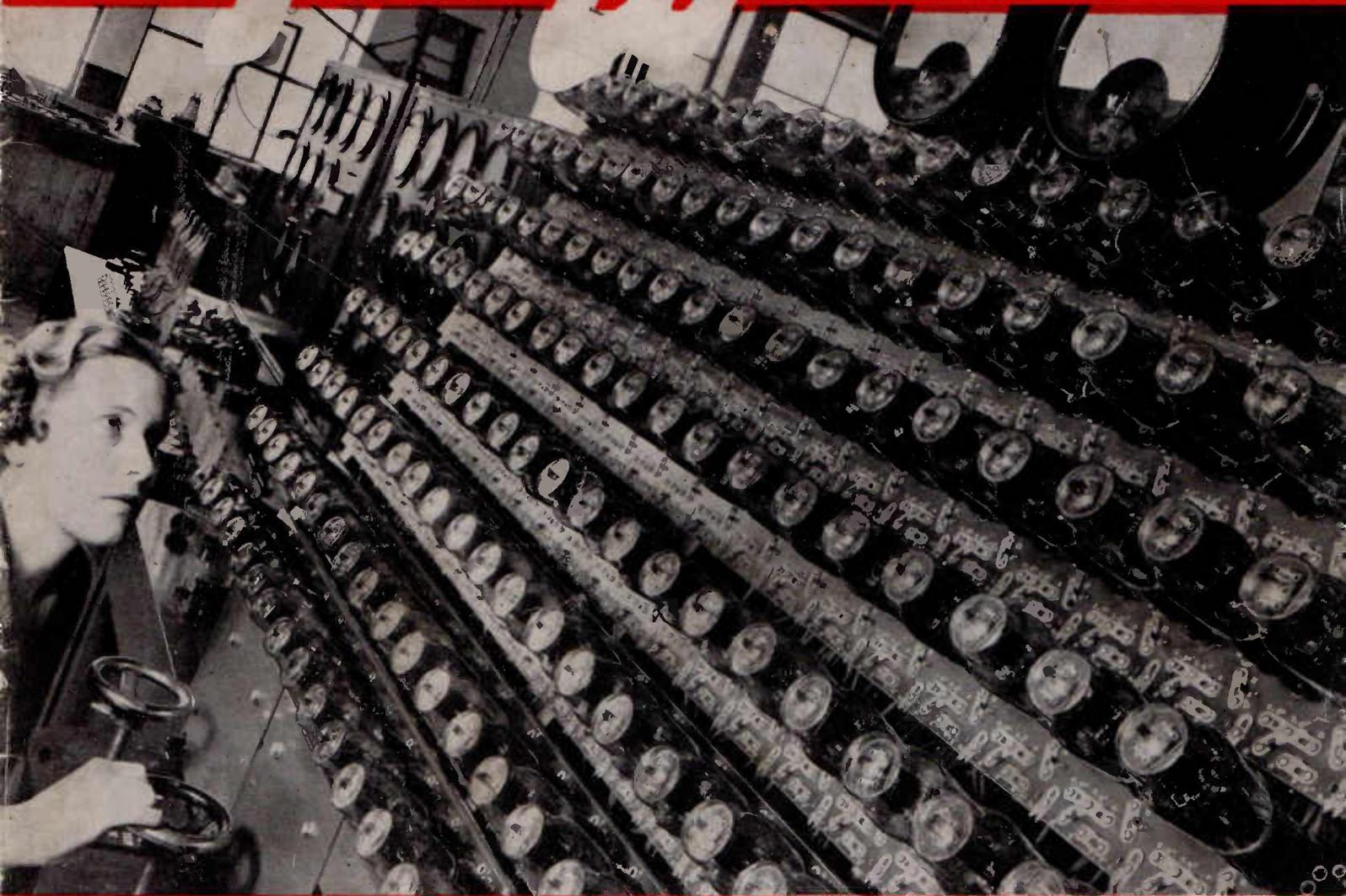


THE
AUSTRALASIAN

JANUARY 1, 1938
VOL. 2 — NO. 9
PRICE, 1/-

Radio World

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



—See Page 8

- MORE ABOUT THE BATTERY AMATEUR COMMUNICATIONS SUPERHET:
- POWER-PACK AND AMPLIFIER UNIT FOR THE A.C. "EMPIRE ALL-WAVE THREE":
- LATEST LIST OF WORLD SHORTWAVE STATIONS



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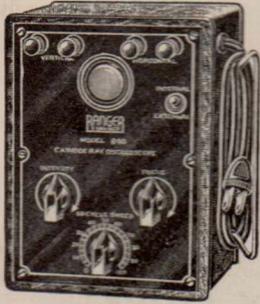
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1938 RANGER-EXAMINER TEST EQUIPMENT



FOUNDATION OSCILLOSCOPE FOR AMATEURS AND SERVICEMEN

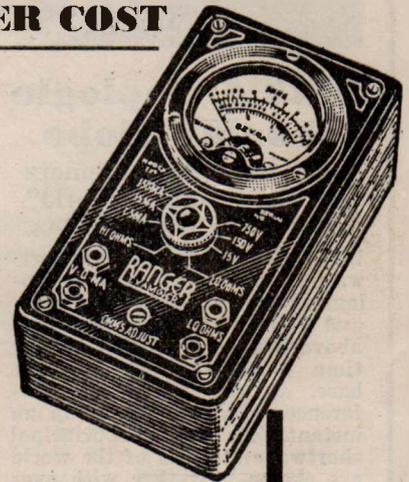
This latest "Ranger-Examiner" release is a foundation oscilloscope with built-in 60-cycle sweep. Invaluable for essential visual measurements of the amateur broadcast station, and also is an ideal practical foundation unit for those who wish to add external sweep and amplifiers for laboratory and service work. Vertical and horizontal deflector plates; controls for intensity, focus and sweep amplitude; A.C. operated. (Valves required, 913, 84).

Price (less valves).....£5

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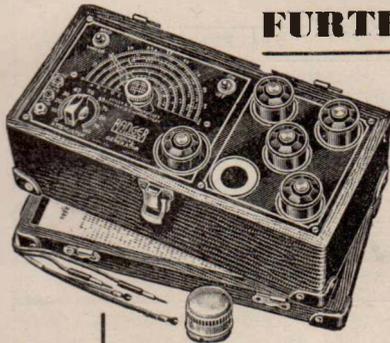
MODEL 735 POCKET VOLT-OHM-MILLIAMMETER

This Ranger-Examiner Model 735 Pocket Volt-Ohm-Milliammeter incorporates a Triplett precision instrument, selector switch, moulded case and individual zero adjustment for resistance measurements. Can be carried easily in the coat pocket. For home and shop servicing, and a handy instrument for engineers or in the laboratory. Ranges: 15-150-750 D.C. volts; 1.5-15-150 D.C. milliamperes; 1/2 to 1,000 low ohms; 0-100,000 high ohms at 1.5 volts. External batteries may be used for higher resistance measurements. Accuracy of tester, 2%. Black moulded case, 3 1/8" x 5 7/8" x 2 1/8". Silver and black etched panel. Battery and test leads with alligator clips are included.



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The Ranger-Examiner Model 557 All-Wave Signal Generator uses trimmer calibrated plug-in coils, ensuring laboratory accuracy. Is a direct-reading D.C. instrument with five frequency bands covering from 110 to 2,000 k.c., all fundamentals. Has high accuracy of 1% from 110 to 3,000 k.c.; 2% for higher frequencies. Is mounted in durable black leatherette-covered case, 12" x 6 1/2" x 5 3/4". Silver and black panel.

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Finished in chromium and black, the model illustrated is very reasonably priced at 59/6. Other models include the Standard full meridian globe, available in 7, 8, 10 and 12-inch sizes, priced as below:—

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10-in. 29/6 12-in. 49/6
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THE AUSTRALASIAN RADIO WORLD

Incorporating the
ALL-WAVE ALL-WORLD DX NEWS.

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

Vol. 2.

JANUARY, 1938.

No. 9.

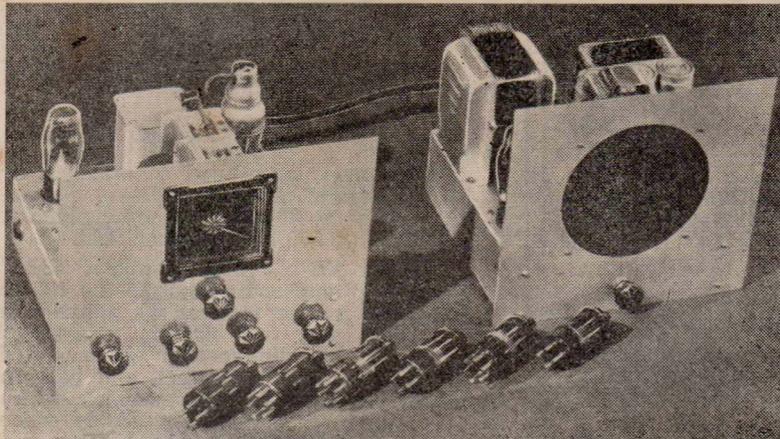
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“Empire” Power Pack And Amplifier



This power pack and amplifier unit, with built-in speaker, was designed for the “A.C. Empire All - Wave Three,” described last month.



Power Pack And Amplifier Unit

The combination power pack and amplifier designed for the “A.C. Empire” is a particularly compact unit,

THE assembly of the “A.C. Empire” is commenced by mounting the coil, valve and power sockets. These should all be arranged so that the filament pins face in the directions shown in the under-chassis wiring diagram. The heater wiring can now be put in.

tinned copper wire around the chassis, all earth returns being made to this line, which is connected directly to the earth terminal. Next, commencing from the aerial terminal, the remainder of the wiring can be put in systematically, as shown in the under-chassis wiring sketch.

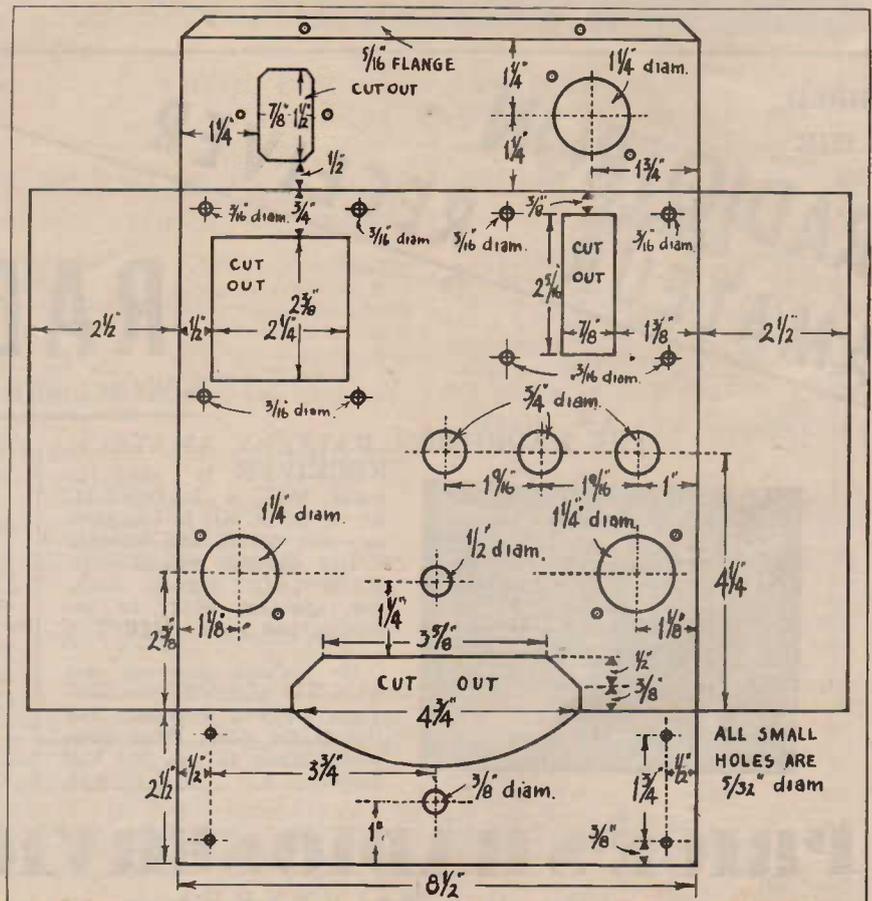
The next components to mount are the on/off switch, condenser gang, aerial and earth terminals, 'phone jack, and two brackets for supporting the r.f. valve and audio gain control. In the original model the front panel is supported away from the front of the chassis by means of four bolts and nuts, and four 1/2" spacers. However, the panel and dial es-cutcheon need not be mounted until last of all.

Well-Spaced Gang Leads Essential

With the front panel controls bolted to the chassis, the wiring can be commenced. Particular care should be taken to keep the two leads from underneath the gang as well spaced as possible. That from the r.f. section is run above the chassis until 1/2" away from the r.f. coil; then it is taken down through a hole in the chassis. After the audio choke has been mounted, a 3-lug bakelite strip with a bolt passing through the centre is attached to the top of the choke, as shown in the photograph. This supports the grid condenser and 1/2-watt grid leak.

The wiring is commenced by running an earth line of 16 or 18-gauge

Dimensions for preparing the power pack and amplifier chassis are given in the sketch on the right, while above is a view of the receiver, with power pack and amplifier unit.



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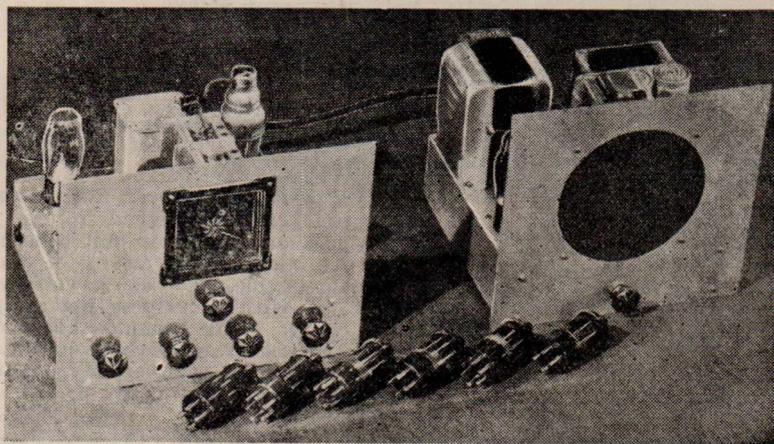
An Advertisement inserted by F. J. W. FEAR & CO., New Zealand.

"A.C. EMPIRE" is Ideal All-Waver for DX Fans

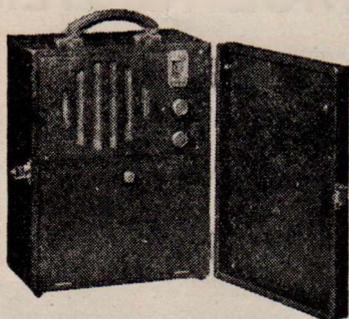
Uses Combination Power-Pack And Amplifier With Built-In Speaker.

All-wave all-world coverage from 12 to 600 metres with standard two-gang condenser; electron-coupled regeneration; speaker or 'phone reception at will—the "A.C. Empire All-Wave Three" is a set you could be proud of!

Broadcast or shortwave, c.w. or telephony—it's all the same to the "A.C. Empire," which gives you MORE ENTERTAINMENT AT LESS COST than any other receiver yet designed for set-builders.



WRITE FOR OUR DETAILED PRICE LIST
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"1937 OUTDOOR PORTABLE FOUR"

The "1937 Outdoor Portable" described in the October and November "Radio World" is still breaking all sales records! Guaranteed, under similar operating conditions, to have more pulling power than many "sixes," it is a remarkable distance-getter—AND the ideal companion for all occasions.

Price with valves, batteries, carrying case, everything required, £12/10/-
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BATTERY AMATEUR COMMUNICATIONS SUPERHET

Designed in the Amalgamated Wireless Valve Co.'s laboratory, this seven-valve battery communications job is the set amateurs have been waiting for. Why spend up to £70 or £80 for expensive imported receivers when you can now build your own?

WRITE NOW FOR OUR COMPLETE KIT PRICE SPECIAL TO AMATEURS.

(A.C. version also available. Write for details.)



"DE LUXE FIDELITY EIGHT"

Seven watts of high fidelity output are obtainable from the world-range "De Luxe Fidelity Eight," which for sensitivity, selectivity and volume, but above all for sheer tonal beauty, is unrivalled. The ideal receiver for the discriminating set-builder. (See description in last month's issue).

WRITE FOR OUR DETAILED QUOTE.

15-WATT PUBLIC ADDRESS AMPLIFIER

Practically all p.a. requirements can be fulfilled with this compact, reasonably-priced amplifier, which delivers 15 watts of high quality output—ideal for dances, sport gatherings, political meetings, etc. (See description in last month's issue).

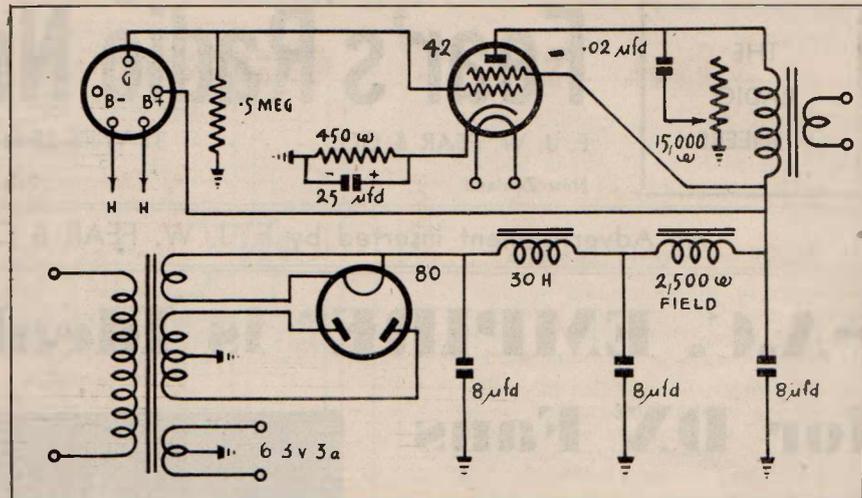
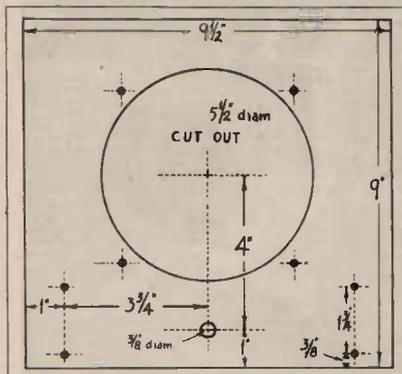
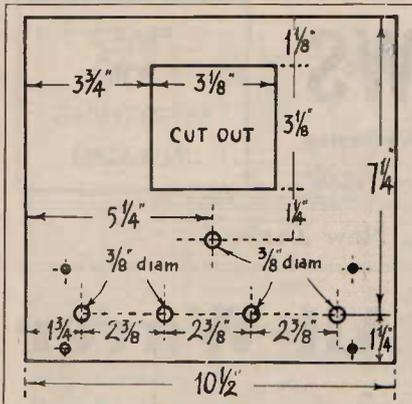
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"DE LUXE METAL MIRACLE TEN"

Uses 6L6 beam power valves with inverse feedback, giving 25 watts output. Frequency-compensated tone control—all-wave coverage from 15 to 550 metres—large oval accurately-calibrated dial—metal valves. 100 per cent. results are assured with the Micromatic factory-adjusted and guaranteed coil unit.
Complete kit, with valves and power supply £33/15/-
With valves, power supply and Magnavox Model 305 speaker £40/-/-

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Dimensions of both front panels are shown on the left (receiver top), while the circuit of the power pack and amplifier unit is shown above.

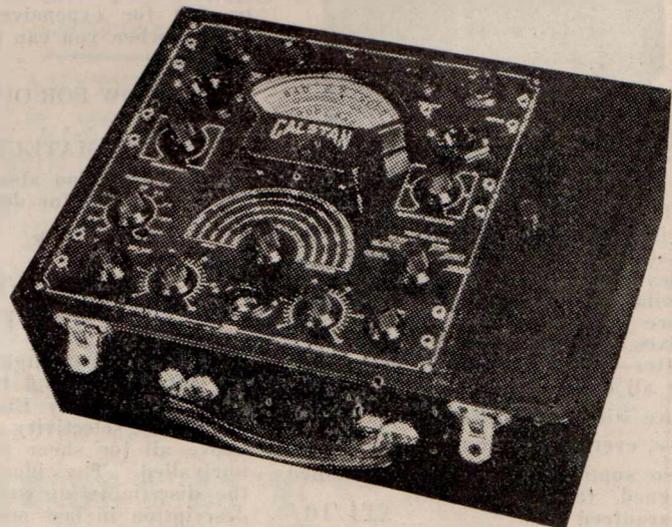
thorough check-over, the valves and coils can be plugged in, the power pack and amplifier unit connected to the receiver by means of the five-wire cable, and the power switched on. With everything operating correctly, there should not be the slightest trace of hum in the headphones. If there is any, or tunable hum appears over any portion of the

dial, the following remedies generally prove effective.

The first refers to the .01 mfd. condenser connected from one side of the detector heater to earth. An experiment should be made to determine from which side it should be connected to give best results. Another useful hint is to connect a condenser of similar capacity from

Still another CALSTAN TRIUMPH the combined VALVE TESTER and MULTITESTER

- Just released by SLADE'S RADIO PTY. for the discriminating Radio Dealer and Serviceman who appreciate and practice the finer points of efficient Radio Servicing. Here at last is an outstanding instrument in the Test Equipment field for all round perfection, combining the multiple functions of a Valve Tester and Multitester. The CALSTAN (CALibrated to STANdard) 223 VALVE-TESTER-MULTITESTER is a boon to the Radio Serviceman and Dealer, and needed by ALL who rely on Radio Service as an effective means of building up a modern radio business.
- Model 223 will test every valve used in Australia, the Multitester range is A.C. and D.C. Volts, 5, 10, 50, 250 and 12,500. Milliamperes, 5 ranges, 1, 5, 25, 100, 250. Ohms., 5 ranges, from 1 ohm. to 5 megohms, also in an excellent instrument for lining up sets. Tests all types of Dry Condensers and Electrolytic Condensers.
- The D.C. VALVE TESTER MODEL D223 is also available as a Combination Tube Checker and D.C. Multimeter. As a D.C. Valve Tester it operates from a 6 volt battery and tests every type of valve used in Australia. As a D.C. Multimeter it has 5 ranges of D.C. Volts. 5 ranges of M.A. and 4 ranges of ohms. Price £18/6/-, Portable Model £18/16/-, both plus tax. Model 223, £17/17/-, plus tax.



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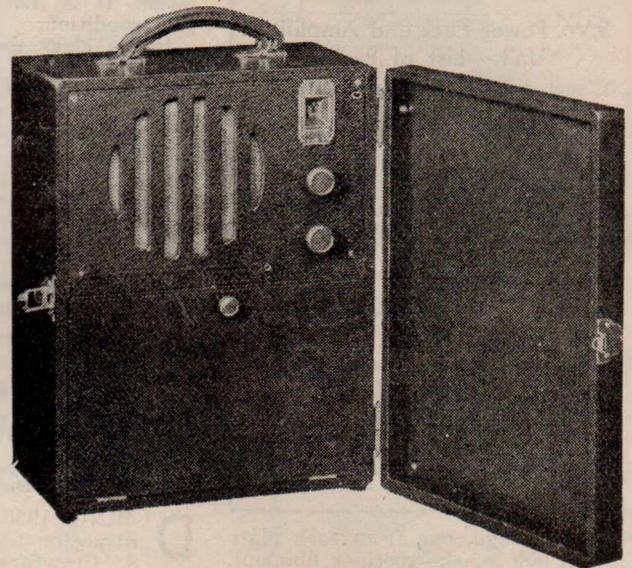
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Complete Kit 11 Gns.

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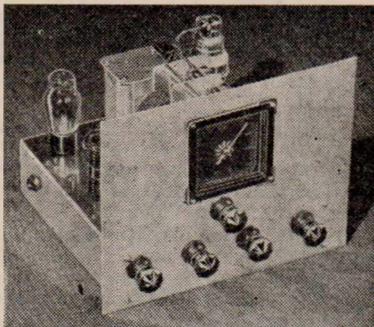


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THE EMPIRE A.C. ALL-WAVE 3
£8/19/6

For only £8/19/6 VEALLS will send, freight paid to your nearest station, the Complete Kit of Parts to build the Empire All-Wave Three described in this issue. You cannot buy at a lower price than VEALLS.

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A COMPLETE POWER PACK AND AMPLIFIER UNIT

Described in this issue

PARTS REQUIRED

- 1 Steel chassis and front panel, to specifications.
- 1 Power Transformer (Radiokes U-80-6)
- 1 30 henry smoothing choke (Radiokes C150).
- 1 4-pin, 1 6-pin wafer socket, 1 5-pin.
- 1 15,000 ohm potentiometer.
- 1 length power flex and plug.
- 1 power socket and plug.
- 1 small knob.
- 2 yards 5-wire cable.
- 2 5-pin plugs.
- 1 .02 mfd. tubular condenser.
- 3 8 mfd. wet electrolytics.
- 1 25 mfd. dry electrolytic.
- 1 450 ohm wire-wound resistor.
- 1 .5 megohm 1 watt resistor.
- 1 80, 1 42 valve (Ken Rad, Radiotron).
- 1 6 3/4" dynamic speaker, 2,500 ohm field, input transformer to match single 42 (Rola DP5B).
- Push-back, bolts and nuts, solder tags, etc.

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EVERYTHING NECESSARY £5/15/6

Freight Free in Australia.

one plate of the rectifier to filament. The best connection can again be determined by experiment. In some cases two condensers can be used

S.W. Power Pack and Amplifier Unit.—List of Parts

- 1—steel chassis and front panel, to specifications.
 - 1—power transformer (Radiokes U-80-6).
 - 1—30-henry smoothing choke (Radiokes C150).
 - 1—4, 1—6-pin wafer sockets, 1—5-pin Dalton.
 - 1—15,000 ohm potentiometer (Mjcrohm).
 - 1—length power flex and plug.
 - 1—power socket and plug.
 - 1—small knob.
 - 2—yards 5-wire cable.
 - 2—5-pin plugs.
 - 1—.02 mfd. tubular condenser (Solar).
 - 3—.8 mfd. wet electrolytics (Solar).
 - 1—.25 mfd. dry electrolytic (Solar).
 - 1—450 ohm wirewound resistor (Radiokes).
 - 1—.5 megohm 1-watt resistor.
 - 1—80, 1—42 (Ken-Rad, Radiotron, Raytheon, Mullard, Philips).
 - 1—6 $\frac{1}{2}$ in. dynamic speaker, 2,500 ohm field, input transformer to match single 42 (Rola DPSB, Amplion).
- Push-back, bolts and nuts, solder tags.

with advantage, one from each plate to each side of the rectifier filament.

Some Operating Hints

The "A.C. Empire" is very simple to operate. The r.f. and audio gain controls can be turned full on, and

the trimmer across the r.f. section of the gang rotated until resonance is obtained. The regeneration control is adjusted at the same time until the set is just on the verge of oscillation. It is then in its most sensitive condition.

In its class the "A.C. Empire" is an outstanding performer, giving even better results than the widely-popular battery version, due to the fact that an extra audio stage is incorporated. The system of using a closed circuit output jack in the plate circuit of the driver valve is a particularly handy feature, as all tuning can be done if preferred on the headphones, the speaker being cut in automatically when required by pulling out the 'phone plug.

1938 Contest For Best Amateur Telegraphist

DURING 1936, the Senior Radio Inspector for this State, W. T. S. Crawford, Esq., generously donated a trophy for competition among the amateur transmitters of New South Wales.

The Senior Radio Inspector has al-

The Front Cover

This month's front cover shows a valve ageing rack at the new Philips valve factory at Camperdown, Sydney.

One of the most important steps in production, the ageing process improves and stabilises the emission, reduces gas, and, as well, subjects the valve to a lengthy running test to ensure long life and reliability.

Much severer conditions than are ever experienced under normal operating conditions are imposed by purposely over-volting every element.

ways held in high regard the operating capabilities of the amateur in this State, and in an endeavour to raise the standard of operation still higher, asked the co-operation of the New South Wales Division of the Wireless Institute of Australia in an effort to discover the best amateur telegraphist.

The trophy takes the form of a handsome silver cup and three replicas, and is to be competed for over a period of three years, 1938 being the second year of the competition. The amateur winning the yearly contest will hold the trophy for twelve months and a replica for all time. The amateur winning the competition more than once will become the outright winner of the cup.

This year the final will be held during the second section of the Sesqui-Centenary Celebrations, and it is anticipated that three additional prizes will be available in the form of Sesqui-Centenary medallions. These will be presented to the winners of the first three places in the final.

In 1937 the trophy was won by R. A. Priddle (VK2RA) after very keen competition, and it is anticipated that the 1938 contest will create even greater enthusiasm.

The Wireless Institute of Australia (New South Wales Division) has been again delegated the honour of drawing up the rules, organising and conducting the competition. This does not mean that the contest is restricted to members of the Institute. Every amateur operator in New South Wales is eligible, with the exception of those mentioned in Rule 1.

The following are the rules and mode of competition:—

RULE 1. The competition is open to every person in New South Wales holding an A.O.C.P. and a current experimental licence. Any amateur holding a commercial certificate, i.e. 1st or 2nd class "Ticket," is debarred from competing. Any amateur who is employed or has been employed as a professional telegraphist is also debarred. (This includes present and ex-P.O., Railway, Naval, Army, Air

(Continued on page 48)



Has it a sufficiently low minimum output voltage for aligning modern powerful superheterodynes fitted with A.V.C.?

Perfect attenuation from maximum to an exceptionally low minimum voltage is now a guaranteed feature of the Palec Model "DR."

Check this point when buying an Oscillator!

Model "DR" also features a Direct Reading Dial in five ranges from 150 k.c. (2,000-19 metres). Reads simultaneously in K.C.'s and Metres, fitted with differential slow-motion drive. Heavy batteries, pilot light, variable modulation, and variable A.F. output are added features. Compact size (9 in. x 7 $\frac{1}{2}$ in. x 6 in.). Price complete with two Valves and Batteries ... £10/15/- plus tax.

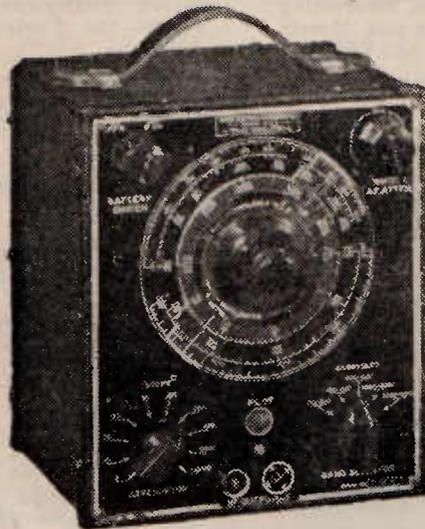
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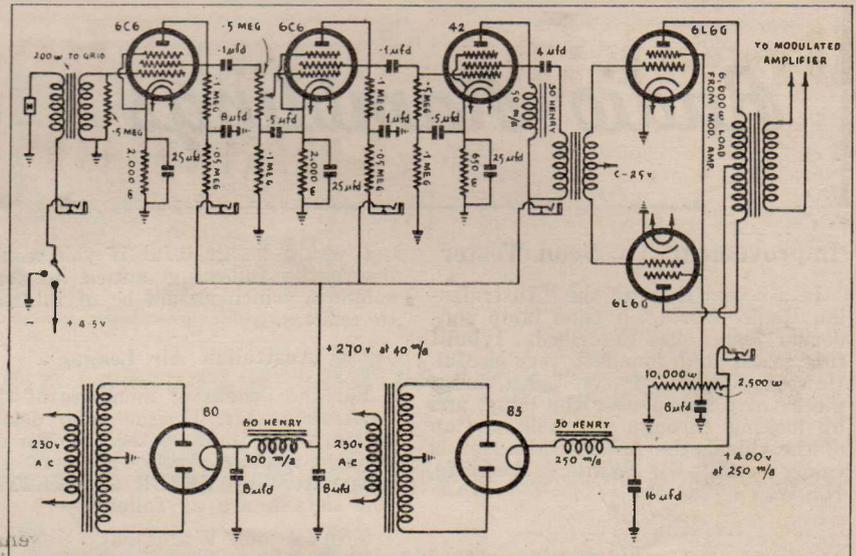
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& ENGINEERING CO. LTD.**

Wellington
New Zealand

- antinode; fundamental frequency; resonance?
- (a) What is the primary object of the use of a piezo-electric crystal in a radio transmitter, and what precautions are necessary to obtain the best results?
(b) Give a schematic diagram of a piezo-electric controlled single valve circuit.
 - Given a power supply of 500 volts d.c., what wattage would be dissipated in a "bleeder" resistance placed across the output if the current flowing through it is 20 milliamperes, and what would be the value of the resistance?
 - Give a brief outline of the process of tuning an M.O.P.A. transmitter, and state what apparatus you would use. How would you determine that the power amplifier was properly neutralised?
 - Quote three of the major causes of frequency instability in a transmitter, and explain the method or methods which should be adopted for their prevention.
 - What is the difference in construction between a voltmeter and a milliammeter of the moving coil type? Explain the reason for the difference.
 - Give a diagram of each of the following three filter arrangements:—
(1) Brute force;
(2) Choke input;
(3) Condenser input.



The circuit of the speech amplifier and modulator portion of the transmitter described in the accompanying article.

- What is the main advantage of choke input? Why is a "bleeder" resistor placed across the output of a power supply?
- (a) What would be the joint capacity of three condensers of 2 mfd., 4 mfd. and 6 mfd. respectively:—
(1) When connected in parallel?
(2) When connected in series?
 - (b) To increase the breakdown voltage of condensers, how would you connect them?
 - Select any three distinct types of microphones and explain the construction and theory of operation of each.
 - Quote three major considerations in the design of a Hertz antenna of high efficiency.

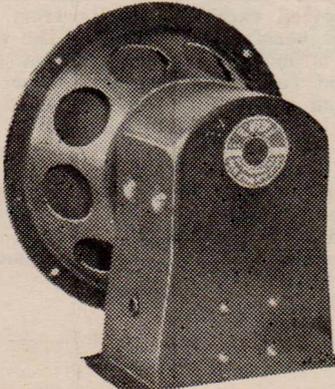
3 NEW AMPLION RELEASES

MODEL "T"

This new auditorium speaker is Amplion's latest and finest product and is a masterpiece of Australian design and manufacture.

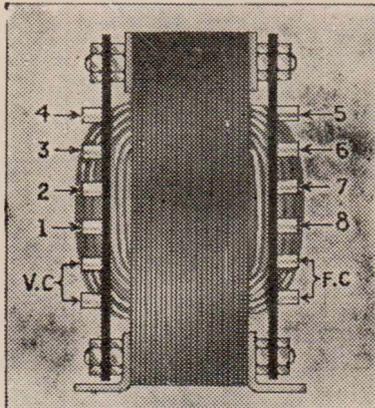
A beautiful reproducer, taking full care of the whole frequency range and with an undistorted output of 10 to 12 watts.

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TYPE "T"

AUSTRALIA'S FIRST MULTI-IMPEDANCE TRANSFORMER



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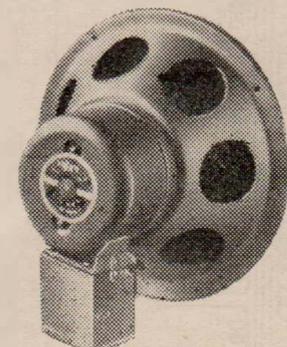
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Radio Ramblings

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

Improvement To Neon Tester

In a recent issue of the "Australasian Radio World," a neon lamp condenser tester was described. I built this tester and found it very useful. However, as well I mounted a three-piece valve shield over the lamp, and by looking through the hole on top of the shield, the faintest glimmer is easily seen.—J. White, Arncliffe, N.S.W.



Best For Experimenters And Amateurs

I would like to express my appreciation of that very fine radio publication, the "Australasian Radio World." Of all the Australian radio periodicals, I consider that for the experimenter and amateur it provides the best and most useful information.

I noticed in your September and October issues that the "Tom Thumb" portable employs the old tetrode principle. During the early period of broadcasting (about 1924-5), I made quite a large number of sets using the old Philips B6 and D6 tetrodes, and obtained very pleasing results, and it is most interesting to see the double grid low H.T. principle being used again. Later Philips tetrodes, the A141 and A441, were a good line, but appear to be off the market now.

I would be grateful if you would insert the following notice in your columns, which should be of interest to readers.

Australian Air League

For the benefit of members of the Australian Air League who desire to learn and improve their Morse receiving, regular practice sessions are transmitted by VK2DR and VK2YY. The details are as follows:—

VK2YY on Wednesday evenings between 7.30 and 8 p.m., on 40 metres.

VK2DR on Fridays between 7.30 and 8 p.m., on 40 metres.

All readers interested are asked to report direct to these stations, and QSL cards will be returned to those who report three weeks in succession. All those intending to become "hams" should make use of this service, as, admittedly, code reception is the most difficult of the A.O.C.P. tests, and actual reception on the receiver is better practice than on a buzzer or audio oscillator. So send those reports along and pass the word round to your friends.—R. C. Black, Greenwich, N.S.W.



Crystal Set With Sirufer-Cored Coil

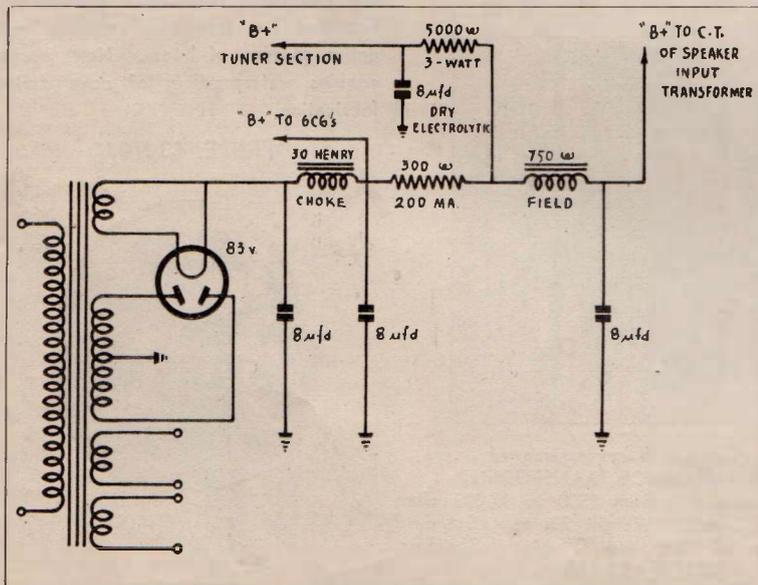
Congratulations on the way the "Radio World" is produced. It is

easily the best magazine for all-round news.

Living as I do, partly in the country and partly in town (Hobart), my hobby is interrupted. I use a crystal set in Hobart, and am about two miles from 7ZL, 7HT and 7HO. This I have improved by using a coil wound on a Sirufer iron core. There are approximately 150 turns of 34 d.s.c. wire, wound in two slots, for the grid coil. The aerial coil will depend on location, and will have from 5 to 10 turns laid in the third slot. With a little experimenting with the turns, a highly efficient coil can be made.

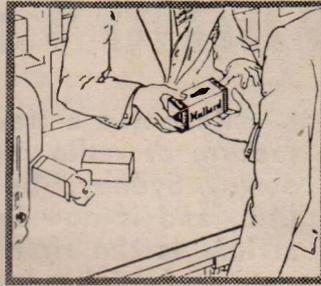
In the country a 3-v. battery job is used. Plug-in coils cover from 15 to 80 m. and the broadcast range. Circuit—VP2 r.f. amplifier, SP2 regenerative detector and PM22A pentode output. The plate impedance for the detector is a Philips audio transformer. Broadcast and most s.w. stations are received on a 6 1/4" per. mag. speaker. I intend to put in Sirufer in the r.f. and det. stages on the broadcast band to increase selectivity and gain. Could you give me any idea of the best gauge wire to use and number of turns, spacing, etc., for aerial, grid, plate and reaction coils?

Don't let Don Knock slack on his articles! They are exceptionally interesting.—W. H. Chambers, Orford, Tasmania.



While many builders of the "De Luxe Fidelity Eight" described in the November and December issues of the "Radio World" have reported excellent results from this receiver, several have mentioned the presence of a motor-boating effect on local stations at full volume. One builder who experienced this trouble eliminated it successfully by applying additional "B+" decoupling for the tuner portion of the set, as shown in the accompanying circuit. The only components required are a 5,000-ohm 3-watt resistor and an 8 mfd. dry electrolytic condenser. Connected as shown, they entirely eliminate all tendency to motor-boating.





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Radio Valves in the

Recently a new factory for the local manufacture of radio valves was established at Camperdown, Sydney, by Philips Lamps (A/sia.) Pty. Ltd., and is now in production. The following article is the first of a series describing the delicate and highly-involved process of valve manufacture, from the making of component parts to the finished, tested and passed product.

TO the average man in the street a radio valve is a complete mystery, a silver shrouded object which he buys, uses for a time, and eventually discards without ever knowing how many years of research and how many hours of actual work have been spent upon its construction.

Not everyone has the opportunity of making a tour of the new Philips valve factory at Camperdown, where, in this spacious five-storey building facing a pleasant park, Australian operatives are engaged in producing these delicate devices. Once it was tacitly understood that such important articles would have to be imported; it is therefore interesting to note that at Philips valve factory not one operative engaged in their actual manual manufacture was brought from overseas. In addition, the installation of the machinery, the manufacture of many parts and instruments, were the efforts of Australian workmen.

Staff Welfare A Primary Consideration

Staff welfare is a primary consideration at the Philips Australian valve works, and every care is taken to ensure pleasant working conditions for the employees. Throughout the factory special attention has been paid to lighting and ventilation, and everywhere the factors of comfort and convenience have been carefully studied.

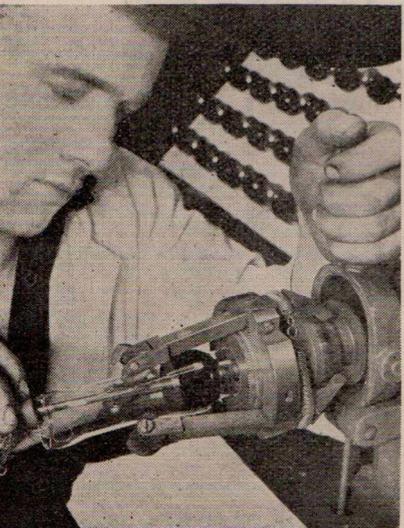
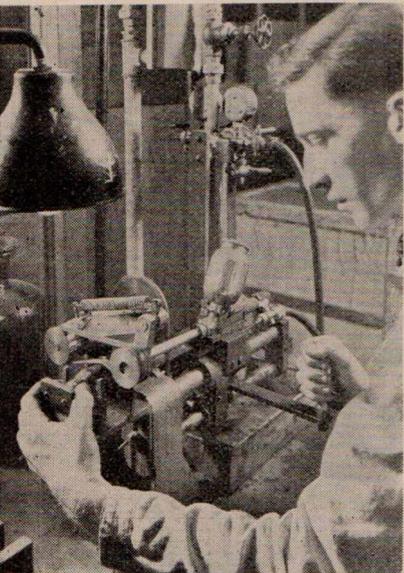
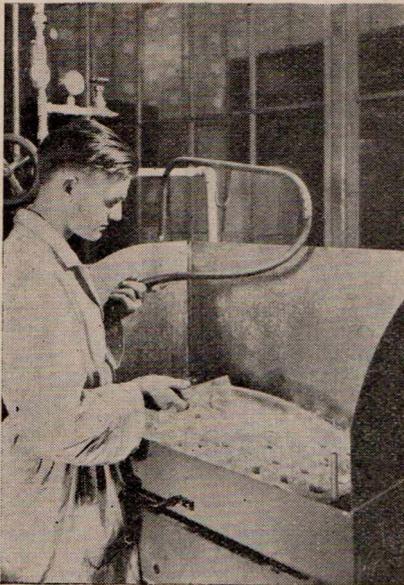
In this connection, the spacious, airy cafeteria plays an important part, as does the dispensary, where a trained nurse, who is always on the premises, or a medical practitioner, who regularly visits the factory, treats sick employees.

Technique Of Valve Manufacture Outlined

This series of articles will give readers some idea of the many and delicate operations that constitute the latest technique in valve manufacture, as followed in the new Philips works.

A modern valve is not an article which can be turned out pell-mell like nuts and bolts. It is a delicate and highly sensitive device, necessitating the absolute maximum of painstaking attention during every stage of its construction, to ensure accuracy and hairline precision.

The complexity of the operations in the construction of a radio valve is such that many of the basic processes such as the



Top: The glass bulbs are given a thorough washing with acid and water to remove all traces of dirt and impurities. Centre: The insides of bulbs intended for certain types of valves are sprayed with carbon. Bottom: While the bulb is mechanically rotated, the surplus carbon is scraped away to leave a clean-cut band of the exact width required.

Making . . . (I)

Right: A "grid-bar" emerging from the head of a grid-making machine, which spirals wire of hair-like fineness around two wire supports.

making and preparing of bulbs, grids, anodes, mica discs, "feet," etc., are carried out concurrently.

"Foot-making" The Fundamental Step

"Foot-making," however, is actually the fundamental step, as it is on the finished "foot" or valve mount that the anodes, grids, electrodes, and other vital parts are mounted prior to the "sealing-in" process.

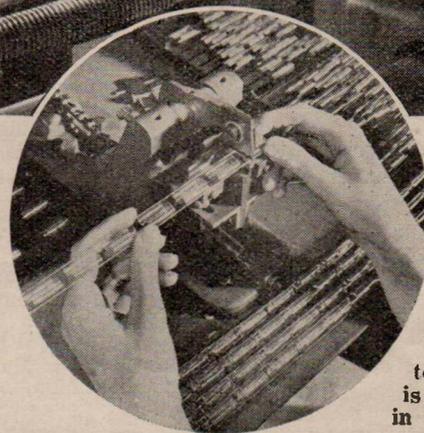
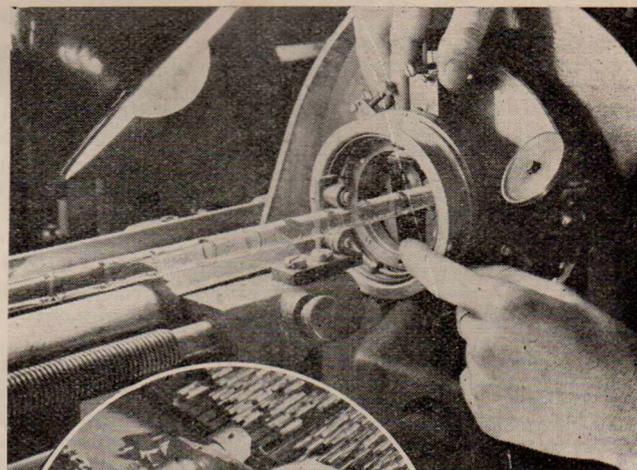
The foot is made on a rotary machine which seals the supports into the glass, together with a hollow glass stem, ultimately used for exhausting the air after "sealing-in."

While "foot-making" is in progress, the manufacture of the various components is taking place, and one of the most interesting operations is grid construction.

How The Grids Are Made

This is carried out by automatic machines, which form the grid spirals by continuously coiling wires of hair-like fineness around several heavier wire supports. On these machines the main wires are stretched and notched, the grid spirals being coiled around them in such a way that they fit exactly in the notches, which are then squeezed tight. In this way a long grid-bar is formed, and when it reaches a certain length the machine stops automatically. The grid-bar is then cut and removed, and the machine started again on a fresh section.

After the grid-bars, which vary in diameter according to the type of valve in which they are to be used, have been removed from the machines, they are subjected to various finishing processes



A grid-bar being cut into correct lengths. Each individual grid is checked in a standard gauge to ensure that it is perfectly circular in shape.

for thorough cleansing, and are then cut into their correct lengths. This is simplified to a great extent by the actual grid-making machine, which, at regular intervals, omits to notch the supporting wires. The fine wires are thus coiled loosely in these sections, which in themselves form the correct places for cutting.

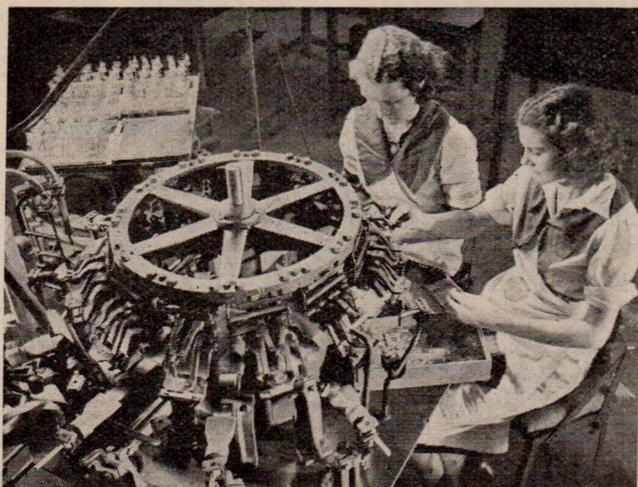
Various finishing processes are necessary before the grids may be mounted on the "feet." The larger ones leave the grid-making machines in a slightly oval shape—their wider sides are squeezed in small presses until the grids are perfectly circular.

Micrometer Tests Ensure Accuracy

During the squeezing process they are continually subjected to micrometer tests until every cross-section of the circumference will fit exactly in a measuring gauge.

All the larger types of grids undergo this formation process. The smallest sizes are usually employed in their original elliptical shape. They too, however, are scrupulously tested for the slightest inaccuracy. Each individual grid is finally examined minutely under a magnifying glass in order to ensure that it leaves the grid-making section faultless in every respect.

After the anodes, grids, and other vital components have been assembled on the mount, the half-formed valve is ready to be sealed into the



A "foot-making" machine, which, by means of gas jets, welds glass rods and wire into a foot upon which the electrodes will later be assembled.

glass bulb. It is of the utmost importance that the glass bulbs should be entirely free from dust and dirt before "sealing-in" takes place. They are therefore given a thorough scouring with both acid and water in order to remove impurities.

After washing and drying, the bulbs intended for use in certain types of valves have portion of their interior coated with carbon. This is done by first spraying the inside with a layer of carbon, part of which is later scraped off to obtain a clean-cut band of the exact width required. The extent of the carbon layer varies in different types of valves, and must be checked on a standard gauge, thus providing an example of the strict attention which must be paid to apparently minor details.

Further Manufacturing Steps Next Month

Next month this detailed tour of inspection of Philips Australian valve works will be continued. The next stage in the construction of a radio valve—the "sealing-in" process—will be explained, as well as the procedure adopted for the rigorous testing which each valve must undergo before packing.

Schedule Of PCJ Experimental Transmissions

TUESDAY.

8.30-10.00 G.M.T., wavelength 19.71 m., frequency 15,220 k.c.

Principal countries covered by this transmission: Australia and New Zealand.

10.30-13.00 G.M.T., wavelength 31.28 m., frequency 9,590 k.c.

Principal countries covered by this transmission: Australia and New Zealand.

19.00-20.30 G.M.T., wavelength m., frequency 9,590 k.c.

Principal countries covered by this transmission: Union of South Africa, South-West Africa, Angola, Belgian Congo, Uganda, Kenya, West Tanganyika, Rhodesia, Portuguese East Africa, Madagascar, Mozambique, Sudan, Egypt.

WEDNESDAY.

14.00-17.00 G.M.T., wavelength 19.71 m., frequency 15,220 k.c.

Principal countries covered by this transmission: British India, Ceylon, Near East, Egypt, Iraq, Iran, the Netherlands Indies, the Philippine Islands, China, Malacca, Siam.

THURSDAY.

1.00-2.30 G.M.T., wavelength 31.28 m., frequency 9,590 k.c.

Principal countries covered by this transmission: Costa Rica, Panama, Columbia, Venezuela, Ecuador, Jamaica, Haiti, Domingo, Suriname and Curacao, Antilles, Peru, British Guiana, Trinidad, Porto Rico, Barbados, Bolivia.

FRIDAY.

0.00-1.30 G.M.T., wavelength 31.28 m., frequency 9,590 k.c.

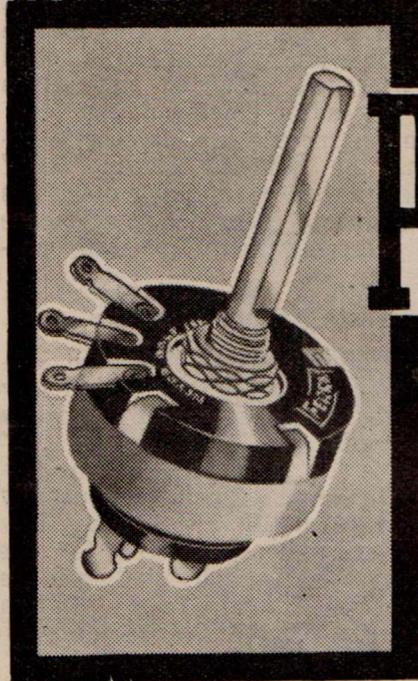
Principal countries covered by this transmission: Bolivia, Brazil, Argentine, Chili, Falkland Islands, French Guiana, Paraguay, Uruguay, Portugal, the Canary Islands, Capa Verde Islands, Azores, Madeira.

2.00-3.30 G.M.T., wavelength 31.28 m., frequency 9,590 k.c.

Principal countries covered by this transmission: Mexico, Guatemala, Salvador, Nicaragua, Honduras, Cuba, Jamaica, Bermuda Islands, the eastern and southern states of the United States of America.

Reports on reception should be forwarded to Phohi-PCJ Studio, Hilversum, Holland.

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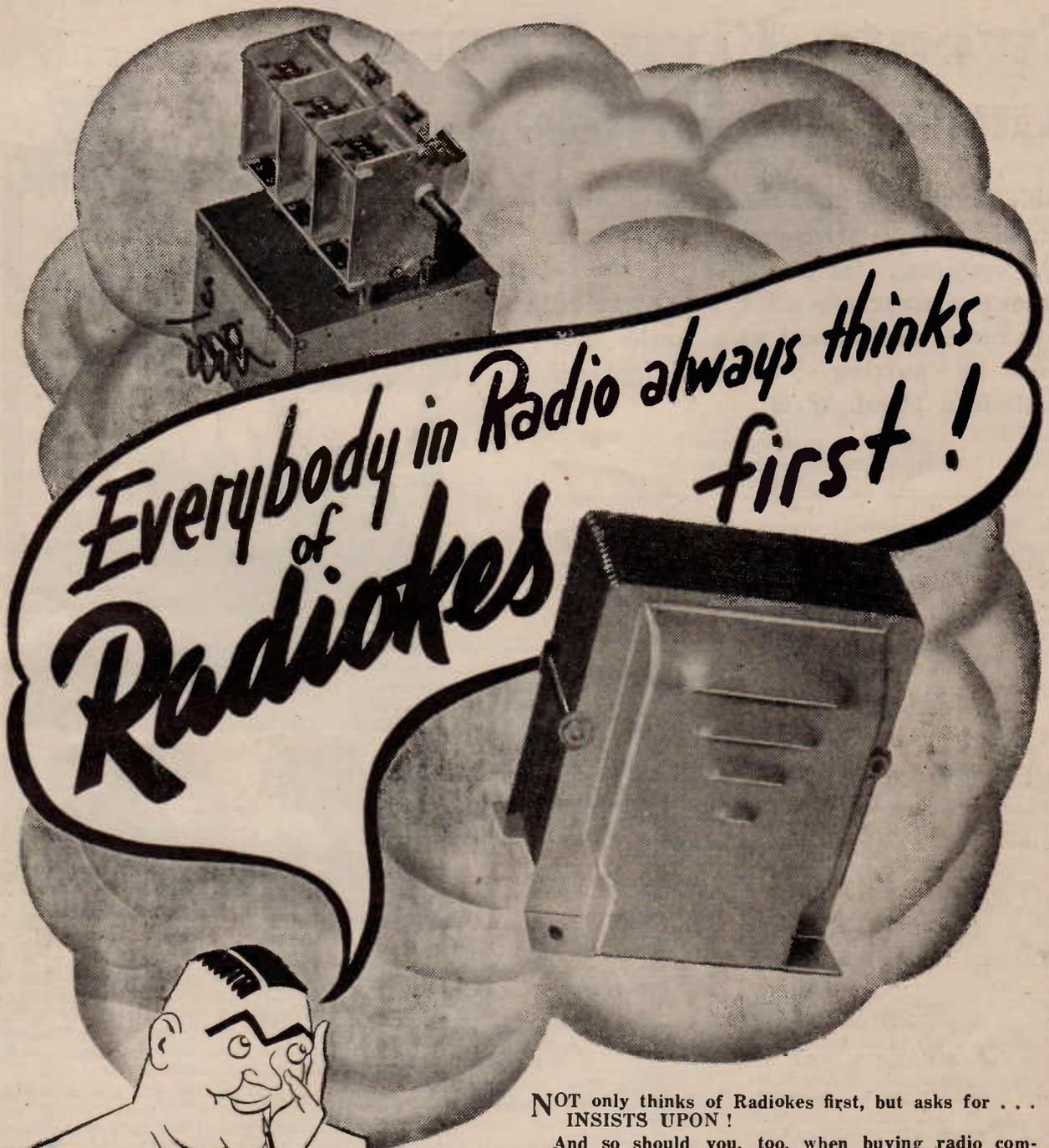
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Twenty-Five Years In Amateur Radio . . . (9)

In this concluding instalment, the author discusses the relative merits of 5-metre aerial systems. He also gives details of further experiences in u.h.f. work, leading up to his establishment of a world DX record by putting 5-metre telephony signals into North Wales.

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

The five-metre transmitter used by VK2NO. It put telephony signals into North Wales, and telegraphy across the Tasman to New Zealand. It has four stages, consisting of a 6L6 electron-coupled oscillator from 10 to 5 metres, capacity-coupled to an RK25. This exciter is linked to a buffer stage with two 801's in push-pull, and this in turn is linked to the final, using two Eimac 35T's in push-pull, with 150 watts input.

BY the end of 1936, much progress had been made at VK2NO, with all kinds of directional aerial systems for 5-metre working, and at times some fearsome looking affairs sprouted around the shack, to the mystification of neighbouring residents.

From the original eight-wire beam with its "one-way traffic" limitations, arrays had passed through the stages of the twin radiator with reflector; twin dipole (end-fire) and Reinartz rotary, to the Bruce system.

There is little to choose between any of these types for local working (up to 100 miles) with the exception of the Bruce array. This system has already been described in "A.R.W.:" It has the highest gain of any in its simplest form of four half-waves in phase, and is bi-directional normally into the bargain. It is likely, however, to be a bit of a nuisance in windy weather unless one has adopted a very strong structural arrangement (which most hams don't do).

This system must be capable of 180-degree rotation with an accessible control, as the horizontal beam angle is around 15 degrees at 5 metres. Either side of that the signal falls off rapidly, both on transmission and reception. It is the best of the u.-s.-w. systems, in the writer's opinion, for those who want the best results.

The twin-dipole is very good. This is also for 180-degree rotation, but has a 45-degree angle and is end-fire. It is easily erected and rotated.

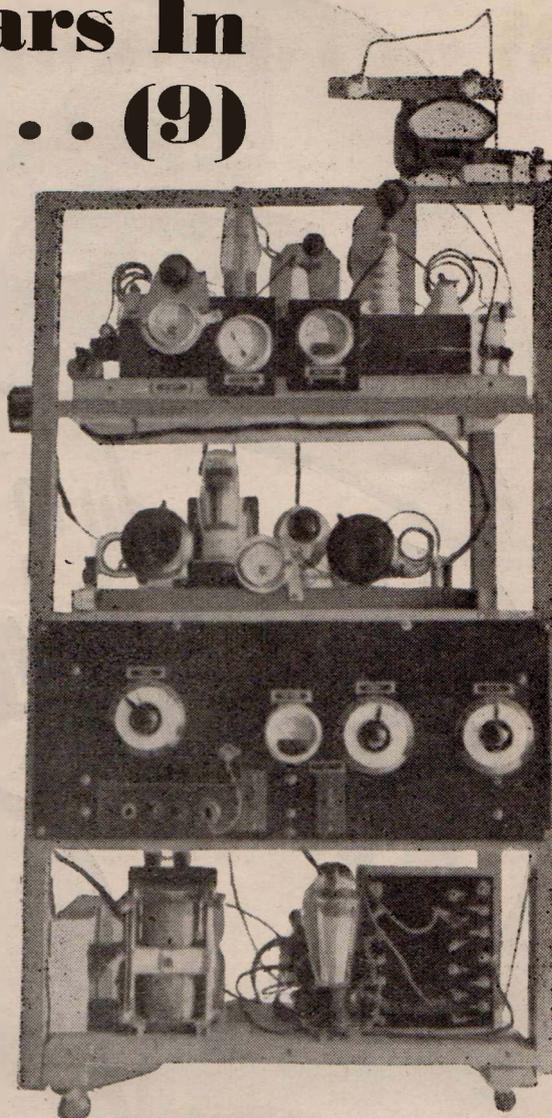
The simplest of all is the Reinartz rotary, being only 30 inches in diameter, but with a 45-degree angle in one direction. It must consequently be capable of 360 degrees rotation.

The system in use at the time of writing is a vertical W8JK "Flat-Top" beam. This has two full-waves out of phase with one-eighth wave spacing; is end-fire with about a 20-degree angle, and is a very convenient type for 180-degree rotation. This aerial is at present being tried out for possible overseas DX on 5 metres.

Atlantic Crossed On "Five" In. 1926

The question of 5-metre DX has always been an interesting one to the writer, possibly because it is a tough nut to crack. The history of 5-metre communications shows that as far back as 1926, signals were sent across the Atlantic to Italy on 5 metres. There was never any two-way working in all instances of reported DX, and up to the present time such is still the case.

Late in 1936, the writer tackled the problem of advanced apparatus seriously, and a transmitter was designed using a 6L6 e.c. oscillator doubling from 10 to 5, driving a capacity-coupled RK25. This exciter



unit was used to drive two Eimac 35T's in push-pull. The final stage would take a comfortable 150 watts input. Receivers were also tackled, and an eight-valve superhet with 5,000 k.c. i.f. channel was evolved.

The transmitter was tested out on various beam arrays, and for a considerable period the twin-dipole with 600-ohm line feed was employed, with a Reinartz rotary fed by twisted pair as a stand-by.

In the test days organised by W.I.A. (N.S.W. division) considerable success was obtained. The first surprise came when VK2DN, of Deniliquin, 360 miles distant, logged the i.c.w. test signals from VK2NO on schedule for a brief period, and this was followed by two-way contact during day and night with VK2ZC at Newcastle, 70 miles distant.

The biggest surprise of all came this year, when an ultra-shortwave observer in Pwllheli, North Wales, claimed to have heard telephony on 5 metres from VK2NO. Conjecture

(continued on page 40)

World Shortwave Stations

Below is published a comprehensive list of world shortwave stations, in which all available information is given. The schedules, which are the latest obtainable, are in Australian Eastern Standard Time.

Because of the large number of new commercial stations now on the air, it has been impossible to include many 'phone stations. However, it is hoped to publish a complete list of these in the near future.

NOTE: To convert kilocycles to megacycles, shift the decimal point three places to the left — e.g., read 21,540 k.c. as 21.54 m.c.

Compiled By **ALAN H. GRAHAM**
(SHORT-WAVE EDITOR, "RADIO WORLD")

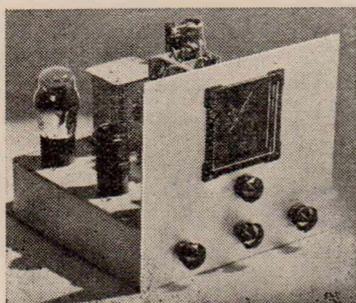
CALL	KC.	M.	LOCATION	SCHEDULE, ETC.
W2XDV	31,600	9.49	New York, U.S.A.	Relays WABC. Daily 9 a.m.-2 p.m. Also Sun. and Mon. 4.30-9 a.m., 10 a.m.-1 p.m.
W3XEY	31,600	9.49	Baltimore, Md., U.S.A.	Relays WFBR. 7 a.m.-3 p.m.
W4XCA	31,600	9.49	Memphis, Tenn., U.S.A.	Relays WMC. Daily.
W8XAI	31,600	9.49	Rochester, N.Y., U.S.A.	Relays WHAM. Daily 10.30 p.m.-3.05 p.m.
W8XKB	31,600	9.49	Springfield, Mass., U.S.A.	Daily, 10 p.m.-4 p.m.
W8XWJ	31,600	9.49	Detroit, Mich., U.S.A.	Daily 9 p.m.-3.30 p.m.; Mons. 11 p.m.-3 p.m. (Tues.). Relays WWJ.
W9XPD	31,600	9.49	St. Louis, Mo., U.S.A.	Relays KSD. Daily.
W9XAZ	26,400	11.36	Milwaukee, Wisc., U.S.A.	Relays WTMJ. Daily from 4 a.m.
GSK	26,100	11.49	Daventry, England.	Not in use at present.
W6XKG	25,950	11.56	Los Angeles, Calif., U.S.A.	Relays KGFJ, Daily, 24 hours.
W3XAU	25,750	11.65	Philadelphia, Pa., U.S.A.	Experimental.
CRCX	24,380	12.3	Bowmanville, Canada	Experimental.
GST	21,550	13.92	Daventry, England.	Not in use at present.
W8XK	21,540	13.93	Pittsburgh, Pa., U.S.A.	Relays KDKA, Daily 10 p.m.-midnight.
GSJ	21,530	13.93	Daventry, England	Trans. 2: 8.45 p.m. Trans. 3: 12.15 a.m.
W2XE	21,520	13.94	New York, U.S.A.	Relays WABC. Daily 10.30 p.m.-1 a.m., Sun. 11 p.m.-1 a.m.
W3XAU	21,520	13.94	Philadelphia, Pa., U.S.A.	Experimental.
JZM	21,520	13.94	Tokyo, Japan.	Experimental.
GSH	21,470	13.97	Daventry, England	Trans. 2: 9 p.m. Trans. 3: 12.15 a.m.
W1XAL	21,460	13.98	Boston, Mass. U.S.A.	Irregular.
GAA	20,380	14.72	Rugby, England.	Irregular.
DHO	20,020	14.99	Nauen, Germany.	Irregular.
KAX	19,980	15.02	Manila, P.I.	Irregular.
VQG4	19,620	15.28	Nairobi, Kenya, S. Africa.	Calls London 10.30 p.m.
PMA	19,345	15.51	Bandoeng, Java, D.E.I.	Irregular at 1 a.m.
PPU	19,260	15.58	Rio de Janeiro, Brazil.	Irregular.
HS8PJ	19,020	15.77	Bangkok, Siam.	Mondays 11 p.m.-1 a.m.
GAQ	18,970	15.81	Rugby, England.	6 p.m.
JVA	18,910	15.86	Nazaki, Japan.	Tests irregularly.
ZSS	18,890	15.88	Capetown, S. Africa.	6 p.m.
PLE	18,830	15.93	Bandoeng, D.E.I.	Evenings.
HBH	18,480	16.23	Geneva, Switzerland.	Irregular.
HBF	18,450	16.26	Geneva, Switzerland.	Irregular.
IUD	18,270	16.42	Addis Ababa, Ethiopia.	Irregular.
LSY3	18,115	16.56	Buenos Aires, Argentina.	Saturdays, 7-8 a.m. and irregular.
GSG	17,790	16.86	Daventry, England.	Daily 12.15, 3.20, 7 a.m., noon, 5, 8.45 p.m.
JZL	17,785	16.87	Tokyo, Japan.	Irregular.
W3XAL	17,780	16.87	Bound Brook, N.J., U.S.A.	Relays WJZ. Daily 11 p.m.-noon.
W9XAA	17,780	16.87	Chicago, Ill., U.S.A.	Irregular.
PHI	17,775	16.88	Huizen, Holland.	Daily (exc. Wed.) 11.25 p.m.-1 a.m. Sun. 10.25 p.m.-1.35 a.m.
W2XE	17,760	16.89	New York, U.S.A.	Sun. and Mon. 9.30-11 a.m. Tues.-Sat. 9.15-11 a.m.
DJE	17,760	16.89	Zeeson, Germany.	Daily 3.05 p.m.-2 a.m. Mon. 2.10-3.25 a.m.
ZBW5	17,755	16.9	Hong Kong, China.	Irregular.
HSP	17,741	16.91	Bangkok, Siam.	Calls Germany 6 p.m., and Japan.
DFB	17,520	17.12	Nauen, Germany.	Irregular.
CMA5	17,260	17.37	Habana, Cuba.	Irregular.
ITK	16,835	18.32	Mogadiscio, Somaliland.	Irregular.
FZR3	16,233	18.48	Saigon, Indo-China.	Tests with Paris.
KKP	16,030	18.71	Kahuku, Hawaii.	Around 6 a.m.
JVE	15,660	19.16	Nazaki, Japan.	Irregular. Around 6 p.m.
JVF	15,620	19.2	Nazaki, Japan.	Irregular. Around 5 a.m. and 8 p.m.

CALL	KC.	M.	LOCATION	SCHEDULE, ETC.
CMA3	15,505	19.36	Habana, Cuba.	Irregular.
IUG	15,450	19.41	Addis Ababa, Ethiopia.	Daily 12.15 a.m.
KWE	15,430	19.44	Bollinas, Calif., U.S.A.	Tests with Japan and Java.
KWO	15,415	19.46	Dixon, Calif., U.S.A.	Tests with Hawaii.
HAS3	15,370	19.52	Budapest, Hungary.	Midnight (Sunday)-1 a.m. (Monday).
DZG	15,360	19.53	Zeesen, Germany.	Irregular.
KWU	15,355	19.53	Dixon, Calif., U.S.A.	Tests Japan.
DJR	15,340	19.56	Zeesen, Germany.	Daily 7.50 a.m.-1.45 p.m. Daily 11 p.m.-midnight.
W2XAD	15,330	19.56	Schenectady, N.Y., U.S.A.	Relays WGY: Daily 2 a.m.-noon.
OLR5B	15,320	19.58	Prague, Czecho-Slovakia.	Irregular.
GSP	15,310	19.6	Daventry, England.	Daily 9.20-11.30 a.m. (Trans.5).
XEBM	15,300	19.61	Mazatlan, Mexico.	Daily 4-5 a.m., 11 a.m.-1 p.m.
LRU	15,290	19.62	Buenos Aires, Argentine.	Daily 10 p.m.-midnight, noon-2.15 p.m.
HIX	15,280	19.63	Ciudad Trujillo, D.R.	Relays HIX. 3.10-4.10 a.m. Suns. 10.40 p.m.-1.40 a.m.
DJQ	15,280	19.63	Zeesen, Germany.	Daily 7.50 a.m.-1.45 p.m., 3.05-8.45, 9-11 p.m., 11.10 p.m.-2 a.m.
W2XE	15,270	19.65	New York, U.S.A.	Relays WABC: Daily 6-9 a.m., Mon. 4-7, 8-9 a.m.
GSI	15,260	19.66	Daventry, England.	Trans. 4: 3.15-6.45 a.m. Trans. 6: Noon-2 a.m.
RIM	15,252	19.67	Tachkent, U.S.S.R.	10 p.m.
W1XAL	15,250	19.67	Boston, Mass., U.S.A.	Daily 5.30-7.30 a.m. Mons. 1.15-3 a.m.
TPA2	15,245	19.68	Paris, France.	Daily 9 p.m.-2 a.m.
HS8PJ	15,230	19.7	Bangkok, Siam.	Irregular: Mondays 11 p.m.
OLR5A	15,230	19.7	Prague, Czecho-Slovakia.	Daily 12.25-2.20, 5-5.15 a.m.
PCJ	15,220	19.71	Eindhoven, Holland.	Tues. 7.30-9 p.m. Weds. 11 p.m.-2 a.m. (Thurs.).
W8XK	15,210	19.72	Pittsburgh, P.A., U.S.A.	Relays KDKA: Midnight-10 a.m.
DJB	15,200	19.74	Zeesen, Germany.	Daily 7.50 a.m.-1.45 p.m., 3.5 p.m.-2 a.m. Sun. 11 p.m.-midnight.
ZBW4	15,190	19.75	Hong Kong, China.	Irregular.
GSO	15,180	19.76	Daventry, England.	Trans. 1: 5 p.m. Trans. 4: 7 a.m. Trans. 5: 9.20 a.m.
RW96	15,180	19.76	Moscow, U.S.S.R.	Irregular.
CXA14	15,170	19.77	Montevideo, Uruguay.	Relays LR3.
JZK	15,160	19.79	Tokyo, Japan.	Daily 6-7, 7.30-8.30 a.m., 3.30-4.45 p.m., 11 p.m.-midnight.
XEWW	15,160	19.79	Mexico City, Mexico.	Daily midnight-9 a.m.
SM5SX	15,155	19.8	Stockholm, Sweden.	Daily 2-8 a.m.
YDC	15,160	19.80	Bandoeng, Java.	Daily 9-10.30 a.m.: 1.30-5 p.m.: 8.30 p.m.-12.30 a.m.
W3XAU	15,150	19.80	Philadelphia, Pa., U.S.A.	Experimental.
GSE	15,140	19.82	Daventry, England.	Daily 1.45-3 a.m., 7-9 a.m., 9.20-11.30 a.m.
HVJ	15,120	19.83	Vatican City, Italy.	Daily (exc. Sun. and Mon.) 1.30-1.45 a.m. Sun. 1-1.45 a.m.
DJL	15,110	19.85	Zeesen, Germany.	Daily 2.35-7.30 a.m., 3-5 p.m., 11 p.m. Sun. 9-11 p.m.
RKI	15,090	19.88	Moscow, U.S.S.R.	Daily 10 a.m.-12.15 p.m. Mons. 4.30-6 a.m.
KAY	14,980	20.03	Manila, P.I.	Irregular.
LZA	14,970	20.04	Sofia, Bulgaria.	Daily 3-5.45 a.m. and 8-9.30 p.m. Also Suns. 3.30-11 p.m.: Mons. 1-7.30 a.m.
PSE	14,940	20.08	Rio de Janeiro, Brazil.	Relays to Germany Thurs. 7-7.15 a.m.
ROU	14,790	20.23	Omsk, U.S.S.R.	Irregular.
JVH	14,600	20.55	Nazaki, Japan.	Broadcasts irregularly 8 a.m.: Phones Europe.
HBJ	14,535	20.64	Geneva, Switzerland.	Suns. 9.45-11.30 a.m.
	14,500	20.69	Asmara, Eritrea.	Around 9.30 p.m.
DZH	14,460	20.75	Zeesen, Germany.	Irregular.
IBC	14,410	20.8	San Paolo, Italy.	Irregular.
EA9AH	14,200	21.13	Tetuan, Span. Morocco.	Daily (exc. Mon.) 5.15-8 a.m. and 10 a.m.-Noon.
SUZ	13,820	21.71	Abou Zabal, Egypt.	Around 2 a.m.
CGA2	13,745	21.83	Drummondville, Canada.	Tests with Europe.
KKZ	13,690	21.91	Bollinas, Calif., U.S.A.	Tests with Japan and Java.
ZGB	13,645	21.96	Kuala Lumpur, Malaya.	Irregular.
SPW	13,635	22.0	Warsaw, Poland.	Tues., Thurs., Sat., 3.30-4.30 a.m. Mon. 2.30-4.30 a.m.
IDU	13,380	22.42	Asmara, Eritrea.	Irregular.
CGA3	13,285	22.58	Drummondville, Canada.	Tests with London.
ZMBJ	13,200	22.7	T.S.S. "Awatea"	Phones Wellington.
VPD	13,075	22.94	Suva, Fiji Is.	Not in use at present
VVS	12,880	23.28	Rangoon, Burma.	Around 9 p.m.
CNR	12,825	23.39	Rabat, Morocco.	Irregular.

CALL	KC.	M.	LOCATION	SCHEDULE, ETC.
HIN	12,485	24.0	Ciudad Trujillo, D.R.	Daily 3-5 a.m. and around 9 a.m.
SPF	12,310	24.37	Gdynia, Poland.	
CB615	12,300	24.39	Santiago, Chile.	Changing to 11700 KC.
TYB	12,250	24.49	Paris, France.	Irregular.
TFJ	12,235	24.52	Reykjavik, Iceland.	Phones England: broadcasts Mon. 4.40-5.30 a.m.
GBS	12,150	24.69	Rugby, England.	Irregular.
DZE	12,130	24.73	Zeesen, Germany.	Irregular.
TPZ2	12,120	24.75	Algiers, Algeria.	Calls Paris 3-9.30 p.m.
CJA	12,100	24.79	Drummondville, Canada.	Tests with Australia.
PDV	12,060	24.83	Kootwijk, Holland.	Irregular.
VIY	12,020	24.95	Rockbank, Australia.	Tests with Canada.
RNE	12,000	25.0	Moscow, U.S.S.R.	Mon. 1-2 a.m., Mon., Tues., Thurs., Sat. 7-8 a.m. Sun., Wed. 9-10 p.m.
HI2X	11,960	25.08	Trujillo, Dominican Republic.	Wed., Sat., 11 a.m.-1 p.m.
IUC	11,955	25.09	Addis Ababa, Ethiopia.	3 p.m.
KKQ	11,950	25.10	Bolinas, Calif., U.S.A.	Irregular tests.
XEWI	11,900	25.21	Mexico City, Mexico.	Tues., Thurs., Sat. 6-7 a.m., noon-3 p.m.: Wed., Fri., 10.30 a.m.-3 p.m.: Sun., noon-3 p.m.: Mon., 3.30-5 a.m.
HP5I	11,895	25.22	Aguadulce, Panama.	Daily 10.30 a.m.-12.30 p.m.
XEXA	11,880	25.23	Mexico City, Mexico.	Daily 5.30-7.30 a.m., 10 a.m.-3 p.m., 11.30 p.m.-2 a.m.
TPA3	11,880	25.23	Paris, France.	Daily 3.15-9 a.m., 5-8 p.m.
OLR4C	11,875	25.24	Prague, Czecho-Slovakia.	Irregular.
W8XK	11,870	25.26	Pittsburgh, Pa., U.S.A.	Relays KDKA: Daily 10 a.m.-1.30 p.m.
YDB	11,860	25.29	Soerabaya, Java, D.E.I.	Daily (exc. Sun.) 1.30-5 p.m. Sun. 10.30 a.m.-5 p.m.
GSE	11,860	25.29	Daventry, England.	Not in use at present.
DJP	11,855	25.31	Zeesen, Germany.	Not in use at present.
(FTQA)	11,850	25.33	Tananarive, Madagascar.	Daily 4-4.30 p.m.
CSW	11,840	25.35	Lisbon, Portugal.	Daily 2.30-4.30 a.m.
OLR4A	11,840	25.35	Prague, Czecho-Slovakia.	Daily 5-7.30 a.m. Tues., Fri. 10 a.m.-noon.
KZRM	11,840	25.35	Manila, P.I.	Irregular.
W9XAA	11,830	25.36	Chicago, Ill., U.S.A.	Relays WCFL: Sun. 11 p.m.-Mon. 10 a.m. and irregular.
W2XE	11,830	25.36	New York, U.S.A.	Relays WABC: Daily 10 a.m.-3 p.m.
GSN	11,820	25.38	Daventry, England.	Not in use at present.
XEBR	11,820	25.38	Hermosilla, Mexico.	Relays XEBH: 5-7 a.m., noon-3 p.m.
OER2	11,810	25.4	Vienna, Austria.	Daily (exc. Sat., Sun.) midnight-8 a.m. Sun. mid- night-8.30 a.m.
T2RO	11,810	25.4	Rome, Italy.	Daily 9.45 p.m.-9 a.m.
OXY	11,810	25.4	Copenhagen, Denmark.	Daily 8 a.m.-1 p.m.
JZJ	11,800	25.42	Tokyo, Japan.	Daily 6-7 a.m., 7.30-8.30 a.m., 11 p.m.-midnight.
CJRX	11,800	25.42	Winnipeg, Canada.	Testing. (See also 11720 KC.)
COGF	11,800	25.42	Matanzas, Cuba.	Relays CMGF: 9 a.m.-2 p.m.
OAX5A	11,795	25.43	Ica, Peru.	Daily 3-7 a.m., 10 a.m.-1.30 p.m.
DJO	11,795	25.43	Zeesen, Germany.	Not in use at present.
W1XAL	11,790	25.45	Boston, Mass., U.S.A.	Daily (exc. Mon.) 7-8.30 a.m. Mon. 8-10 a.m.
DJD	11,770	25.49	Zeesen, Germany.	Daily 2.35 a.m.: 7.50 a.m.
OLR4B	11,760	25.51	Prague, Czecho-Slovakia.	Irregular.
XETA	11,760	25.50	Monterrey, Mexico.	Daily 10 a.m.-2 p.m.
GSD	11,750	25.53	Daventry, England.	Trans. 1: 5 p.m. Trans. 4: 3.15 a.m. Trans. 5 and 6: 9.20 a.m.-2 p.m.
HP5L	11,740	25.55	Davio, Panama.	Daily 7-10 a.m.
XETM	11,730	25.57	Villahermosa, Mexico.	Daily 9 a.m.-2 p.m., 12.30-2 a.m.
(F3ICD)	11,730	25.57	Salgon, Indo-China.	Irregular 8.30 p.m.
PHI	11,730	25.57	Huizen, Holland.	Not in use at present.
CJRX	11,720	25.6	Winnipeg, Canada.	Daily 9.30 a.m.-2 p.m. Mons. 8 a.m.-1 p.m.
CR7BH	11,717	25.6	Lourenco Marques, Port East Africa.	Daily 5.30-7 a.m., 7.30-9.30 p.m. Sun. 8-10 p.m.
TPA4	11,715	25.61	Paris, France.	Mon. 1-3.30 a.m., 5-7 a.m. Daily 9.15 a.m.: 1 p.m.
SBG	11,710	25.63	Stockholm, Sweden.	Daily 2-7 a.m., 9 p.m.-midnight.
YSN	11,705	25.64	San Salvador, Salvador.	Tests. Noon-1 p.m.
CB1170	11,700	25.65	Santiago, Chile.	Daily 2-4 a.m., 7 a.m.-1 p.m.
HP5A	11,700	25.65	Panama City, Panama.	Daily 12.30-2.30 p.m.
YTC	11,700	25.65	Belgrade, Yugo-Slavia.	Daily 5.30-8 a.m. Tues. 10.15-11.15 a.m.
KIO	11,680	25.68	Kahuku, Hawaii.	Irregular.

CALL	KC.	M.	LOCATION	SCHEDULE, ETC.
JVL	11,660	25.72	Nazaki, Japan.	Irregular. 9 p.m.
'COCX	11,435	26.24	Habana, Cuba.	Relays CMX: Daily 10 p.m.-4 p.m.
HBO	11,405	26.3	Geneva, Switzerland.	Sundays 9.45 a.m.-noon. Mondays 3.40 p.m.
HIN	11,280	26.6	Ciudad, Trujillo, D.R.	Broadcasts irregularly.
ZLT4	11,050	27.15	Wellington, N.Z.	Calls Australia.
CSW	11,040	27.17	Lisbon, Portugal.	Daily 4.30-8 a.m.
'PLP	11,000	27.27	Bandoeng, Java, D.E.I.	Relays YDB.
DFL	10 850	27.63	Nauen, Germany.	Irregular.
GBP	10,770	27.85	Rugby, England.	Calls Australia.
JVM	10,740	27.93	Nazaki, Japan.	Daily 7.30-10.30 p.m.
CEC	10 670	28.12	Santiago, Chile.	Daily 10-10.15 a.m.
JVN	10,660	28.14	Nazaki, Japan.	Daily 5-11 p.m.
JIB	10,535	28.48	Taiwan, Formosa.	Works Japan 9 p.m.
VLK	10,520	28.51	Sydney, Australia.	Calls England.
ITK	10,480	28.63	Mogadiscio, It. Somaliland.	Irregular.
YBG	10,430	28.76	Medan, Sumatra, D.E.I.	Daily 10.30-11.30 a.m. and 8.30-9.30 p.m.
KES	10,410	28.8	Bolinas, Calif, U.S.A.	Irregular.
EAJ43	10,370	28.93	Teneriffe, Canary Is.	Daily 5.15-6.30 a.m., 9 a.m.-noon.
LSX	10,350	28.93	Monte Grande, Argentine.	Broadcasts Tues., Sat., 8-9 a.m.: Also tests irregularly.
OAX4H	10,340	29.01	Huacho Peru.	Relays OAX4Q.
'ORK	10 330	29.04	Ruysselede, Belgium.	Daily 4.30-6 a.m.
'DZC	10,290	29.16	Zeesen, Germany.	Irregular.
PMN	10 260	29.24	Bandoeng, Java, D.E.I.	Relays YDB.
CEB	10,230	29.33	Antofagastan, Chile.	Tests around 10 a.m.
JZB	10,065	29.81	Shinkyu, Manchukuo.	Around 9.30 p.m.
SUV	10,055	29.84	Abou Zabal, Egypt.	Tests with Europe: 4 a.m.
'DZB	10,042	29.87	Zeesen, Germany.	Irregular.
CSW	9,930	30.21	Lisbon, Portugal.	Daily 8-10 a.m.
JDY)	9,925	30.22	Darfen, Manchukuo.	Daily 10.10-11 p.m.
EAQ	9,860	30.43	Madrid, Spain.	Reported off Air.
JYS	9,775	30.69	Habana, Cuba.	Relays CMCM: Daily 11 a.m.-3 p.m.
COCM	9,840	30.49	Kemikawa-Cho, Japan.	Irregular around 2.30 p.m.
VLZ	9,760	30.74	Sydney, Australia.	Calls Java and N.Z.
COCQ	9,740	30.78	Habana, Cuba.	Daily 9.50 p.m.-4 p.m.
	9,685	30.98	Fort de France, Martinique.	Daily 1.15-2.30 p.m.
DZA	9,675	31.01	Zeesen, Germany.	Irregular.
TI4NRH	9,670	31.02	Heredia, Costa Rica.	Daily 11.30 a.m.-1 p.m. and 2.30-3 p.m.
CR6AA	9,660	31.06	Lobito, Port. W. Africa.	Thurs. and Sun. 5.45-7.30 a.m.
LRX	9,660	31.06	Buenos Aires, Argentine.	Daily 12.30 a.m.-2.30 p.m.
CT1AA	9,650	31.09	Lisbon, Portugal.	Sun., Wed., Fri. 7.30-10 a.m.
HH3W	9,645	31.1	Port-au-Prince, Haiti.	Daily 4-5, 10-11.30 a.m.
YNLF	9,645	31.1	Managua, Nicaragua.	Daily 3.30-5.30 a.m.: 9.30 a.m.-1 p.m. and 11 p.m.-midnight.
OAX5C	9,640	31.11	Ica, Peru.	Daily 10 a.m.-1.30 p.m.
OAX4K	9,635	31.13	Lima, Peru.	
I2RO	9,635	31.13	Rome, Italy.	Not in use at present.
HJ2ABD	9,630	31.14	Bucaramanga, Colombia.	Daily 2.30 a.m., 8.30 a.m., 10.30 a.m.
HJ1ABP	9,620	31.18	Cartagena, Colombia.	Daily 2-4 a.m.: 8 a.m.-2 p.m. Also around 10 p.m.
(JFAK)	9,625	31.16	Taiwan, Formosa.	Daily 7 p.m.-1.30 a.m.
HP5J	9,615	31.22	Panama City, Panama.	Daily 3-4.30 a.m.: 9 a.m.-1.30 p.m.
YDB	9,610	31.20	Soerabaia, Java, D.E.I.	Daily 9-10.30 a.m., 1-5 p.m., 8.30 p.m.-1 a.m. Sun. 10.30 a.m.-5 p.m., 8.30 p.m.-1 a.m.
XEYU	9,605	31.24	Mexico City, Mexico.	Daily 10 a.m.-1 p.m.
RAN	9,600	31.25	Moscow, U.S.S.R.	Daily 10 a.m.-12.15 p.m.
CB960	9,600	31.25	Santiago, Chile	Around noon.
HBL	9,595	31.27	Geneva, Switzerland	Sundays 8.30-9.30 a.m.
VK6ME	9,590	31.28	Applecross, W. Australia	
PCJ	9,590	31.28	Eindhoven, Holland.	Mon. 5-6, 10-11 a.m.: Wed. 4.30-6 a.m. Thurs. 10 a.m.-1 p.m.
VK2ME	9,590	31.28	Sydney, Australia.	See Local Press.
W3XAU	9,590	31.28	Philadelphia, Pa., U.S.A.	Daily 3-11 a.m. Relays WCAU.
GSC	9,580	31.32	Daventry, England.	Trans. 6: Noon-2 p.m.
VLR	9,580	31.32	Melbourne, Australia.	See Local Press.
HJ2ABC	9,575	31.34	Cucuta, Colombia.	Daily 11 a.m.-3 a.m.
W1XK	9,570	31.35	Springfield, Mass., U.S.A.	Relays WBZ: 10 p.m.-4 p.m.
KZRM	9,570	31.35	Manila, P.I.	Daily noon-1 a.m.

Two Popular "Radio World" Sets



During the past few months many enthusiastic performance reports have been received from builders of the two sets illustrated above—the "1937 Empire All-Wave Three" (battery model) and the "1937 Eaglet All-Wave Two."

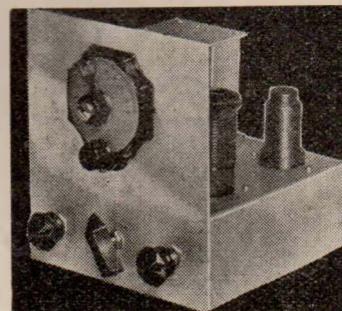
The "1937 Empire" (described in the "Radio World" for May and June last) has proved particularly popular among builders who want the maximum in all-wave DX reception at minimum cost. Outstanding features are:—Continuous waveband coverage from

Readers Report Excellent Results With "Eaglet" And "1937 Battery Empire"

12-600 metres with standard two-gang condenser; 1C4 r.f. stage; type 1K4 screen-grid detector, with electron-coupled regeneration; low "A" and "B" drain, ensuring low initial and running costs; automatic bias on output pentode; full speaker reception from main s.w. and broadcast stations.

"EAGLET TWO" USES METAL VALVES

The "1937 Eaglet Two" (June and July issues of "R.W.") also gives all-wave coverage, though it was designed primarily for short-



wave work. Main features include the use of metal valves, with electron-coupled regeneration and bandspread tuning.

Power supply can be obtained from any commercial receiver using 6.3 volt valves, from an s.w. power pack, or from the combination power pack and amplifier described this month.

Copies of all three issues of the "Radio World" mentioned above are still obtainable from 214 George St., Sydney, N.S.W., price 1/- post free.

CALL	KC.	M.	LOCATION	SCHEDULE, ETC.
OAX4T	9,562	31.37	Lima, Peru.	Daily 2.30 a.m.-4.30 a.m.
DJA	9,560	31.38	Zeesen, Germany.	Daily 7.50 a.m.: 3.05 a.m.
HJ1ABB	9,560	31.38	Barranquilla, Colombia.	Daily 2.30-4 a.m.: 7.30 a.m.-1 p.m.
OLR3A	9,550	31.41	Prague, Czecho-Slovakia.	Not in use at present.
XEFT	9,550	31.41	Vera Cruz, Mexico.	Daily 2.30-7 a.m., 10 a.m.-3 p.m.
YDB	9,550	31.41	Soerabaia, D.E.I.	Not in use. See 9610 KC.
HH2R	9,545	31.44	Port-au-Prince, Haiti.	Irregular.
DJN	9,540	31.45	Zeesen, Germany.	Daily as DJA.
VPD2	9,540	31.45	Suva, Fiji Is.	Daily (exc. Sun.) 8.30-10.30 p.m.
JZI	9,535	31.46	Tokyo, Japan.	Irregular.
W2XAF	9,530	31.48	Schenectady, N.Y., U.S.A.	Relays WGY: 7 a.m.-3 p.m.
ZBW3	9,525	31.49	Hong Kong, China.	Daily 2.30-4 p.m., 7 p.m.-1 a.m. Sun. noon-4 p.m., 6 p.m.-12.30 a.m.
LKJ1	9,525	31.49	Jeloy, Norway.	Daily 2-8 a.m., 8-11 p.m.
OXY	9,522	31.5	Copenhagen, Denmark.	Daily 6-8 a.m.
XEDQ	9,520	31.5	Guadalajara, Mexico.	Irregular. 10.30 a.m.
HJ4ABH	9,520	31.51	Armenia, Colombia.	Irregular. Around 9 a.m. and 11 p.m.
YSH	9,517	31.52	San Salvador, Salvador.	Tests. Noon.
VK3ME	9,510	31.55	Melbourne, Australia.	See Local Press.
GSB	9,510	31.55	Daventry, England.	Trans. 1-4-5-6: 3 p.m. and 3 a.m.-2 p.m.
HS8PJ	9,510	31.55	Bangkok, Siam.	Thurs. 4-5.30 p.m., 10.30 p.m.-1 a.m.
CXA8	9,505	31.57	Montevideo, Uruguay.	Relays LR3.
HJ1ABE	9,505	31.57	Cartagena, Colombia.	Daily 9 p.m.-2 a.m.
XEWW	9,500	31.58	Mexico City, Mexico.	Relays XEW.
HI5G	9,500	31.58	La Vega, D.R.	Daily 1.40, 7.40 a.m. and 9.40 p.m.
(FIQA)	9,500	31.58	Tananarive, Madagascar.	Daily 4-4.30 p.m.

CALL	K.C.	M.	LOCATION.	SCHEDULE, ETC.
HJU	9,500	31.58	Buenaventura, Colombia.	Tues., Thurs., Sat., 3-5 a.m., 11 a.m.-2 p.m.
PRF5	9,500	31.58	Rio de Janeiro, Brazil.	Irregular. 7.45 a.m.
XEFT	9,490	31.61	Vera Cruz, Mexico.	Relays XETF as on 6120 kc. See also 9550 kc.
EAR(2)	9,480	31.65	Madrid, Spain.	Daily 9.30 a.m.-noon.
ICK	9,460	31.71	Tripoli, N. Africa.	Around 8.30 p.m.
TGWA	9,450	31.75	Guatemala City, Guatemala.	Daily 3-5 a.m., 11 a.m.-3 p.m. Sun. noon-8 p.m.
FZF6	9,440	31.78	Fort de France, Martinique.	Irregular around 2.30, 3.30, 9.15 and 11 a.m.
HC2RA	9,440	31.78	Guayaquil, Ecuador.	Irregular at 1 p.m.
COCH	9,428	31.8	Habana, Cuba.	Daily 10.30 p.m.-3 p.m.
PLV	9,420	31.86	Bandoeng, Java, D.E.I.	Works Holland.
COBC	9,363	32.04	Habana, Cuba.	Relays CMBC Daily 10 p.m.-3.30 p.m.
HS8PJ	9,350	32.09	Bangkok, Siam.	Irregular. See 9510 kc.
OAX4J	9,340	32.12	Lima, Peru.	Daily 3-6 a.m. Sun. 9-10 a.m.
CGA4	9,330	32.15	Drummondville, Canada.	Irregular.
YNGU	9,300	32.25	Managua, Nicaragua.	3-5 a.m., 9-10 a.m.
HAT4	9,125	32.88	Budapest, Hungary.	Sun. 9-10 a.m.; Mon. Thurs. 10-11 a.m.
CODX	9,125	32.88	Habana, Cuba.	Relays CMDX.
OAX4T	9,082	33.08	Lima, Peru.	2.30-4.30 a.m.
TFK	9,060	33.11	Reykjavik, Iceland.	Phones London: broadcasts irregularly.
TYA2	9,030	33.2	Paris, France.	Around 6 p.m.
COBZ	9,030	33.3	Habana, Cuba.	Relays CMBZ: 10.40 p.m.-3.10 p.m. (Suns. till 5 p.m.).
KEJ	9,010	33.3	Bolinas, Calif., U.S.A.	Relays NBC programmes irregularly.
TPZ	8,960	33.48	Algiers, Algeria.	Irregular. Calls Paris.
HCJB	8,948	33.52	Quito, Ecuador.	Daily 3-5 a.m.; 9 a.m.-1 p.m. (exc. Tues.)
ZMBJ	8,840	33.94	T.S.S. "Awatea."	Phones Wellington.
HKV	8,795	34.09	Bogota, Colombia.	Tues. and Fri. 10-10.30 a.m.
ZBW	8,750	34.29	Hong Kong, China.	Irregular.
FZE8	8,750	34.29	Djibouti, Fr. Somaliland.	Calls Paris 5.30 p.m.
VPD3	8,720	34.4	Suva, Fiji.	Irregular, 8.30-10 p.m.
KBB	8,710	34.44	Manila, P.I.	Irregular 9 p.m.
COJK	8,665	34.62	Camaguey, Cuba.	Daily (exc. Sun., Mon.) 8.30-9.30 a.m. and 11 a.m.-2 p.m.
XEAW	8,630	34.76	Veracruz, Mexico.	Noon-1 p.m.
YNLG	8,505	35.27	Managua, Nicaragua.	Daily 4.30-5.30 a.m., 9 a.m.-3 p.m.
YNLG	8,590	34.92	Managua, Nicaragua.	Daily 10.30 a.m.-12.30 p.m.
HC2CW	8,400	35.71	Guayaquil, Ecuador.	Daily 2.30-3.30 a.m., 11 a.m.-2 p.m.
IAC	8,380	35.8	Pisa, Italy.	Irregular.
XEME	8,190	36.63	Merida, Yucatan, Mexico.	Daily 1-3 a.m.; 9 a.m.-3 p.m.
ZP10	8,110	37.0	Asuncion, Paraguay.	Daily 11 a.m.-1 p.m.
CNR	8,036	37.33	Rabat, Morocco.	Mondays 5.30-8 a.m.
HC2TC	7,975	37.62	Quito, Ecuador.	Mon., Fri., 11 a.m.
HSJ	7,968	37.65	Bangkok, Siam.	Irregular.
IDU	7,890	38.02	Asmara, Eritrea, Africa.	Irregular.
YSD	7,890	38.02	San Salvador, Salvador.	Tests midnight-2 a.m.
JYR	7,880	38.07	Kemikawa-Cho, Japan.	Daily 7-10.40 p.m.
HC2JSB	7,854	38.2	Guayaquil, Ecuador.	Daily 2-5 a.m., 7 a.m.-2 p.m.
HBP	7,799	38.47	Geneva, Switzerland.	Sundays 8.30-9.30 a.m.
KEE	7,715	38.89	Bolinas, Calif., U.S.A.	Relays NBC and CBS programmes.
IUB	7,620	39.37	Addis Ababa, Ethiopia.	Irregular.
TI8WS	7,550	39.74	Punta Arenas, Costa Rica.	Daily 9 a.m.-3 p.m.
JVP	7,510	39.95	Nazaki, Japan.	Irregular.
JVQ	7,470	40.16	Nazaki, Japan.	Irregular.
HBQ	7,445	40.30	Geneva, Switzerland.	Irregular.
ZLT2	7,390	40.6	Wellington, N.Z.	Calls Sydney.
XECR	7,380	40.65	Mexico City, Mexico.	Mondays 9-10 a.m.
HJ1ABD	7,281	41.04	Cartagena, Colombia.	Irregular.
VP3BG	7,220	41.55	Georgetown, Br. Guiana.	Daily 9-11.45 a.m.
HKE	7,220	41.55	Bogota, Colombia.	Sun., Wed., 11 a.m.-noon. Tues., Fri., 9.30-10 a.m.
ECN1	7,220	41.55	Barcelona, Spain.	Around 7 a.m.
YNAM	7,200	41.67	Managua, Nicaragua.	Tests at noon.
EA1AZ	7,100	42.25	Coruna, Spain.	Around 7 a.m.
FO8AA	7,100	42.25	Papeete, Tahiti.	Wed., Sat.: 2-3 p.m.
EA9AH	7,030	42.67	Tetuan, Sp. Morocco.	Daily 7-7.30 a.m.
HJ1ABK	7,030	42.67	Barranquilla, Colombia.	Mon. 6-9 a.m.
HRP1	7,030	42.67	San Pedro Sula, Honduras.	Irregular.

Call	KC.	ML	LOCATION	SCHEDULE, ETC.
EA8AB	7,010	42.80	Sta. Cruz, Canary Is.	Around 6.15 a.m. (Also reported on 7211 kc.: 41.6m.)
ECH	7,000	42.87	Barcelona, Spain.	Around 7 a.m.
PZH	6,996	42.88	Paramaribo, Dutch Guiana.	Daily 8.30-11.30 a.m.: 9-11.30 p.m. Mon. 12.30-2.30 a.m.
XBA	6,977	43.0	Tacubaya, Mexico.	Daily 12.30-4 a.m.: 10-11.30 a.m.
HCETC	6,976	43.0	Quito, Ecuador.	Sun., Tues., 11 a.m.-noon.
VK8SC	6,960	43.1	Port Hedland, W.A.	Sundays 7.30 p.m.
IUF	6,922	43.34	Addis Ababa, Ethiopia.	Irregular.
HI2D	6,900	43.48	Ciudad Trujillo, D.R.	Daily 1.40-5.40 a.m.: 7.40-11.40 a.m.: 9.40-11.40 p.m.
COCW	6,880	43.62	Habana, Cuba.	Daily 10 p.m.-4 p.m.
CGA7	6,880	43.60	Drummondville, Canada.	Irregular.
KEL	6,860	43.70	Bolinas, Calif., U.S.A.	Irregular: around 2 a.m. and 9 a.m.
TIOW	6,850	43.80	Puerta Limon, Costa Rica.	Daily 1-2.30 a.m. Mons. 5-6 a.m.
HI7P	6,809	44.12	Ciudad Trujillo, D.R.	Daily (exc. Sun. and Mon.) 3.40-4.40 a.m. 9.40-11.40 a.m. Sun. 3.40-4.40 a.m. Mon. 1.40-2.40 a.m.
HHH	6,770	44.26	San Pedro de Macoris, D.R.	Daily 3.10-4.40 a.m., 10.30 a.m.-Noon. Sun. 6-7 p.m. Mon. 7.15-9 a.m.
JVT	6,750	44.44	Nazaki, Japan.	Irregular.
HI3C	6,730	44.58	La Romana, D.R.	Daily 3.30-5 a.m. and 8-9 a.m.
PMH	6,720	44.64	Bandoeng, Java, D.E.I.	Relays YDB, etc., daily 8.30 p.m.-2 a.m. Suns. 12.30-4.30 p.m.
TIEP	6,710	44.71	San Jose, Costa Rica.	Daily 10 a.m.-1 p.m.
YVQ	6,672	44.95	Maracay, Venezuela.	Sundays 11 a.m.-Noon.
HC2RL	6,635	45.21	Guayaquil, Ecuador.	Mon. 8.45-10.45 a.m.: Wed. 12.15-2.15 p.m.
HIT	6,630	45.25	Ciudad Trujillo, D.R.	Daily (exc. Mon.) 3-4.40 a.m.: 8.40-11.40 a.m. Sun. 1.40-3.40 p.m.
PRADO	6,625	45.28	Rio Bamba, Ecuador.	Fridays noon-2.45 p.m.
HI4D	6,558	45.74	Ciudad Trujillo, D.R.	Daily (exc. Mon.) 3-4.40 a.m.
XBC	6,550	45.8	Vera Cruz, Mexico.	Daily 11 p.m.-Midnight.
TIRCC	6,550	45.8	San Jose, Costa Rica.	Mons. 2-5 a.m.: 9-10 a.m.: 11 a.m.-noon. Fri. 9 a.m.-2 p.m. Daily 3-5 a.m.
YV6RB	6,545	45.84	Bolivar, Venezuela.	Daily 10 a.m.-1 p.m. Mons. 6-9 a.m.
YN1GG	6,530	45.94	Managua, Nicaragua.	Daily 11 a.m.-noon.
YV4RB	6,520	46.01	Valencia, Venezuela.	Daily 2-5 a.m.: 8 a.m.-1 p.m.
	6,508	46.1	Tetuan, Span. Morocco.	Irregular.
TIOW	6,500	46.15	Puerto Limon, Costa Rica.	Daily. 3-4.30 a.m.
HIL	6,500	46.15	Ciudad Trujillo, D.R.	Daily 3.10-4.40 a.m.: 8.40-10.40 a.m.
HI4V	6,477	46.32	Ciudad Trujillo, D.R.	Daily 2.40-4.40 a.m.: 8.10 a.m.-12.40 p.m.
YNLAT	6,470	46.36	Granada, Nicaragua.	Irregular.
HI8A	6,450	46.51	Ciudad Trujillo, D.R.	Daily 5.40-7.10 a.m.: 11.40 p.m.-1.40 a.m. Sun. 12.40-1.40 p.m.
OAX4K	6,430	46.68	Lima, Peru.	Tues., Thurs. 12.30-1.30 p.m.
HI1S	6,420	46.73	Puerto Plata, D.R.	Daily 2.40-4.40 a.m.: 8.40-10.40 a.m.: 12.40-2.40 p.m.
TIPG	6,410	46.8	San Jose, Costa Rica.	Daily 3-5 a.m.: 9 a.m.-2.30 p.m.: 10.30 p.m.-12.30 a.m.
YV5RH	6,400	46.88	Caracas, Venezuela.	Daily 10 a.m.-2 p.m.
YV5RF	6,380	47.02	Caracas, Venezuela.	Daily 9 a.m.-1.30 p.m.
YV1RH	6,355	47.2	Maracalbo, Venezuela.	Daily 11 a.m.-2 p.m.
HRP1	6,351	47.21	San Pedro de Sula, Honduras.	Daily 3-5 a.m.: 10.45 a.m.-1 p.m.
HRY	6,350	47.24	Tegucigalpa, Honduras.	Daily 9.30-11.30 a.m.
HJ1X	6,340	47.32	Ciudad Trujillo, D.R.	Daily 3.10-4.10 a.m.: Wed., Sat. 11.10 a.m.-1.10 p.m. Sun. 10.40 p.m.-12.40 a.m. (Mon.)
OAX1A	6,335	47.35	Chiclayo, Peru.	Noon-2 p.m.
JZG	6,330	47.39	Nazaki, Japan.	Irregular.
COCW	6,325	47.43	Habana, Cuba.	Relays CMW: 10 p.m.-3 p.m.
HH3NW	6,325	47.43	Port-au-Prince, Haiti.	Daily 4-6 a.m., 10-11.30 a.m. (exc. Mon.)
HIZ	6,316	47.5	Ciudad Trujillo, D.R.	Daily 2.10-5.30 a.m., 8.10-11.40 a.m. Sun. 8.10 a.m.-2.10 p.m. Mon. 2.40-4.40 a.m.
COWB	6,310	47.55	Habana, Cuba.	Schedule unknown.

Call	KC.	M.	LOCATION	SCHEDULE, ETC.
TG2	6,310	47.55	Guatemala City, Guatemala.	Relays TG2: Daily 2-5 p.m.
YV4RG	6,300	47.62	Maracay, Venezuela.	Daily 11 a.m.-1.30 p.m.
YV5RP	6,290	47.69	Caracas, Venezuela.	Irregular
COHB	6,282	47.76	Sancti Spiritus, Cuba.	Daily midnight-3 a.m.: 7-9 a.m.: noon-2 p.m.
HIG	6,280	47.77	Ciudad Trujillo, D.R.	Daily 3.10-5.10 a.m.: 11.10 a.m.-12.40 p.m.: 10.10-11.40 p.m.
HIN	6,243	48.0	Ciudad Trujillo, D.R.	Daily 3-5 a.m.: 10.30 a.m.-12.30 p.m.
HI8Q	6,240	48.08	Ciudad Trujillo, D.R.	Daily 1.40-4.40 a.m.: 7.40-11.40 a.m.
HRD	6,235	48.11	La Ceiba, Honduras.	Daily 11 a.m.-2 p.m. Sun. 11 a.m.-4 p.m. Mon. 7-9 a.m.
YV1RG	6,230	48.15	Valera, Venezuela.	Daily 9 a.m.-12.30 p.m.
OAX4G	6,230	48.15	Lima, Peru.	Daily 10 a.m.-1.30 p.m.
YV6RI	6,210	48.31	Coro, Venezuela.	Irregular.
H1IA	6,185	48.5	Santiago, D.R.	Daily 1.40-4.40 a.m.: 10.40 a.m.-12.40 p.m. Thurs. 9 a.m.-1.30 p.m.
XEXA	6,171	48.61	Mexico City, Mexico.	Daily 10 a.m.-2.30 p.m. Also around 11 p.m.
HJ3ABF	6,170	48.62	Bogota, Colombia.	Daily 10 a.m.-2.15 p.m.
VPB	6,160	48.7	Colombo, Ceylon.	Daily from 9.30 p.m. Suns. 3.30 a.m.
YV5RD	6,160	48.7	Caracas, Venezuela.	Daily 2-5 a.m.: 7 a.m.-1.30 p.m.
CSL	6,150	48.78	Lisbon, Portugal.	Daily 5-10 a.m.: 10-11.30 p.m.
CJRO	6,150	48.78	Winnipeg, Canada.	Daily 7 a.m.-1 p.m.
ZEB	6,150	48.78	Bulawayo, S. Africa.	Sun. 6.30-8 p.m. Wed., Sat. 4.15-6.15 a.m. Tues., Fri. 2 a.m.-3 p.m.
COKG	6,147	48.8	Santiago, Cuba.	Daily 12-1 a.m.: 2.30-4.30 a.m.: 6-7.30 a.m., 1-2 p.m.: 3-5 p.m.
HJ4ABU	6,145	48.8	Perelra, Colombia.	Daily 12.30-3 a.m.: 9.30 a.m.-1 p.m.
W8XK	6,140	48.86	Pittsburgh, Pa., U.S.A.	Relays KDKA: Noon-4 p.m.
HJ4ABD	6,138	48.88	Medellin, Colombia.	Daily 1 a.m.-5 a.m.: 7 a.m.-2 p.m. Mons. 2-5 a.m.: 10 a.m.-2 p.m.
CR7AA	6,137	48.88	Lourenco Marques, Africa.	Daily 1.30-2 a.m.: 3-6.30 a.m.: 2.15-4 p.m.: 7 p.m.-midnight.
HJ1ABB	6,135	48.9	Barranquilla, Colombia.	Daily 2.30-4 a.m.: 7.30 a.m.-1 p.m.
HI5N	6,135	48.9	Santiago, D.R.	Daily 9.40 a.m.-12.10 p.m.
LKL	6,130	48.94	Jeloy, Norway.	Relays Oslo 2-9 a.m.
TGXA	6,130	48.94	Guatemala City, Guatemala.	Irregular.
COCD	6,130	48.94	Habana, Cuba.	Relays CMCD daily 1 a.m.-2 p.m. (Mons. till 1 p.m.).
ZGE	6,130	48.94	Kuala Lumpur, Fed. Malay States.	Sun., Tues. and Fri., 9.40-11.40 p.m.
VE9HX	6,130	48.94	Halifax, Canada.	Relays CHNS: Tues.-Sat. 12 m.-4 a.m., 8 a.m.-2 p.m.: Sat. 4-8 a.m. Sun. and Mon., 12 m.-4 a.m. and 5 a.m.-2 p.m.
VP3BG	6,130	48.94	Georgetown, Br. Gulana.	Daily from 8 a.m.
OAX1A	6,125	48.98	Chiclayo, Peru.	Daily 11 a.m.-2 p.m.
CXA4	6,125	48.98	Montevideo, Uruguay.	Daily 1-3: 5-11 a.m.
HJ3ABX	6,122	49.0	Bogota, Colombia.	Daily 3-5 a.m.: 8.30 a.m.-2 p.m.: Mon. 9 a.m.-2 p.m.
OAX4P	6,122	49.0	Huancayo, Peru.	From 11 a.m.
HPSA	6,122	49.0	Panama City, Panama.	Daily 3-4 a.m.: 11 a.m.-1 p.m.
XEUZ	6,120	49.02	Mexico City, Mexico.	Relays XEFO 4-6 p.m.
W2XE	6,120	49.02	New York, U.S.A.	Relays WABC. Not in use at present.
XEFT	6,120	49.02	Vera Cruz, Mexico.	Relays XETF. Not in use at present: see 9550 kc.
OLR2C	6,115	49.05	Prague, Czecho-Slovakia.	Not in use at present.
GSL	6,110	49.1	Daventry, England.	Not in use at present.
VUC	6,110	49.1	Calcutta, India.	Daily 6-8.30 p.m.: 12.30-3 a.m. Mon. 10.30 p.m.-3 a.m.
XEPW	6,110	49.1	Mexico City, Mexico.	Relays XEJW 2-4 p.m.
HJ4ABB	6,105	49.14	Manizales, Colombia.	Tues.-Sat. 3.15-4 a.m. Mon. 5.30-8 a.m. Wed., Sat.: 10.30 a.m.-1 p.m.
W3XAL	6,100	49.18	Bound Brook, N.J., U.S.A.	Relays WJZ: Daily 11.15 a.m.-3 p.m.
YUA	6,100	49.18	Belgrade, Yugo-Slavia.	Daily 4-9 a.m.: 3.45-5.30 p.m.: 7-11 p.m.
W9XF	6,100	49.18	Chicago, Ill., U.S.A.	Relays WENR: Daily 8-11 a.m.: 3-4 p.m.
ZTJ	6,097	49.2	Johannesburg, S. Africa.	Mon.-Sat. 2.45-3.30 p.m.: and 6.30-10 p.m. and 12 m.-7 a.m. Sun. 11 p.m.-1.15 a.m. (Mon.)
JZH	6,095	49.22	Tokyo, Japan.	Irregular.
HJ4ABE	6,092	49.25	Medellin, Colombia.	Daily 2-3 a.m.: 9 a.m.-1.30 p.m.

"Scout Battery Three" An Outstanding Performer

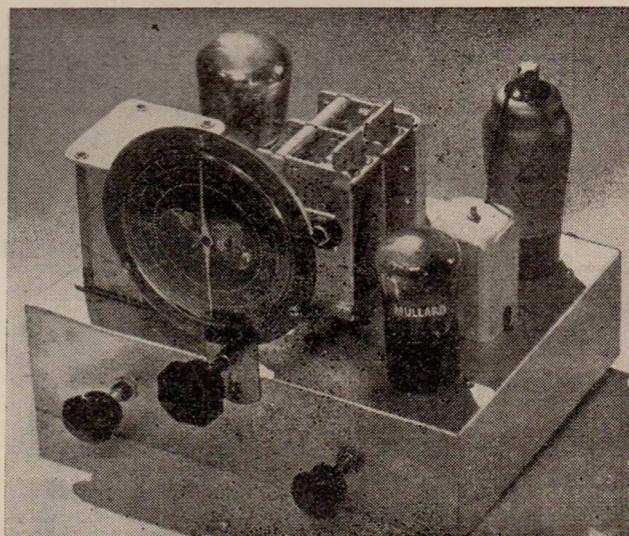
Cheap To Build And Operate : Is
Ideal Small Set For Country Listeners.

ENQUIRIES are constantly coming to hand from readers wanting circuit and design details of a small battery set that is cheap to build and operate, and that will provide full speaker volume from a dozen or so stations.

These requirements are completely fulfilled by the "Scout Battery Three," shown alongside. An ideal set for country listeners who want to get the maximum in radio entertainment at lowest cost, the "Scout" puts up an excellent performance that is actually superior to that given by many of the older four and five-valvers of similar design.

High-gain iron-cored coils, with adjustable selectivity, are used to ensure maximum sensitivity. The r.f. valve is a Mullard VP2 spray-shielded r.f. pentode, the detector a PM2DX, transformer-coupled to a PM22A output pentode, automatic bias being incorporated.

For "sheer" pulling power with a limited number of valves, the "Scout" is outstanding. As well, running costs are particularly light, the "A" drain being under .5 amp. and the "B" between 7 and 8 milliamps.

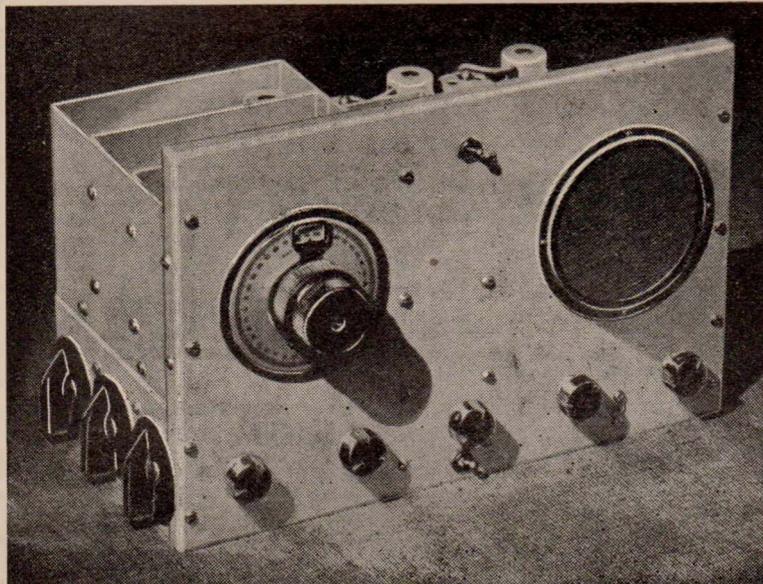


Full constructional details of the "Scout" will be found in the "Radio World" for December, 1936. A limited number of copies of this issue are still available from the "Radio World," 214 George St., Sydney, N.S.W., price 9d., post free.

CALL	K.C.	M.	LOCATION.	SCHEDULE, ETC.
OAX4Z	6,092	49.25	Lima, Peru.	Daily 10 a.m.-1 p.m.
CRCX	6,090	49.26	Ibague, Colombia.	Daily 8.30 a.m.-2.30 p.m. Mon. 8 a.m.-2 p.m.
HJ4ABC	6,090	49.26	Toronto, Canada.	Daily 10 a.m.-3 p.m.
ZBW2	6,090	49.26	Hong Kong, China.	Irregular.
HJ5ABD	6,085	49.3	Call, Colombia.	Daily 3-4.30 a.m., 8.10 a.m.-12.40 p.m.
VQ7LO	6,083	49.31	Nairobi, Kenya, S. Africa.	Mon.-Fri. 8.45-9.15 p.m. Tues.-Sat. 2.30-5.30 a.m. and 11.30 p.m. Sun. 2.30-6.30 a.m. Mon. 2-5 a.m.
ZHJ	6,080	49.34	Penang, Malaya.	Daily (exc. Sun.) 9.40-11.40 p.m. Sun. 2-4 p.m.
CP5	6,080	49.34	La Paz, Bolivia.	Daily 10 a.m.-1.30 p.m.
HP5F	6,080	49.34	Colon, Panama.	Daily 2.45-4.15 a.m.: 10.45 a.m.-1 p.m.
W9XAA	6,080	49.34	Chicago, Ill., U.S.A.	Relays WCFL. Schedule uncertain.
DJM	6,080	49.34	Zeesen, Germany.	Not in use at present.
OER2	6,072	49.41	Vienna, Austria.	Daily Midnight-8 a.m. (9 a.m. Suns.)
YVIRE	6,070	49.42	Maracalbo, Venezuela.	Daily 9 a.m.-2 p.m.
HJ4ABC	6,070	49.42	Pereira, Colombia.	Daily 12-2 a.m.: 10-11 a.m.
VE9CS	6,070	49.42	Vancouver, Canada.	Mons. 4.45 a.m.-12 n., 1.30-4 p.m. Weds. 9-10.30 a.m., 2.30-4.30 p.m. Daily 9-10.30 a.m.
CFRX	6,070	49.42	Toronto, Canada.	Relays CFRB, 9.30 p.m.-2 p.m.
HJ3ABF	6,070	49.42	Bogota, Colombia.	Daily 10 a.m.-2.15 p.m.
VP3MR	6,070	49.42	Georgetown, Br. Gulana.	Daily 7.45-11.45 a.m. Sun. 11 p.m.
HJ4ABL	6,065	49.46	Manizales, Colombia.	Daily 2-3 a.m., 8.30-10.30 a.m. Sun. 8.30 a.m.-1.30 p.m.
SBG	6,065	49.46	Stockholm, Sweden.	4.30-8 a.m.
W8XAL	6,060	49.5	Cincinnati, Ohio, U.S.A.	Relays WLW. Daily 9 p.m.-10 a.m. and 1 p.m.-5 p.m.
W3XAU	6,060	49.5	Philadelphia, Pa., U.S.A.	Relays WCAU. Daily 11 a.m.-2 p.m.
OXY	6,060	49.5	Skamleboæk, Denmark.	Irregular.
GSA	6,050	49.59	Daventry, England.	Not in use at present.
HJ3ABD	6,050	49.59	Bogota, Colombia.	Daily 3-5 a.m.: 10 a.m.-2 p.m. Sun. 8 a.m.-Noon.
HI9B	6,045	49.63	Santiago, D.R.	Irregular 9 a.m.-2 p.m.
HJ1ABG	6,042	49.65	Barranquilla, Colombia.	Daily 2 a.m.-2 p.m. Mon. 2 a.m.-11 a.m.

CALL	KC.	M.	LOCATION	SCHEDULE, ETC.
W4XB	6,040	49.67	Miami, Fla., U.S.A.	Relays WIOD. Schedule uncertain.
W1XAL	6,040	49.67	Boston, Mass., U.S.A.	Usually 9 a.m.-1 p.m.
YDA	6,040	49.67	Tandjongpriok, Java.	Daily 1.30-5 p.m.
HJ4ABP	6,030	49.75	Medellin, Colombia.	Relays HJ4ABQ. Daily 11 a.m.-2 p.m.
HP5B	6,030	49.75	Panama City, Panama.	Daily 3-4 a.m.: 10 a.m.-1.30 p.m.: and at 10 p.m.
VE9CA	6,030	49.75	Calgary, Canada.	Fri. 12 a.m.-5 p.m. Mon. 3 a.m.-3 p.m.
OLR2B	6,030	49.75	Prague, Czecho-Slovakia.	Not in use at present.
HJ1ABJ	6,025	49.79	Sta. Marta, Colombia.	Daily (exc. Thurs.) 8.30 a.m.-1.30 p.m.
DJC	6,020	49.83	Zeesen, Germany.	Daily 2.30-7.30 a.m.
XEUW	6,020	49.83	Vera Cruz, Mexico.	Daily 11 a.m.-3.30 p.m.
ZHI	6,018	49.85	Singapore, Malaya.	Mon., Wed., Thurs., 8.40-11.10 p.m. Sun. 1.40-4.40 p.m.
HISU	6,015	49.88	Santiago, D.R.	Daily 3-5 a.m.: 8-10 a.m.: 11 a.m.-12.30 p.m.: 10.30 p.m.-12 m.
HJ3ABH	6,012	49.91	Bogota, Colombia.	Daily 9 a.m.-2 p.m. Mon. 3-5 a.m. and 7 a.m.-2 p.m.
COCO	6,010	49.92	Habana, Cuba.	Daily 10.55 p.m.-3 p.m.
	6,007	49.94	Rangoon, Burma.	Around midnight.
HP5K	6,005	49.96	Colon, Panama.	Daily 2.30-4 a.m.: 9 a.m.-2 p.m.: 10 p.m.-12 mid.
CFCX	6,005	49.96	Montreal, Canada.	Relays CFCF. Daily 9.45 p.m.-3 p.m. Sun. 11 p.m.-Mon. 1.15 p.m.
VE9DN	6,005	49.96	Drummondville, Canada.	Sundays 2-5 p.m.
VK9MI	6,003	49.98	S.S. "Kanimbla".	Irregular around 9 p.m.
HJ1ABC	6,000	50.0	Quibdo, Colombia.	Daily 8-9 a.m. Mon. Noon-2 p.m.
RV59	6,000	50.0	Moscow, U.S.S.R.	Not in use at present.
(FIQA)	6,000	50.0	Tananarive, Madagascar.	Daily 1.45-2.30 a.m.
ZEA	6,000	50.0	Sallsbury, Rhodesia, S.A.	Daily 11 a.m.-2.30 p.m.
XEBT	5,990	50.08	Mexico City, Mexico.	Daily 11 p.m.-4 p.m.
HJ2ABD	5,988	50.1	Bucaramanga, Colombia.	Daily 2.30-3.30 a.m.: 9 a.m.-1 p.m.
HJ4ABD	5,970	50.26	Medellin, Colombia.	11 a.m.-2.30 p.m. daily.
HVJ	5,968	50.27	Vatican City, Italy.	Daily 5-5.15 a.m. Sun. 8-8.30 p.m.
HJN	5,950	50.42	Bogota, Colombia.	Daily 9 a.m.-2 p.m.
TG2X	5,940	50.5	Guatemala City, Guatemala.	Daily 7-9 a.m.: Noon-2 p.m.: Sun. 5-8 p.m.
VV1RL	5,930	50.59	Maracaibo, Venezuela.	
YV4RP	5,917	50.71	Valencia, Venezuela.	Irregular.
HH2S	5,915	50.72	Port au Prince, Haiti.	Daily 10 a.m.-12.45 p.m.
ZNB	5,900	50.84	Mafeking, Bechuanaland, S.A.	4-5.30 a.m.
TIMS	5,900	50.84	Puntarenas, Costa Rica.	Daily 9 a.m.-1 p.m.
YV3RA	5,898	50.86	Barquisimeto, Venezuela.	Daily 3-4 a.m.: 9 a.m.-1 p.m.
(F3ICD)	5,890	50.93	Saigon, French Indo-China.	Daily 2-4 p.m.: 8.30 p.m.-midnight.
JIC	5,890	50.93	Taihoku, Formosa.	Around 9 p.m.
HCK	5,885	50.98	Quito, Ecuador.	Daily 11 a.m.-2 p.m.
IUA	5,880	51.02	Addis Ababa, Ethiopia.	Irregular.
HRN	5,875	51.06	Tegucigalpa, Honduras.	Daily 4.15-5.15 a.m.: 11.30 a.m.-2 p.m. Mon. 6.30-8.30 a.m.: 11.30 a.m.-12.30 p.m.
H11J	5,865	51.15	San Pedro de Macoris D.R.	Daily 3-5 a.m.: 9.30 a.m.-12 n.
YV1RB	5,850	51.28	Maracaibo, Venezuela.	Daily 2.15-3.15 a.m.: 7.45 a.m.-1 p.m.: 11.45 p.m.-12.45 a.m.
TIGPH	5,830	51.46	San Jose, Costa Rica.	Relays TIX. Mons. 2.45-3.45 a.m. Daily 2-4 a.m.: 9 a.m.-noon.
TDD	5,830	51.46	Shinkyoo, Manchukuo.	Around 9 p.m.
YV5RC	5,800	51.72	Caracas, Venezuela.	Sun. 11.30 p.m.-1.30 p.m. (Mon.). Daily 1.45-4.30 a.m.: 7 a.m.-12.30 p.m.: 10-11 p.m.
JVU	5,790	51.81	Nazaki, Japan.	Irregular.
OAX4D	5,780	51.9	Lima, Peru.	Tues., Thurs., Sun., 12-2.30 a.m.
HJ4ABD	5,780	51.9	Medellin, Colombia.	Daily 1-5 a.m., 7 a.m.-2 p.m. Mons. 2-5 a.m.: 10 a.m.-2 p.m.
YNOP	5,758	52.11	Managua, Nicaragua.	Daily 11 p.m.-12.30 a.m.
HC1PM	5,725	52.4	Quito, Ecuador.	Weds.: Noon-2 p.m.
YV2RB	5,720	52.45	San Cristobal, Venezuela.	Daily 9 a.m.-2.30 p.m.
TGS	5,713	52.51	Guatemala City, Guatemala.	Thurs., Fri., Mon., 9 a.m.-Noon.
T15HH	5,500	54.55	San Ramon, Costa Rica.	Irregular: 6.30 a.m.: 11 a.m.
PMY	5,145	58.31	Bandoeng, Java, D.E.I.	Daily 8.30 p.m.-2 a.m.
TFL	5,000	60.0	Reykjavik, Iceland.	Irregular: Also phones London.
YDE2	4,810	62.87	Solo, D.E.I.	Daily 8.30 p.m.-2 a.m.
VE9BK	4,790	62.83	Vancouver, Canada.	Daily (exc. Mon.) 2.30-2.45 a.m., 6-6.15 a.m. and 11-11.15 a.m.
HC2ET	4,600	65.22	Guayaquil, Ecuador.	Thurs., Sun., 12.15 p.m.-2 p.m.
RV15	4,250	70.4	Khabarovsk, U.S.S.R.	Daily 4 p.m.-1 a.m.
HCJB	4,107	73.05	Quito, Ecuador.	Daily 3-5 a.m., 9 a.m.-1 p.m.
CT2AJ	4,002	74.95	Ponta Delgada, Azores.	Thurs., Sun., 8-10 a.m.
HCK	3,750	80.0	Quito, Ecuador.	Tues. 11.30 a.m.
YDA7	3,270	91.74	Pekalongan, D.E.I.	
YDE4	3,158	95.0	Soerabaya, D.E.I.	
YDA	3,040	98.68	Tandjongpriok, D.E.I.	Daily 9-10.30 a.m.: 8.30 p.m.-1 a.m. Sun. 8.30 p.m.-1 a.m., only.

Battery Amateur Communications Superhet



Full constructional details are given in this article of the seven valve battery communications superhet described in last month's issue. Exceptionally powerful and highly selective, it is the ideal receiver for the country amateur.

Left: The completed receiver. The three band-setters are located along the left-hand wall of the chassis. The five lower panel controls are (left to right) r.f. regeneration, i.f. gain, b.f.o. pitch control, audio gain, and tone control. The two toggle switches are, upper, main on/off, lower, b.f.o. on/off.

LAST month the circuit was published of a seven-valve battery amateur communications type superhet, design features and performance figures being covered in an accompanying article. This battery version of the eight-valve receiver described in the June and July issues of the "Radio World," possesses the same attractive features, among which can be listed the following:—

(1) Continuous band coverage from 9 to 120 metres.

(2) Band spread is provided, for simple tuning on the amateur bands.

(3) Tuned r.f. stage, providing image suppression and ensuring good signal-to-noise ratio.

(4) Electron-coupled regeneration applied to r.f. stage, giving greatly improved sensitivity and selectivity.

(5) Additional 30 paralleling triode section of 1C6, giving greatly improved performance on highest frequencies.

(6) High gain i.f. amplifier using iron-cored intermediates for greatest selectivity.

A plan view of the completed receiver. The three compartments on the left house the oscillator, r.f., and aerial tuning circuits (front to rear), the auxiliary type 30 oscillator being located in the front compartment. This is required primarily to give more efficient operation on the 10-metre band. On others it can be removed if desired to conserve battery current. The centre compartment houses the 30 beat frequency oscillator with its associated coil.

(7) I.f. and a.f. gain controls.

(8) Anode bend detector, giving greater sensitivity and less damping on preceding intermediate than diode.

(9) Separate b.f.o. unit, with control for varying pitch of beat note.

(10) Tone control, with combined on/off switch for cutting in .00025 mfd. audio coupling condenser to reduce low frequency interference for c.w. reception of 1,000 cycle note.

(11) Provision for 'phones or speaker, latter being automatically silenced when 'phones are plugged in.

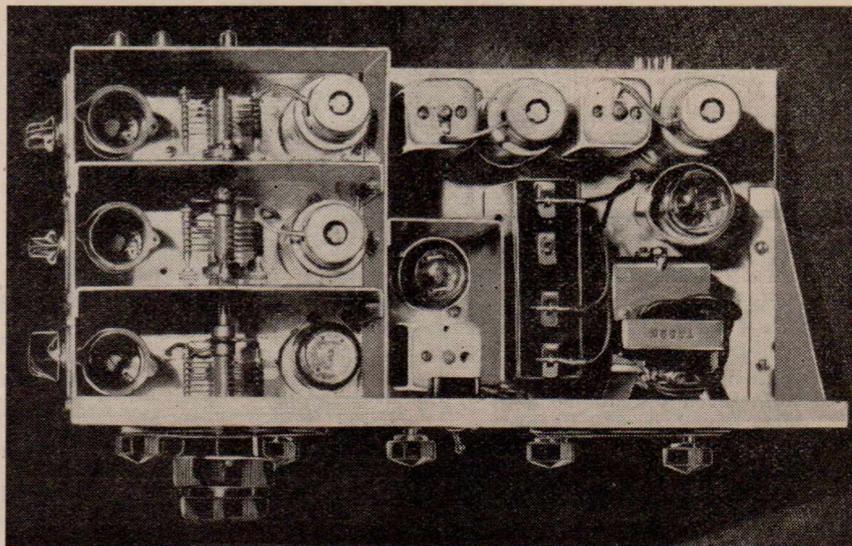
Standard Parts Used Throughout

The parts required (listed in a panel elsewhere) are standard

throughout, and builders should have no difficulty in duplicating them.

The capacity of the three band-setters located underneath the chassis is given in the circuit as 180 mmfd. Condensers of this capacity are available in the Raymart and Polar makes, while another brand of condenser that is ideal for the job is the Eddystone "Scientific" 192 mmfd. type. The coils used in the original model, incidentally, comprise a special Rayway kit manufactured by Standardised Products.

The most difficult part of the construction—that of assembling the chassis, panel, nine partitions and separate bracket for the front panel—is tackled first. A mechanically



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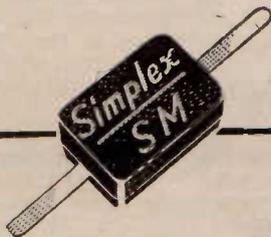
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Type P/T (Pigtails) measuring only $\frac{3}{8}$ in. by $\frac{3}{8}$ in. — capacity range .000005 microfarads to .001 microfarads.

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AGENTS IN ALL STATES.

Amateur Battery Communications Receiver.—List of Parts

- 1—16-gauge aluminium chassis, front panel and shield partitions as per sketches.
- 3—35-mmfd. isolantite midget variable condensers (Raymart, Radiokes).
- 3—180-mmfd. isolantite midget variable condensers (Raymart).
- 1—3-plate midget variable condenser (Radiokes).
- 1—beat-frequency oscillator coil unit (Radiokes).
- 2—iron-cored 465 k.c. i.f. transformers (Radiokes).
- 3—1 meg. potentiometers (Microhm, E.T.C.).
- 1—.5 meg potentiometers (Microhm, E.T.C.).
- 1—vernier dial, panel mounting type (Eddy-stone).
- 1—double circuit 'phone jack (Igranic).
- 3—0-180 degree indicator plates, 2in. diameter.
- 3—pointers to suit.
- 6—small rubber grommets.
- 5—black knobs.
- 4—4-pin, 1—5-pin, 2—6-pin wafer sockets.
- 2—4-pin, 1—5-pin isolantite sockets for coils (Amphenol).
- 1—coil kit wound to specifications (Rayway).
- 3—terminals, 2 red, 1 black.
- 1—single-pole double-throw toggle switch.
- 1—double-pole, double-throw toggle switch.
- 5—valve shields.
- 1—honeycomb r.f. choke.
- 1—r.f.c. with 120 turns 30 s.w.g., s.s.e. on 3in. former (closewound).
- 1—5-pin power socket and plug.
- 1—length 5-wire battery cable.
- 2—couplers.
- FIXED RESISTORS :**
- 2—2,000 ohm 1-watt carbon (E.T.C.)
- 1—20,000 ohm 1-watt carbon (E.T.C.)
- 3—50,000 ohm 1-watt carbon (E.T.C.)
- 1—60,000 ohm 1-watt carbon (E.T.C.)
- 1—100,000 ohm 1-watt carbon (E.T.C.)
- 2—.25 megohm 1-watt carbon (E.T.C.)
- 1—1 megohm 1-watt carbon (E.T.C.)
- FIXED CONDENSERS :**
- 4—.0001 mfd. midget mica (Simplex, E.T.C.)
- 1—.00025 mfd. midget mica (Simplex, E.T.C.)
- 8—.1 mfd. tubular (E.T.C.)
- 3—.05 mfd. tubular (E.T.C.)
- 1—.25 mfd. tubular (E.T.C.)
- 1—.5 mfd tubular (E.T.C.)
- VALVES :**
- 2—1C4's, 1—1C6, 1—1K4, 2—30's, 1—1D4 (Radiotron, Ken-Rad, Mullard, Raytheon, Philips)
- SPEAKER :**
- 1—5-inch permanent magnet speaker to match single pentode (Rola, Amplion).
- MISCELLANEOUS :**
- 4 doz. 3in. nuts and bolts; 2 doz. solder tags; 3 yds. 16-gauge tinned copper wire; hook-up wire (solid and flexible).

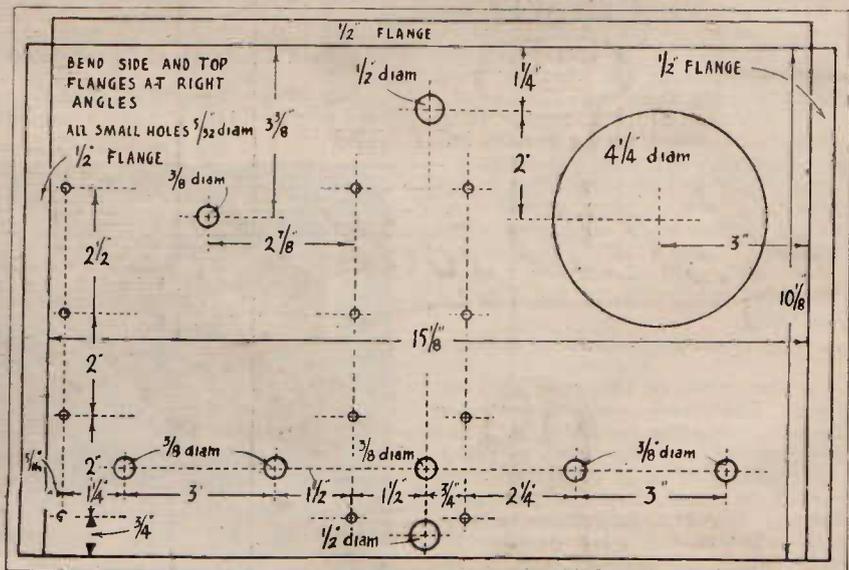
rigid assembly is particularly important, and to ensure this, the front panel and all partitions should be fitted and bolted in place before the task of mounting the chassis components is commenced.

The partitions and panel can then be removed and the valve sockets (with valve shield bases where required), aerial and earth terminals, and 'phone jack mounted on the chassis. In the photographs, the last-named component is shown mounted on the front panel, but as this spoils the symmetry to some extent, pro-

vision has been made for it (see sketch showing chassis dimensions) half-way along the right-hand wall of the chassis.

Continuing The Assembly

With the parts named above mounted in position, the filament wiring can be completed. Next, the three-sided partitions enclosing the coils and first three valves can be bolted in place, together with the two inter-coil shields that also serve as supports for the band-spreading condensers.

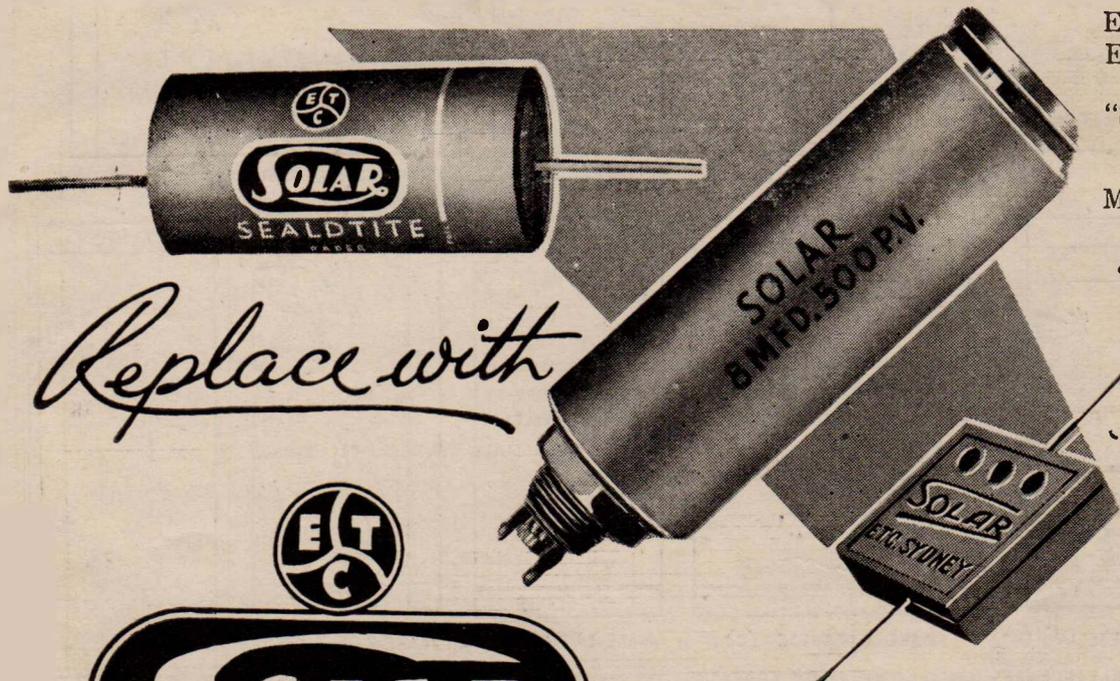


This sketch gives full dimensions for stamping and drilling the 16-gauge frosted aluminium front panel. In the original model the 'phone jack is located on the front panel, but a better position is on the right wall of the chassis. Hence provision has been made for it there in the sketch showing chassis dimensions.

Actually improved

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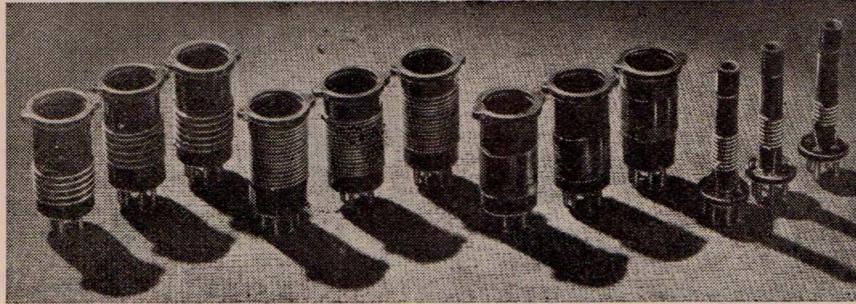
E.T.C. SOLAR
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The Rayway coil kit for the "Battery Communications Seven" consists of four sets of three coils, covering the 10, 20, 40 and 80-metre amateur bands. The 10-metre coils are shown on the right.

Leads can now be soldered to the rotor and stator lugs on the three band-spreaders, and the latter mounted and ganged with the aid of couplers. It is particularly important that these condensers should be in perfect alignment, so that there will be no undue drag on the dial movement. Any sticking in the bearings will result in dial-slipping, among other troubles.

The next components to mount are the band-setters, with scales and pointers, b.f.o. coil and shield, i.f. transformers, and the bracket for the bias battery. The front panel can be mounted next, together with the tri-

angular support bracket on the right, and then the six lower front panel controls can be locked in place. These are (left to right):—r.f. regeneration, i.f. gain, b.f.o. pitch control with b.f.o. on/off switch below, audio volume control, and tone control. The toggle switch at the centre top of the panel is the double-pole double-throw on/off switch in the "B—" "A+" leads.

Completing The Wiring

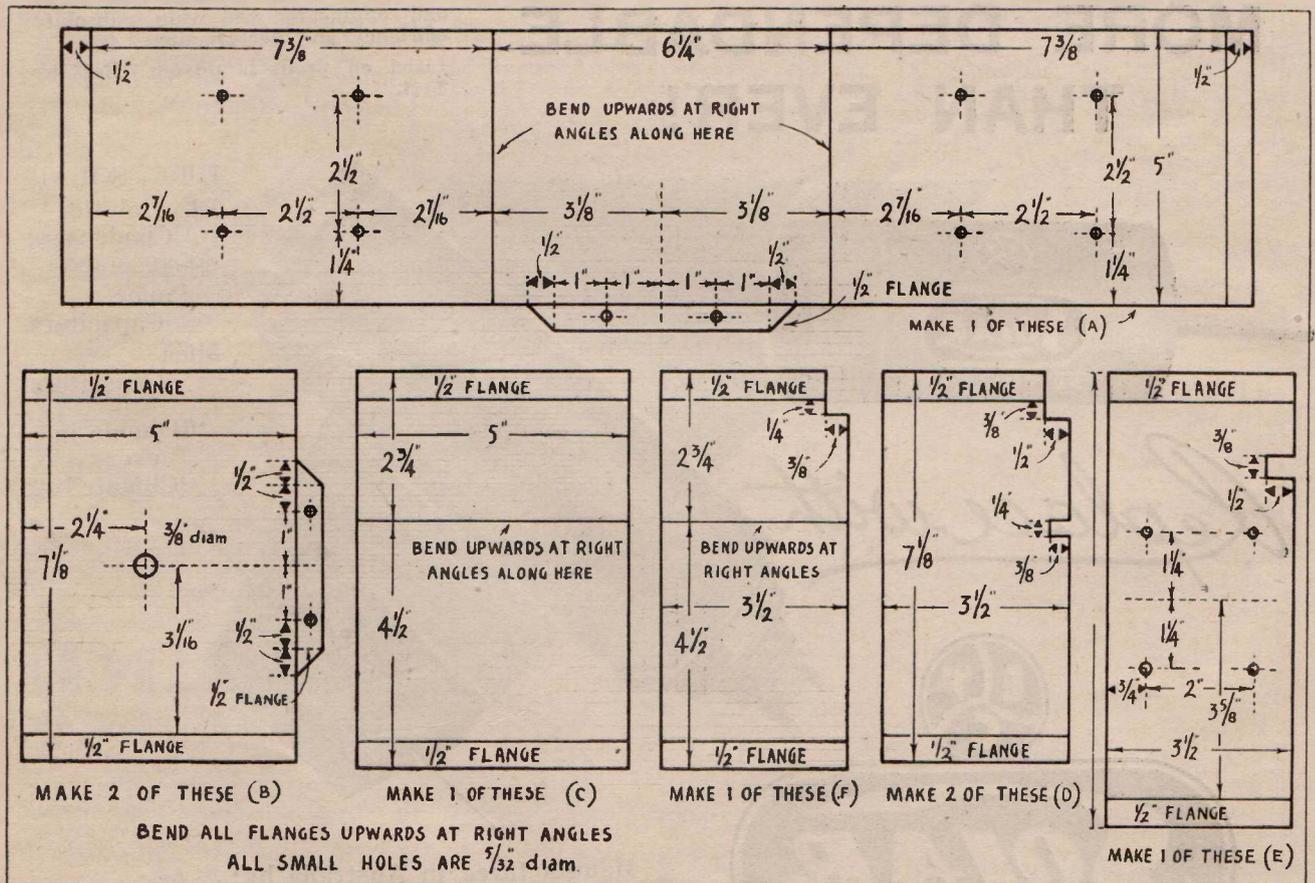
The chassis is now inverted and the wiring put in systematically, commencing at the aerial terminal and working through to the output

jack. When wiring the tuner portion of the set, keep in mind the fact that the five partitions shown in the under-chassis photograph have to be bolted in place later on. Where leads have to be taken through a partition, a small notch is filed in the latter to permit them to pass.

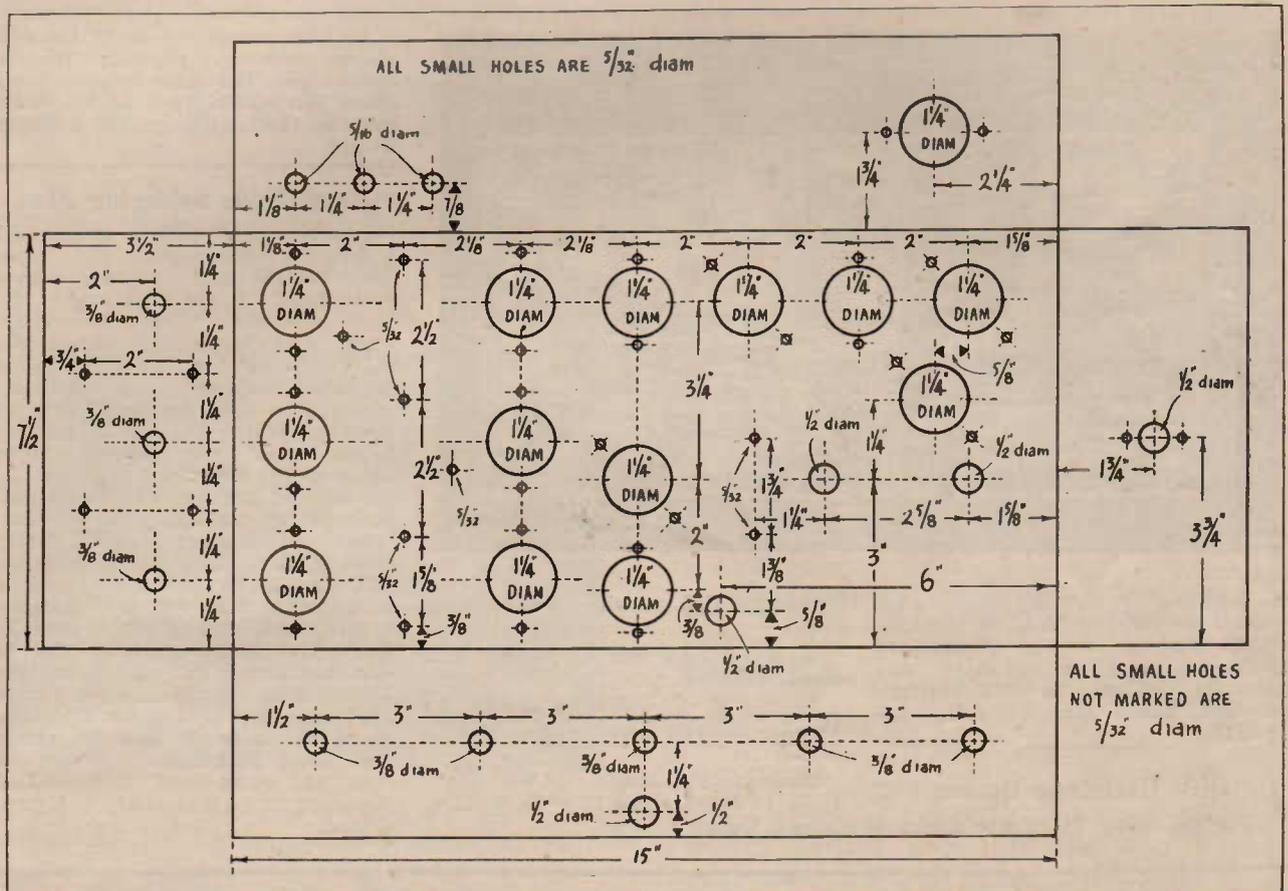
The 5 mmfd. coupling condenser from the plate of the 30 b.f.o. to the control grid of the 1K4 is formed by twisting two flex leads together several times (one lead from each point identified above).

Rigid Wiring Is Essential

Particular attention should be paid to keeping all wiring rigid, especially that associated with the r.f. and mixer-oscillator circuits. As well, following completion of the construction and before the valves are plugged in and the batteries connected, every-



Dimensions for the eight partitions required are given in these sketches, the location of each partition being indicated on a key diagram published opposite.

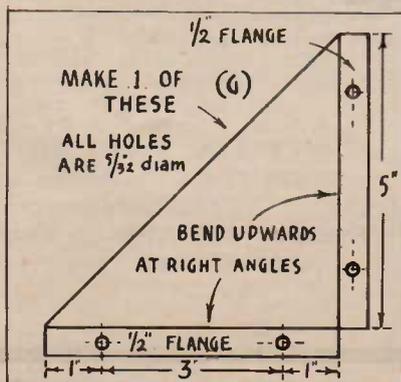


Dimensions for stamping and drilling the 18-gauge aluminium chassis are given above.

thing should be thoroughly checked over to ensure there are no mistakes.

Battery Requirements Outlined

The battery requirements for this receiver are a 2-volt accumulator, three 45-volt dry batteries, and a 4.5 volt "C" battery. The "A" drain with all seven valves in operation is .84 amp., and so a battery such as the Clyde 2VC11, with a capacity of 110 ampere hours, will give over 120 hours of service from a single charge.

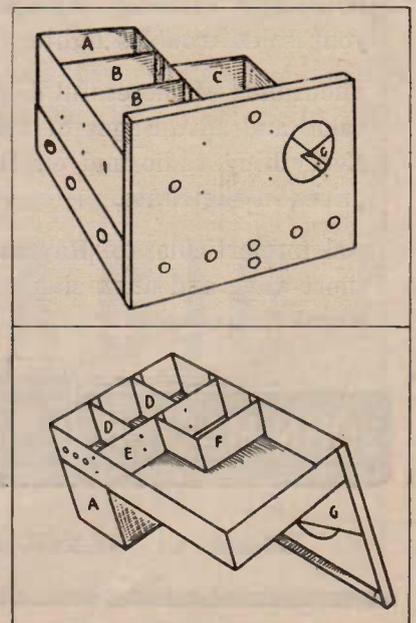


The maximum "B" drain (which, incidentally, will seldom be taken) is 19.5 m.a., and so a set of three Ever-Ready Superdyne "B's" are recommended for most economical operation.

An Excellent Performer

Tests made in the Amalgamated Wireless Valve Co.'s laboratory have proved the "Battery Communications Seven" to be an exceptionally fine performer. Sensitivity is excellent, while selectivity is particularly high—approaching that given by a crystal filter. For this reason, builders will find a little practice in operating the set is necessary before the maximum in DX can be obtained. The method of adjusting the band-

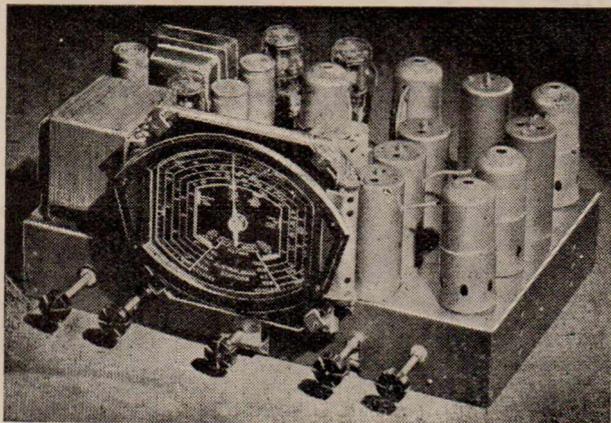
set condensers on ten metres, where there is a tendency towards interlocking in the converter stage, was



The sketch on the left gives dimensions of the right-angled bracket required for locking the right-hand edge of the front panel to the chassis. On the right is a key diagram showing the location of the various partitions.

AN INVITATION

to all Sydney Set Builders



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cordially invited to call in and hear this newest and most sensational development in the de luxe receiver field.

Call in or write for our quote and list of parts for the complete kit or completed receiver, assembled and tested.

"A.C. EMPIRE ALL-WAVE THREE"

The "A.C. Empire All-Wave Three," complete with power pack and amplifier unit, as described this month, is the ideal receiver for the DX fan. A wonderful distance-getter, it tunes from 12 to 600 metres using a standard two-gang condenser. Write for our detailed list of parts and prices; everything guaranteed exactly as specified.

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Eight-Valve T.R.F. Receiver Gives High Quality Output . .

THE circuit shown below of an eight-valve t.r.f. receiver, incorporating the seven-watt high-fidelity amplifier used in the "De Luxe Fidelity Eight" (described in the "Radio World" for November and December) is reproduced, together with the following article, from "Radiotronics" No. 82, published by Amalgamated Wireless Valve Co. Pty. Ltd.

The problem of the design of a fidelity receiver is a very difficult one. The audio amplifier is very much more simple than the radio tuner, and in recent issues of "Radiotronics" there have been described several amplifiers giving a high quality output and which could well be applied to a radio receiver giving a correspondingly high quality output. [The circuits referred to have been reproduced in recent issues of "Radio World."—Ed.]

Main Difficulties Outlined

The principal difficulties as regards quality in a radio tuner are, firstly, the reduction of harmonic distortion, and, secondly, the reduction of side band attenuation. This second problem is related to the selectivity of the receiver and a very serious problem is thereby introduced. The response given by ordinary tuned circuits is not the best type of response for a combination of good audio frequency response and good selectivity.

The simplest form of quality receiver is obviously the "tuned radio frequency" type. Many attempts

The many set-builders who concentrate mainly on obtaining high-quality reproduction from local stations and pick-up will be interested in the following article describing an eight-valve t.r.f. receiver capable of delivering seven watts of high quality audio output to the speaker.

have been made at producing fidelity receivers of this type, and satisfactory results may be obtained with a simple construction. At the same time, it must be realised that the results given by a receiver of this type are not by any means ideal, since the response at the higher frequencies is unavoidably attenuated, and since the selectivity is extremely poor.

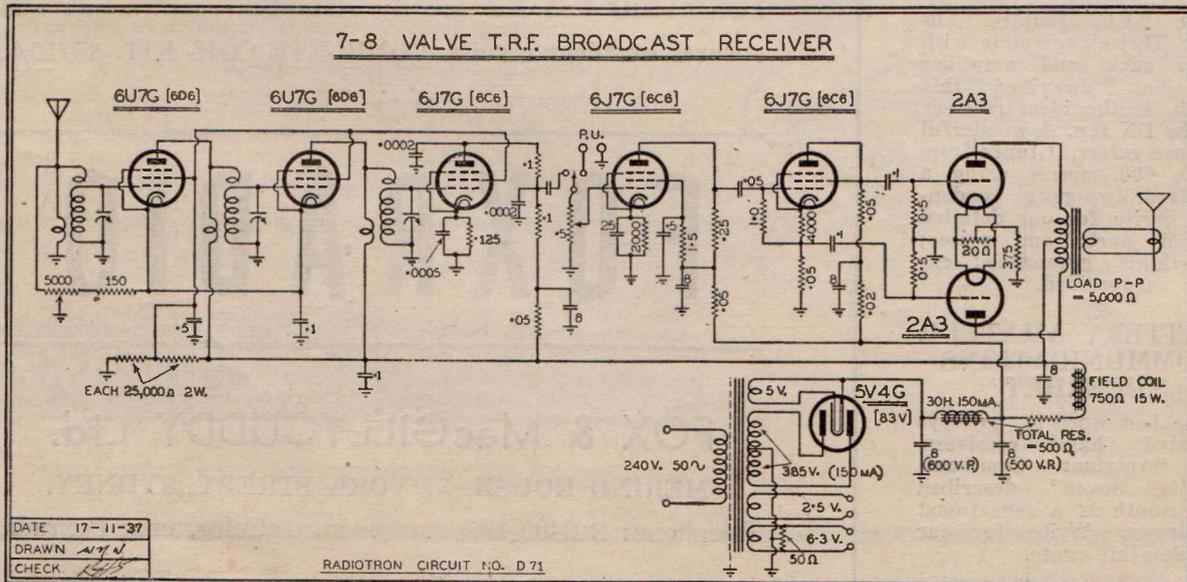
Wave-Trap May Be Necessary

It must be realised that a receiver of this nature, although sufficiently sensitive to give good reception of inter-state stations, is not selective enough to prevent interference even in some cases between local stations of equal strength. If a design of this type is used, it may be necessary to employ a wave-trap in the aerial circuit so as to reduce the strength of the strongest local stations to a more satisfactory level. Even with this addition there are cases when a receiver of this type will not give sufficient selectivity to separate local stations. The application of such a receiver is therefore limited to lo-

calities in which the problem of selectivity is not acute.

On the other hand, there are localities where a receiver of this type may be employed to give reasonably satisfactory reception from local stations, together with good quality. At some later date it is hoped to describe a superheterodyne receiver employing an improved form of "flat top" response with good selectivity. A receiver of this type is necessarily expensive, but the contrast with the t.r.f. type is an interesting one, and the problems involved are of interest to all.

Two stages of t.r.f. were decided upon for this receiver, since less than this number would not provide sufficient selectivity and more would add to the cost and necessitate a 4-gang tuning condenser. One advantage of this type of receiver is that there should be no whistles on any part of the band. A difficulty with this type of receiver is that the sensitivity and selectivity tend to vary very considerably over the band, so that the selectivity on the higher



frequencies is not sufficient for many requirements and the sensitivity at the low frequency end of the band is poor.

High Impedance Primaries Recommended

A distinct improvement in these conditions may be made by the employment of high impedance primary coils, together with a suitably small capacity coupling as employed in a number of the best r.f. coils. By the use of coils of this nature, a reasonably constant selectivity and sensitivity may be obtained over the broadcast band.

In order to improve the selectivity of the tuner, a high impedance "reflex detector" was chosen in preference to a diode detector. The distortion given by this form of detection is very small indeed, and for most purposes it may be completely neglected.

Old Favourite In New Guise

A reflex detector is really an ordinary anode bend detector in which degeneration is applied to reduce the harmonic distortion. The degree of degeneration can be controlled by the arrangement of load in the cathode or plate circuits. With complete degeneration a gain of less than unity is obtained, but with the constants as given in this circuit, a useful gain is obtained while still keeping the distortion to a very low factor.

The reflex detector has the advantages of the anode bend detector in a high input resistance and the capability of handling a reasonably high grid swing. This form of detection cannot be used with a.v.c. unless the a.v.c. is obtained from an entirely separate valve.

We thus have a tuner consisting of two r.f. stages each using Radiotron type 6U7G and a reflex detector using type 6J7G. The coils required will be one aerial coil and two standard r.f. coils of the types mentioned. The details of the receiver are shown in the circuit diagram.

7-Watt High Fidelity Amplifier

Although a number of audio amplifiers could be employed with this tuner, it was decided to combine the tuner with the seven-watt push pull 2A3 amplifier (Radiotron Circuit A115), described first in "Radio-technics 77." This amplifier is sufficiently sensitive to operate from a pick-up, and provides sufficient output for a reasonable margin of power from any loudspeaker operating under home conditions. The quality of the amplifier is extremely high, and the whole receiver gives distortion which, when checked on a cathode-ray oscillograph, is barely noticeable under any conditions. It may therefore be regarded as a receiver of good quality as regards harmonic distortion.

The frequency response of this tuner drops by 6 db. at 10,000 cycles,

due to sideband attenuation, although due to the rising response of the loud-speaker at the higher audio frequencies, the overall response is still above zero reference level up to 5,000 cycles. The high frequency response may therefore be regarded as quite satisfactory, although not quite so good as would be obtained by a "flat top" resonance curve. The bandwidth is 170 k.c. at 1,000 times and the sensitivity 30 micro-volts at a frequency of 1,000 k.c.

The construction of this receiver is very simple indeed, and it should supply the demand for a local station receiver at cheap cost. It is not regarded as being in any way a receiver suitable for the reception of more than the local stations.

No a.v.c. has been adopted in this receiver, since its inclusion would increase the cost without conferring any appreciable advantages. It would also seriously affect the selectivity of the receiver, since with the "reflex detector" the impedance is very high, while with a diode used either for signal rectification or for a.v.c., the damping would be sufficiently serious to necessitate an additional r.f. stage to be used to obtain reasonable selectivity.

Two Gain Controls Necessary

Due to the omission of a.v.c., it is necessary to have two gain controls. The first of these takes the form of a variable cathode resistor for the two r.f. stages, and this should be adjusted so that the input to the reflex detector is sufficiently high to reduce the distortion, while, at the same time, not sufficiently high to cause overloading. It should be controlled according to the strength of the station being received, and its setting bears no relation whatever to the volume provided by the loudspeaker.

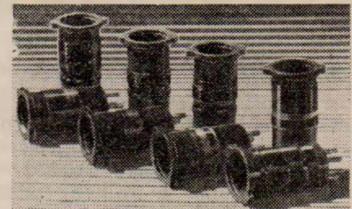
In other words, this r.f. control replaces a.v.c., and it should be adjusted so that the output from each station is as nearly as possible at the optimum level for the reflex detector. This introduces one of the difficulties of such a receiver, and the responsibility for its correct adjustment must rest with the user.

A second gain control is in the grid circuit of the first audio stage, and may also be used when the amplifier is used with a pick-up. This audio control should be adjusted to suit the audio level required from the loudspeaker. There are these two controls to be adjusted, the r.f. control being in accordance with the strength of carrier being received, and the audio control in accordance with the volume required from the loudspeaker. A correct adjustment of these two in relation to each other and to the conditions of reception will be well repaid.

Use RAYWAY Coils for "R9+" Results

You cannot expect 100 per cent. peak performance using coils that are only 40 per cent. efficient. Crudely-wound coils on "moulded mud" formers MUST bring disappointing results, particularly on the short waves, where one indifferent component can mean tremendous loss in signal strength. Wire gauge, turns, spacing, connections, former material . . . every detail must be scientifically planned if the last ounce of DX is to be obtained.

That is why, when building any "Radio World" receiver using plug-in coils, you should INSIST on the special RAYWAY coils as specified and used by the Editor. Follow the designer's lead and ensure that you will duplicate his results.



Illustrated above is the RAYWAY coil kit used in the original A.C. "Empire All-Wave Three." Comprises four pairs of coils, guaranteed wound exactly to specifications . . . £1/17/6

A special kit of coils is also available for the "Battery Amateur Communications Superhet" described this month. Wound exactly to specifications, £3/15/-

Complete coil kits are available for any of the following "Radio World" shortwave and all-wave receivers:—

- "All-Wave All-World Two"
- "Eaglet Shortwave Two"
- "Empire Shortwave Three"
- "All-Wave Bandspread Two"
- "Empire All-Wave Three"
- "Amateur Communications Eight"
- "Jones' Super-Gainer"

If unobtainable from your local dealer, write direct to:—

Standardised Products

Note new address:—

629 PARRAMATTA ROAD,
LEICHHARDT, SYDNEY.
N.S.W.

'Phone - - - LM 5957

National Field Day An Enjoyable Outing



Operating tent VK2LR, on the occasion of the National Field Day on December 5.

THE occasion of the National Field Day organised by the Wireless Institute of Australia on December 4 and 5 proved generally successful as far as Lakemba Radio Club was concerned, although VK-2LR's actual point score did not nearly reach members' expectations.

In choosing the site for the club camp, attention had to be paid to the social as well as the technical side. The camp had to be situated at a quiet spot near a railway station, with plenty of fresh water and swimming facilities available. A site at Macquarie Fields was chosen, and the apparatus put into operation by 6 p.m. on the Saturday.

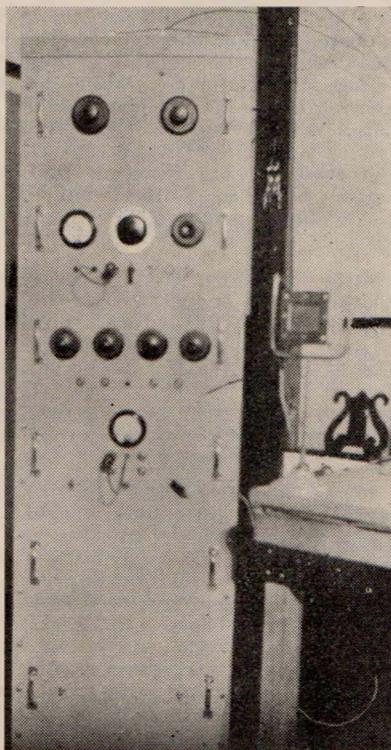
Three transmitters and receivers were installed in the operating tent, with one genemotor and necessary change-over switches for power and aeriels. Three operators were on duty, each listening on a different band. The moment a suitable signal was heard, the operator would call for power, put his apparatus into operation, and endeavour to QSO the station, while the others stood by. Obviously, only one transmitter was in operation at the one time. Each operator was allotted a two-hour shift, after which he could enjoy himself as he wished.

Conditions on 20 and 40 metres did not appear to be very good, static being fairly heavy on Saturday night, due to a heavy thunderstorm in the afternoon. When contacts were made, however, reports were most satisfactory. Those operators who were off duty and were trying to get a little sleep could quite easily copy certain DX signals 20 yards away through the headphones of the operator on duty.

Incidentally, it may interest the technical staff of the "Radio World"

to know that the following apparatus was included in the camp gear:—The "Battery Amateur Communications Superhet" (Dec. "R.W."); "1937 Empire All-Wave Three" (May and June "R.W."); "1937 Outdoor Portable" for broadcast reception (Nov. and Dec. "R.W."); and the "Multi-Band C.C. Transmitter" (Aug. "R.W.").

The week-end was acclaimed by the



VK2MH's transmitter, with which he has obtained W.A.C. on both 'phone and key.

"Radio World" Receivers In Camp ★ Electrical Installations Now Being Inspected ★ Lakemba Radio Club Notes . . .

By W.J.P.

22 present as a great success, and it is anticipated that the occasion of the next W.I.A. National Field Day will be even better attended.

★

Electrical Installations Now Being Inspected

A few months ago reference was made in these notes to the new radio installation regulations and the possibility of their enforcement.

It may be of interest to readers to know that inspectors are now operating in various district around Sydney, making an inspection of the electrical installations, fittings and associated apparatus. Installations and apparatus which are not up to requirements are being condemned, it being necessary to have the faults rectified within a certain period, when a further inspection is made.

One of the most common abuses of the regulations to which exception is being taken appears to be the use of long flex leads, where it is found that the radio set, say in the lounge room, is run off the power point in the kitchen, with the flex neatly tacked around the skirting boards and picture rails.

This action of the electricity authorities is being adopted following a number of recent fatalities from electric shocks.

★

VK2MH Has W.A.C. On 'Phone And C.W.

The accompanying photo shows the transmitter of VK2MH, owned and operated by Laurie Sinclair, of Hurlstone Park, N.S.W. Transmitting most of the time on 20 metres, the rig comprises three stages of r.f., namely, 6A6 crystal oscillator

doubler, 6L6 20-metre doubler, and a 210 in the final amplifier.

Two antenna systems are utilised, one being two half waves in phase directed to U.S.A. and the other a full-wave voltage-fed Zepp, the latter used for better all-round radiation. Three masts are used for supporting all antennas, one 55' high and the other two 30' high.

The modulator stage consists of two 42's in class AB pentodes, preceded by a 42 driver and two stages of speech amplification by 6C6's. The microphone is a Reiss, home constructed.

Owing to severe QRM caused by several local stations operating on 20 metres, the choice of a suitable receiver has resulted in the operator using an eight-valve superhet with iron-cored intermediates. Although the location is excellent, reception is often marred by QRM from motor-buses running alongside the station, but despite these difficulties, VK2MH has W.A.C. on both 'phone and c.w.

Bifrost Resistors Made In Gas-Fired Furnace

High, evenly-distributed temperatures with a controlled atmosphere are imperative for the successful manufacture of high-grade, carbon-centred resistors, porcelain-covered resistances used for radio receivers, earth leakage relays for electrical installations, and other exacting requirements which call for unchanged resistance characteristics despite the effects of overload currents.

Mr. W. J. Mills, of 187 Catherine Street, Leichhardt, is a pioneer in the production of this type of resistance in Australia, and with the collaboration of the engineering staff of the Australian Gas Light Company he has installed a gas-fired saggur furnace to fire Bifrost resistors.

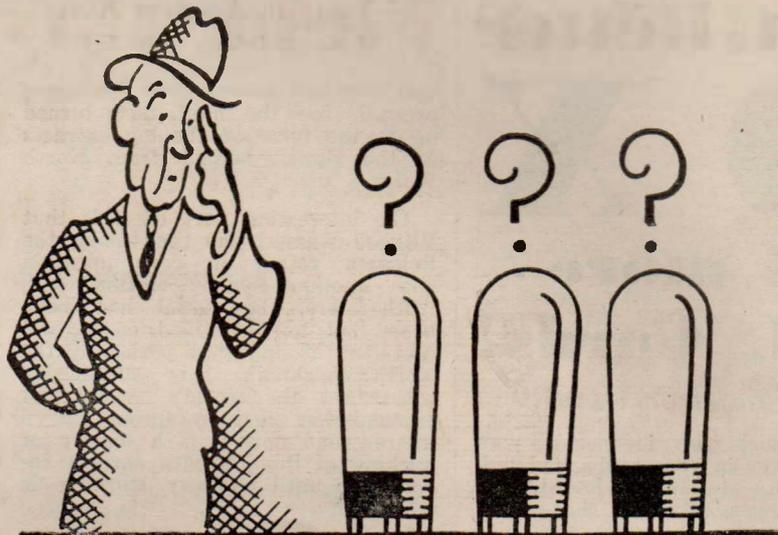
The correct temperature time chart for the furnace is controlled with precision by a potentiometric automatic programme controller, which exactly governs the rate of gas flow to the burners so that the furnace is raised and kept to a pre-determined temperature time curve.

The furnace atmosphere is obtained by means of proportional mixing equipment, which ensures a correct furnace atmosphere irrespective of the rate of gas flow given by the programme controller.

VK And S.W. Lists Appreciated

I am just writing to you to let you know that the "Radio World" is as good as ever. The list of call-signs and world shortwave stations were greatly appreciated.

The "Eaglet Two" is in the course of construction, and I am expecting great things from it. Keep your paper as good as it is and you will always have my support.—T. D. Gott, East Brunswick, Vic.



HOW DO YOU KNOW .. you are getting GOOD VALVES?

HUNDREDS of valves, all looking alike . . . good valves, poor valves, well-known valves, unknown valves . . . all competing for your choice. Confusing. Bewildering. How can you choose? How can anyone who is not a radio expert pick the good valves? There is nothing to indicate quality, not even price, for the inferiority of the poor valve is often disguised with the same price as the good one.

How can you choose? Just by asking this simple question of your dealer — "Has it got 4 pillars instead of two?" If it has, then it's Raytheon and it's the valve you want. Other valves have only 2 supports for their fragile elements. A fundamental principle of balance demands four for perfect stability. That is why only Raytheon can withstand cruel treatment and incessant vibration without budging a hair's breadth from their vital accuracy. Remember, it's Raytheon for longer life, Raytheon for greater accuracy that means surer tone. And 4-pillar valves cost no more.



This patented container allows your Raytheon to be tested before you buy, without breaking the carton or the guarantee seal.

If unobtainable from your local dealer write to Standard Telephones & Cables Pty. Limited, 258-274 Botany Rd., Alexandria

RAYTHEON

THE MAKERS OF

4-PILLAR VALVES

Get Better DX and more QSL Cards!

Signals jump from R4 to R9+!

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

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

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

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

Send me right away your "Noisemaster" Kit. I enclose \$2/6 in postal notes, money order, cheque. (Add exchange to country and interstate cheques.)

Name _____

Address _____

A.R.W. 1/38.

25 Years In Amateur Radio

(Continued from page 18)

was rife, and doubts were freely expressed, but the hard facts turned up in the form of the log extracts of the signal, mailed from North Wales.

The interesting part of it is that VK2NO was at the time using the Reinartz rotary in communication with another Sydney station, and, furthermore, the signal had been heard but not identified on several occasions around that period by the North Welshman. This confirmation constitutes the world's record for transmission and reception on 5 metres, and now it is a matter of sticking at the job with earnest co-operation until two-way working is effected.

Regular Schedules With ON4AU

At the present time, schedules are being kept regularly with the well-known Belgian, ON4AU. He is using first-class equipment for c.w. transmission and reception on 56,080 k.c. ON4AU has 250 watts output with a beam array directed over the Great Circle route, and special W.E. u.-h.-f. valves are employed in the final transmitter stage. His receiver is a t.r.f. type using acorn valves.

In order to be fully up to the mark, the station at VK2NO has been re-modelled, and the transmitter now includes an extra buffer stage with two 801's in push-pull before the 35T's. The final has been re-designed for higher efficiency.

The most interesting part of the equipment is the new receiver for the combined job of straight c.w. and super-regenerative reception. Considerable work has been done with possible c.w. receivers previously, using standard valves, but the results had always been disappointing. Recently this new receiver was completed, and it uses a 956 acorn t.r.f. amplifier, 954 electron-coupled detector, EBC3 as interrupter when "supering" is wanted, and 41 audio.

A heterodyne oscillator has been incorporated, putting an old idea to modern use. This oscillator is at 20 metres, and the fourth harmonic is used to beat with the 954 detector, which can then be used in a non-oscillating but sensitive condition.

The method of operation is very simple. A c.w. signal is first tuned in with the detector oscillating (harmonics from c.c. stations on other bands are very useful for this), and then the beat oscillator is switched in and the detector regeneration backed off slightly. The result is a remarkably stable signal, with no loss of signal strength. The receiver handles on c.w. just as easily as if one were using it on 20 metres.

In use it has proved to be a revelation, and far superior to any receiver yet tried. Some idea of the efficiency can be gained when it is stated that c.w. harmonics of stations as far as 20 miles away can be heard at R7 on 5 metres when working on 20 and 10 metres. These results, however, appear to be obtainable only with valves such as the 956 and 954.

"Acorns" Well Worth While

"Acorns" are admittedly expensive, but despite their relatively high price, it is money well spent where it is a case of determination to get the best ultra-short-wave results. To spend money on the transmitter side and treat the receiver as an after-thought is less than half doing the job.

Apart from the primary interest to-day of ultra-short-wave experimentation, the writer does not completely neglect the ordinary routine of amateur communication, and may occasionally be found on 20-metre c.w. and 'phone, mostly in the early mornings, and very rarely on 40 metres.

In July this year, a considerable amount of 40-metre communication was obtained with the Mackay Aerial Survey Expedition in Central Australia, and this, being something different to the usual kind of communication normally to be had on 40 in these times, was an interesting interlude.

In conclusion, the writer would say that, despite the utility of modern radio-telephone communication, the telegraphy side is still as important as ever it was, and urges the amateur in general to strive to keep his hand in on the key. The reasons for such advice would take too much space, but they are numerous and indisputable.

Radio "Grandest Of Hobbies"

After 25 years of experience in different forms with this yet infant science of radio communication, the writer considers that it is the grandest of hobbies for old and young, that if only the world at large could be made to realise it, amateur radio is a powerful weapon for world peace by intimate contact between fellow men; and that, progressive as radio is, it still has a long way to go. There is no end to its possibilities.

(Conclusion).

Brief Appreciations From Readers

" . . . I must say that the magazine is a wonderful gem of knowledge, and I for one will never be without it. I am interested in DX work, and the 'Radio World' certainly is excellent for this branch of radio."
—L. D. Favilla, Wallaroo, S.A.

What's New In Radio

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

Solar Condenser Colour Code Chart Available Free

Colour coding of manufacturer's type midget mica condensers in preference to stamping on the actual capacities is becoming increasingly popular. As used with colour coded resistors to indicate resistances, three colours are employed with these condensers to indicate capacities, the colour used being those adopted as standard in the R.M.A. resistor code.

Of the three dots, the first two indicate the first two digits of the capacity expressed in terms of mmfd.'s, while the third indicates the number of ciphers.

A colour code chart for mica condensers has lately been made available by Eastern Trading Co. in Sydney for users of their Solar condensers. The use of colour coding for indicating capacities of condensers is explained in detail, and as well the actual colours are shown for a selection of the most popular capacities, extending from .01 to .00005 mfd.

Copies of this Solar Colour Code Chart, together with the latest price list for Ken-Rad valves, can be obtained free and post free from Eastern Trading Co. Ltd., 470-480 Elizabeth St., Sydney.

★

Latest A.C./D.C. Philips Radio- Player A Fine Performer

Until comparatively recently the a.c./d.c. set has been regarded in Australia as more or less the "Cinderella" of receivers. With the development of special valve types for a.c./d.c. operation, however, and particularly of efficient barretters, there is no reason why the present-day a.c./d.c. set should not give just as good a performance as its a.c. counterpart.

That this is true is demonstrated by the fine performance of the Philips Radioplayer a.c./d.c. Model 6723 console, a seven-valve (and barretter) dual-wave superhet. One of these receivers was recently supplied to the "Radio World" for test.

Valves used comprise two CF2's as r.f. and i.f. amplifiers, a CK1 octode, CBC1 diode second detector, a.v.c. voltage rectifier and first audio amplifier, CL4 output pentode, CY2

indirectly heated rectifier, and C1 barretter. A Philips EM1 Electron Star tuning indicator is also provided.

The tuning range is from 200 to 550 metres on broadcast, and 16.5 to 51 metres on shortwave. Main features include incorporation of the well-known Philips "Audioscopic" audio channel, a full floating r.f. sub-chassis, ensuring non-microphonic reception, and wide vision twilight dial with the stations zoned in States. An additional kilocycle scale assists in identifying stations not recorded on the dial.

As a safety precaution, the receiver is fitted with a two-pin power plug, which automatically disconnects the power supply from the receiver when the back of the cabinet is removed. As shown in the accompanying illustration, there are four

controls — volume (left), tuning (centre), with concentric wave-change switch, and tone (right). The wavechange switch is a three-position type covering broadcast and short-wave, with the third position for pick-up operation.

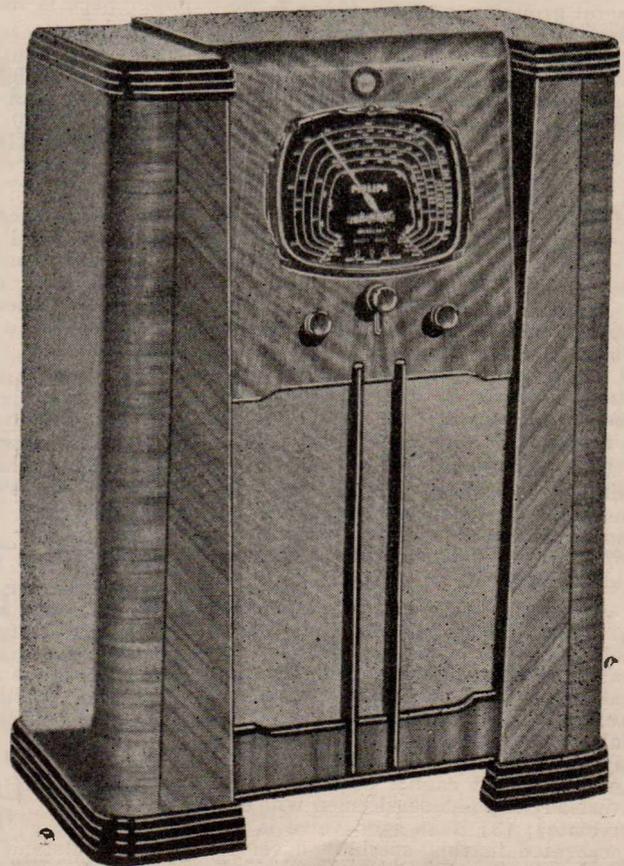
On test, the Model 6723 put up an excellent performance. Selectivity and sensitivity are both high, while tone is exceptionally good, due no doubt to the system of inverse feedback used by Philips in their receivers incorporating Audioscopic reproduction. On the short waves, the main stations throughout the world could be brought in with overloading volume, the a.v.c. system used proving particularly effective in smoothing out fading.

At 36 guineas this latest Radioplayer represents excellent value, and it can be recommended without reservation to prospective set-owners requiring an up-to-the-minute a.c./d.c. receiver.

★

Latest Radiotron Four-Sheet Characteristics Chart Now Available

Supplies of the latest Radiotron Characteristics Chart mentioned in last month's "Radio World" are now available, and readers can obtain copies by forwarding threepence in



The Philips
Model 6723 A.C./
D.C. Radio-
player—a seven-
valve (and bar-
retter) dual-
wave console.

★

stamps to cover packing and mailing to Amalgamated Wireless Valve Co. Pty. Ltd., G.P.O. Box 2516 BB, Sydney.

Because of the completeness of its information and excellent presentation, the Radiotron Characteristics Chart has always been in brisk demand. However, this chart will be found even more useful, in that it has been greatly enlarged and includes full details of the latest octal-based glass types.

The chart comprises four sheets measuring 23" x 18", the first being devoted to selected equipment types, the various groupings comprising (a) Battery Valves (equipment types)—135-volt "B" battery, (b) Battery Valves—Special Ratings for Vibrator Sets, (c) 6.3-Volt .15 Amp. Valves—135-Volt "B" Battery, (d) A.C. Valves—Equipment Types, (e) A.C./D.C. Valves—Equipment Types.

The next two sheets are devoted to a summary of all types, arranged in numerical and alphabetical order, while under-socket connections of all types are given on sheet four.

Other recent Radiotron technical releases, copies of which are obtainable on application, include the "Radiotron 'G' Valve Chart," giving under-socket connections, together with exact and approximate equivalents, of the lately-announced octal-based glass types.

The Radiotron Valve Location Chart—a further release—provides a useful grouping of valve types in the form of two schematic diagrams, covering battery and a.c. receivers, and showing a complete list of all American types available for each socket in a receiver.

★

Complete Valve And Circuit Analysis Given By Latest Palec Release

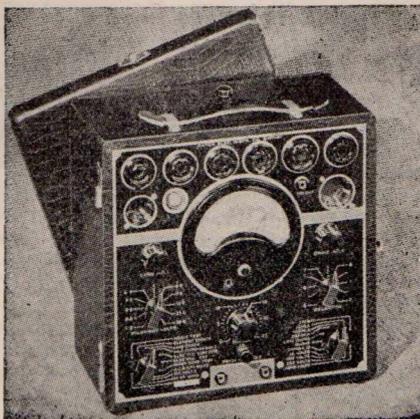
An addition to the wide range of service equipment available from the Paton Electrical Instrument Company, is a new valve and circuit tester combination designed specially to meet the requirements of the outside serviceman.

The instrument, which measures only 10" x 10" x 6", enables a remarkable number of tests to be made; in fact, it covers practically every component in the radio set, valves included.

A number of recent developments have been incorporated, the most notable being the employment of valve rectification to replace the usual copper oxide unit for measuring a.c. and output volts. The use of a valve has several distinct advantages:—(1) It is independent of frequency; (2) it cannot be harmed by overload (a point servicemen will appreciate); (3) if an aged valve is incorporated in this specially developed circuit, it will give years of un-

varying use, as the power consumed is negligible.

Another point in favour of valve rectification is that it follows a linear scale and thus dispenses with the several additional staggered scales necessary when a copper oxide unit is employed, and which usually tend to crowd the meter dial.



The Palec Model VCT combination valve tester and circuit analyser.

Further specifications of the Palec model VCT are as follows:—

Will test all valves, reading direct on a "good/bad" scale, and also applies a neon short test. (An a.c. power pack is incorporated for above tests).

An exceptionally wide range of ohms is available, reading from as low as .1 of an ohm (10 ohms half scale) up to 10 megohms. The low range is particularly useful for checking coils, contacts, dry joints, etc.

Electrolytic condensers are also tested and read on a direct reading scale. Paper condensers from as low as .0005 mfd. can be checked for leakage and open circuit connections by means of a high voltage neon flash test.

The instrument includes also four ranges of milliamps., d.c. volts and a.c. volts. The latter ranges enable use of the instrument as an output meter, for a blocking condenser isolates the d.c. current from the a.c. component.

This latest combination tester is fitted with the large 5" type meter with open clear scales, and judging from its very attractive appearance and great utility, should prove the most popular model the Paton Electrical Instrument Company has yet developed, particularly as it is very moderately priced.

★

Eddystone Ultra Short Wave Guide

The outstanding ultra high frequency DX records put up recently

by VK2NO, of Sydney, once again prove the fact that the ultra short-wave field offers unlimited possibilities for amateurs and shortwave enthusiasts.

Those interested in this new field will find a considerable amount of useful information on practically all branches of the subject in the Eddystone "Ultra Short Wave Guide." Illustrated constructional articles include those describing the assembly of a two-valve transceiver, two-valve super-regenerative receiver, an absorption wavemeter, electron-coupled oscillator, u.h.f. transmitter, super-regenerative three-valve receiver, six-valve superheterodyne, modulated oscillator and a push-pull unity-coupled transmitter. Further articles deal with ultra high frequency measurements using Lecher wires, and u.h.f. aerial systems.

The Eddystone "Ultra Short Wave Guide" is obtainable from Mr. R. H. Cunningham (VK3ML), 1449 High St., Glen Iris, S.E.6, Victoria, price 1/6 (postage 1d.).

★

Agent Appointed For Cossor Cathode Ray Equipment

Messrs. W. G. Watson & Co. Pty. Ltd., of 279 Clarence St., Sydney, recently announced their appointment as exclusive factory distributors for Cossor cathode ray oscillographs and associated equipment.

The complete range includes some nine instruments, but undoubtedly the most popular among servicemen and the radio trade generally will be the Model 3247 Portable Mains Oscillograph, which has been designed to provide a self-contained, compact and robust oscillograph for general laboratory and service use.

It is entirely self-contained, inclusive of power, time base and calibrating circuits, and operates directly off the a.c. mains. Provided with carrying handle, and weighing only 20 lbs., the instrument is entirely portable. The only connections required for the oscillograph are to the mains and to a pair of terminals from the circuit under examination.

The amplitude of the sinusoidal time base sweep, which is taken directly from the mains, can be varied over a very wide range. The tube is viewed through a transparent window graduated in 2 mm. divisions, the nominal deflectional sensitivity of the tube being one division for 4 volts. For accurate quantitative measurements, a calibrating circuit is incorporated. The following controls are provided:—Focus, sweep, modulation and shift.

Some of the more important uses to which this instrument can be put are as follows:—

- (1) Investigation of distortion in radio receivers.
- (2) Investigation of audio-fre-

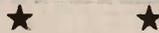
(Continued on page 43)



The All-Wave All-World

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

DX News



VK2ME, 3ME And 6ME — Transmission Schedules For January, 1938.

The following transmission schedules will be observed by shortwave stations VK2ME, VK3ME and VK-6ME during January, 1938:—

	VK2ME (31.28 m., 9590 k.c.)	
	Sydney Time	G.M.T.
Sundays:	4-6 p.m.	0600-0800
	8 p.m.-Mdt.	1000-1400
Mondays:	Mdt.-2 a.m.	1400-1600
	VK3ME (31.5 m., 9510 k.c.)	
	Melbourne Time	G.M.T.
Nightly		
Monday to 7 p.m.-10 p.m.		0900-1200
Saturday (inclusive)		
	VK6ME, Perth (31.28 m., 9590 k.c.)	
	Perth Time	G.M.T.
Nightly		
Monday to 7 p.m.-9 p.m.		0900-1100
Saturday (inclusive)		



Heart Beats On The Air

An interesting broadcast took place through station 2UW, Sydney, last month, when heart beats were broadcast for the first time.

Eastern Trading Company Ltd. provided a Brush Heart Beat Pickup, and also the services of the manager of their Medical Department, Mr. R. A. Jucket, who supervised the experiment. The heart beats of a young lady were first broadcast to show just how a normal heart should sound, and then after she had hurried up two flights of stairs the heart beats were again broadcast, and a marked difference was noticeable.

According to Mr. Jucket, the heart beat pick-up marked a definite advance in electro-medical equipment, as the design of the instrument is such that all sounds of breathing are filtered out, so that all that is left in the reproduction is the true heart beat itself.

Agent Appointed For Cossor Cathode Ray Equipment

(Continued from opposite page)

quency and intermediate frequency wave forms.

(3) Examination of tone control circuits.

(4) Fault location, percentage modulation, and maintenance measurements on radio transmitters.

(5) Frequency calibration of oscillators; when the instrument is used on time controlled mains, frequency calibration can be carried out to extremely close limits.

(6) Measurement of percentage modulation of signal generators, etc.

(7) Measurement of a.c. peak voltages, grid swing, etc.

(8) Examination of rectifier circuits.

(9) Examination of commutator ripple on d.c. generators.

(10) Detection of hunting or winding unbalance in generators.

(11) Detection of iron saturation in transformers or other causes of bad wave-form in power and radio transformers.

Further details of this and other Cossor cathode ray equipment can be obtained on request from the Australian agents, at the address given above.

ALL-WAVE ALL-WORLD DX CLUB Application for Membership

The Secretary,
All-Wave All-World DX Club,
214 George Street,
Sydney, N.S.W.

Dear Sir,

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

Name.....

Address.....

[Please print both plainly.]

My set is a.....

[Give make or type, number of valves, and state whether battery or mains operated.]

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

(Signed).....

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



Short-wave Review

CONDUCTED BY

ALAN H. GRAHAM

SUMMER with its changed reception conditions and troublesome noise-level is again with us, and listeners will find that their dxing must be carried on within rather restricted limits. However, this may be a blessing in disguise, for indications are that a little concentration on the higher frequency channels will produce some worthwhile results.

Just at present the 13, 16 and 19-metre bands are providing exceptionally good reception. The noise-level here is low, and there is a comparative absence of high-speed fading, which so often mars high-frequency signals.

Last summer, good results were obtained on 10 metres, when general conditions were not nearly as promising as they are for 1938, and it must be remembered that interest in the ultra high frequency channels has been considerably increased by the successes of amateur transmitters. Undoubtedly commercial stations will be much more interested in the frequencies between 21,000 and 32,000 k.c. in the near future.

High Frequencies Erratic

At the present moment, the police bands and the 31,600 k.c. broadcast band are in the doldrums. Reception has been more than a little erratic, and there is little of note to report.

The American broadcasters on 31,600 k.c. (9.49 m.) have, I think, slightly improved. But, unhappily, the improvement has merely served to increase the heavy QRM, which usually manages to obscure their signals. At times, however, it is possible to distinguish a call-sign above the tumult—usually that of W9XPD, W8XWJ or W9XHW. Obtaining sufficient details for verification purposes is indeed a task, as it is impossible to distinguish which items belong to which call-sign. Why so many transmitters are permitted to operate on exactly the same frequency with corresponding schedules is something of a mystery. It was reported that several of these stations were considering changing their frequency, but nothing seems to have come from these suggestions.

The police stations are still there

—but are now very weak, with the exception of W5XB, Fort Worth, whose R7-8 signal on 9 metres provides an amazing contrast to the R2-3 signals of the other transmitters.

A verification is to hand from the Bureau of Police in McKeesport, Pennsylvania, whose station, W8XBE, was logged on 9 metres in September. The chief operator, Mr. Ben Farkas (who, incidentally, operates amateur station W8FQL), sends

QSL Forms, Notepaper, And Stickers

Headed notepaper and QSL forms printed for the use of members of the All Wave All World DX Club are available from the "Radio World," 214 George St., Sydney, N.S.W., price 1/6 for 50 sheets, post free. Enlarged two-colour replicas of the Club badge, in the form of gummed stickers, are also available, price 5 dozen for 1/6, post free.

along some interesting information regarding W8XBE's equipment. Of chief interest is the news that the power used is only 100 watts. Mr. Farkas is very desirous of receiving further reports from Australia, as the writer's was the only one yet received from this country. How about it, dxers? Don't forget there is a special U.H.F. trophy to be won!

As was expected, the 10-metre amateur band is definitely on the improve. During the morning some very nice signals are audible from W's and K's. W9RUK, W5CYS, W4DXM and K6NTV were the best for the month.

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Highlights Of The Month

Probably the outstanding feature of the month's reception has been the improvement in the North American stations, especially on 19 metres. The following are audible at good strength in the early mornings:—W2XE (16.89 m.), W2XAD (19.56 m.), W2XE (19.65 m.), W8XK (19.72

m.), W8XK (25.27 m.), W2XE (25.36 m.), W1XAL (25.45 m.), W3XAU (31.32 m.), W1XK (31.35 m.), W2XAD (31.48 m.). Even on 49 m., there is some activity, as W8XK (48.86 m.), W3XAL (49.18 m.) and W8XAL (49.5) are all to be heard in the late afternoons and evenings.

The Polish station, SPW, is still being heard in the West. It is understood that this station is now using a power of 2 kilowatts. Latest reports to hand indicate that SPW's schedule has been changed, and that it is now on the air from 9-10 a.m. daily. The new Polish transmitter, SPD (or possibly SPB), on 26 m., is still being heard relaying SPW.

"Radio Philco," Saigon, French Indo-China, is still audible nightly on 25.57 m. Its signals are best around 9.30 p.m., when they are of fair strength, although rather distorted.

COCQ have altered their frequency. They have shifted from 9,740 k.c., 30.77 m., to approximately 9,690 k.c., 30.9 m. COCQ remains one of the most consistent stations on the air. Other Cubans putting in good signals include COGF (25.4 m.), COCX (26.2 m.), COCH (31.8 m.), COBC (32.23 m.), COBZ (33.2 m.), COCD (48.92 m.) and COCO (49.82 m.).

It is certain that the Portuguese African stations, CR7BH, Laurenc Marques, and CR7AA, same location, are still on the "wanted" list of many dxers. These are still audible in the West at least, for Observer La Roche reports them at good strength on 25.6 and 48.8 m. respectively. The most likely time to log them appears to be just after midnight.

HS8PJ, Bangkok, continues to transmit on 31.5 m. every Thursday night at 10.30 p.m. These transmissions were previously heard on 32.09 m.

With the approach of summer, that most interesting of Africans, VQ7LO, Nairobi, is again being reported on 49.3 m. This station is usually heard fairly well—when the noise-level falls to reasonable proportions—around 3 a.m.

Special Trophy For Ultra-High-Frequency Reception

To stimulate interest in ultra-high-frequency reception, Mr. Alan H. Graham, Shortwave Editor of the "Radio World," is offering a special trophy for competition among readers. Conditions of this competition are as follow:—

1. The trophy will be awarded for the best verification from a 9-metre American police station, submitted to the Shortwave Editor before March 1, 1938.
2. Verifications must be specific, i.e., the frequency on which the station has been received must be clearly indicated.
3. In judging the entries, the judges will take into account the power of the station received, and the type of receiver used.
4. The decision of the judges will be final; the result of the competition will be announced in the April, 1938, issue of the "Radio World."
5. All entries should be addressed to the Shortwave Editor. All verifications submitted will be returned by registered post as soon as possible after the closing date.

A number of the more unusual "Latin-Americans" appear among the loggings for the month. First there is the Guatemalan TGWA, which has been testing on a variety of frequencies—its latest appearance is on 11,710 k.c. (approximately), 25.63 m. (Previously TGWA had been reported on 9,450 and 11,780 k.c.). By the way, there is no need to include return postage with reports to this station.

CMA5, Habana, Cuba, has been testing on 17,260 k.c., 17.37 m., usually in the late evenings. Reports should be addressed C/- Cuba Transatlantic Radio Corporation, Box 65, Habana.

Now on a regular daily schedule, HP5A, Panama City, is audible on 25.65 m. It is heard best around 3 p.m.

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Latest Stations News From Overseas

The Republic of Colombia is having a general shake-up in frequencies, since all the shortwave stations there must go to about 4,800-4,900 k.c. (approx. 62 m.). This will be regretted by Australian listeners, as the chances of logging such low-powered stations on this frequency are far from bright. American lis-

teners, however, are very much in favour of the change, as it will greatly reduce the congestion on the 49 m. band. One of the first stations to move is HJ1ABE, Cartagena, now on 4,860 k.c. (61.9 m.). Other Colombians already in this vicinity are HJ3ABD, Barranquilla (61.97 m.), HJ2ABC, Cucuta (62.63 m.), and HJ1ABB, Barranquilla (62.76 m.).

The following alterations in call-signs should be noted:—

OXY, Copenhagen, Denmark, is now OZF.

HJ4ABU, Pereira, Colombia, is now HJ6ABA.

CT1AA, Lisbon, Portugal, is now CS2AA.

The mystery Communist station known as "Radio Liberte," which is believed to be located in Paris, France, has been causing considerable interest on the other side of the globe. It operates daily from 6-9 a.m. on 28.93, 31.48, 31.75 and 40.9 m.

The Paris-New York telephone service is now by direct circuits to France, instead of via London as formerly. The French transmitters used are TYE2, 16.58 and 21.8 m.; and TYE3, 28.79 m. The American end is handled through the Laurenceville, N.J., transmitters WKF, 15.61 m.; WMP, 20.73 m.; and WOF, 30.77 m.

★

Mystery Stations—Can You Identify These?

A stranger on approximately 24 m.; heard around 5-6 a.m. daily. This station has been reported recently in the West, whence comes the suggestion that it may be Radio Roma on a new frequency. However, we have no confirmation of this, and, indeed, it would be surprising if it proved correct.

A French-speaking station on approximately 49 m.; heard late afternoons, closing around 7 p.m. Almost certainly a French colonial transmitter. Identification difficult on account of high noise-level.

Another foreigner on approximately 40 m. Heard regularly in the evenings by Observer La Roche.

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.

Thought to be one of the low-powered D.E.I. transmitters.

★

News From Official Observers

As these notes had to be compiled earlier than usual because of the holidays, it was impossible to obtain reports from the "Radio World" observers sufficiently early for inclusion, the exception being Mr. La Roche, our West Australian Ob-

"Radio World" Binding Covers Available

Readers wishing to keep their back copies of the "Radio World" in safe and handy form for reference purposes are advised that special covers for Volumes 1 and 2 are available. Using a strong, durable leather board covered in dark blue book-cloth, they are attractively printed in gold with the title of the magazine, volume number and dates of issue.

Twelve strings are attached along the inside back portion of the cover, so that each issue of the magazine as it is bought can be slipped into place in a few moments. This method of binding is simple, effective, and very convenient, as any issue can be instantly removed if desired.

These covers are now available from the "Radio World," 214 George Street, Sydney, price 3/6 each (or for two covers for Volumes 1 and 2, 6/- post free).

server, whose loggings are as full of interest as ever and were of great assistance in the compilation of this review. Stations logged by Mr. La Roche include:—SPW (22 m.), Saigon (25.5 m.), CR7BH (25.6 m.), EAJ43, Canary Is. (28.9 m.), CSW (30.18 m.), HS8PJ (31.5 m.), PRF5 (31.58 m.), Colombo (48.77 m.), CR7AA (48.82 m.), and VQ7LO (49.3 m.).

Amateur Notes

In addition to a fine list of commercial stations, Mr. La Roche forwards an interesting review of 20-metre amateur conditions. His loggings make very interesting reading:—

Europe: G5BT, G6XR, G6ML, G5-NI, G5KH, England; F3KH, France; EI3J, Irish Free State.

Asia: FI8AC, French Indo-China; VU2EA, VU2CA, VU2LL, India; VS7GJ, Ceylon; XU8MC, China; VS-1AD, VS2AK, Malaya; KA1BH, KA-1AP, KA2LB, KA7HS, Philippines; PK1GL, PK1MJ, PK1DB, PK1LO, PK1VY, PK2WL, PK3AA, Dutch East Indies.

America: XE2AH, Mexico; VO11,

VO6G, Newfoundland; CO2EG, CO-2KC, CO2LY, CO2WZ, CO2RA, CO-2XY, CO7CX, CO7JG, CO7HF, CO-8JK, Cuba.

Africa: VQ4CRE, Kenya.

Station Identifications

Continuing the series of station identification signals, commenced in last month's issue, the following information may aid listeners to identify some of those "mystery stations."

TIPG, San Jose, Costa Rica. Opens and closes with the "Parade of the Wooden Soldiers."

OAX4G, Lima, Peru. Closes with "Goodnight Sweetheart."

YV5RF, Caracas, Venezuela. Closes with an organ selection, "Blue Danube" Waltz.

CB960, Santiago, Chile. Opens with "Babes in Toyland." Closes with organ solo, "Somewhere a Voice is Calling."

XEXA, Mexico City, Mexico. Opens and closes with "March of the Toys."

OAX5A, Ica, Peru. Opens with the march "Relator." Closes with "Estrellita."

HP5A, Panamá City, Panama.

Radio Ramblings

KA1YL Call Of Schooner Latitude

I received my membership certificate and club badge this week, and was more than pleased with them. Of late I have noticed a number of queries as to the addresses of XU-8RB and KA1YL. The latter is the call of the schooner Latitude, at present at Manila, the postal address be-

ing KA1YL, C/o Post Office Box RO 3232, Manila; W6BAY, who is on board, is second operator. XU8RB is R. J. Broadley Lane, 159 Seymour Road, Shanghai, China. About two months ago I was lucky enough to hear both chaps tell their addresses to a South African, ZUSN, whom they contacted at 1.32 a.m.

Conditions in Adelaide this last month have never been worse for

dxing. The "W" stations are very poor in the evenings, and nearly as bad in the mornings. Some time ago I received a QSL card from VP6TR, Barbados, and he said I was only the third person to ever report his signals from Australia. He would be very pleased to receive a call from any amateur VK, as he has never contacted one yet. His frequency is 14,054, power 65 watts, and he uses a National H.R.O. receiver.

Last Tuesday night, at 11.30 p.m., I heard PHI on a new frequency, viz., 13.97, practically on top of GSH, and it was coming in Q5, R8-9, being the best station I have heard on 13 metres for some months. At present this band stands alone for clarity, absence of noise or static, and with a minimum of fading GSH, 13.97 m., and GST, 13.93, are R. max. at 9.30 p.m. in Adelaide. The lower frequencies from 25 to 50 metres are particularly noisy at present, and are accentuated with very quick fading.—J. C. Linehan (AW323DX), Adelaide, S.A.

Stop Press—New Stations On The Air

The very latest information from overseas indicates that the following frequencies have just been allotted. Add these stations to your station list.

K.C.	M.	Call Sign.	
21,500	13.95	W9XF, Chicago, Ill., U.S.A.	New frequency.
15,130	19.83	W9XF, Chicago, Ill., U.S.A.	New frequency.
12,007	24.98	CB1190, Valdivia, Chile.	
11,760	25.50	CB1170, Santiago, Chile.	
10,370	28.93	Salamanca, Spain.	"Radio Nacional."
9,630	31.15	HJ7ABD, Bucaramanga, Colombia.	Relays HJ2ABD.
9,590	31.28	W2XE, New York, N.Y., U.S.A.	New frequency.
9,550	31.41	W9XF, Chicago, Ill., U.S.A.	New frequency.
9,195	32.65	COBX, Habana, Cuba.	Relays CMBX.
6,485	42.28	HIIL, Santiago, D.R.	
5,835	51.3	YV5RR, Caracas, Venezuela.	

Changes In Frequency (Actual Or Contemplated)

PRF5	to	15,000 k.c.	:	20.0 m.	from	9,500 k.c.	:	31.58 m.
COBC	"	9,310		32.23	"	9,350		32.09
HCJB	"	8,840		33.94	"	4,107		73.05*
YNLG	"	6,670		44.92	"	8,500		35.29
RKI	"	7,700		38.96	"	15,040		19.95†
OAX4G	"	6,260		47.92	"	6,295		47.64
YV3RC	"	5,900		50.85	"	5,870		51.13
YV3RA	"	5,900		50.85	"	5,880		51.02
HJ1ABE	"	4,860		61.7	"	9,500		31.58

* Reinstated.

† New Winter Frequency.

Opens and closes with the "AnvilChorus."

Have Your "RADIO WORLD" Posted To You Direct

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

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NOTE.—N.Z. subscribers can remit by Money Order or Postal Note.

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

Latest Loggings And Verifications

My latest verifications received include cards from ZL2PP, VK7RC, VK2M, VK3HX, VK9MI, VK2XU, 3LR, and VK3ZK. I have reports out to KZRM, VK5WI, 5RP, 3ME and VK3JD; all stations being logged with a three-valve t.r.f. receiver.

I am enclosing a photo of my shack, and would like to exchange photos with other dxers.—Jack Wallace (AW248DX), Bendigo, Victoria.

DX News and Views

A page for
letters from
DX readers

Reception Conditions Poor At Mt. Isa

Radio reception here at Mt. Isa is very poor. Broadcast is just one continuous roar of static, and 14 to 40 metres is the only part of the short-wave band that is at all clear. Interstate amateurs are always received well, and on the 20 m. band, Java and Manila commercial and amateur stations come in at fair volume. W's and G's are heard at times when reception is best, but VLR is very poor and can hardly be picked up until 3 to 4 p.m.—at 5 p.m. it is at its peak. I think we must be near the skip distance from Lyndhurst, as amateurs (VK3's) break through when we can't raise VLR. London and Germany come in very well on several bands, and there are a lot of foreign stations that I cannot identify.

We are shifting to a new locality in the New Year, and expect to get better DX results then, as at present we are situated between two high hills.—M. D. Hudson (AW283DX), Mt. Isa, Q'land.

"Amateur Game" Articles Appreciated

I have been a reader of your journal since the first copy, and have found it equal to any of the overseas radio papers. In my opinion, it is the best technical radio journal we have in this country.

I have been interested in wireless for the past twelve years, and am at present studying both wireless and television, and can honestly say that I have gained quite a lot of help and very valuable information from your paper. As I have been thinking of having a try for my experimental licence, I have followed with keen interest "Breaking Into the Amateur Game," and have found it a great help in my study.

The set I am using at present for DX work is not very satisfactory, although it pulls in quite a few. It is a commercial 5-valve dual wave, using an ordinary "L" type aerial 60 ft. long, 45 ft. high one end and 25 ft. the other. Some of the shortwave stations I have logged with it are GSD, Daventry; GSB, Rugby; TYB, Paris; TYA, Paris; TPA4, Paris; DJL, Berlin; DJO, Berlin; JVH, Japan; JVM, Japan; DZC, Germany. All were received at fair strength, with many others not so good. In the near future I intend to build one of the "R.W." all-wave jobs.—J. Knut-

sen (AW332DX), Glebe Point, Sydney.

20 And 40 M. Bands Patchy

During the month of November, conditions dropped off considerably, except perhaps on the 40 m. amateur band. The 20 m. band is best at night now, and Europeans can be heard after 9 p.m. E.S.T. Rather unusual conditions have been noticed on 40 m. lately. When the 20 m. band is dead, in the afternoons the "W" stations come in quite well on "40."

On November 30, between 5 and 6 p.m. E.S.T., on 40 m., all "W" districts except "W1" were logged, as well as K5, K6, K7 and VE. The receiver in use was a one-valve (type 19) and a 33ft. indoor antenna. Some of the "W" signals reached R5-6. Best catches during November were FI8AC, SM5QU, VQ8AS, ZU1X, CX-1BG, HB9BD, ON4SU and K7FDU. The QSL's received have been better than the DX received this month.

Australia To England Again on 5 Metres

Added Confirmation For VK2NO's World Record

Mr. C. Mellanby, of Pwllheli, North Wales, has again received 5-metre signals from VK-2NO, operated by Mr. Don B. Knock in Sydney.

For some weeks, VK2NO has been keeping pre-arranged C.W. schedules with ON4AU in Belgium, starting at midnight on Saturdays. No signal has been received between the two stations, but on October 31, at 14.20 G.M.T., Mr. Mellanby heard VK2NO at QSA3 R5/6 calling ON4AU. The report again checks with transmission at the Sydney end.

This reception is remarkable for a 5-metre signal travelling the distance, and is of considerable interest owing to the fair degree of consistency in the reports. The transmitter in use at VK2NO is the one illustrated elsewhere in this issue, with 150 watts input to the two 35T's in the final stage.

Thus history has been made again, and something that was once considered impossible shown to be possible.

CR6AA, Lobito, Portuguese West Africa, verified my report of June 16, 1937, and sent their QSL in a registered letter. Schedule is Wednesday and Saturday 0545-0730 A.E.S.T. on 7,177 k.c.

G16TK sends an attractive QSL and an enrolment form to The World Friendship Society of Radio Amateurs, organised by W9DQD. G16TK also sent stamps and requests further reports from Australia. Other cards to hand are from VE2DQ, VS-7RP, W8JH and EI2L.—Tom D. Dowling (AW97DX), Geelong, Vic.

Special Broadcast From Labrador

During a 'phone QSO with Dorothy Hall, W21XY, New York, I was requested to pass on the following information and ask for your co-operation.

On December 26, 1937, at 1100 G.M.T., a broadcast of special interest to Australian and New Zealand amateurs will be transmitted by the "Voice of Labrador," VO6B, operating on 14,280 k.c. This will probably be the first time that the people of the Frozen North have had the opportunity of speaking to the outside world.

VO6B is particularly anxious to receive reports on this transmission, and all such reports should be addressed to Dorothy Hall, W21XY, who will read them to him daily during schedules as there is no chance of VO6B receiving any mail during the winter months. All reports will be acknowledged by VO6B upon his return to New York in January, 1938.

For those interested, W21XY operates on 14,244 k.c. for schedules with VO6B.—C. Miller, Casino, N.S.W.

Latest News From The East

According to information dated November 14, all the Japanese stations still verify, despite rumours to the contrary. JOAK, 2,870 k.c., 150 k.w., is now completed, and tests from 10.30 to 11 p.m. J.S.T., giving news in English, Japanese and Chinese, this being a special broadcast for the South Seas.

XGOA was bombed, and now XGZ, 660 k.c., is taking its place. The latter is located on Kinryo (Japanese pronunciation), near Nanking; antenna power unknown. New stations in Manchuria are MTGY and MTHY, and there are two new transmitters in Shinkyo, MTCY1 and MTCY2. JOKG and JOAK1 are nearly completed, while some stations whose call-signs are unknown

are under construction in Japan. XQHA, formerly owned by a Japanese merchant, is now controlled by the Government, and the power will be increased.

Since receiving the above information, I have heard JOAK1 at 2 a.m. (closing). He was coming in at good R7, so the power increase must have taken place. The following are details of the new stations and alterations to others:—

K.C.	Power.	Locality.	Call.
180	100 k.w.	Shinkyo	MTCY2
580	*0.25	Shanghai	XQHA
590	150	Tokyo	JOAK1
870	150	(Completed)	JOAK2
660	?	Kinyro	XGZ

* To be increased.

The following stations are to be opened soon:—

K.C.	Power.	Call.	Locality.
840	0.3	?	Hirosaki
880	0.5	?	Morioka
960	0.5	?	Matsumoto
1,010	0.1	?	Kushiro

Supplement:—

915	0.05	MTHY	Shotoku
674	3	MTFY	Harbin

—J. L. Sullivan, Cambridge, N.Z.

1938 Contest For Best Amateur Telegraphist

(Continued from page 8)

Force, Mercantile Marine and Police Operators).

2. Automatic keys and "mills" of any description barred.

3. For the various preliminary heats a judge will be selected from among the professional operators.

4. The preliminary heat will take place on February 15, 1938. The final will be held on Monday, April 11, 1938. Entries will close on January 31, 1938.

5. The radio clubs affiliated with the Institute and the Institute itself will conduct the preliminary heat in city and suburbs. The Institute will conduct two sections of the preliminary: (a) for members, (b) non-members. Amateurs are asked to get in touch with the radio club in their district or the Institute. Any amateur who is not a member of the Institute or a radio club should communicate with Honorary Secretary, W.I.A., Box 1734 JJ, G.P.O., Sydney, who will make arrangements for his test. Country amateurs who are in Sydney at time of final may participate without any preliminary test.

6. First, second and third from each section of the preliminary heat will qualify for the final. Should a very high standard of operating be demonstrated in any heat, the committee reserves the right to increase the number of entrants eligible for the final. Before a radio club is given the right to organise a

section of the preliminary heat, it must have at least six entrants.

7. The Senior Radio Inspector or his nominee will be the sole judge at the final.

8. The Operating and Receiving Test will take the following form:— Receive at the rate of 20 words per minute, two messages, each of one minute's duration, as per P.M.G.'s Handbook. Press for a period of three minutes. Marks will be awarded for correctness, legibility and setting out. Transmit, at the rate of 20 words per minute, two messages, each of one minute duration, and three minutes' press. Marks to be awarded for formation, spacing, freedom from errors and breaks.

9. Judges' decisions in all cases to be final and binding.

Australian Trained Radio Servicemen's Institute—Queensland Division.

By W. J. HUDSON.

THE usual monthly meeting of The Australian Trained Radio Servicemen's Institute was held at the Chamber of Commerce rooms, Adelaide St., Brisbane, on December 2. There were 42 members present, the following business being transacted:—

Mr. E. Cantelin, the president, reported that the affiliation between the A.T.R.S.I. and the Electrical and Radio Federation had been completed. The Federation agreed to recognise our certificate, and to give preference to members holding this certificate when engaging service mechanics. The Radio Federation employs 80% of Brisbane radio mechanics, and 95% of servicemen in Brisbane are now members of the Institute. The next examination has been fixed for March 3, 1938. It has been decided to hold a weekly lecture at the rooms, commencing in January. Good lecturers have been obtained, and this will assist members to prepare for the exam.

The next monthly meeting of the Institute will be held on January 19. Visitors should call on any of the following people when in town:—Mr. E. Cantelin, C/- Edgar V. Hudson's; Mr. Brayne, C/- Trackson's; Mr. K. Elliot, C/- Harrold's Radio; or "Doc" Hadley, Rolf's Chambers, for particulars of meetings.

I am still receiving letters from interstate readers of the "Radio World" addressed C/- Queensland College of Science. This building is now closed, and I would be pleased if readers would address letters to:—K. Elliot, C/- Harrold's Radio, Charlotte St., Brisbane. Do not write to me, as I am constantly travelling, being a marine operator.

I have to advise that at present we have no interstate branches operating, but as the Brisbane Institute is now on a business basis, we hope to extend our activities shortly. The I.R.E. have now started a Brisbane branch, and is working amicably with the A.T.R.S.I. Some of our members have joined the I.R.E.; each society caters for a different branch of radio.

I am requested by our members to extend fraternal greetings at the year's end to kindred radio societies. I also wish to thank the Editor of "The Australasian Radio World" for publishing our reports; the "R.W." is to be found in all parts of Queensland, and most of our letters state, "I saw your report in Australasian Radio World." So cheerio and good DX for 1938.

World Radio Convention

To Be Held In Sydney During Anniversary Celebrations

COMMENCING Monday, April 4, this year a World Radio Convention will be held in Sydney, N.S.W., and will continue for 10 days, until Thursday, April 14. This Convention is being held at that time and place to coincide with the huge celebrations being held in Sydney and New South Wales from January to April in honour of the 150th Anniversary of the Foundation of Australia.

The Marchesa Marconi has accepted the official invitation of the Institute of Radio Engineers, Australia (which body is responsible for the organising and conducting of the Radio Convention), also Sir Noel Ashbridge, chief engineer of the B.B.C., and Mr. David Sarnoff, president of the Radio Corporation of America.

An invitation is also issued to all radio scientists, engineers, broadcasters and executives throughout the world to attend this huge gathering of personages representing every phase and application of electronics. The radio amateurs of Australia are also arranging their annual convention at the same time, so that all phases of radio will be dealt with.

All overseas radio companies who can possibly do so are invited by the Institution of Radio Engineers of Australia to send out at least one, if not more, of their prominent men to take part in this World Radio Convention.

Enquiries can be addressed to the General Secretary, O. F. Mingay, 30 Carrington St., Sydney, N.S.W.

Build Your Own

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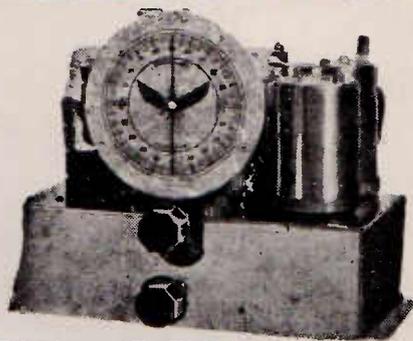
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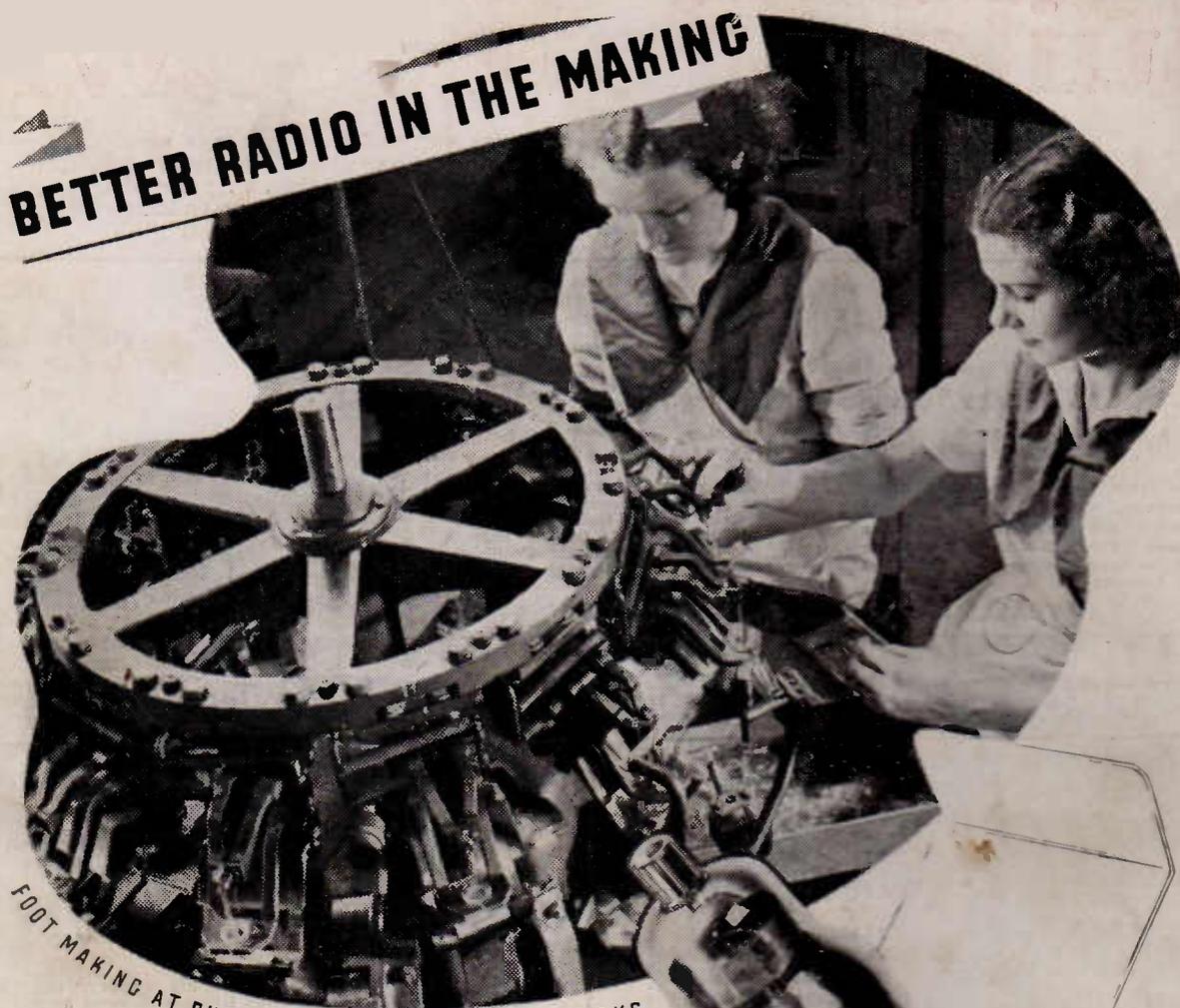
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