THE AUSTRALASIAN

Radio World

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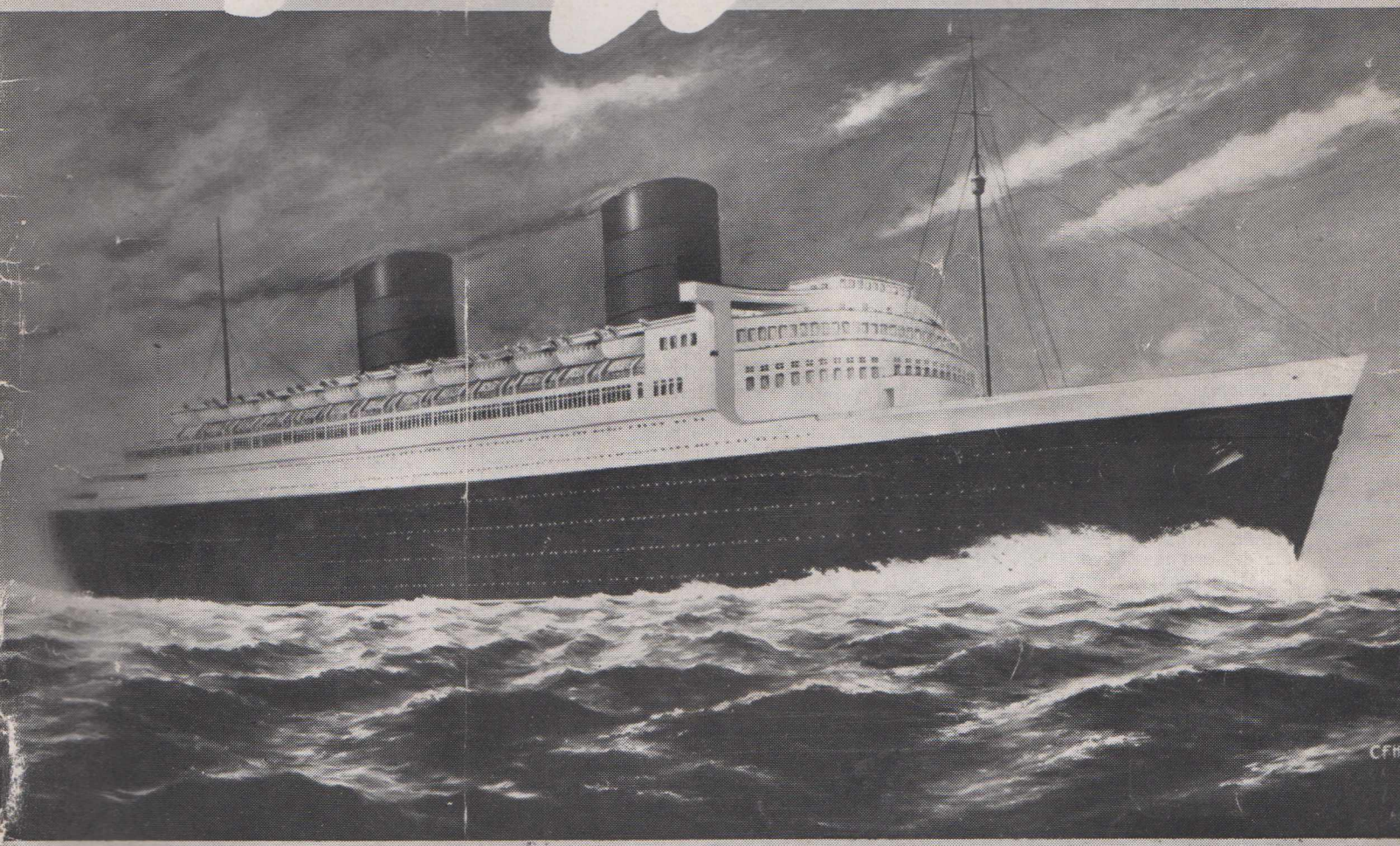
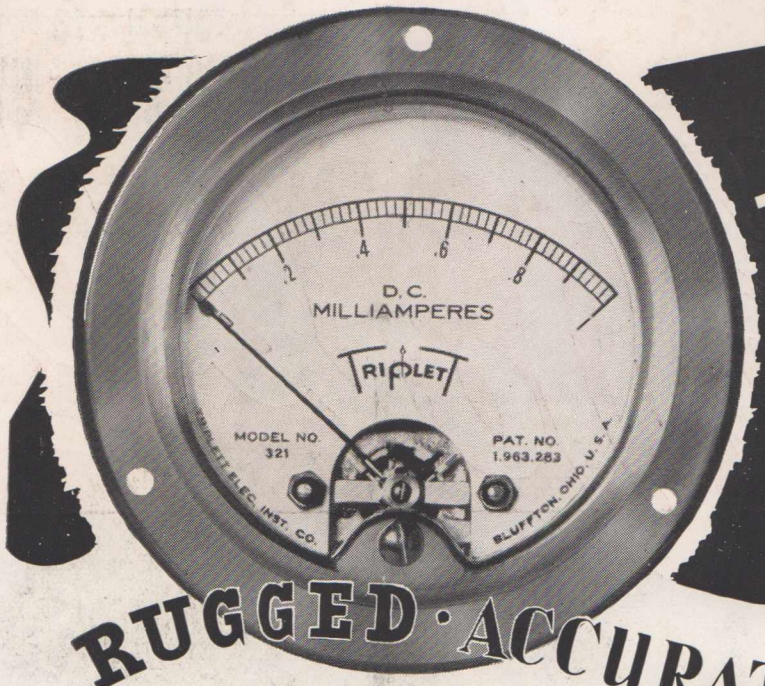


—See Page 8

- HOW TO MAKE HOME RECORDINGS: SPECIAL MARINE RECEIVER COVERS
- ALL BANDS: "SKY-HAWK ALL-WAVE THREE": THIS THING CALLED "Q":
- LATEST WORLD SHORTWAVE NEWS: NEXT DX CONTEST CLOSES JUNE 30.



TRIPLETT
Precision Built
INSTRUMENTS

RUGGED · ACCURATE · DURABLE

MODEL 321 D.C.
Actual size.

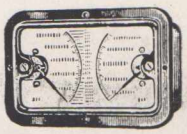
. . . built in many types and sizes!

Triplett instruments have established a new standard of quality in the field. Precision accuracy at low cost, simplicity with extreme ruggedness and bridge type construction are features that evidence the most approved engineering practice.

Magnets of laminated construction have each lamination exactly gauged after hardening, thus assuring accurate printed scale characteristics. This is one reason accuracy of scales, when not hand-drawn, can be as low as 1%. Triplett's exclusive method of maintaining absolute uniform pole piece accuracy supplants the more expensive milled soft iron type, and is far superior to those formed of soft iron. Cast magnets of cobalt and other alloys are used in some of the larger and more sensitive Triplett instruments and relays.

D.C. Instruments are the D'Arsonval type with an extra light moving coil and reinforced parts. A.C. instruments are the movable iron repulsion type; are air damped and have light moving parts. Both A.C. and D.C. have selected sapphire jewel bearings and highly polished pivots; white enamelled metal dials and moulded zero adjusters. Accuracy within 2% except rectifier type instruments which carry a 5% guarantee. Instruments supplied with pointer stops.

TWIN INSTRUMENTS



Twin Instrument.

THE TWIN is furnished in any combination of A.C. or D.C. instruments in the special rectangular moulded case that requires a minimum of space. Permits simultaneous readings on both instruments when connected in the same or separate circuits. Instrument scales are side by side making possible two distinct readings at a glance. Used to balance loads in three-wire circuits; detect line fluctuations when load readings are taken; measure antenna and modulation current; determine filament plate voltages and similar applications.

THERMO AMMETER

High frequency. Accuracy 2%

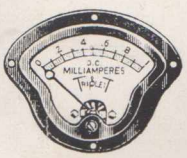
Triplett Thermo Ammeters correspond in size, etc., to corresponding D.C. models. All have moulded cases. Have external couples which withstand 50% overload connected to meter with 2 foot leads. Couples are easily replaced when necessary. Internal couples to order. External couples only, for any model.

LIST PRICE - - - - - - - - - - 50/-

The Model 321, 3 inch dial, illustrated above, is available in 5 and 2 inch dials designated Models 521 and 221.

Typical "321" ranges are:

0.1	Milliamperes.	Price	33/3
0.10	,,	,,	27/6
0.50	,,	,,	27/6
0.100	,,	,,	27/6
0.250	,,	,,	27/6
0.500	,,	,,	27/6
0.1000	,,	,,	27/6

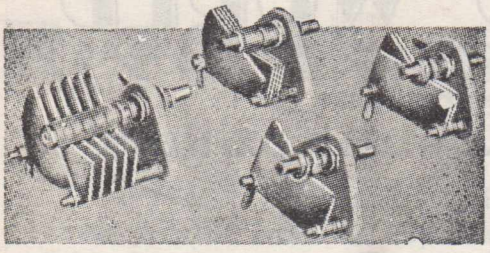


529-D.C. 539-A.C. Thermo Ammeter

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

Head Office: 279 Clarence Street, Sydney. Newcastle branch: King and Bolton Streets, Newcastle.
Branches at Melbourne, Adelaide, Hobart, Launceston and Perth.

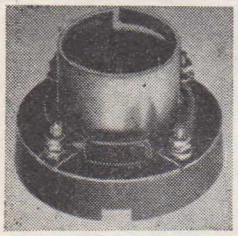
IT'S CHEAPER-IT'S BETTER IT'S SURER!



CERAMIC SHORT WAVE MICRO-VARIABLES

The new range of micro-variables employ their exclusive new material "RMX" for greatest efficiency at highest frequencies. Ball races are electrically shorted, ensuring freedom from noise.

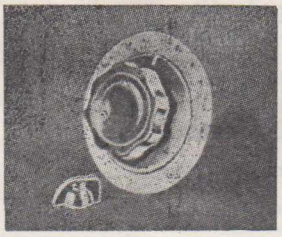
	List Price
VC15X 15 mmfd.	6/9
VC40X 40 mmfd.	7/6
VC100X 100 mmfd.	7/9
VC160X 160 mmfd.	9/9
VC250X 250 mmfd. (.00025 mmfd.)	10/6
NC15 (Transmitting) Neutralising, 15 mmfd. spacing .07 in.	8/–
TC40 (Transmitting) Tuning, 40 mmfd. spacing .07 in.	9/6



American Valve Sockets

In response to the increasing demand for high-quality HF sockets, John Martin offers the following:

Type VA4 4-pin ceramic (for 210, etc.)	3/–
Type VA5 5-pin ceramic (for 46, 47, etc.)	3/–
Type VA6 6-pin ceramic (for 58, 6D6, etc.)	3/–
Type VA7 7-pin large ceramic (for 59, 53, etc.)	3/–
Type VA7S 7-pin small ceramic (for 6A7, etc.)	3/–
Type VA8 8-pin Octal	4/–
Type VA50 50-watt (Air Ministry XMB262 H.F. Dielectric)	12/6
Type VA50 50-watt Porcelain base	15/–



TRANSMITTER DIALS

Individually spun, heavy, solid nickel dials, with engraved, not etched, divisions and handsome knob. Diameter, 4 ins.

List Price 12/9

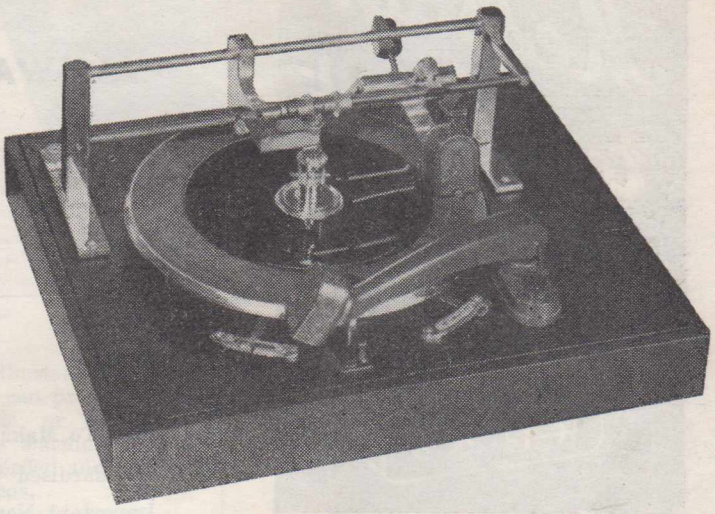
RAYMART

CRAFT A CREED

RAYMART "Craft a Creed" Short Wave and Ultra Short Wave Equipment was used in the "Sky Hawk All-Wave Three" featured in this issue. Insist on RAYMART for the best results.

Rola

ROLA Speakers keep pace with every modern development in the speaker field—they incorporate every worthwhile feature! And many of ROLA'S outstanding points, their specially-developed diaphragms, patented dust-proof systems, Isocore Transformers, are EXCLUSIVE to ROLA!



NOW it is possible to make your home-recordings equal to the standard turned out by the big recording studios! Read the article describing the use of the "Maynard Homerecorder" in this issue! You get the best result possible with the "Maynard." Simple to use—hook up the cutting head terminals to the output of your radio, and record on a "Maynard" blank.

6in. blanks	1/9	10in. blanks	3/6
8in. blanks	2/6	12in. blanks	5/6

Complete with cutting head. £6/6/-.

As illustrated, £16/16/-.

MAYNARD

For the answer to all your construction problems, write to John Martin Pty. Ltd. for full particulars and catalogues. Full stocks of everything radio and electrical are available—at the lowest prices in the State!

Telegrams: "Jonmar" Sydney. 'Phone: BW 3109 (2 lines).

JOHN MARTIN PTY LTD RADIO & ELECTRICAL SUPPLIES

116-118 CLARENCE ST., SYDNEY.

THE AUSTRALASIAN RADIO WORLD

Incorporating the

ALL-WAVE ALL-WORLD DX NEWS.

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

Vol. 3. APRIL, 1939. No. 12.

CONTENTS:

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

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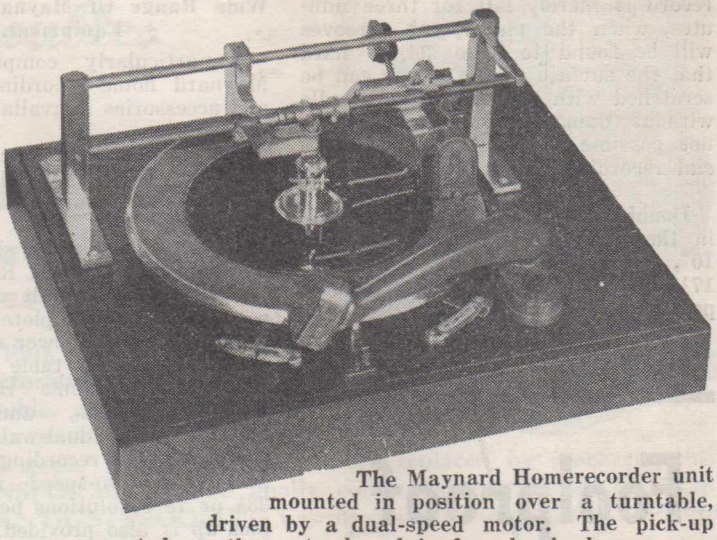
HOW TO MAKE Home Recordings

With the Maynard Homerecorder and special blanks, any receiver giving 2.5 watts output can be used to make first-class recordings.



The Maynard Homerecorder unit mounted in position over a turntable, driven by a dual-speed motor. The pick-up mounted on the motor-board is for play-back purposes.

HOME recording is a new and fascinating branch of radio that is destined for wide popularity among Australian radio experimenters, in that it opens up a wide vista for experiment, with almost unlimited possibilities. A few of the many applications were described in the article on home recording in the February "Radio World," and will be briefly outlined here.

Possibly the simplest application is that of recording "off the air" programmes. Anything that is broadcast, either on the medium or short-wave bands, can be recorded—plays, orchestral music, vocal numbers, speeches or talks.

Another widely popular use is the recording of the voices of friends and relatives and of items by amateur actors and musicians. As well, the home movie enthusiast by the use of disc recordings can provide his silent films with music or commentaries, while for those learning morse, the code can be recorded and played back at different speeds.

Commercial applications include all the above uses, but perhaps the widest application is the recording of programmes for broadcast transmission. Many other commercial applications will suggest themselves to those interested.

Equipment Is Not Elaborate Or Expensive.

The equipment required to set up a home recording plant comprises a recording unit with gramophone motor and turntable, as illustrated above, a supply of recording blanks, cutting needle, pick-up for playing back, and an amplifier. The latter need not be of special design—actually, the recorder illustrated can be used with any amplifier or commercial receiver capable of delivering 2½ watts of undistorted output. Thus any modern a.c. receiver is quite satisfactory for the purpose.

Special Formula For Blanks.

The secret of success in the Maynard home recording equipment lies mainly in the special recording blanks. They are made in Australia by a secret process, in a plant capable of maintaining an output of two million discs a year.

The Maynard disc comprises an aluminium alloy blank, coated with a cellulose compound. After a record has been cut, no baking or treatment with chemicals is required. The

record is merely left for three minutes, when the newly-cut grooves will be found to have set so hard that the surface of the record can be scratched with a gramophone needle without damage—something that is not possible with ordinary commercial recordings.

Double-sided blanks are available in the following diameters:—6", 8", 10", 11¼", 12", 13¼", 16", and 17¼", prices for the first three, respectively, being 1/9, 2/6 and 3/6.

(ABOVE IS SHOWN THE CLYDE SIX-VOLT VIBRATOR TYPE BATTERY WITH PLUGG-IN COVER)

Wide Range Of Maynard Recording Equipment.

A particularly complete range of Maynard home recording equipment and accessories is available to experimenters.

The traversing mechanism and recording head shown in the photograph is the Homerecorder, retailing at six guineas.

The complete unit shown is the Maynard Player Desk Recorder, priced at 16 guineas. It comprises the recording unit complete with head, pick-up and dual-power motor.

A combination table model radio receiver and home recorder lists at 40 guineas, and comprises a five-valve dual-wave superhet complete with recording unit, microphone and two-speed motor, giving 33⅓ or 78 revolutions per minute. A pick-up is also provided. A compact portable de luxe model at 60 guineas can also be supplied with ribbon microphone, and will cut records up to 12" in diameter.

Special Model With 78lb. Turntable.

A final model is designed specially for broadcast stations, and lists at 180 guineas, less amplifier. It is provided with a 17" turntable, statically and dynamically balanced to within half one-thousandth of an inch. The turntable itself weighs 78 pounds, and the entire equipment, 2½ cwt.

A wide range of Maynard gramophone motors, including a specially-designed model at £6/15/-, is also available, together with a selection of microphones of various types from £3/15/-. Ribbon and crystal microphones can be supplied complete with one or two-valve pre-amplifier units to give satisfactory operation from a standard "4/5" receiver.

All kinds of cutting heads are available, and in addition special types can be made to order.

Diamond-polished steel cutting needles guaranteed to cut a minimum of 50 records are recommended for the Homerecorder illustrated. They are priced at 2/- each.

Actually, any unit required for a complete recording equipment can be bought, either separately or in combination with any others.

Motor Chosen Is Important.

The choice of motor is an important factor, as it must be powerful enough to maintain a constant speed while cutting is in progress. Triple-spring hand motors, and the majority of electric gramophone motors on the market to-day will give satisfactory results.

Any reader wanting a ruling as to the suitability for making records of a motor he may have on hand is invited to write to "Radio World."

Homerecorder Operating Instructions.

To mount the Homerecorder over the electrical turntable, centre the drive immediately over the motor spindle and wherever the mounting plate comes at the side of the turntable, screw it down firmly.

To raise or lower the apparatus, use the collar provided. Adjust the height of drive to leave ⅛" to ¼" separation between the top of the plate supplied to fit over the gramo motor spindle, and the bottom of the recorder drive. Once the apparatus has been set up in this way, it can be swung off and on the table as required. All that has to be done then to record is to swing the recorder into position and tighten the grub screw on the standard post.

Before using the recorder, polish the bottom rod and grease thoroughly so that the carriage traverses very easily. Note the adjustment bearing of the worm feed screw at each end. Keep just sufficient pressure so that the whole mechanism turns easily.

To connect the cutting head to any radio receiver with a single output valve, take a lead from the plate of the output valve and connect in series with a 1.0 mfd. fixed condenser to one lead of the recording head. The other lead of the recording head is connected direct to the set chassis (to "E" terminal). The plate lead, of course, can be taken from the speaker plug. It is advisable to fit a single-pole single-throw switch in the plate lead to the recording head, to facilitate easy on and off contact with the recording head.

To connect the recording head to receivers employing push-pull output is just as simple. From each plate a lead is taken and connected to the leads of the recording head, with a 0.5 mfd. fixed condenser in each lead. A double-pole single-throw switch should be inserted in the plate leads to disconnect the recording head. Be certain that the fixed condensers used to connect the output of the receiver to the recording head are of good quality, as injury to the recording head is likely if d.c. is allowed to pass through it.

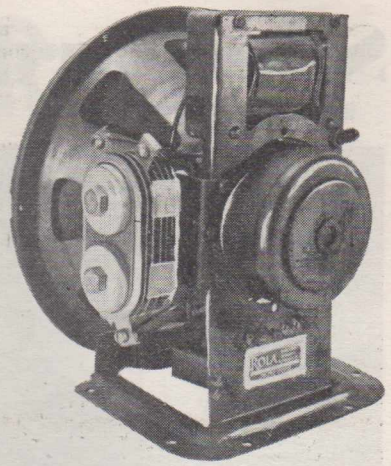
To record, bring the recording head carriage to the place on your blank disc where it is desired to begin cutting. Before lowering the head on to the disc, feel the cutting needle in the head and see if sufficient modulation is coming from your radio set or amplifier. Then switch off completely by using your volume control.

Lower the head on to the revolving blank disc gently, seeing that the cut is approximately two thousandths of an inch deep, which can be governed by the counter balance weight. See that the angle of the cutting head is approximately 5 degrees off the vertical, and that the thread flows easily from the cutting needle towards the centre of the disc. Then turn up the volume control to the pre-determined volume level and you are recording.

It is advisable always to take the recording head as close as possible

(Continued on page 41)

Out Trouped the Troubles One by One . . .

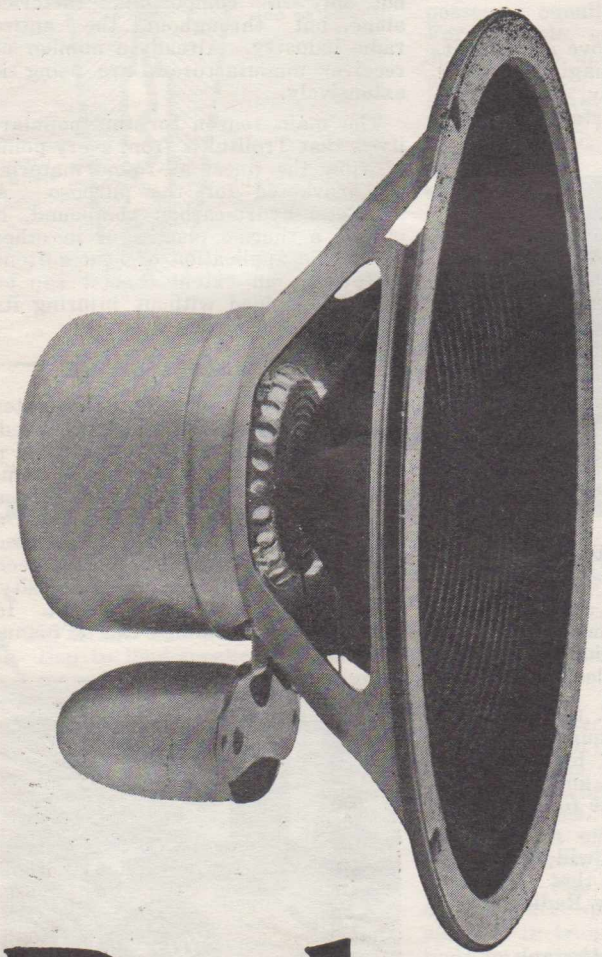


Remember this Rola Speaker?

A brilliant Performer and an undisputed leader in its day—but that was ten years ago.

Down through the years between then and now Rola engineers have gradually simplified loud speaker design, improved performance out of sight, and one by one removed all potential sources of trouble. SEPARATE FIELD EXCITATION disappeared early when the field became a choke. WEIGHT WAS REDUCED with better alloys and special steels. PAPER CONES were replaced by more responsive fibrous moulded types. TROUBLESOME TRANSFORMERS were finally conquered by ROLA ISOCORE, which banished transformer troubles for all times. DUSTPROOFING was introduced and gradually perfected.

Until Now . . . **when Rola makes another outstanding contribution to Loud Speaker Technique and with considerable gratification and pride announces**



PERMACENTRIC CONSTRUCTION

A PATENTED METHOD OF PERMANENTLY ALIGNING THE VOICE COIL SO THAT IT CAN NEVER MOVE OUT OF CENTRE. AT THE SAME TIME POSITIVE DUSTPROOFING IS PROVIDED.

Bolts, clamps and adjusting devices have been abolished for all time. This one-piece construction holds the fibrous spider always in the same position even when the speaker is subject to abuse.

Combining with all the other features that make for Rola's clear-cut superiority, PERMACENTRIC CONSTRUCTION is your guarantee that the receiver you make or sell, using Rola sound reproducers, is perfect in the vital, final stage. You can sell your receiver with the full knowledge that, for tonal perfection and freedom from service worries, nothing else even approaches your choice.

Herein is one component that will never cause an expensive service trip nor a dissatisfied user of your radio receiver.

The new K12 and F12 Rola reproducers are now available with permacentric construction, and other models will be available almost immediately.

Rola

THE WORLD'S FINEST SOUND REPRODUCERS

The Boulevard and Park Avenue, Richmond, E.1., Vic.
'Phone: J 5351

116 Clarence Street, Sydney, N.S.W.
'Phone: B 5867

Standardised Components For Set-Builders

Radiokes And R.C.S. Coils Now Use Trolitul Insulation : Same Coding : And Standard Square Coil Cans.

A sample of Trolitul as it appears before the injection moulding process described below.

SEVERAL years ago a meeting of prominent Sydney coil and component manufacturers was held to investigate the possibilities of component standardisation, not only in the interests of business, but of service to the public and trade as well. Unfortunately, complete agreement could not be reached, and the matter was then temporarily shelved.

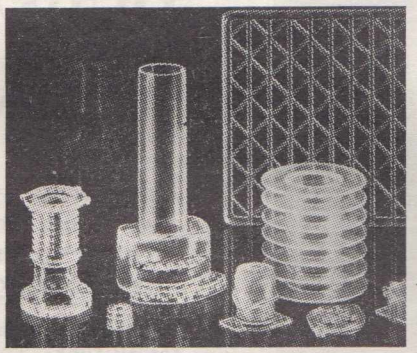
The advantages of standardisation from the points of view of both manufacturer and buyer are so overwhelming, however, that recently a further meeting was arranged. It has proved highly successful, in that the first definite step towards standardisation has now been taken. Those present were Mr. R. K. Stokes (Radiokes Pty. Ltd.) and Mr. Ron Bell (R.C.S.), representing two companies that together handle a considerable proportion of the radio components business to-day.

Complete agreement was reached in regard to the use of trolitul insulation in coils and coil kits, a decision that is not only advantageous to the manufacturers themselves, but is also one of the most progressive steps that could have been made in the interests of those building radio receivers, either commercially or as a hobby.

Actually, this agreement on standardisation has been long overdue. In the past there have been up to half-a-dozen makes of coils on the market, practically all of them using different colour codes, different types of base connections and different mountings. As well, the sizes of coils and coil boxes have varied considerably, with the result that for every receiver described a special chassis was needed. This lack of standardisation meant also that in many cases only one make of coil kit could be used for a particular receiver—unless, of course, a special chassis was designed by the builder.

In future, however, this is all to be changed. Instead of the fifteen or twenty types of coil cans that have been on the market during the past five years or so under the Radiokes and R.C.S. brand names, there will now be only two.

In discussing the above agreement, Mr. R. K. Stokes, managing director of Radio Suppliers Pty. Ltd., stated that this step towards standardisation would be carried to completion as far as possible in the Radiokes coils and coil kits now being released.



A selection of radio component mouldings in colourless Trolitul.

For all coils and i.f. transformers, one of two standard square cans will be used. One can, 2⅜" high, is being used for ordinary coils, and the other, which is 3" high, will be for i.f. transformers.

Both coils and i.f.'s will be wound on the trolitul former that has been adopted as standard by Radiokes and R.C.S.

As shown in the photograph of the former on page 8, it comprises a one-piece moulding with insert lugs moulded into the base. Two types of insert screws will be used, moulded into the top of the former, the longer being intended for i.f. transformers.

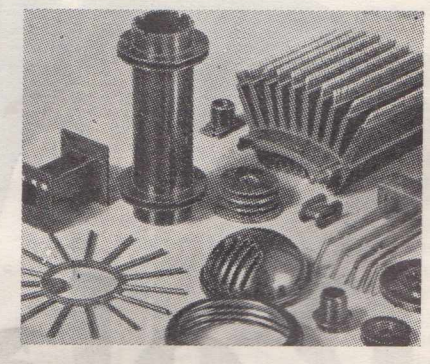
All windings will be put directly on the trolitul former, the connections being taken to the insert lugs in the base. Thus the windings will touch nothing but trolitul, with the result that the highest possible "Q" is obtained.

Trolitul is evidently destined to become the standard insulation material, not only in components factories alone, but throughout the entire radio industry. Already a number of receiver manufacturers are using it extensively.

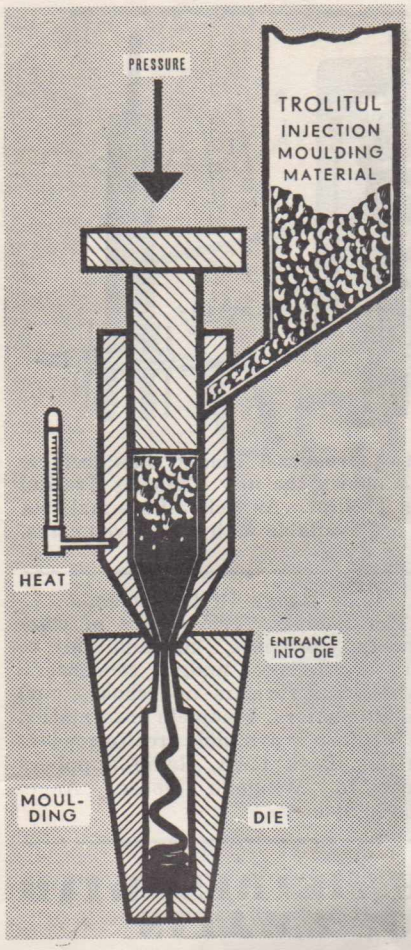
The main reason for this popularity is that Trolitul is from every point of view the finest all-round material yet marketed for the purpose. A synthetic hydro-carbon compound, it is also a thermo plastic, or in other words the application of heat softens it to such an extent that it can be readily moulded without injuring its insulative properties.

How Trolitul Is Moulded.

The sketch opposite illustrates the injection moulding process used. The material is first softened in a heated cylinder, and then it is compressed and squirted through a nozzle. It emerges in the form of a tough viscous thread that is injected into the mould. After it has been compressed to its maximum density, it is permitted to cool and set. In this manner, mouldings can be manu-



Some examples of the applications of Trolitul in the telephone field are pictured above.



This sketch illustrates the injection moulding process developed for treating Trolitul.

factured quickly, and with practically no waste.

Trolitul is available in a variety of transparent colours and can also be supplied colourless, though cream is the colour that will apparently be largely adopted in the radio industry.

Physical And Electrical Properties.

The specific gravity of Trolitul is approximately 1.05, so that it will almost float in water, to which, incidentally, it is impervious. Mechanically it is very strong, while electrically its internal and surface resistances are both listed as being infinite. Electric break-down resistance is 50 kilovolts per millimetre. Thus it is strong, light, an excellent insulator, and is easily moulded, properties that make it ideal for use in radio components.

On the manufacturing side, Trolitul possesses equally attractive features. For example, in place of the half a dozen or so operations necessary to prepare, say, a "doped" cardboard former to take coil windings, a Trolitul former of much higher efficiency can be manufactured, complete with numbered and lettered insert lugs in the base and insert mounting screw on top, in a single operation.

Coils will be provided with 4-lug and 6-lug bases, the former for two

(Continued overleaf)

IMPORTANT NEW ROLA PATENT

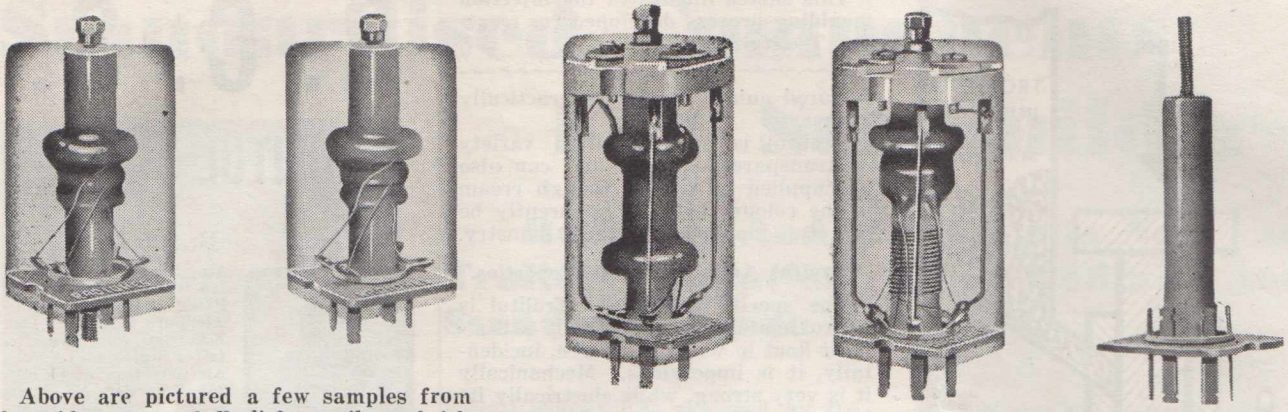
Big Advances In Speaker Technique: Permacentric Construction

ANOTHER outstanding contribution to loud-speaker design and manufacture has been announced by the Rola Company this week. Known as Permacentric Construction, this new development eliminates all forms of spider adjustment and provides a permanent means of holding the voice coil and diaphragm in position.

At the same time, this new patent provides a positive means of dust-proofing incorporating the advanced principles recently applied to Rola speakers.

Fundamentally, the new permacentric construction consists of an inward extension of the cone housing raised as to form a support for the corrugated fibrous spider. The support is perforated and lined on the inside with a porous dustproof material to provide thoroughly efficient dustproofing. The spider is firmly secured to the top of this raised support, and it is impossible to move the diaphragm out of alignment except by the wilful application of considerable force. Normal rough treatment cannot effect the centring of Rola speakers built along permacentric lines. The simplification of such a vital part of the modern loud-speaker is truly a big step forward in construction.

Advice has been received that the 12" K12 and F12 are now available with permacentric construction, and that other models will be available almost immediately.



Above are pictured a few samples from the wide range of Radiokes coils and i.f. transformers, which all use the new Radiokes Trolitul former. On the left are two broadcast tuning coils; centre, a dual-wave coil, and second from right, an i.f. transformer. On the extreme right is shown the new Radiokes Trolitul former. Extremely high "Q" is a feature of all coils, which are wound directly on Trolitul. As well, all are matched to an unusually high degree of accuracy never before attained. All coils and i.f.'s are available with air or iron cores.

and the latter for three-winding coils. In the case of i.f.'s, connections will be identified by the letters "G," "F," "B+" and "P," moulded into the base directly opposite the lugs. For aerial coils, the letters "A," "E," "F" "G" will be used. As well, the lugs will be numbered from one to six for three-winding coils and "specials." These numbers are imprinted on the base outside the lugs, the letters referred to above being inside the lugs.

The standard trolitul former adopted is hollow, and for iron-cored coils and i.f.'s the core is inserted down the centre, a special mounting process ensuring its correct positioning in relation to the winding around it, outside the former. The same method is adopted for permatune coils and i.f. transformers.

Wide Range Of Components.

The Radiokes 1939 range of components comprises, in addition to coils of all types, midget condensers, power transformers and chokes, and potentiometers. Complete information on all lines is available free to readers writing Desk RW4, Radio Suppliers Pty. Ltd., Wingello House, Angel Place, Sydney.

S.T.C. Radio Equipment In World's Largest Ship.

This month's front cover shows an artist's conception of the new Cunard White Star liner, "Queen Elizabeth," launched last year by Her Majesty the Queen, and now being fitted out.

The radio equipment is being supplied by Standard Telephones and Cables, and will embody a number of detailed improvements based on the operating experience in the "Queen Mary," which, incidentally, still holds the world record for the amount of radio traffic handled by a ship's installation.

Passengers will be able to speak from ordinary telephone sets in their cabins, or in the telephone booths, to subscribers in any part of the world, without fear of eavesdropping.

The radio installation will be arranged for multiplex working on short, medium and long wavebands. Automatic high-speed telegraph transmission is planned, and extensive measures for the suppression of electrical interference are to be adopted.

160 MILES ON FIVE METRES WITH INPUT POWER OF 2 WATTS

Using VK2NO Transceiver As Described In "R.W."

THE past twelve months has seen a variety of DX records established by the enthusiastic handful of VK experimenters who are concentrating on the "ultra highs."

Now comes news in the form of a letter to "Radio World" from Elwyn Fallowfield (VK2AKI), that his five-metre transmissions from Taree on March 26 were picked up at Lidcombe, near Sydney, an airline distance of about 160 miles. An amazing feature of this DX is that at the time 2AKI was only using a two-valve transceiver, with about 2 watts input to a loop aerial! The equipment, incidentally, was a small portable rig built by Don B. Knock (VK2NO) and described by him in the "Radio World."

VK2AI writes:—

"I have received a report from Mr. Clive Bambury, of Lidcombe, stating that he heard my 5-metre transmission last Sunday, March 26, at 12.55 to 1.5 p.m. The report was given as QSA2, R3.

"The time given is correct, and I was calling VK2AEY on 'phone. I could not raise him on 'phone, although I managed to copy a few words of c.w. from his station. VK-2AEY came back on 40 metres and told me that my signals were being received at QSA5, R9, with quality 100% from his location.

"The transceiver used here is similar to VK2NO's described in 'Radio World.' I am using a 6C6 and 42 with 100 volts "B" supply. The input would be approximately 2 watts. The antenna is the same as described.

"I hope this will be of interest to 5-metre enthusiasts, and I will be very pleased to receive further reports.—Elwyn Fallowfield (AW243-DX, VK2AKI), 128 Manning St., Taree, N.S.W.

Comment By VK2NO.

When approached by "Radio World" in regard to this new low-power DX record on 5 metres, Mr. Don B. Knock (VK2NO), a leading VK pioneer worker on the "ultra shorts," supplied the following comment:—

This reception in Sydney of 5-metre signals from Taree, a distance of 160 miles north, is another instance of the

(Continued on page 47)

Club Contests In Full Swing

Annual Re-union Early In May ★ Activities And Benefits Of Lakemba Radio Club . . . .

By W. J. P.

DURING the months of March and April, the activities of the club have been confined to a number of contests, which are always conducted prior to the annual reunion, usually held early in May.

The silver cup presented for competition between receiving members only was won by Mr. Biere for the best piece of radio apparatus constructed solely by the competitor. The winners of the Slade Radio Cup (DX contest) and the Chanex-Dulytic Cup (VK-ZL contest), have yet to be announced.

The annual reunion of the club marks the end of the financial year, and this year it is anticipated that that function in general will be even greater than on previous occasions. During 1938-1939, the club had a considerable increase in new members. Of course, a number were also compelled to resign due to being transferred to other districts. The general increase in membership, however, is most satisfactory for a suburban radio club.

For the benefit of those who may wish to become a member of the Lakemba Radio Club during the coming year, might we quote a few of the activities and benefits derived from membership.

The meetings are held every second Tuesday at the Sunrise Hall near Canterbury Railway Station, those for April being held on the 11th and 25th—thence every fortnight. The nomination fee is 2/-, the fortnightly contribution being only 6d.

Those amateurs who are members and wish to use the QSL service are asked to pay an additional fee of 6d. per month, whereby they may dispatch as many QSL cards as they wish through the QSL manager, irrespective of the destination of the cards. This fee, incidentally, was recently increased from 3d., but the service has been improved in proportion.

During the year, various contests are arranged, together with field days and social outings. Interesting lectures, mainly of general interest, are delivered by members and many outside the club. Various members are engaged in practically all phases of the electrical and radio trade, so that a lot of useful information is always readily available.

Use may be made of the club library at no extra charge, there being available to members various books on radio, including "Aust. Radio World," American "Radio," "Q.S.T.," etc. Morse classes are conducted each meeting night at 7.30 p.m. for the benefit of those who are studying for their tickets, while slow morse is also transmitted over the air.

The club is pleased at all times to entertain visitors, particularly those from inter-state and overseas.

Any further information may be obtained from the Hon. Secretary, Mr. A. V. Bennett, VK2VA, 14 Park Ave., Concord, or from the Publicity Manager, 14 Watkins St., Canterbury (phone UA 4751).

★

Zero Beat Radio Club Notes.

By "RUSS."

DURING the month of March there have been some very interesting lectures. On March 3, a lecture on "Time" was given by Mr. Otto Addley, B.Sc., an astronomer from the Sydney Observatory. This lecture proved to be very interesting indeed, and was greatly appreciated by the members. Mr. Les Wirsu gave the lectures on March 10 and 17, the first being on power supplies and the second on meters. These lectures were given in very simple language, so that the novice could fully understand them.

On March 24, Mr. J. Hayman, late of New Zealand, gave a very interesting lecture entitled "Service Communication." All these lectures were given in a simple and precise manner, so that while the younger members could understand them, the matter presented was still of interest to the older and more advanced members.

Since the club rooms were burnt out in January, the club has held its meetings in Palings' Buildings, but now we have secured new rooms in Bulletin Place. We have rented the studio of Repertory Film Players and the members are at present building a transmitting-room. The transmitter is now being re-built and the club expects to continue its usual Friday night transmission shortly after Easter. All meetings and lectures will be given in the studio and transmissions made from the transmitting room.

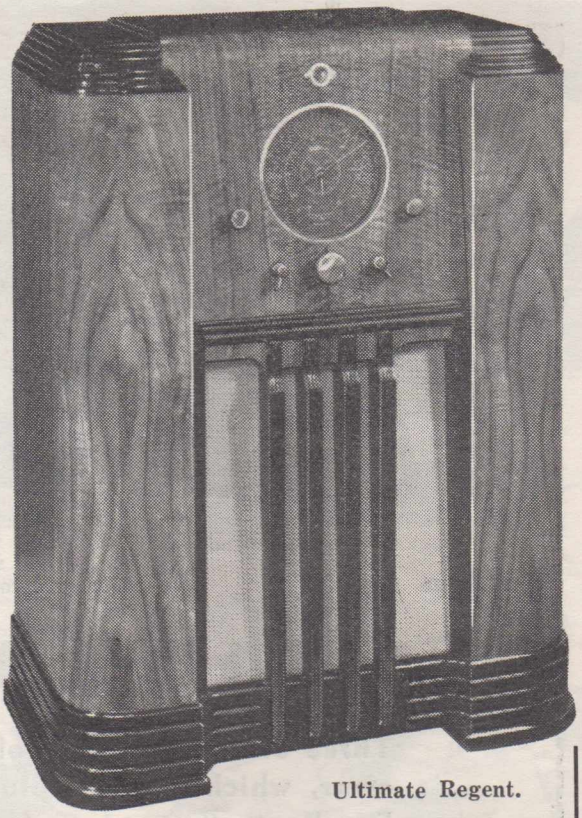
All members are reminded that the annual meeting of the above club will be held in the studios of the Repertory Film Players, 16-18 Bulletin Place, on the last Friday of April, when the new officers will be elected for the coming year.

New or intending members should call at or write to the secretary at the above address.

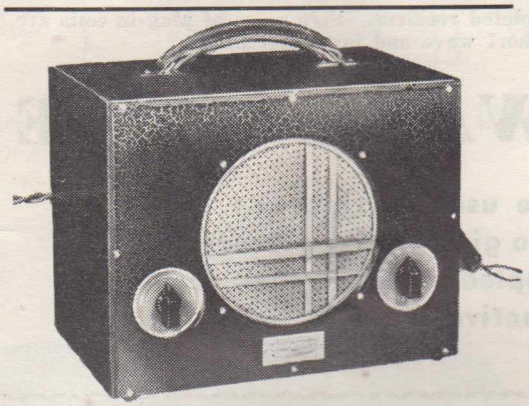
This card was received by the Shortwave Editor from VS6AB, an amateur station in Hong Kong, owned and operated by J. W. Brown.

ULTIMATE Leads The Radio Parade!

ULTIMATE has always led the radio parade . . . only now are other manufacturers adopting Ultimate's 1938 cabinets, spin dial, extended tuning range, battery economy switches, etc. 1939 models still contain those features plus other necessary refinements such as six-gang tuning condensers, all-wave coverage, inbuilt power switch on volume control, new type dials, etc., etc.



Ultimate Regent.



ULTIMATE PORTABLE

Ideal for operation in your car on journeys to the camp or week-ender. Extremely economical in use, and transportable to any location. Two-set adaptability and performance for the price of one.

WIDE VARIETY OF MODELS AVAILABLE

There are nine country models in the Ultimate range—mantels, consoles, radiograms and portables for vibrator and battery operation. As well, there are ten A.C. models, comprising two mantel models, five consoles and three radiograms, for dual-wave and all-wave operation.

You Should Know These Facts About ULTIMATE Radio

(a) A standard 6v. A.C. "Ultimate" holds the world's record for the greatest number of verified stations received—798 on the broadcast band.

(b) An "Ultimate" Battery Set has created a record in logging 531 verified stations.

(c) An "Ultimate" in New Zealand holds Nine Champion of Champions Awards.

(d) "Ultimate" was used by Commander R. E. Byrd in his expedition to the South Pole.

(e) Mr. R. N. Shaw, of Wauchope, uses an 8v. A.C. All-wave "Ultimate" for compiling "Wireless Weekly" Shortwave Notes.

(f) Dr. Sinclair, of Eastwood, official adviser to the B.B.C. on Australian shortwave reception, uses "Ultimates" exclusively.

(g) Mr. Keast, of Randwick, adviser to technical publications on shortwave reception, uses an 8v. A.C. "Ultimate."

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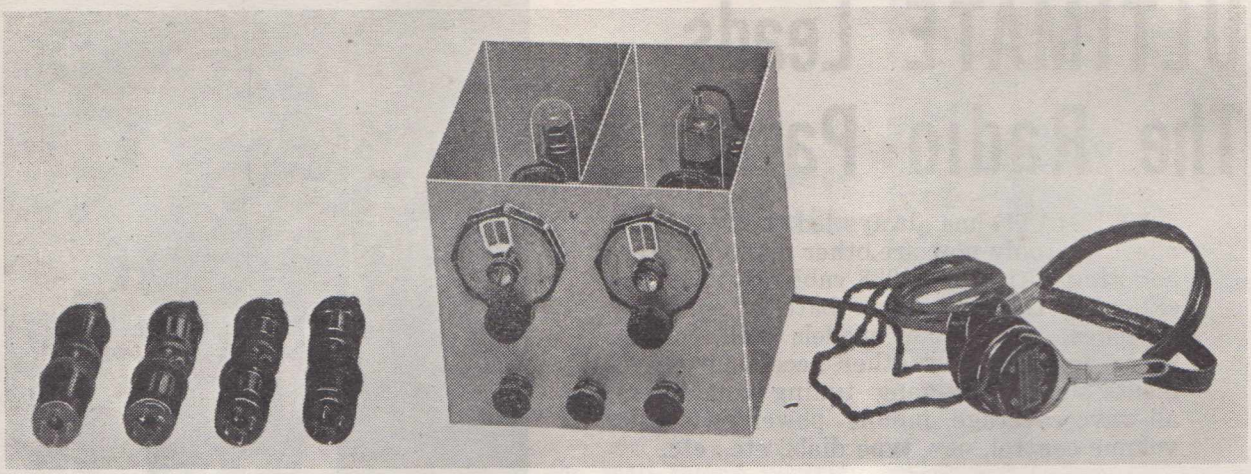
Please send me, without obligation, details of the Special New De Luxe "ULTIMATE RECEIVERS."

NAME .....

ADDRESS .....

(State whether battery or electric and voltage and type of current of power supply)

(Details can be copied to avoid cutting magazine)



A general view of the completed receiver. Five pairs of plug-in coils are used to give coverage of the short wave and broadcast bands.

The . . . SKY-HAWK ALL-WAVE THREE

Three of the new 1.4-volt valves are used in this t.r.f. receiver, which employs plug-in coils to give all-wave coverage. Excellent all-round performance coupled with unusual economy of operation are attractive features.

THE new range of 1.4-volt valves now on the market offers many inviting possibilities to the set-builder in the construction of simple, compact shortwave and all-wave receivers of the t.r.f. type.

Despite the swing in recent years towards multi-valve communications superhets, the t.r.f. set is still a firm favourite among amateurs and shortwave fans. One leading Sydney amateur has for many years now used a simple detector and one audio set for all his DX work, while even those amateurs with communications superhets generally have a t.r.f. job lying around the shack for use as a stand-by receiver.

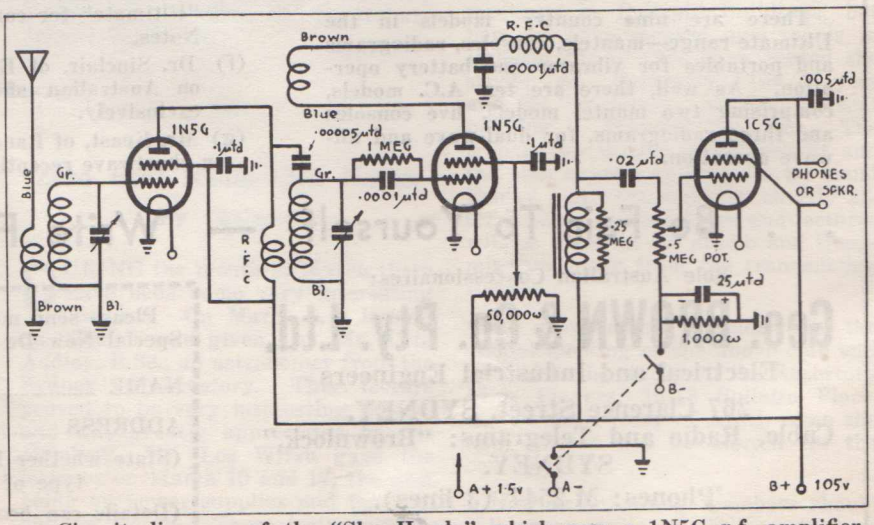
More Stations Per Pound Outlay.

From the shortwave fan's point of view, a set such as the "Sky Hawk All-Wave Three" will possibly give more countries logged on shortwave per pound outlay, than any superhet. On the broadcast band good headphone reception over about 2,000 miles range can be expected, with perhaps a dozen stations at good speaker strength, depending on the location.

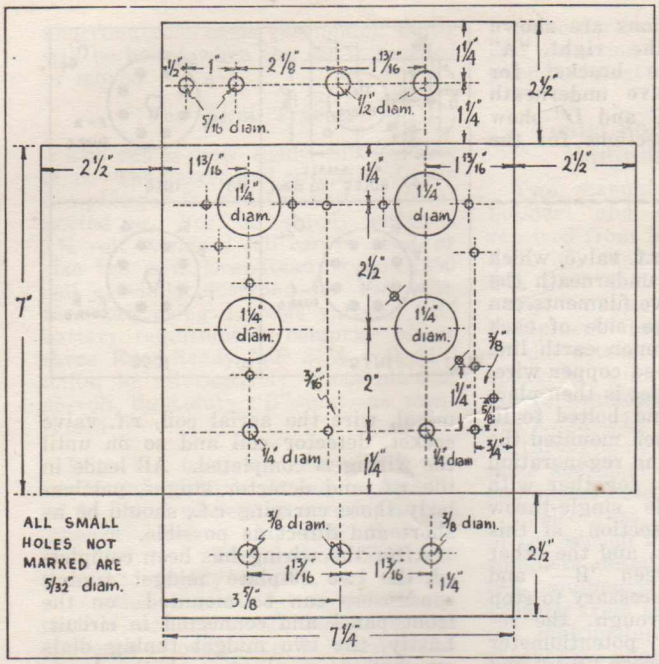
The circuit is of the "sure fire" variety, and is one of the simplest that could be used. Actually, with the exception of the audio driver stage, it is almost identical with that of the "Air Ace Communications Four" described last year.

The battery drain is particularly light. "A" requirements are .2 ampere at 1.5 volts. (If desired, this could be reduced to .15 ampere by substituting a 1A5G output pentode for the 1C5G used in the original model).

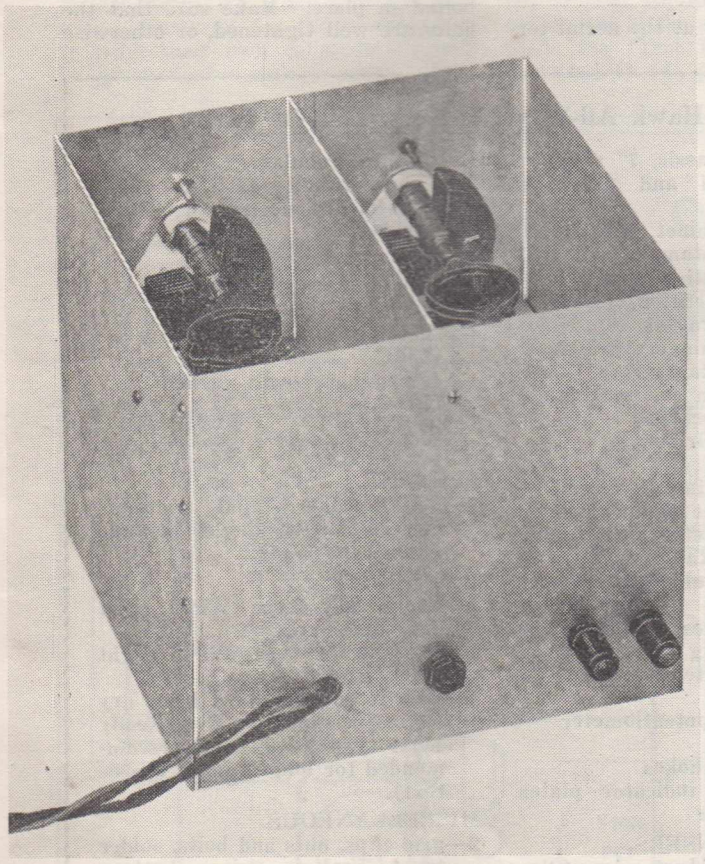
The receiver is housed in an aluminium cabinet measuring only 7" x 7" x 7½." The r.f. and detector circuits are well isolated by shielding, and the



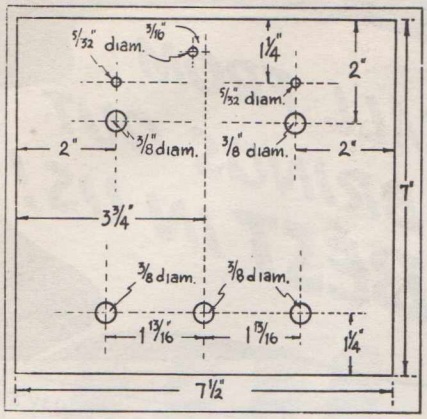
Circuit diagram of the "Sky Hawk," which uses a 1N5G r.f. amplifier, 1N5G regenerative detector and 1C5G output pentode.



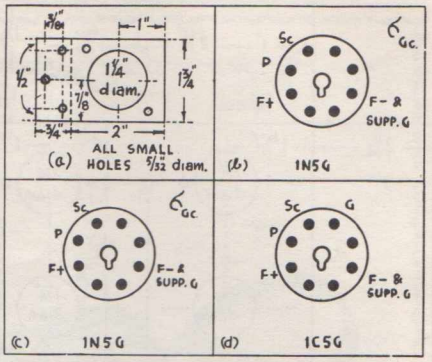
Dimensions for stamping and drilling the 18-gauge sprayed steel chassis are shown above.



This rear view shows the location of the aerial and earth terminals and output jack. The battery cable comprises two pairs of leads, one for "A—" and "A+ 1.5 volts," the other for "B—" and "B+." The two 23-plate midget variable condensers shown are Raymart ceramics.



Front panel dimensions are shown at left, while on the right, "A" gives details of the bracket for mounting the r.f. valve underneath the chassis, and "B, C and D" show the under-socket connections for the valves.



layout has been planned to give shortest possible leads in the r.f. stage. This applies particularly to the plate and grid leads of the 1N5G r.f. valve. By mounting this valve horizontally underneath the chassis, the two leads mentioned are less than an inch long.

Choke-Coupled R.F. and Audio Stages.

For greatest gain, choke capacity coupling has been used between the r.f. stage and detector. The latter is regenerative, feedback being controlled by a 50,000-ohm potentiometer in the screen circuit. Highest audio gain is ensured by the use of choke capacity coupling, the high impedance audio choke required being mounted underneath the chassis in the position shown in the under-chassis wiring diagram.

The "B" supply chosen comprises a 60-volt and a 45-volt light-duty "B" battery connected in series, totalling 105 volts. Automatic bias is used for the output pentode, being obtained from the voltage drop across the 1,000-ohm resistor connected between "B-" and earth. For greatest possible economy in operation, a slight overbias is used, amounting to approximately -10 volts. This leaves an effective plate voltage of 95 volts.

About The Parts.

Raymart shortwave components are used throughout the receiver wherever possible. There are two ceramic-insulated 23-plate condensers and two type CHN Raymart r.f. chokes. If desired, to ensure highest possible gain, ceramic sockets can also be used for the coils and valves, though this is not essential.

The high impedance audio choke should be of a fairly compact type to permit of mounting it underneath the chassis, which is 2½" deep. A good makeshift here is the primary or secondary winding of an ordinary audio transformer.

Sockets Mounted First.

The first step in the construction is to mount the coil and valve sockets, including that for the r.f. valve, which mounts horizontally underneath the chassis. Next, the valve filaments can be wired, the negative side of each being joined to a common earth line of 14 or 16-gauge tinned copper wire.

The aluminium cabinet is then placed over the chassis and bolted to it. Along the front are then mounted the audio volume control and regeneration control potentiometers, together with the rotary double-pole single-throw on-off switch. One section of this breaks the "A" circuit, and the other the connection between 'B—" and earth. The latter is necessary to stop the current drain through the regeneration control potentiometer which is connected between "B+" and earth, while the set is not in use.

Finally, the aerial and earth terminals can be mounted on the rear wall of the chassis, together with the output jack.

Now, commencing at the aerial terminal, wire the aerial coil, r.f. valve socket, detector coil and so on until the wiring is completed. All leads in the r.f. and detector stages, particularly those carrying r.f., should be as short and direct as possible.

After the wiring has been completed, the two 23-plate midget tuning condensers can be mounted on the front panel and connected in circuit. Lastly, the two midget tuning dials are bolted in place, and the lower control knobs fitted.

After the wiring has been checked, the vertical shield separating the r.f. and detector compartments can be bolted in place. Make sure that the bolts are well tightened, or otherwise

"Sky-Hawk All-Wave Three"—List Of Parts.

1—aluminium chassis, 7" x 7½" x 2½", stamped and drilled to specifications
1—aluminium cabinet, with lid, 7" x 7" x 7½", stamped and drilled to specifications
1—aluminium partition, 4½" x 7"
1—small steel bracket
2—.00016 mfd. midget variable condensers (Raymart)
1—4-pin, 1—6-pin coil sockets
3—octal valve sockets
2—small dials (Ormond)
2—control knobs
1—closed circuit jack (Ormond)
1—high-impedance audio choke
2—sets 15-600 metre plug-in coils (10 in all) (Rayway)
1—double-pole double-throw rotary on/off switch
1—pair headphones (S.T.C.)
1—headphone plug
1—50,000 ohm potentiometer (I.R.C.)
1—500,000 ohm potentiometer (I.R.C.)
2—all-wave r.f. chokes
2—0-180 degree indicator plates, 2" in diameter

FIXED CONDENSERS.
2—.0001 mfd. midget mica (Simplex, T.C.C.)
1—.005 mfd. midget mica (Simplex, T.C.C.)
1—.02 mfd. tubular (T.C.C.)
2—.1 mfd. tubular (T.C.C.)
1—25 mfd. dry electrolytic, 25v. working.

FIXED RESISTORS.
1—1000 ohm 1-watt carbon (I.R.C.)
1—.25 megohm 1-watt carbon (I.R.C.)
1—1 megohm 1-watt carbon (I.R.C.)

VALVES.
2—1N5G, 1—1C5G.

SPEAKER.
1—P.M. speaker, input transformer to match single pentode (Rola type 6-14).

BATTERIES.
1—Ever-Ready type WP60 light duty "B" battery
1—Ever-Ready type WP45 light duty "B" battery
1—Ever-Ready standard 1½v. dry cell (or special Ever-Ready 1½v. type X250 cell is recommended for longest service—see text).

MISCELLANEOUS.
2—grid clips, nuts and bolts, solder tags, hook-up wire, battery cable, "A" and "E" terminals, 2 small hinges, rubber grommett.

unaccountable noise resembling static will be heard when the set is touched or moved.

The First Tryout.

The set is now ready for its first trial. The valves and any pair of coils are plugged in, and the batteries connected up. For "A" supply, either a 1½-volt standard cell can be used, or else the new Ever-Ready type X250 cell specially designed for use with receivers using 1.4-volt valves. "B" battery requirements comprise either three Ever-Ready WP 31½ volt "B" units, or alternatively a 60-volt and 45-volt light-duty "B" unit, as mentioned previously.

With the batteries connected, the aerial and earth leads can be attached to their respective terminals, the 'phones plugged in, and the set switched on. The tuning dials are then set roughly in step, and the regeneration control advanced slowly until a rushing sound, indicating the approach of oscillation, is heard in the phones. When the set is in this condition stations should soon be picked up.

For the original receiver, a Rayway 15-600 Metre All-Wave Coil Kit was used. However, for those who want to wind their own coils, details will be given next month.

Some further hints on the assembly and operation of this receiver will be published next month.

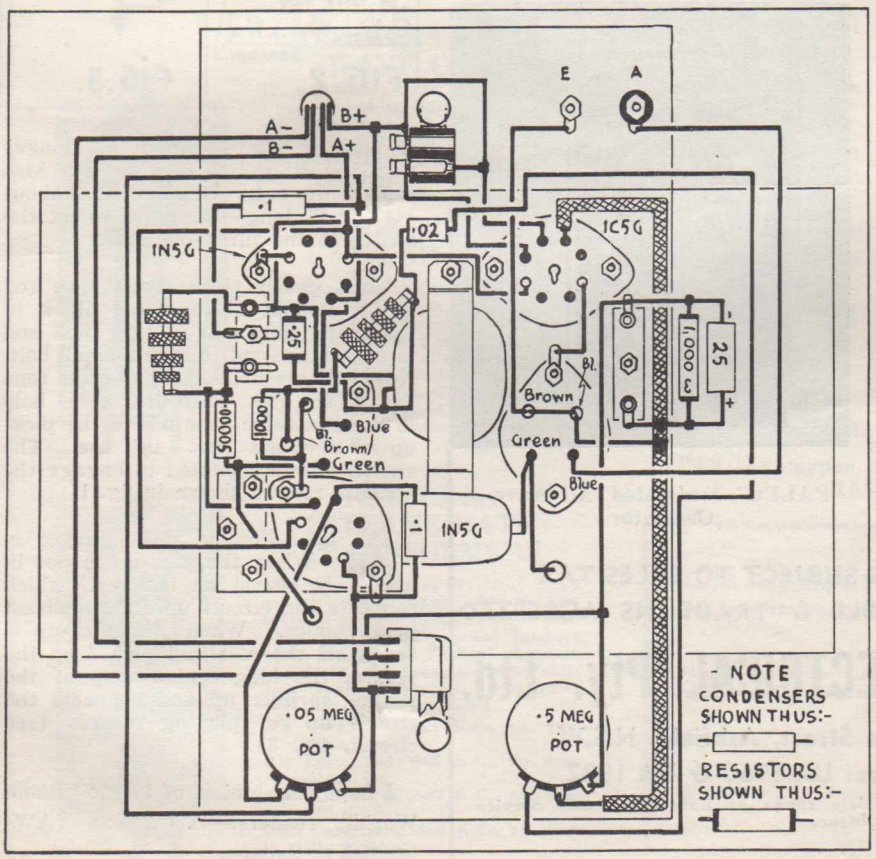
Vealls Sound And Service Equipment Manuals.

Two manuals of interest to set-builders and servicemen have been received from Messrs. A. J. Veall Pty. Ltd., of Melbourne (postal address, Box 2135 G.P.O., Melbourne).

The "Velco All-Purpose Sound Equipment" booklet gives full details of the extensive range of amplifiers, speakers, microphones, projection horns, gramophone motors and pick-ups handled by Vealls. Well-illustrated throughout, the booklet gives complete specifications, with prices, of all equipment listed.

"Velco Test Equipment" is the title of the second manual, which contains complete details of all meters and test equipment handled by Vealls, ranging from small pocket voltmeters to multimeters, oscillators, valve checkers, analysers, etc. Complete specifications are given for each instrument, together with detailed instructions for use.

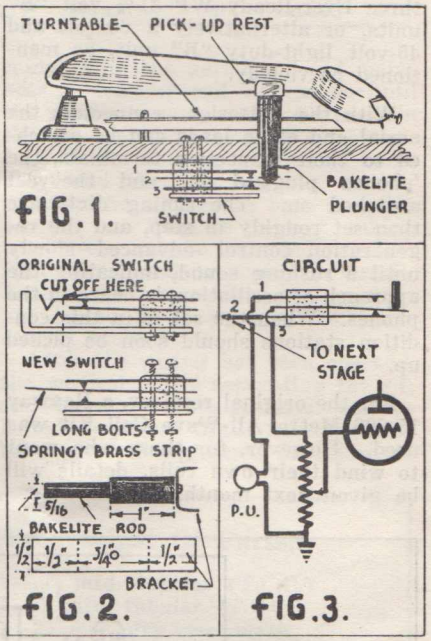
"Radio World" readers can obtain the "Sound Equipment" booklet free on request at the address given above, while the "Test Equipment" manual is priced at 6d., post free.



Automatic Switch For A Pick-up.

Here is an interesting idea for those who use the audio channel of a broadcast set for an amplifier. The switch described here enables one to have pick-up or broadcast programmes at will. A 'phone jack of the type shown in fig. 2 and a piece of bakelite rod is all that is needed.

Remove the centre contact of the switch and replace it with a piece



of springy brass about ¾" longer than the other two (see fig. 2). Also replace the bolts with new ones about 1½" to 2" long—these are to fix the switch to the turntable base.

Next, get a piece of bakelite rod ½" wide and 2" long and file it to the shape shown in fig. 2. Drill and tap the large end to take a small bolt. Now bolt the bracket to take the tone arm to the rod. Also drill a ⅜" hole in the turntable base where the pick-up rests when not in use. The switch is now mounted to engage the bakelite rod, as shown in fig. 1.

The operation of this gadget is simple. When the pick-up is not in use, it is placed on the rest, which connects the circuit up for broadcast programmes. When the pick-up is taken off the rest and placed on the record, the long centre strip of the switch springs up and connects the circuit up for playing records (see circuit, fig. 3).

I hope this hint is of use to "Radio World" readers.—L. Wilson (AW-3OODX), Sydney.

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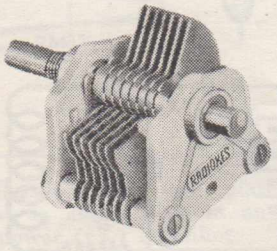
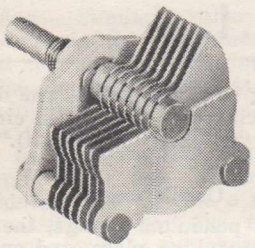
TROLITUL

1939's Greatest Development in COIL and I.F. Design!





TROLITUL MIDGET CONDENSERS

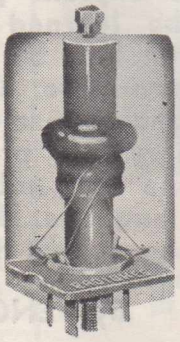
Radiokes Midget Condensers are made in two types, Trolitul insulation guaranteeing practically no loss. The 14 plate equals old-style 23 plate capacity. The M.C.T. type may be gauged.

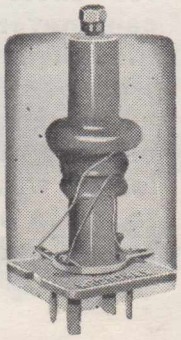
S.S.T. and M.C.T. Midgets

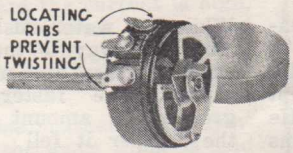
Max. Cap. mmfds.	Min. Cap. mmfds.	Cap. Plates
10	3	2
15	3	3
25	3.5	4
35	4	5
50	4	7
70	5	9
100	6	14

Radiokes Trolitul Tuning Coils

Radiokes new Trolitul Tuning Coils are highest Q yet produced. Being wound on and supported by a combined Trolitul former and base, they lend themselves to an accuracy and precision hitherto unobtainable. All coils are suitable for standard type valves.

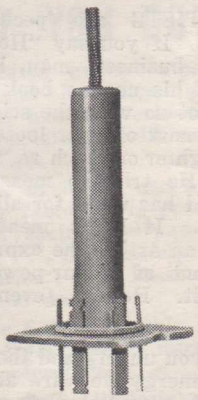






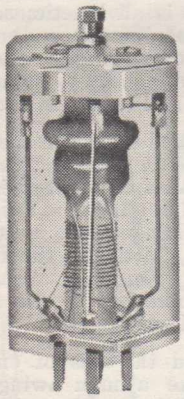
Volume Control Potentiometer

Manufactured under a new process, the new Radiokes Volume Control Potentiometer upholds the quality and precision workmanship of every Radiokes product.



RADIOKES TROLITUL FORMERS

The new Radiokes Trolitul formers combine Trolitul former and base, ensuring the highest standard of high efficiency and low loss.

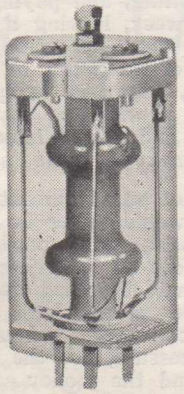


RADIOKES DUAL-WAVE COILS

B'cast 1500 to 550 K.C., S.W. 16 to 50 Metres.
Air Core Aerial Coil.
Air Core R.F. Coil.
Air Core Osc. Coil.
Air Core Osc. Coil, 465 K.C.

RADIOKES B'CAST COILS

Air Core Aerial Coils.
Air Core R.F. Coils.
Air Core Osc. Coils, 465 K.C.
Iron Core Aerial Coils.
Iron Core R.F. Coils.
Iron Core Osc. Coils, 465 K.C.
Permeability Tuned Aerial Coils.
Permeability Tuned R.F. Coils.
Permeability Tuned Osc. Coils, 465 K.C.



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This Thing Called "Q"

Many articles are written on "How to Make It," "Radio in Six Easy Stages" and so on, but most of the "How" articles are, and must be, too short to explain just why, while radio can never be learned in six easy stages, though enough may be absorbed to inspire the student to learn more. The writer of this article has had to teach himself much by interpolating between theory and practice. This particular lesson was one that nobody seemed to be able to put in his language. However, by using simple analogies he hopes that it is intelligible to others.

By "ENGINEER"

SCIENTISTS are peculiar creatures. If you say "How much?" to a business man, he usually thinks of his cheque book or receipt book. Not so with the scientist. He answers most of your loose questions with a tighter one such as "How much **what**?" He tries to measure everything, and has units for all things he measures. If he is measuring the value of an article, he expresses it in the amount of labour-power used to produce it. He can even measure energy.

When you understand the scientist's idea of energy you are able to conjure much more complete mental pictures of the **action** of many things, including tank circuits, for energy is actually the reason behind all action. If you pick up a jug of water, you have to exert an upward force to raise it to the level required.

More force is needed to lift a full quart jug than a pint one **to the same height.** That is the other factor. The higher the jug is raised, the greater the amount of energy needed.

This energy is not lost. When the jug is tilted over a glass, the water falls into the latter and agitation of the liquid is set up. There is action, and the energy causing it was the result of the fall.

As the swirling dies down, the energy is transformed into heat. When the water was in the raised jug it had energy stored in it by virtue of its height and its weight (or mass). The energy was potential. While the water rushed through the air on its way to the glass, it could exert a force on anything in its course. The faster it went, the greater the amount of energy, and the further it fell the more the energy, because it travelled faster. In this way potential energy becomes transformed to kinetic energy.

Take another case: Think of some air compressed in a cylinder. When some of it is released through a paint spray, it can lift the paint out of the container, break it up, and force it to stick to the article being painted. The moving air, like the moving water, has energy of motion—**kinetic** (moving) energy, and the compressed air has potential energy. In the same way, electricity stored in a condenser represents potential energy, and an electric current, especially if it flows through a coil having inductance, has kinetic energy.

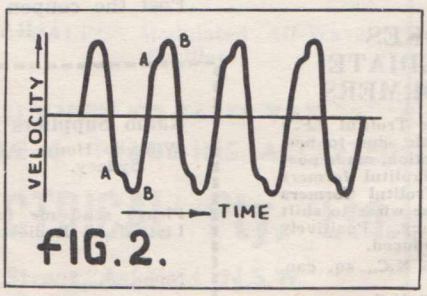

FIG. 2.

Graph of velocity of a pendulum showing the "kick" given by the spring to keep it moving. The "kick" begins at "A" and vanishes at "B."

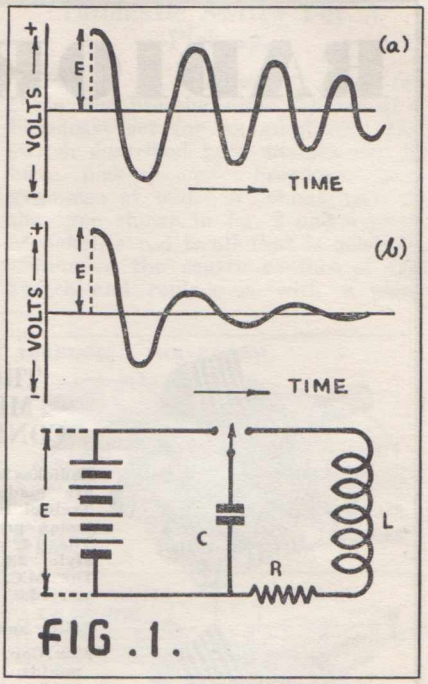

FIG. 1.

Showing how "Q" affects the decay of free oscillations in a tuned circuit. (a) High "Q," and (b) low "Q."

Oscillations.

When a pendulum swings, there is some action taking place, and energy must be present. At the extremes of each swing, it is all potential, and in the middle it is all kinetic; so the action of a pendulum depends on a transformation of potential energy, gradually to kinetic, back to potential, back to kinetic, and so on, in **cycles.**

It may be noticed that each successive swing is a little shorter than the last, indicating that the energy is being lost gradually. Lost? Yes, not destroyed, but changed into heat due to air resistance, friction in the string itself, and in its suspension. Actually, the swing is diminished by the same fraction each time.

In that regard the loss of energy is somewhat like a man owing another man a shilling, and paying off threepence one week, leaving a debt of nine-pence. Then he would pay off one quarter of ninepence, or twopence farthing, leaving sixpence three farthings, of which he pays off one quarter, one and eleven-sixteenths of a penny, the next week, and so on.

In the terms of an agreement like that, the debt would never be paid completely, just as the pendulum tends never to lose all its swing, but in actual fact, the debtor and creditor would, at some stage, both say "damn this nonsense," and call it settled. The pressure, i.e., the debt, becomes zero, and the money ceases

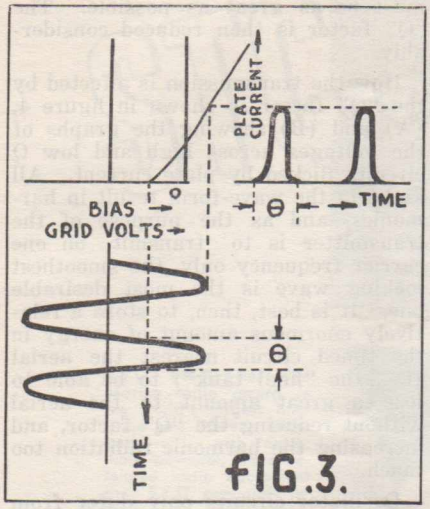

FIG. 3.

Showing how the plate current flows in short flicks in an oscillator or power (r.f.) amplifier.

to flow. Similarly, other forces are at work in the pendulum causing a final cessation of swinging.

The important point is that the pendulum has been used as a sort of tank to store energy, and it has what can be termed a leak, which lets the energy drain out. To measure the goodness of a tank as a reservoir, it is possible to find the ratio of the energy stored to the energy dissipated per second. You may call it the energy factor or any other appropriate name, but it means the same thing as the Q factor of a tuned circuit.

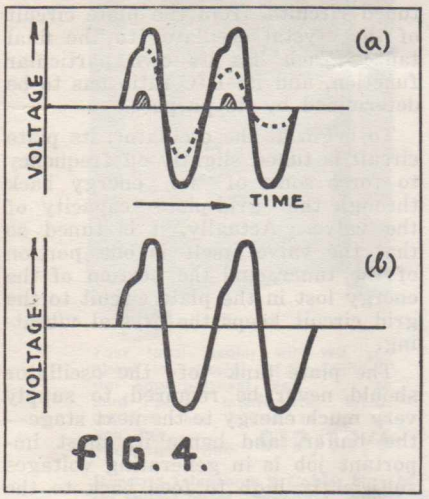

FIG. 4.

How the "Q" factor of the tank circuit affects the operation of the stage. The shaded parts in (A) are the current flicks. Note the dotted line showing how the oscillation would decay, and how the flick prevents it. The high "Q" circuit (A) allows less harmonics than (B) with lower "Q."

The Tuned Circuit.

The tuned circuit has a coil possessing inductance able to store kinetic electrical energy, and a condenser, capable of storing potential electrical energy. Also, the coil has a certain resistance, and so has the condenser. If the circuit is supplied with a burst of energy, it will, as it were, leak out, as heat, due to the resistance in the circuit. The stored energy is in the **reactance** of the circuit, and the energy is lost in the **resistance.**

As the energy is passed back and forth from coil to condenser and vice versa, and the same potential or **voltage** exists across both, the reactance, in volts per amp., or volts squared per Joule of energy, must be the same, so it does not matter which reactance is chosen, coil or condenser.

When considering the resistance, however, it has to be remembered that resistance in the coil has to be zero in a perfect circuit, and infinite in the condenser. A large resistance in the coil has the same effect as a small resistance in the condenser.

Also, the energy lost in the coil is greatest where the current is high, i.e., where the reactance is low, and in the condenser it is greatest where the voltage is high, i.e., where the reactance is high.

In the concise mathematical symbols of radio, the same thing is said by:—

$$Q = \frac{\omega L}{R_1}$$

Where R_1 is resistance in the coil and there is infinite resistance in the condenser.

$$Q = \frac{R_2}{\omega L}$$

Where R_2 is resistance across the condenser, and there is no resistance in the coil.

$$Q = \frac{1}{\frac{\omega L}{R_2} + \frac{R_1}{\omega L}}$$

And where R_1 and R_2 are in coil and condenser, respectively.

In each case, L is the inductance and W (omega) is the product 2π x frequency. In fact WL is the coil **reactance,** which is indeed equal to the condenser reactance 1/WC where C is the capacity, and both are equal to

$$\sqrt{\frac{L}{C}}$$

This queer ratio, often spoken of, often written about, and often alluded to in loose statements about "high C" and "low C" circuits—this L over

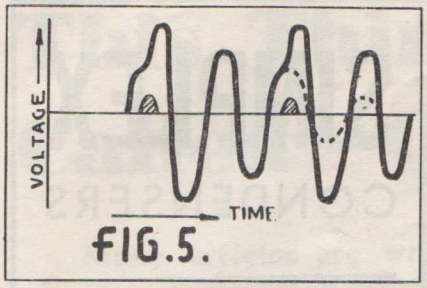

FIG.5.

Action of a frequency doubler. The flicker occurs every fourth half-cycle, and the "Q" must be fairly high to keep the amplitude (peaks) fairly constant.

C ratio—is simply the square of the reactance.

Most circuits have losses in both coil and condenser, and one is put, as it were, between the devil and the deep blue sea in the choice of the best L/C ratio. If the coil is made too large, the voltage becomes high, and the loss in leakage in the condenser is great. If, on the other hand, the condenser is large, the current is high, and the coil loss becomes great. The loss is least when the same amount of energy is lost in both coil and condenser, and this occurs when we make:—

$$\frac{L}{C} = R_1 R_2$$

$$Q = \frac{1}{2}\sqrt{\frac{R_2}{R_1}}$$

In receiver circuits, L is usually fixed before we start, in the r.f. and aerial circuits, and if high Q factors are desirable (which is questionable) they may only be gained by eliminating all possible losses. In transmitters, as will be shown later, the problem is quite complex, but it is all easy to understand when one has mastered the fundamental ideas of tuned circuits, and can see more in them than conductors and insulation.

The Effects Of Q.

Figure 1 will be familiar to most readers. It is a graph of the voltage swinging and dying in its swings in a tuned circuit. Each successive swing, just like the swing of our pendulum, has lost a certain fraction of its voltage. The two figures (A) and (B) show the effect of "Q" on the "death" of the oscillation.

So far, we have only considered the "decay of a free oscillation," or in other words, the way the swinging dies off after the condenser has had one isolated "flick."

Go back to the pendulum—it is easier to watch its action than that of electrons in a tuned circuit. So far, all we have done is to pull the weight to one side, release it, and watch it lose the energy given it. Put it in a clock where it receives one kick on each forward stroke, then look at figure 2.

When the swing reaches the point "A," the escapement begins to "kick" the pendulum along. It gathers energy from the main spring of the clock—enough to carry it up to its original amplitude or "swing." Had we just started the clock, we would have noticed that the pendulum swings either built up, or died down to the condition where the energy from the main-spring is just equal to the losses, and the swing continues through the same small arc, as long as the energy from the spring, per swing, is the same.

When a tuned circuit is placed in the plate circuit of an amplifier in a transmitter, the bias and drive are adjusted so that plate current is cut off through a large part of the swing. Current flows in short flicks during each half cycle, and its effect may be seen in figure 3. A certain amount of the energy supplied on each kick is lost during the swing, and the next kick carries the swing again to its former amplitude. The loss of energy during the swing is, of course, partly the energy fed to the aerial or the next stage, and this, of course, must be as great as possible. The "Q" factor is then reduced considerably.

How the transmission is affected by the "Q" factor is shown in figure 4, (A) and (B) showing the graphs of the voltages across high and low Q circuits flicked by plate current. All kinks in the wave-form result in harmonics, and as the purpose of the transmitter is to transmit on one carrier frequency only, the smoothest looking wave is the most desirable one. It is best, then, to store a relatively enormous amount of energy in the tuned circuit nearest the aerial (i.e., the "final tank") to be able to lose a great amount to the aerial without reducing the "Q" factor, and increasing the harmonic radiation too much.

Oscillator circuits only differ from amplifier circuits in that the valve is amplifying some of its own flicks. If the tuned circuit is a good one, i.e., one having a high "Q" factor, the oscillator is influenced less by external factors, such as plate voltage variations, filament temperature and room temperature changes.

Crystals are really mechanical resonators kept vibrating by forces of electrical attraction. They have the property to store about twenty-thousand times as much energy as they lose, in heat. Hence, they are very stable (steady) oscillators when the little energy they lose is supplied by a valve.

Tuned Circuits, Stage By Stage.

In an ordinary three-stage transmitter, there may be five or more tuned circuits, from the plate circuit of the crystal oscillator to the final tank. Each has its own particular function, and its L/C ratio has to be determined by its purpose.

To begin at the oscillator, its plate circuit is tuned slightly off frequency to force some of its energy back through the grid-plate capacity of the valve. Actually, it is tuned so that the valve itself is one portion of the tuner, and the portion of the energy lost in the plate circuit to the grid circuit keeps the crystal vibrating.

The plate tank of the oscillator should never be required to supply very much energy to the next stage—the buffer, and hence its most important job is in generating voltages sufficiently high to feed back to the grid circuit.

The actual voltage generated depends upon the "dynamic resistance" of the circuit, a quantity calculated from L/CR where R is the coil resistance. L/C must be fairly large, for R cannot be reduced by winding the coil with heavy copper tube. It

(Continued on page 34)

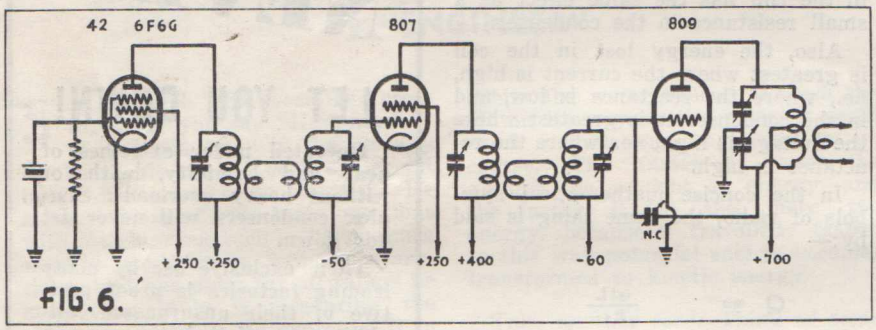

FIG.6.

Circuit of an ordinary three-stage transmitter having about 60 watts output. Actual details are discussed in the text.

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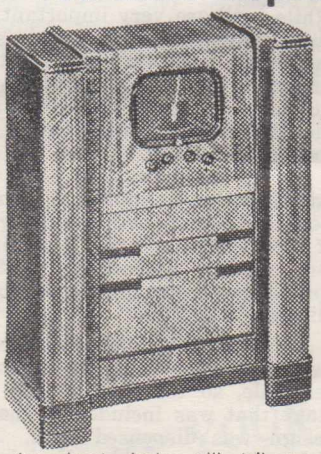

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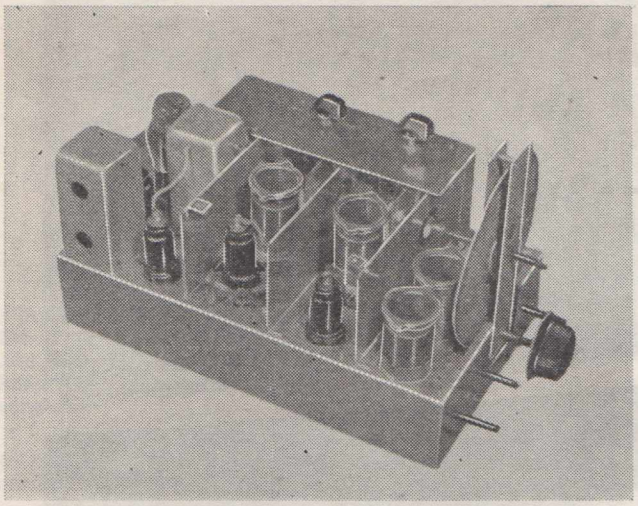


This five-valve all-wave superhet was designed by VK2MQ specially for installation on a motor-cruiser. Particularly compact in design and highly efficient in operation, it is equally well suited for many other applications.

15 To 600-Metre Marine Receiver - Designed, built and described by VK2MQ

AT some time or other, probably every amateur and experimenter has had the desire to build portable equipment that would be suitable for car or marine use—equipment of a specialised type that is not marketed commercially, or at any rate in exactly the form required.

In such cases, home construction not only saves money, but also permits wide freedom in the choice of circuits and components, and as well there is always the deep and lasting feeling of satisfaction that results in completing successfully any type of home-built gear.

The receiver described here was built with the idea of getting as much as possible in the way of performance for every shilling of cost, while still keeping the construction within the capabilities of the amateur who has successfully built t.r.f. receivers and understands what a superhet is all about.

Main Requirements Of A Marine Receiver.

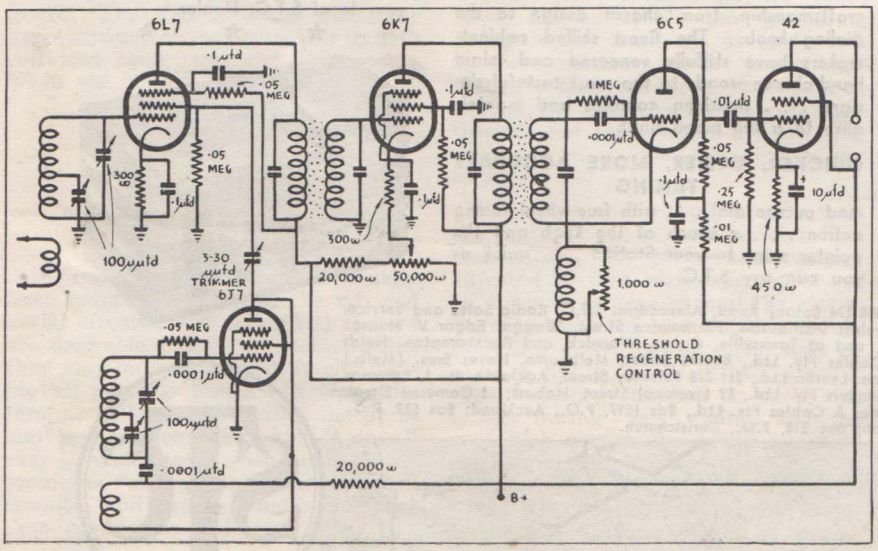
Any receiver reflects to a considerable extent the personal preferences of its builder, insofar as this preference can be exercised with available materials.

In the writer's opinion, a receiver to be used as a marine installation must have a good deal more than high sensitivity and good selectivity. While both are very important, in addition stability is essential, so that the signal will "stay put." Other essentials are a tuning system that is easy and smooth in operation, and for the short waves, bandspread to ensure easy tuning.

As all these features must be obtained without too much constructional difficulty, coil switching is out of the question, since a switching system capable of meeting the bandspread requirements would be complicated in design.

As well, plugging in more than two coils when changing bands is undesirable, so for that reason an r.f. stage that was included in the initial design was dispensed with. In addition, it was considered advisable to cut down the number of stages, on account of possible oscillation troubles.

These requirements can be met by using some of the newest components available for the experimenter to-day. With iron-cored i.f. transformers, for example, it is possible to get in one stage selectivity as good as that obtainable from two i.f. stages using air-cored transformers.



Circuit Details.

The circuit diagram shows the essential details. A 6L7 is used as first

detector or mixer, with a 6J7 separate oscillator, 6K7 i.f. amplifier, 6C5 second detector and b.f.o. control, with a 42 audio for permag. speaker operation.

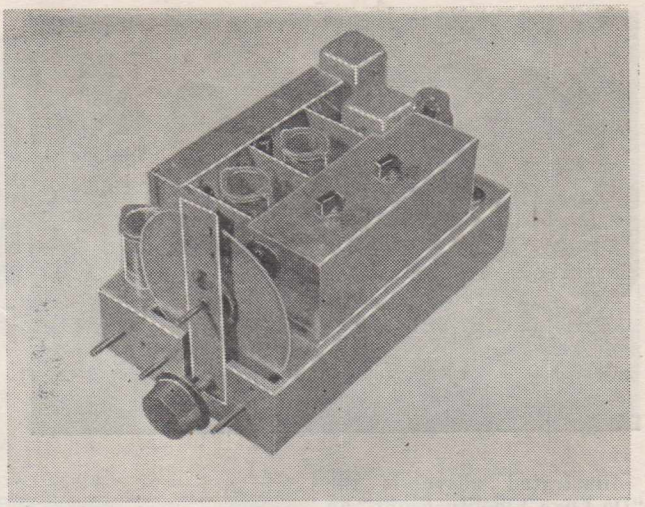
The 6L7, as most amateurs know, is a five-grid valve designed especially for mixer work. The space-charge coupling between detector input and oscillator circuits which characterises the 6A7 and 6A8 type pentagrids is largely eliminated. As well, the lowering of the plate impedance and consequently of gain which is characteristic of suppressor grid injection in a pentode, is absent in the 6L7, since the oscillator grid (No. 3) is completely screened and backed up by a suppressor grid. Also, a lower oscillator voltage is required than with suppressor injection, while the power demand on the oscillator is negligible compared with screen-grid injection.

The intermediate frequency transformers have a frequency of 460 kc. They are of the Sirufer type, which is ideally suited for this type of receiver where an additional valve would mean higher expense and additional drain on the power source.

Regenerative Second Detector.

Then follows the second detector, which is made regenerative by virtue of the coil in the cathode circuit. To eliminate any possibility of "pulling" between detector and oscillator on the higher frequency bands, the oscillator is capacity-coupled to the mixer per medium of a 3—30 mmfd. variable condenser.

The regenerative detector used incorporates one of the finest forms of threshold regeneration control ever devised. It enables an extremely weak 'phone signal to be brought up to reasonable listening level, and for that reason is easily worth another valve.



This view, studied in conjunction with that opposite, gives an excellent idea of the layout adopted, and of the elaborate shielding used to isolate the various stages.

The chassis is 8" wide, 14" deep and 3½" high, with two aluminium shields separating the detector and oscillator components. In addition, the oscillator valve and coil sockets are mounted 1" above the chassis to enable leads to go straight to the tuning condensers and plate of the 6J7.

The bandspread condensers are on top, to facilitate frequent changing. This arrangement also enables a shield to be placed practically right round the entire assembly above chassis.

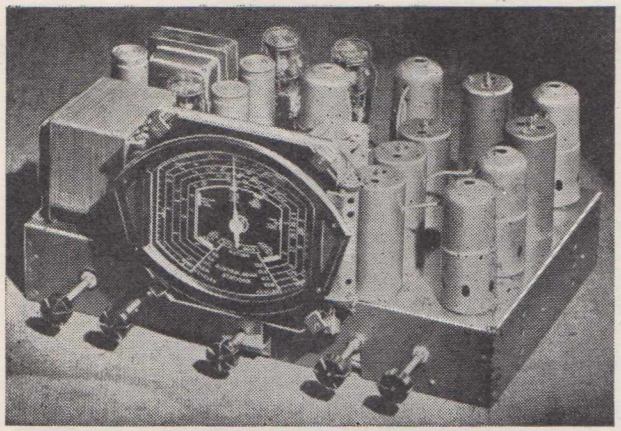
In wiring, the essential features to observe are:—One common ground to run the entire length of the chassis, and all component wiring to be as short and direct as possible.

Suggested Power Supplies.

Power requirements for this receiver using the valve types shown are 6.3 volts 1.9 amps. for the heaters, and 60 mills. at 250 volts for "B+." If the set is intended for home use, a standard power pack such as that described in the October, 1938, "Radio World" would be ideal.

For vibrator or genemotor operation, however, both "A" and "B" drains can be considerably decreased by using the 6.3-volt .15-ampere series of valves wherever possible. Actually, from 150 to 180 volts of "B" battery could be used as an alternative, as the "B" drain under these conditions should not exceed 18 mills.

(For coil data, see page 34)



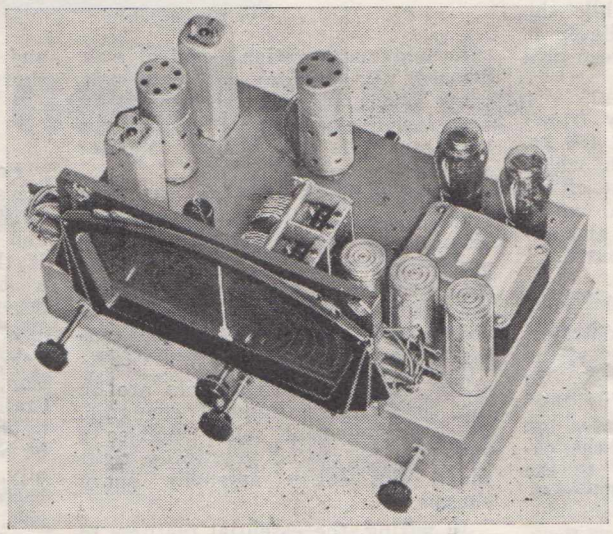
Special Back Issues Offer To Readers

See Page 47 For Full Details

Illustrated on these two pages is a selection of receivers of all types and associated equipment that have been described in "Radio World" during the past three years.... These back numbers are available to readers at special rates, of which details will be found on page 47 of this month's issue.

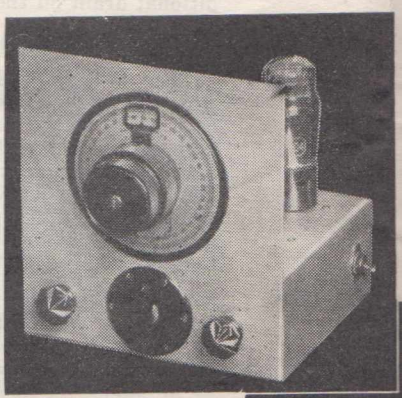
Illustrated above is the "De Luxe Fidelity Eight," an eight-valve dual-wave superhet with r.f. stage, and incorporating a 7-watt high-fidelity audio amplifier using push-pull 2A3's in the output. A de luxe design giving exceptionally high quality of reproduction, combined with excellent sensitivity and selectivity. (Nov. and Dec., 1937).

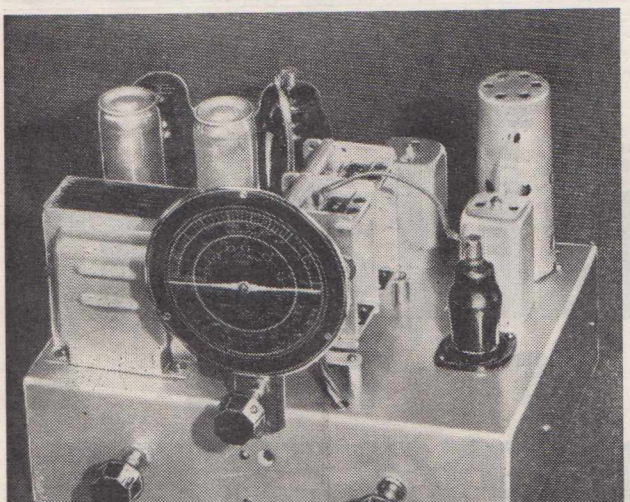
On the right is the "Auto Tune Dual-Wave Five," a 4/5 dual-wave superhet employing a permeability-tuned dual-wave box and i.f.'s, 6K8 mixer, and 6V6G beam tetrode output with inverse feedback. The addition of a push-button tuning unit is also described. (July and August, 1938).



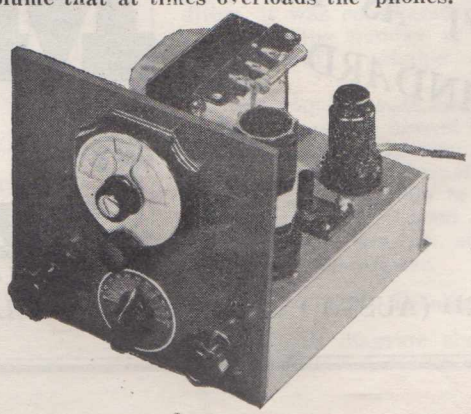
Left: The "Comet Superhet Four," a 3/4 a.c. dual-wave superhet employing a special valve arrangement giving full 4/5 performance. (April and May, 1938).

Below are shown two views of the Wave Bandspread Two," a two-valve bat operated receiver designed for head operation on distant stations, and sp operation on locals. Uses a type 19 twi ode valve as detector and first audio amp with a 1D4 output pentode. Gives world reception on the short waves, and has a of up to 2,000 miles on the broadcast (September, 1936).



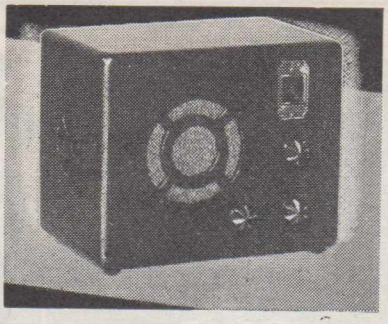


Below is the "Eaglet Shortwave Two," described in the May, 1936, issue of "Radio World." It has proved to be one of the most popular two-valvers ever described. 'Phone and code stations in all parts of the world can be brought in at excellent clarity and with volume that at times overloads the 'phones.



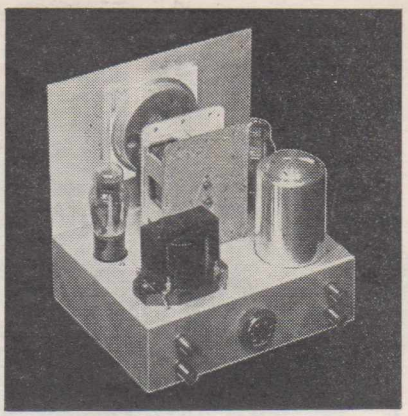
Right: Full i sembling this l transverse curren complete kit of an article publish 1937, issue. The from solid teak, tion for polishin

Many and varied applications can be found by amateurs for this battery-operated two-valve five-metre transceiver. designed and described by Don B. Knock (VK2NO), in the April, 1938, issue. Only two valves are used.

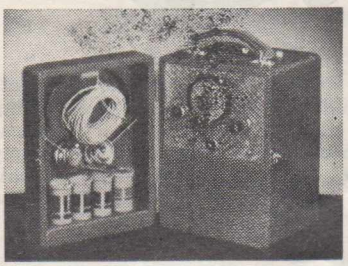


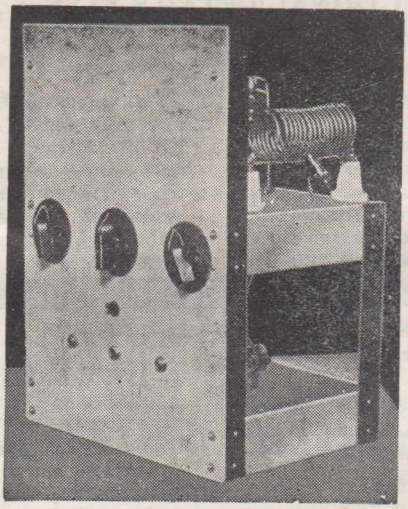
"The Companionette Three," a three-valve a.c. receiver with the gain and selectivity of a "four." (March and April, 1937).

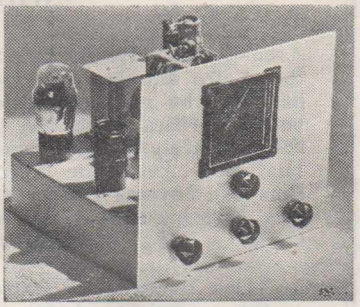
Below: This Two-Band Crystal-Controlled 20- and 40-metre Transmitter uses a 53 as combined crystal oscillator and doubler, driving a 6P6. Full description in April, 1937, issue.



The "Beginner's Battery Two," the ideal small set for headphone reception of broadcast stations. Simple in design and straightforward to assemble, it is the ideal "first set" for beginners to build. Logs several dozen stations at good headphone strength. (Nov., 1936).



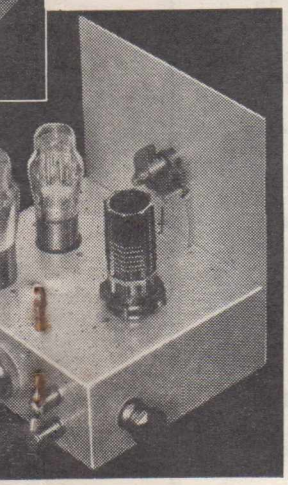


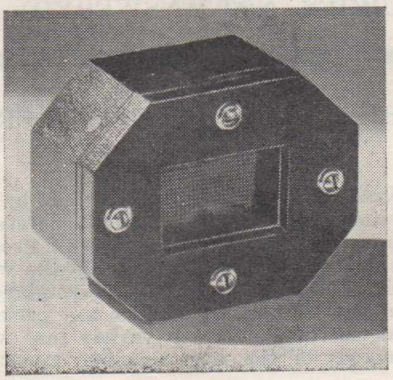


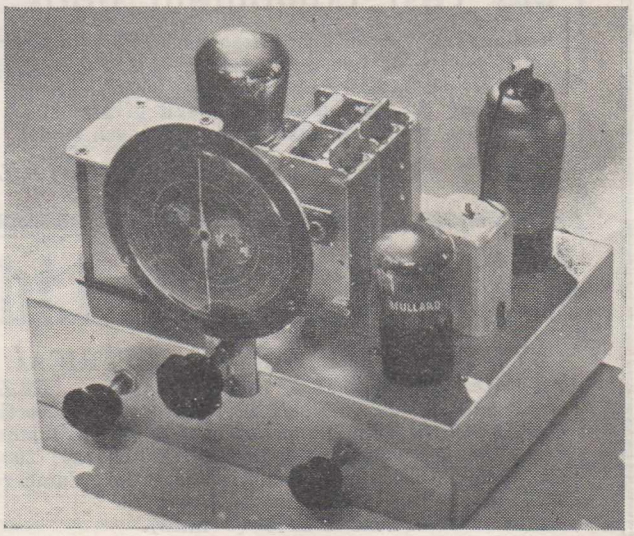
Above: The "Tom Thumb Portable Two," a compact two-valve all-wave portable using a 49 as space charge detector, transformer-coupled to a 49 audio amplifier. Weighs only 12 lbs. complete, and gives world-wide reception on 'phones. (Sept. and Oct., 1937).

The "1937 Empire All-Wave Three," a three-valve all-wave battery receiver incorporating electron - coupled regeneration and automatic bias, described in the May and June issues, 1937. The A.C. version appears in the December, 1937, and January, 1938, issues.

Right: The "Scout Battery Three," a three-valve t.r.f. receiver which uses iron-cored coils and automatic bias. It is the ideal set for country listeners who want to get the maximum in broadcast band entertainment at the lowest cost. See full description in Dec., 1936, issue.

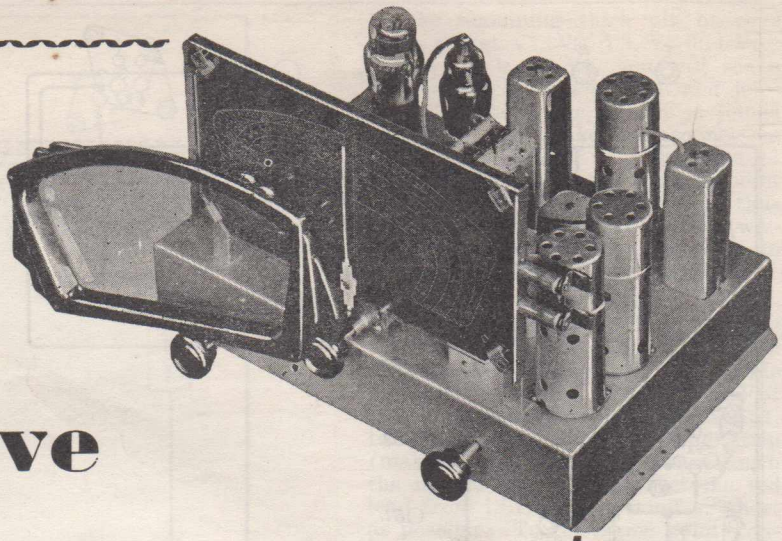






ull instructions for as-
is low-cost, high-quality
urrent microphone from a
t of parts are given in
ublished in the December,
The wooden case is built
teak, finished in prepara-
ishing or varnishing.

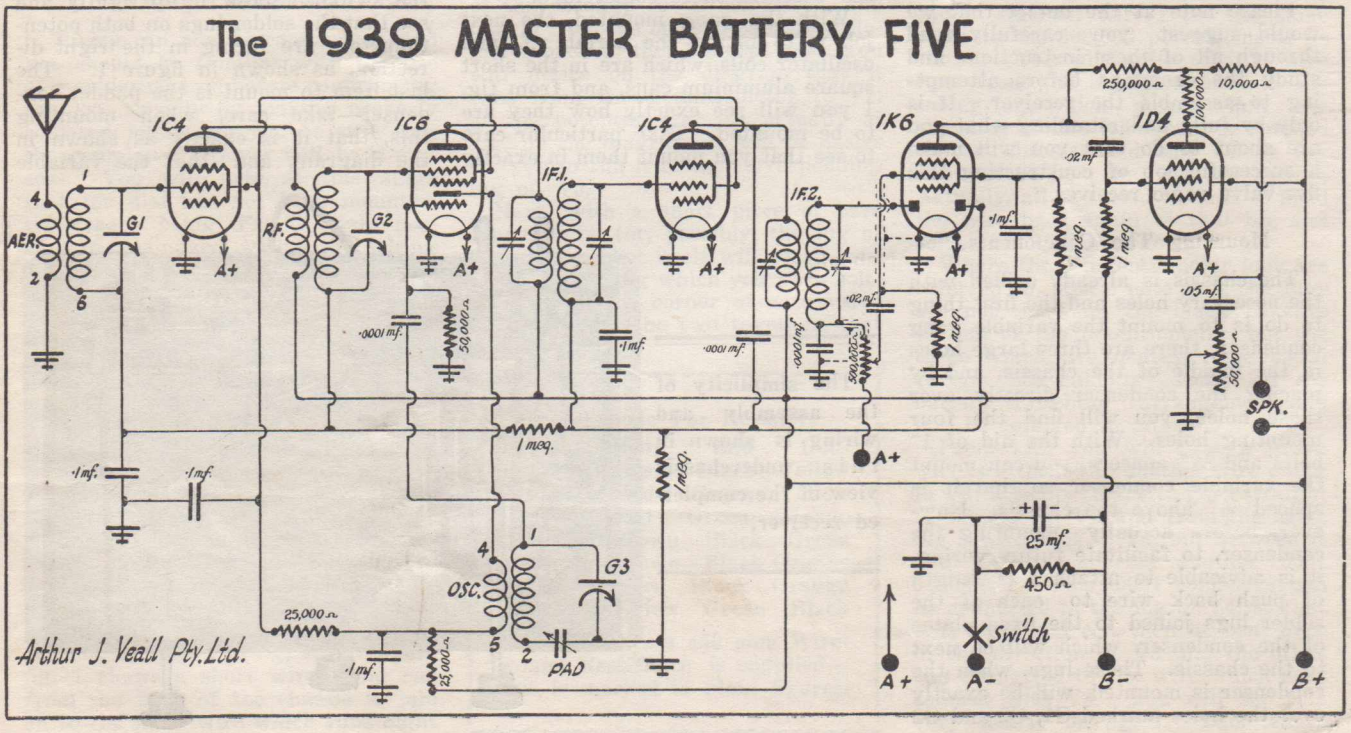
The VELCO... 1939 Master Battery Five



This five-valve battery-operated superhet has been designed specially for country users wanting a receiver that is highly sensitive and selective, and unusually economical to run.

FOR all-round performance and reliability, the "Velco 1939 Master Five" is the best type of set that the country listener could build. It gives not only maximum sensitivity, but also has that high degree of selectivity essential for the separation of stations on adjacent frequencies.

Technical features of the "1939 Master Five" include automatic volume control, automatic bias and inverse feedback, which results in particularly high quality of reproduction. With an "A" battery consumption of only .72 amp., and a "B" drain of



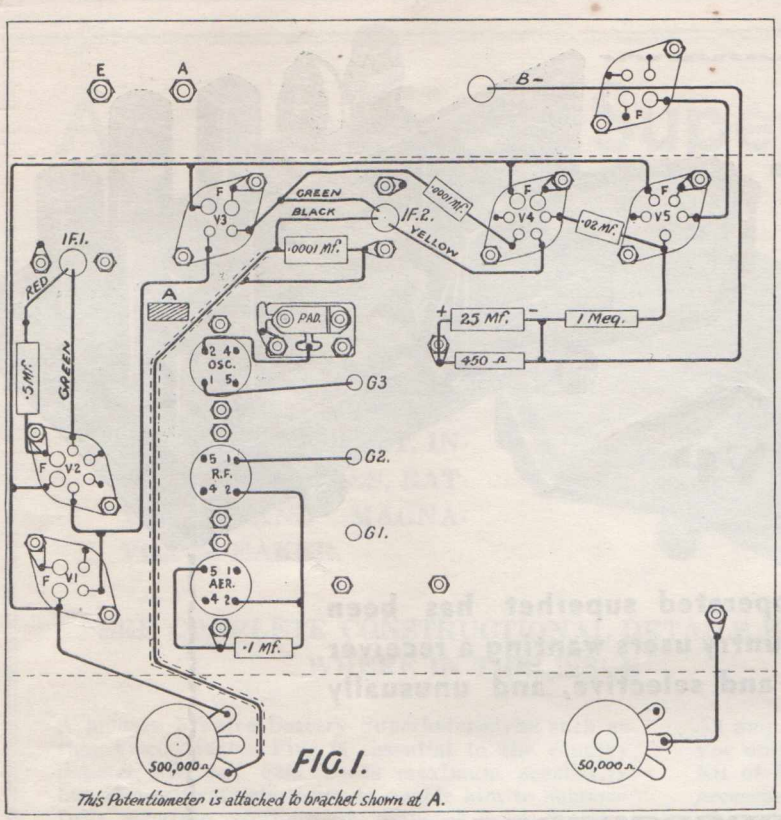


FIG. 1.

This Potentiometer is attached to bracket shown at A.

10.5 m.a., this Velco kit will be found to be both economical and reliable.

The instructions for its assembly given below are in such detail that even those with no previous experience in set construction could complete the assembly successfully.

Please note at the outset that we would suggest you carefully read through all of these instructions and study the drawings before attempting to assemble the receiver. It is only by fully understanding what you are about to do that you will make a successful job of constructing this five-valve radio receiver.

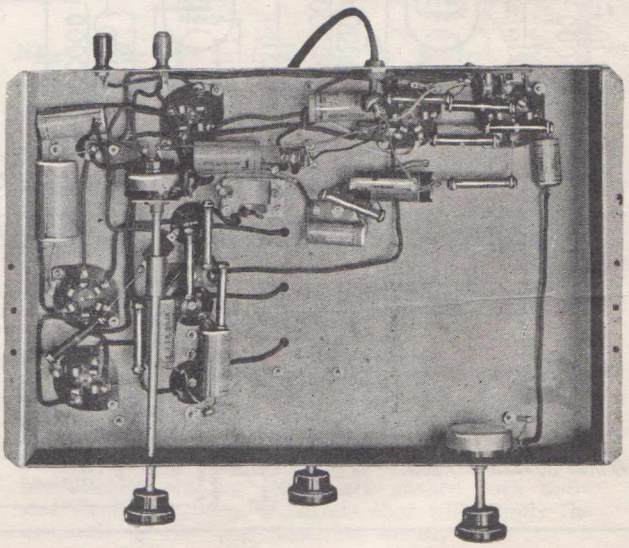
Mounting The Components.

The chassis is already drilled with the necessary holes and the first thing to do is to mount the variable gang condenser; there are three large holes in the middle of the chassis, and by placing the condenser directly over these holes, you will find the four mounting holes. With the aid of 1" bolts and ½" spacers, you can mount the variable condenser so that it is spaced ½" above the chassis. However, before actually mounting the condenser, to facilitate future wiring, it is advisable to attach a 6" length of push back wire to each of the solder lugs joined to the fixed plates of the condenser, which will be next to the chassis. These lugs, when the condenser is mounted, will be exactly over the holes marked G1, G2 and G2 on figure 1, and you will thread the wires through these holes and leave them loose until you reach the instruction in the general wiring, where to join them. You will see that, once the condenser gang is mounted, it would be almost impossible to solder the wires to these solder lugs.

With the gang mounted, the next job is to mount the aerial, r.f. and oscillator coils, which are in the short square aluminium cans, and from fig. 1 you will see exactly how they are to be mounted. Take particular care to see that you mount them in exactly the same position as shown on the diagram—i.e., with No. 1 in the same place as shown. When mounting these coils, attach a solder lug under one of the mounting bolts, so that the three coils can, at a later date, be earthed.

Next mount the two i.f. transformers; the one with the wire coming out of the top is mounted in the right hand corner of the chassis (i.e., looking down at it from the top) and the lead comes out of the left hand side looking from the front. The other i.f. transformer can be mounted in any way, as no wire comes out of the top.

Next, from underneath the chassis, mount the valve sockets and attach the valve can bases to the top of the chassis. From fig. 1, you will see exactly how they are to be mounted, but take particular care to see that, where "F" is stamped on the socket, it is in exactly that place when mounted. Also mount solder lugs as shown in the diagram, on all sockets. At the back of the chassis (when looking underneath) in the right hand corner, is another socket (the speaker socket) which must be mounted, and with this completed, the aerial and earth terminals may be mounted. You will notice that these terminals are supplied with insulating bushings and washers. Mount the washers next the chassis, then between the washer and the nut, mount a solder lug. Next mount the 50,000 ohm potentiometer on the chassis (looking from underneath on the right hand side), and on the left hand side, at "A" (figure 1) mount the aluminium bracket and the 500,000 ohm potentiometer with the switch. Screw it up tightly and see that the solder lugs on both potentiometers are facing in the right direction, as shown in figure 1. The last item to mount is the padder condenser—take care, when mounting this, that it is exactly as shown in the diagram, and that the variable



The simplicity of the assembly and wiring is shown in this underchassis view of the completed receiver.

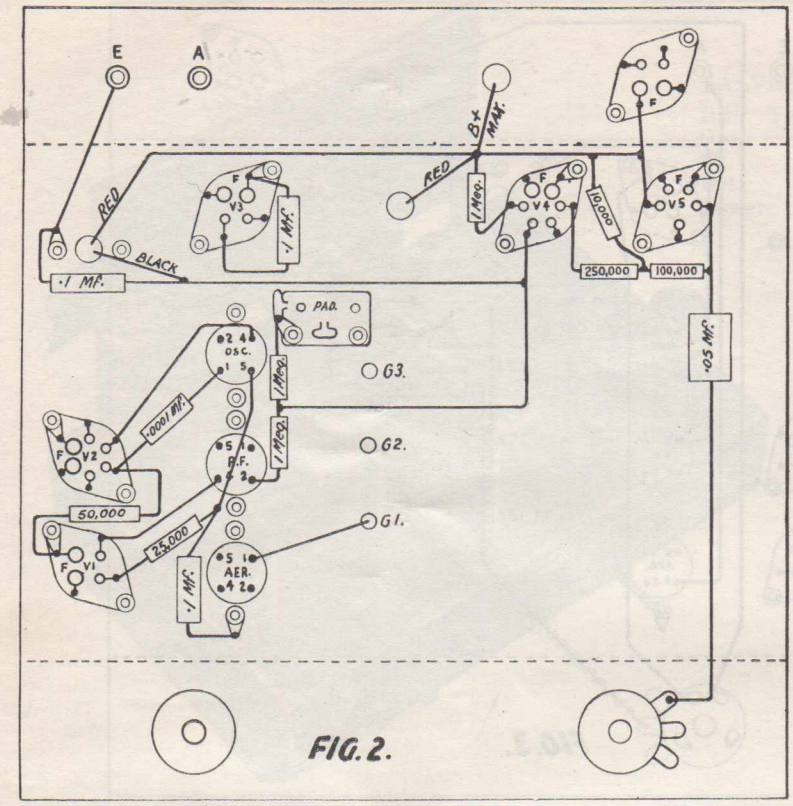


FIG. 2.

screw is over the hole which allows it to be adjusted from the top of the chassis. The insulated terminal lugs have not been mentioned at this juncture, but will be as the wiring proceeds.

Wiring The Chassis.

Wiring can now be commenced, and you should be familiar with the use of a soldering iron before commencing the job, as only by making properly soldered joints can you be sure that the completed receiver will be a success. You will note at this stage that the dial has not been mounted, the reason being that it might possibly de damaged whilst the wiring is being carried out, and should, therefore, be fitted only after the receiver is completed and ready for testing, when the volume control extension shaft may also be conveniently fitted.

Start wiring at VI by soldering the wire from the filament lug nearest the top of the chassis (looking at it from underneath) to the corresponding filament lug on V2; carry the wire right around inside the chassis to the same lug on V3, V4 and V5. To make a good job of this, it is necessary for you to run the wire neatly round the inside edge of the chassis, as shown in fig. 1, but where fig. 1 shows a short wire being run from the back of the chassis to join on to the main wire which runs right round, you will cut the wire at each one of these valve sockets and actually a double wire will run from the lug back to the chassis. Thus, you will run a wire from V2 back to VI, and the next one from V2 on to V3, and so on. This still leaves one wire of this hookup to be completed, and that is from the 500,000 ohm potentiometer back to this filament lead. You will notice on the diagram that it runs from the potentiometer to VI; as the potentiometer is actually at "A" on the diagram, it will be easier for you to run it to the corresponding lug on V3.

Next, with a short piece of bare copper wire (or, possibly, the lug of the valve socket itself will reach over to the solder lug which you have bolted down at the corner of each valve socket) solder the two together, that is, the remaining thick pin on each valve socket V1, V2, V3, V4 and V5.

Now, back at V1, you will see a wire soldered from one pin and joined to another wire, which is joined on to V2. To make this connection run a short piece of wire from the V1 socket to V2, and then from this point continue on to V3; solder this, thus completing another section of the wiring and completing all connections to V1, shown on figure 1.

Next, the diagram shows you clearly where a green wire from i.f.1 has to be joined on to V2. With the aid of a spacing washer on the inside mounting bolt of i.f.1, connect one of the small red fibre mounting strips; to one side of this mounting strip (making sure that it does not touch the middle terminal) connect the red lead from i.f.1, cutting it off as short as possible. To this same point, connect one end of a .5 mfd. condenser, the other end of this condenser (you will see it on figure 1) joins onto the solder lug on V2. When this is completed, you have finished all the wiring on the i.f. transformer, V2 and V1, according to figure 1.

You will see that certain terminals still have wires to be connected, but these will be referred to in fig. 2 and fig. 3, and in the meantime they should be ignored.

As you will see from fig. 1, the solder lug terminal nearest the top of the chassis, i.f.2, is connected to a .0001 condenser; one end of the condenser is soldered to this lug and the condenser is then bent to an upright position. From i.f.2, connect the black wire to the top of this condenser, and run a shielded wire from the same point to the 500,000 potentiometer as shown. You will notice that a wire runs from the shielding back to the solder lug, which means that the shielding of this wire must be earthed to the chassis, and this solder lug happens to be the nearest point. Actually, all you need to do is to bend the wire back again to that lug and solder the screening to the lug.

Where these potentiometer lugs are referred to, please note that the lugs are not those on the black bakelite section of the potentiometer, but the three which are nearest the metal cover. The bakelite section is the battery switching arrangement and will be referred to later.

From i.f.2 you will see a green wire is attached to another wire going to V3; actually this wire goes straight to the lug on V3 and from the same lug a wire runs to V4, but between it and V4 is connected another .0001 condenser. This .0001 condenser can be connected to the lug of V4, so that it is rigid and can then be bent over in the direction of V3 and the other end connected to the wire which does connect with V3. You will see this very clearly on fig. 1. This leaves

Colour Code For Resistors.

Ohm	Body	End	Dot
100,000	Brown,	Black	Yellow
250,000	Red	Green	Yellow
25,000	Red	Green	Orange
1 Meg.	Brown	Black	Green
10,000	Brown	Black	Orange
50,000	Green	Black	Orange
450	Yellow	Green	Black

In some cases a 450 ohm Wire-wound Resistance is supplied—this is marked in plain figures.

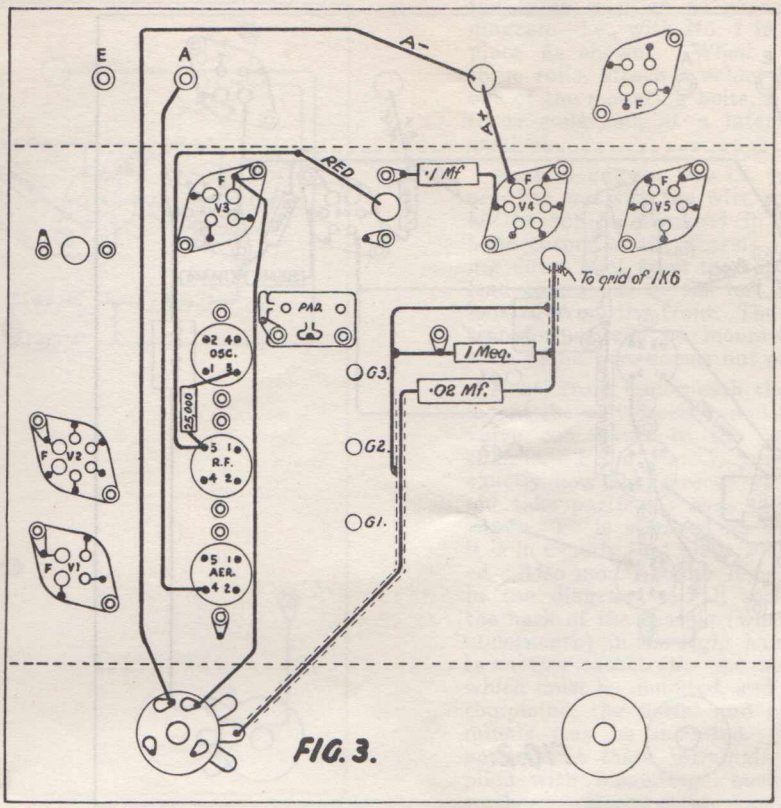
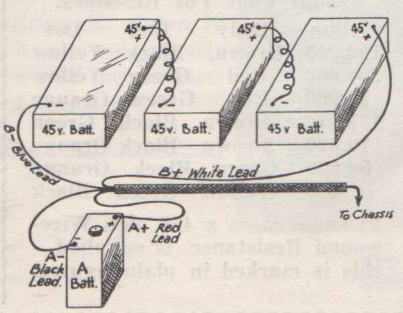


FIG. 3.

the yellow wire from i.f.2 and you will clearly see where it connects on to V4; from V4 to V5, you will see that a .02 condenser is connected. This condenser has long pigtails, and one end can be connected directly on to V4 and the other end on to V5 to the correct lugs as shown. However, take particular care to see that the bare copper wire does not touch the mounting bolt of V5.

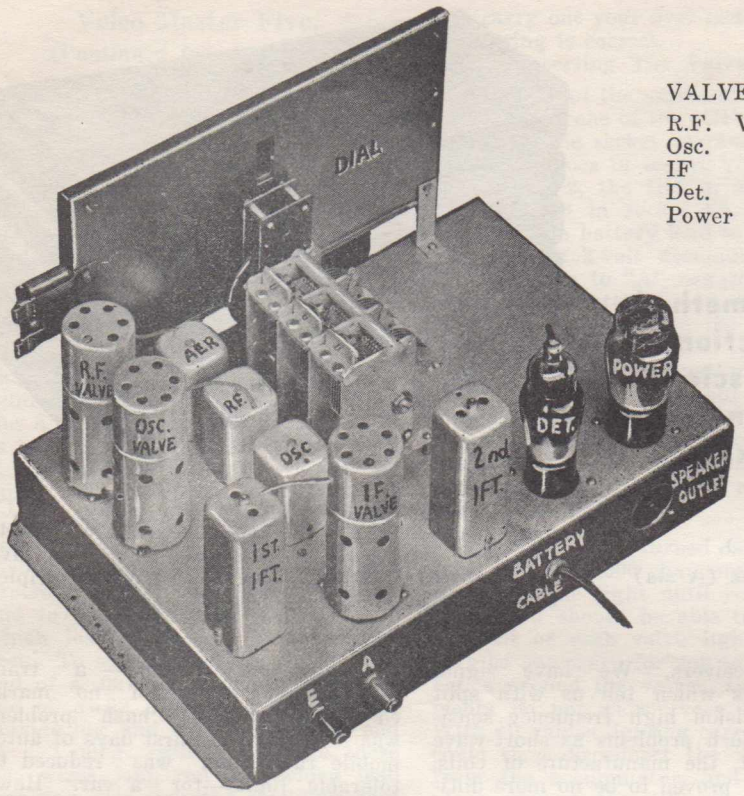
Next you will notice that on one of the bolts which mount the gang condenser, the padding condenser is connected underneath, which leaves the other bolt near the back free. To this, with the aid of a spacer, connect one of the insulated lug terminal strips, and under the middle bolt connect a solder lug, which actually means that the middle bolt can then be used as an earthing point. To this point connect one end of a 25 mfd. condenser and one end of a 400 ohm resistor; to the other ends of these



two components, joined together, and from this joining point (which will be up in the air) connect a blue battery cable wire, which will have to be threaded through the back of the chassis after the insulating bush has been fixed in position at the point marked "B" negative. To the other end of this wire add a tag, B negative, very clearly. At the point this wire joins, you will see that you also connect a 1 meg. resistor, the other end of the resistor being connected to the same lug of V5 as the .02 condenser. See colour code so you will be able to identify the resistors.

From V5 connect a wire to the socket connected to the back of the chassis as shown in the diagram. On the front of the chassis you will see that a wire runs from the middle lug of the 50,000 ohms potentiometer to a solder lug on the chassis; actually, there will be no bolt to hold that solder lug until the dial is mounted, but put the bolt temporarily through the chassis and solder a lug to it, and so complete this portion of the mounting. You can disconnect the bolt later when you are mounting the dial.

Now for the padding condenser, marked "Pad." You will see that one end of this condenser is soldered to a lug on the padding condenser mounting bolt, which means that that end of the condenser is earthed. The other lug of the padding condenser is joined to 2 on the oscillator coil. No. 1



VALVES USED

R.F.	Valve	1C4
Osc.	„	1C6
IF	„	1C4
Det.	„	1K6
Power	„	1D4

Kit Of Parts.

1—Velco 1939 Master Battery Five Kitset, comprising chassis and all necessary parts.
1—Permanent magnet 8" speaker, to match single 1D4.
1—1C6, 2—1C4's, 1—1K6, 1—1D4.
3—45 volt "B" units (Ever Ready).
1—2v. 100 amp. hour Velco accumulator.

on the oscillator coil is then connected to the piece of wire which is threaded through G3. You will remember being told to do this in the earlier part of the instructions. Make this lead as short as you can, and cut off any excess wire. No. 1 on the r.f. coil is joined to a similar wire on G2. Then connect No. 2 on the r.f. coil to No. 2 on the aerial coil, and from No. 2 on the aerial coil connect one end of a .1 condenser, the other end of this condenser joining to the solder lug holding down this coil. No. 5 on the aerial coil is connected to the same point—i.e., earth. This completes all the wiring of fig. 1, which should be carefully checked over.

Commencing with fig. 2, you will see a lead marked "Red" in the top left hand corner, and in fig. 1 you were told to connect the red wire to a terminal. To this point also is attached one side of the .5 condenser shown in fig. 1. From this point, run a wire around the chassis to the lug on the speaker socket, where a connection is made. A little to the left, you will see a number of wires radiating from B maximum; instead of joining them where they are shown on the drawing, join all of these wires to the same terminal, marked "F," i.e., to the terminal marked "F" on the rear of the chassis you will also join to this lug the "B" positive lead (the white rubber covered lead) marking same on the outside "B" positive. To the same point, connect the red lead from the 2nd i.f. transformer, and on V4 you will see where a 1-meg. resistor connects from that socket to the same point. As these two points are quite handy, you will be able, with the length of wire on the end of the resistor, to stretch it across and make it quite rigid. On V4, you will also see where a 25,000 ohm resistor joins to a 100,000 ohm resistor and then to a lug of V5. These two resistors can be joined in the centre, and soldered together, and formed in a rigid type of arcn, then soldered into position. From the centre point join a 10,000 ohm resistor back to the "B" positive connection at "F" on the speaker socket. Another connection must be made to the speaker socket and V5 as shown. From V5, then, you will see another .05 mfd. condenser connected, the other end of which runs up to the 50,000 ohm potentiometer on the right hand side of the chassis. On V3, you will see how a .1 mfd. condenser is connected.

In the left hand corner of the chassis, connect firmly to an earthing terminal lug a .1 condenser which can lie flat and parallel to the bottom of the chassis. The other end turns back and is connected to the black wire of the i.f. transformer. From this point, run a wire right across to V4 as shown in the diagram. From the padding condenser to 2 on the r.f. coil, there are two 1-meg. resistors; these two resistors are joined together and connected to V4; the two outside ends of these resistors go to the padder and the coil respectively. They can be arched up from the chassis and made quite rigid.

In the top left hand corner of the chassis, you will see where a wire runs from the earth terminal out to the solder lug near a .1 condenser. Next, on the oscillator coil point 4, run a wire to V2 as shown, and then from 1 on the oscillator coil, connect a .0001 mfd. condenser to point V2. To the same lug on V2, solder one end of a 50,000 ohm resistor, then solder the other end to the point shown on V1. From the point shown on V1, a wire is connected to 4 on the r.f. coil. Next, from V1, you will see where a 25,000 ohm resistor is connected, near the aerial coil, where a .1 condenser is connected. Both of these ends are soldered and the two unsoldered ends of these components are twisted together, and from where they join a wire is soldered and run to 5 on the oscillator coil.

Next, the wire coming out of G1 on the condenser gang is cut off to the right length and soldered to 1 on the aerial coil. This completes all wiring of fig. 2.

Starting on fig. 3, you will see where an A negative wire comes through the hole in the back of the chassis; this actually is the black wire, which runs straight to one of the two terminal lugs protruding from the bakelite section of the 50,000 ohm potentiometer. The wires in the drawing look to be long, but actually are very short and just close to V3. The other lug of this potentiometer is wired straight back to the nearest earthing point, which you will see clearly shown on the drawing. Next, from the aerial terminal, marked A, run a wire to No. 4 on the aerial coil.

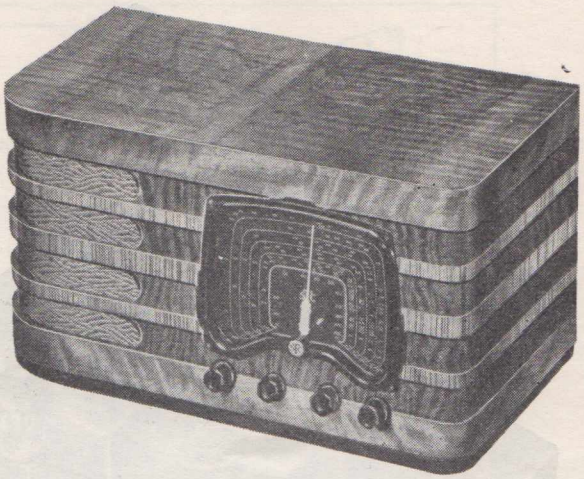
The next wire to be connected is a lead from 5 on the r.f. coil to "red" coming out of an i.f. transformer; actually, in the drawing, this is shown as red coming out of the 2nd i.f. transformer, but you will remember that there is a point on the red of the first i.f. transformer, which would possibly be closer, and it can be connected on to that position. The

(Continued on page 33)

Modern Trends In Set Design

In contrast to the "hit or miss" methods of the early days, factory production of radio receivers is to-day an exact science. Precision checking of assembly and performance eliminates all guess work.

By T. P. COURT
M.I.R.E. (AUST.), A.M.I.R.E. (U.S.A.).
Chief Engineer Standard Telephones & Cables (A/sia) Pty. Ltd.



This cabinet houses four of the latest S.T.C. mantel models—the 408F five-valve vibrator broadcast, 504F five-valve a.c. broadcast, 528F five-valve a.c. dual-wave, and the 632F six-valve a.c. triple-wave models.

IT is a matter of some difficulty to indicate any marked improvements in the latest receivers, as although continuous progress is being made, there are no outstandingly new developments.

Perhaps the greatest advance made lies in the ease with which complicated receivers may be turned out by mass production methods. The array of rapid testing instruments which are now available have finally eliminated all guess work. The design art has now become completely "debunked" and phenomena formerly ascribed to nothing less than Divine intervention now resolve themselves into matters of pure routine.

Two new fields for technique presented themselves in the form of all-wave reception and vibrator operation. A few years ago the evolution of a short-wave receiver really called for a spot of clairvoyance; one such receiver might be made but the next would be utterly different. The gospel according to the designers consisted entirely of "low loss." Extraordinary pieces of apparatus were designed to overcome the Machiavellian propensities of high frequency signals. The completed instrument could usually be handled only by its proud designer—one almost said trainer.

Taking The Guesswork Out of Design.

Anyone who suggested that such a device might ultimately be supplied to the public was regarded more with pity than anger. What a change has come over high frequency design during the few short years! We now have various accurate instruments which measure the "goodness" or otherwise of materials used in short-wave receivers. We have signal generators which tell us with split hair precision high frequency sensitivity. Such problems as short-wave alignment, the manufacture of coils, etc., have proved to be no more difficult than with the orthodox broadcast apparatus. A modern receiver can be designed to embody sensitivity on short waves equal to that on the longer waves and the operation of such a receiver has been reduced to absolute simplicity.

This simplification is attributable entirely to the marvellous popularity of radio and ever-widening circles of broadcast propaganda. While it must be admitted that even to-day long distance broadcast music is not comparable with the local variety, speech is nearly always intelligible and matters of great importance can be broadcast intelligibly to millions of listeners spread all over the world. The performance of the modern receiver permits world wave reception with the greatest ease.

Vibrator Problem.

The successful operation of a receiver from a vibrator high tension supply is a problem of a very different nature. The complete elimination of noise from a vibrator receiver demanded a technique for which there was no precedent. True, the A.C. receiver provided experience in the elimination of "hum" which, in the vibrator set, as in the A.C. set is, to-day, purely a matter of proper design and expenditure.

The vibrator, however, has an unpleasant habit of emitting what is known as "hash"— a train of wireless waves of no marked frequency. This "hash" problem was tackled in the first days of automobile radio, and was reduced to tolerable limits—for a car. However, what is tolerable in a car—usually in motion—becomes intolerable in a quiet living room and, further, the car set designer did not worry about short waves.

Thus the set designer was faced with a really knotty problem. The older methods of Scotch navigation failed dismally, and so it became essential to utilise a special technique. Fortunately, the vibrator itself was being improved steadily until to-day this originally eccentric piece of apparatus gives no more trouble than a valve—perhaps not as much.

The complete elimination of "hash" throughout all the receiver wave bands of to-day has been successfully accomplished and this work has constituted one of the greatest advances made during the past year or two. The production of high economy valves has gone far to offset the bogey of vibrator receivers—battery consumption. With these valves it is possible we may see a reversion to the use of primary batteries in districts where battery charging facilities are scarce.

There are, of course, many other detailed improvements which improve receivers and simplify their production. Indeed, the design of receivers is fast becoming a prosaic occupation. The race of temperamental enthusiasts who racked their own and others' nerves seems marked down for extinction. "Debunking" is a double-edged sword, it seems.

Velco Master Five.

(Continued from page 31)

reason for showing it on the red of the 2nd i.f. is merely for the purpose of showing clearly to you where each and every wire is going, otherwise we would have wires in our drawing crossing each other, which would be confusing.

To 5 on the oscillator coil, connect one end of a 25,000 ohm resistor and connect the other end to 5 on the R.F. coil. The A positive lead comes through the bush in the back of the chassis, and you will see that it then connects directly to the V4 socket, i.e., the A positive lead and the red cable is used. On V4, you will see where a .1 condenser is connected from a terminal direct back to earth.

You will remember that, in Fig. 1, you were told to connect an insulated mounting pillar to one of the bolts protruding from the gang condenser and to use the middle earthing pin, which leaves the two outside lugs free. To one outside lug, connect one end of a .02 mfd. condenser and one end of a .02 mfd. condenser to the outside lug and attach the other end of a 1 meg. resistor. Where these two wires join, run a shielded lead (making sure that the shielding does not touch the solder join) back through the hole in the chassis marked to the grid of the 1K6 valve, and then earth the outside shielding of this lead back to the nearest earthing point, to which you will also join the free end of the 1 meg. resistor. The end of the .02 mfd. condenser, which is furthest away from the grid lead to the 1K6, is, as previously mentioned, now connected to a terminal on its own and from this terminal is run a shielded lead to the middle terminal of the 50,000 potentiometer. This shielding must be carefully attached, so that it does not touch the exposed metal at either end, and the ouside shielding is then connected at a convenient point and earthed back to the chassis. This actually completes all the under-chassis wiring, and it is now necessary for you to turn the chassis over, fit the valves to their correct sockets (see below) and then measure the various lead lengths to their correct distance, cut them off and solder on to the screen grid clip. With this completed, the valves can be removed and the dial then mounted in position, knobs fitted to their various places and the set is then ready for trying out.

When mounting the dial, turn the knob of the dial around until the pointer goes as far to the right as possible. The variable plates of the condenser must now be turned right "in" to maximum capacity and the grub screws on the dial firmly screwed home. With this completed, you can carry out your first test, to see if the wiring is correct.

Inserting The Valves.

Insert all of the valves in their correct sockets, one of the 1C4's being inserted in the socket marked V1, the other 1C4 goes in socket V3, the 1C6 in socket V2, the IK6 in socket V4, and the ID4 in socket V5. Connect "A" positive battery lead to "A" positive of the 2-volt accumulator, and "A" negative to "A" negative of the 2-volt accumulator; do not, in any circumstances, connect up the "B" batteries, but leave the two "B" battery leads loose. As a matter of fact, whilst you are carrying out this test, it is better not to have the "B" batteries on the bench at all, so that you could not accidentally run the battery leads across the batteries and cause a short circuit.

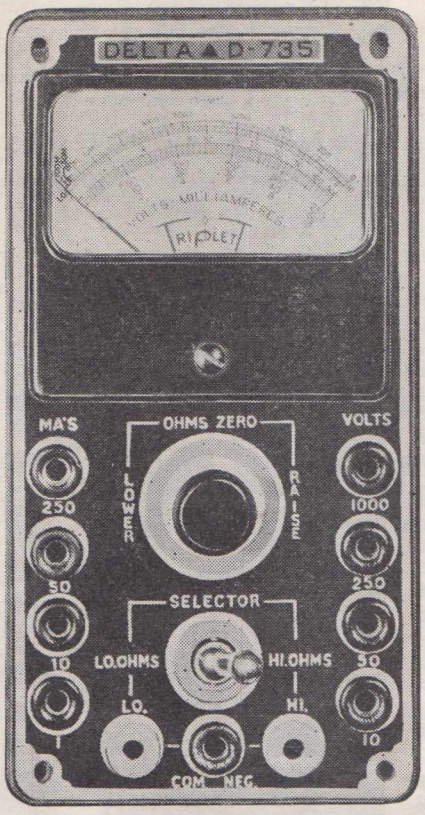
With the switch turned on—i.e., the knob of the 500,000 ohm potentiometer turned to the right until you hear it click—you should be able to see the filament of each valve light up. It may be necessary for you to cup your hands around the valves, as the filaments do not glow very brightly. With all valves lighting correctly, you could then disconnect the "A" leads from the accumulator, and in their place connect the "B" negative and "B" positive leads to the 2-volt accumulator and carry out the same test. However, with the "B" negative and "B" positive joined to the accumulator, the valves should not, in any circumstances, light up. If they do, there is something radically wrong with your wiring and it should all be checked over carefully. With this test properly made, you can then fit the valve shields as shown, connect up your battery, plug in the speaker and with all these connections complete, carry out the testing and aligning of the receiver as follows—

HOW TO ALIGN THE VELCO MASTER BATTERY FIVE.

For initial alignment, it is desirable that the receiver be fitted with only a short aerial. Start the alignment by setting the tuning dial to 3XY and, by adjustment of the oscillator trimmer, endeavour to bring this station in at its correct dial setting.

Up to this point, the volume control may be set at maximum, but once the station is received, cut back the volume until the station is just audible. Under these conditions, the effect of any change to the trimmers of the G1 and G2 sections of the gang will be readily observed.

Having brought 3XY in at its correct dial setting, adjust the G1 and G2 trimmers for greatest increase in volume. Next tune the receiver to 3AR and adjust the padding conden-



DELTA POCKET MULTI-METER HAS TEN RANGES

Alongside is shown the Delta Model D-735 Pocket Multimeter described in last month's issue of "Radio World." The attention of readers is drawn to the fact that the ranges of the instrument as detailed in the heading of the article are incorrect, though they are shown correctly in the diagrams and photographs.

In all, there are no less than ten ranges in this handy little tester — four D.C. voltage ranges, 0-10-50-250-1000 v., four current ranges, 0-1-10-50-250 m.a., and two resistance ranges —low ohms 0.2-500, and high ohms 0-100,000.

Messrs. W. G. Watson & Co. Pty. Ltd., of Sydney, supply a complete kit of parts for this multi-meter for £3/19/8, or alternatively the built-up instrument can be bought for £4/10/-.

ser, meanwhile rocking the gang condenser back and forth over two or three degrees until maximum signal strength is obtained. If these adjustments have been properly carried out, it will be found that the receiver's dial settings agree very closely with the listed settings for the various stations received.

As a final step to obtaining the maximum efficiency from the set, a readjustment to the i.f. transformers may be made. This is best carried out with the receiver tuned to a station about the centre of the dial.

When built to specifications, and carefully aligned, the Velco Battery Master 5 will be found a first-class performer. Its tone is excellent, its output volume more than sufficient for normal needs, and its selectivity adequate. Furthermore, it possesses sufficient sensitivity to provide good reception of the majority of interstate broadcasters.

This Thing Called "Q."

(Continued from page 20)

is important to keep the coil small so that it is out of the fields of other coils, and fairly small wire must be used. A satisfactory coil for twenty-metres, using a 6F6 as oscillator valve is ten turns of 18 s.w.g. wire double-spaced on 1¼" tube.

The grid tuner of the buffer has to develop a fairly high voltage with quite small supply of energy from the oscillator. Its dynamic resistance must be fairly high, and the coil may be similar to the oscillator plate coil.

In the plate circuit of the buffer, we are more interested in producing as much energy as we can to "flick" the final stage. The loss to the grid circuit of the final may be regarded as a resistance shunted across the tuner. The higher we make the dynamic resistance of the plate tuner, the less will be the loss of energy in itself, and the more the available energy for the next grid. Distortion does not matter much, as the flicks themselves are distorted terribly by the next stage. The tuner must have a high L/C ratio and the coil may be nine turns of 16 s.w.g. wire, double-spaced on 1¼" tube.

If the buffer is being used as a frequency doubler, it flicks its plate tuner only on each fourth half cycle as shown in figure 5. To keep the odd cycles as strong as the even "flicked" ones, the "Q" factor has to be higher, and a compromise must be made, for the output is reduced by one half, at least, with only half as many kicks. A satisfactory coil has three turns of 16 s.w.g. wound to cover one inch on 1¼" tube, for ten metres.

Having the energy to drive the final stage, it would seem rather inconsistent to burn it all up in the grid tuner before it reached the valve. It is thus necessary to keep the dynamic resistance high here. The input resistance of the valve, determined by the ratio $\frac{E^2}{W}$ where E is the input voltage and W the power, is fairly high, and the dynamic resistance must be higher in proportion. In the case of figure 6, where an 809 is used in the final, the input resistance is 4,000 ohms and a suitable coil is one of eight turns of 16 s.w.g. wire double-spaced on 1¼" tubing.

Now, again consider the final stage. It is important to have as much power output as possible at one frequency, and as little as possible at all others. To cut down on output at other frequencies, the "Q" factor should be high—as high as possible. The dissipation of the energy occurs at (1) the resistance in the coil, and (2) in the aerial.

The aerial represents a load across the coil, just like condenser leakage. The maximum "Q" is attained when the loss in the coil is equal to the loss in the aerial, but such a scheme would be shamefully inefficient. Besides the waste of energy in the coil, there is a waste in the valve, and the total efficiency of the stage must account for both losses. The loss in

(Continued on page 39)

Marine Receiver—Coil Data.

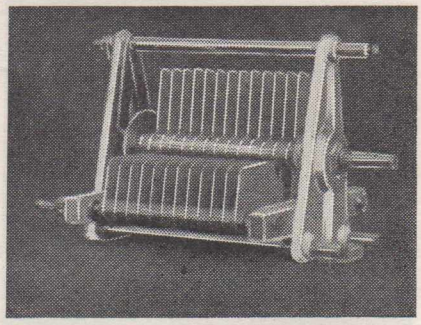
All coils are wound on 1½" formers, spaced over 1½," except oscillator, which is spaced over 1¼." Bandspread tap is from bottom end. Coils with no bandspread tap should have a jumper from B.S. tap pin to top of grid winding pin.

All coils are wound with 24-gauge enamel except broadcast band coils, which are wound with 30-gauge enamel. Aerial and reaction coils are spaced ¼" from cold end of grid windings. Top of grid winding should go to grid, bottom to earth. Then the beginning of reaction winding goes to "B+," other end to plate of oscillator.

Band	Grid	B.S.	Rct.	Aer.
160m.	27	11	7	5
80m.	13	4	4	4
40m.	8	1½	3	3
20m.	4	1	1½	2

What's New In Radio

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



One of the new Raymart transmitting condensers, which possess many attractive features. Note the triangulated construction.

New Raymart Transmitting Condensers.

Messrs. John Martin Pty. Ltd. advise that the first shipment of a completely new range of Raymart transmitting condensers will be landed shortly. They incorporate many features that will make a particularly strong appeal to amateurs.

Insulation throughout is RMX, a particularly high grade of ceramic insulation that was adopted as standard by Raymart several years ago. As the accompanying photographs show, these new condensers are of a special triangulated construction, rendering them practically warp-proof. This is an important improvement, particularly in the case of the split stator type of condenser, where any misalignment in the plates results in one section having a capacity greatly in excess of the other.

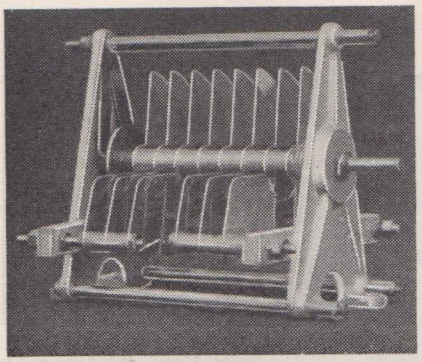
Both finish and workmanship are of a particularly high standard. All spacing pieces, support rods, etc., are highly-polished nickel plate on brass, while the end plates are die-cast aluminium. The rotor and stator plates are of polished aluminium, and in the case of the two 10,000 peak voltage types, the vanes have rounded and polished edges.

Other features worth noting are that the condensers are provided with feet for baseboard mounting, and also have screwed spacer supports for panel mounting. In the former case, there is ample clearance between the stators and the chassis to ensure low dielectric loss and minimum capacity.

Each condenser is fitted with corona discharge disc and phosphor bronze laminated wipers or collectors are fitted to ensure the lowest possible contact loss on the rotor, no current being carried through the bearings.

Friction disc, tension assembly on the front bearing maintains smooth operation, and the diameter is such that rock or looseness cannot occur. All shafts are of special ground alloy steel to provide perfect bearing. Terminal connections are 2 BA, allowing of substantial connection to both rotor and stator connections.

Further details of this and other



Triangulated construction is also a feature of this double-spaced split-stator type.

new Raymart shortwave transmitting and receiving lines are available free on request from John Martin Pty. Ltd., 116-118 Clarence St., Sydney.

★

Four Calstan All-Wave Modulated Service Oscillators.

Further details are now available of the four Calstan all-wave modulated oscillators released recently by Slade's Radio Pty. Ltd., of Croydon, N.S.W. These instruments comprise a modulated test oscillator and a combination test oscillator and output meter, both versions being available for either battery or a.c. operation.

Features common to all four models include the following:—Black crystalline lacquer finished pressed-steel case, fitted with rubber feet and carrying handle, etched nickel silver panel, pilot lamp, black instrument knobs, 5" dial reading direct in k.c. and m.c. (top half), with corresponding metres (bottom half), dial has smooth planetary movement adjustable for slip, instrument incorporates two attenuators, has band spread of 150 kc. to 16m.c on fundamentals without breaks, above 16m.c. by using second harmonics, R.F. signal modulated at will with 500-cycle note, high degree of stability and accuracy, particularly over 175 and 465 kc. channels.

In both oscillator-output meter combinations, a copper oxide rectifier-type output meter is employed. The two instruments are housed side by side in a pressed-steel case, though separate panels are employed.

In addition to the rectifier, the meter is fitted with four multipliers giving full-scale indications of 2.5, 10, 50 and 250 volts. Any of these ranges may be selected at will by means of a rotary selector switch. Provision is also made for independent a.c. voltage measurements within the ranges quoted above.

These four models—306 battery operated, 306A battery operated with output meter, 307 mains operated, and 307A mains operated with output meter—provide a range of service oscillators that fills all requirements, prices being well within the reach of every serviceman and experimenter.

Further details are available free on request from Slade's Radio Pty. Ltd., Croydon, N.S.W.

★

Wash Master Electric Washing Machine.

As a companion line to receivers, there is every indication that this year many radio dealers throughout the Commonwealth will also be handling washing machines.

Messrs. Martin De Launay Pty Ltd., Druitt and Clarence Sts., Sydney, recently held the first of two dealer conferences, over thirty-five dealers attending the first official viewing of the new Wash Master electric washing machines for which the company mentioned has acquired Australasian rights.

There are two models available, both being designed in Australia to incorporate latest features from a range of about twenty American models, giving a composite machine specially suited for Australian conditions. Dealers interested in this new line are invited to write to Martin De Launay Pty. Ltd. at the address given above for further details.

★

New Diamond "B" Battery.

One of the most significant factors in our present-day economic system is the effect of competition in the manufacturing field. Urged on by the desire to out-distance rivals, the factory operator is continually on the alert for ways and means of improving production and improving his products. This is particularly noticeable in the dry battery field, where attention is drawn to the announcement of a new dry battery for use in country radio receivers, a field hitherto considered to be impossible for further improvement.

The new Diamond Tripledyne "B" Battery.

"For years," stated an officer of Widdis Diamond Dry Cells Pty. Ltd., "industry has believed that the present 'B' battery was as near perfection as it was possible to get. Our engineers and technicians, however, have been experimenting for years on an entirely new type of battery and as a result the Company has now released the Diamond Tripledyne "B" Battery. This new product is exactly the same size as hitherto, but its capacity has been increased to prolong life and deliver more power to the country listener's radio receiver. There is also no increase in price."

The new Diamond Tripledyne Radio Battery is being introduced to the general public with the largest advertising campaign in Widdis Diamond history. Large spaces in the press have been released and Mr. Jack Lumsdaine, well-known radio star, commissioned to complete a number of highly original radio announcements that are scheduled for key stations throughout the Commonwealth.

★

United Radio Distributors Release 80-Page 1939 Catalogue.

Last month United Radio Distributors Pty. Ltd. released their 1939 catalogue of radio receivers, components, electrical equipment and general accessories.

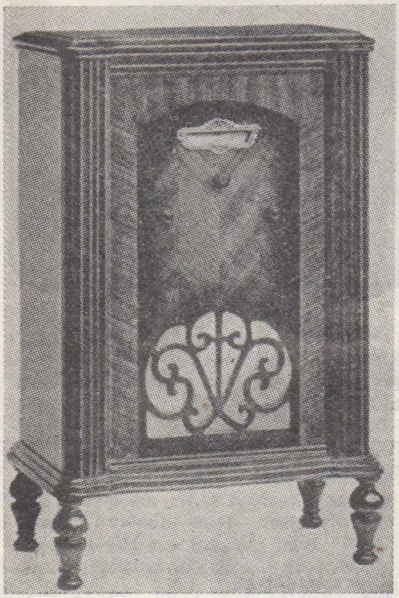
Of handy pocket size, the catalogue comprises 80 pages with two-colour art cover. Page 1 is devoted to an outline of the U.R.D. trading policy, while pages 2 and 3 give an index of contents. For simple reference, every item is arranged in alphabetical order.

An exceptionally wide range of receivers and general radio and electrical equipment is listed and illustrated, making the catalogue invaluable to every serviceman and retailer. Copies are obtainable free on request from United Radio Distributors, 234 Clarence St., Sydney.

New Eddystone Catalogue.

A limited number of copies of the latest Eddystone catalogue is also available to amateurs and shortwave fans from the same address. In this the complete range of 1939 Eddystone shortwave components is listed and illustrated.

Leaves From A Serviceman's Diary . . . . . (1)



Radio has progressed considerably since the days when sets of this type were popular. Nevertheless, as every serviceman knows, many of them are still in operation.

Common receiver faults, with symptoms and suggested cures, are discussed in this new series of articles . . . . . .

By "SERVICEMAN"

DURING the past few years radio receiver design has reached such a stage that considerably more skill is required efficiently to service the modern set than was necessary three or four years ago. The old receivers with their multiplicity of dials and knobs which only the family expert could manipulate, have long since passed out of existence, while long-legged bulky console models are fast becoming obsolete, giving place to instruments of artistic beauty, the operation of many being accomplished by the mere pressing of a button.

Not only have improvements been effected externally, but the internal design has advanced to such a stage that to-day the modern set is the last word in workmanship. It is in itself a fine musical instrument which provides the cheapest form of entertainment, and has come to be an every-day necessity.

With radio licence figures for Australia above the million mark, it will be realised that there has now arisen a new trade for the right men—namely, service and maintenance work to keep these sets in order. Although, as previously stated, a high degree of perfection has been attained in modern sets, nevertheless, it stands to reason they will not perform indefinitely, and at some time or another, replacement parts will be necessary, irrespective of the price paid for the instrument.

Unfortunately, a number of persons have realised that there is considerable remuneration offering in this new profession, but they are attempting to conduct it as a business without the necessary technical knowledge or experience. Numerous cases have been encountered where set owners have suffered at their hands by paying heavy repair accounts for absolutely inferior and very amateurish workmanship.

It is not intended by this statement to criticise the man who conducts occasional repair work, providing, of course, he knows his job. However, if he finds he cannot effect the necessary repairs efficiently, he should pass the work into more competent hands, rather than experiment at the set owner's expense or create any possibility of detrimental and unwarranted reflections being cast upon the manufacturer.

Of course, as in all other trades, there are certain faults which the layman can rectify himself. For example, a service call was recently made to a place 30 miles from Sydney just to discover that the aerial lead had come disconnected, the set itself being still under guarantee. Furthermore, there are numerous cases where the local radio enthusiast is called upon to examine a set which may have stopped at a critical moment, perhaps in the middle of a horse race or test match, when the services of a serviceman are unavailable.

It is not intended in this article to discuss method and procedure in servicing radio receivers as so much depends on conditions, but as emphasised previously in this magazine, the serviceman should adopt a systematic procedure.

The location of faults in a short time can only come by experience, and in this respect it has been found that very often the repairing of a defect as quickly as possible creates a very good impression with the customer. He ascertains that the serviceman apparently knows his work, and is usually much better impressed than if half an hour is spent on "trouble shooting." After the essential fault has been rectified, then it is good policy to give the receiver a general overhaul and inform the client of any other weaknesses.

Owner Should Be Studied, Too.

Besides studying the radio receiver, it is sometimes necessary to study the customer, as many are very temperamental. The average radio listener has very little knowledge of the working of a receiver, and at times is apt to make some very foolish statement or suggestion. He may be convinced, for example, that the fault lies in some particular part of the set, and persists with this idea. Listen to his complaint with a sympathetic ear, and do not immediately condemn or ridicule his suggestion. To satisfy him, some sort of test should be applied to the particular component (even though it is perfectly good), and he should be informed that according to the test equipment that part is quite satisfactory.

Then again, many a receiver owner does not want more parts replaced than necessary to put the receiver in going order. In such a case he should be informed of the other weak or slightly defective components, so that in the event of a further breakdown in the near future, the serviceman can say, "Well, I told you so." A breakdown a few days after a service call very often casts a reflection on the serviceman in the eyes of the client.

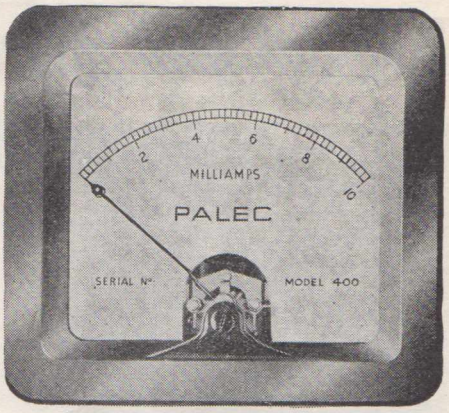
Many fail to realise that the serviceman is not infallible, but should the latter be at all doubtful as to whether he has located the fault, then it should be recommended that the set be brought away for factory or work bench attention.

Cases have been encountered where the customer has complained of a cer-

(Continued at foot of Col. 1 overleaf)

"Find-The-Fault" Contest For Readers

Latest Square Type Moving Coil Palec Meter Is First Prize



This new Palec Model 400 square type 0-1 m.a. moving coil meter is first prize in the "Find-The-Fault" Contest.

ELSEWHERE in this issue, Paton Electrical Proprietary Ltd., of Sydney, manufacturers of Palec meters and test equipment, have released the first of a special series of advertisements designed to assist servicemen in locating common faults. Brief details of symptoms are given, followed by an outline of tests that can be made to confirm each diagnosis.

Mr. F. H. Paton, principal of the Company, has suggested to "Radio World" that readers might like to do a little radio sleuthing on their own account, with the result that the following competition is announced. Below will be found a brief description of a fault that has caused a breakdown in a receiver, symptoms being outlined. Readers are invited to send in a brief description of not more than 50 words, outlining how they would proceed further to track down the trouble. A suggested cause (or causes) of the breakdown should also be given.

The reader sending in the best all-round solution will be awarded as first prize one of the new Palec 0-1 m.a. square type moving coil meters illustrated above, donated by the Paton Electrical Pty. Ltd. The three entrants sending in the three next best solutions will each be awarded a twelve months' subscription to "Radio World." Entries must be addressed to "Find-The-Fault Contest," and should reach the "Radio World" offices at 214 George St., Sydney, on or before June 20, so that results can be published in the July issue. Here is the problem:—

A serviceman, called out to service a recent model 4/5 a.c. dual-wave superhet that had stopped operating, noticed the following symptoms: All valve heaters and the rectifier filament were alight, while a faint humming sound was coming from the speaker. All valves checked O.K. on a tester. A voltmeter test showed that "B+" was present on the output side of the smoothing filter, being exactly 250 volts above the chassis. With the grid clip removed from the duo diode triode second detector and first audio amplifier, and a finger placed on the grid cap, no resulting sound was heard from the speaker.

WHAT FURTHER TESTS SHOULD BE MADE TO LOCATE THE TROUBLE, AND WHAT WAS THE PROBABLE CAUSE OR CAUSES OF THE BREAK-DOWN?

---

tain fault in the receiver which is not apparent at the time of the service call. The serviceman replaces various components which test slightly defective, makes a substantial charge, and departs. Shortly afterwards, the original trouble develops again, much to the wrath of the owner who has paid for service and parts, but has not had the main defect repaired.

If in doubt, bring the set away, or make a further "courtesy call," rather than have a dissatisfied client. A satisfied one usually becomes the source of further business.

In the following series, a list of possible defects will be given, together with symptoms displayed and remedy. Of course, it must be realised that these are by no means a complete list, but constitute some of the simpler faults which have actually been encountered by a serviceman over the past eight years.

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

COMPLAINT: No reception.

SYMPTOMS: Set does not light up.

DEFECTS AND REPAIR PROCEDURE:

(1) Power Fuse Blown.

Test power point or light socket by plugging in an electrical appliance or lamp. Replace fuse if blown.

(2) Set Fuse Blown.

Examine and replace if necessary.

(3) Faulty Power Point Or Socket.

If fuses O.K., apply test (1) and if power point is faulty, connect set to another source of power until point is repaired by an electrician.

(4) Plug Of Set Faulty.

Examine for burnt, loose or broken connections and replace if necessary.

(5) Open Circuited Power Cord.

Test each lead for continuity with meter. Renew cord if open circuit present.

(6) Broken Connection On Primary Input Leads Or Lugs Of Power Transformer.

Test for continuity right at lugs, and if no reading, examine lugs for detached wires.

(7) Open-circuited Primary Of Power Transformer.

Apply test (6) and if connections O.K., primary is open-circuited. A new transformer or re-wind will be necessary.

(To be continued next month)

The All-Wave All-World DX News

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

★ ★

World-Wide DX With The "Atlas All-Waver."

I am in receipt of the club badge and certificate, with which I am delighted. May I say that "A.R.W." is the best magazine ever, and I have been taking it for twelve months now, and always look forward to the next copy.

Re the "Atlas All-Waver." I built this up from the "A.R.W." circuit, and started off by building up the detector and first audio stage with the output pentode. In its two-valve form I got fair results with pretty good selectivity. Later on I added the r.f. stage and this seemed to give a decrease in selectivity, with a great increase in sensitivity. I am at a loss to account for this decrease in selectivity though and would like to hear other readers' views on the subject and also exchange experiences with others who have built this set. Using a P.M. 8-20 Rola speaker, I get plenty of volume on broadcast stations within a radius of 300 to 400 miles. Performance is good on short waves, but as I listen mostly on 20 metres I cannot say much about the other bands. The following is a list of stations received on short waves:—

14 VK2's, 8 VK3's, 17 VK4's 7 VK5's, 7 VK6's, 3 VK7's, 4 VK9's, 12 ZL's, 6 K6's, and XU8NA, VS6AB, CE1AH, OA4AI, ZS2C, XZ2DY, CO-7CX, VQ4KTC, ZS2BU, 13 KA's, 7 W's, F8KI, G5AK, G8UR, GSF, GSE, KZIM, VLR, also many others announcing in foreign languages.—B. Beresford (AW483DX), "Windy," Quirindi, N.S.W.

[Re your problem with the "Atlas," you will probably find that adding the r.f. stage gives what amounts to only an apparent decrease in selectivity. Actually, the appreciable improvement it makes to sensitivity apparently broadens the tuning. The r.f. tuning control will be fairly broad, but the detector tuning should still be sharp. To obtain a still further improvement in selectivity, try the effect of coupling your aerial lead-in to the receiver through, say, a .0001 mfd. midget variable condenser. With this set approximately half out, selectivity will be greatly improved, though sensitivity will suffer a little as these two factors are inter-related. Glad to know you are getting such fine results.—Ed.].

This Thing Called "Q."

(Continued from page 34)

the valve depends largely on the loading of the aerial. By reducing the coupling to the aerial, its effective loading resistance is increased, and the efficiency is raised.

Increasing the load resistance has another effect—reduced power output, for the actual voltage on the plate of the valve is reduced more by the voltage across the load, and the current during the flick is less. Another compromise must be set then, between efficiency and power output. When 'phone is used, a plate-modulated final stage is allowed an efficiency of about 66%, when the valve is allowed to dissipate one-third of the energy.

(To be concluded next month)

QSL Exchange Bureau.

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

L. R. J. Knighton, 334 Barbadoes St., Christchurch, New Zealand.

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.

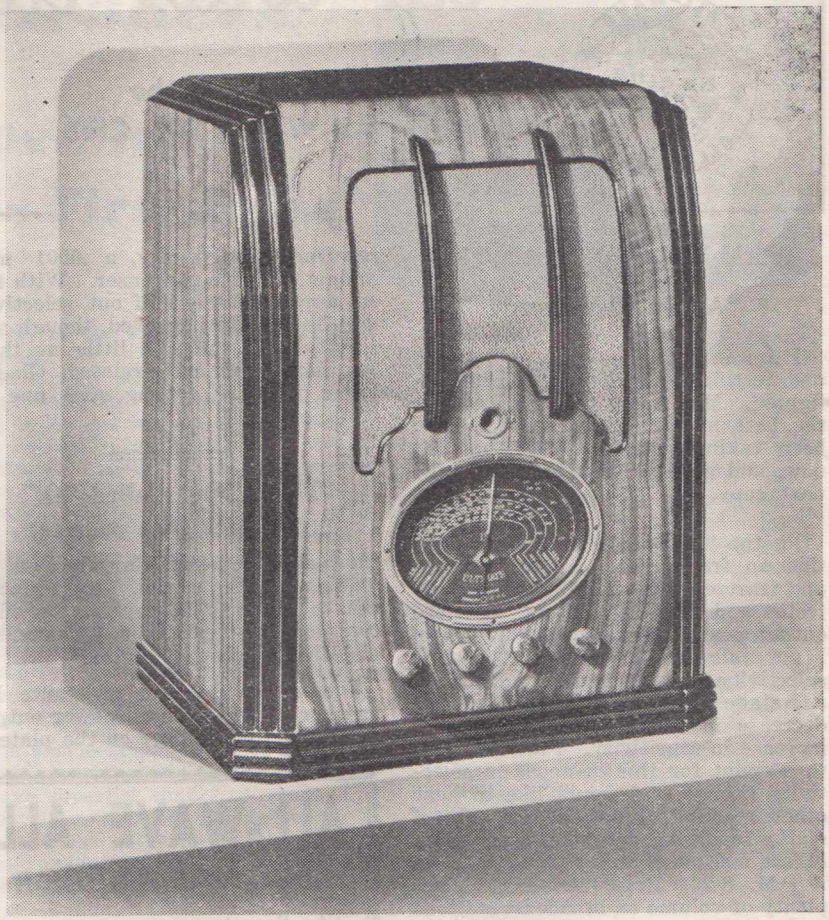
(Signed).....

[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.]

Shortwave Editor Tests DX Champion Receiver

Reports Excellent Results From Latest All-Wave ULTIMATE

By ALAN H. GRAHAM



Right: The Ultimate eight-valve a.c. all-wave table console supplied to "Radio World" for test. Features include a six-gang tuning condenser, "spin dial," bandspread tuning with subsidiary logging pointer, and automatic silent tuning.

ONE of the latest Ultimate eight-valve all-wave receivers arrived here for tests about three weeks ago, and since then it has been in constant use for both shortwave and broadcast band DX-ing, though chiefly for the former, since we were mainly concerned with its performance on the 13 to 98-metre range.

From the angles of sensitivity, selectivity and general suitability for DX work in all its phases, this receiver has proved eminently satisfactory. However, before outlining the actual DX results obtained over the test period, perhaps a few comments regarding the features of the receiver may be of interest.

The Ultimate utilises eight valves, including a 6U5 tuning indicator eye, and an 80 type rectifier. Other valves are a 6K7 radio frequency stage, 6A8 first detector and oscillator, 6K7 intermediate frequency amplifier, 6H6 second detector, 6F5 audio and a 6F6G power valve. All but the 6F6G and the 80 are metal types.

The receiver covers three tuning bands — from 550-1600 kilocycles (broadcast band), from 40-98 metres, and from 13 to 33 metres, respectively.

The large, attractive, multi-coloured dial is divided into three sections, each fully calibrated in a different colour — the broadcast band scale showing the principal New Zealand and Australian stations. As the band selector switch is adjusted, a coloured spot the same colour as the dial scale in use appears on the dial face. The principal shortwave bands, both broadcast and amateur, are clearly indicated.

The controls are simple yet effective, consisting of a combined "on-off" switch and volume control; a "quiet" tuning control; dial control; waveband switch, and a tone control.

The electric tuning eye ensures maximum accuracy in tuning—with this tuning aid the receiver can be silently tuned between stations simply by adjusting the volume control to the minimum position, and rotating the tuning knob to the desired station until the ends of the green inverted "V" of the tuning eye are closest together. The volume is then adjusted as required.

General Operation.

All the controls of the receiver are smooth and sure in operation. This is particularly the case with the tuning control, which responds to the lightest touch, and is free from mechanical play. The logging of shortwave stations is greatly facilitated by the use of a small logging hand, which enables accurate dial readings to be taken for future reference.

The frequency drift from a cold start to temperature stability is surprisingly low.

The A.V.C. action is nice and smooth, and takes care of all ranges of signal strengths. It is particularly useful when listening to the "regular" shortwave stations, such as London and Berlin, giving such signals a remarkable stability, which at times

almost invites comparison with local broadcast band transmitters.

Air Tests.

Most readers will undoubtedly realise that no accurate indication of the DX abilities of a receiver can be presented by the mere listing of a number of stations heard. Given the proper conditions, any average receiver is capable of bringing in a reasonable range of DX. Therefore a mere list of stations seldom carries much weight.

However, we would like to point out that the Ultimate was tested in a locality where local QRM is often very troublesome; while in addition, the antenna used was an ordinary L-type of no particular merit. Yet, despite these drawbacks, it performed with real distinction on all occasions, and came through all its tests with flying colours.

A fair amount of time was spent on the 20-metre amateur band, where really good results were obtained. All continents were logged within a very short time of placing the Ultimate in operation, the stations concerned being:—ON4JW (Europe); ZS5CL (Africa); HK3CL (South America); XU8HB (Asia); VP7NU (North America) and K6ILW (Oceania). This feat of logging all continents was repeated on quite a number of occasions over a period of several hours, European stations coming in particularly well.

On the short-wave broadcast band results were equally satisfactory. The usual "regulars" came in at terrific strength, even when no aerial was used, while many loggings of less well-known stations were effected. Unfortunately, very little listening was possible above 33 metres on account of heavy local QRM, but on the few occasions when the noise subsided sufficiently, strong signals were heard on the 40-98 metre range, the D.E.I. and Indian transmitters putting in nice signals above 50 metres.

To check up on the accuracy of the dial calibrations, a number of commercial code stations were logged from all over the world. Most of these were at good speaker strength. Although the logging of these stations was no great feat in itself, the consistently steady signals received speak well for the A.V.C. action, and sensitivity in relation to noise-level of the Ultimate.

A short excursion into the field of broadcast band DX revealed the possibilities of the receiver in this direction, as a number of the better-known Eastern stations were logged without much difficulty. These included stations located in New Zealand, Japan, Philippine Is., China and Siam.

Shortwave Loggings.

Possibly some readers may be interested in a detailed list of loggings during the test period.

13 metres: GSJ, GSH, DJS, W8XK, W2XE.

16 metres: DJH, DJE, GSG, GSV, 2RO-8, PHI-2, W3XL, TPB-3.

19 metres: DJR, DJQ, GSP, GSO, GSI, GSF, W6XGE, XGOX, YDC, DJL, PCJ-2, TPA-2, W8XK, TAQ, 2RO-5, HS6PJ, OLR5A, RW-96, RKI, HVJ, LRU, VLK-6.

20-24 metres: New York (20) phoning Paris, TFJ, HCJB, XMHA, HBJ.

25 metres: RNE, TPA-3, W8XK, GSE, GSD, W2XE, 2RO-4, JZL, W1XAL, COCX, HVJ, TPA-4, CR7BH, OLR4A, XTJ, SBG, DJZ, Saigon.

26-29 metres: CSW-2, PLP, JVN, JIB, ORK, PMN, HBO, IQY.

30-33 metres: JDY, EAQ, COCQ, CSW-7, ZHP, IRF, JFO, 2RO-9, RAN, ZRK, COBC, VUD, PCJ, W1XK, GSC, KZRM, KZIB, DJA, TPB-11, VPD-2, DJN, JZI, W2XAF, ZBW, Moscow (31.5m.), GSB, COCH, HS8PJ, TAP, DJX, LRX, W2XEE, W3XAL, WDL.

40-49 metres: JLG, Paris (41m.), XPSA, PMH, XEXA, TGWB, TG-2, CR7AA, RV-59, 9MI, GSA, W8XAL, DJC, YDA, COCD.

50-98 metres: VUD, VUM, VUC, VUB, RV-15, YDL, YDA, PMY. N.S.W.).

[Readers are advised that copies of the latest Ultimate catalogue, giving full technical details, with illustrations, of the complete 1939 range of Ultimate receivers, are available free and post free from Messrs. Geo. Brown & Co. Pty. Ltd., 267 Clarence St., Sydney.—Ed.]

How To Make Home Recordings.

(Continued from page 4)

to the centre of the disc, and then to lower the head on to the revolving blank disc for one or two revolutions and so test for depth of cut. Always test each record for depth of cut before recording.

As mentioned previously, the depth of cut should be adjusted to approximately two thousandths of an inch. This is near enough to the thickness of a human hair.

Always switch off the cutting head as soon as you have finished recording. If you are using a microphone, take it as far away from the speaker as you can to obviate the possibility of feed-back. If this is not practicable, a switch can be placed in the voice coil of the speaker.

The cutting needle is placed in the head so that the sharp, flat chiselled face faces the oncoming disc.

Latest News Of Overseas Stations ★ Reports From Observers ★ Hourly Tuning Guide

For much of the information set out below we are indebted to our West Indian representative, Senor Rubio, and to the Universal Radio DX Club and the International Listeners' Association, through their bulletins, "Universalite" and "QSA5," respectively.

Argentine.

LSX, Buenos Aires,1 0350kc., 28.98 m., is reported recently as testing around 2 a.m. At this time they relay Radio Nacional, of Lima, Peru.

The latest schedule of **LRA**, 9690kc., 30.94m., is from 9 a.m. till noon, but this station often remains on the air till as late as 3.30 p.m.

Brazil.

PSH, Rio de Janeiro, 10220kc., 29.35 m., is putting out a very strong signal at present. Opens at 9 a.m.

Canary Islands.

EAJ43, Teneriffe, is now on 7500 kc., 40m., and it is uncertain whether their 28-metre transmitter is still in use. At present they relay Radio National, of Burgos, Spain.

Also on the 40-metre band, on 7200 kc., 41.6m., is **EA8AE**, Las Palmas. This station is reported as working other amateur stations around 2a.m.

China.

XPSA is the correct call-sign of the 42-metre station mentioned last month. Location is Kweiyang. Frequency is given variously as 7000 and 7140kc., or 42.8 and 42.0m. Our information regarding **XPSA's** schedule is also conflicting; however, the station is to be heard best around midnight, and usually closes after 2 a.m. Reports on reception are requested, and should be addressed to Kweiyang, Kweichow Province, China.

The Chinese station heard on occasions on 26.3m., 11400kc., is officiallylisted as XGRV. Location is at present at Chungking. A large part of the programme is given over to news sessions, which are given in Chinese, Japanese, French and English. Schedule is 4-4.35 p.m. and 11-11.35 p.m. The English news is given around 11 p.m.

XTJ, 11540kc., 26m., has also been moved inland to Chungking. It has been reported at 11 p.m.

XMHA, Shanghai, which caused quite a stir in DX ranks on 24.5 metres, seems to have ceased transmissions at the present time.

Various other Chinese stations listed in previous issues, such as **XGOX, XOY**, etc., are still being heard. No further information is available regarding them.

Colombian Republic.

HJ3CAX, Bogota, is one of the few Colombian stations still below 60 metres. It operates on 6020kc., 49.8 m., relaying **HJ3CAZ.** QRI is Box 772.

Another Colombian on this band is **HJ4DAE**, Medellin, on approximately 48.6 metres. Little is known of this transmitter.

Costa Rica.

Two new Costa Rican stations are testing on the 24-metre band, on 12310 and 12325kc., or 24.3 and 24.2 metres, respectively. No calls are being given, the stations merely announcing "Costa Rican station testing."

TILS, San Jose, have shifted frequency. They were originally assigned a channel on 5800kc., but for some time were on 5905 and 6060kc.; now they appear to have settled down on 6160kc., 48.6m. QRA is Postal No. 3, San Jose.

TIEP has also shifted, from 6710 kc., to 6695kc., 44.8m.

Cuba.

According to the latest information available, **COCQ** will remain on 8830 kc., 33.5m. It is to be hoped that they do so, for their wanderings of recent months have resulted in a good deal of confusion.

COCM, now under new ownership, are apparently going to change frequency, too, for they have been wandering from 9800 to 9985kc. They were originally assigned 9833kc.

A new Cuban station is now on the air—COCE relaying CMC. Details are: Frequency, 12230kc., 24.5m.; power, 1kw.; schedule, 11 p.m.-3 a.m. daily (except Mondays, from 3 a.m.-3 p.m.); QRA, Prado 18, Habana.

The Cuban Army will soon be on the air through **COY**, 4290kc., 69.9m. and **COX**, 6390kc., 46.9m. These stations will be controlled by the Press and Cultural Department of the Cuban Army.

Federated Malay States.

ZGE, Kuala Lumpur, which was recently reported to be off the air, has now been taken over by the Government, and now relays the programme of **ZHP**, Singapore. **ZGE** is on 6240kc., 48m.

French Indo-China.

There are three transmitters located in Hanoi, French Indo-China, as follow:—**Radio Hanoi I.**, 9510kc., 31.55 m. (15 watts); **Radio Hanoi II.**, 11900 kc., 25.21m. (100 watts); and **Radio Volonte**, 7100kc., 42.2m. All three stations are now on regular schedules. QRA's are:—**Hanoi I.**, 82 Rue Jules Ferry; **Hanoi II.**, 32 Rue de la Repiniere; **Radio Volonte**, 15 Bd. Hollandes.

French West Indies.

Some confusion exists regarding a station or stations located at Pointe a Pitre, Guadeloupe. **FG8AA** is said to operate on 7050kc., 42.55m.; whilst a FG8AH is reported on 7450kc., 40.27 m. The QRA for both stations is given as P.O. Box 125. It is difficult to say whether one of the above reports is a mistake, or whether there are really two stations. Perhaps further information will be forthcoming next month.

Iraq.

YIJG is the call-sign of the Baghdad station on 7200kc., in the midst of the 40-metre amateur band. Probably they will prove hard to locate amid so much QRM. Their full schedule is unknown, but they close around 6 a.m.

Portugal.

CSW, Lisbon, have quite a number of allocations between 25 and 31 metres, which are all used more or less regularly. **CSW-2**, 11040kc.,

27.17m.; and CSW-7, 9735kc., 30.82m., are those most in use.

Siam.

HS6PJ, Bangkok, 19020kc., 15.77 m., will shortly be on the air every night, instead of only once a week, on Mondays. Further details of these new transmissions will be given over this station during the Monday broadcasts at 11 p.m.

Turkey.

TAP, 9465kc., 31.7m., acknowledge SWL reports around 6.45 a.m., usually on Sunday mornings. They now close just before 8 a.m.

United States.

W1OXJF is the experimental call of **WOGK**, the motorship "Mako," in the Caribbean Sea. **W1OXJF** operates on approx. 34.6m., and less frequently on 46.5m.

U.S.S.R.

Moscow has been operating on 9520kc., 31.5m. in the mornings of late, around 8 a.m. **(RV-96).**

Vatican City.

HVJ now transmit on a number of frequencies:—17840kc., 16.82m.; 15120 kc., 19.84m.; 11740kc., 25.55m.; 9660 kc., 31.06; 9550kc., 31.41m.; 6190kc., 48.47m.; 6030kc., 49.75m.

At the present time the 48 and 49-metre frequencies are used for the majority of transmissions. English sessions are as follow:—Mondays, at 4 a.m., 19.84m.; Wednesdays, at 1.30 and 5 p.m., on 19.84 and 48.47 or 49.75 m.; Fridays, at 5 a.m., on 48.47 or 49.75m.; Saturdays, at 5 a.m., on 48.47 or 49.75m.

★

Reports From Observers.

(N.B. ALL TIMES GIVEN BELOW ARE EASTERN STANDARD)

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

Most of the past month has been taken up with DX on the 20-metre amateur band. However, conditions on the broadcast bands are fairly satisfactory. Generally speaking, best reception is to be had during the evening and very early morning hours; during daylight hours only the strongest signals are getting through the high noise-level.

Best loggings on the various bands include:—

13 metres: **W8XK, W2XE.**

16 metres: **W3XL, PHI-2, 2RO-8, TPB-3.**

19 metres: **W6XBE, 2RO-5, XGOX, OLR5A, W8XK.**

24 metres: **TFJ, XMHA.**

25 metres: **COCX, HVJ, CR7BH, SBG, XTJ.**

26-30 metres: **CSW-2** (27.17), **ORK, EAQ, COCQ, CSW-7** (30.8), **ZHP.**

31 metres: **FZR** (31.19), **ZRK, RAN** (31.25), **VUD-2, YDB, W2XAF, HS8PJ, KZIB, COCH, Moscow** (31.5).

32-45 metres: **JVP, XPSA, CR6AA.**

48-50 metres: **CR7AA, VQ7LO, Saigon** (49.05), **9MI.**

50-100 metres: **PMY, VUD-2, VUB-2, VUM-2, VUC-2, YDL-2, RV-15, YDA.**

The 20-metre band has been very good, especially during the hours of darkness. Asiatics from 11 p.m. and a good number of Europeans from 5-6.30 a.m. During a period of 50 minutes, the following countries were logged:—**G, GI, GM, CT, OK, ON, VQ4, FA, F, PAO, LA** and **VP7.** The month's best loggings include **VQ-4ECJ** (Kenya Colony), **FA3JY** (Algeria), **OK1FZ** (Czecho-Slovakia), **LA1FC** (Norway) and **VP7NU** (Bahamas).

OFFICIAL S.W. OBSERVERS.

N.S.W.: V. D. Kemmis (AW-301DX), "Brampton Hall," 49 Kurraba Road, Neutral Bay, Sydney; A. R. Payten (AW352-DX), High Street, Coff's Harbour.

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

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

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

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

VICTORIA: J. Ferrier (AW-129DX), "Winninburn," Coleraine.

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

Mr. W. H. Pepin (Maylands, Western Australia):

Conditions remain much the same as before on the broadcast bands.

13 metres is falling away a trifle, as even the B.B.C. stations are not too good.

15 metres: The Manila 'phone station, **KAX**, has been heard calling Kuala Lumpur, Fed. Malay States.

16 metres is fairly consistent. Rome, **2RO-8**, puts in a very good signal at times. **W3XL** is heard daily, although signals vary a good deal in strength. **HS6PJ**, Bangkok, are heard regularly. They again announced that a nightly schedule would come into operation fairly soon, probably in April.

On 19 metres the most important happening was the logging of the new G. E. transmitter on Treasure Island, **W6XBE.** It was heard on several occasions from 11.15 a.m. Moscow has been very good of late on this band.

On 22 metres the Sydney end of the Australia-New Zealand 'phone has been noted.

On 25, 31 and 49 metres just the usual stations have been noted. **ZBW** seems to have returned to 34 metres on occasions, having been heard signing off on this frequency at 2.35 a.m.

On the higher wavelengths the four 60-metre Indian stations come in remarkably well. And of course there are the usual **DEI** transmitters up to **YDA** on 98 metres.

The amateur bands are always interesting. I have found 20 metres a little patchy at times. Reception on 10 metres has been good, although somewhat restricted in time, as this band only opens up for a few hours daily—in the late mornings and early evenings. A few **ZL's** are to be heard on 80 metres.

Best amateur loggings:—10 metres: **ZS6, PK, SU** and **W**; 20 metres: **K6, XU, VS6, VS7** and **TG.**

KA1PI at the Manila Exposition has been very active lately. He uses a 870-watt transmitter, with a V-beam antenna directed to the United States. The receiving station is **KA-1ME.** Surely an unusual ham broadcast.

Mr. C. J. Anderson (Dumbleyung, Western Australia):

I have not been able to do very much DX work this month—and therefore have little of interest to report. The only decent DX on 20 metres logged here was **GM6RG**, Scotland, and **FB8AH**, Madagascar.

The Turkish transmitter on 31.7 metres, **TAP**, was heard on March 19 at 2 a.m. at very good strength.

I recently received a letter "veri" from **Radio Hanoi** on 25.2 metres; also one from **Saigon**, 25.6 metres. Both were in French. **Saigon** gave their present wavelengths at 25.59, 49.75 and 30.96. **Radio Hanoi** mention that they have a 42.25 metre transmitter, known as "Radio Volonte Indochinoise."

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

Generally speaking reception has only been fair, due, no doubt, to so much unsettled weather. If I remember rightly we have had only three

fine days this month. UHF reception has been very much affected by these conditions. **W6XKG** has been only fair; another station near **W6XKG** is probably **W9XAZ.**

On 13 metres Daventry is very good on opening at night, but fades out fairly rapidly.

A South American has appeared on 24 metres. This station is heard at good strength, closing at 11 p.m. Four beats of a gong are used as an interval signal. Programme seems to be mainly news. (Seems sure to be **HIN,** Ciudad Trujillo, Dominican Republic. —Shortwave Editor).

9MI is now on a new frequency, 49.54 metres.

JLG and Paris are both pretty good on 41 metres during the mornings. At night **XPSA** on 42 metres is just fair.

TAP, 31.7 metres, are still good. Their Sunday morning session for SWL's is heard well here. They gave me a call on March 19.

As for the amateur bands, both 10 and 20 metres have been crowded with contest competitors. In fact there are so many of them that the QRM is terrible. One has very little chance of logging any decent DX.

Best amateur loggings:—10 metres: **ZL, LU, K6;** 20 metres: **XZ, YV, XU, TI, VS2, VE, LU.**

Mr. J. Ferrier (Coleraine, Victoria):

During the past month I have spent some time on the U.H.F. bands, but conditions have not been too good, and I have been unable to identify any new stations, although a few signals have been heard below 9 metres. A police transmitter on approx. 7½ metres was heard at nearly R7 on one occasion, but no call was heard. Also, a broadcast station on approx. 8½ metres, closing at 11.20 a.m. Bad fading prevented identification.

On 11 metres **W6XKG** is the only worth-while signal. Otherwise things are very poor indeed.

The 10-metre amateur band is usually crowded with W's and K6's working ZL's.

I have head quite a bit of DX on my 2-tube portable. So far 29 countries have been logged on 20-metre 'phone.

Senor Richard F. Rubio (Habana, Cuba, West Indies):

Senor Rubio again forwards an interesting budget of news regarding latest changes in West Indian and American stations. For details see under Cuba, Costa Rica, French West Indies and British West Indies in the Latest News of Overseas Stations section.

Mr. R. C. Coggins (Woodville South, South Australia):

Conditions have been very satisfactory this month, although nothing very startling in the way of DX has been received. The broadcast bands remain much as before, with the usual stations verys strong in the evening and reception being YDC, which is not as good as last month. JVT 44 metres, is very loud.

On the amateur bands conditions have been very satisfactory, with best reception possible about dawn, and just after midnight. The W/VE contest on 20 metres has greatly increased the number of stations on the band. It has been noticed that South Americans have been very hard to log this month.

An interesting amateur broadcast took place on March 19. Under the auspices of the W.I.A. the Adelaide amateurs have completed the organisation of a service for national emergencies, the idea having been brought forward following the good work done by the VK5's during the recent bush-fires. On March 19 tests were carried out between a portable station operated by **5FM, 5LD** and **5LK** and several fixed stations, and a 5-metre transceiver in an aeroplane.

Best 20-metre DX included:—**G, PA, SU, XU, VS6, XZ, VU, VS2, VE** and **XE.**

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.

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

Reception on all bands has been very good this month. At midday the German stations on 19 metres have been coming in with wonderful volume, and if we can judge from daylight reception during the past month I would say that we are for some wonderful DX during the coming winter.

The latest schedules, etc., for **W3XL, W3XAL,** just to hand, are:—

W3XL, 16.87m.: Midnight-7 a.m. to Europe; 7-11 a.m. to South America.

W3XL, 49.18m.: 11-5 p.m. to Central America.

W3XAL, 13.87m.: Midnight-7 a.m. to South America.

W3XAL, 31.02m.: 8 a.m.-4 p.m. to South America.

The transmitters have a carrier power of 25kws., but with the beam directed towards the point for which the programmes are intended, the intensity is estimated as being 600kws.

Amateur station, **HB9L,** "Radio Schaffhausen," is on the air on Tuesdays at 6.30 a.m. on 20.4m.; and on Mondays on the 40-metre band at 4.30 a.m. Recorded programmes are broadcast.

XMHA, Shanghai, wandered from 24.53m., and was heard on 25.13m.; now it seems to be very irregular.

KQH. 20.1m., has been heard on Sundays, closing at 1 p.m. They announce that these broadcasts are point-to-point transmissions, so probably will not verify.

VLR-3, 25.24m., are heard best over here around 1 p.m., when sigs. are good.

OLR4A, 25.35m., has been heard recently just before closing at 2.15 p.m.

2RO-8, 16.83m., is heard well from 7.30 p.m., starting off with a news service in English, after which an excellent musical programme is provided.

ZHP, 30.96m., is now only fair around 8.45 p.m.

Several Japanese stations are in this month's loggings. On the 49-metre band is **JVJ,** heard with an English session at 5 a.m.; good speaker strength. **JLG,** 41.18m., is very strong after 5 a.m., and is relayed by another Jap station on 31.1m.

TAP, 31.7m., is one of the best of the morning stations, with a nice clear, steady signal.

W6XBE, 19.56m., has been heard till close at 1 p.m. QRA is General Electric Co., San Francisco Exposition, Treasure Island, San Francisco.

TGWA, 30.96m., is best on Sundays around 2 p.m. At that time the 10 p.m. chimes from Gautemala City are to be heard.

OFO, Lahti, Finland, on 19.75m., are heard on Mondays between 3 and 4 p.m., when a religious service is broadcast. Signals fair.

SP-19, 19.8m., are heard around midday. Signals weak at present.

The four Indian transmitters on 60 metres are best between 1.30 and 3.30 a.m., closing at the latter time. They ask listeners to give programme details for at least half an hour when reporting.

HIN on 24 metres is heard with a strong signal at 10 p.m., when a news session in Spanish is broadcast. Four chimes on a gong serve as an identification of this station.

SP-31, 31.49m., and **SP-48,** 48.86m., are both new stations. They have been heard at 5.30 a.m., with good signal strength.

HI2X, 25.08m., are good around midday on Wednesdays, Saturdays and Sundays.

TGQA, 46.56m., are heard at 2.30 p.m. till they close at 3 p.m.

Regarding the amateur bands—10 metres is improving here, a good

number of W's and K6's being logged. Best loggings on 20 metres include **VE, HC, J, PY, LU, HB** and **I.**

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

DX has brightened up considerably this last month on all bands. This improvement has been especially noticeable on 10 metres, where **W, KA, K6, ZL, XE, PY,** etc., have been logged between 6 a.m. and 2.30 p.m.; these stations seem to be coming in better each day as the cool weather draws on. The ZL's are as loud as the local VK5's.

An interesting "veri" to hand from **VQ8AE,** Mauritius. He states that he is the only VQ8 on 'phone at present, although **VQ8AF** will be on the air on 'phone shortly.

Radio Tirana, Albania, on 30.1m., were heard around 4 p.m. on one occasion. They announced that they are also testing on 49.4m. Colombo have been logged on 48 metres, closing at 9.30 p.m.

EAQ, 30.4m., have not been noticed since the fall of Barcelona.

Good DX on 20 metres included:—**FN1C,** French India; **LA, SU, YR, ON, ZS, NY, K5, HR, VE** and **TG.**

General Summary of Conditions.

Conditions appear to have been quite satisfactory during the past month, except, perhaps, for a slight falling away on the higher frequencies (except for the 10-metre amateur band, which provided some entertaining listening). Best results seem to have been obtained above 19 metres, for several new stations are reported on 31 and 49 metres. Daylight reception is definitely on the improve, with a number of stations audible after 1 p.m.

Summarising the information to hand this month, we would advise DX-ers to look out for the following stations:—

On 19 metres: W6XBE, 19.56m., the new G.E. station located on Treasure Island, heard during the mornings; **OFO,** Lahti, Finland, 19.75m., heard in the late afternoons; **TGWA,** 19.77 m., in the early mornings; **SP-19,** 19.84m., in the late mornings.

On 25 metres: HI2X, 25.08m., around noon; **SBP,** 25.63m., in the late afternoons. Also **HIN** on 24m., at 10 p.m.

On 30-31 metres: Radio Tirana, Albania, testing on 31.1m.; **SP-31,** 31.49 m., testing around 5.30 a.m.; Moscow, on a new frequency around 8 a.m., 31.5m.; **TAP,** 31.7m., one of the best of the morning stations, closing just before 8 a.m.; **TGWA,** 30.96m., in the early afternoons.

On 46-50 metres: A whole host of stations after 10 p.m. Watch especially for **TG-2, VY1RL, XEXA, VIO** (which is the call of Colombo, Ceylon, on 48m.) and **YV1RD.** In the mornings look for these on the lower frequencies—**CR7AA, VQ7LO,** Moscow on 49m., and **SP-48,** the new Warsaw station on 48.86m.

Above 50 metres: The four Indian stations on 60 metres are best around 2 a.m.

★

Latest Schedules.

Below are set out the latest schedules of the regular overseas shortwave stations:—

GERMANY:

Transmitters:—

DJA	9560kc.	31.38m.
DJB	15200kc.	19.74m.
DJC	6020kc.	49.83m.
DJD	11770kc.	25.49m.
DJE	17760kc.	16.89m.
DJH	17845kc.	16.81m.
DJL	15110kc.	19.85m.
DJN	9540kc.	31.45m.
DJQ	15280kc.	19.63m.
DJR	15340kc.	19.56m.
DJS	21450kc.	13.99m.
DJX	9675kc.	31.01m.
DJZ	11801kc.	25.42m.

Operating Schedules:—

For Asia and Australia: 12.15-2 a.m., **DJH;** 3.05-8.50 p.m., **DJE;** 3.05-10.50 p.m., **DJS** and **DJH;** 3.05 p.m.-2 a.m., **DJB, DJN** and **DJQ;** 11 p.m.-2 a.m., **DJE.** News broadcasts in English at 5 p.m., 10 p.m. and midnight.

For Africa: 1.40-7.25 a.m., **DJL** and **DJX;** 2.30-7.25 a.m., **DJD** and **DJC;** 3.05-5 p.m.: **DJL.**

For South America: 2.10-3.25 a.m., **DJE** (Mondays only); 7.50 a.m.-noon, **DJE;** 7.50 a.m.-1.50 p.m., **DJN;** noon-1.50 p.m., **DJQ;** 9.10-10.50 p.m., **DJE.** Special broadcasts, 7.50 a.m.-noon, **DJQ.**

For North America: 2.10-3.25 a.m., **DJB** (Mondays only); 7.50 a.m.-1.50 p.m., **DJB, DJD** and **DJZ;** 11 p.m.-midnight, **DJL.**

For Central America: 7.50 a.m.-1.50 p.m., **DJR;** 9.30 a.m.-1.50 p.m., **DJA;** 11 p.m.-midnight, **DJH.**

ENGLAND.

Transmitters:—

GSA	6050kc.	49.59m.
GSB	9510kc.	31.55m.
GSC	9580kc.,	31.32m.
GSD	11750kc.	25.53m.
GSE	11860kc.	25.29m.
GSF	15140kc.	19.82m.
GSG	17790kc.	16.86m.
GSH	21470kc.	13.97m.
GSI	15260kc.	19.66m.
GSJ	21530kc.	13.93m.
GSO	15180kc.	19.76m.
GSP	15310kc.	19.62m.
GSV	17810kc.	16.84m.

Operating Schedules:—

Transmission 1: 4.30-6.45 p.m., **GSI, GSO, GSF, GSE and GSD.**

Transmission 2: 8.45 p.m.-midnight, **GSJ, GSH, GSV, GSG, GSF** and **GSE.**

Transmission 3: Midnight-3 a.m., **GSH, GSG, GSF, GSD** and **GSE.**

Transmission 4: 3.20-7 a.m., **GSG, GSP, GSI, GSD, GSE, GSV, GSA** and **GSB.** 7.15-9 a.m.: **GSO, GSD, GSC, GSB** and **GSA.**

Transmission 5: 9.20-11.30 a.m., **GSO, GSD, GSC** and **GSB.**

Transmission 6: 12.20-2.20 p.m, **GSC, GSB** and **GSD.**

News Broadcasts:—

Sundays: 2, 7.15 and 10.40 a.m., 1.30, 6.10 and 11.25 p.m.

Mondays: 2, 7 and 10.35 a.m., 1.30, 6.20 and 11.30 p.m.

Other days: 2, 7.15 and 10.40 a.m., 1.30, 6.20 and 11.30 p.m.

ITALY.

Transmitters:—

2RO-3	9630kc.	31.13m.
2RO-4	11810kc.	25.4 m.
2RO-5	15300kc.	19.61m.
2RO-8	17810kc.	16.84m.
2RO-9	9670kc.	31.02m.
IRF	9230kc.	30.52m.
ICC	6350kc.	47.2 m.
IQA	14795kc.	20.28m.
IQY	11670kc.	25.7 m.

Operating Schedules:—

2RO-3: 4-5.55 a.m.; 7 a.m.- noon.

2RO-4: 9 a.m.-noon; 7.30 p.m.-5.30 a.m.

2RO-5: 1-3.05 a.m.; 4-8.30 a.m.; 9 a.m.-noon.

2RO-8: 7.30-11.45 p.m.

2RO-9: 3-4 a.m.; 4.35-6.35 a.m.

IRF: 3-4 a.m.; 4.35-6.35 a.m.; 9 a.m.-noon.

ICC: 6-6.30 a.m.

IQA: 7.30-8 p.m.

IQY: 6-6.35 a.m.; 8-8.15 p.m.

News broadcasts in English at 2.05, 4.20, 9 and 10.30 a.m., and 9 p.m.

FRANCE.

Transmitters:—

TPA-2	15243kc.	19.68m.
TPA-3	11885kc.	25.24m.
TPA-4	11718kc.	25.6 m.
TPB	7280kc.	41.21m.
TPB-3	17810kc.	16.84m.
TPB-6	15130kc.	19.83m.
TPB-7	11885kc.	25.24m.
TPB-11	9550kc.	31.41m.

Operating Schedules:—

12.30-2 a.m.: **TPB-3.**

2.15-9 a.m.: **TPB, TPB-11, TPA-3.**

10 a.m.-12.15 p.m.: **TPA-4.**

12.30-3 p.m.: **TPB-7** and **TPA-4.**

5-8 p.m.: **TPB-6** and **TPA-3.**

9 p.m.-2 a.m.: **TPA-2.**

News broadcasts in English at 6 a.m.-7.15 and 10 p.m. daily.

HOLLAND.

Transmitters:—

PHI-2	17770kc.	16.88m.
PCJ	9590kc.	31.28m.
PCJ-2	15220kc.	19.71m.

Operating Schedules:—

PHI-2: 10.40 p.m.-12.10 a.m. daily, except Mondays; Mondays, 9.25-11.45 p.m.

PCJ-2: 6-7.30 p.m., Wednesdays; 12.30-2.30 a.m. Fridays.

PCJ: 11 a.m.-noon Sundays; 4.20-4.35, 5-6, 10.15-11.15 a.m., 11.25 a.m.-

12.25 p.m., 12.35-12.50 p.m. Tuesdays; 4.45-6.30, 10.15-11.45 a.m., noon-1.30 p.m. Thursdays; 10.15-11.15, 11.25-11.40 a.m. Fridays.

News broadcasts in English at 10.45 p.m.

PHILIPPINES.

Transmitters:—

KZRM .. .. 9570kc. .. .. 31.35m.
KZIB .. .. 9503kc. .. .. 31.57m.

Operating Schedules:—

KZIB: 8 p.m.-midnight.

KZRM: 7.30-10 a.m., 2.15-3.15p.m., 7 p.m.-1 a.m. (Sundays from 6 p.m.).

News broadcasts in English at 10.50 p.m.; also at 8.30 p.m. Saturdays.

DUTCH EAST INDIES.

Transmitters:—

YDB .. .. 15300kc. .. .. 19.61m.
YDC .. .. 15150kc. .. .. 19.8 m.
YDB .. .. 9550kc. .. .. 31.41m.
PLP .. .. 11000kc. .. .. 27.27m.
PMN .. .. 10260kc. .. .. 29.24m.

Operating Schedules:—

YDB, 19m.: 10.30 a.m.-5 p.m.

YDB, 31m.; YDC, PLP and PMN: 9-10.30 a.m., 1.30-5 p.m., 7.30 p.m.-1 a.m.; also Mondays, 12.30-3 p.m.

U.S.S.R.

Transmitters:—

RV-26 .. .. 15180kc. ....19.76m.
RKI .. .. 15080kc. .. .. 19.87m.
RNE .. .. 12000kc. .. .. 25.0 m.
„ .. .. 12060kc. .. .. 24.88m.
RAN .. .. 9600kc. .. .. 31.25m.
RV-59 .. 6000kc. .. .. 50.0 m.

Operating Schedules:—

RV-26: 5.30-6.30 a.m., Tues., Wed., Sat. and Sun.; 10 a.m.-12.15 p.m., Tues., Thurs., and Fri.; 6-7 p.m. daily.

RKI: 3.15-5.30 a.m., Mondays; 10 a.m.-12.15 p.m. daily.

RNE: 3-5 a.m., 6-9 a.m., 1.15-2 p.m., 9-10 p.m. daily; 11.30 a.m.-noon, Wed. and Fri.; 9 p.m.-1.30 a.m., Sundays; 9-9.30 a.m., 11.30 a.m.-noon, Mondays.

RAN: 9 a.m.-1 p.m., daily except Mondays; Mondays, 9-10 a.m., 12.15-1 p.m.

RV-59: 2-9 a.m., daily; Sundays at 9 p.m.

News broadcasts in English:—

Sundays: 8 a.m. (RV-59), 10 a.m. (RKI, RAN), 6 p.m. (RV26), 9 p.m. (RV59).

Mondays: 2 a.m. (RV-59), 7 a.m. (RV-59), 10 a.m. (RKI, RAN), 6 p.m. (RV-26).

Tuesdays: 7 a.m. (RV-59), 10 a.m. (RKI, RAN), 6 p.m. (RV-26).

Wednesdays: 10 a.m. (RKI, RAN), 6 p.m. (RV-26), 9.30 p.m. (RV-59).

Thursdays: 10 a.m. (RKI, RAN), 6 p.m. (RV-26).

Fridays: 8 a.m. (RV-59), 10 a.m. (RKI, RAN), 6 p.m. (RV-26).

Saturdays: 7 a.m. (RV-59), 10 a.m. (RKI, RAN), 6 p.m. (RV-26).

JAPAN.

Transmitters:—

JLG .. .. 7285kc. .. .. 41.18m.
JVP .. .. 7510kc. .. .. 39.95m.
JZI .. .. 9535kc. .. .. 31.46m.
JZJ .. .. 11800kc. .. .. 25.42m.

Operating Schedules:—

To Europe: 5.30-7 a.m., JLG and JZJ.

To South America: 7.30-8.30 a.m., JZI and JZJ.

To North America: 11-11.30 a.m. and 10-10.30 p.m., JZJ.

To North America, Canada and Hawaii: 3.30-4.30 p.m., JZJ.

To China and South Seas: 11 p.m.-12.30 a.m., JVP and JZJ.

News in English at 5.35 and 11.05 a.m., 3.35 and 11.25 p.m.

★

Amateur Review.

Latest Prefixes.

An additional "K" prefix is KH6 for American Samoa.

10 Metres Good.

In direct contrast to other high frequency reception, conditions on the 10-metre amateur band have been more than satisfactory. During daylight hours, from about 6.30 a.m. till shortly after noon, strong signals are audible, especially from North America and the Pacific. A few Central and South Americans have also been noted.

20 Metres.

20 metres continues up to standard, with some interesting stations reported, such as FNIC, French India; FA3JY, Algeria; VQ4ECJ, Kenya; I1MS, I1MB, Italy; YR5PB, Roumania; ES5D, ES5C, Esthonia; HR2A, Honduras; VP6FO, VP6MY, Barbados; and OK1FZ, Czecho-Slovakia.

The recent W/VE contest resulted in a great number of stations being heard, but their very numbers proved a source of annoyance as QRM was very bad.

★

Calls Heard.

This month's list of calls heard is compiled from information supplied by the "Radio World" Official Observers, and by Mr. J. C. Taylor (AW454DX), of Hurstville, N.S.W.

10 METRES:

Asia:—Japan: J2MI, J3FZ (Linhan).

Africa:—Egypt: SU1MW (Pepin), SU1MD (Linehan).

Pacific:—Baker Is.: KF6PUL (Linehan). Jarvis Is.: KG6NVJ (Linehan). Dutch East Indies: PK1VM (Pepin), PK2AY (Linehan). Philippines: KA1LB (Linehan). Hawaii: K6NYD (Payten), K6PLZ (Linehan), K6DV (Graham). New Zealand: ZL-2BE, ZL2VM, ZL1LC, ZL1AY (Payten), ZL2BE, ZL1HY, ZL1MQ, ZL-1LC, ZL1MR, ZL1NG, ZL3KZ, ZL-2TI (Linehan).

South America:—Argentine: LU-1DA (Payten), LU1DA, LU1BJ, LU-5AN (Linehan). Brazil: PY2AC, PY2AK (Linehan).

Central America:—Mexico: XE2AE, XE1A, XE1F (Linehan).

North America:—Canada: VE5AE (Linehan). United States: W6NBC, W6POZ (Pepin), W4EEB, W7EKA (Linehan), W6CMB, W6TMG, W6-NKF, W6MZO, W9VYE (Johns), W2FIT, W4FRJ, W4PFR, W4EJQ, W5FUA, W5ERV, W5FBP, W6OTH, W6GYN, W6AGJ, W6LYM, W6POZ, W6QJL, W6MEK, W6NNR, W6OSY, W6KRI, W6MVK, W6NCT, W6MOU, W6NKF, W6OJK, W6AGG, W6OGP, W6FKK, W8NJC, W9CXU (Payten), W3DGK, W5BAT, W9CHU, W9YQW, W9AZS (Graham).

20 METRES:

Europe:—England: G2AK, G2AV, G2KT, G2QV, G2UP, G2YV, G3BM, G3GK, G3QO, G5ML, G5ZG, G5GI, G5KH, G5LJ, G5QA, G5RV, G6BY, G6DT, G6MB, G8MA, G8MX (Taylor), G2KO, G3QK, G3FS, G3FA, G5-BJ, G5KT, G5ZG, G6DS, G6GX, G6-HS, G6GL, G6PK, G6XT, G8NK, G8-MJ, G8RG, G8MT, G8KT (La Roche), G2AI, G5KH, G2TR, G5RV (Rubio), G2AK, G2OI, G6FF, G8MA, G5ZG, G6CL, G3BX, G6KL, G6GO, G5BJ (Coggins), G5VM, G8DM, G5LU (Linehan), G5BJ (Johns), G8IK, G8-CL (Graham). Ireland: GI5NG, GI-5NJ (La Roche). Scotland: GM5NW (La Roche), GM6RG (Anderson), GM2UU, GM6RG, GM8MN (Taylor). Wales: GW3KY, GW8HI (Taylor). Belgium: ON4DZ, ON4FZ, ON4TO (La Roche), ON4MG, ON4ZK, ON-4DV (Linehan), ON4MZ (Taylor), ON4JW (Graham). France: F3OO, F3DC, F8XT, F8JL, F8NT, F8YZ (La Roche), F8XT (Johns), F3DI, F8DC, F8PK, F8RV, F8QD (Taylor). Italy: I1MS (Johns), I1MB (Taylor). Roumania: YR5PB (Linehan). Holland: PAOMZ, PAOAD, PI1J (La Roche), PAOWF, PAOMZ (Coggins), PAODA (Linehan), PAOBE, PAOEH, PAO-MZ (Taylor). Norway: LA1FC (La Roche), LA1F (Linehan, Taylor). Portugal: CT1QG (La Roche), CT1QG (Taylor). Czecho-Slovakia: OK1FZ (La Roche). Sweden: SM5SI (Rubio). Esthonia: ES5D (Taylor), ES5C (Graham). Switzerland: HB9BR (Graham), HB9DO (Johns).

South America:—Peru: OA4AI, OA4AN (Taylor), OA4AL (Rubio). Chile: CE1AH, CE2BX, CE3BK, CE-3HT (Taylor). Argentine: LU7VK (Payten), LU1QA (Rubio), LU9BV (Johns), LU5AN (Taylor). Venezuela: YV1AQ (Payten). Ecuador: HC1FG, HC1JW (Rubio), HC1FG, HC2HP, HK3CF, HK3CL, HK3PC (Taylor), HC1FG (Johns). Brazil: PY2JC (Taylor, Johns).

Central America:—Guatemala: TG-9BA (La Roche, Pepin, Linehan), TG-9AA (Taylor). Canal Zone: NY2AF, K5AS (Linehan). Honduras: HR2A

Hundreds Of Constructional Items In Back Issues . . . Special Offer To Readers

On pages 24 and 25 of this issue are illustrated a few of the receivers, transmitters, amplifiers, etc., of all types that have been described in "Radio World" during the past three years. Apart from several issues that are now out of print, back copies for the past three volumes are still available, and during the next few months will be on sale at the following specially-reduced rates.

All copies in volumes 1, 2 and 3 up to and including the December, 1938, issue, are priced at 9d each, post free, for single copies. Any six copies up to the date mentioned are available at 4/-, post free, and any twelve for 7/6, post free.

Inquiries are invited from readers in regard to special types of receivers, transmitters, or associated radio equipment in which they are interested. If the required information has been published in "Radio World," details of date of issue will be sent by return mail (a stamped and addressed envelope must accompany all enquiries). If details have not been published in "Radio World," other sources will be suggested if possible, though readers are reminded that equipment cannot be designed specially to suit individual requirements.

Those wishing to have the "Radio World" posted to them each month direct are invited to forward a remittance of 10/6 (for 12 issues, post free), with name and address, to "Radio World," 214 George St., Sydney.

(Linehan). Mexico: XE2BJ (Coggins).

North America, West Indies, etc.:—Canada: VE3NZ (Payten), VE4FF, VE4AHZ, VE5AEJ (Linehan), VE5-AEJ (Coggins, Johns), VE3AHN (Taylor). Barbados: VP6FO, VP-6MY (Taylor). Porto Rico: K4FAY (Linehan, Taylor). Bahamas: VP7-NU (La Roche), VP7NT (Taylor). Trinidad: VP4TH, VP4TK (Rubio), VP4TK, VP4DM (Taylor). Dominican Republic: HI3N, HI5X, HI7G (Taylor). Cuba: CO2WM, CO2ES, CO2AM, CO2RI (La Roche), CO2RR (Taylor).

Asia:—Ceylon: VS7RA, VS7GJ, VS7EP (La Roche), VS7RA (Pepin), VS7RF, VS7GJ (Linehan), VS7GJ (Taylor). India: VU2EG, VU2FY, VU2CU, VU2FA, VU2CL, VU2CA, VU2BG, VU2FQ (La Roche), VU2LK, VU2FU (Pepin), VU2EK, VU2CQ (Coggins), VU2FX, VU2CA (Linehan), VU2CA, CU2FU, VU2LL (Taylor). China: XU8WK, XU8HR, XU8HB, XU8MU, XU8HP (La Roche), XU8RB, XU8NR, XU8MC (Pepin), XU8RM (Payten), XU8RM (Johns), XU8RB, XU8AM, XU8AW (Coggins), XU8HR, XU8NR, XU8RM (Graham), XU8CM (Rubio), XU8HB, XU8LW, XU8MC, XU8NR, XU8RB, XU8AM (Taylor). Japan: J2MI, J2-NG, J2CS, J3FZ, J7CB (Taylor), J2-PU (Payten), J5CC (Linehan), J3CX (Johns), J2MI, J2NG (La Roche). Burma: XZ2DR (La Roche), XZ2JB (Payten), XZ2DX, XZ2JB (Coggins), XZ2DY (Linehan), XZ2JB, XZ2PB (Taylor). Malaya: VS2AP, VS2AL (La Roche), VS2AB (Payten), VS-2AL (Rubio), VS2AL, VS2AR (Coggins), VS2AL (Linehan), VS2AB, VS-2AL, VS2AP (Taylor). Hong Kong: VS6AJ, VS6AD (Pepin), VS6AL (Coggins). French India: FNIC (Linehan).

Africa: — Kenya: VQ4ECJ (La Roche). Algeria: FA3JY (La Roche). South Africa: ZS1AF, ZS4H, ZS5Q, ZS5AB (La Roche), ZS1AH, ZS2N, ZS1AX, ZS2X, ZS4H (Rubio), ZS5CL (Graham), ZS5DA (Linehan). Madagascar: FB8AH (Anderson). Egypt: SU1AX (Rubio), SU1WM (Coggins), SU1WM (Linehan). Morocco: CN-8MB (Rubio), CN1AF (Linehan).

Pacific:—Fijiis.: VR2FF (Rubio). New Zealand: ZL2BE (La Roche), ZL4AO (Pepin), ZL4GM (Payten). Hawaii: K6BNR, K6ILW, K6CMC (La Roche), K6NZQ, K6OTH (Pepin), K6-PLZ, K6ILW (Payten). New Guinea: VK9VG, VK9DK (Payten), VK9DK, VK9VG (Rubio), VK9DK, VK9WL (Coggins), VK9DK (Linehan), PK6-XX (Payten). Dutch East Indies: PK1RE, PK1RI, PK1MJ, PK2AY, PK3WA, PK4JD, PK4KS, PK4HW (La Roche), PK3WI, PK4JD, PK4KS, PK4VD, PK1VX, PK1RI, PK1VY, PK-5DA (Pepin), PK1VX (Payten), PK-4JD (Rubio), PK4KS (Linehan), PK-4KS, PK3EN, PK1PK, PK1RI, PK-2AZ, PK3WI, PK2BF, PK2LZ (Coggins). Philippines: KA7HB (Linehan), KA7EF, KA1AP, KA1AF, KA-1LB, KA1ME, KA1RB, KA1FH, KA-1CS, KA1WM (Coggins), KA1WM (Johns), KA1JM, KA1ER, KA7EF, KA1CS (Payten), KA1JM, KA1AP, KA1ME, KA1LB, KA1WM, KA1MJ, KA1ER, KA1PI, KA2OV (Pepin), KA1AF, KA1CW, KA1AX, KA1FH, KA1AP, KA1OF, KA1PI, KA1JM, KA1ME, KA1WM, KA1LB, KA1ER, KA2OV, KA4LH, KA7TT, KA7CF (La Roche).

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160 Miles On Five Metres.

(Continued from page 8)

band "opening" under favourable atmospheric conditions. The receiver used by Mr. C. Bambury, of Lidcombe, was of the "Ultra Searcher" type (described in the October, 1938, "Radio World"), using a 1851 t.r.f. stage instead of the 956 Acorn as in the original receiver.

Reception of this kind is occasioned only by bending of the wave or reflection, depending on weather conditions, and must not be confused with direct ray propagation.

On that day it was evident that the ultra-highs were favourably influenced by cyclonic conditions, wherein a belt of cold air swept quickly over warm layers of air close to the earth's surface. At 3.55 p.m. that day the writer heard in the vicinity of 42 megacycles a foreign speech transmission, apparently from an American television station, of which several are active. This signal was fading rapidly from R4 to zero and disappeared in a matter of minutes before identification was possible.

Incidentally, the question of direct ray propagation has been carefully investigated by the writer in conjunction with VK's, 2CI, 2LZ and 2VU, during the last few weeks, with some particularly interesting results that the writer hopes to cover in more detail in next month's issue.

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

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1939

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A Few 1938 Copies Are Available.