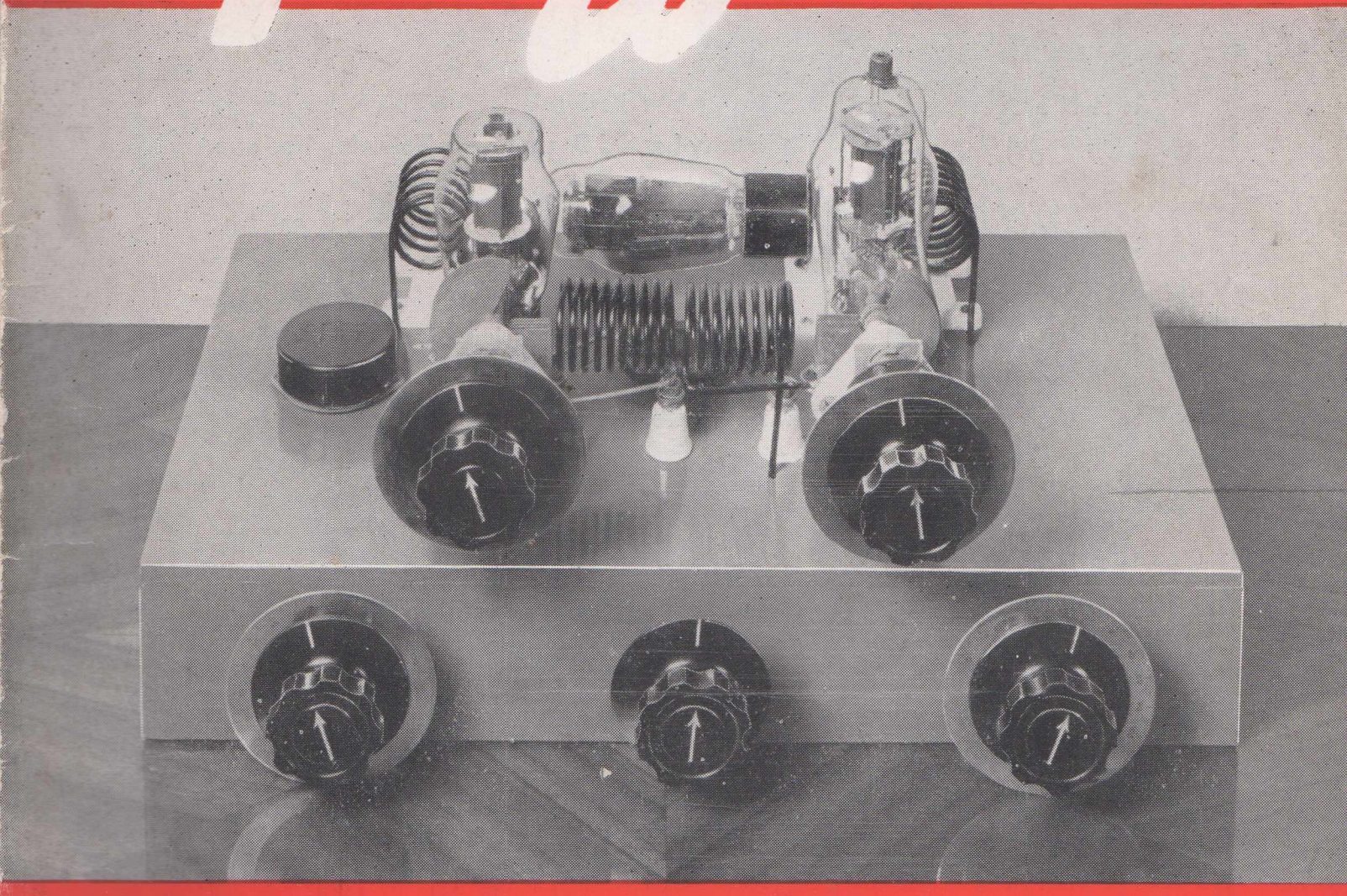
THE AUSTRALASIAN

Radio World

FEBRUARY 10, 1939
VOL. 3 — NO. 10
PRICE, 1/-

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



—See Page 3

- 5 AND 10-METRE CRYSTAL-CONTROLLED PHONE AND C.W. TRANSMITTER :
- MORE ABOUT THE "ONE-FOUR PORTABLE-FIVE" : BUILDING A FIELD STRENGTH
- METER : HOME RECORDING HINTS : LATEST WORLD SHORTWAVE NEWS.

THE AUSTRALASIAN RADIO WORLD

Incorporating the

ALL-WAVE ALL-WORLD DX NEWS.

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

Vol. 3. FEBRUARY, 1939. No. 10.

CONTENTS:

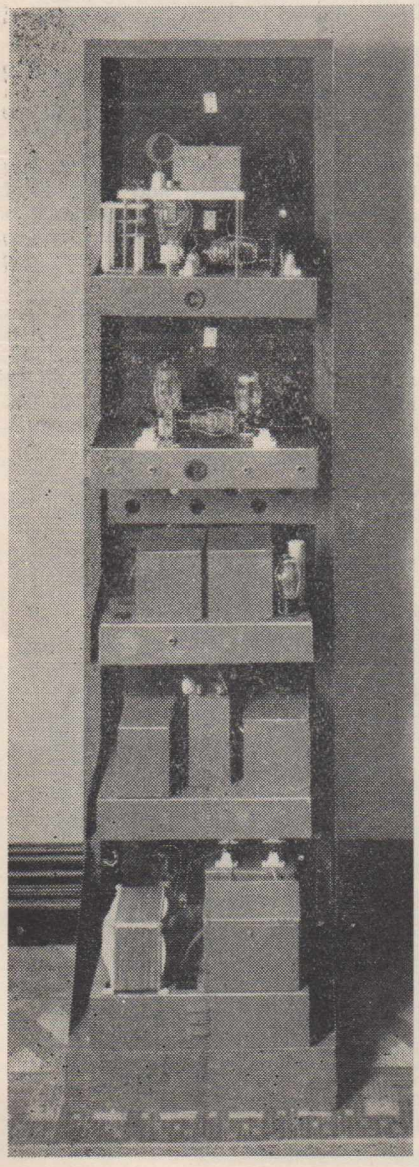
The "Australasian Radio World" is published monthly by Trade Publications Proprietary, Ltd., Editorial offices, 214 George Street, Sydney, N.S.W. Telephone BW 6577. Cable address: "Repress," Sydney. Advertisers please note that copy should reach office of publication by 14th of month preceding that specified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

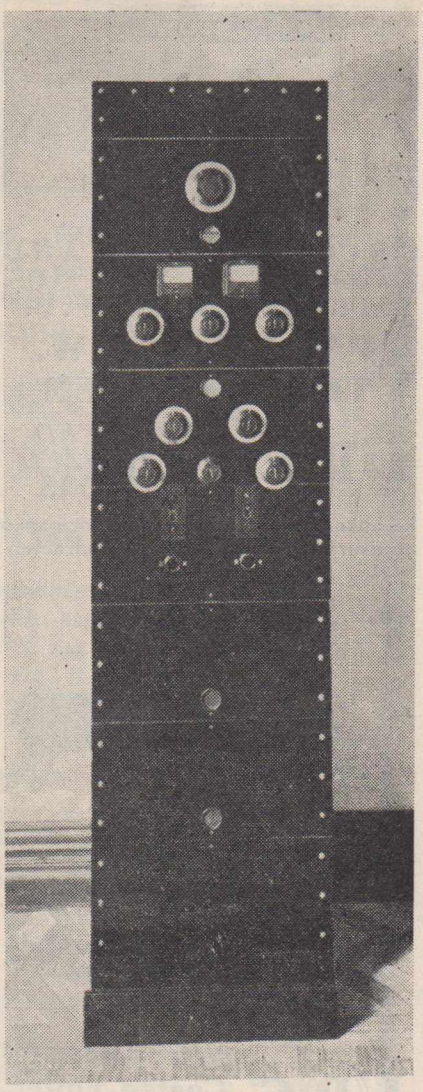
Subscription rates: 1/- per copy, 10/6 per year (12 issues) post free to Australia and New Zealand. Subscribers in New Zealand can remit by Postal Note or Money Order.

5 And 10-Metre 'Phone And C.W. C.C. Transmitter

This two-band ultra high frequency transmitter employs in the exciter unit a 6L6G crystal oscillator, followed by an 807 10-metre doubler, in turn followed by an 802 5-metre doubler. The buffer stage comprises a pair of 802's in push-pull driving a pair of 809's in push-pull in the final. Designed & described

by W. McGOWAN (VK2MQ)





These two photos show front and rear views of the completed transmitter, which incorporates five racks, the three lowest of these being for power supplies.

DESPITE the rapidly-growing importance of the ultra high frequency bands, and the tremendous interest that is being taken in them by overseas amateurs and commercial organisations, particularly in America, comparatively few amateurs in this country are showing any interest in the new and comparatively-unexplored territory that lies below 10 metres. This lack of activity is particularly disappointing, because, while the handful of experimenters who are interested in the "ultra-highs" have done some excellent work, comparatively little can be done in the way of research with only a few stations on the air.

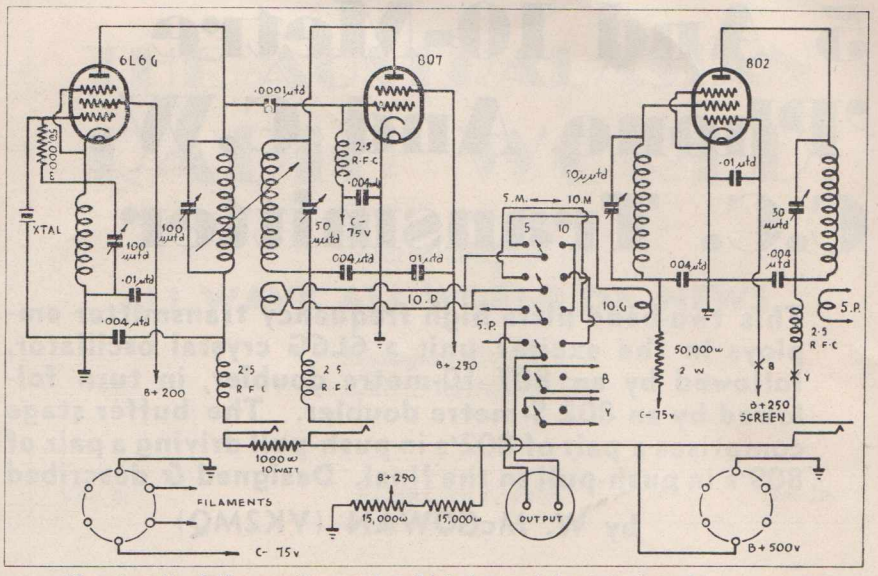
Actually, the cause of this lack of enthusiasm is difficult to understand, because to-day the design and construction of stable highly-efficient transmitters for either 'phone or c.w., or both, is not difficult, and does not involve the use of either non-standard components or valves. Certainly the design of a u.h.f. transmitter involves pitfalls not encountered on the lower frequencies, but generally a knowledge of these enables them to be avoided. For this reason some useful u.h.f. transmitter design pointers are given in the article below.

Crystal Control An Essential.

Early in the development of the 56-megacycle band, it became obvious that more stable transmitters would be required, due to the fact that the super-regenerative receivers then in general use on the u.h.f. bands have several serious inherent drawbacks. Actually, the superhet is the best choice for u.h.f. work, but its use necessitates high frequency stability in the transmitter. Thus crystal control becomes desirable for the ultra high frequencies for many reasons, among them being the fact that the operator has at all times a knowledge of the exact frequency on which he is working, there is virtual freedom from frequency drift, and as well the tuned circuits become easy to adjust.

Many systems have been tried over a period of years on five metres, and the transmitter illustrated is the third crystal-controlled job to be built. Originally there were six stages, the exciter being on 40, with successive stages doubling to 20, 10 and then 5. Single 6L6's were used on 40, 20, 10 and 5, and in push-pull on 5, driving 801's in push-pull as a final amplifier.

While this transmitter was quite



The circuit of the exciter unit, which is explained in detail in the text.

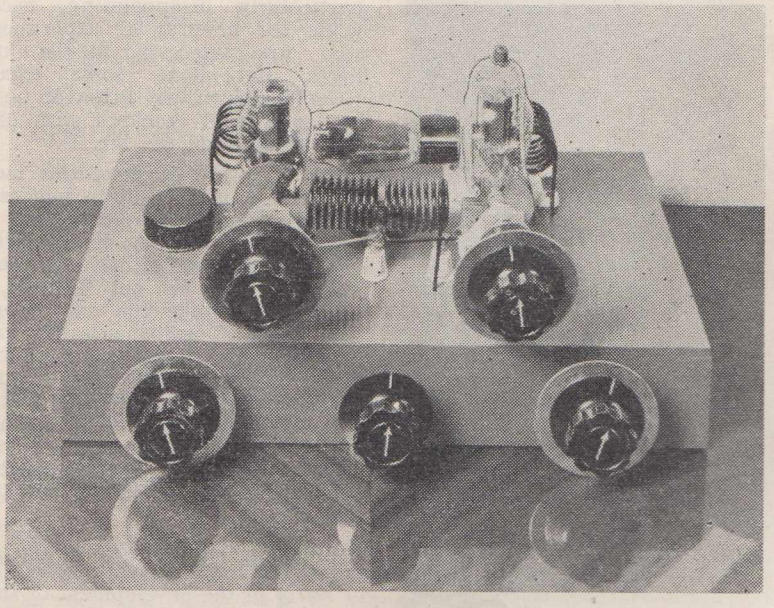
stable and very easy to adjust, some months ago it was temporarily shelved because it was felt that with the new valves that had become available quite a few stages could be eliminated.

The Valve Line-up.

The stage line-up of the transmitter illustrated is as follows:—In the rear view the bottom unit is the power supply for the buffer and final amplifier, and consists of a filament transformer with 5-volt winding and a second power transformer delivering 800 volts a side. The output from this is rectified by two 5Z3's with plates paralleled and choke input, giving an effective 690 volts under load.

The next unit is the H.T. supply for the exciter rack, and consists of a 5-volt filament transformer and a 600-volt per side H.T. transformer, which delivers between 500 and 550 volts D.C.

The next unit, which is in the centre, comprises a filament transformer with three 6.3-volt windings for the exciter, buffer and final, and also the bias pack, which has a relay in circuit so that in the event of the bias



This front view of the exciter unit shows the layout finally adopted after months of experimental work.

VEALLS OFFER A CHOICE FROM ENORMOUS STOCKS

Vealls, with six big stores, offer a choice from the biggest radio and electrical stocks in Australia—at keen Melbourne prices.

Write to-day for a copy of Vealls Big Free Catalogue. Thousands of items, hundreds of illustrations. Enclose a 2d. stamp to defray cost of postage.

RADIOKES' LINES BELOW COST

Here's your chance to buy genuine Radiokes parts at less than cost. Limited number only —so act quickly!

RADIOKES B.C. COILS.

Aerial, R.F., Pre-selector and Oscillator Coils. List Price 5/3.

At Vealls ..... 2/7 each

RADIOKES MU60 POWER TRANSFORMERS

200/250 volt, output 385/385 v. 60 M.A. 5v. 2 amp. 2.5v. 4 amp. C.T. List Price 15/-.

At Vealls 9/-

RADIOKES U80 POWER TRANSFORMER.

200/250 volt, output 385/385 v., 80 M.A., 5v. 3 amp., 2.5 v. 6 amp., 2.5 v. 3 amp. List Price 18/-.

At Vealls 10/10

RADIOKES U100 POWER TRANSFORMERS

200/250 v., 385/385 v., 100 M.A., 5v. 3 amp., 2.5v. 3 amp., 2.5v. 6 amp. C.T. Usually 19/-.

At Vealls 11/5

RADIOKES AUDIO TRANSFORMERS.

Type AFAB. Class A-B for 42 Driving 42 Osc. Valves. List Price 25/6.

At Vealls 17/1

RADIOKES DIALS.

DC1 Standard. List Price 15/-.

At Vealls ..... 7/6 each

DC2 Colour Vision World Range. List Price 17/6.

At Vealls ..... 8/9 each

RADIOKES I.F. TRANSFORMERS.

T465. List Price 5/6 . . . . AT VEALLS 3/4
T175. List Price 5/6 . . . . AT VEALLS 3/4
ST175. List Price 8/6 . . . . AT VEALLS 5/1
QS175.—List Price 7/6 . . . . AT VEALLS 4/6

NO MATTER HOW GOOD YOUR CHASSIS MAY BE IT CANNOT REPRODUCE PERFECTLY WITH AN INFERIOR SPEAKER.

MAGNAVOX

THE WORLD'S MOST FAMOUS SPEAKER.

STANDS ALONE

That is why Australia's leading manufacturers have used Magnavox exclusively in their high-class receivers. You, too, may now fit a Magnavox to your set. Note the new low prices.

NEW LOW PRICES

Permagnetic Types.

Type 382 PM.	12" Cone, 37½ oz Magnet	65/-
Type 380 L	10" Cone, 37½ oz Magnet	55/-
Type 380 H	10" Cone, 26½ oz Magnet	46/-
Type 388 M	10" Cone, 21½ oz Magnet	41/6
Type 380 M	8" Cone, 21½ oz Magnet	38/-
Type 388 S	8" Cone, 13½ oz Magnet	35/-
Type 086 S	6" Cone, 13½ oz Magnet	32/-

DYNAMIC FIELD TYPES

Type 512 High Fidelity, made in U.S.A. 2500 ohms. Any transformer £15/15/-
Type 182 12½" Cone. Any field or trans. . . 44/-
Type 180, 10½" Cone. Any field or trans. 35/-
Type 188, 8½" Cone. Any field or trans. . . 30/-
Type 968, 8" Cone. Any field or trans. . . 24/6
Type 186X, 6½" Cone. Any field or trans. . . 24/-
Type 54XB, 8" Cone. Not dustproof 27/6

ASK VEALLS TO QUOTE

Vealls can quote you exceptionally low prices for your radio or electrical needs. Ask for special prices on "A. R. World" Kits.

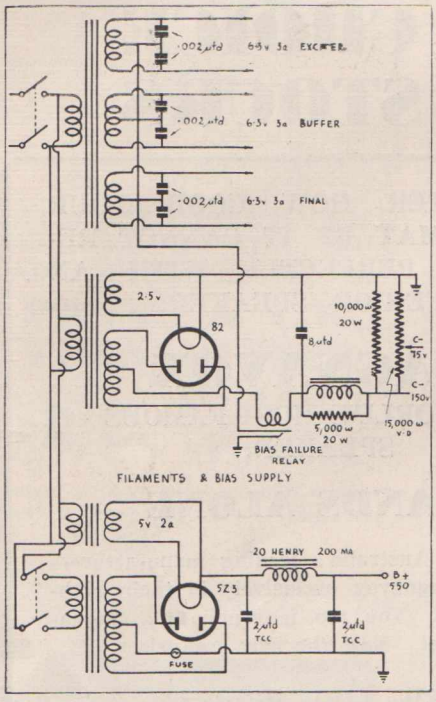
THE FASTEST MAIL ORDER SERVICE IN AUSTRALIA.

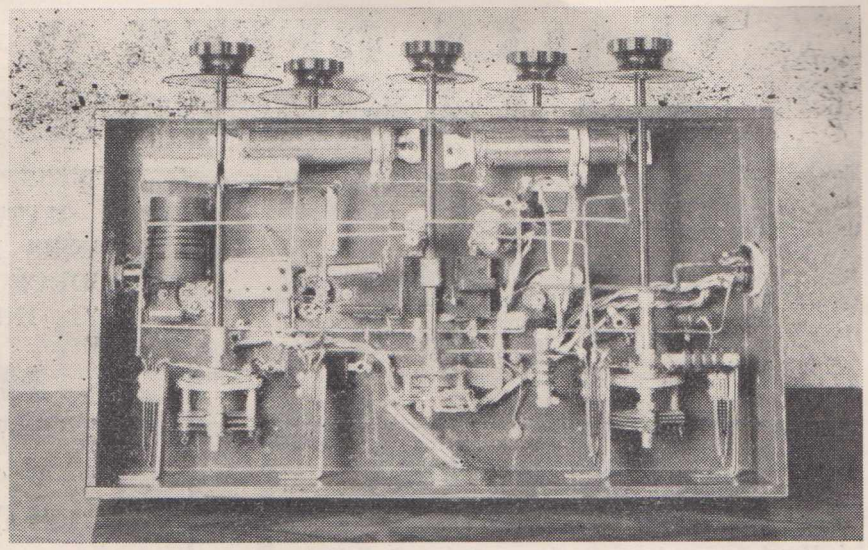
Prompt same-day despatch of all Mail Orders. Individual expert attention to every order—big or little.

ARTHUR J. VEALL PTY. LTD.

Address all correspondence to Box 2135 G.P.O., Melbourne.

490 Elizabeth Street, Melbourne. F 3145.
168 Swanston Street, Melbourne. C 10524.
3-5 Riversdale Road, Camberwell. W 1188.
243 Swanston Street, Melbourne. C 3059.
299-301 Chapel Street, Prahran. Wind. 1605.
97-99 Puckle Street, Moonee Ponds. FU 7822.





An underchassis view of the exciter unit, showing the arrangement of parts. On the left is shown the circuit of the three power supplies.

failing the valves are protected to some extent.

The next unit is the exciter, which will be explained in some detail later. The top unit comprises the buffer amplifier and final amplifier. This consists of a pair of 802's in push-pull driving and inductively coupled to a pair of 809's in push-pull, driven to 150 watts input.

The original exciter was designed around a circuit developed by L. Reinartz, of the R.C.A. Company in America, and consisted of an 802 crystal oscillator on 40 metres, capacity coupled to an 807 with the tanks of both valves in inductive relationship. The output from this arrangement was then link-coupled to an 807 doubling to five metres.

It was found that the 807 doubler on five metres was extremely easy to drive. In fact, five mills. was more than sufficient with —75 volts on the grid of the 807. However, the efficiency of the valve at that frequency

HAMS !

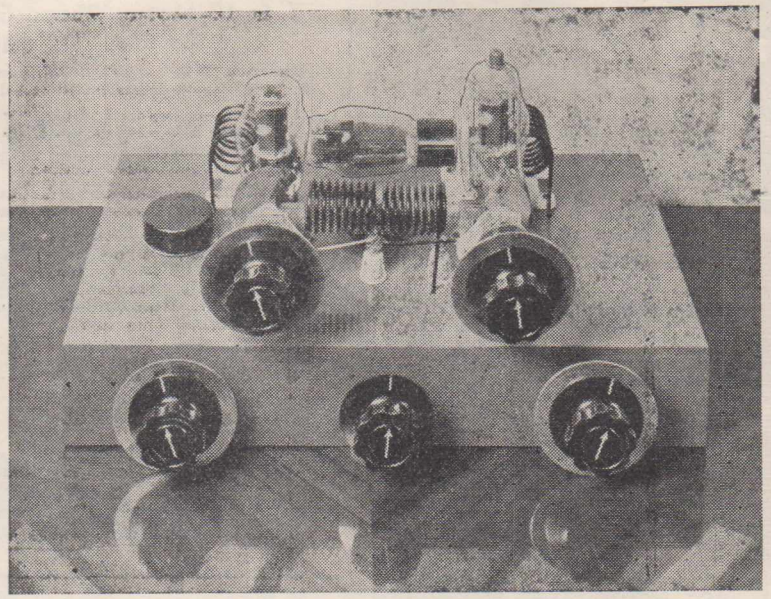
. . . . build the

TWO-BAND U.H.F. TRANSMITTER

described in this month's issue.

Be first to work a VK on "Five!" We can supply a complete kit of parts for this transmitter at a special nett price to amateurs.

WRITE NOW FOR OUR QUOTE.



FIELD STRENGTH METER

A field strength meter is an essential in every amateur shack. Write for our quote on the instrument described in this month's issue.

NOW YOU CAN BUY REAL VITREOUS ENAMELLED RESISTORS

Ohmite manufacture the most reliable range of resistors in the field—10- and 25-watt adjustable types up to 10,000 ohms, 50, 100 and 200 watt up to 100,000 ohms, and fixed types in all wattage ratings and resistance values. Prices are right.

HERE'S A REAL METER FOR YOUR BENCH TEST

The new "9" Hoyt Cyclops is accurately calibrated and easily read at a distance of six feet or more. A.C. and D.C. Volts 0-10-250-1000. Resistance Lo-range, 0-500 ohms. Hi-range, 50-500,000 ohms. D.C. Milliamps. 0-10-250 m.a. Meter mounts on panel and the separate control unit is carried where required and contains all shunts, resistors, etc. Very attractive appearance and sturdily constructed, supplied complete with test leads. The best value we have offered.

Your Nett Cost £10

NEW MEISSNER ALL-WAVE TUNING UNIT —9.25 TO 565 METRES

Here is the finest foundation unit for a real communications receiver that your money can buy. Accurately calibrated, aligned, padded and checked for sensitivity, electric bandspread, slide rule dial, large 9" scale, spin dial tuning, ceramic insulation, bandspread condenser. Band setting and bandspread controls—better than 1 m.v. sensitivity.

Model 13-7606—Your Nett Cost £14/10/-

"MEISSNER" COIL ASSEMBLIES, TRANSFORMERS FOR I.F., NOISE SILENCER, B.F.O. CRYSTAL FILTER. (Limited number, Meissner and Ohmite Catalogues—Send for yours now.)

ONE-FOUR PORTABLE FIVE

The "One-Four" Portable Five" described in this and last month's issue of "Radio World" was the first portable to be featured using the sensational new 1.4-volt valves. Light, compact, no accumulator to worry about, this receiver represents the last word in portables. Write now for our quote.

TRANS-TASMAN ALL-WAVE P.B. FIVE

This is not just another radio receiver; look over its many features. All-wave coverage from 16 to 150 metres and 200 to 550 metres, then automatic tuning of six broadcast stations, ultra-modern circuit employs an entirely new output tube, attractive oval four-colour dial, accurately calibrated, and all main short wave bands clearly indicated. Truly an ideal low-priced kit for the ham, DX enthusiast or for a second set in the home.

Complete with valves and speaker £11/18/6

U.T.C. HIGH FIDELITY AUDIO UNITS

Designed for broadcast and all quality amplifiers—the frequency range is flat from 30 to 20,000 cycles—series L.S., H.A. and "A."

Write for Full Particulars.

COMPLETE AUDIO AMPLIFIERS

Ideally suited for all P.A. or modulator service. Power outputs from 15 to 120 watts. Provided with high and low gain input channels.

"FEAR'S FOR EVERYTHING IN RADIO"

F. J. W. FEAR and CO.

31 WILLIS ST., WELLINGTON, N.Z.

Telegrams - - - - - - - - - - - - - - - "FEAR"

South Island: Radio Warehouse Co., Christchurch.

5 & 10-Metre 'Phone & C.W. Transmitter—List of Parts

(Exciter Unit Only.)

1 chassis 16¼" x 10" x 2½" built of ¼" kauri, impregnated and ducoed.

6 sockets—1 5-pin, 1 6-pin, 1 large 7-pin, 1 8-pin (Raymart), 2 6-pin (Amphenol).

1 2-pin output socket (Dalton).

2 feed-through insulators (Birnbach).

6 1" stand-off insulators (Birnbach).

1 30 mmfd. Isolantite midget variable condenser (Raymart).

1 50 mmfd. Isolantite midget variable condenser (Raymart).

2 100 mmfd. Isolantite midget variable condenser (Raymart).

1 dual-wave switch.

4 3" dials (Raymart).

1 2¼" dial (Lekmek).

1 40-metre crystal in holder.

4 closed circuit jacks.

4 2.5 millihenry r.f. chokes (Raymart type CHN).

1 5-metre r.f. choke.

3 resistor strips for mounting links.

2 aluminium brackets. (These mount on stand-offs underneath the chassis and support midget variables.)

2 feet extension shafting and 5 couplers.

RESISTORS:

1 1,000 ohm 20 watt (I.R.C.).
2 15,000 ohm voltage dividers (I.R.C.).
1 50,000 ohm 1 watt (I.R.C.).
1 50,000 ohm 2 watt (I.R.C.).

CONDENSERS:

1 .0001 mfd. mica (T.C.C. Type HV).
5 .004 mfd. mica (T.C.C. Type HV).
3 .01 mfd. mica (T.C.C. Type HV).
2 .05 mfd. tubular condensers (T.C.C.).

VALVES:

1 6L6G, 1 802, 1 807 (Radiotron).

MISCELLANEOUS:

12-gauge enamel wire for coils, 2" length of 1½" former, 2 grid clips, wire, nuts and bolts, solder tags, etc.

was not very good. The resonant dip was from 85 mills. off resonance to 45 mills., which was not considered enough.

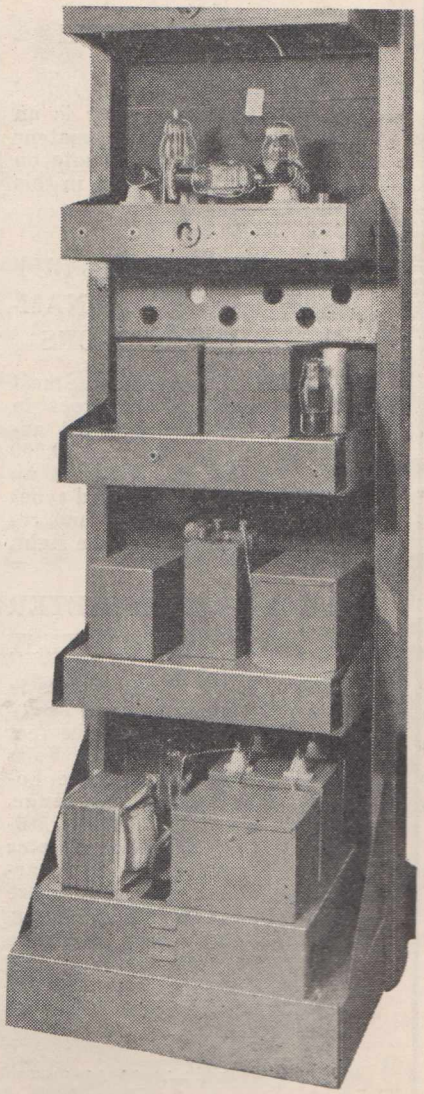
802 Gives Better Efficiency.

An 802 was then substituted. This resulted in an increase in efficiency, and the valve was driven to 7 mills. grid current. The valve ahead—an 807 with 500 volts on the plate—could drive the 802 to 25 mills. grid current. It was then decided to substitute the 802 oscillator with a 6L6G, reduce the input on the 802, and increase the efficiency of the valve by inserting a 50,000 ohm grid resistor, which then developed —325 volts on the grid. This drives the 807 to 5 mills. grid current, which is more than enough to drive the 802 doubling to 5 metres.

To some the oscillator doubler section with the tank coils in inductive relationship may seem wrong. Nevertheless, it must be remembered that the 40-metre tank has quite a strong second harmonic output, and thus in addition to getting the straight drive it is also getting the second harmonic content.

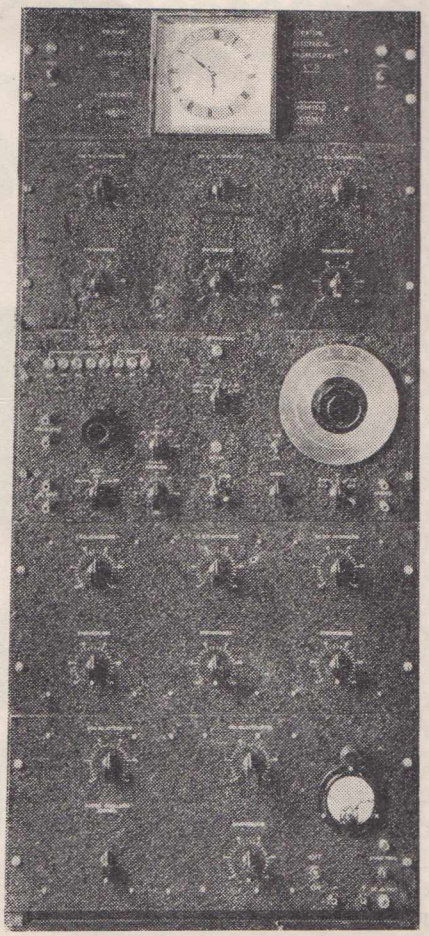
The 802 works equally well mounted vertically or horizontally, though if it is mounted vertically care must

(Continued on page 48.)



This view shows the three power supply racks. The bottom unit is the power supply for the buffer and final amplifier, while the next unit is the H.T. supply for the exciter rack. The third unit from the bottom comprises a filament transformer with three 6.3-volt windings for the exciter, buffer and final, and also the bias supply pack.

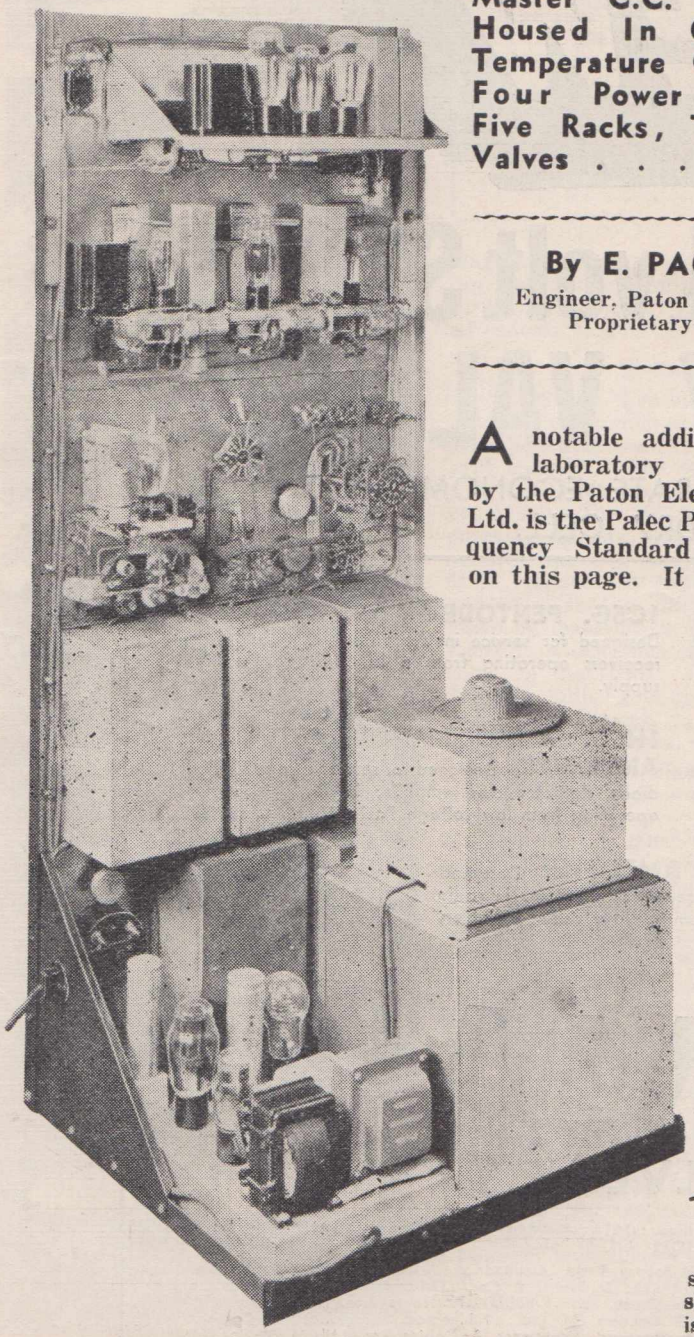
Palec Primary Frequency Standard



Accuracy To Within .0001 Per Cent Can Be Maintained By Checking Against Observatory Time ★ Master C.C. Oscillator Housed In Constant Temperature Oven ★ Four Power Supplies, Five Racks, Twenty-six Valves . . . . . .

By E. PACKER
Engineer, Paton Electrical Proprietary Ltd.

A notable addition to the laboratory maintained by the Paton Electrical Pty. Ltd. is the Palec Primary Frequency Standard illustrated on this page. It can be used to check and calibrate with extreme accuracy all forms of frequency-generating devices, whether audio or r.f. As a general rule, a frequency standard is particularly difficult to maintain, because there are so many variables that can affect accuracy. However, the Palec Frequency Standard overcomes this serious drawback in a particularly ingenious way, in that by checking the electric clock incorporated in the instrument against Observatory time, the accuracy of the master controlling oscillator is always known, and can be maintained indefinitely to an accuracy of within plus or minus .0001 per cent.



In any standard of frequency, the degree of accuracy depends on how stable the master control or generator is over a period of time. For this reason, in the "Palec" instrument great care has been taken in the

The photograph above shows a general view of the instrument, while on the left is a rear view, taken with shield covers removed. The box on which the large dial is mounted horizontally is the constant temperature oven.

design and construction of the master oscillator. The frequency-governing portion of the circuit is housed in a constant temperature oven which is controlled by a sensitive thermostat, and in addition to this the valve itself is highly stabilised by a resistance-controlled negative feedback circuit. The resistances used are likewise temperature-controlled.

Frequency Of Operation Independent Of Valve Characteristics.

In the circuit employed, the frequency of operation is independent of valve characteristics, thus eliminating sources of error and drifts due to voltage variations on the valve electrodes. Nevertheless, even with this highly stabilised circuit, added precautions have been taken by having all electrode voltages stabilised to such a degree that changes in line voltage up to plus or minus 20% do not alter the electrode voltages more than 0.2 per cent.

The tuning range of this oscillator is plus or minus 5000 cycles at 500 k.c.'s. This figure was chosen for the purpose of accurate adjustment of frequency in conjunction with the synchronous electric clock as will be described later. The output of the master oscillator is coupled via a buffer stage to a 500 k.c. symmetrical multi-vibrator, which synchronises exactly with the master oscillator frequency. The 500 k.c. multivibrator in turn locks in with 100, 25 and 10 k.c. multi-vibrators. The last-named again controls 1000, 100, 50 and 10 cycle multi-vibrators.

All Multi-Vibrators Are Isolated.

All these multi-vibrators are isolated by buffer stages from each other, and are separatley shielded as well. The power supply to them all is stabilised against variations in line voltages.

The 500, 100, 25 and 10 k.c. multi-vibrators have their outputs so designed that the higher order harmonics are very much increased in output, compared to the low order harmonics. The 1000, 100, 50 and 10-cycle multi-vibrators have their outputs fed to low pass filters, thus eliminating their harmonics.

The frequencies of all the multi-vibrators are controlled by the master oscillator, and they are therefore exactly of the same accuracy. In this way is obtained a range of frequencies that covers the entire r.f. and a.f. spectrum, for each multi-vibrator is capable of generating detectable harmonics of an extremely high order —as high as the 600th or more in some cases. These harmonics also are of the exact degree of accuracy as the 500 k.c. master oscillator.

From a central control panel, it is

possible to switch into circuit any desired multi-vibrator, so that any harmonic sequence can be selected and attenuated at will. Also, from this same panel a 400-cycle internal Collpits oscillator can be switched into either the 500, 100 or 25 k.c. multi-vibrator circuits, thus modulating them at that frequency. This is for the purpose of providing marking points for the quick checking and calibration of other frequency generators, etc.

50-Cycle Voltage Drives Clock.

The output of the 50-cycle multi-vibrator is coupled to a driver stage, which is again coupled via a filter network to a power amplifier, that also has its output filtered so that the waveform of the output voltage is very nearly sinusoidal. This output voltage is then used to drive a synchronous electric clock that keeps correct time when supplied with exactly 50 cycles from the 50-cycle multi-vibrator.

This clock is daily checked against observatory time, and thus the accuracy of the master controlling oscillator is always known. Taking an extreme case, if the clock were to show a loss of one minute in 24 hours, this would indicate that the 500 k.c. master oscillator was in error by 0.07 per cent., or 350 cycles out in 500,000 cycles. Actually, though, the error in this instrument can be adjusted to half a cycle or better at 500 k.c., giving an accuracy to within plus or minus .0001 per cent.

Identifying An Unknown Frequency.

From the control panel any desired harmonic sequence can be switched to either output terminals for external use, or to an internal high gain receiving set covering a range of 50 k.c. to 20 m.c. The unknown frequency it is desired to measure is fed into this receiving set, and a stable heterodyne frequency meter is then made to beat against the unknown signal. The unknown signal is then dispensed with, for it has been transferred to the heterodyne meter. The 10 k.c. harmonic sequence of the standard frequency is then coupled to the receiving set and the heterodyne meter is also coupled to the same set. This results in an audio beat note of 5000 cycles or less; this beat note is then compared to an audio frequency generator with the aid of a cathode ray oscillograph. The unknown frequency is then the frequency of the nearest harmonic of the 10 k.c. standard plus or minus the frequency in cycles of the audio beat note as measured by the audio generator. The audio generator is itself from time to time checked for drift by checking against the 10, 50, 100 and 1000 cycles output of the standard.

Calibrating Audio Frequency Generators.

In calibrating beat frequency oscillators or other types of audio generators, etc., the 10 cycle standard is coupled to one set of plates of a cathode ray oscillograph, and the oscillator to be calibrated is adjusted until a frequency ratio of unity is shown on the screen of the cathode ray oscillograph by means of a pattern called a Lissajous figure, the oscillator is then of the same frequency as the standard 10 cycles. Then by adjusting the oscillator until a 2:1 pattern appears on the screen, the 20-cycle calibrating point is obtained. Then with a 3:1 ratio for 30 cycles, and so on, until 100 cycles is reached. Then by means of the 50 cycle standard multiples of 50 cycles are obtained, the same applies to the 100 and 1000 cycle standard frequencies. By this means it is possible to accurately calibrate audio oscillators up to 10,000 cycles.

Palec Frequency Calibration Service For Radio Trade.

Mr. F. H. Paton, principal of Paton Electrical Proprietary Ltd., advises the radio trade that the company is prepared to undertake the frequency calibration of equipment, using the new Palec Frequency Standard described in these pages.

In the calibrating of R.F. oscillators a receiving set takes the place of the cathode ray oscillograph, and here we have the harmonics of the Also adjustments to a grid-modulated 10, 20, 100 and 500 k.c. standard frequencies available for calibrating r.f. oscillators.

Transmitters, receiving sets, wave meters whether of the heterodyne or absorption type, beat frequency oscillators, audio oscillators, tuning forks or any other frequency generating apparatus, can be checked or recalibrated with the aid of the frequency standard to a high degree of accuracy, far in excess of normal requirements.

26 Valves And Four Power Supplies.

It is interesting to note that 26 valves are incorporated in this instrument, and 4 separate power supplies are required to energise them.

Radio Ramblings

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

★ ★ ★

Repairing Loose Grid Caps.

Possibly every reader has at some time or other experienced trouble with the grid cap on a valve coming off, leaving a short piece of wire still projecting through the glass envelope. It is generally too short to permit of the cap being soldered back on again.

One way to effect a repair is to obtain a "dud" metal valve and remove the cap, which is much smaller than that used for a glass type. Drill a small hole in the top of the cap and then fill it with seccotine. Place the cap over the wire on top of the valve, solder securely, and allow seccotine to dry.—P. N. Watson, 17 Walker St., Townsville, Queensland.

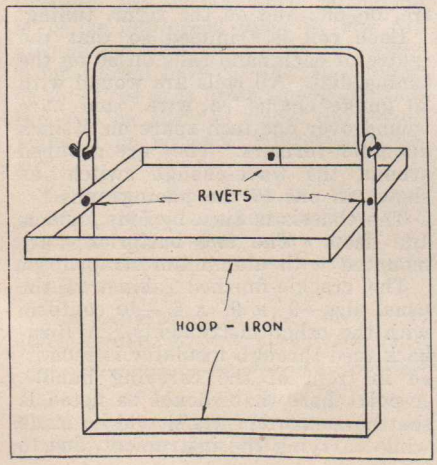
★

A Battery-Carrying Crate.

Owners of vibrator sets will appreciate this description of a battery-carrying crate, which is most useful if an accumulator without a carrying handle is in use. Also, it is just the thing for six-volt car batteries which are heavy and awkward to transport without a handle.

Two pieces of hoop-iron about 1in. wide and $\frac{1}{8}$in. thick are required. Bend one piece to fit around the accumulator an inch or so from the top and rivet the ends together half-way along one long side. The second piece of hoop-iron is made to fit down one end, underneath the bottom and up the other end of the battery, and is riveted to the other piece on each end. Each end of the last piece of hoop-iron should project an inch higher than the top of the battery so that holes can be punched or drilled for the handle.

The handle, which can be made from a piece of No. 8 wire, may be improved by passing it through a short length of garden hose.—H. W. Unger, Alectown, via Parkes, N.S.W.

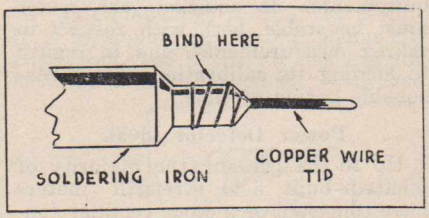


★

Two Useful Hints.

The following hint will be found useful for soldering in awkward places. As shown in the illustration, a length of heavy gauge copper wire is wound around the tip of the iron. The length projecting can be adjusted to one's individual requirements, and when tinned, readily carries the solder to the required spot.

A matt finish which gives a superior appearance to aluminium is obtainable in the following manner. Prepare a 20 per cent. solution of caustic soda. After the caustic soda has dissolved, add as much common salt as the solution will absorb. Heat this solution and place the aluminium in it for about half a minute. Wash



it under a tap and then re-immerse it, this time scrubbing it with a hard brush. When the matt finish has appeared remove the metal, wash it well and dry it, preferably in sawdust.—F. A. Burke, 1 Seaview Street, Waverley.

★

Handy Coil Rack.

I have not long completed the a.c. version of "Empire All-Wave Three," and I consider it excellent for a receiver of its size. I have it working in conjunction with the power pack described.

I am enclosing two ideas for the "Radio Ramblings" page. The first is a convenient rack to hold coils when they are not being used in the set. For the shelf, obtain a piece of wood about 2½in. wide and of convenient length (depending on number of coils), and drill holes to take ⅜in.

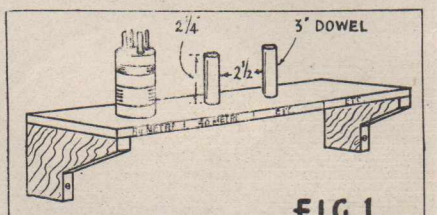


FIG.1.

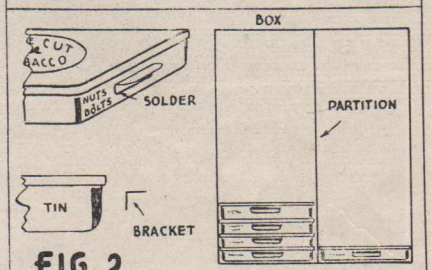


FIG.2.

dowel about 2½in. apart. The dowels, which should be about 2¼in. long, are then glued in the holes. Next make brackets to hold shelf, screw to wall, and place the unwanted coils over dowels. The frequencies the coils cover may be printed neatly on the front edge of the shelf.

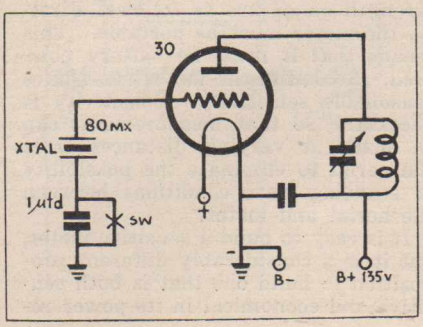
The other tip is to get a number of old cigarette tins (preferably flat type) and in the centre of the narrow side, solder a small bracket to form a tag. The tins may be piled on top of one another in a small box, and resistors, condensers and odds and ends may be kept in them with the name of each scratched on the tin or else printed on paper and glued on the tin.—A. M. Cardwell (AW331DX), Christchurch, N.Z.

★

Automatic Transmitter.

The accompanying circuit will oscillate in a series of dots as long as the power is connected. To start, the

(Continued on page 46.)



Test Equipment . . . 6

Building A Field Strength Meter

High sensitivity and low running costs are features of this field strength meter for amateur transmitter use

By W. McGOWAN (VK2MQ)

A field strength meter is an essential for the amateur who is interested in experimenting with antennas. Such a meter is a necessity when tuning an array of the close-spaced type, in determining maximum gain in the forward direction and greatest attenuation in the backward direction. A more common use of the field strength meter is in comparing the outputs of the transmitter when working into the antenna. Also, during adjustments to a grid-modulated or class "B" linear transmitter, it is difficult to determine without a field strength meter the comparative outputs of the rig under different operating conditions.

Main Requirements.

Main requirements of a field strength meter are as follows: Firstly, the meter must be portable. This means that it must be battery powered. Secondly, the meter must have reasonable sensitivity. Sensitivity is necessary, so that measurements can be made at varying distances from the aerial to eliminate the possibility of standing wave conditions between the aerial and meter.

It is easy to build a sensitive meter, but it is a considerably different proposition to build one that is both sensitive and economical in its power requirements. In addition, the meter must be stable, both with respect to taking measurements, and in regard to holding its calibration over a reasonable period of time.

Power Detector Ideal.

Up to the present, the majority of amateur-built field strength meters have consisted of a diode rectifier connected to a milliammeter. This particular type fulfils the above requirements, except that of sensitivity. In addition, it gives no power gain, and also the diode takes power from the incoming signal to actuate the indicating meter.

When all these things are taken into consideration, it appears a difficult proposition to find a circuit answering to all these requirements. However, it so happens that the common biased or power detector is ideally suited to the job. Only one low drain valve is required. The circuit is sensitive, only a small power input is required to produce a comparatively large plate current change, and none of the power picked up in the aerial is taken to actuate the indicating meter.

In the instrument shown, a 32 type valve is used, connected as a triode. Two batteries are required for the plate, filament and bias supplies. The plate voltage is 22½ volts, the bias about 2½ volts and the filament the rated value of 2 volts. Under normal use the batteries should give a useful life of from six to nine months.

Constructional Details.

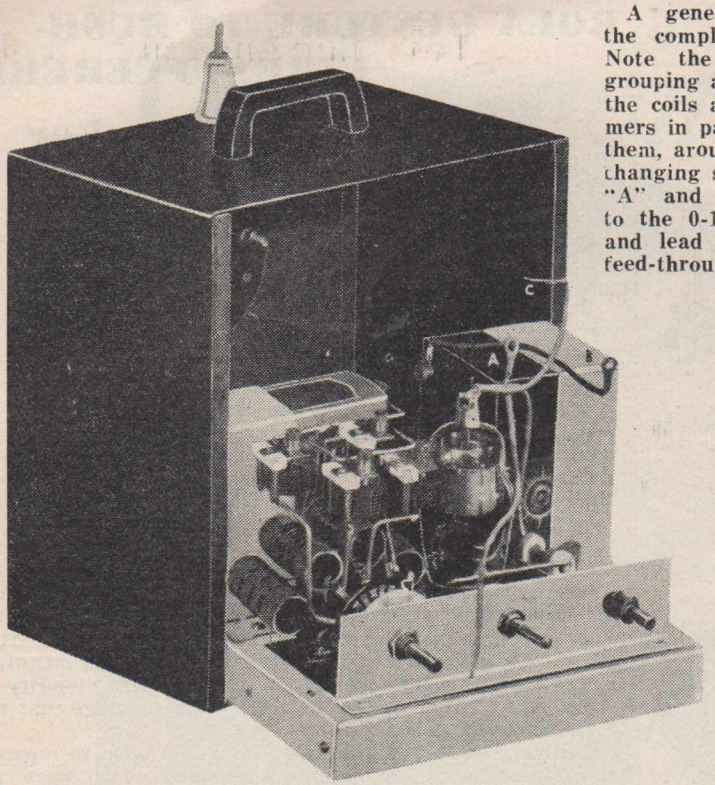
In the unit shown there are six coils, one each for 5, 10, 20, 40, 80, and 160 metres. These are tuned by a 50 mmfd. variable condenser, all coils being separately trimmed with a 50 mmfd. air trimmer.

There are three controls: that on the left is wave-change; in the centre, on/off; and on the right, tuning.

Each coil is trimmed so that the centre of each band falls on 50 on the tuning dial. All coils are wound with 20 gauge enamelled wire and are wound over one inch spare on ¾-inch diameter formers. They are grouped around the wave-change switch, as shown in one of the photographs.

The chassis is 8ins. by 5ins., and is 1in. deep. The two batteries are mounted with aluminium straps.

The crackle-finished cabinet is the usual size—9" x 9" x 6"—to conform with the other instruments. A Birnback feed-through insulator is mounted in front of the carrying handle. A point here that should be noted is that no measurements should be made while carrying the instrument, due to



A general view of the completed chassis. Note the method of grouping and mounting the coils and air trimmers in parallel across them, around the band-changing switch. Leads "A" and "B" connect to the 0-1 m.a. meter, and lead "C" to the feed-through insulator.

Field Strength Meter—List Of Parts.

1—crackle-finished steel cabinet. 9" x 9" x 6", with handle.
1—chassis, 8" x 5" x 1", stamped and drilled.
1—feed-through insulator (Birnbach).
1—50 mmfd. variable condens r.
6—50 mmfd. air trimmers.
1—6 x 1 Yaxley switch.
1—4-pin socket (Steatite).
1—15 ohm wirewound resistor (I.R.C.).
1—32 type valve.
1—.002 mfd. mica condenser (Simplex).
1—on/off rotary switch.
1—0-1 m.a. meter (Calstan).
1—indicator plate.
3—knobs, G.R. type, 2 2", 1 1".
1—4½-volt "C" battery (Ever Ready).
1—22½-volt battery (Ever Ready).
1—grid clip, solder tags, nuts and bolts, etc.

the capacitive effect between aerial and arm.

The 4½-volt "C" battery is used with the C-D½-volt terminal connected to earth and the "-3v." tapping connected to bottom end of 15-ohm series filament resistor as shown in the circuit. This arrangement gives an effective bias of 2½ volts.

Operational Details.

When the unit is first turned on, the 0 to 1 d.c. Calstan milliammeter will indicate about 20 microamperes of plate current flow. In an R.M.S. voltage indicator (of which this meter is a special type) it is always advisable to have some no-signal plate current flowing. As long as there is some plate current flowing through the valves when no signal is being impressed upon it, one can always be quite sure that the valve is not biased past cut-off. In a meter of this type it is quite important that the bias be slightly below the cut-off point, if an accurate indication is desired.

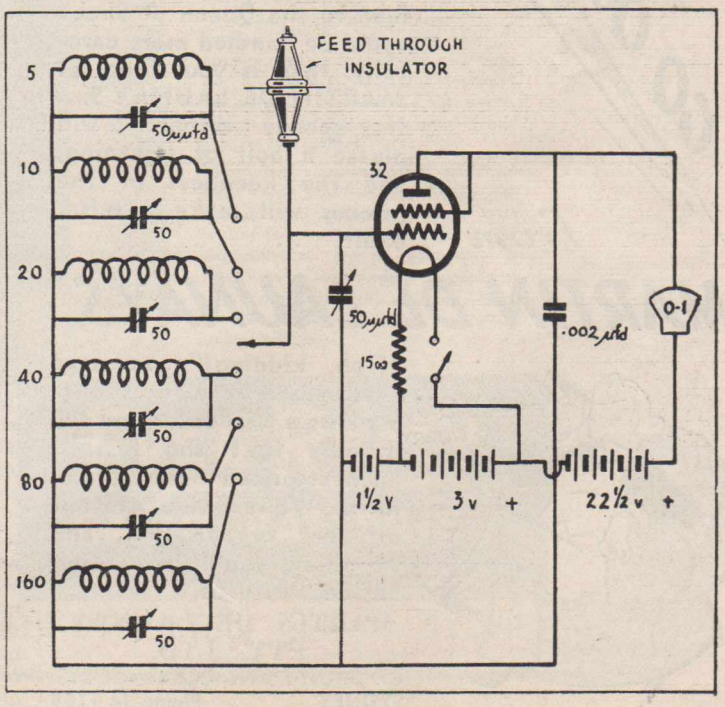
To return the meter to the zero position, it is only necessary to turn the zero adjustment screw until the needle points to zero with the meter in operation.

The calibration of the meter is quite simple, since the scale is quite linear as it stands. Here is the procedure.

Calibration Details.

Firstly, for calibration purposes the transmitter must have a class "C" amplifier stage feeding the aerial. If it is a plate-modulated 'phone rig all is well, but if the rig has a grid-modulated stage or class "B" linear in the final, one of the preceding "C" stages must be used to feed the aerial. In other words, the stage that feeds the aerial must be linear with respect to plate voltage variations. Class "C" stages of 'phone rigs usually answer to this requirement. At least, they are usually quite linear as the plate voltage is reduced from the normal operating value, and that is the important part in making the calibration.

(Continued on page 46.)



Circuit of the field strength meter, which uses a single 32 connected as a triode power detector.

ROLA GESTURE TO BUSH-FIRE SUFFERERS

Free Speaker Repairs

This Rola speaker, salvaged from a house that was burnt to the ground, has been re-built as new.

ADVICE has been received that the Rola Company, loudspeaker manufacturers, of Melbourne and Sydney, is prepared to repair free of charge any loudspeaker damaged in the recent bush fires. Reproducers sent to the company for repair should be accompanied by a declaration signed by a responsible person as to the bona fides of the claim. Thereafter all repair and forwarding costs will be born by the company.

In making this offer the Rola Company do so in a genuine effort to help those who have lost heavily in the fires. Investigations by the company show that of the 1000 odd homes destroyed in the fires, about 750 were equipped with radio sets. A conservative estimate would indicate that about 600 of these were equipped with speakers manufactured by the company. By far the greatest majority of these can be repaired, irrespective of the damage that has been done.

Although the company has been called upon to repair a large number of reproducers, some of which were not more than mere shells, every one has left the factory every bit as good as new.

Salvaged Speaker Is Re-Built As New.

A case in point occurred in the Healesville district when a four-valve radio set made by Phillips and Sons of that town was destroyed. So great was the heat that destroyed this home that not a single item had been saved. In searching through the ashes the remnants of many former treasures were recognised. Even the radio set was located, a pile of ashes and melted steel, but much to his surprise the owner saw the framework of his Rola speaker.

As a curio more than anything else the frame was taken to Mr. Len Phillips, and by a mere chance came into the hands of the Rola Company. It had been used as a demonstration of the tenacity of the magnetism to withstand terrific heat.

On a careful examination it was found that every combustible part was destroyed—even the aluminium rivets holding the transformer had been melted. The transformer had disappeared, and the cadmium plating entirely peeled off.

Twenty-four hours after the frame arrived at the Rola factory, the speaker was ready for use again, absolutely as good as new. All the metal parts had been used again. The cone housing, the front plate and the suspension ring, after having been cleaned, were ready to do their job as though they had never been through fire. The magnet proved to be fully efficient, and when the speaker goes into the set that has been made to replace the destroyed one, it will be the only item of that unfortunate settler's household that will have been saved.

Discussing the ability of the speaker to withstand such terrific heat, the Rola Company stated that, while they were gratified to see how the speaker came through its test, they were not in the least surprised. Every item of material used in a Rola speaker is the subject of world research and selection, and they are built to withstand all manner of abuse. Furthermore, the repair department is ready and willing to handle a speaker in any form of disrepair. Their service in Sydney and in Melbourne is always available to public and trade alike.

Twelve months ago..

EVER READY PUBLISHED THIS ADVERTISEMENT

TO-DAY WE PRESENT THE PROOF

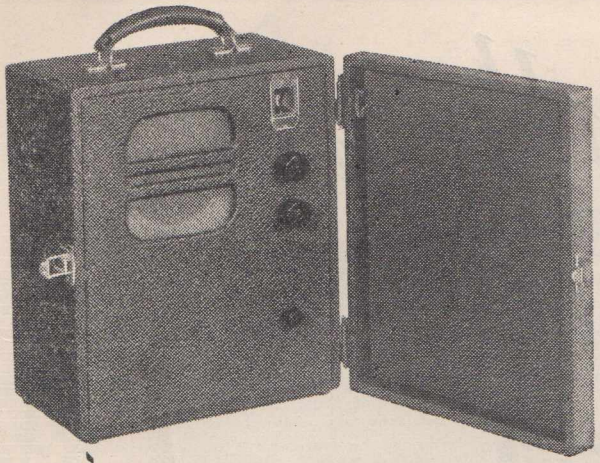
Twelve months ago The Ever Ready Company (Aust.) Pty. Ltd. published the above advertisement. It testified to the determination of The Ever Ready Company to "keep pace" with the needs of Australian broadcasting . . . To-day, with the announcement of an entirely new type of "A" Battery, specially designed for use with the new 1.4 volt valve, you see a practical example of this progressive policy.

Introduced simultaneously with the new valve itself—Every Ready engineers had completed their tests while the valve was still in its experimental stages abroad — it stands as an outstanding example of the manner in which Ever Ready serves the needs of the Australian Radio Industry.

NOTE.—Alert Radio dealers are urged to contact their manufacturers at once for details of the new 1.4 volt valve receiver. The ultimate answer to the country listener's problems, it is destined to be the big selling sensation of 1939.

EVER READY
RADIO BATTERIES

THE EVER READY CO. (AUST.) PTY. LTD. - - SYDNEY



Assembling And Aligning The . . . .

ONE-FOUR PORTABLE FIVE . . . . .

Complete Assembly Instructions With Point-to-point Wiring Plan. ✦ Alignment Procedure Outlined

AFTER the complete kit of parts has been assembled, the construction of the "One-Four Portable Five" is commenced by mounting the five valve sockets, which should be arranged so that the filament lugs face in the directions indicated on the under-chassis wiring diagram.

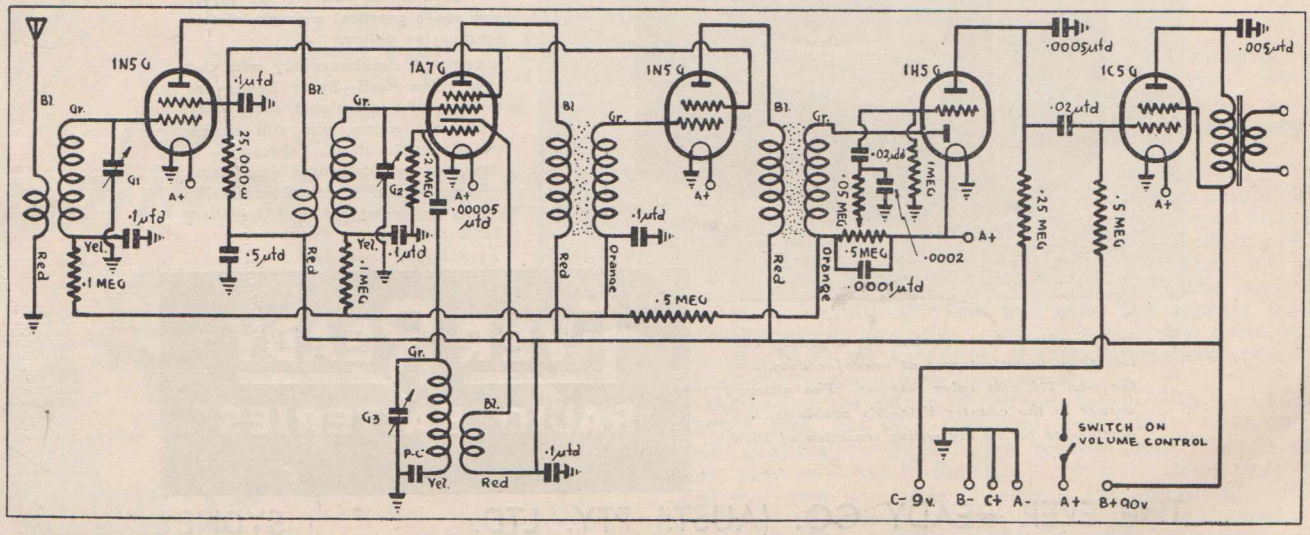
Wiring The Filaments.

The filament wiring can now be put in. The "A—" lug in each case can be joined either to a soldering lug screwed down underneath the nut of a convenient mounting bolt as shown in the wiring diagram, or else, commencing with the output pentode socket, these lugs can be connected together in turn and earthed at a single point. In the case of the receiver in question this point is a solder tag screwed down underneath the nut of the mixer-oscillator socket mounting bolt nearest the centre of the chassis.

Again commencing with the output pentode, connect all the "A+" lugs together, finally taking a lead from the 1N5G r.f. pentode to one side of the on/off switch mounted on the volume control potentiometer. The other side of this switch is connected by a lead running direct to the "A+" lug on the terminal strip mounted on the rear wall of the chassis.

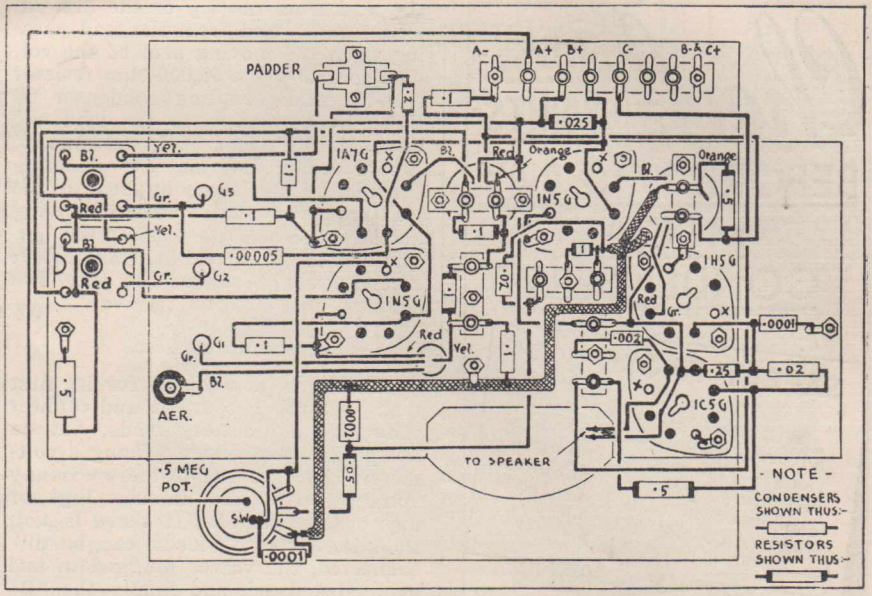
Next, a six-inch length of push-back is soldered to each of the fixed plates lugs underneath the condenser gang, and then the latter is bolted to the chassis, four brass spacers being used to mount it approximately half-an-inch above the latter.

The next step is to mount the aerial, r.f. and oscillator coils, the first being located above the chassis to the left of the condenser gang, and the other two being bolted underneath to



Circuit of the "One-Four Portable Five," re-published from last month's issue for the convenience of builders.

This point-to-point wiring plan should be studied in conjunction with the circuit on the opposite page, and the under-chassis view shown below.



the end wall, as shown in the under-chassis photograph.

Five Terminal Strips Required.

When the i.f. transformers are being mounted, a bakelite strip carrying a pair of lugs in the centre, should be mounted underneath each (see wiring sketch), by means of the i.f. transformer mounting bolts. In each case a pair of nuts is put on first, then the strip, followed by a further pair of nuts to lock the latter in place. The first pair support the strip clear of the chassis.

The wiring sketch shows that three further strips are needed, ⅜" brass spacers being used to keep these clear of the chassis. Three solder lugs are required on each, the mounting bolt in each case passing through the centre one.

A terminal strip carrying eight lugs is mounted on the rear wall of the chassis on ¼" spacers, and provides a convenient method of wiring in the six battery leads. Finally, the padder can be bolted in place and the set is ready for wiring.

Commencing at the aerial socket mounted in front of the condenser gang, wire the aerial coil and 1N5G r.f. amplifier socket. Next, the r.f. coil should be wired, followed by the 1A7G socket oscillator coil, first i.f. transformer, 1N5G i.f. amplifier socket, and so on until the wiring is completed. The colour code of the coil kit used is indicated clearly in the wiring sketch and in the circuit diagram published last month.

Short, Direct Leads Essential.

No difficulty should be experienced in completing the wiring, as it is perfectly straightforward, though it is imperative that all leads should be kept as short, direct and as well-spaced as possible. Pigtail components, particularly by-pass condensers, should have the shortest possible leads, and as well should be mounted as directly as possible to the points across which they are connected.

After the wiring has been completed, and before the battery leads are connected and the valves plugged in, a thorough check should be made. A good scheme is to try and re-draw the circuit from the wiring without reference to the sketches published. If the circuit is puzzled out in this way and put down on paper, any error in wiring will immediately become apparent on comparing this rough sketch with the original. Mistakes in any type of battery receiver are apt to prove expensive.

After the wiring has been thoroughly checked and passed, the six battery leads (three twisted pairs) should be soldered to the terminal strip. Carefully jot down the various colours and their designations.

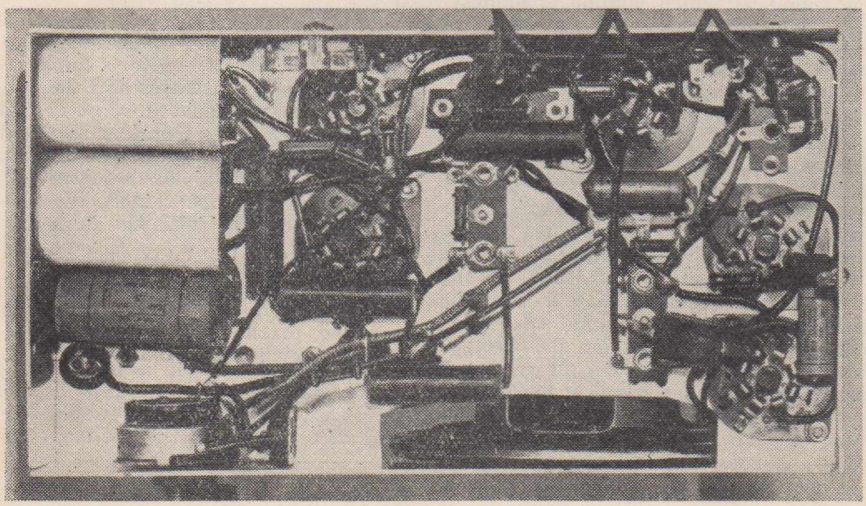
Mounting The Dial.

Now invert the chassis and mount the tuning dial. To do this, bend the slotted mounting bar back at right angles at a point so that when the dial is in position, the horizontal portion lies flat along the chassis. To avoid fouling one of the gang mounting bolts, it will be necessary to cut off a portion. A bolt with washer is passed down through a hole in the chassis, drilled half-way along the horizontal portion of the dial mounting bar. When tightened, it locks the dial securely in position.

One connecting lug of the dial lamp is next swung around till it touches the clip, and is soldered there. A 6-inch lead of pushback is soldered to the remaining lug and is taken down through a hole in the chassis, the other end being soldered to the lug on the on/off switch NOT connecting to "A+" and the terminal strip.

Lastly, the speaker is bolted direct to the chassis by means of the mounting bracket provided, and the two speaker leads are soldered to plate and screen of the output pentode. A 3-inch length of pushback is then soldered to each of the fixed plates lugs on top of the aerial and r.f. sections of the gang. The free ends of these terminate in midget grid clips fitting over the 1N5G r.f. pentode and 1A7G mixer oscillator respectively.

A grid clip can also be fitted to



This under-chassis view shows the completed wiring. Note the method of mounting the r.f. and oscillator coils horizontally underneath the chassis.

the lead from the top of the first i.f. transformer, and from the lead passing from the moving arm of the volume control via a 50,000-ohm resistor and .02 mfd. coupling condenser up through the chassis to the grid cap of the 1H5G. This lead, incidentally, should be shielded and the shielding earthed. The same applies to the lead from the volume control running across the chassis to pick up the bottom end of the second i.f. transformer secondary. These are the only two shielded leads in the receiver.

The First Test.

The set is now ready for its first test. Fit the two knobs and connect the two "B" battery leads, but do not plug in the valves. Using a voltmeter, check to see if there is any voltage across the filament lugs of any of the valves. If there is not, then the two "B" leads can be disconnected, the valves plugged in and grid clips fitted, and finally the "B" batteries can be connected up.

Attach a banana plug to the length of rubber-covered aerial wire supplied in the kit and plug it in the aerial socket. Switch on the receiver, turning the volume control well up, and rotate the dial. The set should sound "alive," and no difficulty should be experienced in picking up stations.

Instructions For Alignment.

To align the receiver, set the trimmer on top of the oscillator section of the gang about one third way out. The other two trimmers and the padder can be set approximately half way out. Then tune in a station on approximately 1400 k.c., and adjust the aerial and r.f. trimmers for greatest volume.

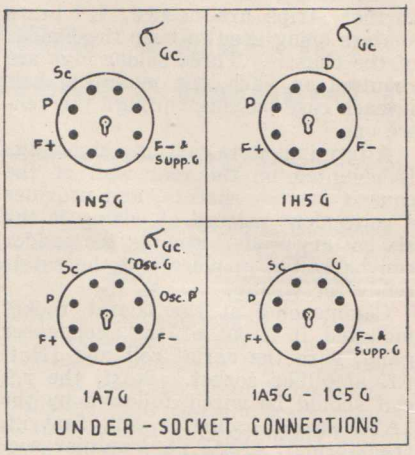
Then swing over to the other end of the dial to a station such as 2FC, turning the volume down low. Then adjust the padder, and at the same time rock the dial backwards and forwards over the station until the point is found at which volume is loudest. The idea of rocking the dial over the station is that as the padder is shifted, so the station's location on the dial changes as well, so that it is necessary to rotate the tuning control as the padder is being shifted in order to keep the station in tune.

This process can now be repeated, and the alignment is complete. The i.f. trimmers can be "touched up" a trifle if desired, though it is particularly important that they should not be moved more than a fraction of a turn at a time, and that the original positions of them are carefully noted so that they can be returned to their original settings if necessary.

While fair accuracy and alignment can be obtained by the method outlined above, if maximum sensitivity is desired it is well worth while having the set lined up with a service oscillator. At all events, it should be remembered that when aligning by ear, the volume should be kept down to a fairly low level as not only does this greatly reduce the a.v.c. effect, which tends to level out volume, but also slight changes in volume are much more apparent.

The Carrying Case Assembly.

With the set aligned and operating satisfactorily, the next step is to mount the chassis in the carrying case, the three pairs of battery leads being passed down through the horizontal partition to the battery compartment below via the hole provided. The aerial plug attached to one top hinge bolt by a length of flex as described last month is next plugged



into the socket, and the chassis is pushed right back in the cabinet. The leatherette-covered front panel is next placed in position and secured by means of two wood screws, one passing through each top corner into the angle piece behind. This suffices to hold the front panel firmly in position, though if desired the bottom of the panel can be bolted to the front of the chassis as well.

The photograph published last month showing the battery compartment flap open illustrates how the batteries are accommodated. Care should be taken to see the negative terminal of the 1.5-volt "A" cell cannot foul the Fahrenstock clips of the lower "B" unit. For the same reason, the bias battery is carried with the clips facing inward.

To prevent the "A" cell from moving around during transport, it is strapped to the lower 45-volt "B" unit by means of two rubber bands.

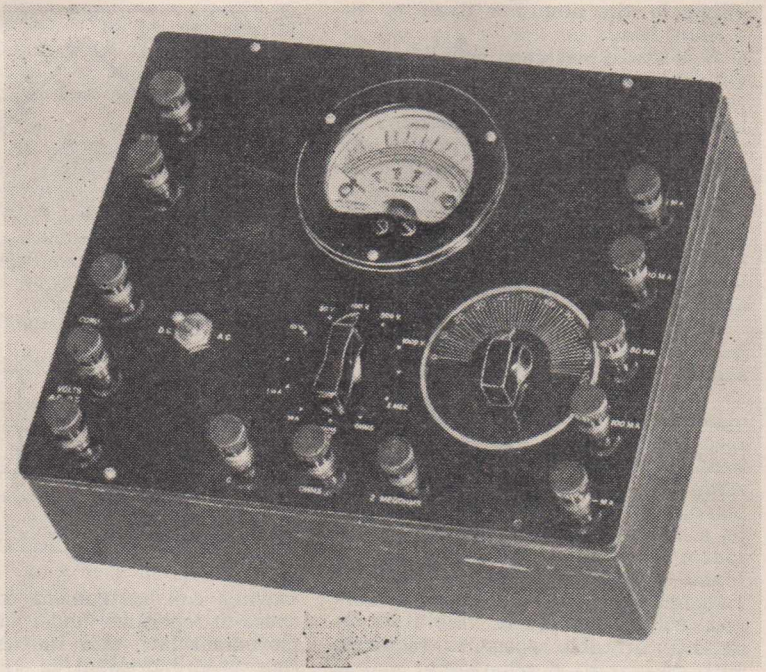
The sheet of gauze used for the lid aerial, and the length of rubber-covered wire carried in the battery com-

(Continued on page 46.)

Home Recording

Additional hints to experimenters are given in this instalment, which also describes some of the many applications of home recording equipment.

By J. C. WARREN and T. M. O'DONNELL.



The multi-meter shown on the right incorporates the circuit shown in Figure 2, and is used by the authors as a volume level indicator. The indicator plate and pointer provide a useful reference for duplicating different volume levels established by experiment as being the most satisfactory for different types of recording.

THE two previous articles on home recording dealt briefly with the main requirements for successful recording in the home, and the care exercised in the commercial field to produce the best possible results from the finished product. It may not yet be realised by the experimenter the great number of applications to which recordings can be utilised, and the various uses to which they are put in countries overseas, both for education and entertainment.

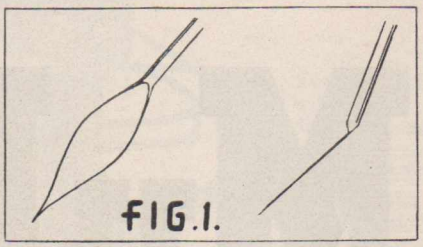
To the average home-recording enthusiast, possibly its simplest and most interesting application is that of "off the air"" programmes. In this case any favourite or outstanding item which is being broadcast, either on the medium or shortwave bands, can be recorded, and is available for reproduction when desired. Many of the well-known radio artists, both at home and abroad, have quite a considerable fan following, and records of their broadcasts are both unique and interesting.

Another ever-popular use is the recording of the voices of friends and relatives, in particular when it is intended to send these records to other people overseas. It will be realised that a message or greeting of this nature will give a great deal more pleasure to the recipient than the usual written letter, especially during festive seasons or on other similar occasions.

Music For Home Movies.

The home movie enthusiast, by the use of disc recordings, can provide his silent films with appropriate music or commentaries. For morse aspirants the code can be recorded and played back at different speeds. Amateur actors, musicians, or singers may record in the early stages of their tuition, and hear themselves as other people will hear them, thus being enabled to more easily correct their faults. Altogether, the applications are numerous, and the ingenuity and interest of the home-recording enthusiast will continually provide him with new and unusual fields in which to utilise his equipment.

In the commercial field, fresh uses are being found every day for the instantaneous playback discs, the first and most natural application being



the recording of programmes for radio transmission. Its importance in this connection cannot be over-estimated, because the modern radio programme demands faultless technical and artistic production. In spite of the ability of flesh-and-blood artists, errors are bound to creep into their work at times, sometimes resulting in embarrassment and trouble for the broadcasting station owners, whereas a recorded version can be checked and corrected (if necessary) before transmission.

Many of the schools which cater exclusively for radio broadcasting technique, now produce recordings of the voices of their students in order that their microphone appeal can be estimated, and also any peculiarities can be discovered and corrected.

Numerous firms have advertising contracts with commercial broadcasting advertising matter. In our picture theatres "talkie slides" are presented in conjunction with these disc recordings. There are many other commercial applications which space will not permit discussing here, but before passing there is one outstanding application worthy of mention which is being put to considerable use in America.

Recording Legal Evidence.

Statements from persons charged with crime are very often taken on a recording disc, thus providing undisputable evidence at the time of their arrest.

In our daily papers we very often read how an accused in court contradicts or denies his original statements made in the charge room, stating that at the time he was unduly pressed for certain evidence. The installation of suitable recording equipment would overcome this difficulty, and no doubt in the near future the authorities in this country will include it as standard equipment in our police stations and law courts.

Over Recording.

In making a recording the experimenter should make certain that his amplifier and controls are so adjusted that no distortion or overload occurs,

either in the amplifier itself or recording head.

A correctly-designed amplifier will eliminate any trouble in the first instance, while correct use of the gain control and careful instructions to the person recording will prevent the head being overloaded. It is most annoying when the person recording suddenly rushes up to the microphone before the operator can reduce his controls. A rehearsal is always advisable, as it will save quite an amount in spoilt records.

Of course, over-recording on short peaks is usually unavoidable, but it should be the object to avoid these as much as possible. In the case of massed instruments or certain speech recordings, short overloads are practically unnoticeable, but in string instruments such as the guitar, or a piano, slight imperfections stand out to a much greater degree. In the course of experiments, the guitar was found to be one of the most difficult instruments to record correctly. Correct volume level and absolute consistent turntable speed is required, with no variation whatsoever.

The Level Meter.

Mention has been made previously of the necessity of some form of volume level indicator. There are a number of types of indicators for this purpose, the most simple being the familiar rectifier-voltmeter. This consists of a good quality (D.C. movement) low resistance 0 to 1 or 0 to 5 m.a. meter which can be shunted across the D.C. output terminals of a copper oxide rectifier.

As the level used for cutting purposes will not exceed 5 watts, a copper oxide rectifier having a D.C. output of 5 m.a. will be suitable. A D.C. moving coil instrument is used because it operates under the linear movement law, and its scale indication is proportional to the average value of the current passing through it.

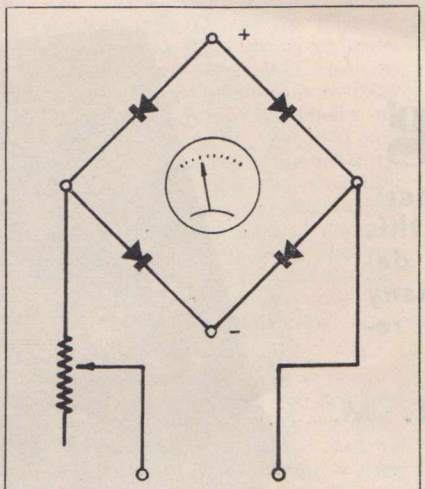


FIG. 2.

In order that a comparative check can be made on recording head levels, a variable resistance is inserted in series with the rectifier meter unit. (See Fig. 2.) The resistance should be controlled by a knob moving over a calibrated scale. Readers will readily see the importance of a variable control on the scale indication of the level meter, because when test cuts are being made there are times when overloads occur, resulting in cutting head distortion. The value of the variable resistance can be from 50,000 to 100,000 ohms.

In constructing a piece of apparatus of this nature, the unit may be made up in a small box as shown in the photograph, and with the aid of switches and various other resistances, can be converted into a multimeter with numerous other useful applications. Meters of this type have been described previously in this magazine, so the basic circuit only of the rectifier-meter is shown in Fig. 2. The experimenter may apply it to as many other uses as he wishes, at his own discretion.

Other types of volume indicators which will not be described in detail are the valve voltmeter, in which the degree of slide-back is adjusted so that the peak voltage only is read on the millammeter connected in the anode circuit of the valve. The neon tube indicator, which has no mechanical inertia, may also be used. This is certainly cheap to instal, but is rather unreliable in action.

The "magic eye" indicator is yet another type, the disadvantage being that the scale is rather small. There are other complicated systems used in commercial recording which will not be discussed here.

It should be remembered, however, that the rectifier type illustrated also has its limitations. A really true indication of the peak voltages cannot be obtained owing to the inertia of the moving parts. Nevertheless, in actual practice the disadvantages are not as serious as might first be anticipated.

A Test Record.

The enthusiast would be well advised to keep a "test" record. Before taking a complete recording of a studio item, it is a good plan to request the person at the microphone

to say a few words or play a few lines for the purpose of test, after the rehearsal has been made into a "dead" microphone. This enables the operator to ascertain whether any final imperfections are in evidence before recording on the main disc.

A 10" or 12" disc is preferable for this purpose, each test cut being over ¼" to ½" of the surface of the record. After these test cuts have been made and checked, the unfinished blank should be wrapped and put away—not left exposed to the air, as this will tend to harden the un-cut surface, with detrimental results on future cuts.

The Recording Room.

Under normal conditions recordings over the microphone may be taken in the same room which contains the entire equipment, providing the motor driving mechanism is sufficiently silent, and undue noise is not picked up by the microphone.

However, for the recording of high quality vocal or musical items, it is desirable to have a separate "studio." This may be the lounge room, where there are plenty of carpets and drapings, thus providing the necessary damping effect. The microphone and associated amplifier could be placed in this room, the output connecting with the main amplifier in the recording room.

Some kind of signal should be installed (for instance, a light controlled by the operator) to inform the artist when to start and when the record is almost finished. When both are within visual range, however, it is much more simple.

Timing The Items.

Care should be exercised in choosing a blank of suitable size which will accommodate the particular item being recorded. The enthusiast will readily be able to ascertain the exact playing time of the various discs and time his items accordingly.

Playback Needles.

In the playing back of soft acetate discs it is essential to use a very light pick-up, together with special needles of the "trailing" type to ensure long record life. An enlarged sketch of a needle of this type is shown on page 21.

These needles are so shaped that when correctly inserted in the pick-up they are inclined at a smaller angle to the record than the usual straight needle. The use of a heavy pick-up and ordinary needles will prove disastrous to the acetate record, which will be badly cut even after a few playings.

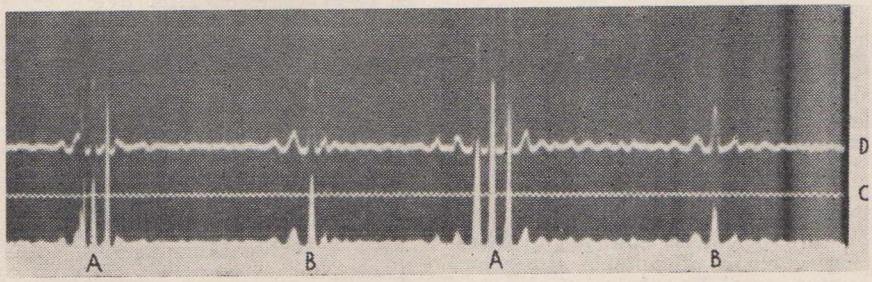
A very useful addition to the recording equipment is a good magnifying glass, as this enables a study of the grooves to be made, besides proving very useful for examining the cutting and playback needles for wear or damage.

A Final Summary.

The object of these articles has been to give the newcomer to this very fascinating field some idea of the use and essential requirements in recording, and to assist him to make successful "cuts" with as few failures as possible.

The idea should be to always make the best possible recording, as errors cannot be erased once they appear on a disc. Of course, with preliminary tests, failures are unavoidable, but in the few suggestions that have been offered, it is hoped that some beneficial hints will be found in this extremely interesting hobby.

Photographing Heart Beats



An electro-cardiogram of a heart-beat taken after the subject had performed physical exercises which shortened the resting period of the beat. "A" is the complex waveform of the first beat sound, caused by muscular contraction and closure of the inlet valve. "B" represents the second sound caused by closure of the outlet valve. "C" is the time-marker tracing (1 division equals 100th second), while "D" shows the identical tracing of heart sounds obtained by using a thin piece of wire in the beam from the lamp. It will be observed that this is not as good as the tracing at the edge of the film.

How Electrocardiograph Works ★ Radio Tests For Bush-Walkers' Club ★ Lakemba Radio Club Notes.

By W.J.P.

A few interesting details of the procedure adopted in making photographic records of heart beats is supplied by one of our medical students, Mr. I. Gardiner (VK2ABY).

The heart normally makes two sounds, more or less "lubb dup," to use medical terms. In diseases of the heart there may be added to these sounds a number of accompaniments which are divided into "extra sounds" or "murmurs." Thus the sounds from the heart may indicate abnormality in having (a) disordered rhythm of the sounds, (b) extra sounds or re-duplications, (c) murmurs present.

It is a comparatively easy matter to record on sensitised paper the wave-form of all the sounds emitted by the heart, and it has been found that the murmurs, sounds and re-duplications can be distinguished. This enables the exact time relations between each component of the heart sound to be worked out, a feat which can only be roughly estimated by a clinician armed only with the ordinary stethoscope with no means of making a permanent record.

When used in conjunction with an electrocardiograph — an instrument which records the changes in electric potential which accompany a normal heart-beat—a most complete record of the heart in action is obtained. The amplifier-oscillograph method of recording heart sounds has led to several advances in knowledge of the heart's action, enabling treatment to be put on a "sounder" basis.

At the Medical School of the University of Sydney, a W.E. contact type of microphone is used, which is held against the chest of the patient. A three-stage pre-amplifier is used to drive an EL5 which operates a moving-iron oscillograph.

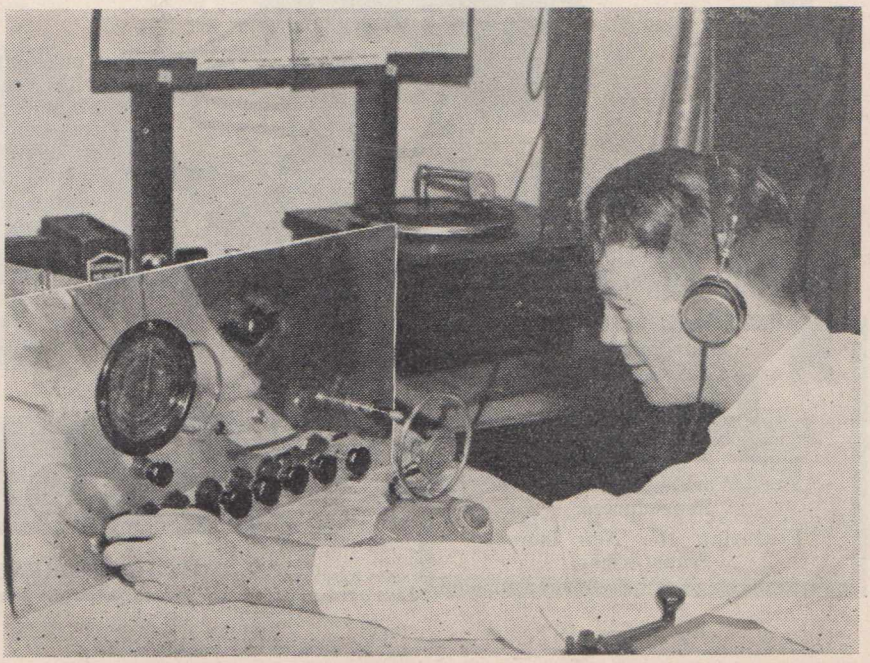
The beam of an arc light is directed on to a concave mirror fastened to the moving iron tongue of the oscillator and reflected to the aperture of the camera. The reflected beam of light is deflected in a horizontal direction in time with the heart sounds, the paper in the camera being moved vertically. Thus the waves are photographed and when developed appear as in the above illustration.

Club Activities

Owing to the holidays, club activities have not been as great during the past month, although in the social field it is reported that Reg. Flood (2BN) and John Warren (2QX) are to be married in the near future. The club wihes them both every success and trusts that having settled down, their interest in radio will continue as before.

A number of members have expressed their intention of building small transmitters and receivers to be used in connection with tests for the Bushwalkers' Club. In view of the recent fire disasters in Victoria and N.S.W. it would appear that if more portable gear were constructed and set aside by amateurs in general, considerable use could be found for it in times of emergency for use by rescue parties on occasions which were witnessed last month.

A definite date has not yet been fixed for the Bushwalkers' test, but it will probably take place at the end



This receiver is a thirteen-valve single-signal amateur communications superhet used by members of the Hurstville Radio Club.

of February. Considerable interest is being displayed in this experiment by many outside the club, and its success or otherwise in maintaining constant communication with the inland

★

Waverley Radio Club Notes.

By 2AHJ.

The first meeting of the year was held on January 10. It was decided at this meeting that a new antenna would be in keeping with the new transmitter and arrangements are being made to erect one. A night was also set down for the projection of some interesting coloured films generously offered by Mr. Miller, chief op. aboard the "Mariposa." Tuesday, January 31, was set down as the night and a suitable projector was borrowed for the purpose.

The next field day is to be held during February, and the band this time will be five metres. A suitable location has yet to be chosen for the outing. Transceivers will probably be used by all, as the gear will need to be portable, and already several are under construction. 2AFZ and 2AHJ will both be in operation, and the latter will be using a pair of sets with unity-coupled 19's in each. So far not much has been heard of the types of transceivers to be used, but these will be determined when the preliminary tests are held.

In anticipation of this next field day, Mr. Gordon Wells, the president, gave a very interesting talk on five-metre gear at the meeting on January 17. Transmitters and antennas were chiefly dealt with, several types of each being discussed.

Club membership is steadily increasing, and on January 24 another new member was elected. The new members are finding much to interest them in the club, and particularly those who have just entered the field of "ham" radio.

Also present on the 24th were 3AH and 2AKA, on a trip to Sydney, who called at the club to see the new gear. Ted Kemp (7PZ) was another visitor. From Devonport, Tasmania, he is at present studying for his 1st ticket in Sydney.

In concluding these notes I would like to invite anyone interested in the club to call at the clubroom, rear "Almont," 13 Macpherson Street, Waverley, any Tuesday evening, or write to the secretary, 465 Pacific Highway, Artarmon.

★

Gladesville Radio Club Notes

By E.W.

The above club held its first meeting this year on Tuesday, January 10, in the Protestant Hall, Gladesville. There were 16 members present and we were pleased to welcome a visitor in VK4KC from Papua, who is down in Sydney for a considerable time. A motion was passed that while he was in Sydney VK4KC (Mr. W. Bock) should become an honorary member of our club.

A reply was received from the P.M.G.'s Department in Melbourne granting the club's license under the call VK2ADY.

First Birthday Party.

The greater part of the night was taken up in discussing the arrangements for the club's first birthday party to be held on February 7, and it was eventually decided that a committee be formed and left in charge of arrangements. Looking back over our first twelve months (the club's first meeting was held on January 19, 1938) we find we still have a fair percentage of our foundation members, as well as a few new members. Several members have resigned for various reasons, but taking things all round we have had a fairly successful year as far as membership is concerned.

In this twelve months we have built a receiver that would be a credit to any "ham" shack; we have obtained our transmitting license; and through the combined efforts of the members we were able to present Mr. Bill Zech (VK2ACP), of Katoomba, with a little two-stage transmitter.

One of the most interesting features of the year was the receiver-building contest, which caused a great deal of enthusiasm among our non-transmitting members. Some very fine receivers were entered, the prize-winning efforts being photographed for publication in the "Australasian Radio World."

Right from the inception of the club Mr. Fryar (VK2NP) has done excellent work in conducting the morse class for beginners.

To those who assisted us to make our first year a success we extend our thanks. I refer to the various lecturers who came along and entertained us, and to the various papers who published our club notes from time to time. There is every prospect of many interesting lectures in the immediate future; also five-metre activity in the club and the building of the club's transmitter. So with our second year before us we close these notes with an invitation to prospective members to come along to our meetings, which are held every Tuesday night at 8 p.m. in the Protestant Hall, Gladesville tram terminus.—E.W.

★

Hurstville Radio Club Notes.

By VK2MZ.
(Affiliated with the W.I.A.)

The Hurstville Amateur Radio Club wish to announce their change of address, the new QRA being 98 Tabrett Street, Banksia (Tempe bus to door).

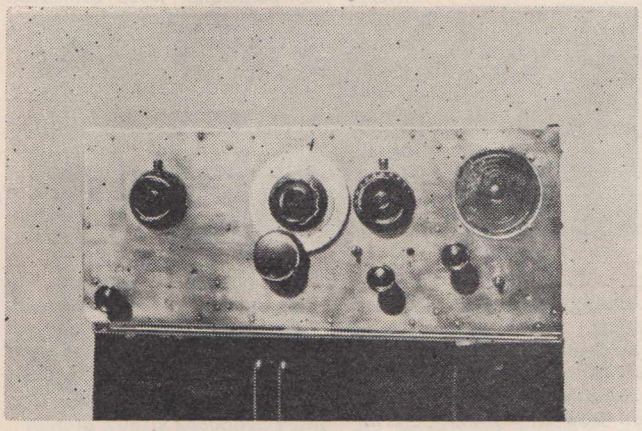
At the annual election for the club offices, the positions were allocated as follows:—A. Brennan, president; G. Calvert, vice-president; P. Heally, treasurer; J. Ackerman, secretary; V. Nugent, official code administrator.

The rig has been off the air for the past few weeks due to re-building, but as the boys are all working overtime it won't be long before VK2MZ is pumping a more pronounced signal. The last A.O.P.C. examination provided an opportunity for three of our budding members to scratch their heads in bewilderment. The R.I. was kind to only one of them, Mr. William Asplith. A new and most enthusiastic arrival is Miss D. Patterson, who is studying very hard.

During the period the rig has been off the air, members have been attending lectures given by VK2ALG on "How I Got My Ticket."

Anyone interested in amateur radio will be welcome any Thursday evening at 7.45, or full particulars regarding the club may be obtained by writing J. Ackerman, VK-2ZLG, 34 Park Road, Carlton.

The D.B.K. 9 To 1000-Metre Communications Receiver



The receiver seen from the controls. Left to right: R.f. dial, detector dial, vernier or bandspread dial, and midget speaker. Knobs below: R.f. gain, regeneration, audio gain. Condenser toggle switch is below detector and vernier dials and "B—" switch is below the speaker.

This experimental amateur all-wave receiver developed by the author incorporates an ingenious rotating coil turret assembly that gives continuous coverage from 9 to 1000 metres. Extremely high efficiency on all wavebands is an outstanding feature of the design.

By DON B. KNOCK
Radio Editor, "The Bulletin."

IN 26 years of trial and error with radio apparatus, the writer has gone through the whole gamut of radio receivers, starting off with drain-pipe inductances and home-made tuning condensers of ancient times. It is interesting to review in the mind the many types, and then to dwell upon the present-day creation with remarkable efficiency contained in compact space.

From the viewpoint of the constructor, short-wave listener, and experimental transmitter, the plug-in coil still holds a front rank position. A receiver using such coils can be made with ease, and it can be remarkably efficient by reason of the shortest possible wiring in tuned circuits.

Coil-Switching Unit Has "Plug-In" Efficiency.

When considering the many types of "communication" receivers of American make, of which a few are now to be found in Australia, with those to whom a deep pocket is not so serious, the critical experimenter is apt to say, "but has it got plug-in coil efficiency?" The reason for such a question is one of dead-end loss and absorption in tuned circuits, as evident in some receivers of the switched variety. If coils can be literally "taken out and thrown away" other than the one in circuit at the one time, up goes the efficiency. Some of the American receivers are designed thus, two notable makes being National and Hammarlund.

A long-cherished idea was put to practice in the development of this receiver, and from the start the writer admits that the engineering work necessary will debar many from taking more than a casual interest. To others, however, the idea may present little difficulty where a well-equipped workshop and associate tools are available.

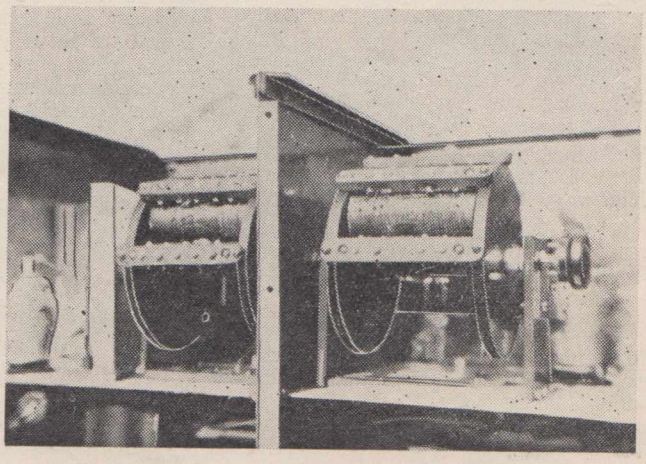
The writer has long needed a receiver around the experimental station which would take in everything from ultra-shorts to long waves. A receiver of this kind had essentially to be free from double-spotting and other forms of spurious signals, being needed when calibrated as a frequency-checking arrangement in conjunction with a signal generator. The superhet was therefore ruled out in favour of a t.r.f. design as the simplest method of obtaining the desired results without trouble.

As a receiver, the t.r.f. is by no means a laggard, and has much to commend it for average purposes. At the same time, it is not the best for amateur band work, but such work was not the primary reason for the building of the receiver.

In contemplating the tuning range it was decided to start just below 9 metres, for the reason that very often there are overseas ultra-short-wave broadcasters and police stations to be heard, and in going up to 1000 metres the 600-metre marine and 900-metre aircraft channels would be included. This seems to be rather a tall order without losing some ease of tuning or efficiency somewhere, but it was surmounted, as the circuit details show.

About The Circuit.

A mixture of valves is used for the reason mainly that several unused 4-volt types had been on the shelves for a year or two, and also because the Philips AF3 r.f. pentode is a first-rate high-gain r.f. amplifier at fre-



How the r.f. and detector coil drums are constructed. The coils are carried on WT/22 bars with contact studs. The spring contacts are on the other side of the drums.

quencies even much higher than covered in this receiver.

Those on hand were the AF3, ABC1, and AL2, so they were put into use as shown. As the power transformer is one with 4- and 6.3-volt heater windings in addition to 385 volts per side h.t. and the 5-volt rectifier winding—a 6K7 metal valve was used as electron-coupled detector.

The ABC1 triode portion is used as the first audio stage and the AL2 pentode drives a Rola permag. midget speaker.

The combination turned out excellently, and no doubt equally good results would be obtained with an AF3 as detector in the same circuit arrangement.

The possible valve combinations that could be used in a t.r.f. receiver of this kind are too numerous to refer to with all the valve types and makes now on the market.

First thing to note is that the r.f. amplifier is separately tuned, and not ganged with the detector. Tuning on this stage is fairly sharp—but not too sharp to miss strong signals completely when well off tune. A .00035 mfd. condenser of the ever-popular Gecophone type is used here. The r.f. stage is primary-coupled to the detector in the usual manner, and oscillation and regeneration are controlled here by a 50,000-ohm screen grid potentiometer.

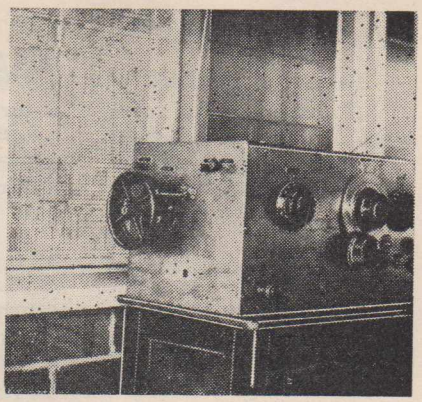
Separate Cathode Coil For Regeneration.

Instead of tapping the grid coil, a separate cathode coil coupled to the grid coil is employed. This puts the 6K7 cathode a few turns above earth in the same way as tapping a grid coil, and has advantages. In the r.f. stage, a 50,000-ohm volume control is used in the cathode of the AF3, and this control shows its useful points where the receiver is used on the broadcast band close to a local station. With the receiver completely screened in brass, as shown in the illustrations, selectivity is good enough to separate all the Sydney stations and many more besides on an aerial 137 feet long. That is good enough for average purposes.

The audio circuits are conventional, and in order to get best possible detector gain, the coupling here is a high impedance audio choke. It happens to be the secondary of the once-popular type of Philips 3-1 ratio audio transformer.

All component values other than coil details are shown in the diagram, but the detector tuning condenser C2 calls for comment. The 40 mmfd. variable in parallel is for vernier tuning and bandspread when the receiver is used on the amateur bands. C2 is a split-stator condenser with one section of .00014 mfd. and the other of .0002 mfd. A toggle switch across the two stators either connects them in parallel to make up .00035 mfd. capacity for broadcast and long waves, or when open leaves in the .00015 mfd. section for short-wave tuning. The smaller coils are wound to suit the smaller capacity.

The toggle switch is on the panel close to the detector tuning dial and is marked "s.w." and "l.w." for the two positions. Headphone reception is provided in the plate circuit of the ABC1 as shown.

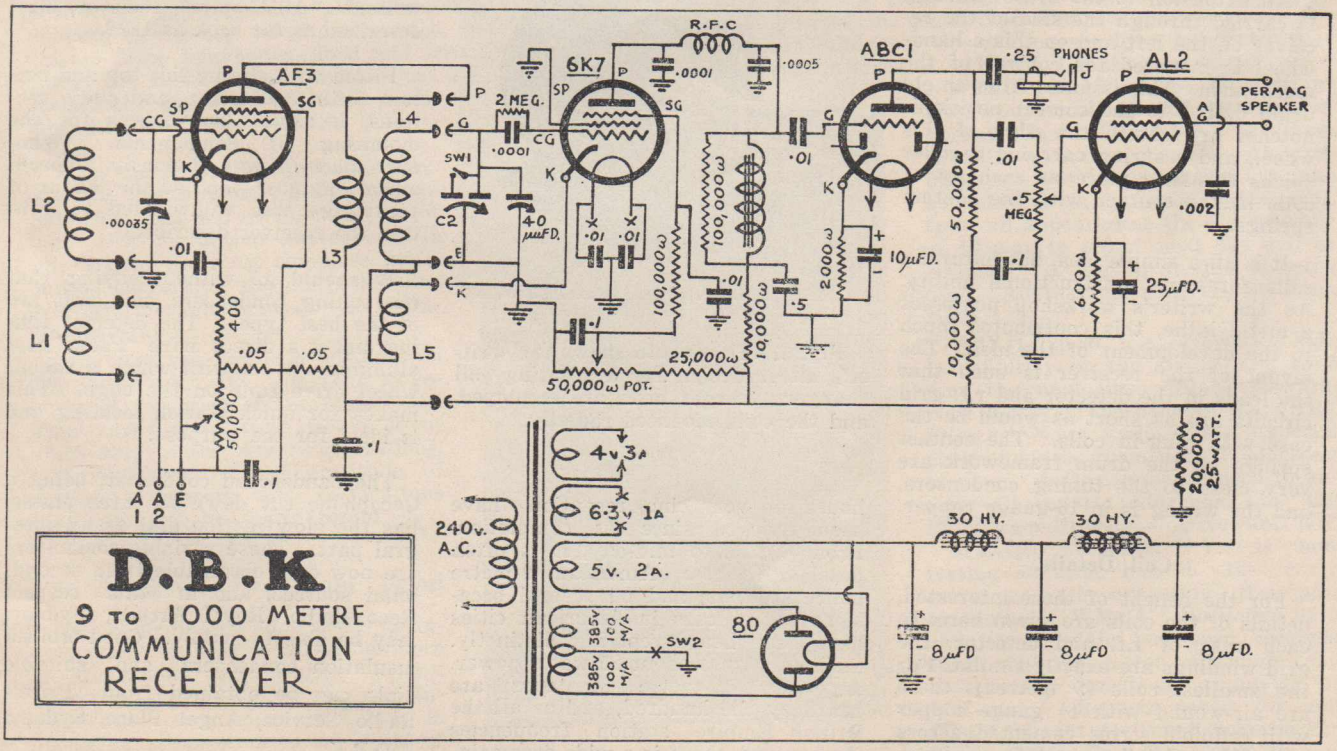


End view of the receiver showing how an old drum is used as the control wheel for the rotating coil drums.

Coil Mechanism.

The basic idea of this mechanism was shown in "A.R.W." recently, that photograph showing the foundation before coils were fitted. Briefly, it consists of two similar drums—made with bakelite discs and cross-bars of WT/22 casing the coils. The discs are fitted with catalin centres for locking to a ¼in. brass shaft running in four bearings.

The bars carrying the coils also have round-headed contact studs for



Circuit of the "D.B.K." 9- To 1000-Metre Communications Five," with all constants. Coil details are given overleaf.

Coil Data : 9- To 1000-Metre Receiver.

Band.	Aerial Coil.	Grid Coil.	Primary.	Cathode Coil.
10 metres ..	3 turns 14 enam.	6 turns 14 enam. ¾in. diameter.	2 turns interwound from each end.	3 turns.
20 metres ..	4 turns 22 enam.	9 turns 22 enam. 1¼" long on 1¼" former.	4 turns, 28 D.S.C. interwound.	4 turns.
40 metres ..	5 turns 26 D.S.C.	22 turns 26 D.S.C. 2" long 1" diam. former.	7 turns 28 DSC interwound.	4 turns.
80 metres	8 turns 28 D.S.C.	42 turns 28 D.S.C. 2" long 1¼" diam. former.	20 turns, 30 DSC interwound.	5 turns.
160 metres ..	15 turns	40 turns 9/41 Litz.	15 turns, 30 DSC	5 turns.
Broadcast ..	30 turns	78 turns 9/41 Litz.	22 turns 30 DSC	7 turns.
1000 metres ..	45 turns	160 turns 30 D.S.C.	25 turns 30 DSC	8 turns.

The 160-metre, broadcast, and 1000-metre coils are wound on Sirufer iron cores.

the coil connections—six for detector and four for r.f. As the ganged drums are rotated, the studs come up against nickel silver springs carried on WT/22 brass bolted across in the correct position to register alignment. The bakelite discs are ¼in. thick and 4in. in diameter. ⅛in. screw bolts are tapped in the edges at the correct positions to lock the coil bars securely in place across the discs. It is a matter of seconds to remove any coil unit for examination by unscrewing the two screws.

An extension to the brass shafting is carried through the side of the receiver on the left and on this a handwheel is mounted for control of the mechanism. This is made from an old drum dial. At the correct positions, notches are cut in the edge of this wheel, and a spring carrying a roller snicks this into place as each set of coils makes contact with the contact springs.

It is all a simple idea, but naturally calls for some constructional ability. As the writer's workshop possesses a metal lathe, this contributed much to the development of the idea. The layout of the receiver is such that the leads in the detector and r.f. grid circuits are as short as would be the case with plug-in coils. The contact springs on the drum framework are very close to the tuning condensers, and the wiring is in 16-gauge copper.

Coil Details.

For the benefit of those interested, details of the coils are given here. In each case of r.f. and detector, the grid windings are exactly similar. For the smallest coils (9 metres) these are air-wound with 14 gauge copper with celluloid strips cemented across with "New Grip" cement for rigidity.

Coils are mentioned as 10, 20, 40 metres, etc., for purposes of identification and with the tuning capacities specified there is complete overlap from 9 to 1000 metres.

The results obtained with this receiver are highly satisfactory, and

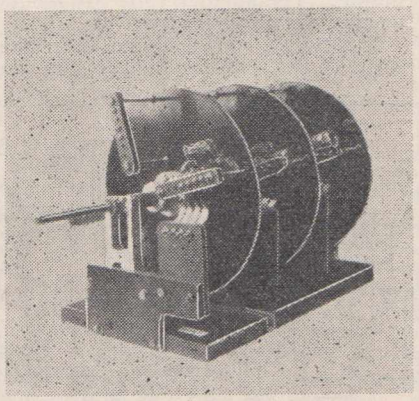


Fig. 5. This photo shows the writer's latest design for a rotating coil changer. Larger discs are employed, and the coils mounted radially.

hours of very fine reception have been enjoyed since its completion. From 8 a.m. to mid-day, it is often possible to hear American 9-metre police stations, and on several occasions patrol cars in American cities have been heard replying distinctly. Such cars were about 25 watts power. American 10-metre amateurs are heard by the hundred, and as all the British Empire station frequencies are covered, there is a wide entertainment scope here. All the amateur bands speak for themselves, although selectivity is not good enough on 14 or 7 m.c. for strong amateur stations in proximity.

With such a receiver away from the metropolitan area, however, it would be quite good enough for general use. Being an old-timer with memories of ship traffic in early radio days, the writer derives no little amount of enjoyment from occasional eavesdropping on evasive doings, and some remarkable DX has been heard in this connection. 600-metre signals often cover long distances.

Finally, in figure 5 is illustrated the writer's latest design for a rotating coil-changer. Here it will be seen that larger discs are employed, and the coils are mounted radially. There should be something for factory radio engineers in putting these mechanical ideas into commercial practice locally.

Constructional Points.

No doubt individual ideas will prevail with the construction of a receiver of this kind, so that chassis sizes are not specified.

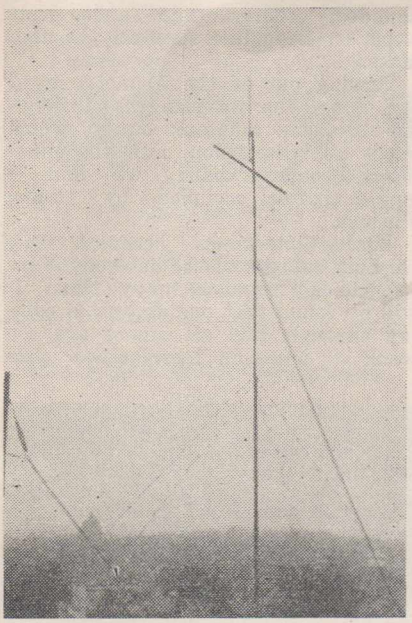
The original receiver is built into a large brass box assembly which had been rescued from a radio dealer's "trade-ins" some time ago. This had originally housed an earlier type of t.r.f. receiver, which was in fact somebody's meticulous version of the writer's "All-Empire" receiver, first described as far back as 1928.

Fitted with sliding lids top and bottom for r.f., detector, and audio sections, it carries sub-chassis for the mounting of components. Whoever made it was obviously a mechanical engineer—and so the labour of years ago was rejuvenated to contain the receiver described.

It should go without saying that the tuning condensers and dials are of the best types. The detector tuning dial is a direct drive "Palec" cast aluminium type, with which a rubber wheel drive runs on the edge. This makes for quick station locating and is ideal for the purpose.

The bandspread condenser, being a Gecophone cut down to three plates, has the slow motion dial as an integral part. These variable condensers are now only obtainable from second-hand sources, and in this respect Reco Radio, Royal Arcade, Sydney, may be able to supply. Good trolitul insulation condensers and suitable dials can be obtained from Price's Radio Service, Angel Place, Sydney.

—D.B.K.



The vertical "J" antenna used by W6XKG, 25.95 m.c., Los Angeles, California.

DX On The "Ultra Highs"

In this article the author---a well-known contributor to American radio magazines of items of u.h.f. interest---appeals to Australasian dxers to turn their attentions towards the ultra high frequency bands, which are now rapidly coming into prominence throughout the world. Full details, including transmission times in E.A.S.T. are given of a wide variety of u.h.f. stations in the States now operating on regular schedules.

By PERCY FERRELL, Jr.
Linwood, New Jersey, U.S.A.

SINCE shortwave and broadcast band DX is becomming more and more "cut and dry," it is high time that more dxers took advantage of the super DX the ultra-high frequencies offer.

Those listeners who only tune through the band occasionally have missed much, for a little probing will bring to light a world of new and unusually interesting DX. Heterogeneous broadcasting services, such as regular, experimental and television, police and marine fire radio, a doctor's emergency telephone service, point-to-point and ship-to-shore telephones, flood and irrigation control and forest fire radio services provide just a few of the broadcasts that make the u.h.f. bands crammed full of thrills for the DX listener.

With the realisation that many dxers are partially or wholly unfamiliar with what and where to listen for u.h.f. DX, the author has collated in this article the most complete information concerning the u.h.f. that has ever been brought between two magazine covers!

Why not get down to business on this super u.h.f. DX, and send in reports of reception of these stations? Your cards and letters would be of great help to the American stations, and your reward, the gratitude of station engineers and verifications that you may be justly proud of.

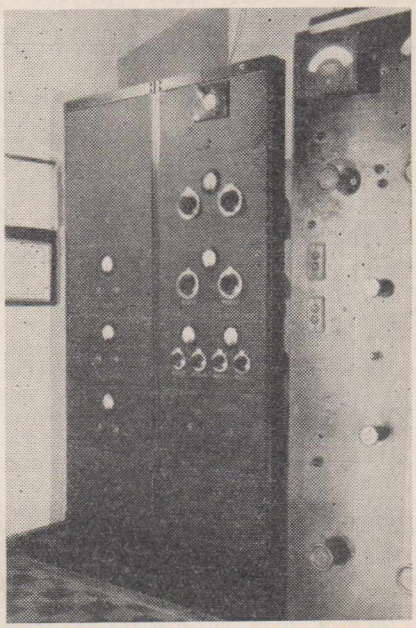
The 11-Metre Broadcast Band

The 26 megacycle band needs no introduction, as it is very popular both in Australasia and United States. However, as yet there are no stations other than those in U.S.A. in operation, although many are licensed.

W6XKG, 25.95 m.c., Los Angeles, Calif., "The 24-hour Station," is still a favourite among many Australasian and east coast American dxers.

Two special programmes are given each Tuesday, Thursday and Saturday at the unsuitable times of 4.15 a.m. and 5.15 a.m. However, it is noted that on many occasions both broadcasts were postponed for one or two hours for undisclosed reasons. The former broadcast is a talk on popular astronomy, and the latter is an interesting and informative DX talk—both ably conducted by that very well-known Pacific coast dxer, Earl G. Dehaven.

Verifications from this station are by a handsome blue QSL card. Address c/o. KGFJ, Los Angeles, Calif.



The 100-watt transmitter used at W6XKG.

W9XUP, 26.15 m.c., St. Paul, Minn., very courteously moved to this frequency last December to leave W6XKG a clearer channel. At writing, tests are being carried out, and no schedule is in force. However, from all appearances the old schedule of 10 p.m. to 4 p.m. next day will be resumed. A very neat QSL is being used. Address: C/o. KSTP, St. Paul, Minn.

W2XJI, 26.30 m.c., Newark, N.J., is definitely on the air 11 p.m. to 4 p.m. the next day. Since Newark, New Jersey, is the home of the NNRC (Newark News Radio Club) a special programme is given each Wednesday at noon. A QSL is being used to answer all reports addressed to the Bamberger Brdcstg. Co., Newark, N.J.

W2XQO, Flushing, N.Y., is now testing on 26.55 m.c. in the early morning, re-broadcasting the programmes of WMCA. No notice of a definite schedule has been received from this 100-watter, although they have lately signed off regularly at 7.30 a.m. Reports asked for and should be sent to The Knickerbocker Broadcasting Co., Inc., 1697 Broadway, New York City, N.Y.

W9XA, 26.45 m.c., Kansas City, Mo., came on the air on October 13, 1938, and has overnight become the talk of dxers the world over.

A variety of programmes of interest to dxers are broadcast irregularly. Among them is a mailbag programme daily at 8.30 a.m., excepting Mondays, a DX talk at 6 a.m. each Monday morning and code classes (irregularly) in the mornings. (At writing there is contemplated a series of lectures on "Sirela," the new universal radio language. All who would be interested in learning "Sirela" should watch for these broadcasts.)

The verification used by **W9XA** is most unusual, as it is a four-page folder. This large pamphlet not only verifies your report, but gives a pictorial description of the station and the station personnel, with many other interesting facts about the station and its purpose. It is very worth while, and all should try to earn one.

The schedule of **W9XA** is mostly 2 a.m. to 4 a.m. and 7 a.m. to 10 a.m., and other times irregular. The power is 1000 watts, although at writing it is 500 watts and is being very slowly increased to the maximum. Address: The Commercial Radio Equipment Co., Kansas City, Mo.

W8XNU, 25.95 m.c., Cincinnati, Ohio, using a four-element di-pole, arranged as a turnstile antenna, is now on the air daily, 10 p.m. to 4 p.m. the next day. At present no special programmes are under consideration, as they are working toward maximum ground-wave coverage. The sky wave, despite the usage of a turnstile (famed sky-wave killer) is extremely strong, and may be heard often competing against **W6XKG**. All reports appreciated and will be verified when addressed to WSAI, Crosley Corporation, Cincinnati, Ohio.

W9XTA, 26.5 m.c., Harrisburg, Ill., has notified us that they are now continuing their tests postponed from last July, and will try to operate to the schedule, 4 a.m. to 9 a.m. 500 watts is the output, and the correct address for reports is c/o. Schonert Radio Service, Harrisburg, Ill.

W9XAZ, 26.4 m.c., Milwaukee, Wisc., is officially off the air.

W9XTC, 26.05 m.c., Minneapolis, is now using its 150 watts irregularly, although schedule is supposed to be 12 a.m. to 12 p.m. A very neat QSL card is being used for all reports addressed to The Minnesota Broadcasting Corp., Minneapolis, Minn.

W9XJL, 26.10 m.c., Superior Wisc., a very faithful performer, is on the air daily 11 p.m. to 12 p.m. next day. 250 watts is the power and the same colourful QSL is being used. Address: Telegram Building, Superior, Wisc.

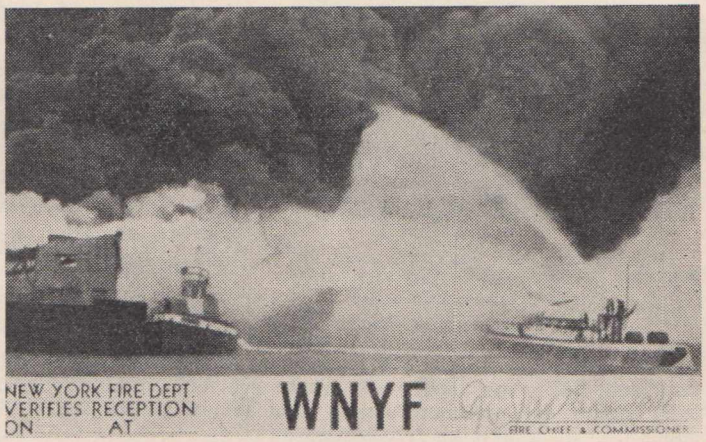
W8XNO, 26.10 m.c., Charleston, West Va., and **W9XH**, 26.05 m.c., South Bend, Ind., are under construction. Both to be on the air shortly.

W3XEX, 26.05 m.c., Norfolk, Va., and **W4XH**, 25.95 m.c., Evanston, S.C., have made no releases for the last several months, and whether they are in operation or not is very doubtful.

W1XOV, 27.10 m.c., Boston, Mass., should be easily heard in Australasia when they contact W1XER at 7 and 10.25 a.m. daily. It is remembered that this station is one end of the communication link between the summit of Mt. Washington, New Hampshire and Boston, Mass. All reports are verified when return postage is included. Address: The Yankee Network, 21 Brookline Avenue, Boston, Mass.

Passing out of the 11-metre band and down the wavelengths through the 10-metre amateur band, which needs no discussion, into the nine-metre broadcast band, we find a single channel occupied by twelve stations.

Tuning sometimes becomes very irksome because of the heterodyne interference; however, many times it will be found that one station is coming through and all others are too weak to cause an interference problem. This skip dissolution is quite prevalent on all the u.h.f. bands, and dxers with a little patience will be well rewarded. (During a freak reception period in U.S.A. one dxer managed to get a verifiable log on seven stations in one evening because of skip dissolution.)



Verification used by WNYF and for fireboats pictured. The New York City fireboats operate on 35.58 m.c., with 50 watts, and may be heard testing around 9 a.m.

The Nine-Metre Broadcast Band

(All stations operate on 31.6 m.c.)

STATION. LOCATION.	POWER. (watts)	SCHEDULE.	VERI.
W1XEQ—New Bedford, Mass.	100	5 a.m. to 9 a.m.	Letter
W1XKA*—Boston, Mass.	50	Off the air.	Letter
W1XKB—Springfield, Mass.	50	9.30 a.m. to 4 p.m.	Letter
W2XDV—New York, N.Y.	50	Irregular.	Card
W3XEY—Baltimore, Md.	100	12 a.m. to 8 a.m.	Card
W3XKA**—Philadelphia, Pa.	50	Off the air.	Card
W4XBW—Chattanooga, Tenn.	100	11 p.m. to 3.30 p.m.	Letter
W4XCA—Memphis, Tenn.	250	1 a.m. to 1 p.m.	Card
W5XAU—Oklahoma City, Okla.	100	Irregular.	Letter
W5XD—Dallas, Texas	100	2.30 to 4.30 a.m.	Letter
W8XAI—Rochester, N.Y.	100	9.30 to 3 p.m.	Card
W8XOY—Akron, Ohio	100	10 p.m. to 3 p.m.	Letter
W8XKA***—Pittsburgh, Pa.	50	Off the air.	Card
W9XHW—Minneapolis, Minn.	50	12 a.m. to 3.30 p.m.	Card
W9XPD—St. Louis, Mo.	100	12 a.m. to 4 p.m.	Letter

* Antenna lost in hurricane.
** License not renewed.
*** Planning move the 7-metre band.

Verification of W3XEY, 31.6 m.c., Baltimore, Md.

The Eight-Metre Broadcast Band.

W3XES, 35.6 m.c., Baltimore, Md., using 300 watts into the antenna from 9 a.m. to 3 p.m. daily, is very well worth looking for, and should be heard in Australasia whenever nine metres is open for the U.S.A. Atlantic coast stations. **W3XES** carries on a very extensive experimental programme and would sincerely appreciate your report. Address: Monumental Radio Company, Baltimore, Md.

W9XUY, 35.6 m.c., Omaha, Nebr., sends word that they are now operating on this frequency from 10.30 p.m. to 4 p.m. with 100 watts output. This station, which verifies all reports with a very neat QSL, seems to make a habit of changing frequency. They first came on 31.6 m.c. and after several months moved to 41.0 m.c., and now they have shifted down to 35.6 m.c. The signal of this station should be very strong as a very large building shadows their antenna to the east and makes for maximum signal strength in a westerly direction. Address: Central States Broadcasting Co., Omaha, Nebr.

W8XNT, 38.6 m.c., Cleveland, Ohio, using 50 watts on a clear channel, has a most promising signal. With the help of said channel and the usage of an excellent antenna 758 feet above ground, **W8XNT** has been reported all over the North American continent, and everyone feels sure that it could be heard at distant points under favourable conditions if dxers will watch for them daily, 1 a.m. to 3 p.m. Reports verified very quickly when addressed to: Radio Air Service Corporation, 1311 Terminal Tower, Cleveland, Ohio.

W2XDG, 38.65 m.c., Bound Brook, N.J., although on another clear channel and with more power than **W8XNT**, it has a very slight chance of being picked up in Australasia, because a beam antenna pointed toward New York City is now used. (It might, however, be possible that the signal may try travelling the long way to Australia, such actions have been noted on the u.h.f.) The schedule is now 12 p.m. to 3 p.m. All reports verified by card. Address: National Broadcasting Co., 30 Rockfeller Plaza, New York City, N.Y.

The Seven-Metre Broadcast Band

The seven-metre band is the u h.f.'s most unusual, and when conditions are right is the most thrilling band in use.

At first glance, quite a bit of amazement will be expressed in trying to believe a station operating so close to the maximum usable frequency can be possibly heard 7000 to 9000 miles away. However, quoting from experiments made while receiving these stations in U.S.A., it has been found that the sky-wave transmission between two points during this period of sunspot activity is very consistent. In fact, **W8XWJ** was heard every day in Los Angeles, Calif., and Phoenix, Ariz., during the month of November. (The writer, although not in a geographical location suitable for seven-metre broadcast reception from U.S.A. stations, was able to intercept several of the European television transmitters on even higher frequencies with practically the same success!)

Tuning on the seven-metre band is extremely critical, and patience is truly a worthy virtue here. After one or two weeks of practice tuning, a peak time of reception will be noted. This period may be only five minutes long in some cases, and in others may be as long as fifteen minutes. Nevertheless, seven - metre trans-Pasific reception is most likely to repeat itself in this period. Again we must stress the use of a sensitive receiver (forget selectivity if you have to, but make it sensitive) and a suitable antenna. If at all possible, use some sort of beam antenna. "Spot tuning will also be a great help in case a station is in a long deep fade.

W1XER, 41.0 m.c., summit of Mt. Washington, N.H., using 500 watts into a turnstile antenna erected last summer, is not as yet in scheduled broadcast operation, but can be heard contacting **W1XOV** daily at 7 a.m. and 10.25 a.m. to report weather conditions, as this mountain is quite a skier's paradise. All reports verified. Address: The Yankee Network, 21 Brookline Avenue, Boston, Mass.

W1XOJ, 43.0 m.c., summit of Asnebumskit Hill, Paxton, Mass., is licensed for a maximum power output of 50,000 watts. Lately they have been testing with reduced power. All reports verified and address is same as **W1XER**.

W1XPW, 43.4 m.c., Hartford, Conn., has been testing on this frequency in preference to their licensed frequency of 40.3 m.c. 1000 watts is the power and the address is: C/o. WDRC, Inc., Hartford, Conn.

W2XHG, 41.0 m.c., New York City, N.Y., re-broadcasting **WEAF** with 150 watts daily from 12 a.m. to 3 p.m. Card verification from National Broadcasting Co., 30 Rockfeller Plaza, New York City, N.Y.

W2XMN, 42.8 m.c., Alpine, N.J., now tests irregularly with 20,000 to 40,000 watts, and has been heard 3000 miles away with a level of 72 db or R14! All reports verified by Mr. Edwin H. Armstrong, Columbia University, New York City, N.Y.

W2XOY, 41.0 m.c., Albany, N.Y., is using 150 watts from 11 a.m. to 12 p.m. on Tuesday, Thursday and Saturday. Card verifications from General Electric Co., 1 River Road, Schenectady, N.Y.

W3XIR, 41.0 m.c., Philadelphia, Pa., tests irregularly about 10 a.m. A very neat card verification. Address: C/o. WCAU, Philadelphia, Pa.

W8XH, 41.0 m.c., Buffalo, N.Y., uses 100 watts at present, although 1000 will soon be used, from 8.45 a.m. to 12 p.m. Address: **WBEN**, Inc., Buffalo, N.Y.

W8XWJ, 41.0 m.c., Detroit, Mich., with a new high fidelity 500-watt transmitter is a seven-metre dxer's best bet. Operating from 12 a.m. to 2 p.m. daily, they are reported to verify with a new QSL, but every U.S.A. dxer who has heard this station has been so far unable to obtain one (your writer included, who heard them three times on short skip). Address: 4465 Penobscot Building, Detroit, Michigan.

A new advancement was made in the art of broadcasting in 1938 when **WBOE**, 41.5 m.c., Cleveland, Ohio, a non-commercial educational broadcast station came on the air. This station using 500 watts, is on irregularly and has an excellent signal, judged by the number of reports received. **WBOE** will soon be joined by **WCNY**, 41.1 m.c., from Brooklyn, N.Y.

Television Stations—

(Voice Transmitters Only.)

Alexandria Palace, London, England, a B.B.C. station on 41.5 m.c., operates daily from 1 a.m. to 2 a.m. and from 8 a.m. to 9 a.m. with 3000 watts into the antenna. This station

is very consistent and in U.S.A. it can practically be logged from coast to coast. Reports will be verified and are very much appreciated.

Paris PTT, Paris, France, is also on daily. 42.0004 m.c. is the exact frequency, although power, schedule and address are unknown.

Berlin, Germany, 43.0 m.c., can also be heard from time to time. Schedule is 1.30 a.m. to 3 a.m. and power to their antenna is 16,000 watts.

Only one American transmitter is really in scheduled operation and that one is **W6XAO**, 52.0 m.c., Los Angeles, Calif., with 150 watts from 6 to 8 a.m. and again from 9.30 a.m. to 11.30 a.m. (Persons interested in trans-Pacific five-metre signals might look for **W6XAO**, whose signal would be a sure guide whether this band is open or not.)

Experimental Stations.

Scattered throughout the entire u.h.f. spectrum is an endless procession of stations falling under the "experimental" classification. The first and largest group of these which we will treat is the police stations.

With the F.C.C. Order 19 being put partially in effect, a most complete and drastic revision of police calls and frequencies was enacted. For police headquarter's transmitters operating under the "No Power Limit" listing, these frequencies are in use: —30.70 m.c., 31.10 m.c., 31.90 m.c., 33.10 m.c., 33.94 m.c., 35.50 m.c., 37.50 m.c., 39.10 m.c., 39.90 m.c.

For those headquarter transmitters that will not use power over 250 watts, the following are used:—31.50 m.c., 33.50 m.c., 35.90 m.c., 37.10 m.c., 37.90 m.c., 39.50 m.c.

For police car use, both portable and portable-mobile, the following are used (in some cases the same frequency as the headquarter's transmitter is used):—30.85 m.c., 30.98 m.c., 31.78 m.c., 33.22 m.c., 33.78 m.c., 35.10 m.c., 35.22 m.c., 35.78 m.c., 37.22 m.c., 37.38 m.c., 37.78 m.c., 39.18 m.c., 39.38 m.c., 39.78 m.c.

In regard to the new calls, at the moment it is impossible to obtain a complete listing. However, "W1X," "W2X," etc., are no more for police use, calls beginning with "WQ," "WR," "KQ," "KR," and "WW" being substituted instead.

Chance reception is always possible of one of the 500 relay broadcast stations that operate irregularly on 31.1 m.c., 34.6 m.c., 37.6 m.c. and 40.6 m.c. with powers from .5 watt to 250 watts . . . of the various emergency stations that use 31.42 m.c., 39.66 m.c. and 39.86 m.c., without limitation of power . . . of one of the many forestry service stations that use 30.94 m.c., 35.74 m.c., 31.34 m.c., 31.58 m.c., 31.94 m.c., and 35.94 m.c., besides numerous other frequencies near seven metres . . . of the Doctor's Emergency Telephone Service in New York City, N.Y., that operates on 31.42 m.c., with 1000 watts. (This station operates in a similar manner to police communication and may be used to call doctors to hospitals, etc., in cases of emergency . . . of one of the any number of stations that operate on 31.6 m.c., 35.6 m.c., 38.6 m.c., and 41.0 m.c., classified as general experimental and include two-way communication between gliders (in flight) and ground stations, stations used by Motion Picture Companies, a ship to shore harbour telephone service in Philadelphia, Pa., and a Pilot Boat service in Norfolk, Va. . . . of the communication link between Mt. Palomar, Calif. (the site of the 200-inch telescope) and Pasadena, Calif., which has been heard several times across the continent and are reported to have schedules at 7.30 a.m. and 12.30 p.m. . . . and of anyone of the seemingly countless stations that make the u.h.f. their home and operate irregularly and are only by chance.

DX On Five Metres.

The reception of 5-metre DX signals is an unequalled thrill, in the writer's opinion, who has been fortunate enough to log stations in New Jersey, Pennsylvania, New York, Ohio, Iniana, Illinois, Michigan, Kentucky, West Virginia, Florida, Minneasota, Iowa, Wisconsin and Connecticut (not forgetting the double thrill of hearing the Provinces of Quebec and Ontario, Canada).

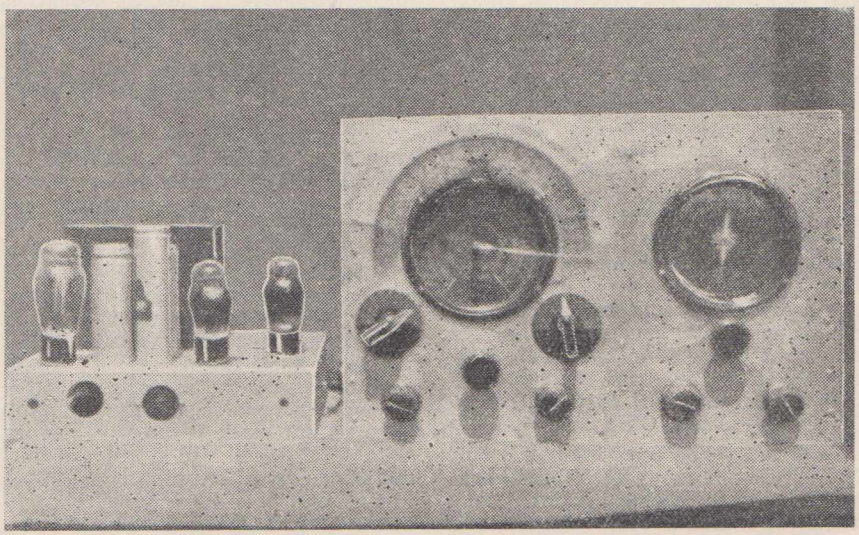
Of course, in discussing five-metre DX our thoughts immediately rest on that bugaboo, "sunspots."

Recent observations by the Mount Wilson Observatory staff has indicated that a double maximum of sunspot activity occurred, one in the summer of 1937 and another in the summer of 1938, the latter being the stronger of the two. (There is also a possibility of the maximum not having been reached to date, although this chance is remote.)

During December, 1938, a series of ionsphere disturbances happened that startled every student of radio, and on eight different occasions the condition of "short skip" was noted. Also, on one busy afternoon—a Sunday, by coincidence—five-metres opened up, and many more DX contacts along the Chicago-New York-Boston path were made.

Reviewing the u.h.f. spectrum, we find the most unstable DX band in existence. Nevertheless, we, too, like uncertainty with our listening, and we feel that many more of you will be badly smitten when you try ultra-high dxing.

Those readers who desire more specific information or who would care to report their results on the u.h.f. may contact the writer at the following address:—Perry Ferrell, jnr., Linwood, New Jersey, United States of America. All inquiries and bits of information are welcomed—the writer will try to answer all cards and letters received.



This receiver photograph was sent in by DX club member John Taylor, Hurstville, N.S.W. The large dial has the celluloid cover and pointer removed and a 4½" pointer extended outside on to a scale on the panel; this gives a bandspread of 3" on a 9" scale on 20 m. The pointer on the left controls the coupling link to the pre-selector. The power supply on the right also includes a pair of 2A5's in push-pull for speaker operation.

What's New In Radio

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

RCA Air-Cooled Transmitting Valve Manual.

An invaluable reference handbook that every radio amateur should include in his library is R.C.A. Technical Manual TT3, dealing with R.C.A. air-cooled transmitting valves.

The first chapter is devoted to general vacuum tube considerations, and deals with valve elements generally and materials used in their construction. Subsequent chapters deal with generic valve types, and installation and application data on transmitting valves. Amplifiers of all popular types are covered, information also being included on frequency multipliers and crystal-controlled oscillators. Over 100 pages are then devoted to R.C.A. transmitting valve types, characteristic curves, outline drawings and socket connections being given for each.

The next chapter, dealing with transmitter design considerations, is a particularly useful one. It discusses choice of valve types, grid bias considerations, inductance and capacitance for tuned circuits, inter-stage coupling, neutralisation, tuning an r.f. amplifier, output coupling, parasitic oscillations and protective devices.

Subsequent chapter headings are as follows:—Useful formulae, transmitting valve charts, rectifiers and filters, circuit section, index and reading list.

Copies of this Manual are available from Messrs. Amalgamated Wireless Valve Co. Pty. Ltd., York Street, Sydney, price 2/- (postage 2d.).

Also available from the above address is the latest amended price list on Radiotron transmitting and miscellaneous valves for experimenters. On popular types such as the 802, 807 and 809 there have been appreciable reductions, these types now listing at 22/6, 27/6 and 25/-, respectively. Copies of this list are available free on request from the address given.

★

Metres/K.C. Chart Free To Readers.

A supply of wavelength frequency conversion charts has been received from Messrs. Philips' Lamps (A'sia) Ltd. for free distribution among "Radio World" readers. This chart enables wavelength in metres to be instantly converted to frequency in kilocycles, and conversely. Commencing at 100 k.c. the table progresses in single k.c.'s to 999 k.c. (3000 to 300.3 metres). However, unknowns applying to quantities that are multiples or sub-multiples of those listed can easily be ascertained, and so the chart can be employed to cover the entire range of frequencies used in radio transmission. For example, 500 metres is equal to 600 k.c. The corresponding frequency for five metres (one-hundreth of 500) is obtained by multiplying the frequency quoted by 100; thus it becomes 60,000 k.c., or 60 m.c.

Readers can obtain their copies of this chart by writing "Radio World," 214 George Street, Sydney, enclosing a 1d. stamp to cover postage.

In Latest "Radiotronics."

Operational data on the Radiotron type 810 transmitting triode, which is intermediate in size between types 805 and 806, is published in the latest issue of "Radiotronics" (Technical Bulletin No. 94), published by A. W. Valve Co. Pty. Ltd. Other articles of interest include "Third Harmonic Distortion—Graphical Method for Push-Pull Amplifiers," "Grid Leak Bias Operation of High-mu Triode Valves," "Effect of Shunt Capacitances," "New Parallel Feedback Circuit," and "1.4-volt Series—Filament Voltage Limits."

Announcements regarding new Radiotrons include mention of a series of three filament type Acorn valves comprising the 957 triode with 1.4 volt 50 m.a. filament, 958 triode with 1.4 volt 100 m.a. filament, and 959 sharp cut-off pentode with 1.4-volt 50 m.a. filament.

Accompanying this latest issue of

"Radiotronics" is an index covering technical bulletins published in 1938, and a Radiotron Classification Chart, grouping valve types according to heater voltages and according to functions.

★

Distributors Appointed For Brown Projection Unit.

The rapidly increasing number of public address installations now being put into service is indicated by the wide demand enjoyed by the type 15 projection unit released recently by Messrs. George Brown & Co. Ltd., 267 Clarence Street, Sydney.

It is now being successfully used for all types of public address installations throughout Australia. A bank of them was used with notable success at the recent Science Congress held at Canberra, while a further supply of these units were recently installed in the P.A. system now in use at the new Manly surf pavilion. The type 150 unit is specially designed for use with standard Rola electrodynamic and permanent magnet reproducers.

Geo. Brown & Co. Pty. Ltd. now advise that distributors have been appointed in Queensland and Tasmania, and Brown's projection units can be obtained from A. E. Harrold, 123 Charlotte Street, Brisbane; W. & G. Genders Pty. Ltd., 53 Cameron Street, Launceston; W. Atkins Ltd., Western Australia; or from Geo. Brown & Co. Pty. Ltd., at the above address.

RADIO & TELEVISION TEXT-BOOKS

Over 50 Titles In New Catalogue

Messrs. Angus & Robertson Ltd., 89 Castlereagh Street, Sydney, have just released a catalogue of new scientific and technical books published during 1937-39. Comprising 50 pages, it gives details of the latest books available on almost every technical subject, nearly 600 new titles and new editions being listed.

In the radio and television section, brief details are given of over 50 textbooks. Every field is covered, books being included for beginners, radio amateurs, servicemen, radio engineers and those interested in public address equipment.

Messrs. Angus & Robertson advise that any of the books listed will be supplied on approval for inspection, or alternatively a detailed list of contents is available.

Copies of this catalogue are available free and post free to "Radio World" readers writing Messrs. Angus & Robertson Ltd. at the address given above.

Philips Technical Review.

"Philips Technical Review" for September, 1938, features on the first few pages an article entitled "Radio Receivers With Push-Button Tuning." Following a general survey of the various systems of push-button tuning, the motor-driven system developed by Philips is discussed. Other articles include "X-Ray Tube For The Analysis of Crystal Structure," "A New Frequency Changing Valve" (type EK3, designed for minimum frequency shift), "Low Pressure Mercury Discharge Within A Luminescent Tube," and "The Tensile Strength Of Deposited Weld Metal."

Crown Catalogue And Review

Readers are advised that copies of the 1939 Crown Radio Products Pty. Ltd. catalogue and price list are available free on request from distributors throughout the Commonwealth, or direct from the company at 51-53 Murray Street, Pyrmont, Sydney.

Printed in two colours on art paper and lavishly illustrated throughout, the catalogue lists the entire range of Crown components now available. The first two pages are devoted to a wide variety of full-vision dials, including the well-known Crown "Magnascopic" and "Spin-drive" types.

Permeability-tuned broadcast and shortwave coils, dual-wave boxes and press-button tuning units, together with standard type air-cored pie wound and solenoid coils, are listed and illustrated in the next three pages. Other components include broadcast and shortwave coil kits, chassis, trimming and padding condensers, resistors, voltage dividers, r.f. chokes and miscellaneous items such as solder lugs and grid clips.

Also available on request is the first issue of the "Crown Technical Review," prepared for the guidance of set-builders using Crown components.

★

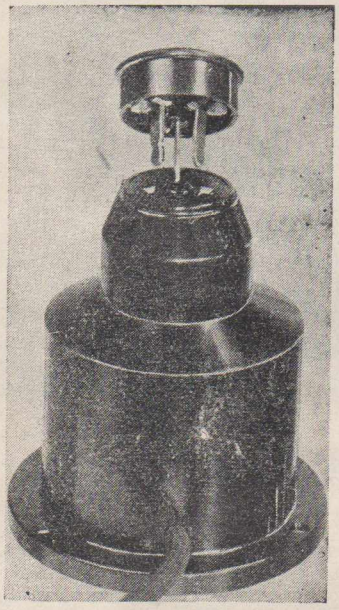
Radio Suppliers Pty. Ltd. Release Three New Radiokes Lines

Mr. R. K. Stokes, managing director of Radio Suppliers Pty. Ltd., Wingello House, Angel Place, Sydney, advises that within the next few months a complete new range of Radiokes components will be released, and will be available to set-builders throughout the Commonwealth. As each new line is released, a detailed review of it will appear in the "Radio World," while in addition receivers will be de-

scribed using Radiokes components wherever possible throughout.

Lines already available comprise a new type of carbon potentiometer line filter unit, and a garage step-down transformer unit. The potentiometer is made in five standard resistances, ranging from 50,000 ohms to 1 megohm, each of which is available with standard tapers. Features of the unit are a new resistance element, one-piece contact lugs, and compact dimensions.

The constructional foundation of these new units is a moulded frame,



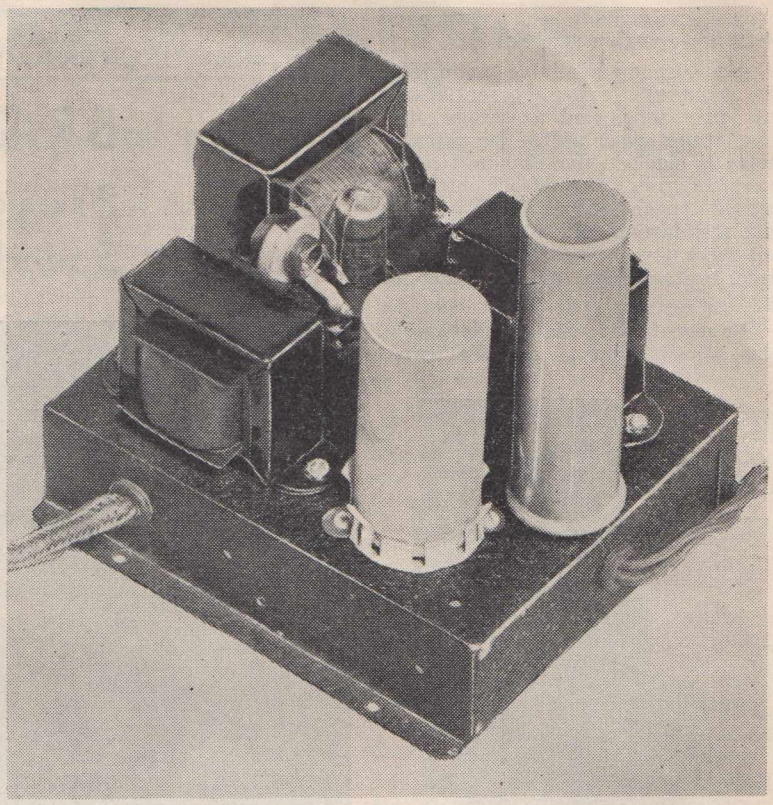
The new Radiokes garage step-down transformer.

1 7/8 in. in diameter, which carries the element, mounting bushing, and contact lugs. A pressed-metal cover fits over the back of this frame and makes the overall depth just over 5/8 in. Single-hole mounting with a standard 3/8 in. thread is employed. An interesting feature is found in the provision of an earthing lug on the pressed-metal cover.

The element incorporated in this unit is claimed to be made under a special process which gives a hard surface impervious to the effects of wear, humidity, etc. In addition to these, another interesting feature of the element is found in the use of metal sputtering to ensure definite end contact and absolute zero resistance at the low-volume end. The rotating contact also is of new design and provides smooth, even contact throughout its range of rotation. The assembly is completed by the provision of a positive stop to prevent over-rotation—this is moulded as an integral part of the frame.

(Continued on page 48.)

Vibrator Unit: Trans-Tasman P.B. Five

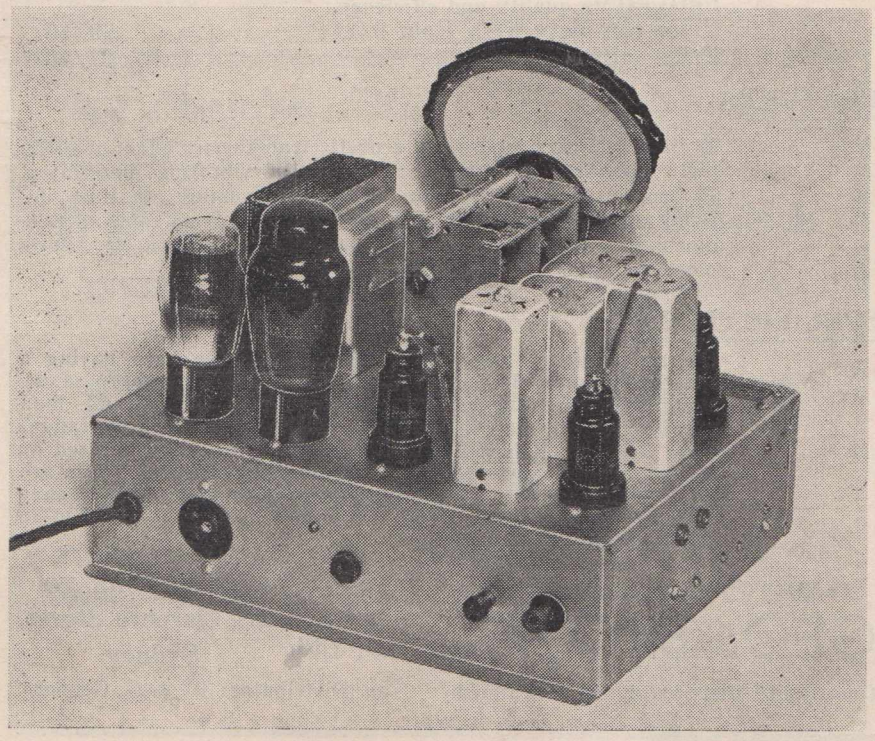


Watch Next Month's Issue For Full Constructional Details.

REPRODUCED above is a photograph of a vibrator unit (with shield cover removed) that will be described in next month's "Radio World." Together with the push-button receiver shown below, it was designed and built by Messrs. F. J. W. Fear & Co., of Wellington, New Zealand, in collaboration with "Radio World." Complete kits of parts for both are available from the firm mentioned.

Vibrator Unit Delivers 150V. At 30 M.A.

The vibrator unit, which employs a synchronous vibrator of American manufacture, is designed to supply 150 volts at 30 mills., which is ample output for any battery receiver employing up to about seven valves. Particular care has been taken in the design to ensure noise-free output.



A rear view of the "Trans-Tasman Push-Button Five," which is built on a steel chassis measuring 11" x 8½" x 3".

Triple-Band 4/5 Superhet.

The receiver illustrated on the left —the "Trans-Tasman Push-Button Five"—is a 4/5 three-band superhet that should possess a very strong appeal for set builders.

It uses a 6A8 mixer oscillator, 6K7 i.f. amplifier, 6Q7 diode second detector and triode first audio amplifier, 6AG-6G high-gain output pentode, and a 5Z4 rectifier. The first three valves mentioned are metal types, and the last two, metal-glass.

The push-button unit used is of American manufacture, and care has obviously been taken in its design to ensure freedom from frequency drift in the tuned circuits. The twelve trimmers—six for the aerial and six for the oscillator circuits—are adjusted from the front of the heassis.

Full constructional details of both the vibrator unit and receiver will be featured in next month's "Radio World."

The All-Wave All-World DX News

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

★ ★

Sixth "Radio World" Shortwave Contest Closes On June 30.

The sixth "Radio World" Shortwave DX Contest will close on June 30, and entries can be forwarded at any time up to this date. The rules are as follows:—

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

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

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

4. Only verifications of reception between June 1, 1938, and closing date will be eligible.

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

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

7. The decision of the judges will be final; and the result of the sixth competition will be announced in the August, 1939, issue of "R. W."

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

—The Shortwave Editor.

DX Notes And News

Recent Shortwave Loggings.

20-metre hams: W1COO, JFG, W2JKQ, EVI, IVK; W3's SII, FN; W4's DLH, BYY, KT; W5's DQ, EIH; W6's NYD, LII, BKY, DRL, NNR; W7's FQK; W8's NOC, QVR, LNE; W9's KWR, CEM; K6's MBH, BNR, OQE, AGM, FKN, ILW; KA1's ME, JR, ER, JM, CS; PK's 3GD, 1VX, 4JD, 4KS, 4VD, 6XX, 1VY, 1RI, 2AY; ZL's 2BE, 2QL, 4GM; VU2CQ, VU2LL; W1AX, CMD; XU8ET, LU4BC, HC1JW. **40 metres:** PK3GD, VK8SK, 9MI.

Commercials: ZBW (31.49 m.), KZRM (31.33 m.), W3XAL (31.02 m.), TI4NRH (31.02 m.), ZHP (30.96 m.), Spain (30.43 m.), COCQ (30.77 m.), XEWW (31.58 m.), KEI (31.61 m.), DJZ (31 m.), VK3ME (31.55 m.), VLR3 (31.32 m. and 25.25 m.), KZRM (25.34 m.), W8XK (25.26 m.), JZJ (25.45 m.), W1XAL (25.43), W8XK (19.72 m.), W2XAD (19.56 m.), W2XE (19.64 m.), OLR5B (19.58 m.), OLR5A (19.7 m.), KAY (20.03 m.), XGOX (19.7 m.), WOF (30.77 m.).

Reports are out to VK2ACL, PK1RI, VK3BS, XZ2DY, VU2CQ, VK6MW.

Cards received from ZL2BE, VPD2, VK2DI and VK3QK.—Wm. Bantow (AW353DX), Edithvale, S.14, Victoria.

"Air-Ace" Best Shortwaver Yet.

I have just finished building the "Air-Ace Communications Four" receiver and would like to say that it is the best shortwave set I have yet built. On the 40-metre band "hams" come in by the score, and I could write reports for weeks if I had the time to spare.—Norman E. Booth (AW92DX), Gungal, N.S.W.

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.]

General Conditions Patchy ★ Ultra-High Frequency Notes ★ Latest Station News From Observers ★ Observers' Reports ★ Amateur Review ★ Hourly Tuning Guide.

Summary Of Present Conditions

From reports received from observers, it seems that the rather abnormal weather conditions now being experienced have resulted in rather patchy conditions on the S.W. broadcast bands. Most reports indicate that conditions are not very satisfactory when taken as a whole, but that good DX has been possible at intervals.

For those who have the patience to listen on the higher wavelengths where the noise-level is pretty terrific, some really good results are obtainable after 10 p.m. Any of the following stations may be heard:—**XYO**, Rangoon, 49.9 m.; **TG-2**, 48.4 m.; **W8XAL**; Saigon, 48.2 m.; **XEXA**, 48.93 m.; **VPB**, 49.1 m.; **CFRX**, Toronto, 49.4 m.; **ZHJ**, Penang, 49.5 m.; **HP5K**, 49.96 m.; and **COCW**, 47.4 m. **SBO**, 49.46 m., is an early a.m. catch on 49 m.

On 31 metres **TAP** and the Italian transmitters are best in the mornings; with the Europeans **OFD, OZF,** and **LKC** just fair. At night look out for **HS6PJ** (Thursdays 11 p.m.), **XEWW**, Radio Tananarive, 31.96 m..; **ZHP**; Saigon, 30.72 m.; and the Cubans between 30 and 34 metres.

Down on 25 metres the Americans are easily the best morning stations **(W2XE, W8XK** and **W1XAL).** Just below the 25 m. band watch out for the new Chinese station in Shanghai, **XMHA**, in the evenings; and also for the Ecuadorean station, **HCJB**, on 24.1 m.

On 19 metres, apart from the regulars, **W2XE** in the mornings; and **XGX**, Chungking, at night are worth some attention.

On 16 metres the new Rome station, **2RO-6**, 16.84 m., can be heard on occasions in the late evenings.

★

Ultra High-Frequency Notes

Present Conditions.

During the past month the 11-metre band has been found to be much better than the 9.49-metre channel. Reception after 10 a.m. has been very satisfactory with quite a number of good signals audible; usually these signals "peak" around 11 a.m. **W9XUP** is generally the loudest on the band, with **W6XKG, W9XTC, W9XJL** and **W9XAZ** also fairly strong. On occasions **W9XA** and **W2XJI** may be heard.

The 9.49-metre band has not been so good (in Victoria, at least, although better results are reported from New South Wales). **W9XUY** is about the best (incidentally **W9XUY** has returned to 9.49 metres after a series of tests on 8.4 metres). Also **W9XPD** and **W8XNU.**

The 10-metre amateur band is apparently not so good as during the latter part of last year. Daytime reception is not so bad, but the falling-off is very noticeable during the evenings, when signals from Europe are not nearly as good as formerly.

Overseas Station News.

W2XBF, New York City, will conduct a series of test transmissions on 42,460 k.c., 7.06 m. Power will be 1 kw. It is rather unlikely that any Australasian S.W.L. will log this station, but one never knows.

WBOE is also testing on 7 metres—on 41,500 k.c., 7.2 m., to be exact. Schedule is midnight to 2 a.m., sometimes later.

Finally there is **VK2MA**, Sydney, on 42,860 k.c., 6.99 m. Transmissions are every Sunday.

On 9.49 m. a newcomer is **W5XD**, Dallas, Texas, which is now on the air from 2.30 to 4.30 a.m.

Several new stations are listed on 11 metres:—

W2XQO, New York City, 26,550 k.c., 11.29 m., is just recently on the air. As yet no schedule is to hand.

W8XNU, Cincinnati, 25,950 k.c., 11.56 m., is transmitting, but no details of schedule are available.

Schedules of 11-Metre "Regulars."

The schedules of the more regular of the 11-metre transmitters may be of interest:—

W9XA: Not quite definite, but audible during the mornings. This station verifies with an attractive four-page folder giving details of equipment, etc.

...W9XAZ: Relays **WTMJ** from 4 a.m. till after noon.

W2XJI: Relays **WOR** from 11 p.m. till 4 p.m. next day.

W9XJL: Relays **WEBC.**

W9XTC: Relays **WCTN** from 12 midnight to 4 a.m., and from 10 a.m. to 3 p.m.

W6XKG: Relays **KGFJ** 24 hours daily.

W9XUP: Relays **KSTP** approximately from 12 midnight to 2 p.m.

W9XUY, Omaha, Nebraska, U.S.A.

A verification is just to hand from **W9XUY**, confirming reports on their 9.4 and 8.4 m. signals. They mention that they have returned to their 9.4 m. channel, as very few reports were received when they transmitted on 8.4 m.

W9XUY is owned and operated by the Central States Broadcasting System (BCB stations **KOIL, KFOR** and **KFAB).** The transmitter is a 100 watts Collins job. The antenna used is a vertical J, 12 floors above street level.

During 1939 **W9XUY** will carry special programmes for SWL's. **NBC** "Blue," **MBS** and **CBS** programmes will be available in addition to the usual studio shows from **W9XUY** itself.

Connected with the station are the following amateurs: — **W9BWH, W9UZE, W9FDF, W9PDI** and **W9EQS** (the above information being furnished by the last mentioned ham, Mr. H. M. Fulmer).

★

Latest Overseas News

Argentina.

LRA, Radio del Estado, Buenos Aires, which broadcasts regularly on 9690 kc., 30.94 m., has lately been reported as conducting tests on 11,730 kc., 25.57 m. These special programmes are usually heard from 2 to 4 a.m. By the way, **LRA** will forward their programme schedules for each month upon request.

Austria.

The German authorities have now changed the call-letters of the Austrian broadcasting stations, which now relay the normal Berlin transmissions. All the stations are now using a power of 50 kws.

DJW (formerly **OER-5**), 15,190 kc., 19.75 m.; irregular.

DJZ (formerly **OER-3**), 11,801 kc., 25.42 m.; daily, 7.15 a.m. to 1.50 p.m.

DJX (formerly **OER-4**), 9570 kc., 31.35 m.; daily, 6.50 to 7.30 a.m.

DJY (formerly **OER-2**), 6072 kc., 49.4 m.; daily, midnight to 8 a.m.

Azores.

CT2AJ, Ponta Delgado, which now operates on 4002 kc., 74.99 m., from 8 to 10 a.m. on Sundays and Thursdays, has a limited area for reception on account of its unusual frequency. Accordingly, efforts are being made to induce the station to shift its frequency so that a far greater number of SWL's may have the pleasure of logging its signals.

Bulgaria.

LZA, Sofia, 8465 kc., 35.4 m., now transmits at the following times: Daily, 2.30 to 7 a.m., and 8 to 9.30 p.m.; Mondays, 3 to 8 a.m.; Thursdays, 1.30 to 8 a.m.

Burma.

Rangoon on 6007 kc., 49.9 m., is believed to be using the call-letters **XYO.** Their transmissions are being heard rather well at present; closing at 12.45 a.m.

Canada.

In these columns last month it was stated that **VE9HX** was now known as **CHNS.** That statement was erroneous, the call now being **CHNX.**

Chile.

Two new stations, both located at Valparaiso, have recently come on the air.

CB970, 9700 kc., 30.9 m., operates daily from 10.30 to 2.30 p.m.

The other station is on 9730 kc., 30.8 m. Call is unknown, the station announcing as "La Voz de Chile." Schedule is indefinite, from 9.30 a.m.

China.

Despite the hostilities in the Far East a surprising number of Chinese stations continue regular broadcasts. Information regarding some of these transmitters is rather difficult to obtain, but the following data will be found reasonably accurate.

XGOX now at Chung-king, the present capital of the Chinese Government, operates on approximately 15,200 kc., 19.74 m. A news session in English is broadcast in English every night at 12 midnight.

XMHA, located in Racecourse Rd., Shanghai, transmits on 12,320 kc., 24.2 m. Announcements are given by an American. This station is apparently on the air every evening from about 9 p.m. till after midnight.

On 9565 kc., 31.35 m., a station relays **XGAP,** Peiping, from midnight to 5 a.m. It is uncertain whether the call is **XGAP** or **XUD.** (Woman announcer.)

XGXA, location uncertain, on 6980 kc., 42.9 m., is reported after midnight. (Woman announcer.)

XTJ, "The Voice of China," is on 11,691 kc., 25.66 m. Regular schedule is 3 to 3.30 p.m. and 10 to 10.30 p.m.

XGX, previously at Hankow, but now thought to be in Chung-king, relays BCB station **XGOW** on frequencies between 9180 and 9300 kc., 32.26 and 32.6 m. Schedule is from 11 p.m. to 12.05 a.m.

The following Chinese phone stations are reported as still on fairly regular schedules: **XTR, XTS, XTK** and **XTV.**

At present very little is known of two new transmitters at Cheng-tu. These are **XOY,** 9370 kc., 32.02 m., and **XOZ,** 15,510 kc., 19.34 m. Schedule is understood to be 12.45 to 1.30 a.m.

Cuba.

COCM, now on 9833 kc., 30.5 m., will relay **CMBL** in future (not **CMCM** as formerly). The station has recently changed hands.

COCQ has shifted frequency from 9708 to 8840 kc., 30.9 to 33.5 m. On the air from 6.45 p.m. till 4 p.m. the following day.

Columbia.

Further alterations of frequency, mainly a continuation of the move to 60 m., have occurred amongst the Columbian stations; and in addition many changes in call-letters have now been made.

HJ7ABB is now **HJ7GAB,** 4775 kc., 62.82 m., Bucaramanga; **HJ6ABC** is now **HJ7FAC,** 4795 kc., 62.51 m., Ibague; **HJ2ABC** is now **HJ2BAC,** 4815 kc., 62.3 m., Cucuta; **HJ3ABD** is now **HJ3CAB,** 4845 kc., 61.93 m., Bogota; **HJ3ABF** is now **HJ3CAF,** 4855 kc., 61.78 m., Bogota; **HJ2TBJ** is now **HJ2BAJ,** 4865 kc., 61.63 m., Santa Marta; **HJ3ABH** is now **HJ3CAH,** 4895 kc., 61.2 m., Bogota; **HJ3ABX**

is now **HJ3CAX**, 6020 kc., 49.83 m., Bogota; **HJ7ABD** is now **HJ7EAH**, 4890 kc., 61.3 m., Bucaramanga.

Dutch East Indies.

Amongst the more unusual D.E.I. commercials which may be logged at present are the following: **YBG**, Medan, Sumatra, 10,430 kc., 28.76 m.; **PNI**, Makassar, Celebes, 8775 kc., 34.19 m.; and **YCP**, Balikpapan, Dutch Borneo, 9120 kc., 32.9 m. These stations are usually on the air around 7.30 p.m. phoning the Javanese commercials. Reports to Engineer-in-Charge, Java Wireless Stations, Bandoeng, Java, will be verified.

Finland.

The following Finnish transmitters are listed as operating on regular schedules:—

OFE, 11,780 kc., 25.47 m., 1 to 3.30 a.m., 4.05 to 6 p.m., 8 to 9.20 p.m.; **OFO**, 15,190 kc., 19.75 m., midnight to 3 a.m., 3.15 to 8 a.m., 4-6 p.m.; **OFD**, 9500 kc., 31.58 m., 3.15 to 8 a.m.

Guadeloupe.

One of the latest comers to the SW. bands is the new French station **FG8AA**, Pointe a Pitre, Guadeloupe, West Indies. This station operates on 7150 kc., 42.6 m., from 9 to 10 a.m.

Guatemala.

The latest list of Guatemalan stations is this:—

TGWA, 15,170 kc., 19.77 m.; relays **TGW**. Schedule: Daily except Monday, 3.45 to 4.45 a.m.; Mondays, 3.45 to 8.15 a.m.

TGWA, 9685 kc., 30.96 m.; relays **TGW**. Schedule: Daily except Monday, 1 to 2.30 p.m.; Mondays, 10 a.m. to 1.45 p.m.

TG-2, 6180 kc., 48.52 m.; relays **TGL**. Schedule: Monday and Friday, 10.30 p.m. to midnight; Monday, 6 to 11 a.m.; Tuesday, 9 a.m. to 2 p.m.; Saturday, 9 a.m. to 2 p.m. and 10.30 p.m. to midnight; Sunday, 9 a.m. to 4 p.m. and 10.30 p.m. to 2 a.m. (Monday).

TGQA, 6420 kc., 46.6 m.; relays **TGQ**. Schedule: Sunday, 1 to 4 p.m.; Monday, 4 to 6 a.m.; Tuesday and Saturday, noon to 2 p.m.

TGWB, 6490 kc., 46.2 m. Schedule: Daily, 1 to 3.15 p.m.

TG2X, 5945 kc., 50.42 m. Schedule: Tuesday and Friday, noon to 2.30 p.m.; Sunday, 1 to 3 p.m. and 5 to 8 p.m.

TG25E, 5790 kc., 51.81 m. Schedule irregular.

TGB, 5732 kc., 52.3 m. National Airport, Guatemala City. Continuous service.

TGS, 5713 kc., 52.4 m. Schedule: Thursday, Friday and Sunday, 10 a.m. to 1 p.m.

TGT-5, 5610 kc., 53.4 m. Commercial phone station; irregular.

TGF, 14,480 kc., 20.7 m. Commercial station; phones **WNC**, evenings.

Hawaii.

KQH, 14,920 kc., 20.1 m., now relays the Hawaiian programmes to the United States, and will verify all correct reports. Transmissions may be heard at these times: Mondays, 3 to 3.30 p.m.; Fridays, 3.15 to 3.30 p.m.; Sundays, noon to 12.30 p.m.

India.

Regarding reports to the various Indian stations, merely address them to "All India Radio" in the particular city in which the station heard is located.

OFFICIAL S.W. OBSERVERS.

N.S.W.: V. D. Kemmis (AW-301DX), "Brampton Hall," 49 Kurraba Road, Neutral Bay, Sydney; A. R. Payten (AW352-DX), 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. Coggins, 8 Glen Rowan Road, Woodville.

QUEENSLAND: J. K. Sorensen (AW316DX), "Fairholme," Station Road, Gympie; E. Neill (AW64DX), 25 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 (AW-129DX), "Winninburn," Coleraine.

NEW ZEALAND: H. I. Johns (AW407DX), Mount Pleasant Avenue, Nelson, N.Z.

Indo-China.

Radio Hanoi II has been reported on 11,900 kc., 25.21 m. Using 150 watts, they operate from 9 p.m. to 1 a.m. daily. There is also Radio Hanoi I. on 9510 kc., 31.55 m., with a power of only 15 watts. Both these stations were built by Rene Lebon, well-known as the owner-operator of FI8AC. QRA for Radio Hanoi is Radio Club de l'Indiochine, Hanoi.

Japan.

Readers will notice that a new transmitter is being used for the regular Tokyo transmissions—**JLG**, 7285 kc., 41.18 m.

Incidentally, the Jap. SW. broadcasters now verify with an attractive card, not a letter as formerly.

Lithuania.

LYR, Kaunas, 9320 kc., 32.19 m., is on a regular daily schedule from 10 p.m. till midnight.

Luxembourg.

The famous BCB station "Radio Luxumbourg" may be heard shortly on the SW. bands, when its new transmitter at Junglinster is completed.

Mexico.

XECR, station of the Foreign Oflice in Mexico City, is continuing its regular transmissions on 7380 kc., 40.65 m., in addition to irregular tests on 15,150 kc., 19.8 m.

New Zealand.

ZL2ZB (announcing as 2ZB, Wellington) has a regular schedule for its three frequencies:—

3480 kc., 86.2 m., daily 3 to 10 p.m.; 6960 kc., 43.1 m., daily 10 p.m. to 7 a.m.; 13,920 kc., 21.6 m., daily 7 a.m. to 3 p.m. Power is 200 watts.

New Caledonia.

FK8AA, Noumea, 6120 kc., 49.02 m., transmits on Wednesdays and Saturdays from 5.30 to 6.30 p.m. Power is only 20 watts. This is really an amateur station, owned and operated by Charles Gaveau, and also operates on 20 m., using phone or CW.

Nicaragua.

YN3DG, Leon, 7130 kc., 42 m., is on irregularly from noon till about 1 p.m.

Norway.

LKC, Jeloy, are now using a new high-powered transmitter on 9530 kc., 31.48 m. It transmits from 11 a.m. to noon, and from 1 to 2 p.m. All reports to Norsk Rikskringkasting, Stortingsgaten 24, Olso, Norway.

Papua.

VIG, Port Moresby, relays **VK4PM** twice a month; on the first and third Sundays at 6 p.m. (not on Saturdays as stated in these columns last issue). Transmissions are on 7310 kc., 41 m.

Persia.

It is learnt that the new 20 kw. transmitter now being constructed at Teheran will operate on 6160 kc., 48.7 m.

Peru.

OAX4X, Trujillo, has settled down on 11,840 kc., 25.35 m. It uses the slogan "Rancho Grando." Announcements in English are given at intervals.

Siam.

A new station at Saladeng, Bangkok, is thought to be operating on 6110 kc., 49.1 m. Schedule is a trifle uncertain, but apparently the station comes on between 10 and 11 p.m., closing around 1 a.m.

Spain.

A new transmitter is now broadcasting from Nationalist headquarters at Burgos. Frequency is 10,330 kc., 29.04 m. A programme in English for the United States is given from noon to 1 p.m.

Another well-known Nationalist transmitter, **RR-6**, Vittoria, "Radio Requete," has shifted to 11,991 kc., 25 m., transmitting from 4 to 5 a.m., from 7 to 8 a.m., from 7 to 8 p.m., and from 11 p.m. to 1 a.m. daily.

EA2BH, Jaca, broadcasts news in English at 11 a.m., on 14,115 kc., 21.2 m.

St. Kitts.

VP2LO, 6385 kc., 47.4 m., has now changed its call-letters to **ZIZ.**

Turkey.

The Turkish broadcasting stations commenced transmissions on October 29 last, using **TAP**, 9465 kc., 31.7 m., and **TAQ**, 15,195 kc., 19.74 m. (Those calls are definite at last, OM's.)

Reports which are verified by letter should be sent to Station Director, Station TAP-TAQ, Turk Muhendisler Birligi, 5 No. Lu Oda, Yeni-Sehei, Ankara, Turkey. (Whew!)

These stations have frequently relayed programmes from Rome, 2RO-4.

Uruguay.

The best time to try for CXA-8, Colonia, 9640 kc., 31.12 m., seems to be on Sundays, when the station remains on the air until 5 p.m.

United States.

W2XE, New York, has a new channel on the 31 m. band, 9650 kc., 31.38 m. Transmissions are from 11 a.m. to 1 p.m.

Vatican City.

HVJ is now testing irregularly on 11,740 kc., 25.55 m.

★

Reports From Observers

Mr. J. Ferrier (Coleraine, Victoria).

As far as the amateur bands are concerned, 20 metres is poor, and 10 metres is the worst it has been for quite a few months.

The best DX on 10 metres was **KA1ME, VS6AO, SU1MW** and a few Europeans. **SU1MW** comes in very strongly around 9.30 p.m. Signals have been a consistent R9. On January 5 a couple of French hams were heard until after midnight—unusually late.

The 11-metre broadcasters have been coming through very well; it has been apparent that there is no connection between conditions on 11 metres and those on the 10-metre amateur band.

It may be of interest that there is a rumour going around that the 40-metre amateur band is showing signs of a return to its former high standard of some years ago, when real DX was obtainable on these frequencies.

Mr. W. H. Pepin (Maylands, West Australia).

There has been very little change in DX conditions during the past three months. Generally speaking, reception has not been as good as in previous years.

Perhaps the most interesting feature of the past month was the All Continents hook-up on 20 metres. On January 3 I heard **W4DLH** making arrangements for the "Round Table" conference on the following day. On January 4, at 8.45 p.m. Perth time, **W4DLH** began the test, and it was successfully completed in the record time of 1 min. 50 sec. Another similar test will be made on January 4, 1940.

On the broadcast bands things are much the same.

13 metres: **GSJ.**

16 metres: **GSG** and **DJE** (only fair).

19 metres: **YDB** and **YDC; W2XE** and the usual German, English and French transmissions.

25 metres: **W8XK** is outstanding in the mornings; also **W2XE.**

30 metres: **EAQ** were very strong on January 4 at 5.15 p.m. Perth time. **COCM** on 30.6 m. is a strong signal.

33 metres: **COCQ** has been heard on their new frequency.

Results on 20 metres have been fairly good. Best loggings include **SU1MW, ZS5CO** and **ZS4H, PAOMZ, VS2AJ, VS2AP** and **VS2AS.**

Mr. G. O. La Roche (South Perth, West Australia).

Conditions have been rather poor during recent weeks, only the regular stations having been heard. The only real DX catch was the 20 m. amateur station **ZC6EC.** On the same band the **W4DLH** sextet broke all records by hooking up in 1 min. 50 sec.

As mentioned above only the regulars were of much interest on the broadcast bands. **W9XF** on 25 m. was the sole exception.

Much time was spent on 20 m. (as 10 m. proved a "dud"), and apart from **ZC6EC** quite a number of good loggings were made: **ZS6PJ, ZS2AZ, ZS2MF, ZS1Z, ZS1AL, ZS1BL, ZS2AY, ZS6BZ** and **ZS1BO** (South Africa); **VP9R** (Bermuda); **G3BM, G2MF, G8MA, G5BI** (England and Europeans are getting scarce); and a number of Indians, Cubans, D.E.I.'s, etc.

Enclosed is a report from Mrs. Nicholls, of Subiaco, W.A. Outstanding loggings are **W3XL** (16); **KQH** (20); **JIB** (28); **JDY** (30), **ZHP, VUD-2, YDB, HS6PJ, KZRM, KZIB** (30-31); **ZHO, XYO** (49); **VUM-2, VUC-2, VUD-2** (60-62); and a number of **NIROM** stations between 58 and 105 metres.

Mr. A. R. Payten (Coffs Harbour, New South Wales).

Generally speaking, DX has been very poor indeed for some weeks now, owing no doubt to the abnormal weather. Actually, the only DX worth anything has been on the amateur bands, for only the usual broadcasters have been logged.

I have been busy erecting a rotary beam antenna for 10 metres, and hope for some UHF DX in the near future. I tried the 10 m. band between 10.10 and 11.25 a.m. on January 29, and was very pleased to hear a number of W's and ZL's at good strength.

The 20 m. band has definitely had its brighter moments: **K7AOC; KF6DHW**, Canton Island; **XU8RV, XU7HV; TG9BA; FB8AD; YV4AV, YV4AE; VE2FU, VE4SS;** and **PK6XX.**

Only the usual broadcast stations have been much good; reception above 44 m. has been impossible on account of heavy QRM. There is a new Japanese station on approximately 42 m. (Probably JLG, 41.18 m.—SW. Ed.)

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

A great improvement in reception conditions has been noted here this month, despite the fact that noise levels have remained very high.

Some interesting DX has been logged on the 20 m. band. **PK6XX**, the transmitter of the American expedition in New Guinea, has been putting in a nice signal. Several interesting informal "talks" have been heard from **PK6XX**, giving information regarding the natives and the surrounding country. Another consistent 20 m. amateur is the Guatemalan **TG9BA.**

Other interesting loggings: **XU8ET, VS2AP, VS2AO; VK9GW, VK9WL;**

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.

ZC6EC; SU1AM, SU1RO, SU1RG, SU1WM, SU1RD; ON4PZ; HK5AR; K5AF and HI5X.

Mr. J. C. Linehan (Adelaide, South Australia).

DX has shown a distinct improvement this month, particularly on 20 metres, where the reception of W's till as late as 10 a.m. seems to indicate that better days are ahead.

A highlight of the month was a description of the rescue of the survivors of the flying-boat "Cavalier," heard over station **W3XAL** on 31 metres. They were relaying from the tanker which effected the rescue. This was on January 22, at 5.30 p.m.

Interesting broadcast loggings this month include **TAP** and **TAQ**; **CR7BH** (25); **ZHP**; and **EAQ** at good strength.

The best 20-metre amateur logging has been **KF6DHW**, Canton Is. This station has been heard in contact with **KA1CS**. It appears that there are eight people on the island, and they maintain communication with the outside world through **KF6DHW**. Stores are delivered every three months, the only time a boat calls at the island. Also logged: **TG9BA**; **SI1DW**, **SU1WM**; **YR5PB** (Roumania); **CR7AU** (Mozambique) and **XU8RB**.

The 10-metre band has been very disappointing—only a few W's and ZL's having put in an appearance.

Mr. H. I. Johns (Nelson, New Zealand).

Reviewing the past month with regard to SW. reception, the first three weeks were only fair, due no doubt to the very bad weather conditions experienced over here. However, the last few days have seen a definite improvement in both weather and DX reception.

A letter from **JDY** gives the following information: Frequency 9925 kc., 30.2 m.; power, 10 kws. Daily programme as follows: 10 p.m., music and news in Japanese; 10.45 p.m., news in English; 11 p.m., close.

English broadcasts are given over the U.S.S.R. stations at the following times: Sundays, 8 a.m. (25); 10 a.m. (31 and 19.8); 6 p.m. (19.76); 9 p.m. (25). Mondays: 1 a.m. (25), 7 a.m. (25), 10 a.m. (19.89), 6 p.m. (19.76); Tuesdays, 7 a.m. (25), 10 a.m. (19.89), 6 p.m. (19.76); Wednesdays, 10 a.m. (19.89), 6 p.m. (19.76), 9.30 p.m. (25); Thursdays, 10 a.m. (31 and 19.89), 6 p.m. (19.76); Fridays, 8 a.m. (25), 10 a.m. (31 and 19.89), 6 p.m. (19.76); Saturdays, as Tuesdays.

Here is a list of stations reported to in the past five months. The figures in brackets indicate the number of weeks elapsing before a verification was received:—**W6XKG** (16), **XEUZ** (10), **COCM** (10), **SPW** (12), **OLR4B** (11), **KZRM** (7), **EAJ43** (14), **VPD-2** (10), **W8XK** (8), **W2XE** (14), **PCJ** (12), **DJD**, **DJC** (11), **TG-2** (13), **HJ4ABE** (10), **PMN** (10), **HCJB** (14), **COBZ** (12), **IRF** (16), **XEXA** (13), **JVN** (16), **PSE** (12), **CXA-8** (11), **TIPG** (14), **HBQ** (16), **ZHP** (3), **COBC** (10), **Malaga** (12), **OAX1A** (11), **OAX4J** (12), **TG2X** (11), **TFJ** (14), **VQ7LO** (14), **SP-19** (11), **VUD-3** (8), **JDY** (20), and **CR7BH** (22).

Station **LZA** on 20.04 m. will be used in future for commercial 'phone work only.

COCQ has been heard very strongly on their new 33 m. channel.

Another new station heard recently is **XMHA** on 24 m. A strong signal is heard from 8 p.m., but CW QRM is usually bad.

Other broadcast loggings for the month:—

13 metres: **GSH.**

16 metres: **W3XL.**

19 metres: **YDC, RV-96** and **VUD-3.**

24 metres: **HCJB.**

25 metres: **VLR-3, SBP, W1XAL, CR7BH.**

27 metres: **CSW.**

30 metres: **ZHP, TGWA, COCM, EAQ, JDY.**

31 metres: **VLR, XEWW, W3XAL.**

47 metres: **TG-2.**

49 metres: **W9XF, W2XE, W8XK.**

Best 20-metre amateur stations have been: **PK6XX, TG9BA, KF6DHW, HK3CO, LU3HK, HC2CC,** and **VK9WL** (6 watts).

Senor Richard F. Rubio (Habana, Cuba).

DX conditions are improving, but are not quite as good as could be expected. 10 metres seems to be opening up; whilst 20 metres is good, so good that I have spent most of my time on this band.

Stations heard: **TILS** (Costa Rica), **YN3DG** (Nicaragua), **XGAP** (Peiping), **XTJ** (Hankow), **FZE-8** (Fr. Somaliland), **FK8AA** (New Caledonia), **2ZB** (New Zealand), Baghdad.

Amateur loggings: **ZS- 3F, 2N, 6DY, 6BB, 2X** and **6DW**; **EA- 8AE** and **8AF**; **VS9AC, CN1AF**; **J- 7CR, 7CB, 5CC** and **2MI**; **XE- 1GK** and **3AQ**; **VU- 2LL** and **2JK**; **CE2AR.** Incidentally **VS9AC** is a new amateur at Aden, using a frequency of 14,335 k.c. He is usually on the air on Wednesday mornings (Aust. E.S.T.). The two EA stations mentioned are both on 41 m., giving war news around midnight (Aust. E.S.T.).

Mr. C. J. Anderson (Dumbleyung, West Australia).

The new year came in very well as far as 20-metre amateurs were concerned with the logging of some very fine DX, such as **YR5AA, HA8N, GM5NW, SV1CA, ZC6EC** and **FB8AH** during the evenings; and **VP9R, VP9L, VP9G, VP7NS** and **TG9BA** in the mornings. Towards the end of the month, however, conditions were bad on account of heavy and continuous QRN.

On the broadcast bands there is nothing startling to report. The Shanghai station XMHA on 24 metres comes in well, though sometimes CW QRM is bad. Radio Philco on 25.57 metres puts in a good signal at 8.30 p.m. (Perth time); also **COBX** (32 m.), and **COCW** (47 m.).

★

From Readers

Mr. W. T. Choppen (Timaru, New Zealand).

I am forwarding the following information which may be of interest to other DX club members.

Radio Requete, RR-6, 11,991, 25 m., sends under registered mail their QSL card, together with six post cards and a packet of stamps. Also under separate cover they forwarded the first issue of a new periodical entitled "Radio Nacional."

They give their schedule as (in Aust. E.S.T.): 7 to 7.30 p.m., first news bulletin in Spanish; 11 p.m. to 1 a.m., second news bulletin in Spanish and music; 4 to 4.30 a.m., music for wounded soldiers in hospital; 4.30 to 4.45 a.m., news in French and English; 7 to 10 a.m., last news and music.

Every Wednesday and Saturday they broadcast a special session for Spanish America from 11.30 a.m. to 1 p.m.

And, finally, every Tuesday and Sunday, from 12.30 to 1 a.m., they relay from the station "Radio Nacional."

QRA is Postas 19, Vittoria, Spain.

XEFT, "La Voz de Vera Cruz," 9550 k.c., 31.41 m., using 20 watts, verifies with a cream coloured card, with call in red and Aztec calendar in the centre. Schedule is from 12.30 to 7.30 a.m., and 9.30 to 2.30 p.m. QRA, Ave. Independencia 28, Vera Cruz.

I have run short of QSL cards at present, but will reply to all SWL's who have sent me their cards as soon as a further supply comes to hand.

(Very many thanks for interesting "dope" supplied, OM. Please write again.—SW. Ed.)

Amateur Review

Bush Fires on 40 Metres.

During the recent tragic bush fires which devastated a great area of Victorian forest areas, SWL's were treated to some interesting and exciting transmissions on the 40-metre amateur band. As the fires destroyed telephone lines many of the threatened districts were cut off from Melbourne, and communication was only restored by the splendid work done by many of the VK3's.

Spectacular work was done by the Omeo station VK3WE (Mr. A. Williams), which broadcast appeals for medical assistance, etc., when the town was destroyed by the flames.

Other stations noted on the 40-metre band were VK- 3FL 3UM, 3SG, 3ML, 3QK, 3ZV and 3VO.

Conditions on 20 Metres.

Conditions on 20 metres continue fairly good, with a good variety of stations audible at fair strength.

The most interesting station logged this month was KF6DHW, located on Canton Island in the South Pacific.

On January 4 the members of the "All Continents Round Trble" again got together and succeeded in lowering their previous record of 3 mins. 20 secs. to the remarkable time of 1 min. 50 secs. A full report of the hook-up, specially written by South Australian Observer, Mr. R. S. Coggins, appears below.

★

SWL Card Exchangers' Section

All the following SWL's guarantee 100 per cent. QSL:—

G. Miles, 73 Palm Avenue, Footscray, Kent, England; Denys Crampton, 35 York Road, Southport, England; Robert Guest, 359 N. Charlotte Street, Pottstown, Penna., U.S.A.; Peter A. Clarius, 11 Marianne Street, Port Richmond, Staten Is., N.Y., U.S.A.; D. V. Young, 615 Euclid Street, Santa Monica, Calif., U.S.A.; Lee F. Peer, Box 775,, Ely, Nevada, U.S.A.; R. Adachi, 110 North Grant Street, San Mateo, Calif., U.S.A.; Wally Hallgren, Box 31, Santa Rosa, Calif., U.S.A.; Don Reid, P.O. Box 168, Ft. Morgan, Colo, U.S.A.; Charles Baxa, 2678 N. Halsted St., Chicago, Ill., U.S.A.; Nicholas Spanos, 340 Market Street, Lowell, Mass., U.S.A.; Marie and Vince Stasen, 5347 Priscilla Street, Philadelphia, Pa., U.S.A.; Roy H. Babbitt, R 1, Killingly, Conn., U.S.A.; Noel E. Kurtz, Xenia, Illinois, U.S.A.; Arthur E. Coleman, 1208 4 Ave., Watervliet, N.Y., U.S.A.; Hensley Morehen, 66 Curtis Street, San Francisco, Calif., U.S.A.; Luther Schnake, 1608 Campbell Avenue, Des Plaines, Ill., U.S.A.; John L. Tate, 612 Halifax Street, Petersburg, Virginia, U.S.A.; Mac Elwyn Van, Sandy R.F.D., Box 332, Union, Utah, U.S.A.; Dick Winne, 10 Elmhurst Avenue, Stop 39 Schenectady Road, Albany, N.Y., U.S.A.

★

Latest Schedules

Below are set out in detail the latest available schedules for the "regular" overseas shortwave stations.

ENGLAND—London.

Transmission 1: 6 to 8.15 p.m., GSI, GSO, GSF, GSE and GSD.

Transmission 2: 8.45 p.m. to midnight, GSJ, GSH, GSG, GSF and GSE.

Transmission 3: Midnight to 3 a.m., GSH, GSG, GSF, GSD, GSB and GSA.

Transmission 4: 3.20 to 7 a.m., GSG, GSP, GSA, GSD, GSB and GSI; 7.15 to 9 a.m., GSO, GSD, GSC, GSB and GSA.

Transmission 5: 9.20 to 11.30 a.m., GSO, GSD, GSC, GSB and GSL.

Transmission 6: 12.20 to 2.20 p.m., GSC, GSB and GSL.

Transmitters mentioned above operate on the following channels:—

GSA, 6050 kc., 49.59 m.: GSB, 9510 kc., 31.55 m.; GSC, 9580 kc., 31.32 m.; GSD, 11,750 kc., 25.53 m.; GSE, 11,860 kc., 25.29 m.; GSF, 15,140 kc., 19.82 m.; GSG, 17,790 kc., 16.86 m.; GSH, 21,470 kc., 13.97 m.; GSI., 15,260 kc., 19.66 m.; GSJ., 21,530 kc., 13.93 m.; GSL, 6110 kc., 49.1 m.; GSO., 15,180 kc., 19.76 m.; GSP, 15,310 kc., 19.62 m.

GERMANY—Berlin.

Transmissions for Australia and Asia: From 3.05 p.m. to 2 a.m., DJA, DJR, DJN and DJQ; from 3.05 p.m. to 8.50 p.m., DJE; from 3.05 p.m. to 8.30 p.m., DJS.

Transmissions for Africa: From 1.35 to 7.25 a.m., DJL and DJX; from 2.30 to 7.25 a.m., DJD; from 4 to 7.25 a.m., DJC; from 3.05 to 5 p.m., DJL.

Transmissions for South America: From 2.10 to 3.25 a.m. (Mondays only), DJQ; from 7.50 a.m. to 1.50 p.m., DJN and DJQ; from 9 to 10.50 p.m., DJJ and DJE.

Transmissions for North America: From 2.10 to 3.25 a.m. (Mondays only), DJB; from 7.50 a.m. to 1.50 p.m., DJB, DJD, DJZ and DJM; from 11 p.m. to midnight. DJL.

Transmissions for Central America: From 7.50 a.m. to 1.50 p.m., DJA; from 11 p.m. to midnight, DJB.

Transmitters mentioned above: DJA, 9560 kc., 31.38 m.; DJB, 15,200 kc., 19.74 m.; DJC, 6020 kc., 49.83 m.; DJD, 11,700 kc., 25.49 m.; DJE, 17,760 kc., 16.89 m.; DJL, 15,110 kc., 19.85 m.; DJN, 9540 kc., 31.45 m.; DJQ, 15,280 kc., 19.63 m.; DJR, 15,340 kc., 19.56 m.; DJS, 21,450 kc., 13.99 m.; DJZ, 11,801 kc., 25.42 m.; DJJ, 21,565 kc., 13.92 m.; DJM, 6079 kc., 49.35 m.

FRANCE—Paris.

From 12.30 to 2 a.m., TPB-3; from 2.15 to 9 a.m., TPA-3; from 10 a.m. to 12.15 p.m., TPA-4; from 12.30 to 3 p.m., TPB-7; from 2.15 to 9 p.m., TPB-11; from 5 to 8 p.m., TPB-6 and TPA-3; from 9 p.m. to 2 a.m., TPA-2.

Transmitters: TPA-2, 15,243 kc., 19.68 m.; TPA-3, 11,885 kc., 25.24 m.; TPA-4, 11,718 kc., 25.6 m.; TPB-3, 17,810 kc., 16.84 m.; TPB-6, 15,130 kc., 19.83 m.; TPB-7, 11,885 kc., 25.24 m.; TPB-11, 9550 kc., 31.41 m.

JAPAN—Tokyo.

Transmissions for Europe: 5.30 to 7 a.m., JLG or JZJ. Transmissions for South America: 7.30 to 8.30 a.m., JZJ or JZI. Transmissions for Eastern North America: 11 to 11.30 a.m., JZJ; and 10 to 10.30 p.m., JZJ. Transmissions for Western North America, Canada and Hawaii: From 3.30 to 4.30 p.m., JZJ. Transmissions for China and South Seas: From 11 p.m. to 12.30 a.m., JZJ and JVP.

Transmitters above: JZI, 9535 kc., 31.46 m.; JZJ, 11,800 kc., 25.42 m.; JLG, 7285 kc., 41.18 m.; JVP, 7510 kc., 39.95 m.

ITALY—Rome.

From 7.40 p.m. to 3.05 a.m., 2RO-4, 11,810 kc., 25.4 m.; from 3.05 a.m. to noon, 2RO-3, 9630 kc., 31.13 m.

2RO is now relayed by the following stations: IRF, 9840 kc., 30.52 m., 6 to 6.30 a.m., 9 to 10.25 a.m., 10.30 p.m. to midnight; IQY, 11,670 kc., 25.7 m., 3.10 to 5.35 a.m., 6 to 6.30 a.m., 9 to 10.25 a.m., 10.30 p.m. to midnight; ICC, 6350 kc., 47.2 m., 6 to 6.30 a.m.

CZECHOSLOVAKIA—Prague.

From 4.55 to 8.10 a.m., OLR4A and OLR4B. (N.B.: At 7.40 a.m. a frequency change is announced, the new transmitter coming on at 7.45 a.m. OLR3A is used on Tuesdays, OLR5A on Wednesdays, OLR2A on Thursdays and Fridays, and OK1MPT on Saturdays.)

From 8.55 to 11.55 a.m. (Sundays and Mondays only), OLR4A and OLR4B, or OLR5A and OLR5B.

From 10.55 a.m. to 1.55 p.m. (except Sundays and Mondays), OLR4A and OLR4B or OLR5A and OLR5B.

From 9 to 11.10 p.m., OLR5A.

From 11.25 p.m. to 1.25 a.m., OLR4B.

Transmitters: OLR2A, 6010 kc., 49.92 m.; OLR3A, 9550 kc., 31.41 m.; OLR4A, 11,840 kc., 25.34 m.; OLR5A, 15,230 kc., 19.7 m.; OLR4B, 11,760 kc., 25.51 m.; OLR5B, 15,320 kc., 19.58 m.; OK1MPT, 5145 kc., 58.31 m.

HOLLAND.

Through PHI-1, 17,770 kc., 16.88 m., from 10.40 to 11.40 p.m. (except Sundays): and 9.25 p.m. to 12.40 a.m. (Sundays only).

Through PHI, 11,730 kc., 25.57 m., from 9.15 to 9.45 a.m. (except Sun-

days and Mondays); 10.15 to 10.45 a.m. (Sundays only).

Through PCJ-2, 15,220 kc., 19.7 m., 5 to 6.30 p.m. (Tuesdays only); 12.30 to 2.30 a.m. (Thursdays only).

Through PCJ, 9590 kc., 31.28 m., 4.20 to 4.35 a.m., 5 to 6 a.m., 10.15 to 11.15 a.m., 11.25 a.m. to 12.25 p.m. (Mondays only); 4.45 to 6.40 a.m., 10.15 to 11.45 a.m., noon to 1.30 p.m. (Wednesdays only); 10.15 to 11.15 a.m., 11.35 to 11.50 a.m. (Thursdays only); 11 a.m. to noon (Saturdays only).

UNITED STATES.

W2XE: 6120 kc., 49.02 m., 1.30 to 2.30 a.m.; 9650 kc., 31.09 m., 9.30 a.m. to 2 p.m. (new frequency); 11,830 kc., 25.36 m., 4 to 9 a.m.; 15,270 kc., 19.65 m., 4 to 9 a.m.; 17,760 kc., 16.89 m., irregular; 21,520 kc., 13.94 m., 10.30 p.m. to 1 a.m.

W8XK: 6140 kc., 48.83 m., 2-3 p.m.; 11,870 kc., 25.26 m., 4 a.m. to 2 p.m.; 15,210 kc., 19.72 m., midnight to 4 a.m.; 21,540 kc., 13.93 m., 9.45 p.m. to midnight.

W3XL, 17,780 kc., 16.87 m., midnight to 2 p.m.

W3XAL, 9670 kc., 31.02 m., 8 a.m. to 4 p.m.

W2XAF, 9530 kc., 31.48 m., 7 a.m. to 3 p.m.

W2XAD, 9550 kc., 31.41 m., 9.15 a.m. to 1 p.m.

W1XK, 9570 kc., 31.35 m., 10 p.m. to 4 p.m.

W3XAU, 9590 kc., 31.28 m., Tues., Fri., Sun., 4 a.m. to 4 p.m.; Mon., Wed., Sat., 3 to 4 p.m.; Thurs., 1 to 4 p.m.

PHILIPPINE ISLANDS—Manilla.

From 7.30 to 8 a.m., and from 7 p.m. to midnight (or 1 a.m.): KZRM, 9570 kc., 31.33 m.; KZIB, 9510 kc., 31.55 m.

DUTCH EAST INDIES—Bandoeng.

From 10 a.m. to 5 p.m.: YDB, 15,300 kc., 19.61 m.

From 7.30 p.m. to 1 a.m.: YDB, 9550 kc., 31.41 m.; YDC, 151,50 kc, 19.8 m.; PMN, 10,260 kc., 29.24 m.; PLP, 11,000 kc., 27.27 m.

SWITZERLAND—Geneva.

From 5.30 to 5.45 p.m. (Mons., Fri.): HBO, 11,402 kc., 26.31 m. From 6 to 6.30 p.m. (Mon. only): HBJ, 14,535 kc., 20.64 m.

★

All-Continents Hook-up On 20 Metres

(Specially written by Observer Coggins.)

Another achievement for amateur radio! This month the members of the "All-Continent Round Table" broke their previous record of 3 mins. 20 secs. by sending a message around the world by radio telephony in 1 min. 50 secs. The record-breaking attempt was made on Wednesday, January 4.

At 12.30 Greenwich Mean Time, the American station W4DLH, who arranged the All-Continent Round Table, was heard calling the members for a "check in."

As they checked in, the stations were heard here at the following lengths:—W4DLH, Q5 R9; VU2CQ, Q5 R8-9; HK5AR, Q5 R8; VK4JU, Q5 R9+; SU1AM, Q5 R6-7; G5ML, Q3 R3.

The actual record-breaking attempt was commenced by W4DLH at 12.57.20 secs. G.M.T. and handed over to VU2CQ at 12.57.45 secs. G.M.T.; HK5AR took charge at 12.57.60 secs. G.M.T., VK4JU at 12.58.20 secs. G.M.T., SU1AM at 12.58.40 secs. G.M.T., G5ML at 12.58.55 secs. G.M.T., and handed back to W4DLH at 12.59.10 secs. G.M.T., thus completing the circuit in 1 min. 50 secs.

W4DLH reported the signal strengths: VU2CQ, Q5 R8; HK5AR, Q5 R9; VK4JU, Q5 R4; SU1AM, Q5 R5; G5ML, Q5 R5.

VU2CQ reported the signal strengths: W4DLH, Q5 R9+; HK5AR, Q5 R8; VK4JU, Q5 R8; SU1AM, Q5 R5; G5ML, Q5 R4.

HK5AR reported the signal strengths: W4DLH, Q5 R9; VU2CQ, Q5 R8; VK4JU, Q4 R6; SU1AM, Q5 R5; G5ML, Q5 R5.

VK4JU reported the signal strengths: W4DLH, Q5 R7; VU2CQ, Q5, R8-9; HK5AR, Q5 R8; SU1AM, Q2-3 R2-3; G5ML, Q2 R2.

G5ML reported the signal strengths: W4DLH, Q5 R7; VU2CQ, Q5 R5: HK5AR, Q1 R2; VK4JU, Q2 R2; SU1AM, Q5 R9.

SU1AM was here "blotted out" by heavy local QRM.

The following were the approximate frequencies used during the "hook-up":—VU2CQ, India, 14.120 kilocycles; HK5AR, Colombia, 14,090: VK4JU, Australia, 14,000 kc.; SU1AM Egypt, 14,120 kc.; G5ML, Great Britain, 14,100 kc.

Another attempt will be made at the record at the same time (12.30 G.M.T. or 10.30 p.m. E.S.T.) on January 4, 1940.

Although he was unable to hear all of the six stations, the Victorian amateur VK3DH made a recording of the greater part of the "hook-up." This should prove a most interesting souvenir of the occasion.

Perhaps next year we may see the time reduced to 1 min. 30 sec. or even less.

★

Calls Heard

10 Metres.

Europe.—France: F- 3NR, 3KN, 8ID. Holland: PA- OFB. England: G- 6FS.

Africa.—Egypt: SU- 1MW.

Asia.—Hong Kong: VS- 6AO. Hawaiian Is.: K6- BNR. New Zealand: ZL- 2BE, 2FY, 3DJ, 2GE, 4BK, 2AU, 3KZ, 1GZ, 2BG.

North America.—United States: W- 3GCZ, 3XBU, 4FIJ, 5FUA, 6GCX, 6ITH, 6PDB, 8AHC, 8NJJ, 9CXU, 9DJU, 9ROQ, 9UEN. Canada: VE- 5AZ, 5BZ.

20 Metres.

Europe.—France: F- 8TU, 8XT, 3DY. Holland: PA- OMZ, OAA. Portugal: CT- 1QC, 1ZA. England: G- 3BM, 2MF, 8MA, 5BJ, 5AK, 5ML, 6HF, 5OB. Roumania: YR- 5PB. Belgium: ON- 4PZ.

Africa.—Madagascar: FB- 8AD. Egypt: SU- 1MW, 1AM, 1DW, 1RO, 1RG, 1RD. Nth. Rhodesia: VQ- 2HC. Mozambique: CR- 7AU. Sth. Africa: ZS- 1AL, 1Z, 1BL, 1BO, 2AY, 2AZ, 2MF, 4H, 5CO, 6BZ, 6BJ.

Asia.—Palestine: ZC- 6EC. Japan: J- 2NG, 2CS, 2XA. Hong Kong: VS- 6AB, 6AF, 6AW, 6AK, 6OG. Malaya: VS- 2AR, 2AJ, 2AS, 2AP, 2AG, 2AO. China: XU- 8RV, 7HV, 8ET, 8RB. Ceylon: VS- 7GJ, 7RF. India: VU- 2CQ, 2FU, 2CA, 2FF, 2FQ, 2LY, 2LL, 2HQ, 2JL, 2FY, 2FS, 2JK, 7FY, 7KF. Burma: XZ- 2DX, 2DY, 2JD. Philippine Is.: KA- 1ZL, 1CW, 1AF, 1CS, 1ER, 1JR, 1JM, 1FH, 1AR, 1AB, 1BH, 1RI, 1ME, 1JP, 1ZB, 1NR, 3BW, 7EF. Hawaiian Is.: K6- PMC, DLZ, ATE, DTT, OTH, LEG, ILW, APH, FKN, OGN, PLZ, OFW, OGA, ETF, OKZ, LKN, BNR, CMC, OQE, OCO, OJI, KGA, IQM, DAD, OBE, BBR, LKU, PQB. D.E.I.: PK- 1RI, 1VS, 1PK, 1GL, 1GH, 1VM, 1GE, 1RL, 1ZZ, 2AY, 4KS, 3GL, 3JK, 2WL, 4CB, 2CG, 4KN, 4RS, 4AU, 3AA.

Australasia, etc.—Pitcairn Is.: VR- 6AY. Canton Is.: KF- 6DHW. Papua: VK- 4HN. New Guinea: PK- 6XX; VK- 9GW, 9XX, 9VG, 9WL. New Zealand: ZL- 2BE, 2BM, 1KJ, 1GE, 4GM, 4AA, 2JB, 4FK.

North America.—Canada: VE- 5OT, 2FU, 4SS, 4AK, 1CN. Alaska: K7- AOC. Mexico: XE- 1GE. Bermuda: VP- 9R.

Central America and West Indies.—Cuba: CO- 7CX, 2WM, 4RY, 2WW. Dominican Republic: HI- 5X. Costa Rica: TI- 3AV. Canal Zone: NY- 4AE; K5- AF, AN. Guatemala: TG- 9BA.

South America.—Peru: OA- 4AW. Venezuela: YV- 4AE, 4AV. Chile: CE- 4AI. Argentine: LU- 3HK. Ecuador: HC- 2CC. Columbia: HK- 3CO, 5AR.

20-Metre Amateur Loggings

Europe: G2MF, G3BM, G3FA, G3QK, G5BJ, G5ML, G5DT, G6GO, G6WX, G8NJ, G6XR (England), GM5NW (Scotland), F8GM, F8XT (France), ON4TO (Belgium), PAOMZ (Holland), HA8N (Hungary), YR5AA (Roumania), SV1CA (Greece).

Asia: ZC6EC (Palestine), K6BNR, G6OGN (Hawaii), KA1AP, KA1JM, KA1ER, KA1CW, KA1CS, KA1ZL, KA1BH, KA1AB, KA1EL, KA4LH, KA7HB, KA7EF, KA1ME (Philippines); XZ2DY, XZ2JB, XZ2DX, XZ2EZ (Burma), VU2CA, VU2CQ, VU2FQ, VU2LL, VU2HQ (India), VS7GJ, VS7RP (Ceylon), VS6AG, VS6AK (Hong Kong); VS2AS, VS2AP, VS2AJ (Malaya); VS1AD (Singapore); J2MI, J2KG (Japan); XU8RB, XU8HB (China); PK1NE, PK1VM,, PK1RL, PK1RI, PK2WL, PK4DG (Dutch East Indies); PK6XX (New Guinea).

America and West Indies: VP9R, VP9G, VP9L (Bermuda); VP7NC (Bahamas), TG9BA (Guatemala), VE3OC, VE3GK, VS3XQ, VE3FW, VE3WW, VE3HI, VE2BG, VE9AL (Canada); CO2GY, CO8BC, CO2RH, CO2LY, CO2WM, CO2AM, CO2HS, CO7VP, CO6OM, CO7CX, CO2RR (Cuba); K5AF (Canal Zone).

Africa: SU1TM, SU1AM (Egypt); ZS4H, ZS5CO, VS6DW, ZS6DJ, ZS6BB, ZS6FW (South Africa); FB8AH (Madagascar).

HOURLY TUNING GUIDE

When and Where To Search

Compiled by ALAN H. GRAHAM.

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

All times are given in Australian Eastern Standard Time.

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

Midnight-1 a.m.

13.97	GSH
16.84	TPB-3
16.86	GSG
16.88	PHI (S)
19.35	W2XAD
19.56	DJR
19.63	DJQ
19.68	TPA-2
19.7	OLR5A (ex. M, S)
19.71	PCJ (Th)
19.8	YDC
19.82	GSF
25.34	OLR4A (ex. M, S)
25.4	2RO-4
25.42	JZJ
25.53	GSD
27.27	PLP
28.48	JIB
29.24	PMN
30.96	ZHP
31.28	VK2ME (M)
31.28	VUD
31.38	DJA
31.45	DJN
31.49	ZBW-3
31.55	GSB
31.55	HS8PJ (F)
31.58	XEWW
31.8	COCH
32.59	COBX
32.95	COCA
33.32	COBZ
39.95	JVP
48.7	VPB
49.59	GSH
49.9	COCO
49.98	Rangoon
58.3	PMY
60.06	VUD
60.61	VUM
61.16	VUC
70.2	RV-15
98.6	YDA

1-2 a.m.

13.97	GSH
16.84	TPB-3
16.86	GSG
19.35	W2XAD
19.56	DJR
19.63	DJQ
19.68	TPA-2
19.7	OLR5A (ex. S, M)
19.71	PCJ (Th)
19.8	YDC
19.82	GSF
19.84	HVJ
19.85	DJL
25.00	RNE
25.24	TPA-3
25.34	OLR4A (ex. S. M)
25.42	RO-4
25.53	GSD
27.27	PLP
28.48	JIB
29.24	PMN
31.01	DJX
31.28	VUD
31.35	TPB-11
31.38	DJA
31.45	DJN
31.55	GSB
48.7	VPB
49.59	GSA
49.9	COCO
58.3	PMY
60.06	VUD
60.61	VUM
61.16	VUC
70.2	RV-15

2-3 a.m.

13.97	GSH
16.86	GSG
19.35	W2XAD
19.63	DJQ (M)
19.74	DJB (M)
19.82	GSF
19.85	DJL
25.24	TPA-3
25.4	2RO-4
25.49	DJD
25.53	GSD
31.01	DJX
31.28	VUD
31.55	GSB
48.70	VPB
49.31	VQ7LO
49.59	GSA
60.06	VUD
60.61	VUM
61.16	VUC

3-4 a.m.

16.86	GSG
19.62	GSP
19.63	DJQ (M)
19.66	GSI
19.74	DJB (M)
19.85	DJL
25.24	TPA-3
25.49	DJD
25.53	GSD
25.71	IQY
31.01	DJX
31.13	2RO-3
31.55	GSB
49.31	VQ7LO
49.59	GSA
60.06	VUD
60.61	VUM
61.16	VUC

4-5 a.m.

16.86	GSG
19.62	GSP
19.65	W2XE
19.66	GSI
19.85	DJL
24.52	TFJ
25.24	TPA-3
25.49	DJD
25.53	GSD
25.57	IQY
31.01	DJX
31.13	2RO-3
31.28	PCJ (M)
31.28	VUD
31.55	GSB
49.31	VQ7LO
49.59	GSA
49.83	DJC

5-6 a.m.

16.86	GSG
19.62	GSP
19.65	W2XE
19.66	GSI
19.72	W8XK
19.85	DJL
22.0	SPW (T, Th, Sat)
24.52	TFJ
25.24	TPA-3
25.34	OLR4A
25.42	JZJ
25.49	DJD
25.53	GSD
25.57	IQY
27.17	CSW
28.93	EAJ43
31.01	DJX
31.13	2RO-3
31.28	PCJ (M, W)
31.55	GSB
41.18	JLG
49.59	GSA
49.83	DJC

6-7 a.m.

16.86	GSG
19.62	GSP
19.65	W2XE
19.66	GSI
19.72	W8XK
19.85	DJL
22.0	SPW (T, Th, Sat)
25.0	RNE
25.24	TPA-3
25.34	OLR4A
25.42	JZJ
25.49	DJD
25.53	GSD
25.57	IQY
27.17	CSW
30.4	EAQ
30.52	IRF
31.01	DJX
31.13	2RO-3
31.28	PCJ (W)
31.28	W3XAU
31.35	W1XK
31.48	W2XAF
31.55	GSB
31.7	TAP
41.18	JLG
43.1	ZL2GB
47.2	ICC
49.59	GSA
49.83	DJC

7-8 a.m.

19.65	W2XAD
19.72	W8XK
19.72	OLR5A (W)
19.76	GSO
19.85	DJL
25.00	RNE
25.24	TPA-3
25.34	OLR4A
25.42	JZJ
25.45	W1XAL
25.49	DJD
25.53	GSD
27.17	CSW
30.40	EAQ
31.01	DJX
31.09	CS2WA
31.13	2RO-3
31.28	W3XAU
31.32	GSC
31.33	KZRM
31.35	W1XK
31.41	OLR3A (T)
31.46	JZI
31.48	W2XAF
31.55	KZIB
31.55	GSB
31.7	TAB
43.1	ZL2GB
49.59	GSA
49.83	DJC
49.92	OLR2A (Th, F)
58.31	OK1MPT

8-9 a.m.

16.87	W3XL
19.63	DJQ
19.65	W2XE
19.71	OLR5A (S, M)
19.72	W8XK
19.74	DJB
19.76	GSO
25.00	RNE
25.24	TPA-3
25.34	OLR4A (S, M)
25.42	DJZ
25.42	JZJ
25.45	W1XAL
25.49	DJD
25.53	GSD
25.60	TPA-4
28.93	EAJ43
30.04	COBC
30.31	CSW
30.43	EAQ
30.51	COCM
31.02	W3XAL
31.06	LRX
31.09	CS2WA
31.13	2RO-3
31.28	W3XAU
31.32	GSC
31.33	KZRM
31.35	W1XK
31.38	DJA
31.45	DJN
31.46	JZI
31.48	W2XAF
31.49	LKJ-1
31.55	GSB
31.55	KZIB
31.58	XEWW
31.8	COCH
49.35	DJM
49.59	GSA

9-10 a.m.

16.87	W3XL
19.56	W2XAD
19.63	DJQ
19.71	OLR5A
19.72	W8XK
19.74	DJB
19.76	GSO
19.8	YDC
22.0	SPW
25.27	PHI (ex. S, M)
25.34	OLR4A
25.36	W2XE
25.42	JZJ

25.42 DJZ
25.45 W1XAL
25.49 DJD
25.51 OLR4B
25.53 GSD
25.57 IQY
30.31 CSW
30.52 IRF
31.02 W3XAL
31.06 LRX
31.09 CS2WA
31.13 2RO-3
31.32 GSC
31.35 W1XK
31.38 DJA
31.45 DJN
31.48 W2XAF
31.49 LKJ-1
31.55 GSB
49.1 GSL
49.35 DJM

10-11 a.m.

9.49 W9XPD
9.49 W9XUY
11.33 W9XA
11.49 W9XJL
11.51 W9XTC
11.56 W6XKG
11.56 W9XUP
16.87 W3XL
19.63 DJQ
19.71 OLR5A
19.74 DJB
19.76 GSO
19.8 YDC
25.26 W8XK
25.27 PHI (S)
25.34 OLR4A
25.36 W2XE
25.42 DJZ
25.49 DJD
25.53 GSD
25.57 IQY
25.61 TPA-4
29.15 DZC
30.52 IRF
31.02 W3XAL
31.13 2RO-3
31.25 RAN
31.28 PCJ (M, W, Th)
31.32 GSC
31.38 DJA
31.41 W2XAD
31.45 DJN
31.48 W2XAF
31.49 LKJ-1
31.55 GSB
49.1 GSL
49.35 DJM

11 a.m.-noon.

9.49 W9XPD
9.49 W9XUY
11.33 W9XA
11.49 W9XJL
11.51 W9XTC
11.56 W6XKG
11.56 W9XUP
16.87 W3XL
19.63 DJQ
19.71 OLR5A
19.74 DJB
19.76 GSO
25.26 W8XK
25.34 OLR4A
25.42 DJZ
25.42 JZJ
25.49 DJD
25.53 GSD
25.61 TPA-4
31.02 W3XAL
31.13 2RO-3
31.25 RAN
31.28 PCJ (M, W, Th Sat).
31.32 GSC
31.38 DJA
31.41 W2XAD
31.45 DJN
31.48 W2XAF
31.55 GSB
49.1 GSL
49.35 DJM

Noon-1 p.m.

16.87 W3XL
19.63 DJQ
19.71 PCJ (W)
19.74 DJB
25.24 TPB-7
25.26 W8XK
25.42 DJZ
25.49 DJD
31.02 W3XAL
31.28 PCJ (W)
31.32 GSC
31.38 DJA
31.41 W2XAD
31.45 DJN
31.48 W2XAF
31.55 GSB
49.1 GSL
49.35 DJM

1-2 p.m.

19.63 DJQ
19.74 DJB
25.24 TPB-7
25.42 DJZ
25.49 DJD
31.28 PCJ (W)
31.32 GSC
31.38 DJA
31.45 DJN
31.48 W2XAF
31.55 GSB
49.1 GSL
49.35 DJM

2-3 p.m.

25.24 TPB-7
31.32 GSC
31.41 TPB-11
31.48 W2XAF
31.55 GSB
49.1 GSL

3-4 p.m.

13.99 DJS
16.88 DJE
19.56 DJR
19.63 DJQ
19.85 DJL
25.42 JZJ
31.28 VK2ME (S).
31.38 DJA
31.41 TPB-11
31.45 DJN
32.15 OAX4J
49.02 W2XE
49.5 W8XAL

4-5 p.m.

13.99 DJS
16.89 DJE
19 56 DJR
19.63 DJQ
19.85 DJL
25.42 JZJ
31.28 VK2ME (S)
31.41 TPB-11
31.38 DJA
31.45 DJN
49.5 W8XAL

5-6 p.m.

13.99 DJS
16.89 DJE
19.56 DJR
19.63 DJQ
19.71 PCJ (T)
19.83 TPB-6
25.23 TPA-3
26.31 HBO (M, F).
31.28 VK2ME (S)
31.41 TPB-11
31.38 DJA
31.45 DJN

6-7 p.m.

13.99 DJS
16.89 DJE
19.56 DJR
19.63 DJQ
19.66 GSI
19.71 PCJ (T)
19.76 GSO
19.82 GSF
19.83 TPB-6
20.64 HBJ (M)
25.23 TPA 3
25.29 GSL
25.53 GSD
28.14 JVN
31.28 VK2ME (S).
31.38 DJA
31.41 TPB-11
31.45 DJN

7-8 p.m.

13.99 DJS
16.89 DJE
19.56 DJR
19.63 DJQ
19.66 GSI
19.76 GSO
19.82 GSF
19.83 TPB-6
25.24 TPA-3
25.29 GSE
25.53 GSD
25.57 Saigon
28.14 JVN
31.33 KZRM
31.38 DJA
31.41 TPB-11
31.45 DJN
31.49 ZBW-3
31.50 VK3ME (ex. S).
31.55 KZIB

8-9 p.m.

13.93 GSJ
13.97 GSH
13.99 DJS
16.86 GSG
16.89 DJE
19.56 DJR
19.63 DJQ
19.8 YDC
19.82 GSF
24.26 XMHA
25.29 GSE
25.4 2RO-4
25.57 Saigon
27.27 PLP
28.14 JVN
29.24 PMN
30.96 ZHP
31.28 VK2ME (S).
31.33 KZRM
31.38 DJA
31.41 TPB-11
31.45 DJN
31.45 VPD-2
31.49 ZBW-3
31.50 VK3ME (ex. S).
31.55 KZIB
43.1 ZL2GB
44.64 PMH
70.2 RV-15

9-10 p.m.

13.92 DJJ
13.93 GSJ
13.97 GSH
16.86 GSG
16.88 PHI (S)
16.89 DJE
19.56 DJR
19.58 OLR5B
19.63 DJQ
19.68 TPA-2
19.71 OLR5A
19.8 YDC

(Continued on page 48.)

Radio Ramblings

(Continued from page 13.)

then turned off. It could be used as a hidden transmitter on field days or for directional work.

I have had good 'phone reports from New Zealand and England for 20 m., and as I have not been on 20 m. at any time with either 'phone or c.w., it is needless to state a "pirate" is using my call on 20 m. I hope to be on 'phone soon, 40 or 80, so would like reports from readers when I do. —C. Jackson (VK2AIV), Carool, Tweed River, N.S.W.

One-Four Portable Five

(Continued from page 20.)

partment for use as a more efficient aerial for distant stations, are both prepared in the manner described last month. A suggestion here is that the aerial carried in the case could be wound on a piece of three-ply approximately 5¼" square. This can then be slipped in in an upright position alongside the bias battery.

Field Strength Meter

(Continued from page 15.)

With a class "C" stage feeding the antenna, and with full plate voltage, the first calibration can be made. A piece of wire or copper tubing 3in. long is attached to the feed-through insulator on the instrument. Then the meter is tuned to the rig and carried around the back yard or street until a location is found where the indicating meter shows 1 m.a. exactly. Next, place the meter on the ground and walk away for about 4 or 5 feet to make sure the body capacity is not disturbing the reading to any extent. Body capacity usually extends to only 3 or 4 feet unless the operator is between the aerial and field strength meter.

Now go back to the rig and reduce the plate voltage by half. Also check the plate current to make sure that it has also dropped to half. Now note the reading on the meter. Next, reduce the voltage again by half, again note the reading, and so on. Continue this procedure until the lowest practicable reading has been taken, not forgetting to leave the meter in the one position and untouched.

The linearity of the meter will then be known, and quite surprising results are obtained in that respect. However, as each person builds his instrument it would be advisable to check it for linearity.

In use, the meter may be employed to compare the relative outputs of different antenna systems as to the radiation pattern on the ground. The meter is placed in a definite position as far away as possible, and a reading made of one antenna. This can then be taken down and a reading taken of another one for comparison.

The meter can also be used to plot field strength patterns of fixed direction beams. To do this, meter is taken completely around the antenna, the readings being taken in as nearly a circle around the beam as possible.

WIRELESS BROADCASTING

PATENT NOTICE

Australian Radio Technical Services and Patents Company Pty. Limited announces that it has the exclusive right to grant in Australia licences for the manufacture, sale, or use of Broadcast Receivers under the patents owned or controlled by:—

AMALGAMATED WIRELESS (A/ASIA) LTD.
BELL TELEPHONE LABORATORIES, INC.
COMPAGNIE GENERALE DE TELEGRAPHIE SANS FIL
ELECTRICAL RESEARCH PRODUCTS, INC.
HAZELTINE CORPORATION
INTERNATIONAL STANDARD ELECTRIC CORP., NEW YORK
INTERNATIONAL TELEPHONE AND TELEGRAPH LABORATORIES, INC.
INTERNATIONAL GENERAL ELECTRIC COMPANY, INC.
MARCONI'S WIRELESS TELEGRAPH COMPANY LTD.
THE MULLARD RADIO VALVE CO., LTD., LONDON
THE MULLARD WIRELESS SERVICE CO., LTD., LONDON
MULLARD (AUSTRALIA) PTY. LTD., SYDNEY
NEUTRODYNE PTY. LTD.
N. V. PHILIPS GLOEILAMPENFABRIEKEN
PHILIPS LAMPS (A/ASIA) PTY. LTD.
RADIO CORPORATION OF AMERICA
RADIO CORPORATION PTY. LTD.
STANDARD TELEPHONES AND CABLES PTY. LTD.
STANDARD TELEPHONES AND CABLES (LONDON)
SOCIÉTE FRANCAISE RADIO-ELECTRIQUE
TELEFUNKEN GESELLSCHAFT FUR DRAHTLOSE TELEGRAPHIE, m.b.H.
WESTERN ELECTRIC COMPANY INC.

ALL PERSONS making, using, vending or otherwise dealing in Wireless Broadcast Receivers, in contravention of the patent rights of the abovementioned parties, **ARE WARNED** that they render themselves liable to be proceeded against for infringement, damages, costs, and surrender of infringing apparatus, unless the manufacture of such apparatus is expressly authorised under a licence issued by **AUSTRALIAN RADIO TECHNICAL SERVICES AND PATENTS COMPANY PTY. LIMITED.**

The undermentioned manufacturers are licensed under the Patents of the above Companies to manufacture, sell or let on hire Broadcast Receivers:—

ABBOTT, A. W.
AIR-MASTER RADIO PTY. LTD
AIRZONE (1931) LIMITED
AMALGAMATED WIRELESS (AUSTRALASIA) LTD.
A. Z. RADIO PTY. LTD
BATY, C. S. & CO.
BEARD, E. G.
BLACK, W. H.
BLAND, W. J.
BLOCH & GERBER LTD.
BORTHWICK, EVERITT & CO.
BREVILLE RADIO PTY. LTD.
BRITON ELECTRICAL & RADIO PTY. LTD.
CALWYN RADIO CO.
CONLON RADIO CO.
COOK, A. A.
CRAMMOND RADIO MFG. CO.
D. W. RADIO PTY. LTD.
DUAL-TONE RADIO CO.
ECLIPSE RADIO PTY. LTD.
ENGERT, C. O.
FERRIS BROS. RADIO PTY. LTD.
FOX & MacGILLICUDDY LTD.
GEORGE, R. W.
GOULD, R. C.
GRAMOPHONE CO. LTD.
HARDING, C. H. V.
HARDINGE BROS. PTY. LTD.
HARROLD, A. E.
HARTLEY'S LIMITED
HEALING, A. G. LTD.
HOWARD RADIO PTY. LTD.
HUDSON, EDGAR V. PTY. LTD.
KILNER & SONS PTY. LTD.
KRIESLER (AUSTRALASIA) PTY. LTD.
LEKMEK (AUSTRALASIA) LTD.
MARTIN, JOHN PTY. LTD.
MARTIN, L. T.
MOSEL, L. E.
MULLARD (AUST.) PTY. LTD.
MUSIC MASTERS RADIO CO.
NATIONAL RADIO CORPORATION PTY. LTD.
NEWTON McLAREN LTD.
NILSEN, OLIVER, J. CO. LTD.
PARAMOUNT RADIO MFG. PTY. LTD.
PHILIPS LAMPS (AUSTRALASIA) PTY. LTD.
RADIO CORPORATION PTY. LTD.
RICHARDSON, L. G.
RYMOLA RADIO & ELECTRICAL PTY. LTD.
SHERWOOD, E. M.
SLADE'S RADIO PTY. LTD.
STANDARD TELEPHONES & CABLES PTY. LTD.
STEPHENSON, C. M.
STRATOSPHERE RADIO PTY. LTD.
STROMBERG-CARLSON (AUSTRALASIA) PTY. LTD.
SYME, E. S. M. PTY. LTD.
THOM & SMITH PTY. LTD.
TRACKSON BROS. PTY. LTD.
VEAL, ARTHUR J. PTY. LTD.
VOX-ADEON RADIO LTD.
VEALL, ARTHUR J. PTY. LTD.
WESTINGHOUSE ROSEBERY LTD.
WESTMINSTER RADIO & TELEVISION LTD.
WOLRIGE, E. C. R.
WRIGHT, A.
YELLAND, L. J.
ZENITH RADIO CO. PTY. LTD.

AUSTRALIAN RADIO TECHNICAL SERVICES & PATENTS COMPANY PTY. LIMITED, SYDNEY

19.82	GSF	31.55	KZIB	25.29	GSE	32.59	COBX	19.68	TPA-2	31.48	W2XAF
24.26	XMHA	43.1	ZL2GB	25.4	2RO-4	33.32	COBZ	19.74	DJB	31.49	ZBW-3
25.00	RNE	44.64	PMH	25.42	JZJ	44.64	PMH	19.76	GSO	31.51	HS8PJ
25.4	2RO-4	48.7	VPB	25.57	Saigon	46.8	TIPG	19.79	JZK		(Th).
25.29	GSE	49.5	W8XAL	25.65	HP5A	48.4	TG-2 (S)	19.8	YDC	31.55	KZIB
25.57	Saigon	58.3	PMY	27.27	PLP	48.7	VPB	19.82	GSF	31.8	COCH
27.27	PLP	70.2	RV-15	28.14	JVN	49.5	W8XAL	19.85	DJL	32.59	COBX
28.14	JVN	10-11 p.m.		29.24	PMN	49.96	HP5K	24.26	XMHA	33.32	COBZ
29.24	PMN	13.92	DJJ	30.23	JDY	49.98	Rangoon	25.29	GSE	39.95	JVP
30.23	JDY	13.93	GSJ	30.96	ZHP		XYO	25.4	2RO-4	44.64	PMH
30.96	ZHP	13.97	GSH	31.28	VK6ME	58.3	PMY	25.42	JZJ	48.4	TG-2 (S)
31.28	VK2ME	16.86	GSG		(ex. S).	60.06	VUD	25.57	IQY	48.7	VPB
	(S).	16.88	PHI	31.28	VK2ME	60.6	VUM	27.27	PLP	49.5	W8XAL
31.28	VK6ME	16.89	DJE		(S).	61.16	VUC	29.24	PMN	49.6	XETW
	(ex. S).	19.56	DJR	31.28	VUD	70.2	RV-15	30.52	IRF	49.9	COCO
31.33	KZRM	19.58	OLR5B	31.33	KZRM	11 p.m.-midnight.		30.96	ZHP	49.96	HP5K
31.38	DJA	19.63	DJQ	31.35	W1XK	13.93	GSJ	31.28	VK2ME	49.98	Rangoon
31.45	DJN	19.68	TPA-2	31.38	DJA	13.97	GSH		(S).		XYO
31.45	VPD-2	19.71	OLR5A	31.45	DJN	16.86	GSG	31.28	VUD	58.3	PMY
31.48	W2XAF	19.76	GSO	31.48	W2XAF	16.88	PHI	31.33	KZRM	60.06	VUD
31.49	ZBW-3	19.8	YDC	31.49	ZBW-3	19.35	W2XAD	31.35	W1XK	60.6	VUM
31.50	VK3ME	19.82	GSF	31.55	KZIB	19.56	DJR	31.38	DJA	61.16	VUC
	(ex. S).	24.26	XMHA	31.8	COCH	19.63	DJQ	31.45	DJN	70.2	RV-15

5- And 10-Metre Transmitter

(Continued from page 8.)

be taken to make the plate lead as short as possible, and to bring all r.f. by-pass condensers directly to the valve socket. If a long lead is unavoidable, this should be the grid rather than the plate lead, and also if the valve is mounted horizontally the filament should be in a vertical plane.

Insulation On The "Ultra-Highs."

A word here about insulation on 28 and 56 m.c. might be in order. In the oscillator circuit bakelite is quite suitable, but the insulation chosen for the rest of the circuit should be of some high-grade non-organic material. Isolantite is perhaps the easiest obtainable, and works much more efficiently than bakelite, which has a habit of blistering on 5 metres. (It should be mentioned here that though the 802 has a bakelite base, the r.f. is comparatively low at the grid.)

The coils are all wound of 12-gauge enamelled wire, and are 1¼" in diameter. They are all self-supporting, being mounted on isolantite stand off insulators. The link coils consist of two turns each, and are mounted on bakelite strips underneath the chassis. Connections from them are taken to a dual-wave switch which throws the link from the 10-metre doubler to the output, and cuts off the "B+" from the plate and screen of the 802.

Inductive coupling per medium of two-turn links has been regarded too often as a nice adornment rather than a necessity for obtaining proper matching and adequate excitation.

Particularly is this the case following a crystal oscillator when this uses a 7 m.c. crystal. The ordinary capacity coupling puts such an excessive load on the oscillator that it stops oscillating, and it is then necessary to tap so far down the coils that the maximum transfer of energy does not take place. Link coupling automatically establishes correct impedance matching, and gives the maximum transfer of energy with lowest drain on the crystal. Furthermore, for the following stages it is essential to have a large grid swing to obtain reasonable efficiency. Particularly is this the case on the ultra highs, where the transfer of r.f. energy engenders more problems than at the lower frequencies. Finally, link coupling enables a much lower "C" grid tank to be used, because it removes to a great extent the capacity of the driven valve.

Another factor that enters into the picture at ultra high frequencies is the broadening of the tuning on the driver valve, caused by the effective resistance introduced into it when both the grid and r.f. choke losses are so closely coupled to the tank as is the case in capacity coupling.

The moral of all this is not to blame the erratic behaviour of the buffer or driver valves, but to study the coupling between the driver and following stages. This is one of the most important points in the design of any u.h.f. equipment.

External Bias Used.

Throughout the transmitter, except for the oscillator, external bias is used, for two main reasons. The first is that if the oscillator stopped oscillating, the current on all stages would climb to excessive values. Particularly is this the case where beam power valves are concerned. Secondly, as far as highest efficiency in the doubler stage is concerned, it is a well-known fact that for the valve to be provided with high plate and grid voltages, within reason, and to be driven hard results in greatest efficiency.

About The Parts.

It is particularly important that the list of parts given should be adhered to at least fairly closely. In u.h.f. work, insulation of components such as variable condensers, valve sockets, etc., must be above reproach. The power resistors recommended are I.R.C., of which there is a very complete range available. Care should be taken when ordering these to ensure that they are of ample wattage, as the resistors are not operating in free air, but are at least partially enclosed underneath the chassis. Valves used throughout the transmitter are Radiotrons. Australian-made types being used wherever possible.

(To be concluded next month.)

New Radio Components

(Continued from page 37.)

Line Filter And Garage Transformer Units.

Two other Radiokes components released this month comprise a line filter unit, and the garage transformer unit illustrated. Both are housed in moulded bakelite cases.

The garage transformer unit incorporates a step-down transformer designed to operate a low voltage portable lamp. As its use provides a positive protection against accidental electrocution—always a real source of danger when no transformer is used—the unit should find a ready market in garages throughout the Commonwealth.

Full details of these and other Radiokes lines to be announced shortly can be obtained free on request from Radio Suppliers Pty. Ltd. at the address given.

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

MEET THE NEW D1503

DELTA

MULTITESTER

DELTA MODEL D666

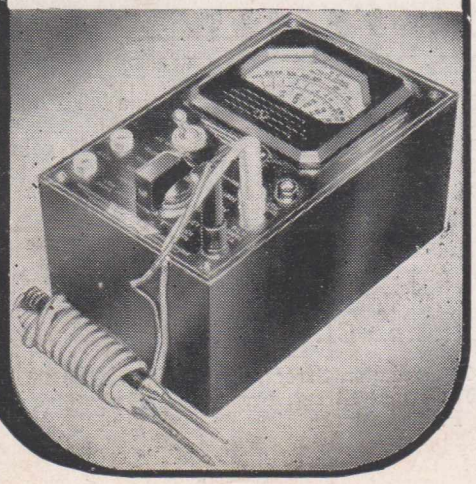
Small, compact, and highly efficient, this new Delta Portable Multimeter incorporates a precision-built Triplett Model 327 D.C. Microammeter, 0/300. Same scale used for A.C. and D.C. Volts.

It is fitted in a highly finished wooden case, 6½in. x 4in. x 3½in., with an attractive engraved panel in black, silver and red.

RANGES:

A.C. and D.C. Volts; 10-50-250-1,250; D.C. Milliamperes, 1-10-50-250; Ohms, 0.2-500 and 100-100,000. Selector switch for instrument readings. Ohms adjuster and A.C./D.C. switch, A.C. and D.C. jacks.

Self-contained battery. Test leads and prods included. PRICE £6/10/-



SPECIFICATIONS:

1. COMPLETE VALVE TESTING (American and continental valves). (Emission Method.)
2. SET ANALYSIS (A.C.-D.C. Voltage, D.C. Milliamperes and Ohms.)
3. CONDENSER TESTER.

Final Analysis multitester:

- Combines in one instrument the equivalent of eight separate units.
- Complete tests for all valves by the approved emission method.
- Separate Diode test.
- Neon Short Test, detects slightest leakages.
- Electrolytic Condenser Test.
- Paper Condenser Test (for shorts and opens.
- D.C. Voltmeter, 10-50-250-1000 Volts at 1000 ohms per volt.
- 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.
- Line Voltage adjustment.
- Attractive, durable, black, silver and red etched panel.
- Triplett Model 426 D.C. Instrument, square De Luxe case, 4¼in. x 4¼in.
- Portable leatherette covered case, 15in. x 9in. x 6½in., sturdily constructed.
- Test leads, prods, alligator clips, 3 core A.C. supply leads and full instructions.

PRICE £16/10/-

MODEL D735

The DELTA Model D735 illustrated at right is a remarkably compact instrument of the most advanced design for service, speed and precision. Employing a Triplett 326 D.C. Milliammeter 0/1,1000 ohms per volt, and fitted in a handsome bakelite case, it measures only 3 1/16 in. x 5⅝ in. x 2⅛ in. high. Bakelite engraved panel and ohms zero adjuster.

RANGES: 1-10-50-250-M.A., 10-50- 250-500 Volts, Ohms 0-10,000 and 0-100,000.
PRICE £4/10/-

W. G. WATSON & CO. PTY. LTD.

279 CLARENCE STREET, SYDNEY. N.S.W.

BRANCHES IN ALL STATES