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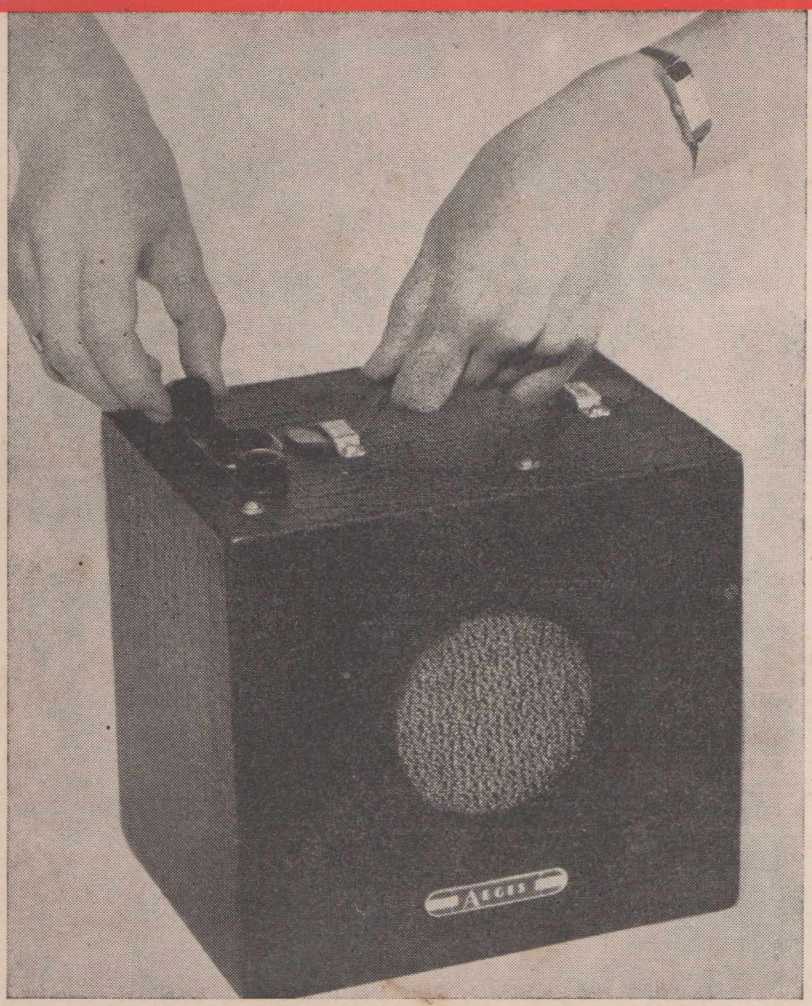

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"SIX - TEN"

A CONVERTER FOR THE VHF BANDS

By Don B. Knock

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★ SHORT-WAVE EDITOR—
L. J. KEAST
6 Fitzgerald Road, Ermington, N.S.W. 'Phone: WL1101

★ HAM NOTES By—
D. B. KNOCK (VK2NO)
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EDITORIAL

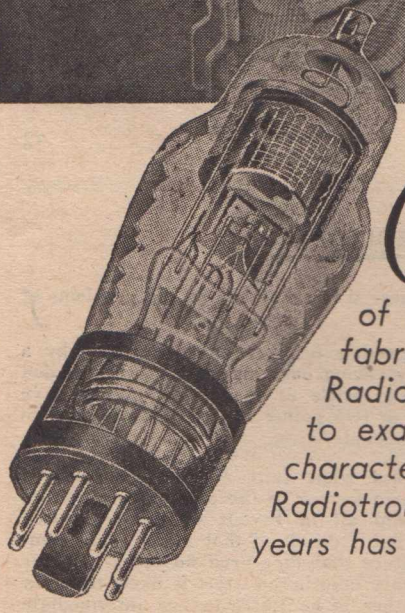
In last month's issue there was an article on the problems of trade discounts.

It is evident that the article has been misunderstood by a number of people. After glancing over my mail I have decided not to publish the second article of the series until I have been able to expand one or two points so that there can be no chance that they will be misunderstood.

What I did not say, but what quite a few accuse me of having said, is that I am in favour of the public being able to buy at trade prices. I am all in favour of the recognised proper trading methods, but I do claim that many radio components are of such a nature that they need no retail price or a long discount. No ordinary man-in the-street is likely to buy a signal generator, but neither is he likely to buy intermediate frequency transformers. Both require specialised knowledge for their proper application.

Another point where several of my correspondents have gone off the track is in regard to so-called "trade" publications. Just because "Australasian Radio World" is sold over counters of bookshops as well as by direct subscription, it does not mean that it is read by those in the trade. Conversely it does not follow that the trade prices openly advertised in "trade" magazines cannot be read by "back-yarders". The wide-awake back-yarder subscribes to trade papers. So why should the trade association bring pressure to bear to stop wholesalers from advertising in the technical press?

A. G. HULL.



OPERATING WITHIN TOLERANCES

of 1/1000 part of an inch, these winding machines fabricate the "grid" coils for use in Australian-made Radiotron valves. Only through constant conformity to exacting specifications, can that uniformity of characteristics be achieved and maintained in Radiotron production — which, for over twenty-five years has established Radiotron valves as — the world's standard valve . . .

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V3

The "SIX-TEN"

V. H. F. CONVERTER

By

DON. B. KNOCK

VK2NO

THE idea of using a frequency changing device ahead of an existing receiver to extend the frequency range is now about as old as radio itself. The principle is straight-forward in theory but varied in practical effectiveness, depending upon types of frequency changers in relation to the higher frequency to be covered. Here in Australia, the superhet converter as a means of tuning over the then comparatively unpopulated "short-waves," first made its appearance about 1930. There were other ideas, not using the superhet method, wherein an external regenerative detector, possibly with tuned RF stage ahead, was plugged into the audio stages of the broadcast receiver. Such "adaptors," to give

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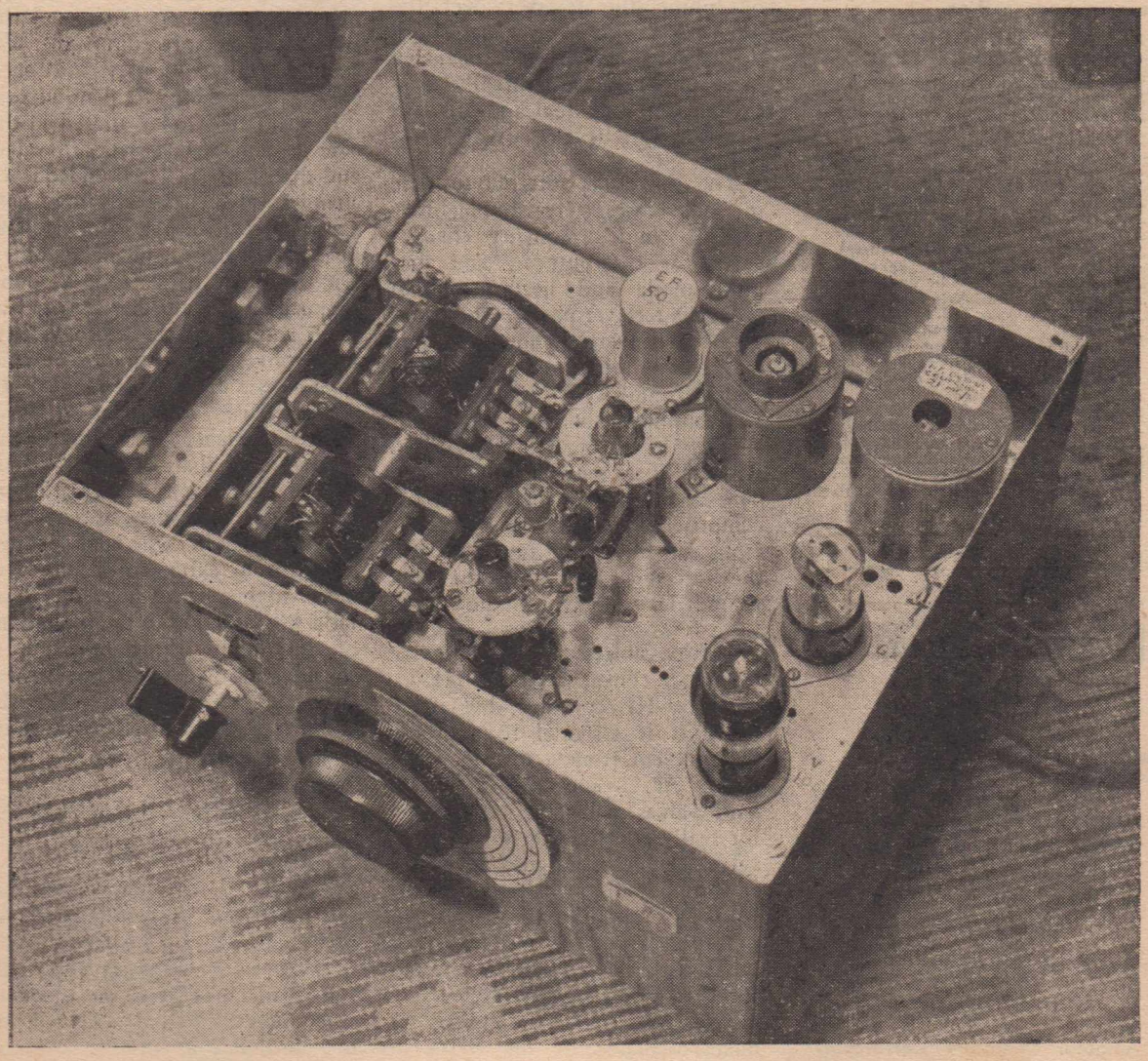


Tuning below the range of dual-wave sets is a tricky business unless you have the right equipment. The best answer is this VHF converter.

"SIX-TEN"

(*Continued*)

them the proper name, were successful in the hands of those who knew what they were doing with "reaction," but quite unsuited for unskilled hands. The Superhet Converter provided a different answer. The broadcast receiver was merely tuned to a specified frequency (usually around 1600 Kc/s) and the Converter connected to the aerial and earth terminals of the receiver. Tuning on the single dial of the Converter was no more fussy or difficult than the accustomed ease of tuning the receiver over the broadcast band. For general HF work, the Converter was relegated to a minor, and eventually non-existent stage as dual and all-wave receivers were developed.

The converters referred to were in some cases very simple; they used a single frequency changer valve for the purpose, and they took anode and heater supplies from the receiver power. The better types of converters, however, were much more effective. These contained frequency changer plus an I.F. coupling valve, and also power supply. In some cases they had an RF amplifier ahead of the mixer. This form of converter assembly comprised virtually an effective front end for an HF superhet, with the receiver making up the I.F., second detection, and audio stages.

It is possible similarly to provide frequency conversion for VHF instead of HF coverage, but in so doing it is essential to approach the problem from a realistic viewpoint. At 28 and 50 Mc/s, standard valves will give results, but for really effective conversion gain, valves that are designed for those and higher frequencies are really worth the application. In pre-war times the writer constructed several superhet receivers and converters for the 56-60 Mc/s band and obtained good results by applying a mixer/oscillator of the 6J8G or 6K8G types with a tuned RF stage such as the 1851 or 1852 ahead. The conversion gain of the 6J8G

Those intending to make use of the 50-54 Mc/s band as a regular communication channel for cross-city or similar work will find a superhet converter of this type a most effective answer to problems of reception. By the use of easily-constructed miniature plug-in coils, the 50 and 28 Mc/s bands are covered. Alternative ranges may be used by providing extra coils.

or 6K8G is not the best at frequencies around 60 Mc/s, and the RF amplifier preceding the FC stage is really necessary with such valves. In passing, I mention that this position is today altered in the case of at least one standard valve, and that is the ECH35, a frequency changer valve that really does give excellent conversion gain at frequencies in the region of 50 Mc/s. On the other hand, it is a sound proposition to make use of two plain triodes, of the acorn variety, in a converter which may be considered as a really wide range VHF type, because such valves will give excellent efficiency at frequencies much higher than 60 Mc/s. Basic idea of the converter described here is that the user may at any time provide himself with one or two easily-made extra coils to cover much higher frequencies. If L/C ratio with relation to the limitations of the required amateur bands is considered and worked out accordingly, it is feasible to make the converter shown here work quite well over 166-170 Mc/s.

955 "Acorns" in Frequency Changer

The circuit diagram shows that this "Six-Ten" Converter is a comprehensive but by no means complicated pre-receiver assembly designed to make good use of available valves. Valves specified are not absolutely imperative so far as types are concerned; there are equivalents in the various VHF valve types the reader may have on

hand, and may wish to utilise. That may be done in the instances quoted. Frequency changing is done by the use of two triode "acorns" of the 955 type, and an important feature is the method of oscillator injection. The merits and demerits of the various schemes could be discussed at length, but it is sufficient to state here that the method of cathode injection of oscillator voltage used here is uniformly good provided the shortest possible connection is used between oscillator plate and mixer cathode. That involves positioning of the acorn valve sockets to suit, but there is no difficulty in so doing, as metallic screening is not necessary between mixer and oscillator. For the benefit of those with alternative VHF valves on hand; this circuit arrangement for the two 955's can be applied equally well with two 9002's, two 6C4's, two HY615's, two 7193's, two CV6's or any combination of such valves. In one instance the writer built one of these converters with exceptionally good results, using a 9002 mixer with a 6C4 oscillator. It is possible, where the receiver with which this converter is to be used has more than enough RF gain at 21 Mc/s, to take the output from the mixer at that frequency direct to the receiver, but the inclusion of the IF stage using an EF50 is recommended for most purposes.

I.F. Stage at 21 Mc/s

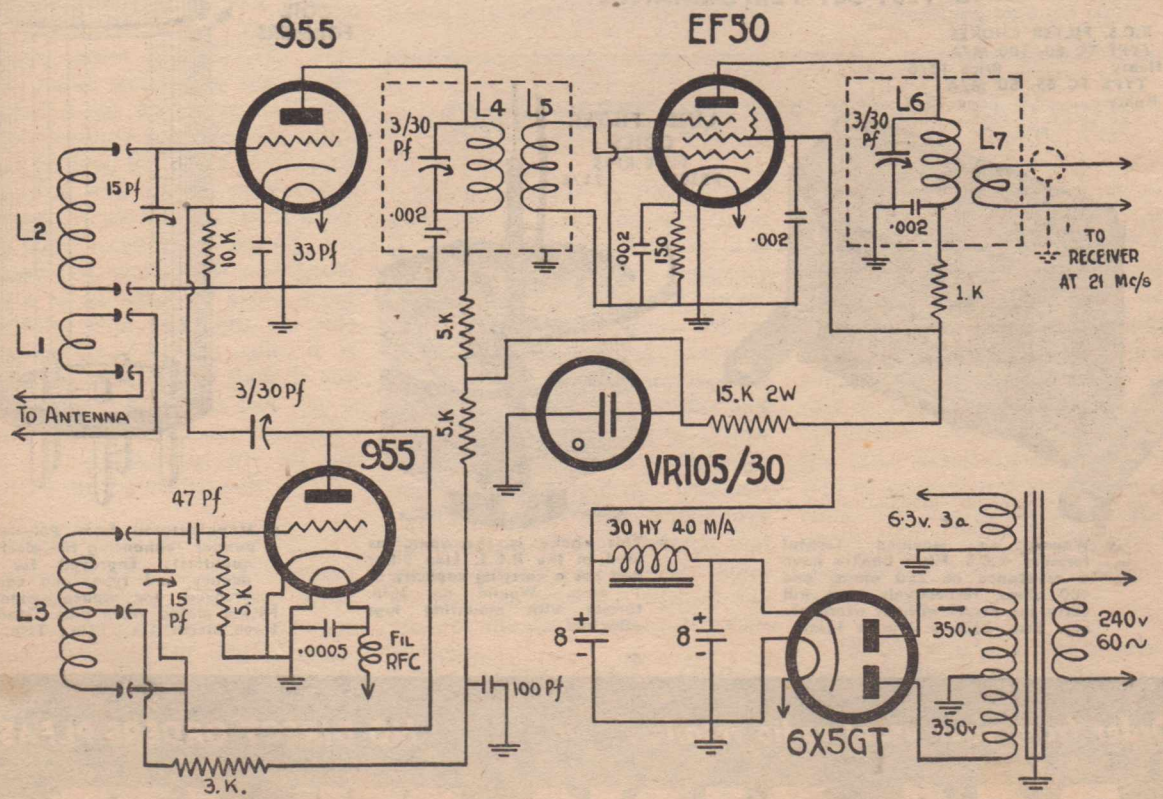
The EF50 type valve is used as shown in the diagram, as an I.F. coupling stage tuned to 21 Mc/s, according to the IFT specifications given later. This valve is now well-known to most experimenters, and as an RF pentode with very useful gain at VHF's, it excels, along with its more refined RL7 type, most ordinary RF pentode valves.

Note that the secondary of the I.F. transformer in the grid circuit of the EF50 is untuned. There is ample gain from the valve thus at 21 Mc/s. The frequency of 21 Mc/s was chosen as a suitable frequency covered by most communications and amateur band receivers, and because of this high frequency, there is very little difference in inductive value for mixer and oscillator coils. There is no reason at all why the converter should not be made with a different I.F., but it is suggested that the designer pick a spot in the H.F. ranges that is reasonably free from commercial traffic, if that is possible. A good alternative is 10.5 Mc/s, a range covered by every "short-wave" receiver.

Voltage Regulation

Included in the scheme of things is a voltage regulator valve of the VR105/30 type, to hold anode voltage constant at that value on the mixer and oscillator. This is a refinement that really is worth-while

(*Continued on next page*)



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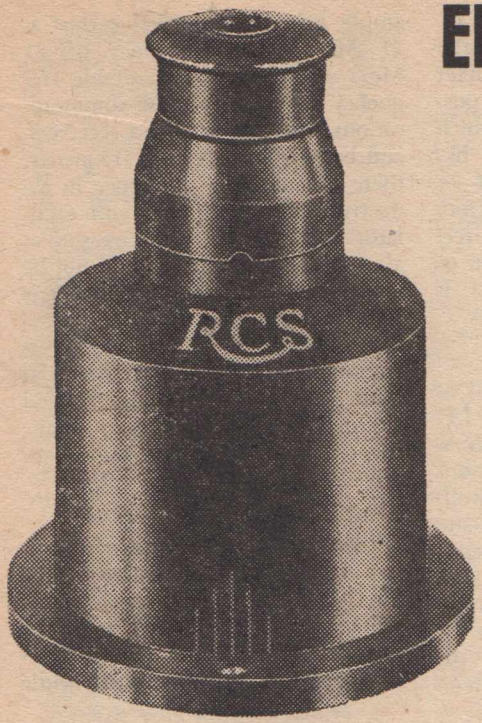

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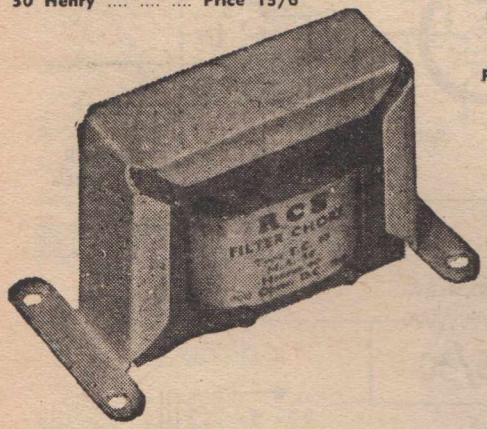

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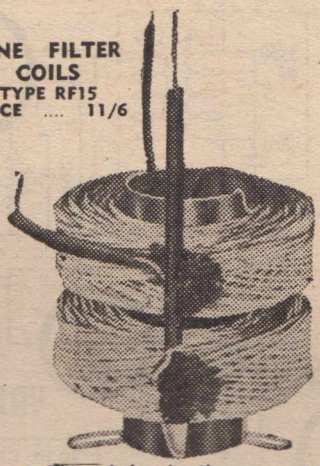

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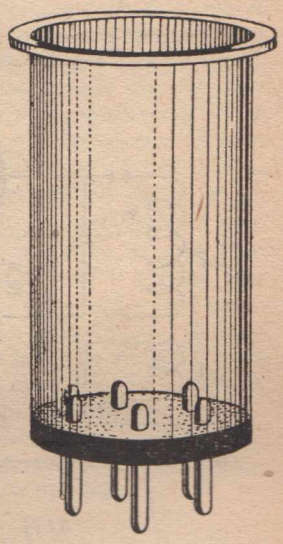

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"SIX-TEN"

(*Continued*)

where mains supply is prone to wide variation. Signals that wander about on the dial because of the gradual rise and fall of the supply mains are likely to be exasperating, especially where the signal is a weak one, and requires a little "fishing" for. Nevertheless, it is not essential that a voltage regulator tube be included, but my advice is to consider desirability of use according to the behaviour of your power supply.

H.T. Supply Unit

As in any VHF converter worthy of consideration in these times, this one has its own power supply, and the rectifier shown is indicated as a 6X5GT. This particular rectifier type, of course, is not imperative; the usual 80 or 5Y3G with 5-volt separate filament winding is applicable. I used the 6X5GT merely because the power transformer I happened to utilise didn't have a 5-volt winding, and I did possess a spare 6X5GT or two. A word of warning about the 6X5GT. This is a useful rectifier to run as indicated from the same 6.3 volt heater winding supplying the other valve heaters; but don't be tempted to use it with a high peak anode voltage. If your power transformer has HT secondaries wound for around 300 volts well and good, but it is advisable to avoid using the valve with 385 volts per side transformers. At 350 volts it is reasonably safe, but if there is any doubt about this, you can use a small capacity condenser in the input to the filter, or use all the capacity on the output side.

General Description

No particulars of chassis lay-out are given other than the views showing two different converters made according to the diagram. Only consideration necessary is that the mixer and oscillator valves be in close proximity, and that the valve sockets be arranged to give shortest possible leads between valve and tuned circuits, bearing in mind also the need for a short connection between oscillator plate and mixer cathode. Mixer and oscillator are tuned by a ganged midget variable assembly, using two 15 mmfd variables. The mixer section is earthed directly through its mounting bracket to chassis, but the oscillator section, using a Hartley type oscillator as shown is above earth for anode voltage. The two midget variable condensers are ganged by an insulating coupling, which can be conveniently of the flexible type. The mixer cathode is above earth by the 10,000 ohm bias resistor, by-passed by a small capacity of 30 to 50 mmfd and oscillator voltage is injected at the mixer cathode through a Philips 3/30 mmfd concentric air "trimmer" condenser. In order to keep this connection as short as possible, it is advisable to arrange the position of the acorn valve socket for the mixer so that the cathode lug is turned toward the oscillator socket. Very little more length of connection is needed other than the physical length of the coupling condenser in this way. It will be found that only a small amount of capacity is needed; about 10 mmfd, for correct injection. One side of the mixer heater is connected directly to earth (chassis) and if this is done by soldering a heavy wire from the heater lug on the socket (mounted flat) down to a lug or soldering point directly underneath on the top of the chassis, this wire can be made to serve as a steadying support for the valve socket. If the two variable condensers, tuning mixer and oscillator are turned around so that the stators are uppermost from the chassis, the sockets can be laid flat over the top of the condensers, but so placed that the "pip" on the 955's is clear of the stator and rotor plates when the valve is seated. The oscillator section is, of course, nearest to the panel and tuning control. The question of a suitable dial is one for the individual . . . there are not too many of the once familiar front panel self-contained dials about these days, and if you are the fortunate possessor of one of the excellent Muirhead planetary drive types as made for Service equip-

(*Continued on page* 10)

SOME NOTES ON THE VALVES SPECIFIED

The 955 "acorn" is a heater type of triode designed for application at frequencies extending to 250 Mc/s; operation at such frequency being possible by means of unconventional structure. Heater voltage is 6.3 at .16 ampere and maximum anode current 4.5 milliamperes. It may be applied as RF amplifier and detector in receivers and as a low-powered oscillator and amplifier in transmitting equipment. One advantage of the 955 type triode over the "miniature" equivalents is that by-passing direct at the valve socket is more conveniently effected because of the disposition of the connections.

The EF50 valve (Philips-Mullard) is a high gain RF pentode of the all-glass "single-ended" type for use at frequencies as high as 200 Mc/s. Heater voltage is 6.3 at .3 ampere; anode and screen voltage, 250; anode current, 4.5 milliamperes; screen current, 3 milliamperes; conductance, 6500; grid voltage, 2 negative. The valve has nine pins as indicated in the base connection view and is used with a corresponding type "T" socket. The two connections marked S are common internally to a shield, and may be used conveniently to solder an external metal partition across the valve socket for effective isolation of control grid and anode circuits. The locator key in the centre of the valve base should also be connected to earth at this common point.

VR105/30 is a voltage regulator tube effective at 105 volts and 30 milliamperes. It is fitted with the standard international octal base with pin 2 to cathode and pin 5 to anode. Another VR tube of similar use is the VR150/30, effective at 150 volts.

"SIX-TEN"

(*Continued*)

ments of certain types, so much the better. Note that the oscillator cathode is earthed and that the heater is by-passed by a .0005 mfd. mica condenser.

Included in the side of the heater not connected to earth is a special RF choke. This is easily made up and consists of about 24 turns of 20 enamelled copper wound over a ¼-inch diameter, such as a pencil, and allowed to spring off. It is used self-supporting, but if the turns are tightly wound together, it can be dipped in polystyrene varnish and will form a rigid little choke when dry. This choke, plus the by-pass, may be quite important with some types of 955 valves. In some instances of slightly refractory oscillators, it may be effective to include an RF choke of about 40 turns of 30 DSC ¼-inch diameter in series with the cathode to earth. Normally this procedure should not be necessary. The oscillator grid condenser, shown as 47 Pf, can obviously be a standard 50 mmfd. The slightly different values quoted in the diagram refer to the very small Philips type ceramic pig-tailed condensers.

Mixer and Oscillator Coils

For 50-54 Mc/s, the coil details in the original converter are as follow:

Mixer: L1, 2 turns 18 enam. ½-inch diam. L2, 8 turns 20 enam ½-inch diam.

For 28-30 Mc/s:

Osc.: L3, 7 turns 20 enam. ½-inch diam., centre-tapped.

Mixer: L1, 3 turns 18 enam. ½-inch diam. L2, 12 turns 18 enam. ½-inch diam.

Osc.: L3, 10 turns 18 enam. ½-inch diam., centre-tapped.

These particulars are given as a guide, and some adjustment will be needed to "hit" the bands by compressing or expanding the turns as needed. The aerial coil for each mixer unit is coupled close to the earth end of the grid coil. In making the coils, use a bar of polystyrene, about ¼-inch thick and as long as needed. In accordance with the spacing adopted for the sockets previously mentioned, drill holes with a very small drill, so that 16 gauge copper wire will just about fit tightly. Make small inverted L-shaped pieces of 16 gauge tinned copper wire with the leg of the L about ⅝-inch long, and the horizontal about ½-inch long. Place the end of the leg in the hole and apply the soldering iron to the top. The wire will sink into the polystyrene bar as the heat reaches the leg and will mould itself into position. Don't overdo this heating process and remove the iron once the required positioning is attained. When the four pins have been inserted thus for the mixer, and the three for the oscillator, you have a rigidly-held miniature coil mounting to which windings can be soldered and removed for adjustment with ease. The polystyrene bar keeps the unit rigid and it will plug neatly into the similarly constructed socket, provided your simple engineering has been up to scratch. This form of VHF plug-in coil construction is based on the use of wafer type octal sockets which are broken up for the spring lug-sockets fitted therein. You will see what I mean if you examine such a socket and also the illustration of the converter using polystyrene mountings shown here. The other illustration is of a similar, but more bulky affair, using banana plugs and sockets fitted to isolantite padder blocks for the plug-in coils. Such form of construction is quite suitable for the frequencies involved, but the smaller construction is better from the L/C ratio angle. The GR type banana plugs are fairly lengthy and bulky, and that means more capacity to earth, longer metallic connections, and consequently less inductance in *coil* form. Nevertheless, ordinary metal plugs and sockets *are* quite in order at 28 and 50 Mc/s.

21 Mc/s I.F. Transformers

The I.F. input and output transformers are very easily made and consist of two appropriate windings

and tuning capacities on formers ¾-inch diameter. The form can be of any good grade material and preferably of polystyrene. For the input transformer, L4 and L5 both have eleven turns close-wound on 20 enamelled copper wire with L4 tuned by a Philips 3/30 concentric air trimmer condenser and L5 left untuned. Space between the windings is not critical, about ¼-inch is suitable. The primary winding, L4, is de-coupled by the 5000-ohm resistor and by-pass condenser of .002 mfd. and the whole assembly is fitted into a small screening can with a hole in the top for adjusting the air trimmer condenser. This transformer is fitted on the chassis top as close as feasible to the anode lug on the mixer valve socket. A short anode lead here is quite important, otherwise trouble will occur with instability, also unwanted signal pick-up in the 21 Mc/s I.F. channel. The output transformer is constructed similarly, with L6 having also eleven turns of 20 enamelled copper wire tuned by a 3/30 pf trimmer. L7 is the output link for connection to the receiver, and is comprised of two turns of wiring flex at the bottom end of L6 and spaced about ½-inch therefrom. The primary is, as before, decoupled, and in this case it will be seen that the anode voltage is kept off the air trimmer condenser by returning the rotor of this direct to earth instead of the coil. Because of the .002 mfd. by-pass, the trimmer is effectively across L6 for tuning. The unit is mounted under the chassis.

The EF50 Stage

The EF50 valve is chosen because this provides a high measure of gain at the relatively high frequency of 21 Mc/s. The secondary of the input IFT is untuned and provides ample gain used thus. Note that the screen is used at the same potential as the anode in this valve, but if a valve of the 1852 type is substituted, the usual screen potential must be applied through a dropping resistor of 50K to 100K.

It is important in using the EF50 valve to apply the metal isolating screen across the valve socket underneath the chassis to provide extra screening between grid and plate circuits. This applies with any of the single-ended RF pentodes, especially where used at VHF's, but the EF50 socket lends itself more easily to the procedure

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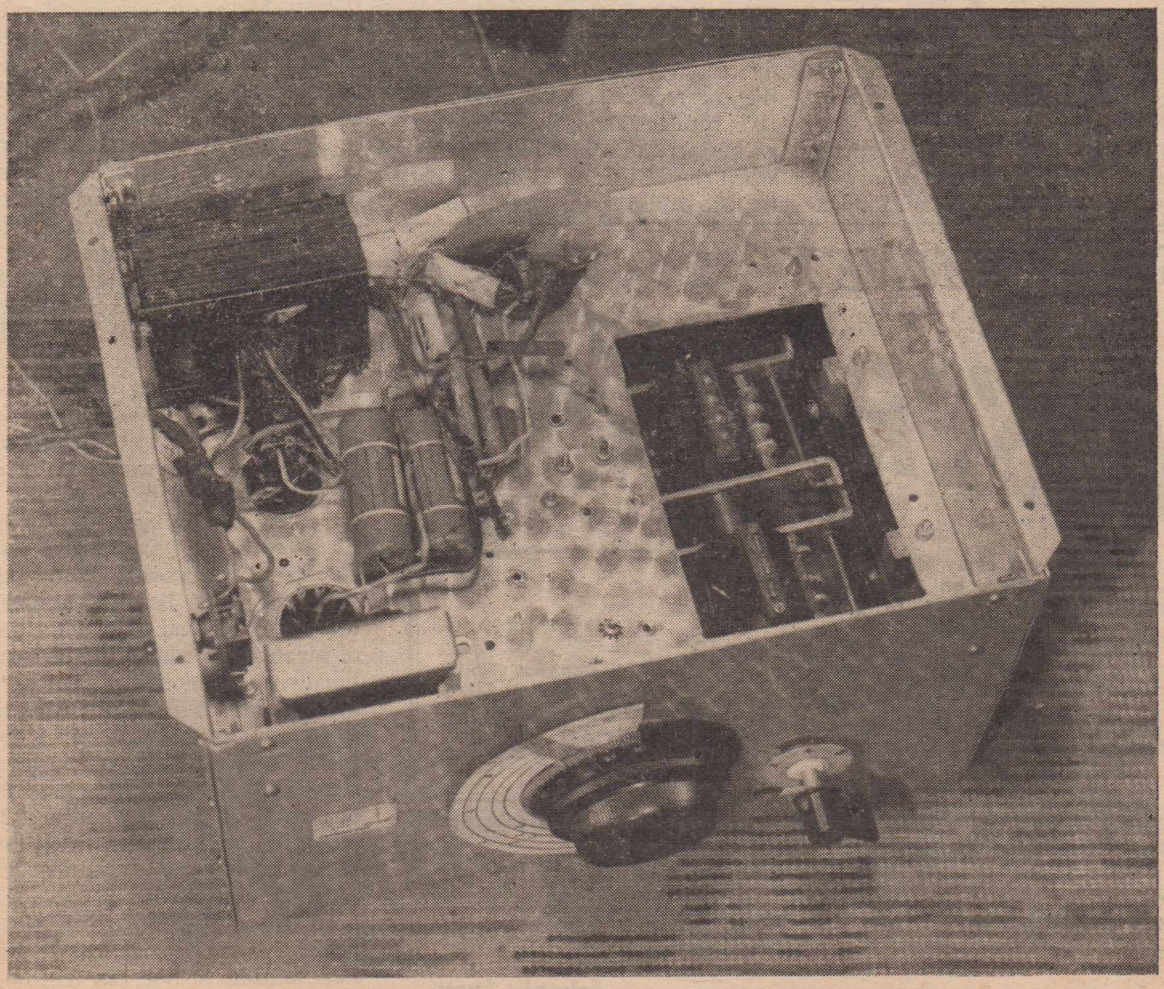


Another view of the Converter.

(*Continued*)

than the usual octal socket. This nine-pin socket has a centre connector which makes contact with the *metal* locator key on the valve. This *must* be earthed, otherwise the metal shell of the valve will be "floating" and instability will be a certainty. Pins 5 and 8 connect to an internal screen inside the valve, and it is convenient to cut a small copper sheet to fit across the socket, and to solder this direct to pins 5 and 8, and thence to earth. If this is done, and if the EF50 control grid and anode leads are screened by a little copper braiding, there is not likely to be any trouble with the valve "taking off."

OPERATION

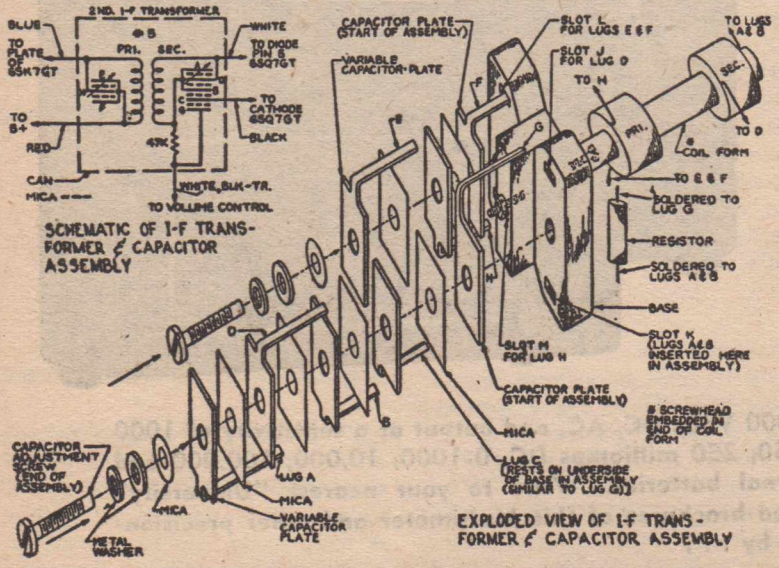
With the converter ahead of a communications, amateur band, or other type of superhet capable of being tuned to the chosen input I.F., the resulting combination is that of a dual conversion superhet. The first I.F. of 21 Mc/s contributes to ease of tuning, and the receiver I.F. deals with things in normal fashion. Such a combination nevertheless is not applicable to signals of the modulated oscillator variety, or MOPA's with heavy frequency modulations, unless the signal is extremely strong. Identification becomes impossible under weak signal conditions if the distant station is unstable. But with the beat oscillator switched on in the receiver section, the weakest of CW signals from a steady crystal controlled source will be easily received.

First process in putting the converter into action is to connect the output, which should be taken through a length of coaxial line as indicated, to the receiver aerial and earth, or aerial doublet terminals. Tune the receiver to 21 Mc/s and set the RF and audio gain controls at about a 50 per cent. level. Switch on the converter power supply and adjust the air trimmer across the I.F. coil L6 until a decided rise in the noise background is noticed in the receiver output. Next adjust the trimmer across L4 in the first IFT similarly and the noise level will increase very considerably when the IFT is at 21 Mc/s. Back off the audio gain control of the receiver to a reasonable level and tune the converter dial. If the 28 Mc/s coils are used primarily, there is more chance of signals being available, particularly in the daytime, than on 50 Mc/s. At the present time of the year, and with sunspot activity running high, there is plenty of activity in the 10-metre band from many parts of the world. If you live in a metropolitan area such as Sydney, Melbourne, Adelaide, Brisbane, Perth, or Hobart, you will find a handy signal to adjust the coils for best tracking by looking for the air beacons around 33.5 Mc/s. These provide a very strong signal locally and can be picked up on any nondescript kind of aerial. Tracking, once the 10-metre band is located, is merely a matter of spreading or closing wire turns until the desired condition is reached. The same goes for 50 Mc/s of course. Here it will be necessary to use the appropriate kind of aerial for the band. In the Sydney locality for instance, all stations are at present using vertically polarised transmissions, and in Melbourne horizontal polarisation. Generally speaking, vertical polarisation is more in favour for local working on 50 Mc/s, and it should be remembered that the band is primarily an excellent local communication channel, and a DX medium as a very secondary consideration. Assuming that all constructional work has been carried out correctly, and that voltages are correct, there should be little or no trouble experienced in putting a converter of this kind into action. As stated before, many valve combinations are possible, and the choice of those becomes a matter for the individual plus a measure of ingenuity in constructional work. Finally, I mention that because of the high output obtainable from the EF50 I.F. stage this type of converter is usable with relatively insensitive receivers. I have used this one with an ancient pre-war TRF job (RF, regen., det. and twin audio) with excellent results. It is usable thus with the humblest of headphone-regenerative receivers, although such practice may be a bit like putting a big cart before a Shetland pony. —D.B.K.

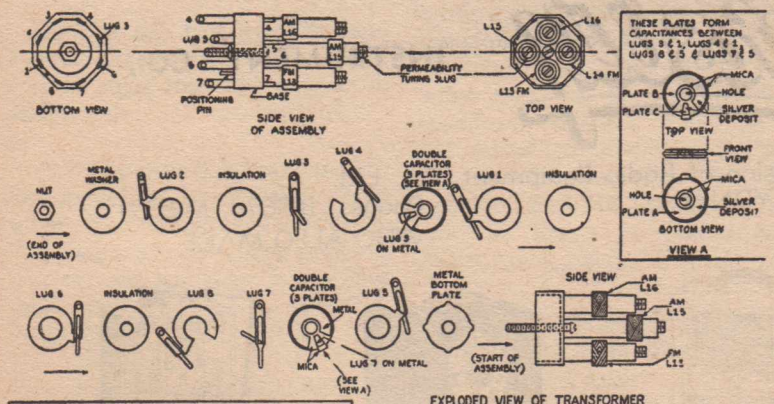
UNUSUAL CONDENSERS IN U.S. SETS

THE modern radio receiver contains many examples of the great progress made both in electrical and mechanical design. In many instances these innovations are readily detected by the radio serviceman, but in an equal number of cases, they may pass undetected. It goes without saying, that if a capacitor in a circuit is defective, its physical location must be known, before it can be repaired or replaced. Hence, it is necessary that the serviceman should know how capacitances are sometimes introduced into a circuit without the usual conventional capacitors being used.

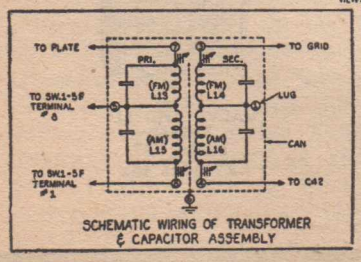
Specific examples of these unusual capicators are shown in Figs. 1 and 2, wherein the plates of both fixed and variable capacitors are built into the bases of i-f transformers. In these illustrations, the mica insulating plates (the dielectric) are depicted by a single line and the metal plates by a double line. In the schematic drawings, the mica plates are shown by the conventional dotted lines.



The second i-f transformer and i-f rejection filter circuit are assembled in one unit in the Galvin Model 452.



In this AM-FM receiver, the i-f coils of both AM and FM are built into one assembly. The perforated discs form the four fixed capacitors. (Zenith Model 12H090.)



Saving Space

The Galvin Motorola receiver model 452 uses an ingenious method of saving space. Fig. 1 shows the electrical schematic of the second i-f transformer and i-f rejection filter assembly incorporated in that set. The primary and secondary coils are each shunted by a fixed capacitor, *H-F* and *D-D*, respectively, and a trimmer capicitor *H-E* and *D-A* respectively. The purpose of using both a fixed and trimmer capacitor is to obtain the required trimming action for which it is not necessary to vary the entire shunt capacitance. The primary and secondary capacitors save one capacitor plate each by making use of common plates (H and D) as a plate of both the fixed and trimmer capacitors.

The i-f rejection filter is conventional, consisting of two low-capacitance fixed capacitors, *G-C* and *C-B*, separated by a 47,000-ohm resistor. The arrangement is so designed that two capacitor plates are saved by using plate *C* for both capacitors, and using plate *B* for one of the filter capacitors and for the secondary fixed shunt i-f capacitor. Fig. 1 also shows an exploded mechanical drawing of the assembly which illustrates the compactness and simple design in-

(*Continued on page* 16)

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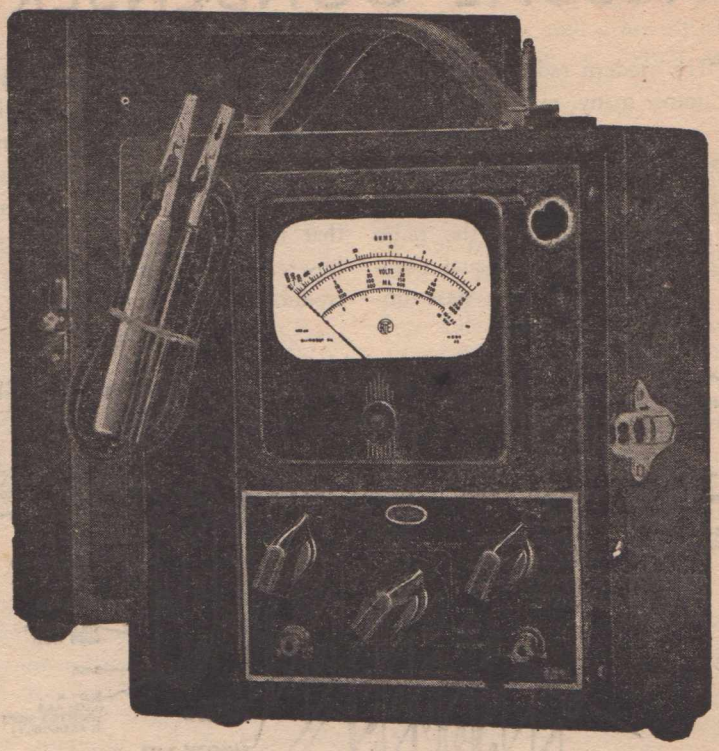

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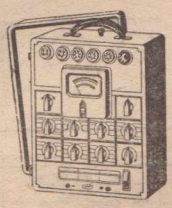

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CAN YOU ANSWER THESE?

Questions For Would-Be Radio Servicemen

IN last month's issue I gave some hints to those thinking about starting up in the radio business. Several readers have written to know how they can tell whether they have sufficient technical knowledge. So I have prepared a series of questions, and if you can answer these without thinking too long about them, you will pass

By

JOHN BRISTOE

Radio Manager
Denham's (M'bro) Pty. Ltd.
Maryborough, Queensland

for technical qualifications and should be able to repair any radio. If you want to check your answers and get an opinion, send your list of answers to me. Make them as short as possible and enclose a stamped, addressed envelope.

Here is the first question, and I would give the good radio mechanic no more than five minutes to answer this.

(1) The set is a normal type AC-DC model. It is used in a town where only DC power is available. The owners are permanent residents and the set has been in use five years. The valve line up is as follows: 6A8G, 6U7G, 6B6G, 25A-6G, 25Z6G, 1941. The 25Z6G valve has given up the ghost completely. Heater lights up OK but no emission. Apart from that the set appears in good order. You cannot obtain a 25Z6G valve, and the only types in stock are 80, 25A6G, 43, 6A8G, 6J8G, 6B6G, 75, 1P5G, 1C4, 1D5GP, 6G6G, 78, C1, CF2, 6U7G, 1C7G, 6S7G, 1941, 1H5G, 1Q5G. The owners are willing to pay only the price of a new valve, about £1, and want the set back in a hurry. What would you do about it?

(2) One of your customers has brought a 1.4 console set in for repairs. You have tested it and found that the 1A7G valve has an open circuit filament. The other valves are OK, and are two 1P5G, one 1H5G, and one 1C5G. You have the same valves as in the previous question, but you are expecting to get some 1A7G stock in about a month. The customer is prepared to pay up to 30/- if you can make his set work until these stocks arrive. What would you do?

(3) The set is an eight valve AC and rectifier job with RF stage and two stages of IF. The valve line up is as follows: 6U7G, RF. 6K8G mixer, 6K7G 1st IF, 6K7G 2nd IF, 6Q7G det. and audio, 6C5 driver, two EL3NG in push-pull output, rectifier 5V4G. The second IF valve, type 6K7G, has a bad short in its plate to earth and has burnt out the primary of No. 3 IF transformer. You have no suitable IF transformers and don't know when they will be available. The customer wants the whole lot of the valves left in the set and will not consider one stage being cut out. You have the list of valves in stock as shown in question one. What would you?

(4) A customer rang to say his set went very weak after an electrical storm and suspects it may have been struck by lightning. It still works, but only very weak on the local station only. What part or parts would you take with you when going to repair this set?

(5) You call at a house to inspect an ordinary 5 valve console AC set that has stopped completely. An examination reveals that the grid of the output valve is glowing red. What is the most obvious cause of this, and could it be repaired without taking the chassis out of the cabinet?

(6) You know that a 6E5 or 6U5 are magic eyes, or visual indicators and when in operation light up green. If the set is operating all right and the magic eye suddenly goes out, yet you can still see the heater in the middle of it glowing, what component part usually causes this trouble and where is it usually located?

(7) An AC set has stopped dead. There is no noise at all, not even a slight hum in the speaker. The rectifier plate glow red when the set is witched on. What particular component or components are usually at fault?

(8) A set is suffering from distortion very badly. The speaker, valves, cathode bias resistors, and every condenser and transformer in the set are good. Name two common causes, and what components, if any, are at fault.

(9) You have just replaced a new vibrator transformer in a synchronous vibrator power pack. After checking it you will find it reads negative on the H.T. output instead of positive. Two wires are connected to wrong places, and by changing them over the fault is remedied. Which are these two leads?

(10) An A.C. set of the usual 5 valves type has a faulty 6K7G. You have only the valves as shown in question one. Two of these valves could be used to replace the 6K7G without any alterations to the set

(*Continued on page* 16)

QUESTIONS

(Continued)

and with practically no difference, if any, in the performance of the set. Name these two valves.

(11) Two car radios, both the same brand and type, were installed in cars by you recently. One in a brand new 1946 sedan and the other in an old tourer, 20 years old. In both cases ignition noise, generator noise and other interference is very low and hardly audible at all. But one set performs much better than the other. Which would you think would perform best, and why?

Allowing nine points for each of these correct answers, and allowing one hour, can you answer them all? If you can't get 80 per cent at least, I would think twice before starting up a radio business, as these are common faults and problems that you are likely to come across every day.

Re the selling of sets. My advice in this respect is to get the agency of one good brand, or two at the most, and concentrate on these. Don't try to sell about half a dozen brands, as you will probably end up by losing the agencies of all of them.

Don't cut prices or give ridiculous prices for trade-in sets. This is one good short cut to bankruptcy.

UNUSUAL CONDENSERS

(Continued)

corporated in the assembly. When one washer is used under the adjustment screw head, the turning of the screw causes the washer to turn when the screw is tight, thus wearing the mica insulator. The use of two washers under the screw head prevents this wearing of the mica.

The Zenith model 12H-090 AM-FM receiver is another example of space-saving methods. Besides the fairly old common method of dispensing with different r-f and i-f tubes for AM and FM reception, this receiver makes use of two devices to save a great deal of space. The first device, shown schematically in Fig. 2, consists of the two AM and two FM coils with their four tuning slugs of the first i-f transformer, enclosed in the same i-f can. The second device is the one previously described of making use of thin mica and metal plates assembled in the coil form base.

Fig. 2 also shows the method of mounting these coils and their associated capacitors within the can. The sixteen components from the metal bottom plate to the nut, when assembled, comprise four fixed capacitors in use. The two double capacitors, a detailed drawing of which is shown in "View A," make up the four capacitors. Lugs connection points to the capacitors. 5, 7, 8, 1, 4 and 3 serve as the connection points to the capacitors. Lug 6 serves as the grounding point for the i-f transformer can, while lug 2 is not used in this particular assembly. Note that the contact portion of lugs 3 and 7 are very small in area. This portion of the lug fits directly on the metal plate *C* (View A) and thus forms a small capacity between lugs 3 and 1 and lugs 7 and 5 for the FM coils; whereas a larger capacity exists between lugs 5 and 8 and lugs 1 and 4 for the AM coils. Since this i-f transformer can thus enclose all the first i-f AM and FM coils, slugs, and shunt capacitors, and since the second, third, and fourth i-f transformer cans are similarly assembled, a considerable amount of space is saved.

—"Universal Commerce," U.S.A.

Radio Launching.—Radio as an aid to the launching of ships was successfully tried out at the Clydeholm shipyard of Barclay Curle & Co., Glasgow, when the 9,430-ton *Sangola* was launched for the British India Steam Navigation Co.

CAR RADIO INSTALLATION

How to deal with electrical interference

By

G. L. F. SMITH

THE biggest worry of anyone dealing with car radio installation is the suppression of the various kinds of interference caused by the electrical system of the car. By studying this interference and the various ways in which it is produced, a better understanding should be obtained of how to remedy the troubles.

There are several sources of electrical noise in the average car and they can generally be listed under the following headings:

1. Generator.
2. Breaker points.
3. Low tension wiring.
4. High tension wiring between the ignition coil and distributor.
5. High tension distributor contacts.
6. Wiring between distributor and spark plugs.
7. Electrical appliances in the car. (Fans, windshield wipers, etc.)
8. Loose contacts in the general electrical system.

It will be noted that the first six sources will only be active while the car is running, while the seventh will only be apparent while any particular appliance is operating, whereas the eighth will be mainly noticeable while the car is running over rough roads.

The interference produced by the abovementioned sources may reach the radio by various means and these may be classified thus:

1. Radiation direct from the source to the receiving aerial.
2. Conduction along a metallic circuit direct to the receiver.
3. Re-radiation from a conductor which has had noise currents induced in it by direct radiation.

Now to consider each source of interference in its turn, and the manner in which to eliminate the noise. Starting with the low tension side, the generator is first on the list.

The Generator: This part of the car causes interference because its output voltage is pulsating and also because sparking occurs at the brushes.

This pulsating voltage produces the current which charges the battery, and this current pulsing in the circuit between the generator and battery produces pulsating magnetic fields which spread out in all directions and are almost certain to reach the aerial system of the car and will induce therein very minute noise voltages. By the time these are amplified by the set they will produce quite heavy interference. This noise is easily distinguished by its characteristic whining or whirring noise which will be noticed to increase in pitch as the engine speed is increased.

Sparking between the brushes and the commutator will produce high frequency signals which will radiate to the car aerial if allowed to reach the car wiring. They can also reach the set via the battery supply circuit but as most car radios have R.F. filtering in the low voltage input circuits, no trouble should be experienced in this direction.

It is useless trying to remedy this trouble unless the generator itself is in good condition. The commutator should be cleaned with very fine glass paper (definitely *not* emery), and, if badly worn, should be turned down carefully in a lathe, and the mica insulation then undercut to the depth of about a thirty-second of an inch. This turning down and undercutting should only be done by a mechanic used to dealing with such work.

Brush holders and brushes should be free of grease and the brushes themselves sliding freely, though

(*Continued on page* 31)

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BATTERIES

The "VOYAGER"

Battery Operated Portable

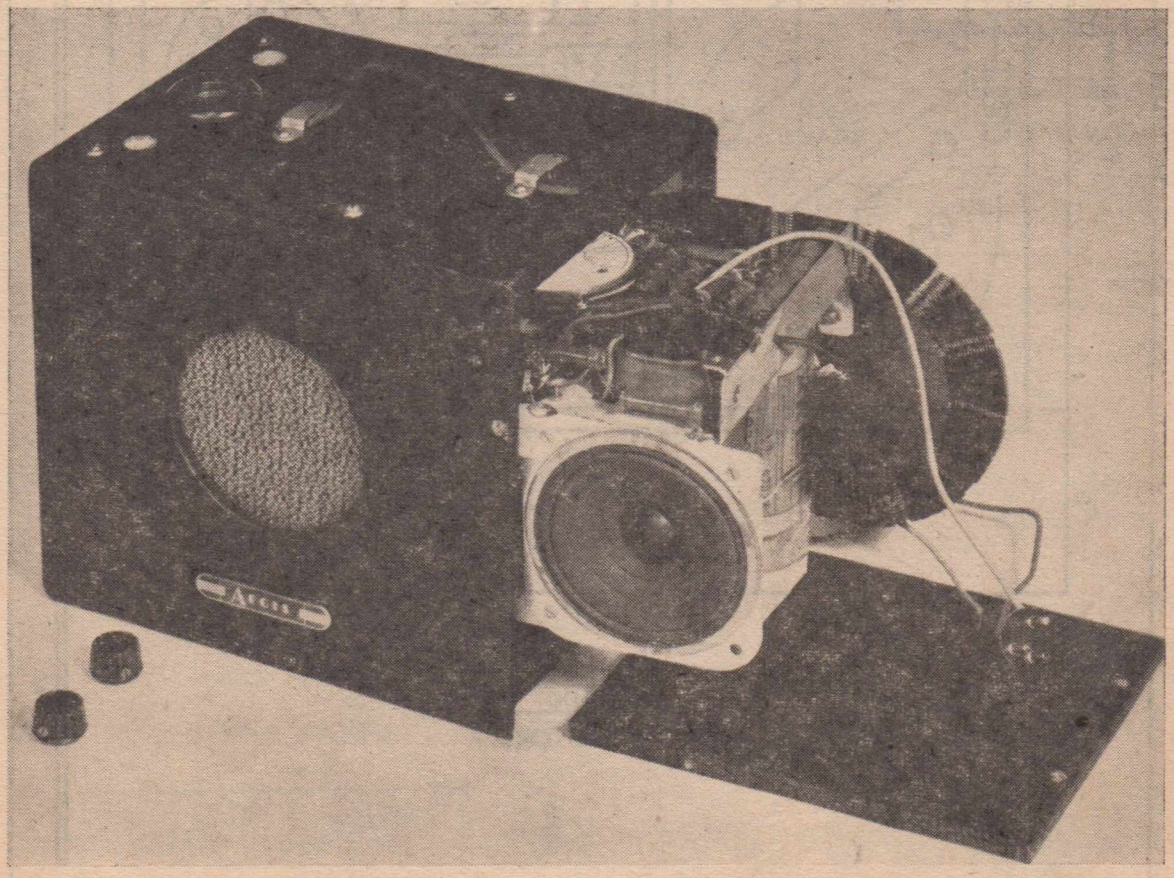
Introduction by
A. G. Hull

Instructions by
The Engineering Staff
Aegis Manufacturing Co.

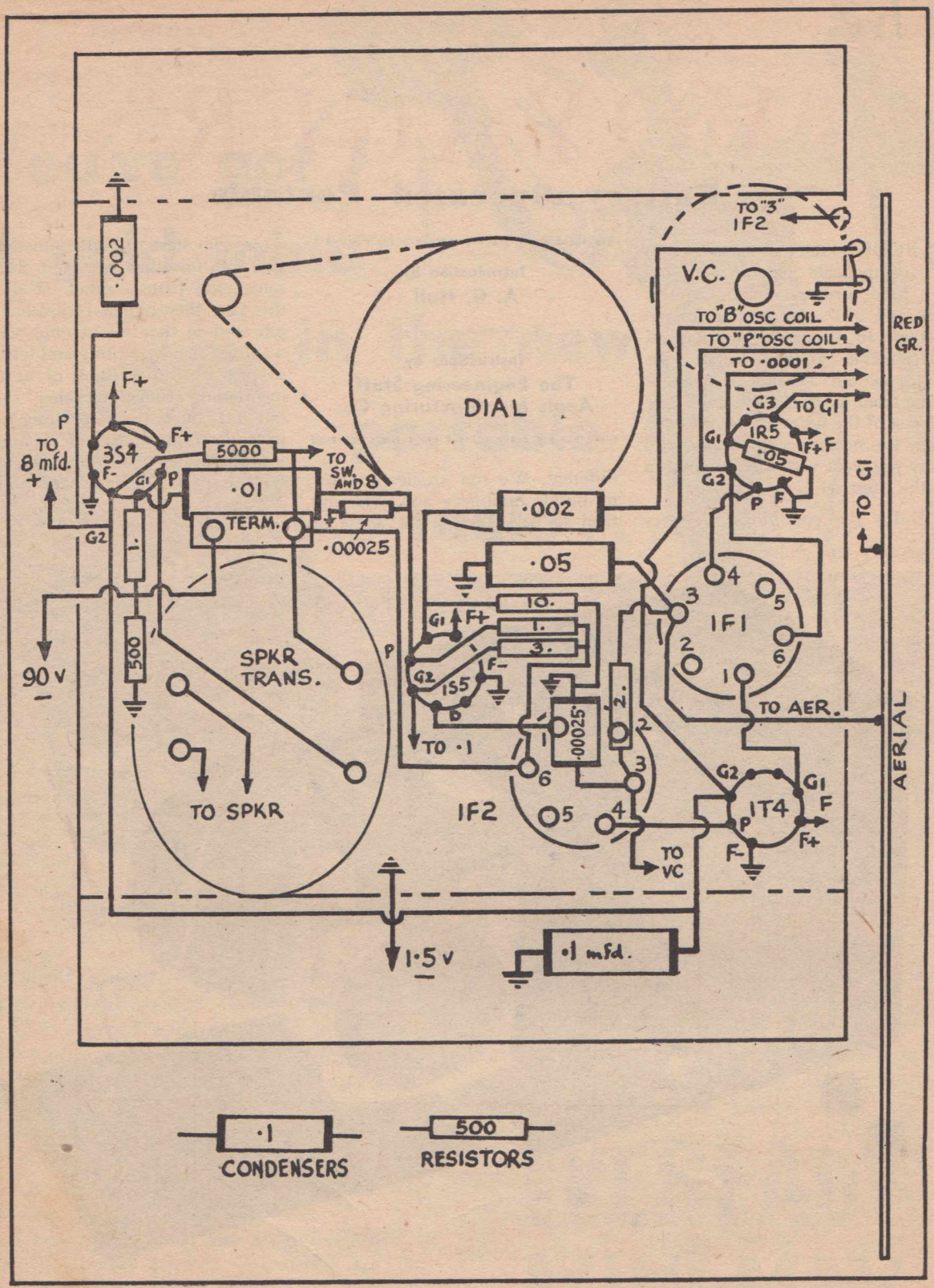
PRODUCTION of certain radio components is still way behind orders. Quite a few items are still scarce on the dealers' shelves. In the good old days it was possible to take a suitable circuit, pick out a handful of spare parts from your "junk" box, buy the rest of the necessary components from the nearest radio dealer, and away you went with the building up of the latest set.

Today the conditions are very different. We run articles on how to build amplifiers and sets and then sit back to take the abuse of those who start to build something and then find that they can't obtain some vital part or other. Without this part they cannot complete the job, and so they fill in time while waiting for it by writing and telling us just what they think of us for mentioning something they can't buy. Of course there are those who have determined natures. They go into the dealer's shop and come out with a speaker in one hand and a

(*Continued on next page*)



A photograph of the completed receiver, showing the inverted chassis.



Picture diagram of the wiring.

"VOYAGER"

(Continued)

couple of electrolytic condensers in their pocket. But we don't know how they do it. Fortunately, however, there is at least one firm which is building up a wonderful business and a wealth of goodwill by offering complete kits for set builders. This is the Aegis Company, and it battles along on behalf of the radio enthusiast. By ordering in huge quantities, and swinging plenty of weight behind it, Aegis manages to obtain all the necessary parts for the building og a set.

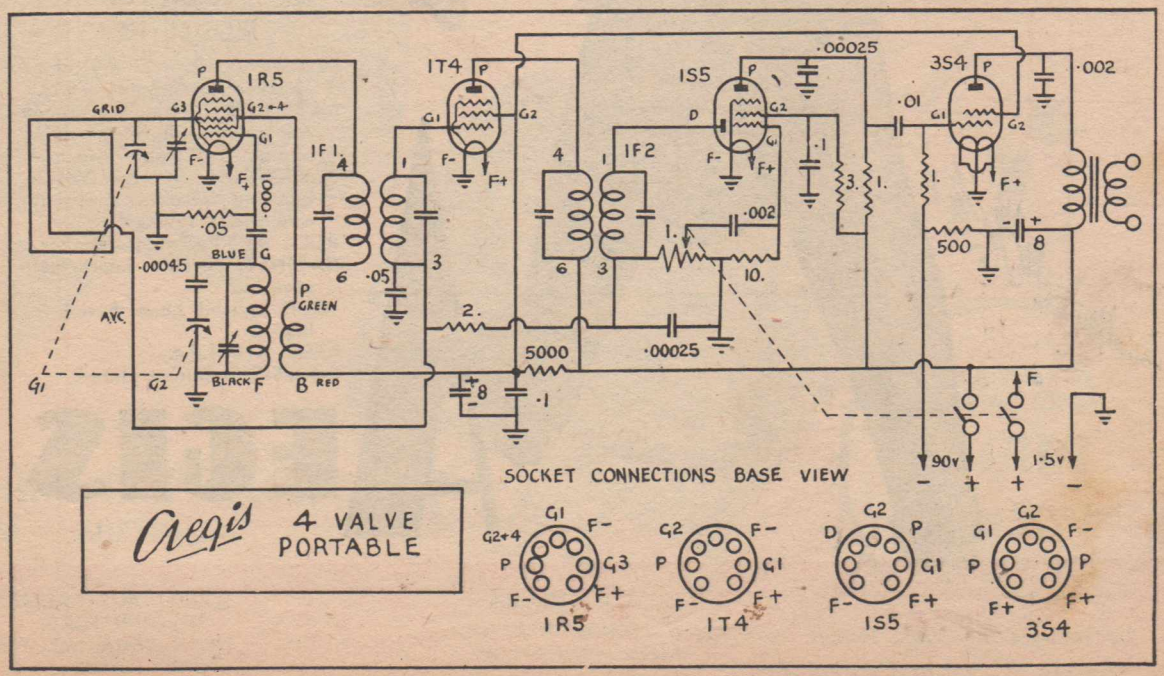
In the May issue of last year we described the "Metropolis" mantel model, which was offered in kit form by the Aegis Company and it was a terrific success. For a time the orders overwhelmed the supply of speakers and other items, but the Aegis Company put up a great fight and eventually caught up with orders. At any rate, even if they haven't quite caught up with orders yet, they are still turning out hundreds of kits. The dealers who handle them report to us that they are a wonderful success in every way. We have never heard of a case of anyone building a "Metropolis" and then having any great trouble with it. In most cases only the simplest adjustments are necessary to ensure performance equal to anything obtained from similar types of sets which have been built and adjusted in factories.

All of which is simply to explain why we again take great pleasure in again co-operating with the Aegis Company by publishing the instructions for the assembly of their latest release, a complete kit set for one of the nicest and most effective little baby portable receivers which we have handled. It is not quite so small as could be made if you went to sufficient trouble to get special minute components, but it is quite a handy little size, yet uses mostly standard components and has plenty of roominess inside to make for easy assembly, adjustment and service. In every way it is a splendid little proposition. The only possible drawback is that you cannot use any of the components out of your junk box, as the kit is only supplied as a complete unit, boxed and sealed and containing everything you need for the whole job.

(Continued on page 24)

PARTS LIST
THE "AEGIS VOYAGER"

1—Carrying case inc. handle, escutcheon and speaker grille.
1—Chassis inc. speaker bracket, tuning bracket, coil bracket.
1—Rola 3C speaker, inc. output transformer 8000 ohms.
1—2-gang condenser.
2—"Aegis" J9 and 10 I.F. transformers.
4—Button valve sockets.
1—"Aegis" M18 oscillator coil.
1—"Aegis" M17 loop antenna.
1—Tuning spindle assembly.
1—Dial drum and scale.
12" Dial cord and dial spring.
2—Small knobs.
2—3-pin battery plugs.
2—482 batteries (Eveready).
1—741 battery (Eveready).
1—1R5 valve (Radiotron or Philips).
1—1T4 valve (Radiotron or Philips).
1—1S5 valve (Radiotron or Philips).
1—3S4 valve (Radiotron or Philips).
3'6" Red hook-up wire.
2' Yellow hook-up wire.
2' White hook-up wire.
1' Black hook-up wire.
1' 20 G tinned copper wire.
1' 1.5 mm spaghetti sleeving.
1—.0001 mFD. mica condenser.
2—.00025 " " "
1—.00045 " " "
2—.002 " Paper "
1—.01 " " "
1—.05 " " "
2—.1 " " "
2—8. " Electro "
or 1—Dual 4 mFD or Dual 8 mFD midget electro. when available.
1—500 ohm Carbon Resistor
1—5000 " " "
2—1. " " "
1—2. " " "
1—3. " " "
1—10 " " "
1—1. " potentiometer W/D. P.S.T. switch.
8—¼" x 3/32" R.H. screws.
8—¼" x 1/8" R.H. "
3—¼" x 1/8" C.S. "
6—½" x 1/8" R.H. "
2—1" x 1/8" R.H. "
8—3/32" hex. nuts.
12—1/8" " "
7—5/32" " "
4—4" screw cup washers.



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AEGIS special Loop Aerial for high Q.
AEGIS J10 I.F.s.
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AEGIS

MANUFA
MELB

TASMANIA:
Le Rossignal Pty. Ltd., Hobart.
Lawrence & Hansen Electrical Pty. Ltd., Launceston.

WEST AUSTRALIA:
Nicholsons Ltd., Perth.
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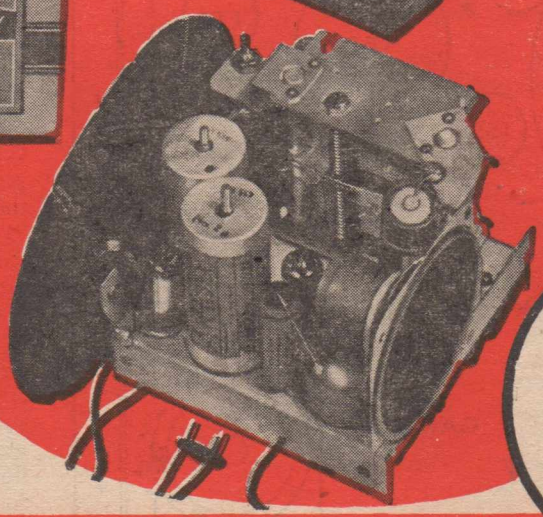
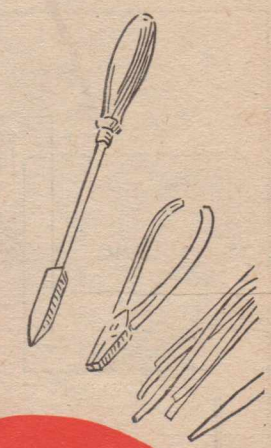
EGIS 'VOYAGER'





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"VOYAGER"

(Continued)

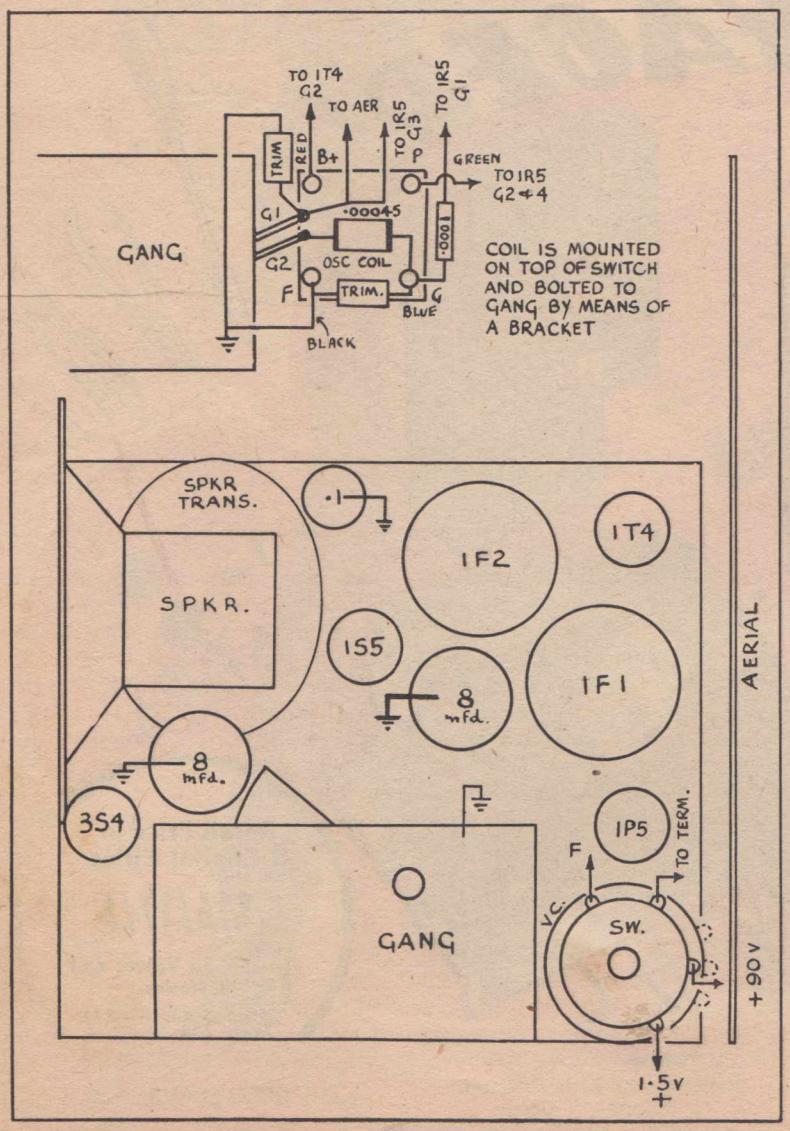
Assembly

The general layout of the chassis and the arrangement of the batteries is so different from normal set practice that it may be advisable for us to outline the set-up.

In order to have a nice balance for the carrying of the set, the weighty (comparatively) batteries are mounted in the bottom of the case. The chassis bolts on to the underside of the top of the case, in an inverted position, the valves being upside down. The control knobs come out through the top of the case.

Considering the chassis as from the normal angle, you might put it that the gang mounts on top of the base, on end, with the spindle going through to the underside, coming out and having the dial drum fitted among the wiring and sundry components. Likewise the volume control mounts on the top of the base with the spindle going through to the wiring side. Just above the potentiometer body is the oscillator coil, mounting on a special bracket from the frame of the condenser. The loop aerial coil goes at the back of the base and the speaker in the front. The speaker transformer mounts through the base, just under the speaker. Three condensers are mounted above the base, the two 8 mfd. electrolytics and the .1 mfd. tubular. There are also a few minor components mounted directly on the oscillator coil base, as shown in our special wiring diagram.

All this may sound a bit complicated, but if you study the kit carefully and in conjunction with the photographs and diagrams you will soon fathom it all. Then you will appreciate that it is both efficient and clever.



The Circuit

In designing this receiver we have, after considerable deliberation, taken certain steps which to some may appear retrograde. We feel, however, that in the light of present conditions we can substantiate our reasons for adopting the present design.

The receiver is a portable in the manner of portables as we have known them, with the exception that it is considerably smaller, and while it does not approach the compactness of the so-called "personal portable" it does offer a receiver with a considerable improvement in size as compared with the older portables.

New Features

Three remarkable new developments have been incorporated in this portable. First, the new "Button-Series" 1.4 volt valves have been used. These excellent tubes not only are much smaller than the GT series, but are a definite improvement in performance. Second, the "B" batteries used are the new "Layer-Built" type which, like the valves, are smaller and give better service than the older type. Third, is the Rola 3-inch speaker. The rest of the components used in the receiver are quite standard. This point at the outset may appear strange and as we said previously, retrograde, but with the existing conditions as regard to supplies this course was adopted in the interests of maintaining an adequate stock. Suffice it to say that the batteries used were the deciding factor as regards to size, the receiver being

designed to fit the space left after suitably arranging the batteries. Also in using the full size portable batteries for both "A" and "B" supplies, the battery life will be in excess of 250 hours, which, at the rate of 4 hours use per day will give two months' service, or where the receiver is used for week-ends only, twelve months service will be possible, with some to spare. This we feel is one of the points in favour of using these batteries in preference to the smaller 67.5 volt "Hearing Aid" battery which only has a quarter of the life.

PERFORMANCE

The receiver is a 4 valve superhet using a loop antenna for pick-up purposes, and has been designed to give the maximum performance consistent with economical battery consumption. The mixer is a 1R5 using combined screen and plate oscillator feedback for maximum oscillator efficiency. The grid circuit is fed with a resonant loop antenna which has been designed with maximum area obtainable in the space available. This has given an area of 30 sq. ins., which is considerably larger than anything we have previously handled. This in no small way helps to give the results we have obtained. The 1R5 is coupled to the I.F. amplifier which is a 1T4 through an Aegis J10 I.F. transformer, which is the High-Gain type. The 1T4 is in turn coupled to the second detector, a 1S5 through another J10 transformer. The 1S5 is a diode-pentode tube enabling detection, A.V.C. and audio amplification. This pentode gives greater gain than the older GT type which was only a triode. The output tube is a 3S4 pentode which has been designed with a double filament, enabling operation on either 1.4 or 2.8 volts.

In operation the receiver has been checked on numerous occasions in the city and country and the performance has been excellent. Operated at home the reception at night of interstate stations has been no effort, and in the country the number of stations received is nothing short of phenomenal.

ASSEMBLING AND WIRING

The sockets and I.F. transformers are mounted in the usual way using 3/32-in. screws for the sockets. The gang condenser is mounted next using three 5/32-in. nuts as spacers, one on each screw. One of the screws mounting the gang is also used to hold the tuning spindle bracket, using two 5/32-in. nuts on each screw as spacers. The speaker bracket is screwed to the top of the gang and the long solder lug on the section of the gang nearest to the chassis is cut to $\frac{1}{2}$-in. long. This is the section used for the oscillator. Mount two 1-in. x 1/8-in. screws in the two output transformer mounting holes, using nuts on either side mount the resistor strip half way up the screw towards the middle of the chassis and then attach the output transformer in the same way, near the ends of the screws. Screw in the volume control after having cut the spindle to a total length of $1\frac{3}{4}$-in. from the chassis. The earth end of volume control is soldered to the metal cover which is in turn earthed to the chassis while the other two lugs are bent back over the edge of the chassis, making sure that they do not short.

Most of the wiring can now be carried out. Having completed this section of the wiring including all the connections to the volume control and battery switch, the oscillator coil can be mounted to the gang condenser and wired in. Then

(*Continued on next page*)

A view showing the chassis layout.

"VOYAGER"

(Continued)

the loop antenna is screwed on and wired up and finally the speaker mounted and wired. The length and position of the battery leads are as follows—"A minus" black lead, 5 ins. long, through hole in side of chassis near output transformer; "A plus" white lead, 10½ ins. long, from switch along edge of chassis between chassis and loop antenna; "B minus" yellow lead, 11 ins. long, between the edge of the chassis and loop antenna; "B" plus red lead, 9¼ ins. long, from the switch between the oscillator coil and the loop antenna, and the "B" battery connecting lead, red lead, 9 ins. long. Having completed the wiring, turn the gang condenser to maximum and screw on the dial with the 10 opposite the edge of the chassis. Tie a loop in each end of the dial cord so that it is 8¾ ins. long, hook one end over the pin on the dial drum, wind two turns around the tuning spindle and with the dial spring attached to the other end of the cord, hook the spring over the pin on the drum.

Alignment

Having checked the wiring, plug in the tubes and connect the "A" battery. Switch on and check the filaments to see if they are lighting. Having made sure that there are no wiring errors that are likely to write off a set of tubes, the "B" batteries can be connected and the receiver switched on. On establishing that the receiver is working O.K., the I.F.T.'s can be aligned to 455KC in the usual manner. From here on it will be necessary to use a radiated signal from the test oscillator. Then the oscillator core is adjusted to bring 600 KC on 9 on the dial and the oscillator trimmer adjusted to bring 1400 KC on 2 on the dial. Before adjusting the aerial circuit the receiver should be set up with the batteries in their operating position as they have some effect on the characteristics of the loop antenna. The aerial trimmer is then adjusted to give maximum output on 1400 KC. The oscillator can now be adjusted to track with the aerial section by feeding in a signal at 600 KC and by a combination of varying the oscillator core and rocking the dial until maximum output is obtained. This is the correct position on the dial for 600 KC, and the oscillator trimmer and core should now be adjusted to bring 1400 KC to its original position and 600 KC to its new position on the dial. These oscillator adjustments should be repeated a couple of times until both are correct. This procedure can be carried out without the use of a test oscillator by making use of two radio stations as near as possible to 1400 KC and 600 KC respectively, using as weak a station as practicable. Do not forget of course that the loop antenna is quite directional and the receiver should be rotated to give maximum pick-up.

Ready for use anywhere, any time!

Final Assembly

With the completion of the alignment, the receiver can be screwed into the cabinet, the batteries connected, the lid screwed on and the knobs fitted. In attaching the batteries the plug is inserted in the "B" battery on the "hot" side and this is then placed in the cabinet, the other "B" battery is plugged in and fitted in the cabinet and finally the "A" is connected.

This completes the construction of the receiver and it is now ready to put into service. We feel confident that the results that you will obtain from this little receiver will agreeably surprise you.

Conclusion

If you require any further information about this fine little set you will find the Aegis Manufacturing Company at your service if you 'phone, write, or call at 208 Little Lonsdale Street, Melbourne.

"TELECONDA 3"

A snappy little mantle model which is cheap to build

LIKE thousands of others I went to the Show. I did not go to see the fat lady, or the calf with two heads, but interested myself mainly in the technical, and in particular, the radio displays. Well, the technical part of the exhibition was certainly remarkable, but what I saw in the field of radio receivers was rather discouraging, and only reflected the frantic efforts of the radio industry to persuade the public that the 1947 radio was something far better and far more advanced than the 1937 one, and in this effort it failed, in my humble opinion, rather badly. Apart from an abundance of receivers you can inspect at any department store without paying 2s. 6d. entrance fee, there were few novelties except some attempts in the field of radio gramophones. There was one, for instance, about twice as long as the ordinary type with goodness knows how many valves and speakers. The tone was not bad, just quite ordinary, with an abundance of resonance peaks and other distortions, that would have driven Mr. L. A. Davies frantic.

By

PAUL STEVENS

21 Fletcher's Avenue, Bondi, N.S.W.

To sum up, the performance of our latest models proved to be in no way better than the sets of ten years ago, and the only novel things about them were the new and very attractive cabinet shapes, and, what is more important, the high prices of these post-war "marvels."

Prices

This price problem set me thinking. What the average city man expects of his radio is not really much. He wants to be able to listen to the locals, wants a reasonably good tone. He does not worry so much about bass or treble response, as long as the tone of his receiver sounds clear and balanced.

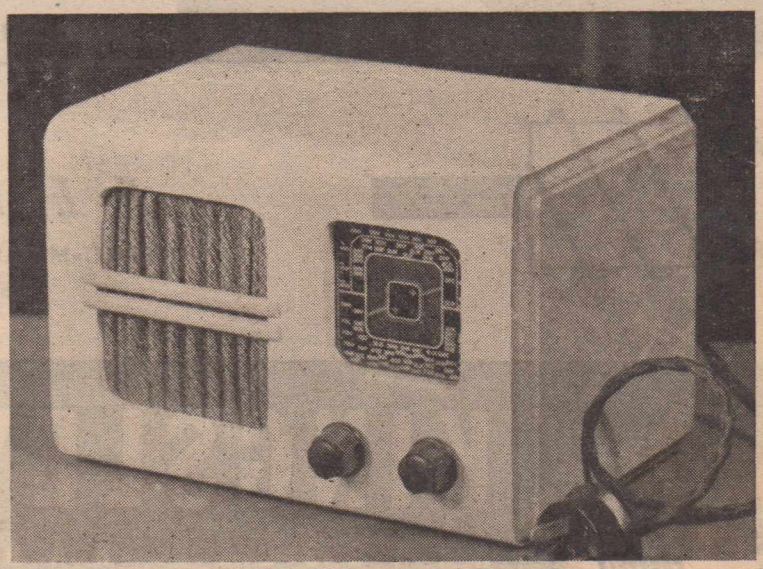
Our simplest and cheapest sets on the market to fulfill these requirements are 4 valve superhets, mantels and midgets for more than £16. But why a 4 valve superhet, if a 3 valve Reinartz can do the job just as well, at much lower cost? Of course, the Reinartz is nothing new, but got out of favour with manufacturers long ago, because its reaction was too tricky and hard to handle. Also, there was no real means of volume control: in other words, not the thing for the average John Citizen.

To make the Reinartz up to date we have to elminate the following drawbacks: (1) Make the reaction control smooth and gradual. (2) Prevent the reaction control from detuning the set when handled. (3) Create an effective volume control. (4) Strike a compromise between selectivity and sensitivity, so as to separate all the locals from each other and still get plenty of volume. (5) Stabilise the circuit sufficiently to enable proper dial tracking.

Reaction Control

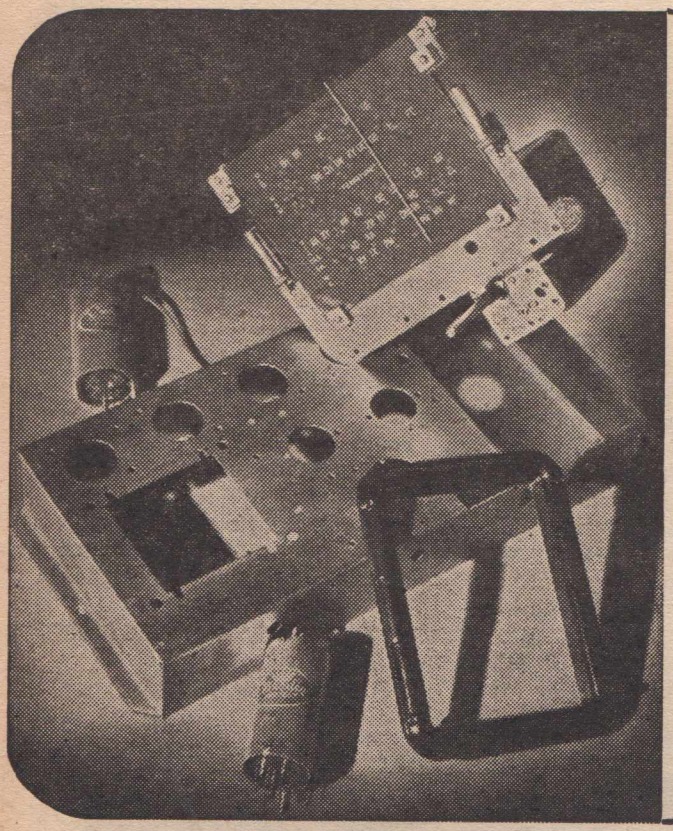
Points 1, 2 and 3 are easily taken care of by introducing a reaction control altering the screen voltage of the pentode detector, which also provides for an efficient volume control. Based on this consideration I have evolved the circuit in Fig. 1. Everybody who had anything to do

(*Continued on next page*)



KKI

THIS IS THE FAMOUS FERROTUNE FOUNDATION KIT



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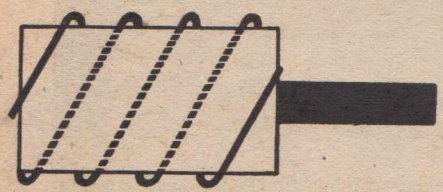

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"TELECONDA 3"

(Continued)

with pentode detectors knows that the optimum screen voltage for best volume, apart from reaction, is rather critical. Our task is now to combine both and adjust the circuit so that oscillation sets in just when the optimum is reached. But while the best possible screen voltage remains constant for a certain set of conditions, the point of oscillation varies a lot when tuning over the broadcast band. This is mostly due to the fact that the impedance of the reaction condenser gets smaller with increasing frequency and makes oscillation set in sooner towards the 1500 kc. end of the dial.

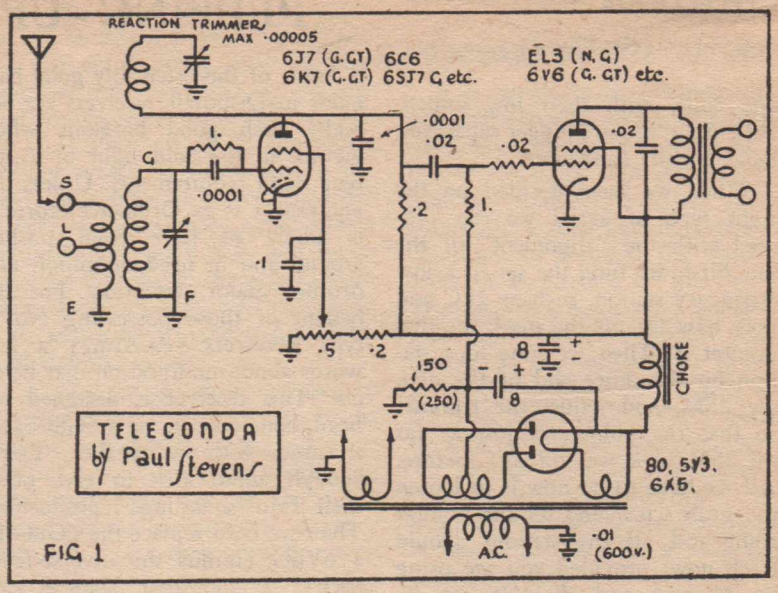
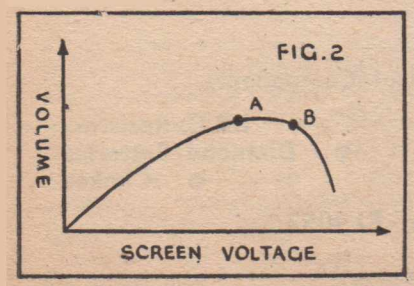


FIG. 1

Capacity Values

To overcome this I used, instead of one very small capacity in the reaction circuit, two bigger ones, consisting of a .0001 mfd. shunt between plate and ground and a .00005 max. trimmer as reaction condenser in series with the tickler coil. That makes it not only easier to handle, but also minimises the influence of stray capacities, which become very troublesome if the reaction condenser is too small. The .0001 bypass condenser tends to keep the point of oscillation at the same spot all over the band, as its impedance decreases on higher frequencies, while the impedance of the tickler coil increases, whereby a higher proportion of RF energy will bypass the reaction circuit.



The values given are right for the shielded RCS Reinartz coil. Different makes may require different capacity combinations. The procedure of setting the reaction trimmer is very simple: first leave the trimmer open and tune to a station of 1200-1300 kc., such as 2SM or 2CH in Sydney; now advance the screen potentiometer. You will notice that the effect is as shown in Fig. 2: first the volume increases gradually, then remains almost steady at a maximum level, then drops off rapidly. Set the potentiometer to point A, Fig. 2, where the curve levels out, then tighten the reaction trimmer till oscillation just sets in. When tuning in to lower frequencies, the oscillation point will move along the curve towards Point B, which in my case it reached at about 800 kcs. Below that there is no more oscillation in the maximum volume area, but the regenerative effect remains high enough to get 2FC at a maximum volume, which would be too loud for a small set. All the other stronger stations were too loud for normal listening with the volume control advanced to near oscillation point, which means that under average circumstances this set can be handled at normal room listening volume without the well known oscillation whistles that are typical for other Reinartz sets, and just as easily as a superhet.

R.C.S. Coil

To achieve this, much care has to be given to the areil circuit. On the RCS coil there are two aerial tappings, one for long, one for short aerials. I used the short tapping and tried various lengths of wire till I found that between 12 and 15 feet brought the best results. The selectivity was still sufficient to separate all the locals, while volume was still ample even on the weakest one. It must not be forgotten to put a .01 mfd. condenser of high breakdown voltage between power line and chassis, unless a separate earth wire is to be used. Ordinary aerial coils have a high impedance primary and the stray capacities of the power transformer are sufficient for earthing through the power line. But Rein-

(Continued on next page)

"TELECONDA 3"

(Continued)

artz coils, with their low impedance input, require bigger capacities, hence the .01 condenser.

When we have decided on the right type of aerial we can proceed with the "alignment" of the set. First, we tune the set to a low frequency station, such as 2FC and note how far off the mark the dial pointer is. Then we tune to a station on the other end of the dial, say 2SM, and adjust the trimmer so that the pointer is just as far off 2SM as it was off 2FC before. All we have to do now is to loosen the grub screw and set the pointer right and all the stations should track now, provided you are using an H-gang and dial. It can be assumed that all modern commercial coils will track, but I will not guarantee for home-made ones.

The sensitivity of the finished product is slightly less than that of a 4 valve super of average design, but in a reasonable position will bring all the locals, even the weak ones in good strength. In bad position a longer, or outside, aerial should be used, which will have to be connected either to the long aerial tapping or through a .0001-.00025 condenser. This will slightly affect the dial tracking at the high frequency end, and the aerial trimmer should be mounted in a position of easy access from the back. Once the proper aerial is installed and the trimmers set, there is no more worry. Anybody can handle this set, the tone quality of which is full up to modern standards. The only real disadvantage against a 4 valve superhet is its limited selectivity. You could not use it closer than about 3 miles from a transmitter without a wave trap. However, here at Bondi, 4.5 miles from 2UW, I get 2CH, adjacent to 2UW, and my weakest local without interference. Although it has its limitations, I think this set would be a commercial proposition, and it could be retailed for about £12—pardon me, £11/19/6.

PEPPING-UP THE No. 4 SET

Some of the ostensibly good bargains in Disposals receivers are not really such good bargains when viewed in the cold light of Amateur Band requirements. Unless the equipment is ex Ordnance Stores it is likely to have been pushed around and in need of minor, and oftimes major, attention. For the benefit of those possessing No. 4 type Receivers (ex-Army) a few words about modification may be of use. This receiver is designed for headphone output, via a 6G8G, and if used with a speaker, hasn't enough audio kick to give other than thin sounding reproduction. The cure is to replace the 6G8G by a 6V6G (minus the inverse-feedback), a job that sounds easy enough but is a bit devilish so far as working in inaccessible corners goes. The RF stage can be improved a great deal by using a high gain RF pentode instead of the 6U7G "loafer." In my case I used an 1851, but there is a catch in so doing. The receiver is fitted with valve screens of which the base has an opening large enough to pass only the small standard octal base. To get a larger valve through, this valve screen base must be demounted and filled out accordingly. Incidentally, some of the ex-R.N. Radar gear has valve base screens of just the type, to pass about 1½ inch diameter. The 1851 makes a vast difference in the overall gain of the Number 4 Set. Of course, the 1852 can be applied with little trouble, and the EF50 wouldn't be too difficult to fit. With an ECH35 instead of the 6J8G to boot, this receiver is really a first class performer. For the benefit of those who don't know, the No. 4 runs from either 240 volt AC or 6 volts DC by the throw of a switch. It is a solidly made job, as it had to be to meet up with armoured vehicle requirements.

CAR RADIO

(*Continued*)

not loosely, in their holders. Petrol does the job of cleaning quite satisfactorily. The whole surface of the brush should bed down on the commutator and its spring should hold it there firmly, but not to such an extent that undue friction is caused.

Satisfactory suppression of generator noise can now be attempted and bypassing of the lead from the generator with a .5 mfd. or 1 mfd. condenser to the generator housing should do the trick. Special condensers are made for this job, but any standard variety will do so long as it is securely attached to the generator.

Ignition System: In the high tension side of the ignition system are found the secondary of the ignition coil and the spark plug. This coil of course possesses the property of inductance as well as the distributed capacity between the windings. Now, any circuit possessing both capacity and inductance is known as an oscillatory circuit and as such will oscillate whenever an electrical disturbance is produced therein. In conjunction with the spark plug it then becomes in effect a spark transmitter as was used way back in the early days of radio. The signal so produced is then radiated and the car aerial being there for that purpose dutifully picks up the signal and passes it on to the receiver. It is also picked up by any other wiring which is connected to the set. This type of interference has a very wide frequency range—from audio to very high R.F. and therefore no filtering in the aerial circuit will effectively eliminate it without also removing the incoming broadcast station's signal.

A very simple means is used to suppress this noise right at its source and that is to connect a resistor in series with each spark plug lead and right against the spark plug. These suppressors, as they are called, are then in series with the oscillatory circuit and effectively damp out the oscillations. With the oscillations damped out, any radiation is reduced to a bare minimum. These suppressors are made in a variety of types to suit all kinds of ignition. In most cases it is only necessary to lift the H.T. lead from the plug, place the suppressor thereon and replace the lead on an appropriate place on the suppressor.

Another way to dispose of this type of noise is to wire the whole ignition system in shielded cable and securely bonding all the shielding to frame, but unless this job is thoroughly done and well maintenanced the result can be worse than without the shielding.

The Distributor: The contact in the distributor does not actually make contact with the electrodes, but clears them by a few thousandths of an inch. As a result, a tiny spark occurs at each electrode and oscillations are produced in the associated wiring. A special distributor suppressor is made to be inserted in the distributor cap, while the lead usually inserted therein fits into the suppressor. This effectively cleans up the hash in a manner similar to the spark plug suppressors.

It is always felt that engine performance is affected very adversely by the installation of these ignition suppressors, but exhaustive tests by experts have revealed that engine performance is not affected provided that:

1. The engine is in good condition to begin with.
2. Spark suppressors do not exceed 20,000 ohms resistance each, and—
3. The distributor suppressor is 5,000 ohms or less.

Admittedly these suppressors pre-

(*Continued on next page*)

ENGLISH MINIATURE SUPER

An interesting range of multi-purpose valves is employed in the English Philips Model 209U superhet for A.C./D.C. mains. The Mullard UCH21 is used in the frequency changer stage and also for I.F. and A.F. amplification. A Mullard UBL21 serves as double-diode rectifier and output pentode, and the power rectifier is a UY21.

The receiver is housed in a neat plastic cabinet with rounded corners and the indirectly-illuminated tuning scale (which is removable) projects from the top. The dimensions excluding dial are only 11 in. x 7 in. x 6 in., and there are three waveranges, including short waves from 16.5 to 51 metres.

RECORDS OF THE FUTURE

It is hardly to be imagined that we shall continue to be content indefinitely with the wax gramophone record, with its contrast compression, its limited frequency range, its needle scratch and its continual deterioration through the wearing away of its surface by the needle. The fact that we haven't got away from the wax record already is due simply to the millions of gramophones, mechanical or electric, and the vast numbers of records owned by men and women the world over. To change over to magnetophon tape or sound track film would be a complicated and expensive business. It would probably be a long time before the new recordings could be made to pay their way and for years both wax and metal or celluloid records would have to be made side by side. Nevertheless, the change is bound to be made in time. My own forecast is that the magnetophon, or a development of this principle, will eventually win the day and that the records of the future will be made on metal-coated plastic tape. And what a boon they will be! Their frequency range will be widespread enough to satisfy the most critical ear; there will be no scratch or other surface noises; no matter how often they are played the quality of their reproduction won't deteriorate; they will make it possible to play through a whole opera without interruption.

—By "Diallist" in Wireless World (Eng.)

CAR RADIO

(Continued)

vent the spark from reaching full intensity, but as the full voltage across the gap is not reached immediately the spark occurs, then the gas in the cylinder has already been ignited before full voltage is reached and therefore the full intensity of the spark is really not required for proper engine performance. A most important point though is that the engine must be in very good condition, otherwise these suppression measures will affect performance.

Low Tension Wiring: Ignition-produced noise may be introduced into the radio via the battery. This is caused by radiation being picked up by the wiring to the lighting, horn, etc. A condenser of .5 mfd. or 1 mfd. connected from the battery side of the ammeter to frame should do plenty in clearing up this type of trouble.

As a further precaution against noise coming back from the ignition coil primary a similar condenser can be fitted from the battery side of the ignition switch to ground. These condensers should be mounted right at the points mentioned and connected direct to frame at that point.

The foregoing measures should reduce ignition interference to a negligible level and should be regarded as the usual measures to adopt when installing a modern radio in a modern car. Not all cars will require all this filtering, while some will require more, but this can only be found out by the results obtained.

Electrical Appliances: The noise produced by fans, wipers, etc., can easily by isolated by operating the radio without the engine running and then switching each appliance on in turn. On discovering the culprit a by-pass condenser of .5 mfd. across the offender's leads will cure the trouble.

Loose Contacts: These will be in evidence while the car is in motion and will produce crackling noises when the car runs over bumpy roads. The only way to dispose of the trouble is to thoroughly overhaul the wiring system and tighten up all contacts after making certain they are all clean.

Re-radiation: This very-hard-to-locate rouble is caused by copper pipe-lines, etc., having noise induced in them from other radiating sources and then the signal so induced radiates of itself. Bonding these conductors solidly to the chassis will produce considerable reduction in trouble from this source. One method of locating this trouble is to use lengths of heavy cable with heavy clips on either end and, by trial and error, earth any likely causes of trouble to chassis until the offending portion is isolated and then a permanent earth can be made.

The difficulty with auto radio installations is that very seldom are to be found two jobs that present the same problems, but the foregoing should cover most of the problems likely to be encountered. Some troubles are very rare and will depend on the ingenuity of the individual to locate them and provide the remedy.

NOTICE

Owing to paper shortage it is not possible to increase the number of copies printed in accordance with the steadily increasing demand. If you want to be sure of getting your issue every month you should place a regular order with your newsagent, a subscription order through him, or a direct subscription to the publisher. Subscriber's copies are bulk posted in Sydney the same day they come off the printing presses. This means that those who are on the subscription list get their copies considerably earlier than if they wait for normal distribution.

The World of Radio

SCHOOLROOM DX

The idea of increasing interest in both science and geography by running an amateur station in class may seem a little spectacular to some, but H. W. Simpsin, B.Sc. (G8DI), has put this scheme into practice. He is science master at Rose Lane Secondary School, Mossley Hill, Liverpool, the school call being G8LL.

G8DI and a friend built the transmitter and behind it, on the class-room wall, is a large coloured map with strings leading from the locations of stations worked to their QSL cards, which surround the map.

Mr. Simpson would be very interested to get into touch with other teachers holding amateur transmitting licences, and to supply any further information regarding his own particular venture.

—Shortwave Magazine (Eng.)

* * *

United Airlines is now using spun-glass lacing cord instead of the familiar linen type in applications affected by heat and humidity.

AIR RADIO

The three State-owned British air-line corporations, B.O.A.C., B.E.A., and B.S.A.A., have formed a non-profit-making company—International Aeradio, Ltd.—with the object of installing and operating in this and other countries radio navigational aids and telecommunications equipment.

* * *

ENGLISH TELEVISION PRODUCTION

A sharp rise in the production curve for television receivers during August, September and October is shown in the latest Board of Trade figures. The monthly output was 235, 754 and 1,334, respectively.

* * *

Standard Telephones and Cables is to provide two major wireless stations for the Turkish Government at Ankara and Istanbul, respectively. The £400,000 order is for long-distance radio-telephone and telegraph equipment.

CALLING CQ!

By Don Knock, VK2NO

A BRIGHT scheme following on the grounded-grid triode amplifier has come to light in New Zealand, and it seems to be an answer to a lot of things for RF amplification minus noise. The idea was first spotted in the NZART magazine, "Break-In," and then a fully-descriptive article was given in that excellent new NZ publication, "Radio and Electronics." Briefly, the application is that of a double triode such as the 6SN7, but if possible with advantage . . . the miniature 6J6, in an RF amplifier without any required neutralisation and with outstanding signal to noise ratio. The first half of the twin triode is used as the familiar cathode-follower. For HF's such as 28, 14 and 7 Mc/s, a choke is connected in the cathode, having a value of 2.5 mH. In series with this to earth is a resistor, of from 1000 to 300 ohms, depending upon the valve used. The grid circuit is tuned in the usual manner and it may be an advantage to connect a grid stopper of about 2000 ohms or less in series with the grid if there is any tendency to oscillation. The anode is fed straight from the HT supply . . . no coupling resistor or choke being needed here. Output from this triode section is from the cathode to the cathode of the other triode, which has the grid grounded directly, and the anode fed through the primary of the usual RF transformer. Advantages of such a system will be apparent . . . a high degree of selectivity and image ratio, plus the inherently-quiet operation of the grounded grid amplifier. It is something that is due for a try-out in the writer's workshop.

KINGSFORD (N.S.W.) RADIO CLUB

The Kingsford area of Sydney is one of those districts where keen Hams abound in quantity and where numbers are on the increase. Because mainly of a high percentage of those who follow the lures of 50 and 166 Mc/s, a few prime movers got their heads together and decided the time was opportune for a local radio club inauguration; that with the number of transmitting amateurs in the area, there should be a goodly response to club suggestions.

This idea proved to be correct and, after John Peell (VK2WJ) and Dr. Alec Dan (VK2ABU) sent out a call to the local lads on various bands, they rolled along in fine style for the first meeting. More will be heard of this new Kingsford Club, which is infused with a spirit of co-operation in populating the VHF bands.

For the time being, meetings will be held in VK2ABU's large double garage, which in these times of space problems, provides an excellent solution. Those who are known, among others, to be interested in the Club are VK's 2WJ, 2ABU, 2ABB, 2AB, 2YC, 2TI, 2CP, 2ABC, 2VW, and there will be others. Good luck, OM's.

Many people prominent in the world of radar and radio started off their careers in amateur radio and the laboratories of the world's most prominent manufacturers include on their staffs men with callsigns tucked away somewhere in their make-up. At present in Australia is one of Britain's most prominent scientists, Dr. W. A. S. Butement. In 1924 there were two Hams in a north-western London suburb under the callsigns 6TM and 6XG, and both were well and truly bitten by the Ham virus. They took part in the epic "first transatlantics" on the old "95 metre" band; had a lot of fun with mobile gear in T model Ford trucks on Field Days. Both also had a hankering after VHF's and played around with fearsome-looking and almost lethal oscillators with lots of power in order to pop signals over a mile or two. 6TM is now the visiting scientist referred to, one who had a direct bearing on the course of air war by his outstanding contribution to the Allied cause of the proximity fuse. The other Ham, 6XG, long ago exchanged his G callsign for an Australian call, namely VK2NO. Ham radio always succeeds in making the world a small place.

* * *

In pre-war times the old Sydney 56 Mc/s gang enjoyed many days of mobile operation when VK's 2NO and 2JU ran tests from cars across country over quite respectable distances. The gear was then of prehistoric nature . . . modulated oscillator variations and squeggers . . . but it served the purpose to

(*Continued on next page*)

EXPERIMENTAL RADIO SOCIETY OF N.S.W.

This flourishing club meets at Melody Hall, George Street, Burwood, Sydney, on alternate Thursdays. Membership enquiries should be directed to the secretary, W. Hayes (VK2AJL), 34 Nicholson Street, Chatswood, phone JA 7729. At the annual general meeting the following were among the officers elected: President, Reg Anthony (VK2TR); vice-president, John Warren (VK2QX); secretary, Will Hayes (VK2AJL); publicity officer, Dave Broadley (VK2AFU); QSL officer, Will Jennings. The technical committee comprises Ron Blades (VK2VP), Mossie Webb (VK2DP), John Warren (VK-2QX) and Jack Lindsay (VK-2AKR).

New members elected were Fred ("Pop") Treharne (VK2BM) and Allan Smith. The society now has 85 transmitting members and 20 receiving members on the books. Chas Luckman (VK2JT) referred to his recent visit to VK3 and his meetings with amateurs there . . . he found that 166 Mc/s is particularly popular there. Wal Manley (VK2XH) is leaving Australia soon and will be signing ZL in the future. At least he will have an extra 260 Kc/s to play around with! At the conclusion of the meeting on April 24 an auction was held and many members took the opportunity to dispose of surplus gear that was of use to others. Many bargains were had and all signals should be T9 judging by the filter condensers that were snapped up. The Annual Reunion was held in the society's rooms on Thursday, May 8, last, with representatives of other amateur organisations in attendance. Representatives of the P.M.G., Trade, and Radio Press were present. A more detailed account of this affair will be given in the next issue.

HAM NOTES

(*Continued*)

stimulate and hold interest. How different are results with more advanced gear. On Sunday, May 4, last, VK2AJU went mobile around Western Sydney suburbs with a neat little crystal controlled rig and appropriate receiver . . . a superhet with an ECH35 in the front end. Under all conditions of screening as far as 20 miles or so distant, his signal was never lost at the writer's station. Most of the time it was around the S8-9 plus mark. During the test, stations appeared on the band (50 Mc/s) like magic, attracted by the unusual goings on. We could do with more days of like nature, so what about it, you fellows with cars and/or 'planes?

* * *

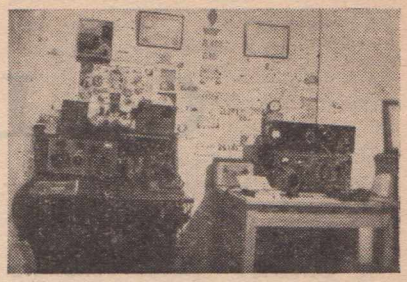
The NSW WIA VHF section under the leadership of Chas. Fryar (VK2NP), is off to a good start, a goodly roll-up of interested people being in attendance at Science House, Sydney, on the night of the first meeting. There is all the old enthusiasm of the pre-war 56 Mc/s Section . . . and possibly a bit more. Likewise in Brisbane, the new VHF Section for the VK4 Division is now in full swing, with Arthur Walz (VK4AW) as president. The "gen" on this section comes from Bill Harston (VK-4RY), who has been on holiday in Sydney and returned full of ideas about ground-plane antennas.

* * *

VK2NP got yarning to a VK3 in Hamilton, Vic., about the 6-metre band . . . on 7 Mc/s . . . and found that he had an interested colleague. The VK3 described the gear he uses himself on 6 metres . . . without any other local to co-operate with . . . a Trojan spirit in truth. His station is QRP but hopeful . . uses a 41 crystal oscillator in the 8 Mc/s region, followed by a 42, and finally a 6E6. The receiver is well and truly out of the ordinary . . . it is a super-regen using the triode section of "Eye" indicator tubes throughout, with a sprinkling of types. They are EM1, 6E5 and 6U5. Chas doesn't say if the eyes blink when the detector hits a carrier.

* * *

Your scribe regrets that our staunch VK3 correspondent will be A.O.L. for some time and out of our sphere of operations. Ken McTaggart, VK3NW, is just about off



ZL4CD, DUNEDIN, N.Z.

This publication is always pleased to devote space in "Calling CQ" to the doings of the new and relatively new amateur, and it is suggested here and now that those who have recently made a start in the ranks of the world's most interesting hobby refrain from hiding their light under a bushel so to speak, and send along the station particulars with photograph. We can then let the other fellows know what makes the noise at the other end! Shown here is the station of one of our very numerous New Zealand readers . . . that operated by Jack Lunn at 65 Duncan Street, Dunedin. Jack is a new hand at the game and would appreciate reports on his CW and telephony signals, particularly outside New Zealand. When this information reached us he had worked one VK2 on CW and VK3 on phone. Input to the final is eighteen watts to a transmitter comprising a 6C5 crystal oscillator and 6L6 amplifier on 3569 or 3540 Kc/s. . . . that is for CW. The input for phone runs at 5 watts. Antenna is a simple quarter-wave Marconi against earth. VK4CD says that he will answer all reports without fail and looks for them especially from "ARW" readers.

—"Don."

WELL-EQUIPPED LISTENING POST

The operator depicted here so keenly concentrating on his tuning controls is the hon. secretary of the "Australian DX Radio Club," Mr. A. W. Wright, 539 Marion Road, South Plympton, S.A., and by the look of the wallpaper, Hams far and wide have responded to his SWL reports in fine style. That is not at all surprising, judging by the excellent form of neatly compiled log sheet he sent along with this shot of himself. Prominent in the illustration is a Philips type R163 communications model receiver, seen in the centre. The control Mr. Wright is handling appears to be a home-constructed preselector or converter. On the left may be seen ex-service gear in the form of portion of a Y10D RAAF equipment which no doubt comprises a handy accessory for HF or MF coverage.

Mr. Wright received a card recently from G3WV, who says that the Australian listener report takes pride of place in his shack there . . . he had worked two Australians only . . . VK3's . . . and hasn't been able to get a QSL out of them.

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to England for a couple of years on business, and the following notes will be his last for some time to come. We expect, however, to have a line now and again from the U.K. about his experiences among the VHF G's. Says Ken . . . "Firstly, a little about 166 Mc/s. We have quite a number of stations there now and for the past 2 or 3 months activity has been increasing. Stations are VK's 3NB, 3UJ, 3ACM, 3EM, 3XM, 3OF, 3MB, 3ARK, 3TZ, 3MJ and 3NW. General run of rigs is 7193's or similar in single linear oscillators, modulated directly and running about 3-6 watts. Some use push-pull tubes of this type in linear arrangements. One chap has a 35T and another an HY615 MO driving an 832. Receivers, with the exception of 3MJ, who has an 11-tube superhet, are 2 or 3 tube super-regens, using 955, quenched. I have the honour to have the first crystal-controlled rig on the band, and now 3MJ has one also. My rig is RK34 PP Tripler from 56 Mc/s into the 832. The RK34 doesn't triple very efficiently but will drive the 832 to about 2 Ma grid current. I am running about 16 watts into a coaxial dipole. 3MJ is using two EF50's to double from 40 to 83 and then 83-166 Mc/s with an 832 in the PA. The second EF50 is not so effective, though. Antennas differ very widely. 3ACM has a 6-element array; 3EM, 3MB and 3NB have 4-element close-spaced arrays. 3MJ has a ground-plane and the rest mainly plain dipoles. We have worked up to 12 miles over the various hills in the suburbs quite successfully with signals varying from R6 to R Max., depending upon power, etc. There is a tendency among the gang to regard 166 Mc/s as a happy hunting ground for 'lousy' gear and only a few seem to be really interested in experimental work. (How true that is of both bands.—Ed.) It is planned to force the issue somewhat by getting a goodly number of crystal rigs and superhets under way and thus induce the others to do likewise or fall by the wayside. Potential crystal-controlled people are 3KU, 3YS and 3LW. About 50 Mc/s . . . there are many new stations and so far VK3MJ has had contacts with 52 different VK3's. My score is 44. Usually there are 6 or 8 stations active nightly. We have a good contact now in 3HZ, who is about 60 miles distant, with a signal that is usually from S6 to S9, depending upon the Melbourne QTH. For example, 3HK, five miles from me, gets 3HZ R9 plus 6 db when I get him about R5 Also I have noticed fading and so has 3HZ . . . whilst between 3HZ and 3HK there is never a sign of fading. Our last Field Day was a big success. 3HK and 3DH at Dandenong, 3LR at Macedon, 3WD at Buninyong, 3PK at Arthur's Seat, 3HZ at home at Warragul, 3YS-ABA near McVeigh, and myself on Mt. Buller comprised the portables. The longest contact was between myself and 3PK, about 112 miles, 9002's, etc., some separately with sigs S9 at each end. 3HK made 20 contacts and 3WI was on using my home rig. Unfortunately, I could not reach the summit of the mountain as the road ended about 1½ miles beforehand and about 500 feet lower. The summit is 4995 feet high. Also I was on the wrong side for Ballarat and Macedon and had to do a bit of manoeuvring to get even a straight shot at Melbourne. It was definitely not line of sight anywhere, but I did very well. My time on the air is draw-

(*Continued on next page*)

HAM NOTES

(Continued)

ing to a close as we are off to England in July. Time away will be 20 months, with 12 in England and the rest in USA. I hope to acquire an SX42 in the latter country (wish you luck, OM—Ed.). In England I will endeavour to contact back here on 20 or 10 metres, but will not attempt to run my own station as I have some of the G's with co-operation already offered on those lines. A few final words re DX on "Six." There is nothing to report, although on two occasions 3GG and myself heard unmistakably American voices on the band . . . fading out before any call was received."

—VK2NO.

* * *

A surprise in the mobile-marine line is that No. 1 Australian old-timer, Chas Maclurcan (VK2CM), is back on the air. With a party of friends, he is off around the Barrier Reef bent on fishing relaxation for a spell and, being still very much a Ham at heart, he couldn't fancy the idea of a few weeks at sea without keeping touch with the mainland per the medium of the old hobby. The vessel, a snappy ex-navy hospital craft, is the "Bilkely" and the signal heard therefrom in the 40-metre band originates from an FS6. Skeds are kept with VK-2NO daily and it is possible that at intervals some of the 40 gang may enjoy the pleasure of a QSO with the man who very definitely started Australian Amateur Radio off as early as 1910. Charles finds it a bit queer to use the VK prefix, for the reason that when he last signed off as an active amateur years ago, there were no prefixes to reckon with. He was then just plain 2CM.

* * *

Another old-timer with a record of radio history behind him has visited VK2NO and had a look at things from the VK angle. He is Ralph Slade, today ZL2BK, but many years ago the pioneer Z4AG of Dunedin. Ralph is as keen a Ham as ever, and what is more he is an active one still, although business affairs keep him in harness a great deal. In Wellington these days he is 2 i/c to Leighton Lord, managing director of the Philips New Zealand interests.

* * *

In U.S.A. there is an organisation of old marine brass-pounders known as the VWOA . . . "Veteran Wireless Operator's Association." A whisper is afoot that something of the kind is brewing in Australia, and some of the now grey-headed and balding identities of the wavy gold-braid days may be seen in conference in trade offices now and then. Such an association cannot fail to attract many of those

MOBILE-MARINE

Remember that 40-metre mobile-marine VK3KO? The call-sign has now been changed to VK4AM. Station in question is operated by Thor Sanderson on the Colonial Sugar Refining Co's SS "Tambua." Thor chose this callsign for the reason it matches fairly closely to his Fijian call of VR-2AM. He expects shortly to increase his power from the mossie-power rig he has been using. VK-4AM is heard often now on 40.

NEWS FROM OUT WEST

FROM Parkes, N.S.W., Jack Francis (VK2OF) sends along details of the low-powered outfit he gets around with in fine style . . . says he: "Herewith the 'Two-Oh-Efferfone.' This has a two-stage crystal-controlled transmitter with 6V6 CO capacity coupled to a 6P6 PA. Suppressor modulation is applied through a 6C6 and a specially wound 1½ to 1 ratio transformer. With this rig link-coupled to a 40-metre half-wave Zepp, results are excellent. Power input varies between 1 and 4 watts, depending upon the power supply in use. The higher power pack consists of a 300 by 300 80 Ma transformer, 60 Ma choke, two 8 mfd. condensers, and a very tired old 80 rectifier. Result is 216 volts on the PA anode at 22 Ma. Frequently a Philips B eliminator is used as HT supply and with power not exceeding 4 watts on speech I have worked all Australian States. *With power at* 11 *to* 15 *watts CW QSO's have been had with three G's, several W's and ZS's, all on Forty.* The half-wave Zepp is 40 feet above earth and pointed east and west. Receiver is an 8-valve Bendix type covering .15 to 15 Mc/s. Average report on speech when working VK2 -3-4- and 7 is R6 with R5 best reports from VK5 and 6. Phone/CW ratio is about 70-30 and SWL reports are always answered by card if postage is included. Address is Jack Francis, 303 Clarinda Street, Parkes, N.S.W. Location pre-war was Broken Hill, where operation commenced in 1935. Service during the recent war was with the RAAF. News of local Hams is as follows.

VK2EI is still too busy milking and well-sinking to get started but has taken out his licence. Hugh Stitt, VK2WH, has done very well for himself with an ex-Army No. 11 but has just got the AC power laid on. It is expected that he will soon be heard from with an AT20. VK2UJ out at Alectown is doing whatever one does to wheat to get on with the job but the look in his eye says that it won't be long before his genemotors start up again. Over in Dubbo VK2AMR has a nice beam on 10 erected on a very well-built tower and he gets out nicely . . ."

Foregoing description of what can be done with a mere handful of watts on an unpretentious rig provides an incentive for the new amateur in particular. Lots of fun can be had with QRP provided that the antenna puts the RF where wanted and doesn't warn the local earth-worms. VK2OF can be heard quite actively on "40" and this scribe can testify to the fact that his Sig strength runs an excellent level, despite competition from AT20's and the like.

—D.B.K.

surviving pioneers of the marine radio highways. Progress will be observed with interest.

The 20 metre band is ever chock-a-block with all nations of the world, but despite the seething multiudes, 20 has the faculty of providing very good DX QSO's minus QRM at times. The "skip" is often beneficial one way or the other, but it is certainly not much use trying to get anywhere during the Eastern Australian late afternoon when W's are bunched in their phone band like a vast Wurlitzer organ gone mad, and one's most active crystal happens to be 1000 cycles *inside* that band. One of my crystals happens to be such a miscreant—pre-war it fell dead on at 14.2 Mcs.—but during the intervening years it has aged and moved on a bit. Seems that the old Indian Ink cure might be effective, or probably a small capacity across the holder. At VK2NO the most effective antenna yet to be applied at the station for this band is in use with outstanding results. It is the much-discussed "inductively-coupled-dipole;" in this case horizontal and rotary. Full details of this and variations tried successfully will be given in a future issue of "A.R.W."

How desperate for a QSL card some operators can be! Heard a station in Sydney in phone QSO with a G on 20, and the QRM at this end was so bad that the VK could get but a word or two of the G's overs. The VK sent triple (in speech) to get his QTH over to the G, and then asked the G to "just put your carrier on so that I will know that you got me OK." That's one way of doing it, but what on earth is wrong with using the good old morse key under such conditions? Too many stations are apt to forget that they have (or *should* have) the ways and means of making themselves understood by the code invented by Samuel Morse. After which remarks I quite expect some disgruntled lad to put irate pen to paper and accuse me of favouring CW against phone! In that score I claim neutrality for the reason that I use both systems; one about as much as t'other.

With winter getting under way 80 is coming into its own on this side of the Tasman Sea, and lots of 40 metre habituees can now be heard at the lower frequencies. This is a good old band well worth attention, and it doesn't need oodles of power or converted AT20's to do it, either. That staunch supporter of the band, Ray Carter, VK2HC of Quirindi, is there on Sunday nights as in days of yore. My advice to the City-Suburban Ham planning for this band is to keep to about 25 watts during broadcasting hours, and if you are a night-owl for rag-chewing, use your permitted maximum power if you wish—when all the dear little BCL's are asleep—or should be.

That Departmental ruling that no special permit is needed to go portable-mobile other than a notification from the licensee is a handy one, but there is a point that strikes me about the mobile business affecting call signs. Unless the QSO'd station imparts the information there is no knowledge that the station may be portable or mobile. Many years ago, VK's adopted an unofficial method which was most effective, but was never agreed to by the P.M.G. The station operating away from the home location just tacked an X on before the call sign—thus: XVK2NO. The idea was at once apparent. In Great Britain they do it the other way, and stick on a P after the call sign: i.e., VK2NO/P. That scheme has since been adopted by the Americans but has been a bit overdone by those worthies to the extent that territories seem to be well and truly mixed up in the call signs. The prefix system is quite clear at all times, but the business of tacking on a stroke and indicator letter as a sort of afterthought can be very misleading.

PHONE VERSUS MORSE CODE

This journal has thousands of readers, a goodly proportion of whom are transmitting amateurs. Recent tilting by the writer at breaches of good taste in 'phone operation have been misconstrued by two correspondents who claim that a personal preference for CW operation colours such references. Nothing could be more off the track . . . those who don't hear the writer's station using 'phone in the popular bands are either deaf or non-observant. No direct reference has been made to any person or callsign, the references having been in the abstract. Nevertheless, there are those who twist words to their own interpretation. Surely when people rush to protest about something they are not accused of individually, the deduction can be only that of a guilty conscience!

For the benefit of those who would like to start a prolonged controversy about "'Phone and CW," it is stated here and now that no such material will be appearing in these columns. Phone *and* CW are both a vital part of amateur radio . . . it is when the future is endangered by the misuse of the first in particular that it redounds to the discredit of the whole movement. The quicker it is realised that everything that is said into a microphone on "20" and "40" is public property, the better for all. And the quicker it is realised by some that we as radio amateurs have no actual *rights* . . . only privileges . . . again, the better. Any criticism in these columns is intended in a constructive manner . . . for the benefit of the many . . . and not in any sense for consideration of a disgruntled minority.

—D.B.K.

Shortwave Review

CONDUCTED BY
L. J. KEAST

NOTES FROM MY DIARY

THE VOICE

No! Not Frankie Sinatra . . . this time it refers to a BBC announcer. Probably few who have listened to the General Overseas Service knew that one of the voices was that of an Australian, Miss Mary Hill. In 1943 she was a news announcer in Delhi, and after some months there, she was appointed to the editorial section of the Psychological Warfare Division of SE Asia Command, where she had the great pleasure in writing leaflets for the Japs telling them the hour of doom had come! Early in 1945 she joined the staff of the BBC, but went off to Singapore for the War Office, ending up as Public Relations Officer to the Singapore Administration. When military administration came to an end in Singapore, she returned to London and resumed her announcing on the BBC's General Overseas Service.

EDITORIAL OPINION

This is a weekly feature of the BBC Pacific Service, and is heard on Saturdays at 4.45 p.m. Britain's Editors discuss questions of the day.

OBSERVATION POST

This is another weekly programme feature of the Pacific Service in which speakers talk on scientific, cultural, social and economic matters. Tuesdays at 6.15 p.m.

Note KRHO, Honolulu, is now on 15.25 m. 19.67 m from 7 p.m. in the usual V. of A. programmes.

SPECIAL DX BROADCAST FROM SWEDEN

Tentative date for special DX programme from Stockholm to N.Z. DX Club has been set for Saturday, July 5. The time is 5-6 a.m. and the frequencies to be used will be SDB-2 10.78 mc and SBO 6.065 mc.

SAYS WHO?

Miss Sanderson writes: I am finding South Americans very good at present and am hearing one opening at 9 p.m. on 11.72 mc., and take it to be Radio Sociedad Nacional de Mineria. It has quite a good signal and music and Spanish is heard. HIIZ is heard on 6.31 mc, with a musical programme, but has bad QRM. I heard it on Sunday, May 11, at 9.15 p.m. HP5J, Panama City, 9.60 mc, 31.23 m, opens at 10.15 with The Rosary and Ave Maria. HP5A, Panama City, 11.69 mc, 25.65 m relays CBS news at 10 p.m. LRM, Mendoza, 6.18 mc, 48.54 m, gives news in Spanish at 8 p.m. HOXA, Panama City, 15.10 mc, 19.86 m., good signal at 7.45 a.m. and can be heard opening at 10 p.m. FZI, Brazzaville, 17.84 mc, 16.81 m. good in afternoon around 3.30. Radio Rodina, 9.33 mc, 32.10 m. gives news in English at 3.30 a.m. OLRA, Prague, 6.01 mc, 49.92 m, news at 6.45 a.m. LRR, Rosario (Argentina) 11.88 mc, 25.25 m. opens with a good march at 9 p.m., then news in Spanish for 30 minutes followed by music typical of the country. Call sign and country given often.

* * *

A most interesting and informative air mail letter is to hand from Paul Dilg, of Monravia, California. He says: "Re that report of Miss Sanderson of Chinese station XMAG. Possibly I can give you some facts, as the report you say Ken Boord air mailed to you was probably mine. I wrote XMAG asking about the various frequencies I was hearing, as I suspicioned that they were probably parasites. A letter in a few days ago says, 'In regard to the other frequencies on which you picked up XMAG, I believe the following will clear the matter. Our shortwave transmitter is in the same building with the transmitters of the Signal Corps. Furthermore, the antennaes are close enough for our transmitting antenna to shock excite the communications antennaes. The frequencies you gave are all used by the Signal Corps in their transmission. We hope that this interference will be corrected soon.' End of quote. They operate on MW 1540, Power output 250 watts, also on SW 4275, power output 1000 watts, beamed for Shanghai. Their schedule is from 1200—2345 *Nanking Daylight Saving Time*, which is nine hours ahead of GMT. (Sydney 7 p.m.—12.45 a.m.) Their QRA is, XMAG, S.S.O. Army Advisory Group. APO 909 c/o Postmaster, San Francisco, California, U.S.A.

* * *

Under your caption "Help Wanted" the station Rex Gillet is hearing on approximately 6087 kcs is undoubtedly Radio Tabriz; they do drift in frequency. For some time I, too, was mystified by this station, as their clock chimes came on the even hour, whilst Iran is 3½ hours ahead of GMT. Kriebel, of FBIS advised me that the province of Azerbaijan was the only province in Iran that used the even hour. I wrote them last November and received a letter from them under date of January 14. Quoting from their letter, they say: 'Since the date of your letter we have added English to our list of foreign languages, same is from 14.20 to 14.30 Iran time, or 11.50 GMT. (Something screwy here: if 3½ hours ahead, should read 10.50 GMT, methinks. Not scheduled for 11.50 GMT, evidently made error in deduction.) Frim this I would surmise that since the occupation they are now using Iranian time instead of Azerbaijan time, which would check with Gillett time he heard the clock chimes.

This English period is daily except Friday, and consists of news followed by a couple of records.

They say on 49 and 25 metres . . . the latter I have never heard. They seem anxious for reports. They did not give their schedule but it was formerly from 1400—1845 GMT. Have heard they were on about 12110 kc, and also were reported on 11965 kc.

The other station of Rex's could be possibly one of the new French controlled stations in Indo China which have been testing on various frequencies. One of these stations is supposed to be Radio Dalat at Dalat, Indo China, which would be a short name Rex mentions. At present I believe this same station is on 7530 kc, but heard them sometime back on 7390 kc. Their schedule is also somewhat irregular, but have heard them open at 12.15 a.m. and close at about 13.45 GMT (10.15 — 11.45 Sydney time) French news is given at 11 p.m. Sydney time, during which they mention Indo China frequently.

There is another French station on about 9.465 mc . . . closes at 1200 GMT (10 p.m. Sydney) by playing the Marseillaise. This station also tested on frequencies from 9.520 to 9.535 mc . . . I assume this to be in Hanoi.

Here is some data I have just received re Radio Tabriz. They are now under control of the Central Government, and were organised in December.

Present schedule is 0930—1100 and 1330—1730 GMT (7.30—9 p.m. and 11.30 p.m.—3.30 a.m. Sydney time).

China XNCR, formerly Yenan, but was bombed out, is now on approximately 7.490 mc, signing off at 1200 GMT (10 p.m. Sydney). The old XGNC at Kalgan also bombed out, can be heard on approximately 6025 kc, relaying XNCR until 1200 GMT after which they use the call XGNC until signing off at 1300 . . . this station is presumed to be at Hantan, China. There is also a former Kalgan station on approximately 8660 kc, signing off at about 1430 GMT (12.30 a.m.).

(Well, that is a very fine report Mr. Dilg and I am grateful for your promptness in clearing up our queries—L.J.K.)

* * *

And here are some excellent notes fom Rex Gillett:

"I am hearing LKQ and LKJ at 6 p.m. with fair signals. This seems to be a new schedule, and have only heard it on Sundays. A means of identifying it is the use of 26 time pips sounded half a minute before the above time.

"Believe I am hearing Radio Tetuan on 6.07 mc, about 7 a.m. with recorded music and announcements in Spanish type language. Earlier wailing-type music is heard. Sked is stated to be 5 a.m. to 10 a.m. according to English advice.

"Ponta Delagad seems to open at 7 a.m. on 4.845 mc. Signals are quite fair until after 8 o'clock. This is a new frequency . . . old one was 4.04 mc.

"The English period from Omdurman is now broadcast on Fridays from 3.30—4 a.m. instead of Thursdays as previously. This one has been heard on a new frequency of 9.70 mc for the past few weeks. It is in relay with the 13.32 mc outlet. Sigs are fair on both.

"Madras reads news in English at 10.30 p.m. on 4.92 mc; Calcutta on 7.21 mc is also good with news at same time.

"Radio Batavia is currently using 10.38, 9.55 and 4.865 mc. The latter is the weakest. All three have been tuned before 10.30 p.m. and after 12. 30 a.m.

XGOUS, Nanking, on an announced frequency of 9.123 mc, was heard reading Press reports with fairly good signal. Time heard was 11 p.m.

"XMTR was the call heard at 3 times at 9.30 p.m. on about 6.03 mc.

"Kuala Lumpur has changed frequency to 6.045 mc, and has been heard opening at 8.30 p.m. Sign off on Saturdays seems to be 2.30 a.m., and it is presumed earlier on other days.

"Mr. Dean, Chief Engineer of Jaffa, advises that he soon hopes to commence a series of tests in English and Arabic on Saturdays from 5.30—7.30 a.m. Transmitters are two RCA ET-4750 7½ Kw. and two stations made 7½Kw. transmitters located at Beit Jala near Jerusalem, 2954 feet above sea level. Frequencies listed are: 11.72, 6.17,

6.135, 6.79, and 3.32 mc Current schedule is 3—4.15 p.m. and from 7 p.m. to 4.15 a.m. (except on festivals). Heard Jaffa here a few mornings ago as late as 6.30 a.m. on the first four channels with native programme. Closed 7 o'clock.

"Bangkok has been heard on two channels till closing at 12.15 a.m. The new one is 6.125 mc, which does not always become audible. The original outlet, 5.99 mc, is in relay. Another schedule concludes at 9.30 p.m."

And from Ern Suffolk, of Lobethal, South Australia, he learn:

Call signs assigned to Radio Macassar are YFA-4 for the 32 metre channel, and that on 60 metres, YFA-10. Schedule is 8.30—9.30 a.m.; 2—4 p.m. and 8 p.m. to 12.30 a.m. English is broadcast on Wednesdays and Fridays from 11—11.30 p.m.

Moscow is now being heard on 17.855 mc, 16.8 m with news bulletin at 9 p.m. and another new frequency is 21.575 mc, 13.9 m at 9.30 p.m. This, however, is all in Russian.

VERIFICATIONS

Verifications from Leipzig and VLA-7 having arrived bring my total to over 1130 from 96 countries.

Last week-end put up my new mulitple dipole antennae. It has 2 x ¼ waves for covering each of the 13, 16, 19, and 25 metre bands, and is slung broadside on Daventry (340 degrees) and that is the bearing from here and bumps up the signals considerably.—Cushen.

* * *

Latest veries to arrive here are as follows: VKC, 4.815 mc; Saigon, 6.19 mc and 11.78 mc; Omdurman, 13.32 mc; Jaffa 11.72 mc; VUB-2, 3.365 mc; Ceylon, 4.90mc; CS2WI (swell new card, blue with world map superimposed on white and large gold call letters; HCJB, 12.455 mc. Verified countries now total 77, latest additions being New Guinea, Indo-China, and Uruguay. —Gillett.

Veries are coming along very well—I now have one from Prague for 25 metre band, a letter from Radio Luxembourg and a card and letter from XPTA, Canton, for the 11.65 mc freq.; schedules from Poland, Burma and Canada reach me regularly and I find them very useful.—Miss Sanderson.

* * *

BBC PACIFIC SERVICE

Note changes of frequency, and also some retiming:

GSP, 15.31 mc, 19.60 m replaces

GVS, 21.71 mc, 13.82 m, as from 3.45—7 pm.

GSG, 17.79 mc, 16.86 m retimed 3.45—7 pm.

GSI, 15.26 mc, 19.66 m retimed 3—7 pm.

GRD, 15.45 mc, 19.42 m, retimed 4—7 pm.

GRQ, 18.025 mc, 16.64 m, retimed 3—7 pm.

BBC GENERAL OVERSEAS SERVICE

GWC, 15.07 mc, 19.91 m directed to Norwest Pacific 2—6 p.m. replaces GWG.

GWC directed to South West Pacific fom 3—6 p.m. replaces GWG.

GSO, 15.18 mc, 19.76 m, directed to N.W. Pacific 2—6 p.m.

GVT, 21.75 mc, 13.79 m, directed to N.W. Pacific retimed 5—7 p.m.

GSP, 15.31 mc, 19.60 m is now directed to North China, Japan and Northwest Pacific from 11 p.m.—1.15 a.m.

GVT, 21.75 mc, 13.79 m. is now directed to North West Pacific and from 5p.m. —9 p.m.

GSD, 11.75 mc, 25.53 m directed to South West Pacific has been retimed to 3 p.m.—3.30 p.m.

* * *

HERE ARE SOME HANDY SCHEDULES

The following schedules and notes are taken from an air-mail letter from "Universalite" received May 30.

—,Stanley, Faulkland Islands, 3.44 mc. 87.20 m: Mondays 6 a.m.—?; Tuesdays through Saturdays 6—7 a.m.

VQ7LO, Nairobi, 4.885 mc, 61.48 m: Daily 4—8 a.m.

HSPP, Bangkok, 5.99 mc, 50.08 m: Heard till 12.15 a.m. with news in English at 9.15 p.m.

OLR2A, Prague, 6.01 mc, 49.92 m: News in English at 3.45 a.m.

—, Rangoon, 6.035 mc, 49.67 m: Signs off at 1.15 a.m.

Radio Tananarive, 6.063 mc, 49.50 m: Heard signing off at 3.45 a.m.

Radio Noumea, 6.16 mc, 48.70 m: 5—7 p.m.; 7.30—8 p.m. Complete schedule.

—, Pontianak (Borneo) 6.65 mc, 44.78 m: 9.9.45. p.m.

Jungle Network, Biak (New Guinea) 7.198 mc, 41.67 m: 7—8.30 p.m.

Radio Club, Macau, 9.23 mc, 32.48 m: 7.30 p.m.—1.30 a.m. with news in English at 10.50 p.m.

PLV, —, (Java) 9.415 mc, 31.87 m: Daily in English for N. America from 12.30 a.m.—1 a.m.; news at 12.45 a.m.

STOP PRESS

A communication from Edward P. Tilton (W1HDQ), VHF Editor of "QST", says that a report is to hand there that Canadian VE7AEZ heard VK2NO on the 50 Mcs. band at 10.20 p.m. Pacific Standard Time on May 8 last. Frequency is given as 50.1 Mcs. and mode of transmission CW. Reference to the log at VK2NO shows that the station was calling "CQ DX SIX" on C.W. at 2000 hours E.A.T. on May 7, 1947. Frequency used continuously at VK2NO is 50.4 Mcs. No claim for confirmation is made until "QST" has been able to secure fully correct particulars from the Canadian. The discrepancy in quoted time with the transmission from VK2NO is very wide, although the difference of 50.1 and 50.4 Mcs. is understandable with receivers of home construction and calibration.

NEW STATIONS

—, Moscow, 21.575mc, 13.9m: Ern Suffolk of Lobethal, South Australia, advises hearing Moscow on this new frequency at 9.30 p.m., but signal is very poor; the programme is all in Russian.

—, Moscow, 17.885 mc, 16.8 m; And Mr. Suffolk found this one giving a news bulletin in English at 9 p.m. Signal on this one is also poor.

—, Ponta Delgada (Azores) 4.845 mc, 61.91 m: Rex Gillet has logged this new frequency and says they seem to open at 7 a.m. and sigs. are quite good till after 8 o'clock. (This station was previously on 4.044 mc and call sign was CSX-2—L.J.K.)

—, Omdurman 9.70 mc, 30.93 m: This Anglo-Egyptian Sudan station on a new frequency was reported by Rex Gillett. He logged them in when they were giving a news session in English on Friday from 3.30-4 a.m. Previously this was on Thursdays. It is in relay with their usual frequency of 13.32 mc.

Radio Kuala Lumpur, Selangor (Malaya) 6.045 mc, 49.63 m: A new frequency and heard at 11 p.m. Signs off on Saturdays at 2.30 a.m. Previously this station was heard on 6.17 mc.

Radio Internacional, Tangiers, 6.195 mc, 48.39 m: This one is reported by Lee Neidow Jr., Chicago, as heard from 4-730 a.m. I note Ray Simpson has logged the station when speaking in English at 6 a.m. At 6.15 a session in French continues till 6.45 when Spanish is the language employed.

—, Pontianak (Borne) 6.65 mc, 44.78 m: Lee Neidow Jr., also reports this one and gives schedule as 9-9.45 p.m.

—, Bangkok, 6.125 mc, 48.98 m: Here is a new frequency for Siamese station but signal is not always audible, but appears to close at 12.15 a.m. The original outlet, 5.99 mc, is in relay. This report also comes from Rex Gillett.

Speedy Query Service

C. G. (Bentleigh, V.) is having trouble to buy a copy each month.

A—Owing to the shortage of paper we are unable to print enough copies to put dozens of them on the counters of the 4,000 newsagents throughout Australia and New Zealand. However, we do print enough for all subscribers and those who place a standing order with a newsagent.

B.C.G. (Collaroy) asks about the DX Club.

A.—Many hundreds of letters were received from those who want the Club re-started, but so far we have not been able to get around to carrying out the necessary re-organisation. Sooner or later, as the song runs, everything should be O.K.

R.L. Kingsford) can't understand why push-button tuning is not more popular, and wants us to run more sets of this type.

A.—Sorry, but push-button tuning seems to be on the way out, and who are we to try and keep it alive? Don't know whether it was the service worries which killed it or whether the public just didn't appreciate it, but push-button tuning is so unpopular that you would have some trouble in finding any manufacturer in the least interested.

S.L.B. (Adelaide) has heard good reports about an English pick-up called the "Connoisseur."

A.—Yes, we have also heard good reports on this pick-up. It is not in the same price group or style as the "Lexington," having a voltage output of about half a volt as against the millivolt of the Lexington. This would indicate that it is unlikely to have good characteristics, but will be much cheaper and easier to instal, as high-gain pre-amplifiers will not be required with it. We hear that samples of the "Connoisseur" are on their way to Australia.

T.H. (Beaufort) enquires about back numbers.

A.—We have practically nothing in stock of the issues before December, 1945, but we have plenty of all issues since then except the March, 1946, stock of which is now down to about five or six copies. Back numbers are 1/- each, post free.

S.R.M. (Sale) queries the mutual conductance figures given for various American and British valves, having carried out experiments which convince him that the higher gain types do not really have such high gain.

A.—Yes, there is some difference in the way in which American and British manufacturers rate their mutual conductance, the American figures being known as "dynamic mutual conductance," whereas others are "static mutual conductance" and about 25 per cent. higher.

BACK NUMBERS

Back numbers of all 1946 and 1947 issues, *except March*, 1946, are available at 1/- each, post free from Australasian Radio World, Mornington, Victoria, or direct from the Technical Book and Magazine Co., 297 Swanston Street, Melbourne.

BARGAIN CORNER

Advertisements for insertion in this column are accepted free of charge from readers who are direct subscribers or who have a regular order placed with a newsagent. Only one advertisement per issue is allowed to any subscriber. Maximum 16 words. When sending in your advertisement be sure to mention the name of the agent with whom you have your order placed, or your receipt number if you are a direct subscriber

FOR SALE.—Long-range two-valver 1P5, 1D8), complete, Rola speaker, cream mantel cabinet, no batteries. £6. Freight free. Apply to "M.S." care Radio World, Mornington, Vic.

FOR SALE.—English "AVO" valve tester, latest model, mutual conductance type, as new. £21. Apply "1852" care Radio World, Mornington, Vic.

FOR SALE.—Cathode ray tube 902, with 884 gas triode. Both brand new. £4/10/- the pair. Apply "Crow," care Radio World, Mornington, Vic.

FOR SALE.—Cossor double-beam oscil'oscope. Only a few months old and in new condition. £68. Apply "No. 1" care Radio World, Mornington, Vic.

WHAT OFFER?—For two 809 type transmitting triodes, brand new. Reply to "Ham 1" care Radio World, Mornington, Vic.

SPEAKER—Rola K8, 2,000 ohm field, 7,000 ohm input, good order. 30/-. Apply "K8" care Radio World, Mornington, Vic.

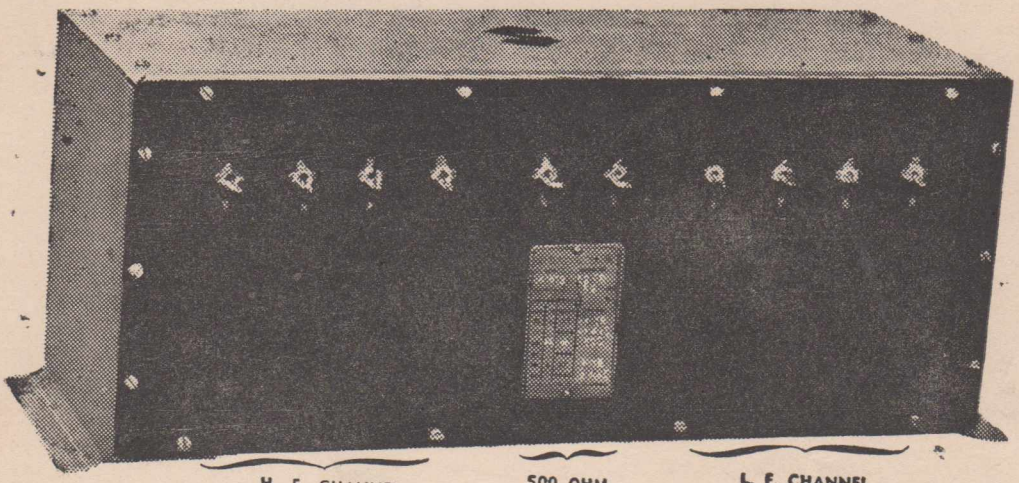
FOR SALE.—1946 edition of the A.R.R.L. Radio Amateur's Handbook. 5/-, plus postage. Apply "A.R." care Radio World, Mornington, Vic.

FOR SALE.—6 volt 3 amp (20 watt) Generator at 100 revs. per minute. New. £2. Apply. "Gen," care Radio World, Mornington, Vic.

RED LINE

EQUIPMENT

FREQUENCY DIVIDING NETWORKS



GENERAL

Type D482 is specifically designed for High Fidelity radio gramophones and small talking picture sound installations. The unit consists of a shunt type cross-over network using high "Q" inductances and is intended for insertion in a 500-ohm line. Loud-speaker input transformers are incorporated in the unit, the voice coil winding being brought out for each channel to 4 terminals for connection either in series, for conventional operation, or in parallel for use with loading resistances for medium and high power circuits with wide range characteristics such as the "Full Frequency Range Amplifier."* This latter method will present what is virtually a constant load to the output tubes with an exremely high damping factor and lead to a marked improvement in transient response.

SPECIFICATIONS

OPERATING LEVEL: Plus 39 db max. INSERTION LOSS: Approximately .5 db. CROSS-OVER FREQUENCY: 500 cps. ATTENUATION: Low frequency channel—20 db at 1200 cps. High frequency channel—20 db at 150 cps. INPUT IMPEDANCE: 500 ohms. OUTPUT IMPEDENCES: Low frequency channel—8 ohms for 1 "Rola" Type G12. High frequency channel—2 ohms for 1 "Rola" Type 8M (if parallel connected, output impedences will be 2 ohms and .5 ohms and require to be shunted with resistences of 2.67 ohms and .66 ohms respectively). FREQUENCY RESPONSE (Both channels): Within 1 db from 30 cps to 12,000 cps.

Weight: 18 lbs. **Size: 13 x 5½ x 5.**

LIST PRICE: £10/10/-.

*** Reprints of the article describing design and construction of this amplifier are available in pamphlet form from:**

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