

How to Build the "MASCOT TWO"—by PERCY HARRIS

# Amateur Wireless

Every  
Thursday 3<sup>d</sup>

and  
Radiovision

Vol. XXI. No. 529

Saturday, July 30, 1932

## BUILDING THE "MASCOT TWO"

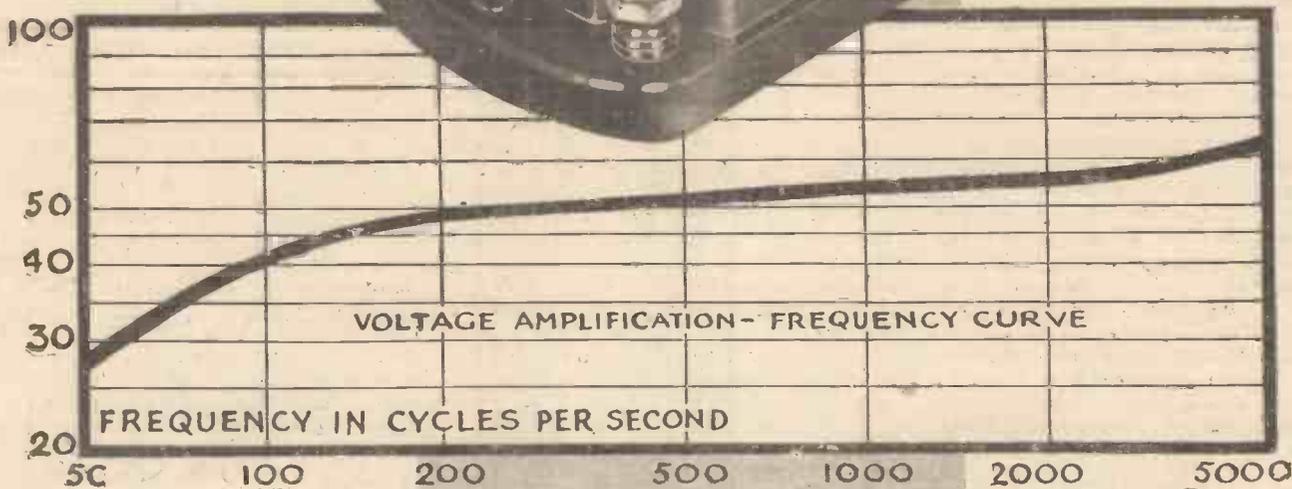
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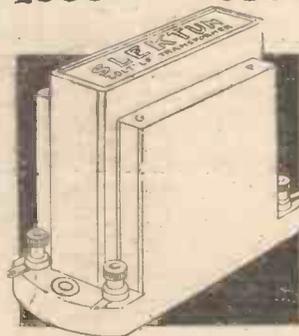
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# Amateur Wireless & Radiovision

BRITAIN'S LEADING RADIO WEEKLY  
FOR CONSTRUCTOR, LISTENER & EXPERIMENTER

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## NEWS & GOSSIP OF THE WEEK

### B.B.C. AT OLYMPIA

TWO chief exhibits by the B.B.C. at Olympia on August 19 will be a model of Broadcasting House and an amplifier. The model of Broadcasting House is on a scale of 1/4 inch to 1 foot and will be approximately 5 feet long and 3 feet wide. The exterior of the front and west sides will be shown and at the back of this a cross section down the centre of the building will show interior detail. On the left of the main amplifier unit will be seen a small rack upon which is mounted the input equipment comprising five stages of resistance-capacity coupled low-frequency amplification. The output from this rack is fed to the lower amplifier which consists of two stages of push-pull resistance-capacity coupled amplification. The high-tension and low-tension supplies for the latter are derived from the motor generator set which may be seen on the right hand side of the stand.

### DURING THE HOLIDAYS

THE "star" vaudeville programme on August Bank Holiday will include a return performance by Tom Burke and his Human Voice Orchestra. Although he was so long absent from broadcasting, the well-known tenor showed, on his recent appearance before the microphone with his Human Voice Orchestra, that his art had lost none of its former brilliance. The Bank Holiday programme includes Elsie Carlisle, Mr. Flotsam and Mr. Jet-sam, and our old friends Alexander and Mose.

### ON AN AIR RECORD

THERE are some interesting things about the Hon. Mrs. Victor Bruce's air duration wireless set which I have seen recently," says our Special Correspondent. "The special lightweight receiver is suspended on aeroplane elastic, just behind the instrument board of the 'plane. There are dials on it, but to save groping about in the dark there are the usual aeroplane type of remote controls which end in Bowden levers just above the dual joysticks. By moving these levers—they are like the throttle and air controls of a motor-cycle—the pilot can tune in the set and adjust reaction! The wireless gear on the travelling van used in conjunction with the 'plane is just as interesting. Apart from the transmitter, for sending messages and cheery music to the 'plane, there is a long-wave receiver which picks up weather reports from the Air Ministry on 4,100 metres."

### IF THE B.B.C. HAD EXISTED

"THIRTY Years Ago" is an imaginary programme of August 8, 1902, compiled by Leslie W. A. Baily for broadcasting in the National programme on August 8 next. Mr. Baily, who is an "A.W." contributor, will have ample material upon which to draw, for if broadcasting had been in existence at that period it would have announced the signing of peace at Pretoria; the illness of Edward VII and his subsequent coronation; the reception of the Boer generals, Botha, De Wet and Delarey, by Lords Kitchener and Roberts and Mr. Chamberlain at Southampton; the early flights in a dirigible of Santos Dumont. The vaudeville programmes would have contained such names as Alec Hurley, Eugene Stratton, Marie Lloyd and Vesta Tilley and, perhaps, that of Harry Lauder, a young Scots comedian of those days!

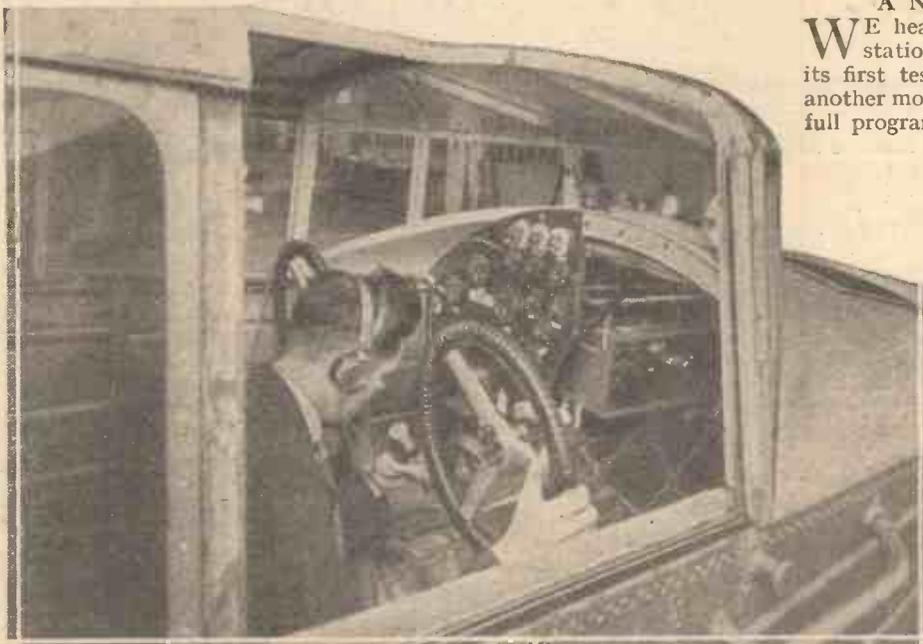
### A NEW STATION

WE hear that the new Italian station at Bari is undergoing its first tests, although it will be another month or six weeks before a full programme is transmitted. It is a 20-kilowatt and so you should make a note of it in your station logs. When it starts up with programme material, it will be particularly worth hearing as a local studio will be used and Bari will not generally work on the Italian landline link with Rome and Naples.

### THE ABERDEEN CHANGES

#### Keen Local Interest

THE emergency low power transmitter is doing yeoman service at



A peep in the Hon. Mrs. Victor Bruce's 'plane for the air duration flight. The radio receiver is just in front of the pilot, and the remote-control levers can be seen at the top of the instrument panel

**NEXT WEEK: AN EASILY-BUILT SHORT-WAVE ONE-VALVER**

# NEWS & GOSSIP OF THE WEEK —Continued

Aberdeen while the old relay gear is being modified. As announced last week, local listeners have resigned themselves to the shorter wavelength transmissions, as they realise that things may be a great deal better when the tuning arrangements of the relay gear have been re-built and transmissions

ference eliminators and an exhibition was held in the Berlin Broadcasting House. It is understood that this is to be a permanent display; the B.B.C. might well consider the idea.

## NATIONAL ON ULTRA SHORT

### RADIO ON THE "SCOT"



Owing to the popularity of radio on trains, the L.N.E.R. have now fitted two of the Scottish expresses, working on the East Coast route, with radio gear. This photograph shows the double aerial equipment on the roof of one of the trains

start again with the main 1-kilowatt broadcaster.

### IN NEWCASTLE

At the moment both the National common wavelength transmitter and a lower power 211.3 transmitter are working in Newcastle, but this is only a temporary arrangement. When Scottish National starts up, in about three weeks' time, the Newcastle and Aberdeen troubles will be greatly ameliorated and it will be possible to see if the wavelengths need changing.

### WAR AGAINST STATIC

#### What Berlin Is Doing

In Germany, as you may know, there is a kind of amateur society at the service of listeners for the suppression of static. Electrical engineers have grouped together to cut down all kinds of electrical interference with radio reception. Just recently the Post Office people, the R.R.G. (the German B.B.C.) and the Union of Electricity Works examined hundreds of inter-

B.B.C. arrangements for transmissions on other systems than at present. But now it appears that the B.B.C. has still fixed nothing definite, but is interested in a German system.

### A STATION DIRECTOR SPEAKS

Authoritative information about forthcoming programmes is always welcome and next Monday the Midland Regional Director is continuing the monthly talks on coming events. These talks were unavoidably absent from the programmes for about two months, and listeners will welcome the Midland Regional Director back again with his popular feature.

### A WELSH 5XX BROADCAST

The Welsh broadcasts from 5XX are not usually of outstanding interest to listeners in other parts of the country, and who do not speak Welsh, but the Royal National Eisteddfod broadcast next Thursday is an item of National interest. Through

5XX the ceremony of the Chaining of the Bard will be relayed and Mr. Lloyd George will broadcast the Presidential address.

### THESE SCHOOLS BROADCASTS

The New Broadcasts to Schools pamphlet has just been issued by the B.B.C. and although you may not be in agreement with the policy of this radio aid to school teaching, you will have to agree that the programme has been arranged along very comprehensive lines. The new scheme covers the school programme from September to June of next year. It is intended to publish a later programme about December giving further details of the broadcasts for the spring and summer terms of 1933. The complete programme is roughly as follows: Mondays, World History and French readings; Tuesdays, Nature Study, Music, French and Current Affairs; Wednesdays, English Literature, Biology and Hygiene; Thursdays, Tracing History Backwards, Speech Training and German readings; Fridays, Geography, Rural Economy, gramophone recitals and Friday afternoon stories.

### DANCE BAND NEWS

One of the best of the present outside dance bands will fill the late dance music period from a studio at Broadcasting House on August Bank Holiday. This is Billy Cotton's Band which at one time was heard regularly from Ciro's Club, but has not been much "on the air" recently by reason of other engagements which could not be made to fit in with broadcasting. Billy Cotton and his Band, besides playing in ballrooms, have been giving spectacular performances on the halls for some time past and have thus helped to promote the healthy rivalry which exists among several bands for that class of work.

### THE SCOTTISH RADIO SHOW

#### Make a Note of It

This is being held from October 12 to 22 and is, of course, the third Annual Scottish Show. The exhibition is under the patronage of the Radio Manufacturers' Association, the Wireless Retailers' Association of Great Britain and Northern Ireland and the Scottish Radio Trades. Elaborate plans are now being put forward and the Scottish show this year should be a bumper success. Arrangements are now being made for the layout of the stands in the Exhibition Hall, Waverley Market, Edinburgh and information in the meantime can be obtained from the Exhibition offices, 6-7 Waverley Market. It will not be possible for sets to be worked on the ordinary stands, but a number of sound-proof rooms will be erected so that the sets and speakers can be demonstrated to their advantage. Both A.C. and D.C. supplies are available in the hall, so all types of receiver can be tested. Make a note of the date, October 12-22. An advance description of the exhibits will be published in AMATEUR WIRELESS.

# DO YOU UNDERSTAND YOUR ACCUMULATOR?



Here is an instructive article by a battery engineer which gives all the points that you should know regarding the maintenance of the low-tension accumulator

**What is a Storage Battery?**—A storage battery is a device which may be used repeatedly for the storing of energy for use at some other time. Energy is put into the battery by charging, and given out when the battery is discharged.

**What are its Essential Parts?**—The essentials of a storage battery are two unlike plates in a solution. This solution is called the electrolyte.

hold small quantities of electrolyte and thus tend to start corrosion.

**How Should Corrosion be Treated?**—To prevent corrosion, remove all traces of acid from terminals and connections by wiping with a rag moistened with ammonia, and then smear all metal parts with pure vaseline. Once corrosion has started, it is somewhat difficult to cure. Scrape the affected surfaces quite clean with a file or wire brush and then treat with ammonia and vaseline as before.

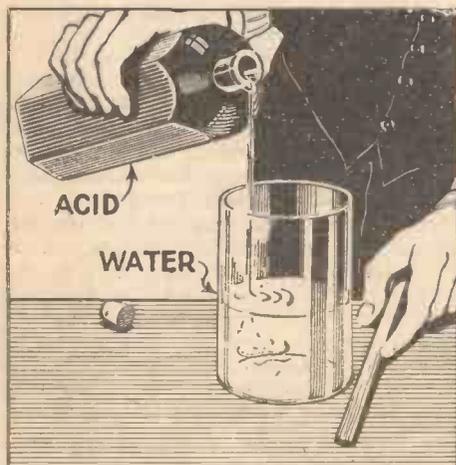
**How Should a Battery be Tested?**—The voltage of a battery should be tested by means of a voltmeter, and hydrometer readings should be taken to determine the specific gravity of the electrolyte. The former should only be taken when the battery is under load, as open circuit voltages are liable to be misleading. The hydrometer should have a graduated float showing the actual strengths of the acid. The "floating ball" type of hydrometer is not a sufficient check on the condition of the electrolyte.

**Why is it Necessary to Add only Distilled Water to a Battery?**—The loss of liquid from a battery is caused by the evaporation of water *only*. Sulphuric acid does not evaporate, and it is only necessary to top up with distilled water to make good that which has been lost by evaporation. Never add acid to a battery unless some has actually been lost by spilling or similar causes.

**What Does Sediment Indicate?**—The sediment which collects in the bottom

of a battery need cause no alarm unless it is deposited very rapidly. There is a thin layer of sediment even in an almost new battery. Rapid depositing of sediment is an indication that the battery is not being operated correctly.

**When Should a Battery be Charged?**—Generally speaking, a battery should be



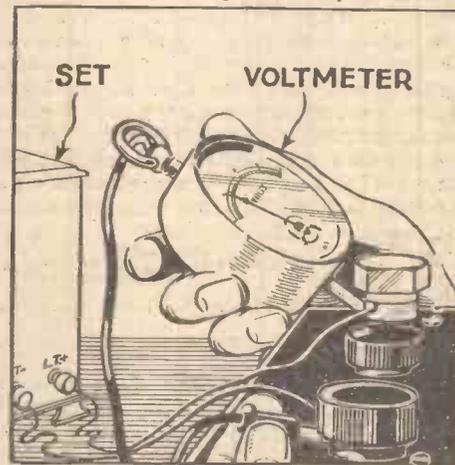
When mixing the electrolyte always add the acid to the water and not *vice-versa*

**What is the Difference Between Positive and Negative Plates?**—Positive and negative plates differ only in the composition of the active material. The active material in the positive plate is brown lead peroxide, while that of the negative plate is grey spongy lead.

**What is the Electrolyte?**—The electrolyte or battery solution consists of a mixture of pure sulphuric acid and distilled water. When filling batteries or reducing strong acid to the required strength, take the following precautions:—

- (1) Use glass, china, earthenware, or lead vessels.
- (2) Carefully pour the acid into the water. Never pour water into acid.
- (3) Stir thoroughly with a stick or wooden spoon.
- (4) Allow the mixture to cool before taking hydrometer readings of the strength.

**Is it Important to Keep a Battery Clean and Dry?**—Yes, very important! Dirt and dampness reduce the efficiency of a battery by permitting the current to leak away. In addition, they attract and



The charge of the battery may be tested with a voltmeter, but such a test must always be made when the battery is under load

charged whenever the voltage falls to 1.8 volts per cell or the specific gravity to 1.100. A battery that has been completely discharged should be recharged immediately and never allowed to stand in a discharged condition.

A battery that has been standing idle should be given a long, slow charge before being put into service.

**What Does Frothing Indicate?**—Excessive frothing in a battery indicates either the presence of some impurity in the electrolyte or that the electrolyte is too strong. Strong acid may be remedied by removing some of the liquid and adjusting to the correct strength with distilled water, but impurities are best treated by washing out the battery and changing the electrolyte.

**How Should Sulphation be Treated?**—White deposits of lead sulphate form on the plates of any battery that has been standing too long in a discharged condition. This can only be avoided by recharging at frequent intervals. Slight traces of sulphate may often be removed by means of a prolonged charge at a reduced rate, but if the trouble is not checked immediately the plates of the battery may be ruined.



The terminals and top of the battery should be cleaned with ammonia and coated with vaseline

Some Notes on Present-

day Short-wave Conditions

# Around the Short-wave Dial

By M.  
BARNETT

THE short-wave stations have recently been providing us with some excellent entertainment. Whatever may be laid against the actual programme value of short-wave transmissions, there is no doubt that when reception conditions are good, these stations will provide us with an excellent alternative service to our usual medium- and long-wave stations. The actual trouble is that reception conditions are *not* always good and so. . . . On July 4, American Independence Day, most of the usual American short-wave stations appeared to be on the air in full force and reception conditions were excellent. W1XAZ was very good, although accompanied by a background from Zeesen. W2 XAF and W2 XAD were both good, with the latter providing a somewhat stronger signal of the two. Here I might mention that in accordance with the new summer schedule, W2 XAD generally closes down at eleven o'clock on weekdays and that after this hour the programmes put out by the WGY stations can only be heard through W2 XAF.

## The Continental Short-wave Stations

At this time of the year, the European

short-wave stations are generally excellent; although owing to our close proximity to some of these stations, signal strength is bound to vary to some extent in different parts of the British Isles. Radio Colonial at Paris is often a good signal and I generally find that the lower-wave transmissions are the loudest, although the quality is not always very good. When listening to the news bulletins put out by this station and some of the American stations, one is bound to come to the conclusion that the news bulletins put out by our own home

stations are not all they might be. Items of news are put out every so often during the course of a day's transmission by the American stations and although they may be mixed up with advertising "blurbs," the result is generally rather attractive and easy to listen to.

The Pittsburgh station, W8 XK, is now sometimes heard on both 25.25 and 48.86 metres simultaneously. The longer wave transmitter is brought into action about midnight, whilst the lower wave transmitter starts up earlier in the evening. At this time of the year, the 48.86 transmission is barely audible, whilst the 25.25 signal comes in at quite good strength about eleven o'clock and onwards. The 25-metre harmonic of the Moscow RW59 station is still to be heard coming over loud and clear on many nights. The Hilversum station has been heard testing again around 30 metres at excellent strength. I am not aware whether or not this is the original PCJ transmitter, but the station does not appear to have any regular schedule at the moment. The 30-metre band of stations is becoming crowded and interference between several of the stations in this group takes place at various times.

## NEXT WEEK.

Full constructional details  
of an easily built One-  
valve Short-wave Set

## WHAT IT IS FOR

## THE TONE CONTROL

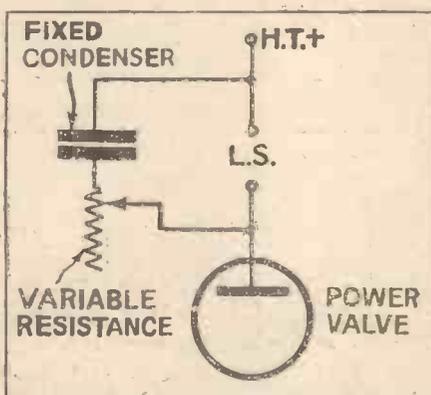
THERE is a widespread idea that the function of a tone control in a wireless set is simply and solely to alter or modify the quality of the loud-speaker output. Recent experience leads me to suggest that the tone control has an additional function, and one that is seldom appreciated.

As is well known, most tone controls are used to cut down the high notes, by offering an alternative path to low-frequency current that would normally pass through the low-frequency coupling or through the loud-speaker winding. By thus cutting down the high-note response of the amplifier or loud-speaker we get the effect of a lowering of the overall tone. The more the high notes are cut down the lower is the pitch or timbre of the tone.

In most sets it is desirable to make the tone control variable, for what is right for one type of broadcast may be quite unsuitable for another. Usually, when listening to speech it is desirable to have the fullest possible amount of "top" in the reproduction in order to get clear-cut definition, but in music a more mellow effect is often preferred.

Such aspects of the principle of tone

control are well known, and are only recapitulated here for the benefit of newcomers. But now for the other and



This diagram shows the usual form of a tone control used in conjunction with a loud-speaker. The tone filter comprises a fixed condenser in series with a variable high resistance, the series arrangement acting as a by-pass for the higher audible frequencies

increasingly important part played by the tone control—I mean in cutting down extraneous background noises when listening on a powerful set—to

foreign stations some distance away.

As will soon be discovered, reception of the foreigners is seldom absolutely free from some form of background, even when atmospheric conditions are generally good. As a rule, crackling noises and "frying" sounds will be heard, at an intensity that will largely depend on the amount of high-note response present in the set's amplifier system.

When there is a very high degree of response above, say, 4,000 cycles, the background noises on foreign-station reception are most pronounced, whereas a set with a cut-off around this frequency will give a fairly silent background.

Here, then, is the additional use of a tone control, particularly when it is designed to give a fairly sharp cut-off around the 4,000 cycle mark. There will be times when some sacrifice of quality, as represented by the reproduction of the full low-frequency gamut, will be more than compensated by the elimination, or at any rate diminution, of tiresome background noises having frequencies around the point mentioned.

HOTSPOT.

# FIRST DETAILS of the NEW BAIRD TELEVISOR



By H. J. Barton-Chapple, Wh. Sch., B.Sc.

IN the issue of AMATEUR WIRELESS dated July 9 appeared a few notes dealing with the demonstration of the new home model Baird Televisor.

This new television receiver has aroused considerable interest and knowing how readers of "A.W." are always anxious to keep pace with new developments, details of the machine are sure to be welcome. The accompanying illustration and diagram will help to make matters quite clear and when compared with the model which has

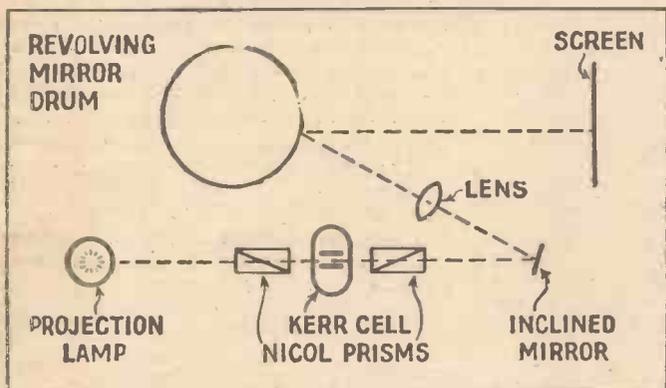
individually selected, are held in place round the edge of the light aluminium drum by means of screws. They are so positioned on the machined surface that each is inclined at a very slightly different angle to its neighbour. When a beam of light is thrown on this drum as it is revolving, the light is reflected and built up into a rectangular area of thirty light strips next to one another on any screen interposed in the path.

back of the instrument and is made to send a beam of light through two sets of Nicol prisms, between which is situated the Kerr cell. As is well known, the action of a Nicol prism is to polarise light, that is, cause it to vibrate in one plane only instead of in every conceivable plane. The first prism polarises the light beam in one plane, while the second prism polarises it in the opposite plane, the net result being that the light vibrations in the two opposing planes cancel each other and no light at all emerges from the second prism.

### What the Kerr Cell Does

A Kerr cell consists essentially of small condenser plates immersed in nitro-benzolene. The light beam, polarised in one plane only, passes between the Kerr cell plates which are connected to the output terminals from the television wireless receiver or amplifier. The effect of these varying electrical impulses of the television signal is to depolarise the light beam so that, according to the intensity of the signal currents, more or less light emerges from the second Nicol prism. The varying light emerging from this last Nicol prism passes to an inclined mirror held inside the casing near the front of the televisor and from here it is reflected through a lens on to the revolving mirror drum. The individual mirrors throw the light spot on to the screen at the front so that the image is built up in vertical strips with the usual light and dark shade formation.

The complete instrument is quite com-  
(Continued in third column of next page)



The schematic arrangement of the new Televisor which employs a mirror drum and Kerr cell

been on the market for over two years, and which is also illustrated on this page, it will be seen that they differ radically.

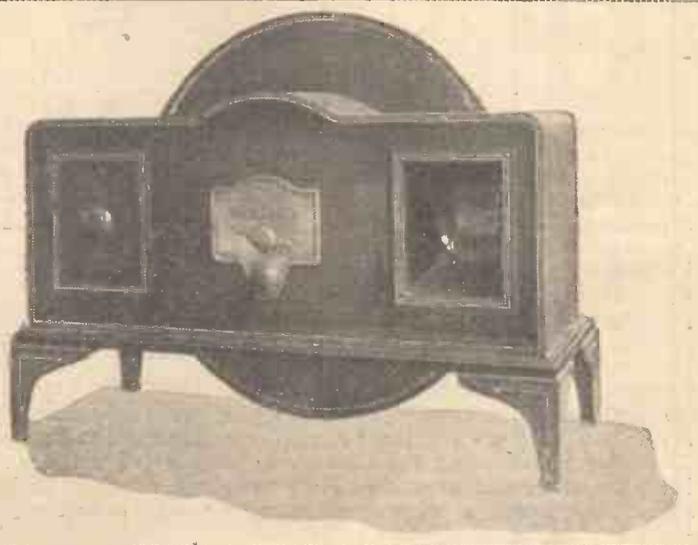
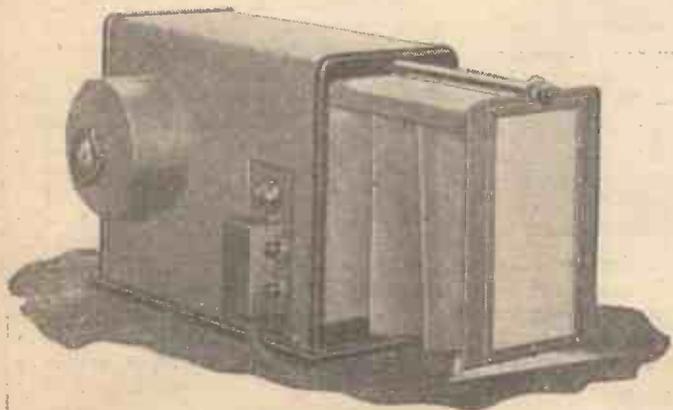
The light disc with its series of thirty holes arranged in the form of a spiral has been replaced by a drum with thirty mirrors. These mirrors, rectangular in shape and

home use. After months of patient research work, the Baird Company have evolved a patented construction which requires voltages found in the average good-class wireless receiver.

A 100-watt projection lamp with a bunched filament is held in a holder at the

## THE NEW AND THE OLD TELEVISORS

These two photographs of the new and old Televisors show what a radical alteration has been made in the design of the apparatus



# THE DECORATIVE AERIAL

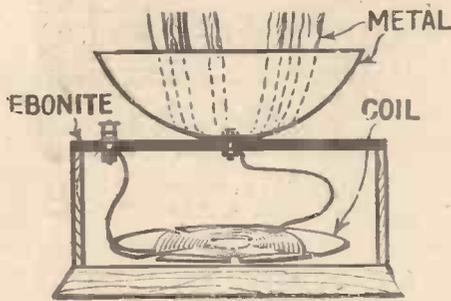
Why not give your aerial a better appearance? Here is a useful suggestion which can be modified to suit any conditions

ALTHOUGH most points in the receiving apparatus have been improved out of all recognition, the aerial system is still much as it was at the beginning of broadcasting. Little has been done to improve its efficiency and certainly no attempt has been made to beautify the erection. We still have to put up with unsightly poles and festoons of wire haphazardly slung up in back gardens.

Even the frame aerial often strikes a discordant note in the room in which the set is installed.

## Disguising the Aerial

Why not make some attempt to conceal the nature of the aerial—turn an objectionable sight into something really ornamental? That this can be done is obvious from a glance at the accompanying photograph, which shows how quite an effective though miniature aerial can be concealed in a bowl of artificial flowers fashioned out of sheet copper and mounted on a suitable stand.



This diagram shows the connections to the loading coil in the base

The stand consists of a shallow wooden box on the top of which is mounted a sheet of ebonite. Inside the box is a small coil of wire, needed to make up for the deficiency in the inductance of the "bowl of flowers" aerial system.

Each flower stem and leaf is soldered to the inside of the bowl, which is secured to the ebonite top of the stand.

## The Connections

One of the screws fixing the bowl to the top of the stand can be utilised as a connection. To this screw attach one end of the loading coil. The other end of the coil should be taken to a terminal mounted in some convenient position on the stand. To this terminal can later be attached the down lead from the aerial unit to the aerial terminal of the set.

In the photographed model the stems of the flowers are made from No. 12 gauge copper wire. The flowers themselves are of natural size, those actually shown being tulips with stems about 8 inches long.

The size of the loading coil is not very critical but as a guide to what is likely to be wanted it is suggested that a basket coil or simple solenoid of about 1 1/4 inches

diameter should be wound with between 15 and 40 turns of 26-gauge wire.

## The Down Lead

The longer the down lead connecting the aerial unit with the set the smaller should be the loading coil required to make up the necessary inductance. In use the unit might well be fitted on a shelf or corner bracket high above the set.

The above description applies to indoor aerials, but it is not impossible to adapt the idea of ornamentation to an outdoor aerial system. It is suggested that a weather vane or other such appropriate object might be fashioned from sheet copper. This could be placed on the top of an existing aerial pole, provided the pole were near the house. Then a vertical down lead would be sufficient and the horizontal portion could be abandoned. No loading coil should be needed.

A point to watch is the connection between the aerial unit and the down lead wire. When an outside system is used there is a risk of corrosion reducing the efficiency of the contact unless suitable precautions are taken, such as coating the unit with paint or lacquering the outside of the terminal point.

F. W. J. WINTER.

## A TATTOO BROADCAST

### Busy Scenes at Tidworth

THE Southern Command Tattoo at Tidworth on July 30 will be relayed to National programme listeners in two sections. This should be well worth hearing. The first, from 10.50 to 11.8 p.m., will consist of the entry of massed bands of the Royal Artillery, 7th, 8th and 9th Infantry Brigades and the Royal Tank Corps; one of the items which they will play is Flotsam's and Jetsam's "Changing of the Guard." The second section will include the playing of "Land of Hope and Glory," "The Recessional," and "Abide with Me." This part of the relay will start at 11.35 p.m. and finish at midnight.

On August 12 the series of programmes entitled "Summer Laughter" will be continued for West Regional listeners. On this occasion, Dr. Cyril Wood will produce *The Pie and the Tart*, by Mathurin Dondo.

The Bridgwater Band Festival will be relayed from the Blake Gardens, Bridgwater, to West Regional listeners on August 13. Every year the Bridgwater Allotment Association organise the Festival and bands from all over the West of England and South Wales compete.



A "bowl of flowers" aerial makes an attractive ornament

## FIRST DETAILS OF THE NEW BAIRD TELEVISOR

(Continued from preceding page)

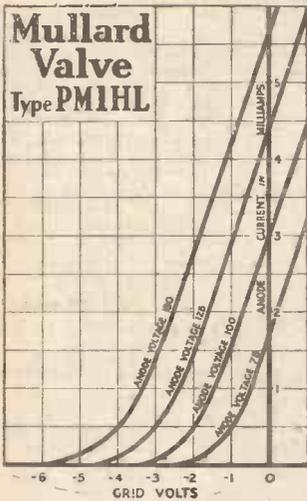
fact, measuring when closed 18 in. long by 8 in. wide by 13 in. high and in normal operation the screen is pulled out as in a camera of the folding type as shown in the illustration. The two switches on the left and near the front, switch on individually the motor and incandescent lamp, while the knob on the same panel connects with the rheostat controlling the motor speed.

On running the motor up to approximately its correct speed of 750 revolutions per minute, the Baird automatic synchronising mechanism takes charge and holds the image steady. The large knob on the left at the back compensates for incorrect framing and phasing. By turning this knob slowly, the image can be raised or lowered on the screen, or be moved round bodily to shift it to the left or right the number of lines it may be out of phase.

The advantage of being able to see the image on a screen 9 in. by 4 in. anywhere in a normally-lighted room is an enormous advantage when compared to two or three persons viewing a smaller image in a lens in the disc model machine. Furthermore, the images are black and white, instead of the orange-red neon colour, and are remarkably free from the line effect which has hitherto been regarded as one of the drawbacks of television.

In use, the apparatus is driven from the mains and can be operated from any high-class wireless receiving set. It will be agreed, therefore, that this new televisor represents a great advance.

*Eoss* is the title of a play by Philip Wade which will be broadcast to the Northern Region on August 3. It deals with family problems created by the War.



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Filament Current	-	-	-	-	0.1A
Max. Anode Voltage	-	-	-	-	150V
	CHARACTERISTICS. (At anode volts 100; grid volts zero.)				
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Amplification Factor	-	-	-	-	28
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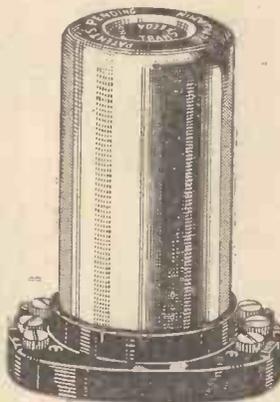
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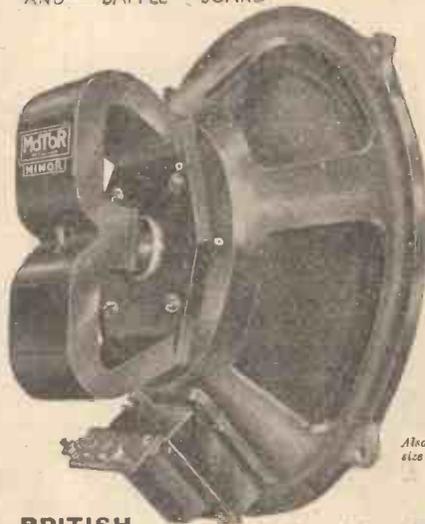
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# On Your Wavelength!

## WATCH YOUR STEP

**I** HAVE noticed lately an extraordinary increase in the number of establishments which undertake the recharging of accumulators. The reason is that many people who know nothing whatever about secondary batteries or their care have been attracted by the idea that there is good money to be made in the recharging business. They instal charging plants of a kind and offer to look after your batteries at very attractive rates. Believe me, battery charging is a skilled art, and the fellow who undertakes it merely as a sideline may cost you pounds whilst apparently saving you pence. Don't send your batteries for a refill to anyone who does not thoroughly understand the business.

Though they look robust enough, accumulators are very easily ruined by improper charging. This applies particularly to high-tension batteries, whose small cells demand particular care. It is really no joke to save a shilling or so over the charging of an H.T. accumulator and to discover subsequently that you have got to spend £5 or so on replacing ruined units. I speak with some feeling, because a couple of years ago I had a brand-new 180-volt accumulator H.T.B. completely done in at its very first charge.

## A NOBLE IDEA

**A** LETTER appeared recently in one of the lay papers from a correspondent who suggested that at the coming Wireless Exhibition there should be a department devoted to showing listeners how to get rid of the interference caused by electrical machinery, tramways, flashing signs, and so on. Like many others, he seems to think that something can be done to the wireless set which will remove the trouble. It cannot, of course; the only way to stop the interference is to render the source of it non-radiating. This is not usually either a difficult or an expensive business; but there is at present, unfortunately, no means of forcing those responsible for interference to fit the necessary devices to whatever causes the crashes, bangs, and tearing noises. We shall have legislation on the subject as soon as public opinion makes itself felt. Unless those who are affected by it lift up their voices and say so, the hands of the authorities are very much tied. If you are one of those who are troubled by man-made interference, send in a report without delay to the B.B.C.

## A SUGGESTION

**A**ND, whilst I am on the subject of home-made atmospherics, don't forget that these are frequently caused by such things as electric fans, vacuum cleaners, and other domestic gadgets. Some of them are such effective

broadcasters that they can cause interference with wireless reception two or three houses away. Don't instal any piece of electrical apparatus in your home unless it is guaranteed to be completely non-radiating. Better still, insist upon a demonstration in your own house and switch on the wireless set whilst it is taking place. Manufacturers of domestic apparatus will very soon take the necessary precautions if they find that the public will not buy gadgets which cause interference.

## OUR QUEER EARS

**I**F you look at the response curve of the best of moving-coil loud-speakers or the best of pick-ups, you cannot help being struck by the number of jagged peaks that it contains. You might think that such a response could not help producing results horrible to the sensitive ear. But such is far from being the case. It was for a long time believed that completely faithful reproduction could be obtained only if the response curve was honestly a straight line without peaks or valleys. After immense labour a loud-speaker was once produced which had a curve very much like this. And were the results perfect? They were not. Those who heard the thing said that they had never imagined that reproduction could be so appalling. Apparently the perfect response curve is very far from being a straight line, and if you listen to the wonderful reproduction given by pick-ups and loud-speakers of to-day you will agree that they suit the human ear very well.

## A COMING NUISANCE

**I** DON'T know whether you have heard him, but the big Luxembourg station has been conducting occasional experimental transmissions for some little time on a wavelength of about 1,250 metres. It is more than likely that you have not been able to make any entry in your log, for the particular wavelength chosen is within a metre or two of that of Vienna Experimental, whilst there is a Russian station almost on top of it. Add to this a good deal of commercial morse, and you have a gorgeous jam. One understands that the Luxembourg station is entirely a business venture, having been erected purely and simply for advertising purposes. There is certainly no room for it on the long waves, but, owing to its immense power, it will elbow its way in somewhere and no doubt interfere with a good many other stations whilst engaged in telling the world of the particular merits of So-and-So's wares. The long waves are becoming now nearly as crowded as the medium wave-band and chaos is likely to ensue unless strong action is taken in the matter.

## H.P. IN U.S.A.

**A** GOOD deal of experimental work with extra high-power transmitters has been done recently by some of the U.S.A. stations. Either KDKA or WGY, I forget which, has been trying outside programme hours an output power up to 400 kilowatts, and now comes the news that WLW, the big station at Cincinnati, has been authorised to instal a 500-kilowatt plant. The power will thus be put up to ten times that at present in use. I have often heard WLW quite well on his present power, and when he goes up to 500 kilowatts, he should be regularly received in this country in winter-time. The prospect that I mentioned some time ago of European medium-wave stations being heterodyned by Americans becomes more and more likely to be realised! If stations continue to grow bigger and bigger, we shall find some ingenious fellow who lives near one of them erecting a gigantic collector system and lighting his house free of charge.

## A FILAMENT POINT

**I** WONDER how many people realise that the filament of an ordinary valve expands quite appreciably when it is switched on. The passage of current through the filament, of course, generates heat which warms up the oxide coating on the wire sufficiently to cause it to give off electrons, but at the same time the filament itself expands just as any ordinary metal will do when heated. This expansion is, of course, quite small, but it tends to allow the filament to become slack; so that, although when it is cold it may be absolutely correctly disposed relative to the grid and anode, there is a possibility that when it is warm it may be too close to the grid, causing a variation of internal resistance, or even, in severe cases, causing a short circuit.

## TAKING UP THE SLACK

**V**ARIOUS manufacturers have adopted different methods for overcoming the difficulty. I saw an ingenious demonstration the other day of the method used by the Osram people in their valves. The filament is supported at the top end on a small spring hook and as the filament expands, this spring moves over slightly and keeps the filament taut. This effect was being demonstrated by placing a valve in front of a source of light and projecting a magnified image on to the screen. The filament hook and the grid wires could quite clearly be seen, and when the current was passed through the filament the movement of the spring hook in taking up the expansion was very evident. When one comes to consider it, the improvements in valve technique of recent years are remarkable. Microphonic valves are really a thing of

On Your Wavelength! (continued)

the past. We do encounter occasional sets or samples where a microphonic howl is set up, but the fearful and wonderful precautions which we used to have to take, such as mounting the valve holders on sponge-rubber pads and such like, are quite unknown to many users of radio who have only taken the subject up within the last year or two.

A PENTODE EXPERIENCE

**I** CAME across a curious fault the other day. I was testing a receiver which had two mains-driven pentodes in push-pull. This had been working very satisfactorily, but I disconnected it to make a small alteration, and on re-connecting up, I found that the signal strength had dropped to a mere whisper. While I was pondering over this, I happened to catch sight of the pentodes which, to my horror, were glowing a brilliant red; and, in fact, one of the auxiliary grids was almost white hot.

Needless to say, I switched off at once, but it was some time before I actually discovered the fault. The circuit appeared to be quite O.K., but measurement with a voltmeter showed that the voltage on the anode and auxiliary grid of the pentode was over 100 volts higher than it should have been. Still continuing to play around with the voltmeter, I discovered that there was no voltage drop across the loud-speaker field, which was being used in series with the main H.T. supply. There should have been a 100-volt drop across this field, leaving the voltage on the pentodes in the neighbourhood of 250, whereas actually, as I stated before, there was only a few volts drop across the field, so that the pentodes were receiving 350 volts.

THE CAUSE OF THE TROUBLE

**W**HEN I discovered that the trouble was due to an electrolytic condenser which had been connected across the field to eliminate hum. During the alterations, the condenser had been removed and connected in the wrong direction, so that the positive terminal was

connected to the negative and vice versa. Under these conditions, of course, the condenser had broken down and was passing a very heavy leakage current, which was acting as a short circuit across the loud-speaker field. Hence the excessive voltage on the pentodes which was causing them to warm up in the rather alarming manner described. As the condenser was of the wet type, it was simply necessary to disconnect it, and connect it up in the right direction when, after a momentary hissing, it re-formed and is now working quite satisfactorily, none the worse for wear.

AUTOMATIC VOLUME CONTROL

**I** CAN'T say that I am very keen on making a set too automatic in action, because, after all, unless there is some opportunity for the personal touch most of the interest goes. For instance, the idea of a switch-tuned set, where one gets any particular station merely by pushing a knob or clicking a switch, leaves me cold, though I admit there is a demand for it amongst those who have "no time for radio" apart from listening to the programmes. But automatic "gain" control is quite a different matter, because amongst other things it serves to prevent "fading" effects which can be very irritating on the distant stations. Designers have been working on this particular problem for some considerable time, and I expect to see the results embodied in many of the sets shown at Olympia. The variable-mu valve, is of course, a distinct help, and there are special ways and means for increasing its efficiency in this direction.

"CENTIMETRE" WAVES

**W**HOSE who remember the cross-channel transmissions made last year on 18 centimetres will be interested to note that recently at the National Physical Laboratory, an outfit for generating waves only 14 centimetres long was shown. The old method of back-coupling is quite impossible for producing waves of this order of frequency. In the first place, it is

impossible to tune the external circuits sufficiently far down the scale, and in the second place the electrons take too long to get across the space between the filament and plate inside the valve. Actually, the Backhausen-Kurz method is used in which the discharge stream is made to oscillate rapidly to and fro in a very short path, which cuts across the positively charged grid. The electrons never reach the plate which is kept negatively biased for this purpose. The energy is radiated from a short wire connected directly to the grid and tuned by its own inductance to the required wavelength.

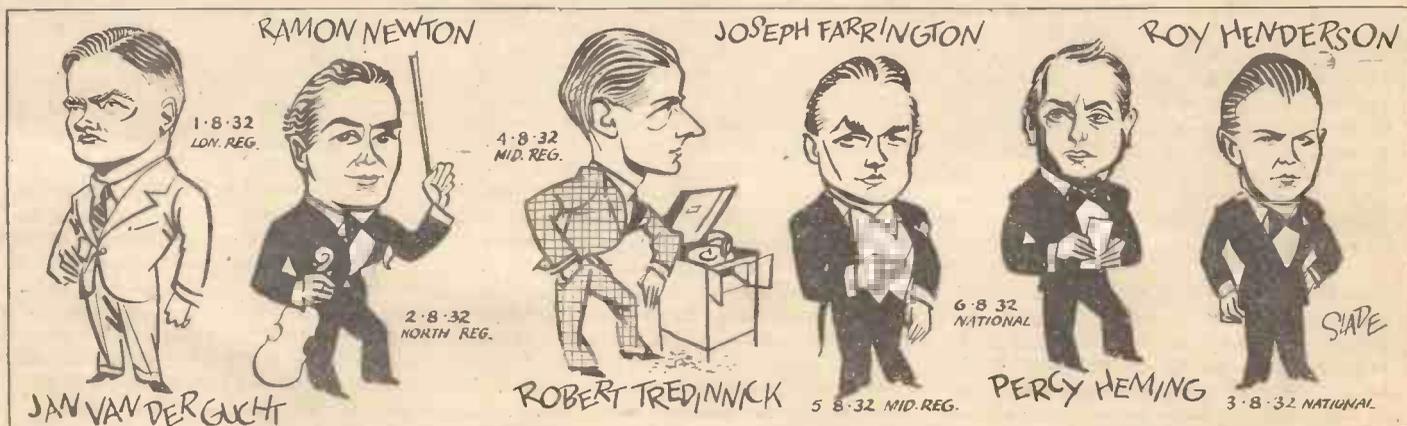
PERPETUAL MOTION

**I** EXPECT most of you have read of the demonstration of super-conductivity recently given by Professor McLennan at the Royal Exhibition. By immersing a lead ring in a bath of liquid helium its temperature is reduced to within a few degrees of absolute zero, and in this condition it is exposed momentarily to an external magnetic field. The effect is to induce a heavy current amounting to several hundred amperes, which apparently continues to flow indefinitely. At all events it was still in full force twenty-four hours after it had been started.

One of my readers, who has evidently been chewing the cud of reflection, writes to suggest that here is a possible solution to the problem of perpetual motion. Well, it certainly is an amazing phenomenon, but I doubt whether it could be used to supply useful energy, which, after all, is the real test of a perpetual motor. The fact is that at very low temperatures all conductors seem to lose the property of ohmic resistance, which is, of course, the electrical equivalent of mechanical friction. Without resistance an electric current, once started, has nothing to stop it, just like a pendulum vibrating in a vacuum and mounted on a frictionless support. But one couldn't use it to "drive" anything without slowing it down. And the same applies to the energy flowing in Professor McLennan's ring.

THERMION.

PERSONALITIES IN THE WEEK'S PROGRAMMES



# MAKING THE MOST of REACTION

In this practical article ALAN HUNTER shows how the reaction control should be used—there is a right and a wrong way



**I**N all but the biggest of sets reaction is still employed. Its main function in, say, a three-valver is to add to the high-frequency amplification obtained from the valves. A well-designed reaction system, by which I mean one that will enable the point of oscillation to be approached smoothly and without erratic "plops," is often almost as good as another stage of high-frequency amplification.

### Reaction as a Help to Selectivity

This amplifying property of the reaction control is sometimes emphasised to such an extent that the more subtle uses of reaction are apt to be overlooked. Probably many set users do not realise how reaction, in addition to boosting up distant stations, can be a great aid to selectivity.

Before this point can be appreciated the

increase the ratio of the strength of the wanted signal to the strength of the unwanted signal.

The unwanted signal may then very possibly be entirely eliminated by reducing the overall signal input. With increased volume from reaction you can afford to cut down the amplitude of the wanted incoming signal, as by reducing the series aerial condenser's capacity.

### How to Reduce Interference

Assuming it is desired to eliminate interference by this secondary function of the reaction control the correct procedure is as follows: Reduce the capacity of the series aerial condenser, thus reducing all incoming signals—the reduction being relatively the same for all of them. Then increase the reaction control's setting; thus,

by the action just mentioned, increasing the signal to which the circuit is tuned.

Experience with this procedure will quickly prove its value as an aid to selectivity, especially in the three-valver with a stage of high-frequency amplification. Also, it must not be forgotten that two-valvers can have something to gain

from the idea. Incidentally, those sets with so-called "simplified" control, in which reaction is applied as part of the volume control, entirely lose the selective advantage of reaction.

Carried too far, the application of reaction, however effective it may be in increasing the selectivity, must inevitably cause loss of quality, because excessive reaction tends to cut off the high notes by making the tuning circuit respond to a too narrow band of frequencies. Evidence of this bad effect is found when the tone sounds "drummy" on speech and lacks brilliance with music.

Some sets accentuate the top frequencies

too much, especially where a pentode is used in the output stage. Then a little dose of reaction, even when not needed for volume or selectivity requirements, may be worth having to improve the quality.

Another use to which the reaction control is often put by the experienced amateur is in ensuring accurate tuning in sets worked by separate tuning condensers. One of the minor troubles in controlling sets with two tuning dials is to find the right combination of dial settings for every wavelength wanted. This can quite easily be done by a judicious application of reaction.

This is the procedure: First set the aerial tuning condenser at about 50 degrees and then increase the reaction setting until the set is oscillating; then is the time to rotate the second dial and as this comes into tune with the first dial there will be a squeal. The sequence should be carried out quickly as there is a danger of causing interference with neighbours' sets all the time the reaction is in its oscillating position. I am certainly not encouraging listeners to howl down the ether by this method. Actually, it should be the means of abating such a nuisance, because once you know that the two circuits are in tune there is no need to oscillate when finding other stations.

From these few applications of reaction I think it is obvious that ordinary sets are losing a great deal more than mere amplification if reaction in some form or another is omitted. Only really big sets can afford to be without reaction.

Blackpool has become so regular a part of the North Regional summer programmes that listeners are liable to overlook the talent available in this town. Tom Vernon's Royal Follies at the Central Pier are old friends and are sure to provide many a laugh when they broadcast on August 4.

The band of the 1st Battalion the Welsh Regiments will broadcast from the Cardiff studio to West Regional listeners on August 7.

On July 29, Ronald Frankau and his Frankau-Optimists will be relayed from the Grove Park Pavilion at Weston-super-Mare. Ronald Frankau comes of literary stock; his mother wrote under the pen name of "Frank Danby," and her brother, Jimmy Davis, was the Owen Hall who wrote the libretto for "The Geisha."



The reaction control is especially useful when the set has two separate tuning controls. It enables the two circuits to be kept "in step" as explained in the accompanying article

action involved in the process of reaction ought to be understood. When reaction is applied to a tuning coil its resistance is decreased and the signal therefore builds up to a greater extent than would be possible without reaction. What is not generally known is that this decreased resistance effect applies only to the amplification of the signal to which the coil is tuned.

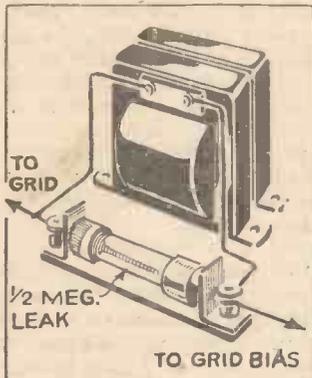
Just think what this really means. If only the wanted signal gets extra amplification by the process of reaction, unwanted signals are relatively reduced in amplitude. If, for example, an adjacent signal to the one that is wanted is causing slight interference, the application of reaction will

# HINTS AND TIPS ON SETS AND CIRCUITS

A collection of practical hints in connection with sets, circuits, radiograms, and so on, which will enable you to get better results

## Making it Stable

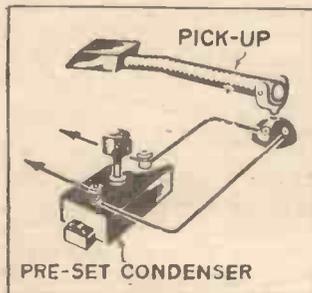
HAVE you ever tried fitting a grid leak across a transformer to make a set stable. It is quite a good idea, especially where you do not want to upset the H.F. choke or anti-motor-boating arrangements. A 1/2 megohm leak is generally suitable, and you should connect it across the secondary terminals of the low-frequency transformer.



A half-megohm leak connected across the transformer secondary winding to make a set stable

## Testing for Silence

IF you have any doubt about the stability of a set, make a quick test with the whole set switched on, but with only the power valve in circuit. You will often find that when the detector is removed low-frequency oscillation starts up because there is no loading on the circuit. If the set is well designed and there is no interaction, then removing the detector valve will, in all probability, not set the power stage oscillating.



A good idea for regulating the tone of your radio-gram reproduction

## Changing the Tone

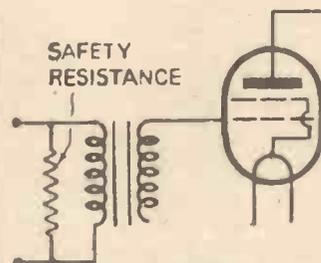
IT is not often that a new pick-up gives any trouble in depth of tone, but in economising by using an old pick-up with a new set, you may find it advisable to make some slight alteration to the frequency characteristic of the pick-up. Some pick-ups give too much "top" and so record-surface scratch

is more noticeable than it should be. One cannot go too far in filtering this out, for otherwise the high-note intensity is lowered, but a small condenser shunted across the pick-up will often make just that little difference in tone which is satisfactory without introducing distortion.

A pre-set condenser of 0.01-microfarad maximum capacity can be placed across the pick-up leads, either at the pick-up or set end. The best value can then be found on trial. Of course, if your present pick-up is inclined to boom and is deficient in treble, then no extra capacity must be put across the leads and, in fact, every step must be taken to keep the inter-lead capacity down to the minimum. A treble booster circuit, consisting of a tapped choke and a condenser, can sometimes be used, but it is difficult for an amateur to get the right values for these parts, without knowing the exact frequency characteristic of the pick-up used.

## Pentode Protection

A GOOD tip to prevent pentode valves being damaged, especially when used in push-pull by large current surges, is to use a fixed resistance across the



Connections for a safety resistance for a pentode

primary of the transformer preceding the pentode. It so often happens that when trying out a set the detector or L.F. valve in front of the pentode becomes temporarily disconnected or is pulled out of its socket while the valves are being tested.

The huge current surge set up is sufficient to damage the average pentode, but if you connect the fixed resistance across the transformer primary, then this acts as a by-pass for the surge current.

A 50,000-ohms fixed resistance is usually sufficient and it will not seriously affect the tone.

## Protecting the Motor

IF your gramophone motor is not totally enclosed, then it is worth while ensuring that dust does not too easily get into the works. A sponge rubber bag or

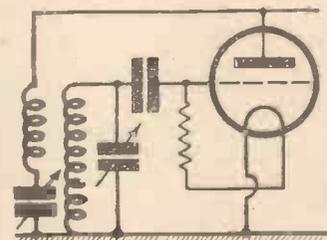
a large rubber pouch with an elastic edge can be slipped over the motor to protect it from dust. The flexible fog coverings used on motor car headlamps are also useful in this way.

## Preventing Mains Danger

IF the mains plug at the back of a set is fitted so that the mains connector has to be removed before the plywood back of the cabinet can be taken out, then there is far less chance of one getting a shock owing to touching a mains "live" part.

## Reaction Circuits and Metal Panels

UNLESS you want to go to the trouble of bushing the reaction condenser mountings on a metal panel, you will have



A reaction circuit suitable for a metal-panel set

to use a reaction circuit in which one side of the condenser is at earth potential. The point must be watched, because there are some coils in which it is impossible to alter the reaction winding connection so that the grid coil and reaction coil are not continuous.

In a suitable arrangement for a metal panel set, the reaction coil is not at earth potential, one side of the condenser being automatically connected to earth through the panel.

## Using Plug-in Coils

ORDINARY two-pin plug-in coils can still be used in some sets—short-wavers, for instance. They are, in fact, very suitable for short-wave working, as the best coil for any particular waveband can be chosen.

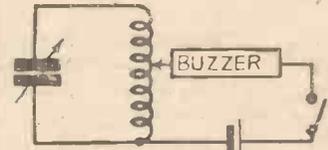
The great thing is to get the socket spacing right. You will have three sockets in the average short-waver, one for the grid coil, one for the reaction coil, and a third for the aerial aperiodic coupling coil. If you are not making up a set according to a blueprint (when the exact socket position will be shown), then try the coils in their sockets before fixing them in position. If the reaction coil is too far from or too close to the grid coil, you will not get smooth reaction.

If the aperiodic coil is too

close to the grid coil it will be difficult to get the set oscillating over the entire waveband.

## Shunting Biasing Resistances

IT is advisable to have a large fixed condenser shunting the fixed resistances used for automatic grid bias. This prevents any interaction between the circuits. There is no need to have high-test voltage condensers for this job as they don't have to withstand the full mains voltage. Ordinary 200-volt test condensers will do and there is no need to have anything bigger than 1 microfarad.



How to tap a wavemeter to sharpen its tuning

## Tapping a Wavemeter

A WAVEMETER is not very much good if it does not tune sharply, for unless the note tunes exactly at one point, you will not know exactly what wavelengths correspond to dial readings. The ordinary buzzer wavemeter which most people use for checking over a big set is apt to give a broad note, especially when the contacts go out of adjustment. You can often sharpen up the tuning by connecting the buzzer and battery across only part of the wavemeter coil.

Leave the variable condenser connected across the extreme ends of the coil, but take the buzzer or battery wire to a tapping point about a third of the way down. This will reduce the damping of the circuit formed by the buzzer, battery, and switch.

## Don't Drop the Lid

PROBABLY you have envied owners of luxury radio-grams fitted with spring-controlled lids which cannot be slammed, but which glide gently into the closed position. A somewhat similar effect can be obtained by fitting a coil spring near the hinge. The spring should be clamped in the same manner as a gate spring of the type which keeps gates on the latch. Used in a radio-gram, the spring must work in the opposite direction, that is it must tend to keep the lid open so that if the lid is dropped it will not slam but will be cushioned. A layer of felt around the edges of the lid and cabinet act as an additional protection.

# Our Broadcast Critic

## TALKS ABOUT

### THE B.B.C. DANCE ORCHESTRA



Arthur Prince, the popular ventriloquist

IT may be true to say that the B.B.C. Dance Orchestra and the vaudevilles attract more attention than all the other types of broadcast put together.

I have been listening to Henry Hall and his orchestra more than usual lately and have come to the conclusion that he is definitely doing something for English dance music.

In making the dance orchestra the subject of two recent pointers, I made an honest attempt to give constructive criticism. In criticising it is so easy to be destructive and to pull everything to pieces, but such criticism does not lead anywhere.

The first of these two pointers has apparently borne fruit. It does not matter if it has not, so far as that goes; all that does matter is that Mr. Hall has been employing vocalists with good voices. George Baker is one of them.

Naturally, the result has been all to the good. I want Mr. Hall to go further; I want him to try the experiment of a grand opera singer for one evening. Not necessarily because grand opera singers are bound to be better than any other type of good singer, but simply because the best of our dance refrains have a reasonable grace about them and, sung by someone with a really big and telling voice would enter the realms of quite good music. Also—and I feel this to be important—by so doing, Mr. Hall might establish an English school of dance music.

If the director of the B.B.C. Dance Orchestra is not going to set a dignified example, *who is?* I submit that it is his job; it is certain that he has more opportunity of doing something definite than anyone else.

The other pointer was on the subject of string tone in Mr. Hall's orchestra. In saying I regret the advent of the saxophone because I dislike its tone, I am not attempting in any way to urge that the instrument is not suitable for the purpose. I think it is. On the other hand I feel strongly that the general tone of the wind instruments used in dance orchestras needs mellowing by the addition of strings.

A violin, employed as a unit, is a mistake. It represents nothing definite. It mixes

badly with the wind instruments. String tone cannot—must not—be represented melodically, but harmonically. Therefore, it follows that a complete quartet—a double quartet for an orchestra that size—must be employed. There should be two first, two second violins, two violas, two cellos. A double bass is hardly necessary for broadcasting, though it may occasionally be useful.

In a sense it was interesting to southern readers to hear the sort of vaudeville the Manchester Hippodrome is capable of presenting. In the broadcasting sense it was anything but interesting. For this no possible blame can attach to the performers. They were there to entertain Manchester people who had paid to hear them. That and nothing more. The fact that a microphone was slung across the theatre probably cut no ice with any of them.

That is just the difference—the very great difference—between relayed vaudeville and studio vaudeville. One caters for the visible audience, the other for the invisible audience.

#### PROGRAMME POINTERS

*A novelty of a pleasing kind was broadcast this week. It was called "Bach and Handel," and proved to be a good concert. The point about it which I want to make here refers less to the performance than to the announcer's remarks preceding it. He said that listeners would have an opportunity of comparing the idiom of these two composers, pointing out that they were contemporary. Obviously the concert, though popular in quite a broad sense, was meant for those who are interested in composers of the classical period. The idea of comparing two composers who lived at the same time, by giving excerpts of their works in this manner, is a good one. Such a concert almost falls under the heading of the "Foundations of Music," but the lateness of the hour at which it was broadcast was a point in its favour, compared with the "Foundations" which are given before the majority of listeners are able to devote time to listening. I think such broadcasts as these, if only now and again, might be welcome. To compare, with good notes by the announcer, composers like Schubert and Schumann (either in song or symphony), Schumann and Brahms, Tchaikovsky and Wagner, Chopin and Mendelssohn, Haydn and Mozart with Beethoven, Wagner and Verdi, and many more, might be a form of entertainment and instruction that would interest a certain class of listener. Moreover, I am personally of opinion that this class is larger than is generally supposed.*

The vaudeville under consideration was good enough, but the turns were too long for broadcasting. The success of a variety show, in the broadcasting sense, depends upon quick change. When you are *there*—in the theatre—it is a different matter. You are so vastly helped by your visual powers that a turn lasting twenty minutes goes in a flash. When you are dependent on your ears only, and are in entirely different surroundings—those of your own home in nine cases out of ten—long turns begin to pall.

I heard the best part of two studio vaudevilles this week. I am bound to say the experience, when compared with the Manchester vaudeville, only confirmed my view as already expressed. I do not suggest that either of these vaudevilles was better than the northern relay but it would be unfair not to say that they were more satisfactory from the broadcasting standpoint. The reason was, that the studio vaudevilles were designed for broadcasting, while the other were not. Arthur Prince, for example, in the sketch called "The Stowaway," proved the point beyond question. I remember Arthur Prince years ago at the Coliseum; I expect most of you do also. If you think of the various turns he did in those days you will remember half the fun was the pathetic expression Sailor Jim managed to put on—droll though he be—especially when he was trying to get out of some scrape. Mr. Prince has modified all that for the microphone. Jim is just as artful as ever he was, but he now conveys his artfulness by his voice.

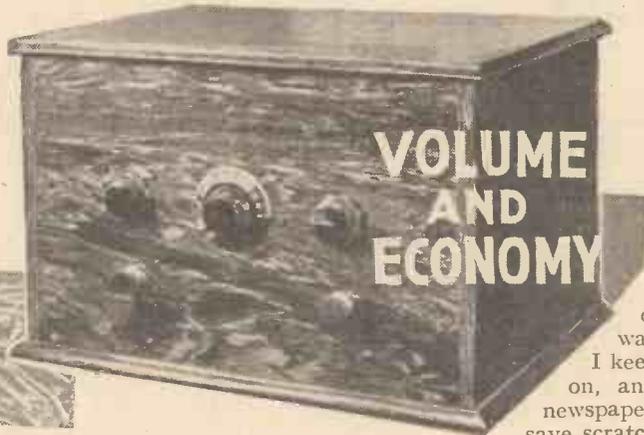
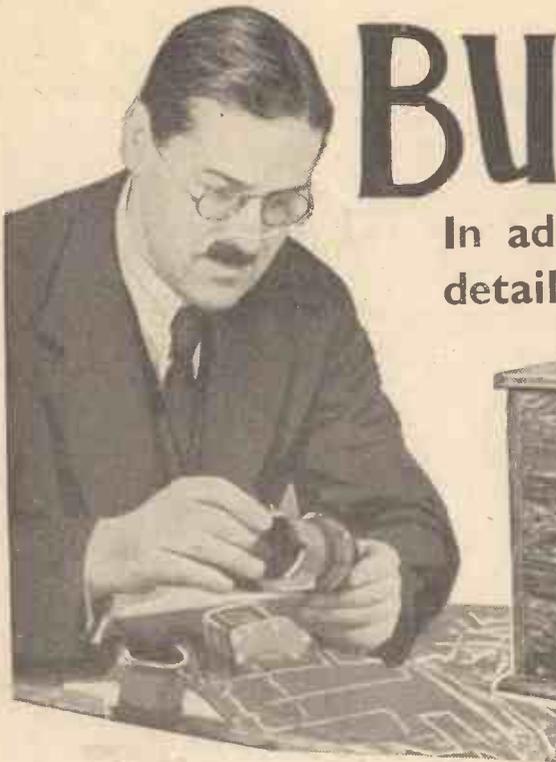
The Monday night vaudeville was not too successful. Will Nyffe seemed to be the only one up to real form. He was extremely funny. His song, "I belong to Glasgow, but when I've had a couple of drinks Glasgow belongs to me," was sung with all the delicate nuance that intoxication can possibly suggest. His imitation of a Scot just over the borderlines of strict sobriety was very amusing. The others seemed to me not to be quite up to vaudeville spirit—or, perhaps, I was not up to appreciation-point.

I have listened to very little serious music—not altogether my fault. Candidly, I think the programmes this week have lacked strength on the whole. Or is it that there have been so many outstanding broadcasts during the last few weeks that a week in which there has been more routine work than usual seemed a trifle dull?

WHITAKER-WILSON.

# BUILDING THE "M"

In addition to giving detailed instructions for details were given in last week's issue, this article points out



**L**AST week I described the circuit of the "Mascot Two," and the reasons which led me to adopt it. Full details were also given for preparing a tuning curve, and the methods of adjusting the selectivity were explained.

As this may be the first wireless set built by a number of AMATEUR WIRELESS readers (I know from my correspondence that there are very many newcomers to the art of home-construction) I propose, this week, to give rather fuller constructional details than usual, for the benefit of those particular people. It is possible, too, that some of the hints will be welcome to those readers who have already built several sets.

## An Important Point

I will assume that you have purchased all the necessary parts, including the cabinet, baseboard, and ebonite panel. A number of AMATEUR WIRELESS advertisers will supply the panel ready drilled for you if desired, but if you have it undrilled, and merely cut to size, make sure, *before you do anything else*, that it really will fit the cabinet. Nothing is more annoying than to find, after everything is mounted up and you go to slide the set into the cabinet, that the panel just will not fit! I have had this happen on several occasions, so now I always make it my business to make this test first.

Now, as to drilling the panel. Lay the new panel on a folded newspaper *face down*, and mark out the positions for the holes on the back, not forgetting it is the back when making the marks. Use the small steel tool known as a scribe, and obtainable from any tool shop. With this, scratch lines as needed. One should run right across the middle ( $3\frac{3}{4}$  in. from the bottom), and on this you can mark the positions for the

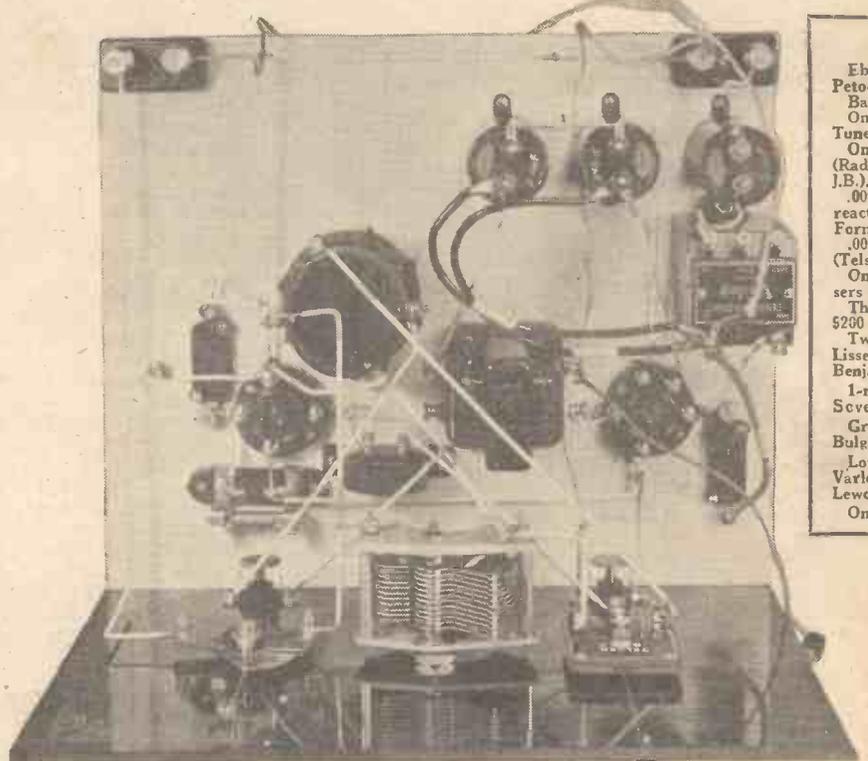
aerial condenser, the tuning condenser, and the reaction condenser, so that they are all perfectly in line. Nothing looks so unprofessional as a badly laid-out panel, and you can easily avoid this if you mark out the panel correctly before drilling. You will also mark the other positions shown.

The next step is to make a small indentation on the panel just where you want to

drill each hole. This can be done with a hammer and centre punch, or, if you have not this tool, a sharp-pointed nail will do. Place the point on the mark where you are to drill, and give a sharp tap. This will make a guiding indentation for the drill point, and will prevent it wandering at the start.

I keep a piece of board for drilling on, and I always use a layer of newspaper between it and the panel to save scratching. Drill with a firm, but not too heavy, pressure and place the panel in such a position that your body will prevent it spinning round with the drill.

There are three holes along the bottom edge of the panel, so as to allow it to be screwed against the front edge of the baseboard. In a bigger set I should use panel brackets, but this panel does not carry



Compare this plan view of the "Mascot Two" with the layout and wiring diagram opposite

**COMP**  
 Ebonite, panel  
 Peto-Scott).  
 Baseboard, 12 in.  
 One "Mascot"  
 Tunewell, Sovereign  
 One Slow-motion  
 (Radiophone, Or  
 I.B.).  
 .0001-mfd. max  
 reaction type (O  
 Forme).  
 .0003-mfd. di  
 (Telsen, Peto-Sc  
 One .0001-mfd.  
 sers (Dubilier, ty  
 Three 2-mfd. f  
 \$200; Lissen, Tel  
 Two push-pull  
 Lissen, Tunewell  
 Benjamin, Sover  
 1-megohm grid  
 Sovereign).  
 Grid-leak hole  
 Bulgin, Sovereign  
 Low-frequency  
 Varley, Telsen,  
 Lewcos, Lotus, S  
 One 50,000-ohm

# MASCOT TWO

building the "Mascot Two," of which first article, by Percy W. Harris, deals with many importance to the home-constructor

much, and the three screws will be quite enough without brackets.

These holes should be drilled along a line situated just half-way between the bottom of the panel and the top of the baseboard. The best way to find the position of the line is to hold the panel upright against the baseboard and then to scratch a line along the back of the panel just where the baseboard comes. The three holes can then be marked between this line and the bottom of the panel.

### Mounting the Components

Now mount the panel components in place, screwing the securing nuts quite tight, otherwise the parts may rotate. Be sure you fix the condenser so that the terminals come in the right position. When the nut is tightened, set the spindle so that all the plates are intermeshed, loosen the grub screw in the dial knob and slide the dial on. Before securing it, make a slight mark with a pencil to show where the edge of the dial comes, then withdraw the dial

for the maximum position of the reaction condenser.

Before securing the panel by means of the woodscrews already mentioned, fix all the parts to the baseboard as shown on the wiring diagram. If you are using alternative components of which the terminals do not come in quite the places shown, make the nearest approach you can to the positions indicated. In low-frequency transformers, the terminal positions of which vary quite a lot, remember the most important of all for positioning is the grid terminal.

Do not attempt any wiring up until you have fastened the panel

fouling it. Many a budding home constructor has made a lovely straight connection between two points only to find that either the valve won't go in, or, more frequently, that the moving plates of the variable condenser foul it when turning.

Wiring can be carried out in several ways. One is to use a thin wire and an insulating sleeving known as systoflex. In this method you first cut the required length of wire, allowing for loops round the terminals, and then you cut off a piece of systoflex equal to the distance between the two points to be joined. This is then slid on the wire. A second way is to use ordinary bell wire, cleaning off the insulation before making the loops, for a short distance at each end. A third method is to use a special insulated wire called Glazite, from which the insulation is easily cut with a pocket knife. This wire is quite stiff and the leads "stay put" in the shapes they are given, and look very neat. A similar

(Continued at foot of next page)

### COMPONENTS REQUIRED FOR THE "MASCOT TWO"

- 12 in. by 8 in. (Lissen, Becol,
  - by 10 in. (Camco, Peto-Scott).
  - pentode coil (Wearite, Peto-Scott,
  - ign, Readi-Rad).
  - on .0005-mfd. variable condenser
  - mond, Lotus, Polar, Dubilier,
  - imum series aerial condenser,
  - Polar Compax, Telsen, Lotus,
  - ifferential reaction condenser
  - tt, Lotus).
  - and one .002-mfd. fixed conden-
  - pe 670; Lissen, T.C.C., Telsen).
  - fixed condensers (Dubilier, type
  - sen, T.C.C., Formo, Ferranti).
  - switches (Wearite, type G.S.P.;
  - , Bulg'in, Lotus, Telsen, W.B.,
  - ign).
  - l leak (Lissen, Dubilier, Telsen,
  - r Lissen, Dubilier, Telsen,
  - transformer (Lissen Hypernik,
  - Tunewell, Climax, Igranic,
  - verreign).
  - ng, one 30,000-ohm, one 5,000-
- ohm spaghetti resistances (Lewcos, Lissen, Varley, Sovereign, Telsen).
- One four-pin, one five-pin valve holder (W.B., Lissen, Telsen, Igranic, Benjamin, Lotus).
- High-frequency choke (Lissen disc, Lewcos, Telsen, Igranic, Climax, Peto-Scott, Readi-Rad).
- Pentode output choke (Varley pentode Nichoke, Tunewell).
- Four wander plugs: H.T.—, H.T.+, G.B.+; G.B.— (Belling-Lee, Eelex, Clix).
- Two spade terminals, marked L.T.+ , L.T.— (Belling-Lee, Eelex, Clix).
- Two terminal blocks (Lissen).
- Connecting wire (Glazite).
- 3 yards thin flex (Lewcoflex).
- Aluminium foil, 5 1/2 in. by 3 1/2 in. (Peto-Scott).

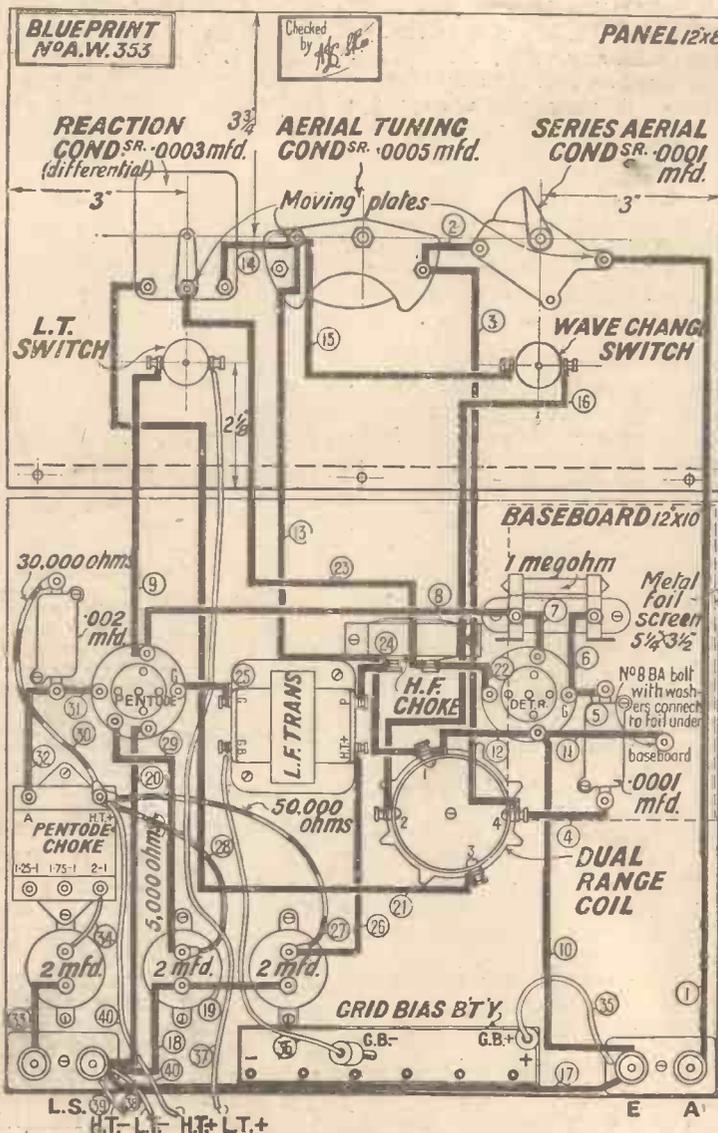
### ACCESSORIES

- Cabinet (Peto-Scott).
- 120-volt H.T. battery (Lissen, Ever Ready, Drydex, C.A.V., Pertrix).
- 9-volt G.B. battery (C.A.V., Lissen, Ever Ready, Drydex, Pertrix).
- Accumulator (Exide, Ever Ready, C.A.V., Pertrix).
- Loud-speaker (Epoch A2 in cabinet No. 600, H.M.V., W.E., Celestion, Blue Spot).
- Mains unit (Atlas A.C.24, Ekco, Regentone, Lissen, Heayberd, Tannoy).

and mark a straight line immediately above the spindle in such a way that it will act as an indicator for the dial. Now slide on the dial, turn it so that the maximum reading comes exactly on the mark and tighten the grub screw. When all the plates are enmeshed the dial will now read maximum and when they are all out it will show zero.

An indicating mark should also be made

to the baseboard, and if you have not previously made a set, keep a valve handy so that you can insert it in its socket from time to time to see that no wires are



The layout and wiring diagram of the "Mascot Two." A full-size blueprint can be supplied, price 1/-

# BETTER SELECTIVITY — WITH THE — VARIABLE-MU VALVE

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

THE variable-mu screen-grid valve has come to stay. When it was first introduced it appeared to be merely another rather freakish form of valve which might have some special application, but which would not be of particular interest to the average user. Time has shown that this is a wrong conclusion.

The variable-mu valve is one in which the effective amplification falls off if the grid bias is increased. While this is true to some extent with any valve, the ordinary valve is designed so that the amplification factor does not vary much over the working range but falls off very rapidly if the grid bias is made too great.

With the variable-mu valve, on the other hand, the characteristic is deliberately made to tail off in a smooth and progressive manner, as shown in the diagram, so that the effective slope and consequently the amplification factor, become progressively less and less as we increase the bias.

## What the Variable-Mu Does

The original reason for the introduction of this valve was that it enabled a smooth control of the volume to be obtained. By altering the bias on the valve the effective amplification of the whole H.F. stage could be altered and the signal strength reduced from full volume down to a whisper. Furthermore, since this reduction in volume occurs in the H.F. stage itself there is no danger of overloading the H.F. valve or the detector valve, always assuming that the variable-mu valve itself is properly designed. Consequently, this method of volume control is becoming very popular and many of the sets both manufactured and home-constructed to-day use this principle.

The variation of the characteristics, however, gives rise to other effects which are not always appreciated. One of these is a marked increase in the selectivity of the set. This is not so much because the valve is inherently any better than any ordinary screen-grid valve, but because the variation of characteristics enables one to obtain a better control over the tuning. The effect is rather interesting and works out in the following manner.

## How Selectivity is Improved.

Assume we have two stations being tuned on a receiver, one of which we want and the other is causing interference. We find that the ordinary tuning of the receiver is not sufficiently good to enable us to get rid of the unwanted station. With the

variable-mu valve it is possible to reduce the sensitivity of the H.F. stage slightly by using the volume control. This, of course, results in a weakening of the signal strength, but if we now re-tune and bring up the strength with the reaction control, it is found that the interfering station has become perceptibly weaker, and in many cases by a slight re-adjustment in this manner, the required station can be lifted clear of the interference entirely.

This is a very useful property which arises apparently from two causes. The first of these is that as we increase the bias on the H.F. valve the internal resistance of the valve increases and therefore the selectivity of the H.F. circuit is im-

proved slightly. The second and probably more telling action is that the detector is better able to discriminate between weak stations than strong ones.

combined volume control and reaction is not as desirable as it seems at first sight, since the two independent controls do not cause any difficulty in adjustment and they have the distinct advantage of enabling better results to be obtained. The alteration in the internal resistance of the valve will often show itself in the following manner. As the volume control is reduced, the circuit becomes more lively, and if the reaction control is already set towards the point of oscillation the circuit will actually oscillate, requiring reduction in the reaction control. This only occurs just towards the maximum sensitivity point on the volume control (minimum bias) and is due to the reduction of the valve damping. It is not always obtained, and in correctly designed circuits it should not occur because there should be sufficient permanent resistance in the circuit to stop at the maximum sensitivity point.

There is, of course, always a small permanent bias resistance so that the bias cannot be reduced absolutely to zero, and it is the choice of this residual resistance which controls the performance of the receiver in the most sensitive position. This, however, is a small point which is only mentioned as some readers may have been puzzled by the effect.

Variable-mu valves are confined principally to mains types and they are now made very nearly as sensitive as the ordinary screen-grid valve, so that there is no noticeable loss of efficiency in changing over to a variable-mu type. Those readers who wish to improve their sets would do well to consider this possibility.

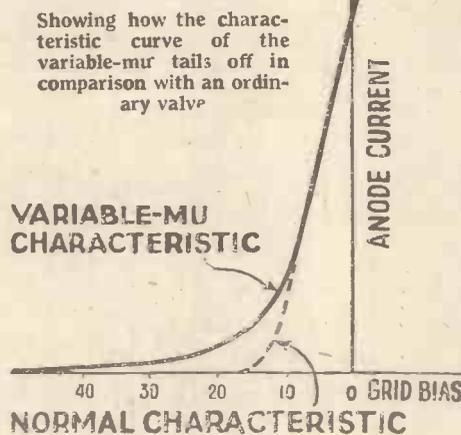
## "BUILDING THE 'MASCOT TWO'"

(Continued from preceding page)

neat effect, is obtained by using a stiff wire and systoflex. All these materials are obtainable from your wireless dealer.

Whatever kind of wire you use, always remember to bend the loops so that they fit in a clockwise direction over the terminal shanks. If this is done, the terminal head will tend to wrap the wire tighter round the shank as the head is turned, whereas if you bend the loops in the other direction, they may loosen and come out during tightening.

While a neatly wired set looks good to the eye, it often does not work a bit better than one whose wiring looks sloppy, so do not get worried if your first set does not look quite professional. If you have followed the instructions and made the right connections, it should work perfectly the first time.

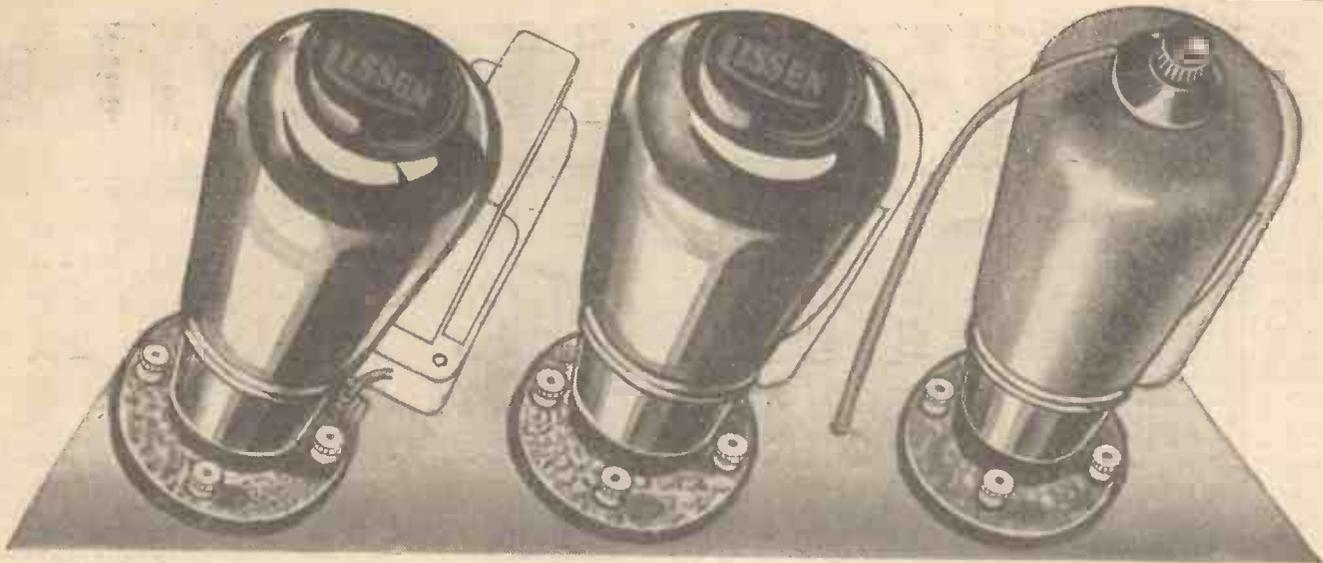


proved slightly. The second and probably more telling action is that the detector is better able to discriminate between weak stations than strong ones.

## Volume Control and Reaction

It is well known that if the carrier wave of the required station can be tuned in stronger than that of the interfering station, then the interference will fade out. It is easier to obtain this selecting action if the signals are weak, and once this effect has started it is easy to encourage it with the application of a little reaction. Hence, a station tuned in with a little less sensitivity on the H.F. valve and more reaction will be clearer from interference than one tuned in with full sensitivity and no reaction.

This explanation is a little unscientific, but the effect is very noticeable in practice. It is for this reason that the use of a



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**P.T.**  
**225**  
**12<sup>6</sup>**

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**H.L.**  
**210**  
**5<sup>6</sup>**

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**S.G.**  
**215**  
**12<sup>6</sup>**



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# IN MY WIRELESS DEN

Weekly Hints—  
CONSTRUCTIONAL & THEORETICAL  
BY  
**W. JAMES**

## CURING FIERCE REACTION

**FIERCE** reaction is a nuisance. In many sets we have to rely upon reaction to provide that little extra magnification which brings in the more distant stations.

When the reaction circuit is nicely proportioned and the circuit can be worked just off the oscillation point it is in a sensitive condition. Really surprising results can often be obtained when the reaction is under proper control. But when the circuit bursts into oscillation before the desired magnification is obtained, a good deal is lost.

Poor reaction may be due to wrong values of grid leak and high-tension. Sometimes increasing the resistance of the leak helps matters and so does reducing the high-tension to the valve. Perhaps the reaction coil is rather large or the reaction condenser may have a small capacity.

In these cases the addition of a condenser between the anode of the valve and the filament will help. A usual size is .001 microfarad, but there are times when a larger size will be better.

Then again a high-frequency choke may be used. This part may be faulty in that it resonates at a frequency within the tuning range of the set. You can test for this by short-circuiting the choke and noticing whether the results appear better at the point where the trouble is occurring in the tuning range. Valves are fairly uniform in these days, and there is not much trouble due to peculiar valves. It pays well to see that the reaction circuit is a good one.

## STOPPING IT OSCILLATING

**IT** is well known that in a push-pull output stage a resistance must usually be connected to each of the grids to stop spurious oscillations which would waste the high-tension energy and perhaps heat and so spoil the valves.

The same difficulty is also met with on occasions when a good power valve is used in a single power stage. It depends upon the make up of the grid and plate-circuits, of course, but the trouble is there in many cases where bad quality is noticed.

A resistance will damp out the oscillations and should be joined in the grid or anode circuits. The resistance should be placed quite close to the grid or anode as the case may be. A grid resistance may be of a few thousand ohms.

Too high a value, such as 250,000 ohms, is dangerous and yet a value of as little as 5,000 may work nicely.

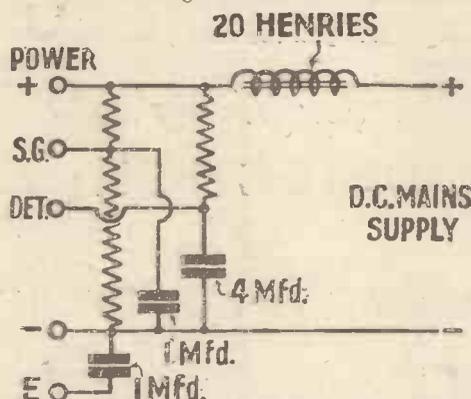
In the case of the anode circuit the resistance will carry current and there will be a definite loss in it. If it were of 5,000 ohms with a current of 10 milliamperes the voltage loss would be 50. This would stop the oscillation and the signals as well.

With 500 ohms the drop for a current of 10 milliamperes would be 5, which is reasonable. This value of resistance would normally be quite satisfactory. A non-inductive type should be used, such as a short carbon resistance.

## TRY IT THE OTHER WAY!

**A** DIRECT current mains unit having but a single choke in it, with the usual smoothing condensers, may work quite well when connected in one house and equally badly when tried in another.

The reason is usually found to be that in one house the negative main is the one more



A typical direct-current mains unit circuit, referred to in the accompanying paragraph

nearly earthed, while in the other the positive side might be the one which is earthed.

The unit is probably wired in such a way that the choke is in the positive lead, as in the accompanying sketch. Then the choke is doing its job when the negative main is earthed. When, however, the positive main is the one most nearly earthed, the choke is not properly effective. It should be transferred to the other main and will then choke properly.

Sometimes two chokes are provided, one in each main lead, but a single choke will be equally satisfactory provided it is placed in the side of the mains not earthed. A switch may be used for the purpose or the correction can easily be made by making a slight change in the wiring. The sketch shows usual values of parts. A screen-grid potentiometer is used and a resistance for dropping the volts for a grid-leak detector

## A CAUSE OF POOR RECEPTION

**A** FREQUENT cause of poor reception is a bad earth. In many cases a tube is driven into the ground and a wire is taken to it.

This form of earth may be fairly satisfactory, but it is not wise to leave such an earth too long without examination. If you pull an earth tube out of the ground after it has been there about a year you may see that it is far from clean. The actual contact between the tube and earth may, therefore, be a poor one.

It is worth going to a little trouble to provide a good earth and the water-pipe earth may easily be found best by trial. Incidentally, a set may be found unstable on the long wavelengths if the earth is poor. A long earth wire is a distinct disadvantage, but a few experiments with your set will show which of different earths is the best.

## "SOLIDS" FOR TUNING

**TUNING** condensers having a bakelite or similar dielectric are seldom used in tuned circuits by amateurs.

They are used in reaction circuits and it is true to say that one would be rather surprised to see an ordinary variable condenser used as the reaction control. There may be particular instances where a good slow-motion air dielectric condenser is used in the reaction circuit.

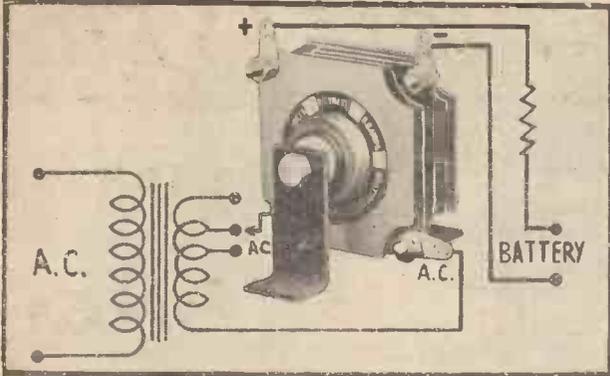
If you wanted very smooth reaction and an extremely fine adjustment was necessary it would usually be better to use an air rather than a bakelite dielectric condenser. The losses of a condenser having thin pieces of bakelised paper between the plates are naturally greater than those of ordinary tuning condensers.

This is usually a matter of no importance in reaction circuits, and, depending upon the coil and the circuit, the losses may not be of much account in tuned circuits. Some small coils have losses which are large in comparison with the losses of a bakelite-dielectric type condenser, and in these cases it is not necessary to use the more expensive condensers.

There are times when the smallest condenser must be used and compactness in the case of the bakelite-dielectric type is obtained without introducing difficulties. In reaction circuits the solid dielectric is usually of advantage in the sense that breakdowns seldom occur.

The Welsh Interlude for West Regional listeners on August 10 is being given by Dr. T. H. Parry Williams.

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## Sets of Distinction

# The LOTUS BUD

## TWO VALVER

Makers: Lotus Radio, Ltd.

Price 10 gns.



I AM always being taken unawares over the capabilities of the simple, but by no means humble, two-valver. Fresh from tests of multi-valvers, one is perhaps inclined to look down on the "two" as being rather "small fish." But Lotus have shown once again that the two-valver, properly designed, can give really good reproduction of the local programmes and can offer the would-be ether searcher plenty of scope to bring in foreign stations.

There is any amount of "punch" in this little set, which is an attractive consolette, entirely self-contained except for the aerial and earth. Inside the pleasant looking cabinet I find a neat metal-chassis construction for the two valves, which are arranged in the inevitable sequence of detector and power output.

### All Self-Contained

The detector is very sensitive, being the Mazda AC2/HL, and the power output is the Cossor 41MP. As this is a mains-operated set, the power supply is also contained in the cabinet, most of the apparatus being mounted in a convenient space behind the loud-speaker board.

A Magnavox mains-energised moving-coil completes the interior layout and just above this is the metal rectifier for the high-tension and grid-bias supply. I noted that the mains transformer is mounted very conveniently for voltage adjustment. All A.C. supplies between 200 and 250 volts can be used by a simple plug-and-socket connection. Fuses are fitted in the mains lead to avoid trouble in the event—may I say the unlikely event?—of a breakdown.

### Adequate Volume

While on the mains subject, let me mention that hum with this little Bud is kept down to an almost inaudible level. In fact, when the set is tuned in to a station, home or foreign, there is no trace of hum. This also applies when the mains aerial is used. I had little luck with this aerial connection, the selectivity being "below par."

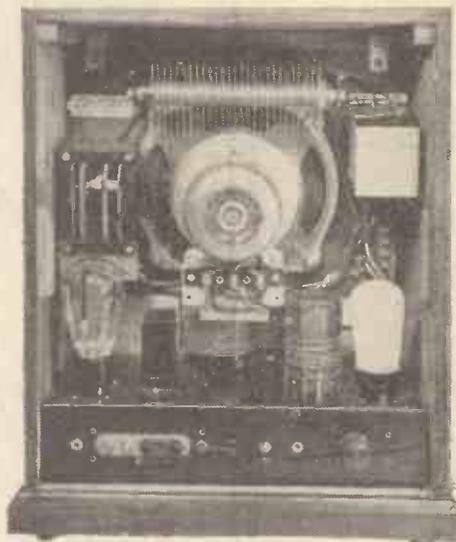
With a normal aerial, such as my 60-ft. test aerial, there is plenty of volume with enough selectivity for most requirements. At twenty miles from Brookmans Park I can entirely separate the London National from London Regional on the Bud, and there is a fairly extensive silent space between the two.

There is no point in giving the spread limits of these two locals, because they

are largely controlled by the setting of the aerial pre-set condenser mounted behind the set. This comes into action when aerial terminal "A2" is in use. "A1" gives a direct-coil connection, quite selective enough on the long waves, but not much use on medium.

With the selectivity control set about half-way towards its minimum capacity I got complete separation of the locals without too much loss of volume, though a little reaction was needed to give the full-bodied output of which the power valve and loud-speaker are capable.

Both the locals showed up the quality to fine advantage. You could not ask for



The internal arrangements of the Lotus Bud are particularly neat

better all-round reproduction, even from a three- or four-valver. Certainly, you would not want greater volume. There is a really pronounced absence of "boominess" in the bass. Top-note response is also a feature, speech being particularly incisive.

This good quality does not seem to be appreciably impaired by increasing the selectivity of the single tuned circuit, though theory would indicate that top notes ought to be cut off. Well, all I can say is that in practice the cut-off is not heard!

With such pleasing quality I am surprised the makers have not included provision for a pick-up. Perhaps they will remedy this deficiency in future models?

Control, as you would expect from such a simple set, is also simple, for besides the main tuning knob, worked by a horizontally moving dial marked in degrees from 0 to 100, there is a reaction condenser knob and a wave-change switch knob—and lastly a mains on-off switch. That completes the front controls, but we must not overlook the all-important series-condenser knob at the back.

### Wide Wavelength Range

During reception tests I noted the wide wavelength ranges covered by the dual-range Lotus tuning coil. It goes well down to 200 metres on the medium waves, which is a fact of special interest at the present time to listeners in the Aberdeen and Newcastle districts, where the B.B.C. will shortly transmit on and around 211 metres—a wavelength not covered by many commercial and amateur sets at present on the market.

On the long waves, too, this Bud set has a wide tuning range, bringing in the Heston Airport weather reports at fine strength, the wavelength being 830 metres.

In addition to this, I got Croydon at very loud strength and Daventry was also a good signal. Radio Paris was fair, though not, of course, very loud. A longer aerial would be an advantage on the long waves with this type of set.

Most of my tests just now are carried out while it is still daylight, but even so, the Bud brought in three foreigners at moderate strength, these being Fécamp, Poste Parisien and Brussels. In the winter it should be quite a distance-getter at night time. Reaction is smooth and builds up the strength when the sensitivity is reduced on the selectivity control.

One last point—the back can be removed in a second by pressing on two catches, which are much more convenient than the usual array of screws. Accessibility is a strong point.

I regard this Bud two-valver as a soundly designed local-station set, capable of giving a quality of reproduction likely to please the most critical listener.

SET TESTER.

An interesting adaptation of a Scots novel will be broadcast as a play to the Scottish Region on August 5. It is entitled *The Green Grass Widow* and is from the novel by Jane and Mary Findlater.

# OUR LISTENING POST

By JAY COOTE

**R**ADIO NORMANDIE (Fécamp), through its regular broadcasts to British listeners, by now must be fairly well known—as a voice—throughout the United Kingdom. Should you be taking your holidays abroad and find yourself in the neighbourhood of The Havre, bear in mind that it is possible to visit both the studios and transmitter of this energetic little station. Fécamp at no great distance from The Havre, is an interesting little port, and Radio Normandie opens its portals to visitors every Tuesday and Friday between 2.30 and 5 p.m. B.S.T.

Although but little has been heard about its new high-power station, Radio Lyons has recently carried out tests of the new plant, much to the discomfort of its citizens who also possess in their immediate neighbourhood a rival station owned and operated by the French P.T.T. Radio Lyons is a private enterprise and, similarly to others in France pending the passing of the long-discussed and many times postponed Wireless Bill, has taken the bull by the horns and invested in more powerful broadcasting apparatus. So far as is known, its wavelength will remain unchanged.

During the holiday season, for the benefit of tourists, the Berlin studio has inaugurated a new feature, namely, a weather forecast to cover a period of days. This special bulletin is transmitted every Tuesday and Friday evening (the latter in anticipation of week-end trips) and at 12.40 p.m. B.S.T. on Tuesdays.

Hilversum also has been struck with a brain wave. Every Sunday morning at 11.40 a.m. a short chat is given on popular

trips to seaside resorts, pleasant "hikes," or, alternately, practical hints regarding tours in neighbouring countries. "What to do and what to see" is the principle underlying these talks. On several occasions when I have casually tuned in this station it has been my luck to come in just at the right moment to pick up an interesting transmission. My luck

## MAKING IT SELECTIVE

Don't forget that the tuning can often be sharpened up by making a new tapping on the coil. Here the aerial



tapping is being adjusted (left hand) while the aerial series condenser is being simultaneously rotated (right hand) to increase selectivity.

held good on Thursday, July 21, when I listened to a recital by Raie da Costa, that clever and popular pianist so frequently featured in the B.B.C. vaudeville hours. British artistes are greatly appreciated in Holland—more so, perhaps, than in any other Continental countries—but a short distance separates us from Hilversum, so from that Dutch studio you may frequently hear items you may have previously missed in the home programmes.

During the past few weeks many references have been made to the new broadcasting scheme to be undertaken in Spain. Apparently this plan, although well conceived, has been wrecked from the start. Barcelona as the centre of Catalonia does not see eye to eye with Madrid in many matters, and in this instance will not agree to anything less than a 60- or 100-kilowatt transmitter for that province. Moreover, Barcelona intends to be independent of the capital and refuses to allow the control of its broadcasting to pass into the hands of the Madrid authorities. We have here all the makings of a very pretty quarrel, with the result that it may be many moons before we pick up loud signals from the Spanish studios.

From another part of Europe—namely, Romania—comes the news that Bucharest, to replace its present station, intends to erect a giant transmitter at least equal to that of Warsaw. Whilst the plans are being worked out, tests are to be made with an experimental station at Blaj from August onwards. This station will act as a relay for the capital programmes.

Finally, as Bari (Italy) is well on the way to completion, its official opening has been provisionally fixed for September 6. It is possible, however, that you may pick up some transmissions from this newcomer at an earlier date. The wavelength will be 280 metres.

# BRITISH RADIOPHONE TUNING CONDENSERS

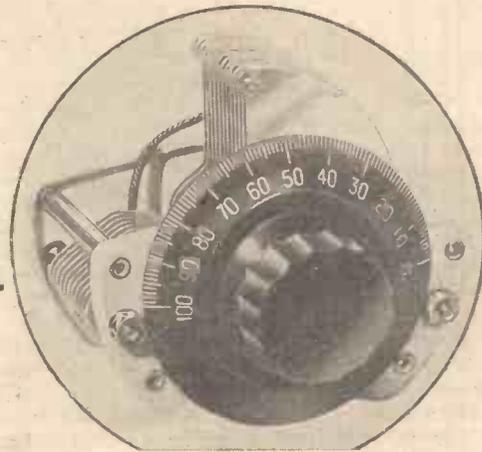
## 'Midget'

Specified for use in THE "MASCOT TWO"

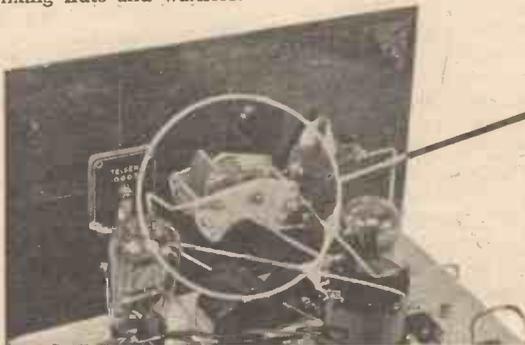
**T**HE British Radiophone Midget Tuning Condenser was chosen for the "Mascot Two" because only the best was good enough.

Constructed with the high degree of accuracy associated with our name, this Tuning Condenser is particularly well adapted to small receivers. The pressed steel endplates are rigidly held by four supporting pillars, and lacquered cadmium plating gives them a rustless and pleasing finish. Best quality hard aluminium is used for the vanes which are very accurately spaced and firmly fixed to the spindle and spacer bars by the unique method incorporating a jig employed in British Radiophone ganged Condensers.

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THE BRITISH RADIOPHONE LTD.  
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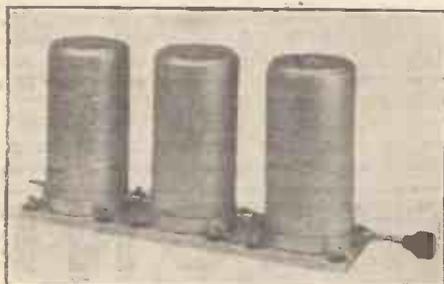


A weekly review of new components and tests of apparatus conducted by J. H. Reyner, B.Sc., A.M.I.E.E.

#### WEARITE COIL ASSEMBLY

WE are reporting this week on the Wearite, type WL2, three-coil assembly. This is a chassis assembly of three coils in cans suitable for two H.F. stages using S.G. valves. The coil cans are carried on a shallow metal chassis which carries the terminals spaced around the base. The coils themselves are wound on ribbed ebonite former  $1\frac{1}{2}$  in. in diameter, the completed coils being mounted on small paxolin platforms carried on pillars inside the cans.

The wave-change mechanism is mounted



The Wearite three-coil assembly

underneath the platform and consists of square-section blocks with metal inserts down the sides, which are rotated between long spring contacts. It is pleasant in use, giving definite positions and good contact.

All three coils take the form of H.F. transformers, the long-wave section being short circuited on the medium-wave band. The H.F. resistances of the coils were 10 and 58 ohms at 400 and 1,600 metres respectively. The inductances were 240 and 2,600 microhenries respectively, which values are rather high and make it difficult to tune down to the wavelengths required for modern conditions. We think they could be reduced with advantage.

The coils were wired up in a complete two-H.F. receiver and were found to be satisfactory within the limitation just mentioned. The unit is well made and the terminals are easily accessible.

#### AERIALITE AERIAL WIRE

WE have recently tested a coil of Aerialite insulated copper aerial wire. This consists of seven strands of 26-gauge bare copper wire twisted together and insulated by means of a weatherproof black braiding. The great advantage of this type of aerial wire is that it is universal in its use and requires no insulation other than that of its own braiding. Care should be taken, however, to ensure that the

insulation is not broken when the aerial is fixed, otherwise leakage will occur and the results will be poor.

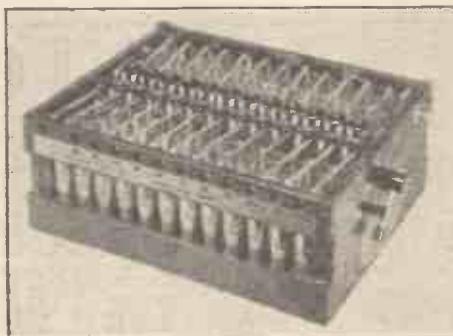
On test the results were quite satisfactory, the signal strength being above normal due, no doubt, to the relatively clean surface of the wire inside the braiding.

The aerial retails in hanks of 50, 75, and 100 feet, the prices being 1s. 6d., 2s. 3d., and 3s. respectively. The manufacturers are The Aerialite Co., of Manchester.

#### MILNES H.T. SUPPLY UNIT

WE have recently received for test an H.T. supply unit marketed by Milnes Radio Company, of Bingley, Yorkshire.

Although in appearance this unit is similar to an ordinary H.T. accumulator, its construction is somewhat different. It employs a series of cells containing special nickel and steel plates, and uses a solution of caustic potash as an electrolyte. A



The Milnes H.T. Unit—a serviceable form of High-tension supply

6-volt accumulator of about 20-ampere hour capacity is used to charge up the unit and the charging current taken from the accumulator is about  $\frac{1}{2}$ -ampere per hour.

The change from charge to discharge position of the supply unit is made by means of a throw-over switch on the side of the container. An additional advantage with this type of cell is that it cannot be ruined by an accidental overcharge or by subjecting it to too great a load on discharge.

Owing to their peculiar construction, it is impossible for the cells to be ruined by sulphation, and since the plates are made of steel, damage due to internal shorting is obviated.

The unit tested had a voltage of 120 and when tried out on a four-valve set taking about 18-milliamperes, gave a perfectly even and noiseless discharge. It has been subjected to a life-discharge test and it is hoped to give a performance curve in a later issue.

#### A NEW RADIO KNOB

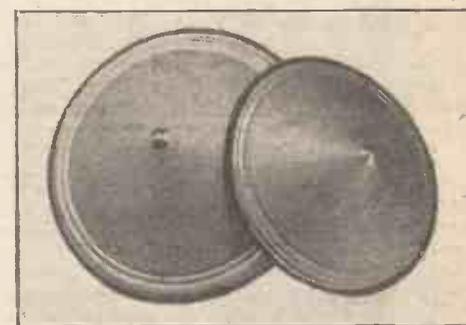
ANYONE who has experienced difficulty with lost or broken grub screws in wireless sets, will appreciate the knob which has just been placed on the market by Messrs. H. Clarke & Co., of Manchester, the manufacturers of "Atlas" components.

Outwardly this knob is conventional in appearance, but internally it contains a small spring which cuts across part of the hole into which the spindle is inserted. All that is necessary is to file a flat on the spindle just sufficient to enable it to fix into the hole. The spring then rests on this flat and keeps the whole assembly quite tight. At the same time the knob can be withdrawn at any period without the necessity of using a screwdriver.

The knob is made in various shapes and sizes, and is of a simple idea which does so much to save trouble.

#### GRANTONA SPEAKER CONES

WE have tested this week two sample Grantona loud-speaker cones, manufactured by Messrs. R. O. Bridger & Co. These cones are of the moulded type and each cone is made from one piece of



Two of the Grantona speaker cones tested

material, thus being entirely seamless. The flexible surround is formed in the usual way at the outer edge of the diaphragm, while a special fitting is employed, enabling the cone to be fixed to the operating unit either from the front or the back, a useful point in some circumstances.

These cones are finished in an old-gold colour on the inside and the edge is felt bound to overcome any liability to rattle.

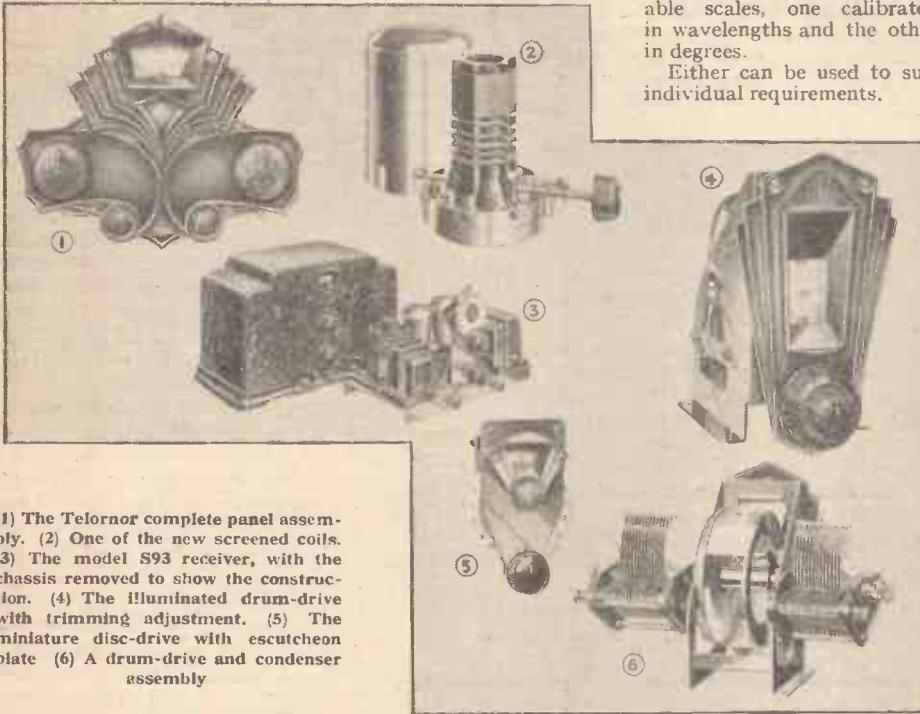
Two sizes were tested, one approximately 10½ in. overall diameter, the other approximately 12½ in. Both these cones gave excellent results and can be recommended. The retail prices of these two cones are respectively 1s. 6d. and 2s.

## NEW TELSEN PARTS

NOVELTY and practicality, combined with economy, have always been predominant features in Telsen productions and this applies, with equal force, to the parts for the new season. A selection of these is shown in the accompanying photographs.

disc drive and escutcheon plate is of interest where economy of space is essential. An illuminated drum dial, complete with trimming adjustment, is available and one of the photographs shows the Telsen drum drive and condenser assembly. This drive is supplied with interchangeable scales, one calibrated in wavelengths and the other in degrees.

Either can be used to suit individual requirements.



(1) The Telnor complete panel assembly. (2) One of the new screened coils. (3) The model S93 receiver, with the chassis removed to show the construction. (4) The illuminated drum-drive with trimming adjustment. (5) The miniature disc-drive with escutcheon plate (6) A drum-drive and condenser assembly

A brief description will be of interest to set-constructors, who will find the new components of great assistance in construction, and in improving the appearance and working of a set.

The Telsen Telnor is an entirely new departure in complete panel assembly. It is an oxidised silver escutcheon plate embodying arrangements for volume control, tuning, wave-changing, and on-off switching. There are several condenser controls and the miniature

Screened coils are in the new Telsen range, and these are available as single-coil units, two-gang units, and three-gang units. One of these coil units is illustrated.

Among complete receivers, the model S93, a battery-driven set, is of special interest, as it sells for only 75s., complete, less batteries and speaker, but with valves. It is made up on an all-metal chassis, and is housed in a very attractive walnut-finished bakelite cabinet.

THE three "Miscellany" programmes which have been already broadcast are sufficient to vouch for the fourth in the series, which will be broadcast on August 3. It is, as usual, a collection of plays, songs, and poems chosen and adapted for broadcasting by C. Denis Freeman and M. H. Allen.

It is a curious fact that some Highland listeners situated farthest from the new Scottish Regional transmitter at Falkirk are receiving better transmissions than those in less isolated localities.

A seaside relay for London Regional listeners will come from the Palace Pier, Brighton, on August 9, when the band of the Coldstream Guards will give an hour's performance.

A novel programme of music from French comedies has been arranged for Midland Regional listeners on August 8. For his items, Mr. Cantell has drawn on popular composers, such as Massenet and Yvain. He will be assisted by Robert Tredinnick with some gramophone records of French comedy songs.

Among the artistes for the Midland Regional ballad concert on August 9 is Elsie Stell, who will be heard in some short violin solos.

*Tom Thumb the Great* is the title of an old play to be broadcast by Sir Barry Jackson's Malvern Festival Company from the Malvern Theatre on August 11.

Carson Robison and his Pioneer Hill-Billy Singers, John and Bill Mitchell and Pearl Pickens, are a novel programme item for National listeners on August 3.

The band of the Fourth Battalion the Loyal Regiment is making a second appearance before the North Regional microphone on July 31.

With the establishment of the new Falkirk Regional Transmitter, aviators in that part of Scotland are finding that they will be required to exercise caution. The new aerial mast is situated on an eminence, the top being estimated at some 1,400 feet above sea level. In foggy weather, it is anticipated, airmen will keep clear of the Falkirk area.

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### Experiments with the "Simple Super"

SIR,—It may interest your readers to have a report on a slightly modified, All A.C., version of the "Simple Super," which I have constructed after several experiments.

My set is really "not quite so simple Super," as (1) it is all-mains driven, (2) has an extra S.G. valve and an extra I.F. coil, between the bi-grid and the second detector, (3) all three of the S.G. valves are the "variable-mu" type, and (4) the power valve is a pentode with choke-filter output feeding a big moving-coil speaker through a step-down transformer.

Messrs. Wright & Weaire, Ltd., besides supplying their wonderful 4-coil unit, also the three I.F. coils, have been most obliging in correspondence. They supplied me with a very complete diagram showing the inner construction of their 4-coil unit, which has been of very great assistance to me.

From my previous experience with the "Super-Sixty" and other of your super-het sets, I came to the conclusion that it is advisable to be able to control the input and for this reason my first S.G. valve is a variable-mu (Osram, V.M.S.4) with an independent potentiometer grid-bias control. My bi-grid valve is a Cossor A.C. (the only one I have available), and the two I.F. valves are also V.M.S.4's with a separate grid-bias control.

The G.E.C. (Osram) gave me very valuable advice with regard to the three variable-mu valves, and I followed exactly their own diagrams which they supplied. This involves very complete and somewhat complicated de-coupling, but it is really very simple and well worth the little extra trouble.

My H.T. supply is by means of a Philips A.C. eliminator, which has six separate tappings, and my six valves are heated from a Bayliss L.T. transformer supplying 4 volts at 6 amps.

When testing the set it didn't take me long to "trim" the 4-gang condenser (J.B.), and the immediate results were almost unbelievable. I had previously logged 104 stations with my old "Super-Sixty," but I am getting new stations now which I couldn't get before. The sensitivity is wonderful, but the great thing is that there is no trace of second-channel interference, nor of harmonics.

It makes no difference whatever if I disconnect the earth entirely, and at the moment my aerial is a length of wire which had not been used for a couple of years, and is lying on the ground among the bushes in my garden.

The potentiometer control of the three variable-mu valves is delightfully smooth and effective. I can control the power for maximum strength to a mere whisper without any distortion whatever.

I can get more stations than I want even in this summer weather, so that I look forward to record results later on when the

darker evenings come. As it is, I had forty-nine stations at full strength in half an hour when first testing the set, and I have had many more since, so that I expect to get "a hundred and forty-nine" when the season changes. H. W. R. (Birmingham).

### Broadcasting Services to the North of Scotland

SIR,—I observe that the B.B.C. has issued a statement, presumably in reply to my letters of 9th and 18th ultimo, in which they complain of "misleading statements" which they do not specify.

I would observe here that I have made no misleading statements, although I am satisfied that many of my criticisms may have been as unpleasant reading for the B.B.C. staff as they have been pleasant to thousands of my fellow countrymen in the north of Scotland. We in the north regard the B.B.C. as servants of the public, not its masters, and I trust the B.B.C. will bear that in mind in its future publications.

The B.B.C. state that "extensions of the present scheme are naturally contemplated, as and when permitted by development, technical and otherwise. This applies

particularly to districts which do not lie within the service areas of the new high-power stations." Now, so far as is known to the public, no extensions whatsoever were contemplated in the Highlands until after this agitation began. On page 31 of the 1932 Year Book the B.B.C. state that the granting of minority demands was "definitely impossible." Which of these statements is true?

The B.B.C. deplore that publicity has been given to a statement concerning the international distribution of wavelengths. They have evidently forgotten their own statement on this subject on page 2 of their recent pamphlet, "Broadcasting Service to the North of Scotland."

I referred in recent letters to the extravagant use of wavelengths in England, but the German delegates at the Geneva conference did so also before I did. Do the B.B.C. think that delegates of foreign countries are to go to Madrid in entire ignorance of the B.B.C. policy? If so, the B.B.C. will get their eyes opened. Why should the B.B.C. deplore publicity being given to what is already known internationally?

So long as the B.B.C. extort by legal force licence fees from Highland listeners, and refuse to supply a service in return, they are not in a position to pose as judges of propriety.

ANDREW MURRAY, Provost (Dingwall).  
(Continued on next page)

## GECOPHONE SETS for the NEW SEASON

THREE aims have guided the General Electric Company, Ltd., in their radio-set programme for the coming season—immaculate cabinet work, superlative performance and prices to suit the times. From a recent examination of the new Gecophone range we can assure readers that the first and the third of these laudable aims have been fully realised, and we are quite sure that the performance of the various sets will be up to the usual high Gecophone standard when we come to test them in due course.

Prominent among the new sets is the Osram Thirty-three Music Magnet, a new kit set of the console type. All-metal chassis construction and a one-piece bakelite cabinet are features of the construction, which is designed around a powerful three-valve circuit comprising a screen-grid high-frequency stage, a screen-grid detector and a power output. The price is only 9 guineas complete with valves and cabinet.

Cabinet work of the mains sets is indeed fine, as our personal examination proved. One of the most popular of the new products will undoubtedly be the Carnival radio-gramophone, which, with powerful three-valve circuit and energised moving coil, will sell at the remarkable price of 30 guineas.

A very powerful gramophone motor is fitted to this machine, which has also an automatic station indicator and a heterodyne filter, as well as many other unique circuit features.

Great interest will be taken in the Gecophone Super-het console, price 26

guineas. This has seven tuned circuits, variable-mu intermediate amplifier valves, a power output of 2½ watts, an energised moving coil, and a really striking cabinet in matt walnut. The claim is that efficiency is equally good on the medium and long waves.

For a high standard of performance under all reception conditions the straight four as exemplified by the Viking model has a wide appeal. Here is a set for A.C. mains with two variable-mu high-frequency stages, a screen-grid detector and a power pentode working a mains-energised moving coil.

A distinguished Gothic cabinet of matt walnut houses the apparatus. The price is 23 guineas, which in view of the imposing specification is extremely reasonable.

One of the more popular types of set is the three-valver, called the Gala in this new range. Price 18 guineas, this set has a powerful three-valve circuit with a screen-grid detector and twin tuned circuits. It has a mains-energised moving coil and a polished walnut cabinet of pleasing appearance.

The Nomad four-valver for D.C. mains, recently introduced, will be a strong feature of the new range. This is 23 guineas in dark polished walnut cabinet of modernistic design.

Such are the high-lights of the new Gecophone range, which will be on show at Olympia, when readers will be able to appreciate the excellence of the cabinet work and the very high standard of workmanship throughout the designs.

**The "Century Super" on the Short Waves**

SIR,—Perhaps I am rather late in sending a report of the "Century Super"; anyway, I feel I must tell you of some of my experiences. Recently I have been searching the short waves, and I find that very good results can be obtained with practically any rough aerial. I have heard W3 XAL, W3 XL, W8 XK (48.86 and 25.25 metres), W1 XAZ and W2 XAF, VE9DR and VE9GW of Canada. I have also heard LSX Buenos Aires, Rio de Janeiro PR XA, SUZ of Abu Zabal, Cairo, whilst Moscow RV59, REN, 2RO, HVJ (Vatican City), FYA (25.2 and 25.63 metres), G5SW, CT1AA, EAQ, OXY, Rabat; DJA can always be had when working. DEQ and PCP have been heard calling America on several occasions, and amateurs romp in on the 42-metre band. F. A. B. (Halstead).

**"The Ultra-Selective 3"**

SIR,—Being a reader of your well-known weekly, which I have taken for a considerable time, I should like to reply to W. D. A. K.'s letter published recently with reference to the "Ultra-selective 3." I heartily endorse all he says with regard to the set, having built it directly it was published. I am working the set at Colney Heath, St. Albans, which is under three miles from Brookmans Park, and I must say the selectivity of the set is top-hole. I cannot say off hand how many stations I can receive at any given time, but I know it is a considerable number. In my opinion the set merits all that was said of it and I find it most easy and very economical with H.T. and L.T. I used all parts as specified.

I find one thing very interesting with this set and that is the reception of all kinds of reports sent out by the Croydon air-port to various aircraft. C. H. (St. Albans).

**The Future of 5XX**

SIR,—I have been interested in your remarks from time to time regarding 5XX and the other national transmitters, and in view of the controversy raging just now concerning broadcasting in the highlands it would be advantageous if you discussed the various points raised.

Firstly, what will be the service area of the new 5XX to users of crystal, one and two-valve sets respectively?

Secondly, if the new 5XX cannot provide satisfactory reception to these users in the densely populated areas covered by the service areas of the London, North, West and Scottish National transmitters, would there be any difficulty as regards reception on the above-mentioned sets in putting all four transmitters on the same wavelength? Owners of three and more valve sets could, I presume, receive satisfactory reception from 5XX if the four transmitters interfered with one another.

This procedure would free two wavelengths, one of which (or even two) could be used for a high-power station between Inverness and Aberdeen. There would still remain the sparsely populated outlying districts of the extreme north and west of Scotland, which would have to rely on 5XX unless a long wavelength could be obtained to serve the whole of Scotland, when the erection of a second regional station in Scotland would be unnecessary. E. A. H. (Edinburgh).

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# BROADCASTING STATIONS

Broadcasting Stations classified by country and in order of wavelengths. For the purpose of better comparison, the power indicated is that of the carrier waves.

Kilo-Metres cycles	Station and Call Sign	Power (Kw.)	Kilo-Metres cycles	Station and Call Sign	Power (Kw.)	Kilo-Metres cycles	Station and Call Sign	Power (Kw.)
<b>GREAT BRITAIN</b>								
25.53	11,751 Chelmsford (GSW)	10.0	327.1	917.2 Poste Parisien	55.0	295.5	1,274 Kristiansand	0.5
211.3	1,420 Newcastle	1.2	345.2	869 Strasbourg (PTI)	11.5	241	1,449 Stavanger	0.5
214.3	1,400 Aberdeen	1.0	369.4	872 Radio I.L. (Paris)	1.0	365.3	821 Bergen	1.0
242.3	1,053 Belfast	1.0		also on 33m. (8000 Kcs.)		367.6	816 Fredrikstad	0.7
261.0	1,147 London Nat.	50.0	384.4	779 Radio Toulouse	8.0	493.4	608 Trondheim	1.2
288.5	1,040 Swansea	0.12	447.1	671 Paris (PTI)	8.0	1,088	277 Oslo	60.0
288.5	1,040 Plymouth	0.12	465.8	644 Lyons (PTI)	2.0	<b>POLAND</b>		
288.5	1,040 Bournemouth	1.0	560.1	527 Grenoble (PTI)	2.0	214.3	1,400 Warsaw (2)	1.9
288.5	1,040 Scottish National	50.0	1,445.7	207.5 Eiffel Tower	13.5	285	1,283 Lodz	2.2
288.5	1,040 Newcastle (temp.)	1.0	1,725	174 Radio Paris	75.0	312.8	959 Cracow	1.5
301.5	993 North National	50.0	<b>GRAND DUCHY OF LUXEMBURG</b>			335	896 Poznan	1.9
309.9	963 Cardiff	1.0	1,250	240 Luxemburg (temp.)	1.0	350.7	788 Lvov	16.0
355.9	843 London Regional	50.0	<b>GERMANY</b>			408	734 Katowice	12.0
376.4	797 Scottish Regional	50.0	19.737	15,200 Zeesen (DJB)	8.0	565	531 Wilno	16.0
398.9	752 Midland Regional	25.0	31.38	9,560 Zeesen (DJA)	8.0	1,411.8	212.5 Warsaw	120.0
480	625 North Regional	50.0	217.1	1,382 Königsberg	0.9	<b>PORTUGAL</b>		
1,554.4	193 Daventry (Nat.)	30.0	218.5	1,373 Flensburg	0.6	241.6	1,247.8 Oporto	0.25
<b>AUSTRIA</b>								
218.5	1,373 Salzburg	0.5	232.2	1,292 Kiel	0.25	282.2	1,063 Lisbon (CTIAA)	2.0
245.9	1,220 Linz	0.5	238.9	1,256 Nürnberg	2.0	<b>ROMANIA</b>		
283	1,052 Innsbruck	0.5	245.9	1,220 Cassel	0.25	391	761 Bucharest	12.0
352.1	852 Graz	7.0	253.1	1,185 Gleiwitz	5.0	<b>RUSSIA</b>		
453.2	662 Klagenfurt	0.5	259.3	1,157 Leipzig	2.0	351	855.5 Leningrad RV70	20.0
518.3	578.7 Vienna	15.0	269.8	1,122 Bremen	0.2	358	838 Moscow (Exp.)	15.0
<b>also testing on 1,252.6 m. from 7.0 p.m. (Mon., Wed., Sat.)</b>								
207.3	1,447 Franchimont	0.2	276.5	1,085 Heilsberg	0.0	385	779 Stalino (RV26)	15.0
278.3	1,440 Antwerp	0.4	283.0	1,058 Magdeburg	0.5	389.0	770 Archangel	10.0
210.1	1,428 Liege (Seraing)	0.15	283.6	1,058 Berlin (E)	0.5	476	630.2 Sebastopol	10.0
215.3	1,392 Chateaufort	0.2	283.6	1,058 Stettin	0.5	502.4	597 Nijni Novgorod	10.0
215.4	1,392.5 Bruxelles Coulerens	0.2	318.8	941 Dresden	0.25	644	465.8 Kazan (RV17)	10.0
215.5	1,392 Liege	0.2	325	923 Breslau	60.0	720	416.6 Moscow (PT 1)	20.0
230.3	1,304 Radio Wallonia	0.3	390.6	832 Mülhacker	60.0	825	363.6 Sverdlovsk RV5	50.0
239.5	1,258 Binche	0.3	372.2	806 Hamburg	1.5	848.7	353.5 Rostov (Don)	4.0
240.2	1,249 Liege (Exp.)	0.1	389.0	779 Frankfurt	1.5	937.5	320 Khar'kov (RV20)	25.0
245.9	1,220 Radio Schaarbeek	0.3	390.0	770 Leipzig (testing)	120.0	1,000	300 Leningrad	100.0
268.5	1,117 Liege (Coinet)	0.4	419.9	716 Berlin	1.5	1,034	290 Kiev	30.0
337.8	883 Brussels (No. 2)	15.0	453.2	662 Danzig	0.5	1,071.2	280 Tiflis	35.0
509	590 Brussels (No. 1)	15.0	472.4	635 Langenberg	60.0	1,111	270 Moscow Popoff	75.0
<b>BELGIUM</b>								
215.5	1,392 Liege	0.2	472.4	635 Munich	1.5	1,171.5	256 Tashkent	25.0
230.3	1,304 Radio Wallonia	0.3	520.0	563 Kaiserslautern	1.5	1,260	238 Bakou	35.0
239.5	1,258 Binche	0.3	559.7	536 Augsburg	0.3	1,271.5	236 Minsk (RV10)	35.0
240.2	1,249 Liege (Exp.)	0.1	569.3	536 Hanover	0.3	1,304	230 Moscow (Trades Unions)	165.0
245.9	1,220 Radio Schaarbeek	0.3	569.3	537 Freiburg	0.25	1,380	217.4 Novosibirsk	100.0
268.5	1,117 Liege (Coinet)	0.4	1,620	135 Norddeich KVA	10.0	1,481.5	202.5 Moscow RV1	100.0
337.8	883 Brussels (No. 2)	15.0	1,634.0	183.5 Zeesen	60.0	<b>also on 46.6 m. (6,438 Kcs.)</b>		
509	590 Brussels (No. 1)	15.0	2,525	119.3 Königswuster	60.0	1,910.8	257 Sverdlovsk (RV38)	20.0
<b>BULGARIA</b>								
318.8	941 Sofia (Rodno Radio)	1.0	2,900	103.5 hausen (press)	15.0	<b>SPAIN</b>		
<b>CZECHO-SLOVAKIA</b>								
58	5,172 Prague	0.5	4,000	75 ditto		252.3	1,189 Barcelona (EAJ15)	3.0
249.6	1,201.8 Prague (2)	5.0	<b>HOLLAND</b>			267.8	1,121 Valencia	8.0
263.9	1,136.7 Moravska-Ostrava	11.0	296.1	1,073 Huizen	8.5	348.8	860 Barcelona (EAJ1)	8.0
279.4	1,073.5 Bratislava	14.0	1,071.4	280 Schevingingen-Haven	10.0	363.1	815 Seville (EAJ5)	1.5
294.4	1,018 Kosice	2.5	1,875	160 Hilversum	8.5	411.5	729 Madrid (EAJ7)	2.0
341.7	878 Brunn (Brno)	35.0	247.7	1,211 Trieste	10.0	424.3	707 San Sebastian (EAJ8)	0.6
488.6	614 Prague	120.0	273.7	1,096 Turin (Torino)	7.0	450.8	557 Malmö	1.2
<b>DENMARK</b>								
281	1,067 Copenhagen	0.75	280	1,071 Bari (testing)	20.0	435.4	689 Stockholm	55.0
1,153	260 Kalundborg	7.5	312.8	959 Genoa (Genova)	10.0	541.5	554 Sundsvall	10.0
<b>also on 31.51 m. (9,520 Kcs.)</b>								
298.8	1,004 Tallinn	11.0	318.8	941 Naples (Napoli)	1.5	770	389 Ostersund	0.6
465.8	644 Tartu	0.5	332.3	902.8 Milan	7.0	1,220.5	244 Boden	0.6
<b>FINLAND</b>								
291	1,031 Tampere	1.0	368.1	815 Bolzano	1.0	1,348	222.5 Motala	30.0
290	1,015 Viipuri	13.0	441	689 Rome (Roma)	50.0	<b>SWITZERLAND</b>		
303.1	813 Helsinki	13.2	540.8	590 Florence (Firenze)	20.0	244.1	1,229 Basle	0.65
1,706	167 Lahti	54.0	525.9	575 Palermo	3.0	245.9	1,220 Berne	0.5
<b>FRANCE</b>								
219.9	1,363.7 Béziers	0.5	198.5	1,510 Riga (tests)	10.0	403	743 Sötens	25.0
223	1,345 Fécamp	10.0	525	572 Riga	15.0	459.4	653 Beromünster	60.0
237.2	1,265 Bordeaux	2.0	<b>LITHUANIA</b>			790	395 Geneva	1.25
249.3	1,203 Juan-les-Pins	0.5	1,935	155 Kaunas	7.0	<b>TURKEY</b>		
255	1,175 Toulouse (PTI)	1.0	304	825 Algiers (PTI)	10.0	1,200	250 Istanbul	5.0
265.4	1,130 Lille (PTI)	1.3	416	721 Radio Maroc (Rabat)	6.0	1,538	195 Ankara	7.0
271.4	1,103 Rennes	1.2	<b>NORTH AFRICA</b>			307	977 Zagreb (Agram)	0.75
286	1,040 Montpellier	0.8	304	825 Algiers (PTI)	10.0	431.7	695 Belgrade	2.5
286.8	1,046 Radio Lyons	10.0	416	721 Radio Maroc (Rabat)	6.0	574.7	523 Ljubljana	2.5
293.7	1,021.5 Limoges (PTI)	0.5	<b>and 32.26 m. (9,300 Kcs.)</b>					
304.9	984 Bordeaux (PTI)	13.0						
309.3	969.9 Radio Vitus	1.0						
315	950 Marseilles	1.0						

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# RADIOGRAMS

**T**HE Abbey Players make their third appearance before the Belfast microphone this season when, on August 8, they will present *The Playboy of the Western World*, a comedy in three acts, by J. M. Synge.

The second of the chamber music concerts in the Belfast Museum will be relayed on August 10. Muriel Childe will be the soloist and the programme will include works by Brahms, Haydn, and Schubert.

The band of the Royal Inniskilling Fusiliers will provide a concert from the Belfast station on August 13. This regiment is at present stationed at Holywood Barracks and has made several previous appearances before the microphone.

Herbert Westerby is to continue his weekly recitals on the Grosvenor Hall organ at 12.45 p.m. on August 12, when he is to give the fourth in his series of International Programmes.

Pat Wilson will appear before the microphone again with Mr. Walter Roy in a vaudeville entertainment on August 3.

The next holiday resort from which a variety show is to be broadcast to Scotland is Prestwick, and on August 13, Scottish listeners will have a chance of hearing a lively show entitled *Play Time at Prestwick*, which is to be relayed from the Beach Pavilion, Prestwick.

Whit Monday and August Bank Holiday would not seem right if they did not provide North Regional listeners with some account of the progress of the Lancashire and Yorkshire cricket match. On August 1 the match at Old Trafford will be dealt with by Mr. A. E. Lawton, whose popular and racy descriptions have been broadcast on many previous occasions.

The "Do You Remember?" programme on August 5 for North Regional listeners will be of a somewhat different nature from its forerunners, for it will deal entirely with the musical comedies which were produced during the War years.

**Tunewell Components:** In the review of Tunewell components given in last week's issue it was stated that these are made by Turner & Co. It should be noted that the name of the manufacturers is Tunewell Radio Ltd., 54 Station Road, New Southgate.

## "RADIO FOR THE MILLION"

It is announced that in the new Radio for the Million range there will be a battery model and an A.C. model, with a choice of cabinets for the battery model.

with a supplementary trimmer, which is adjustable from the panel.

There is a selectivity control on the front, too, and the now tuned anode circuit gives vastly improved results. A useful feature is a single rotary switch, operating medium, long, gramophone, and off.

There are four models of the "Stationmaster," the table battery model A being housed in an ordinary oak-table type cabinet. The set is supplied in kit form. The battery midget model B is an ultra-compact arrangement, incorporating a specially designed Celestion speaker movement.

The A.C. model D includes the set and power unit, which are assembled together, but are completely screened. The kit for this model comprises all the parts for the set and power unit, together with Mullard A.C. valves and valve rectifier.

As in the case of the battery model, there is a midget version, model C, which is in a walnut-finished cabinet and includes a Magnavox moving-coil speaker. Prices and details of



One of the new "Radio for the Million" receivers, and (inset) the chassis, showing the neat construction. Kits of parts are supplied for these sets

The "Stationmaster Three" typifies modern design, and a rigid chassis of cadmium-plated steel ensures the correct positioning of components. There is one-knob tuning, of course,

the kits of parts for all sets can be obtained free, on mention of AMATEUR WIRELESS, from Radio for the Million, 63 Lincoln's Inn Fields, London, W.C.2.

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Please write concisely, giving essential particulars. A Fee of One Shilling (postal order), a stamped addressed envelope, and the coupon on the last page must accompany all letters. The following points should be noted.

Not more than two questions should be sent with any one letter.

The designing of apparatus or receivers cannot be undertaken.

Modifications of a straightforward nature can be made to blueprints, but we reserve to ourselves the right to determine the extent of an alteration to come within the scope of a query. Modifications

to proprietary receivers and designs published by contemporary journals cannot be undertaken.

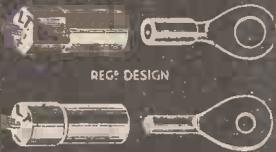
Readers' sets and components cannot be tested at this office. Readers desiring specific information upon any problem should not ask for it to be published in a forthcoming issue, as only queries of general interest are published and these only at our discretion. Queries cannot be answered by telephone or personally.

Readers ordering blueprints and requiring technical information in addition, should address a separate letter to the Query Department and conform with the rules.

Aberdeen has been providing some very good and original broadcasts recently and it is expected to live up to its reputation on August 8, when there will be put on from Aberdeen an operetta entitled *Caravanella*.

"Melody" is the new title chosen by Robert Tredinnick for a series of gramophone recitals which will be composed mainly of familiar numbers. The first recital of this kind will be given from the Midland Regional transmitter on August 13.

## YOU CAN'T GO WRONG!

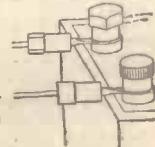


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There "Observer" reviews the latest booklets and folders issued by well-known manufacturers. If you want copies of any or all of them **FREE OF CHARGE**, just send a postcard giving the index numbers of the catalogues required (shown at the end of each paragraph) to "Postcard Radio Literature," "AMATEUR WIRELESS," 58-61, Fetter Lane, E.C.4. "Observer" will see that you get all the literature you desire.

**Replacement H.T. Batteries**

I HEAR from Oldham & Son, Ltd., that replacement Oldham H.T. batteries are now available for two popular sets, the Pye "Q" and the K.B. "Pup." Particulars of these batteries are given in the Oldham literature. **801**

**New Tunewell Coils**

An interesting folder that has just come to hand from Tunewell gives helpful circuits and diagrams in connection with a number of sets in which Tunewell coils and other components can be used. This folder also describes the Tunewell bandpass coils, which are designed to give constant 10-kilocycle separation. **802**

**A New Eta Valve**

One of the new Eta valves is the type DW7AC screen-grid job. This has an impedance of 200,000 ohms, and a slope of 3 MA/V. It is, of course, a 4-volter, taking 1 ampere heater current. **803**

**Burndept Sets**

You will be interested to know that new prices are now operative in connection with the Burndept Super Merrymaker, A.C. Mains Merrymaker, and A.C. Ethophone sets. Details of these well-known outfits can be obtained through my Catalogue Service. **804**

**Observer**

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Communications should be addressed, according to their nature, to The Editor, The Advertisement Manager, or The Publisher, "Amateur Wireless," 58-61 Fetter Lane, London, E.C.4.

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Midget Two (D, RC) . . . . . AW353

Mascot Two (D, Trans) . . . . . AW358

Ever-Tuned Regional Two (D, Trans) . . . . . WM241

Station-finder Two (D, Trans) . . . . . WM253

Music-Lover's Two (D, Trans) . . . . . WM260

New Economy Two (D, Trans) . . . . . WM265

Family Two (D, Trans) . . . . . WM278

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**THREE-VALVE SETS (1s. each)**

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Baby Three (D, RC, Trans) . . . . . AW324

1932 Ether Searcher (SG, D, Pen) . . . . . AW325

Wide World Short-Wave Three (D, RC, Trans) . . . . . AW334

New Favourite Three (D, RC, Trans) . . . . . AW335

Home-lover's All-electric 3 (SG, D, Trans) . . . . . AW337

The P.W.H. "Mascot" (D, RC, Trans) . . . . . AW341

Home-lover's Battery 3 (SG, D, Trans) . . . . . AW343

£8 Radio-gram (SG, D, Trans) . . . . . AW349

New Regional Three (D, RC, Trans) . . . . . WM218

Five-point Three (SG, D, Trans) . . . . . WM212

New Brookman's Three (SG, D, Trans) . . . . . WM218

Five-point Short-wave Three (D, RC, Trans) . . . . . WM223

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Five-advantage three (D, RC, Trans) . . . . . WM257

Everybody's Radiogram (SG, D, Trans) . . . . . WM258

Double Band-pass Three (SG, D, Trans) . . . . . WM259

Everybody's Radiogram (with automatic G.B.) . . . . . WM262

New Economy Three (SG, D, Trans) . . . . . WM263

New Plug-in Coil Three (D, 2 Trans) . . . . . WM270

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Ether Rover (SG, D, RC, Trans) . . . . . WM266

Quadradyne 2 (SG, D, Pen) . . . . . WM273

Double Band-pass Four (SG, D, RC, Trans) . . . . . WM274

Everybody's Radio Gram (SG, D, RC, Trans) . . . . . WM276

A.C. Quadradyne 2 (SG, D, Pen) . . . . . WM279

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Town and Country Four (SG, D, RC, Trans) . . . . . WM282

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A-P-A (Power Amplifier for A.C. Mains) . . . . . WM275

A-P-A Radio Unit (SG, D) . . . . . WM281

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Short-wave Plug-in Adaptor (6d.) . . . . . AW326

Short-wave Super-het Adaptor (6d.) . . . . . AW329

Ether Searcher Radiogramophone motor board . . . . . AW333

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Big H.T. Unit for A.C. Mains . . . . . WM250

Loud-speaker Tone Control (6d.) . . . . . WM234

"W.M." Linen Diaphragm Loud-speaker . . . . . WM235

Two-Minute Adaptor for Short Waves . . . . . WM240

Super 60 A.C. Unit . . . . . WM248

A Simple Mains Unit . . . . . WM283

Short-wave Director (6d.) (wavemeter) . . . . . WM285

Voltage Regulator . . . . . WM287

Copies of the "Wireless Magazine" and of "Amateur Wireless" containing descriptions of most of these sets can be obtained at 1s. 3d. and 6d. respectively, post free. Index letters "A.W." refer to "Amateur Wireless" sets and "W.M." to "Wireless Magazine."

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The Percy Harris A.C. Radiogram. By Percy W. Harris, M. Inst. Rad. E.  
The Gold Coaster. By the "W.M." Technical Staff.  
The Triple-tune Four. By the "W.M." Technical Staff.

## TECHNICAL FEATURES

Radio in Review. By Morton Barr.  
We Test Before You Buy.  
The Designer and His Work. By P. K. Turner, M.I.E.E.  
The Iron-cored Transformer. By Percy W. Harris, M. Inst. Rad. E.  
That Aerial-series Condenser. By E. H. Chapman, M.A., D.Sc.  
Your Milliammeter. By W. James.

## GENERAL ARTICLES

Guide to World's Broadcasters  
World's Broadcast Stations.  
In Tune with the Trade. By Fetter Lane.

Short-wave Television. By H. J. Barton Chapple, Wh. Sch., B.Sc.  
News of the Short Waves.  
A New Televisor. By D. Sisson Rclph.  
Superkinema—1941. By James Peers.  
The B.B.C. Borrows Two Wavelengths. By Alan Hunter.

Height is Not Everything!  
Radio in the Summer. By Alan Hunter.  
Broadcasters Who Do Things! By Whitaker-Wilson.  
Radio Medley. By BM/PRESS.  
The Month's Radio Music. By T. F. Henn  
Queer Police Uses for Wireless. By Kenneth Ulyett.  
On the Crest of the Waves. By Jay Coote.

## GRAMO-RADIO SECTION

The Needle and the Record. By P. Wilson, M.A.  
Choosing Your Records. By Whitaker-Wilson and Chopstick.



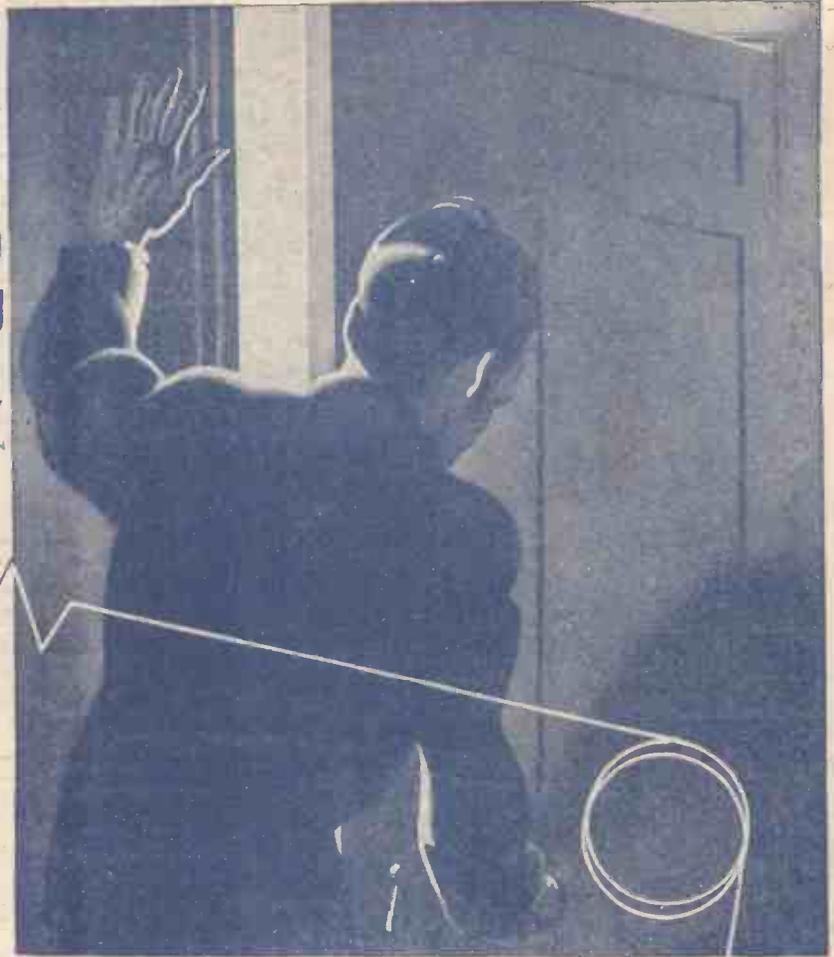
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