

THE  
AUSTRALASIAN

PRICE, 1/-

# Radio World

VOL. 4 . . . . . NO. 3

JULY-AUGUST, . . . . . 1939

Registered at the G.P.O.,  
Sydney, for transmission  
by post as a periodical

● PORTABLES ON PARADE:  
LATEST 1.4-VOLT MODELS

● SKY-CHIEF DUAL-WAVE  
FIVE: ATLAS ALL-WAVER

● 'RADIO WORLD' ECONOMY  
FIDELITY AMPLIFIER

● D X CONTEST RESULTS:  
WORLD S.W. NEWS



Field Test on new STC 1.4-volt Portable.—See Page 3.

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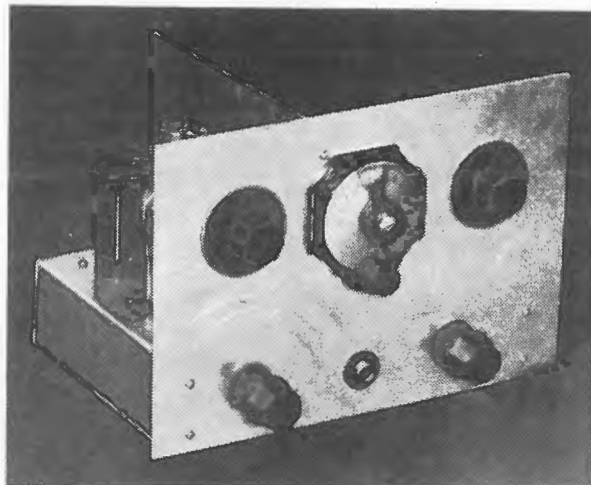
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*The Australasian*  
**RADIO WORLD**

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

*Managing Editor:*  
A. EARL READ, B.Sc.

Vol. 4. JULY-AUGUST, 1939. No. 3.

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Lightness and ease of carrying are two attractive features of the new S.T.C. portable that are apparent from this photograph, in which the test model is being handed to the Editor of "Radio World" by S.T.C. Radio Division Manager J. L. Coote.

## Field Test On New S.T.C. Portable

**Latest S.T.C. release using new 1.4-volt valves and standard portable batteries gives impressive performance during city and bush tests.**

ON July 12 last a field test on the new S.T.C. Model 510 1.4-volt portable receiver was arranged by Mr. J. L. Coote, manager of the Radio Receiver Division, Standard Telephones & Cables Pty. Ltd., and the editor of "Radio World" was invited to accompany the party of S.T.C. executives on the trip. In the party were Messrs. J. L. Coote, H. Pearce (advertising manager), H. Dickson (city representative), W. Muscio (of the S.T.C. laboratory staff) and A. E. Read (editor of "Radio World").

The location chosen was French's Forest, on the North Shore side of the city, and about ten miles from the G.P.O.

The portable model taken was standard in every respect—actually it was the first off the production line. A five-valve broadcast superhet, it uses the latest 1.4-volt valves throughout, a pair of 1P5G super-control pentodes being employed in the r.f.

and i.f. sockets, and a 1A7G as mixer. Next follows a 1H5G combination diode second detector and first audio amplifier, with a 1C5G pentode in the output.

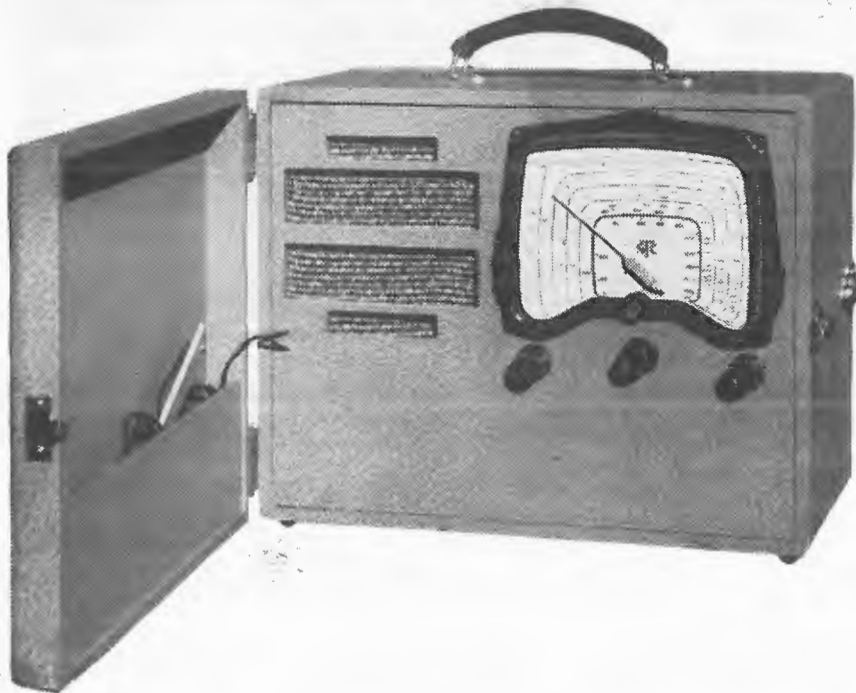
Obviously no effort has been spared in the design to obtain the last ounce of sensitivity, a vitally important factor in any portable receiver. Air trimmers and high-gain aerial and r.f. coils and i.f. transformers all contribute to the exceptionally high overall sensitivity, that laboratory

tests prove to be just under two microvolts across the entire broadcast band.

The set is provided with a hinged door back and front, that at the rear providing easy accessibility to the "A" and "B" batteries. Two Eveready type PR45 45-volt portable units are used for "B" supply, and a PR8 1½-volt portable unit as "A" supply. Battery drain, incidentally, is .3 amp. "A" and approximately 8.5 mills. "B." A 60 milliamp. fuse

### THE FRONT COVER.

This month's front cover photograph was taken during field tests on the new S.T.C. portable receiver at French's Forest, Sydney. In the group are (left to right): Messrs. W. Muscio (of the S.T.C. laboratory staff), J. L. Coote (Manager Radio Division), H. Dickson (S.T.C. City Representative) and A. E. Read (Editor of "Radio World").



This close-up of the receiver shows the large station-calibrated dial, and smart "hogskin" cabinet. The three controls are combined volume control and on/off switch, tuning, and tone control.

of operation as outlined above were purposely made very severe, so that the receiver could be fully extended. The results more than prove its ability to provide entertainment under the most adverse conditions. Actually, in this new S.T.C. portable, sensitivity is such that in any location whatever, as long as a station is providing a signal that is sufficiently strong to over-ride the prevailing noise-level, it can be brought in at good speaker volume. Little more could be accomplished by any receiver, irrespective of the number of valves.

The set was given a further brief test at 8.30 p.m. the same evening with the aerial fully extended and slung over a door. There was a station on almost every degree on the dial, and over thirty of them were brought in at full speaker strength, including 1YA and 2YA, New Zealand. During this test the efficiency of the special a.v.c. system showed up to advantage, in greatly minimising fading on distant stations and blasting on locals.

A final noteworthy feature is the low "B" battery drain, which at approximately 8.5 mills., is unusually low for a five-valve model. Designing as it has been for economy of operation without sacrifice of power, efficiency or tonal quality, this new S.T.C. portable is undoubtedly destined for record sales in the tremendous market that exists throughout Australia for 1.4-volt portable radios.

bulb is provided in the "B-" lead to protect the valve filaments against accidental short-circuits.

Aerial equipment in the receiver comprises approximately 20 feet of flex, which when the set is not in use is carried coiled up in a pocket in the door. A further length of flex terminating in a metal spike provides an effective earth, that greatly improves signal pick-up in locations where it can be used.

#### Exceptionally High Sensitivity.

The tests were carried out in the location shown in the photographs. The first indication of the set's capabilities was provided when it was turned on, with the aerial and earth leads still coiled up in the door. A spin round the dial showed that the eight local Sydney stations could be brought in at good speaker strength—in fact, with several the volume control had to be turned well back to avoid speaker overloading.

Next, the aerial was uncoiled for about 12 feet, and the earth spike pushed in the ground. The extra pick-up thus provided, while only slight, due to the very poor efficiency of the aerial, which was left lying on the ground, was nevertheless more than sufficient to necessitate the volume control being turned well back while

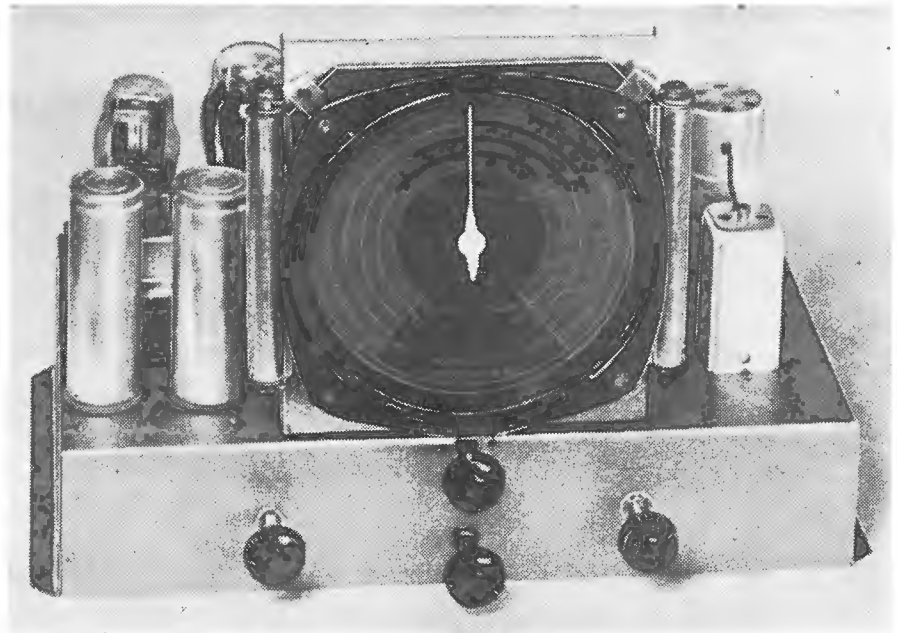
playing all locals. In addition, some half a dozen stations in other parts of the State, including 2KA Katoomba, 2KO Newcastle, 2CO Corowa and 2NC Newcastle, could be brought in at good volume.

As time was limited, the conditions



Mr. W. T. Muscio, of the S.T.C. laboratory staff, points out to the Editor the easy accessibility of the three batteries in their separate compartment

A front view of the completed receiver. The four controls are (left to right), tone, volume (lower), tuning, and wave-change switch. To ensure high quality of reproduction, a single 6A3 is used in the output.



# Sky Chief Dual-Wave Five

*This 4/5 dual-wave superhet, which uses the latest Radiokes DAU-1 coil unit, is designed to give maximum performance on both wave-bands coupled with high quality of reproduction.*

THE "Sky-Chief Dual-Wave Five" is the 1939 dual-wave version of one of the most popular a.c. receivers yet described in "Radio World"—the "Fidelity Broadcast Five" featured in the January, 1937, issue.

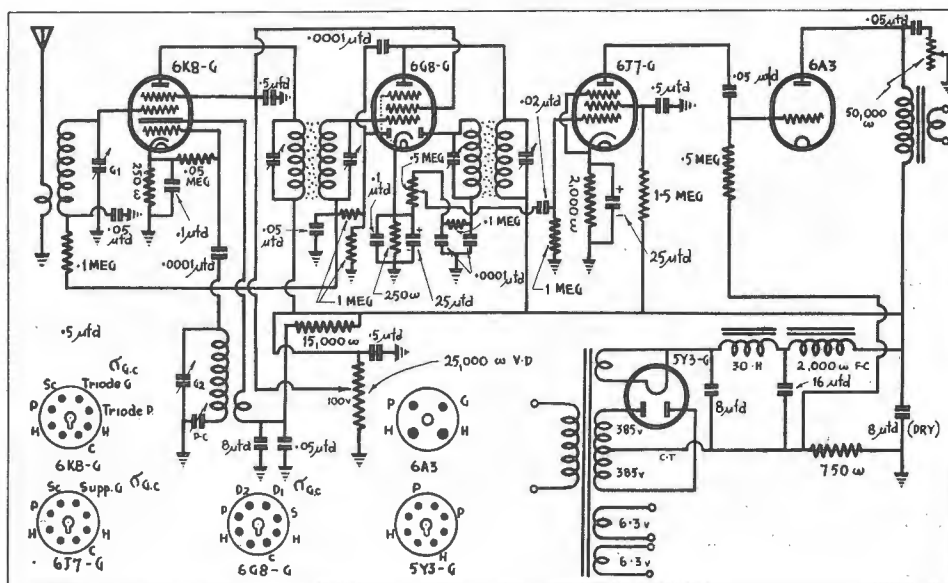
This receiver, which was designed for broadcast band operation only, in-

corporated an audio section comprising a 6C6 pentode driving a single 2A3. In this way pentode sensitivity was combined with triode quality to give well over three watts of output, with a tonal quality equal to that of de luxe receivers costing many times the amount. To those accustomed

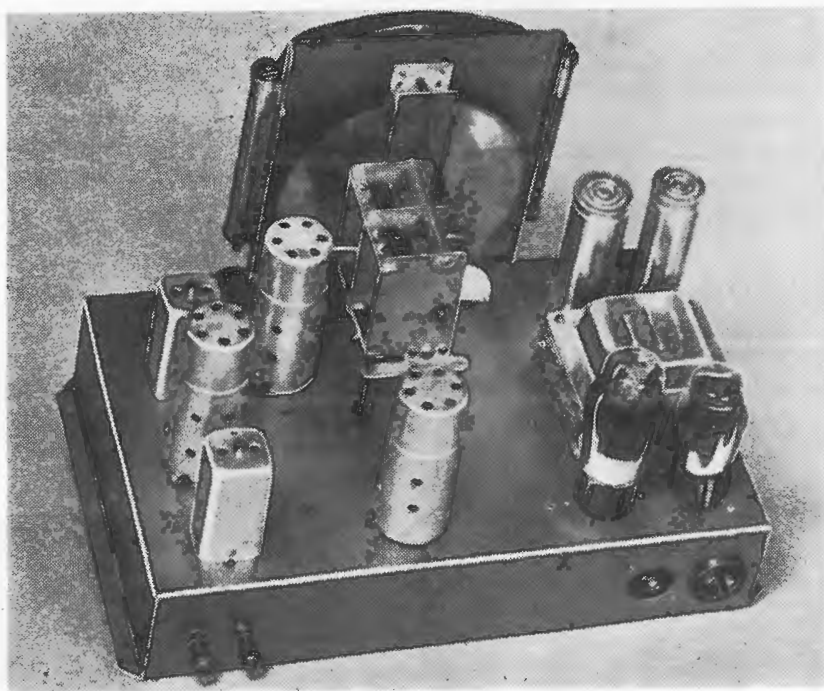
with receivers using single pentode output, the fidelity of reproduction from a receiver of this type is nothing short of startling.

### Laboratory Tests On Amplifier.

Laboratory tests on the audio amplifier used show that linearity to



Circuit of the "Sky-Chief," with all constants. To ensure a very hum level, a two-section smoothing filter is used, employing a 30-henry choke and 2000-ohm field, with a total filter capacity of 32 mfd.



The well-spaced layout used is illustrated in this rear view. Assembly and wiring are both straight-forward, as there is ample room under the chassis for components.

10,000 cycles is perfect up to 2.3 watts output. The total harmonic distortion increases gradually to the low minimum figure of 3.5% at full output—a figure that would be very difficult to improve upon even with the most expensive of equipment.

The audio section of the "Sky-Chief Dual-Wave Five" is identical with that of the "Fidelity Broadcast Five," with the exception that a 6J7G octal-based pentode has been substituted for the older 6C6 used in the driver stage. As well, a 6A3 has been substituted for the original 2A3.

#### **Elaborate Smoothing Ensures Minimum Hum.**

Due to the exceptionally fine bass response, particular care has been taken to ensure a low hum level. A two-section smoothing filter has been used, with a 30-henry smoothing choke on the input side in series with a 2,000-ohm speaker field, with two 8 and one 16 mfd. electrolytics for by-passing.

#### **New High-Efficiency Radiokes Coil Unit.**

On the radio side, the "star" feature is the use of the latest Radiokes type DAU-1 dual-wave coil unit, that after several months in the laboratory has just passed into production. Ex-

haustive tests on its capabilities in the "Sky-Chief" have more than proved the manufacturer's claims that for high gain and perfect tracking it is one of the finest units of its type yet marketed. It is used in conjunction with a pair of the new Radiokes

type I.F.I. trolitul iron-cored i.f. transformers.

#### **Some Circuit Details.**

The circuit used is standard throughout, and except for the omission of the r.f. stage and the substitution of a 6A3 for the 6V6G, it is identical with that of the "Astra Dual-Wave Six" described several months ago. A 6K8G is used as mixer-oscillator, followed by a 6G8G duo-diode pentode, the pentode section of this valve being used as i.f. amplifier, one diode for half-wave detection and the other to provide a.v.c.

Next follows a 6J7G driving a single 2A3, variable tone control being included in the plate circuit of the latter valve. A 5Y3G, octal-based glass equivalent of the 80, is employed as rectifier.

Elsewhere will be found a complete list of the parts required to build the "Sky-Chief," while next month a further article will be published, together with further diagrams and photographs, outlining the assembly, wiring and alignment.

#### **Outstanding Performance From "One-Four" Portable.**

I have built up several sets from "Radio World" circuit diagrams, and in all cases have had good results. These include broadcast, dual-wave and all-wave receivers for battery and vibrator operation.

I have just completed the "One-

#### **List Of Parts.**

- 1 Steel chassis to specifications, 15" x 9 1/2" x 3"
- 1 power transformer 385v. C.T., 385v. 100 m.a., 6.3v. 3a., 6.3v. 2a., 5v. 2a (Radiokes)
- 1 dual-wave coil unit (Radiokes (DAU-1).
- 2 iron-cored o.f. transformers (Radiokes type I.F.I.)
- 1 2-gang condenser (Stromberg-Carlson)
- 1 full-vision dial (Efco WD/180)
- 5 octal sockets, 1 4-pin wafer socket
- 1 length power flex and plug
- 1 rubber grommet
- 3 valve shields
- 1 25,000 ohm voltage divider (Radiokes)
- 1 .5 megohm potentiometer (I.R.C.)
- 3 knobs
- 2 terminals; 1 red, 1 black
- 1 50,000 ohm potentiometer (I.R.C.)

#### **FIXED RESISTORS**

- 1 1.5 meg. carbon (I.R.C.)
- 3 1 meg. carbon (I.R.C.)
- 1 .5 meg. carbon (I.R.C.)
- 1 .25 meg. carbon (I.R.C.)
- 3 .1 meg. carbon (I.R.C.)
- 1 50,000ohm carbon (I.R.C.)
- 1 20,000 ohm carbon (I.R.C.)
- 1 15,000 ohm carbon (I.R.C.)
- 1 2,000 ohm carbon (I.R.C.)

- 2 250 ohm carbon (I.R.C.)
- 1 210 ohm carbon (I.R.C.)

#### **FIXED CONDENSERS**

- 4 .0001 mfg. mica (T.C.C. Simplex)
- 1 .02 mfd. tubular (T.C.C.)
- 5 .05 mfd. tubular (T.C.C.)
- 5 .05 mfd. tubular (T.C.C.)
- 2 .1 mfd. tubular (T.C.C.)
- 3 .5 mfd. tubular (T.C.C.)
- 2 25 mfd. dry electrolytics (T.C.C.)
- 1 8 mfd. wet electrolytics (T.C.C.)
- 1 16 mfd. wet electrolytics (T.C.C.)
- 2 8 mfd. dry electrolytics (T.C.C.)

#### **VALVES**

- 1 6K8G, 1 6G8G, 1 6J7G, 1 6A3G, 1 5Y3G, (Brimar, Radiotron, Mullard)

#### **SPEAKER**

- 1 dynamic speaker to match single 6A3, 2,000 ohm field (Rola K-12 or F-12)

#### **MISCELLANEOUS**

- 6 yards push back, 2 doz. 3/8" nuts and bolts, 1 yard braid shielding, 1 resistor strip, 4 dial lights, 2ft. 4mm. spaghetti, solder tags, 3 midget grid clips.



Four Portable Five," which uses the new 1.4-volt tubes, and have used iron-cored coils throughout. The performance of this receiver is most outstanding. Although heavy QRN has been objectionable lately, the background noise in this set is most conspicuous by its absence. I find the construction of vibrator units and vibrator sets very interesting. The oscilloscope is the thing for locating hash and noise when servicing these sets.

Chassis pickup in sets which have the unit mounted on the receiver chassis is generally hard to find, but here is an interesting point which

may prove useful to someone.

The vibrator box was mounted on rubber on the chassis, and a short piece of hook-up wire was used to earth the box to the common 16-gauge earth line in the set. A grid return, which came out of a coil box, was earthed at a point about 1½ inches from the vibrator earth on the same earth line. Evidently there existed a difference in r.f. potential between the two points, because vibrator hash was strong and the oscilloscope showed that this was being fed into the grid circuit of that particular stage. Earthing them both at the same spot on the earth line

cured the trouble completely.—F. V. Hardisty, Taringamotu, King Country, New Zealand.

★

### A Useful Dial Hint.

Most experimenters have old bakelite or ebonite dials which have had their calibrations discoloured through long use. The appearance of these dials may be improved by the following method.

First, with a sharp point remove all of the old discoloured paint. Then, with a pen and a clean nib go over all the lines with Hobbies Dynamel. Don't worry if you go over the edges.

## THE 1939-40 ULTIMATES ARE HERE!

ULTIMATE RADIO for 1939 brings you receivers incorporating the very latest developments from the world's leading radio laboratories . . . ULTIMATE gives you new features that add to ease of operation . . . to long distance reception . . . to tone quality . . . and to long-life dependability. Skilful design, careful assembling and rigid standards of testing, all combine to give you the finest radio receivers science can produce!

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- Band coverage from 13 to 200 metres and from 1500 to 550 k.c.
- Special 6-gang condenser ensures highest efficiency, gives semi-bandspread tuning on the short waves, with high accuracy of tracking on all wave bands.
- "Spinner" tuning permits tuning ratio of approximately 30-1, while one spin of the knob will cover entire band.
- New smooth-action slide rule dial with logging pointer, volume indicator, and new fan type electric eye.
- Dial scales colour-etched on glass; improved a.v.c. system largely eliminating s.w. fading. Special inverse feedback system gives high quality of reproduction.

NOTE: the model illustrated is the Royal 8-valve a.c. console, which is also available in mantel cabinet. Details of combination model supplied on application. Also available is the Royal 6-valve 3-band vibrator console, which as well can be supplied as a mantel model.



Write now for free technical data of the 1939-40 range of Ultimate receivers. An up-to-date list of 400 world shortwave stations with call signs, frequencies, wavelengths and schedules as logged on an Ultimate (and published as Supplement to "Wireless Weekly") will also be sent post free to enquirers.

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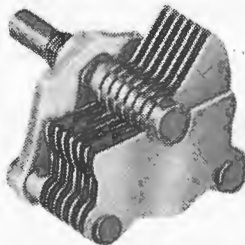
- **GREATEST GAIN . . .** that will pack the dial with broadcast stations from all parts of Australia and New Zealand, and bring in short-wave stations from all over the globe . . .
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## R.C.S.

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"SKY-CHIEF D.W. FIVE"  
described in this issue.

The R.C.S. Type K109 Coil Kit we strongly recommend for the "Sky-Chief" comprises one R.C.S. high "Q" dual-wave coil unit, containing the necessary b.c. and s.w. trimmers, together with two-section wavechange switch and padder mounted on rigid steel bracket. Supplied complete with two air-core intermediate frequency transformers, designed to give maximum possible gain, selectivity and stability.  
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(With iron-core i.f.'s, Coil Kit No. K110, price £2/7/6)



Illustrated above is the R.C.S. mid-gut trolitul variable condenser, recommended for the "Atlas All-Waver" described in this issue. Order type No. CV40 (100 mmfd.).

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## NEW EVEREADY BATTERIES FOR PORTABLE RADIOS.



Designed specially for 1.4-volt portable radios, these new Eveready batteries are light, compact and have excellent service life. On the left are two PR45 45-volt "B" units, weighing approximately 2½ lbs. each, while on the right is the PR8 1½-volt "A" unit, weighing 3 lb. 1oz. Complete data on these batteries appeared in last month's issue.

With a clean cloth wipe gently over the surface and leave the dial to dry.

I have not been taking the "Radio World" for very long, but am already assured that it is the best radio

magazine that I have yet seen. It caters for all tastes, for the most advanced "ham" or the beginner like myself.—T. Williams, Drumcondra, Geelong, Vic.

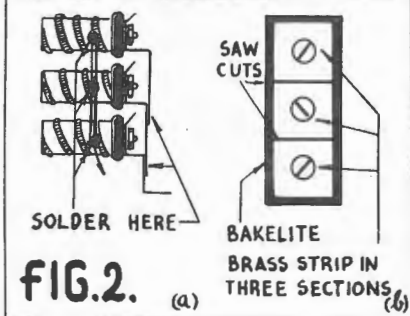
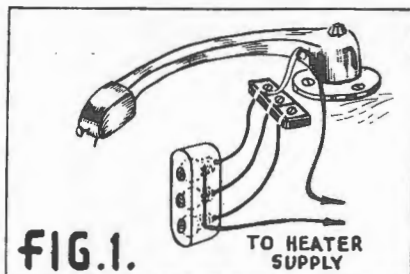


Newest release in the Mullard Luxury Series, the Model 61 illustrated above is a five-valve dual-wave superhet with many attractive features. A detailed test review of this receiver will be a feature of next month's "Radio World."

## Indicator Lights For A Radiogram.

An interesting and also very handy gadget is this indicator light for a radiogram.

To make this simple device you will need three dial lamps, two strips of brass and a small strip of bakelite. Now take the piece of bakelite and bolt one piece of brass to it. Three bolts are needed, one each end and one in the centre. Now, with a hacksaw, make sawcuts between the



screws to divide the strip into three equal parts (see Fig. 2b). The best size for these strips is found by experiment.

The next thing to do is to bolt or solder the second strip of brass to the arm of the pick-up (see Fig. 1) and bend it so that it makes contact with the other strip which is bolted under the pick-up arm.

Having done that, a holder for the three dial lamps is made from three standard dial light holders (see Fig. 2a). This can either be mounted inside the cabinet or outside in a separate cover as illustrated in Fig. 1. If the lights are mounted inside the cabinet, three  $\frac{3}{8}$ " holes are drilled and coloured cellophane is glued behind each one. From top to bottom they should be: red, amber and green, when the lights are wired as shown in Fig. 1.

The bakelite strip with the three brass sections should be screwed in such a position on the motor board that when the pick-up is lowered on the record the first three-quarters of

(Continued on page 48)



Rola 6-15, the most efficient six-inch permanent magnet speaker ever made available to set builders.

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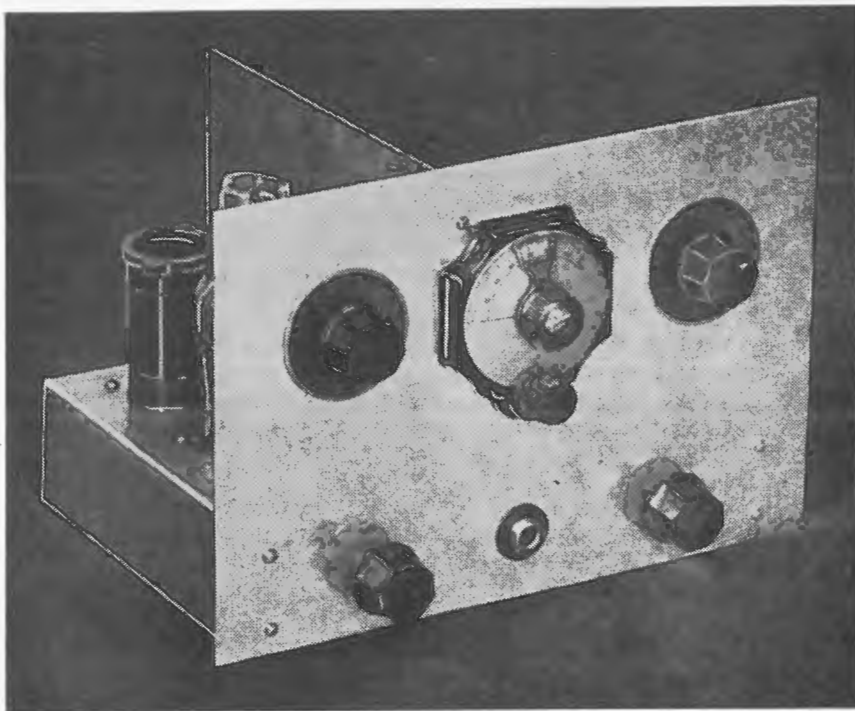
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This front view of last year's model is identical with that of the 1939 version, except that no shield is required for the r.f. pentode. The three upper controls are, left to right, r.f. tuning control, detector tuning control and reaction control. On the right of the 'phone jack is the combined volume control and on/off switch.

# 1939 Atlas All-Wave Three

*Excellent all-round performance on all wave bands, coupled with remarkable economy of operation, are features of this receiver, which uses 1.4-volt valves throughout.*

IN the September, October and November issues of "Radio World" last year there appeared three articles outlining the construction of the one, two and three-valve versions of the "Atlas All-Waver," a three-valve battery set that in its final form used a 1D5G screen-grid pentode as r.f. amplifier, a type 1J6G with one triode section connected as a leaky grid detector with reaction, and the other triode section as an audio amplifier, driving a 1L5G output pentode.

### Now Uses 1.4-Volt Equivalents.

Since this design appeared, 1.4-volt equivalents of all three valves have been released in Australia, and in response to many requests the original "Atlas" design has been modified to use these new types.

As shown in the circuit, the 1D5G used in the r.f. stage in the original model has been replaced by a 1N5G.

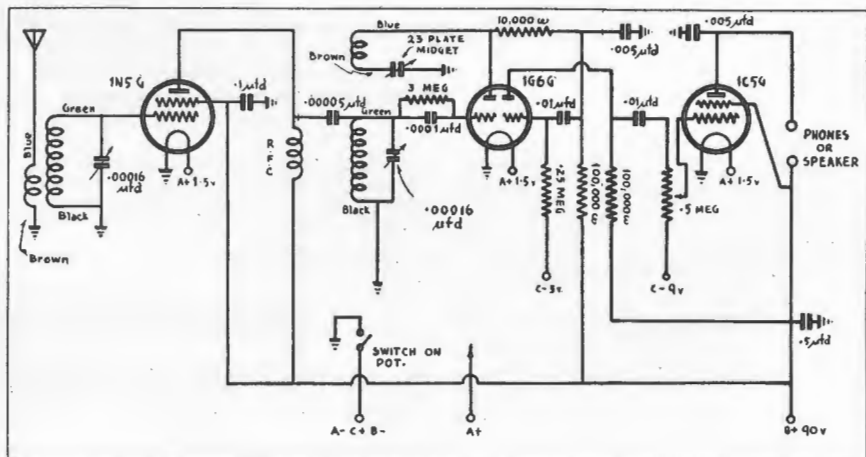
**Circuit of the "1939 Atlas" which uses 1.4-volt valves throughout.**

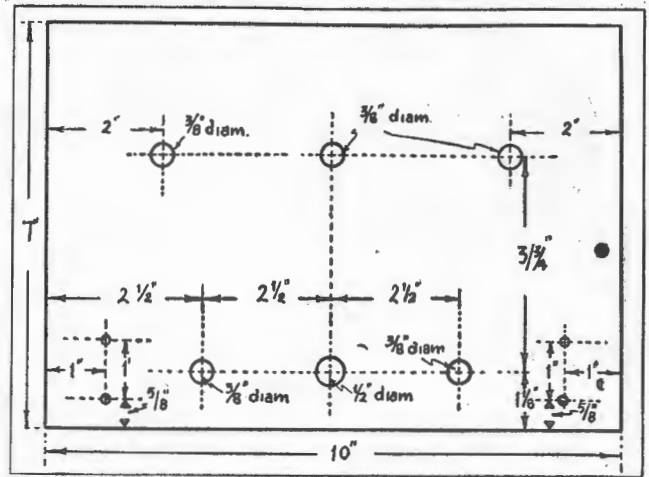
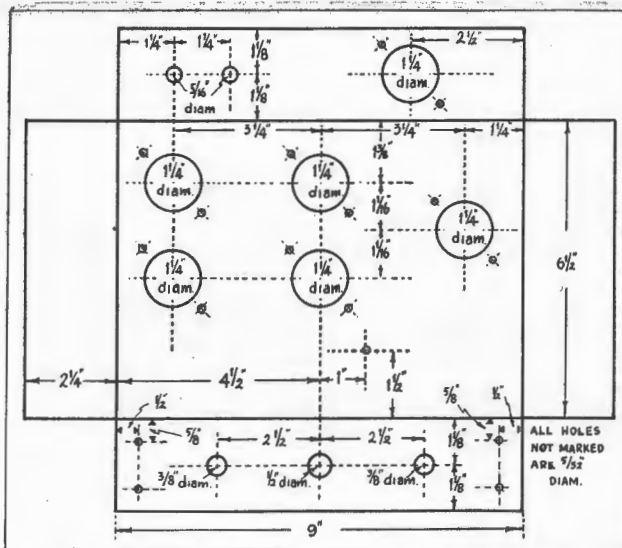
The 1J5G combined detector and audio amplifier has been substituted by a 1G6G and the 1L5G output pentode by a 1C5G.

### Appreciable Saving In Batteries.

The nett result of the substitution has been a considerable reduction in both initial and running costs, both as regards "A" and "B" supplies. In

place of the .54 ampere filament current drawn by the three valves in last year's model, in the latest 1.4-volt version the equivalent drain is .2 ampere. Similarly, the "B" drain taken by the latest model is several mills. less, and as well only 90 volts of "B" battery are required in place of the three 45-volt blocks specified for the 1938 version.





Chassis and panel dimensions are given in these two sketches.

**An Exceptional Performer.**

Despite this appreciable saving in battery requirements and current drain, the performance of the "1939 Atlas" is little short of remarkable. During the initial tests, using a three-foot length of 16-gauge tinned copper wire as a temporary aerial, the main shortwave stations in Europe could be brought in at overloading volume. Reaction on the new model is very

smooth, and it was found that there was no need to alter the specifications of the original Rayway coil kit manufactured specially for the "Atlas" by Standardised Products, of 14 Hedger Ave., Ashfield, N.S.W.

**Audio Volume Control Included.**

As the receiver is intended for operation from a single 1 1/2-volt battery such as the Eveready Type X250

or PR8, the rheostat included in the original model has been omitted, and in its place is a .5 megohm audio volume control with on/off switch mounted on it. (In the front view of the receiver this is the lower right control).

The lower left control is a "dummy," though the original rheostat could be included here if a 2-volt accumulator is being used for "A"

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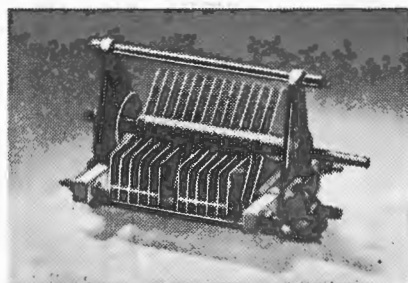
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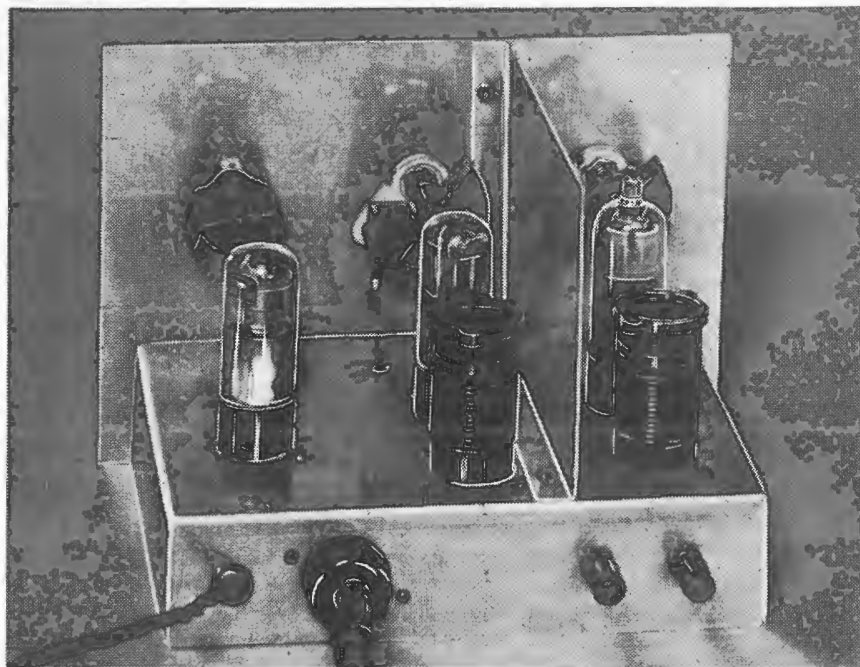
1. Tough, non-hygroscopic tubes.
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4. Special coating, protecting resistors in humid climates and under severe overloads.

Type.	Max. Wattage.	Ceramic Size.
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AB	5 w.	$\frac{1}{2}$ x 5/16ths.
DG	20 w.	2in. x 9/16ths.
DJ	30 w.	3in. x 9/16ths.
EP	50 w.	4in. x 3/4in.
HX	50 w.	3 3/16ths x 1 1/4in.
ES	75 w.	6in. x 3/4in.
HA	100 w.	6in. x 1 1/4in.
HE	150 w.	8in. x 1 1/4in.
HO	200 w.	10in. x 1 1/4in.

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A rear view of the completed receiver, with valves and coils plugged in.

supply. To give the necessary voltage drop from 2 volts to 1.4 at a total current drain of .2 ampere, a resistance of 3 ohms is required. It is particularly important that the rheostat should never be advanced to include less than this minimum amount of resistance; otherwise the valve filaments will suffer.

### Could Be Built As One, Two Or Three-Valver.

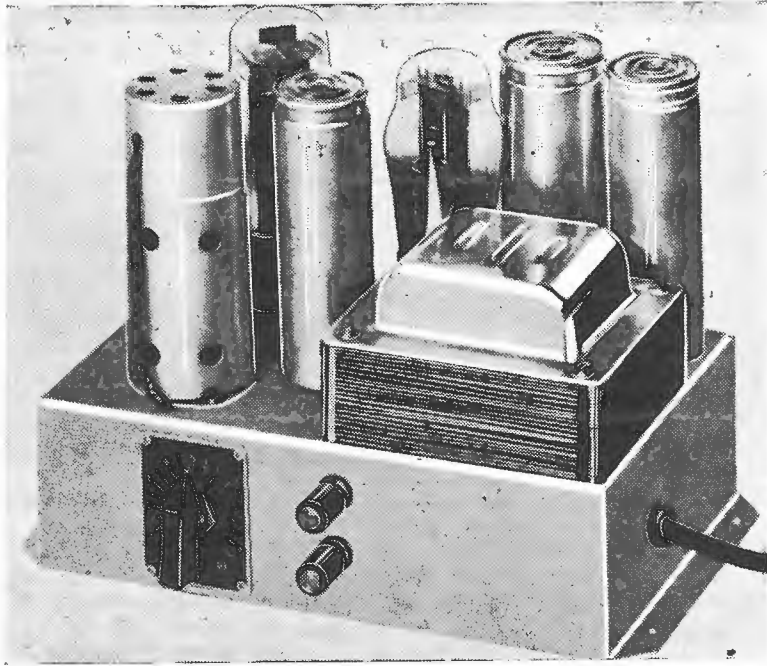
If desired, this receiver could be

built and operated a stage at a time. It could be built as a single-valve model using the 1G6G, with one triode section as detector, resistance capacity coupled to the other triode section acting as audio amplifier. Next, the 1N5G r.f. stage could be added with its coil and associated components, while, finally, loud-speaker operation from several dozen broadcast stations as well as the main

(Continued on page 48)

### "1939 Atlas All-Waver"—List Of Parts.

- |  |  |
|--|--|
| 1 aluminium chassis, 9" x 6 1/2" x 2 1/2", with aluminium front panel 7" x 10", and shield partition, 4 1/2" x 6 1/2". | 1 .1 mfd. midget mica (T.C.C.)   |
| 2 .00016 mfd. midget variable condensers (Raymart)   | 1 .5 mfd. tubular  |
| 1 .0001 mfd. midget variable condensers (Raymart)  | <b>FIXED RESISTORS</b>   |
| 1 all-wave r.f. choke (Raymart)  | 1 10,000 ohm carbon (I.R.C.)   |
| 2 4-pin, 1 5-pin, 3 octal wafer sockets  | 2 .1 megohm carbon (I.R.C.)  |
| 1 'phone jack (with insulating washers if required)  | 2 .1 megohm carbon (I.R.C.)  |
| 1 midget vernier dial  | 1 3 megohm carbon (I.R.C.)   |
| 2 0-100 2" indicator plates (Radiomac)   | <b>VALVES</b>  |
| 2 15-600 metre amateur all-wave coil kits (Rayway)   | 1 1N5G, 1 1G6G 1C5G (Brimar, Radiotron, Mullard).  |
| 2 spring type terminals (1 red, 1 black)   | <b>SPEAKER</b>   |
| 1 pair of headphones (S.T.C.)  | 1 permanent magnet speaker (Rola type 6-15 PM)   |
| 1 'phone plug  | <b>BATTERIES</b>   |
| 1 .5 meg. potentiometer with switch (I.R.C.)   | 2 45 volt light duty units, (Ever Ready type PR45)   |
| 1 length of 5-wire cable with 5-pin plug   | 1 1.5 volt unit (Ever Ready type PR3)  |
| <b>FIXED CONDENSERS</b>  | 1 9 volt "C" battery (Ever Ready)  |
| 1 .00005 mfd. midget mica (T.C.C.)   | <b>MISCELLANEOUS</b>   |
| 1 .0001 mfd. midget mica (T.C.C.)  | 1 1/2 doz. 3/8" bolts and nuts; 1 doz. solder tags; 1 1" bolt and nut with 1/2" pillar and 1" x 1/2" bakelite strip, with double-ended solder lug mounted at one end; 1/2 yard 16-gauge tinned copper wire; 1 yard of hook-up wire; 4 black knobs; 1 midget grid clip. |
| 2 .005 mfd. midget mica (T.C.C.)   |  |
| 2 .01 mfd. midget mica (T.C.C.)  |  |



The completed amplifier, which is built on a sprayed steel chassis measuring  $8\frac{1}{2}'' \times 5\frac{1}{2}'' \times 2\frac{1}{2}''$ .

# Economy Fidelity Amplifier

*Using a single 6L6G in the output, with a special system for applying inverse feedback, this amplifier will give seven watts of high quality output.*

By "TETRODE"

**T**HE "Economy Fidelity Amplifier" featured in last month's issue is particularly simple to build, in that there are only a handful of components to mount and wire.

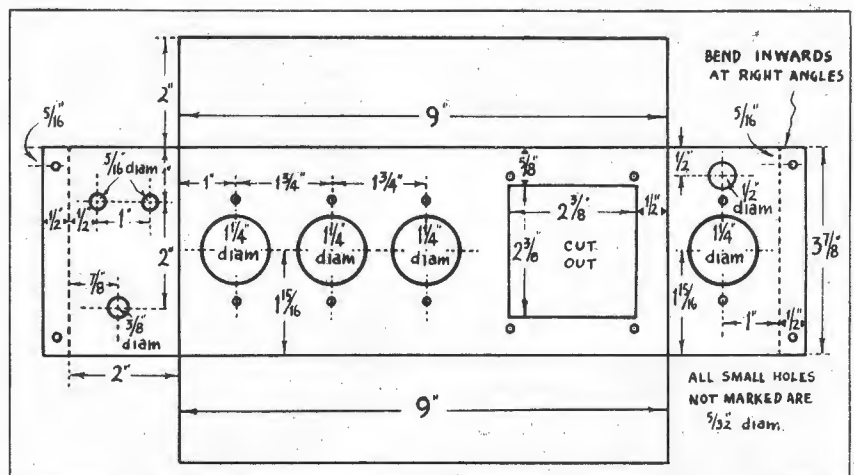
The chassis layout is of little importance in an amplifier of this type, and consequently any chassis stamped and drilled to accommodate an 80 mill. power transformer, three valve sockets and three wet electrolytics would be quite suitable for the job.

The model illustrated at the head of this page is built on a sprayed steel chassis measuring  $8\frac{1}{2}'' \times 5\frac{1}{2}'' \times 2\frac{1}{2}''$ . Those wanting a more compact job could use a similar chassis to that employed for the 4-watt beam amplifier described in the July 1938 issue of "Radio World." This was built on a steel chassis measuring  $9'' \times 3\frac{3}{8}'' \times 2''$  and is housed in a crackle-finished steel case measuring  $4'' \times 6\frac{1}{2}'' \times 9''$ .

If a 6V6G delivering about four watts of output is used in the output stage of the present amplifier, then the chassis as specified for the 4-watt

beam amplifier would be quite suitable, providing dry electrolytics mounting underneath the chassis are used in place of the wet type, for which mounting space is not available.

If, on the other hand, a 6L6G is used in the output socket in accordance with the circuit published last month, then the length of the 4-watt beam amplifier chassis would have to



As explained in the text, a 6V6G can be used in place of the 6L6G for applications where a full seven watts of output are not needed. For this lower-powered version, the chassis layout detailed above makes a particularly compact job.



*In-built  
Quality*

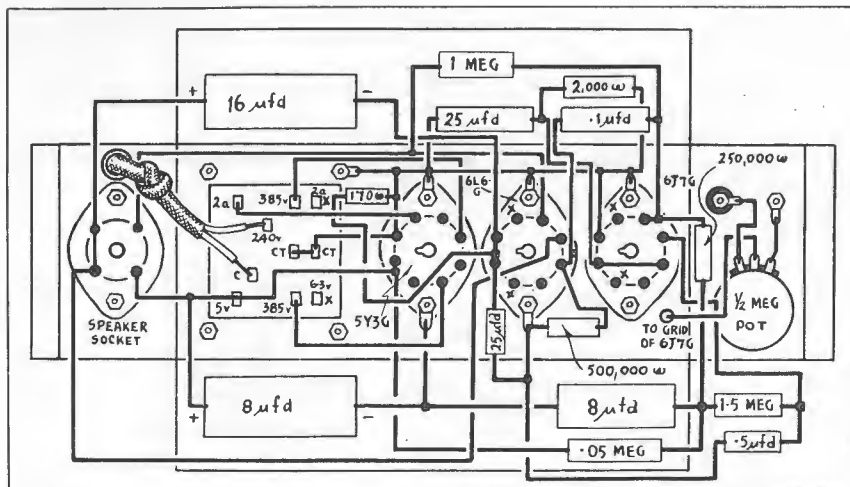
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Complete under-chassis wiring of the amplifier is shown in this sketch.

be increased by at least half an inch to allow for the larger glass envelope for the 6L6G.

Where compactness is not of primary importance, however, a layout similar to that shown in the photograph at the head of this article is quite satisfactory.

#### Construction Outlined.

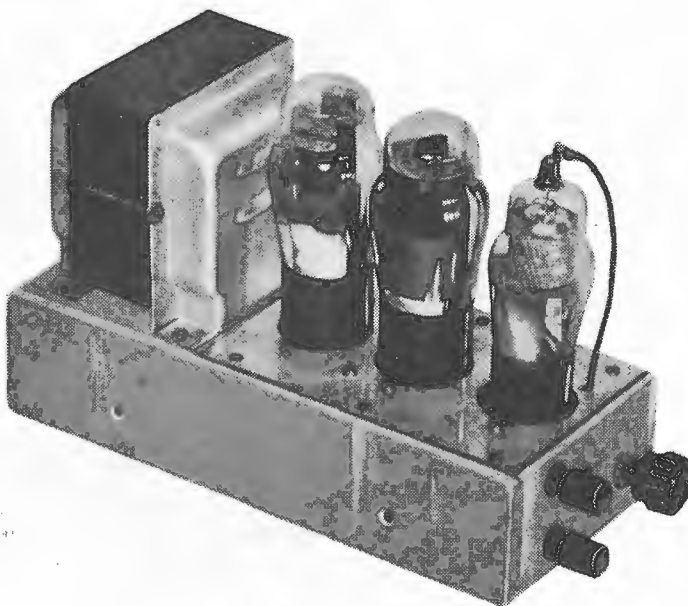
The parts that should be mounted first are the three valve sockets, speaker and power sockets, input terminals, volume control potentiometer and power transformer.

The wiring is very simple, and should be commenced with the rectifier plates and filaments to the power transformer, followed by the heaters of the 6J7G and 6L6G and the speaker socket. Lugs should be tightened

under the nuts of the two 8mfd. electrolytic condensers to provide earth points, and one side of the 6.3 volt heaters should be earthed. The 10 mfd. electrolytic condenser must be insulated from the chassis with the bushes provided, and its lug must be connected to the 6L6G cathode.

Remember to connect the pin No. 1 to No.'s 5 and 8 on the 6J7G socket, for it is connected to the basket-shaped outside shield around the plate inside the valve.

Before connecting any of the resistances, the volume control potentiometer should be connected to the input terminals, and its arm connection (centre lug) should be wired to the grid cap of the 6J7 with braided cable, care being taken to earth the



By using a single 6V6G in place of the 6L6G shown in the circuit, and using dry electrolytics mounted underneath the chassis, the amplifier can be built on this compact chassis measuring only 9" x 4" x 2."



braid to the chassis. Then the screen by-pass condenser (0.5mfd.), the coupling condenser (0.1mfd.) and the two 25mfd. electrolytic by-pass condensers may be soldered in place.

The seven fixed resistors complete the wiring, save for the power lead, which is connected between the appropriate pair of lugs on the power transformer. The wiring and layout have been devised to make a good solid job without any stand-off lugs or resistor panels.

See that the speaker is plugged in before switching on (the rectifier should not be plugged in). The heaters of the 6J6G and 6L6G should glow, and the power transformer should be cold.

When the 5Y3G is plugged in, the hum in the speaker should barely be audible a few inches from the cone. With the volume control in the "on" position, a loud "burp" should be heard when one touches the grid cap of the 6J7G.

The power output of the amplifier is slightly less than 8 watts before serious (grid current) distortion commences. Only 0.26 volt R.M.S. is required at the input terminals to load the output stage completely, so that the usual run of magnetic pickups may be used successfully.

It is, when all is considered, a very economical substitute for a larger amplifier using a pair of 2A3's, and its output and quality compare very favourably with the larger job.

## Over 50 Entries For "Find-The-Fault" Contest

### Won By H. R. de Crewe Of Dunedin

OVER fifty entries were received for the "Find-The-Fault" Contest announced in "Radio World" for April last, and almost without exception the entries were of such a high standard that the judges had a particularly difficult task in choosing the prize winners.

#### Winner Awarded Palec Meter.

The entry chosen finally as the winner was sent in by Mr. H. R. de Crewe, of St. Kilda, Dunedin, New Zealand, who thus wins the Palec moving coil meter donated by Paton Electrical Pty. Ltd., of Ashfield, N.S.W., as first prize. This competitor had obviously examined closely the hints given tending towards eliminating the output stage as a possible source of trouble, as he commenced his tests from the second detector, making the speaker the last component to check. His explanation was given in the correct order in accordance with the rules which asked competitors to state what further tests should be made to locate the trouble, and what was the probable cause or causes of the breakdown. As the following shows, the winner's entry is both clear and concise:—

"Grid cap test indicates audio inoperative. Test plate voltage detector triode section, coupling condenser, plate, screen, grid and cathode of output. Apply continuity test secondary output transformer and voice coil. Probable fault: No B+ triode plate (cause, open plate resistor or plate by-pass shorted to ground), open coupling condenser."

The three next best solutions were sent in by the following readers, each of whom will be awarded a twelve months' subscription to "Radio World" (Note: One entrant from Maroubra Junction, Sydney omitted to sign his name):—Murray W. Higgins, of Knoxville, S.A.; L. Marhoff, Bankstown, N.S.W.; and O. E. Tucker, of Belmore, N.S.W.

The following entrants were sorted out for special commendation. Although the explanations given in several of these entries were a little mixed, the problem was tackled along the right lines:—J. P. Stewart, Ipswich, Queensland; F. C. Johnson, Burwood, Vic.; A. L. MacFarlane, Lardner, Vic.; A. G. Fenton, Newtown, Tasmania; K. Rudkin, Abermain, N.S.W.; W. Cathcart, West

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The remaining entries could be sorted into four groups. In the first group were entrants who commenced their tests at the output stage, despite the fact that a hint was given that this section of the set was O.K.

The second group contained entries that were eliminated because too many possible faults were listed. Careful consideration had obviously not been given to the hints included in the problem that was set.

The third group of entries was eliminated because of confused explanations, round-about methods of attack, etc., while the fourth group consisted of entries that greatly exceeded the 50-word limit set for the brief description required.

In passing, it can be mentioned that no effort was spared to judge the entries fairly. In fact, a standard 4/5 dual-wave superhet of recent design, employing a duo-diode triode second detector and single output pentode, was placed under actual test. The various faults mentioned by entrants were introduced in the circuit, and the effects noted.

#### Some Suggested Faults.

Below are listed some of the faults submitted by readers, with comments:—

**Speaker transformer open circuit.**—Under normal conditions this would have been the first point of test, but it was mentioned in the problem that "B+" was present on the output side of the smoothing filter, being exactly 250 volts above the chassis," this being the normal voltage for the average 4/5 superhet. This was intended as an indication that the power stage was operating normally.

**Plate by-pass condenser (to earth) of output valve broken down.**—Had this fault been in evidence the voltage would have been well below 250 volts.

**Voice coil of speaker open circuit.**—Usually there would be no noise from the speaker at all in this instance, whereas in the problem submitted, a slight hum was in evidence. However, if the voice coil were open-circuited, and a slight hum was being emitted, sounds would still come from the speaker transformer when the volume was turned full on.

**Open bias resistor on power valve.**—Another obvious fault, but remember the "B+" voltage was normal, and if this were the fault the voltage would be greatly above 250 volts.

**Coupling condenser broken down (shorting).**—A short in this conden-

ser would still permit reception, although it would be rather distorted, while the power valve would draw excessive current due to the positive potential on the grid, with a consequent drop in voltage from filter positive output to earth.

The remaining faults would then be (1) open circuit plate resistor, (2) o/c decoupling resistor, (3) o/c detector cathode bias resistor, (4) o/c plate r.f. choke, (5) de-coupling condenser broken down, (6) plate by-pass condenser of diode broken down, and (7) coupling condenser o/c or lead broken.

In the standard 4/5 dual wave superhet under test, faint reception was still in evidence when the volume was turned full on, even when any one of the first five of the above faults was present. This leaves only two, viz., second detector plate by-pass broken down, and plate to grid audio coupling condenser open-circuited.

#### Further Contests Shortly.

In conclusion, Mr. F. H. Paton, of Paton Electrical Pty. Ltd., and the Editor of "Radio World," who collaborated in arranging the contest, wish to thank all readers who submitted entries. It is hoped that a series of similar contests will be arranged shortly.

## INSIST ON RADIOKES!

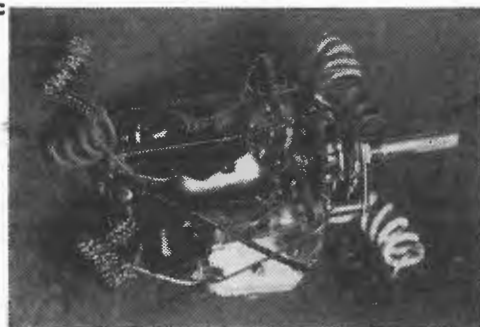
The "SKY-CHIEF DUAL-WAVE FIVE" described in this month's issue is the finest 4/5 dual-wave superhet ever featured in any Australian magazine. Exceptionally sensitive and selective, with excellent tone and plenty of volume, it performs like a "six," though a kit of parts costs no more than for an ordinary 4/5, using inferior brands of coils. The secret of the "Sky-Chief's" success lies in the sensational new Radiokes DAU-1 dual-wave coil unit, and in the latest Radiokes type I.F.I. iron-cored high-gain trolitul i.f. transformers. Accept no substitutes . . . performance equivalent to that of the "Radio World" model is guaranteed only if the same type Radiokes coil kit is used.

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### 1939 Atlas All-Waver and Fidelity Economy Amplifier.

Radiokes components are also strongly recommended for the "1939 Atlas All-Waver" and "Fidelity Economy Amplifier" described elsewhere this month. Write now for the latest Radiokes Price List describing and illustrating dozens of components that comprise the most efficient and extensive range available in Australia to-day.

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**SPECIFICATIONS:** Model 306, Battery-operated, with minimised battery drain ("B" battery drain approximately 5 ma., at 67.5 V.; "A" battery 4.5 V., drain approx. 120 ma., including Pilot).

Band spread 150 Kc/s to 16 Mc/s on fundamentals without breaks; above 16 Mc/s by using 2nd harmonics. R.F. signal modulated at will. High degree of stability and accuracy particularly over 175 and 465 Kc/s channels. Model 307 A.C. Mains operated. Feed back prevented by line filters, thus maintaining good attenuation. Bandsread 150 Kc/s to 25 Mc/s on fundamentals without breaks.

Both models available with or without built-in output meter. **OUTPUT METER:** 3 inch round type. Special Alnico magnet gives approx. 300 per cent. increase over old style. Ranges 2, 5, 10, 50, 250. Provision for measuring A.C. Volts. All necessary cards and instructions supplied.



An Oscillator within the reach of every experimenter, set-builder or serviceman.

306 Battery Operated . . . . .	£10 10 0
306a (illustrated) ditto with output meter . . . . .	15 15 0
307 Mains Operated . . . . .	10 17 6
307a ditto with output meter . . . . .	16 2 6
Output Meter as used on both models . . . . .	5 10 0

(All prices subject to sales tax)



## SLADE'S RADIO Pty. Ltd.

LANG STREET, CROYDON, N.S.W.  
TELEPHONES: UJ5381 — UJ5382

### Distributors:

N.S.W.: Radio Equipment Pty. Ltd., Martin de Launay Ltd., Bloch & Gerber Ltd., United Radio Distributors, John Martin Ltd., Electric Service Co., Newcastle. QUEENSLAND: J. B. Chandler & Co. SOUTH AUSTRALIA: Radio Wholesalers Ltd., Adelaide. WEST AUSTRALIA: Norman L. Burnell & Co., 13 Queen Street, Perth. VICTORIA: Australian General Electric Ltd., Melbourne; Arthur J. Veall Pty. Ltd.; Hartleys Ltd., Flinders Street, Melbourne. TASMANIA: Noyes Bros. (Melbourne) Ltd., Launceston. NEW ZEALAND: New Zealand Electrical Equipment Co. Stocks also available from Turnbull and Jones, all branches



A party of members of the Bushwalkers' Club about to start on an inland hike. On occasions of radio field tests, the transmitting and receiving equipment is carried in packs.

# Bush Radio Rescue Test

*An account of the second field test held on June 25 by the Lakemba Radio Club in conjunction with the Search And Rescue Section of the Bushwalkers' Federation.*

By . . . . . W.J.P.

THE second field test held in conjunction with the Lakemba Radio Club and the Search & Rescue Section of the Bushwalkers' Federation was held at Glenbrook, Blue Mountains, on Sunday, June 25. The pre-arranged meeting place was at Glenbrook railway station at 10 a.m., from which place the parties were to proceed to a location known as The Bluff.

Two of the Lakemba party had the misfortune to be delayed with car trouble. Vince Bennett (2VA) burnt out a generator and had to hire another car for the day. Ern Hodgkins (2EH) broke a back axle on the Great Western Highway near Penrith, but through the courtesy of the N.R.M.A. guide who attended the breakdown and who was travelling through Glenbrook, 2EH forwarded a message by him to the other party. The officer later brought back a return message stating that all was well and that the other two portables were in operation, besides the base station.

A departure was made on foot by the two inland parties, these transmitters being operated by 2ACS and 2HB. The base station was operated by 2VA, while the city station was operated by Reg Anthony (2AEC). The inland parties had no difficulty in maintaining constant communication with the base, while the base station in turn communicated quite easily with the city station.

## Radio To The Rescue.

In the early afternoon Ern Hodgkins, at Penrith with his damaged car, learned that it was not possible to obtain a new axle that day, and so he was faced with the inconvenience and extra expense of transporting himself and family back to the city by train. However, in typical experimenter's style, he gathered up his portable transmitter and batteries and walked down to the Nepean River. Here he erected an aerial, put the rig into operation, and cut in on the Glenbrook transmissions.

Hooking up with 2VA at the base, he requested that a car, with plenty of room to spare, call for him and family at Penrith, on the way home. Those at the base were delighted to contact 2EH, who, although unable to proceed, was not altogether out of the tests. 2EH also communicated direct with the home station, and advised 2AEC of his plight.

The day was a great success, the inland parties conducting various tests from mountains and gullies. One amusing incident occurred when 2VA commented on the extra strong signal from 2ACS, and learned that Vic. Cole was using a rather efficient earth consisting of a coil of wire lowered into the river.

As usual, two battery manufacturers provided the necessary battery supply free of charge. The "B.S.C.O." Company, of Allen St., Waterloo, supplied four large heavy

duty accumulators for the high-powered genemotor, while the light duty "B" batteries were supplied by the Ever Ready Company. This second test by the Lakemba Radio Club definitely demonstrated to the Bushwalkers' Club that consistent radio communication is a practical possibility between parties on foot and outside civilisation.

## Summary Of Results.

Over the past two and a half years individual Lakemba Club members have been conducting tests with extremely low power apparatus in mountainous country, and the following brief summary may be of use to those interested in this type of work:—

**160 metres:** Fairly good consistent reception over a few miles, but strength drops off rapidly after this. The long aerials necessary for efficient operation are also a great disadvantage.

**80 metres:** The most satisfactory wavelength for this type of work. Good signals are obtainable, which are not greatly affected by shielding troubles. The aerials are not as great a disadvantage as might first be imagined.

**40 metres:** Very erratic. Good for casual communication over fairly long distances, but unreliable when it is desired to make contact with a particular station from different points.

**20 metres:** Most erratic, and not suitable where very low power is concerned.

**5 metres:** Very satisfactory from the portability point and for communication over the flatter type of country or from mountain peaks. Not satisfactory for consistent communication from gullies and rough country, as it is greatly hampered by shielding effects.

The above data has been compiled from actual experience with low-powered apparatus, i.e., from .2 to 2 watts. No doubt different conditions would apply and better results obtained with higher-powered equipment, but the transportation of a 5 or 10-watt transmitter with batteries and food supplies over stretches of country as are found between Burratorang Valley and Colong Caves, or the Blue Mountains and Burratorang Valley, is by no means an easy task.

Different conditions apply when the gear has to be carried over mountains and gullies, through streams and creeks, knocking and bumping over boulders and rocks, and still be kept in workable order. Of necessity, such equipment must be small, compact, light in weight and efficient in operation. The type of work for which it has been used in the past was for providing good signals over a radius of about 10 miles, on a frequency which is least affected by shielding and skip effects.

The Lakemba Club President, Mr. Hodgkins, has suggested that a number of members should get together and concentrate on the construction of low-powered, compact and efficient apparatus operating on 5 metres, with a view to investigating further the possibilities of more successful ultra-high frequency communication from such locations. A high-powered semi-portable station at the base, with a sensitive receiver and a simple beam aerial, would eliminate many difficulties in maintaining contact with the low-power inland stations.

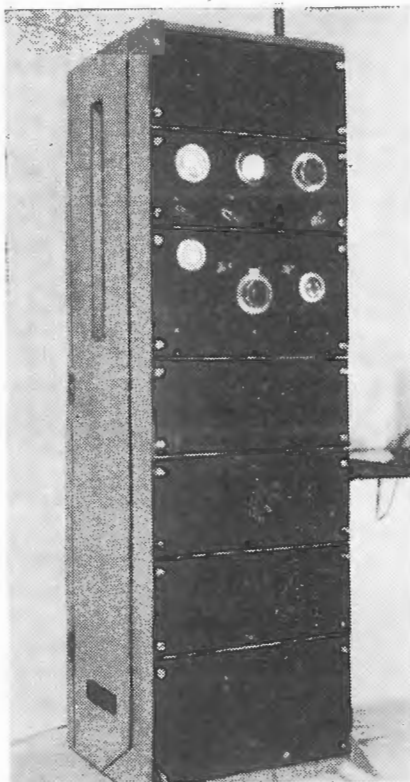
In any case, the field for experiments of this nature would be unlimited, and the President hopes that by next summer there will be a number of members interested.

---

### Waverley Radio Club Notes.

By F.A.B.

Dragging myself away from W6XBE was an effort, but now accomplished I will settle down to give



The rig at 2BV, of the Waverley Radio Club. A thermostatically-controlled oven is used for the four crystals.

you the news from the above Club during the last month.

On June 20 the members were treated to a very interesting lecture by M. Lusby, B.Sc. (2WN). He selected for his subject "The Application of Waves in the Ultra-high-frequency Spectrum," and cleared up matters of which members previously had only a very vague idea.

On June 27, George Paterson (2AHJ) obliged with what one of the old-timers described as "the finest elementary lecture he had ever heard." Perfectly understandable, it was a pleasure to listen to, and I am sure the rest of the members will endorse that opinion.

The next field day, as mentioned in last issue, will be held at National Park on Sunday, July 30. The wavelength will be forty metres. Anyone desirous of attending is cordially invited, and may meet the "gang" at N.P. station at any time after 10 a.m.

The photo on this page is of the rig at 2BV. The line-up at present consists of a 6L6G c.o. with crystal switching giving a choice of four

crystals. The crystals are enclosed in a thermostatically-controlled oven. Then follows a 6L6G doubler, 6L6G alternate buffer or doubler and an 807 also alternate buffer or doubler. The final, yet to be added, will consist of P.P. 809's. As will be seen, provision has been made in the rack for the inclusion at a later date of modulator and speech amplifier.

Last Thursday, members and their friends tempted fate at ice-skating. One put forward the argument that as he had not been caught on the H.T. during several years of "ham" radio, nothing could happen to him there. Reports are not yet to hand but it is imagined that more than xmitters were "on the ice."

Hoping that the invitation extended last month—and repeated now—to call and see the "gang" on any Thursday night at rear of "Almont," 13 Macpherson St., Waverley, will be accepted, present scribe is signing off and going back to play round with his favourite "3 and rectifier!"

### Zero Beat Radio Club Notes.

During the month the prizes for the series of field days were presented. The silver cup donated by Russ Miller was presented to Ross Treharne (2IQ), who was the winner with 470 points. The open order presented by the president went to Mr. B. Jones, who was second with 207 points.

On Sunday, June 24, a Field Day was held in Centennial Park. This site was chosen on account of the convenience of transport and also as an experiment on 5 metres. The 5-metre and 80-metre bands were used and the portable gear was able to make contact with 2NO, who was worked both on i.c.w. and 'phone. Reports of the 'phone contact were not as good as the c.w.

There were two runs during the afternoon, and Mr. L. Hanaford was successful in getting in first on both occasions, but on the 80m. band. The 5-metre receivers proved a little troublesome to get going, but 2IQ managed to get in, notwithstanding interference from water reservoirs and "¼-wave boys."

The next 5- and 80-metre field day will be held on August 6 at Cheltenham. Further particulars can be obtained from the Secretary.

The syllabus for the month is as follows:—July 7: "Oscillators," by L.  
(Continued on page 31)

A pocket multi-meter such as the Delta Model D-735 illustrated alongside is invaluable for service calls. The construction of this instrument was described in detail in the "Radio World" for April last.

# Leaves From A Serviceman's Diary . . . (4)

*Causes and cures of fading and noisy operation are discussed in this month's instalment.*

By "SERVICEMAN"



**A**FTER several years of practical and consistent experience in radio repairs, the serviceman usually acquires a systematic method of fault-finding and trouble-shooting, and in many cases it becomes possible to effect numerous repairs with little or no effort in fault location.

It is only natural that for defects which do not make themselves altogether obvious, the trouble finding should be approached in a systematic manner. For example, if the complaint is noisy operation, the noise should be localised by removing the aerial and earth wires and noting if it still persists. If it does, then the trouble is in the set.

A start could then be made on the audio end of the set by removing the second detector and observing whether the noise still persists. If it ceases, then place the valve back and remove the preceding one. In this way an indication can usually be obtained as to the stage in which the noise is to be found. This is but one example, as it will be found that various methods of approach will suggest themselves according to particular cases.

Possibly the most difficult faults to locate are those causing fading. In many cases the trouble develops after the set has been operating for a period. If the serviceman is not certain whether the fault has been located, the set should be brought away for work-bench attention. It is useless giving a complaint of this na-

ture hurried attention unless the fault is immediately obvious.

## "Trouble Shooting" — Common Causes Of Set Failure, With Suggested Cures.

(Continued from last month)

**COMPLAINT:** Fading.

### DEFECTS AND REPAIR PROCEDURE:

(1) **Natural causes.**

Explain to client that this is normal on long distance, inter-state and short-wave stations.

(2) **Loose or broken aerial or earth.**

Make sure that the fading is not being caused by loose or broken wires in the aerial and earth system.

(3) **Loose connection in set.**

Knock various parts of the set while it is operating and note whether this is accompanied by intermittent operation.

(4) **Faulty valve.**

For fading troubles it is usually advisable to allow the valves to heat thoroughly before testing them in a tube checker. Many operate and test normal when first put into operation, but develop defects after prolonged operation.

(5) **Leaky by-pass condenser or faulty resistor.**

These components sometimes break down after a few minutes operation. A voltage check with a high resistance voltmeter will usually indicate the faulty one. Start testing those

which have the greatest applied voltage.

(6) **Faulty speaker or audio transformer.**

When a transformer operates intermittently, the consequent fading is usually accompanied by a loud sizzling noise. The transformer may be tested by short-circuiting the plate of the valve which it feeds, to earth. This passes a heavy current through the primary, and if it is faulty it will usually break down.

(7) **Faulty speaker voice coil.**

An intermittent voice coil will cause the set to cut on and off. With the set operating at normal volume, move the cone gently backwards and forward and note whether the voice coil is touching or shorting to frame, or whether the set cuts out. Also make sure that the voice coil leads to the transformer are properly soldered.

(8) **Dry joint.**

See "Mechanical Inspection" last month.

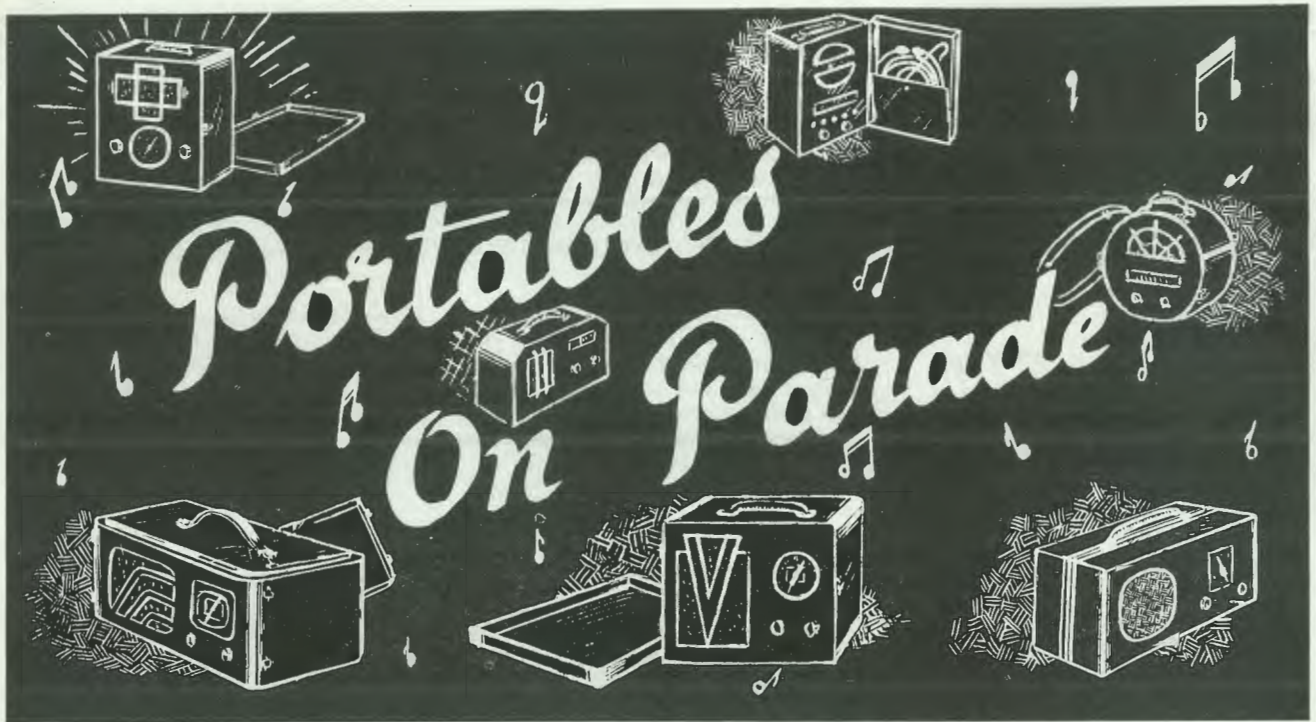
**COMPLAINT:** Noisy operation.

### DEFECTS AND REPAIR PROCEDURE:

(1) **Natural causes.**

Static or electrical interference. A

(Continued on page 32)



**Newest and most sensational development in radio for some years, the 1.4-volt portable receiver is undoubtedly destined for record sales in Australia during the next few months. In this Special Supplement are briefly reviewed all leading makes now on the market, or shortly to be released.**

#### S.T.C.'s New Model 510.

A detailed report of field tests conducted on the Model 510 1.4-volt portable being marketed by Standard Telephones and Cables Pty. Ltd. appears on page 3 of this issue.

Brief specifications are as follow:—

Five-valve broadcast superhet using 1P5G super control pentodes in the r.f. and i.f. stages, 1A7G mixer, 1H5G second detector and audio amplifier driving a 1C5G output pentode. Special features include 6-inch P.M. speaker, highly efficient a.v.c. system, high-gain coils and i.f. transformers, and large dial with station names grouped in States.

Battery equipment comprises two Eveready PR45 45-volt units and a PR8 1½-volt unit. "A" battery drain is .3 ampere, "B" battery drain 8.5 mills.

Cabinet is fitted with hinged doors back and front, ensuring free accessibility to the batteries. Front door is provided with pocket to accommodate aerial and earth equipment, which comprises approximately 20 feet of flex for the aerial, and several yards of flex, terminating in a metal spike, for the earth.



The S.T.C. Model 510 1.4-volt portable.

#### Two Aristocrat Models.

The Model 958P Aristocrat portable, manufactured by Syme E.S.M. Pty. Ltd. (17-19 Glebe St., Glebe, Sydney) is a five-valve broadcast model drawing only 7 m.a. "B" current, and .25 amp. "A" current.

Two models are produced, one with a high-gain aerial coil for use in remote centres where an aerial is available, the other having a built-in loop aerial for reception in areas situated fairly close to broadcasting stations.

The three batteries are housed on a shelf, together with a heavy duty 6" speaker, and are easily accessible behind the hinged lid.

Controls for volume, tuning, tone and battery switch are grouped under the attractive speaker grille. The

# HERE IT IS!

and it

# IS

# PORTABLE

... No bigger than  
a man-sized lunch!



**WEIGHS ONLY 15 POUNDS**  
(Complete with Batteries)  
And Leads the Way in Portable  
Design.

**Small In Size — Big In Results**  
The Smallest, Lightest Portable on  
the Market — therefore the only port-  
able worth handling — and it has a  
full-sized eight-inch Speaker.

**Tone Equal to Electric Set**  
In fact, in the Lamplough Pixie Port-  
able, the Ideal Carry-Radio has been  
Achieved . . .  
Speaker Fret designs to individual  
specifications . . . The trade price is  
keen and allows a worthwhile dealer  
profit-margin.

FOR FULL PARTICULARS WRITE  
OR 'PHONE NOW

## Lamplough Radio Co.

THE HIGHLIGHT OF SERVICE

'Phone: BW 5438

I.O.O.F. BUILDING

100 CLARENCE STREET, SYDNEY.

front lid has a pocket for aerial and earth leads.

The receiver is available in a varied range of coloured leatherette cabinets, measuring 10" long, 10½" wide and 13½" high, and the total weight is approximately 22 lbs.

★

### Two Models From Music Masters.

The Music Masters Radio Co., of 209 Queen St., Brisbane, advise that they are marketing two 1.4-volt portables, a four and a five-valve model both giving broadcast coverage only. The leatherette-covered cabinet that is standard for both models is 13½" high x 11¼" wide and 7¼" deep.

★

### Paramount B.C. And D.W. Models.

Paramount Radio Mfg. Co. Pty. Ltd., of 301 Castlereagh St., Sydney, advise that their model 505, which has been enjoying excellent sales during the past few months, has now been supplemented by the addition of a dual-wave version.

A feature of both models is a door-operated switch, which ensures that the receiver is switched off when the door is closed. As well, in both receivers, provision is made for the use of an external aerial by winding a single turn of wire around the loop and bringing the ends of this coupler out to connectors.

The design of the new dual-wave model follows the same general lines as that of the model 505, and provides a completely self-contained receiver that is capable of tuning in both Australian and overseas shortwave stations on the built-in aerial, as well as giving full broadcast band coverage.

Features of both models include the following:—Automatic battery switch,

Of particularly attractive design, this Paramount portable uses a station-calibrated slide rule dial. Both broadcast and dual-wave models are available.

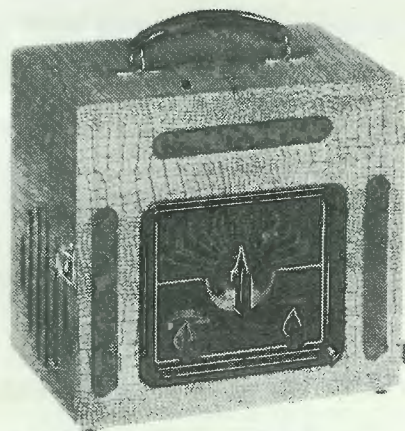


which prevents wastage of battery power when the receiver is not in use, highly efficient automatic volume control system, fully dust-proofed loud-speaker with high efficiency alloy magnet giving excellent tone and volume, continuous action tone control.

★

### Five-Valve Classic Portable.

The Classic portable manufactured by J. Lewis, of 17 Kingston Street, Strathfield, is a 5-valve model using two 1N5G's, a 1A7G, 1H5G and 1C5G. Iron cored i.f. transformers are used



The Classic five-valve portable.

in a high gain circuit which incorporates full automatic volume control. A 6-inch P.M. speaker with 13½ ounce magnet ensures high speaker sensitivity.

Dimensions of the leatherette cabinet illustrated above are 11" x 12" x 9."

★

### Calstan B.C. And D.W. Models.

Slade's Radio, of Lang St., Croydon, N.S.W., advise that they have just released two 1.4-volt portable models, one for broadcast and the other for dual-wave operation. Both



are 5-valve receivers using two 1N5G's, 1A7G, 1H5G and 1C5G, battery drain being .03 amp. "A" and 11 mills. "B."

Main features include a 6-inch Rola speaker, built-in aerial with provision for attaching additional aerial and earth, metal battery box which slides in and out of cabinet on a wooden frame, providing easy battery accessibility, station-calibrated slide rule type dial measuring approximately 5" x 2½," one-piece moulded bakelite speaker fret and dial escutcheon.

Both models, which measure approximately 12" high x 11" wide x 10" deep, including lid, are available in a variety of colours.



### Stromberg-Carlson Dual-Purpose Portable.

A tuned loop aerial and dual-purpose operation are features of the new Stromberg-Carlson Model PD50 portable five-valve superhet.

The receiver is housed in the well-known Stromberg-Carlson bakelite mantel cabinet, this in turn being enclosed in the smart brown leatherette



covered carrying case shown in the above illustration. Thus at home the set can be used as a mantel model, while outdoors it becomes a portable.

Overall dimensions are 15½" x 13¼" x 8½."



### For Release Shortly.

National Radio Corporation Ltd., of 90 Grote St., Adelaide, S.A., advise that they are shortly releasing a 1.4-volt portable, but that developmental

work is not sufficiently far advanced for complete data to be supplied.



### Midget Portable From Kriesler.

It is claimed that the Kriesler 4-valve portable, which is to be released shortly, will be the smallest and lightest on the Australasian market. Front cabinet dimensions are 8" x 9," and overall weight 10½ pounds.



### "Little Wanderer" Portable From Precision Radio.

A new and improved "Little Wanderer" portable is announced by Precision Radio, of 20 Carrington St., Strathfield. Main features include the use of the latest model type 6-15 Rola permanent magnet speaker, litz-wound iron-cored coils and i.f. transformers, new improved a.v.c. system, station-calibrated dial and non-directional aerial.

Valves used are 1N5G r.f., 1A7G mixer, 1N5G i.f., 1H5G diode second detector and audio amplifier, 1C5G output pentode, while battery equip-

# The Paramount PORTABLE



PLAY IT ANYWHERE  
INDOORS—OUTDOORS

#### SPECIFICATIONS:

**AUTOMATIC BATTERY SWITCH:** A specially designed battery which definitely prevents wastage of battery power when the Receiver is not in use.

**AUTOMATIC VOLUME CONTROL,** which is highly efficient, giving exceptionally powerful control of fading.

**Specially developed LOUD SPEAKER,** fully dust-proof, with new alloy magnet giving amazing tone, quality and volume.

**Smooth continuous action TONE CONTROL.**

**Rigid specially BRACED CHASSIS. SINGLE UNIT construction** Receiver and batteries, it is extremely portable, and can be taken anywhere with a minimum of trouble.

## PORTABLE

With the PARAMOUNT PORTABLE, radio has taken a new lease of life, winning for itself a new popularity with the outdoor-loving public of Australia. Inexpensive, convenient, compact, it brings the whole world of radio entertainment to your picnic party or friends, no matter where you may be.

If you go motoring, camping, yachting, or just enjoying a week-end in your garden, you need a PARAMOUNT PORTABLE RADIO. No power point, no wires, no earth or outside aerial needed. Just switch it on whenever you want it and tune into your favourite station.

#### COSTS ONLY ONE PENNY AN HOUR TO OPERATE.

**MODEL 505.—5 Valve 1.4 volt Broadcast Portable—Wave range 200-550 metres.**

Designed for the use of the new 1.4 volt economy valve. Compact because the extremely low current consumption of the new valves enables smaller, less expensive batteries to be used. More convenient, too, because the 1.4 volt valve is designed for use with dry batteries and needs no accumulator. Entirely self-contained; you can carry and use them anywhere. 17gns.

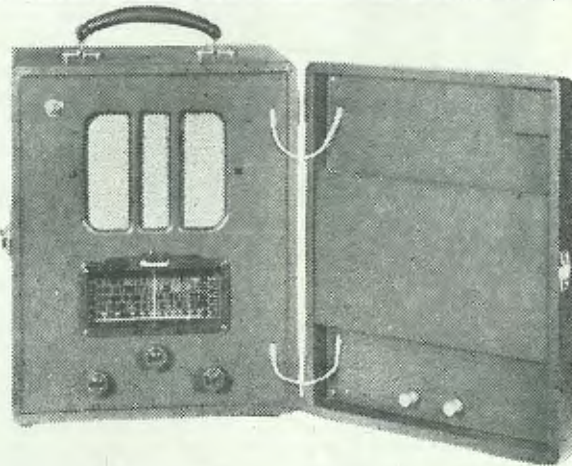
**MODEL 656.—5 Valve 1.4 volt Dual-Wave Portable— Wave range 200-550 metres and 16-50 metres.**

Entirely self-contained. Designed on entirely new lines and incorporating the recently introduced 1.4 volt valves. It is lighter, more compact, more effective and more economical than any other type of portable radio you've ever seen. Operates entirely on dry batteries. 20gns.

Write or phone MA 3875 for further particulars.

**The PARAMOUNT RADIO Mfg. Co. Pty. Ltd.**

299a-301 CASTLEREAGH ST., SYDNEY, N.S.W.



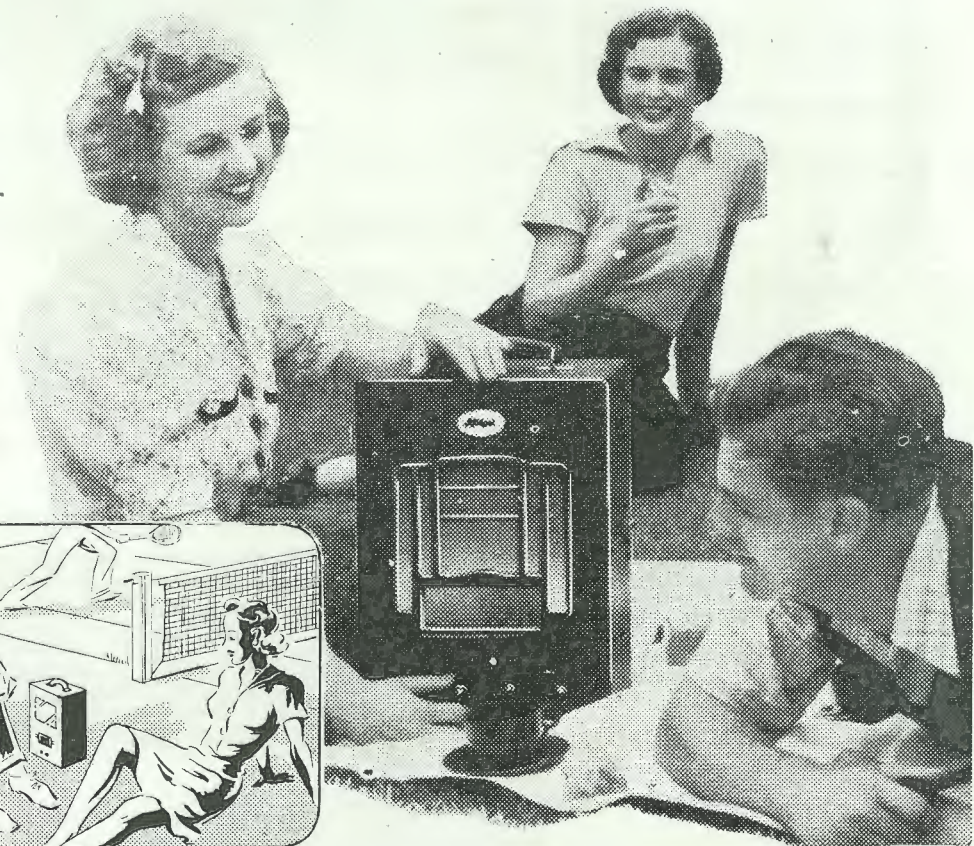
*Popular!*

THE NEW 1.4 VOLT

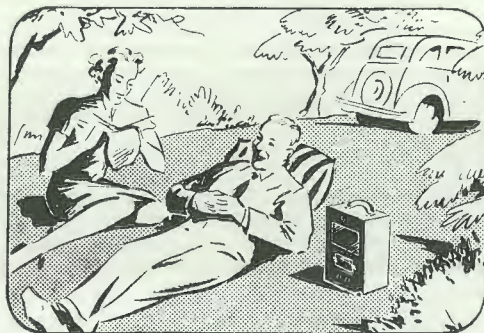
# Portable Radio



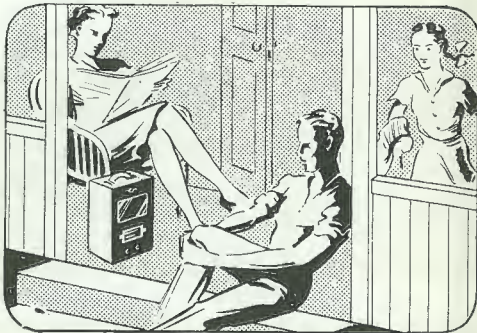
Wherever you go this year—whatever you plan to do outdoors—add to the enjoyment of yourself and your friends by taking one of the wonderful new 1.4 volt portable radios along. Designed on entirely NEW lines and incorporating the recently introduced 1.4 volt valve, it is lighter, more compact, more efficient and more economical than any other type of portable radio you've ever seen. Operates entirely on dry batteries—the smoothest and most dependable source of power for portable sets—and costs as little as 1d. PER HOUR to run! Requiring no power-point, no earth, and no outside aerial, you can carry and use it anywhere. Many well-known makes, many smartly designed models available for you to choose from. See them *to-day* at any good radio store, or if you have any difficulty write direct to Box 37, Mascot, N.S.W., for complete details of latest types.



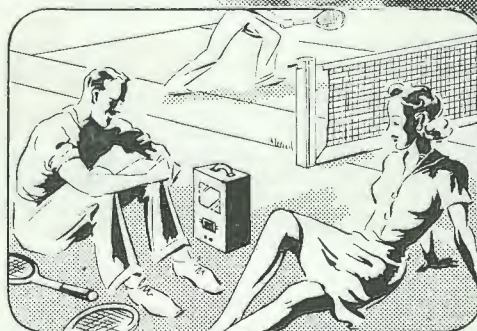
*Dance, sing and enjoy your week-end away from home with a 1.4 volt portable radio. Easily carried because it is so light and compact — always ready to entertain you and your friends.*



*Busk picnics and outings are made ten times more enjoyable when someone has a 1.4 volt portable radio to provide music and entertainment. Take one on your next trip.*



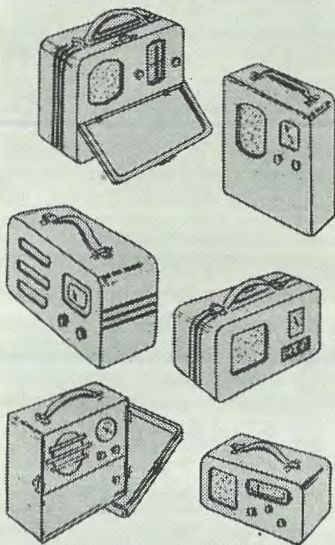
*For your next tennis party what could be better than a modern 1.4 volt portable to provide music between sets? Many makes, many models for you to choose from.*



1.4 VOLT RADIO IS EQUIPPED WITH

# EVER READY

# RADIO BATTERIES



## Special Cabinets for Portable Radios

### AN OPEN LETTER TO RECEIVER MANUFACTURERS

Dear Sirs,

As receiver manufacturers, you undoubtedly know that the next twelve months will see record sales for the new 1.4-volt portable radios.

What we wish particularly to draw to your attention, however, is the fact that for some years now we have specialised in the design and manufacture of cabinets for mantel radios of all types, AND ALSO FOR PORTABLE RECEIVERS. Our experience in supplying the needs of the radio trade in this direction is second to none.

Anticipating the greatly increased demand for these cabinets, we have recently built up a comprehensive range of cabinet cloths, unequalled elsewhere in Australia, enabling us to offer our clients an exceptionally wide choice in up-to-date designs that are the last word in smartness and durability.

Lastly, our new factory is capable of supplying one case—or one thousand, to your specifications and on your delivery date. In everything . . . in design, quality, service and price, we can fill your needs. May we submit a sample and a quotation?

Yours faithfully,  
E. EASTON,  
Manager.

**Western  
Manufacturing Co.**

18 Third Avenue,  
Five Dock, Sydney.

'Phone - - - - UA 3444

ment comprises two Eveready PR45v. "B" units, one PR8 "A" unit, and a 9-volt "C" battery. There are only two controls, tuning and combined volume and on/off switch.

According to laboratory tests made by the manufacturers, this new model has exceptional sensitivity. All the local Sydney stations, and as well, 2KA Katoomba, 2NC Newcastle and 2WL Wollongong, can be played at full volume using the built-in aerial only. Provision is also made for the attachment of an outside aerial, which when not in use is carried coiled up in the cabinet.



### Compact Pixie Portable From Lamplough Radio.

"No bigger than a man-sized lunch" is the slogan adopted by Lamplough Radio Co., of 100 Clarence St., Sydney, for their 4-valve Pixie Portable, which, despite the fact that it is one of the smallest and lightest models yet released, uses a full size 8-inch speaker.

The manufacturers are to be congratulated on a very successful departure from conventional design. As the illustration shows, the two controls are located on top of the cabinet, that on the left being the combined volume control and on/off switch, and that on the right the vernier tuning control. A pair of rectangular chromium indicator plates with black-etched scales provide a very attractive finish to the cabinet, which is finished in leatherette available in a variety of colours. A plated terminal is located at each end of the handle for attaching aerial and earth leads.

Manufacturers' specifications are as follows:—Size, 12 $\frac{3}{4}$ " x 9 $\frac{3}{4}$ " x 5 $\frac{1}{2}$ ". Weight, only 15 lbs., complete with batteries. Easy to carry, due to comfortable handle, size, shape and weight. Same size as small attache case.

Tone equal to an a.c. set, due to specially developed 8" (not midget) Magnavox speaker.

Receiver is housed in attractive leatherette case; full range of colours, red, green, blue, brown, grey and black.

Four valves, 1A7G, 1N5G, 1H5G and 1C5G employed in specially developed superhet circuit, give performance equal to five valves with economy on batteries.

Battery equipment comprises one Eveready type Q295 90-volt "B" battery, and one Eveready Q18 1 $\frac{1}{2}$ -volt



### Lamplough Radio's four-valve Pixie Portable.

"A" battery (no "C" battery required).

Controls are:—(a) Volume and on/off switch; (b) vernier-drive station selector.

The Pixie Portable is built to give absolutely trouble-free service, and uses full-size components throughout. Lloyd's Insurance Policy covers set against fire and burglary, as covered by Magnavox; receiver is fully guaranteed against defective workmanship.

A brief demonstration given to "Radio World" showed that this little receiver has excellent tone with plenty of volume, while sensitivity is well above the average.



### Four-Valve Model From Stratosphere Radio.

Stratosphere Radio Pty. Ltd., of 230 Chapel St., Prahran, S.1, Vic., advise that they are marketing a 4-valve 1.4-volt portable, the main features being very low current consumption, extra high-gain superhet circuit and handsome leatherette-covered case.



### Lekmek Releasing Portable Shortly.

Lekmek Radio Laboratories, of 75 William St., Sydney, advise that a 4-valve 1.4-volt portable is now in the course of production, and will be released in several weeks' time.



### Standard And Dual-Purpose Aladdin Models.

Illustrated opposite are the two Aladdin portables now being marketed by Messrs. Woods & Woods, of 58 Riley St., Darlinghurst, N.S.W. One is a standard four-valve superhet and the other a special five-valve console type of portable that is ideal for both home and outdoor use. With the lid in position, this set is a compact and powerful portable that is light and easy to carry, while with the lid re-

moved it becomes a mantel receiver of particularly attractive design.

Brief specifications of the four-valve Model 414BP are as follows:—Valves used—1A7G, 1N5G, 1H5G and 1C5G; high-gain coils, six-inch Rola speaker, built-in loop aerial (roll of flex is provided for difficult locations where stations are out of loop range); easily accessible battery compartment, three controls—tuning, on/off and volume, aerial to loop (and vice versa) switch. Cabinet dimensions, 13" x 9½" x 7." Battery equipment, two PR45 and one PR8 units. Battery



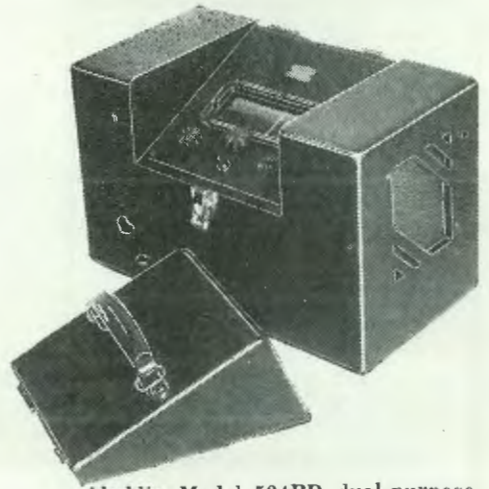
The Aladdin Model 414BP four-valve portable.

drain, .25 ampere "A" and 7 mills. "B" (running costs under one penny per hour); approximate weight, 14 pounds.

Aladdin Model 524BP employs the same valve line-up as the "four," except that it has an r.f. stage using a 1N5G. A six-inch Rola speaker is located in a special acoustic baffle compartment at one end of the cabinet.

Brief details are as follow:—"Push-to-light" slide rule type dial, incorporates a.v.c., has built-in loop aerial with provision for attaching outside aerial, four controls—volume and on/off, tuning, tone, and local-distance switch. Battery equipment comprises two PR45 "B," two Q18 "A" units and one 9-volt "C" battery. Current consumption, .3 ampere "A" and 8.5 mills. "B." Approximate overall dimensions, 14" x 9" x 8." Batteries are fitted on a sliding tray in the base of the cabinet, simplifying battery changing.

Both of the above models are available in cabinets covered in either



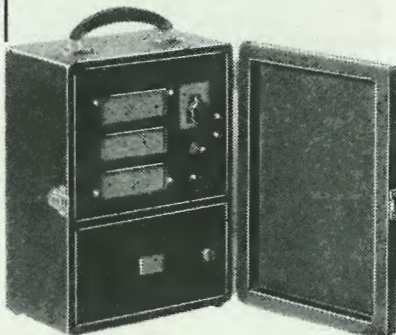
Aladdin Model 524BP dual-purpose portable.

green or brown leatherette.

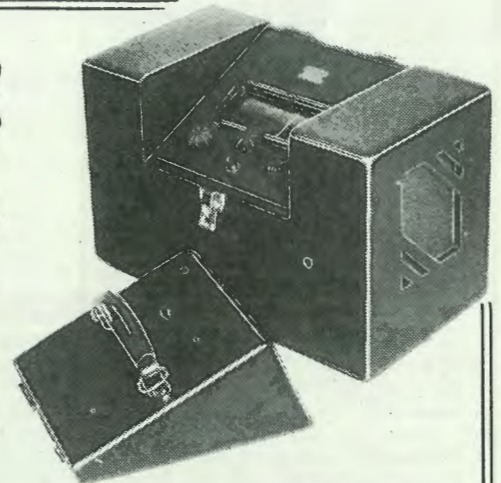
The four-valve model will bring in all local Sydney stations at good volume on the loop aerial, and as well 2KA Katoomba can be received in the daytime. According to the manufacturers, over thirty stations can be logged at good speaker strength during the evening on the four-valve

# MODERN MAGIC! ... by Aladdin

Wherever you go... whatever you're planning to do... for holidays, cruises, week-end jaunts to beach or bush... take an ALADDIN PORTABLE along and have radio "on tap" instantly day or night at the turn of a switch. For compactness, light weight, smart styling AND magnificent performance these sensational new ALADDIN models are unsurpassed.



Aladdin Model 414BP (left) is a powerful, compact four-valve superhet with the performance of a "five." Using four low-drain valves in a special high-gain superhet circuit, with tuned loop aerial... you will marvel at its superb tone... its distance-getting ability... its low cost of operation.



Aladdin Model 524BP (above) is the ideal dual-purpose economy receiver. At home it is a de luxe mantel model... outdoors a powerful, compact portable. Exclusive features include special cabinet design, "push-to-light" slide rule tuning dial, sensitivity switch, powerful five-valve superhet circuit, a.v.c., real economy operation.

WRITE for further details... Interstate distributors wanted.  
Sole Manufacturers:

## WOODS & WOODS

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## "Little Wanderer" PORTABLE RADIO.

MAIN FEATURES INCLUDE:

- Powerful five-valve superhet circuit (using 1.4-volt valves) specially developed to give maximum in performance with minimum running costs.
- Six-inch Rola P.M. speaker with high-sensitivity magnet ensures ample volume with superb tone.
- Litz-wound iron-cored coils and i.f. transformers give exceptionally high sensitivity.
- New improved a.v.c. system, station-calibrated dial, non-directional lid aerial, with provision for attaching outside aerial.

## WANT A RECEIVER BUILT, LINED UP, OR SERVICED ?

—If so, we are fully equipped to handle the job for you. For years we have specialised in building to private orders all types of receivers (A.C., D.C., A.C./D.C., vibrator, battery, dual-wave, all-wave or short-wave), amplifiers of all types (P.A. systems a specialty), auto and portable radios. Sets built to individual requirements, or we will design to suit any conditions.

## Precision Radio

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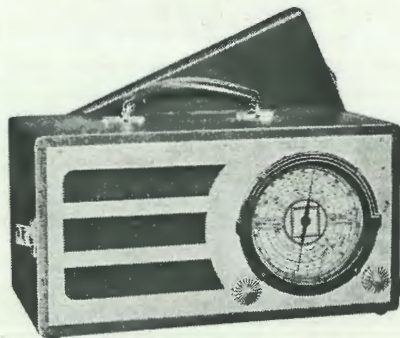
model, and over forty on the five-valve, using the built-in loop aerial only in each case. These include stations 2YA Wellington, New Zealand, which has been picked up regularly on both models.

Messrs. Woods & Woods advise that a third model—a "super midget" portable with built-in loop, with the approximate dimensions of 12" x 6½" x 6½," and using standard batteries, will be released at the end of August.



## Breville "Four" And "Five."

Included in the present range of 1.4-volt receivers marketed by Breville Radio Pty. Ltd., of Missenden Rd.,



The Breville four-valve portable (the "five" is identical in appearance).

Camperdown, N.S.W., are two portables—Models 151 and 131, using four and five valves, respectively. The smaller receiver uses the standard valve line-up—a 1A7G, 1N5G, 1H5G and 1C5G, the larger differing only by the addition of a second 1N5G i.f. amplifier stage.

The following data has been supplied by the manufacturers:—

**Wave Range:** 1600 to 500 k.c. (187-545 metres), making provision for extended frequencies approved by the Cairo Convention. **Controls:** For simplicity only two are used. These are tuning and combined volume control and off-on switch. **Dial:** Large and improved dial calibrated in kilocycles and with Australian stations clearly marked. Stations evenly spaced over the dial. **Intermediate Frequency:** 446 k.c., which reduces image interference.

**Circuit Features:** Iron-cored aerial coil gives high aerial gain, good selectivity and image freedom. I.f. transformers permeability tuned for extra performance and stability of adjustment. Automatic volume control reduces fading. **Speaker:** Improved 6"

permagnetic, giving high undistorted output and beautiful tone. **Battery Equipment:** With portable cabinet two standard 1½-volt dry cells in parallel as "A" battery, and 2-WP45 45-volt "B" batteries in series for "B" supply. One W9S 9-volt "C" battery. **Battery consumption:** Four-valve model .25 amp. "A," 8 mills. "B." Five-valve model, .3 amp. "A," 9 mills. "B."



## Crammond "Perfect" Portable.

Crammond Radio Mfg. Co., of 8 Queen St., Brisbane, advise that four and five-valve dual-wave and broadcast portable receivers have been in production for four months.

Cabinet measurements are: Height, 15¼," width 11¼," depth 10½." Total weight, including batteries, is 25¼ pounds.

Extended frequency band coverage is from 1,600 k.c. to 550 k.c. (187 metres-550 metres) and from 22,000 k.c. to 7,000 k.c. (13.6 metres-43 metres).

Horizontal dial clearly shows all important Australian stations and overseas countries.

Rigid attention to minor details has resulted in foolproof construction:—Speaker is bolted to a solid base block, chassis is securely held on sides and rear, batteries are held in place without screws.

The ingenious battery arrangement adopted gives simplicity and speed in battery changing, while external batteries can be attached in less than a minute. As well, chassis, speaker and batteries can be removed and replaced in a few minutes, if required.

The sloping front panel enhances the appearance and assists tuning.

The small aerial fitted in the door is suitable for short distances, while aerials of any length can be used externally for long-distance reception.



The Crammond "Perfect" portable.

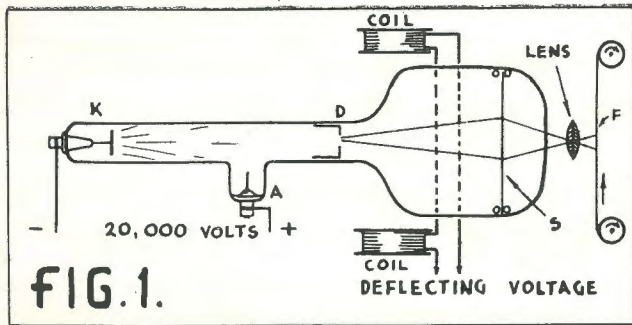


Fig. 1 (left): The original Braun tube of 1897. K—cathode, A—anode, D—disc or diaphragm, S—screen, F—film.

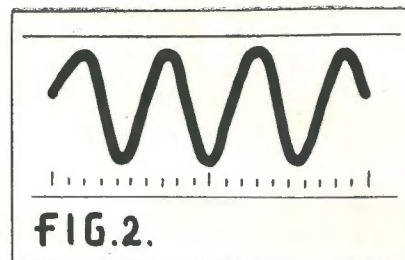


Fig. 2 (right): A typical trace of spot on film with Braun tube oscillograph. The small graduations are thousandths of seconds.

# The Cathode Ray Oscillograph . . . (I)

*This first instalment traces the history of the cathode ray tube from the time of its discovery in 1859.*  
*By . . . . . "ENGINEER"*

## Part 1—The Cathode Ray Tube.

THERE were oscillographs before there were real cathode ray tubes, and, strangely enough, there were cathode rays before there were any real oscillographs. However, since all real oscillographs to-day use cathode ray tubes, we do not have to concern ourselves with any other sort, in the same manner as a modern broadcast operator does not really require to know anything of spark transmitters.

The purpose of these articles is to explain just what the modern cathode ray oscillograph is, how and why each part of it is there, and how to use it all when it is put together.

The true meaning of "oscillograph" may be traced back to "oscillo" (from Latin) meaning swinging, and "graph" (from Greek) meaning "write." So an oscillograph is a thing

to write (or more strictly, draw) swings, whether they be the peculiar rhythmic contortions of the connecting rods of a Diesel engine or the swings—positive, negative, positive negative—of an electric current, or any other rhythmic action.

### The Cathode Ray Tube.

The very heart of this instrument—this wonderful device which "draws rhythm"—is the cathode ray tube. In its modern form it is like a long conical glass bottle—though some are made of steel cylinders—with a valve base on its narrow end, where the cork would fit if there were a hole. The wide end has a white deposit on its inside, which looks as if someone had allowed some lime water to evaporate and leave a deposit.

But cathode ray tubes were not always like this. In 1859, a man named Plucker (pronounced Plooker) found

that when he applied a high voltage between two bits of metal in a sealed glass tube, a strange glow was apparently radiated from the cathode, and that the anode, the bit of metal with the positive charge, actually cast its shadow on the wall of the tube. He called the effect the "cathode ray," and found that it only occurred between two very low pressures—when nearly all the air had been evacuated from the tube.

Later, in 1890, Johnstone Stoney discovered that Plucker's "cathode rays" were actually particles of electricity, which he indeed called electrons, and that the glass walls of the tube glowed because of the bombardment by these tiny electrons. From that discovery the whole electron theory has evolved.

### Beam Deflected By Magnet.

The next important step came with

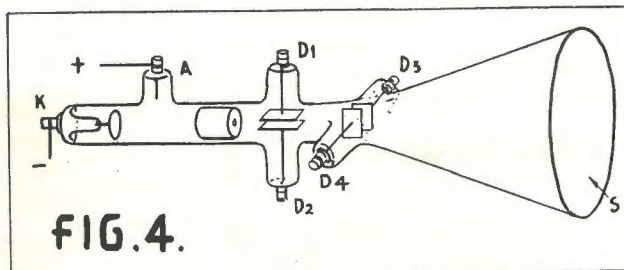
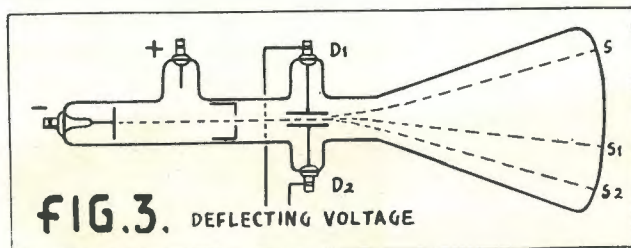


Fig. 3 (left): Illustrating electrostatic deflection. Changes in voltage between the deflector plates, D1, D2, shift the spot to points on the line, S, S1, S2. Fig. 4 (right): With two pairs of deflectors, the spot can be moved to any point on the screen.

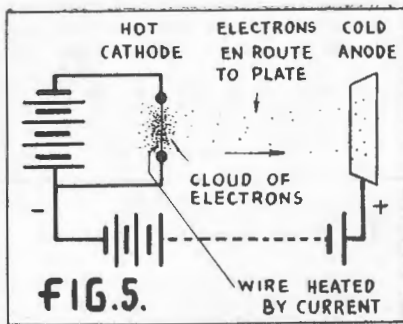


Fig. 5: Illustrating the electron flow that takes place between a hot cathode and cold anode.

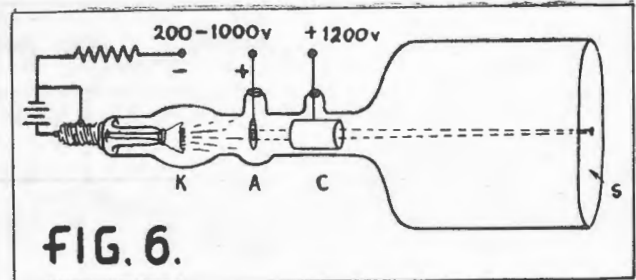


Fig. 6: The Wehnelt tube, which employs a hot cathode K, and focussing cylinder C.

the realisation that if these electrons were particles of electricity moving in straight lines (because they could throw a sharp shadow), then they must be an electric current. It was well known that a wire carrying a current was deflected, or shifted sideways, when a magnet was brought near enough to it. Why, therefore, should a cathode ray not be deflected by the field of a magnet? So this was tried, and the shadow of the anode was shifted sideways.

The next step was to cast the shadow of a plate with a small hole in its centre and this provided a beam which would light up one spot where the ray (not the light) got through. A magnetic field actually shifted the spot.

When an electro-magnet was used in place of the permanent magnet, the strength of the current determined the deflection of the spot. When the current in the coil was reversed, the spot naturally shot out of centre in the opposite direction. An alternating current in the coil caused the spot to swing with the strength and direction of the current, and to an observer the spot drew itself out into a long, narrow oval, because the eye could not follow its rapid swinging. If, however, a photographic film were drawn past the end of the tube, the spot recorded its position at each particular instant, with its appropriate deflection. Here then was an oscillograph.

#### Research On Fluorescent Materials.

At about the same time, it was found that other materials glowed more brightly than glass when they were bombarded by electrons. The glow, called fluorescence, was used extensively for X-ray work as early as 1900, and one of the most general materials pressed into service then,

zinc silicate, is still in very common usage.

By coating a sheet of mica with the fluorescent material and placing it in a tube, as in Figure 1, an investigator named Braun (German, pronounced Brown), made the first cathode ray oscillograph tube.

#### The Braun Tube.

To deflect the ray produced by a disc with a small hole (D), Braun used a pair of coils to which any rhythmic voltage could be applied. The spot on the screen (S) was focussed on the film (F), driven at a constant speed. The spot thus traced a line on the film, and when the spot was deflected out of its central position by current in the coils, the line shifted its position on the film. When the variations of current were rhythmic, the line took the form of a wave, as in Fig. 2. If the speed of the film was known, the frequency could be calculated, and the "wave form" of the "rhythm" could be seen easily from the shape of the line.

It was not long before Braun engaged a more skilful glass blower to make a tube with a flat end, and he could dispense with the sheet of mica by putting his fluorescent material directly on the flat end.

Because the screen had to be larger than the cathode end of the tube, the conical-shaped bottle came into being.

#### Electro-Static Deflection.

If the ray from the cathode was just a stream of negative charges,

then, it was argued, it would be attracted by a positively-charged body, and repelled by a negatively-charged body. So, it was stated, if two plates were placed in the narrow end of the tube as in Fig. 3, then the spot could be made to move on the screen by simple application of a voltage between them.

Thus, another step forward was made, and a further advance came when two more plates (Fig. 4) were added to deflect the ray in another direction—at right angles to the first. With this tube it was possible to shift the spot to any part of the screen, simply by the application of appropriate voltages between the two pairs of plates.

#### The Hot Cathode.

In about 1890 it was known that certain materials, when heated, surrounded themselves with negative charges. They were literally "boiling" electrons from their surfaces. Naturally, they were left in a positively-charged state, having lost some of their negative electricity. The body could, therefore, hold the "cloud" of electrons, by virtue of its own attraction for them.

If, however, there were another body near at hand, with no cloud of electrons (or a smaller cloud), with a more positive charge than the first body had, then some of the electrons would be drawn towards it and, indeed, a current would flow between the two (Fig. 5). If the two "electrodes" were placed in a tube which



The Radiotron type 902 cathode ray tube, which is widely used in oscillographs in this country.

was evacuated to its practical limit (about one millionth of the original air), there were so very few particles of air in the way that the current could pass fairly easily.

In the tube shown in Fig. 6 a hot cathode bubbles off its electrons, and some of them go flying off at high speeds to the plate or anode (A). A few go on flying through the hole, and through the cylinder (C) to the screen (S). This was Wehrelt's tube of 1905. How the cylinder focusses the ray, and what happens to electrons when they have hit the screen will be the topic of next month's instalment of this series.

Focussing the ray to provide a very bright, small spot on the screen is a very important part of cathode ray work, and has been most necessary in the field of television.

### Zero Beat Radio Club. (Continued from page 19)

Wirsu; July 14: "An Advanced Reading on R.F. and Oscillator Circuits," by Mr. L. Hanaford; July 21: "R.F. Amplifiers," by 2IQ; July 28: General Meeting, and August 4: "Keying and Interference Elimination."

Those members who require morse practice are advised to listen to 2AFQ on 7017kc. on Sunday mornings, 10 to 10.30, or 2AJ0 on 14070 every Wednesday evening, 8 to 8.30. These stations are giving morse practice on behalf of the Club at the times specified, when the Club transmitter is off the air.

Any new members should enquire at the Club Rooms, 16-18 Bulletin Lane, Circular Quay, any Friday night.—"Russ."

### Hurstville Radio Club Notes.

(Affiliated with the W.I.A.)

By VK2MZ.

The club wish to announce their change of address, the new QRA being 13 Clevedon Road, Hurstville (bus to door), with meetings every Thursday night as usual. Any ham aspirant interested in the new QRA will be most cordially welcomed any Thursday, or is invited to write to J. Ackerman, Secretary, 34 Park Road, Carlton.

The Club has both the facilities and the room to accommodate three classes, two morse and one for lectures. Bench and 'phone panel are provided for morse reception in both cases, and can accommodate 24 members wishing to practise the code. Lectures are given every Thursday night, and if the Club can get a winning vote on a certain subject it will meet every Tuesday night as well as the regular meeting on Thursday nights.

The rig is on the air once more, and as usual still have the old "Q5, R max." signal. The club has obtained licences for two more members, through their everlasting efforts, and look very much like repeating the same standard at the next A.O.P.C. examination. The YL member is keener than ever and we hope that she has tons of luck in her attempt to obtain a licence in the near future.

Anyone interested in ham radio, no matter how little their knowledge, should come along as tuition is one of the Club's specialities.

Wishing "Radio World" all the success it deserves.—G. J. Boyd.

## Australia's Pioneer Radio Training Institution

ESTABLISHED 22 YEARS

*Complete Courses of Instruction in all branches of Radio*

### RADIO ENGINEER:

Highly specialised training in every branch of Radio Engineering, including practical training at the A.W.A. Radio Centres at Pennant Hills and La Perouse, in addition to workshop instruction at the A.W.A. Radio-Electric Works and Laboratory.

### RADIO TECHNICIAN:

Training includes instruction for the P.M.G.'s Broadcast Operator's Certificate of Proficiency. Practical instruction at the School and A.W.A. Radio Centres. The School is equipped with modern C.W. and I.C.W. and broadcast transmitters.

Call, Write or Phone **BW 2211**

For free 40-page illustrated prospectus.

### WIRELESS OPERATOR:

The only School in Australia equipped with complete Marine and Aircraft Wireless Stations, Direction Finding and Auto-Alarm equipment to enable students to qualify for the P.M.G. Commercial and Aircraft Operators' Certificates. 95 per cent. of operators in the Australian Mercantile Marine are Marconi School graduates.

### TALKING PICTURE OPERATOR:

Theoretical and practical training on standard theatre equipment.

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Advanced theoretical and practical courses in broadcast receivers and servicing.

*Engineering and Technician sections are under the direct control of Dr. W. G. Baker, B.Sc., B.E., D.Sc.E.*

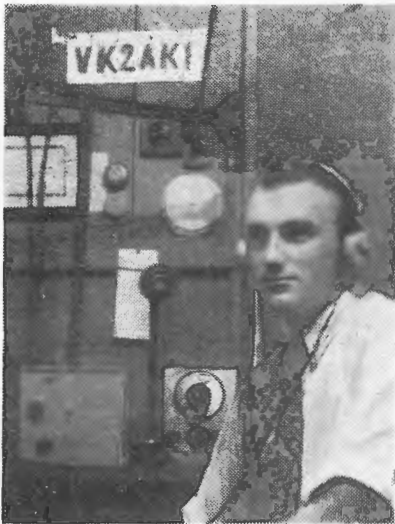
## MARCONI SCHOOL OF WIRELESS

97 Clarence Street, Sydney.

163 Queen Street, Melbourne, C.I.

*Conducted under the auspices of Amalgamated Wireless (Asia) Ltd.*





VK2AKI, of Taree, with his five-metre transceiver built for him by VK2AEY to Don B. Knock's design (featured in the April, 1938, issue of "Radio World").

# 160 Miles On 5 Metres

*In the article below, VK2AKI describes the equipment he used to put up the DX record reported in the April "Radio World".*

*By E. FALLOWFIELD*

**M**Y interest in five metres began by VK2AEY suggesting that I try out one of the small transceivers he had constructed. The transceiver was promptly taken home and experiments began. The 41 type valve was replaced by a 42 as it gave more gain. This is the same transceiver I was using at the time my signals were heard 160 miles away in Lidcombe by Mr. C. Bambury, and was built entirely by Mr. W. Eagling (VK2AEY).

The efficiency of these small transceivers is extremely high, and it is quite possible that what has been done once can be repeated, irrespective of weather conditions. I can recommend this type of equipment to those who are not in a position to invest in more elaborate gear, but who would like to use up parts on hand and have the thrill of being able to get down on "five."

## 2AEY And 2AKI Building New Transmitters.

More efficient transmitters are now being completed by VK2AEY and VK2AKI, and it won't be very long before we are able to carry out further experiments. VK2AEY's receiver uses the 1851 type of valve, and timber is ready for the construction of an outside rotary beam antenna. I am also building a new receiver—the four-valve superhet designed by VK3TH, and described by him in "Radio World."

Since my DX record with two watts has been established, a great deal of interest has been shown by the short-wave listeners of Taree, in particular, by Messrs. S. Gough and P. Potts (AW497DX), whose co-operation in our experiments has been most beneficial. Week-end trips to Comboyne and Bulga Plateau are contemplated very shortly, as these are the highest peaks around Taree. They are approximately 20 miles air-line from here.

It won't be very long before quite a few of the amateurs will be spending some of their time down on "five," and I hope those interested in this band will get just as much kick out of it as I do. I'll never forget the thrill of having received Mr. C. Bambury's report that my signals had been heard in Lidcombe. I was indeed very surprised, as I thought with using such low power I would be only getting out over the back-yard fence. I might also add that real experimenting takes place when using the least possible input, as the best possible adjustments are required.

## Further Tests On "Five."

Low power has achieved results equal to the high-powered transmitters on other amateur bands, which is proved by VK2ABL's experiments with an input of three watts on 20, 40 and 80 metres, so why not down on 5 metres. Test transmissions from VK2ABY and VK2AKI will be conducted on most Sundays.—Elwyn

Fallowfield (AW243DX) (VK2AKI), Taree, N.S.W.

## Leaves From A Serviceman's Diary.

(Continued from page 20)

good earth will very often reduce power or electrical interference.

(2) Aerial broken or scraping an earthed object.

Make sure the aerial is intact and not touching a metallic object.

See (3), (4), (5), (6) and (8) "Fading," which may also be applied to "noisy operation." The latter fault is very often accompanied by fading.

Other defects: Dust between condenser plates, gang not earthing properly, faulty contacts on wave-switch, aerial disconnected, necessitating volume being turned full on.

Note: Next month a special instalment will be devoted to various troubles encountered through faulty aerial, earth or house wiring installations. Of course, the serviceman who does not hold an electrician's licence is not permitted to tamper with the house wiring. Nevertheless, there are other ways in which he may rectify many of the troubles created in a radio receiver by such faulty installation.s

# What's New In Radio

## 44-Page Prospectus For Radio Students.

Inquiries are regularly received from "Radio World" readers who are interested in breaking into radio professionally, and who want to know the best way of doing so. The following extract, taken from a letter just to hand from a reader in Gyra, N.S.W., contains some typical questions:—

"I am keen to get into the radio profession, and would like to know the best way to go about it. Would the training given by a correspondence course enable me to qualify as a serviceman or design engineer? If so, how long would such a course take to complete and how much would it cost?"

These details, and many others referring to the various correspondence courses in radio that can be taken, are answered in the prospectus entitled "Radio—The Industry of Opportunity," issued by the Marconi School of Wireless. Comprising 44 pages, and printed on heavy art paper with two-colour cover, the book is lavishly illustrated throughout with photographs illustrating the many opportunities there are available in radio to-day.

Important facts about the radio industry are dealt with in the first two-page article, which is followed by "The To-morrow of Radio," an article by Sir Ernest Fisk, F.Inst. R.E., A.M.I.E. (Aust.), Chairman, Amalgamated Wireless (A'sia) Ltd.

The growth of the Marconi School of Wireless, which was established in Sydney in 1913, is then reviewed, and the equipment provided for the use of students described. This includes an extensive range of modern wireless equipment installed as complete stations, and a student thus has at hand equipment similar to that used in coastal, ship and broadcasting stations.

There are five courses in all, brief details of each being given below.

**Course A—Radio Engineering**—qualifies students in the design, manufacture and operation of all types of transmitting and receiving equipment,

while, in addition, papers are given on facsimile transmission and television.

**Course B—The Radio Technician**—covers the work necessary to obtain the P.M.G.'s Broadcast Operator's Certificate of Proficiency. In addition, instruction is given on broadcast transmissions, studio design, acoustics and broadcast relay work.

**Course C—Radio Operator**—is designed to enable students to pass the examinations for First and Second-Class Certificates of Proficiency in Wireless as issued by the P.M.G.'s Department.

**Course D—Talkie Picture Operator.** This course gives theoretical and practical instruction on the efficient operation of talkie equipment and in locating and repairing faults in projectors, amplifiers, etc.

**Course E—Radio Mechanic**—gives students a thorough technical and practical knowledge of the construction, operation and servicing of receivers of all types.

Following is a synopsis of this course:—Construction of Matter. The Electron Theory. Theory of Electricity and Magnetism. Alternating Current Theory. Rectification. Radio Frequency Theory. The Thermionic Valve. Aerials. Detection and Radio Frequency Amplification. Audio Frequency Amplification. Receivers. Power Supply Equipment. Fire Underwriters' Rules and Regulations. Sound Reproduction. Loudspeakers. Apparatus for Testing and Adjusting Receivers. Trouble-finding in Receivers.

Examinations are held periodically, and successful students receive the Marconi School Certificate of Proficiency.

Copies of this prospectus are available to "Radio World" readers free and post free from the Marconi School of Wireless, 97 Clarence St., Sydney.

*A monthly review of latest releases  
in sets, kit-sets and components*

## Palec "G" Series All-Wave Oscillators.

Exceptionally high accuracy of frequency calibration is an important feature of the new Palec type "G" series of all-wave oscillators released recently by the Paton Electrical Pty. Ltd., of 90 Victoria St., Ashfield, N.S.W. There are six models in the



This 26-valve Palec Primary Frequency Standard is used for calibrating the new "G" series of oscillators. An accuracy of to within .0001 per cent. can be maintained by checking against Greenwich time.



do you like  
listening too?

Everyone likes listening when there's something that pleases the ear. If your radio is dull and lacks sparkle, worn valves may be the cause. Make listening the pleasure it should be ...

Revalve with



THE WORLD'S  
STANDARD  
RADIO VALVES

Specify . . . RADIOTRONS  
for the "Economy Fidelity  
Amplifier" described in this  
issue.



An internal view of the Palec "G" type oscillator.

range, for a.c., a.c./accumulator and dry cell operation. Three of these units are oscillators only, while the remaining three incorporate built-in multi-range output meters.

The frequency range of all models is from 160 kc. to 24 mc. This range is covered in six steps which are selected by means of the range switch on the front panel. The tuning dial is direct reading in frequency for all bands, and can be set within an accuracy of half of one per cent.

Next to accuracy and flexibility, the two most important requirements of an oscillator of this type are complete control of output and a minimum of signal leakage. As shown in the following, particular attention has been paid to both these features in the new Palec "G" series.

Frequency range: The frequency range is from 160 kc.'s to 24 mc.'s. This range is covered in six steps, which are selected by means of the range switch on front panel. The tuning dial is direct reading in frequency for all bands, and can be set with an accuracy within half of 1%.

Output: The output voltage is continuously variable by means of a slide wire resistance and a 4-step ladder network. The output impedance is 45 ohms on the 1, 10 and 100 steps of the network. The accuracy of repeat readings of the slide wire and network is within 1%. The r.f. oscillator is of the balanced Colpitts type, and is stabilised to prevent fre-

quency drift due to changes in line voltages, etc.

The output of the r.f. oscillator is fed into an equalising circuit and thence into an r.f. amplifier. The output of this amplifier is then coupled to the attenuator. This amplifier serves four purposes.

1. Due to the use of a compensating arrangement in the grid and plate circuits, the output is reasonably flat over each band and also all bands are very even in output level in respect to each other.

2. No reflection of attenuation controls on r.f. carrier frequency is possible owing to these being isolated from the carrier oscillating circuit.

3. Modulation is effected by introducing the 1000 cycle audio voltage in series with the amplifier grid resistance. With this method, frequency modulation is eliminated.

4. Due to modulation being effected in the amplifier valve, the percentage modulation is extremely constant on each band and for all bands. The modulation percentage in this oscillator is fixed at 30%.

The modulating voltage is obtained from a separate 400-cycle audio oscillator of low harmonic content, and high stability, and can be switched in or out of circuit.

Leakage: The leakage is really low for this class of oscillator, due to the use of a well-designed oscillator circuit and good shielding.

By the use of an external dummy antenna of standard I.R.E. specifications, the output impedance is made substantially zero as far as the set under test is concerned.

Taken all round, these new "G" series oscillators are well-built, highly accurate instruments that in both service and production work should give entire satisfaction in all respects. Further details can be obtained free on request from the Paton Electrical Pty. Ltd., 90 Victoria St., Ashfield, N.S.W.



### Second Radiotron Service Lecture.

The second of the series of Radiotron Service Lectures was held in Sydney on June 8 last, the lecture being given by Mr. L. M. Williams, of the Valve Company's laboratories.

This second lecture dealt with detectors and audio amplifiers. Prin-



This under-chassis view illustrates the robustness of the assembly.

ciples of operation of various types of detectors—leaky grid, anode bend, infinite impedance, etc., were explained in detail. Requirements of the ideal amplifier were then discussed, transformer and resistance coupling systems being described in detail. Finally, the advantages and drawbacks of triodes, pentodes and tetrodes when used as power output amplifiers were explained.

This series of lectures has been arranged by A.W. Valve Company for radio technicians throughout Australia. Each lecture is being made available in printed form, and copies are available free on request to the Company, P.O. Box 2516 BB, G.P.O., Sydney.

★

### Series 46 Mallory Precision Vibrators.

E.T.C. Industries Ltd. announce the arrival of stocks of the series 46 Mallory vibrator. Electrical characteristics are as follows:—

Primary rated voltage is 6.3, with a range of from 5 to 9 volts. The maximum primary current at rated voltage is 7.5 amps. Frequency is 115, plus or minus 7 cycles, with time efficiency of 90%. Series 46 is the synchronous rectification type with eight contacts, and driver coil is shunt type. The physical dimensions are 1½" diameter and 3¼" long, excluding prongs.

Accompanying the above data, which was supplied by E.T.C. Industries, of 470-480 Elizabeth Street, Sydney, are three vibrator circuit diagrams with all values shown and including complete power transformer specifications. Further particulars regarding these new vibrators are available to "Radio World" readers free on request from the above address.

★

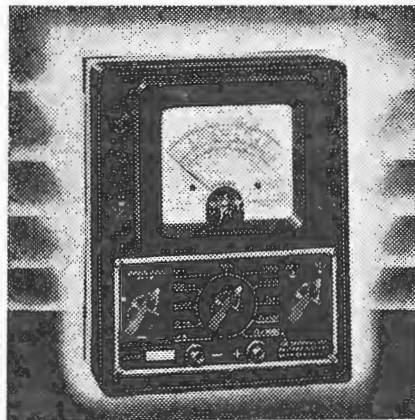
### H.M.V. 1.4-Volt Mantel Model.

The Gramophone Company Ltd., of Sydney, advise that, while a 1.4-volt portable receiver is not at present included in the H.M.V. range of receivers, their newly-released mantel Model 41, though primarily intended for domestic service only, could be used for many portable applications.

A 4-valve model drawing .25 amperes "A" current and 10 milliamperes "B" current, it possesses many



The Symbol of  
**QUALITY**  
Test Equipment!



### "PALEC" MODEL "M" MULTI RANGE METERS

A new range of multi-meters, known as the "M" series, is now available. These instruments will appeal strongly to all service-men and experimenters because of their reliability, utility and moderate price.

A solid cast aluminium case, measuring 8in. x 6in. x 2½in., is used to house all four types. The basis of each instrument is the new "PALEC" Model K400 rectangular moving coil meter, which gives excellent accuracy and legibility on a scale 3½in. in length.

#### RANGES:

Volts—10, 50, 250, 1,000.

Current—1, 10, 50, 250 Ma.'s, D.C.

Resistance in three ranges from 1 of an ohm to 1.5 megohms.

Model MCD: 1,000 ohms per volt, D.C. only .....	£4 15 0
Model MCA: 1,000 ohms per volt, A.C. and D.C. volts .....	£6 17 0
Model MXD: 10,000 ohms per volt, D.C. only .....	£6 15 0
Model MXA: 10,000 ohms per volt on both A.C. and D.C. volts .....	£8 17 0

NOTE: The unusual provision of 10,000 ohms per volt on the A.C. section of Model MXA enables the instrument to be employed in lieu of a Vacuum Tube Voltmeter over a wide range of audio applications.

### THE EVER POPULAR V. C. T. Complete Valve & Circuit Tester

This well known model combines in one instrument rapid direct reading tests of all types of valves for both merit and leakage, together with complete circuit testing facilities, comprising:—Multiranges of D.C., A.C. and OUTPUT VOLTS, MILLIAMPS, OHMS (from a tenth of an ohm to 10 megohms). It also provides INSULATION TESTS, the checking of PAPER CONDENSERS for open circuit and leakage, and the direct reading tests of ELECTROLYTIC CONDENSERS at working voltages.

The model VCT and the "PALEC" all wave Oscillator may be described as the serviceman's right and left hand, and with them every possible check



can be made on a receiver—from the aerial coil right through to the speaker voice coil.

## PATON ELECTRICAL PTY. LIMITED

90 VICTORIA STREET, ASHFIELD, SYDNEY  
'Phones: UA1960-1982

#### DISTRIBUTORS:

Sydney: Leading Distributors. Melbourne: Lawrence and Hanson Electrical Co. Ltd.; Homecrafts, Ltd., 211 Swanston Street, Melbourne. Brisbane: Lawrence and Hanson Electrical Co., Ltd. Adelaide: Newton, McLaren Ltd. New Zealand: The Electrical Lamp House, Ltd., Wellington. Perth: Caryle and Co.





features that will ensure for it a ready market. These include the use of the new 1.4-volt beam power output valve, which it is claimed provides double the normal sensitivity and reduces distortion. Other features are drift-free permeability i.f. tuning, high efficiency iron-cored litz-wound aerial and i.f. coils, floating-deck chassis construction, air type trimmer condensers throughout, two-speed slow motion tuning and new type 6" speaker with exceptional sensitivity.

Further details of this receiver are available free on request from the Gramophone Co. Ltd., 2 Parramatta Rd., Homebush, Sydney, N.S.W.

★

### New Calstan De Luxe Valve Tester-Set Analyser Combination.

A de luxe model valve tester-set analyser combination known as the Model 223A is announced by Slade Radio Pty. Ltd., of Lang St., Croydon, N.S.W., makers of the well-known Calstan test equipment.

Housed in a leatherette-covered cabinet measuring 14½" x 12" x 8", the instrument is sturdily built and attractively finished, being provided with an etched, matt finished nickel silver panel and new 3½" rectangular type "R" Calstan meter. Fundamentally, the model 223A is the popular Calstan 223 with built-in provision for operation from a 6-volt accumulator, an Oak non-synchronous vibrator and transformer being incorporated to convert the 6-volt d.c. input to 240

volts a.c. The power pack for a.c. operation is housed behind the panel, a type 1V rectifier being used.

The valve tester checks all American type valves as well as European "P" and "V" types, eleven filament voltages from 1.5 to 30 volts being available. Wide variations in line voltages are taken care of by the 22 primary tapings provided on the transformer. "Bad—?—Good" and percentage indicator scales are provided, together with a neon leakage indicator.

On the multi-meter side, the instrument will check A.C. (and output) volts up to 1250, D.C. volts up to 1250, D.C. milliamps up to 250, and resistance from .5 ohm to 10 megohms.

In addition, a separate pair of terminals is provided for measuring output voltages in the a.c. voltage, ranges, obviating the use of an external isolating condenser.

A final function of the instrument that servicemen will find invaluable is the provision that has been made for checking paper, mica or electrolytic condensers.

Further details of this new Calstan instrument, which carries an unconditional guarantee for twelve months, can be obtained from Slade's Radio Pty. Ltd., Lang St., Croydon, N.S.W.

A new Calstan meter price list is also available free on request, data being given on approximately 100 standard meter types, as well as on accessories such as special scales, shunts, multipliers, rectifiers, etc.

★

### Seven New Brimar Releases.

A selection of data sheets covering latest Brimar valve releases is just to hand from Mr. J. L. Coote, manager radio receiver division, Standard Telephones & Cables Pty. Ltd.

Seven new types are covered, all being intended for a.c./d.c. applications. Brief details are given below:—

**Brimar 12A8GT** is a pentagrid type converter designed for service as a combined oscillator and mixer. Except for the heater, which draws .15 ampere at 12.6 volts, the characteristics of this valve are the same as those of the 6A8GT.

**Brimar 12F5GT** is a triode designed for service as a resistance-coupled audio frequency amplifier. Except for the heater rating (12.6 volts, .15 am-

pere), its characteristics are the same as those for the 6F5GT.

**Brimar 12K7GT**, which also has a 12.6 volt .15 ampere heater, is similar to the 6K7GT, and is a pentode type amplifier with remote cut-off characteristics, designed for service as a high frequency amplifier.

**Brimar 12Q7GT** is a duo-diode triode type valve designed for service as a combined diode detector, a.v.c. rectifier and audio frequency amplifier. Its characteristics are the same as those of the 6Q7GT, except for the heater rating (12.6v., .15 amp.).

**Brimar 25A6GT** is a pentode type power amplifier designed for service in the output stage of a.c./d.c. receivers. Brief characteristics are as follows:—Heater voltage 25 volts, heater current .3 ampere, maximum plate voltage 180, maximum screen voltage 135, bias -20 volts, amplification factor 100, plate and screen currents 38 and 7.5 m.a., respectively, load resistance 5,000 ohms, total harmonic distortion 10%, power output, 2.75 watts.

**Brimar 35L6GT** is a tetrode type power amplifier designed for service in the output stage of a.c./d.c. receivers. Heater 35 volts .15 ampere, maximum plate and screen voltage 110 volts, bias -7.5 volts, amplification factor 80, maximum signal plate and screen currents 41 and 7 m.a., respectively, load resistance 2,500 ohms, total harmonic distortion 6.5%, power output 1.5 watts.

**Brimar 35Z4GT** is a high vacuum type rectifier designed for use as a half-wave rectifier in a.c./d.c. receivers. Heater rating 35 volts .15 ampere, maximum a.c. plate voltage (r.m.s.) 250 volts, maximum d.c. output current, 100 m.a.

★

### Two New Releases In Mullard Luxury Series.

Following upon the introduction several months ago of the initial Mullard release for 1939—the Broadcast Luxury Model 43, reviewed in last month's "Radio World"—comes the announcement of two more releases in the Mullard Luxury Series, the dual-wave models 61 (for a.c. operation) and 62 (for battery or vibrator operation).

Both models are housed in a one-piece moulded bakelite cabinet in figured walnut, larger than that used for the Model 43, but of similar attractive proportions and design.

Waveband coverage is from 540 to

1600kc. (covering the extended broadcast waveband decided upon at the Cairo Convention of 1938), and from 13 to 38 metres on the short waves. The large verti-scale dial with horizontal pointer introduces a new note in dial calibration, in that the actual place names are given for Australasian broadcast stations, together with extra large call-signs for all principal stations. The main international bands are indicated on the shortwave section, ensuring ease of station location. In the a.c. model, "magic eye" tuning is provided; using an EM3 Electron Star tuning indicator. Special provision is made to ensure positive indication on the short waves.

Valve equipment for the Luxury Model 61 comprises a 6U7G r.f. amplifier, EK2G frequency converter, EBF2 i.f. amplifier, detector and a.v.c., EL3G power output, 5Y3G full wave rectifier and an EM3 Electron Star tuning indicator.

The Luxury Model 62 (available for battery or vibrator operation) employs a KK2 octode frequency converter, KF3 i.f. amplifier, 1F7G diode detector, a.f. amplifier and a.v.c., and a KL4 output pentode.

★

### Two New Ultimate Receivers: S.W. Station List Free To Readers.

Messrs. Geo. Brown & Co. Pty. Ltd., of 267 Clarence St., Sydney, announce the release of two new Ultimate receivers, one an eight-valve all-wave a.c. superhet., and the other a six-valve all-wave vibrator-operated model. Waveband coverage on both models is from 13 to 100 metres on the short waves, and from 550 to 1500kc. on the broadcast band.

During the past few years the manufacturers of Ultimate receivers have built up an enviable reputation in regard to the exceptionally fine distance-getting qualities of their receivers. This is undoubtedly largely due to the years of research that have been devoted by Ultimate engineers to perfecting all-wave coil assemblies, and to designing coils and i.f. transformers with the highest possible gain.

For example, one of the "star" features of these two new Ultimate receivers is the use of a six-gang tuning condenser. Three of the gangs tune the shortwave coils separately, while for the broadcast band the other three gangs are paralleled with the

first three. This gives the highest possible gain on the short waves, with excellent accuracy in tracking, and as well gives what really amounts to semi-bandspread tuning.

Detailed reviews of both these receivers will be published in next month's "Radio World." In the meantime, readers wanting further in-

formation immediately are invited to write to the agents at the address given above for free data on both models. As well, enquirers will be sent free and post free a complete and up-to-date list of 400 world short-wave stations showing call signs, wavelengths, frequencies and schedules in Australian times. This list

## THREE NEW SIX-INCH ROLA MODELS IDEAL FOR PORTABLES

**Application.**—This series of reproducers has been designed for use in all types of receivers where space is at a premium and where it is not convenient to energise the magnet of the speaker from the set itself. The series is applicable to all types of mantle and table model battery receivers, portables, various types of car radio, multiple speaker, installations for any other similar use.

All three speakers are by far the most outstanding 6-inch permanent magnet types ever marketed, and have been designed so that manufacturers can obtain the greatest possible gain from the signal input of a receiver or amplifier. Because of their high efficiency, 6-8, 6-11 and 6-15 enable a receiver to be designed to operate with extremely low battery consumption. They make the most of the low power output of 1.4 volt valves.

**Response Characteristics.** — Never before have 6-inch speakers been capable of reproducing such a wide range of frequencies, a factor which will be thoroughly appreciated by manufacturers of mantle, table and portable type receivers.

**Power Handling Ability.**—6-8, 6-11 and 6-15 have been designed to handle the normal output of standard output valves used in console, table and portable receivers without distortion.

**Efficiency.**—The high grade of steel

used in the magnets, together with the careful design of the magnet structure and attendant components, result in a speaker of abnormally high efficiency. The oval-shaped magnets are of optimum dimensions to concentrate the greatest amount of magnetic force in the air gap.

**Dustproof And Acoustic Filter.**—The new Rola dustproof and acoustic filter completely protects the air gap from dust and fine metallic particles. The diaphragm is suspended by a moulded fibrous spider, the support of which is perforated to prevent the building up of back pressure. The perforations are covered by a porous material to exclude dust and grit. By rivetting the filter instead of screwing, a further improvement has been effected and another movable part dispensed with.

**Transformer.**—All three speakers are fitted with the new compact isocore transformer, which possesses the qualities that make the original isocore so generally acceptable. The new transformer is housed in an attractive streamlined case, fitted, so that it does not project beyond the rim of the speaker.

**Terminals.** — These speakers are normally fitted with 20" leads and four-pin plugs. Standard connections.

**Mounting And Installation.**—The Rola 6-8, 6-11 and 6-15 are interchangeable in mounting with other standard speakers.

Abridged Specifications.—	6-8	6-11	6-15
Overall diameter of cone housing	6 $\frac{5}{8}$ "	6 $\frac{5}{8}$ "	6 $\frac{5}{8}$ "
Diameter of baffle opening	5 $\frac{3}{4}$ "	5 $\frac{3}{4}$ "	5 $\frac{3}{4}$ "
Total depth of speaker, including transformer	3 $\frac{1}{4}$ "	3 $\frac{1}{4}$ "	3 $\frac{1}{4}$ "
Depth of speaker from pad-ring to back of magnet	2 $\frac{7}{8}$ "	3 $\frac{1}{8}$ "	3 $\frac{1}{4}$ "
Vertical dimension of magnet	2 $\frac{3}{4}$ "	2 $\frac{3}{4}$ "	2 $\frac{3}{4}$ "
Horizontal dimension of magnet	2 $\frac{3}{8}$ "	2 $\frac{3}{8}$ "	2 $\frac{3}{8}$ "
Radius of mounting holes from centre of pole piece	3"-3 $\frac{1}{4}$ "	3-3 $\frac{1}{4}$ "	3"-3 $\frac{1}{4}$ "
Diameter of voice coil	$\frac{3}{4}$ "	$\frac{3}{4}$ "	$\frac{3}{4}$ "
Voice coil impedance at 400 cycles	3.7 ohms	3.7 ohms	3.7 ohms.
Weight of speaker packed	3lbs.	3 $\frac{1}{4}$ lbs.	3 $\frac{1}{2}$ lbs.
Weight of speaker nett	2 $\frac{1}{2}$ lbs.	2 $\frac{3}{4}$ lbs.	3lbs.
Shipping measurements of standard park of 10 speakers	1'6"	1'6"	1'6"

comprises stations actually logged in Sydney on an Ultimate receiver and is completely up-to-date.

★

### New Brimar 1.4-Volt Releases.

The release of five new 1.5-volt Brimar valves is announced by Mr. J. L. Coote, manager, radio division, Standard Telephones & Cables. The main characteristics are as follow:—

**Brimar 1B7G** is a pentagrid converter recommended for dual-wave receivers. Filament voltage 1.4, current .1 ampere, maximum plate and screen voltages 90 and 45, respectively, plate and screen currents 1.5 and 1.3 mills., respectively. Plate resistance 350,000 ohms, conversion conductance 350.

**Brimar 1E4G** is a medium mu triode with a 1.4-volt .05 ampere filament. Recommended plate and grid voltages, 90 and -3 volts, respectively. Plate current 1.5 mills., plate resistance 17,000 ohms, mutual conductance 825, amplification factor 14.

**Brimar 1G4G** is also a medium mu triode with a 1.4-volt .05 ampere filament. Plate and grid voltages are 90 and -6 volts, plate current 2.3 mills., plate resistance 10,700 ohms, amplification factor 8.8.

**Brimar 1P5G** is a super control r.f. amplifier pentode with a 1.4v. .05 amp. filament. Maximum plate and screen voltages 90 volts, plate and screen currents 2.3 and .7 mills., respectively, plate resistance 800,000 ohms, mutual conductance 800, amplification factor 640.

**Brimar 1Q5G** is a beam power amplifier with a 1.4-volt filament drawing .1 ampere. With 90 volts on plate and screen and a bias -4.5 volts, plate and screen currents are 9.5 and 1.6 mills., respectively. Recommended load for rated output is 8,000 ohms, and power output is .27 watts.

★

### Rola Factory Catches Up With Record Speaker Orders.

Following is a summary of a statement issued last month by the Rola Company (Aust.) Pty. Ltd., of Melbourne:—

"This year an unprecedented demand is being made for Rola speakers and, with buying pressure unrelentingly maintained, the factory has been called upon to supply up to 50% greater output than had been anticipated.

"To those distributors, manufacturers and other members of the trade who have been inconvenienced

by our temporary inability to supply their complete orders when required, we express our sincere regrets. Now

that our output has been brought up to a satisfactory level, the position has been alleviated."

## Sixth S.W. DX Contest

### Won By J. C. Linehan Of Adelaide

By ALAN H. GRAHAM.

VERY many of the 50-odd cards submitted for the Sixth Short-Wave DX Contest conducted by the "Radio World" were of exceptionally high standard. The task of determining the winner of the handsome trophy offered—a Replogle Globe—was no easy one, in view of the difficulties encountered in arriving at some satisfactory method of comparing the merits of the verifications submitted.

After a great deal of deliberation, the judges decided in favour of Mr. J. C. Linehan, of Adelaide, South Australia, whose winning verification confirmed his reception of station FZE-8, Djibouti, operating on 17.36 metres, on August 4, 1938. In the verification it was stated that reports from Australia regarding reception of FZE-8 were very rare indeed; only two had been received, one from Mr. Linehan and the other from a Victorian S.W.L., both of these reports reaching Djibouti at about the same time. For this reception Mr. Linehan used an 8-tube superheterodyne.

In addition to his winning entry, Mr. Linehan also submitted cards from CR7BH, Mozambique, on 25.6 metres, and the following 20-metre amateurs:—VK9DK, New Guinea; FA3HC, Algeria, 50 watts; HA1P, Hungary, 60 watts; FNIC, French India, 75 watts; VS2AL, Fed. Malay States, 5 watts; VQ8AE, Mauritius, 30 watts.

Honourable mention this month goes to the following competitors:—

Mr. D. J. Hastings, of Brisbane, Queensland, whose best card was from ZC6HS, Palestine, on the 20-metre amateur band, confirming his first report from Australia. Other 20-metre cards forwarded by Mr. Hastings were from HB9CH, Switzerland, 40 watts; GM2UU, Scotland, 25 watts; GW8HI, Wales, 25 watts; and ES5C, Estonia, 50 watts. Receiver is a 7-tube superhet.

Mr. A. R. Payten, of Coffs Harbour, N.S.W., who submitted a most interesting card from VK9RC, New Guinea, confirming reception of 40-metre phone signals transmitted with a power of only  $\frac{1}{2}$  to  $\frac{3}{4}$  of a watt.

Other cards from Mr. Payten, who uses a 6-tube dual-wave receiver, were from the 10-metre amateurs, W6PMB, 500 watts, and W9ZLH, 225 watts; and the well-known U.H.F. station, W6XKG, 11.56 metres.

Mr. C. D. Keen, of Ashburton, New Zealand, whose best card was from OZ1U, Denmark, 20-metre band, power only 10 watts. Others entered by Mr. Keen, who uses a 5-tube superheterodyne, were from VU2CA, India, 20 metres, 10 watts; and LU-7BC, 40 metres, 700 watts, first report from New Zealand.

Mr. H. I. Johns, of Nelson, New Zealand, who differed from most of the other competitors in forwarding only verifications from commercial stations. The following were logged and verified by Mr. Johns on his 4-tube t.r.f. receiver:—Radio Malaga, 20 metres; Radio Salamanca, 28.93 metres; TG2X, 50.5 metres; H12X, 25 metres; CR7BH, 25.6 metres; XEBT, 50 metres; and YV1RH, 47 metres.

Mr. G. A. E. Major, of Manjimup, Western Australia, who submitted cards from ZOI, in Ceylon, 48.70 metres; ZRD, Durban, 30.75 metres; and ZHJ, Penang, 49.4 metres; and also from the 20-metre amateur G3FA, using only 10 watts.

Miss Joy McKenzie, of Takahiwa, via Ruakaka, New Zealand, who submitted a considerable number of entries, many of which were from broadcast band stations in North America. While these cards were of considerable merit, they were, unfortunately, ineligible, as the rules of the contest definitely restricted entries to stations operating between 5 and 100 metres. The best shortwave verifications submitted by Miss McKenzie were from CSW, 30.81 metres; ZHP, Singapore, 30.96 metres; XTJ, Hankow, 25.66 metres; HCJB, Ecuador, 24.08 metres; and LKJ-1, 31.4 metres.

In conclusion, we would like to congratulate the abovementioned competitors on the very high standard of many of their verifications; in many cases these represented really excellent DX, and those submitting them were unfortunate in that only one trophy could be won.

# Shortwave Review

CONDUCTED BY  
ALAN H. GRAHAM

## Latest Station Changes And Schedules.

### Angola.

CR6AA, Lobito, now transmits mainly on 7614kc., 39.39m.; occasionally on 7177kc., 41.75m., but seem to have dropped their 9666kc., 31.04m., channel.

CR6RC, Luanda, operated by the Radio Club of Angola, is reported on 11740kc., 25.55m., on a schedule of 5 to 6.30 a.m. every Wednesday, Friday and Sunday.

### Australia.

According to advices from the P.M.G.'s department, the new short-wave transmitter in Perth will be on the air in August. The call-sign will be VLW, followed by a numeral to indicate the frequency in use. VLW will operate on 6130kc., 48.94m.; 11830kc., 25.36m., and on 9560 or 9570 kc., 31.38 or 31.33m. Aerial power will be 2 kilowatts.

### Burma.

The latest schedule for XYZ, Rangoon, 6007kc., 49.9m., is noon-2 p.m., and 9.30 p.m.-1 a.m. XYZ's programmes are also carried by XZZ on 3488kc., 86.0m.

### Canton and Other Pacific Islands.

Several experimental stations located on various Pacific islands are using a channel on 8100kc., 37.0m. The stations concerned are:—KF6DW, Canton Is.; KC6CKM, Wake Is.; KG-6HCO, Jarvis Is.; and KF6ODC, Enderbury Is. These stations also operate on the 20-metre amateur band.

### Chile.

Times at which the various CB stations close in the afternoons are:—CB1190 (25.21m.) at 2.30 p.m.; CB-1180 (25.04m.) at 2.30 p.m.; CB1174 (25.55m.) at 2.30 p.m.; CB1170 (25.65m.) at 2.30 p.m.; CB970 (30.85 m.) at 3 p.m.; and CB960 (31.25m.) at 3 p.m.

### China.

The full schedule of the Chinese Government stations at Chungking is now available.

Transmission 1: 7-9.30 a.m.; for Europe; XGOY, 25.21m. (will change to 31.58m. on September 21).

Transmission 2: 12.30-2.30 p.m.; for North America; XGOX, 16.85m. (will change to 19.75m. on September 21).

Transmission 3: 8.30-10.15 p.m.; for East Russia, East and North China; XGOY, 25.21m.

*Latest station changes and schedules ★ The month's loggings ★ Ultra-high-frequency notes ★ Amateur review and calls heard ★ Hourly tuning guide.*

Transmission 4: 10.15-11 p.m.; for Japan; XGOY, 25.21m.

Transmission 5: 11 p.m.-1.30 a.m.; for South China and Philippine Is.; XGOY, 25.21m.

Transmission 6: 2-2.30 a.m.; for Moscow; XGOY, 25.21m.

### Cuba.

Closing times for the Cuban transmitters:—COJK (34.64m.), at 1.30 p.m.; COKG (33.44m.), at 2 p.m.; COCD (32.08m.), at 3 p.m.; COCO (49.92m.), COCH (31.8m.) and COCX (25.57m.), at 3.30 p.m.; COCM (30.6 m.) at 4 p.m.; COBC (30.02m), COCA (32.95m.) and COCW (47.4m.) at 4.30 p.m.

### Dominican Republic.

Changes in call-signs are reported for stations HIN and HIZ; they are now known as HI1N and HI1Z.

### England.

Latest B.B.C. allocations are:—GSU, 7260kc., 41.32m.; and GSW, 7230kc., 41.49m. (U for Unity; W for Westminster).

### Ethiopia.

IABA, Addis Ababa, on 9650kc., 31.09m., now transmits on a regular schedule from 2 to 3 a.m. and from 4 to 6 a.m. Occasionally transmissions are continued after 6 a.m.

## ALL-WAVE ALL-WORLD DX CLUB

### Application for Membership



The Secretary,  
All-Wave All-World DX Club,  
214 George 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.]



## Guatemala.

TGWC is a new station reported from this country. As yet no details of frequency are to hand. Station relays TGW.

## Iran (Persia).

Tests are being carried out by 20 kilowatt transmitter at Teheran, using the call-sign EQB, on 6155kc., 48.74m. Other channels to be tried later are EQC, 9680kc., 30.99m.; and EQA, 8950kc., 33.52m.

## Iraq.

As mentioned last month, the latest station in Baghdad is HNF, 9830kc., 30.52m. Schedule is midnight to 6 a.m. HNF relays YI5KG. QRA for both stations is Qasr-el-Zahoor Broadcasting Station.

## Lithuania.

LYR, Kaunas, 9290kc., 32.29m., is on the air daily from 3 to 4 p.m., and from 3 to 5 a.m.

It is also reported that the amateur station LY1J carried out a series of special broadcasts to America and Australia on the 20-metre band.

## Manchukuo.

The latest Eastern station on the air is MYCY, 6125kc., 48.98m. Comes on the air at 11.30 p.m., with a news session a quarter of an hour later.

## Roumania.

The Bucharest station on approx. 9190kc., 32.6m., is reported as on the air till 8 a.m., with a brief news session in English at 7.50 a.m.

## South Africa.

Revised frequencies and calls of the South African transmitters:—ZRG, 9523kc.; ZRL, 9600kc.; ZRH, 6007kc.; ZRK, 6097kc.; ZRJ, 6097kc.; ZTO, 4876kc.; and ZRO, 9752kc.

## Switzerland.

The new Swiss transmitter at Schwarzenburg should be on the air by the time these notes are published. With a power of 25 kilowatts, it will operate on the six regular broadcast bands (13 to 49m.) with programmes for America, East Africa and Asia.

## United States.

Latest schedules for the G.E. stations:—

W2XAD: 13m., 10 p.m.-1 a.m.; 19m., 1.15-8 a.m.; 31m., 8.15 a.m.-12.15 p.m.

W2XAF: 31m., 6 a.m.-2 p.m.

W6XBE: 31m., 3-6 p.m. and 10 p.m.-3 a.m.

W6XBE: 19m., 9.30 a.m.-2.15 p.m.

## Vatican City.

The following six frequencies are now used by the Vatican City station:—17840kc. (16.82m.), 15120kc. (19.84m.), 11740kc. (25.55m.), 9660kc. (31.06m.), 9550kc. (31.41m.) and 6190 kc. (48.47m.).

English sessions are heard at the following times:—Tuesdays, at 11.30 p.m. (25m.); Wednesdays, at 1.30 a.m. (19m.); Fridays at 5 a.m. (48m.); Saturdays at 5 a.m. (48m.); Mondays at 4 a.m. (19m.).

## 41-Metre Broadcast Band.

According to a decision of the recent Cairo Conference, a new broadcast band will come into being on September 1—between 7200 and 7300kc.

This band is limited to European stations, and already several countries have placed transmitters on the air on this band, or are planning to do so.

England: GSU and GSW. France: TPB. Germany: DJI (7290kc., 41.7m.). Italy: 2RO-11 (7220kc., 41.58m.). Portugal: CSW-8 (7260kc., 41.3m.).

## News Sessions In English.

In view of the present unsettled international situation, readers may be interested in the following news sessions in English:—

From London: At 2 a.m., 4 a.m. (except Sundays), 7.30 a.m. (Sundays at 7.15 a.m., Mondays at 7.05 a.m.), 10.45 a.m. (Mondays at 10.30 a.m.), 2 p.m. (Sundays at 1.30 p.m.), 4.30 p.m. and 11.15 p.m.

From Berlin: At 5 p.m., 10 p.m. and midnight.

From Holland: At 10.45 p.m.

From Rome: At 2.05 a.m., 4.20 a.m., 9 a.m., 10.30 a.m. and 9 p.m.

From Tokyo: At 5.35 a.m., 11.05 a.m., 3.35 p.m. and 11.25 p.m.

From Chungking: At 9 a.m., 1.20 p.m. and midnight

## Congratulations from W.A.

Firstly, allow me to add my congratulations to you on your fourth year of publication, among the many others received.

I have been a regular and keen reader ever since the first issue, and never once has the standard of the magazine dropped. In fact, it has become more and more interesting, especially in the Shortwave section; this, without a doubt, is due to the work put into it by Mr. Graham, our live-wire Shortwave Editor.

On reading the leading American S.W. journals, one finds quite a list of "brick-bats" thrown by readers (or so-called readers). This would be almost impossible in the case of the "Radio World," as it would indeed be a very dissatisfied reader who could find anything wrong.

A welcome reappearance in the new "R.W." is the "Radio Ramblings"; also the new cover is very attractive.—

G. O. la Roche (AW155DX).  
Official Observer for W.A.

## This Month's Loggings.

This month we present in a different manner the information forwarded by the "Radio World" Official Observers. Below we list all stations reported during the past month—the names in brackets indicating the Observers supplying the information. In order to save space the regular London, Berlin, Rome, Moscow, Paris and Tokyo transmitters are omitted, except where reception of them is under circumstances of peculiar interest. Stations are grouped according to the countries in which they are located.

### SOUTH AMERICA.

#### Argentina.

LRX, 9660kc., 31.06m., Buenos Aires. Hear either on opening at 9 or 9.30 p.m., or in the afternoons before closing at 2.30 p.m. (Crowley, Anderson).

LRA-1, 9690kc., 30.94m., Buenos Aires. Opens between 7 and 9 a.m.; fairly strong at times (Keen).

#### Peru.

OAX5C, 9380kc., 31.98m., Ica. Heard during afternoons; closes at 2.30 p.m. (later on Sundays), with English announcements (Johns).

OAX4T, 9566kc., 31.38m., Lima. Strong signal on opening at 10 p.m.

OAX1A, 6335kc., 47.33m., Ica. Heard well before closing at 3.05 p.m. Verifies promptly (Johns).

OAX4J, 9340kc., 32.12m., Lima. Good strong signal after 2.30 p.m.; time of closing varies from 2.45 p.m. till as late as 4 p.m. on Sundays. Will verify despite reports to the contrary (Crowley, Johns, Anderson).

#### Paraguay.

ZP-14, 11720kc., 25.6m., Villarica. Irregularly around 8.30 a.m.

#### Brazil.

PSH, 10220kc., 29.35m., Rio de Janeiro. Occasionally heard at very weak strength at 9 a.m.

#### Uruguay.

CXA-6, 9620kc., 31.19m., Montevideo. Difficult to log; relays CX-6 till noon; weak signals around 7 a.m.

CXA-8, 9640kc., 31.12m., Colonia. Widely reported at present; best in the afternoons, until 4 p.m. on Sundays (Crowley, Anderson).

CXA-2, 6002kc., 49.98m., Montevideo. Doubtful; afternoons.

#### Bolivia.

CP-1, 9892kc., 30.33m., Sucre. Heard with a fair signal at 10.30 a.m., till close at 11 a.m. (Johns).

#### Venezuela.

YV5RM, 5000kc., 60m., Caracas. Reported from West Australia; early morning there (about 9 a.m., E.S.T.) (Anderson).

## Chile.

CEC, 10670kc., 28.12m., Santiago. Reported in New Zealand, from 10 a.m. till closing at 10.30 a.m.; weak (Johns).

CB960, 9600kc., 31.25m., Santiago. Good strong signal nightly at 10 p.m., with programme of physical exercises.

CB970, 9730kc., 30.83m., Valparaiso. Best on Sunday afternoons till 3 p.m.

CB1180, 11970kc., 25.06m., Santiago. Strong signal daily till closing at 2 p.m. (Johns).

CB1170, 11700kc., 25.65m., Santiago. Heard in the afternoon; closing around 2.30 p.m. (Johns).

## Ecuador.

HC2JB, 12460kc., 24.08m., Quito. Still heard at 10 p.m.

## CENTRAL AMERICA AND WEST INDIES.

### Cuba.

COCQ, 8830kc., 33.98m., Habana. Opens nightly at 9.55 p.m.; also heard until close at 4 p.m. (Crowley, Anderson).

COBZ, 9030kc., 33.32m., Habana. Good signal; opens at 10.45 p.m.; "Radio Salas" (Anderson).

COCH, 9437kc., 31.8m., Habana. Nightly at 11 p.m. (Crowley, Anderson).

COJK, 8665kc., 34.64m., Camaguey. Reported at good strength in West Australia at 10 a.m. (E.S.T.). Also heard at 10 p.m. in Eastern States (Anderson).

COBX, 9200kc., 32.59m., Habana. Either on opening at 11 p.m. or just before closing at 2.30 p.m. (Crowley, Anderson).

COCM, 9805kc., 30.6m., Habana. Rather weak; at 11 p.m. or 3-4 p.m.

COBC, 9995kc., 30.02m., Habana. Best at night, opening at 9.55 p.m. (Anderson).

COCX, Habana. Listed on 11735kc., but recently heard on approx. 11905 kc., 25.2m. Signs at 3 p.m. (Johns).

COGF, 11800kc., 25.42m., Matanzas. Afternoons till closing at 3 p.m.

COCO, 6010kc., 49.92m., Habana. Afternoons till 3.30 p.m. (Keen, Crowley).

COCA, 9100kc., 32.95m., Habana. Afternoons; closes at different times between 3.15 and 6 p.m. (Anderson).

COCW, 6324kc., 47.4m., Habana. Best at night, opening at 9.55 p.m. (Anderson).

### Dominican Republic.

HI2X, 15270kc., 19.65m., Ciudad Trujillo. Difficult to log; best chance is at 10.40 p.m. on Sundays.

### Costa Rica.

TIPG, 9620kc., 31.19m., San Jose. One of best evening stations on crowded 31-metre band. Opens at 10 p.m. with march.

TIPG, 6410kc., 46.8m., San Jose. Fair signal till closing at 2.30 p.m. (Johns).

## Guatemala.

TG-2, 6190kc., 48.4m., Guatemala City. Regular Sunday afternoon station; often on the air till 6 p.m.

TGWB, 6490kc., 46.2m., Guatemala City. Nightly from 10.45 p.m.

TGWA, 9685kc., 30.96m., Guatemala City. Special DX programmes on Sunday afternoons at excellent strength; till 6.30 p.m. (Johns, Keen, Anderson).

TGX1, 6135kc., 48.91m., Guatemala City. Latest Guatemalan station; reported on Sundays, 3-6 p.m., with special programmes for U.S.A. (Johns).

## Panama.

HP5A, 11700kc., 25.65m., Panama City. Rather weak on opening at 10 p.m.

HP5K, 6005kc., 49.96m., Panama City. Regular station, opening nightly at 10 p.m. (Crowley).

HP5J, 9600kc., 31.25m., Panama City. Opens nightly at 10 p.m.; no announcements in English. It is understood that a special English session is put over on Sunday afternoons.

## El Salvador.

YSP, 10400kc., 28.85m., San Salvador. Reported from New Zealand. Signals very weak, 1-2 p.m. (Johns).

## NORTH AMERICA.

### Canada.

CJRX, 11720kc., 25.6m., Winnipeg. Afternoon reception; till 3 p.m. weekdays, till 7 p.m. Sundays (Crowley).

### Mexico.

XETW, 6045kc., 49.6m., Tampico. Irregular station; can be heard at times on opening at 11 p.m. (Crowley).

XEWW, 9500kc., 31.58m., Mexico City. Good signal till 3.30 p.m.; also heard occasionally after 11 p.m. (Johns, Anderson).

XEGW, 6110kc., 49.1m., Mexico City. Heard around midnight.

XEXA, 6135kc., 48.9m., Mexico City. A regular signal at 10.30 p.m.; programme of physical jerks.

XEBT, 6000kc., 50m., Mexico City. Identify by three cuckoo calls. Heard after 3 p.m., closing before 3.30 p.m. (Johns).

XEW1, 11900kc., 25.21m., Mexico City. Good signal during afternoons; closes at 3 p.m.

### United States.

W1XK, 9570kc., 31.35m., Boston. Weak, but audible before closing at 3 p.m. (Anderson).

W1XAL, 11790kc., 25.45m., Boston. Opens at 6.15 a.m., but best around 8 a.m.

W1XAL, 6040kc., 49.65m., Boston. Heard in afternoons till closing at 4 p.m. (Johns, Anderson).

W2XE, 9650kc., 31.09m., New York.

Weak; afternoons (Anderson).

W2XE, 6170kc., 48.62m., New York. Strong signal in afternoons; closes at 3 p.m. (Johns).

W2XE, 17830kc., 16.81m., New York. New frequency for this transmitter; evenings opening at 9.30 p.m. (10 p.m. Saturdays and Sundays). (Keen, Crowley).

W2XE, 11830kc., 25.36m., New York. Altered schedule reduces chances of logging; occasionally between 1 and 2 p.m.

W2XAF, 9530kc., 31.48m., Schenectady. From 6 a.m.; best around 7 a.m. (Anderson).

W2XAD, 9550kc., 31.41m., Schenectady. From 8.15 a.m.; occasionally strong signal.

W3XAU, 9590kc., 31.28m., Philadelphia. Difficult to log; reported from West Australia till 2.30 p.m. Only on air Tuesdays, Fridays and Sundays (Anderson).

W3XAL, 9670kc., 31.03m., Bound Brook. Good strong signal in early afternoon, till closing at 3 p.m. (Anderson, Crowley).

W3XAU, 6060kc., 49.5m., Philadelphia. Good afternoon station; from 3-4 p.m. (till 5 p.m. on Sundays). (Johns, Anderson).

W3XL, 17780kc., 16.87m., Bound Brook. Around mid-day; good signal (Crowley, Johns).

W4XB, 6040kc., 49.65m., Miami Beach. Afternoons till 3 p.m. (Keen, Johns).

W6XBE, 15330kc., 19.56m., San Francisco. Fair signal around mid-day. Don't be misled by Spanish session.

W6XBE, 9530kc., 31.48m., San Francisco. One of best 31m. stations; every night at 10 p.m. (Anderson, Crowley).

W8XAL, 6050kc., 49.5m., Cincinnati. Old reliable of 49m. band. Afternoons, but better 8.45-9.45 p.m. (Crowley, Johns).

W8XK, 11870kc., 25.26m., Pittsburgh. Mornings and early afternoons till 2 p.m. (Anderson).

W8XK, 6140kc., 48.83m., Pittsburgh. Afternoons till 3 p.m. (Johns).

KKZ, 13690kc., 21.91m., Bolinas. Special relays; afternoons; will not verify (Crowley).

## PACIFIC.

### Tahiti

FO8AA, 7100kc., 42.25m., Papeete. Wednesdays and Saturdays from 2-3 p.m. (Johns, Keen).

### New Caledonia.

FK8AA, 6122kc., 49m., Noumea. Irregularly between 5.30 and 7.15 p.m.

### Papua.

VHSU, Port Moresby, 6540kc., 45.86m. This station is reported again around 7 a.m.

## THE EAST.

### Ceylon.

VIO, 6160kc., 48.7m., Colombo. Regular night station with good signal around 11 p.m. (Crowley).

### Siam.

HS4PJ, 6125kc., 48.98m., Bangkok. One of "newest" Asiatics. Weak signals on some nights at 11 p.m.  
HS6PJ, 9510kc., 31.55m., Bangkok. Several nights a weeks at 11 p.m.

### Malaya.

ZHJ, 6090kc., 49.25m., Penang. Back on air again; opens 9.40 p.m.  
ZHP, 9690kc., 30.96m., Singapore. Regular night station; best around 10 p.m. (Keen, Crowley).

### Philippines.

KZIB, 9500kc., 31.58m., Manila. Good signals at night (Crowley).  
KZRM, 9570kc., 31.35m., Manila. Good signals at night; best after 11 p.m. (Crowley).  
KZHS, 9580kc., 31.32m., Manila. New station.  
KZEG, 6180kc., 48.51m., Manila. New station; relays KZRM, and is heard from 9 p.m.

### India.

VUD-2, 9590kc., 31.28m., Delhi. From 10.30 p.m. (Crowley).  
VUD-4, 15290kc., 19.62m., Delhi. Heard around mid-day (Anderson).  
VUD-3, 15160kc., 19.79m., Delhi. Reported in West Australia (Anderson).  
VUD-2, VUM-2, VUB-2 and VUC2, 60.48 to 61.98m. Heard after midnight at good strength (Anderson, Johns).

### Burma.

XYZ, 6007kc., 49.9m., Rangoon. Good solid signal around midnight (Anderson).

### French Indo-China.

Saigon, 6116kc., 49.05m. Very loud signal around 10 p.m. Also testing on 11780kc., 25.47m. (Anderson).

### Manchukuo.

JDY, 9920kc., 30.24m., Darien. Nightly 10-11 p.m. (Anderson).  
MTCY, 6125kc., 48.98m. New station which opens at 11.30 p.m.

### Taiwan.

JFO, 9635kc., 31.13m., Taihoku. Regular, but not very strong; till 1.30 a.m. (Crowley).

### China.

XPSA, 42m., Kweiyang. Exact frequency still uncertain; given variously as 6980, 7010 and 7140kc.; believe former to be correct. Very strong from 9 p.m. (Crowley).  
XOJD, 6880kc., 43.6m., Hankow. Nouncements in English.

Nightly from 9 to 11.30 p.m., with an-  
XGX, Shanghai. Listed as 9300kc., but reported as testing on approx. 9680kc., 30.99m. (Johns).

XMHA, 11850kc., 25.32m., Shanghai. Still heard regularly (Crowley, Anderson).

XGOY, 11900kc., 25.21m., Chungking. Good signal at night; also heard during morning transmission. See schedule elsewhere in S.W. Section. (Anderson, Crowley).

XGAP, 9560kc., 31.38m., Peking. Heard very well in N.Z. Jap. programme (Johns).

XGRV, 11380kc., 26.36m., Chungking. Call also given as XTS. From 11 to 11.35 p.m. (Anderson).

XGOK, 11820kc., 25.38m., Canton. New station; closes around 11.30 p.m. with English news.

### Dutch East Indies.

YDD, 6045kc., 49.6m., Bandoeng. We understand this is correct call of this station (previously listed as YDA). Same schedule as other NIROM transmitters (Anderson, Johns).

PMH, 6720kc., 44.64m., Bandoeng. Never seems to vary; very strong signal (Crowley, Payten).

YDF-2, 4810kc., 62.37m., Solo. Best of low-frequency DEI stations; heard well in west (Johns).

YDX, 7220kc., 41.55m., Medan, Sumatra. New station; carries NIROM programme at times; also native music similar to PMH.

### Japan.

JVP, 7510kc., 39.95m., Nazaki. Irregular; but heard well when on air (Crowley).

JLG, 7285kc., 41.18m., Tokyo. Does not seem to be in regular use at present; heard occasionally early morning (Payten).

## AFRICA.

### Spanish Morocco.

EA9AH, 13997kc., 21.43m., Tetuan. Operates both as broadcast and amateur transmitter (Johns).

### Ethiopia.

IABA, 9650kc., 31.09m., Addis Ababa. Early morning station.

### Kenya.

VQ7LO, 6082kc., 49.31m., Nairobi. Good signal in early morning, 4 to 5 a.m.

### South Africa.

ZRH, 6007kc., 49.95m., Roberts Heights. Can be heard at times between 6 and 7 a.m.

### Mozambique.

CR7AA, 6137kc., 48.87m., Lourenco Marques. Fairly good signal till 7 a.m. daily.

## EUROPE AND NEAR EAST.

### Spain.

RR-6, 11990kc., 25.02m., Vittoria. Irregular, and not very strong; after 8 a.m. (Johns).

Malaga, 14440kc., 20.78m. Variously reported between 7 and 11 a.m. (Johns).

Burgos, 7210kc., 41.6m. Good signal around 6.30-7 a.m.

### Denmark.

OZH, 15165kc., 19.78m., Skamleboek. Very good signal at 7 a.m.; news session till 7.15 a.m. (Crowley).

### France.

TPB, 7280kc., 41.27m., Paris. Good early morning signal on new broadcast band (Payten).

### U.S.S.R.

RV-96, 6040kc., 49.75m., Moscow. Strong signal till 7 a.m. (Anderson).

### Italy.

2RO-1, 6085kc., 49.3m., Rome. New EIAR station; heard till closes at 7.30 a.m.

IRF, 9830kc., 30.52m., Rome. Heard weakly from 10.30 a.m.; at better strength in N.Z. Will verify (Johns).

IQY, 11675kc., 25.7m., Rome. Heard occasionally between 7 and 9 a.m.

### Portugal.

CSW-2, 11040kc., 27.17m., Lisbon. One of best morning signals (Keen, Payten).

CSW-7, 9735kc., 30.82m., Lisbon. Also heard in early morning at good strength (Anderson).

CSW-8, 7260kc., 41.3m., Lisbon. Another new station on recently allotted broadcast band. Till 8 a.m.

CSW-4, 15120kc., 19.83m., Lisbon. Reported testing at night.

### Irish Free State.

Radio Eireann, 9595kc., 31.27m., Moydrum, Athlone. Irregular; heard on some mornings at 7.30 a.m.

### Finland.

OIE, 15190kc., 19.75m., Lahti. Audible from 6.30 a.m., closing at 8 a.m.

### Norway.

LLG, 9610kc., 31.22m., Oslo. Heard regularly, although not at loud strength, in 6-9 a.m. transmission.

LKQ, 11740kc., 25.56m., Oslo. Comes in fairly well in the early mornings.

LKJ, 6130kc., 48.94m., Oslo. Same programme as LKQ; early morning.

### Turkey.

TAP, 9465kc., 31.7m., Ankhara. One of best morning signals on 31m. band. Closes with short English announcement around 8 a.m.

**Yugo-Slavia.**

**YUA**, 6100kc., 49.18m., Belgrade. Best around 7 a.m.

**Switzerland.**

**HBO**, 11400kc., 26.31m., Geneva. Good signal on Monday afternoons, closing at 4.15 p.m. (Anderson).

**HBJ**, 14535kc., 20.64m., Geneva. Special broadcasts (Anderson).

**Belgium.**

**ORK**, 10330kc., 19.04m., Ruysselede. Regular early morning station.

**Sweden.**

**SBO**, 6065kc., 49.46m., Motala. Good signal, 7.15-8 a.m.

**SBP**, 11705kc., 25.63m., Motala. Good signal in mornings till 7 a.m.

**SBT**, 15155kc., 19.79m., Motala. New station; heard from 6 a.m. till closing at 7.15 a.m.

**SBU**, 9535kc., 31.46m., Motala. New station; from 7.15 a.m., but difficult to log as only 5kc. from **W2XAF**.

**Lithuania.**

**LYZ-4**, 15310kc., 19.6m., Kaunas. Difficult to log, as now very weak at night.

**Poland.**

**SP-19**, 15120kc., 19.84m., Warsaw. Might be just audible on opening at 9 a.m. (Johns).

**SP-25**, 11740kc., 25.55m., Warsaw. As above (Johns).

**Germany.**

**DZH**, 14460kc., 20.75m., Berlin. Heard on special broadcasts to Buenos Aires, around 10.30 a.m. (Johns).

**Holland.**

**PCJ**, 9590kc., 31.28m., Huizen. On Mondays or Wednesdays in early morning, 6-7 a.m., or Wednesdays after noon (Anderson).

**PCJ-2**, 15220kc., 19.7m., Huizen. 6-7.30 p.m. Tuesdays, or nightly at 10.30 p.m. (Crowley).

**PHI-2**, 17770kc., 16.88m., Huizen. Very weak at night.

**Canary Islands.**

**EAJ-43**, 10360kc., 28.96m., Tenerife. Best 6-7.30 a.m. (Johns).

**Ultra-High Frequency Notes.**

During the past month UHF conditions have varied a good deal; generally conditions were only fair, and at times all bands were very poor. Best results were to be had on the 11-metre band, where several of the stations mentioned last month continue to be heard fairly regularly. Below 11 metres not much of interest was noted, as signals were usually

very weak, and heavy QSB made identification difficult.

**Loggings.**

**11 Metres:**

**W4XA**, 26150kc., 11.47m., Nashville. The best signal on the band at present, peaking after mid-day. A highlight during the month was a description of the Louis-Galento title fight (Ferrier).

**W6XKG**, 25950kc., 11.56m., Los Angeles. Also a regular signal; best in the early afternoons (Payten).

**W8XNU**, 25950kc., 11.56m., Cincinnati. Rather difficult to log on account of QRM from **W6XKG**. Heard best round 10 a.m.

**W2XGU**, 26550kc., 11.3m., New York. A new logging; heard several times relaying **WMCA**. Signals weak, and difficult to identify; best at 10 a.m.

**W9XA**, 26450kc., 11.33m., Kansas City. Weak.

**9 Metres:**

**W9XPD**, 31600kc., 9.49m., St. Louis. Heard once or twice during the month, but very weak. Band now very patchy.

A new station, located in San Francisco, on approx. 31500kc., 9.4m. Heard very weakly a number of times early in June; difficult to identify, but believed to be **W6XI**.

**Police Stations:**

On several occasions reasonably good signals were noted from the various police transmitter frequencies on 9 metres. Sufficient time was not available for their identification.

**New Stations.**

Several new stations are reported from America. They include **W3XEF**, 33600kc., 8.93m., Baltimore. No schedule is known for this transmitter, which is probably connected with **W3XEY** in relaying **WFBR**.

Two new stations for 26100kc., 11.49m. (same frequency as **W9XJL**—more QRM) are **W2XUP**, New York; and a station relaying **WHB** in Kansas City. Power of these is 1 kilowatt and 100 watts, respectively.

**VK2MA Reported In New York.**

Readers will be interested to learn that the Sydney UHF transmitter, **VK2MA**, 42608kc., 7m., has been heard in New York. Mention of this outstanding DX feat is made in the latest bulletin of the Universal Radio DX Club of San Francisco.

**UHF Antennas.**

During recent weeks queries have been received from several readers as to the most suitable antenna for UHF reception. From personal experience compared with that of several of the "Radio World" Observers, it would seem that location has a considerable

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214 George Street, Sydney,  
N.S.W., Australia.

influence on the results obtained from various antennas. Personally, we have found an ordinary inverted L has given satisfactory results from 8 to 11 metres, being quite as efficient as various special tuned antennas which have been tried out.

Observer J. Ferrier, however, reports splendid results from his latest antenna. This is a 10-metre vertical doublet, fed with a twisted pair (about 45 feet), the bottom of the antenna being approximately 20 feet above ground level. This antenna is connected to the receiver by means of a 1-turn coupling loop (of 14g. wire) with the centre tap earthed. Observer Ferrier states that it is particularly effective on 11 metres.

#### Police Verification On 8 Metres:

From Observer J. Ferrier comes interesting information regarding a verification just to hand from the Beverly Hills, California, police transmitter. This confirmed his reception of their signals on 37100kc., 8.08m. Call letters are KQAL.

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#### Observers' Reports In Brief.

Mr. H. C. Craig . . . conditions on 10 metres very poor, only good loggings J2MI and SU1MW . . . on 20 metres conditions have been excellent, especially from 5-8 a.m. and 3-7 p.m. . . . logged quite a number of new stations, the one most important to me being W6BYR, Nevada, which gives me "Heard All States of U.S.A." . . . the South African ZS5Q was heard at 3.20 p.m. . . . altogether 48 countries this month on 20 metres.

Mr. V. D. Kemmis . . . am including a few 10-metre calls for the first time, ZE1JR being outstanding . . . conditions on 20 metres quite fair . . . quite a number of Europeans between 6:30 and 7:30 a.m., and from 3:30 to 6 p.m. . . . 42 countries this month, ZB2B, Gibraltar, being a very interesting logging. Since my last report I have installed a new receiver, which has given really excellent results. It is a "Sky-Raider DX Super Nine," covering from 8 to 600 metres. Sensitivity, selectivity and low noise-level are outstanding characteristics.

Mr. J. C. Taylor . . . good results on 20 metres between 7 and 8 a.m. and 4 and 6 p.m. . . . reception of good DX stations often marred by heavy QRM from VK's . . . VE's very good at present . . . best loggings for the month: VP3CO, British Guiana; IIRE, Italy; SM7MU, LA8C, TG5JG, CN8MT.

Mr. K. A. Crowley . . . commercial bands generally have been good, early morning reception being much better than at this time last year . . . South Americans excellent, TIPG, LRX,

CXA-8, etc., etc. . . . on the 20-metre amateur band conditions were very good at the end of June . . . many new Asiatic stations springing up between 39 and 49 metres.

Mr. C. Keen . . . reception very good this month . . . many American stations being heard between 3 and 7 p.m. . . . excellent results on 20-metre amateur band, many countries logged.

Mr. C. Anderson . . . I think there are more thrills on broadcast bands than on 20 metres . . . UHF bands quite "dead" here . . . a number of South Americans being heard here on 60-63 metres, but difficult to identify . . . YV5RM is one definitely logged.

Mr. A. R. Payten . . . low frequency bands poor, with high noise-level, and weak signals . . . a number of stations on 11 metres, but all except W6XEG too weak to identify . . . some strong W's and ZL's on 10 metres.

Mr. H. I. Johns . . . reception not of the best lately . . . may be due to very changeable and bad weather experienced here . . . veries received recently: VUD-2, JLT-2, DJH, 2RO-8, OIE, HIN, TAP, JLG, DJZ, W3XAL, VUB-2, W9XUP, XMHA, VUM-2, VPD-2 (19m.), HI2X, DJX, W2XE (19m.), T14NRH, YV1RH, SP-48, SP-31; and also a number of amateurs, including LU1DA, J3CX, HC2CC, CE-2BX, TG9BA, J2NG and HB9DO.

★

#### Amateur Review.

##### Present Conditions.

On 20 metres conditions have been fairly satisfactory—again this month the Calls Heard list includes about 50 countries—but, generally speaking, things have not been quite as good as earlier in the year. Best reception is during the periods 6.30 to 7.30 a.m., and 4 to 7 p.m. In the early mornings a few Europeans and South Americans are audible; and these stations are also to be heard after 4 or 4.30 p.m. From 2 p.m. the usual large number of W's, VE's and K6's put in good signals till about 7 p.m. Later there are PK's and KA's, with an occasional Central American or West Indies station. Africans have been scarce—although one or two ZS's have been noted around 4 p.m.

Reception on 10 metres has been disappointing. Conditions have been very patchy, and little really good DX has been noted. ZL's, W's and K6's make up almost the entire bag for the month.

For the first time a few 80-metre band loggings are included in the Calls Heard section.

##### Non-QSL-ing Amateurs.

We again publish a list of overseas amateur stations that will not QSL SWL reports.

#### Europe:

Portugal: CT1AY.  
Omit from England G5BJ.

#### Asia-Pacific:

China: XU8ET, XU8MC, XU9MK.  
Burma: XZ2DX.  
Hawaii: K6BAZ, K6BHL, K6FKN, K6GAS, K6ICL, K6ILW, K6KMB, K6LEJ, K6LTV, K6MVV, K6MVX, K6NZQ, K6NTV, K6NFY, K6OJI, K6OLX, K6PIT, K6JLV, K6KKP, K6OKN.  
Japan: J2CR, J2NG, J5CW, J6DU, J7CB.

Malaya: VS1AI, VS2AR, VS3AE.  
Dutch East Indies: PK4VR, PK4WS, PK2VD, PK1RR, PK6AJ.  
New Zealand: ZL2FY, ZL2BE.  
Dutch New Guinea: PK6XX.  
Philippines: KA1AP, KA1ER, KA1JM, KA1JR, KA1MG, KA1MM, KA1RB, KA1JZ, KA4LH, KA7EF.

Readers are requested to assist the Short-wave Editor in keeping this list accurate and up-to-date by forwarding additional calls for inclusion and also by notifying us if cards are received from any stations listed.

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#### Calls Heard.

Observers supplying information for this section were:—

10 metres: Messrs. Kemmis, Craig and Payten (N.S.W.), Ferrier (Vic.).  
20 metres: Messrs. Kemmis, Craig, Payten and Taylor (N.S.W.), Crowley (Vic.), Anderson (W.A.) and Keen (N.Z.).

80 metres: Messrs. Kemmis (N.S.W.) and Crowley (Vic.).

#### 10 Metres.

##### Africa.

South Africa: ZS5DD (Vic.).  
Southern Rhodesia: ZE1JR (N.S.W.).

Egypt: SU1MW (N.S.W.).

##### The East.

Japan: J2MI (N.S.W.).

##### Pacific.

Hawaii: K6-, PIT, PLZ, OQM, BNR, OTH, AIU, OQE (N.S.W., Vic.).

New Zealand: ZL- 1GI, 1MR, 1NG, 1HY, 1KJ, 2BE, 2BT, 2FR, 2FY, 2QS, 2RC, 3IF, 4AF, 4CM, 4FW, 4BK, 4GN (N.S.W., Vic.).

##### United States.

W- 2LHF, 2HWH, 2JCY, 3DOU, 4EJQ, 4FLS, 4FGF, 5URV, 5IDW, 5HCQ, 6GCX, 6HSR, 6PBD, 6PMB, 6POZ, 6QUX, 6HR, 6MOU, 6NKF, 6QGI, 6PQQ, 6NXQ, 8CJM, 8RSX, 8QXT, 9BIR, 9BHP (N.S.W., Vic.).

#### 20 Metres:

##### Europe.

England: G- 2PU, 2AV, 2UT, 2IU, 2XV, 2QV, 2MQ, 2QB, 2WD, 2CG, 3QD, 3DY, 3BM, 3AP, 3QK, 4AS,

4DC, 5RV, 5OV, 5BJ, 5RG, 5BQ, 5IV, 5LU, 6DT, 6JL, 6MZ, 6FS, 6KL, 6NI, 6WT, 6WX, 6RH, 6VQ, 6ZI, 6YU, 6AG, 6VX, 8MA, 8GP, 8IL, 8MX, 8NJ, 8GP, 6LK (N.S.W., Vic., N.Z., W.A.).

France: F- 3MN, 3RA, 8VP, 8NT, 8RV, 8QD, 8XT, 8MX, 8DC, 8UE, 8VP, 8LX, 8NX, 8TU, 8VE, 8KI, 8TK (N.S.W., Vic., W.A., N.Z.).

Holland: PA- MZ, EO, ER; PI- IJ (N.S.W., Vic., N.Z.).

Sweden: SM- 6RF, 7MU, 7XY (N.S.W., N.Z., Vic.).

Scotland: GM- 2UU, 5MW, 6RG, 6WD, 6FM (W.A., N.S.W., Vic.).

Belgium: ON4- DL, AM, OU, AJ, AR, VK, AU, HS, (N.S.W., W.A.).

Portugal: CTI- QN, ZA (N.S.W.).

Irish Free State: EI- 2L (N.S.W.).

Northern Ireland: G1- 2CC (N.S.W.).

Spain: EA- 7BA (N.S.W.).

Wales: GW- 2AA, 3KY (N.S.W.).

Finland: OH-2QM (N.S.W.).

Italy: I- 1RE, 7B (N.S.W.).

Switzerland: HB- 9DO, 9J (N.S.W.).

Hungary: HA- 1K, 5C, 8N (N.S.W.).

Gibraltar: ZB- 2B (N.S.W.).

Norway: LA- 1G, 8C (N.S.W., Vic.).

**Africa.**

Algeria: FA- 3HC (N.S.W.).

Egypt: SU- 1MW (N.S.W.).

Morocco: CN- 1AF, 8AU, 8BA, 8MT, 8MZ (N.S.W.).

Northern Rhodesia: VQ- 2PL (N.S.W.).

South Africa: ZS- 2AV, 2AF, 5Q, 5AW, 6AD, 6AW (N.S.W., Vic., W.A.).

Madagascar: FB- 8AH (N.S.W.).

**The East.**

India: VU- 2CQ, 2BG, 2FU, 2LL (N.S.W., Vic.).

China: XU- 8ET, 8RM, 8PL, 8NR, 8RB, 8AM (Vic., N.S.W.).

Burma: XZ- 2JB, 2DX (N.S.W., Vic.).

Japan: J- 2NF, 2MG, 2MI, 7CR (N.S.W., Vic.).

Korea: J- 8CI (Vic.).

French India: FN- 1C (N.S.W.).

Hong Kong: VS- 6AX, 6BE (N.S.W.).

Philippines: KA- 1AF, 1ME, 1FH, 1FX, 1LB, 1BH, 1AL, 1ER, 1FG, 1JM, 1JP, 1RB, 1ZL, 1CS, 1HS, 1MM, 3KK, 4LG, 7EF, 7HB, 7MA (W.A., N.S.W., Vic., N.Z.).

Dutch East Indies: PK- 1HB, 1RI, 1VY, 2JN, 2WL, 2AY, 2JD, 3MA, 3WI, 4VR, 4JD, 4KS (N.S.W., Vic., W.A.).

**Australasia And Oceania.**

Guam: K6- OCL (portable) (N.S.W.).

New Guinea: VK9- DK, VG, WL (N.S.W.).

Dutch New Guinea: PK6- XX, OM (N.S.W.).

Papua: VK- 4NK (N.S.W., Vic.).

Hawaii: K6- BAZ, BHL, BNR, JLV, KGA, LEJ, LKN, MVA, NYD, OTH, PPR, PQW, PTF, PLZ, CMC, IAE, OQE, CGK, PCJ, BJJ, AIU, ILW, OFW, PTW (all States and N.Z.).

**North America.**

Alaska: K7- AOC, AZS, GSC; W7- ESK (portable) (N.Z., N.S.W.).

Canada: VE- 1DQ, 1CR, 2CO, 3HI, 3HT, 3AHN, 3AG, 3AHA, 4KF, 4NI, 4AEF, 4LQ, 4WJ, 4BT, 4FR, 4IF, 4JV, 4ACP, 4ADV, 4AHX, 5AEJ, 5VO, 5OT, 5GQ, 5VP, 5FO, 5JB, 5ACN, 5ADV, 5EF, 5RV, 5FZ, 5QJ, 9ET, 3SM (all States and N.Z.).

Mexico: XE- 1BC, 1FY, 1CQ, 1GK, 1DT, 1FF, 2CN, 2AS, 2FC, 2JK (all States and N.Z.).

**Central America and West Indies.**

Cuba: CO- 2JJ, 2RH, 2LL, 2RA, 2WM, 2AM, 2WW, 2CW, 7CX, 8AR (all States and N.Z.).

Costa Rica: TI- 2RC; 3AV (W.A., N.S.W.).

British Honduras: VP- 1BA (N.S.W.).

Haiti: HH- 5PA, 2B (N.S.W.).

Guatemala: TG- 5JG, 9BA (N.Z. and N.S.W.).

Panama: HP- 1A (N.S.W.).

Porto Rico: K4- FAY (N.S.W.).

Dominican Republic: HI- 7G (N.S.W.).

Barbados: VP- 6TR, 6YB (N.S.W.).

British Guiana: VP- 3CO (N.S.W.).

Bahamas: VP- 7NU (N.S.W.).

**South America.**

Ecuador: HC- 1JW, 1FG, 2CC; HK- 5AR, 5EA (N.S.W.).

Brazil: PY- 2BH, 7BA, 9AL (N.S.W.).

Venezuela: YV- 1AQ, 1AP, 5AK, 5ABF, 5ABQ (N.S.W., N.Z.).

Argentina: LU- 1QA, 2AW (N.S.W., Vic.).

Peru: OA- 4AW, 4AI, 4C (N.Z., N.S.W., Vic.).

Chile: CE- 1AS, 1AF, 1AM, 1AH, 3DW (N.Z., N.S.W., Vic.).

80 Metres.

New Zealand: ZL- 1AD, 1DI, 1DU, 1HA, 1KE, 1LD, 1NO, 2BE, 2BW, 2FJ, 2FL, 2BN, 2GX, 2HX, 2SZ, 2UK, 2BH, 3CV, 3DC, 3HS, 3IC, 3IF, 4CU (N.S.W., Vic.).

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**SWL Card Exchangers' Section.**

J. Dyke, Hilbelinkspad 20, Winter-  
swyk, Holland.

M. Zeeman, Schipperstrat 4, Huizen,  
Holland.

J. C. Duchene, Gentiaans str. 5, Arn-  
hem, Holland.

M. Hanaar, Jr., Gov. Bidlostrat 80,  
The Hague, Holland.

Mrs. K. Smit, Groene Hilledyk 412-b,  
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P. J. Kavalecki (W9ZMN), Box 93,  
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ifax, Nova Scotia, Canada.

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ards, Sussex, England.

Tom Edgar, 9 Talfourd Rd., Peckham,  
London SE15, England.

Lou Grusd, 34 Milbourne Rd., Bert-  
rams, Johannesburg, South Africa.

Claude Lebeau, RFD No. 1, New  
Market, N.H., U.S.A.

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**Stop-Press News.**

**Radio Saigon.**

Information just to hand from  
Radio Saigon indicates that, in view  
of the numerous reports received  
from members of the All-Wave All-  
World DX Club, the station has de-  
cided to transmit a special pro-  
gramme for Australian listeners.  
This is on the air from 9.00 till 9.45  
p.m., E.S.T. Reports to Box 412,  
Saigon, will be appreciated.

**News From West Indies.**

From our West Indies representa-  
tive, Senor Rubio, the following in-  
formation regarding Latin-American  
stations:—

**Brazil:** Station PSE, on 14935kc.,  
20.08m., now transmits simultane-  
ously with PSH, on 10220kc., 29.35m.,  
from 9 till 9.30 a.m. daily, with a  
news session in Portuguese. Reports  
to Box 709, Rio de Janeiro.

**Guatemala:** The station on 6400kc.,  
46.88m., is TGWQ, announcing as "La  
Voz de Quezaltenango." Reports de-  
sired, to the Director-General of  
Communications, Guatemala City.

**Dominican Republic:** HI1G (was  
HIG), on 6250kc., 47.7m., and HI2G,  
9295kc., 32.28m., transmit simultane-  
ously from 9.40 p.m., from 2.40 a.m.,  
and from 6.40 a.m.

**Cuba:** COCQ is now on 8700kc.,  
34.46m., with a power of 5 kilowatts.  
Schedule is from 10.50 p.m. till 3 p.m.  
(next day).

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**List Of Manchukuo Stations.**

(Contributed by Akifusa Saito, "Radio  
World" Japanese correspondent).

K.C.	K.W.	Station
180	100	MTCY-2—Shinkio
560	10	MTCY-1—Shinkio
575	0.1	MTOY-1—Kinken
615	0.05	MTNY—Chamusu
674	3	MTFY—Harbin
760	1	JQAK-1—Dairen
785	0.5	MTKY—Enkichi

(Continued on page 48)



31.13	2RO-3	31.41	W2XAD	19.63	DJQ	25.24	TPA-3	29.24	PMN	58.3	PMY
31.28	W3XAU	31.45	DJN	19.66	GSI	31.28	VK2ME	30.23	JDY	70.2	RV-15
31.35	W1XK	31.48	W2XAF	19.74	DJB	(S)		30.96	GRX		
31.38	DJA	31.55	GSB	19.76	RW-96			30.96	ZHP		11 p.m.-midnight
31.41	W2XAD			19.79	JZK	7-8 p.m.		31.28	VK2ME	13.91	W2XE
31.45	DJN	Noon-1 p.m.		19.85	DJL			(S)		13.93	W8XK
31.48	W2XAF	11.47	W4XA	25.0	RNE	13.99	DJS	31.28	VK6ME	13.93	GSJ
31.55	GSB	11.56	W6XKG	25.53	GSD	16.81	DJH	(ex. S)		13.97	GSH
		16.85	XGOX	31.02	W3XAL	16.84	2RO-8	31.33	KZRM	15.77	HS6PJ
10-11 a.m.		16.87	W3XL	31.28	W3XAU	16.89	DJE	31.45	VPD-2	16.81	DJH
11.3	W2XGU	19.56	DJR	31.28	VK2ME	19.47	RW-96	31.49	ZBW-3	16.84	2RO-8
11.47	W9XUP	19.57	W6XBE	(S)		19.61	2RO-6	31.55	VK3ME	16.84	TPB-3
11.47	W4XA	19.63	DJQ	31.35	W1XK	19.63	DJQ	(ex. S)		16.84	GSV
11.56	W6XKG	19.66	DSI	31.45	DJN	19.74	DJB	42.98	XPSA	16.86	GSG
11.56	W8XNU	19.74	DJB	31.48	W2XAF	20.28	IQA	44.64	PMH	16.88	PHI
16.87	W3XL	25.24	TPA-3	31.55	GSB	25.4	2RO-4	48.7	VIO	16.89	DJE
16.89	DJE	25.26	W8XK	32.15	OAX4J	25.57	Saigon	49.05	Saigon	19.63	DJQ
19.56	DJR	25.42	DJZ	48.62	W2XE	25.6	JXW-3	49.5	W8XAL	19.68	TPA-2
19.57	W6XBE	25.49	DJD	48.83	W8XK	31.33	KZRM	58.3	PMY	19.71	PCJ-2
19.61	2RO-6	25.53	GSD	49.48	W3XAU	31.49	ZBW-3	70.2	RV-15	19.74	DJB
19.63	DJQ	25.57	W1XAL	49.5	W8XAL	31.55	VK3ME			19.79	JZK
19.74	DJB	25.61	TPA-4	49.65	W4XB	(ex. S)		10-11 p.m.		19.8	YDC
19.76	RW-96	31.02	W3XAL	49.67	W1XAL			13.93	W8XK	19.82	JLU-3
19.8	YDC	31.09	W2XE	50.0	XEBT	8-9 p.m.		13.93	GSJ	19.82	GSF
19.82	GSF	31.32	GSC	4-5 p.m.		13.99	DJS	13.97	GSH	19.85	DJL
19.95	RKI	31.38	DJA	13.99	DJS	16.81	DJH	13.99	DJS	25.21	XGOY
25.24	TPA-3	31.45	DJN	16.81	DJH	16.84	2RO-8	16.81	DJH	25.4	2RO-4
25.26	W8XK	31.48	W2XAF	16.89	DJE	16.89	DJE	16.84	2RO-8	25.42	JZJ
25.4	2RO-4	31.55	GSB	19.63	DJQ	19.47	RW-96	16.84	GSV	25.55	HVJ
25.42	DJZ			19.66	GSI	19.63	DJQ	16.86	GSG	25.7	IQY
25.49	DJD	1-2 p.m.		19.74	DJB	19.68	TPA-2	16.88	PHI	26.31	XGRV
25.53	GSD	11.47	W4XA	19.76	RW-96	19.74	DJB	16.89	DJE	27.27	PLP
25.61	TPA-4	11.56	W6XKG	19.79	JZK	19.8	YDC	19.63	DJQ	29.24	PMN
28.27	CEC	16.85	XGOX	19.83	TPB-6	25.21	XGOY	19.68	TPA-2	30.02	COBC
29.15	DZC	19.56	DJR	19.85	DJL	25.4	2RO-4	19.71	PCJ-2	30.52	IRF
30.52	IRF	19.63	DJQ	25.0	RNE	25.57	Saigon	19.74	DJB	30.6	COCM
31.02	W3XAL	19.66	GSI	25.24	TPA-3	25.7	IQY	19.79	JZK	30.96	ZHP
31.09	W2XE	19.74	DJB	25.53	GSD	27.27	PLP	19.8	YDC	30.96	GRX
31.13	2RO-3	25.04	CB-1180	31.28	W3XAU	29.24	PMN	19.82	GSF	31.06	LRX
31.25	RAN	25.24	TPA-3	(M, W, Th, Sat)		30.52	IRF	25.21	XGOY	31.18	TIPG
31.38	DJA	25.26	W8XK	31.28	VK2ME	30.96	ZHP	25.4	2RO-4	31.25	CB-960
31.41	W2XAD	25.42	DJZ	(S)		31.28	VK2ME	25.42	JZJ	31.25	HP5J
31.45	DJN	25.49	DJD	31.45	DJN	31.28	VK2ME	25.57	Saigon	31.28	VK2ME
31.48	W2XAF	25.53	GSD	31.55	GSB	(S)		25.6	JXW-3	(S)	
31.56	GSB	25.57	W1XAL	49.5	W8XAL	31.33	KZRM	27.27	PLP	31.28	VUD
		25.61	TPA-4	5-6 p.m.		31.45	VPD-2	29.24	PMN	31.33	KZRM
11 a.m.-noon		31.02	W3XAL	13.99	DJS	31.49	ZBW-3	30.02	COBC	31.37	OAX4T
11.3	W2XGU	31.09	W2XE	16.81	DJH	31.55	VK3ME	30.23	JDY	31.38	XGAP
11.47	W9XUP	31.32	GSC	16.89	DJE	(exc. S)		30.96	ZHP	31.45	DJN
11.47	W4XA	31.35	W1XK	19.63	DJQ	44.64	PMH	30.96	GRX	31.48	W6XBE
11.56	W6XKG	31.38	DJA	19.66	GSI	70.2	RV-15	31.06	LRX	31.49	ZBW-3
11.56	W8XNU	31.45	DJN	19.71	PCJ-2 (T)	9-10 p.m.		31.18	TIPG	31.51	HS6PJ
16.87	W3XL	31.48	W2XAF	19.74	DJB	13.93	GSJ	31.25	HP5J		(Th)
16.87	JZL	31.55	GSB	19.76	RW-96	13.97	GSH	31.25	CB-960	31.58	KZIB
16.89	DJE			19.83	TPB-6	13.99	DJS	31.28	VK2ME	31.8	COCH
19.56	DJR	2-3 p.m.		25.0	RNE	16.81	DJH	(S)		32.59	COBX
19.57	W6XBE	16.85	XGOX	25.24	TPA-3	16.84	2RO-8	31.28	VK6ME	33.32	COBZ
19.61	2RO-6	19.66	GSI	25.53	GSD	16.86	GSV	(ex. S)		33.5	COCQ
19.63	DJQ	25.04	CB-1180	26.31	HBO (M)	16.88	GSG	31.28	VUD	42.98	XPSA
19.74	DJB	25.53	GSD	31.28	VK2ME	16.89	PHI (S)	31.33	KZRM	44.64	PMH
19.76	RW-96	31.02	W3XAL	(S)		19.47	DJE	31.35	W1XK	46.2	TGWB
19.82	GSF	31.32	GSC	31.45	DJN	19.63	DJQ	31.37	OAX4T	48.4	TG-2 (S)
19.95	RKI	31.35	W1XK	31.55	GSB	19.68	TPA-2	31.38	XGAP	48.7	VIO
25.24	TPA-3	31.48	W2XAF	6-7 p.m.		19.71	PCJ-2 (S)	31.48	W6XBE	48.93	XEXA
25.26	W8XK	31.58	XEWW	13.99	DJS	19.74	DJB	31.8	COCH	48.94	HS4PJ
25.4	2RO-4	32.08	OAX5C	16.81	DJH	19.8	YDC	31.8	COCH	49.05	Saigon
25.42	DJZ	32.15	OAX4J	16.89	DJE	19.82	GSF	32.59	COBX	49.5	W8XAL
25.49	DJD	47.33	OAX1A	19.63	DJQ	25.0	RNE	33.32	COBZ	49.6	XETW
25.53	GSD	49.65	W4XB	19.71	PCJ-2 (T)	(S, W)		33.5	COCQ	49.9	COCO
25.61	TPA-4			19.74	DJB	25.21	XGOY	42.98	XPSA	49.96	HP5K
30.52	IRF			19.76	RW-96	25.4	2RO-4	44.64	PMH	58.3	PMY
31.02	W3XAL	3-4 p.m.		19.83	TPB-6	25.57	Saigon	48.4	TG-2 (S)	60.5	VUD-2
31.09	W2XE	13.99	DJS	19.74	DJB	25.6	JXW-3	48.7	VIO	61.1	VUM-2
31.13	2RO-3	16.81	DJH	19.76	RW-96	27.27	PLP	49.05	Saigon	61.4	VUB-2
31.25	RAN	16.89	DJE	25.0	RNE			49.5	W8XAL	61.9	VUC-2
31.38	DJA							49.96	HP5K	70.2	RV-15



805	0.05	JQBK—Anto
835	0.05	MTLY—Chichihar
890	1	MTBY-1—Hoten
915	0.05	MTHY—Shotoku
955	0.1	MTOY-2—Kinken
1015	0.05	MTGY—Botanko
1025	0.05	MTPY-1—Eiko
1065	1	JQAK-2—Dairen
1100	0.01	MTSY—Kokuga
1250	1	MTBY-2—Hoten
1260	0.01	MTRY—Hairar
1270	0.05	MTPY-2—Eiko

#### Shortwave Loggings For June.

On the 20-metre band during June the following stations were logged:— 2 W1's, 4 W2's, 1 W4, 3 W5's, 8 W6's, 1 W8, 1 W9, 2 K6's, 2 PK4's, 1 PK1, 1 PK6, 1 KA1, and 6 VK6's. 40m.: VK8, TW, VKSXT.

Commercials: XGOY, 25.21m.; DEL, on 19.27 and 29.31m.; ZBW, 31.49m., YDC, 19.8m.; XPSA, 42.98m.; KZIB, 31.58m.; KZRM, 31.33m.; VK6ME, 31.28m.; VK3ME, 31.50m.; VLR, 31.24m.; VK9MI, 49.54m.; JZK, 19.79m.; 2R04, 25.4m.; W8XK, 25.26m.; TPA-3, 25.24m.; IRF, 30.52m.; W6XBE, 31.48m.; Radio Saigon on both 49.05m. and 43.99m.; Portugal, on 49m., and ZHJ, Penang, on 49.34m.—Wm. Bantow (AW353-DX), Edithvale, S.14, Vic.

#### Radiogram Indicator Light.

(Continued from page 9)

the record is indicated by a green light, the next one-eighth amber, and the remainder red. By this means the length a record has to play is seen at a glance without lifting the lid of the radiogram. I have had this device in use for some time and it has always worked successfully.—J. Smithson, Nowra, N.S.W.

#### "Atlas All-Wave Three."

(Continued from page 12)

shortwave stations throughout the world could be obtained by adding the 1C5G output pentode.

While there are minor differences between the two circuits, beginners could obtain some valuable assistance in this step-by-step method of assembly by reading the articles describing last year's model.

Alternatively, the receiver can be assembled in one operation in its final three-valve form by following the description given below.

#### Mounting The Parts.

The valve, coil and battery sockets should be mounted first, followed by the aerial and earth terminals. The

filament wiring can now be put in in accordance with the circuit and under-chassis wiring diagram. Next, commencing at the aerial terminal, wire the r.f. coil, 1N5G socket, detector coil, triode detector section of the 1G6G socket, and then the triode audio amplifier section of the 1G6G socket.

Before proceeding further, bolt the front panel in position and mount the volume control potentiometer and 'phone jack. Be careful to insulate the latter from the chassis with bakelite washers if it is of the type that requires insulating. Next, the screen partition between the r.f. and detector sections can be bolted in place, and then the three variable condensers—two tuning and one reaction—mounted. Lengths of push-back should be soldered to the fixed and moving plate lugs of all three. These pass down through the chassis and are connected according to the circuit.

#### Five-Wire Power Cable Can Be Used.

In the rear view of the completed receiver, a three-wire cable (the "C" battery connections) is shown coming through the chassis to the right of the battery plug. If desired, these leads can be dispensed with and all battery connections taken to a 5-pin power socket mounted on the rear wall of the chassis.

In last year's receiver, four "B" battery and two "A" battery connections were required, in addition to three leads for the bias battery. In the 1939 model, however, there are only two connections to the "A" battery and two to the "B," with three "C" leads as before. As "A-," "C+" and "B-" are common, and can be joined together externally, a five-pin power socket and plug is all that is required. The five connections are "A-C+B-," "A+1.5 volts," "C-3 volts," "C-9 volts" and "B+90 volts." The wiring of this 5-pin battery socket will be shown in the under-chassis wiring diagram.

After the wiring of the power socket has been completed, the five-wire battery cable can be connected to the five-pin plug. Identify each pin and make a note of the colour of the lead running to it, and of its designation.

After everything has been given a final check, plug in the valves, together with a pair of broadcast coils and the headphones, connect up the aerial and earth leads, and finally the batteries. (A precaution that is well worth while taking after the wiring

#### DX Club Requirements.

All-Wave All-World DX Club members are advised that the following DX requirements are obtainable from Club headquarters, 214 George Street, Sydney.

**REPORT FORMS.**—Save time and make sure of supplying all the information required by using these official forms, which identify you with an established DX organisation.

Price . . . 1/6 for 50, post free.

**NOTE PAPER.**—Headed Club notepaper for members' correspondence is also available.

Price, 1/6 for 50 sheets, post free.

**DX CLUB STICKERS.**—Enlarged two-colour replicas of the Club badge, in the form of gummed stickers, designed for attaching to envelopes, QSL cards, etc. Price, 5 dozen for 1/6, post free.

**DX CLUB LOG SHEETS.**—Designed by the Shortwave Editor, these headed and ruled log sheets are indispensable to dxers who wish to keep a simply-prepared and accurate list of loggings. Price, 3 dozen for 1/6, post free.

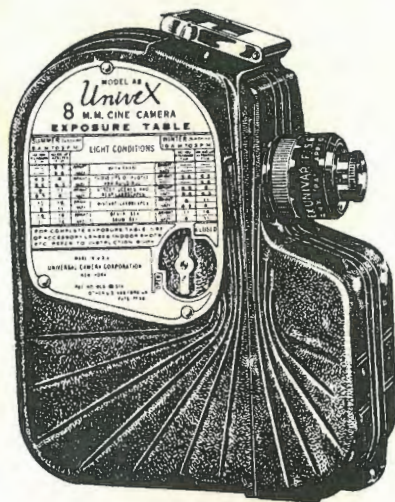
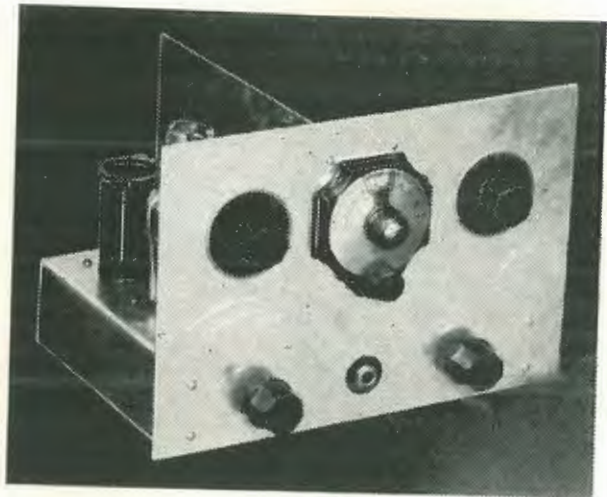
has been completed is to connect up the batteries without plugging in the valves, though the coils should be placed in position. If a voltmeter is not available, attach two lengths of flex to a torch bulb and connect the latter across the filament lugs of each valve socket in turn. If the bulb glows, everything is in order, but if it burns out, there is a wiring error that should be located before the valves are plugged in).

With everything connected and the set switched on, set the tuning dials roughly in step and slowly advance the reaction control. A hissing sound will be heard, followed by a slight "plop," indicating that the set is oscillating. The control should then be slackened off a trifle and the tuning dials rotated to pick up stations.

Next month a further article will be published giving additional hints on the construction and operation of the "1939 Atlas." A point-to-point wiring diagram will be included and also complete coil data will be given for those who wish to wind their own coils.

# World-Wide DX -On Three Feet Of Aerial!

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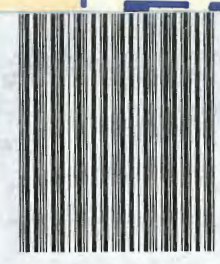
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# BRIMAR VALVES BRING A NEW ERA FOR PORTABLE RADIOS!

## HOME BUILT PORTABLE RECEIVERS AT LAST MADE PRACTICABLE BY THE INTRODUCTION OF 1.4 VOLT VALVES!

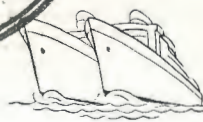
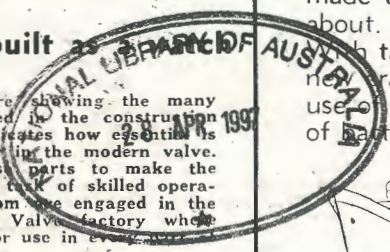
Up till recently the construction of home-built portables was something to be avoided . . . cumbersome accumulators had to be installed and kept upright in case the acid spilled. Then again, fumes from the acid played havoc with the fittings and the interiors of the portable cabinets. Heavy batteries were also necessary, which made the so-called portable a very hefty proposition to carry about.

With the introduction of the Brimar 1.4 Volt Valves comes a new era in portable radio history. These valves eliminate the use of accumulators! . . . and reduce by one-third the weight of batteries!



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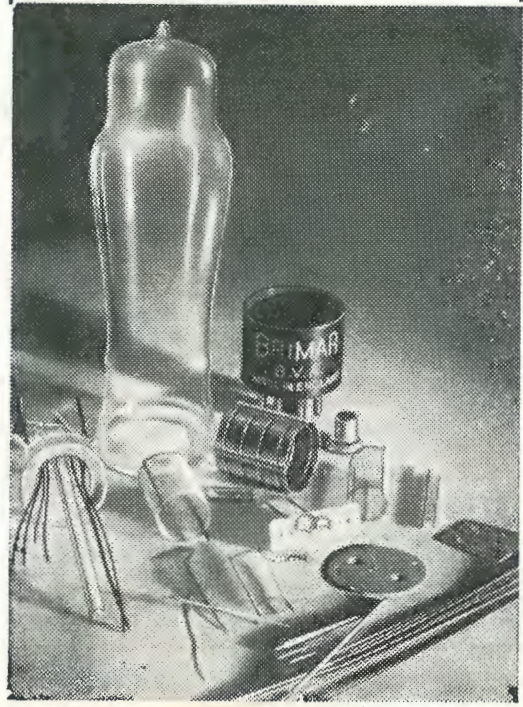
This composite picture showing the many intricate parts required in the construction of a Brimar Valve indicates how essential is the need for reliability in the modern valve. The assembly of these parts to make the complete valve is the task of skilled operatives, hundreds of whom are engaged in the giant Brimar British Valve factory where valves are produced for use in every part of the world.



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