

THE  
AUSTRALASIAN

NOVEMBER 10, 1938  
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# Radio World

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—See Page 8

- ASSEMBLING AND ALIGNING THE "1938 OUTDOOR PORTABLE FOUR": MORE
- ABOUT THE "1938 AMATEUR COMMUNICATIONS EIGHT": NINETEEN-RANGE
- COMBINATION VACUUM TUBE VOLTMETER & MULTI-METER: LATEST S.W. NEWS.

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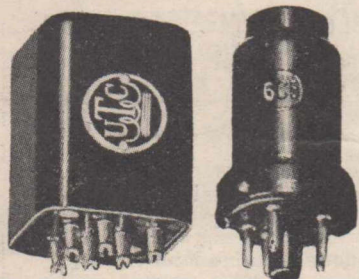
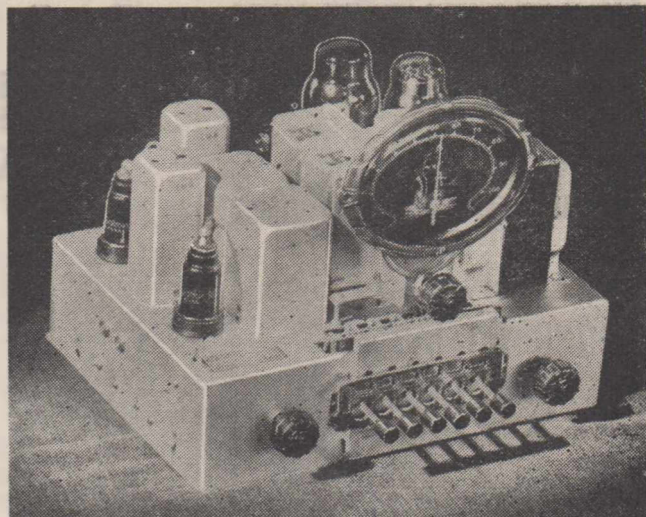
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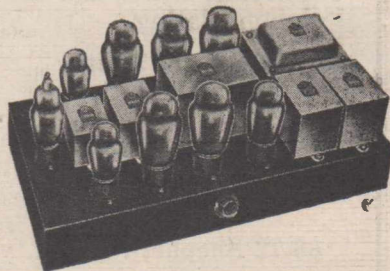
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# THE AUSTRALASIAN RADIO WORLD

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

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

Vol. 3

NOVEMBER, 1938.

No. 7.

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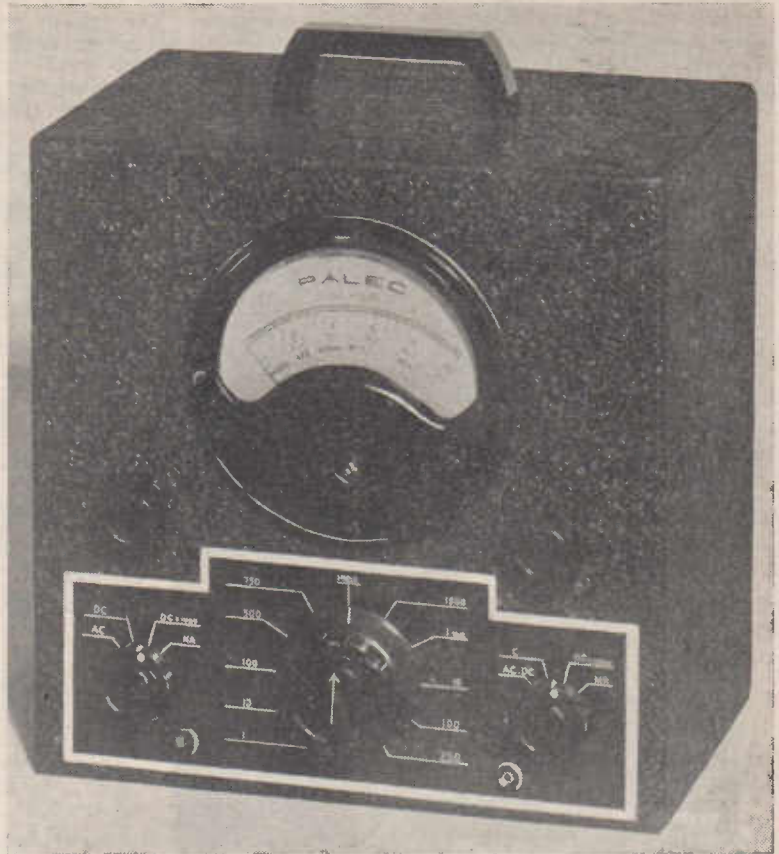
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# Nineteen Range V.T. Voltmeter And Multimeter

In continuance of the "Amateur Station Equipment" series of articles commenced last July, the author describes this month the construction of a particularly flexible combination V.T. voltmeter and multi-meter

By VM2MQ.



**D**URING the past few years a wide variety of vacuum tube voltmeters has been built by the writer, though each one has subsequently been dismantled, either because of some inherent fault that precluded satisfactory operation, or because the parts it contained were required for an improved model. Finally,

a circuit was evolved that proved entirely satisfactory in every way. It is an instrument that fully meets the requirements of the servicemen, amateur and shortwave experimenter.

### Nineteen Voltage And Current Ranges.

The instrument is an a.c.-operated

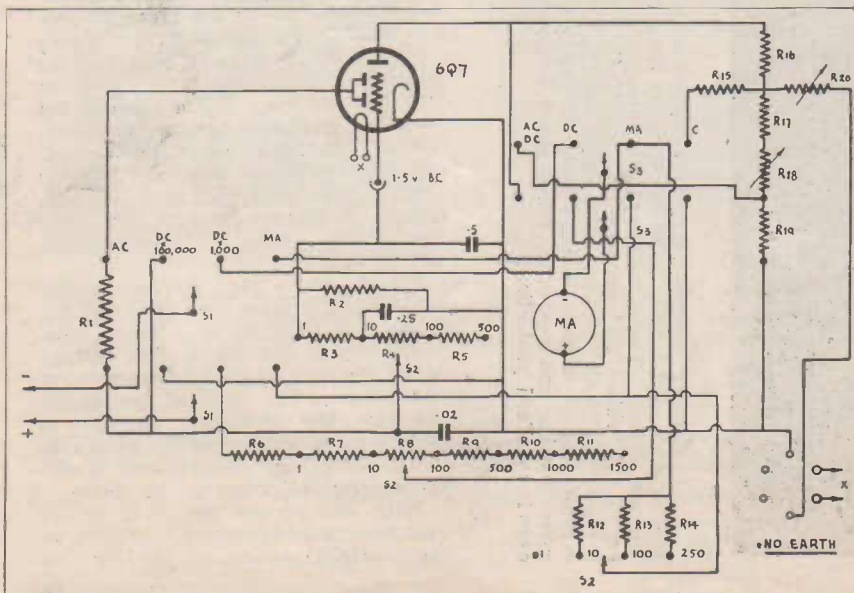
unit that has four a.c. and d.c. voltage ranges of 1, 10, 100 and 500 volts, with a sensitivity of 100,000 ohms per volt. There are also seven d.c. voltage ranges available of 1, 10, 100, 500, 750, 1000 and 1500 volts, with a sensitivity of 1000 ohms per volt. As well, there are four d.c. current ranges of 1, 10, 100 and 250 m.a. A point worthy of note is that the meter scale is linear for all ranges.

The meter used is a Palec Model 475 0-1 m.a. 5" movement. A 6Q7 valve is used for the instrument, which is powered by the special three-unit power supply described in the July issue. Details covering a separate power pack for use in conjunction with the instrument alone will be supplied on request.

### Theory Of Operation.

The theory of the instrument is covered briefly by the following, taken from the original article appearing in the August issue.

"The first job was selecting a valve, and since the maximum sensitivity

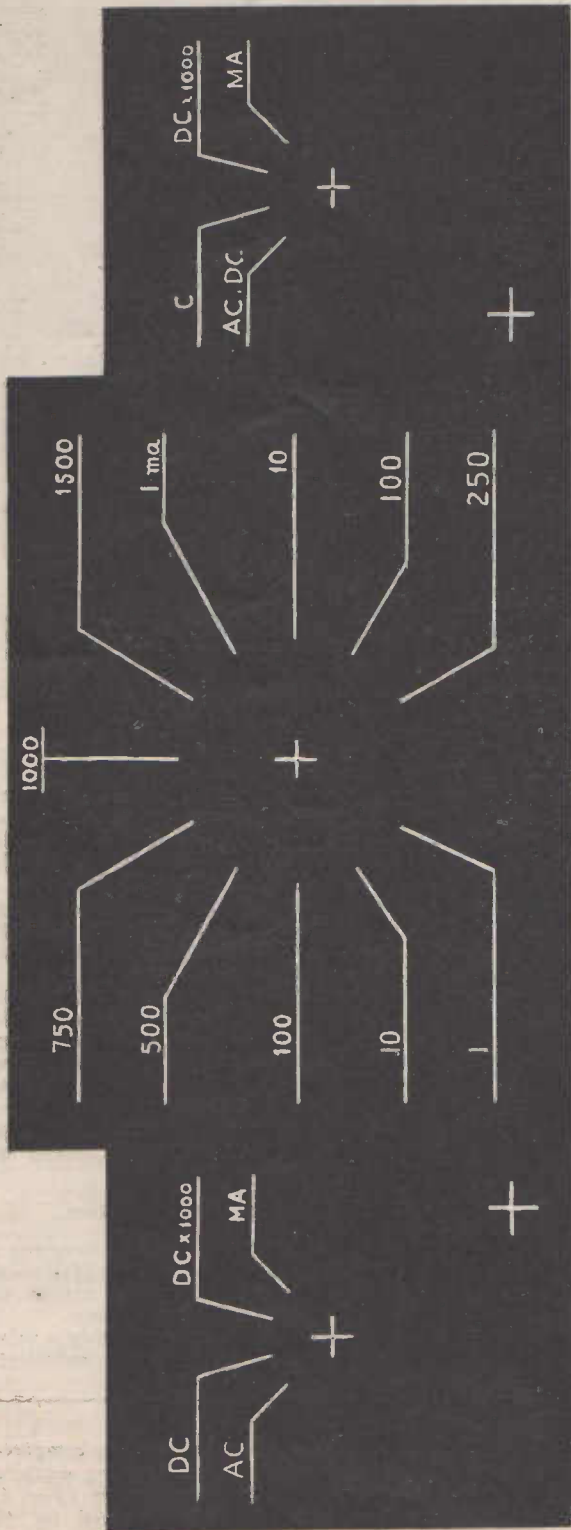


A general view of the completed instrument is shown above, while on the left is the circuit used (Fig. 2). The instrument is powered by the three-unit power supply described in the July issue of "Radio World."

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



A full-size reproduction of the scale developed specially for the instrument, drilling centres being indicated by crosses. The test prod selector switch "S1" is on the left. In the centre is "S2," meter resistor selector switch, while "S3" on the right is the meter selector switch. For measuring A.C. voltages, turn "S1" to "A.C." and "S3" to "A.C./D.C." For "D.C. x 100,000 ohms," "S1" is placed on "D.C." while "S3" remains on "A.C./D.C." For "D.C. x 1000 ohms," both "S1" and "S3" are placed on "D.C. x 1000." To measure current, "S1" and "S3" are both placed on "M.A." For each of the above measurements "S3" is turned to the appropriate voltage or current range. A block-maker's proof of this scale, taken on heavy art paper, will be supplied on request to readers forwarding 6d. to cover packing and postage. When glued in position, the scale can either be lacquered or a piece of clear celluloid, cut to shape, mounted over it to afford protection.

### Nineteen-Range Combination V.T. Voltmeter And Multi-meter.

- 1 0-1 m.a. meter (Palec model 475)
- 2 single-bank switches, 2 pole, 8 position
- 1 three-bank switch, 11 contacts on each
- 1 octal socket
- 2 banana sockets
- 1 1.5v. bias cell
- 3 GR type knobs (1 large, 2 small)
- 1 engraved indicator plate (Palec)
- 1 aluminium chassis, 8 1/2" x 8 1/2" x 2", stamped and drilled to specifications
- 1 crackle-finished steel cabinet, 9" x 9" x 6"
- 1 steel bracket for valve socket, 2" x 2" with 1/2" flange
- 3 m.a. shunts, 10, 100, 250 m.a. (Palec) R12, 13, 14
- 1 black bakelite handle
- 2 test leads, "+" and "-" (Palec)
- 2 10,000 ohm potentiometers (R18 and R20)
- 1 type 6Q7 valve

#### FIXED CONDENSERS:

- 1 .02 mfd. fixed condenser
- 1 .25 " " "
- 1 .5 " " "

#### FIXED RESISTORS:

- 1 5,000 ohm 1-watt carbon (R16)
- 1 10,000 " " " (R17)
- 1 50,000 " " " (R19)
- 1 .5 megohm " " " (R15)
- 1 1 " " " (R1)

#### FIXED RESISTORS:

- (5% accuracy essential)
- 1 .1 megohm 1-watt carbon (R2)
- 1 .9 " " " (R3)
- 1 9 " " " (R4)
- 1 40 " " " (4-10 megohm) (R5)

(Above are for 100,000 ohms per volt ranges)

- 1 1,000 ohm 1-watt carbon (R6)
- 1 9,000 " " " (R7)
- 1 90,000 " " " (R8)
- 1 .4 megohm " " " (R9)
- 2 .5 " " " (R10, R11)

(Above are for 1,000 ohms per volt range)  
Note: Palec multipliers, with an accuracy of 2%, are recommended for the above.)

#### MISCELLANEOUS:

- Nuts and bolts, hook-up wire, midget grid clip, solder lugs.
- (Power supply used was described in the July, 1938, "Radio World.")

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 since high voltages are usually associated with high power, the ordinary low resistance voltmeter section (D.C. x 1000) may be used. Therefore, a maximum scale of 500 volts was decided upon for the a.c./d.c. section.

Fig. 2 shows the circuit finally adopted; it will be seen that the a.c. voltage is rectified by the diodes paralleled in the 6Q7. The voltage peaks are then applied as extra negative bias on the grid of the triode amplifier, the resultant change in plate current causes an unbalance in the meter bridge circuit, with a corresponding indication in the meter.

With the proper choice of initial grid bias so as to insure operation on the straight section of the Eg Ip

# Use A PALEC Kit Of Parts for the NINETEEN RANGE COMBINATION VACUUM TUBE VOLTMETER AND MULTI-METER

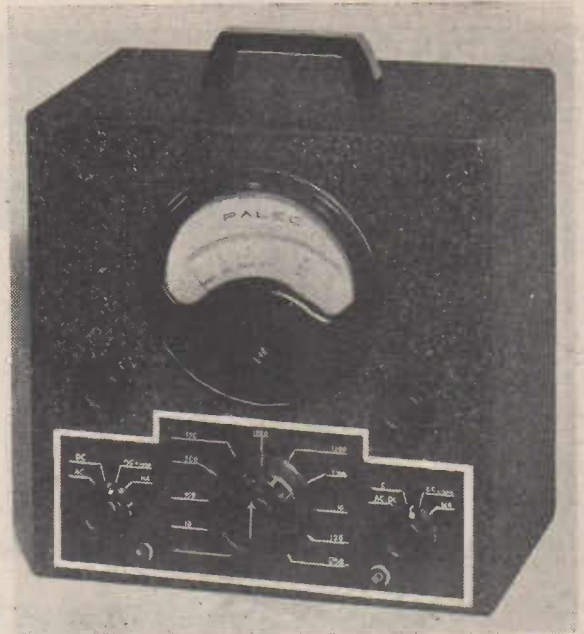
described this month

### SPECIAL PALEC FOUNDATION KIT.

- 1—0.1 m.a. meter (Palec Model 475).
- 2—Single-bank switches, 2 pole, 8 position.
- 1—Three-bank switch, 11 contacts on each.
- 2—Banana sockets.
- 5—GR type knobs (1 large, 4 small).
- 1—Engraved indicator plate.
- 1—Aluminium chassis, 8½" x 8½" x 2", stamped and drilled to specifications.
- 1—Crackle-finished steel cabinet, 9" x 9" x 6".
- 1—Steel bracket for valve socket, 2" x 2" with ½" flange.
- 3—M.a. shunts, 10, 100, 250 m.a.
- 1—Black bakelite handle.
- 2—Test leads, "+" and "-".

### PALEC VOLTAGE MULTIPLIERS (2% Accurate).

- 1—.1 megohm 1-watt carbon.
  - 1—.9 " " "
  - 1—9 " " "
  - 1—40 " " " (4-10 megohm)
- (Above are for 100,000-ohms per volt ranges).
- 1— 1,000 ohm 1-watt carbon



- 1— 9,000 " " "
- 1—90,000 " " "
- 1—.4 megohm " " "
- 2—.5 " " "

(Above are for 1,000 ohms per volt range.)

Write for our special price for the above Foundation Kit, or for the complete kit of parts as listed on page 4 of this issue.

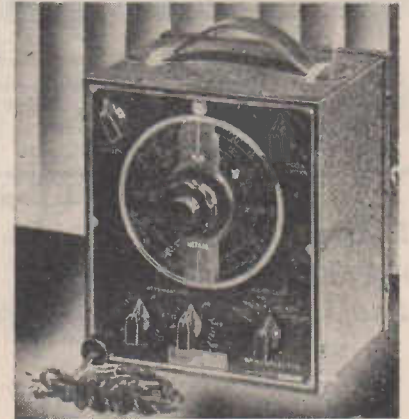
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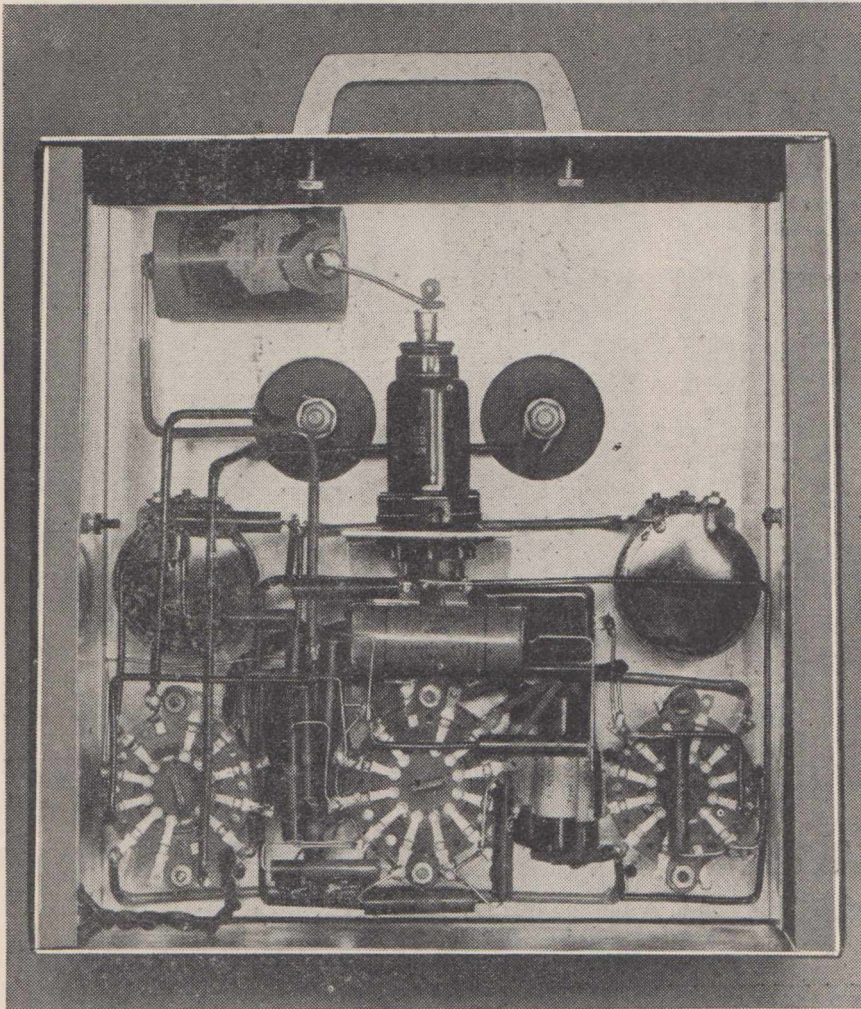
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This rear view of the completed instrument illustrates the method of assembly on the vertical aluminium chassis used. In this view, the test prod selector switch is on the right, meter resistor selector switch in centre, and meter selector switch on the left.

curve, and in selecting the proper value of bridge balance resistors, the meter will indicate exactly 1 m.a. for an applied peak potential of one volt a.c. or d.c.

The writer has always felt that any instrument worth building is worth building well, particularly in the case of a V.T.V.M., which is depended on for its accuracy. So considerable care was taken to insure that all resistors were nearly exact in value, or at the very most having a 5% tolerance.

In the circuit diagram, the test prod selector switch "S1" is on the left, meter resistor selector switch "S2" in centre, and meter selector switch "S3" on the right. These positions are the same for the three lower controls shown in the front view of the instrument. though, of course, they are reversed in the rear view which indicates the location of components.

#### Low Resistance Wiring Essential.

The layout adopted approximates the ideal, for all vital leads are kept short. A word here in reference to the m.a. selector section might be in order. All leads from "S1" to "S3" and to the meter should be of heavy wire, because on the 1 m.a. scale particularly, any resistance will affect full scale deflection. In the instrument illustrated, 12-gauge tinned copper wire was used.

The bias cell is mounted near the grid cap of the 6Q7, and all resistors for all ranges are grouped round their respective selector switches.

The entire unit is enclosed in a cabinet measuring 9" x 9" x 6". It is intended to standardise with other instruments in this series, and is crackle-lacquered for a fine finish.

Installation of the unit in a metal

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## M A S T E R

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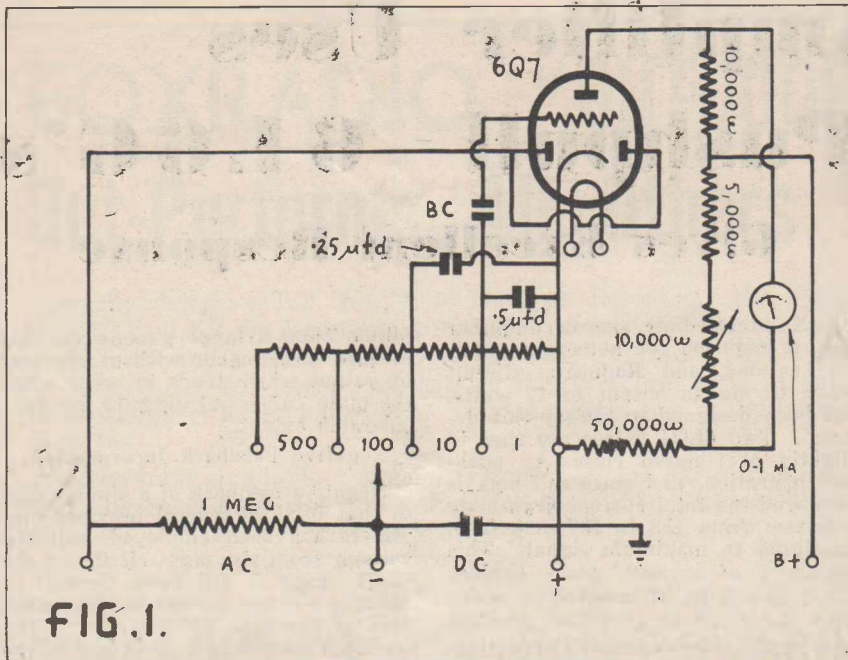


FIG. 1.

Fig. 1.—This diagram (reprinted from the August issue) shows the fundamental circuit used. The diodes rectify the A.C. voltage to be measured, the voltage peaks being then applied as extra negative volts on the grid of the triode amplifier.

cabinet is a desirable feature, and will serve to prevent stray electrical fields upsetting the balance of meter, particularly on the 1-volt a.c. range.

**The Three Switches.**

The selector banks for the prods and meter (S1 & S3) are 2 pole-8 position single-bank units, a fifth and sixth position being available for any future refinements which may be added. The centre switch is a 1-pole 11-position 3-bank, of which first bank nearest the front panel is for the a.c. d.c. 100,000 ohms per volt range, next bank for m.a. ranges, and third or outer bank for d.c. x 1000 ranges.

The chassis is of the vertical type and is 8½" x 8½" x 2". Positions for all switches and test prods can be punched and drilled through the template supplied for panel mounting. The two rheostats are in line with "S1" and "S3," and are 2½ inches above them.

**Calibration Procedure.**

Adjustment and calibration of the instrument is extremely easy, and with reasonable care should remain permanent for an indefinite period, although if precise measurements are to be made at any time it is easy to re-calibrate.

To adjust the instrument, throw switch "S3" to calibrate ("C" as indicated on panel) and adjust "R20" until meter reads 250v. or mid scale. Be careful to allow sufficient leeway on "R20" either way for final ad-

justment. By throwing "S3" to "C," it throws "R15" across the power supply, and since the meter requires only .5 mill. in that position, the potential applied to the bridge circuit will be from 4 to 5 volts more when thrown to a.c. d.c. positions on the same switch.

With "S3" on a.c. d.c. and "S1" on d.c. x 100,000, put selector switch "S2" on 1-volt tap and bring meter needle to zero by adjusting R18. Then apply 1 volt d.c. to the input terminals, when the 0.1 milliammeter should read exactly 1 m.a., or full scale. If it does not, juggling both "R19" and "R17" should bring the desired result.

It is not necessary to spend a great deal of time on them, however, because when meter reads within a few per cent. of full scale, juggling "R18" and "R20" will take care of the discrepancy. On the a.c. 1-volt scale, it will probably be found that the meter will give a substantial scale indication when the input terminals are shorted.

This is unavoidable, and may be compensated for when a.c. readings are made.

The a.c. ranges are peak volts, and a scale indicating r.m.s. values should be drawn for quick determination.

The metal case should be grounded, but not to negative return of instrument, as this connects to the positive input terminal and complication might arise if the metal case is made 500 volts positive.

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# 17-Watt Amplifier Uses Pushpull 6L6G's Gives Excellent Response

### The Front Cover.

This month's front cover photograph shows a draughtsman attached to the engineering department of the A.W.A. receiver factory, finalising plans for the manufacture of a Radiola chassis. The outcome of many months of painstaking work in the laboratory is the completion of the "master" chassis, which, together with comprehensive constructional details, is passed on to the production engineers, who carefully plan every phase of construction, and supervise the manufacture of machine tools. Complete plans for the assembly of every Radiola model are drawn up, to ensure that every process of manufacture is carried out with the utmost precision.

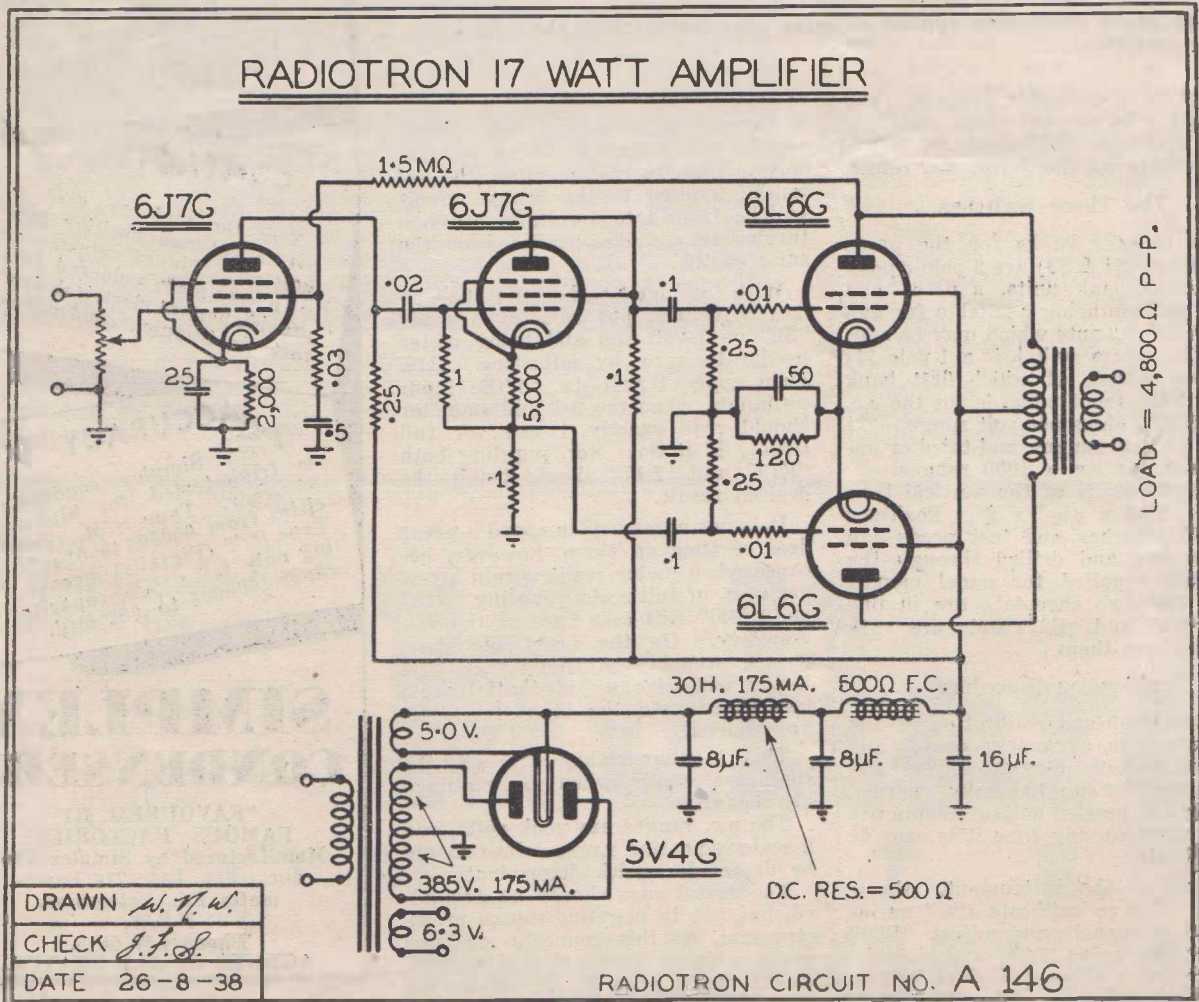
**A**N intermediate size amplifier is required for numerous applications, and Radiotron Circuit A146, giving an output of 17 watts, has been designed to satisfy this demand. Two 6L6G valves are used in slightly over-biased class A, push-pull operation, and since self-bias is employed the total current drain only increases from 158 to 167 m.a. from no signal to maximum signal. This constancy of current drain enables the field coil to be inserted in series with the filter to give the greatest economy in components. Alternatively, if it is desired to operate the am-

plifier from a large genemotor, this is quite practicable without the loss of output which tends to occur when the plate current changes to any considerable extent.

### Negative Feedback Incorporated.

Negative feedback of a similar kind to that used in several previous amplifiers has been employed, and the voltage from the plate circuit of the 6L6G stage is fed back through a suitable voltage divider to the screen grid of the first 6J7G stage. The feedback percentage is adjusted so

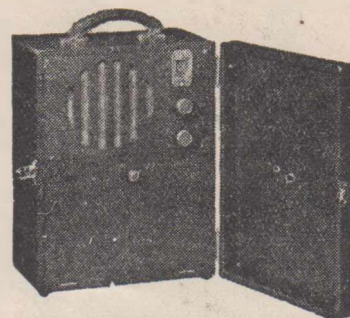
(Continued on page 48.)



# FOXRADIO "OUTDOOR PORTABLE" Out-Performs All Others !

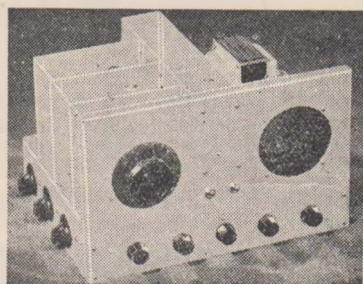
Specially designed for the "1938 Outdoor Portable," the FOX-RADIO Coil Kit we recommend for this receiver gives unbeatable sensitivity and perfect tracking. As well, this new coil kit can be substituted for lower gain kits in the 1936 and 1937 models. Exceptionally high gain with full stability are outstanding features.

We also have available a special complete kit of parts including carrying case, batteries and valves for the "1938 Outdoor Portable Four." Every part guaranteed of highest quality and exactly to the designer's specifications.



Don't buy before writing for our Special Complete Kit Price  
—Sent Post Free by return mail

## FOXRADIO KIT FOR "1938 COMMUNICATIONS EIGHT"



The 1938 version of the most popular amateur communications type receiver ever featured in an Australian magazine, the "1938 Amateur Communications Eight" incorporates many new and exclusive features. Two i.f. stages are used in the latest model, employing three iron-cored i.f. transformers. Other new features include optional a.v.c. and the latest high-gain 6AG-6G output pentode.

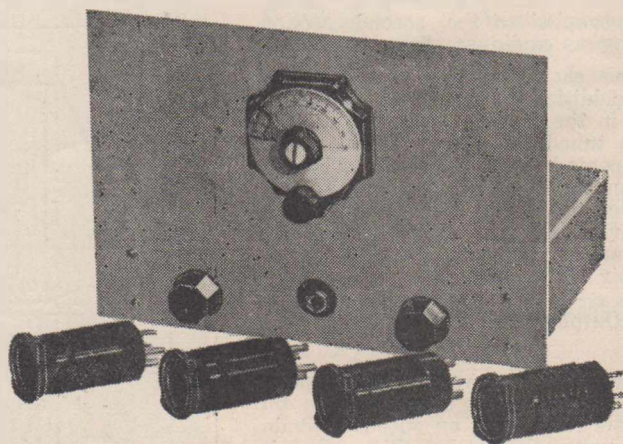
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## Build the "ATLAS ALL-WAVER" with our special FOXRADIO ADD-A-VALVE KIT

Elsewhere in this issue will be found a further constructional article on the "Atlas All-Waver," outlining the method of adding a high-gain economy output pentode.

We have prepared three special kit prices for this receiver—for the single-valve model, and covering the parts required to add the r.f. and output pentode stages. Price of the latter two will apply, even if purchased in a year's time.

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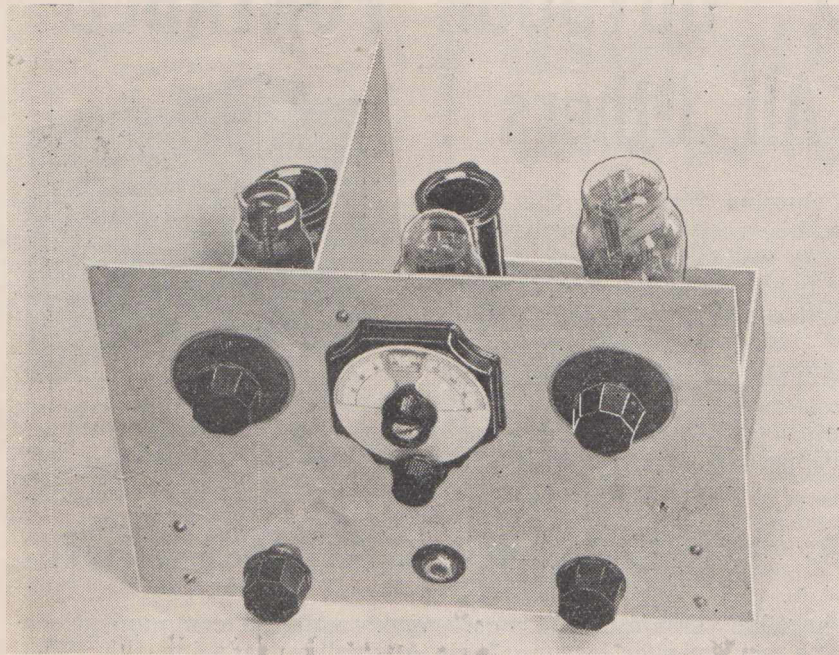
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Adding A Pentode Output Stage To The . . . . .

# ATLAS ALL- WAVER



In this concluding instalment is described the addition of a pentode output stage to give speaker operation from the main broadcast and shortwave stations.

A general view showing the final version of the "Atlas All-Waver," a battery receiver that was first described in the September issue as a one-valver, then as a two-valve receiver using an r.f. stage in the October issue. This month the addition of a 1L5G pentode output stage is described.

In the September issue of "Radio World" an article appeared describing the construction of the single-valve version of the "Atlas All-Waver," a battery receiver tuning from 15 to 600 metres. The valve used was a 1J6G class B twin triode, one section being used as a leaky grid detector with regeneration, resistance-coupled to the second section, acting as audio amplifier.

The chassis was planned so that two additional stages could be added, and in the October issue the addition of a tuned r.f. stage using a 1D5G r.f. pentode was described. This addition resulted in considerable improvement to both sensitivity and selectivity, though on the audio side volume was only sufficient to operate a pair of headphones.

### Output Pentode For Speaker Operation.

For those who want speaker operation, provision has been made on the chassis for adding an output pentode. The valve chosen for this socket in the original is the 1L5G—octal-based equivalent of the well-known 1D4. The filament current is .24 amp. at 2 volts. Operated with 135 volts on

This diagram shows the under-chassis wiring of the three-valve model, together with under-socket connections of both coils and valves.

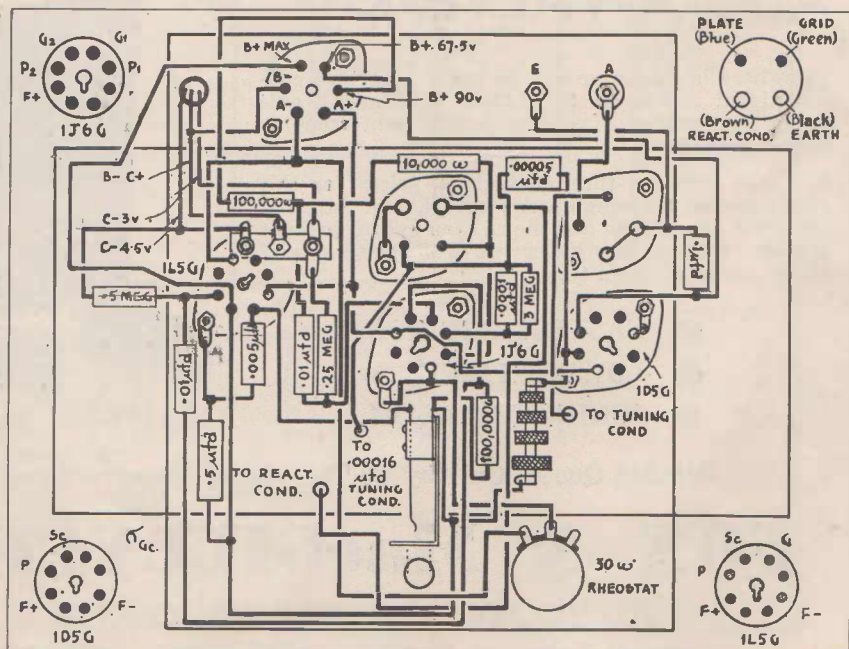
plate and screen, with a bias of  $-4\frac{1}{2}$  volts, total plate and screen current amounts to approximately 8 mills., while an output of around 300 milliwatts is obtainable.

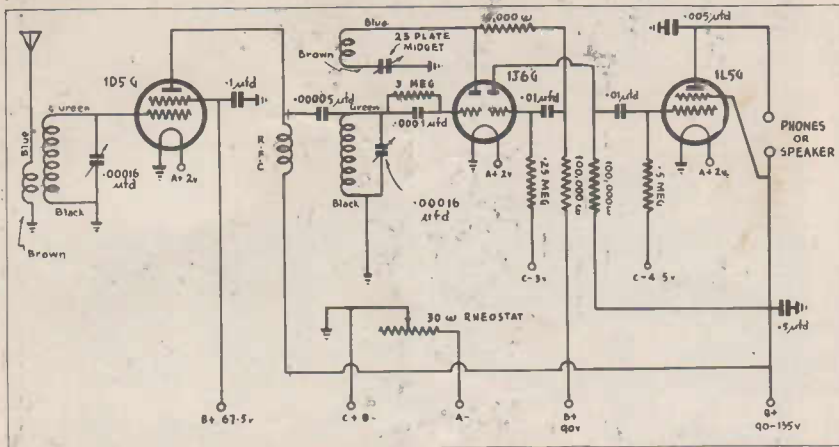
### The Parts Needed.

The parts required to make the ad-

dition comprise a .1 and .5 meg.  $\frac{1}{2}$ - or 1-watt resistors, .01 and .5 mfd. tubular condensers, octal wafer socket, and type 1L5G valve. A permanent magnet speaker such as the Rola 8-14 PM, 8-20 PM or 8-21 PM is also needed.

To effect the alteration, remove the wiring from the 'phone jack, and also the .005 mfd. by-pass condenser from the plate of the 1J6G second triode section. Then, commencing at this plate lug on the 1J6G socket, complete the wiring of the resistance-capacity-coupled output pentode stage as indicated on the circuit and wiring





The circuit of the three-valve model, showing the method of adding a resistance-coupled output pentode stage to give speaker operation.

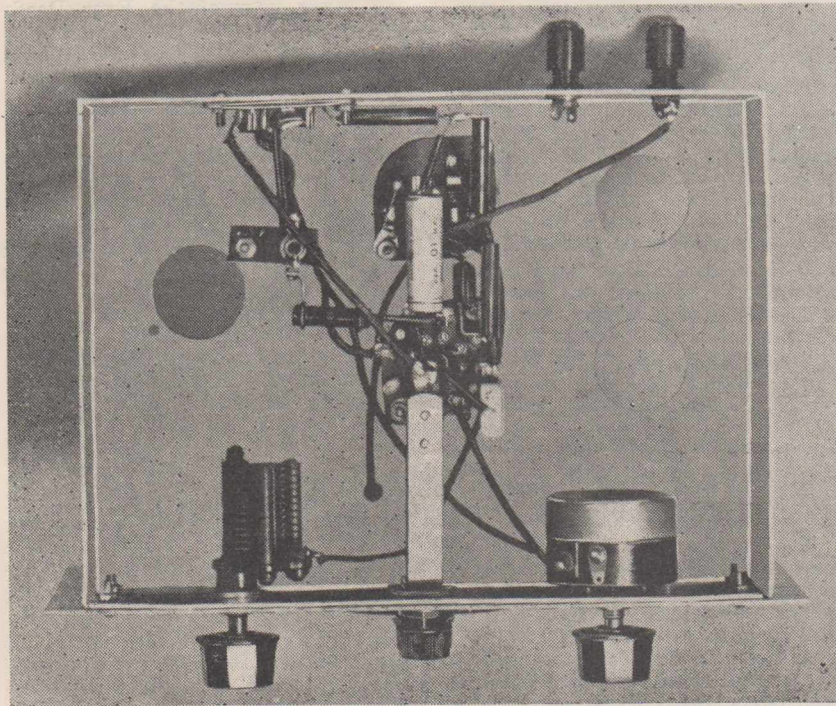
diagrams. The third "C" battery lead is added to the two already present in the set, and passes with them through the rear wall of the chassis via a rubber grommet. This is the "C-4.5v." lead supplying bias to the 1L5G.

**World-Wide Reception On Speaker.**

In its final three-valve form, the "Atlas All-Waver" will give speaker reception from several dozen broadcast stations, as well as the main shortwave stations throughout the world, provided, of course, that a rea-

sonably efficient aerial and earth system is used.

If desired, the lower right-hand control shown in the front view on the opposite page can be made an audio volume control. To do this, the .5-megohm 1L5G grid resistor should be replaced by a carbon potentiometer of equivalent value. The two outer terminals connect, one to one side of the .01 mfd. audio coupling condenser, and the other to C-4.5 volts. The moving arm is then taken to the 1L5G grid.



This under-chassis view of the one-valve model shows the extreme simplicity of the wiring. Note the holes already drilled in the chassis to accommodate sockets for the r.f. and output pentode valves, and the coil for the r.f. stage.



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# Aerial Beacon Erected On Ever Ready Building



## Million Candle-Power Rotating Beam Will Guide Pilots To Mascot Aerodrome . . .

THE erection of a new airway light for Sydney has been completed by the Civil Aviation Department, the site chosen being the tower of the Ever Ready Company's factory in Harcourt Parade, Rosebery.

The Civil Aviation Board, after considerable negotiations, accepted the offer of the Ever Ready Company to place at their disposal the large tower which is a feature of the building, and which rises ninety feet from the ground. The new airway light is of the rotating type, and its purpose is to indicate to pilots flying at night a given point on their route. Although at this stage no official tests have been carried out, it is expected that on a clear night the light will be visible roughly eighty miles away. This means that it would be picked up by pilots as far north as Newcastle, and would be used as their direction guide until Sydney is reached, and the flashing light at Mascot aerodrome sighted.

### Is Automatic In Operation.

This new airway light is automatic in operation and will function continuously from sunset to sunrise. It will be an invaluable guide to all night flyers, and in particular, to the many commercial services such as Airlines of Australia, Australian National Airways and Ansett Airways.

These companies operate services between Brisbane, Melbourne, Adelaide and Sydney, and their planes are scheduled to reach Mascot Airport at times varying from 5.40 to 6.45 p.m., a period during which, for many months of the year, it is dark, and an airway light is vitally necessary. In addition, there is the air service from New Guinea, overseas services and no doubt many other subsidiary services which will directly benefit as a result of the erection of this airway light.

The light has been erected on 10-foot supports mounted on the summit of the Ever Ready Company's tower, and thus will function precisely 100 feet from the ground level.

It was constructed by the British General Electric Company, and con-

A night view of the Ever Ready factory and tower on which has been erected the million candle-power rotating beacon shown in the inset.

sists of a 1500-watt concentrated filament lamp used with a 24-inch diameter parabolic mirror which produces a beam of 1,000,000 c.p. A deflector mounted on the front glass of the housing directs portion of the beam upwards so that a pilot flying high in the vicinity will not lose its signal. Of the rotating type, the beacon revolves once in 10 seconds, a ¼ h.p. motor mounted in the base supplying the power. The flash of the beam is about ¼ second.

In the event of the failure of the lamp, an automatic changing device comes into operation and swings a new lamp into the correct position. A visual and audible alarm is then operated by the changing device, to warn the maintenance engineer of the failure of the lamp.

The instalment of beacons is but the first step for the equipment of aerodromes for night flying. Ultimately floodlights, wind direction indicators and boundary lights will be brought into use, thus bringing Australian aerodromes into line with the best in the world.

### "International Six" Beats 'Em All!

I have built the "1937 International Six" as described in the issue of April 1, 1937, of "Radio World," and have received very fine results as regards tone, sensitivity and selectivity. It is the best receiver I have built and beats any I have heard. I also like your magazine very much.—C. Statham, Market Lane, Ipswich, Queensland.

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  - Paper Condenser Test (for shorts and opens).
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  - A.C. Voltmeter, 10-50-250-1000 Volts.
  - D.C. Milliammeter, 1-10-50-250.
  - Ohmmeter, 0.2-10 megohms in three ranges—0.2-500 ohms, 0-1 megohm, 0-10 megohms.
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  - Attractive, durable, black, silver and red etched panel.
  - Triplett Model 426 D.C. Instrument, square De Luxe case, 4 1/2 in. x 4 1/2 in.
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Mr. T. P. Court.

# Planning Radio Set Sensitivity

Sensitivity is a major consideration in radio receiver design. In the article below the author explains the meaning of the term, and discusses the factors governing the selection of a suitable sensitivity for a modern receiver.

By T. P. COURT,

M.I.R.E. (AUST.), A.M.I.R.E. (U.S.A.).

Chief Engineer Standard Telephones & Cables (A/sia) Pty. Ltd.

**T**HE term sensitivity would appear to be greatly misunderstood in its full application to a radio receiver.

It may be defined as the measure of ability to receive distant signals while converting them to intelligible sound.

Sensitivity can be regarded as the amplifying ability of the radio frequency amplifier. The "reaching out" qualities of a receiver are completely dependent on amplification before detection. In the case of a super-heterodyne, the intermediate frequency amplifier is considered as part of radio frequency system. The part played by the audio amplifier in overall sensitivity cannot be overlooked, but high audio gain cannot compensate for lack of radio gain.

In the precise measurement of sensitivity certain conditions are always assumed. In fact, the statement of sensitivity in scientific terms merely serves as a basis for comparison.

The term of measurement used is microvolts per metre, and the actual measurement is made with a signal generator which is very carefully shielded so that no radio frequency energy can escape except through the desired outlet. The signal generator employs a potentiometer of elaborate design which permits very close adjustment of voltage. Usually the voltage from the generator can be adjusted from about one volt to about one millionth of a volt, i.e., a micro-

volt. This voltage is led to the aerial terminal of the receiver through a dummy aerial.

A dummy antenna, by the way, is supposed to behave in the same way as an aerial approximately four metres long. It comprises resistance, capacity and inductance so proportioned as to have even characteristics throughout the broadcast wave band. This dummy is not used solely for measurement purposes, as the aerial circuit trimmer adjustment is made with the dummy aerial connected.

Thus, although this aerial circuit adjustment may be made very accurately, it would not hold if the receiver were connected to an aerial proper of very different characteristics. Indeed, many modern receivers are used with indoor aerials whose qualities are far different from the dummy on which initial adjustment was made. The sensitivity of such a receiver suffers through incorrect adjustment.

However, the use of the dummy aerial is justified in the vast majority of cases, and sensitivity measured through it is a fairly reliable index to the performance of a receiver.

## Sensitivity Requirements For Modern Receivers.

The actual sensitivity required for effective reception in any location depends largely on the nature of the terrain, but it is fairly safe to say that in the more densely populated States, country receivers of a sensitivity higher than 10 microvolts will be satisfactory. So far as metropoli-

tan areas are concerned, a sensitivity of 50 to 75 microvolts is adequate for interstate reception. In this latter case it is fairly safe to assume that unless a transmitter lays down a signal of at least 50 microvolts it is not worth hearing, owing to parasitic noises which are usually encountered. Daylight reception in suburban areas is not practical owing to absorption effects.

However, it is quite a simple matter to build sets to any requisite degree of sensitivity at broadcast frequencies, so the average set for long distance listening usually has a sensitivity of 5 microvolts or better. This higher sensitivity may be used to great advantage in the country, as there is little or no inductive interference.

It is usually agreed that a sensitivity of about 2 microvolts represents the practical limit, as the inherent noise in a receiver presents a virtually insoluble problem so far as commercial broadcast sets are concerned. Further, if the signals from the broadcast station are so weak as to demand this sensitivity, usually they are almost unintelligible.

## Sensitivity Can Be Too High.

The days of the highly sensitive receiver should be numbered. No advantage accrues from high sensitivity where it is not essential, as under certain conditions the operation of the automatic volume control can cause considerable distortion. Further, such

(Continued on page 33.)



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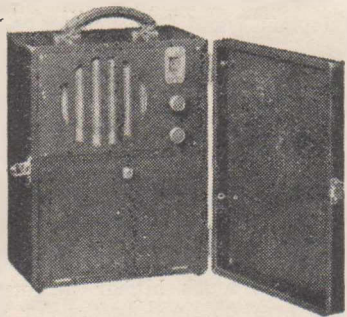
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# New Perth Transmitter Now On Air

## Technical Details Of 1 K.W. Plant Installed By S. T. C.

**T**HE new unit of the national broadcasting network recently installed in the Telephone Exchange Building in Perth represents the latest developments in broadcast engineering.

The equipment, which was designed and built in Australia by Standard Telephones and Cables Pty. Ltd., Sydney, to the order of the Postmaster-General's Department, incorporates several new features. The full power of the transmitter is 1 kilowatt, capable of 100% linear modulation, but the equipment will be operated initially at reduced power on 500 watts.

### Is Air-Cooled Throughout.

The transmitter is exceedingly compact, being housed in two small, totally-enclosed cabinets.

Air cooling is used throughout. The final stage of the transmitter employs one or two S.T.C. type 4279-A valves, according to the power output. These are, incidentally, the largest air-cooled valves of their type manufactured.

### Excellent Fidelity: Crystal Control.

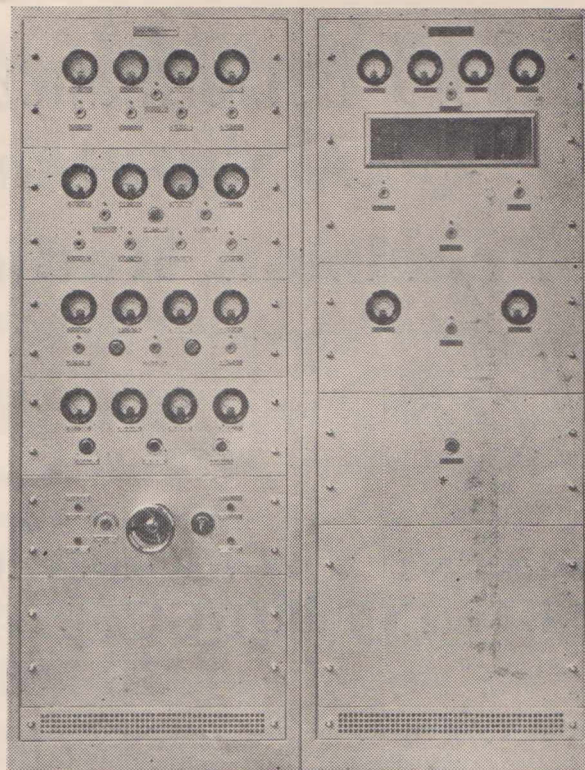
The transmitter employs the latest method of grid modulation with stabilised reversed feed-back, which results in exceptional fidelity of reproduction of speech and music and practically eliminates distortion and "background noise." The carrier frequency is maintained constant within 10 parts in a million by means of a low temperature co-efficient quartz crystal in a thermostatically-controlled oven.

### Locking Device Protects Operators.

The equipment is made entirely safe to operate by means of a safety isolator switch and key inter-lock system. The keys are normally kept in locks associated with the isolator switch in the front panel.

Before these keys can be removed, the isolator switch must be opened

A view of the transmitter installed for 6WN, Perth.



and locked open. It is, therefore, impossible to open the transmitter doors until the isolator switch has been opened and all dangerous voltages removed. Conversely, the high voltage cannot again be switched on until the transmitter doors are closed and locked, when the keys can be then removed and replaced in the isolator switch.

### Full Automatic Operation.

The transmitter is entirely automatic in operation, and can be switched on or off by push buttons located in a different part of the building. The circuit components are fully protected by means of fuses, overload relays and a system of electrical interlocks.

The transmitter panels are attractively finished in aluminium grey with nickel-plated fittings, and the high class appearance reflects the high quality of workmanship in every part of the apparatus.

### World's Largest Shortwave Broadcaster Installed In Rome

On October 31 the Italian Broadcasting Company (Ente Italiano Audizioni Radiofoniche) put into service at Prato Smeraldo, near Rome, a 100 k.w. shortwave broadcaster. This is the highest-powered shortwave broadcaster which has yet been

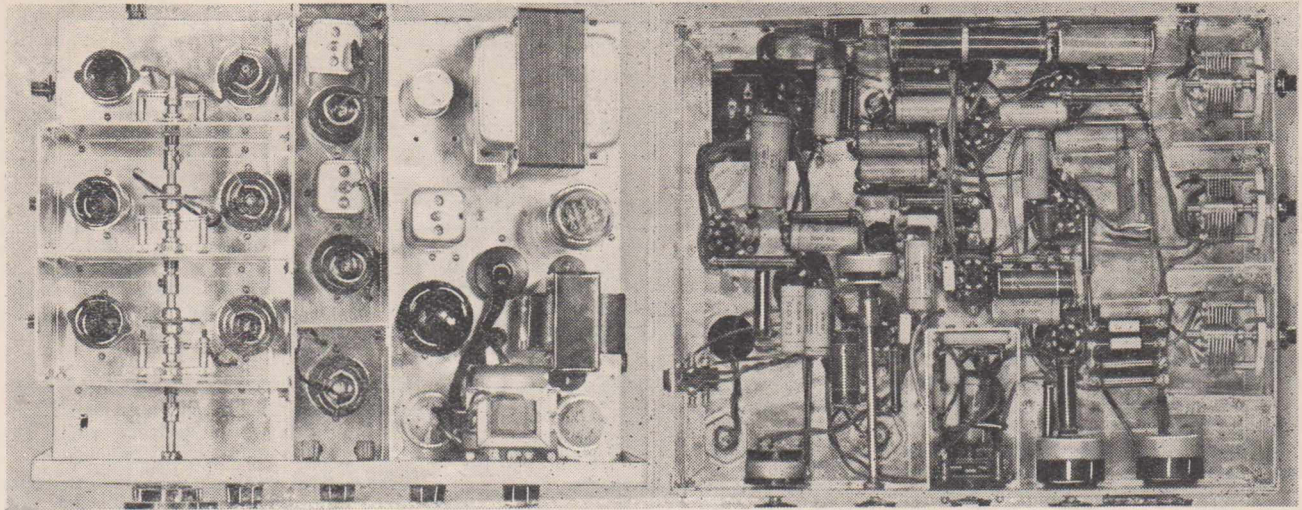
installed, and the first which will give world-wide radio service.

The station was constructed in the Milan factory of Fabbrica Apparecchiatura per Comunicazioni Elettriche, a company associated with Standard Telephones and Cables Pty. Ltd.

The equipment was designed, manufactured and installed within eighteen months, which is a remarkably short time, considering the development work which had to be undertaken. The new transmitter is undoubtedly the most modern and efficient transmitter in operation to date, as it has new and special circuits for the power amplifiers which give it a much higher performance than ever obtained before for shortwave broadcasting.

The trend in the development of broadcasters is to give higher and higher power as the listening public are taking a great deal more interest in shortwave broadcasting and are comparing the reception with that obtained from medium wave local stations. The quality of this new powerful shortwave station is better than the most up-to-date medium wave station.

The wavelengths need to be changed from time to time to meet changing atmospheric conditions, and facilities are provided to vary the wavelengths in a few minutes. This can be accomplished because the circuits for the high power stages are built on a rotating turntable.



The above chassis view on the left shows the location of the extra i.f. transformer used in this year's model. Immediately in front of it is the new Brimar 6AG6-G high-gain output pentode. The view on the right shows the under-chassis assembly. Note the screening partitions between the band-setting condensers, and the shield around the b.f.o. unit.

## Assembling And Wiring The . . . 1938 Amateur Communications 8

Full constructional details of the new 1938 model "Amateur Communications Eight", together with coil-winding data, are given in the accompanying article.

A complete list of the parts required to build the "1938 Amateur Communications Eight" was published in last month's "Radio World." Wherever possible, standard makes of components have been used, though the following points should be noticed.

For the six midget variable condensers used in the aerial, r.f. and oscillator stages of the receiver, the isolantite-insulated variety is strongly recommended. Amphenol steatite sockets should also be used for the coils. The three-plate midget variable condenser used in the b.f.o. to vary the beat note is of the ordinary bakelite-insulated type—in this position the improved insulation is not necessary.

A special RADIOMAC kit of parts for the "1938 Communications Superhet" has been made available by Price's Radio Service, of Sydney, all components supplied being identical with those used in the original model, and detailed in the list of parts last month.

Inclusive price for the Radiomac kit of parts, including valves, speaker and full set of coils, is £19/2/6, while, alternatively, the receiver can be

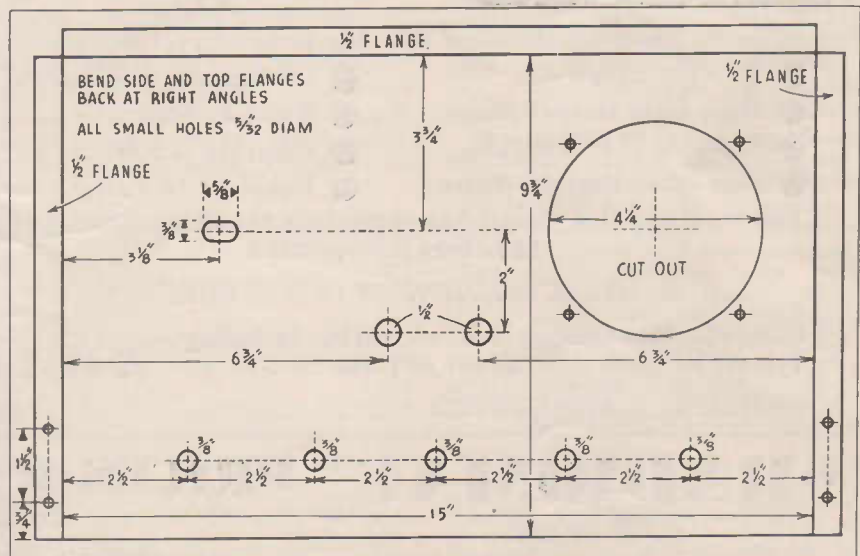
bought fully assembled and air-tested for £26.

### Commercial Coil Kit Available.

While complete turns details are given elsewhere, builders who prefer

not to wind their own are advised that a commercial coil kit is available from Standardised Products. Actually, one of these kits was used in the laboratory model.

The speaker illustrated is a Rola model F-4, a compact 5-inch dynamic that is ideal for the purpose. The total "B" drain is approximately 80 mills., and with a speaker field of 1000 ohms this means a wattage dissipation of approximately 6.4 watts. As this is a little too high for a midget speaker, a 5000 ohm 2-watt resistor



Dimensions for stamping and drilling the front panel are shown above.

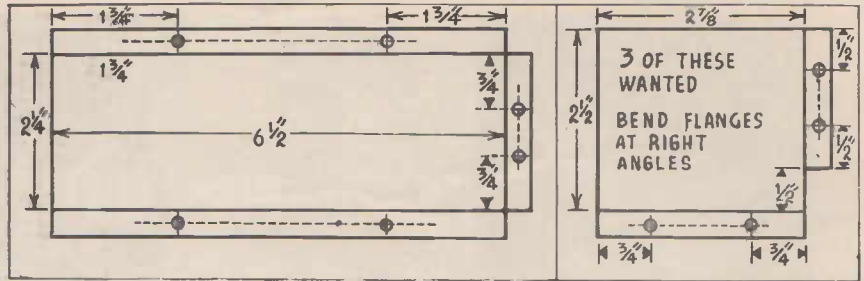
has been connected across the field. The 300-ohm 100 m.a. resistor connected in series with the field provides additional smoothing, and as well reduces the smoothed output voltage to 250 volts.

A 30 henry 100 m.a. smoothing choke comprises the second section of the smoothing filter, which has purposely been made elaborate, as a low hum level is essential in this type of set.

**The Chassis, Panel, And Partitions.**

Sketches of the chassis, front panel and 13 shield partitions required are also included. Nine partitions are needed above the chassis. Three separate the coils, while another two, running from front to rear, isolate the i.f. amplifier, second detector and beat oscillator stages from the r.f. and audio sections. As well, a smaller partition is needed to enclose the 6J7G beat oscillator valve. Another of similar size forms a rear bracing for the long front-to-back partitions, while two more serve the same purpose for the three coil shields, and also eliminate any hand-capacity effects that might otherwise result when the band-setters are being adjusted.

The under-chassis view shows the locations of the three shields isolating the band-setters, and also illustrates how the b.f.o. unit is enclosed



The sketches above show dimensions of the partition isolating the b.f.o. from the second detector (left), and of the shields separating the band setters below the chassis (right).

by a three-sided partition, forming a small box.

**Eight Front-Panel Controls.**

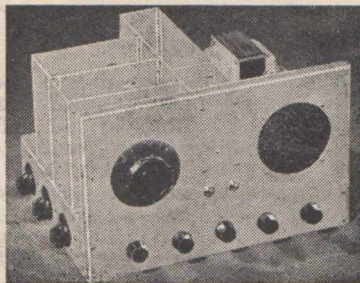
In the front view shown of the receiver, the five lower control knobs are (left to right), mixer regeneration control, i.f. gain control, b.f.o. note adjuster, tone control (combined with switch "S1"), and audio gain control. The two toggle switches are beat frequency oscillator on/off (left) and "B+" on/off. The latter is used when coils are being changed, or minor adjustments made.

Along the left wall of the chassis are the three band-setters (front to rear, oscillator, mixer, r.f.), while the 'phone jack is located on the

right wall. On the rear wall of the chassis are the aerial and earth terminals and power socket, with the a.v.c. switch mounted in the centre.

The first step in the construction is to mount the aluminium steel partitions, commencing with the three that support the bandspread tuning condensers. It is particularly important that the latter should be perfectly aligned, so that there will be no undue drag on the dial movement. The flanges for all three coil shields face the front of the chassis.

Next, mount the two partitions on the left of the coil shields, and then the large partition running from front to back of the chassis, between the r.f. and i.f. sections of the receiver.



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- High Gain Output Stage.
- Separate H.F. Oscillator.
- New Multi-Purpose Valves
- Continuous Band-spread.
- Two I.F. Stages.
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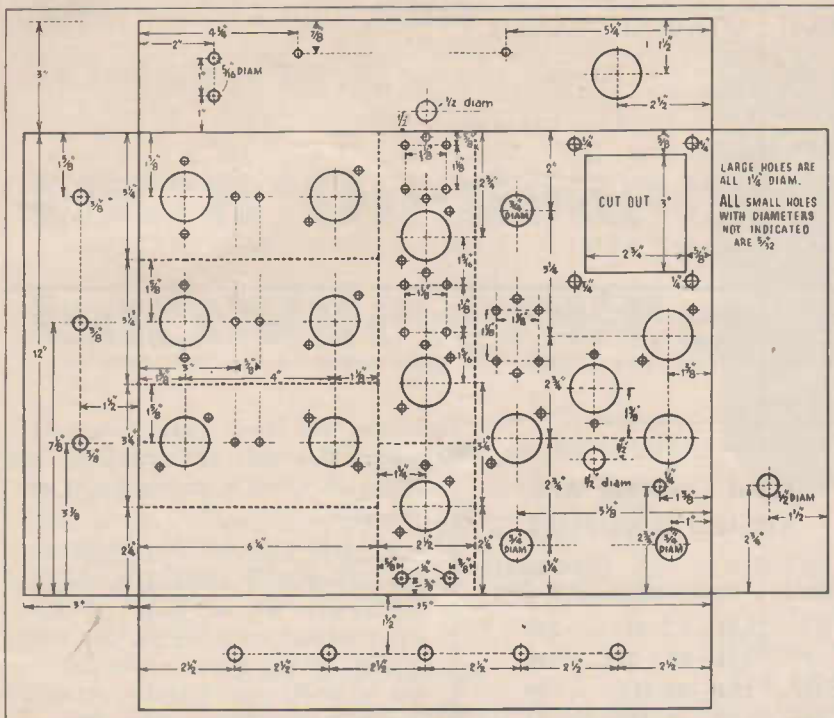
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SYDNEY.



Dimensions for preparing the aluminium chassis are given in this sketch.

coil sockets, and the three i.f. transformers. The three coil shields with their end partitions and the left-hand front-to-rear partition are next bolted in place. Next, two leads can be soldered to each of the three band-spread condensers, and the latter then mounted loosely in their correct positions on the shields. To eliminate unwanted noise, it is a wise precaution to connect flexible pigtailed to every midget variable that is not provided with them.

Leads are now soldered to each one of the two toggle switches and the latter mounted on the front panel, which is then re-bolted to the chassis. The dial is mounted next, and the couplers put in to link up the three bandsread condensers. The latter can then be lined up so that the dial rotates smoothly over the whole of the scale without any backlash.

**Mounting The Speaker.**

Next, unsolder one lead of the speaker voice coil, solder two wires as shown in the circuit diagram, and then mount the speaker on the front panel, followed by the five controls. Be careful to insulate the latter where required.

Lastly, mount the three small shields underneath the chassis, and then complete as many coil socket connections as possible before mounting the band-setting condensers.

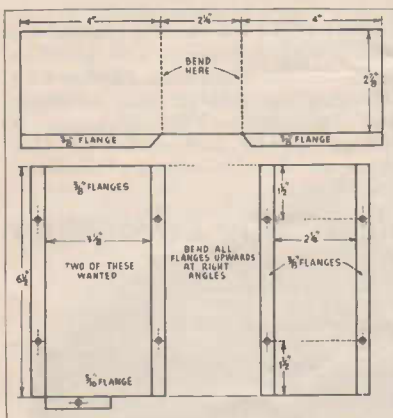
The main portion of the wiring can now be put in, commencing with the filament and power transformer wiring, followed by that of the smoothing filter, speaker socket, and so on. Next, commencing with the aerial terminal, systematically complete the remainder of the wiring.

**Assembling The B.F.O. Unit.**

The shielding around the beat frequency oscillator and its associated circuits is intended to isolate this unit from the remainder of the circuit, thus avoiding unwanted coupling. This shielding is indicated by dotted lines on the circuit diagram.

The pigtail components associated with the b.f.o. circuit are next mounted directly on the 6J7G socket. Small "V's" are cut out of the b.f.o. under-chassis shield so that the 6J7G heater and "B+" leads can pass through. The leads to the b.f.o. switch pass upwards through the chassis, while the 5 mmfd. coupling condenser shown is formed by twisting a shielded flex lead from the plate of the 6J7G around the 6U7G grid lead from the first i.f. transformer. A little experimenting will indicate the correct amount of coupling.

The b.f.o. coil is replaced in its can, and the latter mounted horizontally on two pillars bolted to the front of the chassis, one on either side of the 3-plate midget variable.

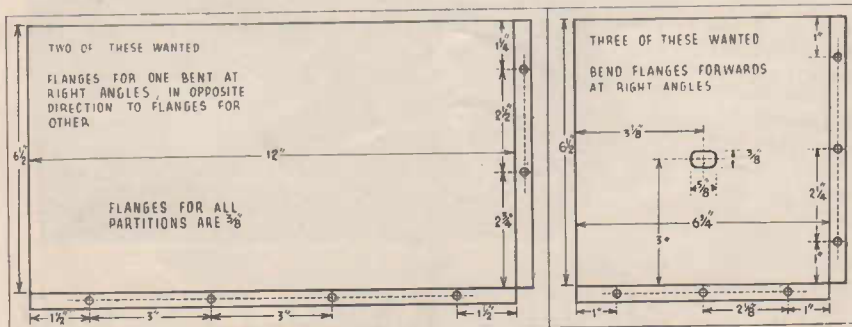


The shield that isolates the b.f.o. valve from the second detector is mounted next, followed by the second front-to-rear shield, and the small partition enclosing the rear end. The flanges for the two long shields face outwards, and for the two small ones, towards the front of the chassis.

The front panel is next mounted so that its lower edge and the bottom edge of the chassis are level. Lastly, mount three small shields between the band-setters underneath the chassis, together with the three-sided b.f.o. shield partition. When this has been completed, all shields can be removed and a start made on the assembly.

First mount the valve, speaker and

The top sketch shows the under-chassis b.f.o. shield, while dimensions of the two end partitions for the coil shields are given in the sketch below (left). The third partition (lower right) is located behind the first i.f. transformer.



Dimensions for the two long front-to-rear partitions are given above (left), together with those for the three coil shields (right).

## COIL WINDING TABLE

AERIAL.			R.F.			OSCILLATOR.	
Band	L1	L2	L3	L4	L4 Cathode Tap	L5	Tap
I	9 (a)	33 (b)	25 (a)	33 (b)	1½ (e)	36 (b)	10 (e)
II	5½ (a)	15¼ (c)	11 (a)	15 (c)	1 (e)	15½ (c)	4¼ (e)
III	2½ (a)	5¾ (d)	4½ (a)	5½ (d)	¾ (e)	6 (d)	2½ (e)
IV	1¾ (a)	2⅞ (d)	1¾ (a)	2⅞ (d)	⅝ (e)	3⅞ (d)	1½ (e)

(a) 30g. SWG. DSC. wire interwound in secondary starting from the bottom. (b) 28g. SWG. Enamelled wire wound 32 T.P.I. (c) 20g. SWG. Tinned Copper wire wound 20 T.P.I. (d) 20g. SWG. Tinned Copper wire wound 6 T.P.I. (e) Tap on secondary counted from bottom. All coils wound on 1¼ inch diameter ribbed formers.

## Testing The Completed Receiver.

After the wiring is completed, it should be thoroughly checked over. Next, the valves and coils can be plugged in and the set switched on. The three band-setters are adjusted until resonance is obtained, indicated by an increase in the noise level, and then the main tuning dial is brought into operation. The i.f. gain control can be fully advanced, but the mixer regeneration control should be kept

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Band	Freq. Range	Amateur B.S. Deg.
I	2.35—5.3 M.C.	280
II	5.15—12.1 M.C.	108
III	10.9—26 M.C.	90
IV	14.2—33 M.C.	84

turned well back until required—when extra gain and selectivity are needed to "lift" a station out of severe QRM.

As this receiver is intended only for experienced builders, a detailed wiring plan will not be given. However, readers requiring further information on any points connected with the assembly are invited to write in, enclosing a stamped, addressed envelope.

# CALSTAN

(CALibrated to STANDARD)

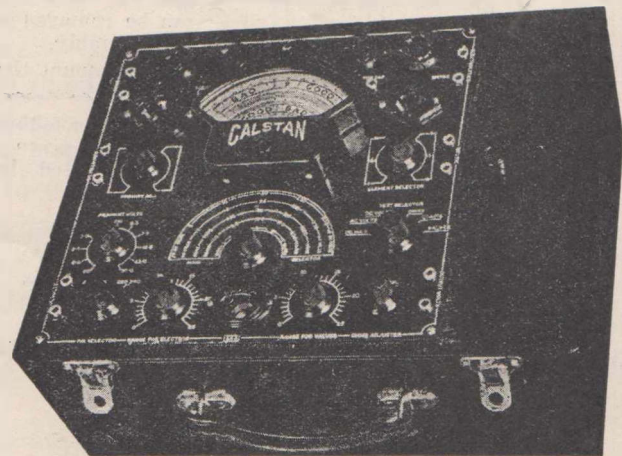
## TEST EQUIPMENT

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 Multitester 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 a "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.

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# Assembling And Wiring The . . .

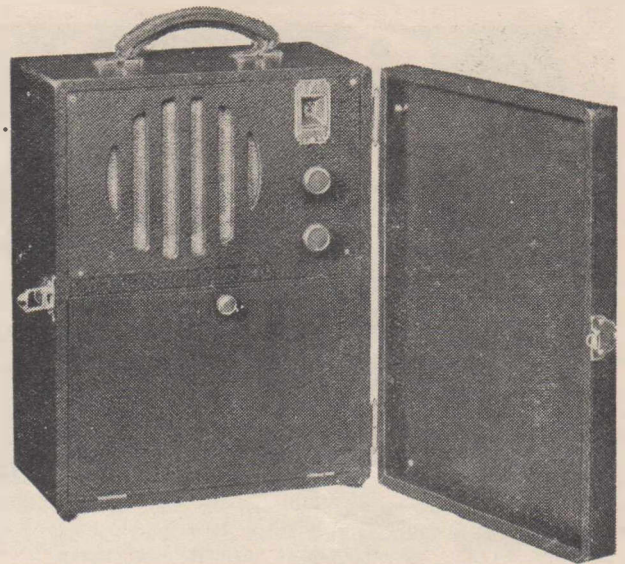
## 1938 Outdoor Portable Four

**L**AST month a review was given of the main design features of the "1938 Outdoor Portable Four," together with an explanation of the operation of the special reflex circuit used. This month further details of this receiver will be given, together with an outline of its assembly and alignment.

### Battery Requirements.

Two Ever-Ready type WP60 60-volt light duty "B" batteries are required, together with a Clyde type 2VS7 2-volt 40-amp. hour accumulator.

The total "B" drain of the set when the batteries are new is approximately eight mills. This drops by several mills. as the voltage drops to 95, but when the economy switch is put over the "B" drain is increased to its original level. As

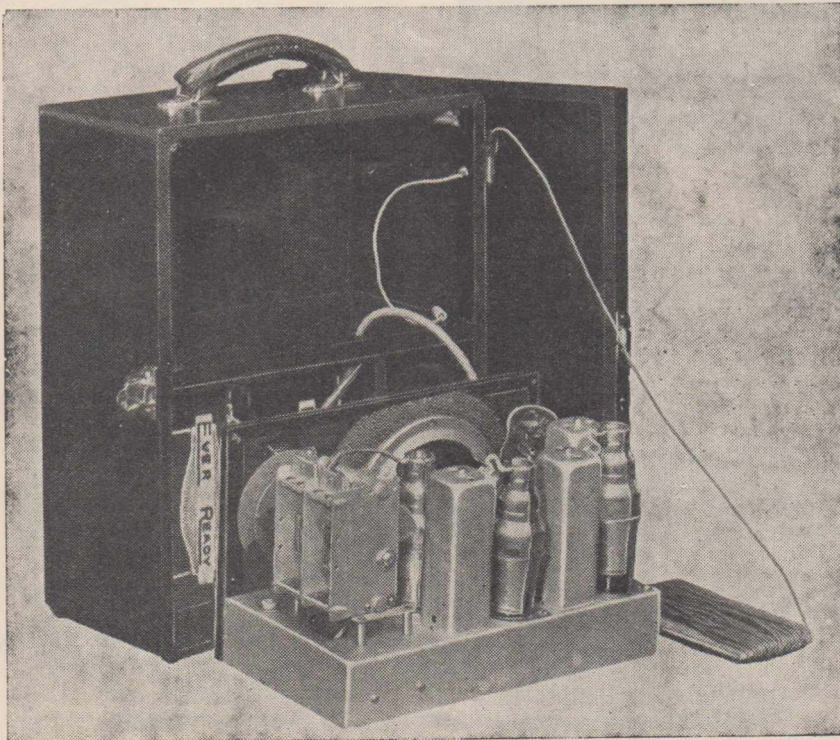


mentioned previously, increasing the screen voltage on the first two valves in this way restores the performance almost to that obtained when the batteries were new.

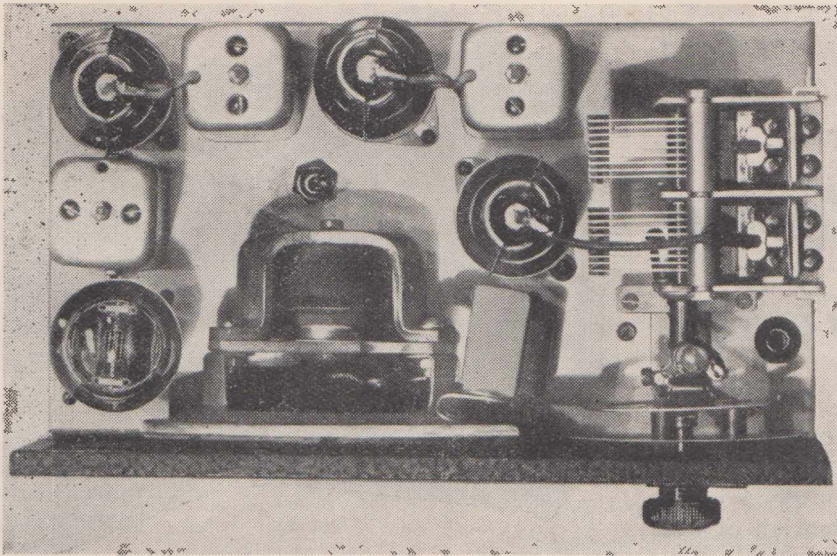
The total "A" drain, including a 60 mill. pilot lamp, is .6 ampere, and so, using a 40 ampere hour accumulator, nearly 70 hours of operation can be obtained from a single charge.

There are only four battery leads, two each for "A" and "B." These are taken down through holes in the shelf to their respective battery compartments.

The set is housed in a leatherette-covered carrying case measuring  $14\frac{1}{2}$ " high x  $11\frac{1}{4}$ " wide x  $7\frac{1}{2}$ " deep, specially built for the purpose by the Western Manufacturing Co., of Sydney. A horizontal shelf is provided upon which the chassis rests, with a vertical partition in the lower compartment to separate the "A" and "B" batteries. In this year's cabinet, the hinges of the battery compartment flap have been shifted to one side, which makes it easier to change batteries when needed.



The view above shows the completed receiver ready for operation, while that on the left shows the chassis removed from the cabinet. The lid has been lifted from its hinges to illustrate how the spare aerial carried in the battery compartment is plugged into the socket portion of the top hinge. The four-wire battery cable shown can conveniently be replaced by two pairs of twisted leads running down through two holes in the horizontal shelf to the "A" and "B" battery compartments below.



A plan view of the chassis showing the compact layout adopted. The socket in front of the condenser gang is for the aerial connection, while the economy switch can be seen at the rear of the speaker. Below is shown the receiver with the lid closed. It is housed in a carrying case measuring  $14\frac{1}{2}$ " high x  $11\frac{1}{4}$ " wide x  $7\frac{1}{2}$ " deep, and complete with batteries weighs 25lbs.

The aerial used for local work consists of a sheet of copper gauze mounted in the lid, connection from the gauze to the set being made via the top metal hinge as shown in the photograph of the dismantled receiver. The top wood screw in each section of this hinge is replaced by a  $\frac{5}{8}$ " bolt, a short length of flex being connected from the gauze to one bolt, and a further length of flex from the other bolt inside the cabinet terminates in a banana plug. This fits into the aerial socket mounted in front of the condenser gang, as shown in the plan view of the completed set.

#### Connecting An External Aerial.

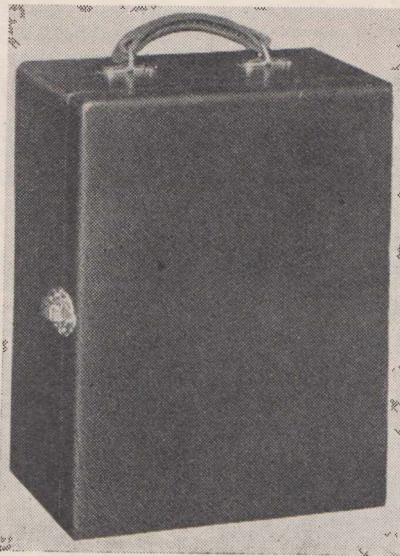
The hinges for the lid are arranged so that the latter can be lifted off at will. In the accumulator compartment is carried an extra aerial, consisting of about eight yards of rubber-covered flex, wound round a piece of three-ply  $2\frac{3}{4}$ " wide by 6" long. A hole is bored in the centre of this, one end of the aerial passed through, and a knot tied. A banana plug is mounted on the other end of the aerial. In locations where interstate reception is required, the lid is slipped off and the aerial carried in the case plugged into the top hinge socket.

#### Chassis Of Frosted Aluminium.

The receiver chassis is of 16-gauge frosted aluminium, and measures  $10\frac{1}{4}$ " x  $5\frac{1}{2}$ " x  $1\frac{3}{4}$ ". The assembly of the components is clearly shown in the above and under-chassis photographs accompanying this article.

The aerial and oscillator coils are mounted horizontally on the rear wall

This under-chassis view illustrates the method of mounting the aerial and oscillator coils, and also shows the general under-chassis assembly and wiring.



of the chassis underneath the condenser gang. To the left of the latter (above the chassis) is the 1C7G mixer oscillator. Behind this is the first i.f. transformer, next to it the 1D5G i.f. amplifier, then the second i.f. transformer, and the 1K7G diode detector, a.v.c. voltage generator, and reflexed i.f. and a.f. amplifier. Immediately in front of this valve is the third i.f. transformer, and in front of this again the output pentode. The economy switch is mounted behind the speaker, which is a Rola 5-6 PM.

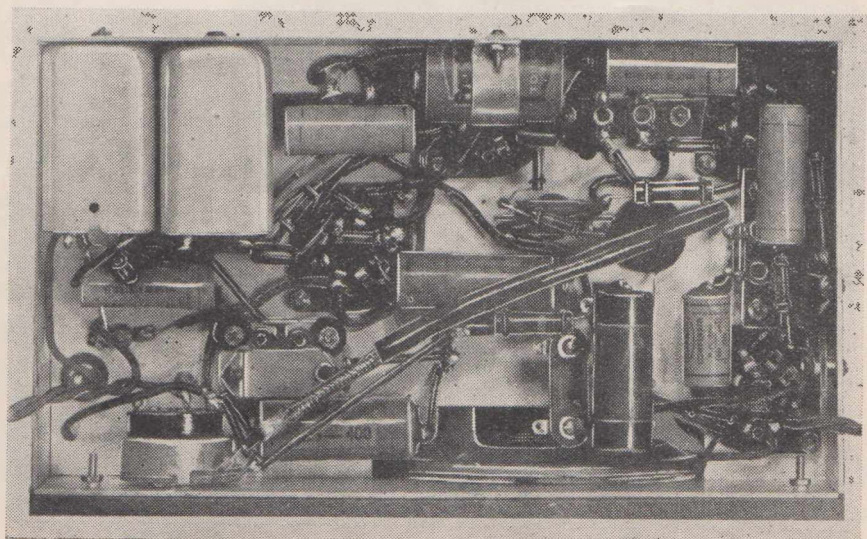
For so small a speaker this has very high sensitivity, and gives really good tone.

#### Parts Should Be As Specified.

The parts used should all be exactly as specified; otherwise some difficulty may be encountered in fitting them in place. Dimensions for preparing the chassis are given elsewhere, and should be followed exactly.

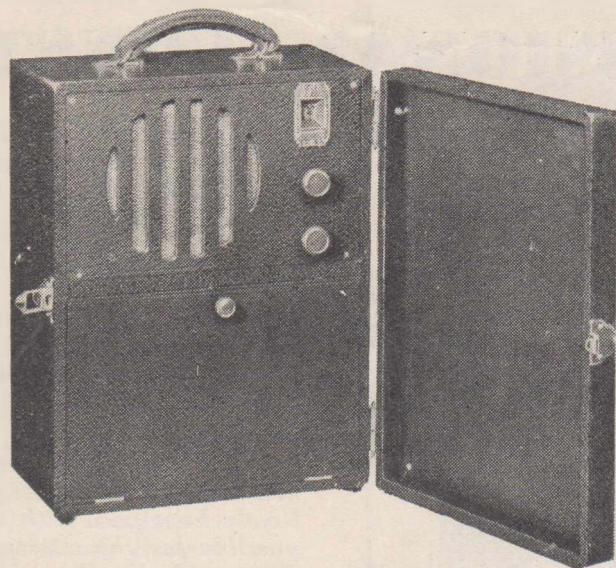
The coil kit chosen for the original model of the "1938 Outdoor" is a kit specially made for the receiver by Precision Radio, of Sydney. The kit comprises one type A1B aerial coil and one type O1B oscillator coil, both mounted in small square cans, three type 465LW litz-wound 465 k.c. i.f. transformers, and one type P7 padder. The kit is supplied complete with colour code chart.

Colour coding of the aerial coil is





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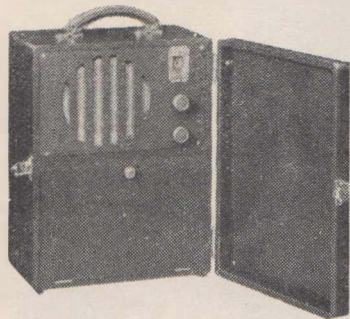
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★  
The Clyde type 2VS7 two-volt "A" battery chosen for the "Outdoor Portable" has a capacity of 40 ampere hours. The total "A" drain of the receiver, including the pilot light, is .6 ampere, which means that nearly 70 hours of service can be obtained from a single charge. It is an excellent plan to buy two of these batteries, so that a fully-charged one is always available when required.



★  
as follows: black, aerial; red, earth; green, grid; yellow, a.v.c. return. Oscillator coil: black, oscillator plate; red, oscillator "B+"; green, grid; yellow, padder. I.F. colour code: black, plate; red, "B+"; green, grid or diode; yellow, a.v.c. return.

In building the receiver, the four valve sockets should be mounted first of all, followed by the aerial socket. In the case of the four sockets a small solder tag should be slipped under the nut belonging to each mounting bolt. These are used later on as required for earthing the "A-" side of the filaments, and for other earth returns.

The filament wiring can now be put in in the underchassis wiring diagram, all the valve socket terminals marked "X" are joined together, a lead finally being taken from "X" on the 1C7G socket to one side of the on/off switch on the volume control. Next, the mounting bolts on top of the aerial and oscillator coil cans are removed. The coils are then placed in position underneath the chassis, and are locked there by replacing the bolts.

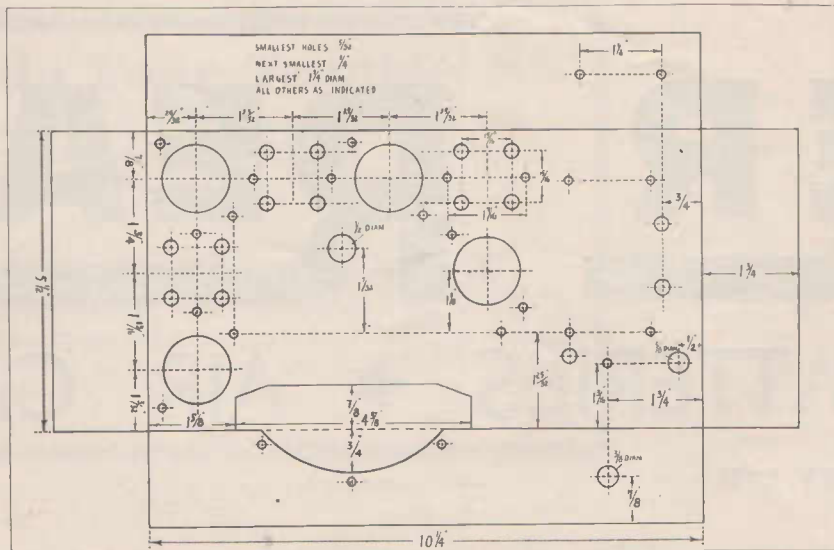
The three i.f. transformers can then be mounted, together with the condenser gang and padder. Before

mounting the gang, solder a six-inch length of push-back to the lug underneath each section. These leads pass through the chassis, and are soldered to the green lugs on the aerial and oscillator coils. Finally, the various small terminal strips indicated on the wiring diagram can be put in; these are mounted clear of the chassis by means of half-inch brass spacers.

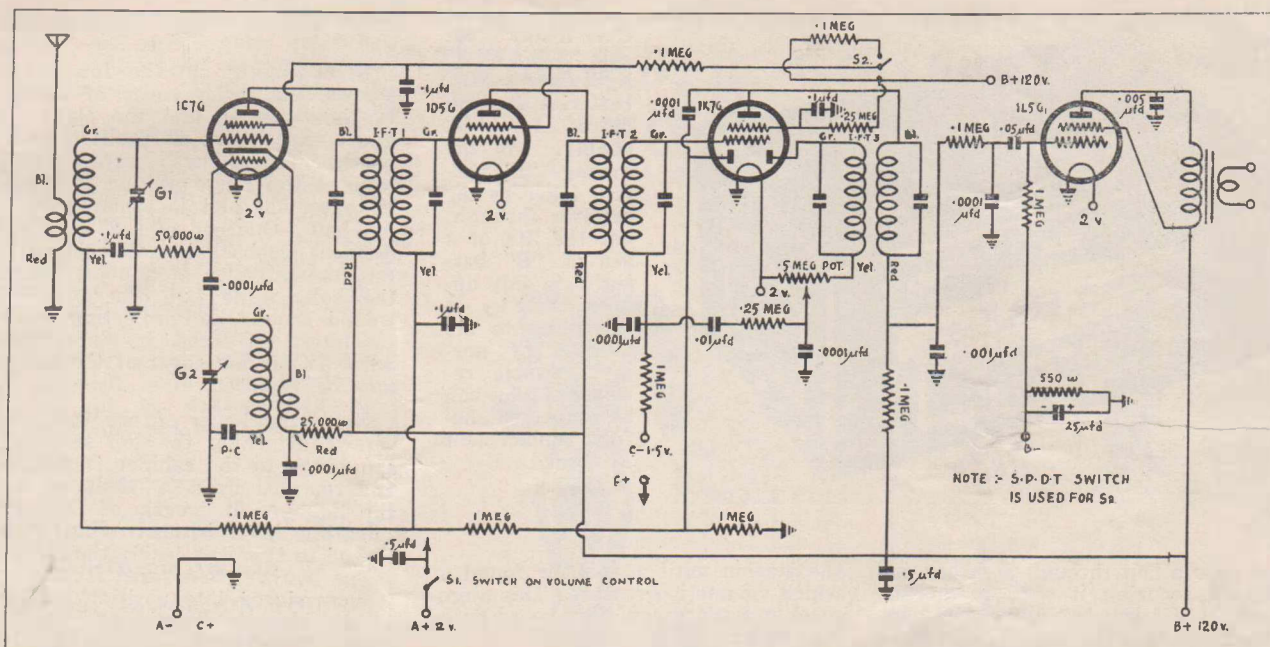
### Putting In The Wiring.

Now, commencing at the aerial socket, wire the aerial coil, oscillator coil, 1C7G, first i.f. transformer, 1D5G, second i.f. transformer, and so on. At this stage the 1½-volt bias cell can be mounted on the rear wall of the chassis by strapping it in place with a strip of aluminium, and also the single-pole/double-throw economy switch can be mounted.

In a set of this type it is particularly important that the assembly and wiring be completed slowly and carefully. All leads, particularly grid and plate leads, should be as short, direct and as well-spaced as possible, while all by-pass condensers should be mounted as close as possible to the points they are intended to by-pass. In addition, all earth returns



Dimensions for stamping and drilling the 16-gauge frosted aluminium chassis, measuring 10 1/4" x 5 1/2" x 1 3/4", are given in this sketch.



The circuit (above) and complete underchassis wiring (below) of the "1938 Outdoor Portable Four."

should be positive as regards contact.

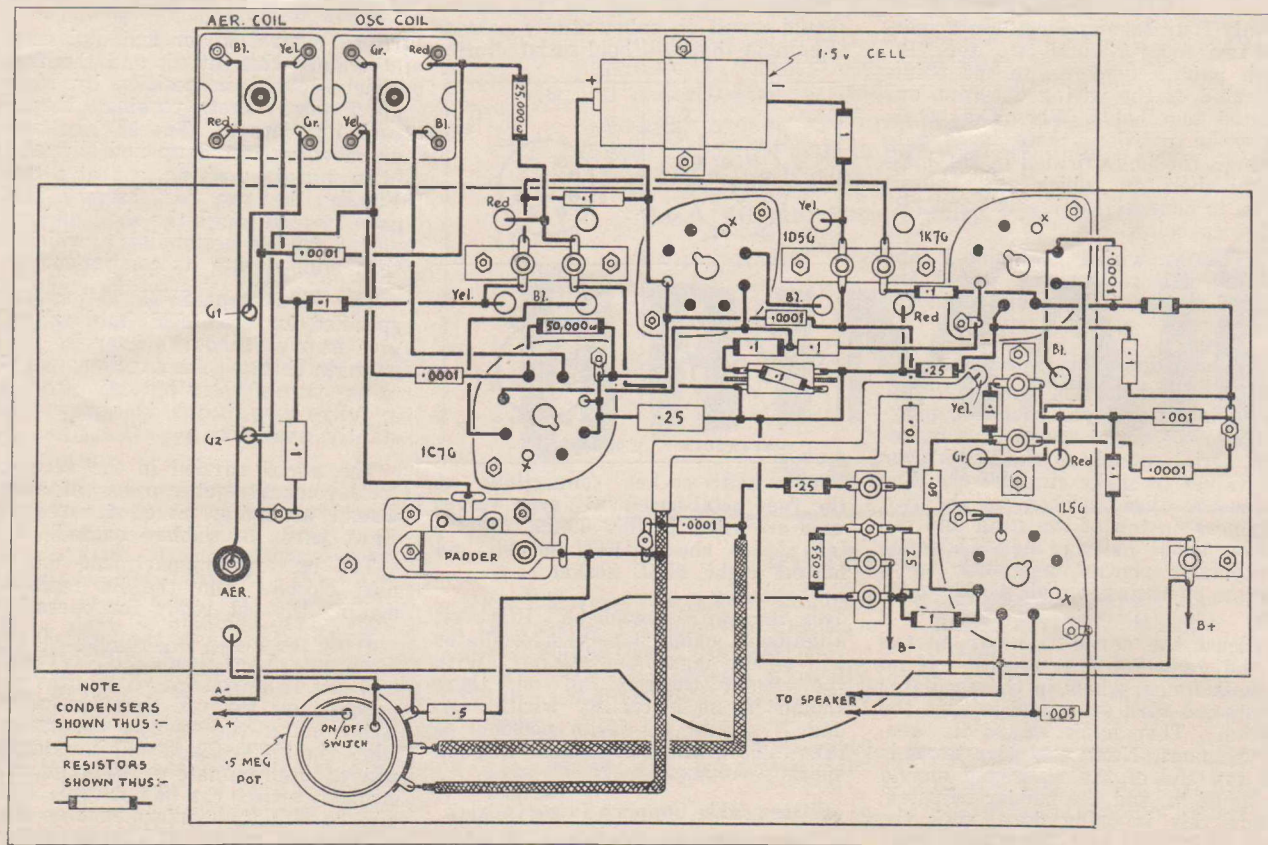
### Shielded Volume Control Leads.

The only shielding required is that on the two leads from the volume control (these are indicated in the wiring diagram). These leads should

be shielded along their entire length, and the shielding earthed at several points along its route. It will be noticed in the sketch that the longer shielded lead is also covered for a portion of its length by wide diameter spaghetti. This is to obviate the danger of possible short circuits.

### Mounting The Tuning Dial.

When the wiring has been completed, the three grid clips can be fitted and the tuning dial mounted. To do this, bend the bottom portion of the mounting bar back at right angles so that it lies flat on the chassis,





and pass a bolt through both bar and chassis, securing it with a nut and washer. Of the two dial light lugs, one is earthed to the dial frame, while a length of push-back is run from the other through the chassis to the terminal of the volume control connected to "A+".

The speaker can now be bolted to the front of the chassis, and the leads from it connected to the plate and screen lugs on the 1L5G socket.

#### Four Battery Leads.

Only four battery leads are required—two for "A" and two for "B." Each pair is soldered to the points indicated on the wiring diagram, and twisted together. When the set is placed in position, these leads pass through the holes drilled in the horizontal shelf on which the chassis rests, to connect to the "A" and "B" batteries below.

With the wiring completed and checked, the set can be tested and aligned before it is mounted in the cabinet.

#### The Alignment Procedure.

With the batteries connected up, and using a few yards of flex plugged into the aerial socket as a make-shift aerial, switch on and check over the valves to make sure all the filaments are alight. Then set the two trimmers on top of the gang and the padder about halfway out. Advance the volume control, and tune in a station operating on about 220 metres.

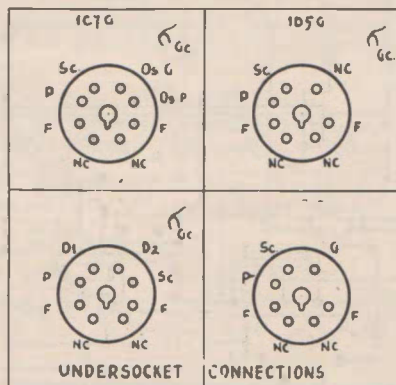
Adjust the aerial trimmer on top of the gang for best results. If no peak is found, screw in the oscillator trimmer a turn or so and re-tune the station. Then again adjust the aerial trimmer. Next, a station towards the top end of the waveband should be tuned in, and the padder adjusted. While this is being done, rock the dial backwards and forwards across

Two of these Ever-Ready 60-volt type WP60 light-duty "B" batteries are required for "B" supply. As the average "B" current taken by the receiver throughout the life of a set of "B" batteries is only approximately 6 mills., up to six months of normal portable receiver service can be expected before replacement is needed.

the station until a point is found at which volume is greatest. This alignment procedure can then be repeated once again.

Finally, the trimmers on the three i.f. transformers can be given a slight adjustment to ensure peak results, commencing with the third transformer and working towards the first. These trimmers should only be shifted a fraction of a turn, and also the original positions should be marked so that the trimmers can be returned to them if desired.

If carefully carried out, the above should result in substantially correct alignment that will hold satisfactorily



The under-socket connections of the four octal-based "G" type valves used are given in this sketch. Bottom left sketch shows 1K7G socket, and bottom right, 1L5G socket.

over the entire waveband. However, alignment using a service oscillator will ensure maximum results. With the volume control full on, there should be no instability whatsoever, and it should be easily possible to tune in several dozen stations at good speaker volume.

#### Fitting The Copper Gauze Aerial.

The set can now be laid aside while

the copper gauze aerial is mounted in the lid.

After taking out the four corner screws, the inside cover of the latter is removed, and the sheet of gauze placed flat in position underneath. The top wood screw attaching the top hinge section to the lid is taken out and is replaced by a  $\frac{5}{8}$ " bolt. One end of a 2" length of flexible pushback is now soldered to the copper gauze at a point nearest the bolt, while the other end is wound around the projecting end of the latter and locked in place with a nut. The inside cover of the lid can now be replaced.

Next, the lower of the two wood screws attaching the top section of the hinge to the cabinet is removed and replaced by a  $\frac{5}{8}$ " bolt, as with the lid. A 6" length of flex, terminating in a banana plug, is attached to this bolt inside the cabinet.

The leatherette-covered front panel is now placed into position in front of the receiver chassis, and the two bolted together by means of two  $\frac{5}{8}$ " bolts and nuts, located one in each bottom corner.

#### Mounting The Set In The Cabinet.

Next, the two pairs of battery leads are passed through the hole in the horizontal shelf provided for them and the set slipped into the cabinet. The aerial is plugged into its socket while this is being done.

The control knobs and dial escutcheon are then fitted, and the front panel secured in position by means of a wood screw passing through each top corner. The "B" batteries are now connected up and slipped in in an upright position, one at a time. Finally the two "A" battery leads are passed through the shelf and connected to the accumulator, which is then slipped into its compartment.

The Clyde type 2VS7 "A" battery specified for the "1938 Outdoor" will give nearly 70 hours of service from a single charge. An excellent plan is to use two of these batteries, so that a fully-charged one is always instantly available.

The aerial carried in the accumulator compartment consists of about wound around a piece of three-ply. eight yards of rubber-covered flex

The battery compartment flap is next closed and the lid replaced, making the set ready for operation.

With normal use, the two 60-volt light duty Ever-Ready "B" batteries will last from four to six months, depending on the use they are given. After about two months' operation, when the "B" voltage will have dropped to approximately 100 volts, the economy switch can be put over. This will restore the performance so that it becomes more or less equivalent

to that obtained when the batteries were new, and also enables the last ounce of power to be obtained from the "B" units.

#### An Outstanding Performer.

For sheer "pulling power" on DX work, combined with excellent volume and tone, the "1938 Outdoor" is in a class of its own. Correctly built and aligned, it will easily outperform any other standard four-valve battery superhet taking the same "B" drain.

(Note: The aerial and oscillator coils supplied with the Precision Radio kit can be distinguished by their black and red base centres respectively.)

### CFGP Is British Empire's Most Northern Station

Contributed By GORDON YOUNG,  
(AW250DX). Queensland.

In Canada, to the north of the State of Alberta, "lies an Empire within an Empire." The great Peace River Country is recognised as being one of the richest areas in agriculture lumber and minerals, spreading over 93,000 square miles with a population of over 80,000 souls.

Nature has isolated this territory from what is colloquially known as "the outside." From Grande Prairie to Edmonton by road is 400 miles, and although a telephone system is in operation in the Peace River Country itself, there is no telephonic communication beyond its own borders.

Radio reception from "the outside" was very poor, so the people set about and established a radio station of their own, with every modern facility.

CFGP is the most northern commercial broadcasting station in the British Empire, transmitting on a frequency of 1200 k.c. with a power of 100 watts. The studios and offices are located in the Donald Hotel, Grande Prairie, with Mr. C. L. Berry as manager and Mr. George Sinclair, VE4UY, as engineer.

No daily newspapers are available in the Peace River, no billboards, in fact, no daily medium of advertising except CFGP. Using an eight-valve Marconi receiver with a two-wave rhombic beam aimed at New York, U.S.A., news is obtained, and four daily newscasts are then sent out by CFGP to its listening audience, estimated to have 10,000 radios.

Transmitter consists of a 59 crystal oscillator followed by a R.C.A. 804 pentode suppressor modulated by a 59 audio. R.C.A. 805's class B with 100 watts output. The antenna is a ¼-wave lattice type guyed mast with an elaborate ground system.

## REMEMBER, GIRLS . HE'S HERE TO FIX THE RADIO



Some radio service men get themselves into some awkward predicaments. But there's one way to avoid valve trouble, and that's change to Brimar. By using a really dependable replacement you gain prestige as a radio man who really knows his valves.

Brimar stocks are immediately available in every possible type in any quantity—no waiting—no substituting.

Make "Brimar throughout" your motto.

# BRIMAR

## VALVES

### DISTRIBUTORS:

NEW SOUTH WALES: Standard  
Telephones & Cables Pty. Ltd., 258-  
274 Botany Road, Alexandria.

QUEENSLAND: Trackson Bros. Pty.  
Ltd., 157-9 Elizabeth Street, Bris-  
bane.

VICTORIA: Noyes Bros. (Melbourne)  
Ltd., 597-603 Lonsdale Street, Mel-  
bourne.

SOUTH AUSTRALIA: D. Harris &  
Co., 140 Rundle Street, Adelaide.

WESTERN AUSTRALIA: M. J.  
Bateman Ltd., Milligan Street,  
Perth.

TASMANIA: W. & G. Genders Pty.  
Ltd., 69 Liverpool Street, Hobart.

NEW ZEALAND: Standard Tele-  
phones and Cables Pty. Ltd., Tro-  
jan House, Manners Street, Wel-  
lington.

# The "Ultra-Shorts" In Review . . . (3)

In this concluding instalment the author continues his review of VK's now experimenting on the "ultra shorts," and appeals to amateurs generally to arrange more organised tests.

By **DON B. KNOCK**

Radio Editor, "The Bulletin."

ONE of the keenest experimenters on five metres in Sydney is W. McGowan (2MQ), who is now just completing a new crystal-controlled five-metre transmitter. 2MQ also has plans for a new five-metre receiver using the recently-released type 1851 television pentodes.

A newcomer to the u.h.f. band is Ross Treharne (VK2IQ), with a splendid transmission from a crystal-controlled 100-watt transmitter, using 800's in the final. For a receiver he has a converter using a 6J7 r.f. stage and a 6K8 mixer, operated in conjunction with his amateur band superhet. A Bruce beam array will shortly be in use at this station.

One new amateur in the Sydney area is worthy of commendation for his interest in breaking into amateur radio by making a start on five metres before the other bands. This is VK2AJH, of Epping, who now has an excellent 'phone signal, and who will be changing to crystal control with 804's in his final very shortly. In the past four years, many other Sydney amateurs have taken part in 5-metre activity, but those referred to are the consistent workers with modern equipment.

In the other States, Victoria has many keen men, but at present South Australia shows most activity, following no doubt on the success of VK5ZU. Stations active there are VK5ZU, VK5HM, VK5CR, VK5OJ and others.

Since I recently visited Brisbane, a burst of activity is reported from the Northern City, and VK4MM, VK4WT, VK4HR, VK4AW, VK4JL and VK4JP are known to be on the job. VK4WT has crystal control and startled the local gang with his powerful signal from an 807 final and a vertical W8JK aerial. VK4JP is expected to be a shining light, having just returned from two years in U.S.A., where he took part in much five-metre communication.

In New Zealand, ZL4DQ, ZL2UD, ZL1IR and others are known to be on the job with modern gear. ZL2UD and ZL1IR have recently been logged

350 miles distant. In the country of N.S.W. there are VK2DN, VK2PN, VK2GU and others who can be counted upon, and recently I have received details of much activity among the VK6's in Western Australia.

With the advent of summer, it is expected this year that there will be some really tangible and satisfying results following on the May and June work in America.

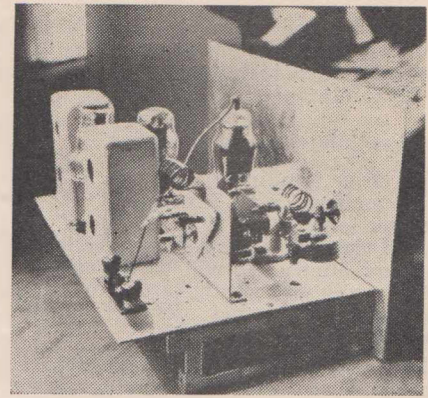
## DX Reports.

Although the matter of DX on five metres is an interesting one, the fact should not be lost sight of that the band is primarily a very useful local communication channel. For that reason alone it is well worth population, and the trend of events internationally is such that we may need to make full use of it before many years have passed.

There have been many instances of DX recorded on five metres, and the history of such reports goes back to 1926. DX on five metres is really nothing new, but with advanced apparatus the possibility of turning it to good account is totally different. In Australia, the outstanding long distance reports include the reception of telephony in Nth. Wales, Britain, by Mr. Cecil Mellanby, from my own station over a year ago. This report came as a great surprise, to no one more so than to me. The radio world everywhere was incredulous to the extent of putting it down as a case of "imaginitis."

In England I know that everything was done to attempt to discredit Mellanby, for the reason, I venture to say, that he is a short-wave listener and not a transmitting amateur. However, Mellanby could be no guesser to the extent of guessing what a man would be doing 11,000 miles distant on five metres.

Examination of my log showed the transmission time exactly as reported, during a local QSO with VK2HL. Mellanby again reported reception a second time, and also the reception of a



The new 56 m.c. "Super-Gainer" built by Don. B. Knock (VK2NO) is a three-valve superhet with a remarkable performance. It uses a 6J8G as mixer-oscillator, 6D6 i.f. and 6A6 as second detector, combined b.f.o. and audio stage. Special 1600 k.c. i.f. transformers were supplied by Tasma Radio, these giving an unusually high gain for the frequency. The receiver shown is now being used by Ross Weeden (VK2PN), of Tumut, N.S.W.

harmonic from VK2UC, of Lismore. Then later he reported hearing something of VK2HL. Needless to say, five-metre reception over the distance staggered the imagination so much so that some amateur officials in England sent members along to interview Mellanby in his receiving location.

Evidently he gave them no loophole to discredit his reception, for it was reported that he would say little beyond show his verifications from not only VK2NO, but the several Americans he had also heard on the band. They did come away impressed, however, with his location, which is high up in the hills at Pwllheli in North Wales. Mellanby's receiver is a three-valve t.r.f. type with two-volt valves.

Time progressed, and then the U.S. Bureau of Standards went to the trouble to check up on ionosphere conditions at the time, and stated definitely that such reception would have been possible over the path between Australia and Britain. Thus is a lesson learned, not to assume that signals will not unexpectedly cover great distances at 56 m.c. Remember that the same was said by commercial radio engineers in 1928 of 10 metres. Anything below 12 metres was useless. And to-day those commercial people have snagged a lump of 10 metres, and done the same to five metres!

Nothing more has been heard from England about the unreliability of the Mellanby report, and one magazine has published a definite acceptance of the facts.



On June 27, 1937, a five-metre test day was in progress, organised by the N.S.W. Division of the W.I.A. Each Sydney station transmitted at pre-arranged periods. VK2DN, of Deniliquin, suddenly heard the i.c.w. transmission from VK2NO, a matter of 360 miles across country.

**More Organised Tests Wanted.**

More organised tests of this kind with a number of stations participating are badly needed, and such tests are run off every Sunday by VK2NO and VK2EM. VK2WJ has now come into these tests, which are run from 11 a.m. to noon Sydney time for New Zealand and BERS195, and 3 30 p.m. to 4 p.m. for VK2DN, VK2PN, VK5ZU and the Brisbane men. After 4 p.m. a check is made on 40 metres to note results, if any. These tests will run throughout the summer until around April next.

The reception of VK5ZU in New Zealand has been referred to previously. At the time, ZL4DQ was using a superbet with limited frequency coverage, but by this time is using an acorn t.r.f. receiver.

In 1937 communication was, as most VK's know, effected between VK2ZC of Newcastle, and VK2NO. VK2EM was heard, and succeeded in hearing VK2ZC. The interesting part of VK2EM's work was that he was at this time located right on water level and water edge at Darling Point, Sydney. This substantiates Mr. Conklin (W9FM) in the assertion that a station over a salt marsh or water is likely to reach out on five metres. Distance to Newcastle is around 70 miles, and this cannot be considered as visual range. The gear in use at that time, moreover, was the old-fashioned type with super-regen. receivers, so that under the advanced conditions 100 per cent. results could be expected.

There is yet much to be done in the development of apparatus, and in this respect it behoves those who like amateur radio from an experimental aspect as well as from the DX QSO point of view, to come into the picture and give assistance. It takes two stations to make a contact, and there is more than there is in talking locally on 40 or 20 metres, for the interference problem is not so acute. Many stations put in a lot of time with 'phone QSO's on 20 and 40 metres, exchanging technical ideas while awaiting DX. Why not do it on five metres and help to populate the band?

If everything sits back and adopts the attitude that it is not worthwhile, we shall be a long while getting very far, and it seems certain that in future years the ultra-high-frequencies, and five metres in particular, will be vital amateur territory. But if we let the band pass by relatively unused, then somebody with commercial ideas will want to appropriate it as they are determined to appropriate the other bands.

# Coil-Winding Data For Philips EK2G Octode Oscillator Grid Current Values

THE accompanying drawings show coil-winding data for the Octode EK2G (octal base) designed for a 4/5 receiver for dual-wave operation. It must be realised, of course, that these windings are based on a certain experimental receiver, and slight variations may be necessary to compensate for varying factors, such as wiring and stray capacities. The recommended capacity range for the tuning condenser is 9 to 400 mmfd. (Stromberg type "F"—Ed.) and independent trimmers (5-30 mmfd.) are required for circuit alignment.

The operating voltages for the EK2G valve should be adjusted as follows:—

- Plate . . . . . 250 volts
- Screen . . . . . 50 volts
- Oscillator plate . . . . . 200 volts
- Negative grid bias . . . . . 2 volts

It is also suggested that a non-inductive resistance of 50 ohms be inserted between the oscillator grid and the grid coupling condenser (.0001 mfd.). This serves to reduce the ten-

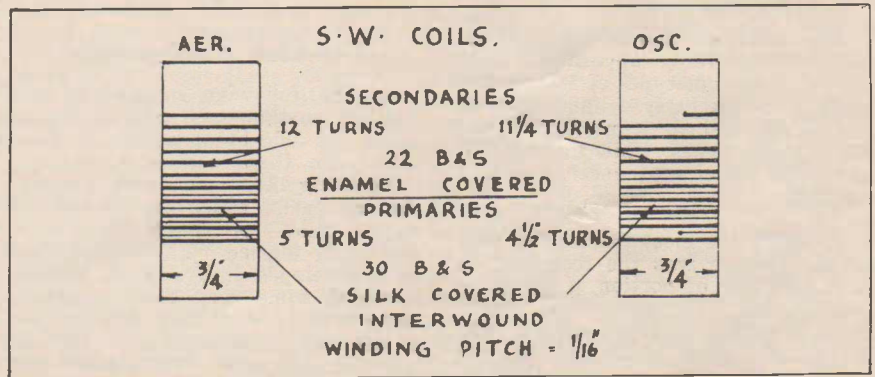
dency towards excessive oscillation at the high frequency end of the tuning range. The grid leak resistance (50,000 ohms) is taken directly from the oscillator grid to ground, and is not connected in series with the 50-ohm resistance.

**Padding Condensers.**

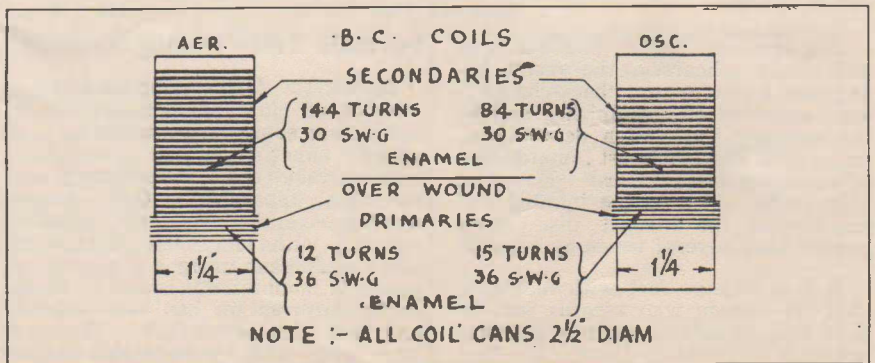
For the broadcast band a padder having a maximum capacity of 0.0004 mfd. was used with the original coils. This padder was made up by connecting a fixed capacity of 0.0003 mfd. in parallel with a trimmer condenser of 0.0001 mfd. maximum capacity. A fixed padder of 0.0045 mfd. is used with the short wave coils.

**Oscillator Grid Current.**

A current of 100-200 microamps. should be realised on the broadcast band with the suggested windings and electrode potentials. Under the same operating conditions on short waves the grid current should fall (Continued on page 46.)



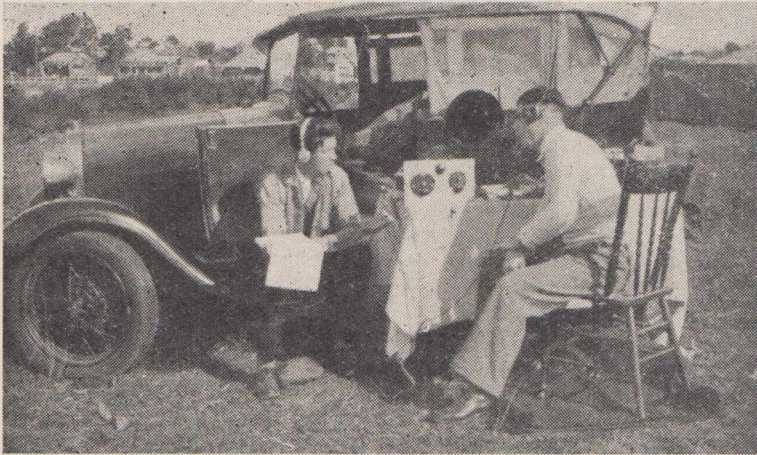
These sketches show EK2G coil data for the broadcast and shortwave bands.



# Unique Home Recording

## Demonstration

### Lakemba Club Meeting Recorded And Played Back ★ Club Auction Sale ★ Portable Tests



A QSO on the outskirts of a country town during field tests.

By W.J.P.

**A**N interesting demonstration of the quality obtainable from home recordings with modest apparatus was given at the Lakemba Clubrooms last month. The lecture was presented in a unique manner, it having been previously recorded, permitting the opening 15 minutes of the discussion to be played through the amplifier.

The lecturers had on display the complete recording apparatus, together with various types of records and discs from the early cylinder type to the latest 15-inch transcription and early talkie types, while an old Edison 1900 model reproducer was also on view.

Probably the most fascinating part of the evening was the recording on a 12-inch disc of portion of the general meeting. The record was played back immediately after cutting, and all present were astounded at the quality and detail recorded thereon, including sound effects, clapping and even noise of passing traffic on the street outside.

The recorded matter had not been previously rehearsed, the result being that a few errors, "back-chatter," etc., appeared on the finished article. At ordinary times such details pass unnoticed, but are most outstanding when taken on a record. However, this really added to the interest and amusement, the finished disc being played back several times by request.

It is a strange fact with recording that the person who records for the first time is seldom entirely satisfied with his own voice, despite the fact

that other listeners claim it to be an exact reproduction.

At the conclusion of the demonstration the lecturers, Messrs. Warren, O'Donnell and Phelps were accorded a hearty vote of thanks for a very entertaining evening.

★

#### The Club Auction Sale.

At the following meeting of the club an auction sale was conducted under the able baton of Mr. V. Bennett. On these occasions members bring along their spare radio apparatus and parts, which are offered for auction sale. Although these were previously termed "junk" sales, they have developed into a much higher standard, some very good apparatus being sold at very keen prices. As an example, a perfectly good 500-500 volt 150 m.a. power transformer was disposed of at 3/-.

★

#### Portable Tests During Summer.

During the forthcoming summer, a number of club members anticipate conducting some very interesting and useful experiments in connection with portable radio transmitting and receiving apparatus. Over recent months several have been experimenting with long and ultra-short wave equipment using a minimum of power in mountainous country. Much useful information has been gained, and it is anticipated that in the very near future radio gear of this nature

will be put to really beneficial use.

Those desirous of obtaining information in connection with the club may do so by calling or writing to the Secretary, 14 Park Avenue, Concord, or the Publicity Manager, 14 Watkin Street, Canterbury.

#### Waverley Radio Club Notes. By 2AHJ.

The club should in the near future make rapid progress, now that the new transmitter and receiver are in operation. Both are working excellently, and as far as design and construction are concerned will take a lot of beating. The 20 and 40-metre bands will be used primarily and the 10-metre band will be used on occasion. Five-metre operation will eventually be attained, and this should be quite unique, insofar as the crystal oscillator used is temperature-controlled and the signal will in all probability be used as a marker signal on that band.

The members recently gave a very interesting demonstration and lecture on "ham" activities before the members of a local social club. Intense interest was displayed by the audience, some of whom did not know previously that "ham" radio existed. The lecture on the subject was very capably handled by Morrie Lusby (2WN) and the working exhibit by Jack Howes (2ABS).

A very interesting "ham" visited the club on October 11 in the person of Mr. Cawood (VS4CS), who has spent the last eight years in North

Borneo. Mr. Cawood gave an interesting discourse on that remote DX land, and is going to become a member of the club. On the same night, Gordon Wells, the president, gave a lecture on the design and construction of the new transmitter, accompanying it with circuits of the coil and crystal switching.

The club welcomes back in its ranks Dud McGowan (2MQ), who recently spent several weeks in hospital. Dud reports being 100 per cent. and fit for lots of DX.

On October 18 Dev. Dunn (2EG) gave an interesting lecture on the composition of music. As a result, members no longer lament the disappearance of their radio licence fee, but instead they more readily appreciate the broadcasts of symphony recitals.

Club meetings are held every Tuesday evening at the rear of 13 MacPherson Street, Waverley, and anyone intending paying us a visit may be sure of finding plenty to interest him.

★

### VK2MZ—The Hurstville Amateur Radio Club

(Affiliated With The W.I.A. (N.S.W. Division).

Classes for the A.O.C.P. examination in January have just commenced, these include morse code practice, theory and regulations.

The modulator of the club's transmitter has been re-built. The line-up is now a 57, 56 into a pair of 89's in parallel. Reports show that it is working very well. Another addition to the Club's equipment is an a.c. audio oscillator, and code practice is given every Thursday night from 8.15 to 9 p.m. b- 2VT.

Members were pleased to meet VK2AKP, who visited the club while on vacation in Sydney. His QRA is Moree, and he is at present working on 40 m.

The club entrance is at the rear of 316 Forest Road, Hurstville, and any information regarding the club's activities can be obtained from the secretary, J. Ackerman, 34 Park Road, Carlton, or from Mr. G. Colvert, 4 Jolley's Arcade, Hurstville.

### Radio Set Sensitivity.

(Continued from page 14.)

a set is prone to bring in more "squeals," interstation racket, and a host of unpleasant incidental noises.

In America there is a tendency to revert to the "good old days" in the matter of sensitivity. One well-known firm has produced a low sensitivity high quality reproduction receiver

which gives perfect reception over a limited distance—an ideal set for the urban listener, but scarcely suitable for existing rural conditions in Australia. All the same, a receiver should be no more sensitive than is required for good reception.

There is another complication introduced by the use of high sensitivity—the ability to separate the numerous stations brought in. It is usual to see these qualities embodied in equal measure in a well-designed chassis.

The apparent lack of selectivity in a highly sensitive set can only be offset by elaborate design, as if selectivity is achieved by "brute force" methods, bad side band cutting with its consequent distortion will result. all unsatisfactory.

### Sensitivity Considerations On The Short Waves.

All the foregoing has reference to the orthodox broadcast wavelengths. What of short waves? The position here is simple. We are struggling to attain sensitivity, especially on the very short waves, while the selectivity problem is confined to avoiding second spot interference.

It is possible to obtain sensitivity on the wave-bands from 25 metres up equal to that of the broadcast band, but from 19 metres down this is considerably more difficult. However, if an overseas short-wave station is laying down a satisfactory signal at the receiving aerial, a sensitivity of about 25-50 microvolts is adequate, and if the short-wave signals are weaker than this the results are usually not worth hearing.

The progress made in the development of more efficient tuning systems and components during the last few years makes the attainment of sensitivity a fairly simple matter, provided correct principles are followed. Measuring instruments have also been improved greatly, and the engineer has almost a cut and dried technique in these matters. One says "almost," because the matter of economics is not to be dismissed lightly. Unfortunately high efficiency in a receiver does not always connote a high sales level.

One looks forward to the extension of the broadcast network to the point where receivers can be designed of low sensitivity, flat tuning and high grade reproduction. The handling of such a receiver would be delightfully easy, while its freedom from noises of various kinds would make it a valuable source of entertainment.

However, it does not seem likely that a set of this kind would find a market in Australia for some time to come.

# Get Better DX and more QSL Cards!

## Signals jump from R4 to R9+!

Here's a quick, easy, inexpensive way to put power in your radio, and pull in far-away stations at loudspeaker strength—yes, stations that many owners of even the most expensive radios are unable to hear.

The "NOISEMASTER" Engineered All-purpose Aerial Outfit dramatically wipes out noise and local static. At the same time it boosts up signals to incredible strength, so that you get smooth, free-from-noise reception of all stations that can be heard in your locality. No matter how bad the man-made interference, no matter how distant the station, the "NOISEMASTER" Outfit will clear out all noise and boost signals anywhere from R4 to R9+!

Here's the secret of its wonderful performance: The "ANTENNEX" Aerial Energiser. The "NOISEMASTER" Aerial Outfit is the ONLY NOISE-REDUCING, SIGNAL-BOOSTING OUTFIT AUTHORISED TO USE "ANTENNEX" . . . the amazing American invention that cuts out noise and peps up sensitivity. You get in the "Noisemaster" Kit, as well, 200 feet of special aerial wire, 12 specially designed transmission blocks, earth clamp, lead-in strip, screws, lightning arrestors, etc. Easy to follow instructions and drawings with each Kit enable you to set up your aerial in a very short time. No testing. No doubt. No delay. Once "Noisemaster" is fitted, your noise-troubles end! Send this special form for your "Noisemaster" Aerial Kit NOW, and get marvellous DX on broadcast and shortwave bands. If you want yours NOW, send this Coupon!

Antennex (A'sia) Agencies,  
Kembala Building,  
48-60 Margaret Street,  
SYDNEY.

Send me right away your "Noisemaster" Kit. I enclose 52/6 in postal notes, money order, cheque. (Add exchange to country and interstate cheques.)

Name.....

Address.....

A.R.W. 5/38.

# What's New In Radio

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

## Vealls Release Radio And Electrical Catalogues.

A new departure has been made this year by Vealls, of Melbourne, with regard to their annual catalogue, in that in place of one volume covering both the radio and electrical fields, two catalogues covering these fields separately have been released.

Radio Catalogue No. 38 comprises 58 pages, and covers what is perhaps the most comprehensive range of radio components, kit-sets and receivers carried by a single firm in Australia. For quick reference, seven pages are devoted to a combined Radio Index and Price List, reference also being made to the pages on which complete details and illustrations can be found. The General Electrical Catalogue (No. 38) is equally comprehensive.

Copies of either or both of these newly-released catalogues can be obtained free of charge from any of Vealls stores, or alternatively by writing to Box 2135T, G.P.O., Melbourne, C1., Victoria. In the latter case a 2d. stamp should be enclosed to defray postage.

★

## In "Radiotronics" No. 91.

Amplifier enthusiasts will be interested in the circuit and data on the new 17-watt amplifier using push-pull 6L6G's, described in the latest issue of "Radiotronics" (Technical Bulletin No. 91), issued by Amalgamated Wireless Valve Co. Pty. Ltd.

The fidelity curve published is a guarantee of excellent performance, as the second harmonic distortion is below 2.5 per cent. over the entire useful audio range, while third harmonic distortion is below 3 per cent. at all frequencies.

Other articles comprise R.C.A. application notes on the improved type 906 cathode ray tube and on the gas triode OA4-G.

New Radiotron valve releases listed comprise type 1613 (6F6, specially selected for operation on 350 volts and about 40 megacycles, and intended for use in transmitting circuits); and type 1614 (6L6, specially selected for operation on 375 volts at approxi-

mately 42 megacycles in radio transmitters).

The 6L6G beam tetrode power amplifier, which until recently was limited to 135 volts maximum, has now been approved with plate voltages up to 200 volts, while the type 906 3in. cathode ray tube is now available with a new construction having a graphite coating inside the envelope, enabling it to be used with lower voltages.

Accompanying "Radiotronics" No. 91 is a further supply of data sheets covering types 6AF6-G, 6F8-G, 6J8-G, 6K8-G, 6Y6-G, and 302.

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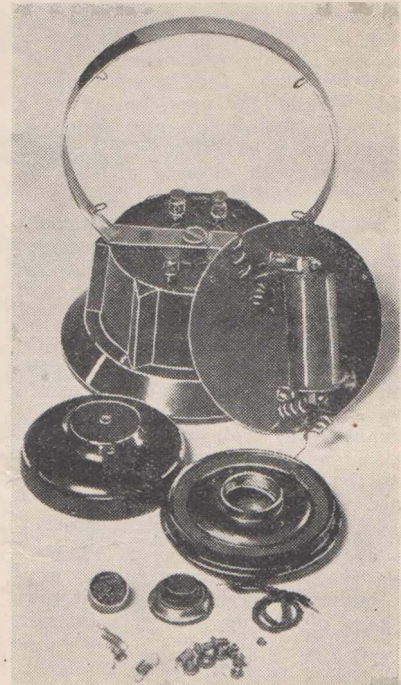
## P.M.G. Type Microphone From Foxtrot.

Of interest to both set-builders and amateur transmitters is the P.M.G. type carbon microphone illustrated below (obtainable from Messrs. Fox & MacGillycuddy Pty. Ltd., 57 York Street, Sydney).

Manufactured by the Automatic Electric Co., of Chicago, U.S.A., the microphone is supplied complete with stand and built-in matching transformer. Of solid construction, it has a sensitivity that compares very favourably with that of the P.M.G. microphone in use throughout this country,



The American-made P.M.G. type microphone described in the accompanying review.



The microphone dismantled, showing the solid construction. The transformer is mounted on the base.

and at 12/6 net it represents particularly good value (postage and packing 1/- extra).

★

## Vidor "Showboat" Portable Radio From Fear & Co.

Of interest to New Zealand set-builders is the new English Vidor "Showboat" superhet portable radio now being handled by Messrs. F. J. W. Fear & Co., of 31 Willis Street, Wellington, N.Z.

A four-valve battery-operated superhet, the receiver employs an octode frequency changer, pentode i.f. amplifier, duo-diode triode second detector, a.v.c. voltage generator, and first audio amplifier, and a power pentode output valve. Other features include permanent magnet moving coil speaker, full-vision illuminated scale and non-spillable jelly-acid type accumulator. Overall dimensions are 11½ x 10¾ x 7 inches, while weight, complete with batteries, is 20lbs.

Complete details are obtainable free on request from Fear & Co. at the address given above.

★

## New N.S.W. Office For Rola Opened In Sydney.

The New South Wales office of Rola Pty. Ltd., Melbourne, which was opened last month, is located on the third floor of Country Traders' House, 116-118 Clarence Street, Sydney (telephone B 5867). In charge is

Mr. G. R. S. Allen, late of George Brown & Co. Pty. Ltd., who has been appointed as resident engineer for the Rola Company in New South Wales.

Full stocks of spare parts are available, and all service work will be carried out at the new headquarters. Stocks of Rola speakers, however, will not be carried, these being available only through the joint distributors, George Brown & Co. Pty. Ltd. and John Martin Pty. Ltd.

To fill the gap created by Mr. Allen's appointment, Mr. Bruce Eaton, formerly of Mullard Pty. Ltd., has joined George Brown & Co. in charge of radio sales and service. Mr. Eaton was associated with Messrs. Fox & MacGillycuddy for ten years as sales manager and secretary, while for the last 2½ years he has been in charge of the valve sales department for Mullard.



**Mr. E. Ashworth Rejoins Clyde.**

The trade will be interested to learn that Mr. E. Ashworth, well-known battery expert, has rejoined the Clyde Engineering Co. Ltd., to control the production of Clyde bat-

teries at their works at Granville, N.S.W.

Mr. Ashworth has been associated with the manufacture of storage bat-



Mr. E. Ashworth.

teries since the inauguration of Australian manufacture by the U.S.L. Company in 1922. He was production manager at the Clyde battery factory from 1924 to 1926, and in 1927 was retained by the Australian General Electric Company as supervisor of their Melbourne and Newcastle factories.

For a period of two and a half years prior to 1931, Mr. Ashworth was works manager, Century Storage Battery Co. Ltd., Sydney, and for the past seven and a half years was works manager at Vesta Battery Co. (Pty.) Ltd., Leichhardt, and recently visited New Zealand for the purpose of setting up battery production at Wellington.

Mr. Ashworth is a qualified draughtsman and engineer, and is a member of the Electro Chemical Society of America.



**Two New Palec Releases.**

Two new test equipment releases by Paton Electrical Pty. Ltd., of Ashfield, Sydney, comprise the Pales Model "CJ" oscillograph, using Radiotron type 902 2-inch cathode

He's your best advertisement, Mr. Dealer . . . that every morning shaver who finds such delight in new and electric shaving . . . Packard Lektro Shaving!

*List Price*  
**£4-19-6**

Inclusive of step-down transformer.

**PACKARD**

*Lektro Shaver*

Write or call now to "The Friendly Wholesale House" for full particulars.

**JOHN MARTIN** PTY LTD **RADIO & ELECTRICAL SUPPLIES**

*"Oh boy, I gotta tell"*



TELEPHONE :  
BW 3109 (2 lines)

TELEGRAMS :  
"JONMAR," SYDNEY

116-118 CLARENCE STREET, SYDNEY.

ray tube, and the Palec Model "RCD" decade box.

The new oscillograph is housed in a black crystalline-lacquered steel case measuring approximately  $8\frac{1}{2}$  x 10 x  $12\frac{1}{2}$  inches. Included in this case are the cathode ray tube, vertical and horizontal amplifiers, saw tooth oscillator and power supply equipment.

The Model "RCD" decade box has a panel measuring  $8\frac{3}{4}$  inches square, overall depth being  $5\frac{1}{2}$  inches. The engraved metal panel carries 10 knobs and two pairs of terminals, providing two complete and independent decade systems. One of these is for resistance, and any value between about 2 ohms and one megohm can be obtained in steps of approximately 2 ohms. The remaining decade system is for capacities, and here a complete range of values from about 20 mmfd. to 1 mfd. is available, the steps in this case being about 2 mmfd. on the lower decades.

This new instrument has a wide variety of applications, and should find ready acceptance among servicemen.

Full details of these two Palec releases are obtainable free on request from the Paton Electrical Pty. Ltd. of 90 Victoria Street, Ashfield, N.S.W.



### New S.T.C. Four-Valve Electric Mantel Model 410.

This latest release from the S.T.C. factory features the new high slope Brimar output pentode—6AG6-G, and presents what all dealers want, a mantel model with the added appeal of low price.

The cabinet has an attractive crocodile leather finish, and is provided with a large, clearly marked and easily read quasi-edge-lit dial and chromium escutcheon.

This new model has metal-dust core

coils, and is air trimmed. The circuit is a 450 k.c. air trimmed superheterodyne using one stage frequency converter, one stage i.f. amplification, diode detector, resistance-

coupled to a Brimar high slope pentode.

S.T.C. claim that the 410 is a four-valve broadcast radio with five-valve performance.

## Radio Book Reviews

### "Admiralty Handbook Of Wireless Telegraphy"—1938 Edition.

One of the most popular textbooks used by students of radio engineering is the "Admiralty Handbook of Wireless Telegraphy," which for years has been regarded as a standard work by radio colleges, universities, etc. The 1931 edition has now been superseded by a new 1938 edition, which is divided into two volumes.

The first volume of over 450 pages covers the field of magnetism and electricity. Chapter headings are as follows:—General Introduction; Electricity and Magnetism; Electromagnetism, Inductance and Capacity; Alternators, Generators and Motors; Alternating Currents; The Transformer, Measuring Instruments, R.F. Effects; The Oscillatory Circuit—Damped Oscillations: Three-phase and Polyphase A.C. Systems.

Volume 2 deals entirely with wireless telegraphy theory. It is divided into 11 sections, each section being separately numbered and cross-indexed for ready reference. Section heads are as follow:—The Spark Transmitter; Thermionic Valves, Reception of Electromagnetic Waves; Amplification—Receiver Design; Power Supplies; Valve Transmitters; Radio-Telephony—Sound Reproduction; Propagation of Electromagnetic Waves; Aerials, Feeders, Directional Arrays; Direction Finding; R.F. Measurement—Wavemeters and Oscillators.

At the end of each section is given a selection of typical examination questions, answers being given to mathematical problems.

Each volume contains, in addition to the matter reviewed above, a variety of tables, appendices, and is provided with a comprehensive index.

"Handbook of Wireless Telegraphy" (volumes 1 and 2), 1938 edition. Our copy from Messrs. Angus & Robertson Ltd., 89 Castlereagh St., Sydney. Price 16/6, postage 2/-.  
★

### "Practical Wireless Service Manual."

Designed to supply the needs of both amateur and professional radio servicemen, "Practical Wireless Service Manual," by F. J. Camm, F.R.S.A., provides an invaluable collection of useful material for all those engaged in the testing and servicing of radio receivers.

Special chapters are devoted to methods of simple testing suitable for amateurs who do not possess elaborate test equipment, while other chapters are designed to appeal to the professional man.

A particularly useful feature of the book is that full constructional details are given of practically all types of test equipment, including an a.c./d.c. multimeter, capacity bridge, vacuum tube voltmeter, audio oscillator, signal generator and valve tester. A particularly useful chapter is devoted to planning a service workshop.

Included among the reference material provided are symbols, abbreviations, wire tables and useful formulae.

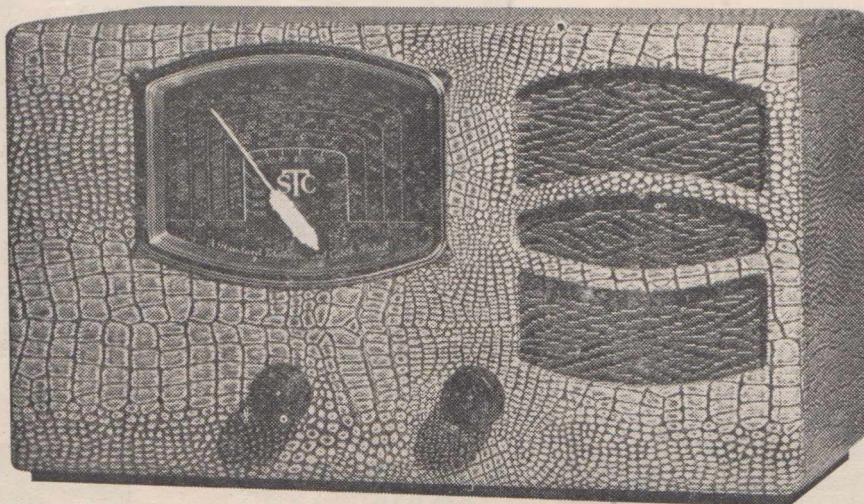
"Practical Wireless Service Manual", by F. J. Camm, F.R.S.A.. 296 pages, 221 illustrations, first published in 1938. Our copy from Messrs. Angus & Robertson Ltd., 89 Castlereagh St., Sydney, price 7/6, postage 6d.  
★

### "A.C. Motors Of Fractional Horse Power."

"A.C. Motors of Practical Horse Power," by H. H. Jones is a newly-released manual on the design, construction and maintenance of a.c. motors of all types.

The working principles of a.c. motors—universal, repulsion, induction, synchronous, and eddy current—are explained in detail, and data given for their construction. The treatment of the subject has been kept simple, and no advance mathematical know-

(Continued on page 46.)



The new S.T.C. Model 410 a.c. four-valve mantel broadcast superhet.

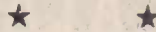
The



# All-Wave All-World

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

# DX News



## DX Notes And News.

### Record For Crystal Set DX?

I noticed in the September issue where a crystal set in Adelaide could get 2FC, 5KA and others. My crystal set here has picked up the following stations:—7LA, 7NT, 5CL, 2FC, 2CO, 5KA, VK5WS, VK5WJ, 3LO and 3AR. The set includes a coil former made from a custard powder carton, .0005 mfd. condenser, crystal detector, .0005 mfd. aerial tuning condenser and 22 D.C.C. wire, built on 3-ply wood base and panel. W. J. Simmons (AW437DX), Port Lincoln, South Australia.

### Latest Loggings On "Twenty."

Lately I have been listening quite a lot on the 20-metre band, which has been very active, and my best loggings have been Peru OA4AI, Venezuela YV1AQ, Cuba CO2WM, CO2RA, Japan J5CC, Northern Ireland GI5ZY, Ecuador HC1JW, Burma XZ6DW, Mexico XE1U, Argentine LU4BC, Canal Zone NY2AE, Norway LA1G, PK6XX, and, of course, heaps of KA's, W's, F3's, G's, K6's, PK's, etc.

My latest verifications are from ZBW and VS6AB Hong Kong, 9MI, HBJ Radionations, PK2DF, W7BVL, K6ILW and G2AK. The last-mentioned came to hand just twelve months all but two days after I sent my report.—M. N. Wicks (AW425DX), Balhannah, S.A.

### American DX Organisation.

The International Listeners' Association (P.O. Box 745, Dryden, Washington, U.S.A.) is an organisation formed to aid members interested in DX to increase the size of their logs, and to assist them in the collection of QSL and SWL cards. Foreign membership fee in Australian currency is 5/3. President Floyd J. Slosson is interested in exchanging QSL's with readers.

### VK-ZL's Logged In Channel Islands.

The following VK2ZL amateurs have been heard here in the Channel Islands recently from September 4 to October 4, on 14 m.c.: VK2's ADE, ADV, AEK, AES, AHG, AIB, AII,

AJF, ANS, CX, DG, EZ, IBK, IG, KZ, LS, NQ, NS, OQ, QZ, RA, SS, TF, TI, TO, VA, VG, WI, YL and YO; VK3's BC, BG, BV, CP, CT, CX, EG, EH, HG, JF, KX, LA, MD, MK, NK, NS, OR, PE, QK, QR, TS, VQ, WA, WL, WX, XP and XU. VK4's BB, DD, GE, JB, JP, KC, PX, SD, UR; VK5's CS, FL, FM, JP, JS, LL, LS, ML, PS, TR and WR; VK6's AF, KO, XI; VK7's AB, LZ, RZ; VK9VG; ZL1's BT, DV, FT, HY, KE, LM, MB; ZL2's BD, CW, FA, GW, LA, NT, QA, SM; ZL3's AJ, AZ, GC, GF, GR, GU, GW, JA; ZL4's AF, AR, BQ, CK, FK, FT, GM, GY; VR4AD and VF6AY.

I am always willing to co-operate with any station by listening for their signals if they will communicate with me direct, giving frequency and times

of operation. In any case, I would be pleased to correspond with any VK-ZL operator. Those requiring to work new countries should listen for G3GS (Channel Islands), 7050, 7190, 14,100, 14,380 k.c., EL2A, ZD2H, ZB2A all on approximately 14,300 k.c.'s, and ZD4AB on approximately 14,320.—M. G. Bourke (G2AOU), "Creditor," Samares, Jersey, Channel Islands, England.

### Illness Prevents Dixer Returning QSL's.

Due to illness, A. W. Wilbur has not been able to return numerous S.W.L. cards that have been received from Australia and New Zealand, but will do so when sufficiently recovered in health.

## 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.]



# Short-wave Review

CONDUCTED BY

**ALAN H. GRAHAM**

## New Foreign S.W. Stations ★ Change To Summer Conditions ★ Overseas News Broadcasts In English . . . . .

### Angola.

CR6AA is using three new frequencies, as follows: 13,000 k.c., 24.3 m.; 9660 k.c., 31.06 m.; and 7177 k.c., 41.75 m. Schedule is 5.45 to 7.30 a.m. every Thursday and Sunday.

### Argentina.

LRA, Buenos Aires, heard recently on 9690 k.c., 30.94 m.

A new station, call unknown, announcing as "Radio Splendid," heard on 17,760 k.c., 16.89 m.

### Belgian Congo.

"Radio Leo" is the slogan of a new low-powered transmitter located at Leopoldville. Operates on 6140 k.c., 48.86 m.; power, 25 watts; schedule, 8.35 to 10 p.m. Sundays and holidays, also irregularly at 1 a.m.

### Bolivia.

CP-1, Sucre, is new on the air on 9892 k.c., 30.33 m. Operates from 2-3 a.m. daily. Announces as "Radio Chuquisaca."

CP-12, Cochabamba, will soon be on 6150 k.c., 48.78 m. Will use 200 watts and will announce as "Radio Tanari."

### British Guiana.

VP3BG, Georgetown, and VP3MR have merged and now use only the former call on 6130 k.c., 48.94 m. Revised schedule is given as midnight-1 a.m. and 5.15-9.30 a.m. daily; Sundays, 8.30 p.m.-2.30 a.m. (Mondays); Mondays, 6-8 a.m.

### Chile.

CB-1185, Santiago, is now relaying CB-138. Frequency 11,850, 25.3 m.

### Colombia.

Yet another new Colombian, another "Voz de Colombia." This is HJ3ABY, 6120 k.c., 49.0, located in Bogota.

### Costa Rica.

Several new stations either on the air or in course of construction.

TIEMC, relaying BCB station

TIEM, on 10,050 k.c., 29.8 m. Announces as "Radio el Mundo." Schedule is 7.20 a.m.-3 p.m. daily. QRA is Apartado 1049, San Jose.

TI2XD, also in San Jose, relays TIXD from 9 a.m.-2 p.m. Announces as "Radio Pilot" on 11,922 k.c., 25.1 m.

TIRA, Cartago, will operate on 6080 and 6090 k.c., 49.34 and 49.26

m., when completed.

### Cuba.

From Senor Ricardo F. Rubio, West Indies representative of the "Radio World," comes the very latest re Cuban S/W stations.

COCO relays CMCK. QRA, San Miguel 86, or P.O. Box 98, Habana. Power, 2½ kws.; 6010 k.c., 49.92 m. Schedule, 10.55-2.30 p.m. daily.

COCQ relays CMQ. QRA, Monte 17 esq. a Prado, Habana. Power, 5 kws., 9740 k.c., 30.76 m. Schedule, 9.55-4 p.m. daily. Slogan, "de la crema dental Colgate y el Jabon embelecedor Palmolive."

COBZ relays CMBZ. QRA, San Rafael 14 altos, or Box 866, Habana. Power 250 watts, 9030 k.c., 33.32 m. Schedule, 10.45-4 p.m. daily. Slogan, "Radio Salas."

COBC relays CMBC. QRA, Box 132, Habana. Power, 1½ kws. 9963 k.c., 30.12 m. Schedule 9.55 p.m.-3.15 a.m., except Sundays; Sundays, 9.55-2 p.m. Slogan, "del Progreso Cubano y los Almacenes de Trajes el Gallo."

COCW relays CMW. QRA, Prado 105 altos, or Box 130, Habana. Power, 2½ kws., 6300 k.c., 47.6 m. Schedule, 9.55-3 p.m. daily except Mondays (till 1 p.m.). Slogan, "La Voz del Philco Radio."

COCM relays CMCM. QRA, Box 33, Habana. Power, 1 kw, 9833 k.c., 30.52 m. Schedule, 11-3 p.m. daily except Mondays (till 2 p.m.). Slogan, "Transradio Columbia."

COBX relays CMBX. QRA, San Miguel 194, Habana. Power 500 watts, 9200 k.c., 32.59 m. Schedule, 11-2.30 p.m. daily. Slogan, "de los talleres de Radio Alvarez."

COCA relays CMCA. QRA, Galiano 102, Habana. Power 100 watts. 9100 k.c., 32.97 m. Schedule, 11-3 p.m. daily.

COCB relays CMCD. QRA, Box 2294, Habana. Power, 250 watts, 6130 k.c., 48.94 m. Schedule, 1 a.m.-2.30 p.m. daily except Mondays (till noon). Slogan, "La Voz del Aire."

COCH relays CMCF. QRA, Box 41 Habana. Power, 5 kw., 9437 k.c., 31.8

### 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.



m. Schedule, 11-3 p.m. daily. Slogan, "de la General Electric."

COCX relays CMX. QRA, Box 32, Habana. Power 2 kw., 11,740 k.c., 25.55 m. Schedule, 11-4 p.m. daily.

COGF relays CMGF. QRA, General Betancourt 51, La Playa, Matanzas. Power, 250 watts, 11,800 k.c., 25.43 m. Schedule, 11-1 p.m. daily except Mondays (noon-1 p.m.). Slogan "Ecos del Valle del Yumuri."

COHB relays CMHB. QRA, Box 85, Sancti Spiritus. Power, 2 kw., 6280 k.c., 47.77 m. Schedule, midnight-1 a.m., 3.30-4.30 a.m., 7-10 a.m. and noon-2 p.m. daily.

COJK relays CMJK. QRA, Finlay 3 altos, Camaguey. Power 1 kw., 8665 k.c., 34.6 m. Schedule, 1.30-3.30 a.m., 10 a.m.-2 p.m. daily. Slogan, "Radio Zenith."

COKG relays CMKG. QRA, Box 137, Santiago de Cuba. Power 2400 watts, 8935 k.c., 33.81 m. Schedule, 11-3 p.m. daily. Slogan, "Emisoras Grau."

**Curacao.**

PJC-1, Willemstad, is on 9590 k.c., 31.28 m.; and PJC-2. same location, on 15,220 k.c., 19.71 m.

**Ecuador.**

HCJB, Quito, has lately been heard testing on a new frequency, namely 12,460 k.c., 24.2 m.

**Finland.**

The new Finnish station at Lahti has a 19 metre frequency 15,190 k.c., 19.75 m.). Its schedule is: Weekdays, 3-5 p.m.; Mondays, 3-4 p.m.

**French Indo-China.**

The new S/W transmitter at Hanoi is operating on 11,900 k.c., 25.21 m. Announces as "Ici Radio Hanoi," signing with "La Marseillaise." Programme is partly native and Chinese, and partly French. Closes at midnight.

**Iraq.**

Baghdad has a new station which is on the air several times a week on an irregular schedule. Frequency is 7110 k.c., 42.2 m. Power is 500 watts.

**Irish Free State.**

Athlone is the location of the new Eire station soon to be on the air. It will transmit on the following frequencies: 6190 k.c., 48.5 m.; 9595 k.c., 31.27 m.; 11,740 k.c., 25.55 m.; 15,120 k.c., 19.83 m.; 17,840 k.c., 16.8 m.

**India.**

The latest available information regarding the new Indian stations is as follows:—

9590 k.c., 31.28 m., VUD-2, Delhi; 11.30 a.m.-1.30 p.m., 4.30-6.30 p.m., 10.30 p.m.  
4995 k.c., 60.06 m., VUD-2, Delhi; 10.30 p.m.-12.30 a.m.

15,160 k.c., 19.79 m., VUD-3, Delhi; 11.30 a.m.-1.30 p.m.; 4.30-6.30 p.m.

9590 k.c., 31.28 m., VUD-3, Delhi; 10.30 p.m.-12.30 a.m.

9550 k.c., 31.41 m., VUB-2, Bombay; 12.30-1.30 p.m., 4.30-6 p.m.

4905 k.c., 61.16 m., VUB-2, Bombay; 10 p.m.-midnight.

4950 k.c., 60.3 m., VUM-2, Madras; 10 p.m.-midnight.

9530 k.c., 31.48 m., VUC-2, Calcutta; 5.06-7.06 p.m.

4880 k.c., 61.44 m., VUC-2, Calcutta; 9.54 p.m.-12.06 a.m.

In addition to the above stations, which are already on the air, VUD-4, Delhi, will shortly commence operations on 9550 and 15,290 k.c., 31.41 and 19.62 m.

**Italy.**

Stations IRF, 9830 k.c., 30.52 m., and IQY, 11,676 k.c., 25.67 m., are still carrying relays from 2RO, Rome.

**Martinique.**

Fort de France, announcing "Ici Radio Martinique," has increased its power from 200 watts to 1½ kws. 9700 k.c., 30.9 m. Call FZF-6 (?).

**Netherland Indies.**

YDA, Bandoeng, now uses a new frequency, 7410 k.c., 40.46 m.

**Nicaragua.**

YN3DG, which was heard as an

'amateur, is the call of a new station using the slogan "Estacion Gilfillan," at Leon. On 7130 k.c., 42 m., from 12.15-12.30 p.m. (From Senor Rubio, Cuba.)

**Panama.**

New schedules for the Panama stations, HP5G and HP5J:

HP5G, 11,780 k.c., 25.47 m., from 9 a.m.-1 p.m.

HP5J, 9604 k.c., 31.24 m., from 3-4.30 a.m., 9:30 a.m.-1.30 p.m., and 4-6.30 p.m.

**Paraguay.**

ZP-8 is a new station on 9264 k.c., 32.4 m. Heard from 9-11.30 a.m.

**Poland.**

SPW-SPD are now relayed by SP-19 and SP-25 on 16,120 k.c., 19.83 m., and 11,700 k.c., 25.65 m., respectively.

**Portugal.**

Several changes are reported in the operation of station CSW. CSW-3 is now on 9670 k.c., 31.03 m. (previously 9737 k.c.). CSW-3 also on 9740 k.c., 30.7 m., operating a new schedule to Mozambique (3-5 a.m.), to Europe (8-9 a.m.), and to North America 9-11 a.m.). CSW-4 has a new frequency, 11,840 k.c., 25.35 m. On the air, 9-11 a.m. Power to be increased to 50 kws.

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Readers who want to take the "Radio World" on a subscription basis and have their copies posted to them direct each month are invited to complete the coupon below (annual sub. 10/6). New readers are advised that all back numbers in Volumes 1 and 2 are still available, price 9d., post free for copies in Volume 1 (May 1936 to April 1937) and 1/-, post free, for copies in Volume 2 (May 1937 to April 1938).

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THE AUSTRALASIAN RADIO WORLD,  
214 George Street, Sydney,  
N.S.W., Australia.



## Broadcast Stations Logged.

13 metres: GSJ, GSH, PCJ.  
 16 metres: W3XAL, GSG, DJE.  
 17 metres: FZE-8.  
 19 metres: LRU, SP-19 (very weak), OLR5A, RV96, HAS-3, JZK, Daventry and Berlin (various frequencies).  
 20-22 metres: KHQ, HPJ, SPW.  
 25 metres: W8XK, W1XAL, 2RO, OLR4A, COCX, VLR-3, JZJ, Hankow, Daventry and Berlin (various frequencies).  
 31 metres: COBC, JDY, ZHP, CSW, EAQ, COCM, TI4NRH, FZF-6, TGWA, COCQ, LRX, CS2WA, COCH, W3XAU, W1XK, W2XAF, KZRM, ZBW.  
 32 metres: COBZ, HAT-4.  
 41-45 metres: EA4R (42.5), PMH.  
 49 metres: ZGE, ZHO, 9M1, VFR, Rangoon, W3XAU, FIU, VQ7LO.  
 58-100 metres: PMY, Indians 60-62 m., YDL-2 (62 m.), RV15, and other Java stations around 86-90 m.  
 Mr. W. H. Pepin (West Australia):  
 During the past month conditions were satisfactory, although varying a good deal from day to day on all bands.  
 13 metres: GSJ is heard nightly around 7 p.m., reaching a peak at 8 p.m.; usually fades around 9.30 p.m., although occasionally remains audible till 11 p.m. W2XE and PCJ (very strong at times).  
 16 metres: W3XAL (fair), GSG (erratic), PH1.  
 19 metres: YDC, RV96, Berlin, W8XK. One morning at 8.30 a.m. a station believed to be VUD-3, Delhi, was logged on 19.79 m. Signals strong.  
 25 metres: W8XK, 2RO, TPA-4 (mornings), JZJ, Saigon.  
 27 metres: PMN and PLP (very strong).  
 28 metres: JVM.  
 30-31 metres: JDY, YDB, KZRM, ZBW and VUB (nights); COCQ, W2XAD, GSC, GSB and COCH (mornings).  
 49 metres: ZGE, ZHP and VUC (strong above noise level).  
 58-100 metres: PMY (strong), YDL-2, Indian station on 62 metres, RV15, YDA (98).  
 (Times are Perth time.)  
 All amateur fans are advised to keep a look-out for W4DLH (14,210 k.c.) on January 4 or 5, 1939, on his all continents hook-up with Europe, Africa, Asia, Australia and South America. W4DLH will attempt to break his record of 12 minutes established this year.  
 Mr. G. O. La Roche (West Australia).  
 DX has been good this month, and quite a few "not so often logged" sta-

tions were noted. Generally speaking conditions are very good from 7 p.m. to 8 a.m.; with daylight reception falling off. (Perth time.)

16 metres: TPB-3, PHI, W2XE.  
 19 metres: W1XAL, TPA-2, OLR5A, W8XK, RV96, JZK, YDC and HVJ.  
 24 metres: TFJ.  
 25 metres: RNE, IRF, TPA-3, W8XK, OLR4A, 2RO, JZJ, W1XAL, OLB4B, TPA-4, CR7BH, Hankow (XTJ?).  
 27-29 metres: PLP, JVN, ORK, PMN.  
 30-32 metres: CSW, EAQ, COCQ, Saigon (30.7), IRF (30.52), ZHP, JFAK, TI4NRH, CS2WA, 2RO, ZRK,

## 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 should be similar in style to those already appearing in the series, and should, where possible, be accompanied with photographs of operator and transmitter.

VUB, W3XAU, KZRM, TPB-11, YDB, VPD, W2XAF, ZBW, OZF, XEWW, COCH, COBC, COBX.

44-47 metres: PMH (44), TG-2 (47), COHB (47).

48-50 metres: ZGE, VPB, COCD, YDA, VQ7LO, SBG, COCO, Rangoon.

52 metres: YV2RA.

58-100: PMY, YDL-2, RV15, YDQ-3 (89.95), YDA and VUD-2 (60), and VUB-2 (61).

Mr. A. E. Bruce (South Australia).

Reception during the past month has varied quite considerably. I have had some unusual loggings at times, but often the 20 metre amateur band has been very poor.

The 13 and 16-metre bands have been very good in the evenings, Daventry being very strong. 31-metre reception has been so poor that I am beginning to wonder whether my receiver is functioning properly on this band.

I have done a little listening to the "outback" stations on 56 metres in the evenings, and they come in fairly well, though sometimes marred by static. 8TJ and 8TW are best of these transmitters.

10 metres has been disappointing—only a few W's and ZL's.

Mr. R. S. Coggins (South Australia).

Conditions in Woodville have been very patchy of late, although the 20-

metre amateur band has improved somewhat of recent weeks, and some fair loggings have been made.

London and Berlin come in very well on all bands between 13 and 49 metres.

Mr. J. Ferrier (Victoria).

Conditions below 11 metres have been fairly good. The 10 metre amateur band is very good around 9 a.m., W's, K6's and even a few South Americans.

Occasionally I log a very weak station on 30.3 m.c., relaying KGMB Honolulu. No call has yet been heard.

The Police bands have been rather dull. Only W6XPA, Los Angeles, puts in a strong signal (R9).

The 31.6 m.c. broadcast band is still mainly a strong heterodyne whistle. It is almost impossible to identify any station.

W9XJL, Superior, is the best of the 11-metre stations.

Mr. H. A. Callander (Tasmania).

Reception on almost all bands (13-85 metres) has improved slightly during the past month, and some very interesting DX has been obtained at times.

GSH (13.97) puts in a very good signal around midnight; also DJS (13) DJQ and DJE. KZRM is a strong signal on 31 metres at 11 p.m.

JZJ (25.4) has been heard testing with America at 11.45 p.m. Announcements are made in both English and Japanese, and reports are requested—a verification being guaranteed.

On 31.58 metres PRF-5 has been putting in a strong signal, with occasional announcements in English. After each item three notes are struck on a gong.

Amateur DX on the 20-metre band has been extremely interesting. Some good loggings include XU, PK6, HC, LU, F18, NY, ZS and VP7.

Mr. A. R. Payten (New South Wales).

It certainly pains me to have to forward such a poor report, but reception has been very disappointing, with QRN holding sway.

Morning reception has been especially poor, only VLR-3 (25), and HVJ, Vatican City (50) putting in anything like a good signal; the others are very weak and irregular.

During the day scarcely a signal is audible.

The evenings provide what little DX there is on offer.

19 metres: JZK, Daventry and Berlin.

25 metres: OLR4A, GSD, JZJ, Paris, RNE and Berlin.

27 metres: CSW, ZLT-4, PLP.

28-29 metres: ORK, JVN.







# DX News and Views

A page for  
letters from  
DX readers

## Time-Saving DX Forms.

I have been dxing for eighteen months, but the writing of two-page reports for "veries" soon tired me. The Club Report Forms have been a boon, and I started all over again, but I don't worry the "hams" for cards except on B.C. I have reports out to the following:—

B.C. (daylight) VK's 4JN, 4EA, 4XW, 4RJ and 4LW. Shortwave, YDC, KQH, HBJ, PCJ, VPD2, KZRM, HJ6ABH, HI20, ZBW3. Also a new stranger—"This is Singapore calling"—not found in the "R.W."—on about 9.82 megacycles.

QRN has been rather bad on s.w. in the past fortnight, but otherwise stations have been quite good until 2 a.m.—B. R. Ferris, Proston, Q'land.

## 10-Metre Coil Gives Promising Results.

My dx listening every night covers the band from 10 to 90 metres. I have just wound a 10-metre coil for my receiver, and have obtained promising results from it. I have coupled a 1938 model Mullard super. through an audio transformer to the output terminals of my present receiver; this amplifies my signals considerably. The Mullard super. uses a 42, 6F7, 6A7 and an 80 rectifier.

Conditions on the 20 m. band have not been very good lately, my best loggings being W1AW, W1OM, W5ZS, W6JT, W6CO, W3EOZ, W2JKQ, W2AZ, W4BY, W6BKY, HI7G, K6ILW, K66AD, K6KMP, K6MTE, K64BC, PK1VY, KA1ZM, VU2CQ. GSQ (13 m.) has been coming in at an average strength of R8-9. KZRM (31 m.) and PCJ (19 m.)—D. E. Tolley, Grove Street, Unley Park, Adelaide, S.A.

## S.W. Bands In Review.

Lately I have been too busy listening to DX to think about writing, but now for some DX news. Starting from B.C. and working down, 2CA Canberra (2000 w.) has now started a midnight-to-dawn programme and is asking for reports from listeners. What is wrong with the boys on the 160 m. band?—there are usually only about four VK's and one ZL on this band. The 80 m. band is usually very lively with VK's and ZL's, but QRN is beginning to creep in, so this band

is losing its popularity. The 40 m. band is good in the afternoons and early evenings, a few W's on c.w. with good strength when not QRM'd by VK 'phones. 20 metres is good in spots, the usual W and VE 'phone stations coming through in the early evening. A few South Americans can be heard in the late evenings, but the band is very dead in the early mornings (2-4 a.m.) and is not worth waiting for.

Moscow has been romping in on 60 m., but it seems as though attempts have been made to interfere with this station on 49 metres. The American and Java station have their usual fight for supremacy until Java closes down about midnight. The 31 m. band has shown signs of improving, and the new station at Singapore comes through on about 30-48 m., closing down at 12.45 a.m. (E.A.S.T.). All the other bands are as usual. My receiver is a 4-tube t.r.f., 1C4 r.f., 32 det., 30 transformer-coupled to 33.—S. E. Molen (AW213DX), Kingaroy, Q'land.

## OFFICIAL S.W. OBSERVERS.

N.S.W.: V. D. Kemmis (AW301DX), "Brampton Hall," 49 Kurraba Road, Neutral Bay, Sydney; A. R. Payten (AW352DX), High Street, Coff's Harbour.

SOUTH AUSTRALIA: J. C. Linehan (AW323DX), 181 South Terrace, Adelaide; A. E. Bruce (AW171DX), C/- 54 Currie Street, Adelaide; R. S. Coggin, 8 Glen Rowan Road, Woodville.

QUEENSLAND: J. K. Sorensen (AW316DX), "Fairholme," Station Road, Gympie; E. Neill (AW64DX), 26 Canning Street, Nth Ipswich.

WEST AUSTRALIA: G. O. La Roche (AW155DX), 62 Gladstone Avenue, South Perth; W. H. Pepin (AW402DX), Seventh Avenue, Maylands; C. J. Anderson (AW417DX), Dumbleyung.

TASMANIA: H. A. Callander (AW304DX), 1 Franklin Street, West Hobart.

VICTORIA: J. Ferrier (AW129DX), "Winniburn," Coleraine.

## Has 228 Verifications.

It's quite a while since I wrote to the Club, but I have not given up DX. I now have 228 verifications, which include:—79 VK2's, 22 VK3's, 41 VK4's, 6 VK5's, 3 VK6's, 1 VK7 and 1 VK9. Also CN8AM, CR6AA, CSW, CT1AK, CT2AB, EA9AH, F8XT, G5SK, G5VE, G5ZZ, G6AK, G81W, HA8N, HI6F, HA8PJ, J3DE, KZRM, OER2, PK1BX, PK3ST, PK3GD, PY2HM, SPW, SU1KE, SU1SG, SM5SX, TI5JJ, VS2AK, W3EGG, W3GIF; W5's AD, GDZ, GSJ, OH, SY; W6's AAN, ACL, BCA, BOG, CBK, CQF, CON, FUD, GUU, HAS, LHF, FQK, ICI, IRZ, IZB, JIH, JJB, LGL; W7's AVC, FQK, GKW, GNQ; W8XWT, YV1RH, ZT2G, ZT6AZ, ZT6AL, Z7KG, ZU6P, ZUIT, ZU6E, ZWB. Besides these I have 161 SWL cards.

Overseas reception has not been very good these last few weeks, but seems to be improving a little now. I have been busy building a one-valver using an RK43 (or a 19). The beauty of the RK43 is that it runs off a 1½ volt torch cell, and I have logged dozens of Americans. I am also experimenting with a new antenna system and think it should work O.K. Before concluding I would like to congratulate you on your very fine publication, "A.R.W."—M. W. Eglington (AW268DX), Murwillumbah, N.S.W.

## W8XK Verifies Report Sent On Official Club Form.

Regarding W8XK mentioned as a station that will not verify, I have their card—a yellow one with orange-coloured call letters and black print—sent promptly after a report on our official forms. Cards to hand this month are from U.S.A., Italy, New Zealand and Canada. The veri. from 2RO has broken all records, being very prompt indeed. I have sent reports this week to South American, Dutch Guinea, and French Indo-China being outstanding.—Gordon Young (AW245DX), Brisbane, Queensland.

## Amateurs Logged On Twenty.

Just a few lines to let you know I am still receiving cards through using the Club's QSL forms, my most recent being from KZRM, 2LF and VK5LW.

The following amateurs have been heard lately on the 20 m. band:—2W1's, 7W2's, 1 W3, 3W4's, 2 W5's, 12 W6's, 1 W7, 3 W8's, 2 W9's,

KA1JM, PK4JP, K4EMG, K6OQE, K6BNR, K6OGR, VE1EH, VE5NK. Commercials: Rangoon 49.94 m., ZBW 31.49 m., COCQ 30.78 m., and KQH 20.11 m.—Wm. Bantow (AW353DX), 237 Point Nepean Road, Edithvale, S.14, Victoria.

#### Details of Sets And Aerials Wanted.

Regarding the QSL card contest, I would like to suggest that a list be printed of members who have forwarded their cards. I think other club members would appreciate this.

Another suggestion I would like to make is that contributors to the DX news page give particulars of their receiver, antenna system, etc., when writing of their station loggings, not forgetting the direction in which antennas are running. I think this will meet with the approval of every reader and create a certain amount of interest. We are all anxious to get the maximum efficiency from our receiving apparatus, and I think the co-operation of readers on the suggestion just mentioned will help to make it possible.

I have tried a number of antenna systems, and the one that gives me the most satisfaction at my location is a half-wave doublet for 20 metres, running 10 degrees west of north. Dimensions of antenna are 16ft. 6ins. each side of a pyrex insulator, with twisted pair feeders three  $\frac{1}{4}$  wavelengths long. Being mostly interested in the 20-metre and 19-metre band, I have found this the most efficient antenna so far. I intend erecting a similar antenna running at right angles to the existing one, thereby probably giving me a 360-degree coverage.

The receiver is an A.G.E. six-valve super with 175 k.c. i.f.'s and a converter is coupled to this using an EK2, and covering from approximately 16 to 50 metres. In conclusion, I would like to add that I am sure members of the club appreciate the action of Mr. J. C. Linehan, of Adelaide, in making the QSL card contest possible.—Charles Jarlett (AW38DX), 26 Edith Street, Hurstville.

#### 333DX Logs "Hot Air Social Club."

Following on a report in the "Mail" re "The Hot Air Social Club," discovered by Dr. Wilson, Flying Doctor, on his recent tour of the north, you may be interested to know that while spinning the dial on Tuesday evening at 9.15 p.m. I tuned in to the "Club."

Two-way conversations are carried on, and there are eight members of the Club, some hundreds of miles apart. The signals came through at R max. on the "Empire."

Stations heard were Wyndham, Angorinchina, 8PJ, Curramoona and Twin Station. Wavelength used is just above the 49.9-metre band. The

signals did not fade, Angorinchina in particular being very strong. Wyndham causes interference at times, working on the same wavelength as the "Club."

The new Flying Doctor base is to be established at Round Hill, about 5 miles from Broken Hill. The Central Wireless Station—installation started this week—will be in direct communication with stations within a 400 miles radius of Broken Hill. The Flying Doctor intends to make regular broadcasts and with the transmitter set, will keep in constant touch with outback stations. Radio advice on minor ailments can thus be given. Some Club members may have heard these two-way conversations; in any case they are very interesting.—H. H. Young (AW333DX), Angaston, South Australia.

#### Three Enzedders Logged On B.C.

DX conditions here in Western Australia have not been too good, but I managed to log the following stations: 1YA, 2YA and 4YA. HS7PJ Bangkok was logged on the 12th ult. on a wavelength of approximately 750 m. The Japanese are coming in at R4, QSA 3, JOAK1, JOBK1, JOCK1, JOIK and JBCK being the most consistent. I hear the stations better in W.A. than I did while in New South Wales, but so far have failed to log any Americans. I think I will have to change my set to a shortwave model.—G. A. McLennan (AW384DX).

#### Radio Book Reviews.

(Continued from page 36.)

ledge is required for the solution of the various formulae.

The practical details given of construction, coil winding, testing and repair should prove invaluable for those who have to deal with the care and maintenance of fractional h.p. motors.

"A.C. Motors of Fractional Horse Power", by H. H. Jones, first published in 1938. Our copy from Messrs. Angus & Robertson Ltd., 89 Castlereagh St., Sydney. Price 11/3, postage 6d.

#### "An Elementary Wireless Course For Beginners."

Written by J. H. Reyner, B.Sc., A.M.I.E.E., and the staff of "Radio Pictorial" and "Television and Shortwave World," "An Elementary Wireless Course For Beginners," now in its third and revised edition, is a book intended for those wanting to gain a working knowledge of how a receiver operates. Written in simple non-technical language, the book treats the entire theory of radio in the simplest and clearest possible way.

To help the reader visualise some of the more difficult principles and theories, the authors have devised many unique analogies, which are not only explained but wherever possible are illustrated as well.

#### U.H.F. DX Improving Rapidly.

DX on the ultra high frequency bands is coming back to normal in leaps and bounds after the dull period during the winter. The 33.1 meg. band is open again, and to-day I heard the following police stations: W6XHR Monrovia, W5XB Fort Worth, W6XMW Arcadia, W6XM Stockton, W6XEH Longbeach, and W6XWA with W6XWF, which I heard testing but did not get their QRA's.

The 30.1 meg. band has not improved much in the last month, except that W6XPA at times reaches R9+, W2XEM coming a good second. There is no sign of the 9.49-metre broadcast band yet, but within the next month I think these bands should be very good. I have not been doing much on the other bands, but 20 m. is getting better now in the evenings.

I am running my receiver off a genemotor and have been spending most of my spare time trying to filter it.—James Ferrier (AW129DX), Coleraine, Victoria.

#### Club Forms Bring Good Results.

I have been getting excellent results by using the Club's report forms—they are great time and trouble savers. The stations I have received reports from are as follows:—

2KA, 2MC, 2TM, 2KO, 2HR, 2HD, 2MW, 2LM, 2CR, 2NZ, 2WG, 2KM, 2CA, 2LF, 2DU, 2BE, 2AY, 2GN, 2GF, 2GZ, 2WL, 2NR, 2BL, 2FC, 2CH, 2GB,

The first three chapters are devoted to an explanation of the principle of tuning. Chapters on detection follow, and on the general theory of the thermionic valve. Towards the end of the book a typical three-valve chassis is analysed in detail, the purpose of every component and the principle underlying its design explained.

"An Elementary Wireless Course for Beginners", by J. H. Reyner, B.Sc. (Hons.), A.M.I.E.E., and the staff of "Radio Pictorial" and "Television and Shortwave World". Third revised edition. Our copy from Messrs. Angus & Robertson Ltd., 89 Castlereagh St., Sydney. Price 5/3, postage 6d.

#### Coils For EK2G Octode

(Continued from page 31.)

within the 50-150 microamp. range. These current values have been quoted as a guide to circuit adjustment and similar values within reasonable limits should ensure satisfactory performance so far as the mixer stage is concerned.

The short wave coils have been designed to cover a wave range of 16-51 metres, and to ensure this coverage, every precaution must be taken to limit stray capacities associated with the tuned circuits.

—Philips Radio Technical Service.



2UW, 2SM and 2RG. Victoria: 3HA, 3SR, 3KZ, 3RO, 3LK, 3DB, 3TR, 3BA, 3WV, 3GI, 3AW, 3UZ, 3XY, 3GL. Queensland: 4BH, 4SB, 4BC, 4AK, 4QG. South Australia: 5RM, 5DN, 5AD, 5PI, 5MU. Western Australia: 6WA. Tasmania: 7LA, 7HT, 7UV, 7EX, 7HO. New Zealand: 1YA, 2YA, 3YA, 4YA, 1ZB and ZJV Suva Fiji.

Shortwave stations logged include VK2ME, VK3ME, VK6ME, VPD2, KZRM, DJB, VLR, W1XK, W2XAF and 2ZB.

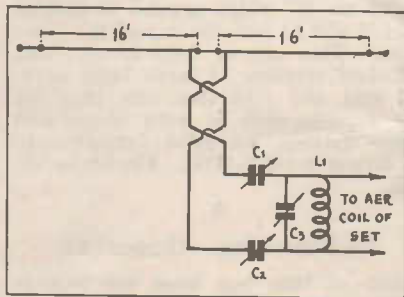
All the stations were logged on a 5-valve Radiola. In a few days I am having their 9-valve all-wave model installed.—C. R. Woolsey (AW403-DX), Terrigal, N.S.W.



### Tuned Doublet Gives Excellent All-Wave Results.

I have ordered parts for the "Battery Communications Seven" and hope to have the receiver completed next month.

At present I am using a 1935 battery five-valve Radiola using a 6A7, 34, 34, 6B7 and 38 output pentode.



This is still serving faithfully, and with several alterations is giving excellent results. I use with it the r.f. amplifier described in your pages some time back, and this results in a tremendous gain, and has been particularly helpful on 14 megs., though noise level has been particularly high lately. I also have a one-tube 2½, 5 and 10-metre job which I built some time back, but have not yet had the time to get down to it and get it going. It uses a 6C5 as a super-regenerative detector.

I now have my receiver and aerial tuners on a rack and panel assembly by my radio table. A small clock is mounted in it, illuminated by a hidden 6.3v. light. I made the panel large with the idea of adding transmitting equipment at a later date. I am using at present a Zepp aerial designed for 14 megs. running N. & S. with optimum reception E. & W. feeders are transposed, and are 60 feet long. These are tuned and I find that this type of aerial works well as an all-wave aerial. The results on 200-550 metres are outstanding. In case anyone would like to try this, then details are shown in the sketch.

C<sub>1</sub>, C<sub>2</sub> and C<sub>3</sub> are 250 mfd., and L<sub>1</sub> is 154 turns of 30 enam., tapped at 77, 38, 19, 10, 5 and 2½ turns. Before feeders are brought towards the receiver, they should descend vertically from the antenna for at least ¼ wavelength; in this case, 16 feet.

I am listing below the list of amateurs positively logged on 14 megs. this month, and on consulting my log book find that it represents 16½ hours listening in the morning and late afternoons. I have at the moment about 200 reports out.

Europe: France, F8VP, F8BA; England, G6BO, GM8BD, G5BJ, G5LK, G2TR, G5NI, G8SB, G6BY, G3BM, G2WP, G5BA, G8CH, G5ML, GH3BD, G2DS, G6BW, G2MI, G2AV; Holland, PAOAD, PAOFP, PAOMF; Hungary, HA4A, HA8N.

Asia: India, VU2BG, VU2AC, China, XU8RV; Hawaii, K61LW, K6OQE, K6MIE, K6BNR; West Indies, PK4JD, PK2AY, PK2WI, PK2RK; Phillipines, KA2OV, KA4LH, KA1AP; Burma, XZ2FZ.

North America: U.S.A., 1 W1, 9 W2's, 1 W3, 3 W4's, 5 W5's, 21 W6's, 1 W7, 2 W8's, 4W9's. Central America: Canal Zone NV2AF; Costa Rica, TI2AV, TI2FG and TI3FE. South America: Peru, OA4JN, OA4C; Venezuela, YV1AP, YV5ABQ. Colombia, HK3LC, HJ1EF. West Indies: Porto Rica, K4EMG. Santo Domingo, HI3A, HI5A.

Conditions are up and down, though for the most part the band is very noisy. I sometimes manage to get in a few minutes when home to lunch and have had some success around 1 p.m. our time, such stations as OA4C, G5LK, G2TR, G6BW, TI3FE, G2AV, F8RV, ON4AJ, G2BY, W6AM being heard among others. There are many that cannot be logged owing to bad QRN or QRM—Joseph Bull (AW146-DX), Beria, W.A.



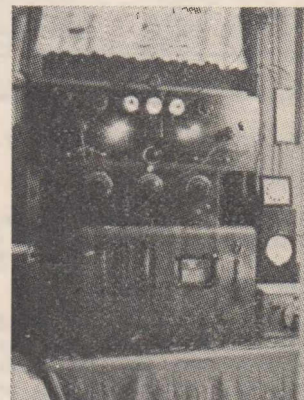
### A De Luxe DX Outfit.

My receiver is an eight-valve tri-wave; frequency range:—528-1730 k.c., 1.71-5.8 m.c., 5.75-18.3 m.c. The valves used are 6K7 r.f., first det., and i.f., 6C5 oscillator, 6Q7 first a.f., second detector, a.v.c., 6F6 output, 5Z4 rectifier and 6G5 "magic eye." It has an 8" electro-dynamic with two-speed tuning (automatic) variable i.f.'s and a "movie dial." This dial has an automatic bandsread on "80" of 4ins., "40" 3ins., and on "20" 2ins.; it works on the same system as a movie projector. This "Airline" I have is made in Chicago and is the sample model that came to Wellington.

I am using three antennas, but am still experimenting with them. My location is on a hill top (700ft.) overlooking Wellington Harbour, and apart from QRN, reception is 100 per cent. The earth is a 10ft. iron pipe

sunk in wet ground and filled with salt.

In the photo, the switches behind the set operate the antennas, and the three dials operate "pots," shunted across the pickup (a Rothermel brush) and it is possible to have wide-range reproduction. On the right of the set is my antenna tuner, and it works so well that I have enclosed a diagram of it. Behind the antenna tuner is an oblong case inside of

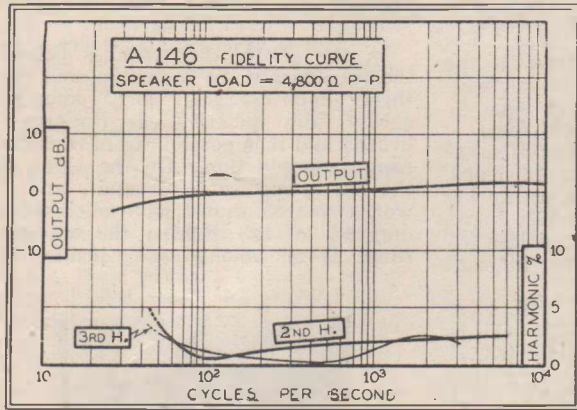


Dyer Raymond Kelly, of Wellington, sent in this view of his listening post. He operates an eight-valve tri-wave American superhet.

which is a globe, so that when the door is opened the light goes out, being a convenient way of knowing someone wants to enter—otherwise difficult with QRN going R max. An electric clock which tells the time in any part of the globe, and the two small lights on the switchboard which automatically light when the pick-up comes to the end of the record, completes the outfit here.

During this year s.w. reception has not been 100 per cent., due no doubt to solar activity, which we are told is taking place this year—a cycle every 11 years. We are in early Spring here, and s.w. during daylight is fast disappearing, but on the other hand, evening s.w. is improving. 20 metres has been poor, and I find that between 8 p.m. and 2 a.m. (N.Z.T.) a few "VK's," "W's," and "PK's" reach R7 on peaks. I have received a veri. from Singapore on 30.49 m., and also have a report out to PK6XS—Archbold 1938 Expedition, New Guinea, on 14 m.c. He was telling a VK that no QSL cards were available until they arrived back in New York—a year hence!

The broadcast band so far has been 100 per cent.; noticeable is the numerous American and Japanese stations that "beat" with the carrier waves of most of the Australian stations. Apart from that conditions are very good, with not much QRN.—Raymond Kelly (AW397DX), Wellington, N.Z.



This set of curves reveals the excellent overall response, with low second and third harmonic distortion, obtained from the amplifier.

**Push-Pull 6L6G Amplifier.**

(Continued from page 8.)

that at full signal output the input voltage to the first stage is 0.24 volt R.M.S., and the gain reduction factor in the 6L6G's is 2.35.

The curve of output versus frequency on a loudspeaker load is shown in the smaller diagram, and it will be seen that the output remains practically constant over a very wide range of frequencies.

The second harmonic distortion is below 2.5 per cent. over the whole of the useful audio range, while the third harmonic distortion is extremely low over the most important part of the frequency range and is below 3 per cent. at all frequencies. This harmonic distortion is as measured over the whole amplifier from the input to the first stage. The amplifier may therefore be claimed to "satisfy" all the requirements of fidelity, while it is also sufficiently robust to be used in any application.

Due to the use of feedback, high voltages are not developed in the 6L6G plate circuit, and there is therefore no likelihood of damage being done to these valves by accidental overload. There is no necessity for the 6L6G valves to be specially matched since they are operating almost under class A<sub>1</sub> conditions.

**Power Supply Details.**

The power supply incorporates a 385-385 volt 175 m.a. transformer and 5V4G rectifier. A two-stage filter is necessary. The first filter choke is rated at 30 henries 175 m.a. and the second is the field of the loudspeaker. This field will receive energisation to the extent of 12.5 watts at zero sig-

nal, and reaching just under 14 watts with maximum signal. If the first filter choke has a lower resistance than 500 ohms, it will probably be found necessary to add further resistance in series in order to maintain the plate-to-cathode voltage of the 6L6G's at 275 volts on maximum signal. The rise of plate voltage at zero signal is quite permissible, and does not exceed the plate or screen dissipation of the valves.

The characteristics of the amplifier are shown in tabulated form for average valves, but it will be understood that individual valves may show discrepancies from these figures, depending on the individual cathode currents of the valves. However, the variations, which will be found to occur, are comparatively slight, and not sufficient to result in any appreciable change in plate and screen voltage.

Certain variations in the plate currents of power valves are always to be expected, and are no appreciable detriment, particularly when self-bias is used. If fixed bias is used, it may be necessary to take additional precautions such as an individual bias adjustment for each valve.

**An Interesting Experiment.**

I have taken the "Radio World" since the first issue and look forward to receiving it each month, as it contains some very interesting items and circuits. I am contemplating building the "Air Ace Four."

Just around here where I am living are the Glass House mountains, a group of seven mountains all in an area of roughly five square miles, and ranging from 995 to 1740 feet high. I am going to climb these, taking a

**A146 AMPLIFIER CHARACTERISTICS.**

	Zero Signal	Max. Signal	
Plate to Cathode 6L6G Voltage	286	275	Volts
Screen to Cathode 6L6G Voltage	286	275	Volts
Total Amplifier Current	158	167	m.A.
Grid Bias 6L6G	18.85	19.85	Volts
Field Energisation	12.5	13.95	Watts

portable s.w. job, and will test reception results. The mountains are mainly made up of ironstone, so it should be interesting to see what happens.

My house is situated right at the bottom of Beerburum mountain, and I find that reception on 265 metres and 255 metres is very weak, but others come in o.k.—D. H. Fowler (AW385DX), Beerburum, Q'land.



**Cheap Plug-In Coils.**

I have built the "1937 Communications Eight" described in "Radio World" and think that while it is a wonderful set, it would be much better if it had a.v.c. in it. The European stations come romping in, but they fade considerably, and I was wondering if you could let me know if it would be best to put in an a.v.c. or use a three-band doublet which was described a few months ago.

The aerial I am using is 40ft. high x 100ft. long, and is situated in a north-east-south-west direction. By the way, here is a little hint which I would like you to publish in the "R. W":

Get some old valve bases and cut the pins out of one or two. Then file about an 1/8" ridge around it just so that it will fit into the top of the other base. This can be held firmly with celluloid cement. I have built several sets and find that this idea for the plug-in coils is very cheap and saves cutting up good formers.—L. F. Evans (AW351DX), Christchurch, N.Z.



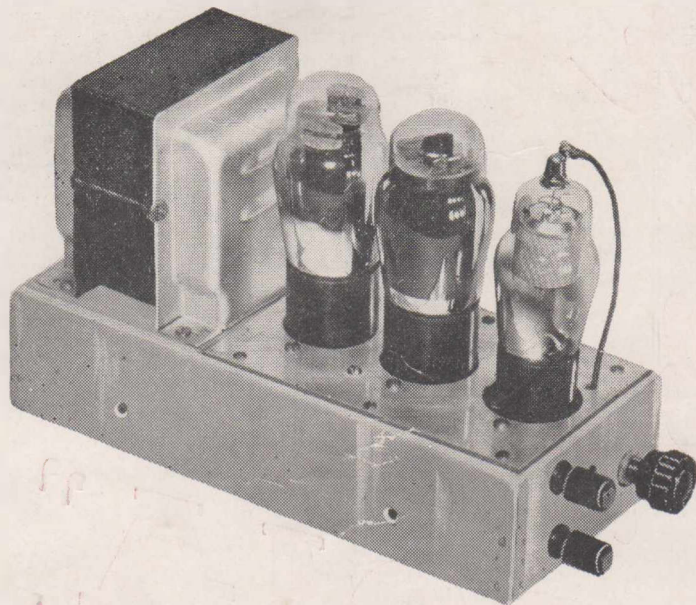
**Re-Finishing Aluminium**

DX of late has been too bad to waste time and power on. However, I heard Daventry in the morning session giving their news in Italian and Portuguese, which made it appear rather confusing at first. The 20-metre band has joined the "Legion of the Lost," I think, because at my location I can hardly hear any DX worth while.

I would like to thank all the DX members who sent their cards in answer to my request.

I have attached to my speaker the baffle that was described in the April "Radio World," and find that it is a wonderful improvement.

The following kink may be useful to readers: There is many a set-builder using aluminium panels for the front of their receivers, etc., who inadvertently get them badly scratched. The appearance can easily be restored by rubbing the panel with a piece of fine emery paper in one direction. Then, using the same emery paper, only attached to a small cork or something similar, make circular motions all over the panel in equal rows. This gives a nice frosted appearance, similar to that of the panel of the "Tom Thumb Portable Two."—W. M. Chapman (AW112DX), Waterloo, Sydney.



*You can build the*  
**Four-Watt  
 Beam  
 Amplifier**

FOR ONLY ...

**£5-7-6**

The Four-Watt Beam Amplifier fully described in the July issue of this magazine is powerful enough for a small hall, and at £5/7/6 for the complete kit represents really wonderful value. The price includes valves and speaker, and—Vealls pay freight to your nearest Railway Station. **ORDER A KIT TO-DAY!**

**Also Available  
 VEALLS ELECTRICAL CATALOGUE**

Vealls new 1938 Electrical Catalogue covers all electrical contractors, suppliers' and dealers' requirements, in addition to a complete range of Household Appliances and electrical labour-saving

devices. This catalogue is separate from the Radio Catalogue described elsewhere in this issue. State if you require both. Your name and address on a post card will bring copies to you.

The  
**VIBRA**  
**DUAL-WAVE FIVE**

See the full details elsewhere in this issue . . . a vibrator operated 5-valve dual-wave superhet using the new 6.3 volt .15 amp valves throughout. Ask Vealls to quote you for the supply of the complete kit ready for assembly.

**TEST  
 EQUIPMENT**

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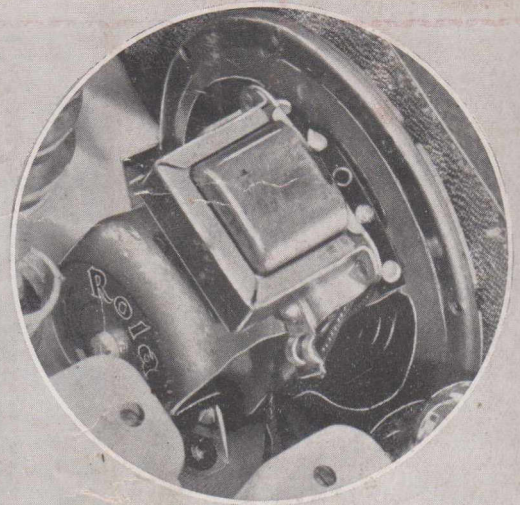
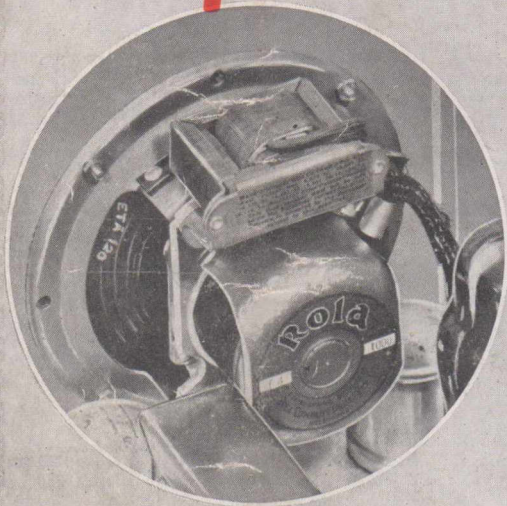
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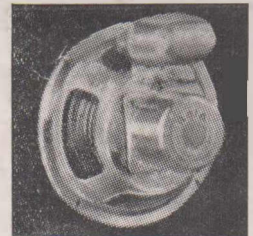
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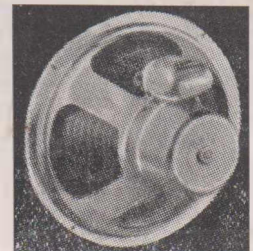
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