the receiving end, a local valve oscillating at the carrier frequency reintroduces the missing carrier wave. The local oscillations, after combining with the incoming single side-band signals, are applied to a detector valve which restores the message to its original form and fullness. The ether channel occupied by the waves in transit is the minimum width of frequencies necessary for intelligible speech, viz., a band of approximately 3,000 cycles.

B. A. R.

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Dramatic performances are now being arranged as part of the broadcast transmissions to Scottish schools. The subject of the first of these is pure history, consisting of three episodes from the history of Edinburgh Castle.

Russia leads all other European nations in the number of broadcasting stations in regular operation. They number about seventy. Receivers are installed at street corners, in schools, and in village assembly halls.

Owing to the demands upon our space in this issue, we regret that it has been necessary to omit the feature "Our Information Bureau."

# 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.*

### Cost of Issuing Licences

SIR,—P. D. of Towcester in your issue of January 11 states that he would be very pleased to issue three million licences at a cost of a farthing each. I wonder!

For a farthing per licence he would have to have three million forms printed in duplicate, numbered and, for convenience, bound in book form supplied with a piece of carbon paper and distributed to post offices throughout the length and breadth of the country. For each application he would have to fill in the name and address and return the duplicates to a central office together with the fee. The central office would need a fairly elaborate filing system by which they could keep a record of all who had and who had not paid licences, besides, of course, having to keep accounts. At the end of a year he would have to print, address, and post three million postcards to licence holders to remind them that a renewal was due (and postage still has to be paid even if postcards bear the magic initials O.H.M.S.). More records would have to be kept to discover who did and who did not respond to these postcards, and possibly action taken against those who did not. And all for a farthing a time!

And supposing that P. D. decided as his small contribution to the vast labour involved to issue the actual licences himself, he would discover that it would be necessary, in order to issue three million within a year, that he could only allow himself three seconds per licence. Such speed would call forth my sincerest admiration.

R. H. B. (Hanwell).

### Is Control Necessary?

SIR,—I wish that, by some means or other, the protest THERMION makes would penetrate the intelligence of the B.B.C. staff. Every important broadcast made is mauled and spoiled in the way he described. I have complained to the B.B.C., and have received polite letters about "land-lines." Of course, "land-lines" have nothing whatever to do with the cause of the trouble which arises in the control room (*vide* B.B.C. Handbook, page 312), and is due to lack of co-ordination among the control staff, and also to lack of intelligence there. The B.B.C. contends that control is necessary. Personally, I am not convinced that it is. In any case, I have never noticed "control" being exercised on transmissions from "foreigners"; and I have listened to many scores of operas, concerts, etc., from abroad. Certainly, if control *is* necessary, it ought to be exercised in a sane and intelligent way. Only combined protest will, I imagine, have any effect on the B.B.C.

W. E. H. (Seaford).

### American Receiver Comparisons

SIR,—J. W. of Upminster seems to forget that the American radio situation is in no way comparable with our own.

He talks blithely of nine-valve sets with 3 H.F., push-pull L.F., moving-coil speaker, remote control, etc., etc., and all for 175 dollars. Well, it is cheap. But who in this country wants such a set?

To many Englishmen, everything in America seems cheap (except beer), but you can be sure that the American himself does not think so. For instance, where can one obtain a British car to compare with those magnificent streamline cars obtainable in America for 1,800 dollars, or roughly £360? What J. W. has missed is that it is all a matter of comparison.

To go back to wireless, then, may I point out also that no one over here would care to bear the upkeep costs of a nine-valver, especially if they recognised that, at least, four of the valves were entirely unnecessary? As a matter of curiosity, I should love to know how many valves there are in the 275 dollar models and what extra gadgets they include. I do hope they are mains operated!

As regards price, the American market is based on the principle "small profits, quick returns," combined with "mass production." If you have not got the returns, you can neither make them quick, nor mass produce. And until you do so, you cannot cut your profits.

The American manufacturers have themselves acknowledged the difference between the radio conditions of the two countries—or better—Continents. For proof, one has only to study the price of American components in England.

H. A. H. (Shortlands).

### "The 1930 Ether Searcher"

SIR,—Not having, up to the present, seen any comments on the "1930 Ether Searcher," may I give you my short experience with this circuit?

First of all, I am waiting for delivery of a "Mazradia" screen-grid valve of French Thomson-Houston manufacture, but in the meantime I put in an ordinary H.F. valve, a Philips of 20,000 ohms impedance.

Obviously it is not just to a receiver when an ordinary H.F. valve is used in place of a

S.G., but the result more than fulfilled my expectations.

The plate of the H.F. valve was, of course, coupled to the .0003 condenser before the grid condenser.

The adjustment of the rotor inside the anode coil was a little more touchy than I expected to find, due no doubt to the slight alteration of circuit and the different H.F. valve, but all other instructions were carried out to the letter.

The dial readings are, however, slightly different from those given, 2LO coming in at 106, instead of 120; 5XX coming in at 110, instead of 116.

I will give you more particulars after an S.G. valve is in use, but the following is interesting :—

Sixteen stations below 2LO (365 metres) at good loud-speaker strength.

2LO (261 metres).—Excellent and no fading.

2LO (365 metres).—Very flat, comes in covering 15 to 17 degrees of the dial.

5GB.—Excellent.

Langenberg.—Excellent, and can be entirely cut out from 5GB or *vice versa*.

Vienna.—Excellent.

Munich.—Good.

With the exception of 2LO (365 metres), there are twenty-one stations all good to excellent with an ordinary H.F. valve.

H.T. on L.F. valve, 75 volts; H.T. on detector, 65 volts (or H.F. choke); filament voltage, 4. C. G. (Carentan, France).

### "P. D." Replies to His Critics

SIR,—I am extremely gratified to observe that my recent comments on the cost of issuing radio licences have been taken up by fellow readers of AMATEUR WIRELESS. I thought that when I offered to issue licences at a farthing a head I might be "putting my foot in it"! And there's no chance of Mr. Lees-Smith (the Postmaster-General) accepting my sporting offer, and letting me prove my statement for a year or two! No. He won't do that, because *the job's too profitable*.

All joking apart, my farthing-a-head offer is as ridiculous as the present sum swallowed by the P.M.G.—and representing a large margin of profit—for issuing the annual licences. The post office charges too much. Why should the post office be entrusted with the job? Cannot the law be altered. As things stand, listeners' money is pouring each year into the G.P.O. coffers. The National daily Press recently launched a campaign against the out-of-date methods of the post office. Here is another glaring wrong which should be righted.

Can other readers suggest a useful method of procedure? It's no use writing to the B.B.C. about it.

P. D. (Towcester).

*NEXT WEEK :*

**HOW TO GET THE FIFTY BEST STATIONS.**

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# WIRELESS IN PARLIAMENT

*(From Our Own Correspondent)*

MR. Philip Oliver asked the Postmaster-General whether he was prepared to extend to persons who were permanently bedridden or home-fast the same exemption from fees in respect of wireless licences as was at present extended to blind persons; and, if legislation was required for the purpose, was he prepared to introduce a Bill.

Mr. Lees-Smith replied that the Broadcasting Committee, 1925, considered the question of the grant of free wireless licences and recommended that this concession be made to blind persons only. Effect was given to the Committee's recommendation by the Wireless Telegraphy (Blind Persons Facilities) Act, 1926. He did not consider that he would be justified in asking Parliament to extend the concession to other classes of the community.

***Cifel Junior H.T. Eliminator.***—In our test report of this compact A.C. mains unit given on page 178 of last week's issue occurred a slight error in the statement of the voltages obtainable. The voltage on the maximum tapping is 142 at 10 milliamps, whilst at 120 volts the output is 12 milliamps. This eliminator is marketed by Messrs. Fonteyn & Co., Ltd., 2, 4, 5, and 6 Blandford Mews, Baker Street, London, W.1, at the price of £3 3s.

## CHIEF EVENTS OF THE WEEK

**LONDON AND DAVENTRY (5XX)**

Feb. 11 Vaudeville programme.
" 12 *The Dawn*, a play by Naomi Jacobs, S.B. from Glasgow.
" 13 Concert relayed form People's Palace.
" 14 Symphony concert relayed from Queen's Hall.
" 15 Running commentary on the fifth round of the F.A. Cup.

**DAVENTRY EXPERIMENTAL (5GB)**

Feb. 9 *The Childhood of Christ* (Berlioz).
" 10 Vaudeville programme.
" 13 Symphony concert relayed from Town Hall, Birmingham.
" 14 *Any Rags ?* a saga of syncopation.

**GLASGOW**

Feb. 12 *The Dawn*, a play by Naomi Jacobs.

One of the latest American talking films features as heroine in its story the announcer of a mythical transmitting station, SEX, and much of the plot possesses as a background the daily life of an important broadcasting studio.

It is reported in France that, barring unforeseen circumstances, the new high-power Radio Strasbourg transmitter will carry out its first tests about February 15 on 346 metres.

## MORE RADIOGRAMS

A dispatch from The Hague states that the Dutch Government is going to improve connections with the outside world by creating forty radio stations in lonely centres. The work of erection will cover four years.

A survey just completed by the Metropolitan Life Insurance Company estimates the number of radio families in the United States at 9,640,348 and the total radio audience as being approximately 41,000,000. Over 59 per cent. of the radio families are reported to have possessed their sets less than two years. Only a little more than 3 per cent. have had their receiving sets more than five years. The average length of time for all families is one year and eight months. Approximately 3 per cent. own crystal sets, more than 80 per cent. of the total number of families interviewed said they were in the habit of using their sets daily.

A new general order has been issued by the American Radio Commission prohibiting obsolete radio broadcasting transmitters, owing to the interference caused by apparatus using damped waves. The order will mean the eventual barring of spark transmitting sets widely used by amateurs. An exception is made in the case of ship equipment installed prior to January 1, 1930. A similar exception is made for transmitting apparatus in Alaska.

There is little likelihood that the repertoire of the U.S. Marine Band will be exhausted. In the barracks library are approximately a quarter of a million compositions with a librarian in charge. The band broadcasts almost any number upon request.

Station W3XAU, the second short-wave rebroadcasting station of the Columbia broadcasting system in America, is now on the air. This short-wave unit is associated with WCAU, in Philadelphia. W3XAU will broadcast on two wavelengths, 31.2 metres and 49.5 metres. A series of experiments will be conducted early in February to determine the possibilities of two-way broadcasts in communication service between America and Europe. During the tests W3XAU will utilise both frequencies, alternating from one to the other every two hours.

For the first time in history the Indian broadcasting station in Calcutta relayed Chelmsford's transmission of the speeches of the Naval Conference, but, owing to atmospherics, the results proved a big disappointment to the listeners. Only isolated words and phrases of the King's speech were audible, but as night approached the clarity increased and speeches of the French delegates were plainly heard.

A new short-wave broadcasting station about nineteen miles from Rome will be working in a few days; the wavelength will be about 80 metres with a power of 12 kilowatts.

The first of the regular relays by Berlin of U.S.A. transmissions was carried out on January 24 last via the short-wave Zeesen station. The concert was successfully passed on to other German stations as well as to Vienna.

National programmes to be broadcast by the main European stations are to include Czecho-Slovakia (March 2), Sweden (April 16), and Belgium (September 17). In most instances the original transmission will be relayed to the various countries via land line.

The short-wave experimental station at Prague (Czecho-Slovakia) is now broadcasting twice weekly on the wave of 5172 kcs. (58 metres). The transmissions take place every Tuesday and Friday from 19.30 to 21.30 G.M.T. (7.30 to 9.30 p.m.). Announcements are generally made in Czech., German, French, and English respectively, and the station's call-sign, OK 1 MPT, is transmitted in slow Morse after the announcements.

Radio chains in the United States span four time zones, but Canada's recently completed chain from Vancouver on the west to Moncton, New Brunswick, on the east, goes one better and includes five time zones. The five zones are Atlantic, Eastern, Central, Mountain, and Pacific. A programme originating in Moncton at 11 p.m. is released in Vancouver at 7 p.m. —a difference of four hours.

The Falkirk district is properly proud of its prospect of being the site for the Scottish regional broadcasting station. When the B.B.C.'s transmitting van commenced test operations at Middlefield Farm, Grangemouth Road, near Falkirk, it was visited with due "pomp and ceremony" by representatives of the local authorities, including the Provost of Falkirk and Captain C. A. Salvesen, M.C., as representing the Publicity and Development Association of the locality.

Sir Robert Greig, Professor F. A. E. Crew, and Mr. Archibald MacNeilage, three of the leading Scottish agriculturalists, have addressed a letter to the Press in order to emphasise the value to farmers and the agricultural community generally of the special talks and features arranged for them by the B.B.C. They say that during the past two or three years very many farmers have found the service most helpful. The range of the talks for 1930 is very wide. In addition to a series on Scottish livestock will be two dealing with specific diseases of stock. Problems of animal-breeding and plant-breeding are to be discussed, while scientific milk production will be the subject of four or five speakers. On controversial topics the syllabus includes the question of imported German oats and credit facilities for agriculture, as well as the problem of small holdings. Beef grading, grassland manuring, and woman's part in the rural community are among a number of miscellaneous features.

## SPEECH FREQUENCIES

IT has been calculated that in order to recognise a person's voice over the telephone, the wire must be able to pass frequencies ranging from 100 to 3,000 cycles per second. For mere intelligibility a much narrower band of frequencies would serve, but in order to convey "naturalness" more of the higher harmonics and overtures are necessary.

In broadcasting, provision is made for side-band frequencies extending for 5,000 cycles above and below the carrier wave. It is for this reason that stations are separated in the ether by a minimum "frequency gap" of 10 kilocycles. In "talkie" work, where the highest possible fidelity is aimed at, the speech band ranges from 60 to 7,000 cycles per second.

M. B

## NEXT WEEK

A SPECIAL LIST OF THE FIFTY BEST BROADCASTING STATIONS WITH WAVE-LENGTHS, POWER, AND HOW TO IDENTIFY THEM.

## A "DUPLEX" LOUD-SPEAKER

INHERENT resonance in a loud-speaker gives rise to distortion because it emphasizes certain frequencies at the expense of others. In order to distribute this effect as equally as possible over the entire musical range, the use of a duplex or double diaphragm has been proposed consisting of a small cone nested inside a larger one.

The larger cone favours the lower notes, whilst the smaller accentuates the higher notes and gives them "brilliancy." The combination tends to preserve the original musical balance which is usually destroyed when only one resonant frequency predominates in the speaker output.

B. A R

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| Ether Ranger (D, Trans) | WM156 |
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| All-wave High-mag. Three (D, 2 Trans) | AW199 |
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| Talisman Two-three (D, RC, Trans) | AW203a |
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| 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 |
| Standard Coil Three (HF, D, Trans | WM117 |
| New Year Three (SG, D, Pentode) | WM123 |
| Lodestone Three (HF, D, Trans) | WM129 |
| Simple Screen Three (HF, D, Trans) | WM131 |
| 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 |
| Brookmans Three (SG, D, Trans) | WM161 |
| Community Three (D, RC, Trans) | WM164 |
| New Q3 (SG, D, Pentode) | WM167 |
| Brookmans 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 |

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| *Music-lover's Gramo-radio (Loud-speaker—1s.) | AW202b |
| *Music-lover's Gramo-radio (Motor-board—9d.) | AW202c |
| Binowave Four (SG, D, RC Trans) | WM119 |
| 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 AC—SG, D, RC, Trans) | WM162 |
| Outpost Four (SG, D, 2 Trans) | WM165 |
| Brookman's Four (2 SG, D, Trans) | WM174 |
| Transportable Four (SG, D, 2 RC) | WM180 |

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|---|---|
| Fidelity Five (HF, D, 2RC) | WM130 |
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| 1930 Five (2HF, D, RC, Trans) | WM171 |

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| A.W. Gramophone Amplifier | AW205 |
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| Brookman's Separator (HF Unit) | AW212 |
| Two-valve Amplifier | AW216 |
| Signal Booster (HF Unit) | WM128 |
| Concentrator (HF Unit) | WM169 |

**The three prints are obtainable for 2s. 6d. post free*

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

## CHEAP RECORDS FOR GRAMO-RADIO REPRODUCTION

A CORRESPONDENT says in many cases when using a pick-up equipment he was unable to tell whether or not the record being played was a cheap one. Certainly there is quite a lot of truth in this statement. Electrical reproduction does, to a certain extent, level up record quality. Perhaps it may be by imparting a new brilliance to the cheaper variety. Of course, it must not be forgotten that as you perfect your reproducer so faults in the records will be shown up more glaringly, just as a moving-coil speaker will show up the faults of an amplifier which previously had fed a balanced armature-driven speaker with satisfactory results. Given an absolutely first-class radio-gramophone, the superiority of the dearer records is still evident. Apart from the added advantage due to electrical reproduction, every keen gramophile is always on the look out for cheap records of high quality. Below is given a short list of operatic records which are cheap, and yet the reproduction they give is of a quality which would justify a red or light blue label :—

"E lucevan le stelle" ("The Stars were Shining Brightly"), *La Tosca*, sung by Louis Graveure (Col. 5211), 3s.

"Addio fiorito Asil" ("Farewell, Oh, Happy Home"), *Madame Butterfly*, sung by Alessando Valente, accompanied by La Scala Orchestra, Milan (H.M.V. B3141), 3s.

"Vesti la guibba" ("On with the Motley"), *Pagliacci*, sung by Tom Burke (Dominion B15), 1s. 9d.

"Anvil Chorus," *Il Trovatore*, sung by the Apollo Choir (H.M.V. B2376), 3s.

*Cavalleria Rusticana* ("Easter Hymn"), Columbia Opera Chorus (Col. 3399), 3s.

"Scène de L'Eglise" ("Church Scene"), sung by Maryse Beaujon, F. Bordon, and Chorus (Col. 9669), 4s. 6d.

(*Continued on next page*)

"Recondita Armonia" ("Strange Harmony"), *La Tosca*, sung by Tino Pattiera (Parlo. 10538), 4s. 6d.

A selection of operatic records has been chosen because generally such records are very dear. The recording of all of the above records is first class and they can be recommended to anyone who wishes to add an operatic section to his collection. The only criticism that can be made regarding the cheaper discs is that sometimes the recorded frequencies do not go low enough. It is as if the cut off were made just below one hundred cycles per second, but in order to compensate for this the hundred-cycle and neighbouring frequencies have been unduly emphasised.

Strangely enough, the difference between the older and higher-priced records and the new cheap discs is most noticeable on orchestral records, where the tone tends to become a trifle mixed and rather organ-like in character. The individual instruments comprising the orchestra do not stand out with such startling clarity as they do on some of the special records mentioned in earlier AMATEUR WIRELESS reviews. Piano records, however, seem to be well worth searching for among the cheaper series. Recommended issues are :—

"Prelude in C Sharp Minor" (Rachmaninov), played by Herman Wasserman (Dominion B21), 1s. 9d.

"Rustle of Spring" (Sinding), played by Herman Wasserman (Dominion B14), 1s. 9d.

"Hungarian Fantasia" (Liszt), played by Maurice Cole and Metropolitan Symphony Orchestra (Broadcast 5087/8), two records), 4s.

"Ballade in G Minor" (Chopin), played by Maurice Cole (Broadcast 5076), 2s.

All the above are good, Maurice Cole's firm touch and good tone being particularly commendable.

### *Theme Songs*

Talking films, the merits and demerits of which are still being fiercely argued, have to answer for that new terror—theme songs. In general, readers may not be attracted by popular songs of the "I'm Sorry I'm Losing You" type, and it was possible that theme songs would divert the gramophone companies from recording better material. Actually you may find many of the theme songs bright and tuneful. "The Wedding of the Painted Doll" is probably the best example of a popular talkie film tune. Of the present-day film songs, the following have been selected :—

"You're Always in My Arms," *Rio Rita*, sung by Bébé Daniels (H.M.V. B3211).

"Singin' in the Rain" *Hollywood Review of 1929*, sung by Layton and Johnstone (Col. 5650).

"Love is a Dreamer" *Lucky in Love*, sung by Lou Abelardo (Decca F1592).



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