PERCY W. HARRIS ON—ARE HIGH NOTES IMPORTANT ?

THE HOME-LOVER'S BATTERY 3

Amateur Wireless

and Radiovision

Every Thursday 3d

Vol. XX. No. 517 Saturday, May 7, 1932

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

No. 517. Vol. XX. MAY 7, 1932

Amateur Wireless & Radiovision

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

EDITOR: BERNARD E. JONES. TECHNICAL EDITOR: J. H. REYNER, B.SC., A.M.I.E.E. RESEARCH CONSULTANT: W. JAMES. ASSISTANT EDITOR: H. CORBISHLEY.

NEWS & GOSSIP OF THE WEEK

A GOOD BATTERY SET

IF you are on the look-out for a good self-contained battery set—receiver, batteries and speaker being all in the one cabinet—then turn to the middle pages of this issue. Here you will find a battery version of the "Home Lover's" outfit, which, as an all-mains set, was introduced in "A.W." a couple of months ago. It was such a success that a battery model was called for, and here this week is a full description.

MOVING EPISODES

ANNOUNCERS are rushing backwards and forwards during the transition from Savoy Hill to Broadcasting House. One artiste recently arrived just in time for her broadcast—but she turned up in the wrong building. So the "mike" at the religious studio was hastily brought into action and she gave her pianoforte recital, after all.

"CANNED" MUSIC TROUBLES

TROUBLE is breaking out between broadcasting authorities and gramophone record producers in Australia, and many of the B class stations, privately owned, will suffer heavily if the gramophone companies have their way. They insist on a royalty of 2s. 6d. per record for every broadcast.

PUTTING IT BLUNTLY

THE Post Office direction finding van started last week an intensive campaign in the areas of Middlesbrough, Stockton, Darlington and The Hartlepools, with the object of tracing unlicensed sets. As the B.B.C. naïvely states in an official announcement: "It is expected that the presence of the van in those areas will be effective in inducing listeners who have hitherto enjoyed the facilities provided by broadcasting without buying a licence to pay a visit to their local post offices forthwith, and pay the small fee of ten shillings which is required of them."

A BATCH OF PIRATES

THE more serious side is obvious when you hear that in one day recently at Stratford Police Court, twenty cases were heard against listeners, who were charged with using unlicensed sets. The total fines amounted to £42!

FLEETWOOD'S GRATITUDE

YOU may remember the fuss caused by Mr. Filson Young's broadcast talk on Fishing Fleets, when he referred to Fleetwood as "a town of expansive mudbanks . . . inhabited by old women and children." Now the Town Council has decided to name its new motor launch after him, in recognition of the fact that he has done more than any other individual to draw attention to the town in recent years. An example of well-directed mud-slinging!

THE LEGION OF LISTENERS

GERMANY is following us closely in the great race for licence figures. Statistic fiends now claim that there are over four million licensed listeners in Germany. This includes the thousands of free licenses which, in Germany, are given to the unemployed, war heroes, blind people, and so on. As in this country, there is yet no sign of the saturation point being reached.

STUDIO APPLAUSE

WE shall have less cause to complain of the studio clacque's noise when a new microphone arrangement comes into operation in the near future. It will then be possible to cut down untimely—or unseemly!—applause from the studio audience, because their noise will be picked up on separate "mikes" and "faded out" when not wanted.

JACK GOES OFF AGAIN

Jack Hylton and his Band recently made another one of their famous cross-Channel trips in order to give a Continental broadcast. Here they are seen leaving Croydon by air

NEWS & GOSSIP OF THE WEEK—*Continued*

MUSIC HALL

THE May 21 music-hall show will be done in No. 10 studio and not at Broadcasting House as originally planned. So far, Lily Morris and Leslie Hutchinson have been engaged. Prior to this, on May 10, there will be a Broadcasting House music-hall show, with G. S. Melvin (first "mike" appearance), Harry Tate, Tommy Handley, Mabel Marks, Jeanne de Casilis, and, of course, Henry Hall and the new B.B.C. dance band.

SUNDAY PROGRAMMES

STARTING on Sunday, June 5, the B.B.C. will extend its hours of Sunday broadcasting. The programme will start at 12.30 p.m. and will continue without a break until 6 or 6.30 p.m. The extra two and a half hours programme time will be utilised for suitable musical concerts of the quintet or restaurant type.

STUDIO "BB"

HENRY HALL, whose experiences of 8A Studio are described in this issue, has been trying out a new studio in the basement of Broadcasting House. Known as Studio BB, this was at first thought to be too small for the band, but now we hear that Henry Hall is delighted with it—and so is everyone else.

STUDIO "BA"

THERE is some delay in the completion of the vaudeville studio, known as Studio BA, owing to the non-delivery of certain wall coverings. There is no doubt that the many delays in the completion of the various studios have been more than justified by the greatly improved acoustics.

BROADCAST OPERA

THE B.B.C. has asked some of its "bright young men" to go into the question of popularising broadcast opera. The idea is to evolve "potted" operas, or popular operatic excerpts in such a way that the great bulk of listeners will develop a positive craze for opera—both grand and comic!

NOT TRUE!

PERSISTENT rumours have been going around that the underground river Bourne is seeping into the foundations at Broadcasting House. It is true that during the digging operations the engineers encountered more water than they had expected, but steps were taken to overcome any difficulty, and at the present time there is no trouble at all.

7-METRE TRANSMITTER

THIS has now arrived at Broadcasting House and is being assembled and wired on the seventh floor. It will be three or four weeks before tests can begin.

NEW STUDIOS

ONE of the new Talks Studios at Broadcasting House is suffering from its own excellence! Due to the almost complete elimination of reverberation, by the use of rock wool, articulation is absolutely perfect in the studio, but the B.B.C. is a little nervous of having speakers unused to the microphone in the studio, owing to the extraordinary "dead" effect produced when speaking.

THE RUSSIAN MENACE

LENINGRAD is reported to be increasing its power to 250 kilowatts. At present this station broadcasts on 348.8 metres with a power of 10 kilowatts. It seems doubtful whether the reported power is right, because such a high power on medium waves would be a sheer waste.

POWERFUL NEWCOMER

WHAT may be the high-power Leningrad station has recently been heard heterodyning Barcelona on 349 metres. It seems probable that the new Leningrad is now testing on its scheduled wavelength of 348.8 metres.

AFTER "T'COOP!"

An echo of the Cup Tie walking off the field, not with the Cup, but with a batch of the loud-speakers which were used for public address work during the match

FACING THE MICROPHONES

When the Prince of Wales spoke at the opening of the new Shakespeare Memorial Theatre his speech was recorded, broadcast in this country and in America, and "talkie" recorded. This photograph shows you the bank of microphones which he had to face

A concert by the Swansea Orpheus Choral and Orchestral Society, will be relayed from the Central Hall, Swansea, on May 19.

On May 14, an unusual band will visit the Manchester studio. This is the Wednesday Star Novelty Band which was formed just over a year ago from unemployed men and their children. It contains about seventy musicians, of whom forty play mouth organs and twenty-four are "clapper-boys."

Mr. Stewart Deas will be the conductor of the Scottish Philharmonic Orchestra at their fourth concert on May 17 in the concert studio of Scottish Broadcasting House.

Congratulations to our contemporary *The Wireless World* on the attainment of its twenty-first birthday.

HENRY HALL IN BROADCASTING HOUSE

The B.B.C. Dance Orchestra was the first to broadcast from the new studios in London and our Special Commissioner talks with HENRY HALL about these first Broadcasting House programmes

"MR. HALL? Yes, sir, he's in Studio 8A at the top of the building."

The lift man whisked me from the elaborate entrance of Broadcasting House to the top studio storey of the new building. As I got out of the lift there was the sound of a dance band rehearsing so I needed no guide around the corridor to the studio.

Quite a number of people during the last week or so have asked me when programmes will be heard from the Broadcasting House studios, showing that it isn't generally realised that Henry Hall has often broadcast from the new London headquarters.

I was present at a rehearsal of the new dance orchestra a few days before the first broadcast several weeks ago. The condenser microphones were being tested, engineers were busy with the wiring and with connecting up the special indicator lights in the studio.

Mr. Hall told me that in a few days the talkie engineers would be busy, as a news film was made of the first broadcast; this, incidentally, is the first time that the film people have been allowed behind the scenes at the B.B.C.

A Rehearsal

When I went into Studio 8A, Val Rosing was vocalising before the baffle of the new Western Electric microphone and the B.B.C. Dance Orchestra was playing up in the far corner of the big Military Band Studio. They were placed in this way to avoid echo.

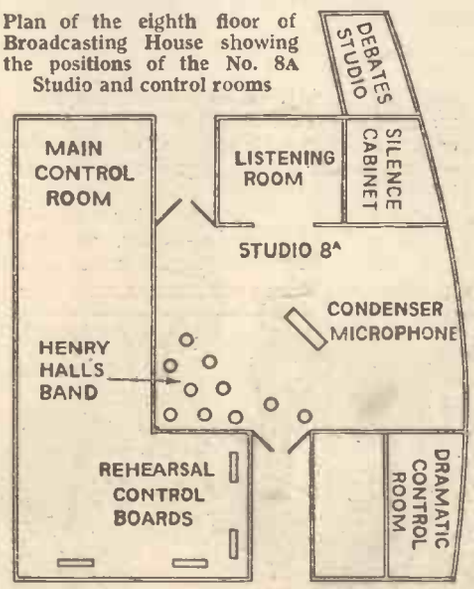
In an anteroom a moving-coil speaker was reproducing the music of the rehearsal, and Mr. Hall was alternating between the studio and the listening room in order to see how each tonal effect came out.

During the interval we had a chat and he showed me the technical arrangements of the new studio. He told me that the microphone apparatus had been installed in a hurry in the listening room (connected with the main studio by a small sound-proof glass window) and the main amplifier, moving-coil speaker and volume controls were stood about on the floor and hurriedly wired up. He said that the lines had been completed through to the control room and thence to the Savoy Hill control room and the junction point of the Brookmans Park lines.

Condenser Microphone with Baffle

Together, we examined the new microphone which is being used for dance-band broadcasts and which will figure largely in Broadcasting House when all the studios are in action. The "mike" is in a metal box, together with its associated amplifier, in the middle of a 4-ft. baffle board. Rosing sings very softly right close up to the board. Henry Hall, who generally uses a baton, half faces the orchestra so that he is the liaison between the band and the vocalist. In many numbers the players cannot hear the vocalist, as he has to sing softly.

At present, he says, No. 8A is a convenient studio because it is next door to the Control



Plan of the eighth floor of Broadcasting House showing the positions of the No. 8A Studio and control rooms

Room where are the control panel and rehearsal desk. At one end of studio 8A is the Dramatic Control Room and at the other end the listening room and silence cabinet for the studio, the Band Room and the small Debates Studio 8B.

Henry Hall was one of the first of the programme section to work in Broadcasting House. I had the pleasure of a long talk with him the first morning he came to London and took up his new duties, and when his sole possessions in Broadcasting House comprised a fountain pen, a piece of blotting paper and a long trestle table; no orchestra, no staff and no music!

Preparing the Music

Since then, he told me, his arrangers had been busy transcribing music of all kinds specially for the new orchestra. The tonal arrangement of Henry Hall's combination is such that no stock setting of any dance piece is suitable for playing as it stands. Hundreds of hours transcribing have to be done for the now regular dance-music sessions.

Structural alterations are still being carried out to the studio and weird shapes of futurist chromium-plated metal work are brought in and erected in intervals between rehearsals.

The whole studio is lined out with metal, edging the special wall panels and the resilient rubber composition floor. Although this is the only studio in which there are windows out to the open, artificial lighting is being arranged, and there is a very soft and pleasing effect of the light streaming from the modern-style glass panels built into the walls.

The new signal arrangements are ingenious. A red light shows that Henry Hall is broadcasting and a blue light that a rehearsal is in progress. A green "flick" is being installed for use in connection with dramatic control work and a flashing white light silently calls Henry Hall or the announcer to the listening room. These indicators are worked from the control room.

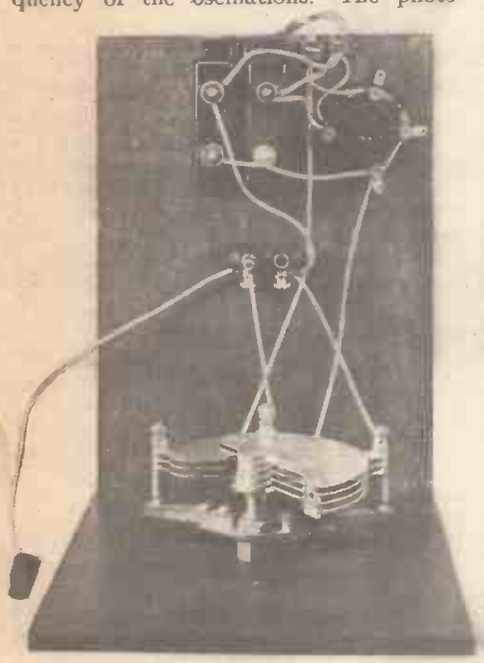
It is good news that Covent Garden will have a summer season of opera after all. It is to take the form of a Wagner Festival and will be held from May 9 to June 3. The relays by the B.B.C. will be divided between the National and Regional programmes throughout the four weeks.

A SHORT-WAVE WAVEMETER

When listening for short-wave stations, it is a great help to have a wavemeter in order to find just where you are listening on the short-wave band. This dynatron-type wavemeter will be useful in conjunction with the broadcast band wavemeter described last week.

AN absorption type wavemeter is not of great use on the short waves, as it does not give sufficiently accurate readings. A heterodyne wavemeter is needed, and there is no reason why you should not make use of that type of oscillating circuit known as the dynatron.

A screen-grid valve, used under certain operating conditions, can be made to oscillate and it remains only to insert a tuned circuit in the anode output of the screen-grid valve to determine the frequency of the oscillations. The photo-



The construction of the wavemeter can be followed from this plan view

graphs show a simple oscillator wavemeter, using a screen grid valve in this way. It is operated with about 30-volts on the anode, and a much higher voltage, about 90, on the screening grid. The normal grid is connected through to low-tension negative. Decoupling condensers are provided of 1-microfarad capacity. There is a switch controlling the L.T. supply, and for tuning, a short-wave condenser and a short-wave plug-in coil.

Any type of plug-in coil may be used, a 2-turn coil going down to about 15-metres, a 4-turn coil, tuning round about 20-metres, a 6-turn coil, tuning from 35-metres upwards, and other coils covering the rest of the useful short-wave band.

The unit is not connected to the set. It is stood at a good distance away, three or four feet, and switched on so that its oscillating note can be picked up on the set. It must be calibrated by choosing five or six well-known short-wavers on a known receiver. The wavemeter must then be set oscillating on each station in turn so that on the wavemeter dial you know just which setting corresponds to each station, and therefore what wavelength readings are represented by the dial degrees.

The squeak of the oscillator note will be heard on the short-waver, and you must take great care that the oscillator

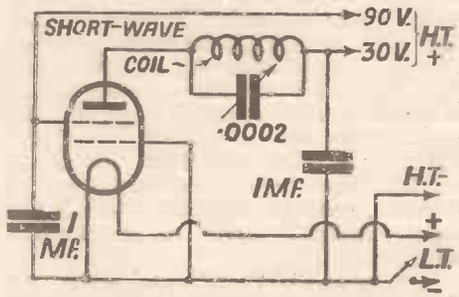
COMPONENTS REQUIRED

Ebonite panel, 7 in. by 6 in. (Becol, Lissen, Peto-Scott, Readi-Rad).
Baseboard, 8 in. by 6 in. (Camco, Peto-Scott, Readi-Rad.)
.00016-mfd. short-wave variable condenser (Stratton, Utility, J.B., Cyldon).
Slow-motion dial (Burndept "Ethovernier," Lissen, Ormond, Utility).
Low-tension switch (Bulgin, Lissen, Readi-Rad, Telsen, W.B., Sovereign).
Plug-in coil holder (Bulgin, Lissen, Igranic, Atlas, Stratton, Lotus).
Four-pin valve holder (Lissen, Lotus, Junit, W.B., Igranic, Bulgin, Clix, Benjamin.)
Two 1-mfd. fixed condensers (T.C.C., Lissen, Dubilier, Telsen, Formo).
Three yards of thin flex (Lewcoflex).
S.G. anode connector (Belling-Lee, Clix).
Three wander plugs, marked H.T.—, H.T.+1, H.T.+2 (Belling-Lee, Clix, Eelex).
Two spade terminals, marked L.T.—, L.T.+ (Belling-Lee, Clix, Eelex).
Connecting wire and sleeving (Lewcos, Jiffilinx, Quickwyre).

ACCESSORIES

Cabinet.
Screen-grid valve (Mazda 215SG, Mullard PM12, Marconi and Osram S22, Cossor 215SG, Six-Sixty 215SG, Lissen SG215, Eta BY6, Tungsram S210, etc.).
Set of short-wave plug-in coils (Stratton, Atlas, Igranic).
120-volt H.T. battery (Lissen, Drydex, Pertrix, Ever Ready, Oldham, Fuller).
2-volt accumulator (Lissen, Exide, Pertrix, Ever Ready, C.A.V., Oldham, Fuller).

setting exactly coincides with the tuning point of the stations being received for test purposes. Once this calibration has been done, the meter can be used for wavelength finding on any new short-waver. If the battery supply or valves are changed, then it is advisable to check up



The circuit of the short-wave wavemeter

the wavemeter readings. Choose suitable operating voltages so that the valve oscillates gently over the whole tuning range—even with the smallest plug-in coil in use.

For short-wave working it is a really good plan to make a calibration graph of dial readings against wavelengths, using the known stations on which you have checked up the meter. Then you can use this graph by interpolation to find the settings for other stations, and, to a certain extent, you can exterpolate and find the settings of those outside the wavelength range of those measured.

IMPROVING YOUR SET for SUMMER CONDITIONS

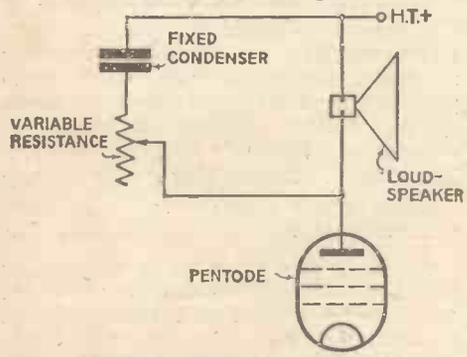
This article by ALAN HUNTER is of special interest at this time of the year, when many listeners will be on the lookout for simple ways of combating the falling off in signal strength of foreign stations

MANY sets that have given satisfactory reception of foreign stations during the present season will fall off in performance as the summer days approach. Now is the time to ask yourself whether the satisfaction of the past few months has been due to inherent efficiency in the set, or whether the signal strength you have obtained from the foreigners has been mainly due to their great field strength.

The answer will soon be forthcoming, for if the set has been working "below par" during the winter its shortcomings will be emphasised when the field strength of the foreigners suffers a seasonal decline. Thanks to the enormous power of some of the foreigners, such as Prague, Beromunster and Langenberg, a set of average efficiency will certainly bring in many alternatives to the home stations throughout the year.

A Change of Aerial

If you are keen on keeping up the log as much as possible you may be interested to see whether your set conforms with the requirements to be mentioned. Firstly, what about that aerial? Perhaps it is an indoor erection, hastily slung round the picture rail in the middle of the winter when the new set was completed. Now

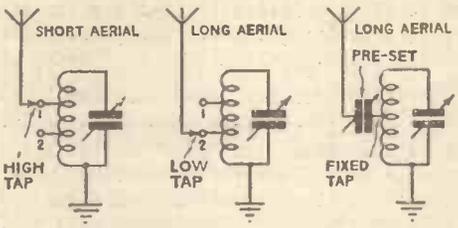


When increasing the amplification of a set by using a pentode instead of an ordinary power valve, remember to add tone-correcting components to avoid high-note accentuation

is the time to think about making a good job of the aerial—and earth—so that the maximum efficiency will be obtained during the more difficult months ahead of us.

If you decide to put up an outdoor aerial in place of an existing indoor wire, remember that any considerable increase in the length of wire may result in loss of selectivity. Many sets that are quite sharply tuned with say 30 feet of indoor wire need modification in the aerial-tuning circuit if an extended outdoor wire is put up.

Perhaps your tuning coil has two or three aerial tappings—if so try one of the smaller tappings when bringing the new and longer aerial into service. If



If you lengthen the aerial to improve its efficiency you must take precautions against broad tuning. With a tapped aerial coil a tap nearer to earth will be needed for the aerial lead when using a long wire. If there is no tap on the coil, or this is fixed, you can obtain the same effect by putting in a pre-set condenser

there is no provision for altering the aerial coupling on the tuning coil you can easily achieve much the same effect by one of the pre-set type condensers. Use one with a maximum capacity of not more than .0003 microfarad.

Do not assume that the erection of a longer outdoor wire will necessarily mean loss of selectivity, because, as a matter of fact, the average indoor aerial is heavily damped, even when it is quite short. I should say that a well-erected outdoor wire of 70-feet total length would be less likely to cause unselective tuning than a 50-foot indoor wire.

In our efforts to get the most out of the set during the summer months we must look not only at the aerial but at the power supply. A renewed high-tension battery often works wonders with a set that appears to have deteriorated in distance-getting properties. Remember that modern valves work at maximum efficiency with quite high anode voltages, and it pays, in a quest for the last ounce of efficiency, to go up to 150 volts in the high-tension.

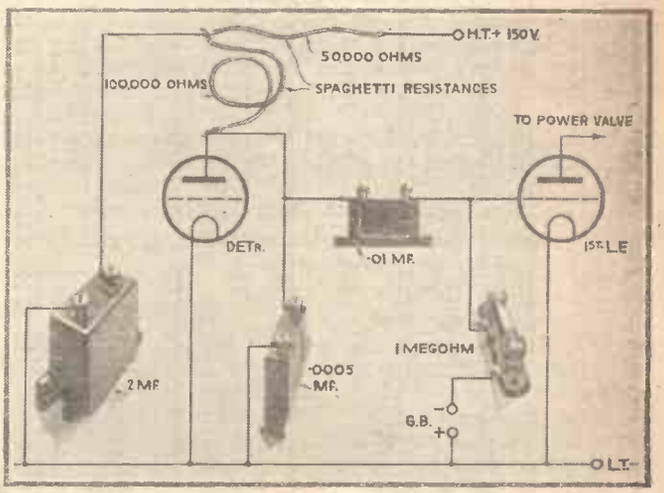
But remember also that increased voltage, especially in the power stage, means more negative grid bias, and even then the total anode current may be considerably increased, so you may need a bigger *capacity* battery if you materially increase its voltage. This point is often neglected.

Now we have done all that is practically possible to improve efficiency outside the set. Is there anything that might be altered in the set? Well, the obvious need in the summer is maximum amplification, so you might consider ways and means of increasing the overall signal magnification.

In a three-valver, with a stage of high-frequency amplification, it is possible to obtain more magnification by changing the power valve for a pentode. This may make just the difference between mediocre and good signal strength. And the modern pentode is by no means greedy in anode current. In fact for a given expenditure of anode current the pentode gives more power to the loud-speaker than an ordinary three-electrode power valve.

If you do decide to increase the "punch" of your set by adding a pentode make sure of tone-compensating the output by means of a high-note filter, consisting of a fixed condenser in series with a variable resistance, or a fixed resistance, across the loud-speaker output. Values suggested are .01 microfarad and 25,000 ohms.

When attempting to increase the magnification of the set at the low-



Here is a pictorial diagram showing the skeleton connections for an intermediate stage of resistance-capacity coupling between the detector and power valves. Note the de-coupling condenser and the anode by-pass condenser

frequency side you must also be careful not to overload the power valve. The question to ask yourself is this: "Is my present set efficient enough to load the power valve to the fullest extent when

(*Continued at foot of next page*)

SIMPLE TESTING FOR THE AMATEUR—III

TRACING THAT DISTORTION

The third of an informative series of articles by "Hotspot," specially prepared for the benefit of amateurs wanting guidance on carrying out simple tests to trace the causes of the various faults that develop from time to time in wireless sets

THERE is nothing worse than a distorting set. Much better have dead silence than reproduction that is muffled, or terribly "woofy" or excruciatingly "tinny." Now many sets start by doing well, and only develop one or other of the symptoms mentioned after some months use. This applies more especially to battery-operated sets.

I hope you will forgive me for mentioning the battery once again, but there is no doubt this part of the installation is frequently responsible for distortion. In a word, it is *run down*.

The big trouble with batteries for high tension is that there is no sharp dividing line between the useful and the useless. Thus you cannot say throw away the battery when the voltage drops from 120 to 90 volts, because many listeners will go on using the battery with quite fair results by putting up with either distortion at normal volume, or reduced volume and tolerable reproduction.

The High-tension Supply

Still, there comes a time—all too frequently—when the high-tension battery is definitely the cause of distortion, and no matter how you may juggle with the grid-bias voltages, and no matter how much you reduce the volume, the distortion can be cured only by getting a new battery.

There are many other causes of distortion. And these causes are traceable to *all points in the set*. Just a moment, though, do we know what distortion means? Shall we define it, for the sake of argument, as a mutilation of some part of the frequency range reproduced by the set and loudspeaker?

Over-doing reaction, for example, will mutilate the high-note reproduction, for by means of reaction we cut down the resistance of the tuning coil, and the outer sidebands of the incoming telephony are cut off. You can prove this point by tuning in some weak signal and then applying varying degrees of reaction. As the reaction is increased, the reproduction will tend to become more and more low-pitched as high notes are progressively cut.

At the other end of the set you have the risk of high-note accentuation produced by a pentode not provided with tone-correction. Bad matching between the output valve and the speaker is a frequent cause of distortion.

Distortion on the Local Stations

Local-station reception is more likely to cause distortion than reception of weaker signals, because the local signals are more likely to overload the valves of the set. Overloading of the early stages of a multi-valve set produces very bad distortion.

If this is suspected you might try one of the several forms of volume control before detection. With a screen-grid valve, control of screen-grid volts is quite good, although at the low volume point there is some distortion, and the best way out is a variable-mu type of valve, with the sensitivity controlled by the variation of grid bias.

Sets provided with a great deal of pre-detector amplification, or used near a powerful station, are likely to distort at the detector if suitable precautions are neglected. The so-called power-grid detector can be used, to avoid distortion due to over-loading the valve in its capacity of amplifier, by applying the maximum amount of high tension available.

Distortion in the low-frequency coupling between the detector and low-frequency or power valve is not so common these days, but can easily be produced even with good components. The nickel-alloy type of transformer should be watched for core saturation. If more than a milliampere or two of anode current is flowing through the primary, use the resistance-feed system, and so avoid the passing of direct current through the winding.

If resistance coupling is used, distortion can be caused by wrong values of coupling condenser, anode resistance and grid leak. Do not use too high a grid leak resistance, nor too low a coupling-condenser capacity.

The high-resistance leak will cause grid choking on loud passages, and the low-capacity coupling condenser will attenuate the higher audible frequencies. So will too high a value of resistance in a grid stopper, which should never exceed 100,000 ohms.

Bias

Just another point about the battery side of the business; it is ten to one that the high tension will run down long before the grid bias, but often this point is overlooked, and a running-down high-tension battery is used in conjunction with a full-voltage grid-bias. The result may be distortion, for it is just as bad to over-bias as to under-bias—so far as reproduction is concerned.

If you know the high tension is below par reduce the bias a peg or two, and you will probably find that, though the maximum undistorted volume is less than under the original conditions of full high tension and grid bias, good quality at reduced volume is now readily obtainable.

These few points only lightly touch upon the causes of distortion, but from my experience they are the most commonly recurring. As such they may be of use to you if your set is now distorting, or if you are called in to diagnose the cause of distortion in a friend's set. HOTSPOT.

Next Week: On the Track of that Background Noise.

"IMPROVING YOUR SET FOR SUMMER CONDITIONS"

(*Continued from preceding page*)

tuning to the required foreigners?" If not, you are justified in increasing the amplification before the power valve. If a small power valve is fully loaded and you want to put in an extra stage of low-frequency amplification you will also have to provide a bigger power valve. Thus a three-valver with a PM2 preceded by one transformer-coupled stage would be converted into a four-valver with a PM252.

It is not at all expensive to interpose a stage of resistance capacity coupling if your power valve will take the increased signal amplitude. All you need are two spaghetti resistances, a 2-microfared fixed condenser, a coupling condenser, and a grid leak—with a suitable valve and valve holder.

A MAINS DANGER POINT

Twist adhesive tape around wires passing near the exposed terminals of

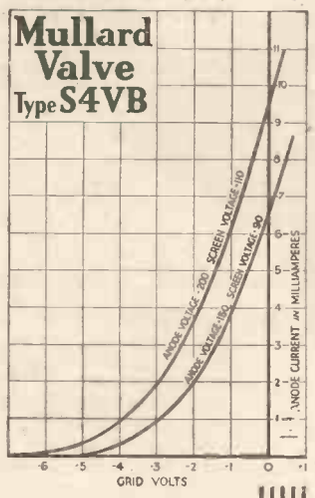
a mains transformer. This will prevent "shorts" and constant fuse blowing.

Assuming you have one of the popular detector and low-frequency type of set, the summer months will certainly be a suitable time to add a stage of high-frequency amplification. Several add-on units have been described in AMATEUR WIRELESS from time to time.

Although the medium-wave stations are apt to fade out during the summer the short waves still offer scope for keeping in touch with far-away stations. Either a super-het adaptor or a plug-in adaptor can be used with the broadcast set to tune down to the short waves.

To sum up: you can maintain a good log of foreign stations throughout this summer if you make sure of aerial efficiency, battery sufficiency and ample amplification of the incoming signal. And when the medium waves fail you can go down to the short waves.

S4VB



OVER TO THE NEW RIGID-UNIT CONSTRUCTION.

The adoption of the new RIGID-UNIT construction for Mullard indirectly heated AC mains valves is the Mullard solution to the problem of adapting modern high slope, high amplification valves to the entirely new conditions of service imposed by powerful receivers and radio-grams having large built-in moving coil speakers.

In such sets, some watts of acoustic energy are liberated in a restricted space and in close proximity to highly sensitive valves. The vibrations set up by a powerful speaker, when transmitted to the valve electrodes, cause periodic variations in characteristics. The valve becomes hyper-sensitive to a particular frequency, and energy at that frequency is built up in the circuit, is re-amplified and made audible as a powerful musical note.

The new RIGID-UNIT CONSTRUCTION ensures

PERFECT STABILITY AND

ABSOLUTE FREEDOM FROM MICROPHONY

by the use of a more stiff mechanical assembly, and greater inter-electrode clearances.

Type **S4VB** screened grid valve is one of the first types to go over to the new construction.

PRICE 19/-

OPERATING DATA.

Heater Voltage	4.0V
Heater Current	1.0A
Max. Anode Voltage	200V

CHARACTERISTICS.

(a) At Anode Volts	200	(b) Under Working Conditions, viz.	
Screen Volts	110	Anode Volts	200
Grid Volts	0	Screen Volts	110
Mutual Conductance ...	3.6 mA/V	Grid Volts	−1.5
		Amplication Factor	750
		Mutual Conductance	2.5 mA/V

Mullard Valves specified for the "Home Lover Battery 3" described in this issue:

Detector P.M.1HL

Output Valve P.M.2A

Mullard

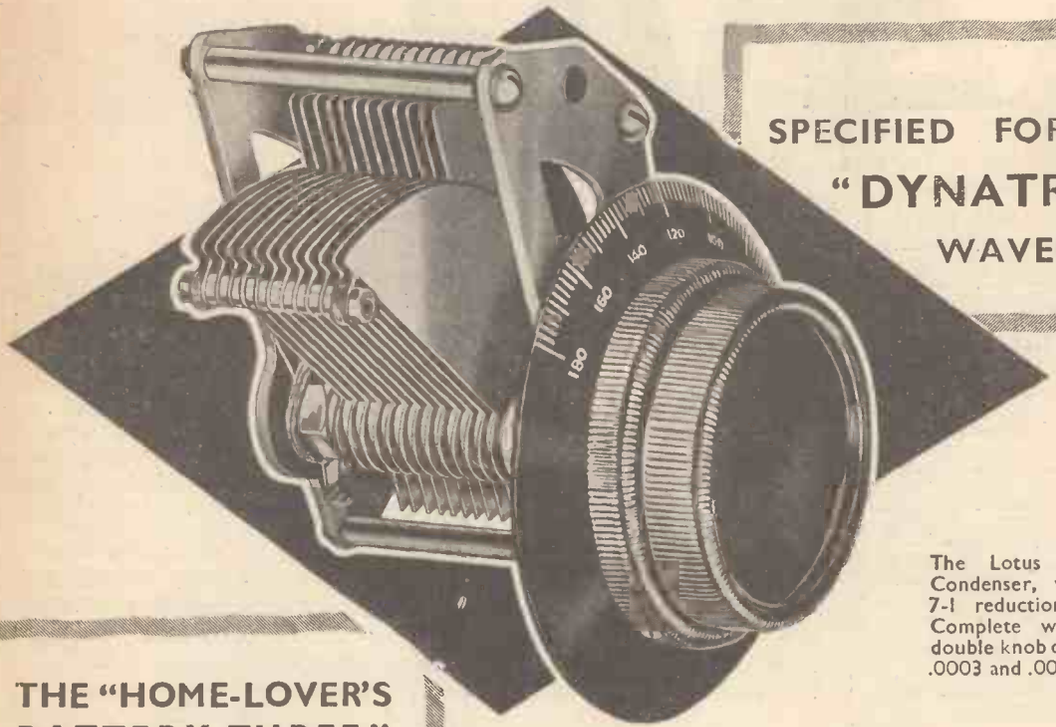
THE·MASTER·VALVE

MADE IN ENGLAND

Advt. The Mullard Wireless Service Co., Ltd., Mullard House, Charing Cross Road, London, W.C.2

ARKS

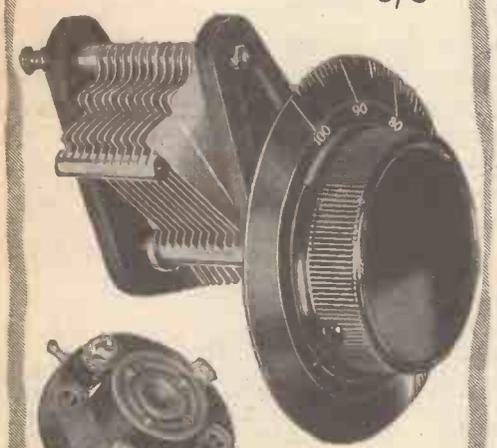
LOTUS PRECISION TUNING



SPECIFIED FOR THE "DYNATRON" WAVEMETER

The Lotus Slow-motion Condenser, with integral 7-1 reduction in spindle. Complete with double knob dial .0003 and .0005 **6/6**

THE "HOME-LOVER'S BATTERY THREE" SPECIFIES— Two Lotus Log Condensers .0005 Each **3/6**



Two Lotus Valve Holders, type VHK. each **6D.**

One Lotus L.F. Transformer **5/6**

Two Lotus H.F. Chokes. Each **2/6**

• • • LOTUS Condensers afford the last word in precision tuning. Control is delightfully smooth and absolutely silent, while sturdy construction ensures lasting accuracy and unfailing reliability.

All the leading set designers specify LOTUS. They know that for reliability and efficiency they are absolutely dependable. Follow the experts' lead : insist on LOTUS Components.

The range includes L.F. and Power Transformers; H.F., L.F., and Power Chokes; Variable Condensers; Gang Condensers; Drives; Coils; Valve Holders; Jacks; Switches, etc. All fully guaranteed.

Ask or write to-day for your copy of the LOTUS Component Catalogue. It is full of interest to the home constructor.

LOTUS

GUARANTEED COMPONENTS

LOTUS RADIO, LTD., MILL LANE, LIVERPOOL

POST THIS COUPON TO-DAY

LOTUS RADIO, LTD., Mill Lane, Liverpool.

Please send me FREE copy of the Lotus Component Catalogue.

Name .....

A.W. 7/5 Address .....

Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention

On Your Wavelength!

CITY "STATIC"

IN most big towns there are "black" spots—in the neighbourhood of electric plant—where it is practically hopeless to attempt to get reception during working hours. A wireless retailer will naturally give such areas a wide berth, if he can, as it is impossible to give any satisfactory shop demonstrations to his customers. But in some cases it is necessary to make the best of a bad job, and a solution which I hear is efficacious is to make use of two aerials set close together. One aerial is made just high enough to reach outside the densest part of the disturbing field, whilst the other is some twenty or thirty feet longer. Both aerials will then pick up interference to an equal degree, and by connecting the two down leads to opposite ends of the same input coil, the disturbing field is automatically balanced out, leaving the signal energy picked up on the longer aerial free to operate the receiver.

AN ACCUMULATOR PROBLEM

A FRIEND of mine came to me the other day with a little problem which was rather puzzling. Apparently he was using a bank of accumulators on a power amplifier, and he found that one unit was not giving its proper 20 volts. He therefore tested each cell individually and found that one cell right in the middle of the bank was showing a completely reversed polarity. The cell was not up to 2 volts, giving something approximating to 1.8 volts, but the point which puzzled him was the fact that the polarity was reversed. In other words, this cell was reading in direct opposition to the other nine cells (the unit was one of the familiar 20-volt blocks), and consequently the voltage on the whole was only 16 instead of 20 volts. He came to ask me whether I could supply any explanation as to how this had happened. Short of removing the whole cell and turning it round there seemed to be no feasible explanation, yet actually, of course, the unit was of the type in which all the cells are cast in one block, so that it was quite impossible for the connections to have become reversed in any way.

REVERSED POLARITY

I MUST confess that I was puzzled, but eventually I saw a possible solution. If the cell in question had developed a small internal short-circuit it might have discharged itself completely during the idle period when the battery was not in use. When the amplifier was started up again this cell, of course, would contribute nothing to the total current, but it would still have a negligible internal resistance, and the voltage from the other cells would force current through it. Now this current would be in such a direction as to charge the battery with the wrong polarity. The ordinary accumulator consists of two plates each containing a different oxide of lead. When the accumulator is discharged the paste on the plates is converted to lead sulphate, and, therefore, if the cell is charged in the wrong direction the lead peroxide, which usually forms on the positive plate, will form on the wrong plate and the cell will actually charge up in the wrong direction.

The cell will not be so efficient in this condition because the conversion of the paste to sulphate is not complete during the discharge process, and, therefore, there will be a certain amount of lead peroxide on both plates. The cell will, however, register somewhere around two-volts in the wrong direction, and I have actually found ordinary L.T. accumulators charged by a careless garage man with a reversed polarity.

A QUALITY TEST

ANY set which will give clear-cut reproduction on a jazz-band, particularly the saxophone, can claim good marks for quality, because the saxophone is peculiarly rich in overtones, in spite of its deep pitch. If the same set can also separate the characteristic quality of a violin from that of the cello, then it is definitely high-grade. Another test is to distinguish clearly between the harp and piano. If one sounds uncommonly like the other, it is a sure sign that the sidebands are being cut. In other words, the higher overtones are being lost, and with them some of the true musical flavour. This kind of thing is, of course, only to be expected when reaction is pushed to the limit, or if the set is otherwise being strained for something beyond its normal capacity.

PUSHES & PULLS

ONE reader writes to me to say that he doesn't think that there is very much in push-pull, after all. "If," he says, "I remove from its holder one of the two output valves of my set, the set goes on working just as it did before and there is no difference at all in the volume." Well, that's perfectly true. The set certainly continues to work and signals have just about the same loudness. But if you care to make the experiment with a push-pull set I am quite sure that you will not fail to detect *the* reason why push-pull scores. The quality suffers very considerably when you remove one of the valves, and you will find that blasting is much more prevalent. The best way of making the experiment is to choose a time when a piano solo is being broadcast from your local station. With both valves in position adjust the set so that you get good volume without any overloading. Then remove one valve and see what happens. You will find that unless you reduce the volume to a surprising extent blasting occurs pretty frequently.

OTHER POINTS

EVEN on passages where there is no actual blasting the distortion due to overloading of the output valve is present when you go over from push-pull to single output, and if your ear cannot detect it a milliammeter in the plate circuit will show it up by the kicks and waggles of its needle. Adjust the set, by reducing the volume, until no overloading takes place with one valve in the output. Then ask a really musical friend if he can detect any difference in the quality with the one valve or with the two in push-pull. If your loud-speaker is a good one he will certainly be able to do so, though he will quite likely not be able to tell you why it is that he prefers the push-pull arrangement. What happens is that you get much less harmonic distortion with two valves in push-pull than you do with a single output valve. The two valves in double harness cancel out each other's faults to a very great extent.

A PICK-UP TIP

MANY people who use pick-ups fitted to the tone arms of small gramophones are disappointed by the quality obtainable from the loud-speaker, for there seems to be often a good deal of chattering and zizzing. Actually, unless the set is being hopelessly overloaded, this chattering is due simply to the vibrations of the pick-up's armature, and the unpleasant noises come not from the loud-speaker, but direct from the pick-up itself. You can easily test this by listening with your ear close to the loud-speaker. So long as the gramophone has a lid which will close over the pick-up when a record is being played, these noises can usually be eliminated—though sometimes the lid is so thin that it doesn't serve to drown them.

SEVEN METRES

PROBABLY by the time that these lines appear in print the B.B.C.'s 7-metre transmitter will have been installed at Broadcasting House, and it is hoped that before long experimental work may be started with it. The B.B.C. is, I fancy, interested in 7-metre wireless mainly from the point of view of relaying. Readers probably know that one peculiarity of the 7-metre waves is that they travel in straight lines, like the rays of light and do not follow the contours of the earth. The range of a 7-metre transmitter, therefore, is, for all practical purposes, limited to the area visible from the top of the aerial mast. For relays of running commentaries,

On Your Wavelength! (continued)

such as that upon the Boat Race, 7-metre transmissions might be invaluable owing to the small amount of interference usually experienced, to the minute power necessary, and to the ease with which these midget waves can be focused into a beam. A certain number of amateurs are, I believe, interested in 7-metre work, and any of them who live in or near London may benefit by the transmissions from Broadcasting House, once these are under way.

AUTOMATIC VOLUME CONTROL

HAVE you ever operated a big set fitted with automatic volume control? If you have you must have come to the conclusion that it is very nearly the ideal kind of apparatus for reception. Automatic volume control has very much the same effect upon the wireless set as have the "governors" upon a gramophone motor. The governor prevents the engine from racing and keeps its speed practically constant; automatic volume control prevents the set from ever assaulting your ears with a horrid blare when you turn unexpectedly to the wavelength of some powerful transmission. When the set is installed you adjust the volume of the local station to suit your requirements. Then you don't need to touch this control again. Every station that is within full loud-speaker strength range of the set will then be received at exactly the same strength.

HOW IT IS DONE

THERE are several ways of obtaining automatic volume control, but there is only one which is at all widely used. The basis of the whole scheme is the variable-mu screen-grid valve, which, as you know, amplifies to a greater or less degree according as its grid bias is made less negative or more negative. In addition to the ordinary valves of the receiving set, an extra controlling valve is required. This is generally arranged in parallel with the detector. Its plate current rises and falls according to the strength of the incoming signal, and by suitably connecting the cathodes of the variable-mu valve the grid bias of these valves is increased by a strong signal and decreased by a weak one. The result is that the volume produced by the set is delicately governed and the sound level is kept practically constant.

FADING DEFEATED

AND there is another wonderful point about A.V.C. You know what a nuisance it is sometimes when you tune in a fine programme from a foreign station only to discover that fading is in evidence. The signal builds up gradually to an ear-splitting roar, then wanes and falls away to a whisper. In automatic volume control the high-frequency magnification is decreased as signal strength rises and increased as it falls. You thus obtain very nearly constant volume unless, of course, fading is so bad that the signal is going right out at times. The only thing that you are conscious of in listening to a fading station is that interference, if there is any, increases and decreases rhythmically. The reason is that at maximum periods, with minimum amplification in use, the wanted signal is sufficient to drown it, though at minimum periods with maximum amplification it isn't. Some of this year's big sets are to have automatic volume control, and I hope that it won't be long before it becomes a standard fitting on the bigger fellows.

A REAL MENACE

SOME of the lay papers, I see, are becoming alive to the reality of the threat to European broadcasting to which I called attention in these columns many moons ago. This lies in the development of the Russian scheme for a mighty chain of giant broadcasting stations. The first of these, at Petrograd, will have come into operation ere these notes appear in print, and readers who use the London Regional as their staple provider of entertainment may have had their first taste of what is likely to happen. The Petrograd station, when it works up to full power, will, it is stated have 250 kilowatts in the aerial, a power more than twice as great as that of any other station in Europe. Its wavelength is only 5 metres below the London Regional's and the kilocycle difference is 12.5. Though there should be no heterodyne, provided that the Russian station adheres to its wavelength, I anticipate that considerable interference with the London Regional programmes may be caused to owners of not very selective receiving sets. At least a score of huge stations are projected, or in some cases already nearing completion in Russia, all of which are intended to operate within the limits of the medium waveband. Unless a way can be found out of the tangle likely to arise, a big proportion of European stations may be adversely affected within the next eighteen months.

A SUGGESTION

ONE of the troubles is that, though the Russians have been invited to various wavelength conferences, their stations are regarded for channel allocation purposes as being outside Europe. Hence they do not come into the Prague Plan. This was all very well so long as most of the Russian stations were using one or two kilowatts. A station of this kind, for instance, operating at Sebastopol on 476 metres is not very likely to cause interference with listeners to the Northern Regional on 480 metres or to Langenberg on 473 metres. But just imagine Sebastopol's power going up to 100, 200, or 500 kilowatts, and you will see at once that both the Northern Regional and Langenberg would be bound to suffer.

It seems to me that there is a way out of the difficulty which has possibly not occurred to those who are responsible for organising European broadcasting. At present, countries which are members of the International Union are limited as regards the number of their stations, but there seems to be no particular limit to the power that each station may use. What I suggest is that each country should be given a kilowatt quota in proportion to its population. The kilowatts allotted would represent the maximum that might be used by all the broadcasting stations of that country taken together.

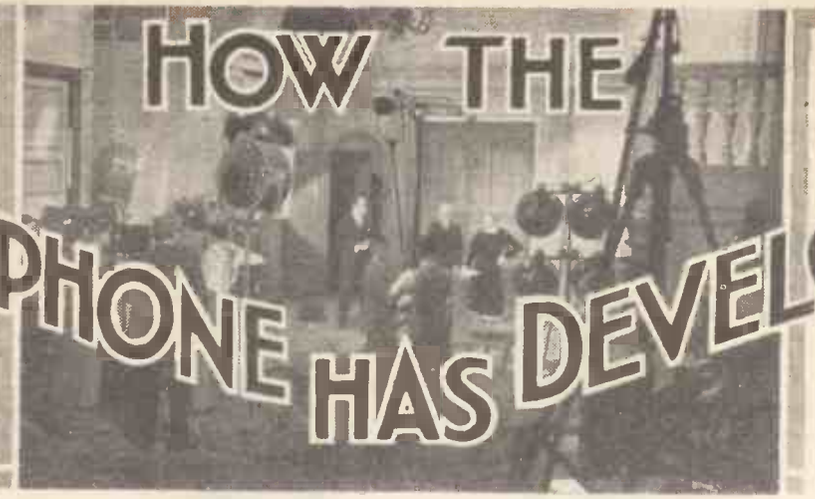
HOW IT WOULD WORK

IT would be open to a country allotted, say, 200 kilowatts, to operate two 100-kilowatt stations, or four rated at 50 kilowatts, or ten at 20 kilowatts. The higher the power you use, the more interference you are liable to cause at short, medium, and long ranges owing to the spread of the station. But under this scheme, if you want to increase your power you must reduce the number of stations, which means that you automatically clear certain wavelengths. The basis I would suggest for the scheme would be, say, 3 kilowatts per million inhabitants. This would give our own country a total of about 150 kilowatts, and it would mean that the B.B.C. could either work out the regional scheme with ten 15-kilowatt stations or operate five 10-kilowatt stations on the medium waveband, plus a 100-kilowatt National on the long waves. I think that there is something in the idea, and I feel pretty sure that a scheme on these lines will eventually have to be adopted.

ANOTHER POINT

THERE is one point which I think ought to be very seriously considered by the next general conference of the U.I.R. This is that such enormous strides have been made in the design of modern receiving sets that a power rating of 50 kilowatts is now quite unnecessary in order to provide a reasonable service area for a station. In a good receiving set of, say, the three-valve order, we have ample selectivity and ample sensitiveness for the reception of a 20-kilowatt station at a range of at least 100 miles.

How ridiculous the position is at the present was shown in a recent issue of AMATEUR WIRELESS, when it was mentioned that measurements made by the B.B.C. had disclosed that the field strength of many foreign stations was 2 or 3 millivolts per metre in the London district. This means that with any reasonable set, London is definitely in the service area of stations hundreds of miles away. Readers know that with a good three-valve set, such as the "Mascot," there is little to choose between the volume or quality obtainable from home and foreign stations. It seems, therefore, that if interference is to be avoided on the overcrowded waveband, there should be a movement for a limitation of the service areas of stations or, in other words, that there should be an all-round reduction of output rating.



HOW THE MICROPHONE HAS DEVELOPED

MY PAL—MIKE

By Baynam Honri

FROM the very beginning of broadcasting, when Melba sang into an old "solid-back" Post Office type microphone at Chelmsford, public interest has been focused on the microphone more than any other individual component of the technical trappings of transmission via ether.

The microphone—now so familiarly known as "Mike"—is no recent invention. Edison, Hughes and Hunnings patented microphones in 1878, and these were the first instruments that definitely set out to transform variations in air pressure, such as those caused by the sound of the human voice, into impulses of electricity. At that time the whole idea of the telephone as a method of communication was quite new, but its development was hampered by the fact that receivers had to be used both for speaking and hearing, and the distance over which the telephone could be employed was limited by the resistance of the lines and the lungs of the communicators!

The action of nearly all the earliest microphones was based on the principle that a loose contact formed between two non-oxidisable substances is subject to great variations in resistance, depending on the intimacy of contact between the two surfaces. The "bad contact" formed,

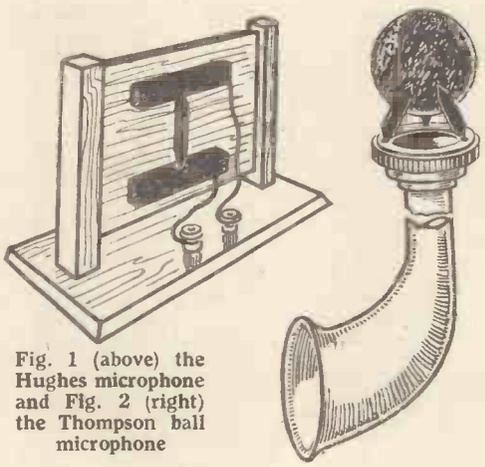


Fig. 1 (above) the Hughes microphone and Fig. 2 (right) the Thompson ball microphone

for instance, between a carbon pencil supported by, and forming an electrical circuit with, two carbon blocks, was the method used in Hughes' original invention. In his primitive but effective device the carbon blocks and pencil were mounted on a thin sounding board, as illustrated in Fig. 1. The vibrations produced by shouting at the sounding board agitated the carbon pencil on its supports and caused fluctuations in the resistance of the circuit, and the varying current so controlled was sufficient to make loud sounds and quite recognisable speech in a telephone receiver connected in the same circuit. Another early microphone was that of Hunnings, in which loosely granulated carbon was placed between a diaphragm (a thin sheet of platinum) and a solid block of carbon at the back of the instrument. Another early effort, which was really an attempt to get around certain strong patents, was that of the then Prof. Sylvanus Thompson, in which the "diaphragm" was a carbon ball resting on three carbon pencils (Fig. 2).

A new type of condenser microphone—the "bomb"

Slow Progress

In the years that followed, improvements were made on these early microphones, but only in practical details. The Hughes or the Hunnings principle was strictly adhered to, for it was efficient and cheap, and gave sufficiently good quality for telephone work, the only field in which microphones were used. In fact, it was not until the radio era dawned and radio telephony became a possibility that there were any great departures from the form of microphone which was virtually the same as the Post Office type now in use.

Early Radio Mikes

The first wireless transmitters were of the spark type, still used on ships, and painfully familiar to coastal listeners. It was realised in about the year 1900 that if the periodicity of the spark of a wireless transmitter could be speeded up so as to become practically a continuous wave, the modulation of its oscillations by a microphone would result in the radio transmission of speech. The great difficulty that confronted pioneers in radio telephony was the fact that the ordinary microphones available could only carry a current of about ¼ ampere without packing badly, and furthermore, their resistance was high for direct use in aerial or oscillating circuits. Meanwhile the arc type of wireless transmitter had been invented, and radio telephony was attempted on this system with far better results.

The R.C.A. "ribbon" microphone

Power Microphones

So far, little attempt had been made to improve the tonal quality of the microphone. Efforts had been concentrated upon increasing its power of control, so that big enough microphones could be evolved to control the colossal aerial radiation of the big arc wireless stations

that were erected between 1905 and 1914. Ranges of up to a hundred miles were obtained from time to time by various experimenters, and one of the most successful of these was W. T. Ditcham. Standing in the middle of a room full of flashing sparks and creaking condensers, Mr. Ditcham shouted into a huge water-cooled microphone in Letchworth and was regularly received on a crystal set at Northampton, 34 miles away. All kinds of peculiar microphones were designed for radio at that time—all with the prime object of directly controlling high-frequency currents. These varied from dozens of carbon microphones in parallel to flame, water, condenser and liquid jet contrivances, and many of them gave fairly good performances.

Enter the Valve

It was the invention of the valve that made further progress with microphone development possible. In the first instance, there was a reversion to the standard type of P.O. microphone; for that was all that was necessary for controlling the grid or aerial circuit of a valve radio transmitter. But at the same time, the valve was being utilised as an amplifier, and this enabled the condenser type of microphone, previously used directly in the aerial circuit of a transmitter, to be used . . . not for radio transmission, but for experimental work on sound that had not previously been possible.

The Cause Of It All

Broadcasting has been blamed for many things, but its popularity has led to the highly specialised development of its every link. The instant popularity of broadcasting was responsible, indirectly, for the perfection of high-quality microphones and loud-speakers; for the use of public address systems, for electric gramophone recording and for talking films.

Bandana Days

At the commencement of broadcasting in this country, there were available the earlier models of the three types of microphone still in general use. The carbon microphone was represented by the solid-back P.O. type (quickly abandoned as being unsuitable for broadcasting) and the Western Electric high-quality double-button microphone. Moving-coil and moving-iron microphones (yes! and loud speaker bases used as microphones) there were in plenty, and the best of these was the Marconi-Sykes, a moving-coil instrument, adapted for B.B.C. use by Capt. H. J. Round. The condenser was unstable and unreliable at that time, though encouraging results were obtained at the Birmingham station, where the B.B.C. had a complete Western Electric equipment.

—and To-day?

At the present time there are available high-quality condenser, carbon and magnetic microphones, and the type used depends on the particular service it is required to give. For broadcasting, a microphone is wanted that requires little attention and can be depended on to "perform" in a studio for hours and hours without giving trouble. So far, the carbon microphone (represented by the Marconi-Reisz) has fulfilled these conditions, but there are signs that the condenser type is gaining ground. The disadvantages of the high-quality carbon mike are: audible carbon hiss, blasting on loud sounds, and (sometimes!) a peculiar mushiness about the high notes.

The Condenser Mike

Condenser microphones suffer from the disadvantage that their output is extremely low, and that they must have a valve amplifier attached to them. They are free from hiss or background noise, so long as they are kept dry, and they have a crisp and slightly hard tone ("brilliant") due to the resonance of the cavity in front of the diaphragm, a resonance which

The Jenkins and Adair condenser microphone

results in a rather higher response to frequencies in the region of 3,500 cycles. This brilliant tone, giving great intelligibility, is particularly suitable for talking-film work. In gramophone recording, the brilliant, but slightly metallic tone has been found to be advantageous. By comparison, recordings made with a carbon microphone sound dull when reproduced on the average acoustic gramophone.

One Man's Meat—

Magnetophones of various types, including particularly the "ribbon" mike, are used in talkie work, where the directional effect is an advantage. From the quality point of view, however, it is a debatable point whether ribbon mikes are better than carbon or condenser types, and sound-film recording engineers wax eloquent in favour of one or the other. My own experience in recording inclines me towards the condenser microphone for general film work, though there are certain scenes and certain sounds where I prefer the ribbon or carbon mikes. For public address outside broadcast and topical film work, the carbon microphone is by far the most convenient to use; its reliability under various temperatures, rough handling and hasty setting-up being supreme.

Microphones and Loud-speakers

From the very beginning of microphones their progress has been determined by the means of reproduction, whether it be by telephone, loud-speaker or gramophone. That is why, at the transmitting or recording end, the highest quality microphone (from the theoretical point of view) has not necessarily been the one chosen. In broadcasting, for instance, it was unnecessary to use a microphone with a high bass response when no receivers or loud-speakers could reproduce such low notes. But the B.B.C. was prepared for progress at the receiving end, and anticipated good bass reproduction by a few months. In talking-picture work, we try various new microphones from time to time, some with very fine frequency characteristics. But actual tests invariably show that, on the average cinema reproducing equipment, the newer and finer microphones give poorer intelligibility and lifeless quality! This is due to the rapid falling off of the reproduction of frequencies above 5,000, on which microphones with a flat frequency characteristic up to 10,000 are not always satisfactory.

High Ideals—and Filthy Lucre!

But this is only temporary. The time is not far off when 50 to 10,000 cycles will be the range of reproduction for radio, talkies and possibly gramophone records. At the present time, radio is well ahead; the B.B.C. is fortunate enough to be able to set its own standards at the microphone end. Talkie makers have to progress more stealthily, taking care that their product will sound intelligible on the bad as well as the good cinema projectors.

The brass band concert on May 14 in the North Regional programme, will be given in the Newcastle studio. The Harton Colliery Band will be heard.

Two relays will be taken for the West Regional transmitter from the Somerset Week at Bath, which runs from May 12 to May 21, inclusive. On May 14, the Band of the 2nd Battalion of the Somerset Light Infantry will be relayed from the Pavilion, Bath, and on May 18 a concert will be relayed from the Pump Room.

"The Eleventh Annual Welsh Children's World Message" will be given during the West Regional Children's Hour by the Rev. Gwilym Davies, M.A., on May 18. The Children's Hour, which begins at 5.15 p.m. will be devoted on this day to a special programme entitled "A Girdle round the World," arranged by Raymond Glendenning.

A recital of organ music by Italian composers will be given by Herbert Westerby on May 20.

The short stories which have been read to North Regional listeners by their authors on Thursday afternoons have proved quite a popular feature. On May 12 Miss Phyllis Bentley will read "One Night in Bradford."

THE PICK OF THE MONTH'S RECORDS

A GUIDE TO THE BEST OF THE LATEST RELEASES.

The records reviewed below are a careful selection of the best of the recent issues. It will be noted that criticism is chiefly devoted to the treatment of the music and quality of recording rather than the actual composition.

ORCHESTRAL RECORDS

Suite Americana, 1s. 6d. WIN 5444
A first-rate cinema performance by the Commodore Orchestra. The more one hears Muscant's men the better they seem.

Speak to Me of Love and **Granny's Photo Album**, 1s. 6d. WIN 5443
Another good pair by the Commodore Orchestra, but these have "vocals."

Souvenir d'Ukraine and **That's Why Darkies Were Born**, 1s. 6d. FILMO 407
This is quite a good performance by Reg. King and his Orchestra. The tone and recording improve.

March from "Tannhauser" and **Prelude to Act 3, "Lohengrin,"** 6s. H.M.V. DB1557
From Chicago (S.O.). Played with tremendous verve. There is no doubt that this orchestra knows Wagner. Its performance here will more than satisfy the popular idea of this composer.

Leonora No. 1 Overture, 6s. COL LX160
Another delightful performance by the Concertgebouw Orchestra, with Mengelberg conducting. Here is good music at its best.

Stradella Overture, 4s. COL DX326
Flotow's piece seems to be having a run. Here is a creditable performance by the Bournemouth Municipal Orchestra. It's a jolly thing, well worth hearing.

Poem—Fibich and **Humoreske—Dvorak**, 1s. 6d. BRDCST 3154
Quite well played by a Viennese Salon Orchestra, but the volume is *far* too heavy for these pieces—they might be massed bands!

Di Ballo Overture, 4s. H.M.V. C2308
Here is a lively, tuneful composition written by Sullivan in his young days before his collaboration with Gilbert in the operas. A thoroughly light-hearted piece, which will be liked, I feel sure.

Second Symphony, Borodin, 18s. H.M.V. DB1554-6
The impressions one forms in listening to this symphony is that it portrays national history, with its alarums, festivities, and troubles. And yet it is in no way "impressionistic" as the term is now understood. The performance, by the L.S.O. under Coates, is wholly excellent and the recording commendably judicious; that is to say that volume has been kept within bounds.

A Supper with Suppé, 1s. 1d. PIC 911
What an appalling title! Thank goodness, the Athanaeum S.O. retrieve the maker's reputation by their playing, which is good.

BAND RECORDS

Americana, 4s. H.M.V. C2335
A really fine example of playing and recording. This performance of the Coldstream Guards Band is exceedingly impressive. There is no *finesse* about the piece: it is just a straightforward piece of heavy music and is so played. The volume is terrific.

Pique Dame Overture, 2s. 6d. STERNO 8026
This light-hearted Suppé piece is most capably handled. The wood-wind is really good and the volume is impressive.

Caliph of Bagdad Overture, 2s. 6d. COL DB744
The B.B.C. Military Band provide a record here which is a refreshing change from marches and medleys.

Faust Selections, 1s. 6d. WIN 5466
If you like Faust by a military band, you will find this record quite pleasing.

DANCE RECORDS

Hullo, Twins, 1s. 1d. PIC 905
A comedy fox-trot which is mostly vocal, but excellent fun.

Mona Lisa and **Hold My Hand**, 1s. 6d. WIN 5458
Well played, but marred by the vocal part.

Granny's Photo Album and **My Mystery Girl**, 1s. 6d. WIN 5462
Well put over in real modern style, especially the latter.

Live, Love, and Laugh and **Just Once for all Time**, 1s. 6d. WIN 5414
Really first rate in every way.

Memories and **That Naughty Waltz**, 1s. 6d. PANA 25120
Two waltzes whose performance is very fair.

Kiss Me Good Night, not Good-bye and **My Mystery Girl**, 1s. BRDCST 815
A sparkling performance by Bidgood's Good Boys.

One More Kiss and Then Good Night and **Home**, 1s. 6d. BRDCST 3157
A really rhythmic, polished performance which owes nothing to the recording.

INSTRUMENTAL RECORDS

Traditional Scottish Airs, 1s. 6d. WIN 5432-3
Some old favourites played by a trio of pianoforte, violin, and clarinet. Quite unusual and interesting.

Waltz in A Flat (Brahms), The Bee (Schubert), and **Slavonic Dance (Dvorak-Kreisler)**, 2s. BRDCST 5266
These violin solos by Winifred Small are skilfully played, but the recording is not too good: there are muzzy passages here and there.

Serenade (Schubert) and **Cavatina (Raff)**, 1s. 3d. STERNO 867
A very satisfactory performance by Walter Meysowitz's Octet.

Voices of Spring and **Echoes of Vienna**, 4s. COL DX328
Brilliant, and still more brilliant. This is the story of these two pianoforte solos by Ania Dorfmann. It is difficult to tackle this Viennese stuff on the piano without making it sugary, but I feel that this errs in the other direction.

A Perfect Day and **Love's Old Sweet Song**, 1s. 6d. WIN 5463
Two cinema organ solos by Harry Davidson. The performance is excellent; there are no tricks, and I imagine it will be greedily absorbed.

VOCAL RECORDS

One Little Quarrel and **Because I Worship You**, 1s. 6d. WIN 5451
The description "Blues Ballads" made me shudder, but I played and enjoyed this record. In its class it is wholly admirable—every American should be compelled to buy a copy.

The Song that Reached My Heart and **Drinking Song, Rose of Persia**, 2s. 6d. H.M.V. B4045
Two queerly assorted companions, surely! Walter Glynne is better in the first. The second demands a little more robust voice.

One Alone and **The Desert Song**, 1s. 3d. STERNO 874
Spencer Carlton, baritone, has a considerable voice and handles the two revivals quite well.

That's Why Darkies Were Born and **The Thrill Is Gone**, 2s. 6d. BRUNS 1250

MISCELLANEOUS RECORDS

The Verdict and **The Last Trail**, 4s. H.M.V. C2340
The second and third prize "thrillers" in a recent competition. These are far better than "Down the Vale" from the viewpoint of dramatic force. "The Verdict" is *quite* well done.

He Played His Ukelele as the Ship Went Down, 1s. 6d., PANA 25154; 1s. 6d., WIN 5471; 1s. 3d., STERNO 882; 1s. 6d., BRDCST 3151
These four versions are placed in order of merit. The first two are well put over, the last two are indifferent performances.

The Clock is Playing and **Bells Across the Meadows**, 1s. 6d. FILMO 404
Two novelty numbers well put over by John Johnson's Novelty Orchestra. They would have been better still had they not been treated as conducted tours!

Scotch Hot and **Two of Irish**, 1s. 6d. WIN 5465
These bell solos by Rudy Starita are good because of the splendid orchestral accompaniment—speaking Irish, as it were!

I Don't Work for a Living and **Hallelujah, I'm a Bum**, 1s. BRDCST 812
Lazy cum hill-billy humour well put over by Monte Hunter. A quaint pair, these songs.

Volante March and **Bertina Waltz**, 1s. 1d. PIC 914
A fine record of a gipsy accordeon band. The volume and skill of the playing are astonishing.

Lovely Night and **In a Pine Forest**, 1s. 1d. PIC 912
Balalaika music well put over (if you like these instruments).

"RECORDER."

The HOME BATTE

AN UP-TO-DATE SET EMPLOY BATTERY VALVE—*Designed ULTRA SELECTIVE*

SO great was the success of the "Home-lover's All-electric 3" recently described, a short resumé of which is given on page 842, that we have now produced a battery version. This retains the advantage of the original set in having a variable-mu valve.

Just what is the advantage of this variable-mu? Undoubtedly, a greatly improved form of volume control. By varying the negative grid bias on a variable-mu type of screen-grid valve it is possible to obtain a wide variation in the valve's amplification, and therefore in the volume output, without appreciably affecting the quality of the reproduction.

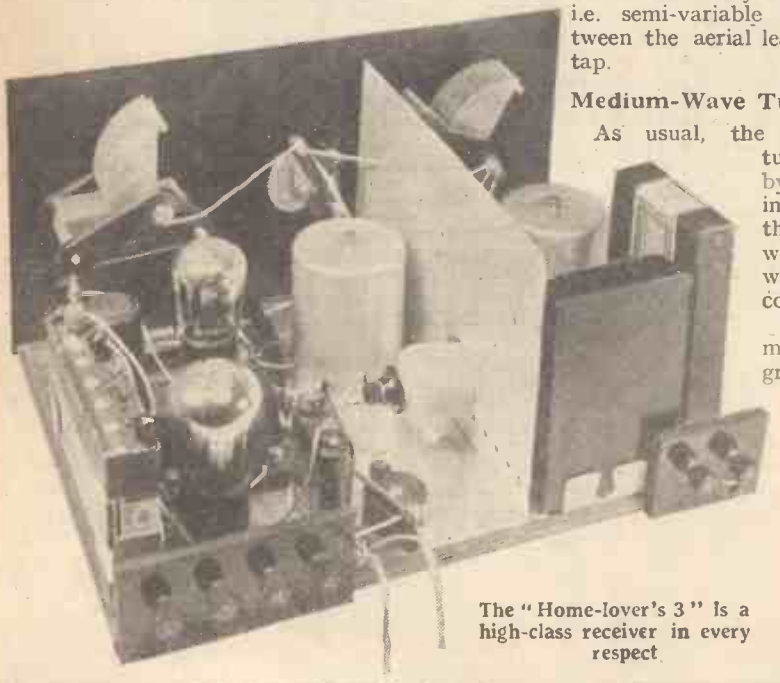
The Battery Variable-mu

Until recently the variable-mu valve, with all its advantages, has been available only to mains-sets users. But now we have the Cossor variable-mu for battery operation. This valve has made possible the design of the "Home-lover's Battery 3."

As might be expected, the three valves of this new set are arranged in the popular sequence of high-frequency amplifier, detector and transformer-coupled power output. As far as possible the features of the original all-electric model have been retained.

For the benefit of those unacquainted with the original it will be as well to go over the circuit details, which can be studied from a careful examination of the theoretical circuit reproduced herewith.

The aerial circuit is quite straightforward. There is a screened dual-range coil by the usual .0005-microfarad variable condenser. The tuning coil has an aerial tap, so that a high degree of selectivity is obtained. A further aid to selectivity is a .0003 preset, i.e. semi-variable condenser, between the aerial lead and the coil tap.



The "Home-lover's 3" is a high-class receiver in every respect

Medium-Wave Tuning

As usual, the medium-wave tuning is effected by short-circuiting a portion of the coil, and long waves are tuned with the whole coil in circuit.

As a variable-mu type of screen-grid valve is used, certain modifications are necessary in the grid circuit connections in order to apply the necessary negative bias to the control grid. It should be noted that the earth return lead to the negative side of the filament of the screen-grid valve is intercepted by a 1-microfarad fixed condenser, thus isolating the control grid from the potential of the filament battery.

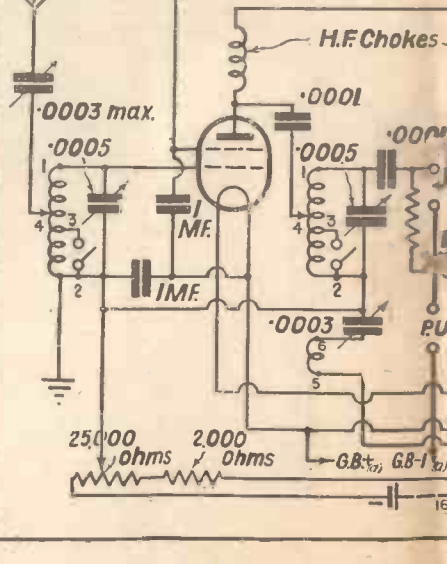
A Stable Set

It will be seen that the earth side of the aerial coil is taken to the slider of a potentiometer, the winding of which is connected across a separate bias battery of 18 volts.

The 2,000-ohm resistance is connected in series with the 25,000-ohm potentiometer winding so that when the slider is at the minimum negative point there is still a small negative potential applied to the grid. This confers the advantage of stability of operation and absence of cross-modulation.

The screen-grid obtains its potential from the high-tension battery in the usual way with a 1-microfarad condenser connected between the screen-grid and earth as usual.

The circuit follows closely that of the "H such a notable success and of which a



COMPONENTS REQUIRED

Ebonite panel, 14 in. by 7 in. (Becol, Lissen, Peto-Scott, Trelleborg).
Baseboard, 14 in. by 10 in. (Camco, Peto-Scott, Clarion).
Aluminium foil, 14 in. by 10 in. (Peto-Scott, Readi-Rad).
Two .0005-mfd. variable condensers (Lotus, Lissen, Polar, Telsen, Dubilier, Utility, Igranic).
Two .0003-mfd. reaction-type variable condensers (Polar, "Compax," Lissen, Telsen, Lotus, Readi-Rad, Formo, Ormond).
Gramo-radio change-over switch (Bulgin, type S.86; Lissen, Readi-Rad).
Three-point push-pull shorting switch (Bulgin, Lissen, Telsen, Wearite, Readi-Rad).
Combined three-point shorting switch and 25,000-ohm potentiometer (Wearite).
Two screened dual-range tuning coils (Lissen).
Horizontal-mounting screened-grid valve holder. (W.B., Lissen, Junit).
Two four-pin valve holders (W.B., Lissen, Lotus, Telsen, Benjamin, Wearite, Clix, Bulgin, Junit).
Two 1-mfd. fixed condensers (Telsen, Lissen, Dubilier, T.C.C., Wilburn).
1-mfd. fixed condenser (Dubilier, Lissen, T.C.C. Telsen, Wilburn).
Two .0001-mfd. and one .0003-mfd. fixed condensers (Lissen, Dubilier, T.C.C., Telsen, Sovereign, Ormond, Formo).
1-megohm grid leak (Dubilier, Lissen, Telsen, Sovereign).
Grid-leak holder (Readi-Rad, Lissen, Bulgin, Telsen).
High-frequency choke (Lewcos, Lissen, Telsen, Lotus, Igranic, R.I., Climax, Varley, Readi-Rad, Wearite, Atlas, Watmel, British General).

-LOVER'S
RY-3-

ING THE NEW VARIABLE-MU

by S. Rutherford Wilkins

Now we come to the method of coupling the screen-grid valve to the detector. The popular choke-feed system is used, as this gives very good selectivity with a high degree of sensitivity. A high-frequency choke is connected in the anode circuit of the screen-grid valve and the voltage developed across this choke is handed on to the detector grid-tuning circuit through a .0001-microfarad fixed condenser, which goes to a tap on the dual-range grid coil.

Fine Quality

This grid coil is similar in every way to the aerial coil, both being of the modern dual-range screened type with external short-circuiting switch for changing from medium to long waves.

The values chosen for the detector, namely .0001 microfarad and 1 megohm, give something approaching power-grid detection, with all the advantages of distortionless rectification and amplification.

Reaction is applied to the grid-tuning coil by means of a nearby winding in series with a .0003-microfarad reaction condenser, the fixed plates of which are at earth potential. Efficient detection and adequate high-frequency by-passing are maintained by the .0003-microfarad fixed condenser connected between the anode of the detector and earth.

SIMPLE CONTROL

The detector is coupled to the power valve in the normal way by means of a transformer with the usual 20,000-ohm resistance and 1-microfarad fixed condenser for decoupling the primary circuit.

Grid bias to the power valve is obtained from a separate 9-volt battery.

Such, then, is the complete circuit analysis of the Home-lover's Battery 3, which, with the specified valves, gives full loud-speaker reproduction with excellent quality from a large number of stations for a total anode-current consumption of just over 9 milliamperes with a 120-volt high-tension battery.

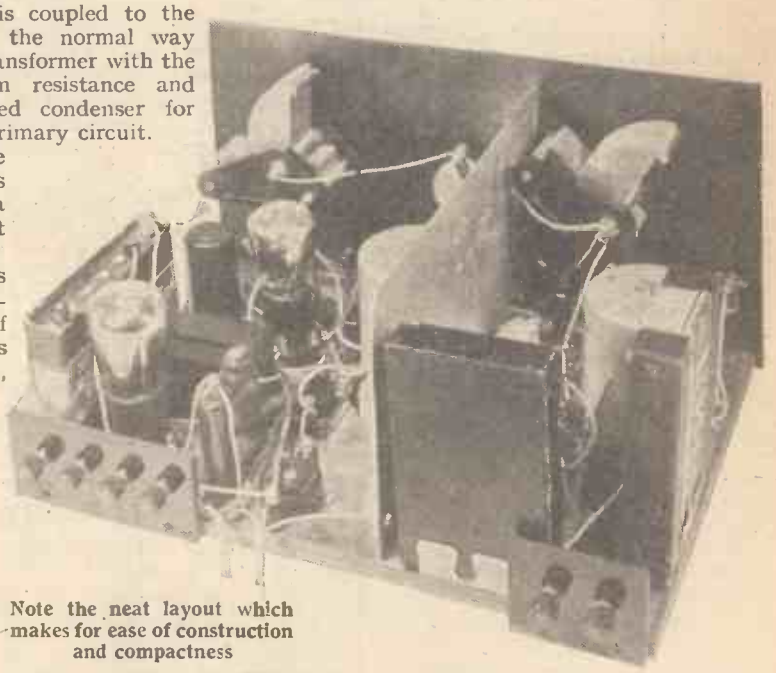
Simple to Build

Next week full constructional details will be given, but here it should be pointed out that the assembly is simplified by the use of screened dual-range coils mounted one on each side of a simple vertical aluminium screen fitted to the baseboard, which is covered with tin foil to complete the screening. Comparison with the original "Home-lover's All-electric 3," of which a brief description is given on another page, will show the similarity of the two receivers.

The Wiring Diagram

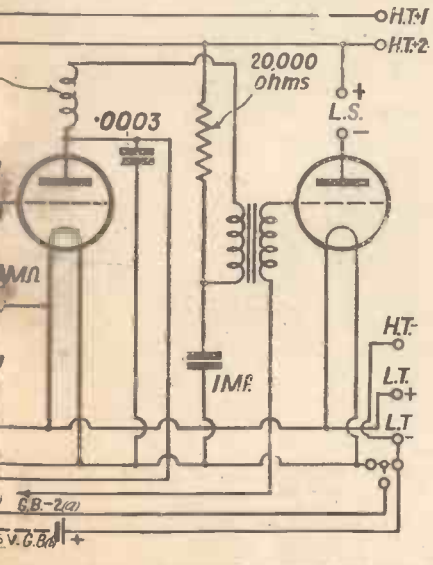
Although so efficiently screened, assembly work is unusually simple. A reproduction of the blueprint on a reduced scale together with full constructional details will be give next. A full-size blueprint is available and the price of this is only 1/-; it can be obtained, post free, from our blueprint Department, AMATEUR WIRELESS, 58-61 Fetter Lane, E.C. 4.

London readers can see how simple the "Home-lover's Battery 3" is to build by examining the original model which is on view in the Radio Department of Messrs. Selfridge in Oxford Street, London. Look out for full constructional and operating details of this new set next week!



Note the neat layout which makes for ease of construction and compactness

Home-lover's All-electric 3" which was a brief summary is given on page 842



COMPONENTS (Continued)

High-frequency choke (British General, Lissen, Telsen, Lotus, Igranic, R.I., Climax, Varley, Readi-Rad, Wearite, Atlas, Watmel).
Two spaghetti resistances, one 2,000-ohm and one 20,000-ohm (Bulgin, Lissen, Lewcos, Telsen, Varley, Sovereign, Igranic, Tunewell).
Low-frequency transformer (Lissen, "Torex" R.I., Telsen, Lotus, Lewcos, Varley, Ferranti, Igranic).
Partition screen, 10 in. by 6 in., with hole for S.G. valve (Peto-Scott, Readi-Rad, Parex).
Terminal strip, 7 in. by 2 in. (Becol, Peto-Scott).
Six terminals, marked Aerial, Earth, Pick-up (2), L.S.+, L.S.— (Belling-Lee, Clix, Eelex).
Four yards thin flex (Lewcoflex).
One foot single shielded flex (Lewcos).
Connecting wire and sleeving (Lewcos).
Ten wander plugs, marked G.B.+ (3), G.B.—, G.B.—1 (2), G.B.—2, H.T.—, H.T.+1, H.T.+2 (Belling-Lee, Clix, Eelex).
Two spade terminals, marked L.T.+, L.T.— (Belling-Lee, Clix, Eelex).
Two single grid-bias battery clips (Bulgin, type No. 2).
Pair grid-bias battery clips (Bulgin, type No. 1).

ACCESSORIES

Loud-speaker (W.B., type P.M.4).
Three 9-volt grid-bias batteries (Lissen, Ever Ready, Pertrix, Drydex, Siemens, Fuller).
120-volt H.T. battery (Lissen, Ever Ready, Pertrix, Drydex, Siemens, Fuller, C.A.V.)
2-volt accumulator (Lissen, Ever Ready, Pertrix, Exide, C.A.V.).
Cabinet (Peto-Scott).

Our Broadcast Critic TALKS ABOUT VARIETY

BILLY MAYERL—
the well-known syncopated pianist

THE essential feature of successful vaudeville is undoubtedly its variety. The B.B.C. has evidently realised this by making each item last roughly seven minutes. Recently, however, I have noticed a tendency to lengthen some items and shorten others. This is all very well so long as they happen to lengthen something you like and shorten something you do not care for so much.

Apart from such personal considerations it is doubtful whether there is much wisdom in asking a banjo soloist or a whistler to give three items consecutively, unless they are very short items. From the broadcasters' point of view, it is unwise to go on too long; in a vaudeville it is surprising how soon the listener tires of the item. Probably it is use, but there it is; variety is the key to success.

• • •

Christopher Stone gave his listeners an unusually entertaining few minutes by broadcasting an old record made (I think he said) in 1899 of Gus Elen singing that imperishable classic "It's a Great Big Shame" and comparing it with a recent issue of the same song sung by the same singer. The comparison served to show how great have been developments in recording since those early days, thirty-three years ago.

The other thing that entertained me in that particular broadcast was the good Christopher's delightful French phonetics. I never heard anyone pronounce French or German with greater abandon than he. It is a positive education to hear him. Someone ought to persuade him to record a French talk; he would make a fortune with it. I am sure he will not mind my teasing him about this; he is, as everyone agrees, one of *the* personalities of the microphone.

• • •

The art of piano-playing seems to be undergoing some change if Bill Mayerl's particular style of playing and writing are anything to go by. I personally cannot enjoy too much of that kind of playing, but I do acknowledge his technical resources. I am sure his popularity is deserved.

Finding a space in the programme on Saturday evening which did not seem to be particularly useful for these notes I reached out to the Midland Regional in order to hear *Mike on the Hike*. I cannot say that it greatly appealed to me; indeed I found difficulty in understanding some of it. Surely these light and lively shows would do better with a clearly defined plot? That is what I missed in this particular broadcast.

• • •

The train conversation was, for the first time to my remembrance, not too entertaining. Perhaps the theme was one that would appeal to a limited number of people? I should like to hear Miss Lloyd George again, all the same.

• • •

The Saturday night broadcast of *Henry V* was very well done. The French scene, in particular, was very delicate. So often that charming little episode is clumsily handled. Dennis Arundell made a splendid King; Douglas Ross as Fluellin ended triumphantly, but I thought when he began that he was not Welsh enough.

I should have enjoyed Violet Marquesita more as the Chorus had she delivered her lines more evenly; such perfect English did not need the variation of vocal tone she thought fit to give it. Gladys Young's playing of the comparatively short part of Queen Isabella was more in keeping with Shakespeare. Her playing was one of the outstanding events of the broadcast.

• • •

PROGRAMME POINTERS

It would, indeed, have been hard to find anything more completely English—and therefore more completely suitable—to send to America than John Milton's "Comus," with music by Dr. Arne. It was a good beginning. It may also be regarded as a return for all we have suffered in this country from Americanised voices in our dance-music; and for some of the relays we have had from the States. I have long concluded that there is nothing that America can teach England in the matter of broadcast speech; on the other hand, Americans can learn much from us. I therefore appeal most earnestly that nothing but classics shall be sent over the Atlantic, and that some of the relays shall be of Shakespeare. I hasten to add that I hope actors will be chosen who are capable of delivering their lines in standard English. It will do the Americans no harm to listen to perfect English oratory; it will be something new for them.

The Wycombe Orpheus Male Voice Choir needs encouraging. All the same, to be quite candid, they must overcome a tendency to flat singing. Their accompanist must have noticed a discrepancy every time he played the interludes in "The Shepherdess." It was very noticeable to me.

• • •

Bruno Walther created a deep impression in Queen's Hall on Wednesday. His playing of the Mozart concerto, which he conducted from the piano, has been reviewed by the daily press in quite extravagant terms of praise. The reason his tone broadcast so well was because he did not hammer, a point in his playing which won approbation from most of the critics. Oh that all pianists would emulate him!

• • •

The boy soprano made quite a success, not so much because of his voice, which was rather unusual in quality for a boy, but because he used it so well. Choirboys rarely broadcast or record satisfactorily; perhaps the unusual quality of this particular voice accounted for the good transmission. Rather an interesting point!

• • •

One of the outstanding broadcasts of the week, was, in my view, Jimmy Elliott's amazing animal imitations. Usually, when this sort of thing is being done, one has the feeling that there has been a weak spot somewhere; in this instance I failed to find one. The imitations seemed absolutely lifelike.

• • •

George Mozart can generally tell a good story. I should have enjoyed those he told on Monday evening if he had been good enough to go a little slower. There is a speed limit in diction when a microphone is used.

• • •

The "Omnibus Romance," apparently in its second episode, was given in a style that may develop into something rather good. It is quite possible that the two characters which Mamie Soutter and Blake Adams have created may live. If so, something will have been done for vaudeville.

• • •

The Cornish Comedy, *The Little Ass*, relayed from St. Hilary, was certainly very Cornish and interesting on that account. Daft Willie was quite well played.

Another trifle worthy of comment was the Golfing Interlude called "Cupid Plus Two." There was nothing in it, of course, but there is room for occasional performances that do not require rapt attention for their assimilation. WHITAKER-WILSON

BUY THE BATTERY WITH A LIFE GUARANTEE!

NOT "How long will your battery last?" is the important question, but how many months of pure, distortionless power output will it give you?

There is an *exclusive* process used in the Improved Lissen Battery which deepens the power capacity of the cells and produces a flow of current so powerful, so steady and sustained that a PRINTED LIFE GUARANTEE is given with every Lissen Battery sold.

This is the battery for you to buy! The Improved Lissen H.T. Battery will give you months of trouble-free service, of current so pure, so noiseless that your loud-speaker will sing to you, speak to you, play to you with every word distinct and clear, every note true and sharply defined.

Ask firmly for an Improved Lissen H.T. Battery. Obtainable at all radio dealers.

LISSEN

Use also Lissen Accumulators. They hold their charge stubbornly and deliver current freely.

H.T. AND L.T. BATTERIES

60 volts 5/6

100 volts 9/3

LISSEN LIMITED, WORPLE RD., ISLEWORTH, MIDDLESEX

Advertisers Appreciate Mention of "A.W." with Your Order

Percy W. Harris asks

ARE HIGH NOTES IMPORTANT?

Interesting topics are dealt with this week, and facts are given which will assist the old argument as to whether or not good high-note response is essential.

I CAME across a group of experts arguing furiously the other day regarding the necessity of transmitting and receiving frequencies above 5,000 cycles. According to one everything up to 8,000 cycles *must* be radiated and properly reproduced if natural and satisfactory reproduction is to be obtained, and a couple of others in the group expressed the opinion that even this was a compromise and that real satisfaction would only be obtained by taking in everything up to ten thousand. When another not-so-expert member mildly suggested that uniform reproduction up to five thousand would be perfectly satisfactory he was regarded by the rest with withering scorn, for which reason he made no further contribution to the debate.

Comparing the Results

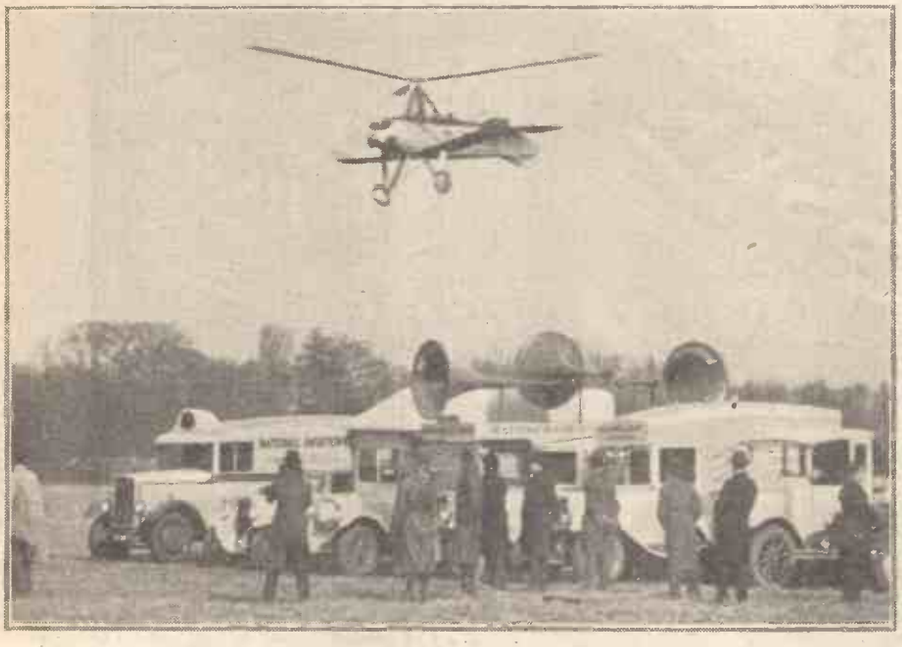
Not long after I had the pleasure of listening to a remarkably fine set with two loud-speakers arranged so as to give both high and low-note reproduction satisfactorily over a range extending well above 7,000 cycles, and having an appreciable amount of 8,000 in it. The B.B.C. was broadcasting a particularly good orchestral concert and a little later the reproduction of gramophone records commenced. Both the orchestral concert and the gramophone records—at least, those records which were of music similar to the concert programme—sounded almost equally well and I could scarcely distinguish the difference. Three or four of us were listening, and one member of the audience whose knowledge of music is above the average remarked on the huge improvement that had taken place in the last year or two in the recording and reproduction of gramophone records. He quite rightly said that frequently it is almost impossible to distinguish the broadcast record from the broadcast original and I am very much inclined to agree with him.

Now, the moral of this, if there is any moral, can scarcely be comforting to those who argue that we must have eight or nine thousand cycle reproduction. Modern gramophone records reproduce most frequently uniformly up to about 4,500, after which there is a rapid fall off and at 5,500 or so we reach their limit. There is practically nothing beyond this and frequently even *this* figure is not reached, yet I have often heard people say that they only wish their radio set would reproduce as well as the modern electrically reproducing gramophone.

Does it go over 5,000?

Personally, I think these arguments can be very misleading, particularly when the participants are trained engineers who have accustomed their ears to high-note reproduction and by this special training can very easily detect differences which are inaudible or unnoticeable by ninety-nine per cent. of listeners. I think I am correct in stating that there is not a single wireless set on the market which, when measured so as to include the loud-speaker, as well as the set, gives uniform reproduction up to even 5,000 cycles. Many start to fall off rapidly after 2,000 and dozens of makes have nothing whatever over 3,500 in their reproductions. I have pointed this out before and I am doing it again because I consider that before we start arguing about whether or not we should reproduce frequencies of six, seven, or eight thousand we should make sure we get everything there is to be had up to five. So much more can be done in improving quality before it is necessary to increase the frequency range of transmission that it is up to all of us to get on with that side first!

GETTING AIR-MINDED



Banks of public-address speakers on vans containing power amplifiers are used to broadcast information during the National Aviation Day campaign being run all over the country by Sir Alan Cobham. The famous autogyro 'plane is hovering over the loud-speakers

SOME RADIO "LABELS"

RADIO names are funny things. Few sciences have such a misleading and even ludicrous selection of labels. The remarkable device which has made modern radio possible is still called "the valve," which is about as misleading a term as one can think of in the circumstances, for according to a dictionary I have just picked up a valve is defined as "one of the leaves of a folding door; a cover to an aperture which opens in one direction and not in the other; one of the pieces or divisions forming a shell." My dictionary also tells me that the word comes to us through the French from the Latin meaning "a folding door." Personally, I can't see anything much like a folding door in the modern valve. Of course, the name was originally given to it because of the unilateral property of the two-electrode valves, permitting current to pass between the filament and the plate in one direction and not in the other.

In the early days of commercial wireless the radio frequency transformer connecting the closed oscillating circuit of the transmitter with the aerial was called a "jigger." The name was derived from a device used for raising sacks in the milling trade and as the transformer was used for raising the voltage there was some kind of connection between the ideas. It may seem strange to you that the milling trade should supply any name for wireless, but in point of fact, when Senator Marconi first came to England one of his financial backers was closely associated with the milling industry.

The word "radio" is none too good and is far too broad in its implication to be satisfactory as a name for the science. It is an abbreviation of radio-telegraphy and radio-telephony, the implication being that the signals are radiated in every direction by this form of communication. While it is true, or approximately true, the same also applies to flash-lamp signalling, flag signalling or any other visual method of communication.

AN ALL-ELECTRIC SET FOR £7-17-6!

Including Receiver, Mains Unit, Speaker and Cabinet

—THE HOME-LOVER'S ALL-ELECTRIC 3

This fine console set for A.C.-mains operation was fully described in "Amateur Wireless" dated February 27, 1932. Employing the latest variable-mu type of screen-grid valve, the set gives a fine control of volume and during tests brought in 57 stations at loud-speaker strength.

AS this is a console set, everything for reception is contained within the table cabinet with the exception of the aerial and earth.

There are three constituent parts to the console—the set chassis, mounted at the bottom of the cabinet, the power unit mounted behind the loud-speaker, and the loud-speaker assembly mounted at the top of the cabinet behind the ornamental fret.

Although a perfectly "straight" circuit is used, the selectivity is exceptional, due to the tapped screened coils, with separate tuning for the aerial and inter-valve tuning circuits.

No Distortion

The sensitivity of the variable-mu valve is controlled by varying the grid bias. There is no distortion with the volume at minimum, and the other advantage of the variable-mu is increased selectivity.

The detector works on the power-grid system, and will take the full signal amplitude developed by the screen-grid stage without overloading.

The output power valve gives about 600 milliwatts undistorted power to the loud-speaker, which can therefore provide full-bodied volume without distortion.

All three valves have indirectly-heated filaments, which are heated by A.C. stepped down by the mains transformer. This component is part of the power unit,

> Compare this receiver with the "Home-lover's Battery 3" described in the centre pages of this issue.

which, in conjunction with a valve rectifier and an improved system of smoothing, provides the high-tension current to the valves without the slightest trace of mains hum.

The controls of the "Home-lover's 3" are simple to handle and represent all the latest ideas in flexible selectivity and general convenience. In addition to the two tuning dials, there is an aerial-coupling knob, a reaction knob, a combined wave-change and volume-control knob, a gramo-radio switch knob, and, lastly a mains on-off switch knob.

Safety of operation is ensured by the fitting of a simple fuse-holder and mains plug on the back of the cabinet. When the back is taken off the mains lead is automatically broken.

A programme of Chinese Music entitled "Through a Chinese Moon Door," will be given for West Regional listeners on May 18.

HERE ARE THE COMPONENTS REQUIRED FOR BUILDING THE "HOME-LOVER'S ALL-ELECTRIC 3"

Three-ply panel, 14 in. by 7 in. (Peto-Scott, Camco, Clarion).
Baseboard, 14 in. by 10 in. (Peto-Scott, Camco, Clarion).
Sheet of aluminium foil, 14 in. by 10 in. (Peto-Scott, Readi-Rad).
Two .0005-mfd. variable condensers (Polar "No. 4, Lissen, Lotus, Telsen, Dubilier, Utility).
Two 3-in. dials (Polar).
.0003-mfd. reaction condenser (Polar "Compax," Lissen, Lotus, Readi-Rad, Telsen, Ormond).
.0003-mfd. variable series aerial condenser (Telsen, Polar, Lotus, Lissen, Readi-Rad, Formo, Ormond).
Two screened dual-range tuning coils (Lissen).
Combined three-point shorting switch and 25,000-ohm variable resistance (Wearite).
Gramo-radio change-over switch (Readi-Rad, Lissen, Bulgin).
Single-pole toggle switch (Bulgin, Igranic, Claude Lyons).
Four-pin valve holder (Telsen, Lissen, Lotus, Benjamin, Wearite, Clix, Bulgin, Junit).
Two five-pin valve holders (Telsen, Lissen, Lotus, Benjamin, Wearite, Clix, Bulgin, Junit).
Horizontal mounting valve holder (Lissen, W.B., Junit).
Two 1-mfd. fixed condensers (Lissen, T.C.C., Dubilier, Formo).
.2-mfd. fixed condenser (Lissen, Telsen, T.C.C., Dubilier).
Two .1-mfd. fixed condensers (Telsen, Lissen, T.C.C., Dubilier, Igranic).
Two .0001, one .0002, and one .001-mfd. fixed condensers (Telsen, Lissen, T.C.C., Dubilier, Graham-Farish, Sovereign, Ormond, Formo).
2 mfd. fixed condenser, 400-volt D.C. working (Formo, Ferranti, Dubilier, T.C.C.).
2-mfd. fixed condenser (Lissen, Telsen, T.C.C., Dubilier, Formo, Ferranti).
.2-mfd. centre-tapped fixed condenser, 1,000 volt, A.C. test (Dubilier, type BE3L).
1-megohm grid leak (Telsen, Lissen, Dubilier, Sovereign, Graham-Farish).
Grid-leak holder (Readi-Rad, Lissen, Telsen, Bulgin.
High-frequency choke (Telsen, Lissen, Lotus, Lewcos, R.I., Climax, Varley, Read-Rad, Wearite, Igranic, Atlas Watmel).
High-frequency choke (Lissen, Telsen, Lotus, Lewcos, R.I., Climax, Varley, Readi-Rad, Wearite, Igranic, Atlas, Watmel).
Four spaghetti resistances, values 50,000, 40,000, 20,000 and 1,000 ohms (Lissen, Telsen, Lewcos, Varley, Sovereign, Graham-Farish, Tunewell, Igranic).
One 750-ohm spaghetti resistance (Lewcos, Telsen, Varley, Sovereign, Graham-Farish, Tunewell).
Partition screen, 10 in. by 6 in., with hole for S.G. valve (Peto-Scott, Readi-Rad, Parex).
Low-frequency transformer (Lissen, "Torex," Telsen, Lotus, R.I., Ferranti, Lotus, Lewcos, Varley, Igranic).
Mains transformer, with the following secondary windings: 230-0-230 volts, 2-0-2 volts 1 amp., 2-0-2 volts 4 amps. (Heayberd, Atlas, Junit, R.I.).
Smoothing choke (R.I. "Dux Audirad," Lissen, Ferranti, Lotus, Atlas, Lewcos, Varley, Igranic).
Six terminals, marked Aerial, Earth, Pick-up (2), L.S.—, L.S.+, (Belling-Lee, Clix, Eelex).
Combined mains plug and fuse (Bulgin).
Terminal strip, 7 in. by 2 in. (Becol, Peto-Scott).
Two yards thin flex (Lewcoflex).
One foot single shielded flex (Lewcos).
Connecting wire and sleeving (Lewcos).
Cabinet, with chassis for loud-speaker and mains unit (Peto-Scott).
Loud-speaker unit (Lissen four-pole balanced armature, Telsen, Blue Spot, Ormond, Brown).
Piece of cone paper (thin Bristo board from any art shop).

Postcard Radio Literature

GET THESE CATALOGUES FREE

Here "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. Please write your name and address in block letters.

Wire-wound "Pots"

A WIRE-WOUND potentiometer is useful in many positions in a set and leaflet 6560 of the Igranic Electric Co., Ltd., describes wire-wound "pots," in sizes from 1,000 ohms to 50,000 ohms. **753**

A Triotron Alteration

Make a note of the fact that the filament consumption of the Triotron 10-watt power output valve K435/10 has now been altered to 1 ampere at 4 volts. All other characteristics remain the same, as in the current Triotron catalogue, copies of which can be obtained free. **754**

Marconiphone Pick-up

The Marconiphone gramophone pick-up fitted with a convenient rotating head, and sold complete with carrier arm, is described in a current Marconiphone catalogue. **755**

A Short-wave Adaptor

The type T short-wave adaptor, made by Burne Jones & Co., Ltd., is dealt with in a new leaflet. This works with any type of set, A.C. or battery-operated. The leaflet also gives a list of leading short-wave stations and this you will find handy when tuning in. **756**

The Model 435

When "Set Tester" reviewed the model 435 H.M.V. table-model three-valver, he was full of praise for it. Why not get the new descriptive literature from the Gramophone Co., Ltd. The set is a band-pass "three," mains operated and with a built-in permanent-magnet moving-coil speaker.

OBSERVER. **757**

A little comedy, *Sad about Europe*, will be broadcast to Midland Regional listeners from the Birmingham Repertory Theatre studio on May 18.

The first of a series of talks on "Rambles in the Midlands" by Charles H. Chandler, will be heard on May 20.

On May 8, North Regional listeners will hear a vocal and instrumental concert by the Royston Male Quartet.

Robert Tredinnick's gramophone recital, "Rhythm" on May 16, will be devoted to works by Duke Ellington. Midland Regional listeners will hear this programme.

SETS of DISTINCTION

The REGENTONE A.C. THREE

Makers : Regentone Ltd. Price : 16 guineas

LET me introduce you to one of the first sets to incorporate the new multi-mu type of screen-grid valve—the Regentone all-electric three-valve console. As most of you know, the great advantage of the multi-mu, or variable-mu valve as it is sometimes called, is a non-distorting control of volume. So here is a console set with a very definite advance in design technique.

My tests showed that the output can be reduced to a mere whisper without making the slightest difference to the tone. That is a remarkable achievement, as all who have operated commercial mains sets will readily agree. And you know as well as I do that there are many occasions when it is convenient to turn down the volume without actually switching off.

Simple Control

The volume control knob on the Regentone has practically a 360-degree movement so you can see that a wide control of the output is possible. I cannot too highly praise the volume control of this set, which does indeed mark a great advance on present-day design.

The other controls of the Regentone are, as might be expected, for tuning, reaction and circuit changing. Thus we have a main tuning knob just below the escutcheon of the wavelength scale. Super-imposed on this is a small trimmer knob. The two tuned circuits are roughly tuned by the two-gang condenser, and final trimming is easily effected by the auxiliary knob.

The reaction knob on the right, balancing the volume control on the left, has a good movement — practically 180 degrees, and builds up signal strength without fuss.

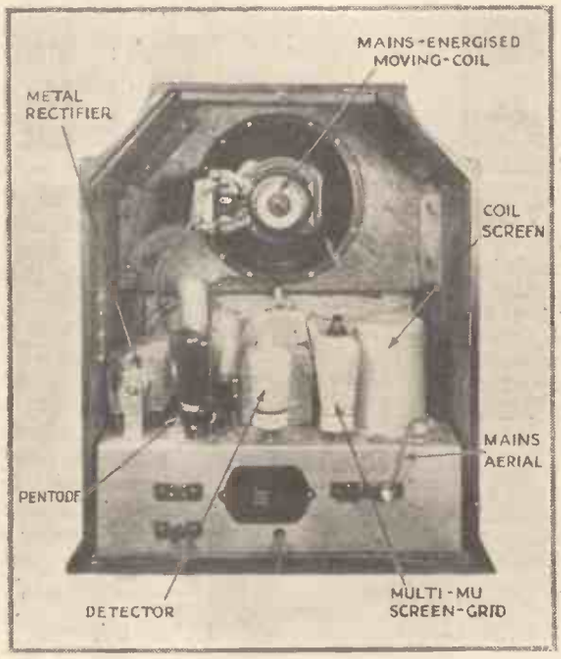
Remains the combination switch knob at the bottom centre of the cabinet—a model of smooth acting mechanism, plainly marked to show what happens as the knob is turned from point to point. It has a mains-off position, and the usual three positions for meduim waves, long waves and gramophone pick-up, in all three of which positions the mains are of course switched on.

Arrangement of Components

To take off the back of the cabinet of the Regentone is a second's work, and then you have exposed a neat metal chassis, carrying the screen-grid valve, metallised detector, and pentode output valve. A metal rectifier is used for the high-tension supply, and this is mounted at the end of the chassis remote from the screened coil.

Above the chassis is the moving-coil loud-speaker. This is mains-energised, and has built-in transformer. It is a Rola.

Suitable sockets are provided at the back for the connection of a pick-up, external loud-speaker, and the aerial and earth leads. Two alternative aerial connections



A rear view of the Regentone A.C. Three : the design is particularly neat.

are fitted, with a mains aerial connection for use on local stations, or for the reception of the more powerful foreigners.

The circuit adopted in connecting together the three valves is straightforward, with ample de-coupling wherever it is needed. The aerial is coupled to the screen-grid valve through a transformer, "A1" being a direct connection and "A2" a connection through the series condenser.

The screen-grid valve is coupled to the detector by the tuned-anode system, with the variable condenser at earth potential—achieved by the use of a large fixed condenser in series with the variable.

The detector is resistance-fed to the low-frequency transformer coupling it to the pentode output valve. This in turn is transformer coupled to the loud-speaker, and across the primary winding are shunted tone-correcting components to avoid high-note accentuation.

The rest of the circuit consists of a simple rectifier system for obtaining the necessary high-tension and grid-bias supplies from the alternating-current mains. The transformer is so designed that simple taps on the primary enable supply voltages between 200 and 250 volts to be used on the standard model, and there are special models for out-of-the-way supply voltages and periodicities.

Tested in London

My tests were carried out at home, which is in south-west London, some 20 miles from Brookmans Park. I was able to restrict the locals to a reasonable wave-length spread. I consider the selectivity is good for two tuned circuits. And there is no doubt the trimmer greatly assists in accurately tuning in the stations.

Brussels No. 2 on 337.8 metres and Toulouse on 384 metres were both clear of London Regional, and the National was eliminated for the reception of Trieste on 247.7 metres, and Turin on 273.7 metres.

These results were obtained with the 60-foot aerial connected to "A1"—with "A2" the greater selectivity obtained was only at the expense of volume and I prepared to cut this down on the volume control, increasing the strength of the wanted station by reaction.

Clean-cut separation between adjacent foreign stations is really more important than spectacular elimination of locals, and here the Regentone does well in getting such adjacent giants as Langenberg, North Regional and Prague free from interference.

On long waves, Radio Paris is a fine signal clear of Daventry, with Zeesen strong but rather over-shadowed. Huizen

(*Continued on page* 852)

The most efficient all-wave set ever designed

Ready Radio METEOR III

Still bringing radio from America, Africa, Australia, into countless homes

Listeners all over the country tune in America, Australia, Africa, and other distant countries, as well as Home and Continental programmes, night after night, on the Meteor III. The Meteor III can justly be claimed as the most efficient all-wave set ever designed. Files of testimonials from more than satisfied constructors are open for inspection at our offices.

Ask your radio dealer for your free Meteor Folder!

METEOR Consolette Cabinet Model

Complete Kit with Consolette Cabinet, as illustrated, to house set, speaker, and batteries,

£5:0:0

or 11/- down and 9 monthly payments of 11/-

METEOR III KIT

Complete set of quality components, including panel (cut and drilled), baseboard, Jiffilinx, flex, screws, plugs, etc.

75/-

or 9/- down and 7 monthly payments of 10/6

METEOR Standard Cabinet Model

Complete Kit, with Standard Cabinet to house set only

89/6

or 11/- down and 8 monthly payments of 11/-

Note these special features of the Meteor—18 to 1 Slow-motion Control on both tuning and reaction; Extended anti-capacity reaction drive; adjustable selectivity; Kendall loose-coupled air-spaced coils; Radio-gram switching; R.I. Transformer; Graham-Farish and Lewcos Resistances; Condensers by T.C.C. No soldering, no cutting, no drilling a screwdriver and pliers are the only tools you need. All the necessary wires, flex, screws, plugs, etc., are included in the Meteor Kit. Mullard Valves are recommended by the designer.

Mr. G. P. Kendall, B.Sc. the famous designer of the METEOR III

Choice of Recommended Accessories

Mullard Valves
1—P.M.2 DX 7 0
1—P.M.1 L.F. 7 0
1—P.M.2 ... ... 8 9

Batteries
Pertrix 120 v. Super capacity 1 5 6
or
Pertrix 120 v. Standard 15 6

Pertrix 9 v. G.B. 1 3
or
Ever Ready 9 v. C.B. ... 1 0

Accumulator
Fuller 2 v. 20 amp. type S.W.X.H.7 ... ... 10 9

Loudspeaker Chassis
R & A type 40 Reproducer 16 6

Gramophone Pick-up
ReadiRad 1 7 6

Volume Control
ReadiRad .5 meg. 5 9

Gramophone Motor
Collaro Type B.30 with Unit Plate and Automatic Stop 1 13 0

FREE . . .

Name .....

Address .....

.....

A.W. 7/5/32. **BLOCK LETTERS—IN INK PLEASE.**

Ask your radio dealer for your FREE Meteor Folder. If he is out of stock, post coupon now to:—Ready Radio, Ltd., Eastnor House, Blackheath, S.E.3. If you also include four 1½d. stamps, we will send you Mr. Kendall's latest book, entitled, "Ten Hows for Modern Radio Constructors." Packed full of useful information.

To READY RADIO LTD., Eastnor House, Blackheath, S.E.3.

Please dispatch to me the following goods .....

.....

.....

(a) I enclose
for which (b) I will pay on delivery (Cross out item not applicable) £ .....
(c) I enclose first deposit of

NAME .....

ADDRESS .....

.....

All Cash Orders of 10/- or over, post free. A.W. 7/5/32

To Ensure Speedy Delivery, Mention "A.W." to Advertisers

WE TEST FOR YOU

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

BULGIN SOLDAWYRE

SET constructors will be very interested in the Bulgin Soldawyre, which has been produced in an endeavour to facilitate the wiring of amateur-made receivers. This wire consists of a flex, with six strands of tinned copper wire twisted up with a strand of solder, the whole being insulated in a braid covering.

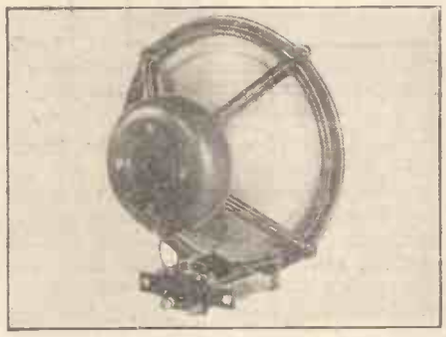
The wire is very simple to use. The insulating braid should not be cut, but merely pushed back, and a small amount of flux applied to the parts to be joined. A hot iron applied to the junction then causes the solder to run and a joint is obtained. No extra solder is required, as the strand included in the make-up of the wire is ample for all requirements.

After the joint has been made, the insulation can be pulled back over the exposed portion, while the stiffness of the wire is such that it can be made to take up any desired position, thereby facilitating neat wiring.

We have tried this wire, and find it very satisfactory. It is, in fact, well worth a trial. Various colourings are available.

TEKADE MOVING-COIL SPEAKER

WE have tested this week one of the Motor permanent magnet moving-coil speakers, made by Messrs. Tekade Radio Electric Ltd. This speaker is built into a cast metal chassis, which is exceptionally strong. The diaphragm, which is red brown in colour, is suspended from the chassis by means of a sectional-



The Tekade permanent-magnet moving-coil speaker in chassis form

ised leather surround. The moving coil is approximately 1-inch in diameter, and is of the low-resistance type. The necessary input transformer is provided with the speaker, and is mounted on lugs provided on the metal chassis. The centering device is of the normal web type, mounted behind the diaphragm; the suspension as a whole allowing ample movement for the reproduction of the lowest frequencies.

(Continued on page 849)

IN MY WIRELESS DEN

Weekly Hints — Constructional & Theoretical

By W. JAMES

OVERLOADED DETECTORS

THE detector stage is really a most important part of a set, for quite apart from the fact that detection or rectification takes place in this stage, there is also reaction to be considered, and the power handling capacity.

Too often the detector stage is overloaded. This spoils quality. To avoid this as much as possible use the maximum high-tension. Some people still use a fairly low voltage, such as 60. It is better from the overloading point of view to use 120. The anode current will be greater and the reaction may not be quite as smooth. But, so far as the local station is concerned, the results will be better.

It is particularly necessary to use the maximum voltage when a resistance is included in the anode circuit. There is a fall in voltage across the resistance. For 30,000 ohms, which is a usual value, the voltage drop is 30 per milliampere. So you see that the voltage on the anode of the valve is fairly low in any case.

When a decoupling resistance is used as well as an anode resistance, the total value being perhaps 50,000 ohms, the position is even more serious. The loss now is 50 volts per milliampere, which means that when the total voltage is 120 the voltage on the anode is not much.

THOSE ANNOYING SNAGS

A point which cropped up the other day may be of interest as showing one of the little snags that might be rather worrying. A set was made to a specification and was found to be not quite stable, with the result that the amplification was poor. The set was certainly wired properly, but parts had been substituted. Amongst these were by-pass condensers of 1 microfarad. It turned out that the old ones used were not of the non-inductive type at all, and of course the specification included non-inductive condensers. The instability was cured when the correct condensers were used.

This example shows one of the dangers of using old parts, although I must admit that sometimes it is quite possible to use them without spoiling the results

WATCH THE G.B. BATTERY

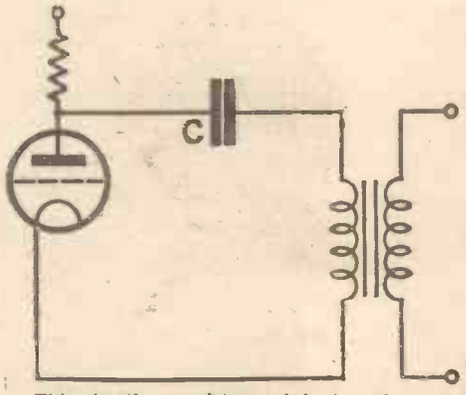
A high-resistance grid battery may cause poor quality and in certain instances howling. The battery may be used to supply bias to two or more circuits.

These will be coupled if the resistance of the battery is appreciable and will affect the results in much the same way as a high-resistance high-tension battery. I often fit a separate bias battery to the power valve when there are other circuits that must be biased.

This is cheaper than fitting decoupling resistances and condensers, and in a sense is better, too. Grid batteries have uncertain lives, and in the case of a set that is more or less shut up and placed where it will provide the daily programmes, it is as well to take precautions.

GETTING GOOD BASS

It is well known that by suitably proportioning the parts used in a resistance-fed transformer circuit a good bass response



This is the resistance-fed transformer arrangement mentioned in the accompanying paragraph

may be obtained even when the transformer has a small primary.

The arrangement is really quite a clever one. Condenser C in the accompanying diagram is made of such a size that it tunes the transformer to which it is connected; as a consequence, by making the tuning effect at a low frequency the bass response is good.

A point to note is that no direct current passes through the primary coil. The inductance of the transformer is therefore greater when it is used in this way than when the primary coil is connected in the anode circuit and carries current. From this it follows that a smaller transformer may be used, as no allowance has to be made for the reduction in the inductance which normally occurs when direct current flows through the primary.

Some very good characteristics are to be obtained from resistance-fed transformer circuits. The results in comparison with cost tend to show that the expensive transformer used directly in the anode circuit of a valve has no advantages for ordinary purposes over the resistance, condenser and small transformer combination. It is true that three pieces are used in comparison with one, but the resistance and condenser are parts that normally do not give trouble.

GRID-CONDENSER VALUES

It is surprising how great a variation can be made in the value of the fixed condenser used in a power-grid or leaky-grid detector circuit without much affecting the volume.

You might fit a .0003, a .0002, or a .0001 and not notice a difference at all. The quality would naturally vary with the three condensers. With a .0001 microfarad the higher notes would be stronger than with a .0003.

I have tried a pre-set condenser of .0003 microfarad maximum capacity in the grid circuit. As the knob is turned, starting from the position of maximum capacity, the results appear to be affected but little until the capacity is made small. As the capacity is further reduced, the strength falls off, but the surprising thing is that so small a capacity can be used.

The results depend partly upon the detector valve used. Some mains valves have a considerable working capacity in comparison with battery types. If you have a spare pre-set condenser, try it in place of the present grid condenser.

Some people prefer a .0003 microfarad, but I like to use less capacity. If you connect a pre-set of .0003 microfarad maximum capacity, tests can easily be made and the most satisfactory value be found.

The Venerable P. W. N. Shirley, B.D., Archdeacon of Connor, is to give the address at the Evensong Service from St. Jame's Parish Church, Belfast, which will be relayed on May 15 from Belfast.

Edward Lewis has prepared a version for the microphone of a novel by Jacob Wassermann, entitled *The Triumph of Youth*. This will be broadcast on May 11 (National) and May 12 (Regional).

A novel song recital is to be given from Midland Regional on May 16, by Peter Howard. This will be Vaughan Williams' Song Cycle, " The House of Life."

"WE TEST FOR YOU"

(*Continued from page* 847)

The permanent magnet is of the pot type, rather flat in shape.

On test, the speaker gave excellent results on both speech and music, the reproduction being entirely free from any objectional resonances or bass boom. This speaker is also quite up to standard as regards sensitivity, and it should give good results with any normal type of receiver employing a power output valve. It was also tested with inputs of the order of 3 or 4 watts, and it was found to handle this power without any undue signs of distress.

This speaker can be obtained with a tapped input transformer for use with ordinary triode output valves, or with a special transformer suitable for use with pentodes. The speaker is British made and, at a price of 7os. complete with the transformer, is very good value.

NEW TELSEN VALVE HOLDER

SET builders will be interested in a new right-angle mounting valve holder, which has been produced by Messrs. Telsen Electric Co., Ltd., This consists of the normal bakelite valve holder moulding, four-pin type, bolted to a neat L-bracket with an oxidised copper finish. Terminal connections are provided on

The new right-angle mounting Telsen valve holder

the holder, and a firm grip on the valve pins is assured by the special collar method of connection which also provides a certain degree of resiliency in the mounting.

These neat valve holders sell at only 9d, each, and should greatly facilitate constructing a set where it is essential to mount a valve at right angles to a panel or baseboard.

Pessimists who think that less business is being done in practically every industry will be pleased to have proof that the wireless industry is achieving extraordinary success. Pye Radio, Ltd., inform us that they have this year achieved a trading profit of nearly twice that of the preceding year and have declared an ordinary share dividend of 125 per cent. !

"SIMPLE SUPER" VALVES

It should be noted that the following Six-Sixty valves are suitable for use in the "A.W. Simple Super"; SS215SG, SS210DG, SS215SG SS210HL and SS220PA.

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 wave.

Metres	Kilocycles	Station and Call Sign	Power (Kw.)
GREAT BRITAIN			
25.53	11,751	Chelmsford (G5SW)	16.0
242.3	1,238	Belfast	1.0
261.6	1,147	London Nat.	50.0
288.5	1,040	Newcastle	1.2
288.5	1,040	Swansea	0.12
288.5	1,040	Plymouth	0.12
288.5	1,040	Edinburgh	0.3
288.5	1,040	Dundee	0.12
288.5	1,040	Bournemouth	1.0
288.5	1,040	Aberdeen	1.0
301.5	995	North National	50.0
309.9	968	Cardiff	1.0
355.9	843	London Regional	50.0
376.4	797	Glasgow	1.0
398.9	752	Midland Regional	25.0
480	625	North Regional	50.0
1,554.4	193	Daventry (Nat.)	30.0
AUSTRIA			
218.7	1,375	Salzburg	0.5
245.9	1,220	Linz	0.5
285.2	1,052	Innsbruck	0.5
352.1	852	Graz	7.0
453.2	666	Klagenfurt	0.5
517	581	Vienna	15.0
also testing on 1,237 m. from 7.0 p.m. (Mon., Wed., Sat.).			
BELGIUM			
208.3	1,440	Antwerp	0.25
210.1	1,428	Liege (Seraing)	0.15
215.3	1,393	Chatelineau	0.2
215.5	1,392	Bruxelles Conference	0.2
216	1,389	Liege	0.1
219.9	1,364	Binche	0.1
242	1,240	Liege (Exp.)	0.1
260	1,115	Liege (Cointe)	0.4
283.6	1,058	Brussels (SBR)	0.5
337.8	888	Brussels (No. 2)	15.0
509.3	589	Brussels (No. 1)	15.0
BULGARIA			
318.8	941	Sofia (Rodno Radio)	0.5
CZECHO-SLOVAKIA			
249.6	1,201.8	Prague (2)	5.0
263.8	1,137	Moravska-Ostrava	10.0
279.3	1,074	Bratislava	13.0
293	1,022	Kosice	2.5
341.7	878	Brunn (Brno)	32.0
488.6	614	Prague	120.0
DENMARK			
281.2	1,067	Copenhagen	0.75
1,153	260	Kalundborg	7.5
also on 31.51 m. (9,520 Kcs.)			
ESTONIA			
298.5	1,005.9	Tallinn	11.0
453.2	662	Tartu	0.5
FINLAND			
291	1,031	Viipuri	13.0
368.1	815	Helsinki	12.0
434.6	690	Pori	1.5
540	556	Tampere	1.0
1,796	167	Lahti	54.0
FRANCE			
219.9	1,364.1	Béziers	0.5
221.7	1,353	Fécamp	5.0
236.7	1,267.3	Bordeaux-Sud-Ouest	2.0
245.9	1,220	Strasbourg 8GF	1.0
250.3	1,198.5	Juan-les-Pins	0.5
255.1	1,176	Toulouse (PTT)	1.0
265.4	1,130	Lille (PTT)	1.3
271.5	1,105	Rennes	1.2
285.4	1,051	Montpellier	0.8
289.5	1,036	Radio Lyons	10.0
293.7	1,021.5	Limoges (PTT)	0.5
304.9	984	Bordeaux (PTT)	13.0
308.4	972.8	Radio Vitus	1.0
also on 43.75 m. (6,865 Kcs.)			
315	950	Marseilles	1.6
328.9	912	Poste Parisien	85.0
345.2	869	Strasbourg (PTT)	11.5
369.4	812.4	Radio LL (Paris)	0.5
384.4	779	Radio Toulouse	8.0
450	666.7	Paris (PTT) testing on 7.0 Kw.	0.7
466	644	Lyons (PTT)	1.5
539	570	Grenoble (PTT)	2.0
1,445.7	207.5	Eiffel Tower	13.5
1,725	174	Radio Paris	75.0
GRAND DUCHY of LUXEMBURG			
1,250	240	Luxemburg	1.0
GERMANY			
31.38	9,560	Zeesen	15.0
217	1,382	Königsberg	0.75
218.5	1,373	Flensburg	0.5
219.9	1,364	Cassel	0.25
232.2	1,292	Kiel	0.25
239.4	1,253	Nürnberg	2.0
245.9	1,220	Cassel	0.25
253.1	1,185	Gleiwitz	5.0
259.3	1,157	Leipzig	2.0
269.8	1,112	Bremen	0.2
276.5	1,085	Heilsberg	60.0
283	1,060	Magdeburg	0.5
283	1,060	Berlin (E)	0.5
283	1,060	Stettin	0.5
318.8	941	Dresden	0.25
325	923	Breslau	1.5
360.6	832	Mühlacker	60.0
372	806	Hamburg	1.5
389.6	770	Frankfurt	1.5
419.9	716	Berlin	1.5
453.2	662	Danzig	0.5
472.4	635	Langenberg	60.0
532.9	563	Munich	1.5
559.7	536	Kaiserslautern	1.5
559.7	536	Augsburg	0.3
556	530	Hanover	0.3
569.3	527	Freiburg	0.25
1,634.9	183.5	Norddeich	10.0
1,634.9	183.5	Zeesen	75.0
2,525	119.3	Königswuster-hausen (press)	15.0
4,000	75	ditto	
20 Kw. Station testing			
HOLLAND			
296.1	1,013	Hilversum	8.5
1,071.4	280	Scheveningen-Haven	10.0
1,875	160	Huizen	8.5
20 Kw. Station testing			
HUNGARY			
210	1,429	Budapest (2)	3.0
550	545	Budapest (1)	18.5
ICELAND			
1,200	250	Reykjavik	16.0
IRISH FREE STATE			
224.4	1,337	Cork (6CK)	1.2
413	725	Dublin (2RN)	1.2
ITALY			
42.7	7,016	Rome (2RO)	15.0
247.7	1,211	Trieste	10.0
273.2	1,098	Turin (Torino)	7.0
280	1,071	Bari	20.0
312.2	961	Genoa (Genova)	10.0
318.8	941	Naples (Napoli)	1.5
331.5	905	Milan	7.0
368.1	815	Bolzano	1.0
441	680	Rome (Roma)	50.0
500.8	599	Florence (Firenze)	20.0
526.1	570.2	Palermo	3.0
LATVIA			
198.5	1,510	Riga (tests)	16.0
525	572	Riga	15.0
LITHUANIA			
1,935	155	Kaunas	7.0
NORTH AFRICA			
363.4	825.3	Algiers (PTT)	16.0
416	721	Radio Maroc (Rabat)	6.0
and 32.26 m. (9,300 Kcs.)			
NORWAY			
235.5	1,274	Kristianssand	0.5
240.5	1,247	Stavanger	0.5
364	824	Bergen	1.0
367.3	816	Frederiksstad	0.7
416	604.9	Trondheim	1.2
1,083	277	Oslo	60.0
POLAND			
214.2	1,400	Warsaw (2)	1.9
234.9	1,283	Lodz	2.2
312.8	959	Cracow	1.5
334.4	897	Poznan	1.9
380.7	788	Lvov	16.0
409.8	732	Katowice	12.0
566.1	529.9	Wilno	16.0
1,411.8	212.5	Warsaw	120.0
PORTUGAL			
241.6	1,241.8	Oporto	0.25
282.2	1,063	Lisbon (CT1AA) also on 42.9 m. (Fri.)	2.0
ROMANIA			
394	761	Bucharest	12.0
RUSSIA			
251	855.5	Leningrad RV70	250.0
358	838	Moscow (Exp.)	15.0
368.1	815	Kharkov	10.0
378	792.5	Moscow Regional	20.0
385	779	Stalingrad	10.0
389.6	770	Archangel	10.0
424.3	707	Moscow-Stalin	100.0
411	729.2	Pokrovsk-Volgo	20.0
449.4	667.5	Odessa RV13	10.0
473.2	634	Sebastopol	10.0
502.4	597	Nijni Novgorod	10.0
720	416.6	Moscow (PTT)	20.0
824.2	364	Sverdlovsk RV5	50.0
849	353	Rostov (Don)	4.0
937.5	320	Kharkov (RV20)	25.0
968	310	Alma-Ata	10.0
1,000	300	Leningrad	100.0
1,032.6	290.5	Kiev	25.0
1,071.2	280	Tiflis	25.0
1,103	272	Moscow Popoff	75.0
1,170	256.4	Taschkent	25.0
1,250	240	Bakou	40.0
1,260.5	238	Novosibirsk	10.0
1,304	230	Moscow (Trades Unions) also on 50 m. (6,000 Kcs.)	165.0
1,380	217.5	Novosibirsk	100.0
1,482	203	Moscow	100.0
1,600	187.5	Irkutsk	15.0
SPAIN			
251	1,193	Barcelona (EAJ15)	6.0
266.1	1,127.1	Valencia	20.0
348.9	860	Barcelona (EAJ1)	8.0
379.8	790	Seville (EAJ5)	1.5
411.5	729	Madrid (EAJ7)	2.0
427.4	702	Madrid (España)	2.0
450.6	557	San Sebastian (EAJ8)	0.6
SWEDEN			
232	1,292.9	Malmö	1.25
257	1,167	Hörby	10.0
305.8	981	Falun	0.5
321.9	932	Göteborg	10.0
435.4	689	Stockholm	55.0
541.5	554	Sundsvall	10.0
777.5	386	Ostersund	0.6
1,241.6	241.6	Boden	0.6
1,348.3	222.2	Motala	30.0
SWITZERLAND			
244.1	1,229	Basle	0.65
245.9	1,220	Berne	0.5
403	743	Söttens	25.0
459.4	653	Beromuenster	60.0
760	395	Geneva	1.25
TURKEY			
1,204.8	249	Istanbul	5.0
1,538	195	Ankara	7.0
YUGOSLAVIA			
307	977	Zagreb (Angram)	0.75
430.4	697	Belgrade	2.5
572.6	524	Ljubljana	2.5

WHEN SUBMITTING QUERIES . . . .

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.

The Prince of Wales will unveil the Thiepval Memorial on May 16 and the ceremony will be relayed from France to National listeners.

A Mystery Play entitled *At Six O'clock at Night*, by Mabel France, the author of the famous "Aunt Maria" sketches, has been written for Midland Regional on May 12.

"THE REGENTONE A.C. THREE"

(*Continued from page 844*)

at the top end of the scale is very strong. There is no long-wave instability.

Although tried out in the early evening this set yielded no fewer than 24 stations at good loud-speaker strength. The sensitivity is well up to standard.

Mains hum is non-existent when tuned to a station, and is very subdued even when listening to a weak foreigner.

The performance is even at all points of the scale, the top and bottom extremities of the long waves being unusually good in this respect.

The Rola speaker gives a full-bodied output, with plenty of bass, free from box-resonance boom. Speech is really good, showing that the reproduction is not deficient in essential top notes.

I think I ought to mention that during broad daylight this set brought in Budapest at fair strength on an indoor aerial.

SET TESTER.

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

General Correspondence is to be brief and written on one side of the paper only. All sketches and drawings to be on separate sheets.

Contributions are always welcome, will be promptly considered, and if used will be paid for.

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.

FULL-SIZE BLUEPRINTS

When ordering, please send Postal Order NOT STAMPS

CRYSTAL SET (6d.)

1931 Crystal Set AW308

ONE-VALVE SETS (1s. each)

Easy to Build One AW304
Short-wave One-valver AW327

TWO-VALVE SETS (1s. each)

Twenty-shilling Two (D, Trans) AW274
The Room-to-Room 2 (D, Trans) AW298
Big-volume Two (D, Pen.) AW309
Two Star 2 (D, Pen) AW315
The 25/- Two (D, Trans) AW330
Ten-Station Two (D, Trans) AW336
Big-Power Melody 2 (DD, Trans) AW338
Brookman's A.C. Two (D, Trans) WM225
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

THREE-VALVE SETS (1s. each)

Square Peak Three (SG, D, Trans) AW293
35/- Three-valver (D,2RC) AW323
Baby Three (D,RC, Trans) AW324
1932 Ether Searcher (SG,D,Pen.) AW325
Wide World Short-Wave Three (D,RC, Trans) AW332
New Favourite Three (D,RC, Trans) AW334
Home Lover's All-Electric 3 (D, SG, Trans.) .. AW335
The P.W.H. "Mascot" (D,RC, Trans) AW337
Five-point Three (SG,Trans) WM212
New Brookman's Three (SG,D, Trans) WM218
Five-point Short-waver (D,R.C., Trans) WM223
Plug-in-coil Three (D,2 Trans) WM232
Band-pass Inceptordyne (SG,D, Trans) WM244
Ether Marshal (SG,D,Trans) WM247
Meridian Short-waver (D,RC, Trans) WM256
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
Transportable Three (SG, D, Trans) WM271

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

The £3 3s. Four (SG,D,RC, Trans) AW303
The £3 3s. Four (Improved Model) AW303A
Everybody's Radio-gramophone AW310
Four Star 4 (SG,D, RC, Trans) AW318
50/- Four (SG, D, RC, Trans) AW331
Five-Point Four (SG, D, RC, Trans) WM216
Brookman's Three-plus-one (SG,D,RC, Trans) WM233
Ether Rover (SG. D, RC, Trans) WM266
Quadradyne (2 SG, D. Pen.) WM273
Double Band-pass Four (SG, L,RC, Trans) .. WM27
Everybody's Radio Gramophone (SG, D, RC, Trans) WM276
A.C. Quadradyne (2 SG, D, Pen) WM279

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

A.C. Britain's Super (Super-het) AW322
James Short-wave Super (Super-het) AW328
Simple Super (Super-het) AW340
Regional D.C. Five (SG, D, RC, Push-pull) .. WM252
Ideal Home Super (Super-het) WM280
Easytune 60 (Super-het) WM284

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

Century Super (Super-het) AW287
A.C. "Century Super" (Super-het) AW295
Mains Unit (1/-) AW295A
Super 60 (Super-het) WM229
A.C. Super 60 Radio Gramophone (Super-het) WM239
A.C. Super 60 (Table Model) WM245
Super 60 (with Wearite base) WM249
Super 60 (with Lewcos base) WM251
1932 Super 60 (Super-het) WM269
1932 A.C. Super 60 (A.C. Super-het) WM272

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

Super Senior (Super-het) WM256
Super Senior (Wearite base and Lewcos coils) .. WM261

PORTABLE

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

AMPLIFIERS (1s. each)

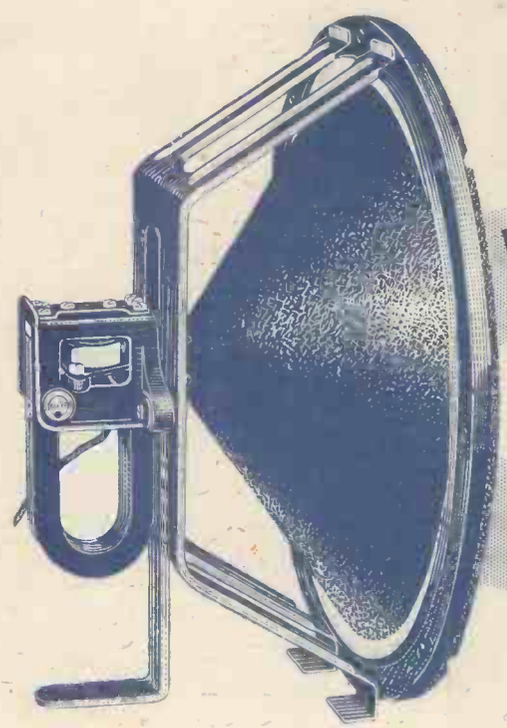
Add-on H.F. Screened grid Unit AW296
Universal Push-pull Amplifier AW300
"A.W." Record Player (L.F, Push-pull) .. AW319
Quality Amplifier (DC), 1/6 .. .. .. WM264
A.P.A. (Power Amplifier for A.C. Mains) .. WM275
A-P-A Radio Unit (SG,D) WM281
Economy Gramophone Amplifier WM277

MISCELLANEOUS (1s. each)

Booster Speaker (6d.) AW286
"A.W." Tone changer (6d.) AW288
"A.W." Selectivity Unit (6d.) AW290
A.C. Trickle Charger AW305
Amateur's Linen Speaker AW307
D.C. H.T. Unit AW312
Output Unit for Pentode Sets AW316
Short-wave Plug-in Adaptor AW326
Short-wave Super-het Adaptor AW329
Ether Searcher Radiogramophone motor board AW333
"A.W." Short-wave Adaptor AW339
Big H.T. Unit for A.C. Mains WM230
Loud-speaker Tone Control 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

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

Amateur Wireless Blueprints Dept., 58-61 Fetter Lane, London, E.C.4.



BRITISH MADE

Write for Catalogue No. AW35U

... ANY NOTES!

BLUE SPOT 100U, more than any other speaker, has accomplished wonders in the improvement of wireless reproduction. This Inductor Type Speaker can be compared favourably with any first-class Moving Coil Speaker.

Blue Spot 100U gives a depth and colour to the reproduction of speaking and singing voices that has hitherto been completely lacking. It handles the most intricate instrumental music with delightful smoothness, detracting nothing from the freshness and charm of the original. It does full justice to the bass, but is equally fair to the treble—in fact every note in the musical scale is reproduced at its true value.

But to appreciate the difference 100U will make to your enjoyment of wireless programmes, you must hear it and compare it for yourself. Try it out against the most expensive speakers you can find and you will admit, as thousands and thousands of others have admitted, that Blue Spot 100U is better than them all.

Suitable alike for normal power and Pentode valves — no matching transformer required.

THE BRITISH BLUE SPOT COMPANY LTD.

BLUE SPOT HOUSE, 94/96 ROSOMAN ST., ROSEBERY AV., LONDON, E.C.1

Telephone: Clerkenwell 3570. *Telegrams: "Bluospot, Isling, London."*

Distributors for Northern England, Scotland and North Wales: H. C. RAWSON (Sheffield and London), Ltd., 100 London Road, Sheffield: 22, St. Mary's Parsonage, Manchester: 183, George Street, Glasgow.

Blue Spot REGISTERED TRADE MARK

100U · 39/6

Printed by The Sun Engraving Co., Ltd., London and Watford. Published by Bernard Jones Publications, Ltd., 58/61 Fetter Lane, London, E.C.4.
Sole Agents for South Africa: CENTRAL NEWS AGENCY, LIMITED. Sole Agents for Australasia: GORDON & GOTCH, LIMITED. Saturday, May 7, 1932