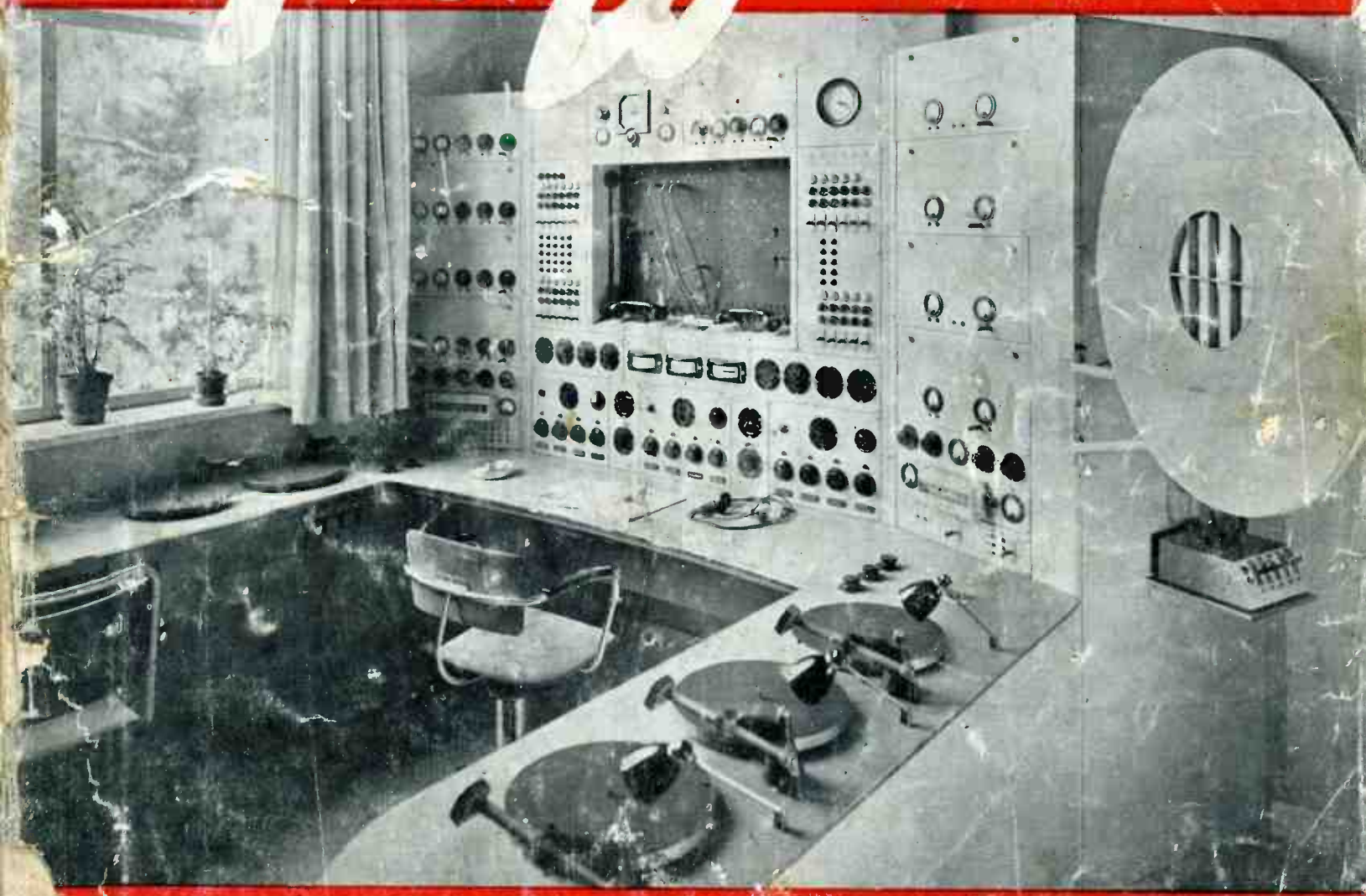
THE AUSTRALASIAN

Radio World

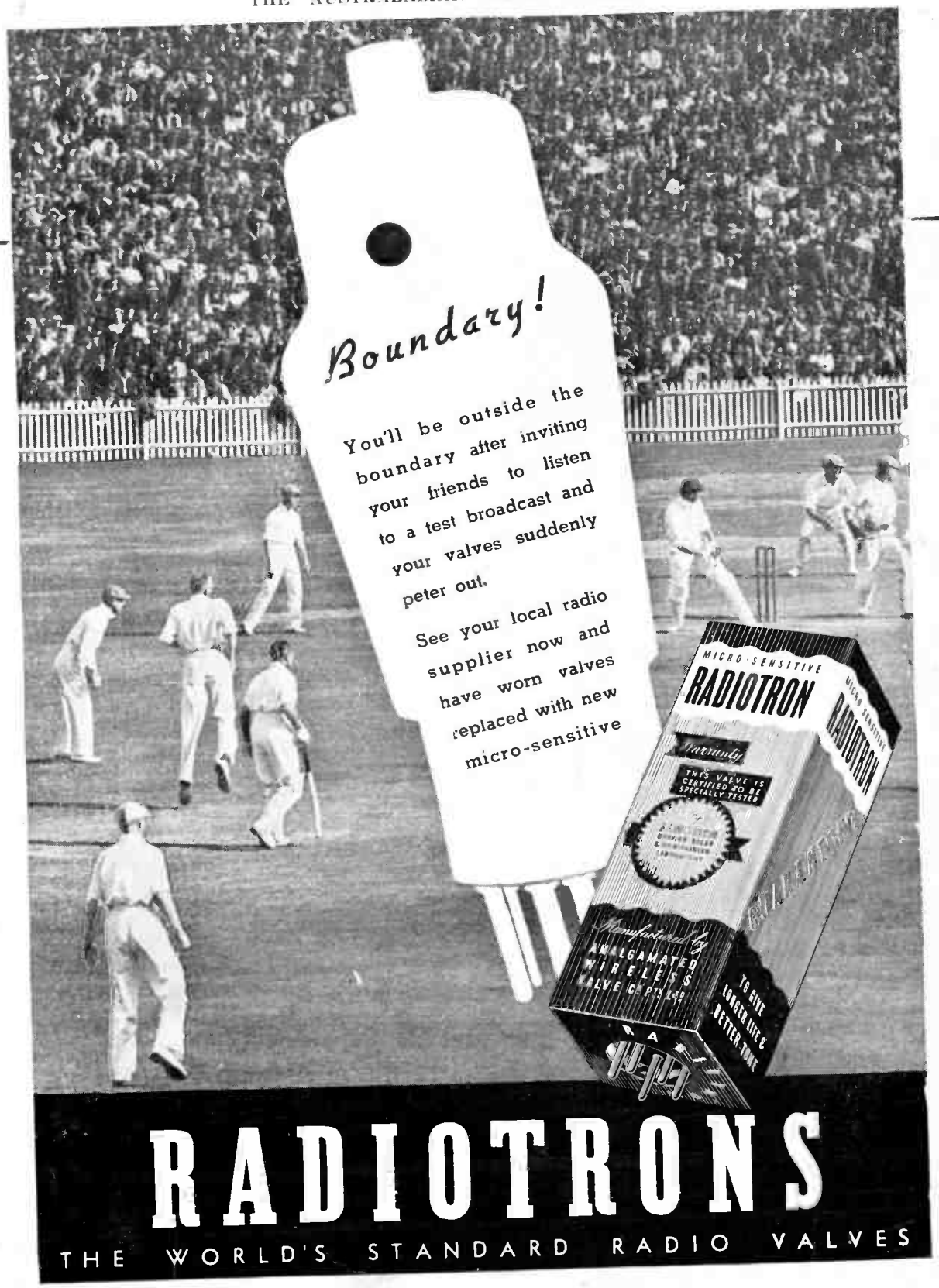
AUGUST 1, 1938
VOL. 3 — NO. 4
PRICE, 1/-

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



—See Page 8

"1938 DE LUXE FIDELITY EIGHT" : AIR-ACE COMMUNICATIONS FOUR" : V.T. VOLTMETER AND MULTI-METER : NEW RADIOKES D.W. UNIT IN SIX-VALVE SUPERHET : VIBRATOR-POWERED 4-VALVE D.W. SUPERHET.



RADIOTRONS

THE WORLD'S STANDARD RADIO VALVES

AUSTRALIAN GENERAL ELECTRIC LIMITED
Sydney, Melbourne, Brisbane
Adelaide, Hobart

AMALGAMATED WIRELESS (A/SIA) LTD.
47 York Street, Sydney
167-169 Queen St., Melbourne

NATIONAL ELECTRICAL & ENGINEERING CO. LTD.
Wellington
New Zealand

(Advertisement of Amalgamated Wireless Valve Co. Pty. Ltd.)

CROWN

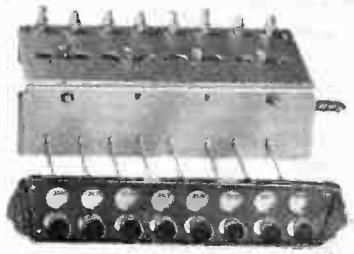
PRESS BUTTON TUNING

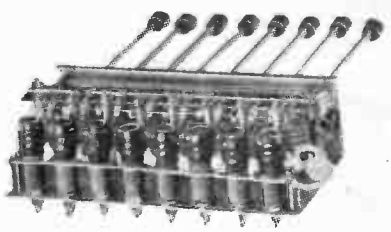
For Your ....

AUTO-TUNE DUAL-WAVE FIVE

Fully described by the Technical Editor on page 14

THE MOST MODERN FEATURE IN RADIO TO-DAY may now be fitted to your receiver with the Crown PB8/ST Press Button Tuning Unit.

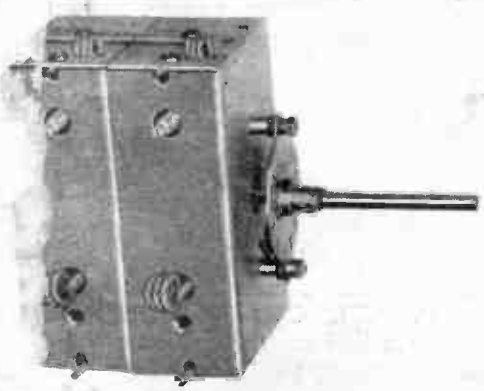




Easily fitted—only three wires to connect.
Simplifies tuning—just "Press a Button," there's your station. Dial tuning is in no way affected.
The unit consists of eight separate Permatune oscillator coils and eight aerial trimmers, completely assembled and wired to the Press Button Switch.
Each unit is individually generator-tested in a receiver on the air before despatch, ensuring absolute consistency of performance.
In different locations, the Crown PB8/ST Tuning Unit gives excellent sensitivity and selectivity, as each station is individually aligned for best results.
Provision is made for fitting either inside the chassis, in the case of new receivers only, or direct to the cabinet, either to the panel above the dial or through the top of the cabinet as desired.
CROWN PRESS-BUTTON TUNING UNITS are available for all States and New Zealand with escutcheon and appropriate station indicator for each State.

TYPE PB8/ST. PRICE 79/6
CROWN FD3G Edgelit Dial as illustrated above 27/6

Permatune Dual-wave Coil Assembly



Type D22 Coil Assembly.

TYPE D22. PRICE 49/6

As used in the Auto-Tune Dual-Wave Five.
This is a complete self-contained unit, comprising Aerial and Oscillator sections incorporating Permeability Tuned B/C and S/W Coils, mounted and wired together, in the one assembly. All units are thoroughly tested on the air and aligned to track with CROWN DIALS in any type of 4/5 receiver, either new models or for converting present B/C receivers to D/W.
DIAL LIGHT SWITCHING is incorporated in all models, and A.V.C. bypass condensers are wired internally. Size, 3" x 4⅜" x 2½". Fits under 3" chassis.
12/35 Metres—TYPE NUMBERS: D22, Penta., A.C. D22/B., Penta., Batt. D22/0, Oct., A.C. D22/0B, Oct., Batt.
16/50 Metres—TYPE NUMBERS: D26, Penta,. A.C. D26/B., Penta., Batt., D26/0, Oct., A.C. D26/0B, Oct. Batt.

AVAILABLE ALL DISTRIBUTORS IN AUSTRALIA AND NEW ZEALAND.

CROWN RADIO PRODUCTS PTY. LTD.

51 MURRAY STREET, PYRMONT, SYDNEY.

'Phone : MW 2628 (3 lines). Telegrams : "Crownradio," Sydney.

THE AUSTRALASIAN RADIO WORLD

Incorporating the

ALL-WAVE ALL-WORLD DX NEWS.

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

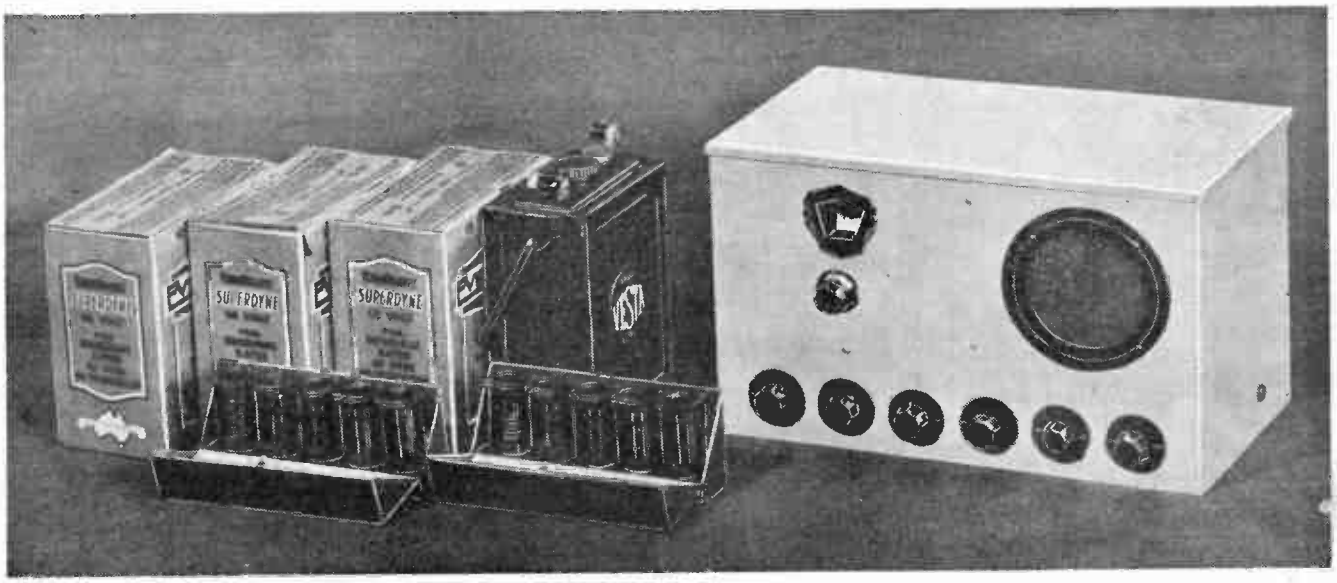
Vol. 3. AUGUST, 1938. No. 4.

CONTENTS:

The Air-Ace Communications Four	3
The 1938 De Luxe Fidelity Eight	6
Adding Push-Button Tuning To The Auto-Tune Dual-Wave Five	14
Trans-Tasman Five-Metre Trophy	18
A.O.C.P. Questions And Answers	20
Improved Quality From A Single-Button Microphone	22
Twenty-Five Years A DX Fan	24
C. R. Oscillograph Uses Standard Parts	26
Four-Valve D.W. Superhet For Vibrator Operation	30
What's New In Radio	32
New Radiokes Coil Kit In Challenger Dual-Wave Six	35
Combination V.T. Voltmeter And Multi-Meter	36
The All-Wave All-World DX News	37
Shortwave Review	38
Hourly Tuning Guide	41
Fifth S.W. Contest Closes On September 1	42
Radio Ramblings	43
DX Notes And News	44
Breaking Into The DX Game	46
All-Wave All-World DX Club—New Members	47

The "Australasian Radio World" is published monthly by Trade Publications Proprietary, Ltd., Editorial offices, 214 George Street, Sydney, N.S.W. Telephone BW 6577. Cable address: "Repress," Sydney. Advertisers please note that copy should reach office of publication by 14th of month preceding that specified for insertion.

Subscription rates: 1/– per copy, 10/6 per year (12 issues) post free to Australia and New Zealand. Subscribers in New Zealand can remit by Postal Note or Money Order.



The "Air-Ace Communications Four," with the Rayway 15 to 600-metre plug-in coils and necessary "A" and "B" battery equipment, comprising three Ever Ready 45-volt Superdyne units and two-volt accumulator. The 9-volt "C" battery required can, if desired, be mounted in the audio compartment of the receiver.

The . . . Air-Ace Communications 4

DESPITE the growing popularity of the communications type superhet, the t.r.f. receiver is still used by many thousands of amateurs and shortwave fans throughout the world, and it will undoubtedly remain a firm favourite for many years yet. The main reasons for this are, firstly, its comparatively low cost; secondly, its simplicity of construction, and, thirdly, its "sure-fire" operation. Particularly high sensitivity and low noise level are additional features.

Octal-Based Valves And Built-In Speaker.

The "Air Ace Communications Four" is a four-valve battery t.r.f. set using the latest octal-based valves throughout. A 1D5G is used as r.f. amplifier, followed by a 1K5G as regenerative detector, choke-coupled to a 1H4G first audio stage, which in turn is resistance-coupled to a 1L5G economy type output pentode.

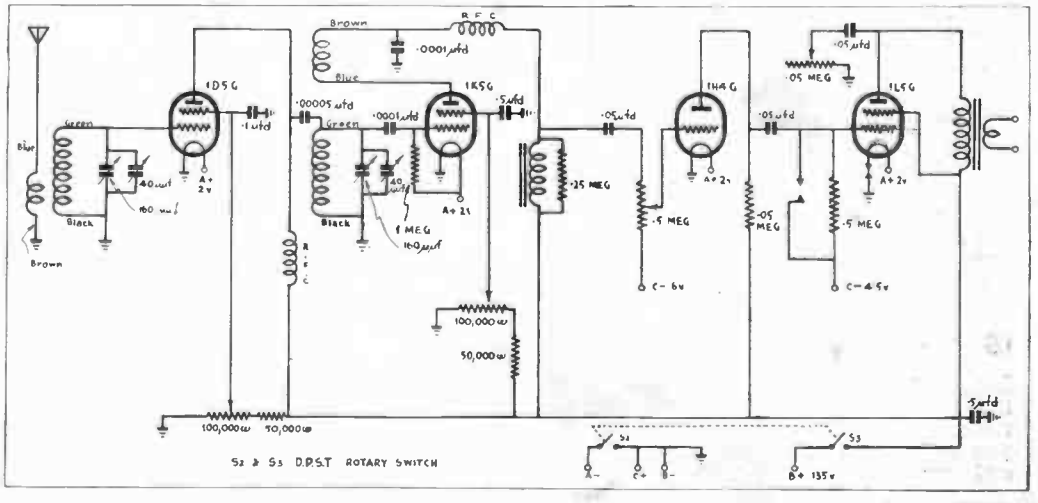
Designed as a communications type receiver, the "Air Ace" is housed in an aluminium cabinet measuring 16" wide x 10" high x 9" deep. Band-spread tuning is incorporated, together with a built-in speaker.

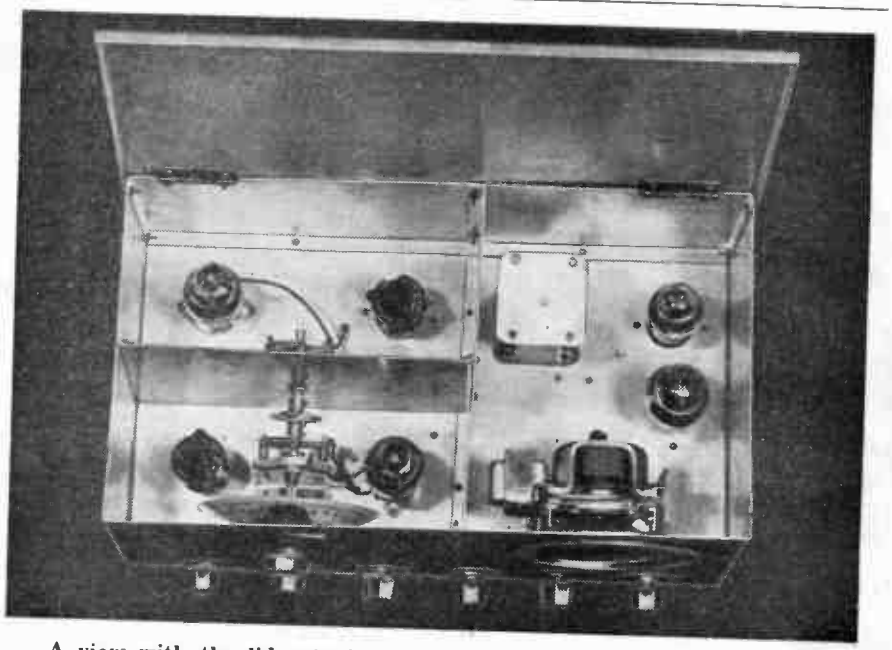
In the photograph of the completed receiver, the six controls shown in a row along the front of the chassis are, left to right, r.f. gain control, detector band-setter, r.f. band-setter, regeneration control, audio gain control and tone control. While the r.f. gain control is, strictly speaking, not necessary for the receiver in its present form, if the receiver is at any time modified to incorporate regeneration in the r.f. stage (with an additional untuned choke-coupled r.f. stage added to prevent inter-locking between the tuning circuits) then this control would become the r.f. regeneration control. Hence its inclusion at this stage is well worth while. The tuning dial incorporated is a Raymart dual-speed, for fast and slow tuning.

★

The circuit of the "Air-Ace," which uses the latest battery-type octal - based valves throughout. A 1D5G is used as r.f. amplifier, followed by a 1K5G regenerative detector, choke - coupled to a 1H4G triode, driving a 1L5G output pentode.

★



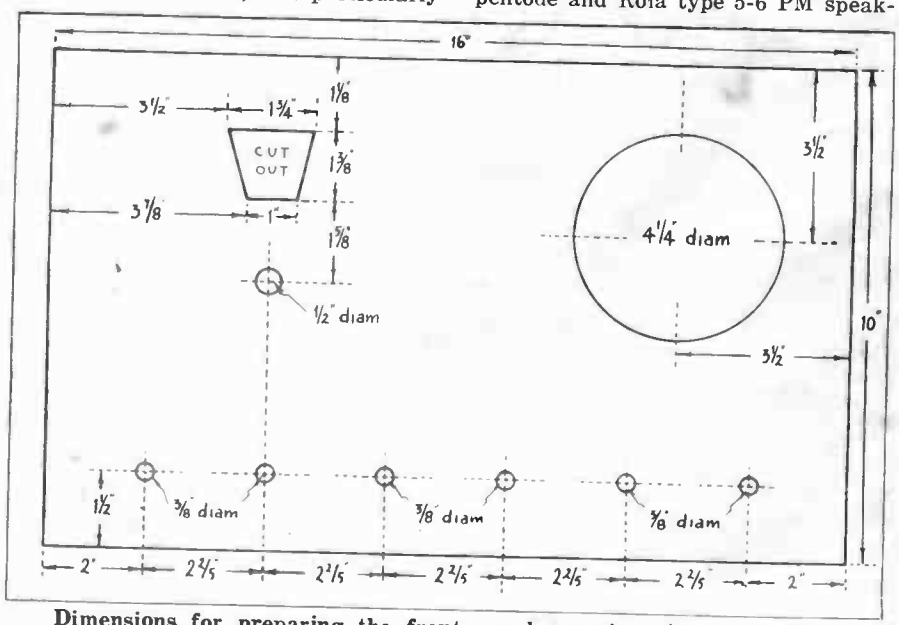


A view with the lid raised, showing the clean, well-shielded layout.

Provision For 'Phones Or Speaker.

At the rear of the chassis are two aerial terminals—the second one for use if a doublet aerial is employed—an earth terminal, power socket and double-pole double-throw on/off switch operating in the "A—" and "B+" leads. At the right end of the chassis is a double circuit 'phone jack wired in such a way that when the headphones are plugged in across the grid leak of the output pentode, the filament circuit of the latter valve is broken, thus effecting a saving of 7 or 8 mills. of "B" current while the 'phones are being used.

As can be seen from the interior view of the receiver, it is particularly well shielded. The left rear compartment contains the aerial coil and r.f. valve, together with the 40 mmfd. r.f. band-spreading condenser. Near the coil socket under the chassis is located the r.f. band-setter, a flexible coupler and extension shaft being used to give front-panel operation of this control. The r.f. gain control is also located under this compartment near the 1D5G socket. In the front left-hand compartment are the detector coil and valve, with detector band-spreading condenser. The detector band-setter is located immediately underneath. In the right-hand compartment is the high impedance audio choke, the 1H4G first audio valve, 1L5G output pentode and Rola type 5-6 PM speak-



Dimensions for preparing the front panel are given in this sketch.

"Air - Ace Communications Four" List of Parts

1—aluminium chassis, panel, lid, brackets, and partitions as per sketches
2—15 to 600 metre amateur all-wave coil kits (Rayway)
2—160 mmfd. midget variable condensers (Raymart)
2—40 mmfd. midget variable condensers (Raymart)
2—100,000 ohm potentiometers
1—500,000 ,, ,,
1—50,000 ,, ,,
1—dual-speed vernier dial (Raymart)
1—double circuit 'phone jack (Ormond)
6—0-180 degree indicator plates, 2 in. diameter
6—black control knobs
1—double-pole single-throw toggle type switch
4—octal sockets (2 Raymart ceramic, 2 wafer)
2—4-pin sockets (Raymart ceramic)
1—6-pin wafer socket
1—6-pin battery plug with 6-wire cable
1—H.I. audio choke (Radiokes)
2—all-wave r.f. chokes (Raymart)
3—Flexible couplers and bushings (Raymart)
2—goat valve shields
1—pair headphones, with plug

MICA FIXED CONDENSERS

1—.00005 mfd. mica (Simplex)
2—.0001 ,, ,, (,,)

TUBULAR FIXED CONDENSERS:

3—.05 mfd. tubular
1—.1 ,, ,,
2—.5 ,, ,,

FIXED RESISTORS:

3— 50,000 ohm 1-watt carbon
1—250,000 ,, ,, ,,
1—500,000 ,, ,, ,,
1—1 megohm watt carbon

VALVES:

1—1D5G 1—1K5G, 1—1H4G, 1—1L5G (Radiotron, Raytheon, Philips, Mullard)

BATTERIES:

3—45v. Superdyne "B" batteries (Ever-Ready)
1—9v. "C" battery (Ever-Ready)
1—2v. accumulator (Vesta, Clyde)

SPEAKER:

1—5 in. permanent magnet speaker to match single pentode (Rola 5-6 PM)

MISCELLANEOUS:

4 doz. 3-8 in. bolts and nuts, 2 doz solder tags, 3 yards 16-gauge tinned copper wire, 3 Dalton terminals, 2 red, 1 black, 2 small hinges.

er. Ample room is also available for mounting the bias battery in this compartment if desired.

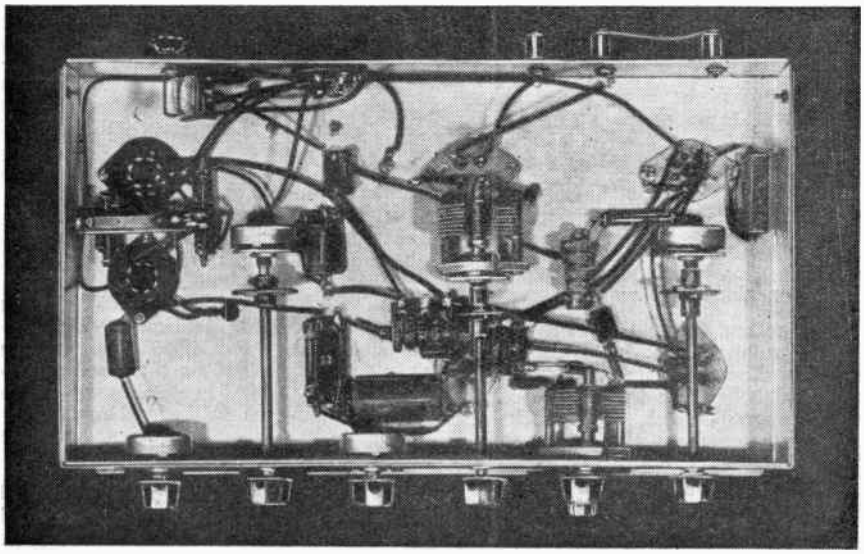
Ceramic Sockets Obviate Losses.

In this receiver, Raymart components have been used wherever possible, an important feature being the use of Raymart "RMX" ceramic sockets for the two coils and first two valves.

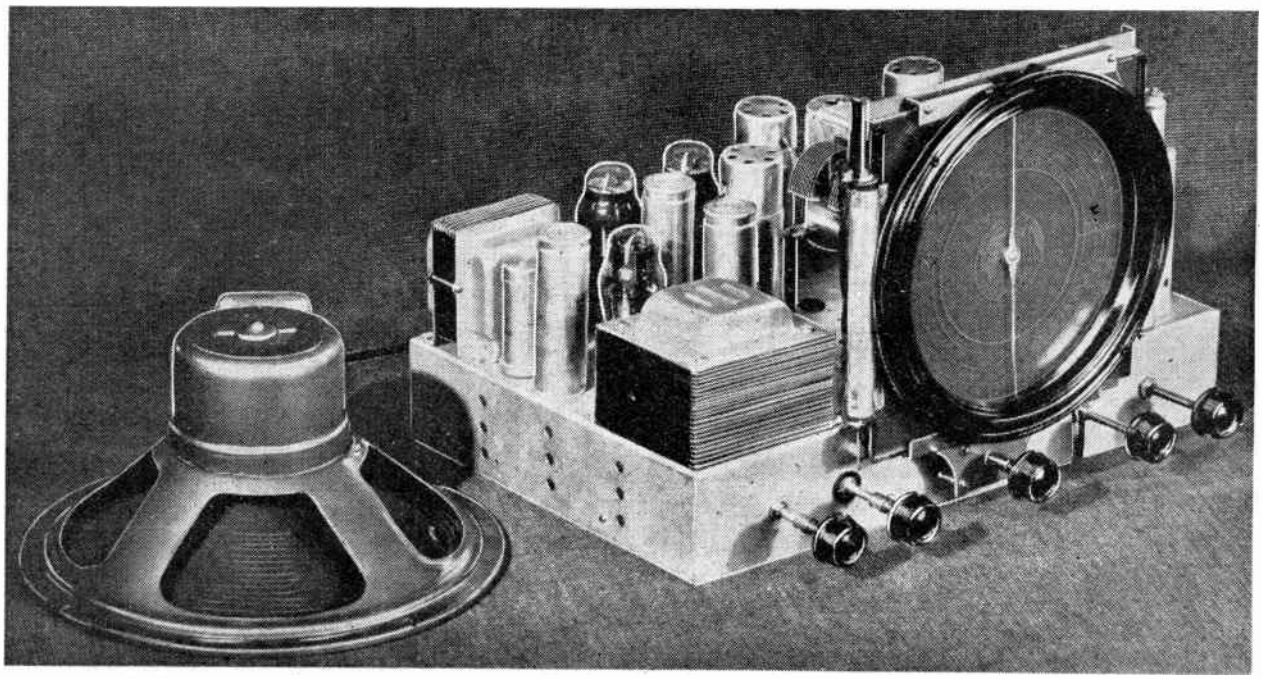
Uses Two Rayway All-Wave Kits.

This receiver is also the first to feature the lately-released "Rayway" Amateur All-Wave Coil Kit tuning from 15 to 600 metres, five plug-in type coils being required to give this coverage. Two complete coil kits are required, one for the r.f. and one for the detector stage. For maximum possible gain, the r.f. valve is choke-capacity-coupled to the detector grid winding, an all-wave r.f. choke being used to parallel-feed the 1D5G plate, a .00005 mfd. mica condenser being employed for coupling purposes. Regeneration is controlled by varying the screen voltage, a method that provides particularly smooth control, with no overlap.

(Continued on page 45.)



This under-chassis view illustrates how flexible couplers and extension shafts have been used to eliminate long, straggling leads—always a source of instability and losses in a receiver of this type.



A front view of the "1938 De Luxe Fidelity Eight," with a Rola K-12 speaker on the left.

The . . . . 1938 De Luxe Fidelity Eight

Push-pull beam tetrodes deliver 8.5 watts of high quality output ★ Octal-based valves used throughout ★ Inertia-drive dial ★ Latest Foxradio coil kit.

SINCE the description of the "De Luxe Fidelity Eight" was published in the "Radio World" last year, so many letters of appreciation regarding its exceptionally fine performance have been received from readers that few changes have been made in the 1938 model illustrated above. At the same time, every worthwhile modern development has been incorporated, giving the 1938 version even slightly better all-round performance than last year's receiver.

Octal-Based "G" Valves Used.

The first important change has been the use throughout of the new octal-based "G" type valves, which will evidently be standard types for many years to come. The only exception is that an 83V has been retained as rectifier, though if desired the 5V4G octal-based glass equivalent could easily be substituted.

The Foxradio coil unit and iron core i.f. transformers have been retained, though minor improvements in coil design have resulted in slightly improved gain, selectivity and tracking. As well, the design of the tuner portion remains unaltered, except for two minor changes.

The first is that the "B+" supply for the oscillator section of the 6A8G has been obtained from the input side of the smoothing filter through a 40,000 ohm resistor, to give the necessary voltage drop. This is bypassed with an 8 mfd. electrolytic condenser, paralleled by a .1 mfd. tubular condenser to provide efficient r.f. by-passing. This high capacity provides a reservoir effect which stabilises the oscillator "B" supply, eliminating any tendency towards fluttering on the short waves.

The second alteration lies in the method adopted to silence the receiver on radio while the pick-up is being used. Placing the three-position wavechange switch to "pick-up" changes over from the lower end of the second i.f. transformer secondary to pick-up, and at the same time breaks the screen supply to the 6G8G.

The New Valve Line-Up.

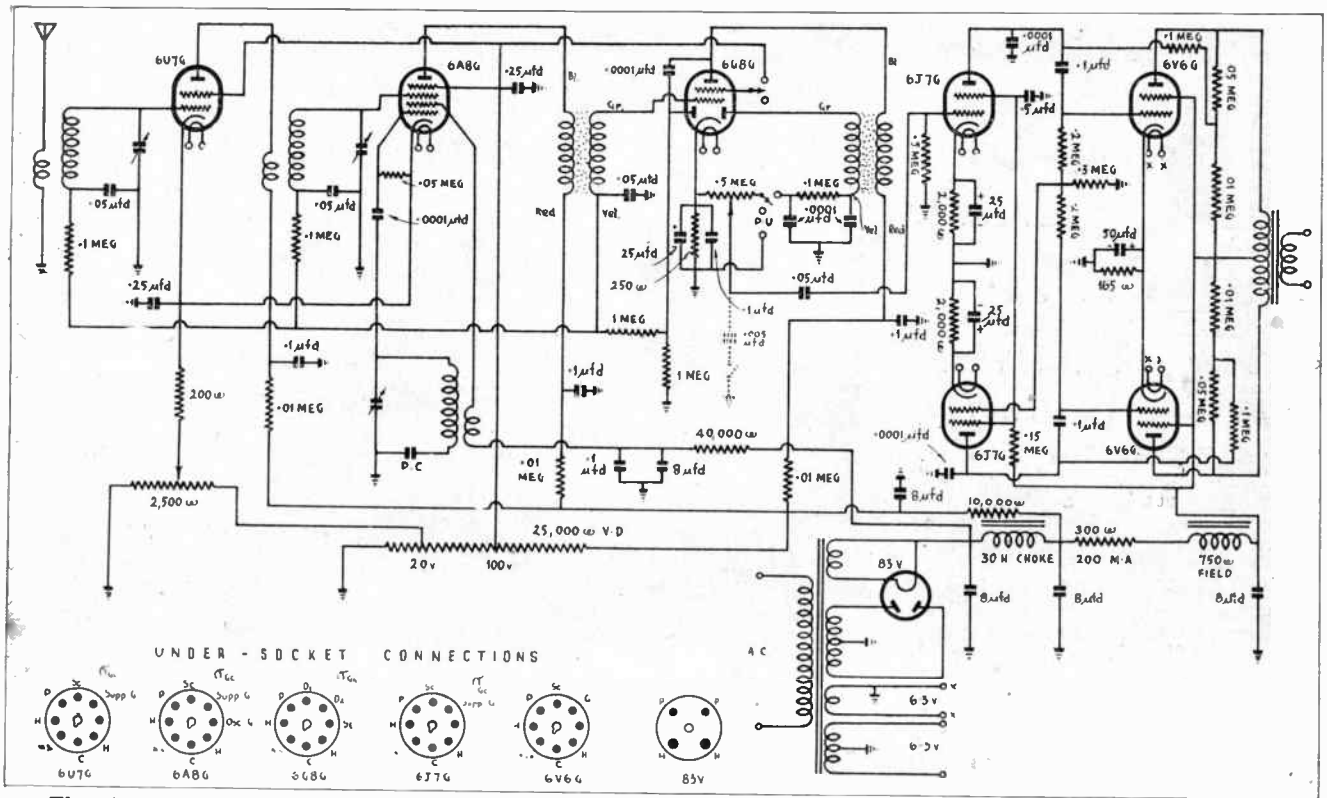
Thus the valve line-up of the tuner section comprises a 6U7G r.f. amplifier, 6A8G mixer oscillator, and 6G8G pentode i.f. amplifier, diode second detector and a.v.c. voltage generator.

Sensitivity of this tuner is particularly high, in fact, the set rarely needs to be opened full out. The sensitivity control as used in last year's model has been retained, as it is a refinement that is well worth while.

When local stations only are required, the control is turned back a little, thus eliminating the objectionable inter-station mush that is automatically brought in when the a.v.c. goes out of action between stations. This control, incidentally, should be turned back just sufficiently to provide the required effect, the volume of individual stations then being controlled by the .5 megohm potentiometer acting as diode load resistor.

Beam Tetrodes In Output.

While the amplifier section is still resistance-coupled throughout, and employs four valves, the circuit has been changed to that developed recently by Amalgamated Wireless Valve Company, and described in Radiotronics No. 83. In this circuit



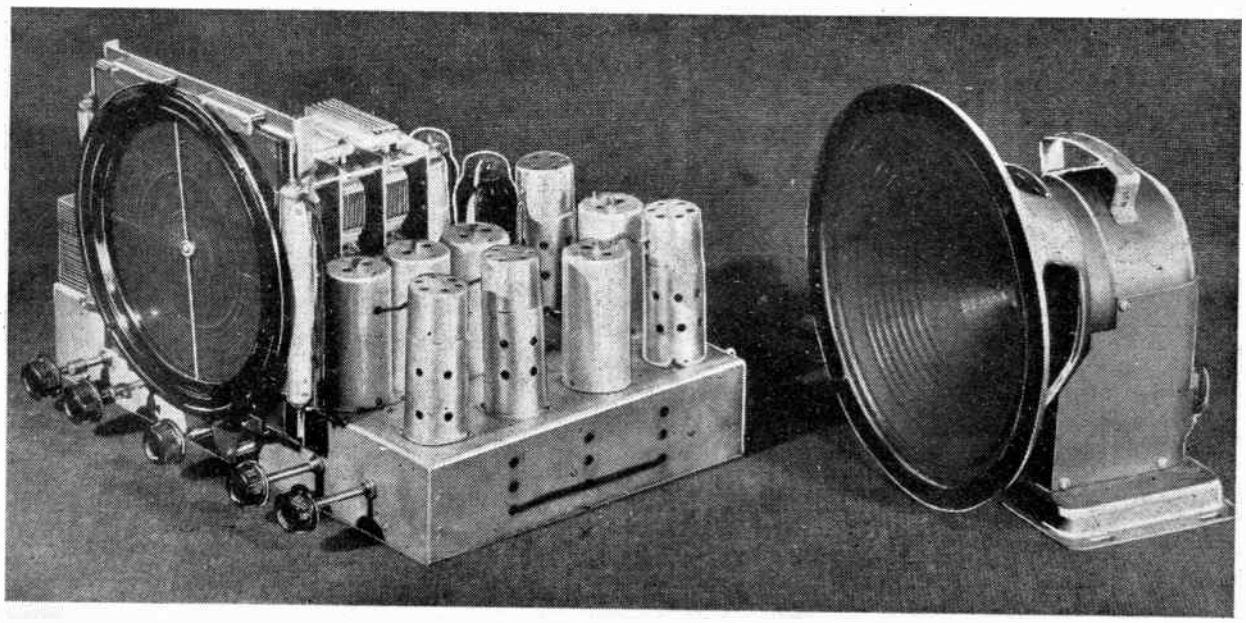
The circuit of the "1938 De Luxe Fidelity Eight," wh ich uses a pair of 6V6G's in the output stage, giving over eight watts of high quality output.

the first stage is a 6J7G, the phase-splitter another 6J7G, while the output stage consists of two type 6V6G's operated under class "AB1" conditions, with 250 volts between plates and cathodes.

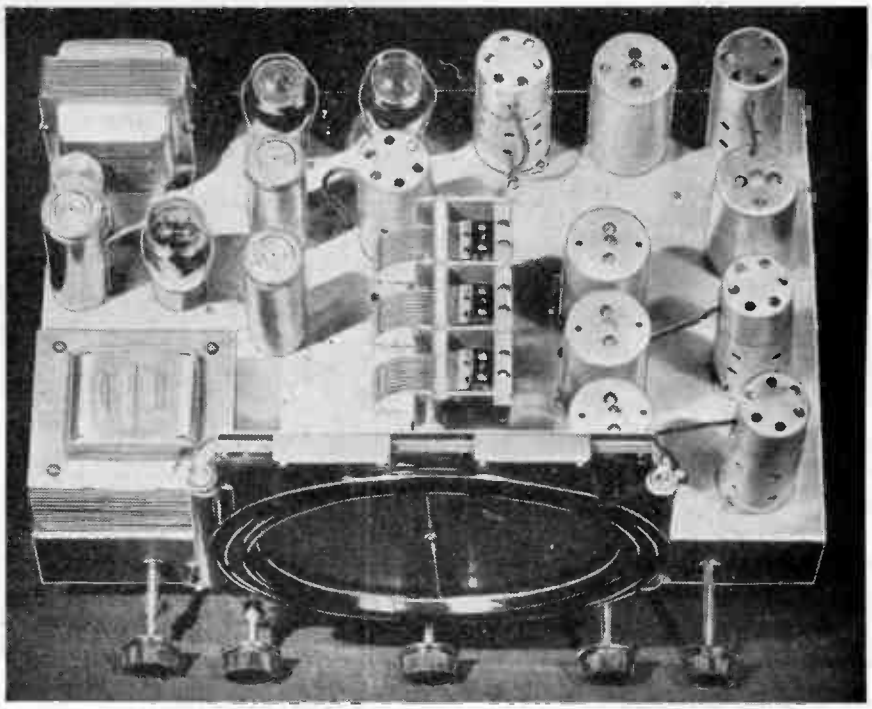
Inverse Feedback Gives High Quality.

Inverse feedback is employed, applied to the beam tetrodes in the output, the nett result being an amplifier giving excellent fidelity coupled with economy. In addition, an output of 8.5 watts is obtained, as compared with the 7 watts given by push-pull 2A3's in last year's circuit.

In this circuit approximately 10 per cent effective negative feedback is obtained from the resistors of 10,000



Another front view, taken from a different angle—this time showing the Rola Wide Range G-12 speaker recommended as a de luxe alternative to the K-12.

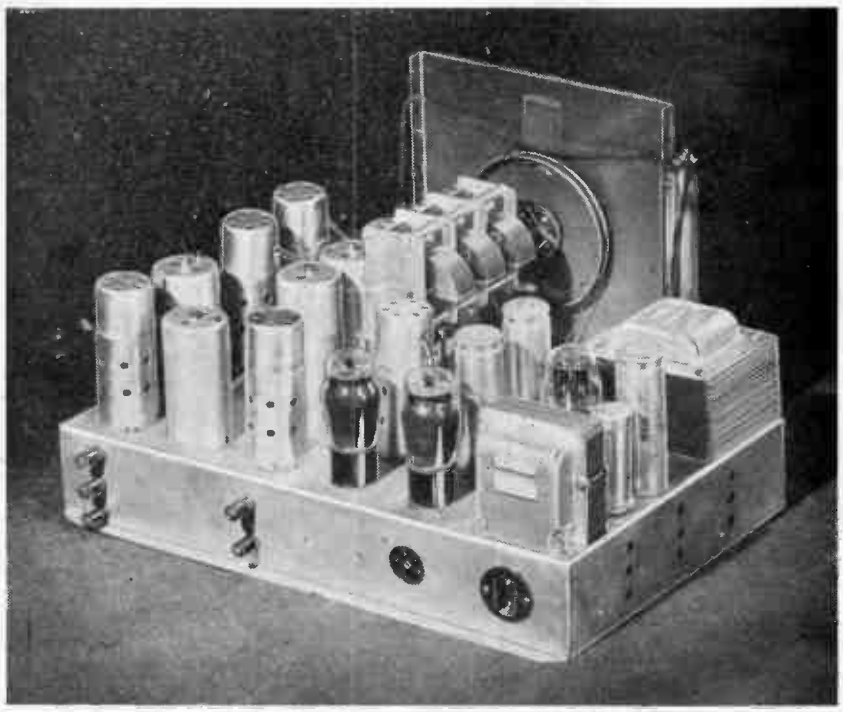


This front view shows to advantage the clean, well-spaced layout.

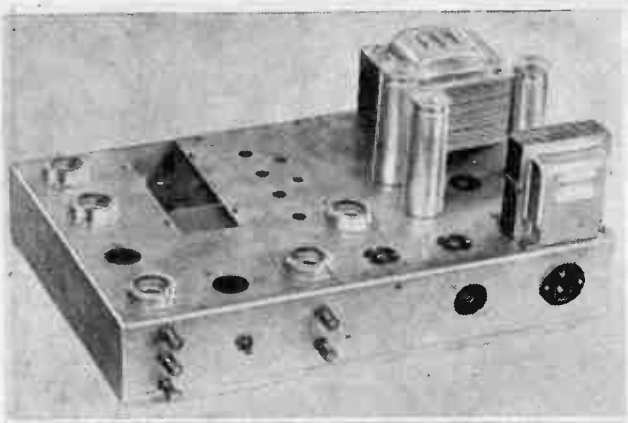
and 50,000 ohms, arranged as a voltage divider across each half of the output load. This results in an appreciable reduction in harmonic distortion—to a figure lower than that given by any broadcast station—while sensitivity is ample. The input voltage required to fully load the 6V6G's is .318 volt r.m.s., which means that any crystal or sensitive magnetic type of pick-up will give excellent results.

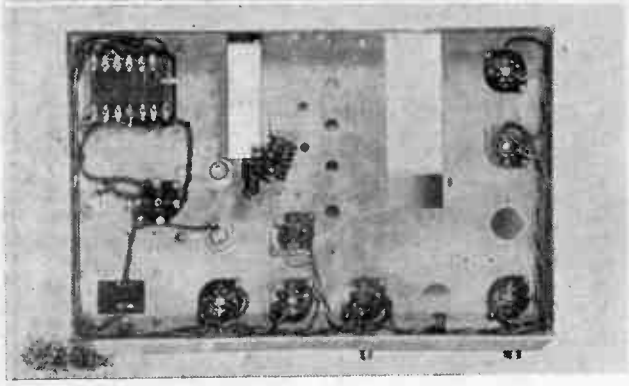
For details of front cover photograph, see page 12.

Adequate filtering of the "B" supply is obtained by the three-section smoothing filter with condenser input, the first section consisting of a



A rear view, with the 30-henry 150 mill. smoothing choke in the foreground. To the left of it are the 6V6G's, and behind it the 83V rectifier.





These above- and under-chassis views show the first stage in the assembly of the "1938 De Luxe Fidelity Eight." Below is given an under-chassis view of the completed receiver.

"1938 DE LUXE FIDELITY EIGHT"—LIST OF PARTS

1—steel chassis to specifications, 18 x 11½ x 3ins., with bracket for mounting volume control.
1—power transformer to specifications 385v. c.t. 385v. 150 m.a., 5v. 3a. 6.3v 3a., 6.3v. c.t. 2a.) (Radiokes)
1—smoothing choke (30h. 150m.a.) (Radiokes).
1—dual-wave coil unit, with 2 iron-cored i.f's. (Foxradio)
1—3-gang condenser (Stromberg-Carlson)
1—full vision dial (Foxradio)
7—octal, 1—4-pin wafer sockets
1—5-pin speaker socket
1—power socket and plug
5—valve shields
1—s.p. s.t. toggle switch
1—.5 meg. potentiometer
1—2,500 ohm potentiometer
1—25,000 ohm voltage divider (Radiokes, Crown)
5—knobs
1—length power flex and plug
5—terminals, 3 red, 2 black
1—½in. rubber grommet (for Magic Eye cable, if required)
5—midget grid clips
2—ft. tinned copper braid
1—12in. extension shaft with bush and coupler
2—1½in. extension shafts with couplers

FIXED RESISTORS:

2—1 megohm 1-watt carbon
1—.5 ,, ,, ,,
1—.3 ,, ,, ,,
2—.2 ,, ,, ,,
1—.15 ,, ,, ,,
5—.1 ,, ,, ,,
4—.05 ,, ,, ,,
5—.01 ,, ,, ,,
1—40,000 ohm ,, ,,
1—10,000 ,, ,, ,,
2—2 000 ,, ,, ,,
1—300 wirewound
1—250 ,,
1—200 ,,
1—165 ,,

MICA FIXED CONDENSERS:

6—.0001 mfd. mica (Simplex)
1—.005 ,, ,, ,,

TUBULAR FIXED CONDENSERS:

4—.05 mfd. tubular
7—.1 mfd. ,,
2—.25 mfd. ,,
1—.5 mfd. ,,
3—8 mfd. wet electrolytics
1—2 x 8 mfd. dry electrolytic
3—25 mfd. dry electrolytics
1—32 mfd. wet electrolytics

VALVES:

1—6U7G, 1—6A8G, 1—6G8G, 2—6J7G's, 2—6V6G's, 1—83V.

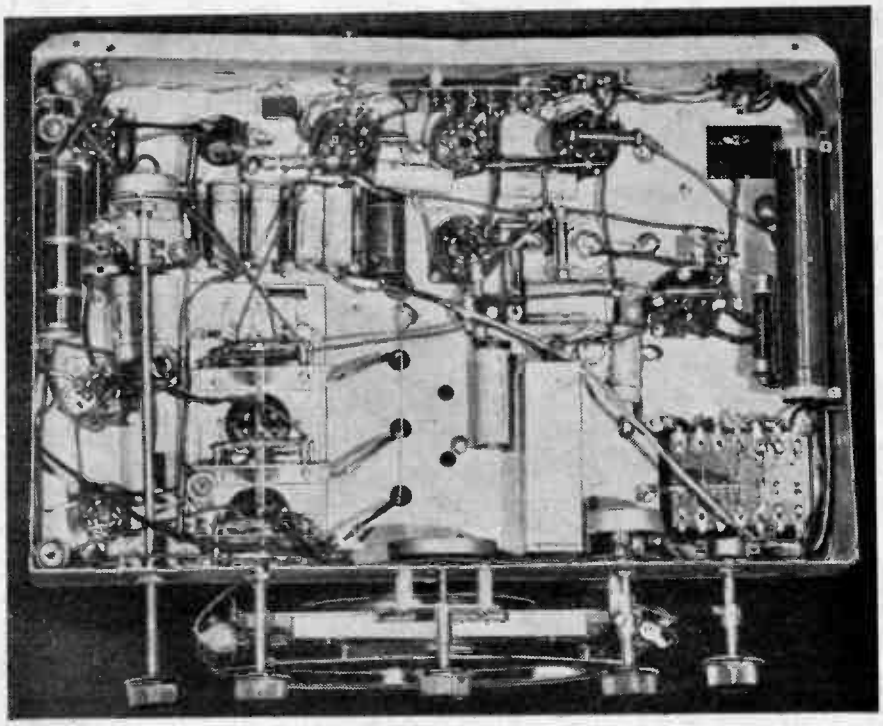
SPEAKER:

1—dynamic speaker to match P.P. 6V6G's, (Rola K-12 or G-12—see text)

MISCELLANEOUS:

4—6.3v. dial lights; push back; 1-6 lug 1-8 lug, 2 single lug, double terminal strips; 2ft. 4mm. spaghetti; solder tags; nuts and bolts.

30-henry 150 m.a. smoothing choke, and the second, of a 300 ohm 200 m.a. wirewound resistor in series with a 750-ohm speaker field. This arrangement provides adequate excitation for a speaker such as the Rola K-12, which, incidentally, is an ideal low-priced speaker for this receiver, as it is capable of handling the full output, giving excellent quality of reproduction. An alternative speaker, though a more expensive one, is the Rola G-12. If this is used a 1200-ohm speaker field should be specified, and the 300-ohm wirewound resistor omitted from the circuit to increase the excitation to approximately 15 watts.



The "B" supply for the tuner section of the receiver is taken off after the first section of the smoothing filter, through a 10,000 ohm 5-watt resistor by-passed by an 8 mfd. electrolytic. This forms one section of a 2 x 8 dry electrolytic, the second section forming the 8 mfd. by-pass at the "cold" end of the 40,000-ohm voltage-dropping resistor in series

with the "B+" supply to the oscillator section of the coil unit.

The elaborate smoothing provided is so effective that despite the high-gain amplifier used, with the audio gain control turned full on, not the slightest trace of hum can be heard three feet away from the speaker.

Tone Control Not Needed.

With an amplifier of this type no tone control is required, as the inverse feedback applied to the 6V6G's provides ideal tonal balance. However, a two-position tone control is shown on the circuit as an optional fitting. It consists of a .005 mfd. mica condenser connected from the moving arm of the audio gain control to earth, with a single-pole single-throw switch in series to throw the condenser out of circuit when not required. Actually, the only time it might be needed is to reduc "mush" when noisy, distant transmissions are being brought in. In all other circumstances its use is definitely not recommended, as it reduces the input to the amplifier.

The five controls shown in the front views of the "1938 De Luxe Fidelity Eight" published with this article are, left to right: Tone control (if this is not required, a "dummy" control can be fitted to preserve the symmetry), r.f. gain control, tuning, wave-change switch and volume control.

New Inertia-Drive Dial.

A particularly attractive feature about this year's model is the Foxradio dial with inertia drive. The tuning drive is fitted with a heavy fly-wheel, enabling the tuning needle to be spun almost from one end of the dial to the other with a single flick of the knob. Thus, while a fairly high ratio drive is used, making accurate tuning on the short waves simple, no laborious turning of the knob is necessary to travel from one end of the band to the other.

The Construction Outlined.

The parts required for building the "De Luxe Fidelity Eight" are listed elsewhere. A steel chassis 18" x 11½" x 3" is required, stamped to specifications, together with a small steel bracket for mounting the volume control potentiometer towards the rear of the chassis, thus avoiding long leads.

Elsewhere will be found two photographs illustrating the first stage in the construction of the receiver. This comprises the mounting of the five terminals, valve, speaker and power sockets (with valve shield bases where required), power transformer and choke, three wet electrolytics and the 2 x 8 dry electrolytic. The power socket is then wired to the appropriate

lugs on the power transformer, and the heater wiring is put in.

The i.f. transformers can be mounted next, and then, commencing at the aerial terminal, complete the wiring as far as it is possible to do without mounting the coil unit and condenser gang. This latter component is mounted by means of spacers and bolts approximately 2½" the chassis. Also, all three leads from underneath the gang are covered with wide diameter spaghetti and then with copper braid shielding to prevent any inter-action between them. The coil unit is mounted and wired last of all, and then the wiring is given a thorough check.

If everything proves to be in order, the grid clips and control knobs should be fitted, and the dial mounted.

Next month a further article will be published giving additional hints on the assembly and wiring, together with a sketch showing the full underchassis wiring of the receiver. As well, the alignment procedure will be described in detail.

The Front Cover.

This month's front cover photograph, reproduced by courtesy of Philips Lamps (A/asia) Pty. Ltd., shows one of the control rooms at the A.V.R.O. studio building, Hilversum, Holland. Its distinctive design is typical of the modernistic note struck throughout the building, which is the headquarters of the General Association for Wireless Broadcasting in Holland.

There are four Dutch broadcasting societies, of which the A.V.R.O. is the largest. Owing to the wavelength situation the four organisations have to share two transmitters, so that each has only half a week's broadcasting time. In Holland, incidentally, there is no commercial broadcasting and the listener pays no license fees, but of his own free will joins one of the four societies and pays a voluntary annual subscription.

The A.V.R.O. building is unique in that each studio—of which there are seven—has its own foundations, and the walls are separated from each other by a substantial air space. In this way it is impossible for sound to be transmitted from one studio to another.

Among the many up-to-the-minute technical features to be found in the A.V.R.O. studios, the extensive amplifier installation by Philips plays an important part.

Adding Push-Button Tuning To The . . .

Auto-Tune Dual-wave Five

The 4/5 dual-wave superhet described last month can easily be converted to provide push-button tuning, using the Crown eight-station push-button unit.

The "Auto-tune Dual-wave Five" mounted in a console cabinet. Magic Eye tuning is optional.

THE conversion of the "Auto-tune Dual-wave Five" to push-button tuning is very simple to effect, as there are only three leads running to the unit. Before the change-over is made, however, the receiver should be operating perfectly as a standard 4/5 dual-wave superhet.

The Parts Needed.

The only parts required for the addition are a Crown push-button unit (model PB/8ST), two .0005 mfd. mica condensers, a 20,000 ohm 1-watt carbon resistor, Yaxley 6 x 2 single-bank switch, and, if pick-up connections are required, a double-pole double-throw rotary type switch to provide the change-over.

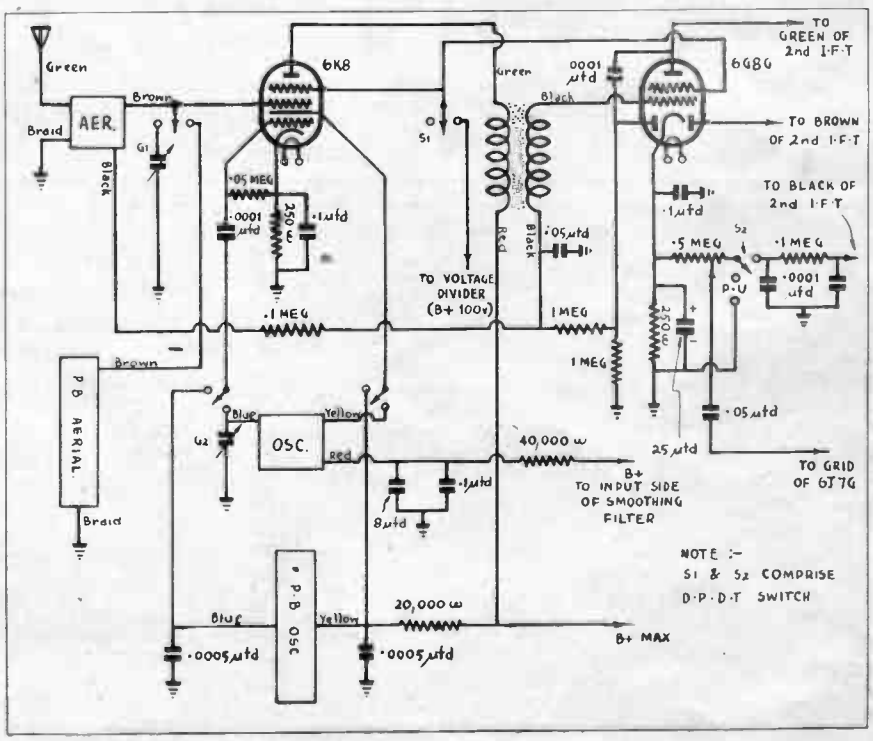
The Crown PB/8ST push-button unit provides for capacity tuning in the aerial circuit, with eight separate permeability-tuned circuits for the oscillator section. The unit is completely wired to the switch, and connections are made to the unit with three coloured leads. While separate windings are provided for each of the eight oscillator circuits, the aerial broadcast winding in the dual-wave box is used in the aerial section for automatic tuning. In other words, the switch in this stage merely changes over the aerial grid winding from the aerial section of the condenser gang to the semi-variable condensers in the push-button unit.

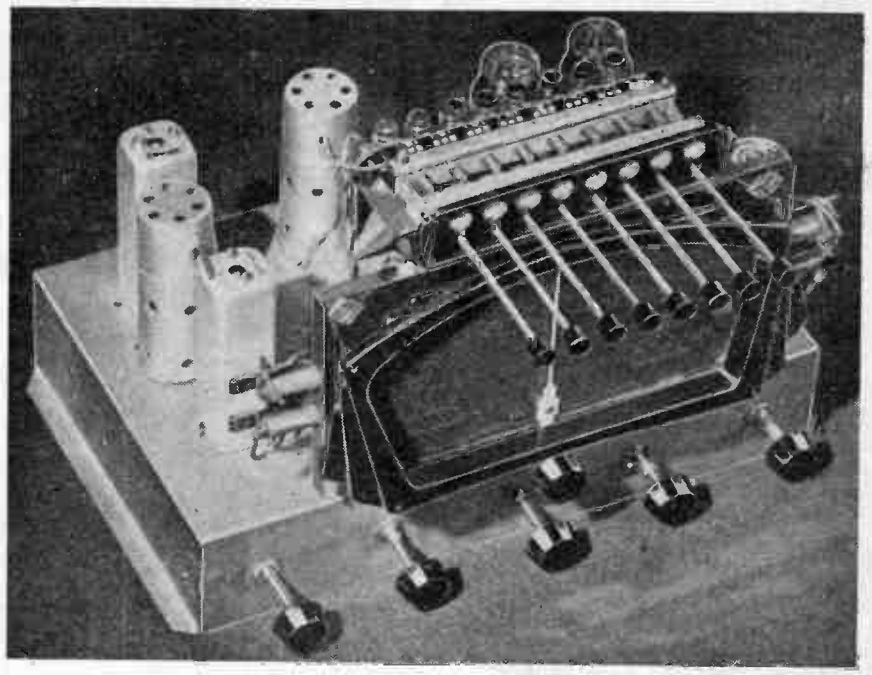
The alterations necessary to include push-button tuning are shown in this circuit, which should be studied in conjunction with that published last month.

Universal In All States.

Each unit provides for eight separate stations, and is universal for all States in its application, a frequency variation of approximately 300 k.c. being obtained in each circuit. This is accomplished by turning a special alloy screw attached to the iron core. Thus the latter can be moved up and down inside the coil, to vary the inductance. After each coil has been accurately adjusted, permanency of setting is assured by a special type lock-nut and locking washers.

In practice, a "spin-tite" spanner formed from a length of hollow tubing is fitted over the lock-nut, which





A view of the "Auto-tune" chassis, with the Crown push-button unit mounted temporarily in the approximate position it occupies in the cabinet. Alternatively, it can be mounted with the knobs projecting through the top of the cabinet.

is then loosened. A screw-driver is then inserted down the centre of the tube and the iron core adjusted until the station is correctly tuned. Then, while the station is kept in tune with the screw-driver, the lock-nut is tightened down. The special "spin-tite" required, incidentally, is manufactured by Crown Radio, and is available from all distributors.

Approximate frequency coverage of the eight bands is as follows:—

Band.	K.C.
No. 1	550 to 750
2	630 „ 1030
3	630 „ 1030
4	820 „ 1200
5	820 „ 1200
6	1100 „ 1500
7	1100 „ 1500
8	1100 „ 1500

Highly Stable Oscillator Used.

A particularly important point in connection with the satisfactory operation of the unit is that the two .0005 mfd. condensers used to control oscillation must have an accuracy of plus or minus 2½%. The condensers used in the original receiver were supplied by Simplex Products Pty. Ltd., a firm that, incidentally, manufactures to special requirements, and within specified tolerances, mica condensers varying in capacity from .000005 mfd. to .002 mfd.

For effecting the conversion, the Yaxley 6 x 2 single-bank switch is mounted in the vacant hole to the left of the wave-change switch. (See

SEE PAGE 14 FOR FURTHER INFORMATION

photograph at head of last month's article.) A double-pole double-throw rotary type switch is then mounted in the remaining hole to the right of the wave-change switch, thus balancing up the controls. Thus, the two new controls are second from the left and second from the right respectively, in the front-of-chassis view published this month.

A ⅜" hole is next drilled through the chassis near the mixer-oscillator, to permit the leads from the push-button unit to pass through. The Yaxley 6 x 2 switch and the double-pole double-throw rotary switch are then wired in accordance with the amended circuit shown elsewhere this month. One section of the latter switch changes over from radio to pick-up, while the other breaks the screen circuit of the first two valves, thus effectively silencing the set on radio while the pick-up is being used.

Location Of Unit Depends On Space Available.

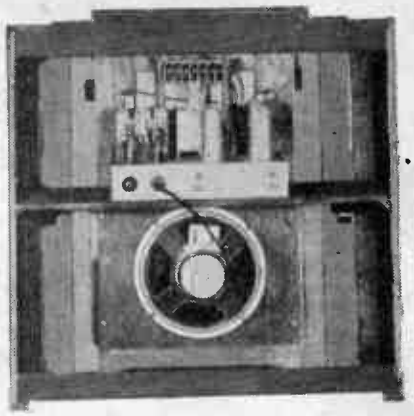
The location of the push-button unit will depend largely on the space available in the cabinet. It can be mounted immediately above the dial, as shown in the photograph elsewhere, or vertically, with the buttons projecting through the top of the cabinet—a method that is apparently becoming very popular in America.

To exclude dust, both from unit and chassis, it is recommended that the upper rear portion of the cabinet be closed in with fine gauze attached to a rectangular wooden frame.

Aligning The Set For P.B. Tuning.

It is necessary to align the push-button unit while the receiver is out of the cabinet. Assuming that the set has been correctly aligned on manual tuning, switch over to automatic tuning, and follow the procedure outlined below.

Commence at one end of the band, and press the button corresponding to the station required. Now, using the "spin-tite" supplied with the unit, adjust the screw controlling the inductance of the appropriate oscillator coil until the desired station is tuned in. A simple way of doing this, incidentally, is to connect an oscillator to the set and adjust it to the frequency of the station, beating the station transmission with the output of the oscillator. Then switch off the oscillator and make the final adjustment on the station, securely locking the trimming screw when this is completed. Next, adjust the aerial trimming screw until the maximum strength is obtained, and then seal the screw. (A short aerial should be used while these adjustments are being made). The above procedure should be repeated on all stations, completing the alignment and leaving the set ready for use.

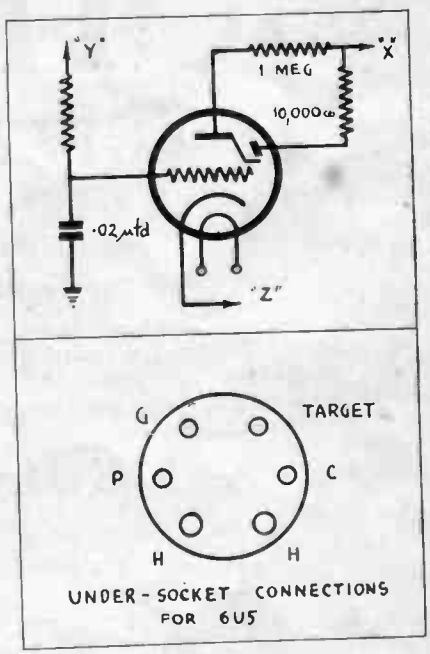


A rear view of the "Auto-tune," showing the location of the push-button unit.

It should be noted that if the alignment of the i.f. transformers is interfered with subsequently, it will be necessary to re-align the push-button unit on all stations.

Receiver On Display For Sydney Builders.

Readers who would like to examine the "Auto-tune Dual-wave Five" are invited by Messrs. John Martin Pty. Ltd., of 116 Clarence Street, Sydney, to call in during August and inspect the receiver, which is mounted in the console cabinet illustrated elsewhere.



This sketch shows connections to the Magic Eye socket. The points "X," "Y," and "Z" appear on the circuit published last month.

City Radio

NOW COMES TO THE FARM

Radiola (at right): Model 265. 6-valve World Range Air Cell operated. 38 GUINEAS. Others from 20 gns.

Stromberg-Carlson: Model 780. 6-valve Dual Wave Air Cell operated. 38½ GUINEAS. Others from 28 gns. (Prices slightly higher in W.A.)

H.M.V.: Model 330. 5-valve Dual Wave Air Cell operated. 33 GUINEAS. Others from 27 gns.

S.T.C.: Model 523D. 5-valve Dual Wave Air Cell operated. 35 GUINEAS. Others from 20 gns. (Prices slightly higher in Qld.)

Advt. issued by the Ever Ready Co. (Aust.) Pty. Ltd., Rosebery. N.S.W.

To-day the Australian community that lives beyond the power lines and has no electricity can have a radio every bit as convenient to operate as those who live in wired areas. You can prove this for yourself at any time simply by paying a visit to your local radio dealer and seeing one of the amazing new Air Cell operated models demonstrated. Endorsed by no less than 23 leading manufacturers of radio sets in Australia, it is equipped with an Ever Ready Air Cell, the new type battery that supersedes the accumulator, **NEEDS NO RECHARGING** and no attention whatsoever. With normal use it will give over twelve months of perfect service.

Other well-known makes of Air Cell operated Radio include: Aristocrat (E.S.M.), Batyphone, Briton, Calstan, Crammond, Croydon, Genalex, Howard, Kriesler, Lekmek, Paramount, Velco, Weldon, Zenith, Bandmaster, Breville, etc.

For full details concerning any particular make of Air Cell operated Radio Receiver, consult your local dealer or write the Ever Ready Co. (Aust.) Pty. Ltd., Harcourt Parade, Rosebery, N.S.W.

Breville: Model 111. 5-valve Triple Wave Air Cell operated. Price: 35 GUINEAS. Others from 31 gns. (1 gn. higher in Q. S.A., & W.A.)

Tasma: Model 585. 5-valve Dual Wave Air Cell operated. 37 GUINEAS. Others from 29 gns. (Prices slightly higher in W.A.)

Equipped with an EVER READY Air-Cell

A16A.

Trans-Tasman Five-Metre Trophy

Silver Cup Won By New Zealander For Trans-Tasman Reception On "Five": Blue Mountains DX: Why Not Join A Radio Club?

By W. J. P.

Equipment used by VK2OD during mobile tests on five metres in 1934-5. The transceiver is mounted under the dash-board at the left. This photo was taken at Bathurst during tests with VK2NS over the 1935 Easter holidays.

EARLY last year members of the Lakemba Radio 5-metre group offered a silver cup to the first listener who secured a 5-metre verification from a station across the Tasman.

The cup has been won by Mr. P. A. Morrison, of 7 Essex Street, Wellington, N.Z., who, towards the end of last year, was successful in logging the signals from VK2NO, Sydney, N.S.W. Arrangements for the presentation of the trophy are being made in New Zealand by the club representative, Mr. W. G. Picknell.

It is gratifying to know that the winner is a most enthusiastic and ardent short-wave listener, whose interest in radio date back to over 20 years. Details of his experiences appear elsewhere in this issue of "Radio World."

Even at the present time he is endeavouring to create further interest in 5-metre work in New Zealand. During past months he has been conducting tests with ZL1IR, owned and operated by S. J. Tutley, of Te Aroha, N.Z., and on three occasions during the month of June, heard the 5-metre signals from this station over a distance of some 350 miles, constituting a record as far as the Dominion is concerned.

Tests are still being conducted by ZL1IR in conjunction with another station, ZL2UD, at Hastings. According to Mr. Morrison, these two stations operate on 56 m.c. practically every Sunday from 12 to 12.30 p.m., 1.30 to 2.30 p.m., 3 to 3.30 p.m., and 3.45 to 4 p.m.; further information will be sent along at a later date, including some definite skeds for VK.

Mr. Morrison's ultra-high frequency equipment consists of a simple super-regenerative receiver, used in conjunction with three antennas consisting of a Reinartz beam, Picard vertical and an inverted beam. He is anxious to secure schedules from Australian stations, and will listen for them if advised of the time and date.

★

Blue Mountain DX.

During a recent holiday week-end, 2OD and 2DL spent a few days touring around the Blue Mountains in the vicinity of Katoomba with a portable transmitter and receiver.

Results obtained with a half-watt 'phone transmitter were remarkable, while receiving conditions surpassed anything yet heard by either operators, considering the receiver used. It consisted of a simple two-tuber detector and audio worked off 90 volts of "B" battery.

On the Sunday afternoon, the gear was put into operation on the top of Mt. York, the highest point for several miles around. The 40-metre band was absolutely crowded out with thousands of signals, many being copyable through the headphones while standing several feet away. Best reception was obtained just at sunset, when practically all continents were audible within a quarter of an hour, including several unidentified foreign 'phone.

What a DX man's paradise! The only drawback, of course, is the fact that the signals come in; but one has not the power to reach out from such isolated locations.

★

Join A Radio Club.

A suburban radio club provides an excellent opportunity for the "hams" of the district to meet together and discuss ideas or common grievances. It also enables prospective "hams" to come along and meet in person those amateurs whose signals they have been listening to so often, and to obtain a lot of useful information so necessary for obtaining a licence.

If you live in the Western or South-Western Suburbs, why not join the Lakemba Radio Club, which meets every second Tuesday at the Sunrise Hall, near Canterbury Station? The next meetings are as follow: August 2, 16 and 30, at 8 p.m.

Zero Beat Radio Club Notes.

By "Russ."

Now that the annual meeting is over, the club is settling down again to the work of training the young members in the technique of radio communication, bringing them to the standard of receiving their operating licenses. Morse classes are held every Friday night until 8.30, after which a lecture is given from a syllabus of lectures calculated to prepare candidates for the A.O.C.P. examination in about four months.

The new officers for the coming year are as follows:—President. Mr. E. Treherne (2AFQ); secretary, Mr. Josceyln (2AJO); chief of transmitters, Mr. P. Mulligan (2ABH); chief of receivers, Mr. Harry Whyte-Meach; publicity officer, Mr. Russ Miller.

The eighteenth field day of the club will be held on the last Sunday in September, and will be held every two months after on the last Sunday.

These field days are generally held at some picnic place where the social aspect of the club is predominant until the actual hunt for the hidden transmitter, when everyone "goes radio" again and sets off with direction finding receivers to locate the transmitter.

Club Meets Every Friday Night.

The club meets every Friday night in Gregson's Studios, 38 Sydney Arcade, Sydney, where any intending member should call and see the secretary.

Waverley Radio Club Notes.

AT the weekly meeting of the club, held on June 14, a very interesting lecture was delivered by Mr. Lusby (VK2WN) on direction finding. Many new points were learned and should be put to some good use when the next field day is held on July 17. An interesting visitor was present in the person of Mr. Miller, of Qantas Airways. Mr. Miller is also a competent authority on D.F., and added some very interesting remarks.

New Code Practice Oscillator.

June 28 saw Jack Patterson arrive with a large, heavy parcel, and investigation showed that he was burdened with the new code practice oscillator. Further investigation revealed a very neat audio oscillator with built-in power supply and speaker. No time was lost in putting the new gear into service.

Code practice is held at 7.30 every Tuesday evening, and all those interested are welcome.

A library is to be added to the club, and any technical literature will be available to club members. New books will be purchased from time to time, and copies of magazines and other periodicals will be tabulated for easy reference.

The club has a new member in Mr. McGowan (2MQ) who, according to reports, is very keen on five metres. Maybe 2MQ will be a source of some very interesting lectures.

New Transmitter Nearing Completion

The club's transmitter (VK2BV) is at the moment out of commission, but by the time these notes are published the new rig, which is at present nearing completion, should be in constant operation, and with the club's nine-tube superhet, should do some fine DX work.

Meetings Every Tuesday Evening.

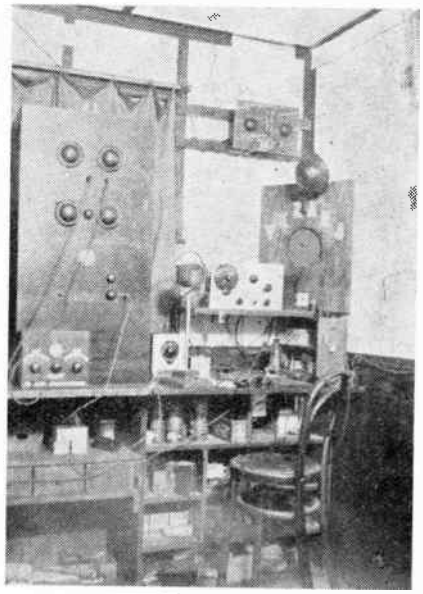
In conclusion, I would like to say that the members of the club would like to meet anyone interested in "ham" radio, particularly readers of this magazine, and are always willing to help them on to "hamdom." A hearty welcome is always assured any Tuesday evening at the clubroom, rear of "Almont," 13 Macpherson Street, Waverley.

★

Round The Shacks—VK2AHJ.

VK2AHJ, of Randwick, has been on the air since September, 1937, having passed the A.O.P.C. exam. in July of that year.

Several rigs have been tried, both crystal-controlled and self-controlled, the latter being favoured because of its flexibility. The same power amplifier has been used throughout, and has proved very dependable. The first line up was a 6L6G e.c.o., linked to a 210. Following this, a 2A5 c.o.-46-



A general view of VK2AHJ's equipment, which as far as early-morning DX is concerned, is very conveniently located in a corner of the operator's bedroom.

210 arrangement was used, and the 2A5 was found to give better desults as a tri-tet than as a pentode oscillator.

Again the building urge got the upper hand, and the rig changed into 53 c.o.-6L6G buffer-210. Shortly after this, the 'phone permit was granted, and a modulator was constructed using a Neophone "mike," 57 pentode, 58 triode and 2A5 in Heising single choke modulation. The input on 'phone was 14 watts.

The transmitter has since been altered to 6L6G e.c.o.-6L6G buffer-210 P.A., and the modulator is a Neophone mike, 57 pentode-56 phase inverter and push-pull 2A5's modulators. Input has been raised to 25 watts.

The photograph shows the operating position at 2AHJ, which, though not the last word in neatness, is very convenient, being located in the operator's bedroom, as are many other "ham" stations.

While not engaged in "ham" radio, 2AHJ is a junior mechanic in the telephone department, and is 17 years of age.

VK2ABS, of Artarmon, will be described next month.

VK2MZ—Hurstville Amateur Radio Club.

Affliated with the W.I.A. (N.S.W. Division).

Several more enthusiasts have joined the club, while others have expressed their intention to join at the next general meeting on August 4. Five members sat for the A.O.C.P. examination in July, and are hoping the R.I. will be kind to their efforts.

The first DX station to be worked on the present rig was a c.w. QSO with XE1AM. Fine work, "Joe"!

2VT has started out in the radio trade, and all the boys wish him luck in his new venture. Mr. Les Taylor (2CL) paid a visit to the club and gave a talk on his travels through the United States. It was very interesting, and members would like to hear more.

Club Transmitter On "20" On Thursday Nights.

The club's transmitter—2MZ— is on 20 m. 'phone on Thursday nights and Saturday afternoons. Reports will be acknowledged by the QSL officer, Mr. Harry Key.

All particulars of club activities can be had from the secretary, Mr. J. Ackerman, 34 Park Road, Carlton.

Gladesville Radio Club Notes

Gladesville District Radio Club recently held a successful meeting at the Protestant Hall, Victoria Road, Ryde, for the election of office-bearers for the ensuing six months. Mr. W. Manley (VK2XH) was returned unopposed as president, while Mr. R. Ellis (VK2AHR) was returned as secretary.

The Club has only been running six months, and showed a financial surplus.

The events during the first half-year were the financing and building of a new transmitter for VK2ACR at Katoomba, where the members of the club spent an enjoyable day installing the rig. Mr. Friar (VK2NP) is to be congratulated on the way he built the transmitter.

Any persons desirous of entering the Club should apply to Mr. R. Ellis, of Morrison Road, Ryde.—**S. P. Sullivan (AW382DX), Homebush.**

A.O.C.P. Questions & Answers

The questions set for an A.O.C.P. examination held last year, together with model answers, are published in the article below — the fourth of a series specially written for "Radio World" by . . . .

H. WHEELER (VK5HW)

A.O.C.P. Examination Paper.
—October, 1937.

1. In the following circuit diagram, enumerate at least three of the mistakes in the circuit drawing, and state the effect each fault would have if it existed singly in a receiver wired in accordance with the drawing.

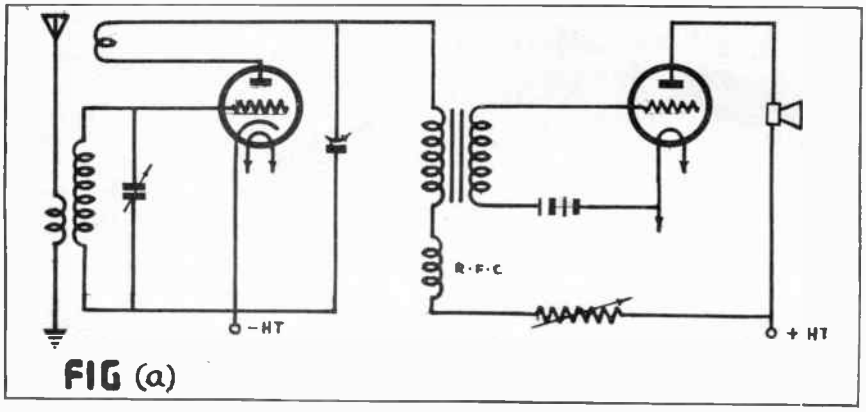


FIG (a)

1 (a) The connections to the reaction control condenser are reversed. This will not prevent the receiver from functioning efficiently, but the control would suffer from body capacity.

(b) The radio-frequency choke should be situated above the primary of the transformer, not below it. In the position indicated it is not fulfilling its proper purpose, since the r.f. current is not blocked from leaking through the transformer by virtue of the capacity of its windings back to earth, thereby diminishing the effectiveness of the regeneration control.

(c) There is no negative H.T. connection to the audio amplifier, which would therefore be altogether incapable of working.

In addition, the grid of the amplifier is biased positively, which would lead to serious distortion. It can be assumed that the filament supply to the amplifier is d.c., and that the voltage of the "C" battery, when reversed, would be correct when the filament battery voltage is taken into consideration.

The detector is presumably an indirectly-heated triode. It would function poorly unless a certain negative bias were applied to the grid; alternatively, a grid condenser and leak could be installed.

2. Describe with the aid of simple circuit diagrams three methods of harmonic suppression or prevention in a telephony transmitter.

2. Harmonics are less likely to be generated if proper care is taken in the design and operation of the final amplifier. If two valves in push-pull, correctly adjusted, are used, the even harmonics are cancelled out in the plate circuit. A "high-C" tank circuit is also of advantage.

Over-modulation will cause harmonic generation, and for this reason, among others, should be avoided.

Harmonic radiation may be suppressed by giving careful attention to the output coupling. A Faraday shield between tank and aerial circuits will reduce electrostatic coupling and minimise transfer of harmonic frequencies. An impedance-matching network of the type shown in Fig. 5, when correctly tuned, acts as a low-pass filter which transmits the fundamental unimpaired, and attenuates harmonic frequencies.

3 (a) Calculate the physical length in feet of a Hertz antenna having a fundamental frequency of 7000 k.c./sec.

(b) Quote three major considerations in the design and erection of a Hertz antenna of high efficiency.

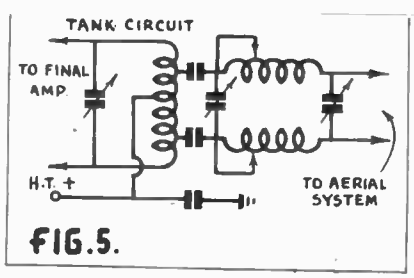


FIG.5.

3. (a) The formula

$$\frac{0.95 \times 492{,}000}{7000}$$

gives approximately 66.8 feet.

(b) See "Radio World," February, 1938, page 36 (10).

4. If you were required to tune a three-stage transmitter, explain the procedure step by step, and state what apparatus you would use for the purpose.

4. The most useful pieces of apparatus are probably milliammeters in the plate circuits of all three stages. It is desirable also to measure the d.c. grid current of the final stage. An absorption frequency meter with small lamp in series is useful for obtaining a rough check on frequency, and on the amount of energy in the circuits to which it is loosely coupled. A well-shielded heterodyne frequency meter and monitor should also be employed, especially if the oscillator is not crystal-controlled. Its tuning range should include the frequency of the final stage.

Allow all valves, including rectifiers, to warm up without plate power connected to any of the three stages. In applying plate power for the first time reduced voltages should be employed in each case. Starting with the oscillator, the plate tuning condenser is turned until the plate current drops sharply, indicating resonance with the crystal. The circuit is tuned to a frequency slightly higher than resonance. The frequency should now be checked by listening to the fundamental or a known harmonic on the monitor.

The grid circuit of the next stage, if separate, is now tuned to resonance, indicated by a maximum d.c. grid current, and coupling adjusted for best power transfer. With reduced plate voltage now applied, the plate circuit of the second stage is then tuned to the same frequency if it is a straight amplifier, or double frequency if it is a doubler. In the former case neutralisation will be necessary unless the valve is of the screen-grid type. In the latter case the grid bias will have an important bearing on the out-

put, the optimum bias depending on plate voltage and excitation voltage.

The final stage, if a triode, will have to be neutralised. Without plate voltage connected, the neutralising condenser is rotated, with the grid circuit simultaneously adjusted to maintain resonance, until the plate condenser on being swung through resonance does not cause any deflection of the grid milliammeter. The absorption meter on being coupled to the tank circuit will light the lamp if the neutralisation is not accurate. A valuable check on all tuning operations is obtained by listening on the monitor.

Generally the frequency can be dragged slightly by a powerful signal: hence if the monitor is set just off the transmitter's frequency, the heterodyne note will vary perceptibly as each condenser is swung through resonance.

When the neutralisation is completed the full plate voltages can be impressed on all stages, the aerial coupled, and further slight adjustments may be necessary, according to the indications of the meters. If the operator is fortunate there will be no parasitic oscillations to worry him.

5. With the aid of simple curves and circuit diagrams describe—(a) plate rectification; and (b) grid rectification.

5. (a) The detector valve is biased to the lower bend of the plate-grid characteristic curve, usually by means of a by-passed cathode resistor. The plate current will then be only a fraction of a milliampere, with no signal. (Theoretically, the upper bend of the curve is also suitable for rectification.)

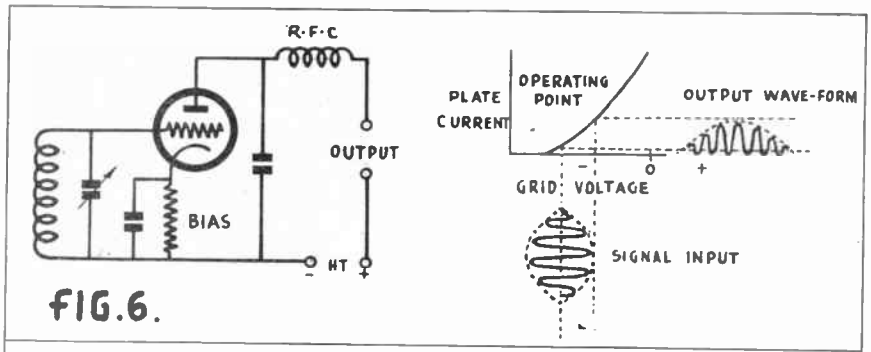


FIG.6.

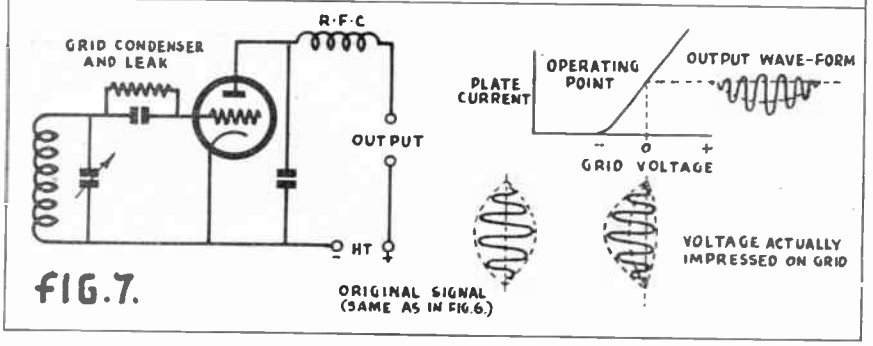


FIG.7.

The application of an r.f. alternating voltage to the grid (see Fig. 6) current along the straight portion of the characteristic on positive half-cycles, but on the negative half-cycles there is only a slight fall in plate current, owing to the curvature at the operating point.

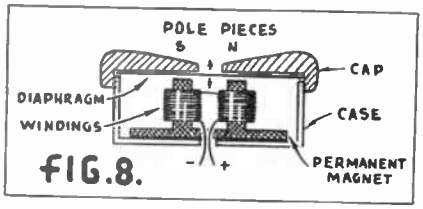


FIG.8.

Thus rectification is brought about by practically cutting off the negative half-cycles, and the resultant average plate current rises and falls in a manner conforming to the envelope of the incoming wave train. The r.f. component of the rectified signal is shunted to earth through the small fixed condenser, and the a.f. component passed on.

(b) In the process of ordinary cumulative grid rectification, the bias is approximately zero with no signal, and a certain steady value of plate current flows. It will be noted (Fig. 7) that a grid condenser is inserted causes normal rise and fall of plate

in the circuit, shunted by a high resistance, the grid-leak, which allows the grid condenser to leak slowly.

Positive half-cycles of r.f. voltage cause the grid to pick up electrons, which cannot leak away fast enough, and some remain after the collapse of the half-cycle as a negative charge accumulated on the grid. The negative half-cycle immediately following acts on a grid already negative, and at its conclusion leaves the grid at almost its previous potential. The next positive half-cycle attracts more electrons to the grid. The net effect of an incoming signal is to drive the grid negative, and to decrease the steady value of plate current.

At the end of each wave-train the grid condenser discharges through the grid-leak, and the process is repeated with the next wave-train. The signal is thus detected by a fall in plate current, the a.f. component of which conforms to the shape of the wave-train.

6. Describe the construction and operation of a telephone earpiece. Illustrate your answer with a sketch.

6. See Fig. 8. The telephone earpiece consists essentially of a short cylindrical case enclosing a permanent magnet with two projecting pole pieces, attracting but not quite touching a circular iron diaphragm, and surmounted by an ebonite cover.

Around the pole pieces are wound a large number of turns of insulated fine wire, generally having a resistance of 2000 ohms. When current from an external source traverses the windings, its direction is such as normally to increase the magnetic attraction for the diaphragm. An increase in current will draw the diaphragm nearer, and a decrease allows it to recede.

An a.f. component of current impressed on the steady value passing through the windings causes the diaphragm to vibrate in step with the current variations, thereby pushing the air to and fro outside the diaphragm to give rise to a sound wave.

7. Select any three distinct types of microphone, and explain the construction and theory of operation of each.

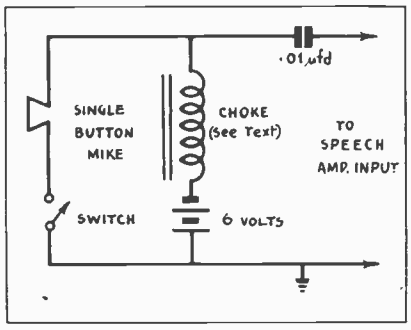
7. See the "Radio World," February, 1938, page 36 (9).

A Correction.

In the Reco Radio advertisement on page 45 of last month's issue, the 5" Rola speaker included in the list of parts was, because of a typographical error, incorrectly priced at 14/6. This should have read 24/-.

Improved Quality From A Single-Button Microphone.

The system of microphone coupling to be described is a great improvement over the usual transformer-coupled arrangements as regards quality and background noise. Of course, the overall gain is considerably reduced, necessitating increased



amplification. (Two transformer or choke-coupled stages should be quite satisfactory.)

It should be noted, however, that a reasonably good telephone microphone is necessary, as no amount of external attention will compensate for damp carbon granuals or defects inside the unit. The mouthpiece should be removed, and it is advisable when operating to speak "across" the mike rather than "into" it.

The low impedance choke is not particularly critical, the windings of an old telephone receiver of about 60 ohms being a convenient arrangement. Any similar winding may be used, however.

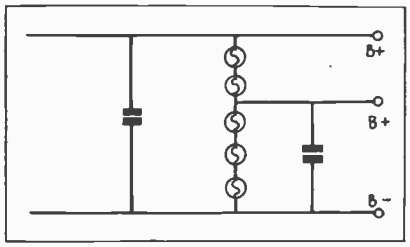
The reports received while operating a P.M.G. mike in this circuit have been most satisfactory indeed. The quality is said to compare favourably with the average Reiss microphone.—D. Broadley (VK2AFU), 99 Homer Street, Undercliffe, N.S.W.

★

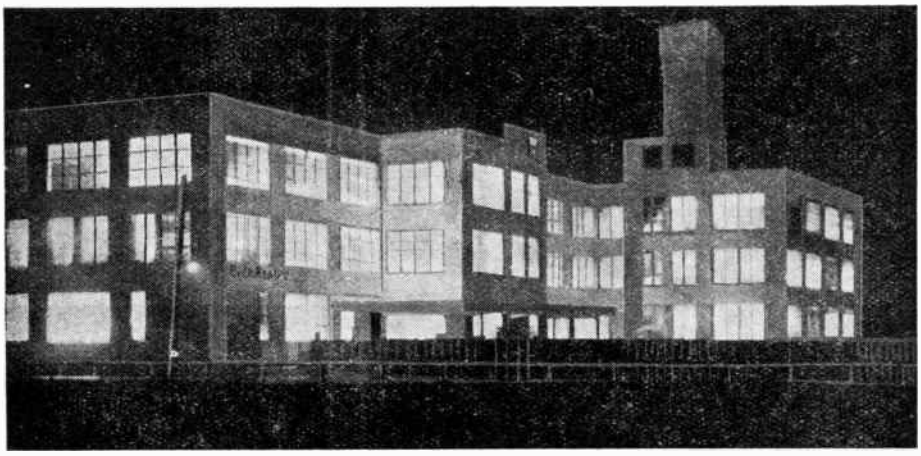
A Heavy Duty Voltage Divider For Transmitters.

Sometimes it is necessary to use a heavy-duty voltage divider in transmitters, especially where lower voltages are required to be tapped off for other stages. It is usually found that the windings of the divider get quite hot if the current is at all high. A very satisfactory method to overcome this difficulty is to use a bank of 240 volt 10-15 watt pilot lamps connected in series and shunted across the pack.

A variety of voltages may be tapped off without fear of any overheating. These lamps are available fairly



cheaply, the number required depending on the voltage output of the pack. A milliammeter should be temporarily connected in series with the bank for purpose of checking the bleeder current, and if found to be too high, more lamps can be added until the desired drain is obtained.—H. Ackling (VK2PX), 76 Market Street, Bankstown, N.S.W.



Striking evidence of the rapid expansion of the dry cell industry during the recent winter months is shown by the above night photograph of the Ever Ready factory at Rosebery, N.S.W. With the electric torch steadily increasing in popularity and the normal rise in turnover experienced at this time of the year emphasised by the cricket tests, this company has found it necessary to operate a full night shift several nights each week in order to keep up with the current demand for its products.

Mr. A. P. Morrison, of Wellington, N.Z., who logged amateur station VK2NO, Sydney, on five metres, using the receiver shown below.

Twenty-Five Years A DX Fan

Winner of the Lakemba Radio Club's trophy for the first listener to submit a verification of trans-Tasman reception on 5 metres, Mr. A. P. Morrison, of Wellington, N.Z., in the article below outlines his DX experiences over the past 25 years.

MY experiences in radio perhaps date back longer than those of most present-day enthusiasts, as I first became interested in this very fascinating pastime about 1916. My first introduction to radio was through the courtesy of Mr. Charles Forrest, now managing director of International Radio, well-known both in New Zealand and Australia.

As a young man Chas. was always delving into any scientific mysteries of the day. By chance I met him one day in Wellington, and in course of conversation he pulled from his pocket, among other odds and ends, a piece of bright substance which he explained was for the purpose of receiving radio signals.

Later I visited his home in Sussex Street, and there I was shown a crystal set built on the once-popular slider principle, with its large coils of wire wound on a cardboard cylinder, a crystal and an old headphone. I was invited to put my ear to the 'phone and listen while Chas. made the necessary adjustments, but on this occasion nothing was heard, and it was only after several visits to the mysterious outfit that I was rewarded and heard my first radio signal in morse code. Where it came from I do not know, but it was not long afterwards that I had my own receiver in operation and receiving the same signals.

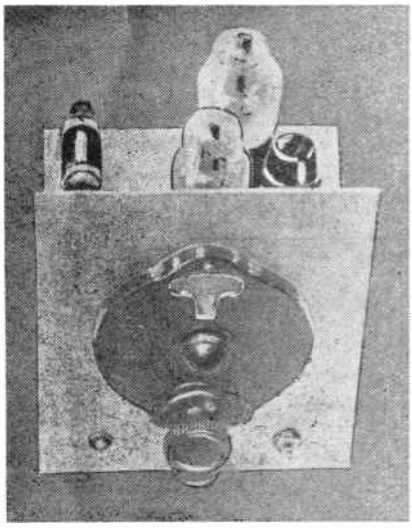
At this period we were forced to discontinue radio experiments owing to the Great War, so the gear was carefully packed away and was not brought to light again until 1923.

First Valve Receiver.

A valve receiver was then built up, the first one being the old De Forrest Radiophone using American parts. This set did not last very long, as I only heard one signal on it, namely, the once popular song "Yes, We Have No Bananas." Where the music originated I do not to this day know, but it faded out and was the first and last signal I ever heard on that set.

I then used Armstrong's regenerative detector circuit, which was, and remains, one of the most extraordinary pieces of radio equipment ever developed, especially for DX work. One thing I well remember in connection with this outfit, and that was the fact that the old Cunningham detector drew 1 amp. filament current and provided enough light by which to tune the set.

Furthermore, I had the misfortune to connect a 45-volt battery across the filaments of both the De Forrest and Cunningham valves, which cost about £1/10/- and £2/10/-, respectively. Mr. Forrest will no doubt remember this little episode, and how I saved up enough cash to replace them.



The two-valve super-regenerative receiver used by Mr. Morrison for his trans-Tasman DX on "five." Circuit details will be published in next month's issue.

The First DX Signals.

The first station to be heard on this receiver was ZL2AQ and the old 4YA, Dunedin, the latter being run by Mr. O'Neill and his daughter.

Many more New Zealand "ham" stations were then logged, until the first Australian broadcast was heard. This was old 2FC, Sydney, on 1100 metres, which came in at wonderful strength. Several more Australians were heard, until I started to turn my attention to the Americans.

The first "Yank" was KGO, California, which in 1924 was in its experimental stages, using the call-sign of W6XN. My next station was KFON, California, which was a wonderful little station, using only 500 watts, and could be heard practically every night on 241 metres. My location was out in the country, and was free from all interference.

I derived a great deal of pleasure searching the ether for new stations night after night until 1926, when I turned my attention to the short waves.

Short Wave DX.

In April, 1927, 2XAF Schenectady, N.Y., was logged on an experimental broadcast on 32.77 metres, and was heard from 4 p.m. until 11 p.m. RFM, Russia, operating on about 50 metres, was my next shortwave station. By this time it was realised in various countries that the short waves had great penetrating power, with the result that new stations were making an appearance every week, keeping me very busy logging them.

In March, 1930, I succeeded in logging the little station NRH, located in Costa Rica, Central America, which at the time was using only 7½ watts. I sent away a report and in due course received a reply, stating that it was the first report from Australasia, and constituted a world's record in low-power reception. Details of this reception must have been published in various radio magazines, as I received many letters offering congratulations and asking for details of the

circuit being used. These requests I complied with as far as possible.

The "Ultra-highs"—In 1928.

We will now pass on to the more modern waves—ultra-high-frequencies —28 and 56 m.c. I first became interested in 28 m.c., or 10 metres, in 1928, when I listened for tests conducted by the General Electric Co. of America. However, I was unsuccessful in logging them. Further interest in 10 metres was not taken until about 1933. At this stage I will give a little history of 10-metre activities.

In October, 1928, Mr. Matthews, of G6LL, established the first amateur contact on this band between England and U.S.A. The year 1928 coincided practically with the last sunspot maximum, conditions on the 20-metre band being unusually good, thus inspiring experimenters to go to 10 metres.

Three outstanding Americans at the time were W2JN, W2BG and W2ACK, all of them making many Trans-Atlantic contacts with England, France, Germany, and Belgium.

The year 1929 appeared to be equally as good, when good contacts were made with the west coast of U.S.A. and with Africa in December. Much useful work was done on low power, in particular by Mr. Rodman, of G2FN, who worked with California on an input of 8 watts. Shortly after, 28 m.c. long-distance work practically died right out, nothing outstanding being heard for several years except a few European stations and occasional harmonics from 20-metre commercial stations.

In June, 1934, the R.S.G.B. announced an International 10-metre contest running for one year, from October 1, 1934, points to be scored for all contacts over a distance of more than 100 miles.

Unusual Harmonic Reception.

On the night of January 26, 1935, a friend and I were listening down on 10 metres when we heard a station testing, which turned out to be G2WQ, of 7 Stanley Road, Broughton Park, Manchester, England. We sent a report to G2WQ, and received a very interesting letter in reply, stating that he was testing on 20 metres.

I will here quote his letter:—"Thank you very much for your very interesting letter reporting reception of my signals on 28 m.c. This is most interesting and is one of the longest distances which a harmonic has travelled. At the time I was working on 14 m.c., when conditions were not too good.

"I wrote to the manager of the R.S.G.B., which collects research data of this nature, and he stated that he thought it was the first case of its kind between ZL and G. In 1931 two French stations heard ZL2GB and on December 15, 1934, ON4AU was heard in N.S.W., these being fundamental signals."

First ZL-VK Contacts On 10 Metres.

In November, 1934, the Australians set the ball rolling by establishing many contacts with New Zealand, the first two-way contact being between Messrs. Boxindale (ZLICD) and Bischoff (VK2LZ), of Crows Nest, Sydney. This created a Southern Hemisphere Trans-Tasman record.

By February, 1935, British "hams" were hearing harmonics of American commercial stations, while somewhat doubtful reports of American "hams" were also heard. In March things really started happening: two Australians worked with Japan, one being in contact with the east coast of U.S.A., and another with the west coast. The stations concerned were VK2LZ, VK2HY, and VK2HC. By April, Australian-U.S.A. contacts were commonplace.

During May things progressed still further: South Africa was heard in England for the first time since 1929; contacts with Algeria and Egypt were made, and a West Coast American was heard in Spain.

In June, the first South American was heard in England; British "hams" had worked with South Americans; Europeans were being heard in South Africa and South Africans in Europe, while ON4AU was heard in Australia. On October 6, ON4AU and French F8GS were in touch with VK2HZ and VK2LZ, the first European-Australian contacts.

The Five-Metre Band.

Now for the most interesting band of all—five metres, or 56-60 m.c. To my way of thinking, this is the most fascinating wavelength I have ever experimented on, more so because it was one of the first frequencies on which experiments were ever conducted.

In the year 1886 Henrich Hertz, with the world's first transmitter, working on from 1 to 15 metres, sent signals from room to room and demonstrated quasi-optical transmissions. Marconi with a 1-metre spark transmitter sent signals for two miles, but abandoned ultra-high-frequency signals shortly afterwards, which lay nearly dormant for 30 years.

In 1925, Harry A. Leyman, with a 3-metre ultra-audion oscillator of 2 watts output, transmitted over a distance of 14 miles; in 1926 Mario Santangeli at Milano, Italy, using 40 watts, sent five-metre signals, which

(Continued on page 29.)

C. R. Oscillograph Uses Standard Parts

The release of the Philips type DG7-1 low-voltage cathode ray tube makes possible the design of a cathode ray oscillograph using standard radio parts throughout.

TO-DAY the cathode ray oscillograph is accepted as an important instrument for investigating the performance of radio and electrical equipment, since it provides a means of visually observing important performance characteristics such as amplitude distortion in amplifiers, modulation percentage of transmitters, wave form, etc. In previous issues of this magazine references have been made to the Philips range of cathode ray tubes (see T.C's. Nos. 45, 57, 58, 59, 62, 63) and articles have been published describing certain associated apparatus such as rectifier systems, amplifiers and time base units.

With the introduction of the DG7-1 low voltage tube (Anode 2 at 500 v.) it is now possible to construct from standard radio components an oscillograph capable of rendering valuable service in the fields of research and production.

The oscillograph described here can be divided into three sections comprising:—

(a) Power supply incorporating a rectifier, high tension transformer, filament supply and filter circuit.

(b) Time base unit comprising 4686 gas triode and AF3 pentode for generating saw tooth sweep voltage.

(c) Cathode ray tube and associated circuits.

The complete circuit diagram for the oscillograph is shown in Fig. 1.

Power Supply.

The power supply has been designed to provide a potential of approximately 520 volts across the final condenser (C2) of the filter circuit. The filament windings can be wound on the same transformer core as the high tension winding, but precautions must be taken to ensure that the winding for the gas triode has a low capacity with respect to the core and other windings. This winding should be wound on the outside and separated by additional insulating layers to reduce capacity coupling to the other windings.

A choke coil of 10 henrys with a d.c. resistance of approximately 200 ohms is recommended. Since the positive high tension is grounded the containers of the 8 mfd. filter condensers must be insulated from chassis.

Time Base Unit.

In the time base circuit, the saw tooth voltage is generated by charging a condenser by means of a constant current source which is provided by the AF3 pentode and discharging this condenser periodically by means of the 4686 gas triode. This system gives a more linear saw tooth voltage than the alternative method of charging a condenser through a resistance.

Details of this sweep circuit arrangement have previously been given in T.C. No. 58 (page 9). The saw tooth voltage amplitude is controlled by means of the potentiometer R8, which controls the grid bias on the 4686. Variation of the grid bias also affects the frequency of the sweep voltage, and it is therefore suggested that the amplitude should be adjusted first. The required sweep frequency is then obtained by means of the se-

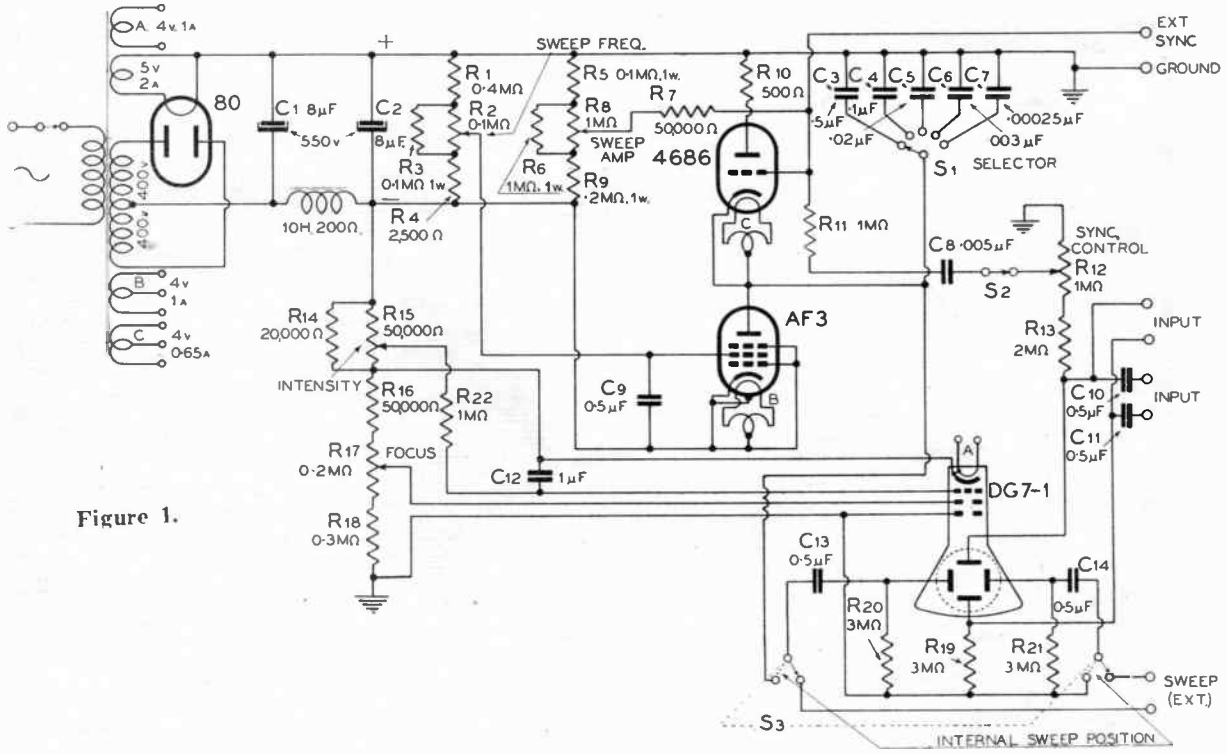


Figure 1.

CALSTAN (CALibrated to STANdard) PRECISION TEST EQUIPMENT

. . . "The RADIO TRADE'S choice by TEST" in a comprehensive range of SERVICE INSTRUMENTS, including the following . . . .

- TUBE CHECKERS
- VOLT OHM METERS
- SET ANALYSES
- SIGNAL GENERATORS
- OUTPUT METERS
- MULTIMETERS
- THERMO-COUPLE METERS
- OSCILLATORS
- GALVOMETERS

TUBE-TESTER MULTI-TESTER . . . . the Radiotricians Portable Laboratory

. . . . which creates yet another Calstan triumph and has filled a much needed place in the Radio Servicing Field.

- Released by SLADE'S RADIO PTY. for the discriminating Radio Dealer and Serviceman who appreciate and practise the finer points of efficient Radio Service. Here is an outstanding instrument for all round perfection, combining the multiple functions of a Valve Tester and Multitester. This instrument is a boon to the Radio Serviceman and Dealer, and needed by ALL who rely on RADIO SERVICE as an effective means of building up a MODERN RADIO BUSINESS.

- A.C. Model 223 will test every valve used in Australia, including American and European P. and V., and in addition to the emission test a Neon leakage indicator is fitted for individual electrode selection. Eleven steps for filament voltage from 1.5 to 30 volts is provided. The multi-tester range is:—

  A.C. and D.C. VOLTS: 5, 10, 50, 250, 1250
  MILLIAMPERES: 5 Ranges, 1, 5, 25, 100, 250.
  OHMS: 5 Ranges, from 1 ohm to 5 megohms.

- This is also an excellent instrument for lining up sets and as an "Multimeter" operating in conjunction with the Power Supply an electrolytic condenser leakage test is available and condensers may be checked at 10, 25, 100, 150 and 250 volts, and a "GOOD"—?—"BAD" meter scale provides the necessary indications.

PRICE

A.C. MODEL 223A, £17/17/-

D.C. MODEL 223D, £18/6/-

D.C. MODEL 223D PORTABLE, £18/16/-

A.C. and BATTERY 6-VOLT PORTABLE, £18/18/-

ALL PLUS SALES TAX

. . . . and for the Country Radio Dealer.

- The D.C. VALVE TESTER MODEL D223 is also available as a Combination Tube Checker and D.C. Multimeter. As a D.C. Valve Tester it operates from a 6 volt battery and tests every type of valve used in Australia. As a D.C. Multimeter it has 5 ranges of D.C. volts, 5 ranges of Milliamperes and 4 ranges of Ohms.

Slade's Radio Pty. Ltd.

LANG STREET, CROYDON, N.S.W.
'Phones UJ 5381-5382.

Calstan Equipment is now available on Terms. Pay as you are using Equipment. Write for full particulars

DISTRIBUTORS :

N.S.W.—Australian Radio College; Martin de Launay, Ltd.; Bloch & Gerber, Ltd.; Fox & MacGillycuddy, Ltd.; John Martin Ltd., Sydney; Electric Service Co., Newcastle.

VICTORIA—Australian General Electric Ltd.; Arthur J. Veall Pty. Ltd., Melbourne.
QUEENSLAND—J. B. Chandler and Co., Brisbane.
WEST AUSTRALIA—Carlyle & Co.; Norman L. Burnell & Co., 13 Queen St., Perth.

SOUTH AUSTRALIA—Radio Wholesalers Ltd., Adelaide.
TASMANIA—Noyes Bros. (Melbourne) Ltd., Launceston.
NEW ZEALAND—New Zealand Electrical Equipment Co.
Stocks available from Turnbull and Jones, all branches.

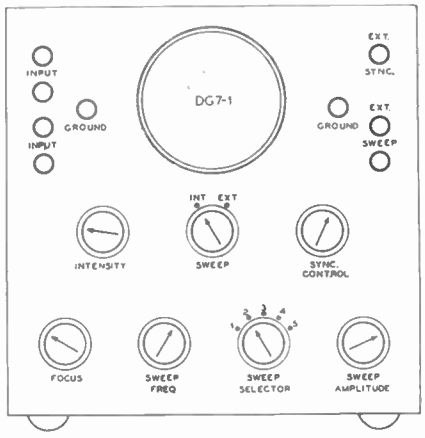


Figure 2.

lector switch S1 and adjusting potentiometer R2.

The condensers arranged for charging by means of the pentode provide for a frequency range of approximately 10 to 30,000 cycles per second. The high frequency response depends on minimising the capacities in parallel with the condenser to be charged and it is for this reason that a low capacity filament winding has been prescribed for the 4686, as capacity between this filament and ground is in parallel with the sweep circuit condensers. The capacity between the filament winding for the gas triode and ground should be limited to 40-50 mmfd.

An amplifier has not been provided, as the sweep generator used in this circuit is capable of supplying sufficient output to meet most practical requirements. A two-way switch S3 connects the horizontal deflecting plates to the terminals provided for an external sweep. This may be required if for example, a symmetrical saw tooth sweep is necessary. A push pull time base unit was outlined in T.C. No. 62.

The "Ext. Sweep" terminals are also required for making modulation measurements, since for this application voltage from the modulator is applied to the horizontal plates for

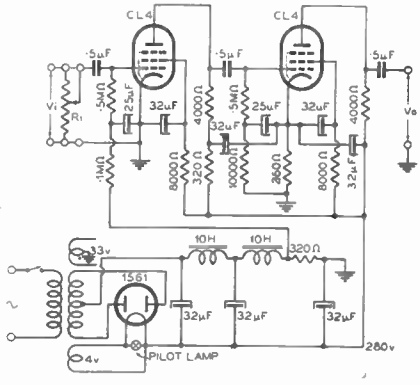


Figure 3.

sweep voltage and the modulated r.f. signal is applied to the vertical deflecting plates.

Cathode Ray Tube.

In T.C. No. 63 information was given with respect to operating voltages, dimensions and socket connections for the DG7-1 tube. In this equipment the tube is operated under the 500 volt conditions and the deflection sensitivity is as follows:—

Plates nearest cathode 0.30 mm/V.
Plates nearest screen 0.24 mm/V.

The signal to be observed is applied to the plates nearest cathode, as these provide the greatest sensitivity. A signal to the order of 230 volts (peak) is required for full scale deflection of the DG7-1. In most cases an amplifier will be required between the voltage source to be examined and the input terminals of the oscillograph. An oscillograph amplifier was described in T.C. No. 57 and the circuit diagram is reproduced in Fig. 3.

The grid of the DG7-1 is connected to the bias potentiometer (intensity control) through a resistance of 1 megohm which in conjunction with a by pass condenser serves to keep hum voltage from the grid. The DG7-1 is provided with a separate contact for each deflecting plate and these are grounded through resistors of 3 megohms each.

A potentiometer has been inserted in series with one of the vertical deflecting plates so that a voltage of signal frequency can be introduced into the grid circuit of the sweep oscillator. This control is provided so that the sweep may be synchronised with the signal under observation.

Synchronisation.

If an oscillograph is to be used to examine periodic phenomena the frequency of the saw-tooth voltage may be adjusted so that a definite number of cycles appear on the screen. For example a 450 cycle voltage will appear as three complete cycles if the sweep oscillator is adjusted to a frequency of 150 cycles. To obtain a stationary image it will be necessary to synchronise the sweep with the voltage applied to the vertical deflectors. If the signal is not properly synchronised the pattern will drift across the screen of the cathode ray tube.

In the circuit diagram (Fig. 1) the synchronising voltage is controlled by the potentiometer R12 (combined with switch) and applied to the grid of the gas triode through the coupling condenser C8. For synchronising the pattern with a voltage independent of the input (e.g., 50 cycle a.c.) termin-

als marked "Ext. Sync." have been provided.

Other Controls.

The potentiometer R15 regulates the grid voltage on the DG7-1, and thus serves to control the magnitude and velocity of the electron beam emitted by the cathode. The adjustment of this potentiometer controls the light intensity of the spot on the fluorescent screen and this spot or the pattern is focussed by adjusting the ratio between Anode 1 and Anode 2 by means of R17. With a voltage of 500 volts on Anode 2, the potential on Anode 1 should not exceed 140 volts.

Panel Arrangements.

A layout diagram for the various controls and terminals is given in Fig. 2. Alternative input terminals are provided, one pair with isolating condensers serve for applying voltages containing a d.c. component.

Suggested dimensions for a casing to house this oscillograph are nine inches wide, nine inches high and 11½ inches deep. The casing should be made from 1 mm. sheet iron. A metal partition is recommended to divide the casing into two sections horizontally so that the cathode ray tube, valves, electrolytics and filter choke may be mounted on the top side with transformer, heater and high tension wiring, bleeder circuits, etc., below.

It is important to keep all leads as short as possible, and screened leads should be used for wiring between deflector plates and the input terminals. External leads connected to the input terminals should likewise be screened and earth terminals are provided on the panel for grounding the screening on these leads.

Twenty-Five Years A DX Fan.

(Continued from page 25.)

were received on schedule by Captain Filipini in Northern Africa, a distance of about 1600 miles; in 1927 Boyd Phelps at Jamaica, L.I., and Adriano Ducati at Bologna, Italy, heard each others five-metre signals at intervals, but were unsuccessful in establishing two-way communication. Power at either end was 500 watts.

In 1931 Thomas R. Marshall copied KKP's harmonic (Fundamental 10.9 metres) over a distance of 5700 miles. I have the original circuit on hand which Mr. Marshall was using, and would be glad to forward it to anybody interested. (Mr. Morrison's address is 7 Essex Street, Wellington, N.Z.—Ed.)

Referring back to 28 m.c., or 10 metres, a few years ago it was the belief that this wavelength would be suitable only for transmitting signals over very short distances, or as was stated at the time, "over the back fence." The same was said about 7½ metres, but only recently the sound signals from the B.B.C. television station were picked up in South Africa, thus disproving this theory.

Why such a theory was put forward I could never understand, as it is my contention that when a signal leaves the transmitting aerial it goes up, and what goes up must come down. In dealing with high frequency signals, about which comparatively little is known, I do not think that too much attention should be paid to the theoretical side, especially with regard to the radiation of the waves. It has now been proved in many instances that signals on five metres do really reach out.

As early as 1937, the 56 m.c. signals from VK2NO were heard on telephony in England, travelling over a distance of 11,500 miles, which could hardly be termed a short distance. 2NO was also heard by me in Wellington in October of last year; also at a later date. Reception on both occasions has been verified. I have also heard W9FG, W6ITH, VK2GU and JNJ, the first three instances being first harmonics of a 10-metre wave, while JNJ has been heard many times on his fourth harmonic. Several more Americans have been heard, but those mentioned are the most consistent.

The fact that so many harmonics are heard leads me to the belief that the majority of five-metre transmitters and antenna systems at present in use are not as efficient as they might be.

Patience Is Essential.

To those who listen for five-metre signals, a little advice might be offered. To begin with, one must have plenty of patience; it is useless to sit down for 10 minutes or so, and to give it up, not having heard anything. I have often sat for hours on end, and in some instances, all day, without having heard a sound of a carrier wave. However, I have never been discouraged, as there is always another day.

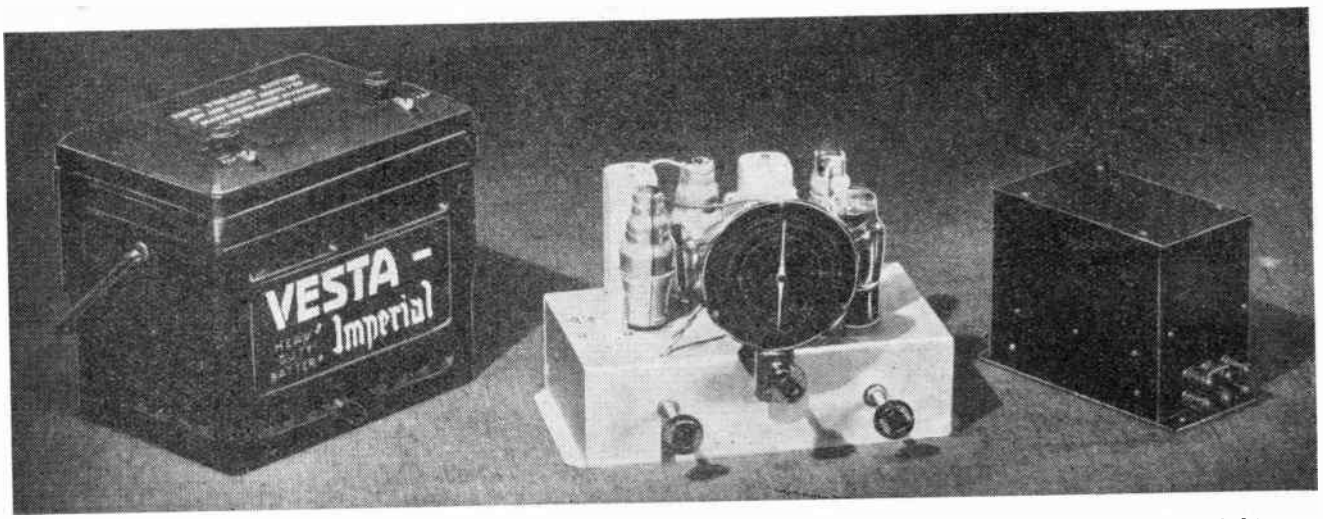
From experience, I have found that the best periods are as follows:—3 p.m. to 6.30 p.m., 7 p.m. to 9.30 p.m., and 2 p.m. to 2.30 a.m. Once you get the "feel" of the receiver, you can usually tell the peak periods. I have found that the periods do not last long, perhaps 15 minutes, although at times I have copied C.W. over a number of hours; so it always pays to be on the spot if DX is required.

More Co-operation Required.

I read in a radio magazine recently that the Tasman has been crossed again and verified, so it is to be hoped that it will not be long before a two-way contact will be made. I think that perhaps a little more co-operation could be had between New Zealand and Australia. We know that the last Sunday in every month is a five-metre day, but what of all the other week-ends?

I am willing to co-operate with anybody interested, irrespective of times, so invite "skeds" from VK "hams," as I am sure we have here in New Zealand many willing listeners.

[In next month's issue a description of Mr. Morrison's receiver will be given.—Ed.]



The receiver discussed below, with Vesta vibrator type battery on left and Radiokes vibrator unit on right.

Four-Valve D.W. Superhet For Vibrator Operation

THE receiver illustrated above is the four-valve battery-operated dual-wave superhet described in the May and June issues of "Radio World." On the right is one of the new Radiokes vibrator units, type VB-25, while on the left is a Vesta vibrator type six-volt battery with patented "Right-Way" cover lid.

While designed originally for battery operation, the receiver illustrated can be fully recommended to those finding vibrator-operated sets more convenient—in other words, those who have adequate facilities for battery charging.

The Radiokes vibrator unit can be used with any battery set employing 2, 4 or 6-volt valves, the method of connections being very simple. It is fully outlined in the instructions accompanying each unit.

Excellent Results On Both Bands.

Tested with the receiver shown above, and with no additional smoothing, excellent results were obtained. The unit is exceptionally quiet in operation, no trace of vibrator noise being apparent on the broadcast band, and only the slightest trace on short waves. While not in the least objectionable, this could be very easily eliminated by connecting a .5-ohm iron-cored choke, by-passed with a 500 mfd. condenser, in series with the "A" lead to the receiver. This choke, incidentally, should be fitted as close as possible to the set and the condenser earthed to the chassis.

The unit could be equally well adapted for use with other receivers, a "B" voltage of 130 volts, at a maximum current rating of 25 m.a., being available.

Vesta Battery With "Right Way" Cover Lid.

The Vesta battery shown alongside the set is provided with a cover lid that has been specially developed by the Vesta Battery Co. Pty. Ltd., of Sydney, to cater for the rapidly-growing number of listeners using vibrator-operated receivers. Incorporating an ingenious method of eliminating the possibility of wrong connections, this new type lid represents one of the most important advances yet made in the development of radio batteries.

With this new patented "Right Way" cover lid and terminals, it is impossible to make wrong connections, as both the two-terminal "S" type battery and the three-terminal "S3" tyne battery have recessed terminals, each recess having its own exclusive shape. Correspondingly-shaped spade terminals are also provided, obviating any possible chance of the user making wrong connections. As well, in both types the terminals are located on the same side of the battery, thus avoiding crossed leads.

The terminal mountings are shaped correspondingly to the designs of the lid openings, so that even with the latter removed, correct connection of the spade lugs is practically assured.

The hard rubber lid, in addition to enhancing the appearance of the battery, entirely covers the connectors and guards against acid spray.

No less than seventeen Vesta radio type batteries are available, in every possible combination of voltage and capacity that could normally be desired, all being backed by a three-years' guarantee.

VK2ME, 3ME And 6ME — Schedules For August.

The following transmission schedules will be observed by shortwave stations VK2ME, VK3ME and VK-6ME during June.

VK2ME (31.28 m., 9590 k.c.)

	Sydney Time.	G.M.T.
Sundays:	3-5 p.m.	0500-0700
	7.30-11.30 p.m.	0930-1330
Mondays:	1.30-3.30 a.m.	1530-1730

VK3ME (31.5 m., 0510 k.c.)

	Melbourne Time.	G.M.T.
Nightly Monday to Saturday (inclusive)	7 p.m.-10 p.m.	0900-1200

VK6ME, Perth (31.28 m., 9590 k.c.)

	Perth Time.	G.M.T.
Nightly Monday to Saturday (inclusive)	7 p.m.-9 p.m.	1100-1300

Built by Triplett—the name that throughout the world means high quality, accurate test equipment—these Triplett Master Units incorporate every modern circuit and constructional feature.
They are light, compact and easily portable, and ensure maximum protection against obsolescence.
Every test will show these units are outstanding in versatility. Every effort made to maintain accuracy throughout. Each unit represents the most up-to-date engineering practice in every detail.

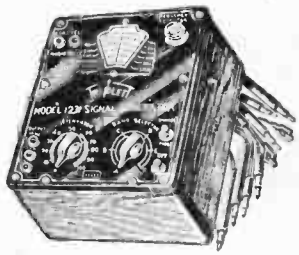
MODEL 1200-A.—Shown above is the Triplett Model 1200-A Volt-Ohm-Milliammeter. Has two instruments (A.C. and D.C.) in moulded case. Can be tilted to any reading angle. Scale readings: D.C., 10-50-250-500-1000 volts at 2000 ohms per volt; 1-10-50-250 M.A.; Low ohms, .5-500; 1500 ohms, 1.5 and 3 megohms. A.C., 10-50-250-500-1000 volts. Resistance measurements have individual zero adjustments. Selector switch for all readings includes 22½ volts and 1½ volt batteries.
Price £9, or kit of parts complete down to last nut and bolt, with full assembly instructions and wiring diagrams, £7.

TRIPLETT
Precision
ELECTRICAL INSTRUMENTS

W. G. Watson & Co. Pty. Ltd.

279 CLARENCE STREET, SYDNEY

398 Post Office Place, Melbourne
King and Bolton Streets, Newcastle
91a Currie Street, Adelaide
And at Hobart, Tasmania, Launceston and Wellington, N.Z.
Western Australian Distributor: ATKINS (W.A.) LTD., 894 Hay St., Perth
Queensland Distributor: W. E. PETERMAN, 160 Edward St., Brisbane

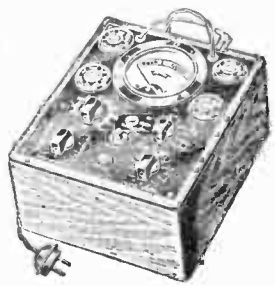


MODEL 1231.—All-wave Direct Reading D.C. Signal Generator now has blilt-in trimmer calibrated coils for accuracy of 1 per cent. on broadcast, intermediate and short wave bands. Six bands cover 120-30,000 Kc.—all fundamentals. Fully stabilised. Extra-long 12in. vernier type direct reading scale. Improved band selector switch. 400 cycle audio signal available. Includes batteries and two type '30 tubes. PRICE, £10/10/-.

1232 Unit (same as 1231, but for A.C. operation). PRICE, £10/15/-.

MODEL 1230.—Is an All-wave Signal Generator, supplying a continuously variable signal. Frequencies controlled on six fixed positions, from 100-18,000 Kc. Batteries, tubes and six individually calibrated graphs supplied. PRICE, £6/10/-.

MODEL 1220 A.—For servicing sets using metal, glass-metal or glass tubes. Has five sockets —with standard RMA markings. Panel also includes eight automatic switch type and ten single action jacks. Makes all series and parallel meter connections through the set sockets to all parts of the circuit. Automatic in operation. Used in conjunction with any Triplett Volt-Ohm-Milliammeter. Extra connections may be added, when necessary, at a very slight cost. PRICE, £4/5/-.



MODEL 1210 A.—Tests all types of tubes. Direct reading. Coloured GOOD and BAD scale. Includes rectifier tube. Large meter. Line voltage regulation. All short tests. Cathode leakage test. Individual tests on diodes and full wave rectifiers. Simple to operate. Has four sockets with one 5-6 in combination to minimise panel space. Has a new RMA approved circuit with every essential for a dependable emission test of tube values. No confusion, complications or calculations. PRICE, £10/5/-.

What's New In Radio

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

In "Radiotronics" No. 88.

Tentative ratings and characteristics of Radiotrons 921 and 922 new cartridge type photo-tubes, together with an R.C.A. application note on the operation of photo-tubes, are contained in the latest issue of "Radiotronics" (Technical Bulletin No. 88).

Other articles featured in this issue are entitled "Testing for Mutual Conductance," "The Phon—Unit of Loudness," and an article of particular interest to amateur transmitters, "Measuring R.F. by Illumination."

Also included with this latest "Radiotronics" is a further supply of valve data sheets, covering types 6R7G, 25A6G, 25Z6G, 6Z7G, 6L7G, OA4G, 6G6G, and 6N7G.

★

Eddystone "All-World Eight" Is De Luxe All-Waver.

Illustrated below is the Eddystone "All-World Eight," an eight-valve all-wave battery superhet designed to give reliable service under the severest of conditions. The solid cast aluminium alloy chassis and cabinet, while artistically designed and finished, will withstand the roughest handling. As well, the receiver is fully protected against corrosion in the most humid of climates, and as well is insect and damp-proof.

Low "A" And "B" Drain.

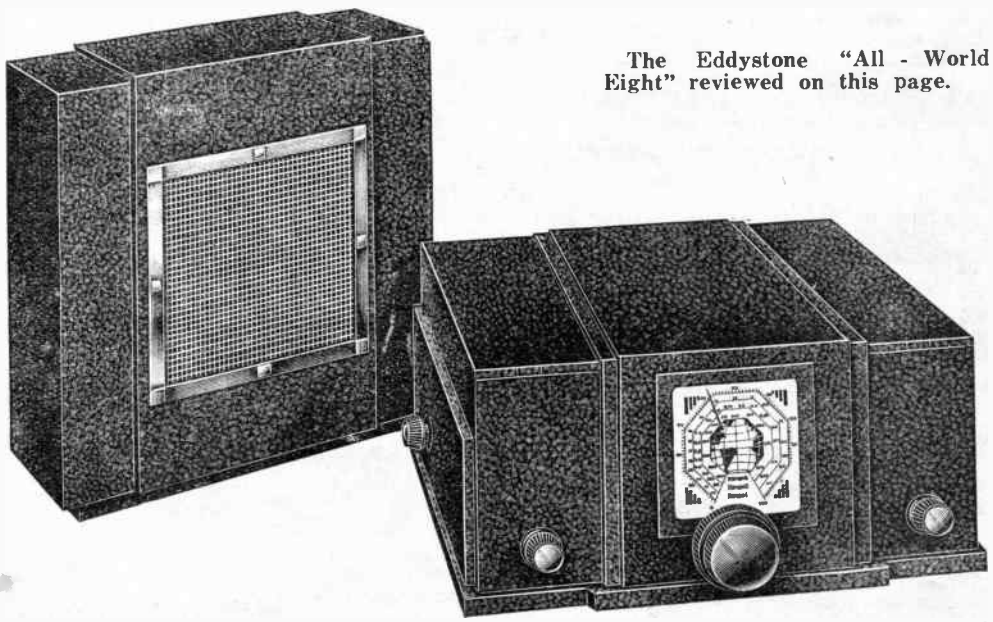
Despite its elaborate design, the receiver is particularly economical to operate, as the "B" consumption is only 15 to 18 m.a., with an "A" drain of 1.1 amperes.

Eight valves are used in all, an r.f. amplifier, separate oscillator and first detector valves, two i.f. stages, double diode triode for detector and first audio amplifier, with a pair of beam power tetrodes in class "AB" push-pull in the output, delivering 1.5 watts to the tropical model moving coil speaker.

The circuit is arranged to give high gain and efficient automatic volume control. All-wave coverage, complete stability of operation, high quality reproduction and ample output are other important features of the design. Background noise, second channel interference, frequency drift and double tuning are eliminated. There are nine tuned circuits operating on all waye-bands, and giving an 8 k.c. separation. The sensitivity is in the order of 5 microvolts for a 50 milliwatt output. Grid bias is automatically obtained.

Tuning is delightfully easy with the dual ratio (22-1 and 115-1) dial. Volume and tone controls are provided, and gramophone pick-up connection, as well as a dial light and switch. The set is easy to instal and operate, no previous radio knowledge being necessary. It is supplied with clear working and service instructions.

"Radio World" readers wanting further details of this receiver can obtain them free on request by writing the Australian representative for Eddystone—Mr. R. H. Cunningham (VK3ML), 94 Robinson Road, Hawthorn, E.2, Victoria.

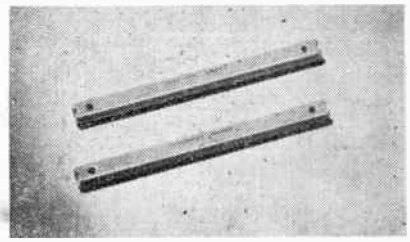


The Eddystone "All - World Eight" reviewed on this page.

New Raymart Lines.

The photograph below shows two of the new Raymart feeder spreaders, of which ample stocks have just been landed by the Australian representatives, Messrs. John Martin Pty. Ltd., of 116 Clarence Street, Sydney. Designed for 6" or 600-ohm lines, these spreaders are both light and strong, the highly-glazed finish providing effective insurance against losses due to atmospheric influences. Amateurs will find these spreaders excellent for Zepp. aerials.

Also now available are Raymart type "AX" transmitting aerial insulators. Manufactured from highly-glazed porcelain, and 12" long, these



insulators provide an exceptionally long leakage path, with capacity reduced to a minimum.

Supplies of Raymart type "EO1" cable have also been landed. A 72-ohm impedance braided and compounded cable, it is made to stand continuous outdoor exposure when used for transmitting aerials.

Further details of these and other new Raymart lines are obtainable free on request from the address given above.

Catalogue Of Radio Books

Available Free To Readers

A selection of up-to-date radio text-books, covering both the theory and design of radio components and equipment generally, is an invaluable asset to anyone interested in radio technically, whether as an amateur or a professional. For this reason readers will be interested in the 1938 catalogue of technical radio books just released by Messrs. Angus & Robertson Ltd., of Sydney.

Twenty-nine books are featured in this 16-page booklet, brief details of each being given with, in many cases, a complete outline of contents. Books of all types are included—for service-men, design engineers, amateur transmitters, set-builders and those wishing to learn the fundamentals of radio.

Included with each catalogue is an "on approval" form, enabling readers to obtain these books on approval for a period of seven days. As well, terms are available for the purchase of books.

Readers can obtain this and subsequent catalogues free and post free by writing Messrs. Angus & Robertson Ltd., 89 Castlereagh Street, Sydney.

Additions To Ducon Range.

Additions to the already extensive range of semi-dry electrolytic and tubular condensers manufactured by the Ducon Condenser Co. Pty. Ltd., are listed in detail in this company's recently-issued Bulletin No. 17. As the company has now acquired the Australasian rights to use exclusively the patents, formulae and methods of the Aerovox Corporation of New York, the types formerly manufactured by the Continental Carbon Co. are now included in the Ducon range.

★

D.C. Unit For Calstan Multi-Tester.

Slade's Radio Pty. Ltd., manufacturers of the well-known Calstan test equipment, advise that a new unit to convert the A.C. 223 multi-tester to battery operation is now available. The addition of this unit, which is priced at 35/- net, makes the A.C. 22 a portable tube-tester multi-tester combination that operates from either 240 volts a.c. or 6 volts d.c.

★

ATR D.C.-A.C. Inverters.

The ATR d.c./a.c. inverter provides a simple and very efficient method of producing standard 230-volt alternating current from 6-volt and 12-volt storage batteries, 32-volt farm plants and 110 or 230-volt d.c. systems. A.C. power for operating standard a.c. devices such as radios, public address systems, test equipment, vacuum cleaners, fans, mixers, medical appliances, etc., is made available by the ATR unit at an efficiency of approximately 80 per cent.

A plug-in full-wave vibrator unit is used, a four-point voltage regulator making possible the correct output voltage for minimum and maximum loads. It also helps to compensate for input voltages which are lower or higher than normal.

Brief specifications of the five types available are as follow:—

Type	D.C. Input	A.C. Output 50-60 Cycles	Wattage Max. Output
6-S	6-volts	230-volts	50-watts
12-S	12-volts	230-volts	100-watts
32-S	32-volts	230-volts	100-watts
110-S	110-volts	230-volts	200-watts
230-S	230-volts	230-volts	200-watts

Further details are obtainable free on request from Messrs. George Brown & Company Ltd., 267 Clarence Street, Sydney.

Appreciations From Readers

Please find enclosed application for membership in the DX Club. While writing I would like to inform you how much I appreciate reading the "Australasian Radio World." There is no wireless paper printed in Australia or New Zealand which has so much information regarding short-wave DX as the above paper. Mr. Alan Graham is to be congratulated on his very fine notes.—**H. I. Johns (AW407DX), Nelson, New Zealand.**

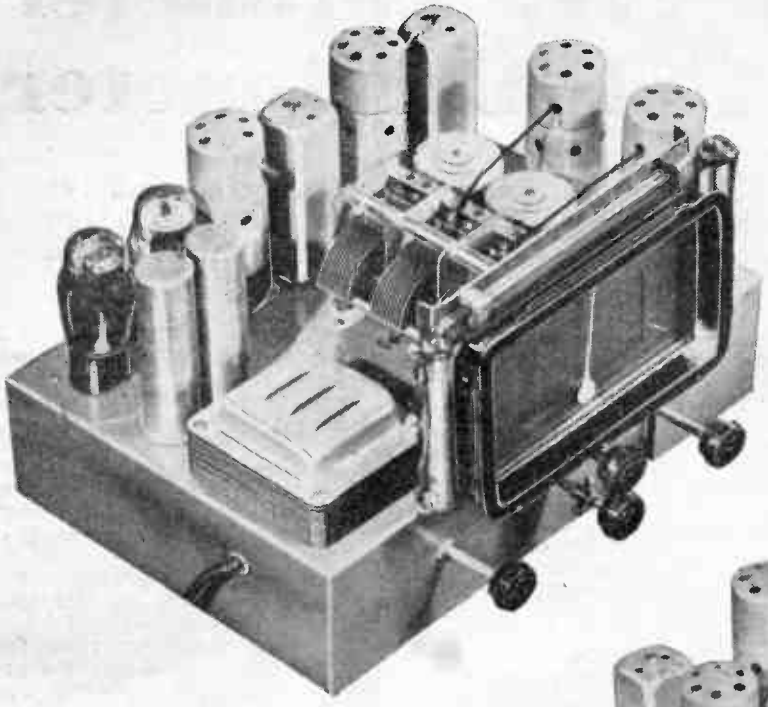
★

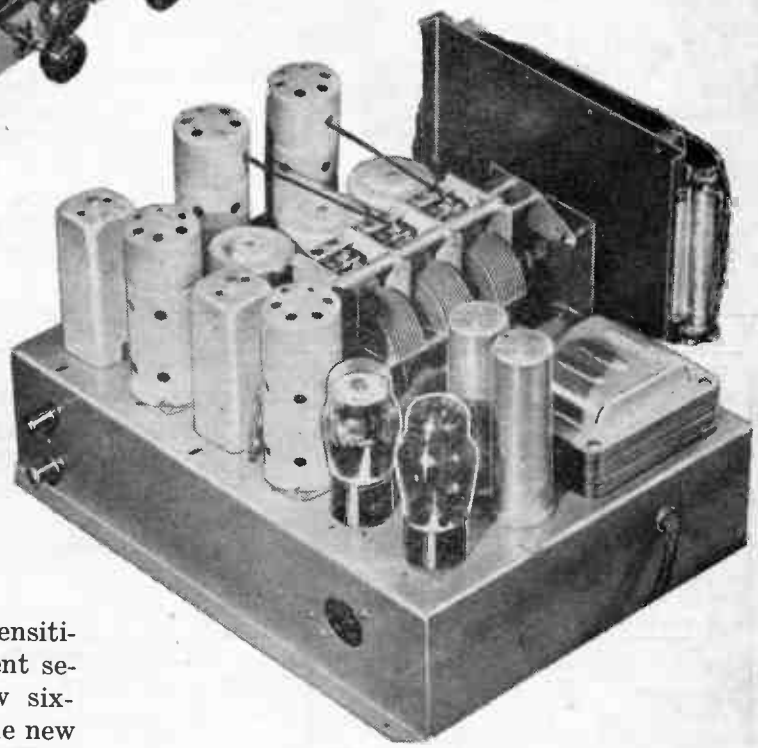
Adjustable Aerial Coupling Coil

The following hint may prove of interest to readers—at the moment I am using this idea on my receiver and it is proving very satisfactory. Instead of using an aerial winding on s.w. coils, get a piece of 1044 electric light wire, or "18," as it is commonly called, and wind 2 or 3 turns slightly larger than the coil former. Twist the loose ends together and take one end to the aerial and the other to earth. Then lower the finished aerial winding over the grid winding.—**Jack Walran, Bendigo, Victoria.**

New Radiokes Coil Kit In . . .

Challenger Dual-Wave Six





Front and rear views of the "Challenger Dual-Wave Six," which will be described in detail in next month's issue.

★

Up-to-date six-valve dual-wave superhet features latest Radiokes coil unit and i.f. transformers.

★

EXCEPTIONALLY high and uniform sensitivity over both wavebands, with excellent selectivity, are striking features of this new six-valve a.c. dual-wave superhet, which uses the new Radiokes type DWU3 dual-wave coil kit, and a pair of new Radiokes iron-cored i.f. transformers.

Low-Priced, High-Performance Set.

Despite its excellent performance, the "Challenger Dual-Wave Six" is perhaps the cheapest six-valve receiver of its type it would be possible to design, consistent with the results obtained. As shown in the circuit overleaf, the new octal-based glass valves are used throughout, a pair of 6U7G's as r.f. and i.f. amplifiers, 6A8G as mixer oscillator, 6B6G diode detector, a.v.c., voltage generator and triode audio driver, followed by a 6F6G output pentode. A 5Y4G—octal equivalent of the 80—is used as rectifier. Back bias is used for the 6B6G and 6F6G.

Stable Over Both Wavebands.

Automatic volume control is applied only to the first two stages, giving adequate control over both blasting on local stations and fading on distant transmissions. Though the circuit has been kept as simple as possible throughout, with a minimum of de-coupling, there is not the slightest trace of instability on either waveband, despite the unusually high sensitivity.

As a low-priced dual-wave superhet of a standard design, the "Challenger Six" will undoubtedly prove one of the most popular sets of its type ever described.

Full constructional details will appear in next month's issue of "Radio World."

Combination V.T. Voltmeter And Multi-meter

In this article – the second of a series on amateur station equipment–the author discusses the design of a combination V T. Voltmeter and multi-meter.

By VK2MQ

AS has been said before, and cannot be said too often, every amateur should possess among other instruments a vacuum tube voltmeter. There is no more suitable device for measuring voltages, especially where it is important that the device does not draw appreciable current from the circuit being measured.

Choosing The Circuit.

In casting about for a suitable circuit to be used in constructing a permanent instrument for the author's use, some ten or twelve circuits appearing in all important papers for the past twelve or fifteen months were studied.

All the circuits had one or more serious faults, such as poor flexibility and unstable calibration. The voltmeter to be described is a combination of a few circuits, with innovations added, and it seems to eliminate all apparent faults.

The design finally arrived at incorporates the new 5" Palec instrument, which is an 0-1 m.a./d.c. movement, and its flexibility and sensitivity suit the purpose admirably.

Measures D.C. Volts As Well.

In designing this instrument it was felt that as well as measuring a.c. volts, d.c. volts would also be applicable, and that it would take only 1 volt for full scale deflection and would be linear over its entire range, and so make re-calibration unnecessary.

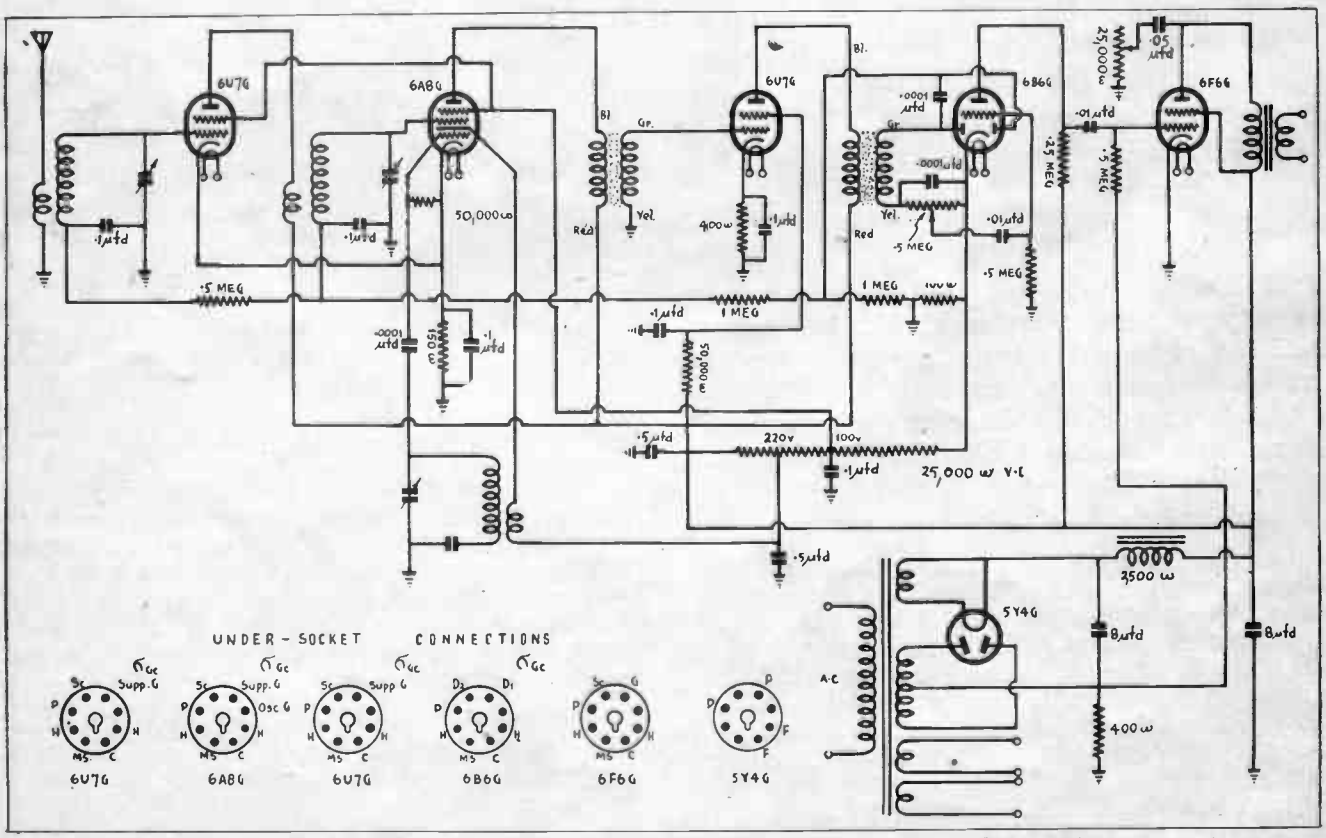
The first job was selecting a valve, and since the maximum sensitivity desired is one volt, full scale, it was necessary to find a tube whose Eg Ip curve showed a change of 1 m.a. or more for a grid voltage change of one volt. Finally, the 6Q7 was decided upon.

The fundamental circuit is shown in Fig. 1. It is seen that the diodes rectify and filter the a.c. voltage to be measured, the voltage peaks are then applied as extra negative volts on the grid of the triode amplifier. The resultant change in plate current causes an un-balance in the meter bridge circuit, with a corresponding indication in the meter.

With the proper choice of bias, the meter will read on the straight portion of the Eg Ip scale.

With the necessary resistors for voltage dividing, almost any reasonable voltage may be measured, but

(Continued on page 44.)



The circuit of the "Challenger Dual-wave Six," described on the previous page. This receiver uses the new Radiokes DWU3 dual-wave coil unit.

The All-Wave All-World DX News

Official Organ of the All-Wave All-World DX Club

★ ★

DX News and Views

Two "Specials" Arranged By "R. W.'s" Cuban Rep.

Two special programmes were recently arranged for the A.W. DX Club from COCM and COBZ by the Club's Cuban representative, Richard F. Rubio. However, the information unfortunately arrived too late for publication in last month's issue.

He writes, "As a result of the radio conference held here last December, many changes were produced in frequencies, power, addresses, operating schedules, etc., so I decided to prepare a new list of Cuban S.W. stations with all the changes, a copy of which I am sending you. I am also sending you my new S.W.L. card—please note my new QRA.

Regarding the list I am sending you, please note that COCX requested permission to instal a new transmitter of 20 k.w., so they will not be heard for a month or two.—**Richard F. Rubio, Calle 10 No. 407 entre 17 y 19, Vedado, Habana, Cuba.**

Club Badge Makes Friends For New Member.

I wish to acknowledge receipt of my membership certificate and club badge—needless to say, I am pleased with both. Through wearing the badge I have already made new friends interested in dxing and radio in general.

I thank you for enclosing a sample of the club's report form—if you had not sent it I would have had some of my own printed, which would have been much dearer and not as good.

I am most interested in ultra high frequency work and am getting parts ready for a four-valve a.c. resistance-coupled superhet for 9 and 10 metres, and 5 metres by coil changing.—**M. H. Buchhorn (AW383DX), Lavington, N.S.W.**

Has Heard 31 Countries.

I am writing to let you know the QSL forms are still successful. I have lately received two cards and a certificate of reception from the following:—VK5RL, 2TM, and TI4NRH, 9670 k.c., 31.02 m.

Two new countries were heard this month, Guatemala (31.75 m.), and Rangoon (49.94 m.), bringing the total to 31 countries heard. The 20 m. band seems to be dead at times this month, while the 31 and 49 m. bands are heard best in the late afternoon and evening.

Reports are out to VPD2 (31.45 m.) and 2I.F. 20 m. amateurs heard include 14 W's, 1 K6 and 1 KA. Commercials: KAY (20.03 m.), W8XK (19.72 and 25.26 m.), VPD2 (31.45 m.), JZJ (25.42 m.), TGWA (31.75, relaying TGW), W2XAF (31.48 m.), COCQ (30.78 m.), ZBW (31.49 m.), CS2WA (31.09 m.), and Rangoon (49.94 m.).—Wm. Bantow (AW353-DX), Edithvale, Victoria.

Wants Page For B.C. Band Dxers.

Now for a criticism of "R.W." DX notes. How about a special page for B.C. (550-200 m.) band listeners? The Club is established for all types of dxers, and believe me the b.c. band has its adherents in plenty. But do not think from these remarks that I am dissatisfied with "Radio World." It is the best magazine I have read, and fulfils a long-felt want for a local magazine for DX listeners in Australia. Carry on the good work and you will not lack my support. and in this statement I think I voice the opinions of thousands of DX listeners throughout Australia.—**K. A. Crowley, Bentleigh, Victoria.**

[B.C. band listeners will be given a page of their own the moment sufficient contributions dealing with this branch of DX are received each month to justify this step. Glad to know you like "R.W."—Ed.]

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.]

International Conference At Cairo ★ Improved conditions During Past Month ★ Overseas Station Jottings ★ Reports From Observers.

Suggestion Re DX Contest.

An interesting letter was recently received from Mr. Choppen, winner of the fourth DX Contest. In it he makes a suggestion for the amending of the Contest rules. He proposes that the winner of any one contest should have to stand down from the next two contests. What do readers and intending competitors think of this suggestion?

It is also of interest to hear from Mr. Chopnen that a local DX Club intends to run a similar contest every month, the trophy being a button; at the end of twelve months a cup will be awarded to the most successful competitor.

International Conference at Cairo.

The results of the recent International Conference held at Cairo to discuss the allocation of radio channels for the whole world are now available, at least as far as the short-wave bands are concerned.

Three new broadcast bands have been approved for use for local broadcasting in tropical countries where high static level makes the use of the regular broadcast band out of the question. These bands are from 120-130.4 metres, from 85.7-90.9 metres, and from 61.2-63.8 metres. Readers will note that many South American stations are moving to the last-mentioned wavelength.

The other broadcast bands will be as follow:—48.36 to 50 metres; 41.1 to 41.7 metres, new band for European s./w. broadcasters which, incidentally, is in the middle of the 40 metre amateur band; 30.9 to 31.58 metres; 25.2 to 25.65 metres (unchanged); 19.56 to 19.87 metres (unchanged); 16.8 to 16.9 metres; 13.9 to 13.99 metres.

General Comments On Recent DX Conditions.

Generally speaking, conditions have been quite satisfactory over the past month. Reports from Observers are almost unanimous on this point; the only exceptions being the West Australians. At the present time quite a number of South and Central Americans are being heard, especially in New South Wales. In addition, considerable interest has been aroused by the appearance of the new Indian and Singapore transmitters. 19, 25 and 31 metres have been most satisfactory; 49 metres continues disappointing, especially in the southern States.

★

Overseas Station Jottings.

Spain.

There are a considerable number of Spanish stations broadcasting news for both sides. The Nationalist (rebel) transmitters for the most part relay Salamanca.

These stations operate on a variety of wavelengths, mainly between 40.4 and 42.2 metres. The times of these broadcasts are fairly regular: from 6.15 to 6.40 a.m., and from 7 to 10 a.m.

Previously, information regarding the Republican (lovalist) transmitters was rather meagre. However, it is now definite that the stations in Madrid include the following:—

ED-5, 42.3 metres, on the air from 10.30 till 11 a.m.

EA4R, Radio Norte, 42.5 metres, from 7 till 10.15 a.m.

"Radio Madrid," 42.8 metres, from 7 till 10 a.m.

"Radio Azed," 42.8 metres, and also 44.4 metres, from 7 till 10 a.m.

EA8AG, 41.55 metres, from 7 till 10 a.m.

Also an unidentified station on 27.17 metres reported between 9.45 a.m. and 12.45 p.m.

Guatemala.

Guatemalan station **TGWA** has been very much in the limelight of late. Just at present the wavelengths in use are 19.77 and 30.96 metres. It is probable that 25.51 and 16.84 metre channels will be used during the later months of the year.

On 49.65 metres **TGWB** will shortly make an appearance. The schedule of this new transmitter is set down as from 3.45 to 6.15 a.m., from 10.30 a.m. to 3 p.m., and from 10.50 to 11.30 p.m.

France.

Readers are by now well aware that the famous "Radio Coloniale" is now known as "Radio Mondial." Call letters and wavelengths are: **TPB-1** (13.96 m.), **TPB-2** (16.87 m.), **TPB-3** (16.88 m.), **TPB-4** (19.6 m.), **TPB-5** (19.69 m.), **TPB-6** (19.83 m.), **TPB-7** (25.24 m.). **TPB-8** (25.33 m.), **TPB-9** (25.6 m.), **TPB-10** (31.3 m.), **TPB-11** (31.35 m.), **TPB-12** (31.41 m.), **TPB-13** (31.51 m.), **TPB-14** (48.79 m.), **TPB-15** (49.26 m.), and **TPB-16** (49.65 m.).

U.S.S.R.

RNE has returned to its former position on 25.0 metres, transmitting from 1.15 to 2 p.m. The English news session from Moscow is over **RKI** from 10 a.m. till 12.15 p.m.

Occasionally the same programmes are relayed by one or other of the following stations:—**RWG** (36.65 m.), **RBO** (36.1 m.), **RPK** (40.4 m.), **RKA** (43.2 m.), and **RYS** (44.4 m.). Probably it will be rather difficult to obtain verifications for reception of these stations.

Turkey.

It is learnt that the new 20 k.w. transmitter near Ankara, Turkey, commenced operations on July 22. So far it is not clear whether 31.7 or 19.7 metres was the channel used.

FROM READERS.

Mr. H. H. Young (AW333DX):—

Mr. Young writes for information regarding a number of unidentified stations. Of these the 80-metre station would appear to be a harmonic of a West Australian station. If this is not the case there is no record of an English-speaking station on that wavelength.

The station below the 80-metre amateur band will almost certainly be **RV15** on 70.2 metres.

The third station above the amateur band is undoubtedly one of the low-powered low-frequency D.E.I. transmitters. These are difficult to identify unless accurate calibration of the receiver is possible. The station heard may have been either **YDA-7**, Pekalongan, on 91.74, or **YDA**, Tandjongpriok, on 98 68 metres. If your guess regarding wavelength was correct, Mr. Young, more probably the former.

VK6AS is the call of the amateur station of Mr. A. D. Wood, "Kia Ora," Odmond Road, Mount Barker, West Australia.

Mr. R. Simpson (winner of third DX Contest):—

Mr. Simpson writes of very good conditions prevalent in his locality towards the end of July. His loggings during this period make very interesting reading.

New loggings comprise **PSH**, Rio de Janeiro, Brazil, on 29.35 metres, heard between 9.35 and 10 a.m. Between each item a single note is struck on a bell.

CXA-8 was logged on a new frequency, namely 15,730 k.c., 19 metres.

HP5G is a new station in Panama City, transmitting on 11,780 k.c., 25.4 metres. Heard on Sunday afternoon, testing.

During the afternoons the South and Central American stations are excellent, especially on 25 metres. **HI2X, CB1190, HP5J** and **OAX4T** are all good.

★

Reports From Observers.

Mr. A. E. Bruce (South Australia):—

Conditions seem to be improving generally. Observations on the various bands are as follow:—

31-metre band: Some quite good reception in the afternoons from London, Germany and Lyndhurst. In the evenings Japan, D.E.I., Hong Kong, and Perth are best, with **KZRM**, Manila, not as good as previously.

25-metre band: The only stations heard here are London (afternoons), and Java (evenings). London, **GSD**, is the best station on the air at present.

20-metre band: There are any number of U.S. amateurs on this band during the afternoons, together with a few Europeans. Evening reception has been less interesting, just a few Americans.

19-metre band: Germany has been rather patchy lately in the afternoons, leaving **YDC** as the best on this band. Morning reception includes a number of stations, but is marred by a rather high noise-level.

16-metre band: London has been erratic, but, on the whole, this band seems on the improve, and promises good reception in another few weeks.

13-metre band: Now seems quite dead. Am unable to raise even a carrier.

10-metre band: Have thoroughly overhauled receiver, winding 10-metre coils. Results have been quite good, stations being logged till as late as 4 p.m. W6's, K6's and W8's have been about R7-8 shortly after midday.

Mr. J. C. Linehan (South Australia):

Conditions generally have taken a decided turn for the better on all bands, from 10-80 metres. I think the best station I have heard for some time is **VVD-2**, New Delhi, transmitting simultaneously on three wavelengths, namely, 31.28, 60 and 340 metres. This station, particularly on 60 metres, roars in around 1.30 a.m. They announce in English and Hindustani alternatively every 15 minutes, including the wavelengths on the hour.

PMY, 58.3 metres, are exceptionally good around 12.30 a.m. Reception of this station is very clear, as the noise-level between 48 and 100 metres is surprisingly low around this time. It is not surprising then that **YDA**, 98.6 metres, and **RV15**, 70.2 metres, are coming in at full strength. **RV15** give a news session at 11.30 p.m., occasionally followed by a call-sign in English.

A new station logged this month was **VP3MR**, 49.42 metres, British Guiana. They were heard at 3.45 a.m. Reception was marred by very heavy surging.

The 49-metre station at Rangoon now has a new call-sign, **XYO**. Signals are very good at 12 midnight.

On 31 metres **ZBW** is coming in very nicely; whilst on the higher frequencies the Daventry and Zeesen stations are outstanding.

The 13-metre band is a total loss at night; but on 11 metres **W6XKG** is good up till 2 p.m.

Regarding the amateur bands: On 20 metres things are fairly lively till as late as 11.30 p.m. On July 19 a remarkable phenomenon was noted—although no W stations were audible, practically all the VE's in Canada were logged. The best of them was VE4KZ, R9 plus.

10 metres is showing further improvement. From 11 a.m.-2.30 p.m. W's, K6's, ZL's and occasionally an XE are heard at good speaker strength.

Best amateur loggings include:—

10 metres: ZL—1HY, 1MQ, 2BE, 2FY, 3AY, 4AF; K6—LCV, MHY, BAZ; XE1GE, TI2LR; W— 6PDB, 5FUS, 9CXU, 5DHK, 6GCX.

20 metres: OA4R, XE1K, CO8JK, KA2OV, PK2AU, PK3WL, LU1HI, VS1AE, ON4MZ, G6DT, K4EMS, HH2X, HI5G, J2MI, VS7GJ, F3OO,

K7FBE, ZS5CL, VE4KZ, VE5FO. Later.

Another new station logged is Singapore. Address is British Malaya Broadcasting Corporation, Thompson Street, Singapore.

They announce as—Singapore calling. This is ZHJ, L for Liberty, on 235 metres, 1632 k.c.; and ZHP, P for Province, on 30.96 metres, 9690 k.c.

The station transmits from 5-10 p.m., Singapore time, which corresponds to 7.30 p.m.-12.30 a.m. A.E.S.T.

Mr. G. O. La Roche (West Australia):

Conditions here are very poor during the evening hours. Early morning reception, however, is quite good. The most interesting logging of the month is that of the new Indian transmitters on 25, 31 and 60 metres. Unfortunately the 31 metre transmitter is heterodyning VK6ME.

The amateur bands are very poor. 20 metres is most disappointing, both morning and evening. The only stations logged during the month, apart from a few stray VK's and W's, are G5MW, G5ML, G6DT, CO7CX, CO2RA, PK3AL and KA1BH.

Broadcast Band Loggings.

Morning (best period for the day is from 7-9 a.m.): YDC (19), SPW (22), W8XK (25.2), 2RO-3 (25.4), OLR4B (25.5), TPA-4 (25.6), PHI (25.57), SPD (26), ORK (29.04), IRF (30.4), CS2WA (31.09), 2RO-4 (31.13), W3XAU (31.32), TPB (31.35), OLR3A (31.41), W2XAF (31.48), OLR3B (31.5), OLR2C (49.06).

Afternoon and Evening: JZJ (25.4), JVN (28.14), Delhi (31.28), XEWW (31.5), PMY (58.3), RV15 (70.2), and YDA (98) are good. The following are audible, but only at poor strength: TPA-2 (19.68), Madras (25.2), COCQ (30.77), JFAK (31.06), KZRM (31.32), YDB-2 (31), ZBW-3 (31.4), VPB (48.77), Rangoon (XYO ?) (49.9), Delhi (60.7), YDL-2 (62).

Mr. W. H. Pepin (West Australia):—

Reception has been satisfactory, although on occasions the noise-level has been high.

Stations logged before midday include YDC (19), PMN and PLP, COCM (30.1), COCX (30.77), EAQ (30.4), W1XK, W2XAD, IRF (30.6), RAN (31.25), PCJ (31.28), GSC and GSB, COCH (31.8).

Afternoon and evening loggings: COCX, YDB (31), Delhi (31), KZRM, ZBW, XGOX, PCJ-2 (19), heard very well on special directional broadcast to Australia and New Zealand, 1.30-3 p.m. (Perth time).

For the past two months SPW, Warsaw, operating on 22 metres, has been a daily visitor, with a R8 Q5 signal at 8.15 a.m. (Perth time). The station is still anxious for reports.

Of the lower frequency stations, YDA (98), RV15, PMY, YDL-2 (62), PMH (44), Bangkok (49) opening at 10.30 (A.E.S.T.) are outstanding.

Amateur loggings: EI6G, KA1AF, KA1AP, KA1ZL, PK2DF, VS2AE, VE5OT and a good number of W's.

Mr. A. R. Payten (New South Wales):—

Conditions generally have shown a decided improvement on all bands, except for 16 metres. During the day all the usual stations are coming in; and then after 10 p.m. conditions are very good.

Best loggings for the month are: Singapore on 30.9 metres heard very well on July 17, including a description of a yacht race between Royal Singapore and Royal Batavia Yacht Clubs. Around 11 p.m. signals reached R8-9.

Next, Delhi on 31.2 metres, also very strong. A programme item of interest was a broadcast of G. K. Chesterfield's Father Brown play, "The Invisible Man."

Also VPB, 48 metres; KEJ, Bolinas, Calif., 33.3 metres, relaying NBC programme re. Howard Hughes Round-World Flight; and an Hawaiian station on approx. 20.1 metres on a point-to-point transmission. (Probably KQH, Kahuku, Hawaii, 14,920 k.c., 20.11 m.—S.-W. Editor.)

General conditions are indicated by the list of broadcast band stations:—

49 metres: 9MI, DJC, VPB.
44 metres: PMH.
30-31 metres: GSB, OZF, ZBW-3, VPD-2, W1XK, KZRM, COCM, COCU, HS8PJ, JIB, DZA.

26.29 metres: HBO, CSW, PLP, PMN.

25 metres: GSD, GSE, OLR4A, DJD, JZJ, 2RO, Paris, RNE.

22 metres: ZMBJ, ss "Awatea" calling Wellington.

20 metres: HBJ.

19 metres: GSO, YDC, PCJ, TPA-2, DJQ, DJR.

The most interesting feature on the amateur bands was a QSO between VK2ADK and W7FQK, during the course of which W7FQK made a record of 2ADK's "over," and then played it back to him.

Verifications recently to hand include DZE, TI4NRH, RNE.

Official Shortwave Observers.

N.S.W.: V. D. Kemmis, "Brampton Hall," 49 Kurraba Road, Neutral Bay, Sydney; A. R. Payten, High Street, Coff's Harbour.

South Australia: A. E. Bruce, C/- 54 Currie Street, Adelaide; Joseph C. Linehan, 181 South Terrace, Adelaide.

Queensland: Ern Neill, 26 Canning Street, Nth. Ipswich; J. K. Sorensen, "Fairholme," Station Road, Gympie.

West Australia: G. O. La Roche, 62 Gladstone Avenue, South Perth.

New Zealand: Robert Russell, Taupo Road, Taumarunui.

Tasmania: Henry Alexandra Callander, 1 Franklin Street, West Hobart.

Victoria: James Ferrier, "Winninburn," Coleraine.

Mr. J. K. Sorensen (Queensland):—

Although originally transferred to Gayndah for a month, I have been here ten weeks already, and there is no prospect of returning home yet. Naturally I have had very little chance for DX-ing, being home only on occasional week-ends.

London is good on all bands in the afternoons, both in Gayndah and Gympie.

The most interesting logging of the month was a 49-metre station closing with "God Save the King" in the morning hours, probably VQ7LO.

The commercial station at Rabaul has been logged when contacting Sydney. Signals from this 21-metre transmitter were very strong and 100 per cent. readable.

Results on the 20-metre amateur band have not been exciting, the only loud stations being the 1 k.w. W's.

Mr. E. Neill (Queensland):—

Conditions have been rather peculiar here, varying very considerably from day to day. QRN has been unusually heavy, too, for this time of the year.

PCJ on 19.7 m. is very good at 4 p.m.; the programmes from this station have been very much enjoyed. The Japanese stations, JVE, 19.16 m., and JVH, 20.55 m., are also good in the late afternoons.

The usual Daventry and Zeesen stations are very strong in the mornings, but are barely audible in the evenings.

OLR4A and OLR4B are good, whilst another good 25 m. station is RNE. The other Russian, RAN, is also audible.

On 31 m. the best logging for the month was LKJ-1, Jeloy, Norway, 31.5 m. ZBW-3 is another good station on this band. The American W2XAF is fair in the morning. Of the other Americans, W8XK and W2XE are best.

HBO, 26.3 m., are quite fair on Monday afternoons.

HOURLY TUNING GUIDE

When And Where To Search

Compiled by ALAN H. GRAHAM.

In order to assist beginners and less experienced dxers, it is intended to publish monthly a special tuning guide, setting out at what times to listen for the more easily logged stations. ..It should be noted that the guide is not intended to cover all stations audible; for full details as to when and where to look for the best catches are given elsewhere. Moreover, the fact that a station is shown as being on the air at a particular time is no guarantee that reception must follow as a matter of course.

All times are given in Australian Eastern Standard Time.

Key to abbreviations used: S, Sundays only; M, Mondays only; T, Tuesdays only; W, Wednesdays only; Th, Thursdays only; Sat, Saturdays only.

Midnight-1 a.m.

19.68 TPB-5
19.71 PCJ (Th)
19.74 DJB
19.8 YDC
19.82 GSF
25.4 2RO-4
25.45 JZJ
27.27 PLP
28.48 JIB
29.24 PMN
30.78 COCQ
30.9 ZHP
31.28 VK2ME (M)
31.38 DJA
31.45 DJN
31.49 ZBW-3
31.55 HS8PJ (F)
31.58 XEWW
31.8 COCH
32.9 COCB
33.2 COBZ
48.7 VPB
49.9 COCO
49.98 Rangoon
58.3 PMY
70.2 RV15
98.6 YDA

1-2 a.m.

16.23 HBH (M)
19.63 DJQ
19.68 TPB-5
19.71 PCJ (Th)
19.74 DJB
19.8 YDC
19.82 GSF
19.84 HVJ
19.85 DJL
25.0 RNE
25.24 TPB-7
25.4 2RO-4
25.49 DJD
27.27 PLP
28.48 JIB
29.24 PMN
31.4 OLR3A
48.7 VPB
49.83 DJB
49.9 COCO
58.3 PMY
70.2 RV15

2-3 a.m.

16.23 HBH (M)
19.63 DJQ (M)
19.74 DJB (M)
19.71 PCJ (Th)
19.82 GSF
19.85 DJL
25.24 TPB-7
25.4 2RO-4
25.49 DJD
25.53 GSD
48.7 VPB
49.31 VQ7LO
49.83 DJC

3-4 a.m.

19.63 DJQ (M)
19.71 PCJ (Th)
19.74 DJB (M)
19.85 DJL
25.24 TPB-7
25.49 DJD
25.53 GSD
31.13 2RO-3
31.55 GSB
49.31 VQ7LO
49.59 GSA
49.83 DJC

4-5 a.m.

19.65 W2XE
19.71 PCJ (Th)
19.85 DJL
20.64 HBJ (M)
24.52 TFJ
25.24 TPB-7
25.49 DJD
25.53 GSD
29.04 ORK
31.13 2RO-3
31.4 OLR3A
31.55 GSB
44.94 HBQ (M)
49.31 VQ7LO
49.7 OLR2B
49.83 DJC

5-6 a.m.

16.87 W3XAL
19.56 W2XAD
19.6 GSP
19.65 W2XE
19.67 W1XAL
19.72 W8XK
19.85 DJL
20.64 HBJ (M)
22.0 SPW (T, Th, Sat)
24.52 TFJ
25.24 TPB-7
25.34 OLR4A
25.48 DJD
25.51 OLR4B
25.53 GSD
27.17 CSW
28.93 EAJ43
29.04 ORK
31.13 2RO-3
31.28 PCJ (M, W)
31.46 JZI
31.55 GSB
39.95 JVP
44.94 HBQ (M)
49.59 GSA
49.83 DJC

6-7 a.m.

16.87 W3XAL
19.56 W2XAD
19.6 GSP
19.65 W2XE
19.67 W1XAL
19.72 W8XK
19.85 DJL
22.0 SPW (T, Th, Sat.)
25.0 RNE
25.24 TPB-7
25.34 OLR4A
25.49 DJD
25.51 OLR4B
25.53 GSD
27.17 CSW
31.13 2RO-3
31.28 PCJ (W)
31.28 W3XAU
31.35 W1XK
31.46 JZI
31.55 GSB
40.83 DJC

7-8 a.m.

19.56 DJR
19.56 W2XAD
19.63 DJQ
19.65 W2XE
19.72 W8XK
19.74 DJB
19.76 GSO
19.82 GSF
19.85 DJL
25.0 RNE
25.24 TPB-7
25.34 OLR4A
25.42 JZJ
25.45 W1XAL
25.49 DJD
25.53 GSD
27.17 CSW
31.09 CS2WA
31.13 2RO-3
31.28 W3XAU
31.32 GSC
31.35 KZRM
31.35 W1XK
31.38 DJA
31.41 OLR3A (T, W)
31.45 DJN
31.46 JZI
31.48 W2XAF
31.55 GSB
49.75 OLR2B (F)
49.83 DJC
49.92 OLR2A (F)

8-9 a.m.

19.56 DJR
19.58 OLR5B (M, Th, S)
19.63 DJQ
19.65 W2XE
19.7 OLR5A (M, Th, S)
19.72 W8XK
19.74 DJB
19.76 GSO
19.82 GSF
25.0 RNE
25.24 TPB-7
25.34 OLR4A
25.42 JZJ
25.45 W1XAL
25.49 DJD
25.51 OLR4B
25.53 GSD
25.60 TPA4
28.9 EAJ43
30.04 COBC
30.31 CSW
30.4 COCM
30.43 EAQ
30.7 COCQ
31.06 LRX
31.09 CS2WA
31.13 2RO3
31.27 HBL (S)
31.28 W3XAU
31.32 GSC
31.46 JZI
31.35 KZRM
31.35 W1XK
31.48 W2XAF
31.49 LKJ1
31.55 GSB
31.58 XEWW
31.8 COCH
38.48 HBP (S)
49.75 OLR2B (Th)
49.92 OLR2A (Th)

9-10 a.m.

19.56 DJR
19.56 W2XAD
19.6 GSP
19.63 DJQ
19.72 W8XK
19.74 DJB
19.8 YDC
22.0. SPW
25.34 OLR4A
25.42 JZJ
25.45 W1XAL
25.49 DJD
25.51 OLR4B
25.53 GSD
25.61 TPA4
30.31 CSW
31.06 LRX
31.09 CS2WA
31.13 2RO3
31.27 HBL (S)
31.32 GSC
31.35 W1XK
31.38 DJA (M)
31.45 DJN
31.49 LKJ1
31.48 W2XAF
31.55 GSB
38.48 HBP (S)
49.1 GSL

10-11 a.m.

19.56 DJR
19.6 GSP
19.63 DJQ
19.74 DJB
19.8 YDC
25.26 W8XK
25.34 OLR4A (T, W)
25.49 DJD
25.51 OLR4B (F, S)
25.53 GSD
25.61 TPA4
26.31 HBO (M)
31.13 2RO3
31.25 RAN
31.28 PCJ (M, T, Th
31.32 GSC
31.38 DJA
31.45 DJN
31.48 W2XAF
31.49 LKJ1
31.55 GSB

11 a.m.-noon.

19.56 DJR
19.6 GSP
19.63 DJQ
19.74 DJB
25.26 W2XK
25.34 OLR4A (T, W)
25.49 DJD
25.51 OLR4B (F, Sat)
25.53 GSD
25.61 TPA4
31.13 2RO3
31.25 RAN
31.28 PCJ (M, T, Th)
31.32 GSC
31.38 DJA
31.45 DJN
31.48 W2XAF
31.55 GSB

Noon-1 p.m.

19.56 DJR
19.63 DJQ
19.66 GSI
19.74 DJB
25.26 W8XK
25.34 OLR4A (T, W, F, Sat)
25.49 DJD
25.51 OLR4B (T, W, F, Sat)
25.53 GSD
25.60 TPA4
31.28 PCJ (F)
31.32 GSC
31.38 DJA
31.45 DJN
31.48 W2XAF
31.55 GSB

1-2 p.m.

19.56 DJR
19.63 DJQ
19.66 GSI
19.74 DJB
25.49 DJD
25.53 GSD
25.61 TPA4
31.28 PCJ (F)
31.32 GSC
31.38 DJA
31.45 DJN
31.48 W2XAF
31.55 GSB

2-3 p.m.

25.61 TPA4
31.48 W2XAF

3-4 p.m.

19.63 DJQ
19.74 DJB
19.76 GSO
19.85 DJL
19.82 GSF
25.42 JZJ
25.53 GSD
30.04 COBC
31.28 VK2ME (S)
31.38 DJA
31.45 DJN
31.55 GSB
32.15 OAX4J
32.59 COBX
33.26 COBZ
49.18 W3XAL
49.5 W8XAL

4-5 p.m.

19.63 DJQ
19.74 DJB
19.76 GSO
19.85 DJL
19.82 GSF
20.64 HBJ (M)
25.24 TPA3
25.42 JZJ
25.53 GSD
26.31 HBO (M)
31.28 VK2ME (S)

31.38 DJA
31.45 DJN
31.55 GSB
49.5 W8XAL

5-6 p.m.

19.63 DJQ
19.74 DJB
19.76 GSO
19.82 GSF
25.23 TPA3
25.52 GSD
28.14 JVN
31.28 VK2ME (S)
31.38 DJA
31.45 DJN
31.55 GSB

6-7 p.m.

19.63 DJQ
19.31 PCJ (Th)
19.74 DJB
25.23 TPA3
28.14 JVN
31.28 VK2ME (S)
31.38 DJA
31.45 DJN

7-8 p.m.

19.71 PCJ (Th)
19.74 DJB
25.57 Saigon
28.14 JVN
31.38 DJA
31.45 DJN
31.49 ZBW3
31.55 VK3ME

8-9 p.m.

16.86 GSG
19.68 TPA2
19.71 PCJ (W)
19.74 DJB
19.8 YDC
19.82 GSF
25.4 2RO4
25.57 Saigon
27.27 PLP
28.14 JVN
29.24 PMN
31.28 VK2ME (S)
31.38 DJA
31.45 DJN
31.49 ZBW3
31.55 VK3ME
31.45 VPD2
34.0 VPD3
44.64 PMH
70.2 RV15

9-10 p.m.

19.58 OLR5B
19.63 DJQ
19.68 TPA2
19.7 OLR5A
19.71 PCJ (W)
19.74 DJB
19.8 YDC
19.82 GSF
19.85 DJL (S)
25.0 RNE (W)
25.4 2RO4
25.57 Saigon
27.27 PLP
28.14 JVN
29.24 PMN
30.23 JDY
30.61 XGOX
31.28 VK2ME (S)
31.28 VK6ME
31.38 DJA
31.45 DJN
31.45 VPD2
31.49 ZBW3
31.55 VK3ME
34.0 VPD3
44.64 PMH
48.7 VPB
49.5 W8XAL
58.3 PMY
70.2 RV15

10-11 p.m.

19.58 OLR5B
19.63 DJQ
19.68 TPA2
19.74 DJB
19.8 YDC
19.82 GSF
19.7 OLR5A
19.85 DJL (S)
25.4 2RO4
25.45 JZJ
25.57 Saigon
25.65 HPSA
27.27 PLP
28.14 JVN
29.24 PMN
30.23 JDY
30.61 XGOX
30.78 COCQ
31.28 VK6ME
31.28 VK2ME (S)
31.35 W1XK
31.38 DJA
31.45 DJN
31.49 ZBW3
31.8 COCH
32.09 COBC
32.59 COBX
44.64 PMH
46.8 TIPG
48.7 VPB
49.5 W8XAL
49.96 HPSK
49.98 Rangoon
58.3 PMY
70.2 RV15

11 p.m.-midnight.

19.56 DJR
19.63 DJQ
19.68 TPA2
19.74 DJB
19.8 YDC
19.82 GSF
19.85 DJL
25.4 2RO4
25.42 JZJ
25.57 Saigon
27.27 PLP
29.24 PMN
30.61 XGOX
30.78 COCQ
49.96 HP5K
31.28 VK2ME (S)
31.35 W1XK
31.38 OAX4T
31.38 DJA
31.45 DJN
31.49 ZBW3
31.51 HS8PJ (Th)
31.8 COCH
32.09 COBC
32.59 COBX
33.2 COBZ
44.64 PMH
48.7 VPB
49.5 W8XAL
49.9 COCO
30.9 ZHP
49.98 Rangoon
58.3 PMY
70.2 RV15

"Radio World" Fifth Shortwave DX Contest Closes On September 1.

The fifth "Radio World" Shortwave DX Contest will close on September 1, and entries can be forwarded at any time up to this date. The rules are as follows:—

1. For this Contest a trophy (a Replogle World Globe with time converter, value 59/6) will be awarded to the reader who submits the best individual verification.

2. Verifications from any shortwave station between 5 and 100 metres may be submitted. Thus cards from broadcast, commercial, radiophone and amateur transmitters are all eligible.

3. All verifications must bear a date (a post-mark on the card or envelope will suffice where no date is given on the actual verification); and the frequency on which the station has been received must be clearly indicated.

4. Only verifications of reception between July 1, 1937, and closing date will be eligible.

5. In judging the entries, the judges will take into account the power of the station received, the frequency on which the station was heard, and the type of receiver used.

6. There is no limit to the number of verifications which may be submitted by any entrant.

7. The decision of the judges will be final; and the result of the fifth competition will be announced in the October, 1938, issue of "R.W."

8. All entries should be addressed to the shortwave Editor, and should be endorsed "DX Competition." All verifications submitted will be returned by registered post as soon as possible after the closing date.

—The Shortwave Editor.

ROUND THE SHACKS

Amateur operators desirous of having their transmitters and activities featured under this heading are requested to forward details to "Reporter," C/- "Radio World," 214 George St., Sydney. Articles shonld be similar in style to those already appearing in the series, and should, where possible, be accompanied with photographs of operator and transmitter.

DX News And Views

Has Verified 46 Stations.

The weather has not been too good down here lately, but I managed to log the following stations:—W4DAA, W4EAN, VK7LR, K6KPF, W9BEU, G2AK, G2NA, ZL2OQ, W9DJG, VE5VP, K6OVM, VE5OT, PK4BR, W6PCH, W8CNA, and PK4BR, Sumatra. My latest verifications are from W8XK, G2NA, PCJ, VK6AY, VK7CM, VK3RI, VK6ME, VK3GO, VK5LB, and several commercials. I have now 46 veries and am expecting several more. —Fred Combe (AW365DX), Armadale, Victoria.

Week's DX On Shortwave.

The following is a list of DX stations I have received during the past week, the VK's being the strongest.

25-31/7/37: W1AXA, PK1VY, W9VVB, W2AXY, W7FQK, W1DS, W7EGV, VE5OT, VEACF, W6GQL, W6BKY, K4XM, PK1MX, VDP2, KA1YL, G2IS, G5NI, W3MD, and VK6AF, VK5's JU, WK, FW, SW, KG, PS, HL, AI, DI, HN, GM, HM, RL, DW, VK4's JU, RJ, HC, XM, EC, VK, MX, VK3's ZX, MT, MP, TZ, VK2's ABD, ABE, OQ, VU, AHA, CP, OF, TC, TV, 1Z, NS and 7YL.—E. W. Bergin (AW405DX), Locksleys, S.A.

Appreciations From Readers.

As a new reader of "Radio World" I am writing to order some back issues of your grand magazine, which is the best radio journal I have yet encountered. I commenced reading it in January of this year, and my only regret is that I did not start very much sooner, so you can easily understand my desire for back issues. May I wish "R. W." every success from a now confirmed reader.—W. J. Robertson, Mitchelton, N.W.3, Queensland.

Excellent Results From "Empire" On All Wavebands.

I would like again to congratulate you on your excellent radio magazine. The early high standard is being maintained, and the DX section is excellent. The sets described are first class. At present I am using the "Empire A.C. All-Wave" as described in your paper, and results are excellent on all wavebands.

I have a number of veries from VK's and oversea stations, but only send a report when I think I can be of service to the transmitting station. The report forms are excellent, and have not failed to bring a card in reply.

Wishing the "Australasian Radio World" continued success.—H. H. Young (AW333DX), Angaston, S.A.

Radio Ramblings

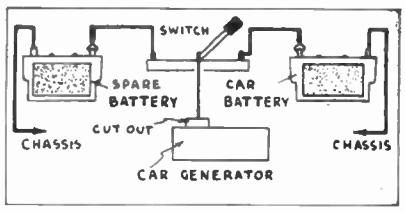
A page for letters from readers. A prize of 2/6 will be awarded for every technical contribution published.

★ ★ ★

An Inexpensive Battery Charger

Quite frequently we hear of various ways and means for charging the radio battery, but here is quite a new idea which is both simple and foolproof. Many an owner of a vibrator-operated receiver complains that his battery does not last any more than two to three weeks. To anyone using a six-volt accumulator on a receiver, and owning a car which is in use frequently, the following is worth putting into practice.

First procure a large S.P.D.T. switch and two 25 amp. clips, and a small coil of very heavy gauge insulated flex. Now disconnect the lead from the cut-out on charger or generator, and having mounted the S.P.D.T.



switch in a convenient position, connect a length of flex to the centre terminal and to the cut-out. One end of the switch is then joined to the wire disconnected from the cut-out which is, of course, the battery wire, and to the other end of the switch a length of flex is attached, to reach the battery to be charged, a clip being put on this end. The other side of the battery is connected by a piece of flex to the car chassis.

By noting which side of the switch the car battery is connected to, one can change over to either battery as desired. A rough sketch showing the connections is given above. I use my car often, and can keep two spare radio batteries charged besides my car battery.—**J. T. Smith (AW103DX) Glen Innes, N.S.W.**

★

Six-Valve Vibrator Set Gives Excellent DX Results.

I have taken the "Radio World" since about the third issue, and always look forward to getting the next one. It is indeed one of the finest radio magazines published, and that is saying quite a lot, for I am a service engineer and a keen experimenter, and read all available magazines and books printed.

The articles on "Tracking Down Power Interference" are much appreciated here, because that complaint is very prevalent.

Since last writing I have built up a 6-tube vibrator job, and is it the goods! It uses a 1C4 r.f., KK2 first detector and oscillator, 1C4 intermediate, 1K6 second detector, 30 driver, 19 twin "B" class output coupled to a 10" permanent magnet speaker. Tunes from 16 to 50 and 190 to 560 metres, with a special three-plate trimmer adjustment for short waves, also local distance switch. I often listen to 1YA, New Zealand, at midday here, and the usual overseas stations (shortwave) are received at terrific strength on an 80 ft. inverted "L" type aerial, 30 feet high.

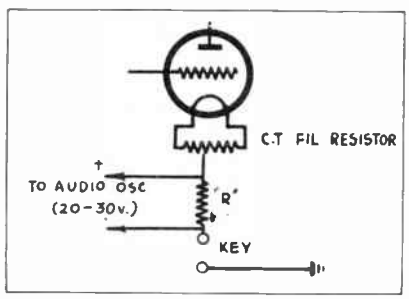
Wishing the paper the best of luck. —**J. T. Smith (AW103DX), Glen Innes, N.S.W.**

★

An Audio "Hooter."

The operator of every C.W. station should have some kind of monitor in operation when using the key. An effective arrangement is to construct a simple audio oscillator similar to those described in previous issues of this magazine, but instead of the conventional method of H.T. supply, place a fixed resistor in series with the key lead, and utilise the voltage drop across this resistance to drive the audio oscillator. The diagram should be self-explanatory.

Resistor "R" should be capable of carrying the full current of the R.F. stage being keyed. Its value will depend entirely on the current drawn by the valve which is being keyed, and is calculated from Ohm's Law, being of such a value to permit a voltage drop of from 20-30 volts, which is sufficient to operate the average oscil-



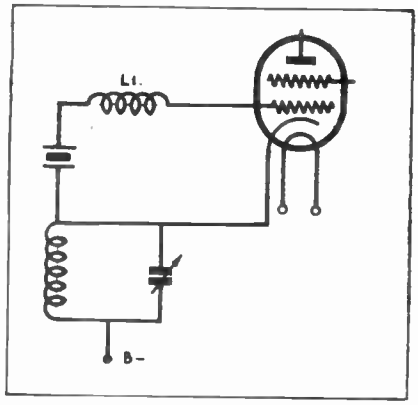
lator. The filament voltage for the oscillator may be taken from one of the filament windings on the transmitter supply. An old speaker unit connected to the output and concealed under the table provides an effective room monitor which automatically comes into operation when the transmitter is on the air.

The only drawback, of course, is the fact that the plate voltage on the R.F. stage is 20-30 volts less. However, with the average transmitter this is of little consequence.—**I. Gardiner (VK2ABY), 228 Queen Street, Ashfield, N.S.W.**

★

Repairing A Broken Crystal.

I am submitting a kink used and tried on my own transmitter (6L6G crystal). Many an amateur will dis-



card a crystal because it is cracked or has a piece chipped off it, not knowing that a little regeneration in the circuit will make it oscillate. In the sketch, L1 is the regeneration coil, and can be wound on the crystal holder (if of valve base type), or on a former of about 1¼in. or 1½in diameter, with between 10 and 30 turns of 20 d.c.c. wire. One must experiment to get right amount of turns. The best idea is to have a coil tapped every 2 turns and adjust the turns by a crocdile clip. The following worked excellently here on a crystal that I accidentally chopped a piece off one corner.

The crystal, if cracked, is broken through the fracture, and the edges carefully smoothed and straightened on a carborundum stone. Be careful not to scratch the face, and one can get two crystals this way. Best of luck to your excellent "mag."—**K. W. Craig, Stockton, Newcastle, N.S.W.**

Vacuum Tube Voltmeter And Multi-Meter.

(Continued from page 36.)

since high voltages are usually associated with high power, the ordinary low resistance voltmeters may be used. Therefore, a maximum scale of 750 volts was decided upon for the measuring device.

Five A.C. And D.C. Ranges.

Fig. 2 shows the method of voltage dividing which is used. The values given in the table provides for measurements of 1, 10, 100, 500 and 750 volts, A.C. or D.C., full scale. With the circuit shown, the meter has a constant impedance of 100,000 ohms per volt.

In respect to resistors required, it must be remembered that only the best should be used.

Full Description Next Month.

A vacuum tube voltmeter is now under construction using the circuit shown, and it is hoped will be completed and tested in time for a full description of its assembly and operation to be published in next month's "Radio World."

"Fidelity Eight" A Fine Set.

Before closing, many thanks for putting me on to such a good set as the "De Luxe Fidelity Eight." I will recommend it to everyone.—L. M. Simpson, East Kew, Victoria.

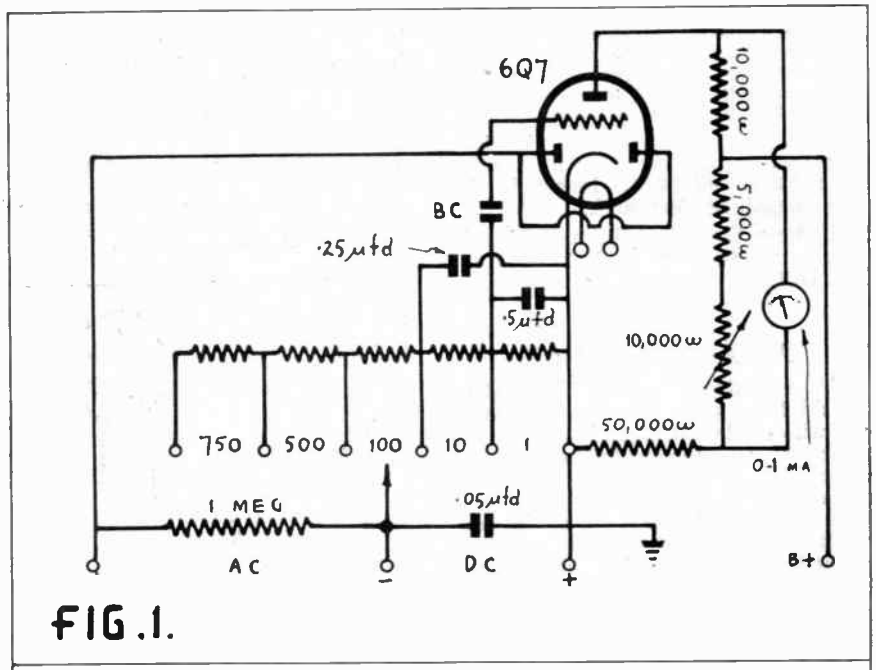


FIG. 1.

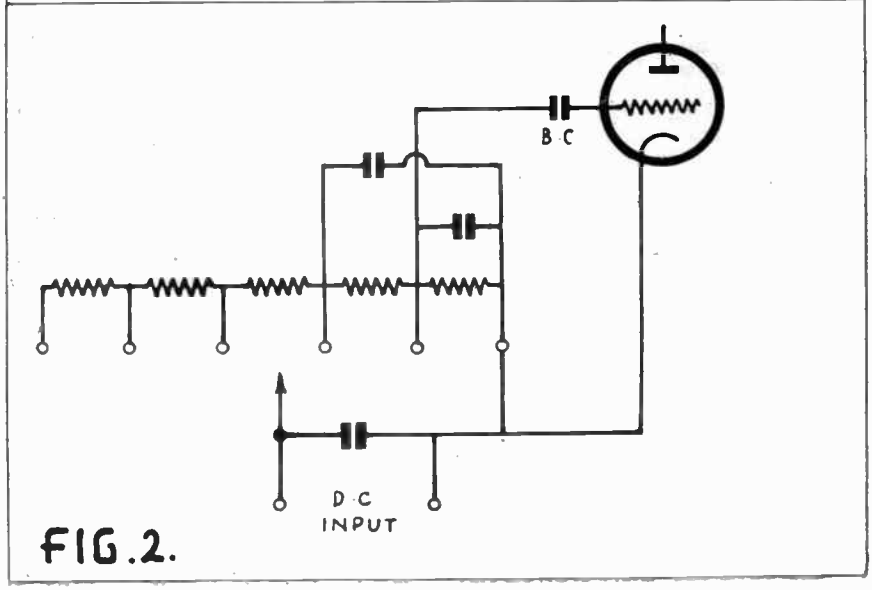


FIG. 2.

DX News And Views.

Jersey Reader Offers To Report On VK's and ZL's.

I have just been lent an old copy of your excellent magazine, and I feel I must congratulate you on it. It makes very enjoyable reading, particularly for one as far away as I am.

As you will see from my card, I am the holder of the British Artificial Antenna Transmitting Call, 2AOU, but hope soon to be in possession of a full call—and then for those VK/ZL's! My record of DX receiving is 145 countries, the latest being EL2A, VR2FF, VR4AD and VK9DM. By the way, can any of your readers inform me as to the genuineness of the latter (VK9DM). He sounds very much like a pirate to me.

As it may be of interest to your transmitting readers, I enclose a list of VK's and ZL's heard here during the month of May. I shall be glad to stand by on my receiver for any VK/ZL requiring reports from "G," if they will write me and tell me their frequency and dates and times they are on the air. The code is fully understood here, so c.w. stations are included.

The 145 countries I have heard are divided as follows:—Asia 21, Oceania 15 Africa 24, North America 28, South America 15, and Europe 42.

The receiver in use is a home-constructed straight four-valve, all batteries, and antennas ½-wave 40 m. window and ½-wave 20 m. window.

Very best wishes.—Martin G. Bourke, "Crediton," Samares, Jersey, Channel Islands, England.

VK and ZL calls heard by Martin G. Bourke (G) 2AOU, "Crediton," Samares, Jersey, Channel Islands, England, during May:—

20 metres ('phone and c.w.): VK2's ABE, ACN, ADE, AEK, AEZ, AFN, AGD, AGJ, AHX, AIB, APJ, BJ, BK, BR, CR, DI, DR, DU, EO, FF, HZ, KJ, LB, NF, NQ, NO, OT, PX, QV, RD, UT, UY, VU, VV.

VK3's AL, AN, AT, AX, BAR, BZ, CE, CX, DS, DT, HC, HG, IR, JA, KS, MR, NG, NS, NV, PE, VB, VF, VJ, WO, XG, ZH, ZJ.

VK4's AD, BN, DR, EL, HD, RY, UX, TY, VS, WT.

VK5's AI, GG, JS, JT, LL, ML, PN, RT, SW, WK. WR. VK6AF and AY. VK7CL and CM VK9DM.

ZL1's HY, JI, KE. ZL2's BI, GN, GW, LA, LB, MN, PB, QR, VM. ZL3's AP, DJ, GR, JR, SM. ZL4's AC, AF, BR, DK, DQ, DR, DR, FB, FS, GM, GW.

U.S.A. Aircraft Stations Logged.

This month has been pretty poor from the DX point of view on the short waves. The 9.9-metre police band is now starting to pick up again, and to-day I heard W6XPA, W6XGC, W2XEM and W2XIJ; W6XPA reached R9 at times. There are no signals audible on any of the higher fre-

quencies yet, but 20 metres has been fair during the afternoons, with mainly W's and Europeans.

A very interesting incident this month has been the reception of the United States aircraft stations on 54 metres. On several occasions I have heard the 'planes answering them, but these stations are very hard to log as they give no call signs as far as I know. On the broadcast band with my "Outdoor Portable Four" I have heard KZRM, many Japanese and Chinese, and also a station on 1310 k.c. which signed itself as KGMJ or KGNJ, heard around 6 p.m.—J. Ferrier, Coleraine, Victoria.

Conditions On "Twenty" Improving.

The conditions on the 20 m. band have been a little better, and between June 16 and July 16 I logged the following stations:—

4 W2's, W3JS, 3 W4's, 9 W5's, 31 W6's, 5 W7's, 2 W8's, 5 W9's, K6ILW, K6KKC, K4EVC, VE4JJ, VE5HU, VE5JB, F8LX, F8RV, VU2BG, XE2IY, ON4AW, HK5DB, PK2CG, TI2FG, CT1ZA. These stations were heard on 'phone between 3 and 6 p.m., after that the 20 m. band fades out.

My latest QSL's to hand are from SU1RD, YV1AP, W9ZMN, XZ2EZ, ZS6AJ, ZL2KJ, GW8HI, G2NA, VK's 4AE, 4AX, 4ZP, 4XW, 2BY, 2AFP, and 2ZP. The aerial used was a half-wave doublet, 30 feet high.—**Charles H. Thorpe (AW342DX), North Rockhampton, Queensland.**

QSL Exchange Bureau.

The following member would like to exchange QSL cards with other readers:—

Lyle Schulte, C/- Miss E. Chayter, 14 Macaulay Street, Coorparoo, S.E.2, Brisbane, Queensland.

"Radio World" Publication Date Changed From First To Tenth.

To facilitate publication and distribution of the "Radio World" each month, arrangements have been made to publish on the 10th of each month instead of the 1st, as in the past. This scheme will also permit the inclusion of reports on monthly meetings, technical lectures, etc., held by various radio clubs and commercial organisations in Sydney during the month preceding that of publication. Contributors are asked to note that "copy" should reach the Editor not later than the 28th of the month preceding the intended issue of publication.

The Rayway all-wave coil kit used with the "Air-Ace."

The Air-Ace Communications Four.

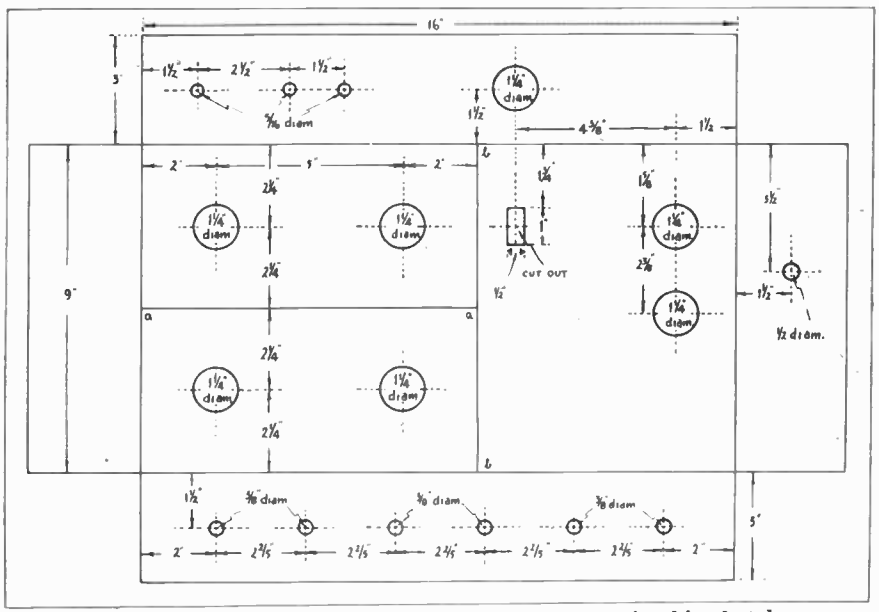
(Continued from page 5.)

A complete list of parts required to build this receiver is given elsewhere, together with sketches showing chassis, cabinet and partition dimensions. The data given will enable experienced set-builders to complete the assembly of the receiver without delay, while for those not so experienced, a further constructional article, together with under-chassis wiring diagrams, will be published next month.

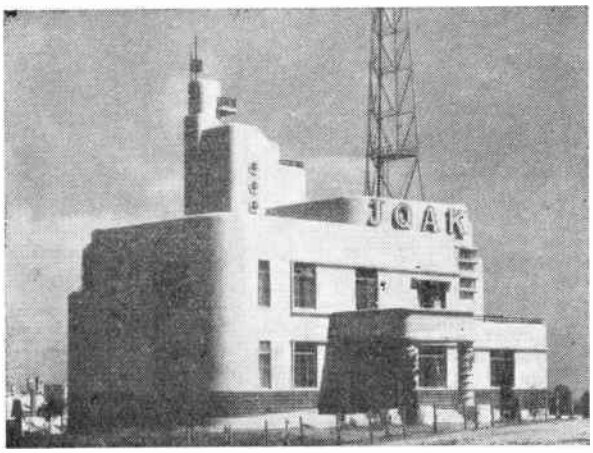
Excellent For All-Round DX.

Tests conducted on the "Air Ace" at two Sydney suburban locations have shown this receiver to be excellent for all-round DX work, both on short waves and the broadcast band. Those interested particularly in the amateur bands will find the band-spread feature very useful, though those who want the receiver just for general shortwave and broadcast DX work could easily omit the band-spreading condensers and use 160 mmfd. tuning condensers, with the present r.f. band-setter replaced by a 5 or 7-plate midget variable as a trimmer across the r.f. section of the gang.

Also, if desired, the detector band-setter could be replaced by a 23-plate midget variable connected in series with the aerial to provide variable aerial coupling. This condenser could be mounted towards the rear of the chassis, near the aerial terminal, a flexible coupler and extension shaft being incorporated to enable this control to be operated from the front panel.



Dimensions for preparing the chassis are shown in this sketch.



A card received by the author from JOAK, Japan.

Breaking Into The DX Game

Some valuable hints for DX beginners are given in the article below, written for the "Radio World" by . . . .

ALAN H. GRAHAM

"HOW can I be sure of getting a verification from that overseas station?" is a question which every S.W.L. has asked at one time or another in his DX career. And since the introduction of commercial dual and all-wave receivers has brought about a great increase in the number of DX fans, the problem of compiling a really helpful and informative report of reception, which can confidently be expected to secure a verification, has become increasingly important.

After all, many of the more powerful short-wave broadcast stations receive hundreds of letters a day, and it is obvious that the staff will not waste their time on reports which contain no information of real value.

Beginners—and perhaps not a few more experienced S.W.L.'s—should bear in mind that the following points are essential to a really first-class report.

Legibility An Essential.

Firstly, the report must be clearly written. If possible, it should be typewritten. If this cannot be done, then only your best handwriting will suffice—and if your writing is not as legible as it might be, print that report. Of course, if printed report forms, such as are available to members of the A.W.A.W. DX Club, are used, much trouble will be saved all round; but even when filling in these report forms remember that legibility must be your first consideration.

Secondly, give your address in full, and print it. One cannot be too careful in this direction, as mistakes are easily made at the other end. I know of one S.W.L. whose verification from JDY, Radio Dairen, Manchukuo, was addressed to Victoria, British Columbia, instead of Victoria, Australia. Fortunately, the Canadian postal authorities were equal to the occasion.

These above remarks concerning legibility apply especially when reports are being prepared for stations in countries where English is not generally spoken. Most stations, however, have someone on their staff who can read English, if it is clearly written. And it might be as well to mention that, in writing to stations in the above category, it is advisible to avoid the use of idiomatic and slang expressions—in short, use only words and constructions which a foreigner with a reasonable knowledge of English might be expected to understand.

It should be the objective of every S.W.L. to provide the staff of the station to which he reports with as much really useful information as possible. It is very little use to merely mention one or two items heard, and then add that the signals were good speaker strength. The station engineers desire more detailed information than that.

Typical Information Required.

At the present time several of the larger stations are issuing their own report forms to interested listeners. As these are compiled by the station staff personally, it can be taken for granted that all the information desired is requested. A typical form sets out the following questions.

Receiver: Type, and name, if a standard make.

Antenna: Type; dimensions; direction.

Location: Distance from sea, and from nearest large city; approximate height above sea-level.

Frequency of transmission.

Strength (R) and Readibility (QSA) of signals.

Quality of transmission.

Noise-level (QRM and QRN).

Fading (QSB).

Interference.

Weather conditions.

Comparison with other stations in same locality—or on same wavelength.

A short review of how station is received during the various seasons of the year; mentioning especially during what months reception is best.

Details of Reception: (Most stations prefer reports giving results over a period of a week or a month. Of course, this is often impossible, as some stations are logged but once or twice a year.)

Local Times And G.M.T. Wanted.

In order to facilitate the verification of your report, comprehensive details should be given as to the programme heard. Firstly, great care should be taken to avoid confusion as to times—all times should be given in local standard time and in Greenwich Mean Time. Secondly, give as full details as possible regarding the programme items logged over a fairly considerable period, at least half an hour. Merely to forward a letter stating—"I heard your station yesterday morning at 8 a.m., broadcasting orchestral music" is not at all sufficient. No station would verify a report of this nature.

Finally, and above all, enclose return postage with all reports, either in the form of Reply Coupons, or unused stamps. Most stations will not verify if postage is not forwarded with a report (there are exceptions to this rule, but they are very few and far between—such as TGWA, TG2, etc., the Guatemalan stations). Such an attitude is only reasonable, as the expense of printing and mailing QSL cards is very considerable. Reply Coupons (International 7d. Imperial 3d.) are obtainable at all post-offices. Incidentally, there are a few countries where International Coupons are not redeemable—make enquiries concerning these from your local postmaster. Offhand there come to mind Nicaragua (enclose 5c. in U.S.A. postage), Honduras and Ecuador.

There are a number of stations which will not verify under any condition—even when comprehensive re-

ports are accompanied by return postage. For example, the Americans W1XK and W8XK, and the B.B.C. transmitters.

Most commercial telephone stations will not verify unless reports cover test transmissions; and quite a considerable number will not verify at all. These latter include the U.S. New Zealand and U.S.S.R. 'phones. From personal experience it can be said that the German, Italian and English 'phones verify as readily as do most commercial broadcast stations.

For the guidance of S.W.L.'s we reproduce below a typical letter requesting verification—if report forms are used, include the same information under the appropriate heading.

August 1, 1938.

Radio Station HP5A,
P.O. Box 954,
Panama City,
Republic of Panama.

Dear Sirs,—

I have much pleasure in forwarding you a report on reception of station HP5A, transmitting on 25.65 m., or 11,700 k.c.

In order to facilitate the checking of this report with your station log, I am listing the following programme details.

Local Standard Time.	G.M.T.	Programme Details.
12.45 p.m.	0245	Announcements in Spanish and English; call-sign and frequency.
12.48 p.m.	0248	Orchestra and vocal chorus — selections from "La Boheme."
12.54 p.m.	0254	Announcements in Spanish and English. Orchestra and vocal chorus—selections from "Aida."
1.00 p.m.	0300	Announcements in Spanish and English — call, frequency, request for reports.
1.03 p.m.	0303	Piano solo.
1.06 p.m.	0306	Announcements in Spanish and English. Soprano solo.
1.09 p.m.	0309	Announcements in Spanish and English. Orchestra —Rhumba.
1.14 p.m.	0314	Closing announcements in Spanish and English.
1.17 p.m.	0317	Station closed.

Details of Reception.—HP5A was logged on March 21, 1938. Signals were fairly strong—steady R5-6 on speaker; and quite readable, QSA4,

(Continued overleaf.)

ALL WAVE ALL WORLD DX CLUB . . . New Members

AW322DX—Herbert Hindle, Premer, via Werris Creek. N.S.W.
AW323DX—Joseph C. Linehan, 181 South Terrace, Adelaide, S.A.
AW324DX—George Wall, 40 Union Street, Subiaco, Perth, Western Australia.
AW325DX—Lewis D. Favilla, Wildman Street, Wallaroo, South Australia.
AW326DX—Philip S. Cooper, 80A Alexander Street, Crows Nest. Nth. Sydney.
AW327DX—Herbert J. Culwick, 5 Ford Street. Preston West, Victoria.
AW328DX—J. R. Webb, 4 Yangoora Road, Belmore. N.S.W.
AW329DX—Patrick W. Dilworth C/o. Post Office. Yannergee, N.S.W.
AW330DX—Ronald James Linsell, Ganmain, N.S.W.
AW331DX—Alan M. Cardwell, 146 Rolleston Street, Christchurch, E.1, New Zealand.
AW332DX—John M. W. Knutsen, 11 Stewart Street, Glebe Point, Sydney, N.S.W.
AW333DX—H. H. Young, Murray Street, Angaston, South Australia.
AW334DX—Ellis C. Champion, 10 Dynnyune Road, Sandy Bay, Hobart, Tasmania.
AW335DX—Con. A. Stiglish 42 Argyle Street, Mornington, Dunedin, W.1, New Zealand.
AW336DX—Thomas Johnston-Lord, 10 O'Donnell Street, Port Kembla, N.S.W.
AW337DX—K. W. John, 33 Penkivil Street, Bondi, Sydney, N.S.W.
AW338DX—H. Bohleuder, Brookville, Ohio, U.S.A.
AW339DX—J. Muldoon, Mt. Joy Ter, Manly, Queensland.
AW340DX—Jack Norman Prior, Box 87, Coonamble, N.S.W.
AW341DX—Leo Funk, Oaka Lane, Gladstone, Queensland.
AW342DX—Charles Harold Thorpe, 25 Charles Street, North Rockhampton, Queensland.
AW343DX—John Cooke, 111 Archer Street, Chatswood. Sydney, N.S.W.
AW344DX—R. Lloyd, Korweinguboora, via Daylesford, Victoria.
AW345DX—S. Wright, 10 Milton Street, Mackay, Queensland.
AW346DX—H. Dearness, 33 River Street, Mackay, Queensland.
AW347DX—Norman Clarke, 27 Nelson Street, Penshurst, Sydney, N.S.W.
AW348DX—Frank Hawkins, 169 Mackenzie Street. Toowoomba. Queensland.
AW349DX—W. Cromie, 67 Baylis Street, Wagga Wagga, N.S.W.
AW350DX—Norman J. Hawkesworth, 158 Powlett Street, East Melbourne. Victoria.
AW351DX—L. F. Evans, Box 574, Christchurch, New Zealand.
AW352DX—A. R. Payten, High Street, Coff's Harbour, N.S.W.
AW353DX—William Bantow, 237 Point Nepean Road, Edithvale. Victoria.
AW354DX—George Pitkin, C/o. Post Office, Port Lincoln, South Australia.
AW355DX—L. Myatt, 40 Dunmore Street, Bexley. Sydney. N.S.W.
AW356DX—Douglas Hayes, 34 Cleland Road, Artarmon. Sydney. N.S.W.
AW357DX—Bryan Gibbons, C/o. Brooks Bros., Jamestown, S.A.
AW358DX—Arthur Charles Stengert, C/o. Mr. G. R. Hawker, "Yamin Park," Manilla, N.S.W.
AW359DX—Ian C. Goodall, Park Avenue, Terang, Victoria.
AW360DX—Keith Studley Crespin, Ripple Vale. Leongatha, Victoria.
AW361DX—Bert Christofferson, Poole Street, Bowen, North Queensland.
AW362DX—John T. Waterhouse, 39 Stanhope Road, Killara. N.S.W.
AW363DX—Raphall Geller, 1652 Radcliff Avenue, Bronx, New York. U.S.A.
AW364DX—N. Phillips, C/o. Gympie "Times," Mary Street, Gympie, Q'land.
AW365DX—Fred J. Combe, 20 Kelvin Gr., Armadale, Victoria.
AW366DX—George William Roy, 54 Campbell St., Rockhampton, Central Queensland.
AW367DX—Allan E. Ball, Matakohe, North Auckland, New Zealand.
AW368DX—Kevin Arthur Crowley, 283 Centre Rd., Bentleigh, S.E.14, Victoria.
AW369DX—Thomas Forrest, 846 Old South Head Rd., Rose Bay, Sydney.
AW370DX—Douglas John MacDermott, Post Office, Inverell, N.S.W.
AW371DX—Gwen Payten. High St., Coff's Harbour, N.S.W.
AW372DX—Ronald P. Falla, Donald, Victoria.
AW373DX—Harold Roach, York St., Beenleigh, Queensland.
AW374DX—K. Brent, 111 Queen Victoria St., Bexley, Sydney, N.S.W.
AW375DX—P. S. Quinton, 7 Cope St., Coburg, N.13, Melbourne, Victoria.
AW376DX—H. A. Warner, City Rd., Beenleigh, Queensland.
AW377DX—Albert Henry Tuiller, 42 Ward St., West Maitland, N.S.W.
AW378DX—G. H. Hodges, Hilton Rd., Gympie, Queensland.
AW379DX—Ray Keogh, 8 George St., Mackay, Queensland.
AW380DX—Mervyn J. S. Tippett, Cooper St., Koongal, Rockhampton, Q'land.
AW381DX—Jack Hazzard, 136 West St., Casino, N.S.W.
AW382DX—S. P. Sullivan, 11 Shipley Ave., Homebush.

(Continued overleaf.)

AW383DX—Max H. Buchhorn, Lavington, via Albury, N.S.W.
AW384DX—G. A. McLennan, C/- Wirth's Circus (now touring Australia).
AW385DX—Donald Henry Fowler, C/- Railway Dept., Beerburrum, Q'land.
AW386DX—D. Newton, 175 Geelong Rd., West Footscray, Victoria.
AW387DX—John E. Fawcett, "Home Lea," Darvall St., Rosanna, N.22, Melbourne, Victoria.
AW388DX—H. Thomas, 52 Inkerman St., Maryborough, Victoria.
AW389DX—Thos. B. Hamilton Smith, Dent Island Lighthouse, C/- Altmann's Mail Service, Deauville, via Proserpine, Queensland.
AW390DX—Julia Platonoff, 33 River St., Mackay, Queensland.
AW391DX—L. K. Allison, Mill Hill, Warwick, Queensland.
AW392DX—Max Gardiner, 94 Hotham St., East St. Kilda. Victoria.
AW393DX—Hubert Harrison, 6 Esperance Ave., Middle Brighton, Melbourne, Victoria.
AW394DX—Alan Thomas Berry, Hawthorne St., Roma. Queensland.
AW395DX—Joy McKenzie, Takahiwai, via Ruakaka, Nth. Auckland, N.Z.
AW396DX—John Butler, 4 Flat, "Novacastria," Manion Ave., Rose Bay, Sydney.
AW397DX—Raymond A. Kelly, 51 Fairview Crescent, Kelburn, Wellington, W.1, New Zealand.
AW398DX—Ronald Emanuel. 209A Brown St., Armidale N.S.W.
AW399DX—Jack Cornes, Caledonian Hill, Gympie, Queensland.
AW400DX—Lyle Schulte, C/- Miss E. Chayter, 14 Macauley St., Coorparoo, S.E.2. Brisbane, Queensland.
AW401DX—John W. Ashley, E.S. & A. Bank, Ulmarra, Clarence River. N.S.W.
AW402DX—W. H. Pepin, 146 Seventh Ave., Maylands. Western Australia.
AW403DX—C. R. Woolsey, Campbell St., Terrigal, N.S.W.
AW404DX—S. E. Williams, Box 75, Leonora, Western Australia.
AW405DX—Edward William Bergin, 20 Hinton St., West Underdale, Lockleys, South Australia.
AW406DX—Frank S. McKenzie, 184 Talbot St.. Geraldine, New Zealand.
AW407DX—H. I. Johns, Mt. Pleasant Avenue, Nelson, New Zealand.
AW408DX—Edwin Ayrton, 121 Brighton St., Petersham, Sydney.
AW409DX—C. Taylor, 163 Annandale St., Annandale. Sydney, N.S.W.
AW410DX—Reginald L. Brook, 34 Campbell St., Rockhampton, Queensland.
AW411DX—Vincent Clark, Stuart St., Mullumbimby. N.S.W.
AW412DX—E. George Smith, Furracabad, via Glen Innes, N.S.W.
AW413DX—Roy William Francis Kennedy, 21 Brown St., Adelaide, S.A.
AW414DX—Kenneth G. Cowan, Thistle St.. Blackall, Central Queensland.
AW415DX—G. R. McDonald, Bank of New Zealand, Wellington, C.1, N.Z.

(To be continued next month.)

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.

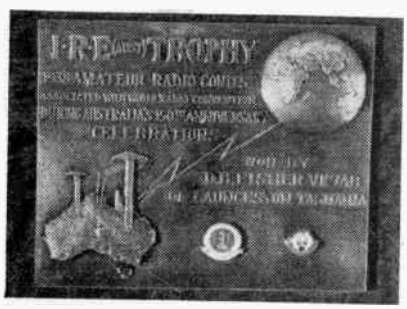
NOTEPAPER.—Headed Club notepaper for members' correspondence is also available. Price, 1/6 for 50 sheets, post free.

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.

VK7AB Wins I.R.E. World Radio Convention Trophy.

Herewith is a reproduction of the I.R.E. (Aust.) trophy won by Mr. D. H. Fisher, VK7AB, Launceston, Tasmania, for being the wireless amateur who won the 1938 Amateur Radio Contest in having made more contacts



overseas in sending messages about Australia's 150th Anniversary Celebrations, than any other transmitter.

This trophy is of unique design. It measures about 15 inches square, with a base of Queensland maple. The trophy itself is hand-beaten in copper, the design containing the I.R.E. Radio Convention badge, together with the Wireless Institute Badge. Arrangements are now in hand to make a suitable presentation to Mr. Fisher in Tasmania very shortly.

VK2ME, 3ME And 6ME — Schedules For September

The following transmission schedules will be observed by shortwave stations VK2ME, VK3ME and VK-6ME during May:—

VK2ME (31.28 m., 9590 k.c.)

	Sydney Time.	G.M.T.
Sundays:	3.30-5.30 p.m.	0530-0730
	7.30-11.30 p.m.	0930-1330
Mondays:	12.30-2.30 a.m.	1430-1630

VK3ME (31.5 m., 0510 k.c.)

	Melbourne Time.	G.M.T.
Nightly Monday to Saturday (inclusive)	7 p.m.-10 p.m.	0900-1200

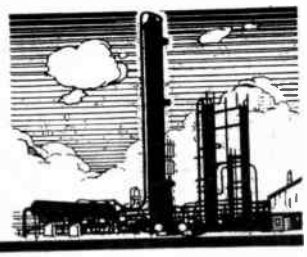
VK6ME, Perth (31.28 m., 9590 k.c.)

	Perth Time.	G.M.T.
Nightly Monday to Saturday (inclusive)	7 p.m.-9 p.m.	1100-1300

The trophy donated by Mr. J. C. Linehan, of Adelaide, S.A., for the QSL Card Contest closing on August 15. It will be awarded to the dxer entering the most attractive QSL card. The winner will be announced in next month's issue.

Printed by Bridge Printery Pty. Ltd., 214 George Street, Sydney, N.S.W., for the proprietors of the "Australasian Radio World," 214 George St., Sydney

REFINING NEWS



de Runs to Stills Set or District 3 Refineries

NPN News Bureau

SHINGTON — Under a y-control plan for District eries with war orders are assured of refinery runs t to make these war s, but they will share are alike with other re- in remaining outlets.

e aim of the Office of n Co-ordinator, whose director is supervising . to preserve so far as the same relative rela- among refineries, based ge crude runs for the of 1941.

os in Plan Listed

n calls for these steps ry to drafting month- tions for each refinery: crict 3 refining commit- mates quantity of prod- meet demand within Dis-

PC transportation direc- alculates transportation fa- available for movement products to other districts. OPC director of petroleum ly estimates volume of ucts required for shipment ide of the continental U. S. In light of above three s, District 3 refining com- ee determines what is total available for refined cts from the district's re-

C refining director re- o the district refining e on required produc- te of war products.

P oducts Come First

ict ; refining committee to devise a monthly al- n plan designed to (a) war products specified with minimum refinery nd (b) distribute equit- among District 3 refin- the remainder of the total ry outlet so as to pre- as nearly as possible, the operation percentage rela- ip as the average crude or last six months of 1941. the event that the remain- put of non-war products by the refineries producing war products," OPC explains, "then, in order that all refineries may share such deficiency equitably, the remainder of the total refinery outlet, after provision is made for the output of actual war products (not including non-war products produced in connection with manufacture thereof), shall be allocated ratably among all refineries, both war products and non-war products refineries, and war products refineries shall make such processing arrangements, purchases, sales, loans, or exchanges of petroleum, petroleum products, or outlet to be provided hereunder as may be necessary to enable uninterrupted output of war products."

On or before the 25th of each month, District 3's refining committee is to submit its refinery-control plan to OPC. But before any such plan goes into effect, it must have approval of OPC's chief counsel and either the Petroleum Co-ordinator or his deputy.

A directive is then to be issued and "all refineries in District 3 shall be operated at an average monthly rate not in excess of that established by such plan".

Affects East First

At first, this plan is to affect only the Seaboard, or so-called Texas-Louisiana Gulf Coast, refineries. But plan is flexible enough to include other refineries when deemed advisable by OPC's refining director. Initiative may be taken by District 3's refining committee, but approval of OPC's refining director is required.

If transportation should not be available to move products as planned, OPC is to see that transportation is first provided for war products. Remaining transportation facilities are then to be distributed equitably among the other refiners.

Ability of states and areas in District 3 to produce various grades of crudes called for in the plan, is to be reported monthly by District 3's production committee.

If adherence to any provisions in this refinery-control plan interfere with the required production of petroleum war products, exception may be granted upon application to OPC.

WPB Puts Control On Instrument Use

NPN News Bureau

WASHINGTON—Controls are imposed by War Production Board's Conservation Order No. L-134 on many types of instruments, regulators and control valves made of nickel or chromium and their alloys.

The order contained specifications for production of various types of instruments and restricted their use. WPB said it covered 28 items forming component parts of industrial processing instruments, valves and regulators, and in some cases limited the use of the instruments to specified operating conditions.

Instruments which do not contain nickel, chromium or their alloys, or manufactured before May 26, are not affected.

Manufacturers are prohibited from processing any chromium, nickel or alloys of those metals in producing any instrument parts except for use under the specified operating conditions, WPB said, pointing out that 30 days after issuance date of the order—May 26—manufacturers may not deliver any parts except for the specified uses, and effective immediatey, they can not deliver these instrument parts except to fill orders with a rating of A-10 or higher.

A purchaser is forbidden to accept delivery of any instrument part unless he expects to install the item, and all similar ones on hand, within 90 days.

The instruments listed in the order are:

Capillary tubing having an internal diameter of .025 in. or less; protective armor tubing; tubes and springs (pressure and thermal systems); diaphragms or bellows; sockets, wells, protecting tubes, sheaths and target tubes; temperature bulbs except resistance thermometer elements; bushings and revolving or coupling nuts; resistance thermometer elements; contact rods for flame control; thermocouples; extension lead wire; safety shutters and switches for radiation pyrometers; liquid level float cages and flanges; liquid level floats and float rods; liquid level expansion and immersion tubes; flow nozzles; orifice plates for use in pipe sizes below 10 in.; orifice plates for use in pipe sizes 10 in. and above; orifice meter accessories; straightening vanes; cleanout valve trim and liners for use with venturi tubes; studs for differential pressure chambers; conductivity cells for measuring con-

Davies Reports:

100-Octane Output is 50% above Hopes

NPN News Bureau

WASHINGTON — Existing plants alone have boosted 100-octane output to a point where it is 50% more than the maximum believed possible a few months ago—an achievement brought about by "the sheer technical genius of the American refining industry."

This report was made to the Cole oil investigating subcommittee on May 26 by Deputy Petroleum Co-ordinator Davies who said the amount of 100-octane under contract to the government from present and projected facilities has trebled since January 15.

Figures Withheld

Because the hearing was open to the public, he was unable to give specific figures, but added that coincident with Co-ordinator for War," he continued, "has now practically completed the expansion program authorized by the War Production Board in the sense that it has given technical and economic approvals to contracts covering the building of the necessary facilities and the purchase of the product."

He said, however, that construction and operation of the plants remains to be completed.

He reported that 19 majors and 31 independents are involved in the program now, and "in each case, the size of the 100-octane installation is the maximum possible for that particular refinery."

In an effort to conserve critical materials, 100-octane and

WPB Drafts Order On Chrome, Nickel Use in Refineries

NPN News Bureau

WASHINGTON — War Production Board is drafting an order which will require refiners and other industries to use alloys with a lower chrome and nickel content, according to a reliable source.

The order will make more definite, it was said, a WPB request that refiners use heat resisting and corrosion resisting alloys lower in nickel and chrome than the alloys they have specified in the past.

These alloys are already on the market, an official said.

After a recent meeting in Cleveland, refiners agreed to do voluntarily as WPB requested and were to decide where they will use the lower alloys, but the WPB order will tell them what alloys to use.

Designed for Shorter Life

Probably the use of the lower alloys will result in a shorter life, but not in every case, a responsible official added, explaining that whereas a refiner used to design for a 20-year life, he will now design for a 2 to 5 year life. Meantime, WPB announced that technical information on national emergency steels is available to industry in loose leaf form as published by the Iron and Steel Institute.

An official said the "NE" steels are more suited for production tools than for refineries.

WPB said the Iron and Steel Institute publication included curves showing the hardenability characteristics of all "NE" steels and the mechanical properties of a number of the compositions.

The steels, WPB said, are "made in accordance with new specifications designed to conserve scarce alloying elements".

Co-op Proposes to Build Farm Alcohol Plant

Special to NPN

SCOTTSBLUFF, Neb. — Directors of Consumers Co-operative Assn. have voted unanimously to form subsidiary to manufacture alcohol from farm products, the alcohol to be used in making synthetic rubber and for other war purposes.

U. S. government will be

Synthetic Rubber Plant 'Not Even in Blueprint'

NPN News Bureau

WASHINGTON—"The plans are not even in the blueprint state," a high government official said here when asked about published reports of a $50,000,000 RFC synthetic rubber plant to be built in West Gary, Ind.

This plant, it is said, would be built for the government but be operated by Cities Service, Sinclair, Indiana Standard, Dow Chemical, U. S. Rubber and Firestone.

Socony to Double 100-octane Output

NPN News Bureau

NEW YORK—Additional facilities to double output of 100-octane aviation gasoline are now under construction for Socony-Vacuum Oil Co. at 8 of its refineries, President John A. Brown told stockholders' annual meeting here May 28.

New construction will cost an estimated $27,400,000, approximately half of which is being paid by the company and half loaned by the government. Company also is building a plant in Texas at government cost to extract toluene from petroleum for use in making TNT.

Mr. Brown also called attention to Socony's new catalytic cracking process known as Thermofor, which, it is believed, will save considerable material and cost for plant construction compared with other catalytic units, and company's participation with four other companies in Neches Butane Products Co. This company was formed to erect and operate a plant in Texas for production of 100,000 short tons of butadiene a year from petroleum, sufficient, when combined with other ingredients, to provide for manufacture of 100,000 long tons of raw synthetic rubber.

Earnings Above '41

Socony's estimated domestic earnings for first 5 months of this year were better than the unsatisfactory first 5 months of 1941 but have been declining sharply from January through May, Mr. Brown told stockholders, adding "it is impossible at this time to give

OPC Plans to Use 'Distress' Gasoline For Butadiene till Plants Are B ui

NPN News Bureau

WASHINGTON — "Distress" gasoline is being counted on as a source of raw material for synthetic rubber while butadiene plants are being built, Wright Gary, refining director, Office of Petroleum Co-ordinator, told the Cole oil subcommittee on May 29.

Normally, construction required for a plant to make butadiene from petroleum would require 12 to 14 months, said Mr. Gary, answering a committee member's question. But there are many other factors that enter into these projects, especially the larger ones. They require a lot of engineering on processes and there is not any long experience record behind them, he explained.

From experience with the 100-octane program, in which top priorities were available and yet unavoidable delays developed, Mr. Gary said that a free flow of materials for synthetic rubber plants was a "hazardous assumption".

'Not Over 24 Months'

Pressed for an estimate as to time for completing the petroleum butadiene plants—assuming priorities were provided—Mr. Gary said:

"I sincerely hope that they can be built in less than 24 months."

Also, it will require 3 to 6 months before a new plant can be brought into full commercial production, he added.

Mr. Gary made it clear, however, that he was speaking of "completion of a program rather than steps of the program." Individual plants could be forced to completion quicker. "And some of these plants undoubtedly will be capable of coming on stream next year," he added.

Small Refiners to Help

During the 24-month period for building the petroleum-butadiene plants, the OPC is "strenuously working" to utilize existing plants and equipment to provide raw material for synthetic rubber without use of new materials and without interfering with other building programs.

Small refineries, and some large ones, too, which have "distress" gasoline due to decreased demand could send it to another

to be "purified" (butylene s arated from the butadiene).

Mr. Gary was asked h much raw material for s ic rubber the oil indust producing now. He said th did not know exactl thought the amount was tively small".

Oil Scrap Prog Suggested by

NPN New

WASHINGTON—A scrap collection in th dustry which can ap nationwide basis has down by Milton Sing rector of scrap colle the oil industry in Salvage Section of War P duction Board's Bureau dustrial Conservation.

He submitted suggestio collection of scrap for the fornia segment of the in in a speech before an o zational meeting of the fornia Oil Industry Sa Committee in Los Angele May 27.

His suggestions were:

Details of Plan Told

"1—That in each district plan to insure that all wa materials, particularly met and rubber, are removed fr all locations concentrating a definite program for each d trict and setting a time li for completion of these effo

"2—Encourage the review all idle facilities, including fineries and natural gasol plants, that are no longer service, abandoned pipeli and production equipment bo for drilling and handling of making preparations and c rying out dismantling whe ever possible.

"a—To facilitate economic tion in any dismantlement, y are requested to give all sistance possible, securing formation on what second-ha equipment and material owner will not require af the completion of this progra and see if use can be found this equipment in other companies at prices better th they can receive from deale

"3—Arrange for meetings every district in the State California, one for each mo for the next 4 months, u the close of the program a