

THE  
AUSTRALASIAN

PRICE, 1/-

Published by the D.M.O.  
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by post at 2/6 per copy

# Radio World

VOL. 4 . . . . . NO. 12

MAY, . . . . . 1940

FULL DETAILS  
AMPLIFIER  
CHAMPIONSHIP

DE LUXE  
FIDELITY 8  
for 1940

ENLARGED  
SHORT-WAVE  
SECTION

12-VALVE  
RECEIVER  
CIRCUIT



A selection of Radiotron output valves.—See page 28.

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The Australasian  
**RADIO WORLD**

Incorporating the  
**ALL-WAVE ALL-WORLD DX NEWS**

Vol. 4.                      MAY, 1940.                      No. 12.

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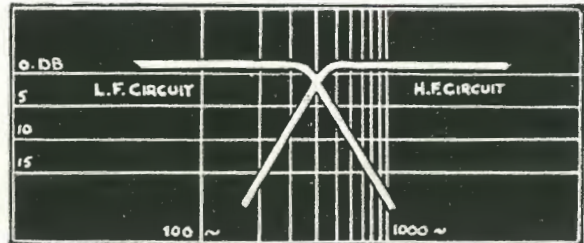
The "Australasian Radio World" is published monthly by A. G. Hull. Editorial Offices: 117 Reservoir Street, Sydney, N.S.W. Telephone FL 2842.

Advertisers please note that copy should reach office of publication by 14th of month preceding that specified for insertion.

Subscription rates: 1/- per copy, 10/6 per year (12 issues), post free to Australia and New Zealand.

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## EDITORIAL . . .

Things are booming along at a great pace.

For the April issue we printed just twice as many copies as were sold of the February issue, but within a week we found ourselves completely out of stock and we had to disappoint hundreds who wrote in from every part of Australia trying to obtain a copy of this issue. Actually there is a chance that some copies will be returned from newsagents in outlying districts, and if any such copies become available those who have placed orders for them can rest assured that the orders will be filled in rotation as soon as possible.

Organization for the Amplifier Championship is also getting ahead at a fast pace, and already prizes to the value of over £80 have been donated, and it seems that the final prize list will total well over £100.

Readers are warned, however, that we move at a rapid pace when we get started and therefore it is essential for everyone interested to write now and book seats for the auditions, or place their entry, as the case may be.

We know that it takes a bit of an effort to look out some paper and a pen, and then the ink, find the stamp and get the letter posted, but if you don't want to get left out of this extremely interesting contest you'll have to take a grab of yourself by the back of the collar and get moving!

Owners of comparatively simple amplifiers will be pleased to know that they are not only eligible to compete, but that they stand a good chance of collecting some of the excellent prizes which have been allotted for amplifiers using not more than three valves in all, including the rectifier.

There is no entry fee of any kind and the whole contest is being conducted solely in the interests of enthusiasts, so be sure you get your share of the fun.

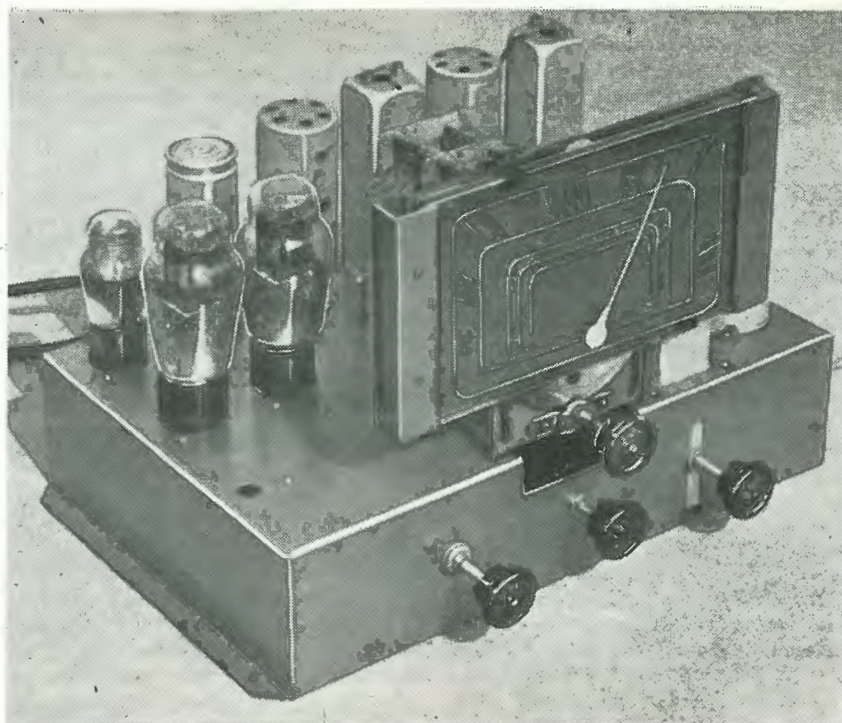
Already the contest has stirred up keen interest, and as a result the two major speaker companies are hard at work on the job of producing reproducer equipments capable of giving phenomenal fidelity at a price within the reach of the average enthusiast.

We draw special attention to the details of these assemblies, as covered in the two articles in the special amplifier section.

A. G. HULL

# The De Luxe Fidelity Eight for 1940

*A powerful dual-wave receiver, using the best of everything and capable of outstanding performance.*



Front view of the tuner chassis. The power supply is built as a separate unit.

FOR several years past it has been the practice of the "Australasian Radio World" to describe one outstanding receiver each year, called the

De Luxe Fidelity Eight.

To be worthy of such a title the design needs to cover a receiver which is capable of exceptional performance,

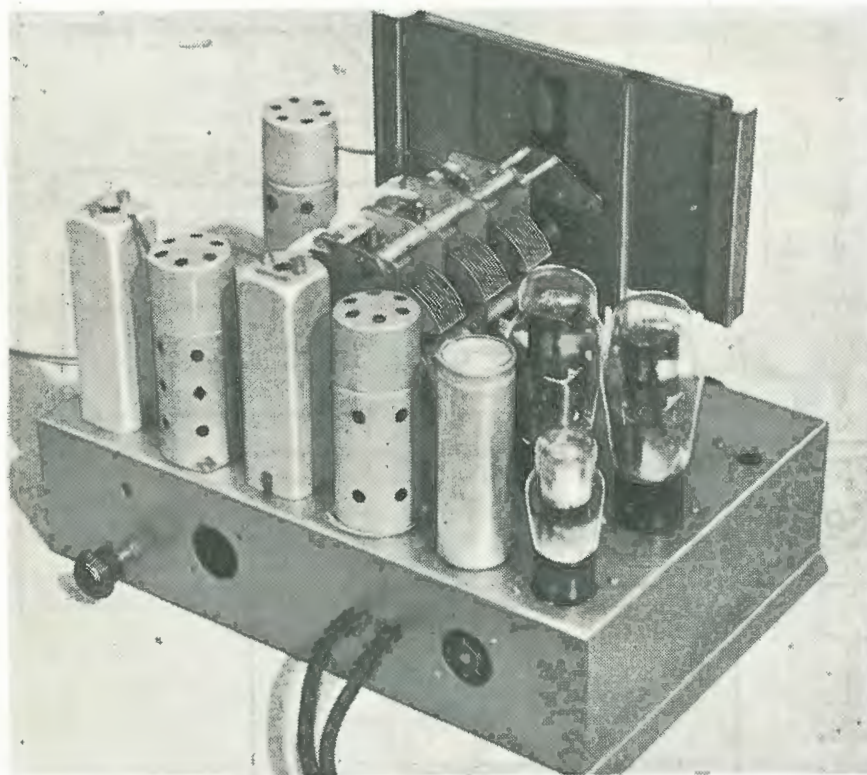
with the utmost in fidelity, selectivity and the many other details which go to make up the desirable in a radio receiver.

Naturally such a receiver tends to be expensive and, as there has to be a limit somewhere, no attempt is made to include anything which could be considered impractical. Similarly the matter of design must be along recognised lines, with nothing which may be termed experimental, for the man who builds this set wants to be quite certain that he will not be taking any risks when he lays out a fairly large sum on the production of this receiver.

## Up To The Minute.

For 1940 we feel sure that we have a circuit which is a truly worthy successor to the De Luxe Fidelity circuits of the past. It is capable of stunning performance on both broadcast and short-waves, with enough power to make the windows rattle, and fidelity of a standard as high as is desirable under present conditions.

To go into finer detail, the circuit of the tuner end of the receiver follows more or less accepted practice, with the latest type of dual-wave tuning unit, with an r.f. stage of amplification ahead of the latest type of frequency changer. One stage of intermediate amplification is used, with the newest permeability-tuned inter-



Rear view of the tuner unit, showing the two power supply cables, and the tone control knob.

mediate transformers. But the audio end of the receiver follows amplifier practice. A diode-triode gives detection and the first stage of audio amplification, and is resistance-capacity coupled into a driver stage. The driver works into a push-pull audio transformer, with two triode power valves in the push-pull output stage.

There is nothing revolutionary about this audio arrangement, but keen attention has been paid to detail, and it is hard to imagine any improvements which could be devised.

#### The Audio Transformer.

The whole heart of the receiver is the audio transformer. The tonal quality of the finished set depends on the quality of this transformer. In the original receiver we took no chances, and used one of the Airzone full-range push-pull transformers. It is a locally-made transformer, but right up to world standard. A few years ago it was thought that in order to get a really good audio transformer you had to import one. Step by step the Australian radio factories have caught up with the rest of the world, passing it here and there. And

in the matter of this audio transformer we have another example of Australian workmanship which can truly hold its own without the slightest need for any apology. No matter whether you judge by listening or by measuring with test equipment, the Airzone full-range transformer, used in a circuit as recommended by the makers, is capable of first-class results.

As has long been realised in talkie as well as radio work, a properly designed push-pull circuit, using a good audio transformer, takes a lot of beating.

As regards the speaker equipment the De Luxe Fidelity Eight can be used with any good twelve-inch speaker capable of handling its power output, but it is also ideal for use with either of the new twin-speaker equipments, as detailed in this issue.

#### On Shortwaves.

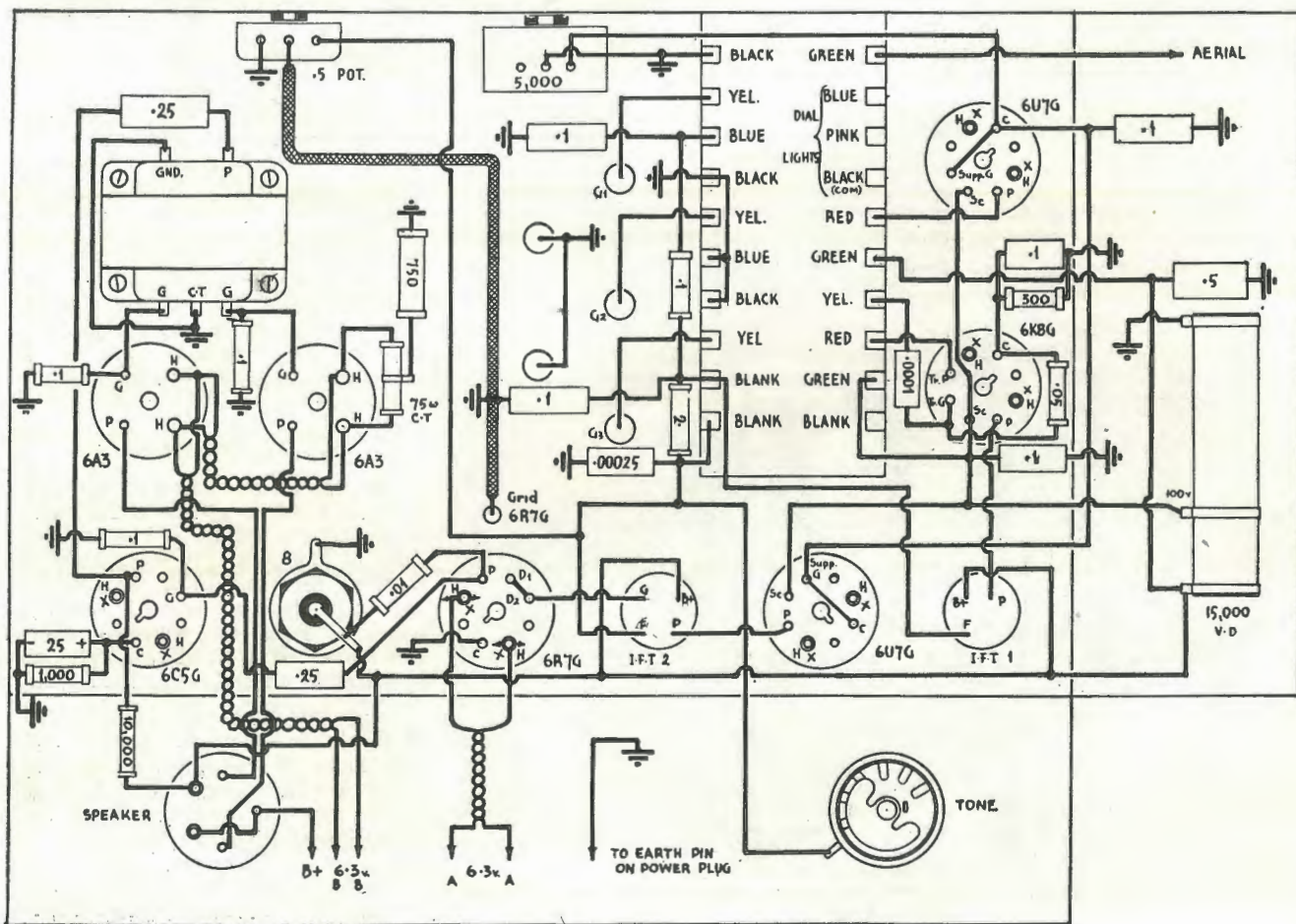
On the short-waves the performance is infinitely better than that found in 90% of the commercial receivers on the market to-day. The main reason for this is the higher audio gain which is attained in this circuit by virtue of the two audio

stages. This extra gain, being obtained without increasing valve hiss, means that those weaker stations which are of no entertainment value on an ordinary set, can be received on this one with ease and played at normal room strength without excessive receiver noise.

#### Easy to Build.

Before we go further we feel that we should re-assure those who feel that they would like to build such an outstanding receiver, but doubt their ability.

We can state most emphatically that this set is just as easy to build and adjust as any ordinary 4/5 valve receiver; in fact, it is easier. The terrific reserve of performance means that, even if alignment and adjustment are not one hundred per cent., the results will still be excellent. Actually, however, the original receiver went together in record time, and immediately gave sterling performance in every way. No adjustments of any kind were required in order to play stations from near and far, and even when checked up later on a signal generator it was found



## PARTS LIST.

### De Luxe Fidelity 8.

1—Suitable base or pair of bases (Radiokes).

1—Power transformer, as specified (Radiokes).

1—Filter choke, 150 m.a. (Radiokes) gang (R.C.S.).

1—Coil kit, with intermediates and gang

1—Dial to suit (R.C.S.).

1—Audio transformer, push-pull, class A. (Airzone).

#### CONDENSERS:

1—25 mfd. electrolytic, 25-volt (E.T.C.).

3—8 mfd. electrolytics, 500-volt (E.T.C.).

1—.25 mfd. tubular condenser (E.T.C.).

6—.1 mfd. tubular condensers (E.T.C., T.C.C.).

1—.00025 mfd. mica condenser (E.T.C., T.C.C.).

1—.0001 mfd. mica condenser (E.T.C., T.C.C.).

#### RESISTORS:

1—300 ohm 1-watt (I.R.C.).

1—750 to carry 150 m.a. (I.R.C., R.C.S.).

1—1,000 ohm 1-watt (I.R.C.).

1—10,000 ohm 2-watt (I.R.C.).

1—50,000 ohm 1-watt (I.R.C.).

2—100,000 ohm 1-watt (I.R.C.).

1—1 megohm 1-watt (I.R.C.).

1—2 megohm 1-watt (I.R.C.).

1—75 ohm centre-tapped resistor (I.R.C., R.C.S.).

1—15,000 ohm voltage divider (R.C.S.).

1—5,000 ohm potentiometer (Radiokes).

1—500,000 ohm potentiometer (I.R.C., E.T.C.).

#### VALVES:

2—6U7G, 1—6K8G, 1—6R7G, 1—6C5G,

2—6A3, 1—80 (Brimar, Radiotron, Ken-Rad, Mullard, Philips).

4—Valve cans

#### SOCKETS:

5—Octal

4—4-pin

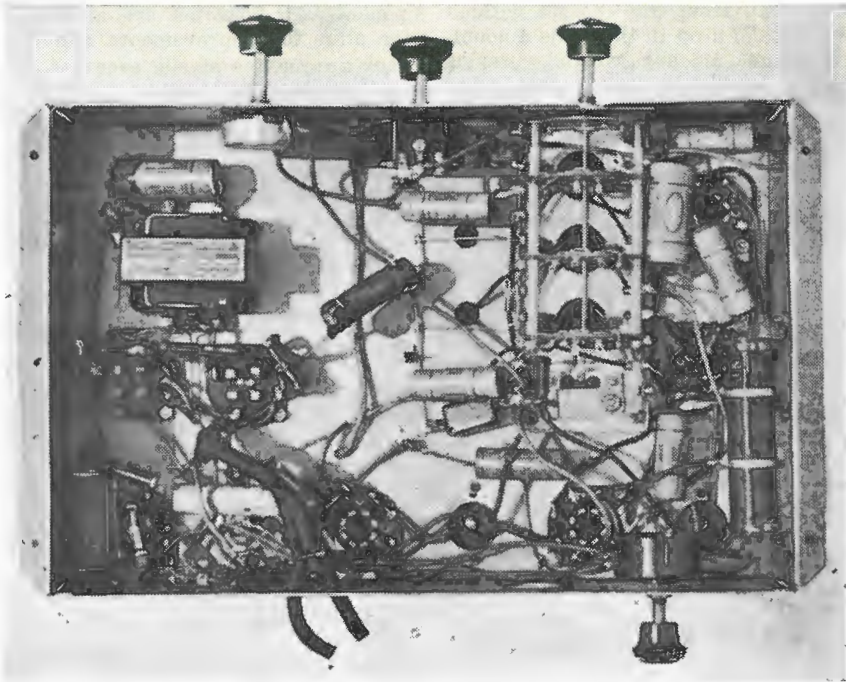
1—5-pin

#### SPEAKER:

12" speaker, 2,500 ohm field, to suit push-pull triodes (Rola, Amplion).

#### SUNDRY HARDWARE:

Power flex, screws and nuts, hook-up wire, soldering lugs, knobs, dial lights, etc., etc.



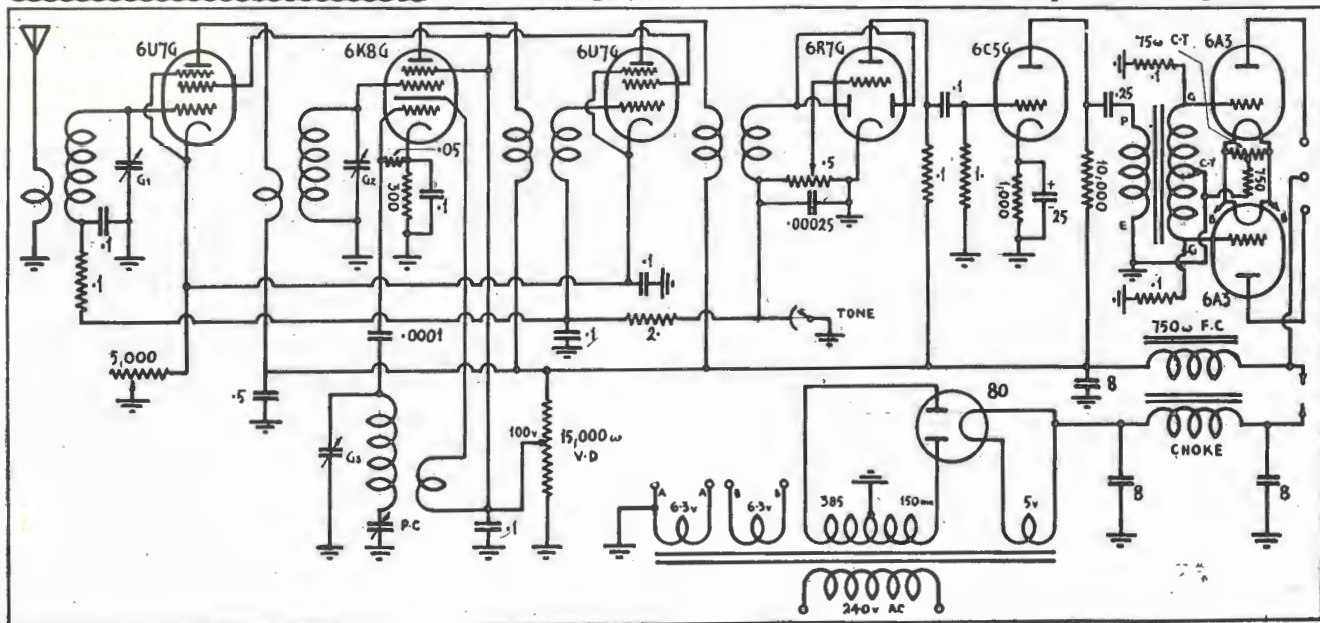
Compare this photograph with the picture diagram opposite and check with the circuit diagram below and the parts list alongside, and you can't go wrong!

that an eighth of a turn on the aerial trimmer was the only attention needed.

#### Separate Power.

As is our modern style, two separate bases are used, one for the receiver proper and the other for the power supply. This simplifies the building of the job, and allows the power transformer to be mounted at a distance from the audio transformer and other components likely to pick up hum by induction. As with other recent designs, the hum level is

guaranteed to be inaudible. Many commercial receivers, even the best of them, try to get away with a merry little hum as a background for the music. We feel that the elimination of hum is a matter worthy of attention, and special precautions have been taken in this design to see that there can be no complaint. Coupling the power unit to the set, we used a pair of lengths of three-wire power flex, the heaviest we could get. With this heavy power cable, it is possible to have the power unit up to three



feet away from the chassis without the voltage drop in the leads amounting to an amount worth worrying about.

### Modern Parts.

Although it might be held against us, we readily admit that the performance of this receiver surprised us. We have built up lots of different sets using dual-wave coil units that looked the same as this one, but which were made several months ago. We didn't realise that the engineers in the com-

ponent-part factories are always on the alert for improvements, and that they are making steady progress. We used a new unit in this set, and as we said before, it looked the same as the old, but when it came to results, well, it surprised us. The gain was infinitely greater, due to a modification in the aerial coupling, we understand, and this added gain meant lower noise level in practice, as it was ahead of the converter valve. The converter itself gives infinitely better performance than the old type valves,

being one of the latest 6K8 metal valves. Actually the 6K8 and its glass equivalent are supposed to be similar, and to give similar results. Maybe we have been unlucky in this respect, but in at least three cases we have found the 6K8 to be a better valve on short-waves. Perhaps the coils used suit this valve better. The difference is not great, of course, but sufficient to be noticeable when the valves are changed over, even without the use of testing equipment or meters.

### The Intermediates.

As with the coil unit, so with the intermediate transformers. Instead of the usual 7/9 type of intermediates, we decided to get the best, and so paid 13/6 each for a pair of the latest permeability-tuned transformers, with trolitul insulation.

These transformers have fixed mica condensers across the windings to tune them, instead of the usual type of adjustable condensers. The tuning adjustment is effected by moving an iron-dust core or slug, this slug sliding along a threaded brass rod to put it directly in the core of the winding or move it slightly out.

It is claimed that this type of intermediate is impervious to the effects of humidity, and that it will hold its adjustment indefinitely, irrespective of climatic conditions. The fact that they are winning favour in spite of their rather high cost seems to indicate that these claims are borne out in practice.

As regards performance, we found that they were unmistakably superior in both gain and selectivity, and we also noticed a definite absence of the "swish" tuning noticed in many sets when bringing in a distant station.

### Construction.

Construction is greatly simplified by the use of a ready-drilled base.

First step is to sort out the components and make sure that you know them and can readily identify them. Next, get your soldering iron hot and clean and then proceed to "tin" all the soldering lugs and terminals. This requires that each lug be scraped with a hack-saw blade, old pocket-knife blade or some such instrument, and can be done more quickly and easily if carried out before the part is assembled into the chassis.

Assembly is just a matter of mecanno work, the diagrams and photographs being followed to make sure that the valve sockets are mounted the right way round, and so on.

Wires should be soldered to the ter-



## 1940 DE LUXE FIDELITY EIGHT

1940 version of one of the most popular receivers ever described in "Radio World," the "1940 De Luxe Fidelity Eight" is a set you'll be proud to build and own. Tremendous sensitivity on both wavebands, knife-edge selectivity, seven watts of high fidelity output . . . these are only three of the many features of this sensational design, that gives an all-round performance unsurpassed by commercial receivers costing several times as much. All components in our kit of parts are guaranteed to be exact duplicates of those used in the original model.

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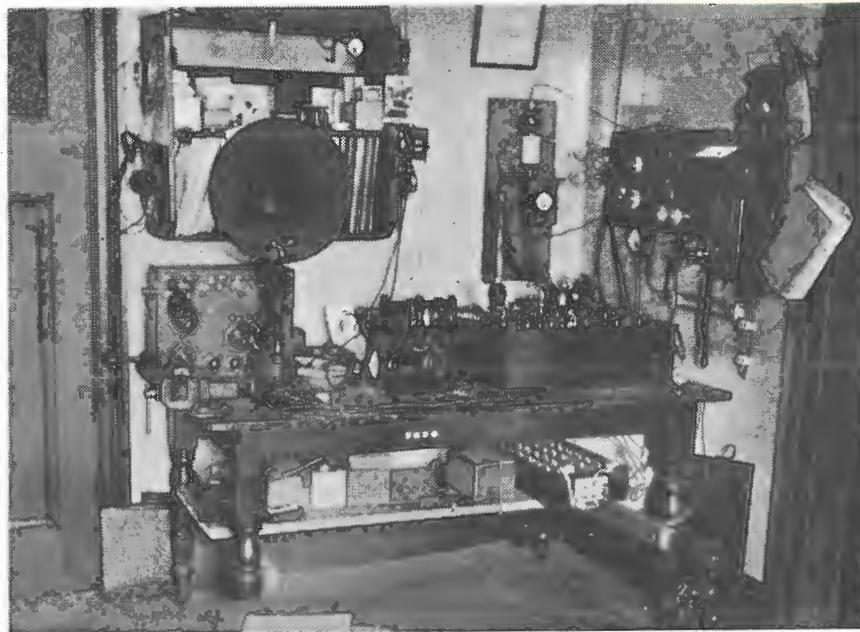
minals of the condenser gang before it is mounted, and it is not a bad practice to have a rehearsal with the dial and gang before you get too far with the assembly. Unless the kit has been picked by a salesman who is accustomed to handling these items, there is always the chance that there will be unexpected and tiresome difficulty in getting the three parts to coincide in the required manner.

**Valve Types.**

There are two points about valve types which need explaining. The first is in regard to the 6R7. This valve is not used very widely, being a new type of diode-triode, with a low-gain triode portion. Should any difficulty be found in obtaining this valve, an alternative way is to use a 6G8G, with its screen and plate tied together, and considered as the plate. Under these circumstances the characteristics approach those of the 6R7.

The 6A3 type output valves are identical in characteristics with the 2A3 type, except in the matter of the heater voltage and current. If it is desired to use the 2A3 types it is simply a matter of getting a power transformer with a suitable filament winding of 2.5 volts to suit these valves.

**THE GOOD OLD DAYS**



What a good "ham" shack looked like about twenty years ago! This photograph turned up the other day among some of our old papers. We don't know whose station it was, but probably one of the early amateur transmitters in Melbourne. Can anyone identify it?



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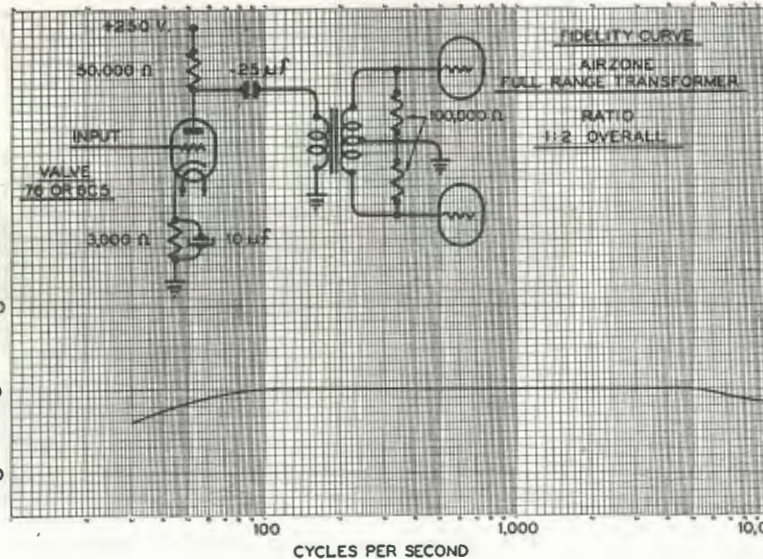
Telegrams: FOXRADIO.  
(In Lq.)

# AIRZONE FULL RANGE AUDIO TRANSFORMER TYPE 312

The Airzone full-range push-pull interstage audio transformer is a super "high quality" transformer of the very latest design and construction.

## CONSTRUCTION:

Core is of the latest type, high permeability nickel alloy, and a special form of winding is employed to give the remarkable frequency response. The windings are vacuum impregnated and the transformer sealed in the bakelite case with a special compound rendering it entirely moisture-proof which ensures freedom from breakdowns even under severe tropical conditions.



## SPECIFICATIONS:

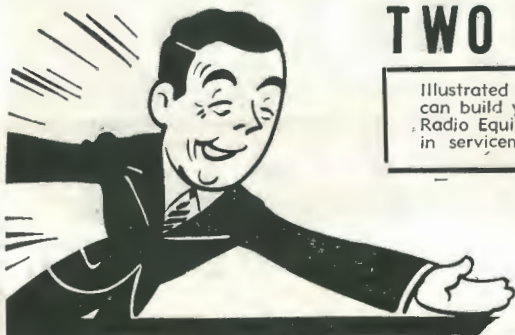
Push-pull Class "A." Amplification ratio: 1-2 over all. Suitable for coupling one plate of 26, 27, 37, 55, 56, 76, 86, 6CS to push-pull grids type 10, 41, 42, 43, 45, 47, 48, 50, 71A, 2AC, 2A5, 6F6, 6L6.

CONNECTION: Type 312 full range audio transformer is for use only in a circuit having the shunt feed method as shown on the connection diagram.

WARNING: Under no circumstances must direct current be passed through the windings.

Designed and manufactured by Airzone (1931) Ltd., Camperdown, N.S.W.

RETAIL PRICE, £3/17/6  
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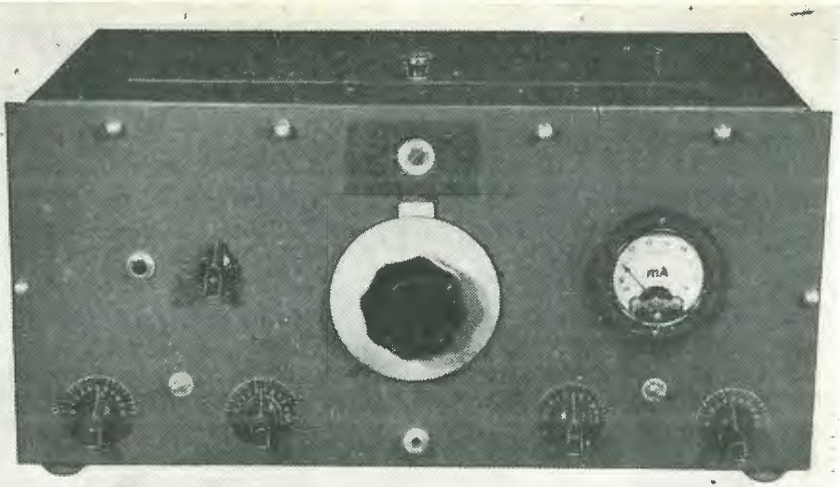
E.S. & A. BANK BUILDING, BROADWAY (OPP. GRACE BROS.), SYDNEY

Phones: M. 6391 & M. 6392.

# 12 - Valve SUPER SET

By D. S. ROBERTSON  
(VK5RN)

The receiver to be described in the following pages was originally designed solely as an "Amateur Bands" receiver. However, when the war started, the design was modified, and the receiver was built for general coverage of all the most important short wave bands. The receiver was also planned with a view to keeping the cost as low as possible without sacrificing performance, and for this reason a crystal filter was not included in the set, and plug-in coils were used instead of band-switching. The circuit finally arrived at was vastly different from the original plans, and was the result of several months of experimenting with various circuits. Regeneration was avoided in all circuits, in order to preserve the stability and reliability of the



She has a business-like appearance.

receiver, and, in any case, it was found to be unnecessary, owing to the large number of stages. Standard circuits were used throughout the receiver, and no "trick" arrangements

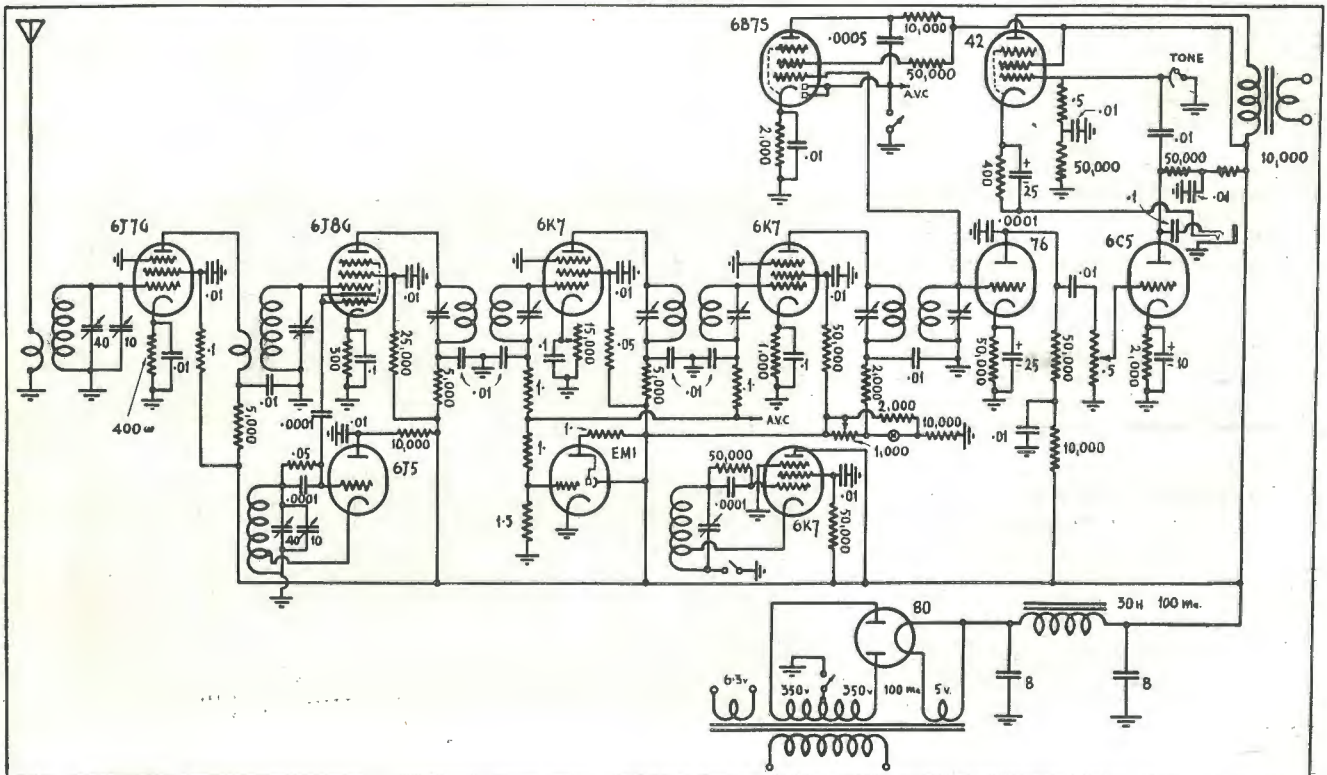
were resorted to, so that little difficulty should be had in getting it to work properly.

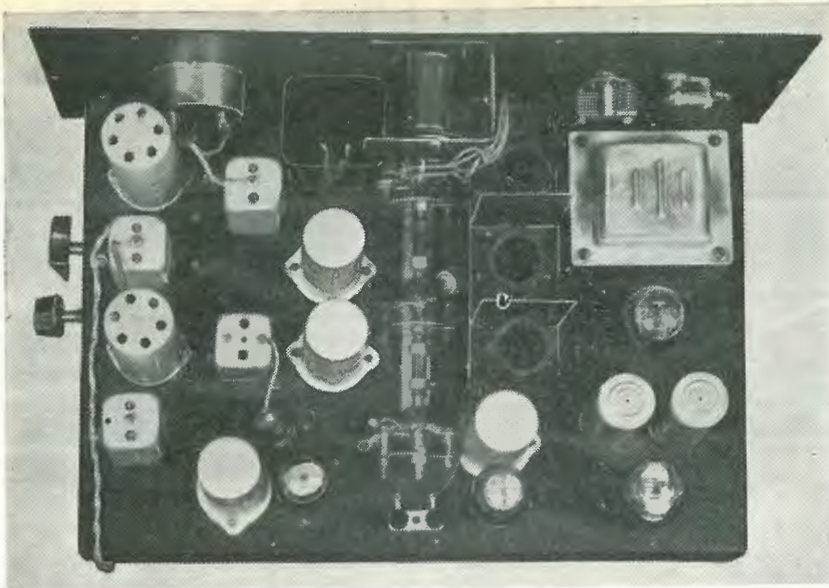
## The R.F. Stage

One stage of R.F. amplification is used in order to reduce second-channel interference. The tube chosen was a 6J7G, which is run without A.V.C. in order to ensure a good signal to noise ratio all the time. It might have been better to use a high-slope pentode such as the 1851 in this position, but this was not done, owing to the

## Silent Hams :

*Now that you have time on your hands, why not build a decent receiver to replace the old blooper two ? This war won't last for ever.*





This plan view shows all details of the layout.

high cost of such a tube, and the difficulty of obtaining them in Australia. The 6J7G, however, gives quite an appreciable gain at 19 metres, but there is no noticeable advantage to be had from it at 10 metres. In coupling the R.F. stage to the mixer both capacitive and inductive methods were tried, and the inductive coupling was found to give far better image rejection, and to be well worth the bother of winding an extra coil.

#### The Converter.

A 6J8G was used as a converter tube, and although it has a reputation of being a critical tube, little trouble was experienced in getting it to work well and with a remarkably low hiss level. Altogether, the 6J8G was found to be highly satisfactory, although a 6K8 would probably perform quite as well.

A separate oscillator was used, but this is probably unnecessary, and no trouble should be experienced in using the triode section of the 6J8G. However, a separate oscillator should give a higher oscillator voltage, and is also desirable as it helps to isolate the oscillator from the mixer circuits and thus minimises the possibility of "locking," which is so annoying when the mixer is being separately tuned, as is the case in this receiver.

#### The I.F. Stages.

Three R.C.S. air-core transformers are used in the I.F. stages, as two iron-core stages might have been rather unstable and difficult to handle, especially with A.V.C. being applied to them. The first stage has a gain control of 15,000 ohms in its cathode, and the second stage works "flat out" all the time in order to work the "R" meter satisfactorily, the meter being connected in the plate circuit of this

stage.

The meter is connected in a bridge circuit, so that it will read in the right direction and not backwards as is the case when a meter is merely connected in series with the plate supply of an I.F. stage. The zero reading of the meter can be adjusted by means of the 1,000 ohm potentiometer in the bridge circuit, and in this particular set the control was brought out at the side of the receiver. The meter reads the change in plate current of the tube, due to the A.V.C. voltage applied to its grid and thus it only works when the A.V.C. is operating.

#### The Second Detector.

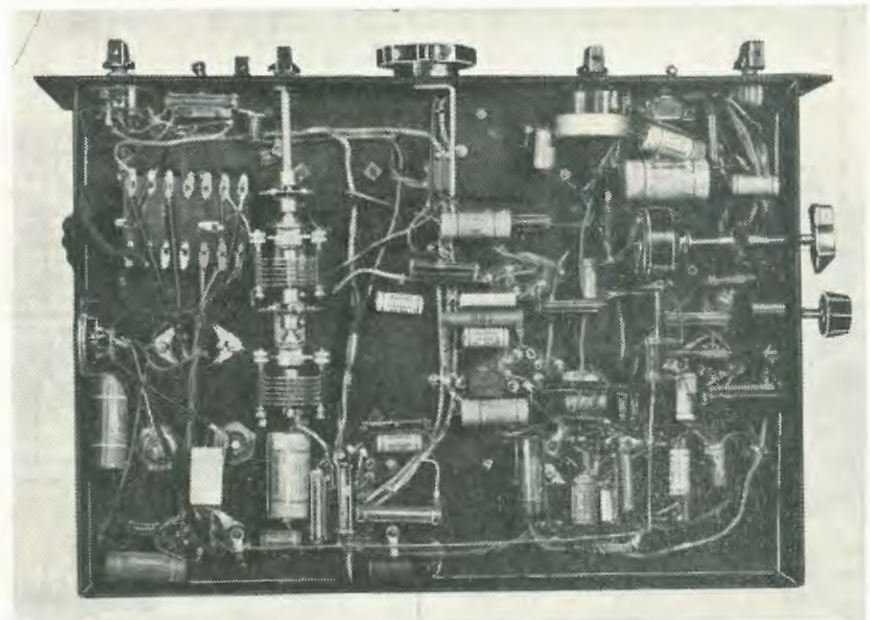
After trying numerous second detector arrangements, an anode band detector was used in preference to a diode, owing to its greater sensitivity and higher output. This type of detector has another distinct advantage as it does not load the secondary of the last I.F. transformer, as does a diode. Thus this winding on being tuned, will "peak up" like any of the previous windings and will not be broad as is the case with a diode, and thus greater selectivity can be realized. Number 1 I.F. transformers are used throughout. There is, however, one disadvantage to be considered—that is the necessity of using a special tube for obtaining A.V.C. voltage, and this adds slightly to the expense of the receiver.

#### The A.V.C. System.

A separate tube was necessary to obtain A.V.C. voltage, so a 6B7 was tried, operating as an A.V.C. amplifier and rectifier. This system gives far greater A.V.C. voltage than the simpler and more conventional circuits and is well worth the extra tube. The A.V.C. voltage is applied to the I.F. tubes only, as instability was experienced when it was introduced to the mixer. The control is excellent, and the large A.V.C. voltage gives a good deflection on the "R" meter in fact, it is almost too great, as trouble is experienced with the needle hitting the front stop on strong signals and thus straining the bearings of the meter.

#### The Audio Stages.

The audio amplifier is quite conventional and uses a 6C5 and a 42. The 42 can be driven directly from the detector, but the 6C5 is useful for



There is ample room for all the minor components without crowding.

driving the headphones, and also gives a great deal of extra gain. Lots of decoupling was necessary, however, as audio instability was encountered. The head-phones plug in at the front of the receiver and automatically switch out the speaker by opening the cathode to earth circuit of the 42.

#### The B.F.O.

The beat oscillator is a 6K7 tube and the coil is an Eddystone component. The coil is supplied complete with grid condenser and resistor enclosed in a little metal can, with trimmers across the grid coil for fine and coarse tuning. Several home-made coil units were tried but without a great deal of success, as it is fairly difficult to strike the right frequency, although it is possible to use an old I.F. transformer winding. No coupling to the second detector was found necessary, and even with good screening around the beat oscillator the stray coupling was quite adequate.

#### The Magic Eye.

An E.M.I. tube was used as a tuning indicator and although unnecessary, especially when an "R" meter is being used, it will follow a rapidly fading signal much better than the meter, and is useful in this way.

The eye is worked from the A.V.C. line, but the A.V.C. voltage was found to be too great for it, as it would close on a very small signal, so that a voltage divider was made from a 1.5 and a 1 meg. resistor, the grid of the eye being connected to their junction. With this arrangement the eye just closes on an R9 signal.

#### The Power Supply.

The power supply had to supply 250 volts at about 100 m.a., so that it was quite small enough to be built on the receiver chassis. A 100 m.a. transformer was used with 6.3 volt and 5 volt windings for the filaments.

It was originally intended to use the speaker field as a choke, but the voltage drop through a 2,500 ohm field was found both in theory and practice to be far too great, and a separate choke and a permagnetic speaker were used instead. A speaker with a low impedance field however, should work quite satisfactorily, and should not cause too great a voltage drop, as the set draws only about 80 or 90 m.a.

#### The Condensers.

The band setters are 40 mmfd. Eddystone condensers and are perhaps a little small. A larger coverage would be obtained if 100 mmfd. condensers were used instead. The oscillator and R.F. band set condensers are ganged by means of a flexible coupler and mounted under the chassis, the mixer condenser being

entirely separate. The mixer is tuned with an R.C.S. 100 m.m.f.d. trolitul condenser which is mounted on the panel. This system offers a distinct advantage over the usual practice of ganging all three condensers, as the mixer can always be kept in line with the other circuits by adjusting this condenser. In addition there is no necessity for a trimmer in parallel with the mixer coil.

The three band-spread condensers are mounted in an Eddystone cradle and ganged with couplers. It is most important that the oscillator conden-

ser should be mounted next to the dial, as otherwise back-lash will be introduced by the couplers. This mistake was made when the receiver was first built, and it made accurate tuning almost impossible, so that the converter section of the receiver had to be entirely rebuilt. The band spreaders shown are a make which is unprocurable in Australia, but any small condenser with a maximum capacity of 10 or 20 m.m.f.d. would, of course, be just as good.

#### The Coils.

The coils were wound on Rayway

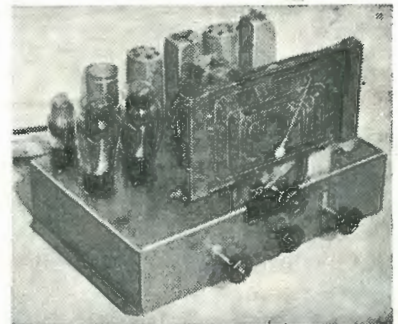
## JONMAR KIT SET

### for the De Luxe Fidelity 8

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Complete to the last screw, completely tested before packing—every part chosen so that you have no misfit components. Save time and money—write to "The Friendly Wholesale House" for parts lists and prices.

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Completely assembled chassis of the De Luxe Fidelity 8. All parts from John Martin are recommended by the Editor.

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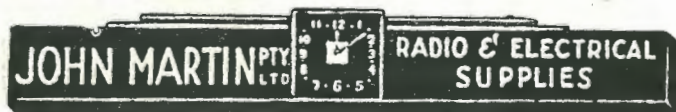
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The World's Finest Sound Reproducers ensure best results—always!

The shortwave gear that always gives high fidelity reception.

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# ?



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Nothing makes a set-builder more savage than to have the performance of his favourite DX job ruined by the failure of a "dud" valve—and "bargain" valves are usually "dud."

If you're wise, you won't take risks with "bargain" valves. Play safe always with **BRIMAR**, the British-made valves that were selected for use in the radio equipment of the "Queen Mary" and "Queen Elizabeth."

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# BRIMAR

## VALVES

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**EVERY BRIMAR VALVE IS 10 TIMES TESTED**

1¼ inch formers and 26 gauge enamel wire was used. All coils are close-wound except the 10 meter coils which are space-wound. So far, only four coils have been wound for the set, as it has only been necessary to cover the principal bands. The data is, of course, only approximate and will vary widely for different receivers.

### Construction.

The set was built on a steel chassis and panel, measuring 12" x 17" x 2½", the panel being welded to the chassis and the set was crackle finished. The metal cabinet was added as an after-thought, and measures 12" x 17" x 8".

The controls from left to right are—A.V.C. switch, send-receive switch, band-setter, headphone jack, I.F. gain, beat oscillator switch, and on the extreme right is the audio gain control. To the left of the main tuning dial is the mixer tuning control and an indicator lamp. A tone control and the zero-setting control for the "R" meter are mounted on the side of the chassis.

Range in Megacs.	R.F. Ant.	F. Grid.	Coil Plts.	Detector Grid.	Oscillator
26-32	2	3	2	3	3 tapped at 1
15-20	3	5	3	4	5 tapped at 2
11-15	4	7	4	6	7 tapped at 2½
7-10	5	9	5	8	9½ tapped at 3

### NOTE.

This article has been contributed by a prominent South Australian experimenter, Mr. David S. Robertson, of "Maroonika," Mount Lofty.

As we have not handled the original receiver, we cannot speak of its performance, but the design appears to be sound and well thought out. We cannot, however, extend our Special Laboratory Service to cover sets built up to this circuit.—Editor.

### ZERO BEAT CLUB

The Zero Beat Radio Club has changed its address to new premises at Bulletin Place, 214 George Street North, Sydney.

The meetings are held on Friday nights as usual and are fairly well attended, although several of the "boys" have joined the fighting forces.

The morse class is active and the interests of the beginners as well as the more advanced "ham" are well looked after, as the sending speeds are varied gradually from about 8 w.p.m. and upwards.

A new series of A.O.P.C. lectures will commence shortly and anybody interested is welcome and should interview the secretary at the above address.

# Snipers' Post

*By a Platter-bug*

*By a Mike-man*

Dear Sir,—Congratulations on your grand journal. Our technicians here vote it A1 at Lismore. It must give you quite a kick to be back among the circuits and services of radio—after having had to put up with a lot of drivel about we announcers, etc.

Anyhow, here's wishing you and the paper all the best of successes and a long life.—Yours, etc.,

HARRY WHARF,

Advertising Manager,  
Richmond River Broadcasters Pty. Ltd.

*By a Listener*

Dear Sir,—I think you hit the nail on the head in your recent article in which you drew attention to the poor quality of the recorded advertisements which are plugged over some of the commercial stations. These recordings must be made with the most elementary equipment, or else with equipment which is hopelessly out of adjustment.

It is a definite reflection on their ability if the standard of these recordings is to be taken as a fair example of what Australian radio engineers can do.—Yours, etc.,

"DISCUS."

Mozman.

*By a Champion*

Dear Sir,—It is with pleasure that the good news is received that you are again taking an active interest in amplifiers, and in the promotion of another championship contest.

Re the judging. The idea of having the competitors as judges of the heats has much to commend it, but I would suggest that the competitors actually under test should not have any say on the night that their amplifiers are tested.

The method used in the previous contest has much to recommend it for the final judging, with the exception that all finalists should use the same item, but not the same record, as that would hardly be fair, owing to the wear of the record. The person having first use of a record would be at a great disadvantage and also the last competitors.

If the competitors are to act as preliminary judges, I would suggest that circuit details be kept secret until the conclusion of the contest, and the judging be on the basis of a secret ballot, with each competitor draw-

ing for position, as done in the previous contest.

You can certainly count on an entry from me, irrespective of what your decision will be in the matter of judging, and the greatest pleasure I will get from the contest (apart from winning it myself) will be to congratulate my successor as champion.

Wishing you the greatest success with the contest, and also in your new position.—Yours faithfully,

HARRY J. CARTER.

Marrickville.

(Mr. Carter was the winner of the Amplifier Championship held in 1934.—Ed.).

As a confirmed amplifier and "high fidelity" enthusiast I am very pleased to see you propose holding a competition in the near future.

We all become used to our own particular versions of high fidelity and tend to think it is near enough to perfection but having a chance to hear others, I think, gives us a better perspective.

Now as to the suggested rules—I don't think they are the best. The idea of the competitors being allowed to judge is unsound; each would compare the reproduction with his own "perfect job."

Also I think it is a mistake to hold the audition in a small room. It does not allow the development of the necessary audio punch. The size of the hall in which the last comp. was held was about right; even a small amplifier would get out over  
(Continued on page 33)

## RADIO WAR GAME



An interesting novelty which attracted a lot of attention from visitors at the recent Toy Fair, held in New York, was a "naval defence" game. It was awarded second prize among the toys voted outstanding by a jury of prominent buyers at the Fair. It was said that but for the tendency in recent years to "soft-pedal" on military toys, it probably would have taken first place.

The chief feature of the game is the beam-o-scope mystery gun, which throws out electrical rays of sufficient power to keel over the toy battlecraft.

The inventor of the game is a radio and television expert, John Fettig of Maurice Despres and Company of New York City. Mr. Fettig explains that the beam from the gun, in conjunction with a field of magnetism, completes the circuit only when aimed accurately.

The game is based on a number of manouvre charts furnished in a book which is supplied with the game. One of the boys acts as Admiral of the enemy fleet; the other boy acting as Commander in charge of the shore defences.

# RADIOKES

## NOW OFFERS EVEN GREATER SERVICE TO THE RADIO INDUSTRY AND TO THE HOME CONSTRUCTOR

With the formation of a new company, Radiokes Pty. Ltd. announce that they will very shortly produce an entirely new range of exclusively designed RADIOKES Components—with features that will delight and amaze you! Just as Radiokes have led the field in high efficiency radio components since 1923—so in the future they will step right out again with better designed, precision constructed RADIOKES products.

The use of Trolitul wherever possible in Radiokes components will ensure the maximum standard of results, and for your protection all components will be clearly branded with the name of RADIOKES. Complete moulding will be a feature of construction, that is, the formers will be moulded together under terrific pressure, a new process ensuring far greater rigidity and stability. POST COUPON below for details of new lines.

The *MYSTERY 4/5 Dual Waver* features *SENSATIONAL NEW*

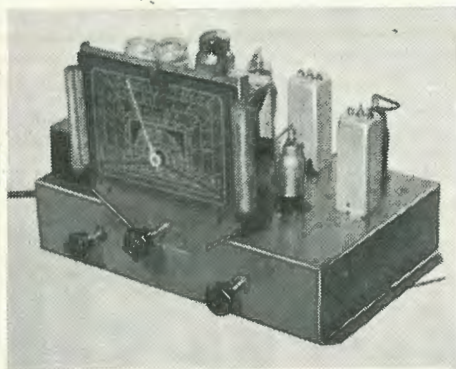
### RADIOKES

### 13.7 to 50

METRE

DUAL-WAVE

UNIT



The special 4/5 Dual-Waver to be featured in the next issue of "Radio World" has been specially designed and built by the Editor, using the new releases of RADIOKES Components throughout. Don't miss this set—and don't miss getting the RADIOKES Components to build it with!

### WATCH FOR THESE EXCLUSIVELY DESIGNED RADIOKES PRODUCTS

- NEW DUAL-WAVE COIL UNIT WITH 13.7 TO 50 METRES SHORT-WAVE BAND.
- NEW INTERMEDIATE TRANSFORMERS.
- NEW COILS AND COIL FORMERS.
- NEW TRIMMER BASES.
- NEW DOUBLE PADDERS.
- NEW W.W. VOLUME CONTROLS.
- NEW DIALS.

#### RADIOKES COIL KITS FOR THE SETS IN THIS ISSUE

##### DE LUXE FIDELITY 8

Specify	complete Kit, comprising	Radiokes DAU-3	Coil D/W	
Unit				£3 7 6
1 Pair	I.F.I.'s			£1 2 0
				£4 9 6
Battery-operated	S.W. Converter			
Coil Kit				13 9

Sole Agents for RADIOKES PRODUCTS,  
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Please add my name to Radiokes Mailing List for complete details of new Radiokes releases, and all further Radiokes technical data—without obligation, of course.

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# Mystery Dual-Wave Receiver

*This four-five receiver uses the latest valves, coils, intermediate transformers and gang condenser.*



Front view of the chassis.

**D**URING the past few weeks a couple of entirely new lines have been introduced and, being desirous of making a practice of getting acquainted with anything new, we put together the receiver pictured on this page, and built to the circuit given below.

Results obtained indicate that there must be continual progress in the design and construction of valves and components.

## 13 to 50 Metres

The coil kit used is the first release from the new Radiokes factory, and although in appearance it is similar to previous types of dual-wave brackets, it is really far more effi-

cient. This efficiency allows a wider coverage on the short-wave band, and when used with the new "H" type Stromberg-Carlson condensers gives a full coverage from 13 to 50 metres, covering two of the short-wave broadcasting bands which are missed with ordinary dual-wavers.

## Intermediates.

The intermediate transformers are all the latest products of the new Radiokes factory, with permeability tuning, which is attained by sliding iron cores through the centres of the Litz windings.

The fixed tuning is obtained from fixed mica condensers which are doubly impregnated, so that the units

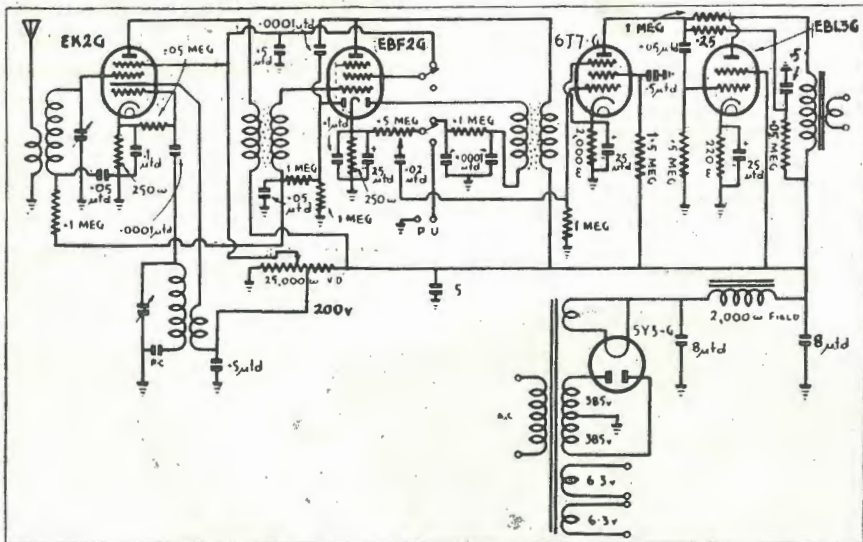
are quite impervious to humidity and other climatic conditions which upset the tuning of ordinary intermediate transformers.

## Valves.

All of the valves are of the latest Philips types, products of the Australian Philips valve factory. They are fitted with octal bases, but retain the high-performance characteristics of Continental design. The EBF2 type, used as intermediate frequency amplifier and diode detector, has only been released a few days.

## In Next Issue.

For the benefit of those who are sufficiently advanced to build receivers from the circuit diagram we are releasing these advance details of this truly modern receiver, and the full constructional details with complete plans and comprehensive diagrams should be ready for publication in our June issue, due to be on sale about June 10.



Schematic of the circuit.

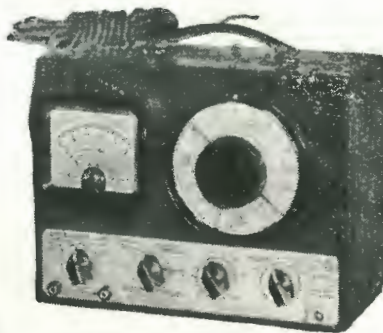
## ROLA EXPANDS

Rola Co. (Aust.) Pty. Ltd. has extended its existing building on the Boulevard, Richmon, Vic., to take in all the 1¼ acres available at that site. In the new section, just being completed, will be housed a considerable quantity of new plant, which, with the existing plant, will enable Rola to manufacture loud-speakers almost completely from raw material. Furthermore, this development will enable Rola to produce improved types of speakers. Further announcement in this direction will be awaited with considerable interest.

*These two* outstanding **PATON ELECTRICAL** lines *will enable you to make*



Paton Model "VCT" Valve and Circuit Tester.



Paton Model "G" Oscillator.



**EVERY  
POSSIBLE**  
*valve & circuit  
test*



There isn't a single testing problem that can't be solved with the use of the PATON "VCT" VALVE AND CIRCUIT TESTER AND "G" SERIES OSCILLATOR. You can't afford to be without these two wonderful lines—they give you laboratory precision at very reasonable cost.

PATON ELECTRICAL equipment enables you to make every possible valve and circuit test quickly—easily—more accurately, and ensures years of reliability and durability.

PATON ELECTRICAL equipment is widely used by satisfied government department technicians—radio receiver and transmission manufacturers—radio servicemen—and amateur assemblers—in every case it provides maximum performance; and is outstanding for its "suit every pocket-book" price range—don't delay; investigate PATON—it will pay you handsomely.

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PHONES: UA 1960...1982  
The Australasian Radio World, May, 1940.



# HEADACHE CORNER...

*Being tales of woe from our Lab. Service*

**F**IRST set brought into our laboratory did not conform to the rules and regulations, being a nine-valve superhet built to one of the first articles on modern superhets, and published by A. G. Hull in 1932.

This set was still running quite well, with all the original valves, but every now and then the volume would drop and the background hiss come up to an unpleasant level.

Preliminary checking of the valves showed that they were all serviceable, although down in emission a trifle.

Subconsciously thinking along the lines of background noise indicating too much i.f. gain and not enough r.f. gain we dived at the aerial coil and the r.f. stage, but all checks for continuity were O.K. and so we took off time for about a minute and thought hard. We immediately realised that the quickest way to locate the trouble would be to work back along the valves, removing them one by one until the noise stopped. This was done, the noise continued when the 24A detector was removed, but stopped as soon as the 227 audio valve was removed, so we were able to narrow down the source of the trouble. A careful inspection of the socket of the 227 showed that one of the leads to the terminals looked a bit whitish, and there were still traces of resin about.

### The Cure.

The application of a hot soldering iron cured the trouble in a fraction of a second, and that was that.

We couldn't help being impressed with the performance of the set which used a pair of 45 type valves in push-pull with a comparatively cheap audio transformer.

The sensitivity was terrific and in every way the set an excellent performer, surely proof of the value of building an up-to-the-minute set from good components. If instead of building this superhet an ordinary set of that period had been purchased, it would have been hopelessly out of date and completely out-performed, but not this nine-valve superhet of 1932 vintage.

Next set to come in was one built

up from the "Astra" circuit described in our issues of May and June of last year. This set was working fairly well, but had a quiet sort of fluttery motor-boating when the volume control was turned down, especially when not tuned to a station. We started to fiddle around with it for a few minutes, but soon realised that there was not any easy way out of this difficulty. The audio system is a very high-gain one and when motor-boating is prevalent it is often hard to stop, especially as the circuit will not permit de-coupling.

### A Circuit Change.

So we took the easy way out, altering one resistor and a soldered joint to change the circuit right over to a different form of inverse feedback. This immediately cured the motor-boating and allowed the addition of a condenser to de-couple the detector

plate circuit and take away the last ounce of hum.

The tonal quality was not affected at all, as the same amount of inverse feedback or slightly more, was applied.

As a result the owner was delighted with the improved hum level and the way in which the motor-boating trouble was cured. We can recommend the idea to anyone else who happens to be using one of those high-gain inverse feedback circuits using a pentode audio valve and a 6L6 or 6V6 output valve.

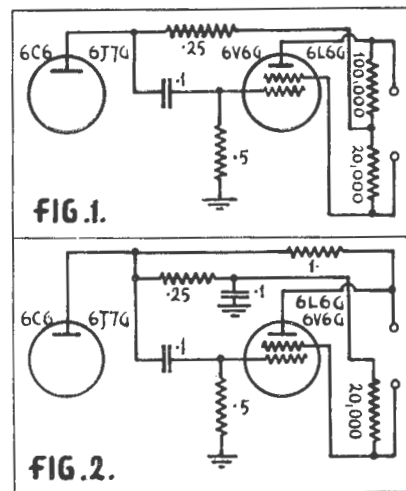


Fig. 1 shows the original feedback circuit, while Fig. 2 shows the alteration to permit de-coupling.

## LABORATORY SERVICE FOR READERS

For the assistance of bona-fide amateur set builders, we have installed laboratory equipment at our head office, 117 Reservoir Street, Sydney.

At this laboratory we will inspect and test receivers built up according to constructional articles published in this or any future issues of Australasian Radio World.

We will not carry out repair work, or make adjustments or alignments, but we will be prepared to inspect and test the receiver, and report on its performance.

If not up to standard, we will indicate what we think should be done to obtain normal results.

A nominal fee of 2/6 will be charged for the service.

### THE TESTS.

Briefly, the receivers will be tested as follows:—First, the valves will be checked for emission and mutual conductance, the electrolytic condensers tested for capacity and leakage, wir-

ing tested for high-resistance joints, and the main resistors and condensers will be checked to make sure that they are according to their ratings.

Then the receiver will be tested for comparative performance with an oscillator and output meter and finally the receiver will be tested on the air under normal running conditions.

### CONDITIONS.

Normally the service will take about 24 hours to perform, and receivers left for inspection on one day should be ready to be picked up by 5 p.m. on the day following.

In the event of the service proving even more popular than we anticipate, a slightly longer period of time may be required for the inspection.

Receivers forwarded from distant readers will be unpacked and repacked without extra charge, but no freights or carrying charges will be paid.



# VIBRA

## Public-address Amplifier

*Powered from a Car Battery.*

**A** SMALL self-contained power amplifier has a great many uses, especially out-of-doors. Whenever a crowd gathers it is highly desirable to have a method by which they can be communicated with.

Taking an interest in model aeroplanes last year we attended a few of the contests promoted by the Model Aeronautical Association, and we immediately noticed the need for an amplifier for the use of the contest director so that he could get in touch with any of the competitors on the field.

For the National Championships, held last November, we sought the assistance of Frank Bridgewater and his big Amplivox sound truck. With this elaborately fitted sound unit we had fifty watts of power output available and it made a wonderful difference.

The contest was a marvellous success, and it was generally felt that the amplifier was one of the biggest factors in this success.

A bright lad at the microphone described the contest with a running commentary which kept the crowd on its toes, and whenever a wandering competitor was required on the starting line a whisper into the micro-



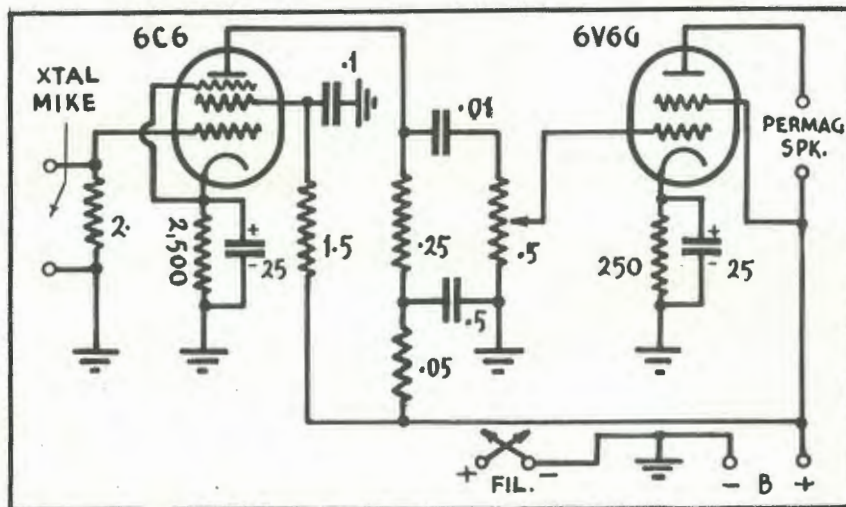
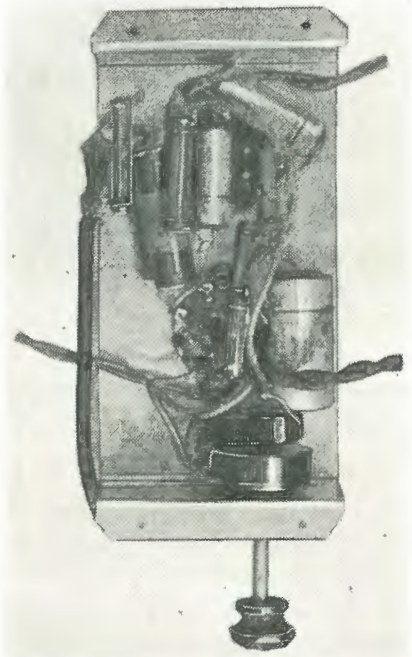
phone would bring him back from half a mile away.

But of course an amplifier equipment along the lines of the one used by Frank Bridgewater would be quite out of the reach of the average club, radio dealer or enthusiast. It required a big bank of heavy accumulators for power supply, and re-charging would be quite a problem.

So we set about designing a small amplifier, to operate economically and yet do the work required, and here it is.

We found that two valves were sufficient to give ample gain for a crystal microphone and that a beam power valve was capable of delivering enough power to be effective in the open, even when supplied with the comparatively low voltage available from a vibrator power unit, which draws only  $2\frac{1}{2}$  amperes from a standard 6-volt car battery.

The total current drain of the amplifier works out at about 3 amperes, and it is quite feasible to draw this current from a car battery for three or four hours at a time



The circuit diagram.

without any visible effect, the car's generator taking care of the re-charging without any difficulty at all. Modern cars have generators capable of supplying a big charging rate when they are called upon to do so, and the ignition and lighting system does not stand the slightest chance of being damaged by the use of a unit of this kind.

Naturally the power output of the little amplifier with its single permanent speaker could not pump out the same wallop as the big Amplivox system, but at least it could deliver about five times as much as the loudest-voiced member of the club.

Possibly there was a certain amount of distortion at full output, but this was not in evidence as anything tending to make the output hard to understand, in fact the quality was very crisp, with plenty of sharp high notes

to make it "as clear as a bell."

No trouble was experienced with feed-back, and even if the mike was taken out of the car and operated within four or five feet of the speaker it was only a matter of keeping the mike at right angles to the direction of the speaker's output in order to stop howl.

### The Circuit.

Referring to the schematic circuit, it will be noticed that a pentode audio amplifier feeds into a beam power output valve, with resistance-capacity coupling. The screen of the pentode is fed through a series resistor, with a by-pass condenser, this being the most effective way of operating this valve, and at the same time doing

### PARTS LIST.

#### Vibrator Power Amplifier.

- 1—Base, size 6 x 3 $\frac{1}{4}$  x 2
- 1—500,000 ohm volume control (I.R.C., E.T.C.)

#### CONDENSERS:

- 2—25 mfd. electrolytics, 24 or 40 volt (T.C.C., Solar)
- 1—.5 mfd. tubular condenser, 400 volt (T.C.C., E.T.C.)
- 1—.1 mfd. tubular condenser, 400 volt (T.C.C., E.T.C.)
- 1—.01 mfd. mica condenser (T.C.C., E.T.C.)

#### RESISTORS:

- 1—250 ohm wire-wound resistor (I.R.C., R.C.S.)
- 1—2,500 ohm wire-wound resistor (I.R.C., R.C.S.)
- 1—50,000 ohm 1-watt resistor (I.R.C., Bradley)
- 1—250,000 ohm 1-watt resistor (I.R.C., Bradley)
- 1—1.5 megohm 1-watt resistor (I.R.C., Bradley)
- 1—2 megohm 1-watt resistor (I.R.C., Bradley)

#### SOCKETS:

- 1—6-pin
- 1—Octal

#### VALVES:

- 1—6C6, 1—6V6G (Brimar, Radiotron, Ken-Rad, Mullard, Philips).

#### MICROPHONE:

- 1—Crystal microphone (Astatic D104 or D104H)

#### SPEAKER:

- 1—Permag. speaker, matched for single pentode (Amplion, Rola).

#### POWER SUPPLY:

- 1—Vibrator or genmotor to supply 220 volts at 50 m.a. (Calstan).

away with the need for a voltage divider which would increase the drain on the high tension supply.

If so required the later type of 6J7G valve can be substituted for the 6C6, the only alteration being the use of an octal socket, wired accordingly, of course. Performance should be identical with either valve.

The 6V6G makes an ideal output valve, being particularly efficient in the matter of delivering power output for a given high tension input, and also being sufficiently sensitive to be driven with the single high-gain audio stage. The heater current is also low, making the valve far more suitable than the 6L6G.

The effective gain of the pentode in this circuit is estimated to be something over 100, and such terrific gain makes it desirable to take every pre-



The outfit in operation.

caution against instability. For this reason the plate supply of the pentode is de-coupled with a 50,000 ohm resistor and a .5 mfd. tubular condenser. Care is also taken in the layout to see that the microphone cable is effectively earthed, and the speaker, power and microphone leads all kept well apart, and running in different directions.

### Construction.

The construction of the unit is very simple, the original being run together in less than two hours.

The actual amplifier is built on to a small base, with flanges at each end. Screws through these flanges mount the amplifier base on to a baseboard, measuring 8 inches square, with the new Calstan vibrator unit mounted alongside, as can be seen from the photographs.

The use of a different type of vibrator unit, or a genmotor of a different

shape would make it necessary to vary the baseboard accordingly.

### Amplifier Base.

Under the amplifier base the small components can be mounted by their own soldering lugs, and this part of the construction is just as simple as building a most elementary type of radio receiver.

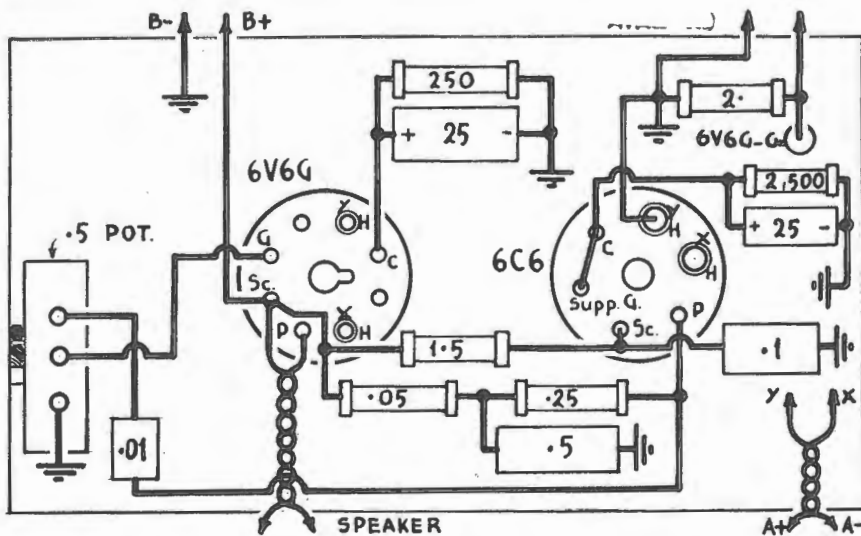
We trust that there is no need to go into the finer details of how the components are soldered in place according to the picture diagram.

A shield is provided for the 6C6, although not essential.

### Baffling.

Some type of baffling is essential for the speaker, and in order to save space we suggest a box baffle, open at the back so that the speaker is not any more directional than can be reasonably arranged.

(Continued on page 35)



Picture diagram of the wiring.

# Specity

PIEZO

**ASTATIC**

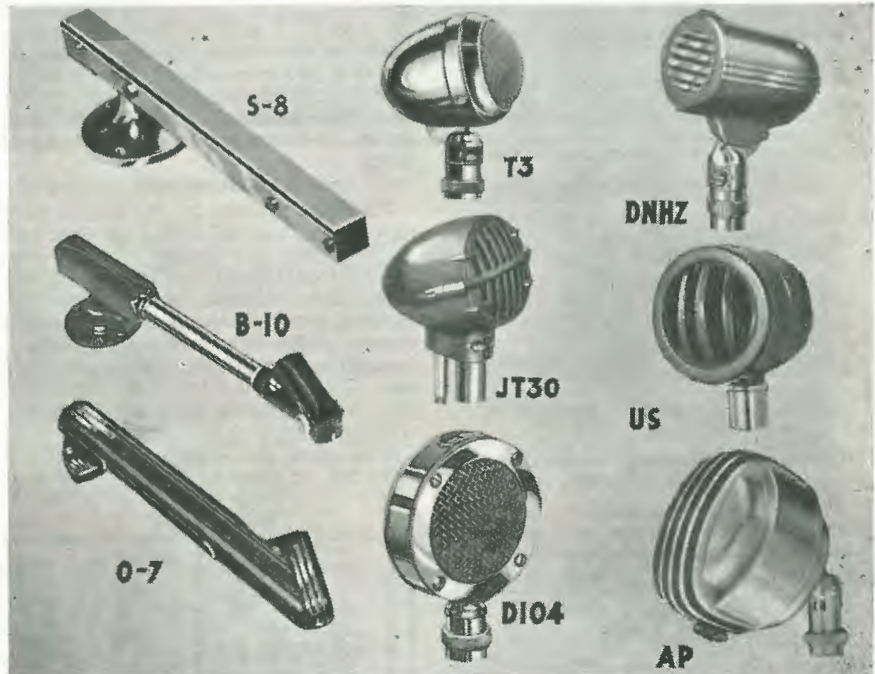
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MODEL S/8, Straight Arm	£4 10 0
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SYDNEY AND MELBOURNE

The basis on which the entries in the "Australasian Radio World" Amplifier Championship will be judged will be, firstly, realism. For the highest standard of realistic reproduction you MUST use a crystal pickup—as recommended by the Editor.

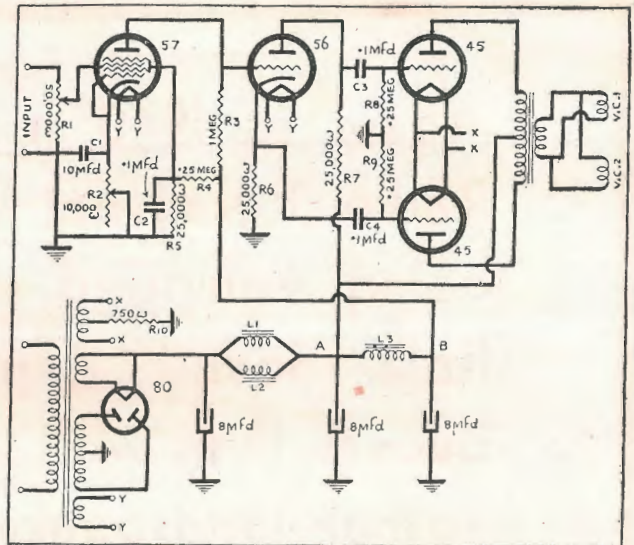
Piezo Astatic Crystal Pickups give brilliant life-like reproduction with full bass and extended frequency range free from distortion. Needle weight of 2½ ozs. eliminates record wear, and tracking error is slight. Available in price range from £2/15/- to £10/10/-.

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# Some further notes about FIDELITY AMPLIFIERS

*With the approach of the Amplifier Championship, there is extraordinary interest being taken in the subject of amplifier design.*

*At the request of several readers we go a little deeper, in this article, about amplifiers in general.*



**A circuit for a direct-coupled driver for push-pull. An interesting novelty from N.Z.**

In last month's issue we dealt at some length with the subject of fidelity amplifiers for home use. The article, however, was of necessity a general one dealing with such

subjects as correct motor speed, and so on. By carrying out the instructions given and paying attention to the various details mentioned in that article it is possible to obtain repro-

duction which is strikingly beyond the ordinary reproduction obtained from the average radio set.

Sad to relate, however, it only starts the enthusiast on that long trail which must be followed in the pursuit of realistic reproduction, and which to all intents and purposes has no ending.

The further you go the more difficult become the many problems associated with the search for true fidelity of reproduction.

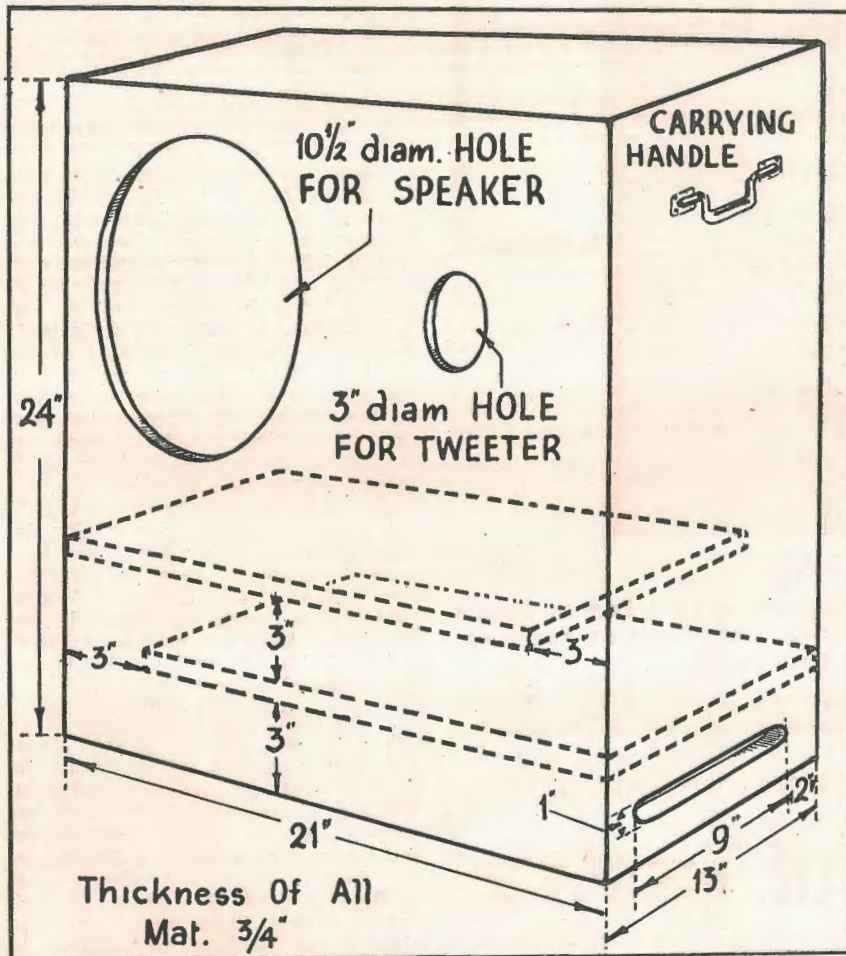
Actually there is some doubt as to what we want to achieve, although we sum it up as true fidelity, we really refer to the illusion of reality.

We don't think that anyone is going to care whether electrical measurements or theory indicate that the amplifier is perfect; the final test is how the amplifier sounds in practice. No matter whether the frequency response is straight or crooked, we want to get something out of the speaker which is satisfying to the ear; which arouses emotion only as true music can affect the soul of the listener.

### The Contest.

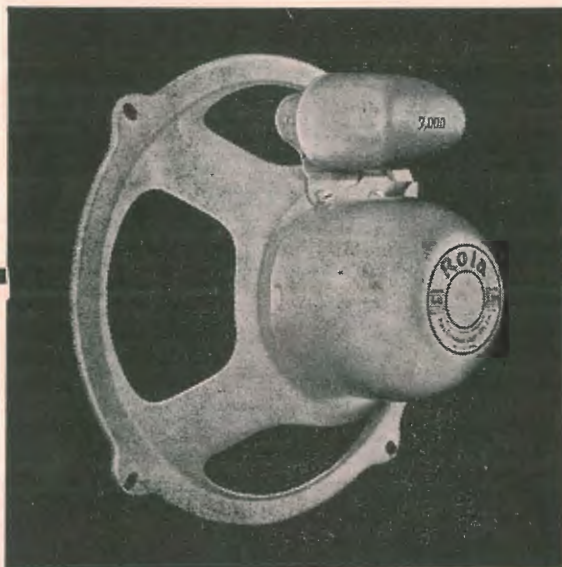
Generally speaking, our readers are keenly appreciative of the idea of holding the amplifier contest, so that dozens of different amplifiers and reproducing arrangements can be operated one after the other under similar conditions, so that practical comparisons can be made.

Several of the best-known and undoubtedly competent technicians, however, are not particularly keen on the idea and claim that it will serve no useful purpose. It has even been said that a competent technician can foretell the performance of any amplifier from a glance at the circuit diagram. We do not agree, and we will not even admit that an electrically-perfect



**Diagram of an enclosed baffle box to allow loading of the speaker cone for proper low-note reproduction.**

Again in 1940 more  
Radio Receivers are  
being equipped with  
Rola Sound Repro-  
ducers than with any  
other loudspeaker.



... because home builders, engineers and buyers find in Rola's comprehensive range exactly the speaker they want at the price they are prepared to pay.

For your De Luxe Fidelity Eight, Rola recommends the Model G12, which faithfully and realistically handles a wider range of frequencies than modern radio transmissions give ..... £8/12/-

For the Vibra Power Amplifier, use either the 8/42, 72/6; or 10/42, 74/6.

**Rola Co. (Aust.) Pty. Ltd.**

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MANUFACTURERS OF THE WORLD'S FINEST SOUND REPRODUCERS

amplifier is necessarily the best amplifier for ordinary home use.

We hope that the amplifier contest is going to serve a most useful purpose by bringing to light practical ways and means of controlling the performance of amplifiers to make them suit the particular operating conditions under which they have to perform. A perfect amplifier operating under ideal acoustic conditions may be good, but what we want to find is an amplifier which will do its best when operated in the average home. There being no such thing as an average home or an average room, we feel that the only solution to the problem is to have an adjustable amplifier, adjustable to suit individual taste and individual acoustics.

Something has already been done along these lines in America, where technicians associated with the publication, "Radio News," went to great lengths to produce an amplifier with adjustable characteristics, even to the adjustment of the volume level of both highs and lows and also with volume expansion control in the separate channels. The resultant amplifier, however, is far from practical, being a most elaborate and costly affair, as shown in the circuit diagram which we have taken the liberty of reproducing from that publication.

**Our Aim.**

If we can unearth an amplifier design which will give similar performance or even comparable performance, but which is within the reach of the ordinary man, with his ordinary bank balance, then we will rest satisfied that our amplifier contest has really done something worth while for the development of the art.

As a further guide to contestants and those who are interested in the effort to get this progress under way, we hope to get together some data on the subject of reproduction, and various technicians and designers are helping us to provide articles which should help in this direction.

Naturally it will be necessary to get down to rather more specific detail than usual, but we do hope that we will be able to keep the phraseology sufficiently simple to be followed by those enthusiasts who do not happen to have the necessary knowledge of higher mathematics to go right into the finest details.

**High-note Diffusion.**

A point which needs greater attention than has been paid to it in the past is that of high-note diffusion. When a loud-speaker reproduces frequencies above about 3,000 cycles these are thrown out in a fairly narrow beam. Especially when normal baffling is used, this beam of high notes is very noticeable as can be checked in practice by walking to and fro in front of the baffle.

It is quite a simple matter to arrange some vanes to deflect the high



notes and break up this beam effect, and in many cases it gives a definite improvement in realism. Sometimes with an ordinary amplifier there is a definite "music through a keyhole" impression, but diffuser vanes can be fitted, and we give a diagram which shows the main features of a suitable design. We can strongly recommend all amplifier enthusiasts to carry out practical experiments with diffusers.

**Bass response.**

The true reproduction of the bass is also a matter which is far more involved than appears at first glance. Using an ordinary three-foot square baffle and a good twelve-inch speaker, it is possible to get a form of reproduction of low notes which is fairly acceptable to the ear, especially to an ear which has become accustomed to

reproduction from ordinary radio receivers.

But it is not true bass response, and mainly a thump in the speaker which beats time with the music, even as a drummer might beat on the bass drum.

It is also a mistaken idea to imagine that the true bass response is improved by the use of a larger baffle board. Actually every speaker has a bass resonance at some particular frequency, dependent on the constants of the cone, the characteristics of the suspension and other design details. At this particular frequency the speaker is acutely sensitive and will reproduce notes around the frequency far more easily than it will reproduce higher notes. It will almost refuse to handle efficiently frequencies lower than its bass resonance fre-

quency. On this account speaker manufacturers try to keep the resonance frequency low, and for a good 12" speaker it would be about 60 to 70 cycles.

In practice it is seldom found necessary to reproduce any frequencies lower than this. A true fifty-cycle note can be felt, rather than heard. Such low notes are also incapable of exciting free air, unless the air is displaced with a large cone area, as with the special 15 and 27 inch cones used in certain speakers which have been developed for low note work, but which are not available commercially.

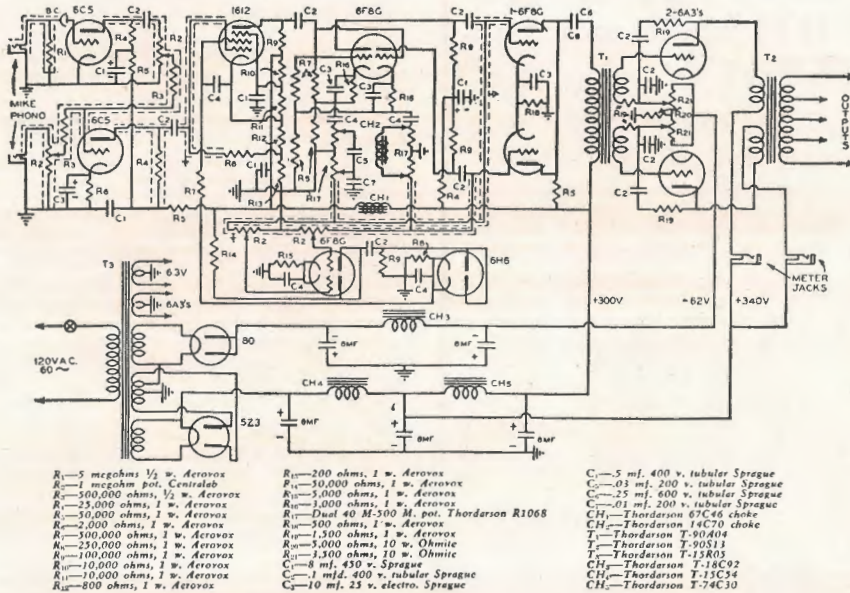
**Cone Loading.**

To overcome both the difficulty of the cone resonance and the exciting of the air with the sound of low notes there is a comparatively simple solution which does not seem to have been considered adequately by amplifier enthusiasts.

We refer to the loading of the cone of the speaker by weighting it with air, or to put it crudely, to steady up its excessive vibration at low frequencies by applying a cushion of air behind it. By enclosing the whole of the back of the speaker with a box of air it is possible to load up the cone in this way, but of course it is necessary to have the arrangement correctly designed to allow the speaker to function correctly and reproduce true low notes.

A design for a suitable box for loading up the cone in this way was detailed by A. K. Box in his "Audio Amplifier Handbook" (published some years ago and now out of print, we understand), and consists of a totally-enclosed box of three-quarter inch thick wood, lined with hair-felt, and with two internal shelves, and a narrow slot at the bottom. It will be noticed from the diagram of the box, which we reproduce herewith, that

(Continued on page 38)



- R<sub>1</sub>—5 megohms 1/2 w. Aerovox
- R<sub>2</sub>—1 megohm pot. Centralab
- R<sub>3</sub>—500,000 ohms, 1/2 w. Aerovox
- R<sub>4</sub>—25,000 ohms, 1 w. Aerovox
- R<sub>5</sub>—50,000 ohms, 1 w. Aerovox
- R<sub>6</sub>—2,000 ohms, 1 w. Aerovox
- R<sub>7</sub>—500,000 ohms, 1 w. Aerovox
- R<sub>8</sub>—250,000 ohms, 1 w. Aerovox
- R<sub>9</sub>—100,000 ohms, 1 w. Aerovox
- R<sub>10</sub>—10,000 ohms, 1 w. Aerovox
- R<sub>11</sub>—10,000 ohms, 1 w. Aerovox
- R<sub>12</sub>—800 ohms, 1 w. Aerovox
- R<sub>13</sub>—200 ohms, 1 w. Aerovox
- R<sub>14</sub>—50,000 ohms, 1 w. Aerovox
- R<sub>15</sub>—5,000 ohms, 1 w. Aerovox
- R<sub>16</sub>—1,000 ohms, 1 w. Aerovox
- R<sub>17</sub>—Dual 40 M-500 M. pot. Thordarson R1068
- R<sub>18</sub>—500 ohms, 1 w. Aerovox
- R<sub>19</sub>—1,500 ohms, 1 w. Aerovox
- R<sub>20</sub>—5,000 ohms, 10 w. Ohmite
- C<sub>1</sub>—8 mf. 450 v. Sprague
- C<sub>2</sub>—1 mf. 400 v. tubular Sprague
- C<sub>3</sub>—10 mf. 25 v. electro. Sprague
- C<sub>4</sub>—5 mf. 400 v. tubular Sprague
- C<sub>5</sub>—0.5 mf. 200 v. tubular Sprague
- C<sub>6</sub>—25 mf. 400 v. tubular Sprague
- C<sub>7</sub>—0.1 mf. 200 v. tubular Sprague
- CH<sub>1</sub>—Thordarson 67C46 choke
- CH<sub>2</sub>—Thordarson 14C70 choke
- T<sub>1</sub>—Thordarson T-90A04
- T<sub>2</sub>—Thordarson T-90S11
- T<sub>3</sub>—Thordarson T-15R05
- CH<sub>3</sub>—Thordarson T-14C92
- CH<sub>4</sub>—Thordarson T-11C24
- CH<sub>5</sub>—Thordarson T-74C30

The "Radio News" circuit for an elaborate amplifier.

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Chosen the valves for that prize-winning amplifier yet? If not, you'll be interested to know that MULLARD offer an exceptionally wide range of output valves, in both American and Continental types.

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Write now (mentioning "Radio World") to the address given below, for your free copy of this valuable publication. (Please enclose a 1d. stamp for postage).

# THE AMPLIFIER

*Every reader interested in the matter of electrical reproduction should take part in the Amplifier Championship which starts next month.*

*You can enter for the contest and stand a good chance of winning one or more valuable prizes, even if your amplifier is only a small one.*

*If you don't want to enter an amplifier you can participate by coming along to help in the judging.*

*Don't delay - act now and fill in one of the forms given below.*

## ENTRY FORM

To The Organiser,  
Amplifier Championship,  
117 Reservoir Street,  
Sydney.

Please accept my entry for the Amplifier Championship.

I will be using an amplifier as follows:—

Valves used.....Number.....Types.....

Circuit .....

Coupling .....

Pick-up .....

Speaker .....

Other details.....

Should I be successful in the contest I agree to supply full details of the equipment for publication in "The Australasian Radio World," inclusive of all copyright.

I agree to accept the Judges' decisions as final.

NAME .....

ADDRESS .....

**THIS FORM MUST BE IN THE HANDS OF THE ORGANISER BEFORE MAY 31.**

As announced in the last two issues, the Amplifier Championship of New South Wales is to be held this season.

The object of the contest is to find which type of receiver gives the best illusion of fidelity.

Entries are invited from all interested.

There is no entry fee.

The public are also invited to come along to hear the amplifiers being tested, but at the final only entrants, judges, and the committee will be present.

Entries should be forwarded immediately, and not later than May 31.

Entrants will be drafted into heats, each heat consisting of six competitors. At the testing heats each competitor will play the standard recording, and then ten minutes of reproduction from recordings of his own selection. A finalist will be selected from each heat by the judging committee, which will be present.

### The Committee.

Members of the committee include; Wal Ryan of the Wireless Institute of Australia, Tom Parramore, and Rom Errmann of the Recorded Music Society, Ken Page of E.T.C. Industries, Norman Head of Amplion, George Allen of Rola, Lance Graham of the Australian Radio College, Ray Allsop of Raycophone, J. Hartridge of R.C.A. Photophone, and Earl Read and A. G. Hull of "Radio World."

Several other prominent authorities are also expected to join the committee.

### Semi-finals.

If found necessary, according to the entries received, semi-finals will be held to eliminate some of the heat winners so that only about half a dozen competitors will fight out honors at the final contest.

# CHAMPIONSHIP

The heats will be held on Tuesday nights, at the Australian Radio College, Broadway, at 8 p.m.

A limited audience will be admitted, but only by invitation.

All seats will be reserved, and immediate application should be made for reservations. There is no charge for admission or reservation, but a 2d. stamp should be enclosed with your application to cover postage of the reservation tickets.

For the final contest several prominent musicians and technicians will be present to assist in the judging.

It is intended to allot prizes for the various sections, and for various types of amplifiers.

The Champion should collect several prizes as well as the cheque, cup and blue ribbon.

## Low Power Amplifiers.

Owners of modest amplifiers should not be timid about putting in their entries, as special prizes will be awarded for the best performance by an amplifier using not more than three valves, including rectifier.

Unless with the special permission of the committee, all amplifiers must be equipped only with valves listed as receiving types.

It should be noted that it is not possible for the public to reserve seats for the final contest, as only entrants, the committee, and the judges will be admitted.

This should be an incentive to owners of amplifiers to enter in the contest, as this will permit them to participate in the judging of the finalists.

## Entry By Proxy.

Competitors unable to attend the contest personally can forward their amplifier to the Organiser, and it will be operated by a member of the Committee, and given every chance of winning.

## Battery Models.

Prizes are also available for amplifiers operated from batteries, and from vibrators powered from accumulators.

## Don't Delay.

The first heat of the eliminations will be held on June 11.

## The Amplion Prizes.

Prizes donated by Amplion (A/asia) Pty. Ltd. are as follows;—To the competitor gaining the highest number of points who used an Amplion speaker—a Diponic Reproducer Kit, valued at £10/10/-. For other sections of the contest two prizes one a type 12P64 Speaker valued at £5/10/- and the other a type 12E22 Speaker valued at £2/16/-.

## THE PRIZES.

The following prizes have already been donated, and it is expected that quite a number of additional prizes will be made available by the time the contest commences:—

Goods to the value of 3 guineas, by W. J. McLellan & Co. (I.R.C. Resistors);

Goods to the value of 4 guineas, by Ducon Condenser Pty. Ltd. Mullard Valves to the value of 5 guineas, by Mullard-Australia Pty. Ltd.

Packard Lectro-Shaver, valued at £5, by John Martin Pty. Ltd. Test Meter, valued at £6, by Radio Equipment Company Pty. Ltd.

Goods to the value of £18/16/-, by Amplion (Australasia) Pty. Ltd.

Brimar Valves to the value of 5 guineas, by Standard Telephones & Cables Pty. Ltd.

Five-band Communications type tuner kit, valued at £13/12/6, by R.C.S. Radio Pty. Ltd.

Rola G12 Speaker, valued at £8/12/-, by Rola (Aust.) Pty. Ltd. Meter, valued at 2 guineas, by Paton Electrical Pty. Ltd.

And Cheque for ten guineas, Championship Cup and Blue Ribbon, by the proprietor of "Australasian Radio World."

It will be noticed that the prizes already amount to a value of over £80. It is expected that more than £100 worth will be available by the time the contest is concluded.

## APPLICATION FOR SEAT RESERVATIONS.

To The Organiser,  
Amplifier Championship,  
117 Reservoir Street,  
Sydney.

Please reserve me.....seats for one of the auditions of the judging heats of the Amplifier Championship.

I would prefer to attend on a Sunday/Tuesday evening.

I enclose a 2d. stamp for postage.

NAME .....

ADDRESS .....

THIS APPLICATION MUST BE IN THE HANDS OF THE ORGANISER BEFORE MAY 31.

# The AMPLION DIPHONIC Reproducer

*New High Fidelity Standards  
attained with a Special Dual  
Speaker Circuit.*

By

**NORMAN HEAD**

Engineer,

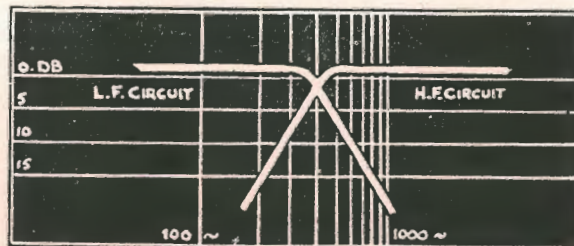
AMPLION (A/sia.) PTY. LIMITED.

**A**S the name Diphonic implies, the Amplion Diphonic Reproducer divides the frequency range supplied to the speakers into two distinct paths. A 12" cone speaker capable of handling the signals without distortion takes care of all frequencies below 400 cycles per second. Frequencies above 400 cycles are fed to a special unit, the Amplion 8P90 Cine Permag. Division of frequencies is done with a low-pass and a high-pass filter, cutting off in each case at approximately 400 cycles.

High-fidelity sound characteristics are dependent on proper balance of the frequencies as well as a sufficiently wide range. Range is of paramount importance. Intelligibility of speech and music is a factor of the upper frequencies mainly. McLachlan says, "The interpretational qualities in speech and music reside in the upper frequencies, and it is not possible to obtain naturalness unless the range extends to 12,000 cycles. This applies particularly to severe transients such as hand-clapping, footsteps, jingling of coins or keys, rustling of paper, etc. There is no difficulty in calculating the natural frequency of a coin, assumed to be a homogeneous free-edge circular disc. For example, the fundamental mode of a half-penny is about 12,000 cycles. Consequently it is quite easy to understand why the higher frequencies are indispensable if coin-jingling is to be reproduced. The overtones of orchestral instruments of various kinds extend well up

to 10,000 cycles. Even the flute, usually cited as an emblem of acoustic purity, requires quite an extensive range. One of the reasons why the reproduced version of the human voice sounds unnatural from the average loudspeaker is due to the absence of frequencies above 5000 cycles. To any musician with a faculty for discrimination, a musical range which does not extend beyond 4000 to 5000

**Figure (1): Characteristic Curves of the Amplion Diphonic Speaker System.**



cycles is definitely lacking in brilliance and naturalness. Absence of the upper register is aggravated to an extent by accentuation of the lower register, by speaker resonances, and, in the average room by low absorption." (1).

It is a fact that the average radio transmission or commercially available recordings do not extend to the higher frequencies recommended above. But if the range to 8000 cycles can be handled without resonance peaks or dips, that is at an even balance, something worthwhile will have

\*N. W. McLachlan, "Loudspeakers."

been attained. It has been found impractical to get this effect from any single speaker unit, although good response can be obtained.

#### Bass Modulation.

A source of unpleasant distortion found in single speaker systems is bass modulation of the "highs." This is disclosed as a ripple super-imposed on the highs, giving a warble tone, caused by the cone which is moving through large amplitudes on bass notes, requiring to be modulated through its cycle or part cycle by high-frequency impulses. The distortion is most evident when quite high frequencies are combined in the reproduction with frequencies below 400 cycles. As shown later, this source of distortion is eliminated in the Amplion Diphonic Reproducer.

#### Transient Response.

Transients are trains of impulses of indefinite frequency, never attaining a steady state; neither do transients possess any particular sustained frequency. A "start" transient occurs when an e.m.f. is applied, and a "stop" transient when the circuit or current is interrupted. They occur in many musical instruments and are characteristics of such "noises" as drum beats, cymbal crashes, etc. The instantaneous frequencies encountered in transients may be extremely high. Not only does the reproduction of these noises require a wide range, but also high damping.

Damping of the cone diaphragm which reproduces transients may be mechanical or electrical. Mechanical damping introduces undesirable peaks in reproduction. Damping, that is the ability of the cone to resume quickly its original position without rebound, may best be attained electrically; the highest possible mag-

netic flux is required in the voice coil air gap. Therefore it is impossible to secure high fidelity with inefficient electro-magnet circuits, or small permanent magnets, if the annulus is large. Therefore, for high quality reproduction of either highs or lows the cheaper speakers are seldom satisfactory, because of lack of sufficient flux density in the air gap.

#### The Diphonic Reproducer.

Systems for dividing the frequency range have in the past been extremely expensive. Theatre installations for wide range use a similar system and

to obviate power losses which are important in large installations, the filters are costly. The Amplion Diphonic Reproducer for the first time places the dividing network economically within the scope of the enthusiast.

A slight power loss is encountered but this is negligible when it is remembered that the average receiver or amplifier output is really higher than required. The small loss of the circuit can be neglected. It can only be avoided at considerable extra cost, which is unwarranted.

Wide range reproduction, "ironing out" the resonances of the single speaker unit, characterises the Diphonic system.

It is not easy to secure reproduction of comparative fidelity with any single speaker, and systems which have been used previously with simple capacitors to by-pass high notes have not the efficiency of the tuned effect of the high-pass and low-pass filters.

In Figure 1 the filter cut-offs are shown. The cross-over is at 400 cycles and attenuation at the drooping end should not exceed 20 db. per octave to avoid objectionable distortion.

The system used as shown in Figure 2 is a parallel filter of half-sections, or "L" type. The inductance and capacity values have been accurately determined for definite factors (input and output impedance, and cut-off frequency), none of which can be altered without re-determining the values. It has been found that any variation of output impedance either upwards or downwards results in fast rising cost of components. Since this would be uneconomic, it is not recommended.

The efficiency of the circuit can be demonstrated by shorting out either the low-frequency or the high-frequency speakers when the remaining unit will carry on reproducing its own particular range. This lends itself also to tone control if desired. It cannot be too strongly stressed that "tone control" is detrimental to high fidelity. Any deterioration of quality arising from the effect of varying high resistance volume controls should be corrected at the source, and tapped volume controls are definitely advantageous, and really necessary.

Another factor which may require attention in any high fidelity system such as this is "scratch" or surface noise emanating from commercial recordings; many discs even when new have high surface noise which, although perhaps not heard on an ordinary reproducer, will be quite evident in the high-fidelity system.

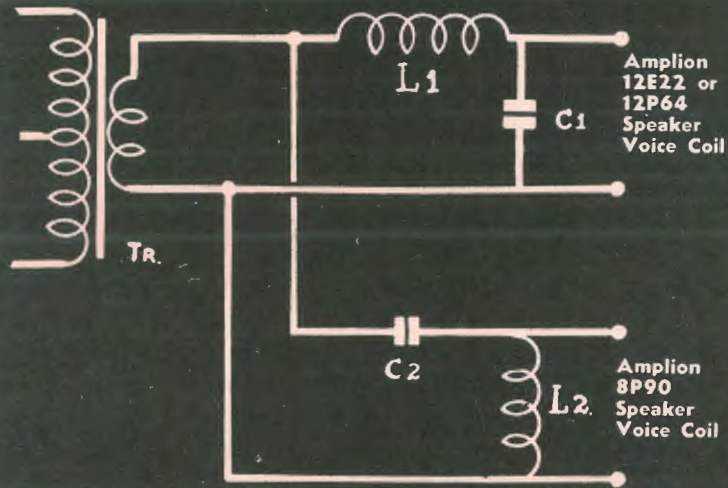
This can be reduced by the use of a properly-designed low-pass filter across the pick-up source. Such true low-pass filters are obtainable commercially, but for the best results require individual design for correct impedance and cut-off frequency.

The Australasian Radio World, May, 1940.

## AMPLION DIPHONIC REPRODUCER

### Dividing Network

(Models A and AP)



Tr - Amplion Speaker Transformer to Match Output Valve(s)

L1 - Amplion L1 Special Inductance

L2 - Amplion L2 Special Inductance

C1 - Capacity 33 mfd.

C2 - Capacity 20 mfd.

Circuit No. 88-1. 22/4/1940.

#### Constants.

In filter systems such as is used, the attenuation characteristics shown in Figure 1 depend on the non-resistivity of the choke coils and condensers. The capacities used should be of good non-inductive quality.

The inductances are designed and supplied by the Amplion Company. In mounting the inductances, they should be kept clear of magnetic metals which might influence their characteristics. A bakelite bridge across the top of the winding bobbins may be anchored by a brass screw. The common side of the two-voice coils may be earthed if desired.

#### Cabinets.

The cabinet for housing the speakers can be left to the user with specific recommendations. It should be solidly constructed, otherwise resonance and rattles will be evident from the low-frequency response; adequate baffle area should be provided for the bass speaker and if the cabinet area is too small an extended air path from the back of the speaker should be constructed on the lines of an acoustic labyrinth. Lining of the cabinet with sound absorbents will be an improvement.

Since no great baffle area is required for the utmost efficiency of

the high-frequency speaker, this need not be included in the back labyrinth. If the H.F. speaker is mounted above the L.F. unit a shelf may separate the two and the labyrinth built into the bottom only.

The two speakers may be closely mounted, and should be so for the best phasing. Due to the fairly sharp cut-off of the filters, no trouble will be experienced in phasing as is found with other dual speaker systems where each speaker actually handles the same frequency range input.

#### Several Types.

Initially, the Amplion Company is making available two types of similar performance. "Type A" utilises a 12" electro type speaker (the 12E22) in combination with the Cine Permag. (8P90); neither speaker has transformer attached, but a transformer to suit the output valve or valves is included in the kit, loose, in addition to the two special inductances, L1 and L2. The field winding of the electro-magnet speaker should be suited to the circuit if it is used as a power-pack filter choke, and any resistance desired should be stipulated as when ordering an electro speaker.

"Type AP" is identical except that both speakers are permags, the 12E22 being replaced by the Amplion

**TABLE OF FUNDAMENTAL FREQUENCIES FOR HIGH FIDELITY REPRODUCTION.**

Instrument	Range (cycles)
Cymbals . . . . .	32-13,000
Snare Drum . . . . .	80-15,000
Bass Drum . . . . .	53- 4,096
Kettle Drum . . . . .	48- 4,608
Violin . . . . .	192- 8,192
Piano . . . . .	72- 6,144
Cello . . . . .	64- 8,192
Bass Viol . . . . .	40- 4,608
Piccolo . . . . .	960-10,240
Flute . . . . .	288- 8,192
Oboe . . . . .	256-16,384
Soprano Sax. . . . .	213-12,288
Trumpet . . . . .	171- 9,216
Clarinet . . . . .	160-10,240
French Horn . . . . .	85- 5,461
Trombone . . . . .	80- 7,680
Bass Clarinet . . . . .	80-13,000
Bassoon . . . . .	60- 7,000
Bass Saxophone . . . . .	55- 8,100
Bass Tuba . . . . .	42- 3,840
Female Speech . . . . .	160-10,240
Male Speech . . . . .	106- 8,192
Handclapping . . . . .	106-18,000
Footsteps . . . . .	80-16,500

12P64, a 12" permag with 64 oz. magnet. This combination requires no field excitation and should be used only where no field coil choke is included in the basic amplifier or radio circuit. Types A and AP are capable of reproduction above 10,000 cycles.

The quality of high-fidelity reproduction from the Diphonic Unit is noticeably superior to that from single speakers. Low frequencies are delightfully crisp and the "highs" sparkling and free from peaks, and extend so "right out of sight" to mix a metaphor.

It should be noted that Figure 1 does not represent the characteristic of the combined speaker unit, but that it refers only to the characteristics of the filter.

The best results are obtained also only when the acoustic outputs from H.F. and L.F. speakers are evenly balanced, and in the Amplion Diphonic system this will be found approximately at normal excitation of the 12E22 electro speaker, that is at 10-11 watts. When two permags are used, the matter is automatically taken care of.

Amplion (A/sia) Pty. Ltd. will be pleased to demonstrate the Diphonic Reproducer to anyone interested, at the office of the company, 382 Kent Street, Sydney.

**RADIOTRON SUGGESTIONS FOR AMPLIFIER CONTEST.**

Shown on this month's front cover is a selection of Radiotron output valves suitable for use by entrants for the forthcoming Amplifier Contest, details of which appear on pages 24 and 25 of this issue.

The table below shows minimum and maximum outputs obtainable from all five valve types, both in single-ended and push-pull applications. Outputs quoted for single-ended use are for Class A with self-bias, while for push-pull the class of operation recommended is in each case that giving highest output, consistent with latest official Radiotron ratings.

Valve Type	Single-ended Self Bias	Push-pull Fixed Bias	Class of Operation
45	2.0	18	AB2
2A3	3.5	15	AB1
50	4.6	9.2	AB1
6V6G	5.5	11.0	AB1
6L6G	6.5	47.0	AB2

*MADE IN*  
*the Australian*  
**PHILIPS**  
**VALVE**  
**FACTORY**



**P**HILIPS are proud, indeed, to be able to offer the highest quality valves, made in Australia by Australian operatives.

The Australian Valve Factory is concrete evidence of the intention of the Philips organisation to serve faithfully the Australian public.



**PHILIPS VALVES**

# Shortwave Review

CONDUCTED BY

L. J. KEAST

**Lowell Thomas Heard ★ Treasure Island Again ★ Quick News from the United States ★ Radio Black-outs ★ Notes from Overseas ★ Two Unusual Stations ★ Letter from Paris ★ Full List of Month's Loggings-**

## Lowell Thomas Now Being Heard.

Known to thousands of Australians through his commentary in Fox Movietone News, Lowell Thomas, recognised as one of the best informed of all news commentators, can now be heard of a morning at 9.45 through WPIT, 25.27m.

I have tried on many a morning to hear this great speaker, but with no success. Patience was rewarded, however, as this morning he was as clear as a bell.

Readers who can tune in at this hour (9.45 a.m.) would be well advised to do so.

## Radio Saigon.

This station has gone back to 8.45 p.m. for their news in English. KGEI, 31.48m., Treasure Island.

At last once more it looks as though we can enjoy this station from the moment they open up at 10 p.m., as the Jap., JZI, who, on 31.46, severely spoilt reception from KGEI until he, the Jap., closed down at 12.30 a.m., has now forsaken 31.46 and is heard on 19.79 at 10.30 instead.

## Australian Programmes for Overseas.

VLW-4, 9665kc., 31.04m., and situated in Wanneroo, West Australia, is now giving a special programme from 2 a.m. to 3 a.m., A.E.S.T., for South Africa.

The programme, apart from musical items, consists of news and talks in English and Afrikaans.

As a check for S.W.L. who may be running over the band at this hour, they are reminded that the Afrikaans session is: Talk at 2.40, and news at 2.50.

The session on VLW-3, 25.36, from 3.30 to 4.30 p.m. has been cancelled.

Another change that will be in operation before this issue is on the streets is with VLQ-2, 11,870kc., 25.27m., which will from April 28 give a special programme for Southern Europe, in English from 3.30 a.m. till 4; in Spanish from 4 to 4.30 and in Italian from 4.30 till 5 a.m. This replaces the 5.30 to 6.30 p.m. session. Probably some of our readers may have heard the Prime Minister opening the new schedule.

A still further alteration has been made in the Department of Information's overseas programmes by the cancelling of what is known as Transmission 4.

## New Station?

What to me is a new station is KZRC, Manila. Call is given by a woman, who says "This is KZRC, the Voice of Cebu."

If frequency was given, I did not hear it, but figure it to be approximately 6110kc., or a wave-length of 49.10m. Schedule is not known, but I heard them from 7.59 to 8.45 p.m. I think these people are associated with KZRH and are using the channel where we first used to hear KZRH.

Monday, April 8, 1940.

Probably long before this paragraph is read, a lot of news will have come over the air, but I think it is worth while recording this date. It was reminiscent of last September, and once more our Yankee cousins showed us how quick they can be in disseminating news. Their coast-to-coast hook-ups, their expedition in arranging 'phone talks from distant countries, the extra power that seems to be always available, the Hollywood technique that surrounds their request (which seems more like an hypnotic

suggestion) to "keep tuned to this station, more news momentarily," must give a fillip to short-wave listening.

KGEI in their afternoon session on 31.48m. gave vivid accounts of Germany's movements and considered the news (which was given "momentarily") of sufficient interest to keep them on the air an hour longer than usual. They closed at 7 p.m., and before they opened up again at 10 p.m. we had their sister station, WGEA, in New York, opening up at the unusual hour of 9 p.m. on 19.57m. And what a signal. They certainly excelled themselves.

## Radio Black-outs.

In all the years that I have been listening-in on the short-waves, I think I can safely say, from March 23 to and including March 30 will be recorded in my log book as the most unusually bad patches I have experienced.

Returning on March 23 from the Royal Agricultural Show, I was told that 2FC had announced conditions were such that they could not relay Daventry at 9.30 p.m.

I immediately turned on my three sets, but to my amazement I could not find London, nor could I hear any European station. There was just the suggestion that Moscow was on the air on 19.47m., and the first station to

(Continued on page 33)

## B.B.C. Summer Schedule

### Extensive Re-timings in Transmission 1 and 6.

#### Extensive Retimings in Transmissions 1 and 6.

Transmissions 1 and 6 of the B.B.C.'s overseas service will go over to summer-time working on May 5, and, in consequence, the timings of a number of fixed-point broadcasts, as well as of the transmissions themselves, are being revised.

#### Transmission 1.

Transmission 1 will begin at 2.55 p.m., and close down at 6.15 p.m.

The news bulletin at 4.15 p.m. will remain unaffected, and will be supplemented by the restoration of a news summary at 6 p.m.

The following fixed-point broadcasts will, from May 5, be broadcast at the hours shown (all times are given in Australian Eastern Standard Time):

Sundays: "Dispatch from the Front," 5.15 p.m.; "The Week's Programmes," 4 p.m.; Religious Service, 5.30 p.m.; "In Town To-night," 4.45 p.m.

Mondays: Saturday-night Variety, 4.45 p.m.; "Vive la France," 5.45 p.m.

Tuesdays: Talk—"The Empire at War," 4 p.m.; Talk—"Under Nazi Rule," 5.15 p.m.; Serial play—"Vanity Fair," 5.30 p.m.

Wednesdays: Talk—"In England Now," 3 p.m.

Thursdays: Talk—"Matters of Moment," 4.45 p.m.

Saturdays: Talk—"In England Now," 3 p.m.; Talk—"London Log," 5.45 p.m.; Variety—"At the Black Dog," 4.45 p.m.

#### Transmission 6.

The new timing of Transmission 6, while not directed to this country, but may still be heard and should improve as our winter approaches, will be from 12.40 p.m. to 2.30 p.m., A.E.S.T. The full news bulletin at 2 p.m. and the news summary at 12.45 p.m. are unaffected.

Revised timings for fixed-point broadcasts are:—

Sundays: Talk—"London Log," 1.45 p.m.

Saturdays: Talk: "World Affairs," 1.45 p.m.

# The Month's Loggings

Stations not listed last month are indicated by an asterisk.

ALL TIMES ARE AUSTRALIAN EASTERN STANDARD.

## AUSTRALIA AND OCEANIA.

**VLR-3**, 11,890kc., 25.25m., Lyndhurst: Re-lays A.B.C. programmes 6.30 a.m. to 5.15 p.m. daily. From 6.45 a.m. Sundays. Being heard well in New Zealand (Gandy).

**VLQ-2**, 11,870kc., 25.27m., Sydney: 3.30 a.m. to 5 a.m. for South and Central Europe in English, Spanish and Italian.

**VLW-3**, 11,830kc., 25.36m., Wanneroo: 8.30 a.m. to 12.15 p.m., 2 to 8 p.m. National programme Sundays from 9 a.m. (African programmes, see **VLW-4**).

\***VLQ-5**, 9680kc., 30.99m., Sydney: Dept. of Information programmes for North America, 10-11 p.m. and 1.30-2.30 a.m.

\***VLW-4**, 9665kc., 31.04m., Wanneroo: Special programme in English and Afrikaans for South Africa. 2-3 a.m. (See reference elsewhere).

**VLW-2**, 9650kc., 31.09m., Wanneroo: 8.15 p.m. to 1.30 a.m. (Sundays closes at 12.30 a.m.).

**VLQ**, 9615kc., 31.2m., Sydney: 5-7 p.m. for Europe in German, French, Dutch and English. 9.15-9.45 p.m. for South America, in English and Spanish. 11.15-11.45 p.m. for India in English.

**VLR**, 9580kc., 31.32m., Melbourne: 5.30-midnight, national programmes (Sundays till 11 p.m. (10.30-11.30 is Dept. of Information for East). Midnight to 12.30 a.m., Dept. of Information for D.E.I. in Dutch and English.

\***VLW**, 9560kc., 31.38m., Wanneroo: Not in use at present.

\***VLW**, 6130kc., 48.92m., Wanneroo: Not in use at present.

**Fiji**.  
**VPD-2**, 9535kc., 31.47m., Suva: 7 to 8 p.m. Getting better weekly. Strong (Bantaw).

### New Caledonia.

**FK8AA**, 6122kc., 49.00m., Noumea: Wednesdays and Saturdays from 5.30-6.30 p.m. Loud signal, but noise level usually high.

### Sunday Is. (Reoul Is.).

**ZMEF**, 9200kc., 32.61m.: Phone station reported from N.Z. as heard between 4.30 and 5.30 p.m.

## AFRICA.

### Algeria.

**TPZ-3**, 8960kc., 33.48m., Algiers: Heard with news session shortly before 7 a.m. with fair signal on several occasions (Cushen, N.Z.).

### Ethiopia.

**12AA**, 9650kc., 31.09m., Addis Ababa: Heard daily about 5 a.m.

### Kenya.

**VQ7LO**, 6083kc., 49.31m., Nairobi: Heard weekly at 5 a.m. (Bantow).

### Madagascar.

**Radio Tananarive**, 9870kc., 30.4m.: Fair signal, early morning.

**Radio Tananarive**, 6060kc., 49.5m.: Opens about 1 a.m., fair signal.

### Mozambique.

**CR7BE**, 9640kc., 31.12m., Lourenco Marques: Has been heard with fair signals in a special transmission to Europe and North America (Cushen, N.Z.). Reported to have moved to 30.88m.—Ed.

### South Africa.

\***ZTE**, 11,800kc., 25.42m., Durban: Only fair after 2.30 a.m. (Rodgers).

\***ZRO**, 9755kc., 30.75m., Durban: Weak at 2 a.m. (Rodgers).

\***ZRL**, 9606kc., 31.23m., Capetown: Heard occasionally early mornings (Rodgers).

**ZRH**, 6007kc., 49.94m., Pretoria: Fair signal, early mornings (Rodgers).

\***ZNB**, 5900kc., 50.95m., Mafeking: Fair signal early mornings. Closes at 5.30 a.m. (Rodgers).

## AMERICA.

### Central America.

#### Costa Rica.

**TIPG**, 9625kc., 31.19m., San Jose: Opens at 10 p.m. Good.

**TIEP**, 6690kc., 44.82m., San Jose: Opens at 10.30 p.m.

#### Guatemala.

**TGWA**, 15,170kc., 19.77m., Guatemala City: Monday mornings only at 7 a.m. (Gandy).

**TGWA**, 9685kc., 30.98m.: Sunday afternoons best (Gandy).

**TGWB**, 6445kc., 46.55m.: Note alteration in frequency. Heard after 11 p.m. nightly.

\***TCQA**, 5400kc., 46.88m., Quezaltenango: Sunday nights, late.

**TG-2**, 6190kc., 48.47m., Guatemala City: Nightly towards midnight.

#### Panama.

**HP5A**, 11,700kc., 25.64m., Panama City: Nightly from 10.

**HP5K**, 6000kc., 50.00m., Colon: "La Voz

## WITH THE REPORTERS.

Our short-wave loggings have been compiled from reports received from all over Australia and New Zealand. These, together with our own observations, have enabled us to make a goodly coverage.

We invite our readers to send us reports of their loggings or to notify us of anything unusual in the matter of reception.

We acknowledge with gratitude notes from our Official Observers:

Wm. Bantow, Victoria.  
W. H. Pepin, West Australia.  
A. T. Cushen, New Zealand.  
D. J. Hastings, Queensland.  
J. C. Taylor, N.S.W.  
W. M. Chapman, N.S.W.

also reports from N. E. Gandy (New Zealand) and O. G. Washfold (Victoria).

We greet newcomers to our pages:

M. Rodgers, Hunter's Hill.  
T. Smith, Bondi.  
M. Woods, Kingsford.  
R. Oliver, Bankstown.

and thank them for their notes.

de la victor." Address Box 33. Heard nightly from 10. Schedule: 10 p.m.-midnight, 2.30-4 a.m., 9-10 a.m.

## NORTH AMERICA.

### United States.

**WNBI**, 17,780kc., 16.87m., Bound Brook, N.J.: O.K. mornings (Pepin).

**KGEI**, 15,330kc., 19.56m., Frisco: Have heard as early as 11 a.m., but reliable from 1 p.m. Very good on alternate Saturday afternoons when "talking" to Admiral Byrd's expedition, when actually they are relaying

### WGO.

**WGEA**, 15,330kc., 19.56m., New York: Good till 8 a.m. R-7 (Washfold).

\***WCBX**, 15,270kc., 19.63m., New York: Fair (Chapman).

**WRUW/WRUL**, 15,130kc., 19.83m., Boston: Fair (Chapman).

**WPIT**, 11,870kc., 25.26m., Pittsburg: Weak in mornings (Chapman, Sydney). R-7 (Washfold, Melbourne).

**WCBX**, 11,830kc., 25.34m., New York: Weak in mornings (Chapman).

**WRUW**, 11,730kc., 25.58m., Boston: R-7 (Washfold).

**WRCA**, 9670kc., 31.03m., Bound Brook, N.J.: Being heard daily in W.A. by Mr. Pepin.

**WCAB**, 9590kc., 31.28m., Philadelphia: Giving an R-6 signal daily in N.Z. (Cushen).

**WGEA**, 9550kc., 31.41m., Schenectady, N.Y.: Being heard in W.A. quite well (Pepin).

**KGEI**, 9530kc., 31.48m., San Francisco: Reported by Mr. Chopman as weak. Think this must have been one of the bad nights for reception, as we are hearing it at very good strength and clarity nightly, especially since **JZI** has closed. Being received at R-8 in Melbourne (Washfold). Strong at 10.30 (Bantow).

\***WRUL**, 6040kc., 49.65m., Boston: Can now be heard well on Wednesday and Saturday afternoons from 2 till closing at 2.30 Wednesday and 2.45 on Saturday. Have been doing a lot of testing as late as 5.30 recently.

\***WCBX**, 6120kc., 49.01m., New York: Being received in N.Z. with R-7 signal (Cushen). Heard well here also.—Ed.

**WLWO**, 6060kc., 49.5m., Cincinnati: R-7-8 (Washfold, Victoria) Splendid signal here daily.—Ed.

### Mexico.

**XEQQ**, 9680kc., 30.99m., Mexico City: Best in afternoons till 4 p.m.

**XEWV**, 9503kc., 31.57m., Mexico City: Receiving R7 signal (Washfold). This is a splendid station of an afternoon. Closes at 4 p.m.—Ed.

### South America-Argentina.

\***LRX**, 9660kc., 31.06m., Buenos Aires: Heard closing at 9 p.m. with English announcements at good strength, stating they were shifting to **LRU** on 15,300kc. (Cushen, N.Z.).

### Chili.

\***CB-1180**, 11,945kc., 25.12m., Santiago: Good night station.

### Colombia.

**HJFK**, 9730kc., 30.83m., Pereira: Opens at 10 p.m. Good.

### Ecuador.

**HCJB**, 12,460kc., 24.08m., Quito: Still fair at 10.30 p.m. (Chapman). See special reference elsewhere.—Ed.

### Peru.

\***OAX47**, 9556kc., 31.38m., Lima: Has anyone heard this lately?—Ed.

**OAX5C**, 9390kc., 31.95m., Ica: Sunday afternoons.

**OAX4J**, 9340kc., 32.12m., Lima: Sunday afternoons till 4 p.m.

### Uruguay.

**CXA-8**, 9640kc., 31.12m., Colonia: Strong signal after 8 p.m. on top of KZRH. (Cushen, N.Z.).

## THE EAST.

### Burma.

**XYZ**, 6056kc., 49.54m., Rangoon: Mr. Washfold reports a R-7 signal, and Mr. Pepin in W.A. classes same as R-9, Q-5.

### China.

**XGOX**, 15,190kc., 19.75m., Szechwan Prov.: Reported heard in N.Z. from 7-8.30 p.m. (Gandy).

**XGOY**, 11,900kc., 25.21m., Szechwan Prov.: Heard nightly at very good strength (Gandy, Bantow, Chapman, Pepin).

**XMHA**, 11,855kc., 25.3m., Shanghai: Mr. Washfold, of Victoria, reports a R-7 signal, but the best we get here is the same as reported by Mr. Chapman, of Sydney. Fair.

**XGOK**, 11,650kc., 25.75m., Canton: Weak at 9.15 p.m. (Bantow). Fair (Chapman). We find it weak and hard to follow.—Ed.

\***XTC**, 9295kc., 32.28m., Shanghai: Strong 10-11 p.m. (Bantow).

**XPSA**, 7000kc., 42.8m., Kweiyang: Weak at 11 p.m. (Bantow).

### Dutch East Indies.

**YDC**, 15,150kc., 19.8m., Bandoeng: Strong nightly (Bantow, Washfold, Chapman, Pepin).

**PLP**, 11,000kc., 27.27m., Bandoeng: Weak (Washfold, Chapman, Pepin).

**PMN**, 10,260kc., 29.24m., Bandoeng: Strong most nights (Bantow, Pepin). Fair (Chapman).

**PMH**, 6720kc., 44.64m., Bandoeng: Strong (Bantow, Washfold, Pepin).

**YDX**, 7220kc., 41.55m., Medan, Sumatra: Excellent (Pepin). Heard with good signal in N.Z. at 2.30 a.m. (Cushen).



**YDD**, 6045kc., 49.63m., Bandoeng: Not very strong (Bantow, Pepin).

**YDF**, 4960kc., 60.48m., Soerabaya: Can be heard, but noise level very high.

**YDA**, 3040kc., 98.68m., Tandjongpriok: Quite a good signal.

**Radio-Saigon**, 11,780kc., 25.47m., Saigon: One of the best and loudest on the air (Bantow, Washfold, Chapman). Opens with English session at 8.30 p.m.

**Radio Saigon**, 6110kc., 49.05m., Saigon: Can just be heard in Sydney, but surrounding noise terrific. Same programme as 25.47m.—Ed.

#### Hong Kong.

**ZBW-3**, 9525kc., 31.49m., Hong Kong: One of the old reliables (Washfold, Chapman).

#### India.

**VUD-3**, 15,290kc., 19.62m., Delhi: Heard well in N.Z. from 1 to 3 p.m. A.E.S.T. (Gandy).

**VUD-7**, 11,870kc., 25.25m., Delhi: Putting in an excellent signal nightly. Carries same programme as 31.28m.

**VUD-2**, 9590kc., 31.28m., Delhi: Good (Gandy, Bantow, Chapman).

The 60-metre Indians can be heard, but generally noisy.—Ed.

#### Japan.

**JZK**, 15,160kc., 19.79m., Tokyo: Good both morning and night. Has replaced **JZI**, 31.46m., in news in English at 10.30 p.m.

**JVH**, 14,600kc., 20.55m., Tokyo: Two of our N.Z. reporters Messrs. Gandy and Cushen, are receiving fair signals in early evening.

**JZJ**, 11,800kc., 25.42m., Tokyo: Another of the Jap. stations that is good, both morning and night. News in English at 10.30 p.m. (Chapman, Bantow, Cushen, Gandy).

**MTCY**, 11,775kc., 25.48m., Hsinking, Manchukuo: Good at 7 a.m. (Chapman).

**JVW-3**, 11,720kc., 25.60m., Tokyo: Opens at 6.45 p.m. News at 7.55 p.m. Always good (Chapman, Washfold, Bantow).

**JLG-3**, 11,705kc., 25.63m., Tokyo: Heard of a night, but weakly (Pepin).

**JZI**, 9535kc., 31.46m., Tokyo: Observations confirmed by programme schedule just to hand, shows this station as having been withdrawn from night transmission. This is fortunate as it permits of **KGEI** being heard without distortion.

**JVW**, 7258kc., 41.34m., Tokyo: Heard strongly at 6.15 to 6.45 a.m. (Pepin, Bantow).

**MTCY**, 6125kc., 48.98m., Hsinking, Manchukuo: Heard at 6.15 to 6.45 a.m. (Bantow). Fairly strong at night (Bantow).

#### Malaya and Straits Settlement.

**ZHP**, 9700kc., 30.94m., Singapore: Much clearer since they moved up to present wavelength. Heard strong at 9.45 p.m. (Bantow).

#### Philippines.

**KZRH**, 9640kc., 31.12m., Manila: "The Voice of the Philippines." Excellent station. Heard strongly at 11.45 p.m. (Bantow).

**KZRM**, 9570kc., 31.35m., Manila: Radio Manila, "The Nation's Station." Always reliable. Fairly strong at 8.30 p.m., better later (Bantow).

**KZIB**, 9500kc., 31.58m., Manila: Good most nights (Gandy, Washfold, Pepin, Bantow).

**KZRF**, 6140kc., 48.86m., Manila: Heard fairly strong some nights (Bantow).

**KZRC**, 6100kc., 49.18m., Manila: "The Voice of Cebu." See reference elsewhere.

**KZIB**, 6040kc., 49.67m., Manila: Can be heard nightly, but noisy. Heard fairly strong at 10.15 p.m. (Bantow).

#### Thai.

**HSP-6**, 7968kc., 37.65m., Banakok: Very good from opening at 11 p.m. News in English at 11.45 p.m.

#### EUROPE.

##### Bulgaria.

**Radio Sofia**, 10,310kc., 29.09m., Sofia: Heard daily at 6 a.m.

##### Belgium.

**ORK**, 10,330kc., 29.04m., Ruysselede: Weak (Chapman).

##### Canary Islands.

**EAJ-43**, 10,360kc., 28.96m., Tenerife: Un-

#### LETTERS FROM OVERSEAS.

A letter from the World Wide Broadcasting Foundation, University Club, Boston, Mass., U.S.A., informed me I was the first member in Australia.

Listeners are aware of the educational talks that are broadcast from the stations controlled by this body through **WRUL** and **WRUW**.

#### TWO NEW STATIONS.

##### China.

**FFZ**, 12.08kc., 24.83m.: Heard nightly from 10 p.m. French programme till 11, when gong is struck and news in English is given. Excellent strength, but spoilt by morse after 11.30 p.m.

##### "British Rebel."

5920kc., 50.63m.: Every morning at 6.30. Shuts off sharp at 6.50 with "God Save the King." This station, purporting to be British, has been "located in Germany" by B.B.C. engineers.

derstand has been closed for duration of war.—Ed.

##### France (Paris Mondial).

**TPB-3**, 17,765kc., 16.88m.: Heard nightly. News at 9 p.m. (Pepin, Chapman, Washfold).

**TPC-5**, 15,243kc., 19.68m.: Now opens at midnight at fair strength.—Ed.

**TPB-3**, 15,130kc., 19.83m.: Operates from 1.30 a.m. till 3.30 a.m. with a break of 30 minutes at 2 a.m.

**TPA-3**, 11,885kc., 25.24m.: Reports from Victoria and N.Z. show this as weak. We concur (Bantow, Gandy).—Ed.

**TPB-7**, 11,885kc., 25.24m.: Fair just before closing at 3.30 p.m.

**TPC-5**, 11,845kc., 25.33m.: Only used in early mornings, 1.30-2 a.m.

**TPC-8**, 11,845kc., 25.33m.: Continues from 2.30 a.m. to 7.15 a.m.

**TPB-4**, 11,720kc., 25.60m.: Excellent. Can be heard at my location most days from 11 a.m. till closing at 3.30 p.m.—Ed.

**TPB-23**, 9580kc., 30.99m.: Very good of an afternoon. 4-7 p.m.

**TPC-13**, 9520kc., 31.51m.: One of the best of the Paris Mondial transmitters. Particularly good from 3.45 to 4.45 p.m.

**TPB-25**, 7280kc., 41.21m.: Another now used in early mornings, 3.30 to 4 a.m.

##### Germany.

**DJS**, 21,460kc., 13.98m.: Only heard occasionally, and then late at night.

**DJH**, 17,845kc., 16.81m.: Good signal from 9 p.m. Very good when giving news at 10 p.m. (Pepin).

**DJR**, 15,340kc., 19.56m.: Seem to have been dropped.—Ed.

**DJQ**, 15,280kc., 19.63m.: Always reliable for a good signal. Good at 5 p.m. R7. (Washfold).

**DJB**, 15,200kc., 19.74m.: Can be heard almost round the clock. Used by Berlin from 11 a.m. for "talks" to America. This session is really interesting if you have a humorous vein.—Ed.

**DJL**, 15,110kc., 19.85m.: Can be heard well at 3.30 p.m. Is used at 11 p.m. for relays to U.S.A. Has replaced **DJB** in this regard, but is not easy to hear at this hour. Reported heard well in N.Z. at 10 p.m. (Gandy).

**DJD**, 11,770kc., 25.49m.: Heard in Sydney quite well at mid-day.—Ed. Received O.K. in N.Z. in afternoon (Gandy).

**DZC**, 10,290kc., 29.25m.: Oriental programmes—see reference elsewhere.

**DJW**, 9650kc., 31.09m.: Good from mid-day;

## ALL-WAVE ALL-WORLD DX CLUB

### Application for Membership



The Secretary,  
All-Wave All-World DX Club,  
117 Reservoir Street,  
Sydney, N.S.W.

Dear Sir,

*I am very interested in dxing, and am keen to join your Club.  
The details you require are given below:*

Name.....

Address.....

[Please print  
both plainly.]

My set is a.....

(Give make or type,  
number of valves,  
and state whether  
battery or mains  
operated).

*I enclose herewith the Life Membership fee of 3/6 [Postal Notes  
or Money Order], for which I will receive, post free, a Club badge and  
a Membership Certificate showing my Official Club Number.*

(Signed).....

(Note: Readers who do not want to mutilate their copies of the "Radio World" by  
cutting out this form can write out the details required).

gives news in English at 5 p.m.—Ed.  
**DXB**, 9610kc., 31.22m.: Heard strong, in English at 6 a.m. (Bantow). Opens at 2.15 p.m. with music. "Lord Haw Haw" (English) every morning at 7.15 a.m.  
**DJA**, 9560kc., 31.38m.: R8 (Washfold). Very good from mid-day.—Ed. Delightful at 4 p.m. (Rodgers).  
**DJN**, 9540kc., 31.45m.: Heard well in N.Z. after midnight (Gandy).  
**DXJ**, 7240kc.: See reference elsewhere.  
**DJC**, 6020kc., 49.83m.: Good in early morning sessions. News at 5 and 7.10 a.m.

#### Holland.

**PCJ-2**, 15,220kc., 19.71m., Huizen: Fair (Chapman).

#### Hungary.

\***HAS-3**, 15,370kc., 19.52m., Budapest: Fair at midnight (Chapman). This station's schedule is: Sundays, midnight to 1.30 a.m. Mondays.—Ed.

#### Italy and Vatican City

**2RO-8**, 17,820kc., 16.83m., Rome: Week most nights. News at 9.15, also at 1.40 a.m. (Pepin, Chapman).  
**2RO-20**, 17,780kc., 16.87m., Rome: Gives news in English at 1.40 a.m. Good.—Ed.

**2RO-6**, 15,300kc., 19.61m., Rome: Heard well at 4.30 p.m.; fair at 9.15 p.m. (Pepin, Chapman, Washfold, Bantow). Also heard well in N.Z. (Cushen).

**2RO-14**, 15,230kc., 19.70m., Rome: News in English at 1.40 a.m. Good signal.—Ed.

**2RO-12**, 15,100kc., 19.87m., Rome: Fair in mornings (Chapman).

**2RO-4**, 11,810kc., 25.40m., Rome: Strong at 8 a.m. (Pepin, Bantow). Gives news at 1 p.m. Very fair signal.—Ed.

**2RO-15**, 11,750kc., 25.51m., Rome: Good of night (Chapman). Gives news at 1.40 a.m.—Ed.

**2RO-9**, 9670kc., 31.02m., Rome: News at 9.30 a.m. Very good.—Ed.

**2RO-3**, 9635kc., 31.15m., Rome: Being specially directed to Australia and N.Z.; gives splendid signal of an afternoon (Washfold, Bantow, Rodgers, Smith, Oliver). Reported good in N.Z. (Cushen, Gandy).

#### Portugal.

**CSW-5**, 11,040kc., 27.17m., Lisbon: Heard at 4 a.m. with fair signal (Cushen, N.Z.). Is being heard very well in Sydney till 6 a.m., when they change to 30.80m.

**CSW-7**, 9740kc., 30.8m., Lisbon: Opens at 6.0 a.m. and continues till 8.30. Can be heard most mornings till closing, although weakens after 7.30 a trifle.

#### U.S.S.R.

**RW-96**, 15,400kc., 19.47m., Moscow: Now appears to be about 10 p.m. before being heard.

**RW-96**, 15,170kc., 19.76m.: Gives session called "Current Events" at 6.30 p.m. Closes

at 6.45. When heard on April 14 the familiar female voice announced, "We will be on the air again at 11 a.m. G.M.T. on 25.21m. and 25.77m. It is now sixteen minutes to 12 noon Moscow time. Good-morning, everybody." I tried to hear them at 9 p.m. on the wave-lengths mentioned but had no luck. Incidentally, looks as though Moscow is adopting daylight saving time.—Ed.

**RNE**, 11,990kc., 25.00m. Moscow: One of the old reliables as regards strength, but does not seem to have any fixed schedule, excepting news at 6.25 a.m.—Ed.

—, 11,900kc., 25.21m., Moscow: Reported heard in N.Z. between 10.30 and 11.30 p.m. on Sundays only by Mr. Gandy. Have any of our Australian listeners heard them on 25.21m.?

—, 11,645kc., 25.77m., Moscow: Supposed to be on at 9 p.m. nightly.

—, 10,037kc., 29.85m., Moscow: Can be heard at 6.20 a.m., but Morse on top makes it difficult to follow.

**RAN**, 9600kc., 31.25m., Moscow: Another transmitter heard at 6.20 a.m., but also spoilt by Morse.

**RW-96**, 9518kc., 31.51m.: This seems to be a happy wave-length, as Moscow is great at 6.20 a.m., and it is splendid for **Paris Mondial** in the afternoon. Mr. Cushen, of Invercargill, reports Moscow good at 6 a.m. also.

—, 8060kc., 37.17m.: Mr. Cushen also reports good reception on this wave-length.

—, 7350kc., 40.76m.: Said to be giving news in English between 6 and 7.30 a.m., but not heard at my location.

**RV-59**, 6030kc., 49.75m.: One of the best signals on this band at 6 a.m., and also after midnight. Reported O.K. in N.Z. (Cushen).

—, 6000kc., 50.00m.: Can be heard some mornings in same programme as **RV-59**, but not so clearly.

#### Spain.

**EAQ**, 9860kc., 30.43m., Madrid: Heard fairly well some mornings.

\***EAJ-9**, 7220kc., 41.55m., Malaga: Schedule is 7 to 9 a.m., but I have heard them several mornings at 6.30 a.m. Good and loud.

\*—, 7120kc., 42.1m., Malaga: Call sign unknown, but can be heard daily from 5 to 6 a.m.

#### Switzerland.

Understand all **HBO** stations closed. Since confirmed by letter from League of Nations.—Ed.

#### Scandinavia.

\***OZH-2**, 15,320kc., 19.58m., Skemlebak: Used to open at 11 p.m. on Sundays and could be heard pretty well from midnight. Owing to international position, would be worth watching.

#### Finland.

\***OIE**, 15,190kc., 19.75m., Lahti: Since hostilities ceased has been heard quite often. Can be heard almost daily from late afternoon till 7 p.m. Said to be operating in mornings, but this may be confused with Moscow on 19.76m.

#### Norway.

**LKV**, 15,170kc., 19.78m., Oslo: Another country that may be off the air, but worth watching. Used to be heard till 8 a.m.

**LKQ**, 11,735kc., 25.57m., Oslo: Same remarks apply. Used to be heard faintly till 6 a.m.

#### Sweden.

\*—, 6060kc., 49.50m.: Gives news in English at 7.45 a.m. for five minutes, then news in German, commencing with words, "Actung! Actuna!" ("Attention! Attention").  
**SBP**, 11,705kc., 25.63m., Motala: Fairly strong at 4.30 to 5 a.m. (Bantow).

#### Turkey.

**TAP**, 9465kc., 31.78m., Ankara: Splendid station from minute of opening at 1.30 a.m. till closing at 7.30 a.m. Plenty of music and on Sundays at 6.15 a.m. gives talk in English.

#### Yugoslavia.

**YUC**, 9505kc., 31.56m., Belgrade: Some mornings fine, others spoilt by interference. News 7.30.

## Amateur Band Review

Conditions on 20 metres have held up during the month and quite a number of loggings have been made, and a few have been received on 10 metres, chiefly for the United States.

#### CALLS HEARD.

Compiled from reports furnished by Messrs. Bantow, Chapman, Cushen, Hasting, Pepin and Taylor.

#### 10 Metres. 10 METRES.

W1CQR.  
W2FGB, W2LXY.  
W3EOZ, W3HFV, W3HUL.  
W4BMR, W4CYV, W4EEE, W4EEV, W4E1Y, W4EJQ, W4EMF, W4FB, W4FCT, W4FTB, W4FUM, W4FYB, W4HJ, W4HXV.  
W5AMJ, W5DWP, W5EEZ, W5EOT, W5FUA, W5GKZ, W5HCQ, W5HUB, W5HYT, W51KU, W51LU, W51RO, W5QE, W5YF, W5YV.  
W6AGG, W6BEI, W6BJB, W6CAH, W6CDO, W6CQR, W6CQS, W6CYU, W6EQS, W6EUV, W6FEZ, W6FB, W6FNI, W6FTU, W6GZZ, W6HDY, W6IAJ, W6ITH, W6JRA, W6JVL, W6KJ, W6KYL, W6KYT, W6LBP, W6LI, W6LSM, W6MYS, W6NHK, W6NKF, W6NNR, W6NPF, W6NYQ, W6NXQ, W6OCH, W6OIS, W6OQK, W6OXC, W6PDB, W6PFF, W6PGF, W6PHX, W6PMB, W6PNO, W6POW, W6POZ, W6PQA, W6PQQ, W6QEI, W6QGI, W6QHI, W6QMJ, W6QNW, W6QOZ, W6QUZ, W6QXI, W6RGO, W6RHK, W6RKL, W6RTV, W6SAH, W6SAV.  
W7ACD, W7EEK, W7EMT, W7EYW, W7GA, W7GCM, W7GLX, W7GRL, W7HIA, W7HKI, W7HPX, W7HXU, W7QD.  
W8CTI, W8EKS, W8FGV, W8GHX, W8ROT, W8SGP.  
W9ABJ, W9BRZ, W9CCI, W9CXU, W9DCX, W9DIZ, W9DRQ, W9EAG, W9FFB, W9FXB, W9HCL, W9LSW, W9MCD, W9OFL, W9PQX, W9QCD, W9QCK, W9QZG, W9ROQ, W9RRX, W9TIO, W9UMF, W9UUR, W9WHR, W9YRR, W9YZK.  
K6FBX, K6FHG, K6LVJ, K6MXM, K6NZC, K6ONJ, K6OQM, K6PCF, K6PIR, K6PLZ, K6PHD, K6SGJ, K6ROJ, K6IVG, K6KA, K6IAP, K6IME, K6IMN.

#### 20 METRES.

#### United States.

W1CND, W1DEK, W1AXA, W1AKK, W1ABM, W1ZI, W1IFH, W1ADM, W1IED, W1KKJ, W1AXA, W1JFG, W1CND, W2DN, W2JK, W2KEI, W2IXY, W2HS, W2WQR, W2JT.

W3FAM, W3FHU, W3BNC.  
W4BMR, W4ECS, W4DRZ, W4DXP, W4DSY, W5IDV, W5AKS, W5YF, W5AKZ, W5AXS, W5EPP, W5BET, W5ASG, W5BEK, W5AAN, W5GL, W5DXW, W5KD.  
W6CQS, W6OXC, W6GL, W6MHL, W6MR, W6NHK, W6AM, W6COM, W6ITH, W6CCV, W6ABT, W6MYD, W6MET, W6COH, W7DAE, W7ACD.  
W8RRP, W8SOJ, W8QJB, W8IOB, W8ROP, W8LIR, W8LFE.  
W9YIT, W9MTY, W9EXT, W9LQ, W9YRA, W9NDA, W9HOB, W9UAZ, W9ATZ, W9YIT, W9BEU, W9VXV.

#### Central America.

##### Guatemala.

TG9BA.

##### Costa Rica.

T12RC.

#### Dutch East Indies.

PK2LZ, PK4KS, PK1JR, PK1VM, PK3DW, PK3GD, PK3JK, PK1VD, PK4AY, PK4ES, PK1FK, PK1HG, PK1OGV, PK1VY, PK5HR, PK2AY, PK3KT, PK4DA.

#### China.

XU8MC, XU8RJ, XU8IB, XU8RJ, XUBAM, XU8ZA, XU8ZC, XU8RB, XU8WK, XU-IA, XU4HR, XU5EM, XU5LT, XU6AB, XUOA.

#### Philippines.

KA1KF, KA4LF, KA1ME, KA1RV, KA1FH, KA1CW, KA1AC, KA1XQ, KA1ZL, KA4RP, KA3BW, KA1BB, KA1PJ, KA1JT, KA1SM, KA1LB, KA1GC, KA1ME, KA1FH, KA1OZ, KA1RV, KA1ER, KA1JH, KA1MN, KA1BN, KA1MM, KA1FG, KA3BW.

#### West Indies.

CO6OM, CO2WM.

#### Japan.

J2NF, J2NI, J2NG, J2XE, J2XA.

#### Pacific.

K6NYD, K6ILW, K6MYA, K6PCF, K6LKM, K6KRG, K6RVU, K6PCF, K6PCS, K6PLZ, K6LKN, K6BNR, K6KLG, K6MYD, K6QXU, K6LEJ, K6KGA, K6QHU, K6OTH.  
KF6JEG.  
K4FKC.

#### South America.

Argentina: LU5HE, LU4BC, LU7EG.  
Solivador: YS1MS.  
Peru: OA4C, OAAI, OAAW.  
Brazil: PY2LN.  
Chile: CE2BX.  
Cuba: CO2GY.  
Johnstone Is.: KE6NYD.  
Luxembourg: LX1B.

show up was Berlin on the 16-metre band.

This, followed by London at 10.15, gradually improved till 10.30, when both could be classed as good. There was, however, still no sign of Paris or Rome.

DJR and DJQ were still very groggy, but London on GSF, 19.82m., could be followed O.K.

But the most remarkable condition was still to come. From midnight I do not remember hearing stations from everywhere so well. There were signs of the milkmen long before I "pulled the big switch," as our amateur friends would say.

#### NOTES FROM OVERSEAS.

**TI-4NRH**, Heredia, Costa Rica: Is now on 9692kc., or 30.96m. Schedule: Noon to 1 p.m. and Sundays 10 to 11 p.m.

**TGSJG**, Guatemala City: A new station on 11440 and 11750kc., or 26.22m. and 25.53m. Schedule: 12.30 to 1.30 p.m. Address reports to Apartado No. 12, Guatemala City.

#### STOP PRESS!

Elsewhere I referred to WLWO and their new transmitter with power of 50,000 watts.

I heard them for the first time on Anzac Day at 4.25 p.m. when they gave a short news bulletin.

They closed at 4.31 p.m. and referred to their new power and that they would be on the air again at 5.45 a.m. E.S.T., which is 8.45 p.m. our time.

The announced frequency was 9.59 m.c. or 31.28m.

Anticipating that there would be some glorious heterodyning when VUD-2 came on at 9.30 p.m., I tuned WLWO in at 8.45 and the signal, while not quite as strong as in the afternoon, was still excellent. At 9.30 the fun started and the Yank and the Indian seemed to be alternately coming through. Of course, reception from both was spoilt, so maybe it is just as well that Delhi conveniently arranged some time ago to be heard on 25.25m.

#### Continued from page 13.

a quiet audience. Remember how well that battery job performed?

To be quite fair I think the best way would be to have the heats and the final in the same place as you suggested.

The judging system, I consider, should be similar to last time, but the choice of records played to my mind is the chief point to be considered.

I suggest that the main item should be the standard recording or sections of different recordings such as heavy orchestra, organ, violin etc., and then the competitor could give one of his own selection to break the monotony.

The standard disc or discs would need to be picked very carefully before hand, preferably by the musical and technical judges (could we get John Moyle in on this job?)

And after the winner has been decided, how about arranging a night to listen to the successful amplifier playing a specially selected programme of recordings?

Yours etc.,

JOHN CRAWFORD.

## ALL-WAVE ALL-WORLD DX CLUB

# New Members

During the past few weeks a large number of readers have joined the All-Wave All-World DX Club.

If you are interested in long-distance reception and want to join too, you will find the necessary application form on page 31 of this issue.

- AW523DX** H. L. Christine, 2014 Grand Ave., Parsons, Kansas, U.S.A.  
 524 H. Bartlett, 15 Denby St., Cairns, Nth. Q'land.  
 525 P. F. Clifton, 99 Nowell Rd., Barnes, London, England.  
 526 L. Callaghan, 69 Koroit St., Warrnambool, Vic.  
 527 The Right Hon. J. B. Morcombe, R.E., Box 145 P.O., Maryborough, Q.  
 528 H. F. Bennetts, Silkwood, North Q'land.  
 529 G. Claes, Reynolds St., Bowen, Q'land.  
 530 B. Ashley Cooper, 17 Victoria St., Strathfield.  
 531 P. R. Horan, George St., Bowen, Q'land.  
 532 J. L. Christensen, Edmonton, via Cairns, N. Q'ld.  
 533 J. Scott, Jnr., 107 Hawk's View Rd., Guildford, N.S.W.  
 534 Ian Wilson, 17 Northcote Rd., Lindfield, N.S.W.  
 535 A. Deppeler, Edmonton, via Cairns, N. Q'ld.  
 536 J. N. Goucher, 44 Pasley St., Sth. Yarra, Vic.  
 537 P. L. Smith, Dunnsborough, via Busselton, W.A.  
 538 G. C. Smith, Dunnsborough P.O., W.A.  
 539 R. B. Dufty, 469 Mowleray Rd., Lane Cove, N.S.W.  
 540 K. C. McGregor, 17 Tararua St., Masterton, N.Z.  
 541 J. H. Lilburne, P.O., Murtoa, Vic.  
 542 R. F. Gertau, Clare, S.A.  
 543 J. Collins, 55 Brermba St., Grafton, N.S.W.  
 544 P. H. Kleidon, Avondale, via Bundaberg, Q'ld.  
 545 J. A. Sargent, Mount Mitchell, via Glencoe, N.S.W.  
 546 R. F. Woodman, Wirrealpa Station, via Blinman, S.A.  
 547 C. A. Hyatt, Ferry Creek Ave., Upper Ferntree Gully, Vic.  
 548 D. W. A. Porthouse, 96 Siblin St., Newtown, Tas.  
 549 J. S. Howie, 38 Nelson St., Gordon, N.S.W.  
 550 A. R. McRitchie, C/- B.H.P., Whyalla, S.A.  
 551 G. J. Meagher, Lawloit, via Nhill, Vic.  
 552 Chris. Nolan, 385 Nicholson St., Nth. Carlton, Vic.  
 553 A. D. Hall, 2 Gordon Grove, Sth. Yarra, Vic.  
 554 K. J. Blight, Cromie St., Murtoa, Vic.  
 555 Les. Brennan, Cnr. George & Takalvan Sts., W. Bundaberg, Q'ld.  
 556 D. Robertson, 17 Risby St., Ulverstone, Tas.  
 557 L. G. Clark, 17 Wattle Ave., Lower Mitcham, Adelaide, S.A.  
 558 R. T. Blight, Breen St., Murtoa, Vic.  
 559 M. Bandt, 24A Shipster St., Torrensville, S.A.  
 560 M. Edwards, 15 View St., Wollongong, N.S.W.  
 561 N. L. Bonney, Box 22, Ulverstone, Tas.  
 562 A. Ryan, St. Patrick's College, Ballarat, Vic.  
 563 J. H. Johnston, 5 Douglas St., Randwick, N.S.W.  
 564 J. P. Thomas, Kinmond Ave., Nundah, Brisbane, Q'ld.  
 565 B. W. Keats, 21 Margaret St., Launceston, Tas.  
 566 B. A. Gleeson, 26 Balonne St., Narrabri, N.S.W.  
 567 C. W. Noble, 26 Foster St., Parkside, Adelaide, S.A.  
 568 I. Edwards, Grant St., Alexandra, Vic.  
 569 W. Basterfield, 31 South Rd., Moorabbin, Vic.  
 570 W. Walter, 103 Dean St., Enfield, N.S.W.  
 571 A. T. Cushen, 105 Prince's St., Invercargill, N.Z.  
 572 Endel Nomm, 188 Victoria Rd., Drummoyne, N.S.W.  
 573 M. E. Russell, 53 Liverpool St., Paddington.  
 574 T. Ryne, Nile St., Alexandra, Vic.  
 575 R. Hoyer, 71 Wentworth Rd., Strathfield.  
 575 R. Hoyer, 71 Wentworth Rd., Strathfield.  
 576 V. Hampson, 146 Jellicoe St., Toowoomba, Q'ld.  
 577 S. J. Nelson, P.O. Box 921, Cairns, Q'ld.

# CRYSTAL SETS are still popular

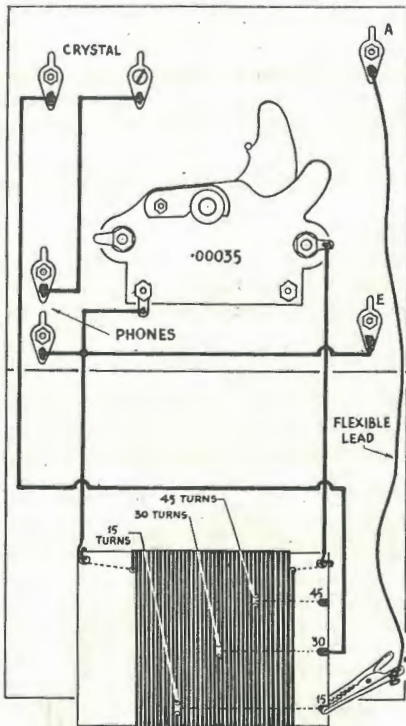
*There will always be a place in radio for the crystal set, as it costs nothing for upkeep.*

Of recent months there has been a steady demand for crystal circuits, quite a few of the enquiries coming from the Ingleburn camp, where a crystal set can be a great boon to a soldier. The powerful transmitter of the national station, 2FC, is located within a mile or two of the Ingleburn camp, and pumps in such a solid signal that good headphone signals from this station can be heard with any type of crystal set.

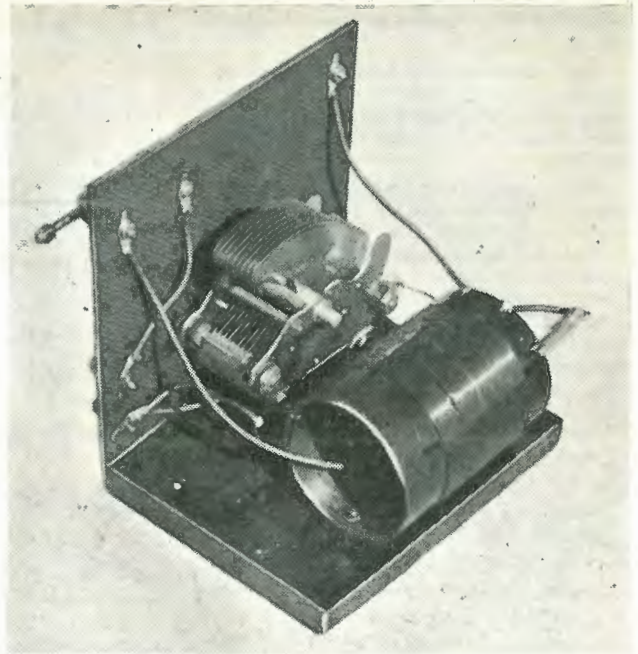
Most of the enquirers ask for new designs for crystal sets, but this is a big problem to us.

For twenty years there has been no development in crystal circuits.

Modern radio science has done many wonders for the bigger broadcast sets,



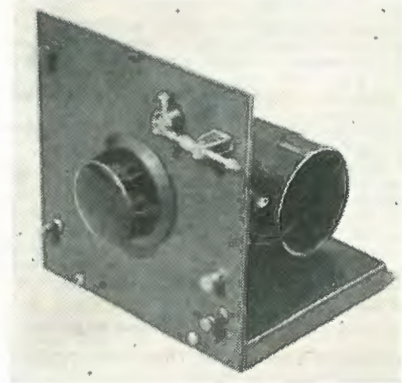
Picture diagram, drawn as though the front panel has been folded down.



A photo of the set when built.

## PARTS LIST. Crystal Set.

- 1—.00035 single gang condenser.
  - 1—Knob or dial to suit.
  - 4 inches of 2½" composition former.
  - 15 yds. 22 or 24 G D.C.C. or enam. wire.
  - 1—Panel, 6" x 6" (bakelite or masonite).
  - 1—Crystal detector or crystal.
  - 4—Terminals.
  - 1—6" x 6" wooden baseboard.
  - 1—Alligator clip.
- Coil consists of 60 turns, tapped 15-30-45.
- Headphones, Aerial and Earth Wire are also required.



A front view.

but has done nothing to help the lot of the modest listener with his little crystal set and headphone.

Many readers write us indignant letters, telling us that we should do something about it.

But there doesn't seem to be anything we can do.

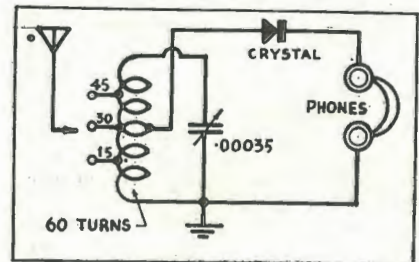
### The Reason.

Fundamentally, the crystal circuit lacks any method of amplifying the actual signal received in the aerial, and so we have to depend on the power of the signal itself to operate the headphone.

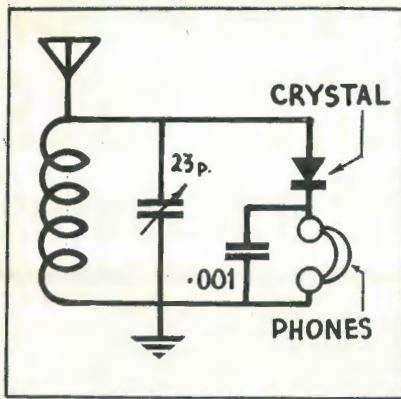
At a distance of a hundred miles or so from a broadcasting station the actual power in the signal is minute. It requires to be amplified by millions before it is able to drive the loud-speaker of a modern set. Actually, of course, the signal itself is like the finger on the trigger in relation to the power of the gun. The finger

only needs a pull of an ounce or two to release the power behind the bullet which amounts to a ton or two. So it is with the big set. The signal in the aerial controls the power from the power supply. But in the crystal set there isn't any power supply, and the feeble signal has to do the work.

At one time and another mechanical devices have been tried for doing the amplification, but in this respect the valve is infinitely more efficient. Therefore, we find that there is no

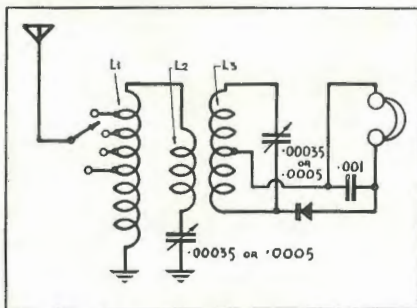


The circuit.



The simplest form of standard crystal circuit, which gives good results when used fairly close to a powerful station.

such thing as a modern crystal circuit, or an old one. Levenson's Radio, who have sold thousands of crystal sets, tell us that they have used the same circuit for twenty years and they doubt whether there is anything better. Murdoch's have also handled



An elaborate circuit, used and recommended by Levenson's Radio for the past twenty years. The two tuned circuits give improved selectivity.

Continued from page 19.

From the photograph it will be seen that only a small box was used for the original, the amplifier unit and microphone tucking away around the speaker for transportation when out of use.

We attached the speaker with a length of about nine feet of power flex. This allowed the speaker to be mounted on top of the bonnet of the car, with the amplifier on the running board, and the operator sitting inside the car.

#### Switch.

Although not fitted to the original amplifier unit, it might be quite a good idea to fit a switch to the unit, so that the operator can save current drain during pauses. The main difficulty with such a switch would be the delay between the time of switching on and the time when the heaters have warmed up sufficiently to allow the amplifier to work.

a large number of crystal sets, but they were also quite unable to suggest any improvement which could be made to the circuit they have found successful over a number of years. We asked Radiomac, of Angel Place, for the latest type of crystal set, and you see it pictured on this page. As might be expected, it does not show any revolutionary changes, any octal-based amplifying crystals or anything like that.

#### Efficiency.

In a nutshell the whole aim of a crystal set is to get an efficient tuning circuit and a sensitive pair of headphones and hope for the best. One way of increasing the range of a crystal set is to use a good aerial, for preference one which is out-of-doors

and fairly high. In the city and suburban areas, however, such a big aerial may mean that the selectivity is insufficient, and two or more stations may be heard together.

#### The One-Valver.

In this matter of selectivity, the one-valve circuit has a lot of advantage over the crystal set, as the use of reaction can make the effective selectivity of a single tuning circuit infinitely greater than that of the similar tuning circuit of a crystal receiver.

In its place, and operated with an appreciation of its limitations, however, the crystal set can give wonderful entertainment, with a running cost of absolutely nothing at all.

## Modest Kits From Murdochs

Beginners who are interested in building up simple sets at a reasonable price are especially catered for at Murdoch's radio department.

Three low-cost, simple-to-build receiver kits available from Murdoch's Ltd., of Sydney, comprise the Lodge crystal set, Lodge one-valver and the Improved Reinartz Three.

The only tools needed for assembling them are pliers, screwdriver and soldering iron. Accompanying each kit is an instruction chart outlining the construction, a pictorial wiring diagram being included.

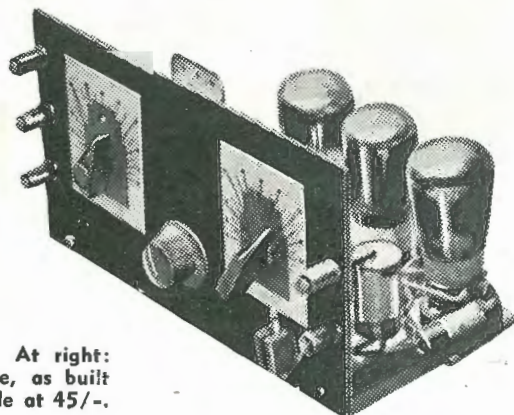
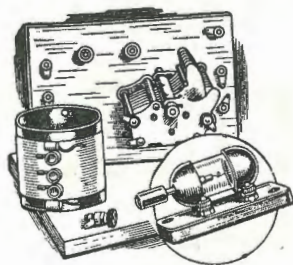
The Lodge crystal set, which will operate anywhere within 25 miles from a powerful station, is priced at 13/6 (less aerial and headphones). The Lodge one-valve kit, which has a daytime range of 100 miles, increasing to over one thousand miles after sunset, lists at 30/- (accessories extra).

Excellent speaker operation day and night is obtainable from the Improved Reinartz Three, which sells at 45/-, less batteries and speaker, but including valves.

A feature of all three receivers is that they can all be built progressively. In other words, after the crystal set has been built, it can then be dismantled, if desired, and most of the parts, such as terminals, panel, variable condenser, etc., used for the single-valve model. Similarly, the one-valver can be re-built as a two, and finally as a three, at little added cost.

All components used in these kits are of good quality, and as well results are guaranteed. In the unlikely event of failure, Murdoch's Ltd. undertake to put the receiver in working order free of charge—a particularly generous offer that should reassure those who are doubtful of their abilities as set-builders.

Descriptive pamphlets on all three kits are available free on request from Murdoch's Ltd., George and Park Sts., Sydney.



Above: The crystal set. At right: The Improved Reinartz Three, as built from the kit which is available at 45/-.

# Make the De Luxe Fidelity 8 a "SUPER" Set with **R.C.S.** TROLITUL COILS and Intermediates

## BATTERY-OPERATED S.W. CONVERTER

Coil Kit Type K141 ..... Price 13/9

Specify the new R.C.S. Trolitul Dual Wave Unit for 13.7 to 50 metres shortwave and 1600 to 550 k.c. broadcast. There is also a special dial available for this unit.

## DE LUXE FIDELITY 8

R.C.S. Trolitul Components are your guarantee of complete success in building the De Luxe Fidelity 8. Coil Unit Type K142 ensures highest fidelity results, combined with ease in installing and wiring-up. R.C.S. Coil Unit, Type K142. Price, £3/7/6. R.C.S. Iron Core I.F.'s, Type IF109. Price ..... 11/-  
Type IF110. Price ..... 11/-

## NEW R.C.S. DIALS

For some time we have felt that we should provide dials for use with coils of our manufacture, thus assuring perfect tracking. Both types are single glass Dual Wave, the type DA-2 having been designed especially for use with our Five Band Communications Receiver coil kit, and the "H" type condenser. Type DA-1 is a standard Dual Wave dial for use with R.C.S. Coils and the "F" type condenser. DA-1. Standard D/W Dial. Retail Price, 22/6.

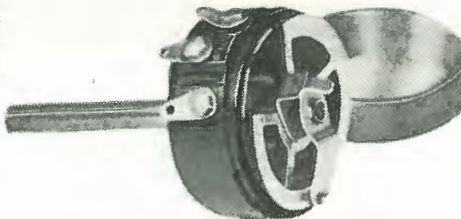
## R.C.S. TROLITUL MIDGET CONDENSERS



M.C. Type

R.C.S. Midget Condensers are made in two types, using Trolitul supports, thus guaranteeing practically no loss. The 14-plate equals old style 23-plate capacity. The M.C. type may be ganged.

## R.C.S. POTENTIOMETERS AND RHEOSTATS



The R.C.S. Volume Controls are the result of improved and new methods of manufacture, together with alterations in design and final testing. Noiseless, they are constructed so as to cut off all volume.

## STAR AND M.C. MIDGETS

Max. Cap. mmfd.	Min. Cap. mmfd.	Pts.	STAR Cat. No.	Retail Price	M.C. Cat. No.	Retail Price
10	3	2	CV43	3/6	CV41	6/9
15	3	3	CV35	3/9	CV42	7/3
25	3.5	4	CV36	4/-	CV43	7/10
35	4	5	CV37	4/3	CV44	8/6
50	4	7	CV38	4/9	CV45	9/-
70	5	9	CV39	5/4	CV46	9/6
100	6	14	CV40	5/11	CV47	10/3

## R.C.S. AUDIO TRANSFORMERS AND CHOKES



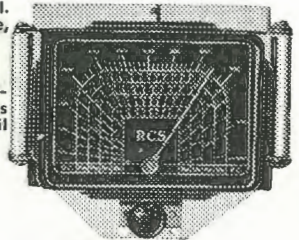
Long experience in the production of highly efficient transformers, combined with extensive research into raw materials and design, has resulted in the production of an audio transformer of excellent performance and complete reliability.

TB4—"A" Class

Cat. No.	Retail Price
TA1 Audio Choke, Bakelite Case	18/6
TM1 Modulation Transformer—Power	30/-
TB4 Single Input "A" Class Bakelite	20/-
TB5 Push Pull "A" Class Bakelite Case	21/-
TB6 Input "B" Class Bakelite Case	18/6
TB35 "A" Class High Fidelity Steel Case	67/6
TB36 "B" Class Input High Fidelity Steel Case	67/6
TB37 "AB" Class Bakelite	28/6

	Cat. No.	Retail Price
6 ohm Rheostate	.25 Amp. PT40	5/-
10 " "	.25 Amp. PT38	5/-
20 " "	.25 Amp. PT39	5/-
30 " "	.25 Amp. PT34	5/-
400 " Potentiom.	50 M/A PT46	5/-
1000 " "	35 M/A PT47	5/-
2500 " "	30 M/A PT49	5/-
5000 " "	30 M/A PT51	5/-
10000 " "	20 M/A PT52	5/-
15000 " "	20 M/A PT53	6/6
20000 " "	15 M/A PT54	6/9

DA-2. Communications Dial. Retail Price, 22/6.

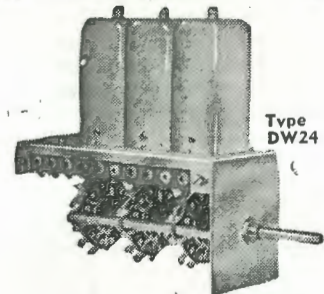


Illustrated Type DA-1.

## R.C.S. DUAL WAVE UNITS

Type DW24, as illustrated, consists of Aerial, R.F. and Oscillator Coils, Wave Change Switch, the necessary B/C and S/W Trimmers and Padder mounted on a rigid steel base, wired up ready to assemble in a set utilising 465 k.c. and an R.F. Stage. The bands are S/W 16 to 50 metres, and B/C 1500 to 550 k.c.

Retail Price  
DW24 for A.C. operation ..... £3 7 6  
DW25 for battery operation ..... £3 7 6



Type DW24

## R.C.S. TROLITUL INTERMEDIATE TRANSFORMERS

The new R.C.S. Trolitul I.F.'s are extremely stable, due to new methods of construction made possible by the use of Trolitul formers and base. No loose wires to shift and alter frequency. Positively the best I.F.'s yet produced.

Cat. No.	Retail Price
Air Core, 465 k.c.	
IF107. 1st I.F.	7/6
IF108. 2nd I.F.	7/6
Iron Core, 465 k.c.	
IF109. 1st I.F.	11/-
IF110. 2nd I.F.	11/-
Air Core, 175 k.c.	
IE68. 1st I.F.	7/6
IE69. 2nd I.F.	7/6



Type IF107

Obtainable from your local dealer or direct from—

# R.C.S. RADIO

PTY. LTD.

50 GLEBE ST., GLEBE.

'Phone: MW 2405

# Short-Wave Converter For Battery Operation

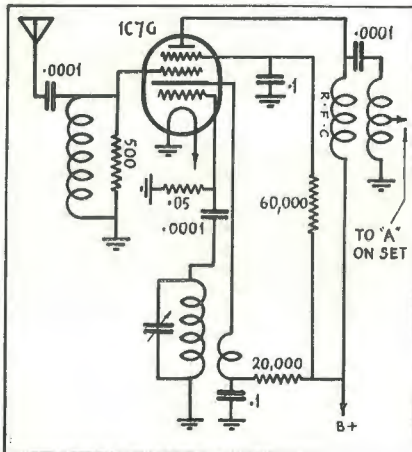
*Fitted to any broadcast receiver, this unit converts it into a dual-waver.*

*You can build one quite cheaply.*

In last month's issue we gave details of a modern version of the type of short-wave converter which enjoyed such great popularity until the time when dual-wave receivers became more or less universal.

Apparently there are still thousands of ordinary broadcast receivers in operation, judging by the popularity of this circuit, and the many requests which we have had for a similar type of converter, but suitable for use with a battery-operated receiver.

Fortunately it is a simple matter



The circuit.

to build a battery-operated version, and it is even easier than the a.c. model when it comes to attaching it to the receiver, for leads can be run direct to the batteries.

### Use.

The short-wave converter here described can be fitted to any sensitive broadcast receiver, and makes it capable of receiving short-wave stations direct.

The performance, when used with a set having plenty of gain, is equal to and in some cases superior, to a dual-wave receiver.

Some of the smaller dual-wave receivers, especially those using only four valves, are not especially sensitive on the short-wave bands. We tested our original converter with a receiver of this type and we found that short-wave results with the converter attached to the set were infinitely better than those obtained on the short-wave band using the dual-wave switch. It seems in fact that this converter can serve a very useful purpose in this matter of boosting up the

performance of a small dual-waver.

### What It Is.

A short-wave converter consists of a frequency changer valve, which when operating ahead on a t.r.f. set

### PARTS LIST.

#### Battery-operated Short-wave Converter.

- 1—Base, size 6 x 6 x 2½
- 1—Single-gang condenser (R.C.S.)
- 1—Dial to suit (Efco)
- 1—Special coil kit (Radiokes, R.C.S.)
- 1—R.F. choke (R.C.S., Radiokes)
- 1—60,000 ohm 1-watt resistor (I.R.C.)
- 1—50,000 ohm 1-watt resistor (I.R.C.)
- 1—20,000 ohm 1-watt resistor (I.R.C.)
- 1—500 ohm wire-wound resistor (R.C.S., I.R.C.)
- 1—.0001 mfd. mica condenser (T.C.C., E.T.C.)
- 1—.00025 mfd. mica condenser (T.C.C., E.T.C.)
- 2—.1 mfd. tubular condensers (T.C.C., E.T.C.)
- 1—Octal socket
- 1—1C7G valve
- 1—1C7G valve (Brimar, Radiotron, Mullard, Philips, Ken-Rad).



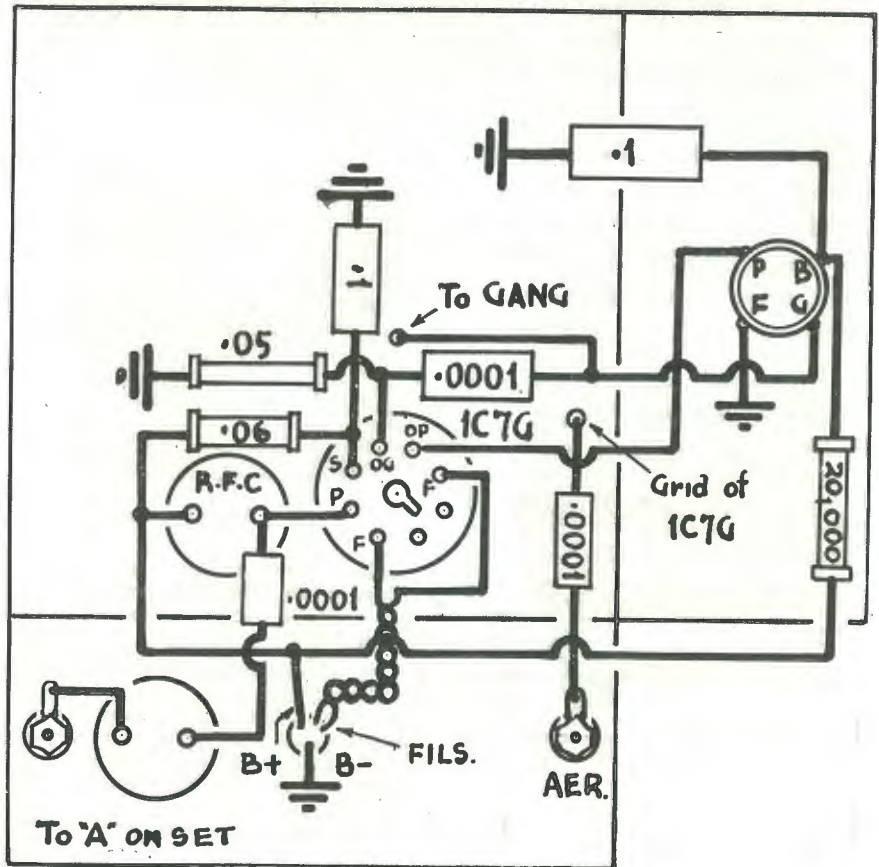
### The wiring.

makes it into a superheterodyne with the "intermediate" amplification being carried out at a frequency at the top of the broadcast band, the actual amplification being done by the broadcast receiver.

When the converter is used with a superheterodyne receiver, it becomes a double superhet. The incoming signal is "converted" to a broadcast frequency and then converted for a second time to an intermediate frequency.

### The Circuit.

The circuit design follows the same lines as the a.c. version which was described in last month's issue and (Continued on page 43)





LIGHTENS THE TASK  
WHEN **RADIO**  
TAKES A HAND.

Radio brings to your home the joyous music and constant companionship that lightens all duties and provides more leisure hours.

★ ★ ★

A second set banishes loneliness, widens knowledge and creates that happy atmosphere which is so conducive to good health.

★ ★ ★

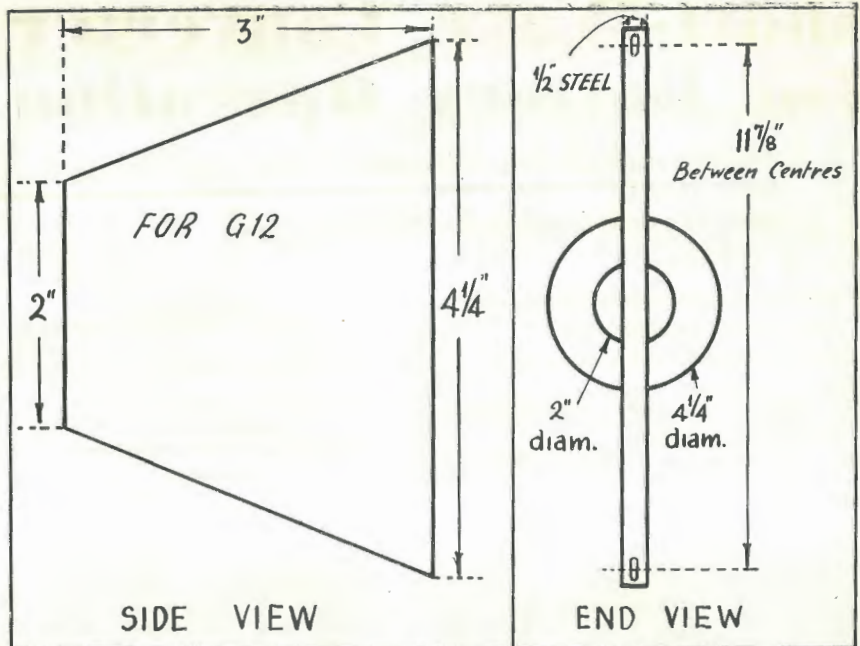
For constant reliability be sure that the second set you choose is equipped with

**RADIOTRON**  
**VALVES**

★ SEALED FOR YOUR PROTECTION



Advt. of Amalgamated Wireless Valve Co. Pty. Ltd.



An open-ended metal cone, mounted close to the speaker cone, can be used as a high-note diffuser. Here are the correct dimensions for a diffuser for the Rola G12.

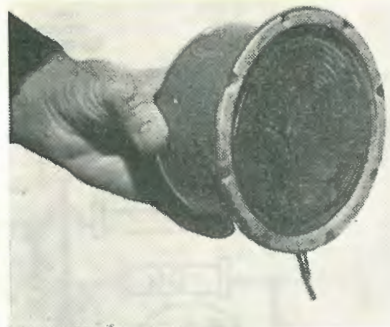
AMPLIFIERS

(Continued from page 23)

the shelves form a sort of reversed horn for the rear of the speaker, with the narrow slot as the opening.

Tweeters.

In the diagram of the box baffle, there will be noticed a small hole



The Rola Tweeter.

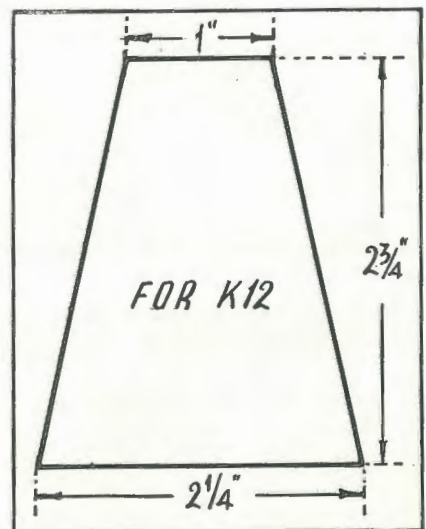
marked "for tweeter," and so that brings us to another important point, the proper reproduction of the "highs."

Any good speaker is capable of reproducing high notes within a reasonable range, but after a time the amplifier enthusiast may develop a thirst for further highs, even up to 14 and 15,000 cycles. There is only one practical way of extending the range in this direction, and this is by the use of a separate speaker for the highs. Special speakers have been designed

for the purpose and are readily available. One of these is the Rola T5, listing at 35/-.

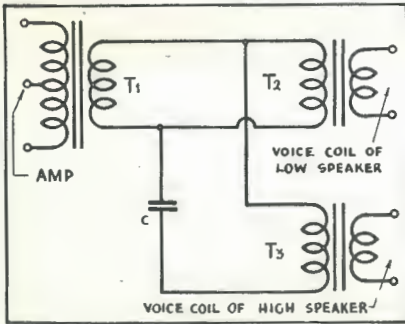
The tweeter must not be called upon to handle low notes, and so it becomes necessary to arrange a filter system of some kind to separate the highs and the lows and then feed them to their respective speakers.

This appears a rather difficult matter, but has been greatly simplified by the speaker people. We show a schematic of a suitable arrangement of transformers, which has been designed by the Rola people, and is available to any reader who is keen



Dimensions for a diffuser for the Rola K12. Other details are the same as the diffuser for the G12.





Circuit for the Rola tweeter.

enough to want the widest possible reproduction.

The transformer T1 is an output transformer, through which the output valves of the amplifier are fed with high tension current. It has a step down ratio to reflect a load of 500 ohms. The 500 ohm secondary feeds into two special speaker transformers in parallel. T2 is the input transformer for a suitable speaker, such as the Rola K12, which will handle the low notes if properly loaded, as mentioned above. The transformer T2 has design characteristics which make it operate as a filter to pass the lows without attenuation, but to cut off most of the highs.

Transformer T3 is the input transformer for the special T5 Rola tweeter, and is so designed that it will handle only the high notes. In this circuit is a small tubular condenser of about .05 mfd. capacity. Variations in the capacity will vary the output of the tweeter, and either increase or decrease its efficiency. In the former case a peak can be introduced to greatly accentuate the high note response and yet provide a sharp enough cut-off to miss the needle scratch from the records.

#### Amplifiers.

Dealing with the amplifiers themselves, there were one or two points which we did not treat fully, one of these being the matter of bias for the larger types of output triodes. When operating anywhere near their maximum power output ratings, triodes suffer from distortion unless the bias is fixed at a value which is not affected by the signal. All forms of self-bias are more or less dependent on the plate current of the valve, which varies with the signal input, and does all sorts of tricks if the valve is momentarily overloaded by a heavy passage of reproduction. Fixed bias can be obtained from a separate rectifier and power supply, or from a bias battery provided for the purpose. A compromise can be arranged by using back biasing arrangements with resistors carrying the full high tension current of the amplifier, including a heavy bleeder current through a voltage divider or heavy load resistor across the high tension,

# The New 1.4 Volt Valve has Simplified Country Radio!

- ★ No Accumulator
- ★ No Recharging
- ★ Fewer "B" Batteries



If you want to enjoy Country radio at its best—buy one of the new 1.4-volt models available this year. Utilising the amazing new 1.4-volt valve and equipped throughout with dependable Eveready Radio Batteries—a combination that is unbeatable for simplicity and economy—it has NO ACCUMULATOR, and thus no recharging problem. In addition it requires only TWO "B" Batteries instead of three, so that operating costs are reduced by ONE-THIRD.

Practically every set manufacturer in Australia is turning to 1.4-volt radio as the answer to the Country listener's demand for a more convenient, more economical type of set. Ask your dealer to demonstrate next time you are in town.



R57-1531

# EVEREADY

TRADE-MARK

## RADIO BATTERIES

EVEREADY (AUSTRALIA) PTY. LTD., SYDNEY, N.S.W.

# WHAT IS AN "EXPENSIVE" RESISTOR?

You can buy resistors at almost any price—but, remember, you generally get just about what you pay for. One lost service customer, one call-back as the result of trouble with a "cheap" resistor can cost far more than you can possibly save on dozens of resistor "bargains."

Insist on IRC Insulated Metallized Resistors—the finest most reliable resistors at any price. You can rely on them any time, any place, under the most severe conditions. They are a good investment in long, satisfactory performance. They are the least expensive resistors to use because they are the best resistors for protecting your reputation for highest quality workmanship on every job.

Sole Agents for Australia:  
**Wm. J. McLELLAN**  
& CO.  
BRADBURY HOUSE,  
55 YORK STREET, SYDNEY.



Note These Prices—  
1/2-watt (Type BT-1) . . . 9d.  
1-watt (Type BT-1) . . . 1/-  
2-watt (Type BT-2) . . . 2/-  
3-watt (Type F-3) . . . 3/6  
They Stay Put!



**INSULATED**

*Metallized*

**RESISTORS**

# The Gang's All Here

*Can you tell the difference between an "F" and a "G" type gang condenser? Do you know why the design was changed?*

WHEN a letter arrived the other day from a fellow who was in doubt about gang condensers, we thought that it was going to be easy enough to answer, but when it came to the point we found that the problem was far more difficult than originally anticipated. All that he wanted to know was how to tell the type of a gang condenser. He mentioned that the coils he was going to use were labelled "For use with a Stromberg-Carlson 'F' type gang," but he didn't know how to tell an "F" type from a "G" type, and, what was more, if he found that his gang was not an "F" type, what would be the result if he used the coils with the wrong gang?

All so simple and easy, we thought, but when we came to work it out we decided that the simplest way would be to take photographs of each of the gangs and make the reply in the shape of a short article.

Here it is.

Practically all the gang condensers on the shelves of the Sydney radio dealers are of Stromberg-Carlson manufacture.

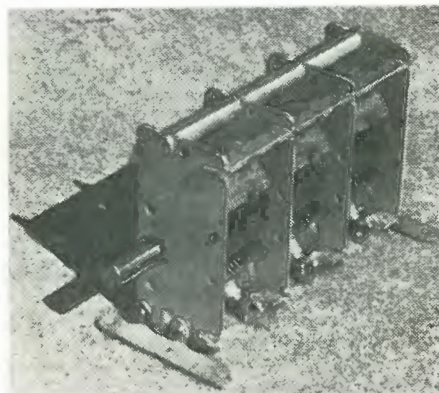
About ten years ago it was necessary to buy separate single condenser units, mount them up individually, and then couple up their mainshafts with little coupling units. Then one day the Stromberg people produced a gang condenser unit, made up of folded aluminium sheet, and from that day on the Stromberg gangs have been prominent.

Since then there have been more

than 700,000 Stromberg gangs sold, we were told when we enquired.

Several different types have been produced from time to time, but at the moment there are three main types, known as "F," "G" and "H."

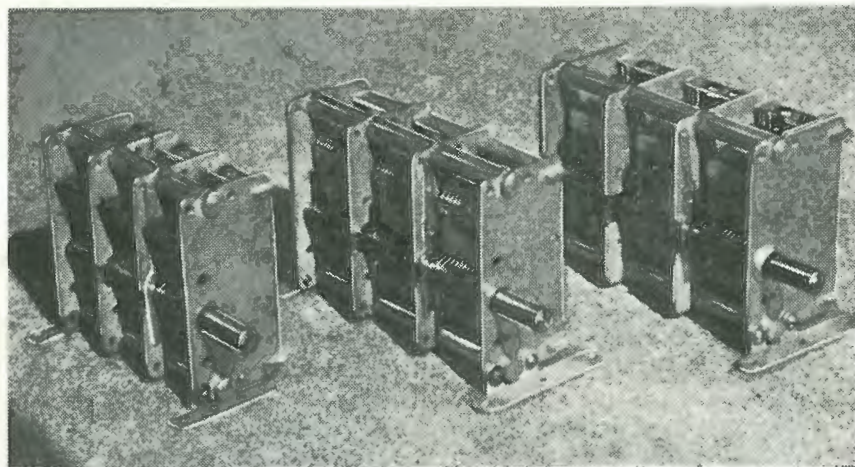
Each type is again sub-divided into two styles, with and without trimmers, and each type and style is available in either two or three-gang units.



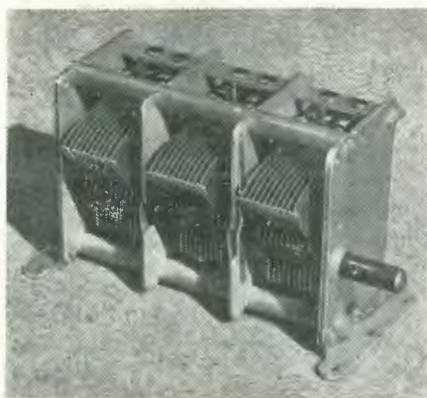
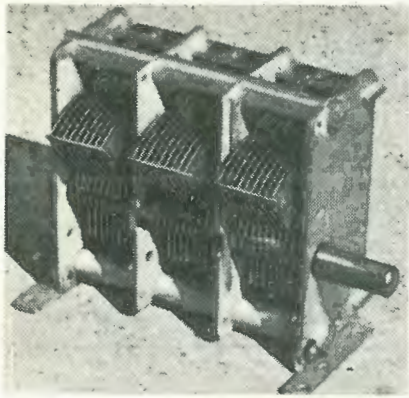
The "H" gang has white ceramic pillars mounting the stators.

When used with dual-wave coils, the trimmers are not needed on the gang, the normal practice being to build the trimmers into the coil units, with separate trimmers for each band.

Type "F" is the most popular type, being a good general purpose con-



The three modern gang types, from left to right, "G," "H," and "F."



These photographs give a good idea of the difference between the compact "G," on the left, and the longer "F" type, on the right.

denser with a capacity range from 11.7 to 405 mmfds. per section, without trimmers. The trimmers have a range of 4.2 to 49 mmfds.

Type "G" is similar to type "F" in general construction, but has been built more compactly, so that it is much shorter than either the "F" or "H" types.

It has a capacity range of from 13.8 to 370 mmfds. per section, without trimmers. When fitted, the trimmers on the "G" gang have the same capacity as those of the "F" type.

#### For Broadcast Sets.

The "G" type gang, on account of its closer spacing and lower capacity range, can be considered as being suitable more for broadcast receivers than dual-wave sets. Both the "F" and "H" types have heavier plates, extra heavy end plates, and wider spacing between plates, making them less likely to give microphonic troubles, especially when using high gain at high frequencies.

#### The "H" Type.

The latest Stromberg gang is known as type "H" and is a most efficient gang, with a wide capacity range, low minimum, rigid assembly and fine low-loss characteristics. Capacity range is 9.5 to 415 mmfds.

In appearance the "H" gang resembles the "F" in size, but is easily distinguished on account of the ceramic supports for the stators. These white pillars can be seen at a glance.

The "H" gang has a different shape of plate to the other condensers, giving a more even spacing of the stations along the dial than is obtained with the other condensers.

#### The Result.

Using a gang which is not according to the coil maker's specifications means that two points will have to be watched, first, coverage, and, secondly, dial calibration.

For example, to use the "G" gang with coils designed for use with the "H" type will mean that the coverage will be less, and possibly the coils will tune only as low as 1450kc., instead of 1500 as required for the broadcast

band, and perhaps only as high as 600 instead of 550. On short-waves the effect would be even more pronounced, especially as regards the shortest wave-length tunable. The dial calibrations would be completely upset.

It should be noted, however, that there would be no question of the set actually working, the converter converting and all that sort of thing, although some people seem to have that impression.

#### Conclusion.

In a nutshell, Strombergs turned out originally the type "C," the first gang condenser made available to set-builders from an Australian factory, which was later known as the "biscuit-tin." Lack of rigidity seemed to be one of its drawbacks. Next came the "D" with steel body, and with square end plates which projected to cover the full width of the open rotors. Next came the "E" type, with isolantite balls to support the stators.

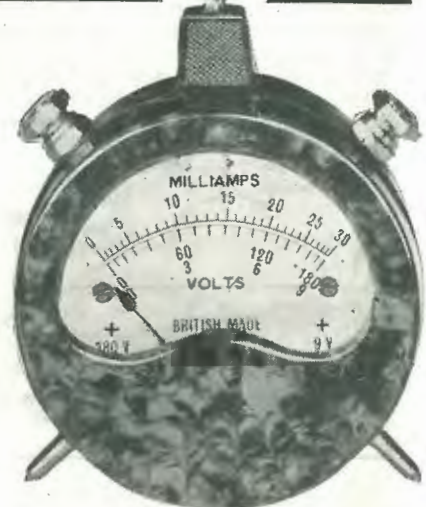
All of the above types are now more or less obsolete. Of the new types there is the "F" for general purpose, type "G," a compact job recommended for the broadcast band only and "H," the high-efficiency gang for dual-wave receivers, with wide coverage, non-microphonic and non-hygroscopic properties and very rigid assembly. It is possible, when using efficient coils and an "H" condenser, to get a coverage of from 13 to 50 metres on the short-wave band. The "H" gang is also characterised as giving a more even spacing of stations on the broadcast band.

#### EBF2 Being Made Locally.

Philips Lamps (A/sia) Pty. Ltd. advise that the Philips duo diode type EBF2 is now being manufactured in Australia.

Brief characteristics are as follows: Fil. voltage 6.3v., fil. current, .2 amp.; plate, screen and control grid voltages, 250, 100 and -2, respectively; plate and screen currents are 5 and 1.6 m.a., respectively; slope, 1.8 m.a./v.; plate resistance, 1.3 megohms; plate to grid capacity, .002 mfd.

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- Servicemen who know prefer the Telsen Multimeter. Gives Milliamp reading 0-30 0-300; Voltage reading 0-8, 0-16, 0-240 (A.C. and D.C.). Price, 22/6. Full details from

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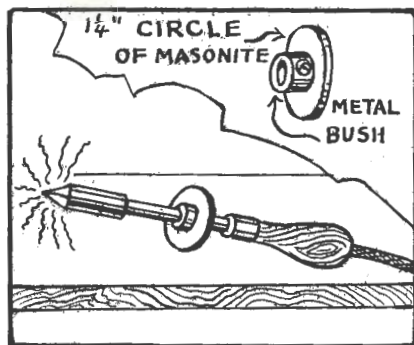
# HINTS and TIPS

by *Walter G. Nichols*

## A Soldering Iron Tip.

Don't burn chunks out of your work bench by letting your hot soldering iron lie around.

First obtain a piece of metal tube of such a diameter that it will fit snugly over the shank of your iron; drill a hole in one side of the tube and tap to receive a small metal bolt. Now from a piece of masonite or

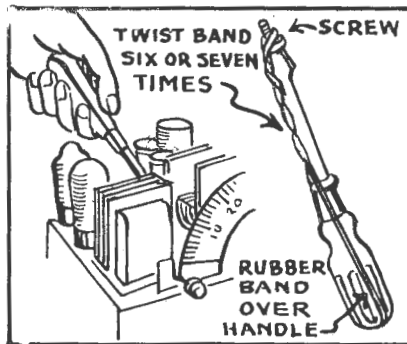
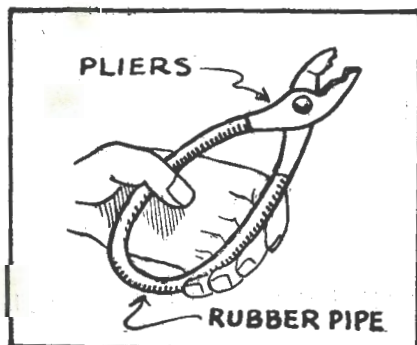


other heat resisting material cut a circular disc  $1\frac{1}{4}$  inches in diameter, drill a hole in the centre of an equal diameter to the inside diameter of the metal tube. Rivett the disc and tube together with small brads and slip the whole assembly on to the shank of the iron by first removing the wooden handle.

Slide the disc along the shank of the iron till you get the iron properly balanced, then keep in place by tightening the set screw.

## Novel Plier Opener.

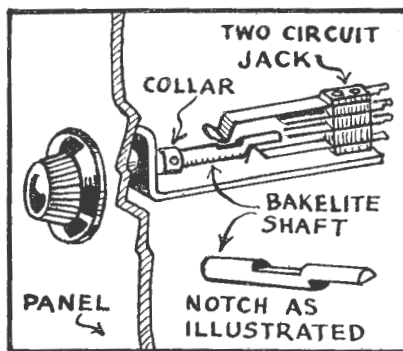
When working in cramped spots fit a section of rubber pipe over the handles of your pliers as shown in sketch. The hose will spring the plier jaws apart whenever you loosen your grip. The hose also insulates the handles and prevents the possibility of getting a shock.



## A Rubber Band Screw-Holder.

As shown in the illustration, the screw is first placed on the blade of the screw driver. Then a rubber band is looped over the threaded shank of the screw, twisted six or seven times, and finally hooked over the handle of the driver.

If the screwdriver blade fits the slot of the screw as it should, the rubber band will hold the screw firmly enough to allow it to be started in its nut. Once started, the screw can be freed simply by loosening the rubber band from the top of the screwdriver.

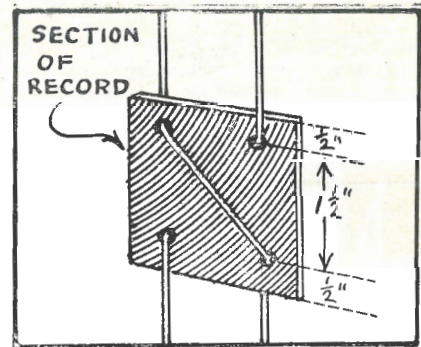


## TELSEN TWO-RANGE METERS.

Experimenters who have not the means to run to elaborate test equipment will be keenly interested in three new Telsen testers just released in Australia by Reg. Rose & Co. Pty. Ltd., 58 Margaret St.

Designed to fit the pocket in both size and price, all three instruments are smart, compact and flexible enough to fill all ordinary needs.

The two-range voltmeter (0-9 and 0-180 volts) is priced at 8/6, and the three-range volt-milliammeter (0-9, 0-180 volts and 0-30 m.a.) at 10/6.



## Another Transposition Block.

If ready made transposition blocks are not available satisfactory substitutes can be made from old phonograph records. Simply mark on the record with a pencil or sharp pointed instrument  $2\frac{1}{2}$  inch squares. Soak the record in boiling water till soft and cut to shape with a pair of sharp scissors. As soon as they have hardened drill four  $\frac{3}{8}$  inch holes in each square, each hole being about  $\frac{1}{2}$  inch in from the corners. About every 15 inches along the lead-in insert a transposition block.

## Improved Gang Switch.

An efficient 2-gang switch can easily be constructed from an old double circuit phone jack and a length of bakelite rod. Mount the jack body on the panel in the usual way. Notch the bakelite rod as shown in sketch and insert in hole of jack, keeping in place by a collar and set screw, the front end of rod is then fitted with a small knob.

The notches in the rod were arranged so that in the "on" position both jack arms rested in the notches while turning the knob spread the two arms apart opening the circuits. With various combinations of jacks and rods many switching arrangements can be made.

The third instrument is an A.C./D.C. multimeter, with voltage ranges of 0-8, 0-16 and 0-240 volts (a.c. and d.c.), and current ranges of 0-30 and 0-300 milliamps.

Included with each instrument is a pamphlet detailing its various applications, a set of pictorial diagrams being included, illustrating methods of carrying out different tests.

Full details of this new series of testers are available free on request from the address given above.

**CONVERTER** (continued from page 37).

we suggest that those who are building the battery version might do well to glance over the previous article, as quite a few of the points mentioned will be found to apply equally well to the building and operation of this battery model.

It should be noticed that there is no need for separate batteries for the converter, but we suggest that in order to save confusion, burn-outs of filaments and difficulties in switching, it is best to have a separate set of leads for the converter and run these direct to the batteries, rather than try and connect the converter to the internal wiring of the battery set with which it is being used.

**Voltages.**

The converter, as described, uses a 2-volt converter valve and is only suitable for use with a 2-volt accumulator, unless great care is taken to see that not more than two volts potential goes to the filament of the valve. If a four-volt set is used the 2-volt valve can be operated from one cell of the two-cell (four-volt) accumulator used. If the set has a six-volt (three-cell) accumulator, the same precautions apply, and only one cell must be connected to the valve in the converter. If the broadcast set uses 1.4-volt valves, then it will be best to use a converter valve of this type in the converter, types 1A7G and 1B7G being typical examples.

# Valve Characteristics

**FREE BOOKLET AVAILABLE**

Comprising 26 pages and cover, the Mullard Valve Characteristics book (1940 edition) released this month, is one of the most comprehensive publications of its kind ever compiled in Australia. No less than 318 valve types are listed, with full data.

**Complete Physical and Electrical Data.**

The old system of valve grouping employed in the earlier edition has been discarded as being too complicated. Instead, there are only two groups comprising American and English types, the valves in each being arranged alphabetically and numerically. For example, the American series commences with type 0Z4, and concludes with type 89. Corresponding European types are the AB2 and 934V. Another admirable feature of the chart is that electrical and physical characteristics (including under-socket connections) have been separated, being arranged on facing pages for easy reference.

The index on the back cover lists not only the 318 valve types dealt

with, but includes common European equivalents in other makes with different type numbers. For example, types B217 and DEP610 are shown as being equivalents of Mullard types PM2DX and PM6, respectively.

Useful additional information that could not be included in tabulated form (e.g. data concerning alternative ratings and special precautions, etc.) is contained in a special four-page section. As well, special pages are devoted to operating conditions of resistance-coupled amplifiers and push-pull output stages. Data given on rectifiers is unusually complete, ratings and outputs being given for both choke and condenser input filters.

Free to "Radio World" Readers.

Altogether, this new Mullard Valve Chart will be found indispensable by everyone interested in radio technically. Readers mentioning "Radio World" can obtain copies free on request by writing Mullard-Australia Pty. Ltd., 367-371 Kent Street, Sydney. (A 1d. stamp should be included to cover postage).

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# The JUNIOR TECHNICAL SECTION

Conducted by A. J. BARNES

## THE WORKSHOP

### TWIST DRILLS

Seldom can we get through a job without reaching at least once or twice for the drilling machine.

Difficult or easy going, clean or burred holes—well it just depends on the condition of the twist drill used.

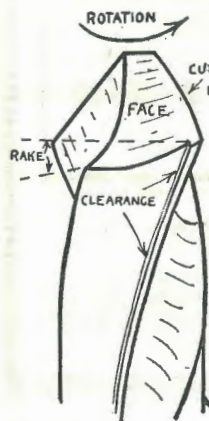
If twist drills are to be kept in proper trim it is then imperative that we possess an abrasive grinding wheel or that we have access to one.

This is because for one reason a twist drill is made from very hard steel which cannot be filed. Secondly a spinning abrasive wheel allows us to pay our entire attention to the manner in which the drill is applied in order to properly shape the point.

#### Two Cutting Edges.

All twist drills are designed to rotate in a direction which is clockwise when looking at the shank end or plain unfluted section which is gripped by the chuck.

An ordinary twist drill presents two cutting edges which form an angle of about 90 degrees. The angle is more acute, i.e., the point is sharper for cutting softer materials but at the same time the speed of rotation must be greater. The opposite applies, of course, when we come to deal with steel and cast iron, etc. However, for all-around work, the 90 degree angle or point is a good performer.

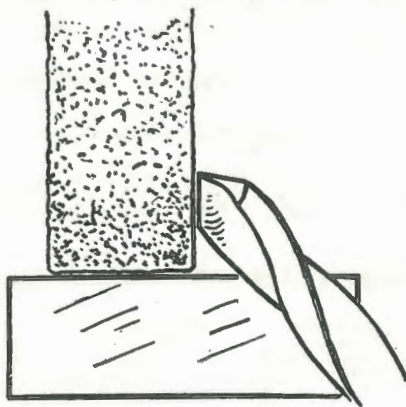


Now the cutting edge is theoretically a line and must be given clearance or rake in order to allow the edge to bite. To provide this rake the face is

ground away towards the trailing edge. Of course, both cutting edges must be symmetrical and getting them this way takes a little practice. You may find this procedure a little difficult and it is well worth while if you purchase an extra drill to be kept for a sample only. By doing this we may always check our grinding efforts on the others.

#### Grinding.

The very first thing to do before



### A HANDY SAW

At a cost of a few pence only the home constructor can make up the useful little saw shown in the accompanying photograph.

This saw has a metal handle into which blades of different shapes and sizes may be fitted.

The narrow pointed blade makes a fine "keyhole" saw with the aid of which circular cuts and holes are easily executed. The wide blade should always be used for long straight cuts.

The material for making the saw is purchased from an engineer's supply store. Two twelve inch power saw blades, five inches of  $\frac{1}{8}$  inch, by 18 gauge steel tubing and a  $\frac{1}{4}$  inch whitworth bolt and nut will be required.

Start off by doming one end of the tubing. To do this four triangular pieces are cut out so that the end at first has four pointed projections. These projections are curved neatly

using a grinding wheel for any job at all is to make sure that the tool rest is set as close as possible to the front face of the wheel and horizontally in line with its axis.

The twist drill is held flat on the tool-rest at an angle of about 45 degrees to the side or cheek of the wheel and the point is slowly rotated. First the two cutting edges are formed to the correct angle and then the faces are backed off to form the rake. Use a large size drill for your first attempt and the results will be more easily checked.

Large holes drilled in thin metal are often anything but a true circle and "grabbing" by the drill is a trouble. Both these undesired effects may be minimized by grinding the drill point so that there is little, if any, rake. The same treatment should be applied to a drill which is to be used for enlarging a hole already existent.

#### Deep Holes.

The twisted flutes of the drill perform the important function of clearing away the cuttings. Deep holes or short drills make it sometimes necessary for the drill to be forced so far into the material that the flutes are covered. In such cases the drill should be frequently lifted in order to allow the waste material to clear away.

#### Lubrication.

Light work with hand power drilling machines seldom calls for cooling or lubrication of the drill. Even heavier and faster work with brasses and aluminium is best done with a "dry" drill. Such work with steel, however, calls for cooling with soapy water or just plain water. Once heat "blues" a drill point we can safely assume that the drill must be ground back for at least half an inch and then re-trimmed.



inwards with quick light hammer blows until the end of the tubing is rounded to form a handle which does not hurt the palm of one's hand.

Now the remaining open end of the tubing is squeezed nearly flat in a vice for a length of about one inch. This forms a narrow opening into which the blade fits. A  $\frac{9}{32}$  inch hole through this flattened end completes the handle.

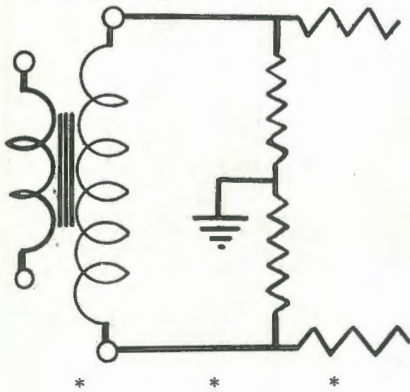
A blade may now be fitted to the handle, making the saw ready for use. The shaped blades, however, must be trimmed on a grinding wheel. Your local garage man can do this trimming in a few minutes.

# An Amplifier Hint

Circuits may come and go, but it's a safe bet that the "Pair of triodes transformer coupled" will be like the compound marine engine, a tried and true friend for years to come.

The main drawback to this type of amplifier lies in the fact that a really good push-pull driver transformer costs quite a deal of money. On diligently searching the junk-box one may usually find an ordinary "single ended" audio transformer of reputable make. Across the secondary of such a transformer it is quite permissible to connect an artificial centre-tap in the form of two resistors connected as shown; the value of such resistors may be from point one to point five megohms.

From his experience the writer can



## Economy Hint.

After you have finished wiring up a chassis, it is a good plan to go around and collect all the blobs of solder which have fallen on to the bench and the floor.

Keep these blobs of solder in the lid of your fluxite tin, and you will find them invaluable when you are cleaning and tinning the tip of your soldering iron.

\* \* \*

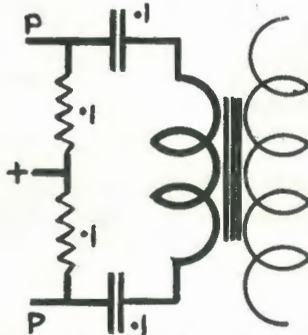
## QUERIES.

J.K., Sans Souci.—The square 1.5 volt "A" cell for portable sets is made up from several small cells connected in parallel.

R.M.L., Denman.—(1) Yes, you could use the zinc rods for the cell, but the larger surface of the zinc sheets gives greater "amperage," i.e., the internal resistance of the cell is lower. (2) A beat oscillator must be added to a superhet receiver in order to hear C.W. signals. The signals you can hear at present are modulated C.W. (I.C.W.).

C.M.G., Blackheath.—(1) The galvanizing is actually a coating of zinc. (2) If properly twisted together and soldered the aerial wire can be considered as a continuous length.

say that it is difficult for the ear to detect any differences in the performance of this set-up from that of an amplifier which uses a transformer with a centre-tapped secondary winding.



Two handy ideas for using ordinary audio transformers for push pull circuits. At the left, two grid leaks across the secondary, to drive push-pull output valves. Above, two resistors across the primary for push-pull drivers.

## Mind Your Eyes.

Always be careful when un-soldering a set. If you pull on a wire, especially a stranded one, with the soldering iron heating up the joint, there is always a chance that the wire will spring away, throwing small blobs of solder in the direction of your eyes.

It costs two guineas to have one of these blobs of solder removed from

the eye, and it is a pretty painful business all round. I know, for I have tried it!

The moral is obvious; don't watch too closely when soldering.

## \* \* \* RANDOM JOTTINGS.

A pea-lamp fuse does not afford protection to the valve filaments.

Its use merely safeguards the "B" battery. Be always careful with battery connections.

A colour-coded hookup makes for easier wiring and future servicing.

Use black for heater wiring, red for high voltage, green for plate circuits, yellow for grid circuits and blue for the cathode circuits.

Never cut short the pigtailed on such components as resistors and condensers, etc., as you may want to use them again in a different hookup.

If the lead is too long double it back and slide on a piece of "spaghetti" sleeving.

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2B7	14/-	42	12/-
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6E5	9/-	71A	11/9
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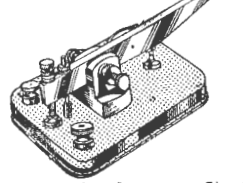
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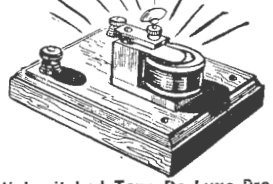
RADIO AC-CUMULATORS.

2v. 110a.	16/6
2v. 150a.	19/6
4v. 65a.	20/-
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6v. 90a.	26/-
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LIKE-A-FLASH MORSE CODE KEYS, SETS, BUZZERS, ETC.



As illustrated. Long or Short Tappers, 12/6. Adjustable all ways. Bakelite base. Nickelled.

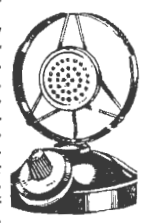


High-pitched Tone De Luxe Professional Buzzer. The best made. 15/-; Morse Code Practice Sets, Keys and Buzzers, and Light, 25/-; With P.M.G. Key, 30/-; Buzzers, British, small practice type, 3/9 and 4/9. High Tone 5/6.

GRAMO NEEDLES for Pick-up playing, as used by B.B.C., London. 150 Golden Pyramid Radiogram Needles, each play 5 records, 4/6. "Embassy" semi-permo. needles, each plays 10 records, 2/-; tin. 50 tins of 40 needles, 4/3. 100 tins of 15 needles, 3/6.

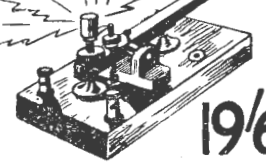
Insulated British Manufactured Police Patrol AERIAL. Rubber clad, highly sensitive, multi-strand finned copper wires, needs no separate lead in or insulators, 50ft., 2/6; 100ft., 5/-; Heavier clad, super grade multi-strand finned wires, 50ft., 5/-; 100ft., 10/-.

B.G.E. Table Type Microphone, highly recommended for amateur or professional use. Built-in Transformer and Battery, with volume control incorporated. Just plug into pick-up terminals of any set or amplifier. 39/6.



CRYSTAL SETS AND CRYSTALS Famous All-Station Model. Charts 6d. All Parts 25/-; Bu It 35/-; in Cabinet 45/-; Phones 12/6. Aerial—Earth 2/6. Midget Crystal Sets, 15/-; Phones 12/6. Aerial—Earth 2/6. CRYSTALS A.1. Semi Fixed, 2/6. "Tec" Fixed Crystal 2/6. Liontron 5/6. Lion Micro 5/6. Refills 2/6. Red Diamond 4/6. Refills 1/6.

P.M.G. TYPE MORSE CODE KEY



P.M.G. ADJUSTABLE EVERY WAY MORSE CODE KEYS, 19/6. Special Ship's Operator or Professional Morse Code Keys. A few left. 50/-; "Bug Keys," 75/-; Heavy Type, extremely flexible action.

BRAND NEW AND TESTED. P.M.G. TYPE 280 VALVES. SOUNDER. Made in U.S.A. 9/6 each.



MICROPHONES, as illustrated, Hand Holding Type, 22/6. MICROPHONES, as illustrated, Hand Holding Type, 22/6. Or B.G.E. Type, 39/6. Ready to plug into Pick-up Terminals of your radio or Amplifier. Microphones Experimental Buttons, small, 3/9; large, 4/9; in housing, 7/6.



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# SPEEDY

# QUERY

# SERVICE

Conducted under the personal supervision of A. G. HULL.

**J.W. (Wollongong) complains of whistles at the top end of the band beyond 2FC.**

A.—This trouble may be due to insufficient selectivity in the aerial circuit. Quite a few coil kits tend to get broad at the top end of the band, where ineffective selectivity can cause whistles in this way. The trouble is especially noticeable when a large aerial is used. One sure cure is the use of a "booster unit" ahead of the first valve, and another way is to use a looser coupling in the aerial coil, or a smaller aerial. This tends to cut down the sensitivity, however. Great care should be paid to the adjustment of the podder, and it may even pay to adjust the trimmers by hand at the top end of the band for maximum efficiency, even if they go out of track a little at the lower end. All t.r.f. sets and even the best of superhets tend towards losing their selectivity at the top end, and it is an inherent difficulty which can only be overcome by careful design and adjustment.

\* \* \*

**R.B.H. (Mortlake) wants to know whether it is a fact that a detector can be made from razor blades and a piece of lead pencil.**

A.—Yes, it is quite possible, but naturally the results are not up to standard. Your query reminds us that the first time we ever heard a wireless signal was with a detector of this type, two safety razor blades standing on a piece of wood with edges up and a piece of pencil resting on the blades, with a pair of headphones between the blades and a rough tuner consisting of a large winding of bell wire. We heard morse signals from station V.I.M. on this contraption way back about 1918.

\* \* \*

**C.B.S. (Canberra) deplores the present tendency towards making sets smaller and smaller and claims that they are difficult to build.**

A.—We agree that there are limits to this business of building sets into small spaces, but we doubt if the position is really as serious as you suggest. With the modern conveniences, such as electric soldering irons, components fitted with pigtailed, and ready-drilled bases it is simple enough to build even the most compact sets. Although theoretically the closeness of components should lead to instability and hum troubles these are not encountered to any great extent in practice, and we would say, judging from letters received, that even novices are not running into any appreciable difficulties with small sets.

\* \* \*

**A.S. (Cairns, Q.) enquires about battery-operated amplifiers.**

A.—It is simple enough to design big power amplifiers to operate from batteries, and the main trouble is to pay for the batteries. Watts are watts in any language,

and you can't get more out of an amplifier than you put into it. Buying watts by the "B" battery is an expensive business when you get up into figures such as you mention. The only practical scheme would be to use a special rotary converter to run from a pair of extra rotary 6-volt accumulators in series, or a big twelve-volt car battery. If re-charging facilities are available this would be much cheaper than trying to use batteries. The converters, however, are fairly dear, and you would have to count on spending from £5 to £10 for a suitable unit.

\* \* \*

**P.L.B. (Caulfield, Vic.) would like to pass his Amateur Operator's examination while the war is on.**

A.—We were under the impression that the examinations had been suspended, as were the amateur licences, but the Senior Radio Inspector tells us that this is not so, and the exams are being held in January, April, July and November as usual. Needless to add, you won't be able to make much use of the licence at present, but it would be a good idea to get it while you have the time to practice up the code and study the abbreviations. This war can't last forever.

\* \* \*

**E.J.S. (Mt. Gambier, S.A.) wants further details of the DX Club.**

A.—No you don't have to undertake any great responsibility in order to join. The main idea is to provide a badge, stationery, report forms and to otherwise assist those who are interested in getting verifications of long-distance reception.

\* \* \*

**W.N. (Murrumbidgee) wants to know why the crystal circuit did not appear in the April issue.**

A.—At the last moment, pressure on our space made it necessary to hold over the article on crystal sets. When we write our advertisements to appear in other papers we still have about three weeks' work ahead of us in the making up of our issue, and it is difficult to estimate the amount of space available. Naturally we try to give all the articles we mention, but accidents will happen.

\* \* \*

**Eliminate (Sydney) has an R.C.A. high-fidelity speaker (lucky man), and he recently cut out a condenser fitted to the system with a view to getting still higher fidelity, but it didn't work out that way!**

A.—We are not familiar with the unit you mention, and so we can only guess that it follows out something along the lines of the circuit shown in this issue for separating highs and lows.

It seems to us an awful pity to interfere with a unit which has been scientifically designed and which should be capable of remarkably fine results without any modification.

**L.M. (Strathfield) has in mind to use the family radio set as a public address amplifier.**

A.—Yes, the idea is sound enough, but you need to appreciate the limits. For example, no matter how you go about it you are unlikely to get maximum power output in excess of the loudest you can get from it when operating on radio. Even to get this you will need a microphone with high voltage output, such as one of the special home-broadcaster units which are sold for the purpose. You would need an input transformer and an energising battery before you could use the telephone "microphone." Actually a magnetic speaker or permagnetic can be used by connecting it to the pick-up terminals, but as you will discover if you experiment, the results are not up to real public address standard.

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are yours when a second radio accompanies the daily round.

The companionship of radio provides mental relaxation, calms the nerves and promotes healthful living.

Pleasing tone and enjoyable entertainment result when your radio is equipped with ...

## RADIOTRON VALVES

★ SEALED FOR  
YOUR PROTECTION



Advt. of Amalgamated Wireless Valve Co. Pty. Ltd.



**W.R. (Greenwich) has a portable set which draws 22 milliamps of high tension current and kills the batteries in quick time.**

**A.**—We are not at all surprised that the batteries don't last if the drain is really as high as you say. If you are quite sure that your friend's meter is quite correct we would think that the trouble must be due to the bias battery being run down or incorrectly connected. To get any real life from portable batteries you should keep the current drain under 10 milliamps, and for preference down around 7 mills. With the 1D8GT type of output valve, as used in a number of portables, the bias battery needs to be a 9 volt one, and we suggest you check up on the types of valves used, as the 4½ volt C battery seems to be wrong to us.

\* \* \*

**K.T.T. (Bowman's Glen) asks about material for the chassis.**

**A.**—Usually experimental sets are built on an aluminium base because it is so easy to cut and drill. Actually, the aluminium is also efficient from a radio frequency point of view, but this is not at all serious. As a matter of fact one of our very old friends, writing this week, mentions that Lysaghts "Zinco" sheets make excellent bases and this material takes a nice finish when brushed with duco or any of the new quick-drying enamels. One of the chief difficulties you will encounter, we imagine, is in regard to cutting the valve socket holes. We hope you appreciate that all you will save will amount to a few shillings, and considering the time and trouble you will expend it doesn't seem a good proposition at all.

\* \* \*

**W.W.H. (Wollongong) seems to have been talking too loud and someone has called his bluff. He wants us to settle the argument.**

**A.**—It is quite possible for a voltage rise to occur in the rectifier in an ordinary circuit, that is, the actual d.c. output of the rectifier will be higher than the a.c. voltage applied to the plates of the rectifier. The reason for this is that the a.c. voltage is the r.m.s. value, not the actual peak voltage. The rectifier, however, handles the peak and when feeding into a capacity in its output circuit there is often an apparent rise, especially if the current drain is lower than about 50 milliamps. This isn't anything to worry about in practice as it is well understood by transformer manufacturers. You will get a nice 385 volts D.C. at normal current drain from a rectifier fed by any commercial transformer marked 385.

\* \* \*

**"Old Soldier" (Bathurst) enquires about a crystal circuit for use in Ingleburn camp.**

**A.**—Any type of crystal set should be quite O.K. at Ingleburn, as the camp is located within a mile or two of the powerful 2FC transmitter, which is located at Liverpool. We doubt whether it will be possible to get any of the other stations, but at least you should get excellent results from 2FC, and that will give you the news and quite a handy programme. We wouldn't be at all surprised if you could do without a tuning condenser by using a fairly large coil, or you could use an ordinary coil, tuned with a .0005 mfd. fixed mica condenser, removing a few turns until results are O.K. and then leaving the set tuned all the time to 2FC only.

\* \* \*

**S.H. (Albury) wants information about our recommendations in regard to parts lists.**

**A.**—Our paper is strictly independent, and is not connected, either directly or indirectly, with any trade firm or organisation. Generally speaking we like to co-operate with any advertisers who support us, but not if it means in any way jeopardising the interests of our readers. For example, just to disprove your theory, you will notice that we used and recommended the Ducon high-voltage electrolytic condenser for the "Dandy Three," and also for by-passing the main bias resistor in

"Baby Grand," although the Ducon people are not advertisers with us at the moment. In practice you will find that it pays to follow the recommendations, as if you start to use components manufactured by firms which are not interested in our articles you stand a good chance of getting tangled up, due to the fact that they don't happen to be acquainted with what they are trying to do. The close co-operation with our advertisers at least ensures that they know what we are trying to do, and they can design and build their equipment to make it suitable for use in our circuits.

\* \* \*

**L.D.M. (Chatswood) is not too clear about the correct speaker for the "Dandy Three" which was described in the March issue.**

**A.**—Frankly we are not surprised that you found the sentence puzzling. To be quite frank, we started out to build up that particular receiver with an energised speaker, using a fairly low resistance for the field coil. Later experimenting showed that the use of a permagnetic speaker was desirable and allowed greater power output as the full high tension voltage could be applied to the output valve. To get to the point—use a permagnetic speaker. The 50 ohm resistor is simply to dampen out the peaks in the current as the rectifier might otherwise be overloaded on peak current if it fed into a condenser. The 200 ohm resistor is the real smoothing resistor.

## SPEEDY QUERY SERVICE.

Readers should note that our radio information service has now been re-organised and we offer two distinct forms of assistance.

Letters received by the 15th day of any month will be answered in these columns in the next issue. There is no charge for this service, no coupon is required and all readers and their friends are invited to use the service for any queries dealing with radio, photography, model aeroplanes, and any other subjects for which we are likely to be able to get helpful information.

The other service is for a reply by mail, and in this case a fee of 1/- is charged.

Every effort will be made to get replies to such queries away within 24 hours, but no guarantee of this can be given, as there may be times when pressure of other work will make it necessary to hold over queries for a day or two. Answers to such queries are limited to a single sheet of letter paper, and there is no hope of such a service covering the design of special circuits, the calculations for special power transformers, coil windings, etc.

Address all correspondence to  
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WORLD,  
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### PUSH BUTTONS OPERATED

This is the latest addition to the "Delta" range of Testing Equipment, and incorporates the Triplett twin instrument with a sensitivity of 2,000 ohms per volt on the D.C. scales.

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D.C.: 0-10-50-250-1000 volts at 2,000 ohms per volt; 0-1-10-50-250 milliamperes; Low ohms:  $\frac{1}{2}$  to 500, 1500 ohms and 1.5 meg-ohms. A.C.: 0-10-50-250-1000 volts.

### BACK-UP OHMMETER CIRCUIT

For reading low ohms,  $\frac{1}{2}$  to 500, with minimum contact error.

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- Leatherette carrying case, 9" x 7 $\frac{3}{4}$ " x 5 $\frac{1}{2}$ ", with handle for portability. Bakelite engraved panel, test prods and leads and all self-contained batteries supplied.
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