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FEBRUARY 15, 1947

THE AUSTRALASIAN
RADIO WORLD

Devoted entirely to Technical Radio

and incorporating

ALL-WAVE ALL-WORLD DX NEWS

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EDITORIAL

Journalism is one of the surest ways to fame and fortune. During the past twenty years I have had the pleasure of seeing many people succeed in life directly or indirectly on account of their literary efforts.

There was Dr. Barry, who did music criticism for the old "Wireless Weekly." The last I heard of him he was Director of Programmes for the A.B.C.

Then I remember Bob McCall, who signed himself as "Discobolus at the foot of a page of record criticisms in the old "Weekly." In almost no time he was in charge of recorded music at the A.B.C., then Manager for Victoria and away to England for further promotion.

The Discobolus page was taken over by Greg Spencer, and sure enough he too climbed the ladder of fame until his untimely death recently.

Lahm did comic drawings for me long before he became famous for Snifter in "Man."

Wep did the Humperdink series as one of his stepping stones to fame. You know him now if you read the "Women's Weekly." I could go on indefinitely with the names of dozens I knew when they were keen to succeed. They had the ability; they showed it in black and white; it was recognised; now they are on top.

Yet how difficult it is to get anyone to try their hand at writing a technical article. In last month's issue I called for applications for the position of editorial representative in Sydney. Hundreds of replies were received; most of them mentioning how much they would like to take up journalism, yet apparently not one of them had ever submitted anything for publication, let alone get it published. Wouldn't it?

—A. G. HULL.

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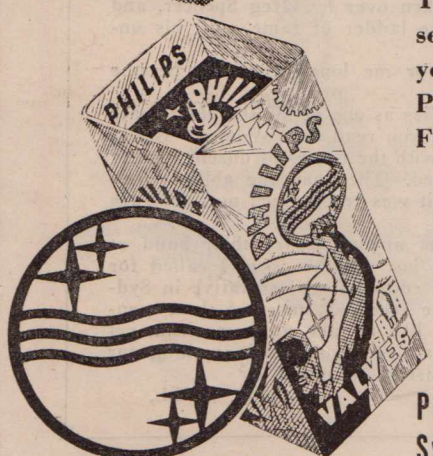

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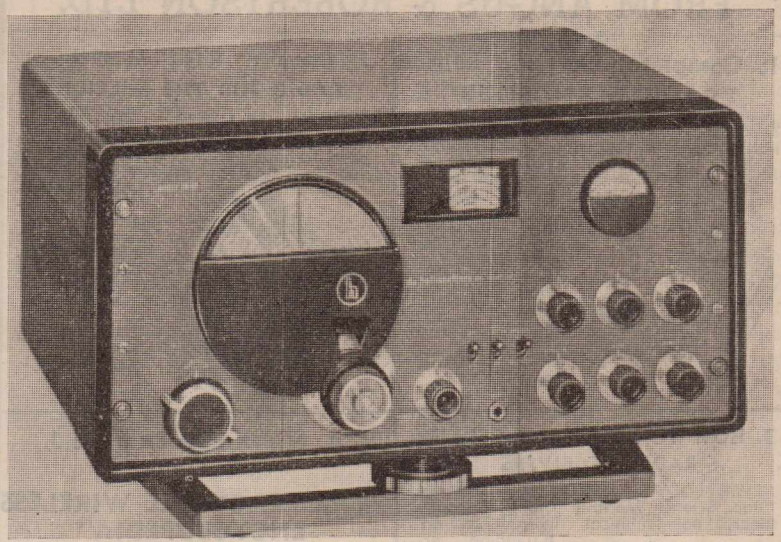
V.2.

TRENDS OF DESIGN

IN the latest issue of "Q.S.T." from America there is an announcement of the latest in communications receivers, the Hallicrafters Model SX42.

From the advertising associated with the release of this new receiver it is possible to glean some idea of the technical details, and these appear to represent a foundation on which Australian set manufacturers might start to think when they do get around to thinking about marketing receivers of this type.

As most of our readers are aware, we have been plugging away for years trying to convince local set manufacturers that they should make available a receiver of the communications type, assuring them that there are thousands of enthusiasts in Australia who would appreciate such a receiver if it were up to standard, even if the price had to be in keeping with the amount of costly development work necessary to get a set of this type into steady production. But, so far, we have not been able to get anyone sufficiently interested to undertake the task.



Here is a photograph of a 1947 model American set of the communications type. Why can't we buy sets like this in Australia? That is the question our readers keep repeating.

Some Coverage

The first important claim for the new Hallicrafter is the band cover-

By

A. G. HULL

age, which is continuous from 540 kcs. to 110 megacycles, covering the ordinary broadcast band and then every wave-length down to less than 3 metres.

In addition, the set will tune frequency-modulated signals from 27 to 110 megacycles.

Coverage of the wide range of frequencies is accomplished by switching through six wave-bands.

The first band is the broadcast band, including the extensions which may be used at some time, right from 540 to 1620 kcs. Band 2 covers from the broadcast band right down to 5 megacycles (60 metres). Band 3 runs from 5 megs. (60 metres) to 15 megs (20 metres). Band 4 covers from 15 to 30 mcs. (20 to 10 metres). Band 5 runs from 27 to 55 megacycles, whilst the last band covers from 55 to 110 mcs.

The wide band coverage is made possible by the use of novel intermediate transformers which have double windings, and when the wave-band switch is moved from band 4 to band 5 it automatically switches the intermediate frequency from 445 kcs. to 10.7 mcs.

For the ham bands there is electrical bandspread, with a separately calibrated bandspread dial for the 3.5, 7, 14, 28 and 50 mcs. bands. A four-position switch selects the mode of operation, viz., amplitude modulation, frequency modulation, phono amplification or c.w. reception. When on the c.w position the pitch of the B.F.O. is controllable from a panel knob.

Valve Arrangements

There are fifteen valves in all, with two r.f stages using types 6AG5. Separate gain control is provided for these r.f. amplifiers. The converter is a type 7F8, followed by two stages of i.f., then a combined detector and noise limiter, two F.M. limiters and an F.M. discriminator, audio phase inverter, a pair of 6V6 outputs, a 7A4 beat frequency oscillator, VR150 voltage regulator and a 5U4 rectifier.

The use of the dual-triode 7F8 as oscillator and converter is interesting. Byron Goodman of QST recently suggested the use of the 6SN7GT as combined detector and oscillator for a ten-metre converter. We have been experimenting with this set-up and from our own observations it appeared to be most effective. We were just wondering what the drawbacks must be to account for it not being used more widely. Now it seems that possibly the reason is simply that few

(Continued on next page)

TRENDS

(Continued from page 5)

set manufacturers have progressed that far.

Selectivity Control

A crystal filter operates on all bands between 540 kcs. and 30 mcs., with a crystal phasing control and a six-point selectivity switch.

Is It a Forerunner?

This seems to be the first release of a really new post-war set design in America and possibly it is only the forerunner of even better sets to come. We cannot imagine that the many other prominent manufacturers of communications-type sets will let the Hallicrafter people stand alone in offering such a comprehensive specification.

The Price

In case you are interested we may mention that the price is 250 dollars, but of course it is no use rushing to draw your money out of the bank for the import licence restrictions, prohibitive customs tariff and the dollar exchange position make it virtually impossible for anyone in Australia to think of ever owning a set of this type, unless local manufacturers will take the hint and turn out something similar. It is not by any means beyond the technical ability of Australian engineers, but merely beyond the scope of vision of Australian radio executives.

* * *

RADIO IN EVERY ROOM

Grosvenor House Hotel in London has a radio service laid on in every bedroom—first important new amenity to be provided by the hotel since the war. The hotel thus becomes the first in England to provide fitted radio in every room for the convenience of its guests.

HOW NOT TO REPORT RECEPTION

MANY years before the war the League launched the RST system of signal reporting. It is now the world-wide data on the quality of the signals and the goodness of the contact. In this system a report of three digits is given in telegraph work,

By K. B. WARNER

This article recently appeared in "QST." It seems that it might well stand re-printing, especially as it specifically refers to lack of knowledge of the subject on the part of an Australian "ham."

of two in telephone work. For either c.w. or 'phone, the first digit is the readability (R) on a scale of 1 to 5, with precisely the same meanings as the QRK1-to-QRK5 scale of the International Radio Regulations; and the second digit is the signal strength (S) with the same 1-to-9 strength scale that we have used so many years. This is all there is for voice work but for c.w. there is a third digit to indicate the tone (T) on a 1-to-9 scale. Thus a c.w. report of "RST488 (or just "488") means readable with practically no difficulty, strong signals, good d.c. note with just a trace of ripple. And so on for the whole range of possibilities.

This scheme has been publicised in amateur literature everywhere. In c.w. work it is well-nigh universal and it seems to be applied with reasonable uniformity and "honesty." But in 'phone operation there are so many confusing variations, misunderstandings and abuses that we think the subject deserves some examination. Mind if we number a few points to keep them separated?:

(1) If you feel that you like to use c.w. abbreviations in 'phone work, the report of signal strength should be given as an S number, not an R number. In the amateur world, R is for readability—for these many years back. Your receiver has an S-meter, not an R-meter. An extremely strong signal is S9, not R9. Too many of you oldtimers have elephant memories that go back to the old Eccles R scale of years ago. The newcomers hear you and follow you, so that we have a whole crop of R strength reports that cause distressing conflict with the thesis of R-for-readability. *Please say S.*

(2) But we'd like to say that, for our money, it is not pleasant to hear purely c.w. abbreviations used in 'phone operation. With the most flexible means of communication in the world at our disposal, the human voice, we believe in "saying it with words." Let us illustrate with an example. To our mind it is much more logical to say, "Readability 4, strength 9" than it is to pronounce the abbreviations "QRK4, S9" (and an awful lot better than saying "Q4 and R9"!). Or, if you care to go all out for saying it with words, why not just tell your correspondent station that his signals are extremely strong and readable with practically no difficulty?

(3) The report of readability, to mean anything, must be carefully arrived at by an actual comparison of the goodness of reception with the scale on which the other fellow relies for information. And flattery must be left out of it, both because the man at the other end seeks data of technical value to him and because he will gauge his transmitting to what you say of your reception. The scale seems to deserve repeating and new emphasis:

1—Unreadable
2—Barely readable, occasional words distinguishable
3—Readable with considerable difficulty
4—Readable with practically no difficulty.
5—Perfectly readable.

You can see that you ought either to know the scale by heart or have a copy constantly before you. You must actually consider the received signal and grade it. The other morning an Australian 'phone station in the course of one sentence raised us to a magnificent glow and then threw the reversing switch. What he said, in effect, was, "You have a grand signal, Q5 and R9, but I can't understand a word you say because of bad interference." Well, maybe we were S?. But we were certainly not Readability 5. We were Readability 1—which is to say, unreadable. It was obvious that this lad didn't understand the readability scale at all. It is perfectly possible to have a 1-9 signal in interference, just as the converse 5-2 signal may exist under favourable conditions. We don't think he just reached for a number he thought we'd like. We think he somehow though the "Q" part of his report also had something to do with strength. He wouldn't have said perfectly-readable-but-I-can't-read-anything if he had stopped to think what his abbreviations meant. He couldn't have said it if he'd "said it with words." Let's remember what those scales mean!

We plead for a little more knowledge of the scales, a little more care and understanding in their application, a little more uniformity in their rendering.

F.M. GOES AHEAD IN U.S.

According to our Washington, D.C., contemporary, *Broadcasting*, the number of constructional permits for F.M. stations granted by the F.C.C. totalled 102 at the middle of July. It is also stated that the number of applicants to whom formal permission has been granted to operate F.M. stations, although they have not yet received permission to erect stations, totals 349. In addition, some 380 applications are pending.

MAKING DIAL SCALES

Hints For Obtaining An Engraving Effect

Some time ago I conceived the idea for a meter dial of painting the numbers in reverse on a piece of celluloid and then flooding the back with a contrasting colour of paint, so that the view from the front would be of a calibrated scale on a shiny flat background. Later on I extended the idea to nameplates because of the neat appearance and great durability—paint all being behind the celluloid. Any yellowness which will occur with time must be only on the outer face and is readily removed with metal polish.

Now while the whole idea sounds simple enough, a number of snags soon made themselves apparent if anything approaching professional standards was to be obtained. The first essential was found to be to wash the celluloid in carbon tet. on the side to be painted, and *not* to touch it with the fingers afterwards. The next difficulty came in writing the figures, and for this I've found by far the best answer is a mapping pen, and *thin* paint diluted in petrol as you go, i.e., mix the paint and the petrol with the pen at each letter or two. Any errors can be easily removed with a piece of cotton wool on a stick, and with care quite professional results may be obtained. When the background is ready to be put in, and when the figures are dried hard, this should be done by pouring a pool of *thin* paint towards one side and persuading it over the whole area by tilting only. Then leave it dead flat to dry.

Larger Areas

When dealing with surfaces over about 8 sq. in., i.e., tuning dials, calibration charts and the like, the flooding operation tends to be a little more complicated if a perfectly uniform background is required, and here a very soft brush is to be recommended to "push" the pant along until it covers the whole area, and then the celluloid must be steeply tilted in alternate directions several times to ensure perfectly even and comparatively thin distribution. The paint which runs on to fingers and top side of the celluloid is easily removed later, but under *no* circumstances *brush* the paint on, for brush marks will never completely disappear.

A quite pleasant mottled effect can be got by using four or five smaller pools of rather thicker paint and running one into the other, the paint thickness and pool size being found by experiment.

Calibrating the Dial

My first method of calibrating the celluloid was to place it in position and mark it appropriately in ink. Then just turn over and paint in reverse. But as the ink wouldn't come completely off, and that even if and when it did it still left a scratched outline, I can hardly recommend such a method. A far more satisfactory practice is to make a paper template, calibrate, and then hold it against the window to draw in its reverse. Then place template, reverse side uppermost, on a table and put the celluloid on top and paint in the calibrations.

Etching in of markings is definitely deprecated unless full tools and skill of trade are to hand, although dots put in with the tip of a drill are very effective, but ensure on a piece of scrap that the tip is at the right angle for the job before operating on the main piece. First impressions can be very confusing here.

A further point to remember is that in cutting celluloid a deep score on either side with a scriber for straight lines, or a pair of dividers for circles, is quite sufficient to permit a fracture or tear along that line.

—Practical Wireless (Eng.)

HIGH-FIDELITY PICK-UPS FROM ENGLAND

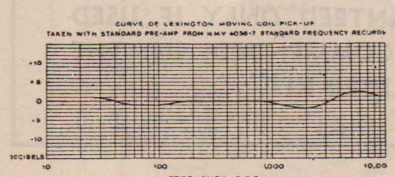
Details Of A Model To Be Available Here Shortly

AUSTRALIAN importers are promising early delivery of a moving-coil pick-up which is proving popular with gramophone enthusiasts in England.

To ensure faithful translation of the lateral deviations of a record groove into rotary motion in a moving-coil pick-up it is essential amongst other things that the movement should have only one principal degree of freedom. This is achieved in the "Lexington" pick-up by mounting the moving coil between end bearings with "watchmaking" clearances. Damping is applied by a rubber pad at the needle holder, which plays no part in the suspension of the coil.

The moving coil is housed in a light plastic tube which has just enough resilience to allow the small vertical movement required by "pinch effect." Deflection of the centre of the coil in this manner is limited by a ring of increased diameter formed round the centre of the tube; this acts as a stop if the pick-up is accidentally dropped on the record.

Special sapphire needles are used with this pick-up. They have morse-tapered shanks fitting a tapered hole in a metal insert in the moving-coil unit; no set screw is required. A shoulder is provided on the needle and a special mechanism is incorporated in the tone-arm rest for removing and inserting needles; both operations are easy, as separate locators are provided.

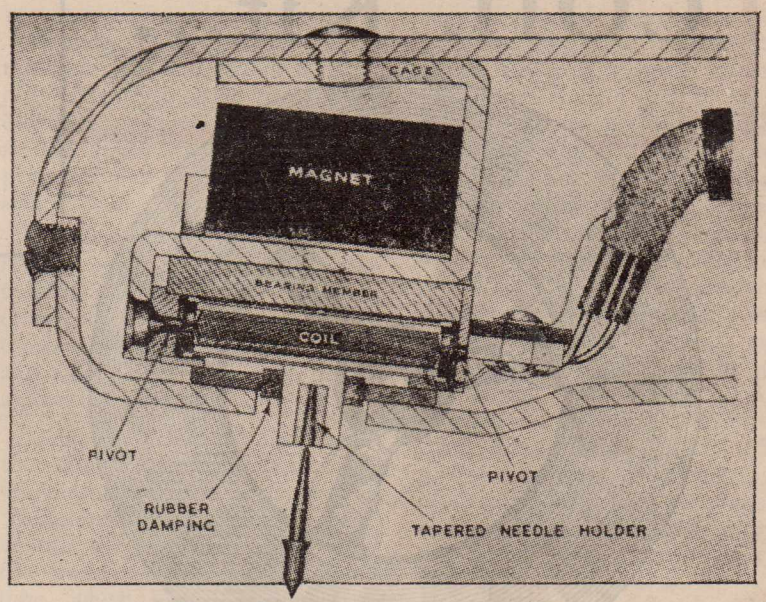


Frequency response of the Lexington pick-up, as claimed by the makers.

The tone arm itself is light but rigid and is of pressed and welded aluminium construction. The pivot bearings are well made and consist of single ball joints which give full freedom without any trace of slackness. Needle pressure is controlled by a long leaf spring inside the arm, and a light coil spring is arranged to give the tone arm a lateral bias towards the centre of the record. This is stated to result in a reduction of surface noise. The weight at the needle point is of the order of ½-oz.

The average output is about 1mV and the frequency response is stated to be flat from 30 c/s to 12 kcs. A coupling transformer giving an output of 50 mV is available and also a heavy gauge Mumetal screening box. External bass compensation is necessary and a twin triode pre-amplifier incorporating the necessary tone correction circuits is obtainable from the makers, the Cooper Manufacturing Co., 134, Wardour Street, London, W.1. The price of the "Lexington" pick-up is £5 plus £1 5s. purchase tax. The output transformer costs 16s. and the Mumetal screening box 14s. 2d. Sapphire needles with 0.0015-inch tip radius are available at 15s. 3d. each.

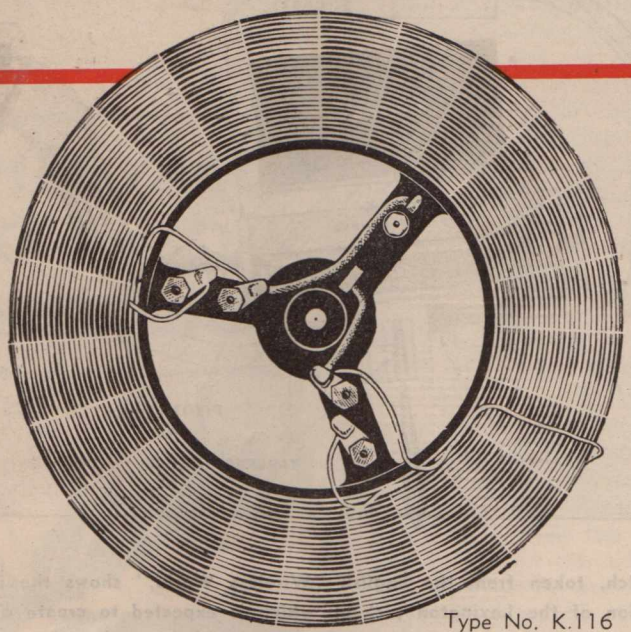
The above English prices are mentioned only as a rough guide. Owing to exchange, landing charges and so on, it is expected that the Australian price will be about £15. A sample of the Lexington has already been received by Mr. L. A. Davies of F.F.R. fame, and his impressions on it should be ready for publication in an early issue.



This sketch, taken from the English "Wireless World," shows the internal construction of the Lexington pick-up which is expected to create a furore in the near future when it is released on the Australian market.

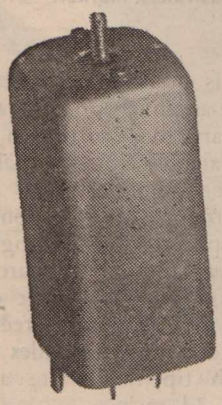
LOOP Aerial Portable COIL Kit...

42/-

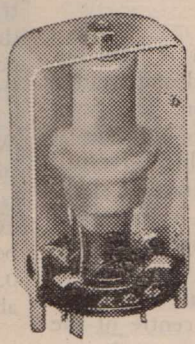


Type No. K.116

● This Special R.C.S. "LOOP AERIAL KIT" has been carefully engineered to give high performance with excellent stability, each component being designed to work efficiently in the complete kit, ensuring the elimination of alignment and tracking problems. This kit is prematched and tracked as a unit at the factory, on precision "Q" meters.



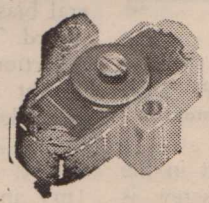
PERMATUNE INTERMEDIATES
I.F. 162—PERMEABILITY tuned
I.F. 163—460 K.C.



OSCILLATOR COIL
TYPE E3.44

KIT comprises—

1—loop aerial coil, 2—permatune intermediates, 1—oscillator coil, 1—padder and all are GUARANTEED ONLY IF USED AS RECOMMENDED IN THE COMPLETED KIT.



PADDER
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SIMPLE SUPER FROM THE PAST

An Interesting Impression Of A 1935 Model

HOW often it is that many a good radio receiver is designed and the details published in radio journals, and how very often it is that owing to the large number of parts needed and the cost of them that it is beyond the financial resources of many radio enthusiasts to construct them.

By

LANCE S. HARRISON

YENGARIE, Q.

It is without doubt that "Australasian Radio World" has many readers who have stuck by it since its infancy, but it is unlikely that many will remember the copy of "Wireless Weekly" dated October 18, 1935, 11 years ago in which Mr. A. G. Hull, then Technical Editor of the same journal, outlined the principles of a simple superheterodyne radio receiver.

Recently I came across one of these old jobs and rebuilt it to the original design, using the original old style air cored coils and Intermediate transformers, the only new parts being an odd paper condenser and resistor.

In my opinion, judging by the results obtained, and the small number of parts required for its construction it is ideal for the enthusiast who has limited finance and who, at the same time, desires a good broadcast receiver.

Diagram 1 shows the circuit used and differs very little from the one outlined by Mr. A. G. Hull in "Wireless Weekly" back in 1935; another diagram shows an alternative method of biassing the power tube, which may be adopted by those who wish to do so.

This set was fitted into a console cabinet and is now giving very good service in a private home; it is not necessary, however, that constructors should go to the expense of a cabinet unless they so desire.

As can be seen by Diagram 1 the converter, or first detector, is of the autodyne type. The mere mention of an autodyne converter to some folk brings forth a gasp of horror. It is not so in this case, although somewhat unusual this arrangement is one of the most sensitive and reliable I have seen; it is easily wired into the circuit and gives no trouble when the set is being lined up. When the padding condenser is being mounted, see that it is at least a quarter of an inch away from the metal chassis, as the padder as can be seen by the circuit diagram is in the way of high tension. Apart from this no other special precautions are necessary. Modern autodyne coils are available and should be very satisfactory in this set. Alignment should be carried out in the usual way.

The intermediate frequency employed in this set is 460 kilocycles, however, 175 kilocycles could have been used and better performance gained if the cost and alignment problems are not im-

(Continued on page 12)

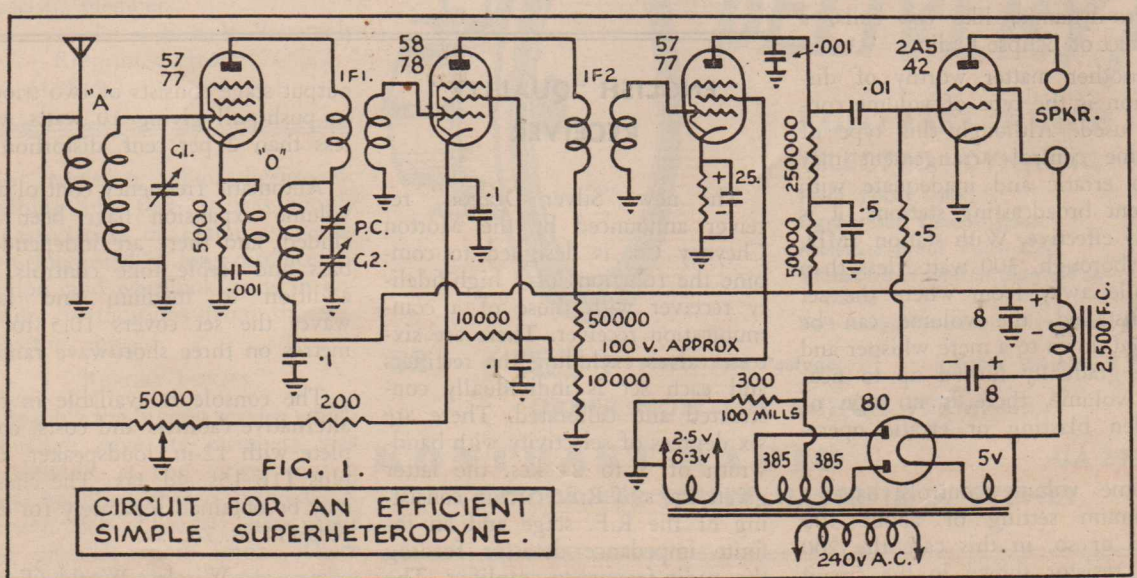


FIG. 1.

CIRCUIT FOR AN EFFICIENT SIMPLE SUPERHETERODYNE.

SIMPLE SUPER

(Continued)

portant. However, for ease of construction, adjustment and low cost 460 kcs. Intermediates are used. With 175 kcs intermediates a preselector must be used in order to get rid of second spot tuning, not only this, it requires a 3 gang tuning condenser.

The 2.5 volt heater type valves were used in the set, but their 6.3 volt equivalent can be used should they be available. In this case the power transformer used should have a 6.3 volt winding instead of 2.5 volts.

The output valve in this set is a pentode of the 2A5 variety. To some this may seem objectionable, on paper! As can be seen by the circuit diagram, back bias is used on the output valve. This method is far better than cathode bias as shown in Diagram 2 and gives greater power output and much better tonal quality. Cathode bias is shown for those who wish to use it, although back bias was used and is recommended.

Although employing a pentode the output of this set is almost perfect to listen to. No matter what audio amplifier is used the ear is always the final judge, no matter what fancy apparatus is used to detect distortion. The speaker used on the set is a "Saxon" 12-inch electro-dynamic, like the coils, a product of Eclipse Radio.

Another matter worthy of discussion is the type of volume control used. Although this type of volume control arrangement may seem erratic and inadequate with present broadcasting stations, it is really effective. With station 4MD, Maryborough, 300 watts, less than a mile away from where the set is installed, the volume can be turned down to a mere whisper and then gradually turned up to near full volume, there is no sign of sudden blasting or erratic operation.

Some volume controls have a minimum setting of about 300 ohms or so, in this case the 200 ohm resistor shown in the circuit in series with the volume control may be omitted, the minimum resistance of the volume control being sufficient to provide minimum bias to the intermediate frequency valve. When building this set pay attention to this, because if the extra resistance is included in the circuit the full sensitivity of the set may never be realised.

The voltage divider arrangement in the I.F. circuit, consisting of a 50,000 ohm and a 10,000 ohm resistor, may be replaced by two 25,000 ohm resistors or a voltage divider of 15,000 ohms connected in the same manner. If a 15,000 ohm voltage divider is used there will be a greater drain on the power supply owing to the larger current drain through the lower resistance of the voltage divider. The power transformer used is an 80 mill. Radiokes job providing 385 volts either side of centre tap, 5 volts for the rectifier, and 2.5 volts for the valve heaters or 6.3 volts if the valves are of the 6.3 types. One side of the valve heater winding should be earthed. A good old 80 valve was used as rectifier; however, its octal based equivalents, 5Y3G, may be used instead if it is on hand. The 300 ohm back bias resistor should have a current rating of at least 100 mills, as the total current drain of the set must flow through it. With present type electrolytics the back bias system offers no difficulties.

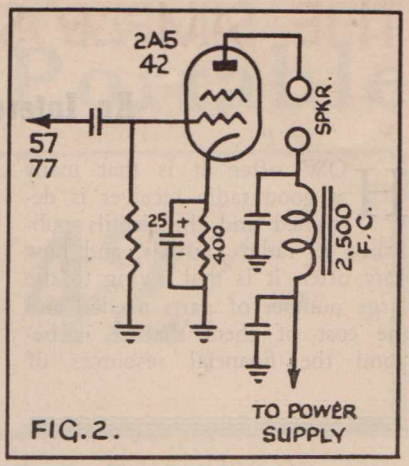


FIG. 2.

The original 0-100 type dial was retained, due to its smooth operation and that the cabinet was already cut to suit. The constructor can use any dial to suit himself, his requirements and the gang used.

As already stated, old-type coils were used throughout this set and as far as performance and tonal quality goes it is more than satisfactory and should modern coils be used the results will be better still. With a 50ft. aerial 10ft. high, and a waterpipe earth, this set is providing all the entertainment required of it in a private home, so intending constructors should have little fear in investing in the few necessary parts to build it.

ENGLISH "QUALITY" RECEIVER

The new "Silver Dragon" receiver announced by the Morton Cheyney Co. is designed to combine the functions of a high-fidelity receiver with those of a communication receiver. There are sixteen valves excluding the rectifiers and each set is individually constructed and calibrated. There are six degrees of selectivity with bandwidth of 5 to 24 kcs. the latter given by a T.R.F. circuit consisting of the R.F. stage and an infinite impedance detector feeding the audio-frequency amplifier. The output stage consists of two triodes in push-pull giving 10 watts with less than 2 per cent. distortion.

Automatic frequency control and volume expansion have been included, and there are independent bass and treble tone controls. In addition to medium and long waves the set covers 10.5 to 80 metres on three short-wave ranges.

The console is available in two alternative cabinets and costs, complete with 12-in. loudspeaker, £78 plus £16 15s. 4d. tax. The chassis may be obtained separately for £52 plus £11 3s. 7d. tax.

—Wireless World (Eng.)

THE ALL-WAVE ALL WORLD DX CLUB

When "Australasian Radio World" was first launched by Earl Read nearly eleven years ago, one of its strongest features was the All-Wave All-World DX Club. This was not a Club in the same way as the Civic Club, the Millions Club, the Commercial Travellers' Association, or anything like that. The DX Club could not boast of club rooms, a liquor licence or anything like that. It was simply an association of enthusiasts who were interested in long-distance reception, and who took pride in obtaining verifications from the stations they logged.

WANTS LISTENER CO-OPERATION

Kannimangalam, Nemmara.
Cochin State, Madras, India.
Editor,

I have applied for patent rights for a new "short-wave generator" in the United Kingdom No. 10662/44, and in the U.S.A. Serial No. 595,211.

Present systems of broadcasting are either amplitude-modulated or frequency-modulated. I have yet another method which eliminates the defects of both the systems and retains the good points . . . It will be interesting to test the system over long distances and your country is the farthest from India (either way). For this purpose, I shall be obliged if you can put me in touch with a few of your enthusiastic members.

—E. S. V. Pattamaly

—Rreprinted from "Q.S.T." (U.S.A.).

Report Forms

Possibly the biggest service which the Club gave its members was to provide, at cost price, plus a small handling charge, printed stationery, such as headed letter paper and printed report forms. These report forms were not only quicker and easier to fill in than writing a letter, but were more effective in obtaining the desired verification since they had an official appearance, gave the station a worthwhile report on its signal and made it pretty obvious that the reporter was worth consideration as a member of an organisation.

The life membership fee was 3s. 6d., which covered the cost of providing each member with a club badge to wear in his lapel, and a brightly-printed membership certificate to hang in the radio shack or over the radio receiver.

The All-Wave All-World DX Club was a great success and many hundreds joined up and availed themselves of the services provided.

Then came the war, with restrictions on the use of paper, on printing and on the production of badges.

The activities of the Club came to a standstill.

Now the war is over and in every mail come enquiries from enthusiasts who want to see the old Club back into swing. A review of the position seems to indicate that the biggest problem is the secretarial work involved, but the manpower position is gradually easing so it may be possible to have a member of the "Radio World" staff to handle this, as was done in pre-war days.

The main point at the moment is—are there enough readers interested to make it worth while to have a batch of a few hundred badges run through production and a few thousand report forms printed? It is on this point that we would like readers to express their opinions, and we will then act accordingly.

Unbelievably **TRUE SOUND** *Reproduction!*

CARBON RESISTORS—I.R.C.

CODE

R1	250,000 ohms	½ Watt.
R2	5,000 ohms	1 Watt.
R3	25,000 ohms	1 Watt.
R4	25,000 ohms	1 Watt.
R5	25,000 ohms	1 Watt.
R6	30,000 ohms	1 Watt.
R7	250,000 ohms	½ Watt.
R8	250,000 ohms	½ Watt.
R9	600 ohms	1 Watt.

Wire Wound Resistors—"Mega"

R10	25 ohm 50 ohms Centre-tapped 5 Watt.
R11	25 ohms 50 ohms Centre-tapped 5 Watt.
R12	100 ohms 5 Watt.
R13	100 ohms 5 Watt.
R14	10,000 ohms 8 Watt.
R15	1,000 ohms 5 Watt with variable tap.
R16	50 ohms 5 Watt, Centre-tapped.
R17	20,000 ohms (2 x 10,000 ohms 5 Watt in Series).

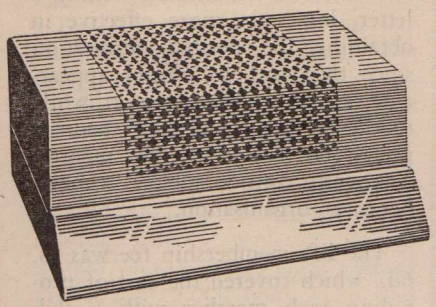
CONDENSERS

Paper, Tubular, Pigtail

C1	0.1 mfd. 400 W. Volts.
C2	0.1 mfd. 400 W. Volts.
C3	0.1 mfd. 400 W. Volts.
C4	0.1 mfd. 400 W. Volts.
C5	0.1 mfd. 400 W. Volts.

Dry Electrolytic, Pigtail

C6	8 mfd. 450 W. Volts 525 P. Volts.
C7	8 mfd. 450 W. Volts 525 P. Volts.
C8	8 mfd. 500 W. Volts 600 P. Volts.
C9	8 mfd. 500 W. Volts 600 P. Volts.
C10	8 mfd. 450 W. Volts 525 P. Volts.



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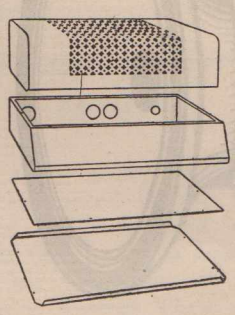

Power and Audio Equipment

CODE

T1	No. 5176 Power Transformer.
T2	No. AR2 Driver Transformer.
T3	No. AW5 Output Transformer.
L1	No. 102512 Input Choke.
L2	No. 50825 Smoothing Choke.

VALVE EQUIPMENT

V1	6J7G as Triode.
V2	6J7G R.F. Pentode.
V3	6J7G as Triode.
V4	807 Beam Tetrode.
V5	807 Beam Tetrode.
V6	5V4-G Rectifier (ind. htd.)
V7	5Y3-G Rectifier.

Cabinet, Chassis & Accessories

AMPLIFIER CABINET—Grey Crackle Finish. Comprising Alclad Chassis Plate 9in. x 18in.; Frame; Perforated Cover and Baseplate (illustrated).

VALVE SOCKETS:

- 1 x RT5 5-pin Amphenol.
- 6 x RT8 Octal Amphenol.
- 2 x RS55 5-pin Amphenol Steatite.
- 1 x Goat Valve Shield.

SUNDRIES

- 3 x 3-way Mounting Strips.
- 2 x 9-way Mounting Strips.
- 3 x small S. Grid. Clips
- 2 x Large S. Grid. Clips.
- 1 doz. 5/32in. Solder Lugs.
- 5 x Rubber Grommets ½in.
- 8 yds. Hook-up Wire.
- 3ft. Shielded Hook-up Wire.
- 3 yds. 3-core Power Flex.
- 2 doz. 3/8in. x 5/32in. M.T. Screws and Nuts.
- 3 doz. 3/8in. x 1/8in. M.T. Screws and Nuts.

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THE "F.F.R." 45-Watt AMPLIFIER

Some Notes On Pick-ups And Input Circuits

By

L. A. DAVIES

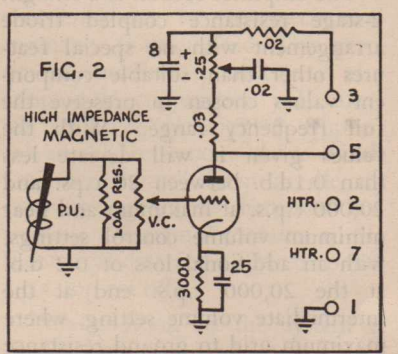
505 ST. KILDA ROAD
MELBOURNE

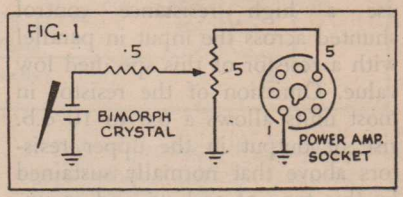
FOLLOWING the remarks set out in the November A.R.W. on the requirements and development of a fidelity power amplifier, I will continue with basic and advanced data on one of the many units which builders of the basic amplifier will wish to add.

We will proceed with the pre-amplifier equaliser as treatment of this unit allows us to go well into the matter of the equalisers which are found to be necessary for correction of constant amplitude bands on laterial recordings and de-emphasis necessary at the receiving end in standard FM practice. It also acts as a vehicle for some analysis of expected output voltages and purity among available types of phono. pickups and includes the elements of all fidelity low level amplifiers, so from this one unit can, and will, be evolved the more complex mixing and equalising systems as used by recordists and broadcasters.

Reference to the data on the F.F.R. amplifier shows that the required input signal for full output is 2 volts at all frequencies. Logically, to design apparatus of sufficient gain to produce this output from various pick-ups it is necessary to know not only their outputs but sufficient of their frequency characteristics so that an estimate may be made of the equaliser losses to be incurred.

Broadly there are three groups of pick-up when considered from the above point of view. Firstly, the pick-up of high output and large proportion of recording loss compensation, example, the Bimorph crystal in a commercial type arm. Then there is the pick-up of medium output and partial inbuilt compensation, numerous examples of which appear among the medium weight magnetics used on popular radiograms and universally available. Lastly, and of maximum import when seeking ancillary apparatus for F.F.R. reproduction is the group of light-weight magnetics and dynamics which are necessarily of very low output and possess no inherent compensation with its attendant effects on wave form and transient response.





As has been indicated in a previous article, a good crystal worked at N.T.P. into the existing amplifier circuit is capable of running it to quite high outputs provided that the low frequency arm resonant effects are sufficient to overcome both recording loss and crystal shunting effects. However, controlling the volume with this arrangement is difficult and at best only a temporary expedient for those who wish to operate their amplifier while deciding on a more flexible system.

For those who wish to incorporate commercial magnetics a single stage of amplification is necessary to allow for the partial equalisation required and provide a reserve of gain for under recorded discs.

Diagram 2 shows a recommended arrangement for this unit using a single triode type 6C5G as a non-degenerative amplifier with provision for additional bass boosting up to 6 d.b. per octave below 250 c.p.s. in the plate circuit. Volume control is effected in the input circuit as the overall gain at this point is low enough for contact noise to be inaudible, and any benefits derived from the lowering of pre-amp. noise in sympathy with signal volume may well be offset by overloading on loud passages, when a pick-up capable of 1 volt or more output is used.

It must be remembered to either use a volume control of overall re-

(Continued on page 16)

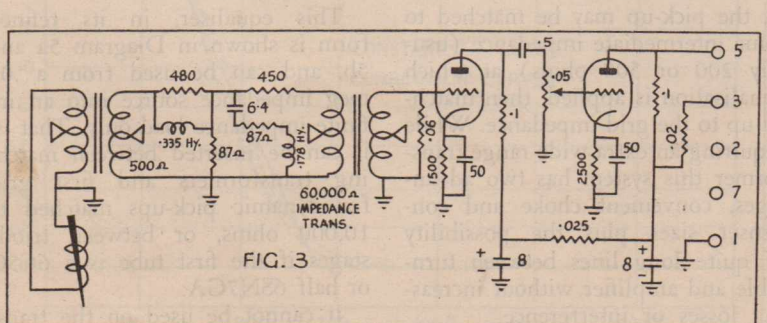


FIG. 3

(Continued)

sistance equal to that specified by the pick-up manufacturers as being ideal load for their pick-up, or to use a high resistance control shunted across the input in parallel with a resistor of this specified low value. Omission of the resistor in most units allows a 6.0 to 10 d.b. rise of output in the upper resistors above that normally sustained by this type of pick-up and so upsets any tonal balance, or the value of any partial compensation achieved by the manufacturer. In certain critical registers it can cause a rise in distortion of from less than 10 per cent. to more than 40 per cent. on single tone only, with even greater effect on "blasting" due to inter-modulation.

Bass compensation is shown as continuously variable on the diagram, and in the maximum position is capable of 6.0 d.b. per octave boost to 60 c.p.s. with no further increase between 30 and 60 c.p.s. This is sufficient for many discs as the bottom register is poor below 50 c.p.s. and few, if any, magnetics of this class will hold the groove at 50 c.p.s. The upper register of this group of pick-up is limited to 2,000 c.p.s. in some up to 4,000 c.p.s. in the very best types for a deviation of 6.0 d.b.

The group most applicable to the F.F.R. amplifier requires at least

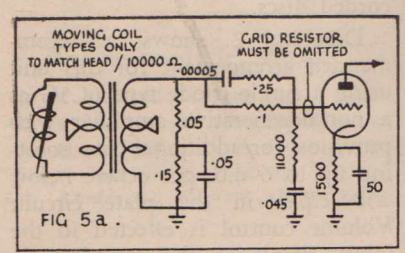


FIG 5a.

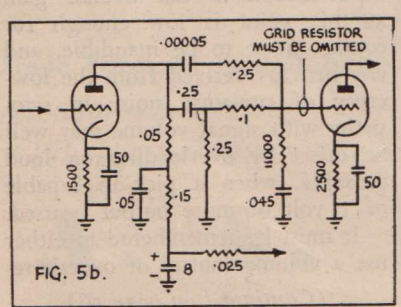


FIG. 5b.

2 triode stages to attain the necessary output after incurring a 24 d.b. equaliser loss and having available little more than 100 Mv. after transformation from the pick-up impedance, to upwards of .05 meg.

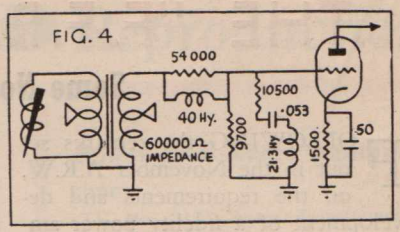
Diagram 3 includes a circuit of this amplifier, and details of a network which is correct as to frequency response within 1.0 d.b. down to 30 c.p.s., including the input transformer and amplifier. Attenuation is effected between stages as there is no possibility of these types of pick-up overloading the first stage, whether an equaliser is inserted between the pick-up and grid or not.

The amplifier section is a straight 2-stage resistance coupled triode arrangement with no special features other than suitable component values chosen to preserve the full frequency range. With the values given it will deviate less than 0.1d.b. between 20 c.ps. and 20,000 c.p.s. at maximum and near minimum volume control settings, with an additional loss of 0.2 d.b. at the 20,000 c.p.s. end at the intermediate volume setting, where maximum grid to ground resistance occurs. Use of a 1.0 meg. pot. in the second grid circuit would increase this mid-point muting of the highs to several d.b. at 5,000 c.p.s., depending on the wiring method adopted.

Distortion is 2 per cent. at 52 volts output and mainly 2nd harmonic, which decreases directly with signal in this arrangement, therefore the required 2 volts of output signal suffers no deterioration up to this point.

Input matching and equalising can be achieved in two ways. Firstly, the pick-up may be matched to some intermediate impedance (usually 200 or 500 ohms) at which equalisation is applied, then matched up to the grid impedance. While requiring an extra wide range transformer this system has two advantages, convenient choke and condenser sizes plus the possibility of quite long lines between turntable and amplifier without increasing losses or interference.

Alternatively, the pick-up may be



matched directly to the grid circuit impedance and equalisation inserted at this point. Diagram 4 shows this, and indicates the magnitude of the components required. Chokes for circuits 3 and 4 have to be of magnastatically balanced construction and housed in cases built to provide same magnetic shielding. Added to this, those of circuit 4 have to be multi-section wound so that their self capacities do not appreciably affect the filter at high frequencies.

Critical Features

In both cases the design is rather critical as magnetic balance is not effective in eliminating hum unless high induction alloy of uniform cross-section (i.e., no gaps) is used, and the problem with these alloys is that their permeabilities change rapidly with change of magnetising force, so the chokes become massive in order that this force can be kept low enough for the metal to be worked on the near-flat region at the low induction end of the B-H curve.

The chokes for the No. 4 circuit are virtually unobtainable in this country and those of No. 3 only to special order. An attempt was therefore made to develop a filter of comparable characteristics without resorting to inductances of any kind, and if possible using capacities less than 1.0 mfd.

This equaliser, in its refined form is shown in Diagram 5a and 5b, and can be used from a .01 meg impedance source into an infinite impedance load only. That is, it can be inserted between matching transformers and first grid for dynamic pick-ups matched to 10,000 ohms, or between triode stages if the first tube is a 6C5G or half 6SN7GA.

It cannot be used on the trans-

(Continued on page 17)

former with lightweight magnetics without serious high losses unless elaborate connecting networks are added.

The connection curve "B" in Fig. 6 shows the transmission characteristic of circuit 3 and curve "C" that of circuit 5 plotted against the theoretical curve "A" required for perfect equalisation of records defined as Constant. Amplitude below 250 c.p.s. Inspection shows that each compares very favourably with the optimum, considering that a change of 2.0 d.b. is the maximum audible at middle frequencies and over 6.0 d.b. at 50 c.p.s.

Use of the circuit 5b equaliser between stages is ideal and although some may question the advisability of controlling volume at the input on such low level apparatus, it must be remembered that frequencies above 250 c.p.s. are attenuated 24 d.b. so volume control noise is also suppressed by that amount.

So far consideration has been given only to equalisers directly associated with recording loss and pick-up bass correction. Before leaving pick-ups we will mention that numerous equalisers have been developed for individual types to provide correction for any existing high frequency deviations.

REED RESONANCE

The only really successful method is to design lightweight magnetic types with a reed resonance occurring at the highest possible frequency and to incorporate a sharp cut off low pass filter which reduces the pick-up output at the reed resonance by 30 or 40 d.b. so that not only is a level frequency response maintained between fixed limits but distortion of transients due to the mechanical resonance is minimised. This practice in equaliser application is also adopted in conjunction with moving coil type pick-ups to suppress the signal frequencies above which "monkey-chatter" from needle tip non-tracking effects becomes distressing. Diagram 7 contains all the theoretical data for a filter of 6,000 c.p.s. top cut off.

This addition to the system is found desirable when multiple speakers are used in the output, although its virtues are concealed when only a 12-inch speaker is used, due to the inherent steep attenuation curve above 5,000 c.p.s. of these speakers.

The equalisation method outlined in Fig. 2 produces a compensating curve whose critical frequency is somewhat lower than 250 c.p.s. and has purposely been made variable to accommodate pick-ups equipped with resonant arms. These types commonly have a rise in output progressing from 600 to 800 c.p.s. to the bass resonant point, seldom less than 100 c.p.s. even in the best types, so the variable equaliser has its curve displaced bodily in the direction of the bass end in order that, by judicious use of the control, quite a variety of the characteristics found in commercial pick-ups can be corrected to a near approximation of the ideal response.

Another equaliser application of increasing importance is de-emphasis as applied at the receiving end of F.M. communications.

Apart from fixed equalisers used to restore a device of known non-linearity to linear output there is also the necessity for equalisers capable of adjustment to compensate programmes of suspected non-linearity in the recording or transmission end as well as correction for acoustics at the receiving end, humidity absorption, baffling losses and scale distortion when reproducing sound at other than the level of its inception.

The ultimate in these equalisers would be an arrangement whereby frequency bands of controllable width anywhere in the audio spectrum could be raised or lowered at will to compensate for all these variables. However, such a system, if correctly devolved, would require a large number of multi-tapped complex switching array, and with the supply position as it is, would be far beyond the reach of all builders of the basic amplifier. Hence, the most universally applic-

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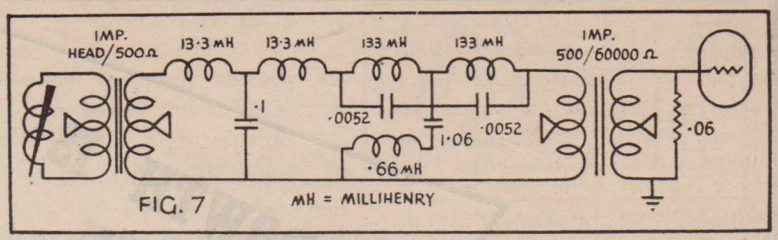


FIG. 7

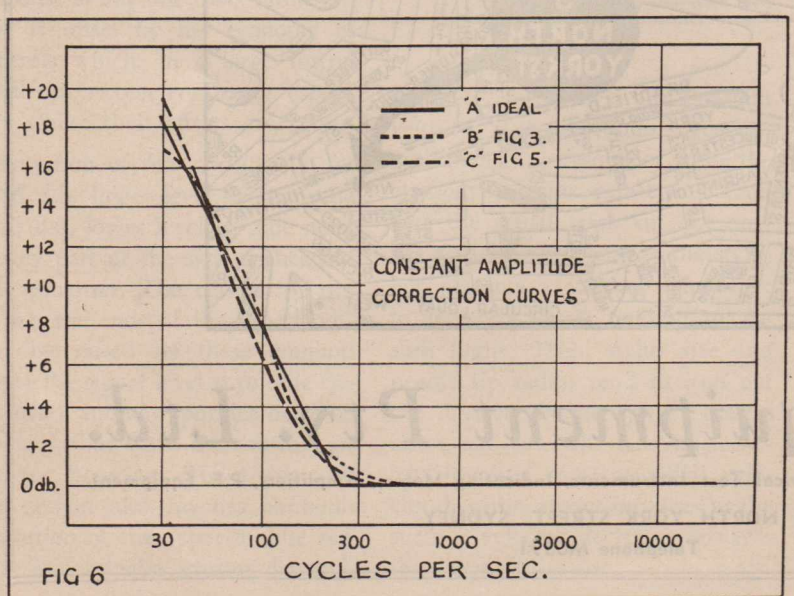


FIG 6

(Continued)

able of the capacity type spectrum-controls is the only one we will deal with in detail.

Wide-range Control

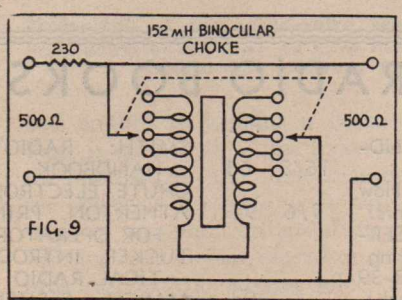
As with all equalisers over all losses must be equal to or greater than the amount of compensation required at any one point, therefor each equaliser will be considered as part of an amplifying system capable of restoring the total equaliser loss. Fig. 8 is the circuit of an equaliser capable of a bass lift of 0 d.b. to plus 16 d.b. independent of its ability to control the treble from minus 10 d.b. to +6.0 d.b. at 10,000 c.p.s Each of these three ranges of control are both necessary and desirable, and while bass attenuation is not possible it is not found necessary for other than recording and close-talk microphone work.

One drawback to the system is that level treble response occurs at an intermediate point on the treble control and unless a fader is used in this position and the level point determined, the operator has no definite assurance that he has level response at any one time. However, this is offset by the economy of controls which, in a large instrument can become confusing, especially where their effects are subtle.

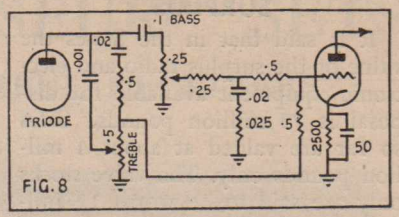
Insertion of this circuit calls for a 16 d.b. lower level of hum and a 10 d.b. lower level of tube noise in any part of the system ahead of this equaliser. The reason for this is that the ends of the "spectrum" can be raised by these amounts above the signal level at middle frequencies, and any spurious noise receives favour when the controls are set for boosting. The treble lifting system also favours harmonic distortion of the upper middle register and imposes greater demands of purity on pick-ups and radio detectors, etc.

Another and only recently applied function of this treble section is to accent the high response of a reproducing system as seldom do we find high powers in this band when speakers of high treble efficiency are used. This accent is removed by a corrective filter applied to the voice coils of the treble speakers after allowance has been made for distributor absorption.

To complete this group of corrective equalisers we will touch briefly on the requirements of modern instantaneous recording technique. It is well known to those who have recorded on the cellulose type of disc that considerable treble is lost, due to elasticity of the record coat allowing it to move with the tip of the cutting stylus and



as these recordings are constant velocity the amplitude decreases with increasing frequency while the elasticity remains constant. Therefore the actual track cut not only has a varying response to the stylus but presents a varying impedance to it, both effects tending to absorb highs. Then, stylus size and needle tip radius tend to iron out the higher frequency or shorter notes, and since the Australian system involves constant radial velocity this ironing out increases as the surface velocity decreases towards the centre of the disc.



Equalisers which are controlled as to cut-off frequency instead of amplitude are used to neutralise the sum of these effects from a progressively lower frequency as the record diameter diminishes. Fig. 9 illustrates this procedure, the switch positions being determined after trials with any complete studio equipment and arranged to coincide with regular steps of spiral diameter.

URANIUM A PROTECTOR

Deadly radiations from the uranium-made atomic bomb may be stopped short by shielding with gloss containing the same mineral, Professor Alexander Silverman, of the University of Pittsburgh, revealed recently.

"Strange as it may seem," he said, "uranium, which is used indirectly in atomic bomb manufacture, produces a glass which is probably the best protection we have against powerful X-rays and other harmful radiations. In post-bombing rescue work, uranium or lead spun glass garments and helmets lined with these glasses in plate form will permit safe entry into the bombed area. Oxygen respirators will be equipped with glass-insulated high-frequency precipitators to keep radio-active dust out of the lungs of the rescue squads."

SURPLUS

It is said that in the States the value of the surplus radio and-electronic equipment available for disposal is 75 million pounds. Sales so far are valued at about 4 million pounds only. The valve stocks only are said to be worth 12 million pounds! These are War Assets Administration (WAA) figures, and are unchallengeable—and we *have* remembered to convert from dollars to pounds. It would be a reasonable estimate, on the basis of these figures, to assess the value of British surplus radio equipment at about 40 million pounds. No official British valuation has, however, yet been issued.

—"Shortwave Magazine," (Eng.)

* * *

ANOTHER RADAR SECRET

Taking advantage of the fact that radar waves can be directed in a manner similar to sound issuing from a horn, an enormous horn-shaped antenna was installed in England during the war. The antenna was made of wire netting supported on telephone poles, was 150 feet long and had a mouth 6 by 18 feet. It was used to "jam" the radars of German night fighters. Birds flying into the horn were killed and cooked by the radio frequency power.

—*Ohmite News.*

* * *

Aircraft receiver QRN, artificially created by metal planes in flight, is eliminated by the use of an Army-Navy wartime development, a dozen small whip dischargers trailing from the wing and tail surfaces of the plane. The whips are made of cotton rope-like material, 10 inches long, impregnated with a silver compound which affords a high-resistance unit. United Airlines is replacing trailing-wire tail-cone dischargers with the new device.

A snowflake carries a static charge that is estimated to be equivalent to 17,500 electrons.

—"QST" (U.S.A.)

* * *

It is our sad duty to relate that Gordon Anderson, W5IQU, was electrocuted on August 1, 1946, while operating his 'phone transmitter. Investigation has disclosed that a defective transformer, with windings shorted to the core, caused Mr. Anderson's *ungrounded* transmitter rack and microphone cable to become "hot" with respect to ground.

—"QST" (U.S.A.)

* * *

RADIO HEATING

Radio-frequency heating was used during the war for drying cabbage, since dehydration could be effected in about one hour with dielectric heating as compared with eight hours in a normal oven.

TWO MORE "CONNOISSEUR" SETS

AEGIS KITS AVAILABLE FOR POWERFUL RECEIVERS

THE instant success and popularity of the "Connoisseur Five" prompted us to bring out these two additions to the "Connoisseur" range. In the case of the six-valve receiver the addition of a stage of R.F. amplification gives considerable improvement in sensitivity and image-ratio as well as a better A.V.C. characteristic due to the extra tube controlled. The seven-valve receiver incorporates an extra stage of I.F. amplification as well as the stage of R.F. This results in greater selectivity, even better A.V.C. due to the large number of controlled tubes and improved I.F. stability.

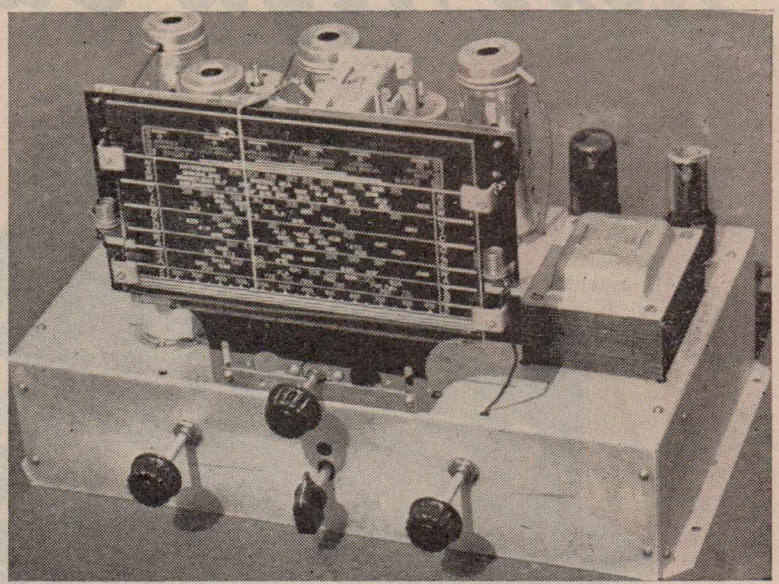
From the

ENGINEERING STAFF

AEGIS MANUFACTURING CO. PTY. LTD.

208 Little Lonsdale Street

Melbourne



Photograph of the seven-valve version of the "Connoisseur," one of the most powerful receivers we have handled, even including imported communications-type receivers. It is ideal for the DX enthusiast.

The Six-Valve Version

This receiver is similar to the original "Five" with the addition of the stage of R.F. amplification, plus some minor modifications. It is designed around our R.F. Coil Kit Type K2 and the chassis has been designed to suit either the six or seven-valve version. In the case of the six the I.F. transformer and valve mounting holes in the back left hand corner of the chassis are not used. We have only shown the circuit of the seven-valve receiver, but it is only necessary to disregard the 6U7G I.F. amplifier tube with its associated I.F. transformer and components, the receiver having been designed with sufficient flexibility to enable this.

The receiver once again employs back-bias, although it will be observed that the mixer has cathode-bias applied to it. This is because there is no A.V.C. on the mixer on the short-waves and some bias on the mixer is desirable as it has a stage of amplification ahead of it. The increase in bias caused on the broadcast has no adverse affect as while it reduces the gain very slightly it does not affect the signal-to-noise ratio and this is the deciding factor in a receiver of this size. The screens of the R.F. and Mixertubes are operated from individual voltage-dividers consisting of .05 meg. resistors. This maintains the screen voltages more nearly constant with varying A.V.C. voltage and helps to give the improved A.V.C. characteristics. The screen of the I.F. amplifier is fed with a .1 meg. series resistor to give an extended "grid-base" and so reduce the tendencies of "modulation-rise" on strong signals causing increased distortion. Decoupling has been used on all plate and grid circuits in the interests of good stability.

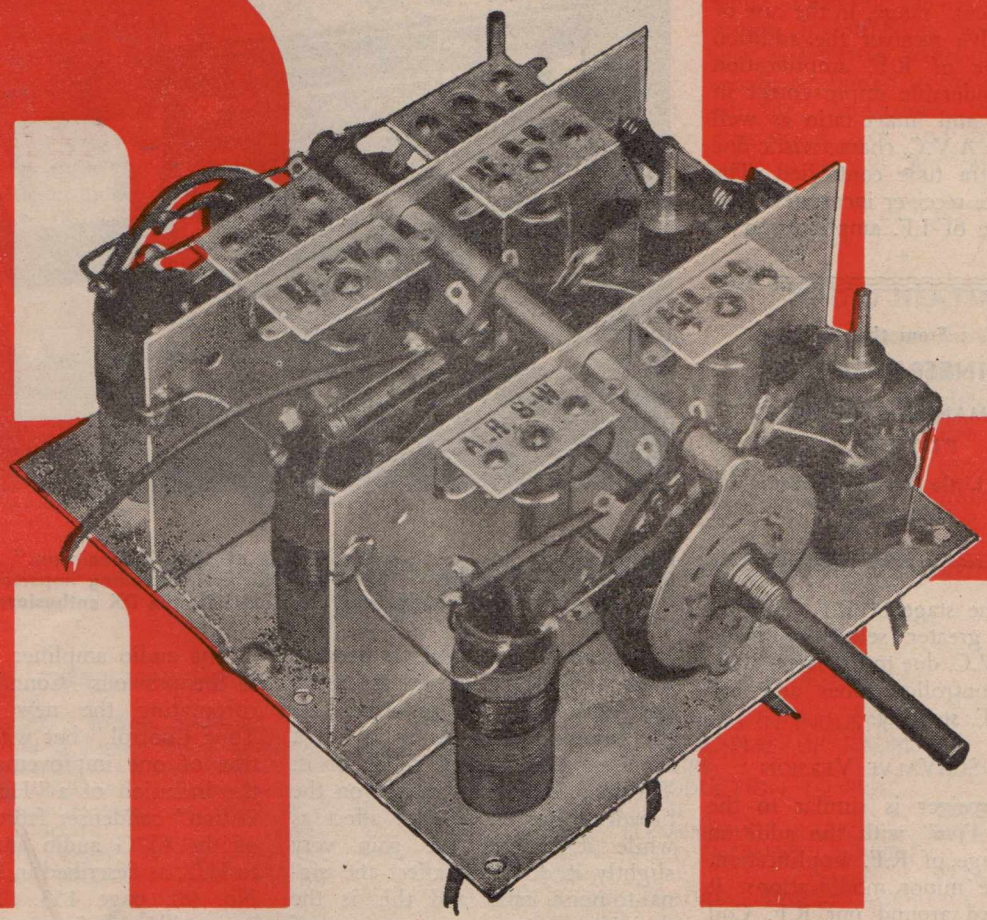
The audio amplifier is the same as the previous "Connoisseur", incorporating the new "Feed-back Tone Control," but with the addition of one improvement. This is the inclusion of a "Hum Neutralisation" condenser from the screen of the 6J7G audio amplifier tube to H.T. as described in Radiotronics No. 90, page 153. This results in considerable improvement in the reduction of hum. The power transformer rating has been increased to 80 mA. to carry the extra current drain.

For the I.F. transformers to be used in this receiver we recommend the Aegis Type J9 for the interstage transformer and the type J10 as the diode transformer. These transformers have been designed with the maximum selectivity obtainable in conjunction with a reasonably broad "flat-top" re-

(Continued on next page)

Next Aegis Success,

R.F.



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RETAIL PRICE 140/–

"CONNOISSEUR"

(Continued from page 21)

sponse to give adequate audio-frequency response.

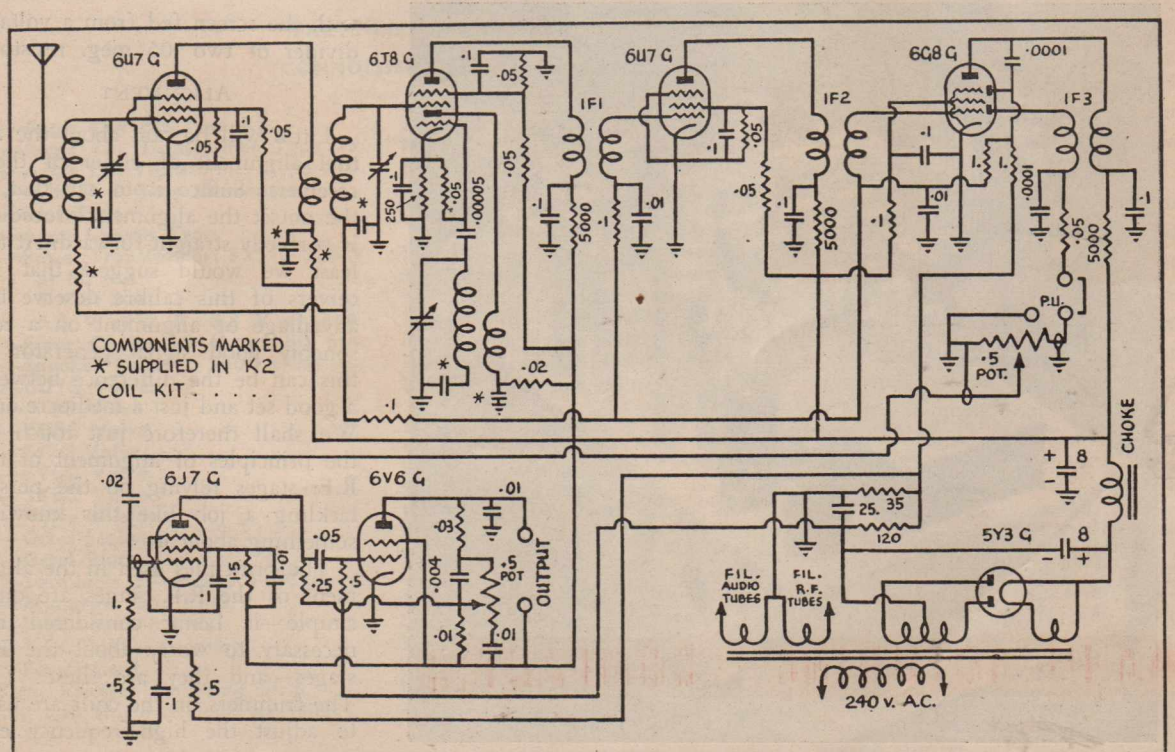
The Seven-Valve Version

The inclusion of an extra stage of I.F. amplification to the previous six-valve receiver produces a piece of equipment to suit the tastes of the most ardent DX-er.

The use of a third I.F. transformer enables the selectivity to be considerably improved and at the same time the inherent stability of the I.F. channel can be increased. This statement may be regarded by many who have used two stages of I.F. amplification as being somewhat astray when they remember their difficulties in getting the "bugs" out of it. This can, in most cases, be explained very simply as it would be safe to say that in practically every case the I.F. transformers used were standard high-gain types designed for a single stage of amplification. When two stages of I.F. are to be used it requires that the I.F. transformers be specially designed for the job. To appreciate this fully it can be seen that our previous six-valve receiver, which has sufficient gain to literally deafen you, would be hopeless with the inclusion of another stage of high-gain I.F. with a nominal gain of 400? From this it can be seen why there is extreme difficulty in maintaining stability from regeneration. It should also be realised that the increase is overall gain of say 400 will not improve the usable sensitivity by 400 times. This usable sensitivity is governed by the signal-to-noise ratio and the percentage of noise to signal is entirely a function of the aerial coil and the R.F. stage, so that any increase in gain in the I.F. stages amplifies the noise generated in the R.F. stage as well as the signal, with no improvement in signal-to-noise ratio.

With this point in mind we can design our I.F. transformers to have considerably lower gain than that normally required for single stage work. This enables a number of improvements in the characteristics of the I.F. channel. Firstly, circuit loading on the tuned circuits can be reduced to negligible proportions enabling higher effective working "Q" to be obtained with improved selectivity. This applies particularly to the diode circuit which normally reduces the effective "Q" of the transformer to less than half. With these specially designed I.F.T.'s the loading effects of the diode can be forgotten, as it is too small to be of any account. The I.F.T.'s can be used in any receiver that one might be contemplating building employing diode detection without any fears of loss of selectivity provided that the diode load resistor is not less than .5 meg. Secondly, the detuning resulting from "Miller-Effect" is also reduced to negligible proportions, so that the I.F. channel always remains in tune in the presence of a signal with extreme fading. It is these points which warrant the

(Continued on page 24)



(Continued on page 23)

statement that the I.F. channel is more stable and will give the ultimate in performance.

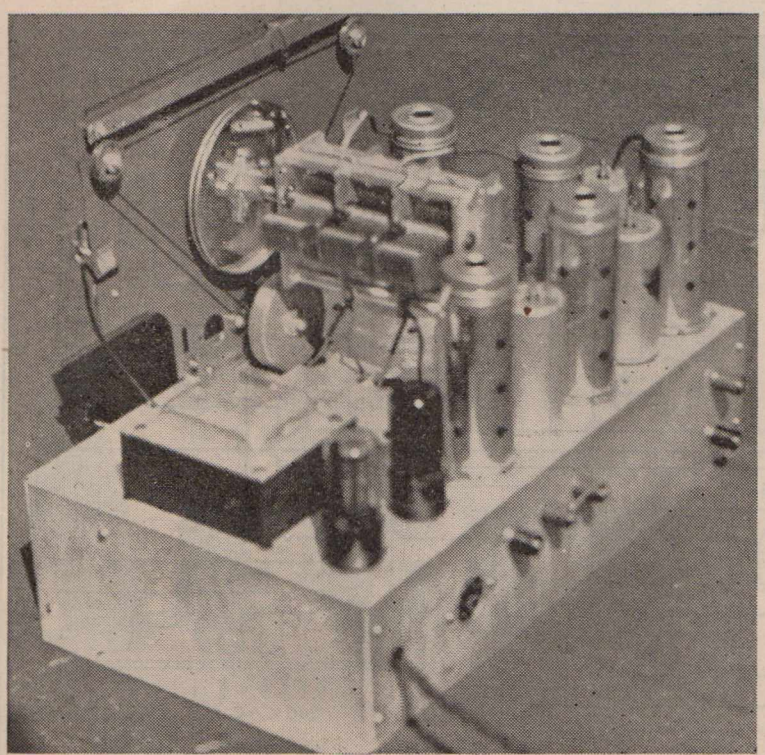
We have designed two types in these two-stage I.F. transformers as follows: One is a medium selectivity type with a band width of 4.5 kcs. at 6 db. and 20 kcs. at 60 d.b. These will be known as Type J20 as the interstage—No. 1 and 2— and Type J21 as the diode transformer —No. 3. The other is a high selectivity type with a band width of 3.6 kcs. at 6 d.b. and 15 kcs. at 60 db. These will be Type J22 as the No. 1 and 2 and Type J23 as the No. 3. We therefore recommend them to the amateur and DX-er who contemplates a new receiver requiring extremely good selectivity.

The design of this seven-valve receiver otherwise is on the same lines as the previous six. The additional I.F. stage is operated under similar conditions to the R.F. stage

PARTS LIST FOR

"CONNOISSEUR SEVEN"

1—Aegis Coil Kit Type K2.
2—Aegis I.F. Transformers T J20.
1—Aegis I.F. Transformer Type J21. or 2—Type J22 and 1—Type J23.
1—A.W.A. 3 Gang Condenser.
1—Dial Type.
1—Aegis Chassis Type.
1—Power Transformer. 325-0-325 V at 80 mA. 5V at 2 A. 6.3 V at 2 A. 6.3 V at 2 A.
1—Filter Choke 15 H. at 80 mA.
1—Speaker Permag. 5000 ohms.
2—6U7G Valves.
1—6J8G Valve.
1—6G8G valve.
1—6J7G valve.
1—6V6G valve.
1—5Y3G valve.
5—Valve shields.
8—Octal Sockets.
1—Octal Plug.
5—Terminals 2—Black 3—Coloured
5—Miniature Grid Clips.
2—Pilot Lamps 6.3 V.
1—½-in. Rubber Grommet.
1—Power Cord.
18-in. Resistor Mounting Strip.
Plain and Shielded Hook-up Wire.
Tinned Copper Wire 20 G.
Hardware.
1—.00005 mfd. Mica or Ceramicon Condenser.
2—.0001 mfd. Mica or Ceramicon Condenser.
1—.004 mfd. Mica Condenser.
5—.01 mfd. Paper Condenser 400 V.
1—.02 mfd. Paper Condenser 400 V.
1—.05 mfd. Paper Condenser 400 V.
10—.1 mfd. Paper Condenser 400 V.
2—8. mfd. Electro Condensor 525 V.
1—25 mfd. Electro Condenser 40 V.
1—35 ohm Resistor.
1—120 ohm Resistor.
1—250 ohm Resistor.
3—5000 ohm Resistor.
1—.01 meg Resistor.
1—.02 meg. Resistor.
1—.03 meg. Resistor.
8—.05 meg. Resistor.
3—.1 meg. Resistor.
1—.25 meg. Resistor.
3—.5 meg. Resistor.
3—1. meg Resistor.
1—1.5 meg. Resistor.
2—.5 meg Potentiometers.

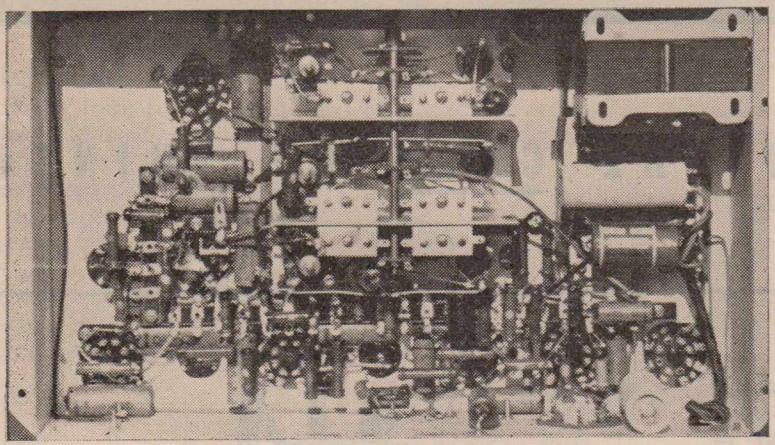


with the screen fed from a voltage divider of two .05 meg. resistors.

Alignment

Little will be said about the actual alignment of either of these receivers. Suffice it to say that at the outset the alignment procedure is perfectly straight-forward. At the least we would suggest that receivers of this calibre deserve the advantage of alignment on a reasonably good signal generator as this can be the difference between a good set and just a mediocre one. We shall therefore just touch on the principles of alignment of the R.F. stages relying on the person tackling a job like this knowing something about it.

The principles used in the alignment of the R.F. stages are quite simple—it being considered not necessary to worry about the I.F. stages—and they are these: (1) The trimmers on the coils are used to adjust the high-frequency end



of each band, i.e., the oscillator to bring the high-frequency setting to its correct position and the aerial and R.F. to give maximum output.

(2) The adjustable iron-cores in the coils are used to adjust the low-frequency end of each band.

(3) Repeat the adjustments at each end until both are correct, always starting with the iron-cores and making the final adjustment with the trimmers.

(4) Improved results in operation can often be obtained if the receiver is finally aligned on the aerial, which is to be used on it using weak stations, but in the case of a variety of aerials it is preferable to use a standard dummy-antenna and signal generator. At the same time it should be realised that this should only be contemplated after previous alignment with a signal generator and, also, it will only affect the aerial stage.

In conclusion once again let us remind you firstly of the excellent results obtainable with our R.F. Coil Kit Type K2, and secondly the advantages of these new scientifically designed two-stage I.F. transformers for that new "Communications" receiver you are just going to build.

PARTS LIST FOR

"CONNOISSEUR SIX"

1—Aegis Coil Kit Type K2.
1—Aegis I.F. Transformer Type J9.
1—Aegis I.F. Transformer Type J10.
1—A.W.A. 3 Gang Condenser.
1—Dial Type.
1—Aegis Chassis Type.
1—Power Transformer: 325-0-325 V at 80 mA.
5 V at 2 A.
6.3 V at 2 A. 6.3 V at 2 A.
1—Filter Choke 15 H. at 80 mA.
1—Speaker Permag. 5000 ohms.
1—6U7G Valve.
1—6J8G Valve.
1—6G8G Valve.
1—6J7G Valve.
1—6V6G Valve.
1—5Y3G Valve.
4—Valve Shields.
7—Octal Sockets.
1—Octal Plug.
5—Terminals 2—Black, 3—Colored.
4—Miniature Grid Clips.
2—Pilot Lamps 6.3 V.
1—½-in. Rubber Grommet.
1—Power Cord.
18-in. Resistor Mounting Strip.
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1—.02 meg. Resistor.
1—.03 meg. Resistor.
6—.05 meg. Resistors.
2—.1 meg. Resistors.
1—.25 meg Resistor.
3—.5 meg. Resistors.
3—.1 meg. Resistors.
1—1.5 meg Resistor.
2—.5 meg Potentiometers.

Direct Long-distance Calls

All long distance telephone operators will some day be dialling calls, directly and unassisted, straight through to the called telephone even though it be at the other side of the continent. This method, now in limited operation, is the announced objective of the American Telephone and Telegraph Company, according to a recent statement made by its president, Walter S. Gifford.

The ultimate aim, Gifford states, goes further and will be reached when telephone subscribers can dial "anyone anywhere in the United States or perhaps anywhere in the world just as simply and promptly as you dial the telephone of a neighbour in your own home town." This long-range goal, he says, is "undoubtedly many years away from practical use."

The first plan is already in use. About five per cent of the daily 2,700,000 toll board calls are now handled by the operator toll dialling method. Under this method the customer dials the outward toll operator, who in turn completes the call pH of chemicals or minute currents such as those produced by photo

* * * *

Dick Rees, of VK2APW writes to say that his QTH is no longer the one listed in the PMG book of July this year. He is now located at 511 Hanel Street, Albury, and having (lucky lad) secured the house, is busy, after prior attention to domestic needs, making plans to get on the air.

KP3

LET'S GET TO THE CORE OF THINGS

As with all KINGSLEY radio products the reason why "PERMACLAD" I.F.'s are now spoken of as the best in Australia is found in the ferromagnetic iron-dust cores used in their construction. Apart from the inherent technical superiority of iron-core tuning, every "PERMACLAD" I.F. is turned out on a production line that sets a particularly high standard of quality.

So from the first to the final step . . . that of oscillagraph testing and tuning . . . each I.F. is made to give the absolute maximum in performance. The use of the enclosed pot-type ferromagnetic cores give KINGSLEY PERMACLAD I.F.'s a particularly high degree of permeability, high "Q" and gain.

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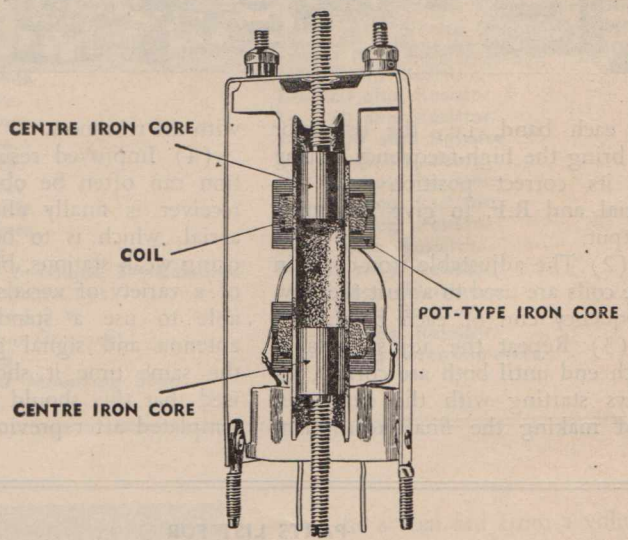
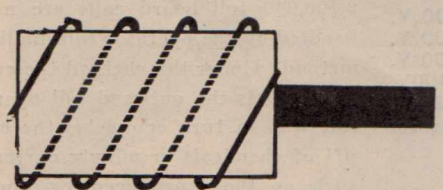


The above diagram is a cut away sketch of a PERMACLAD I.F. Tuning is done by the two centre iron-cores.



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RE-VAMPING THE "FS6" FOR HAM USE

JUDGING by the huge mail coming forth from all parts of the Continent excepting (so far) (VK6 and 7, it would seem that everybody with a F.S.6 has decided to write for dope on same, and seeing as how it's beginning to get me down, I thought it best to comply with A.G.'s earlier 'request for an article on F.S.6. I must impress upon readers and

By

BOB RICHARDSON

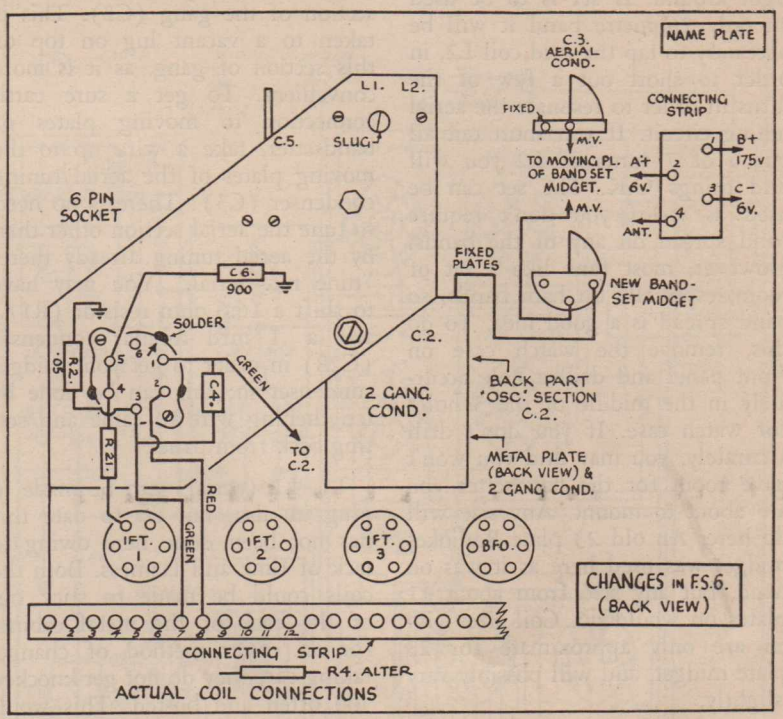
VK3ZP

FARM ROAD

CHELTENHAM, VIC.

owners of F.S.6 sets, ex-army men, and hams, that I am not an ex-signals officer, etc., as I knew nothing of F.S.6 before I purchased same and got to work on it. Several hams have possibly had a lot more to do with this set than I have, so I leave it to you to pull to pieces both this article and the F.S.6

It is only a matter of experimentation, as it were, any radio fan could do it without being a B.Sc. or A.M.I.R.E., etc.! The main bands are generally 20, 40, 80 metre ham bands, and I altered my own job for 20 and 40 mainly, although one was altered to go on B/C—and it did, too, with excellent results. It is quite possible the thing would go on 10 metres also, but I don't fancy it as giving "excellent" results as grid leads, etc., are not too short. My own personal opinion of F.S.6 is that it isn't such a hot set as it is, noise level seems extremely high; but it isn't critical to the army evidently, as I believe they only use these sets over short distances. It is my intention to rebuild the whole thing entirely, using just a standard superhet circuit with original B.F.O. The converted set has been used for several months prior to the writer shifting to new headquarters, with no A.C. either. To get on with the job.



We are mainly interested in the coils—especially the oscillator coil L3-L4 which are grid and plate respectively. These are the coils that have to be dissected. Before doing anything drastic, make a note of the different connections to this coil. It is the coil on the plate at the back of the set and cannot be mistaken—I hope.

Check diagram before delving into the works. If socket is wired EXACTLY as shown, no need to check wiring of original coil. Advisable to use a 6-pin socket to avoid the trouble of lengthening the original wires, if socket is placed with filament pins as shown. It will be necessary to remove the whole coil and can of the original L3, 4, so that there is a vacant hole left in the plate. Insert the 6-pin socket in the vacant hole with connections as shown. It may be necessary to rewire C6 a little differently to what it was. The wiring in words: No. 1 fil. pin goes to green wire (fixed plates C2 back section) and one side of C4. No. 2 pin goes to red wire that goes down to the connecting strip (No. 8 lug), No. 3 pin goes to green wire on connecting strip (No. 7 lug), and to other side of C4. As well as one side of 5,000 ohm resister R2, other side of R2 goes to earth (metal plate).

No. 4 pin goes to R21 and is bridged across to pin No. 5, which has one side of C6 (900 mmf.) connected to it. The other side of C6 goes to earth. Pin No. 6 is blank. It will be necessary to solder the metal mounting plate of the socket to the metal plate. Clean and tin both first and make sure of a clean joint and not a dry one.

(Continued on page 28)

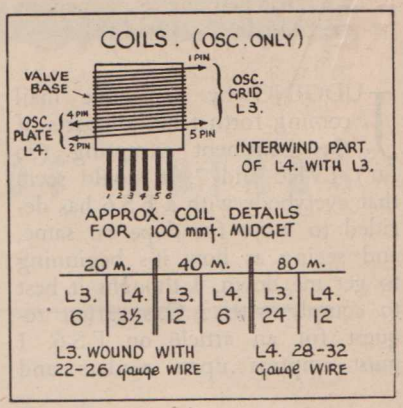
"FS6"

(Continued)

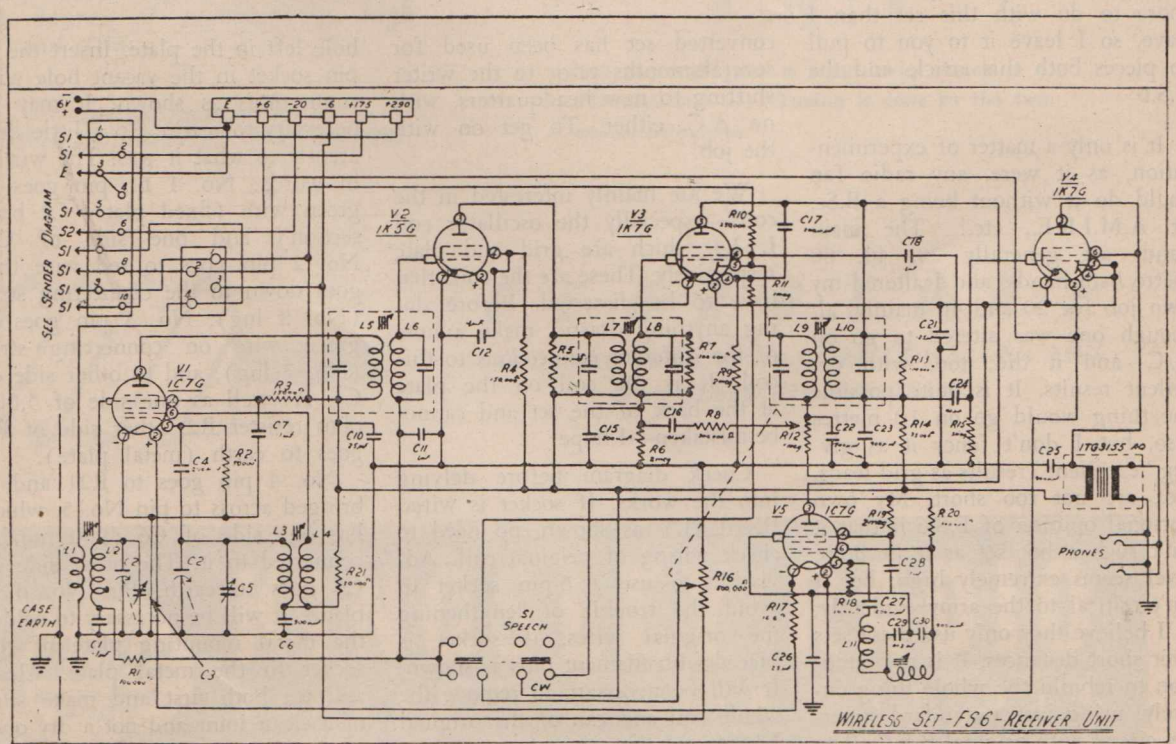
Solder in 3 or 4 opposite places with good blobs, no need to go right around. If set is to be used on only 20 metre band it will be necessary to tap the grid coil L2, in order to short out a few of the turns in order to resonate the aerial tuning circuit. If you short out all but 6 or 7 turns of L2 you will find things O.K. The set can be used as is—if you don't require band spread on any of the bands. However, most fans like a bit of room, especially on ham bands, so band spread is a good idea. To do this, remove the watch case on front panel and drill a hole accurately in the middle of the 3 holes for watch case. If you don't drill accurately, you may find you won't have room for the bandsetter you are about to mount. Any size will do here. An old 23 plate Radiokes midget was used here as it was on hand, but any size from about 11 plates on would do. Coil sizes given are only approximate for 23 plate midget, and will possibly vary slightly.

Now we presume you have mounted the midget condenser O.K. Make sure it goes to earth for moving plates, the fixed plates go to the fixed plates of the back section of the gang (C2). This is taken to a vacant lug on top of this section of gang, as it is more convenient. To get a sure earth connection to moving plates of bandsetter, take a wire up to the moving plates of the aerial tuning condenser (C3)! There is no need to tune the aerial section other than by the aerial tuning already there, "tune rec. aerial." You may have to shift a 16.6 ohm resistor (R17) and a .1 mfd tubular condenser (C28) in order to get your midget condenser in; this can be done by lengthening wire to same and setting back from panel.

L1, L2 (aerial) can be made to plug in also, but up to date this has not been done here owing to lack of time and laziness. Both the coils could be made to stick out of the back of the metal cabinet for an easier method of change, taking care they do not get knocked too often and busted. This would



mean that instead of the oscillator coil mounting with its top to panel it would have to face out. If this idea is carried into action, it may be necessary to lengthen connections to 6 pin socket so that it can be turned with bottom inside, instead of outside as is now. Watch those connections carefully. Another idea is to tap the aerial grid coil for different bands required. This will mean only 1 coil has to be changed each time it is required to change bands. The aerial



is then switched on or tapped by banana plug and sockets.

The large primary winding (L1) on aerial coil is evidently to match up with the small aerial used on these sets. It is only necessary to set the oscillator bandsetter and then tune aerial for maximum noise, set is then tuned with vernier controls, 2 gang condenser that was original main tuning. It is advisable to remove a few of the moving plates from each section of gang (C2) to get good band spread; be careful doing this, take a firm hold on each plate before removing same and when finished complete job, check remaining moving plate to see it is not touching fixed plates each side. Removing plates is a matter for one's own discretion, of course.

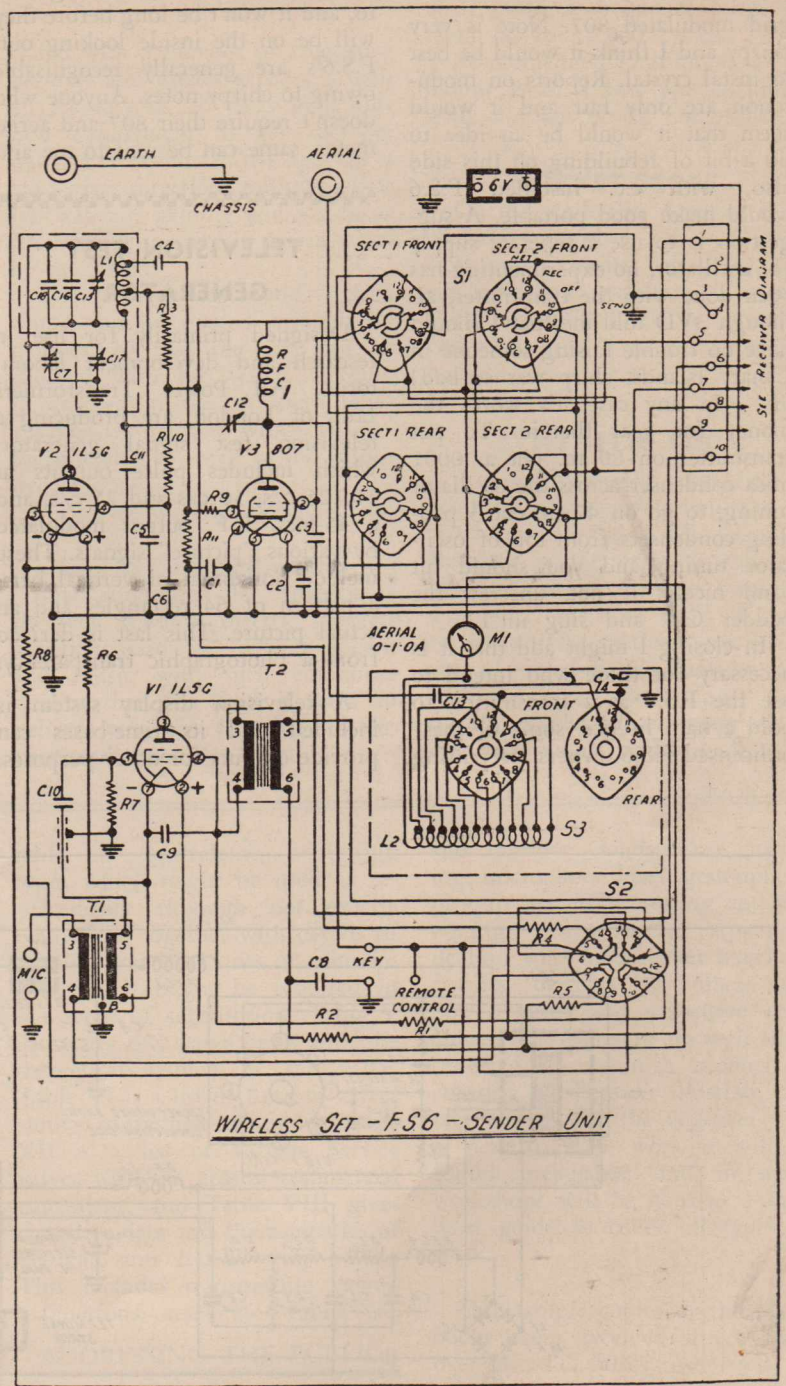
Remove R4, which is 150,000 ohms (measured 200,000 actually here) and put in a 20 to 30,000 ohm one. This should aid things a litle in the way of increased screen volts on 1K5G. It is advisable to put a dial indicator plate on bandsetter so that it can be reset without having to hunt for bands each time. It will possibly take some time to find the band, depending on how good you are.

Receiver will operate a permag. speaker quite well (if you can get one, of course) and I might add that speaker was used exclusively here, as it was found noise was too high on phones to be comfortable. To the ham who only wants locals, etc., the set is O.K. as is, but for anyone who likes a bit of DX, do what I'm going to do—rebuild it.

If the output is fed into a single 6V6G or similar tube, it will nearly blow the house down, as volume is terrific and a small power supply can be used with a 6 volts accumulator for filaments only—this way the wet battery should last considerably longer as filament consumption should be very low. A voltage divider can be placed across a power supply and 135 to 180 volts tapped off, not forgetting the 6 volt "C" battery, a Philips' B and C eliminator is just the thing here. Pull out the 807 while receiving only, as consumption is as follows: Set only, pulls 2 amps (including vibrator in all cases) with 807 in 3.5 amps, and with transmitter on 6 amps, according to my ammeter.

Now, as to transmitter part, as it is it's a Hartley oscillator with a

(Continued on page 30)



WIRELESS SET - F.S.6 - SENDER UNIT

"FS6"

(Continued)

grid modulated 807. Note is very chirpy and I think it would be best to instal crystal. Reports on modulation are only fair and it would seem that it would be an idea to do a bit of rebuilding on this side also, with c.c. installed F.S.6 would make good portable. A suggestion is to use a seperate supply for oscillator, no experimenting has been done with the transmitter, although 3VD told me that I should have no trouble raising someone in Canary Islands, chirp was so bad! Hi! In any case it's worth the money for gear therein. To put transmitter on 80 m. put a .0001 mica condenser across the oscillator tuning, to go on 40 m. cut 3 padding condensers from top of oscillator tuning and you should hit band nicely; if not, unscrew the padder C17 and slug in L1.

In closing I might add that it is necessary for those who intend to use the F.S.6 as a transmitter, to hold a ham licence, some of these unlicensed F.S.6 owners are putting out lovely loud signals for the P.M.G. direction finders to get on to, and it won't be long before they will be on the inside looking out. F.S.6's are generally recognisable owing to chirpy notes. Anyone who doesn't require their 807 and aerial meter, same can be sent to me and full use will be made of them! Hi! Incidentally new headquarters here, Farm Road, Cheltenham, S.22. Any visitors requiring dope on F.S.6 welcomed week-ends only. No charge made, and actual set can be seen

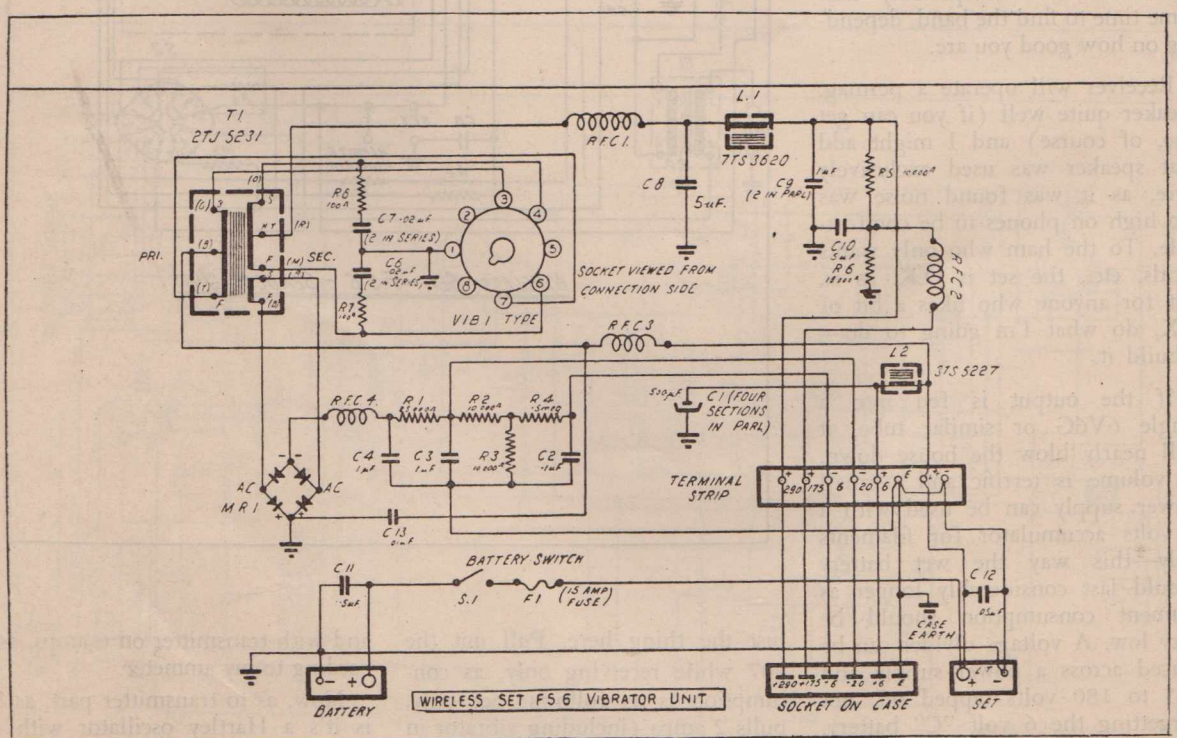
TELEVISION TEST GENERATOR

Designed primarily for use in research and development laboratories, All Power Transformers Ltd., of London, are producing a television test signal generator, which includes pulse outputs at 10,125 c/s, 50 c/s and 25 c/s, and a 45-mcs. R.F. output modulated by various "picture" signals. These include horizontal or vertical bars, a pattern of 64 rectangles and an actual picture. This last is derived from a photographic transparency.

A television display system is included and its time-bases can provide outputs for other purposes. There is also a single-sweep oscilloscope. The apparatus is rack built and priced at £1,300.

CHEAPER CONDENSERS?

The American Department of Commerce announces that a German machine, developed by the Robert Bosch concern, will revolutionise the manufacture of condensers. It produces paper condensers without the use of foil, the sides of the paper being coated with a thin layer of vaporised zinc. The machine has been taken to the U.S.A. for study.



THE WORLD OF RADIO

SCHOOL BROADCASTS IN ENGLAND

The Central Council for School Broadcasting announces that there are now over 13,000 schools registered as listening to the B.B.C. schools broadcast. This total—a record—is some 1,300 more than last year. There are, in addition, 1,684 schools registered in Scotland.

* * *

ELECTRONIC WATCH TIMER

An instrument for rapidly checking and adjusting the rate of clocks and watches has been produced by Furzehill Laboratories, in England. A cathode-ray tube with a circular rotating time base is used and the tick from the timepiece under observation is picked up by a microphone, amplified and causes a bright spot to appear on the trace.

The time base is derived from a crystal-controlled oscillator associated with a number of frequency dividers and rotates at 10 c/s with an accuracy of 20 parts in a million (equivalent to 1.7 sec per day). Precession of the spot in a clockwise direction indicates that the watch is gaining and a scale is provided from which the rate can be calculated.

The microphone and watch clamp can be rotated through 90 degrees, so that the rate can be checked with the watch working in different planes. A small loudspeaker is included which enables the operator to listen to the amplified tick.

—"Wireless World," Eng.

* * *

LATEST IN SPEAKERS

Just announced in America is the new Western Electric speaker, which is said to "deliver speech and music with such emotional quality that you find it hard to believe you are listening to reproduced sound."

The speaker has a 12-in. cone, is rated to handle 30 watts continuously, with a frequency range of from 60 to 10,000 cycles.

Recommended baffling is to mount it in a box-type enclosure with a space of 2½ cubic feet.

* * *

POCKET SCOPE

On the market in America is an oscilloscope with a 2-in. tube, vertical and horizontal amplifiers, linear time base oscillator, 'n everything; contained in a portable case measuring 4-in. x 6-in. x 10-inches.

* * *

SYNTHETIC MICA

A new process for production of synthetic mica, perfected in the laboratories of the KWI Ceramics Institute in Germany, is reported by U.S. investigators to result in a product that is as good as natural mica. The synthetic mica consists of mixed oxides, fluorides, and silico-fluorides containing such metals as aluminium, magnesium, iron, chromium, and vanadium.

BOOKS RECEIVED

RADIO VALVE VADE-MECUM

By P. H. Brans. Obtainable from Messrs. Ritchie Vincent & Telford Ltd., Harrow, Middlesex, 232 pp. Price 12s. 6d. post free.

This is the 1946 edition of a most valuable and comprehensive book, which should be in the hands of every experimenter and serviceman. It is divided into eight sections, each of which is "thumb indexed," and these give the following details: Table 1 is a list of characteristics and working data of practically every valve in common use on the Continent. Table II (occupying 40 pages) deals similarly with valves found in the British market and includes many of which details cannot now be obtained, such as those manufactured before the war by the 362 and Clarion Companies. Table III gives the equivalent of European, American and British types. Table IV gives a most exhaustive table of equivalents, indicating types which might be used as replacements although not exactly equivalent, together with details of modification to circuits or components which might be required in the event of substitution. Table V illustrates 689 valve bases with the theoretical symbol of the valve. Table VI is a list of Russian valves similar to the first two tables. Table VII is a list of various Service valves with the nearest commercial equivalent, and Table VIII gives complete data and characteristics of German and Italian army valves. This includes transmitting valves, magnetrons, accelerator tubes, etc.

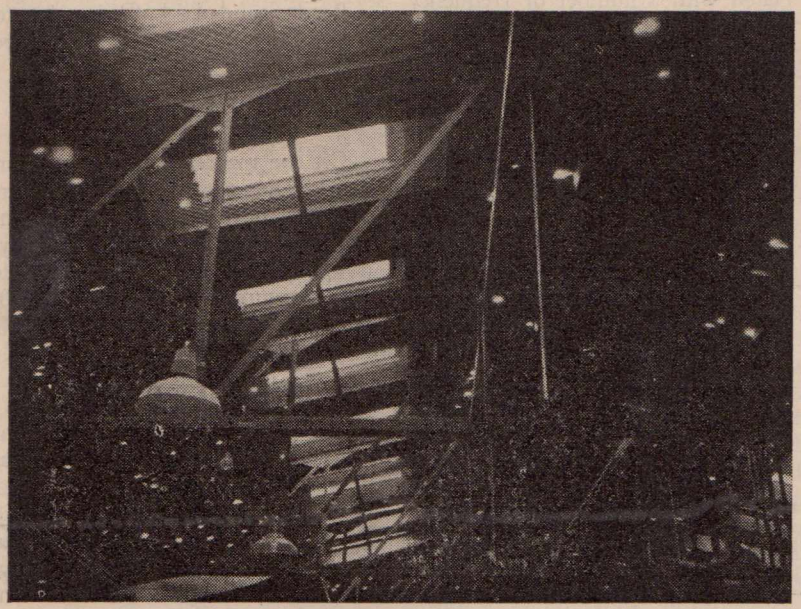
ADDRESSING THE PUBLIC

By P. J. Walker. Obtainable from the Acoustical Manufacturing Co. Ltd., Huntingdon, England. 61 pp. Price 3s. 6d. post free.

This book deals with the Fundamentals of good Public Address technique, and covers the equipment and its locations, both indoor and outdoor; loudspeaker matching; microphone lines; gramophone pick-up matching; testing and operating, and a useful Appendix dealing with loudspeaker matching circuits, decibels to voltage and power ratios and capacitive reactances. The chapters are well illustrated and contain a number of amusing sketches to illustrate certain points. For the engineer who is new to P.A. work it will be found invaluable, and in many workshops will be kept as a standard guide to cover all types of work.

* * *

Our sample copies of the above books were received direct from overseas. Doubtless copies will be received by local booksellers in the near future and those of our readers who are interested in purchasing copies should get in touch with the Technical Book and Magazine Company of 297 Swanston Street, Melbourne, or Angus and Robertson, 89 Castlereagh Street, Sydney.



BUSINESS AS USUAL

The phenomenal hailstorm which pelted down on many suburbs of Sydney early in January let the Radiotron Valve Store at Glebe have the full force of its fury. Accounts of the size and weight of the hailstones stagger the imagination—ranging up to two pounds in weight and four inches through—and their shape—not smoothly rounded but jagged—made them a fearsome projectile.

The corrugated roof of the Radiatron building bears many scars testifying to the force of their impact and the accompanying picture graphically tells its own story.

Fortunately, prompt repairs were effected and no damage to Radiotron stocks resulted.

CALLING CQ!

By Don Knock, VK2NO

ALTHOUGH the efforts of those Hams using the band can only bring the ultimate QSO's, observations on the part of listeners can play no small part in developing 50-54 Mc/s as a useful communication medium. That listeners are always on the job was instanced during the recent reception of VK3HK's signals in Sydney and Wyong; they were heard also by Clive Bambury of Lidcombe. Mr. Bambury has stations to listen to in the Sydney area; therefore, his interest is always at high level . . ., but what of the listener doggedly immersed on the band away in the isolated country areas . . . and for that matter Hams similarly placed? All they hear most or all of the time is the background noise of the receiver. If signals break through, the occasion will be something of a gala day. It takes enthusiasm of a high degree to keep listening for signals that simply aren't there, but surprising is the number of observers who make a hobby of Six-metre listening in isolated places. One of these is A. H. Wass, of Carinda, via Coonamble, N.S.W. As he says, he is "situated out in the back blocks with the Blue Mountains between us. Receiver is a 954 RF with 6K8 converter with 10 Mc/s I.F. into a 4-valve portable. This combination is used also on 'Ten,' and with regeneration on the 6K8 lifts the DX up out of the noise. According to ARRL Handbook the 6K8 is OK on 56 Mc-s. (Correct . . . we used it there oft-times.—DBK.) Exact location here is the junction of the Macquarie and Darling Rivers. Re the difference between W/T and Radar Mechanics in the Services. As one of the latter, I think the W/T boys have the edge on us at H.F., but I'll back the Radar men at UHF and aerials." With which observations we agree open-mindedly. As we said in effect once before, the ideal combination is the pre-war Ham who can punch a key at a good clip and can modulate 100 watts or so nicely . . . who acquired UHF technique in Radar during the war. He is the lad who *should* know the ins and outs of it all.

* * *

The foregoing reminds me . . . I heard a station on "Forty" in the country decrying a published opinion to the effect that VHF's should be used instead of the popular DX bands for "social contact." It all depends . . . if the Ham is away in the country in a more or less iso-

(Continued on next page)

ARMY v. AMATEUR STANDARDS

WITH the advent of the 7 Mc/s band in particular, and to some extent 3.5 Mc/s, of signals of the rubber mouthpiece mike variety, the time is opportune to say a few words about Army-designed equipment of the 108, 101, FS6, and 109 variety. Much of this gear has found its way via Disposals dealers' counters into amateur stations and as such have constituted excellent bargains. There are plenty of solid "bits and pieces" in such equipment, which, if badly "cannibalised" can be "exploded" and the parts put to good use somewhere. In the case of the equipment complete with power supply . . . ready to put into action . . . it is likely that the relatively inexperienced newcomer ham will trust to those who designed it . . . that it works as well as it may look. Where speech transmission is concerned and the system is by grid modulation with carbon mike through the usual transformer in the P.A. grid, very harsh and unpleasant reproduction can be the result. Aerial loading plays a big part here and where variation is provided by "anode taps" as in the 101 and FS6, care should be taken with adjustment to note that a rise in indicated aerial current occurs when modulating. If the thermo-couple meter shows a decrease in reading, a different tap should be tried with a variation of the aerial tuning control. Above all, the user should try not to bellow into the rubber mouthpiece of the handset . . . as the output from a carbon mike No. 3 can be quite considerable.

Where CW operation is concerned, one of the immediate results of too heavy aerial loading is "yooping" of the signal. Lighter loading will clean up the chirp and the difference in output won't be even noticed. There are other considerations of these types of Army equipments designed for short-range working as field stations which indicate that, as they stand, they are just not good enough to meet modern amateur requirements. It must be realised that what the Army needed for the purposes of field communication, especially in the earlier war days, was transmitters that would put out signals *within a small percentage of specified frequency* under arduous and trying operating conditions. As we judge things today . . . by amateur standards, and they are supposed to be high, the *quality* of the signal was of secondary importance.

—VK2NO.

HAM NOTES

(Continued)

lated spot, he *must* use 40 or 80 to talk to his Ham neighbours who may be, at the nearest, 100 miles or so distant. Nobody would suggest that VHF's be the means of contact . . . under those conditions. But where fellows "mag" for hours literally over a few hundred yards instead of miles, it isn't cricket to do that on already crowded DX bands. There are stations in and around the capital cities that run QSO's on 20 and 40 for an hour or more at a time and make a regular feature of so doing. If these people are interested only in yarning with their immediate cronies, the VHF channels *are* the appropriate ones for the purpose, and by that I mean 166 Mc/s and higher. Surely nobody will seriously deny that a vast amount of inane rubbish *is* sprouted into mikes between stations "close in" on 20 and 40? Which is likely to bring up the matter of methods of operating and that is a subject to take up lots of space. What I mean is the matter of "handles" and things like that about which some OT's with years of operating behind them are apt to get quite sulphurous.

* * *

On the subject of SWL's and station reporting. As I have often said, I am always keen to give the SWL every encouragement . . . for his angle on this most versatile of hobbies is as important to him as the TX is to the transmitting enthusiast. Lots of Hams scorn to answer SWL cards and reports by reason of the inordinate expense involved in replying to them all. It takes the Ham all his time to keep up to date with his QSL's to the stations he has *worked*. But for the Ham who accepts the SWL's enclosed postage and ignores it, I have the deepest contempt. Don't do that, fellows; it is not a fair go . . . and if you don't have a QSL card on hand, what is wrong with a letter when the supplicant has enclosed stamps? Finally, a word to SWL's . . . don't expect replies from transmitting men *unless* you enclose postage.

* * *

Ray Boyle of Rockhampton, Qld., sends along notes on local amateur doings. The club there is the "Rockhampton Radio Experimenters' Association," which meets monthly, and membership totals around 30, of which 8 are licensed VK4's. They are VK's 4DO (president), 4VD (secretary), 4EC, 4ZL, 4CD, 4TD, 4FD, and 4CL. The last-named runs morse classes for members on Thursday and Friday nights. Needless to say, correspondent Boyle is in the running himself for a licence and is busily plugging away with the necessary theory and code practice. Good luck, OM.

* * *

Everything comes to those who wait, and the SWL who waits for results on "Six" is likely to wait a lengthy time before hearing anything, if he is removed from local activities. Signals came to the 50 Mc/s receiver of Mr. M. Tomkins, of Bingera Street, Bundaberg, Qld., in fine style during the initial DX splurge of the band. I say "initial" because I am optimist enough to believe there will be other occasions. On Saturday, December 7, 1946, he logged VK's 2NO, 2AHF, 2AZ, and 4AW at strengths varying from R5 to 6 and on the 9th of that month he pulled in VK's 3MJ, 3BW, 2NO, 3HK, and 3NW. His receiver is a 5/6 superhet with ECH35 mixer/osc., EBF35 first I.F. at 1900 Kc/s, and 6SQ7 second stage. Detector is a 6C5 and audio via an EL3NG. Plug-in coils are used with band-spread . . . a sensible sounding arrangement. Mr. Tomkins says "it was not originally intended for 6 metres and it surprised me very much when it worked." It certainly functioned OM. Incidentally, the aerial is a coaxial type about 25 feet from ground. I can well imagine the "kick" that an SWL gets on hearing DX on "Six" for the first time

(Continued on next page)

FACTS ABOUT FREQUENCIES

HEREWITH a few historical points about amateur bands internationally, for the edification of the new licencee in particular.

1. Prior to the year 1924 amateur radio was given the use of all frequencies above 1500 Kc/s . . . in the vernacular of those times . . . "200 metres and below." Then came the time when some slices were carved out around 1750, 3500, 7000, and 14,000 . . . were handed to amateur radio to make do with, and *the rest was given to commercial and government services.*

2. The year 1927 brought the Washington Conference where the commercial services grabbed all they could get their hands on. The result was that amateur radio was packed into bands which were the forerunner of things as they are today.

3. Amateur representatives, headed by the A.R.R.L. and I.A.R.U. protested vigorously about the theft of frequencies by the commercial services, but were blandly informed that they didn't deserve any more than they had, and what they had was ample anyway.

4. Since 1927 the number of amateurs has been multiplied by many times . . . U.S.A. alone had 60,000 before 1939 . . . now estimates half a million inside the next few years . . . *but amateur radio is still restricted to the same narrow bands.* The last International Conference held pre-war at Cairo refused to extend amateur territory although there are portions of the frequency spectrum relatively unoccupied.

At no time in the history of amateur radio has interest run so high as since the close of the recent world war. With the ranks of amateurs everywhere increasing in numbers, a time will arrive when more than a mere clamour will be imperative if strangulation is not to set in on the most popular channels, around 14 and 7 Mc/s.

The radio amateur will have a strong case for widened frequency bands . . . he has, as history shows, every right to his claims.

—D.B.K.

. . . and who am I to talk? Lives there the 6-metre TX man who can honestly say he didn't get a boy-like thrill out of his first real DX contacts on that band, after months of looking for it? Yes, brother, the thrill I got was akin to the time I worked my first American. That was in 1924, and it was John Reinartz himself . . . way back in the early 80-metre days (or nights).

* * *

Widespread use of Disposals equipment has its snags, not least being the tendency to Ham piracy by irresponsibles armed with "revamped ex-Army 101's, 108's, FS6's and the like. Some of the callsigns heard dithering around on Forty and Eighty were never issued by the PMG, and it's up to those of us who set some stock by our licences to back up the W.I.A. and the Advisory Committees in hunting down these interlopers. In New Zealand our ZL colleagues are having similar troubles, mainly as a result of indiscriminate sales of Transceiver outfits known as "ZC1's." These are about on a par with the A.M.F.'s "Wireless Set No. 22" and as such can make quite a bit of noise on the air. With due respect to those who are using such outfits intelligently, I shudder oft-times at so-called telephony I hear around and about on Forty and which I recognise immediately as "Number Eleven Set Quality." It should be realised that with all those grid modulated Army equipments, antenna loading plays a vital part in modulation characteristic. Attempts to load the antenna circuit beyond a reasonable figure will result in the condition described as "downward modulation" with its attendant roughness, plus the obvious accentuation by "earbashing" the rubber mouthpiece bakelite-encased carbon microphone . . . something like "loop" modulation and solid-back carbon mikes of the bad old days.

* * *

It just goes to show. At 7.45 p.m. on December 30 last, I overheard that staunch 6-metre man, VK3NW, on "Forty" working a local . . . VK3TD. Ken said he

(Continued on page 36)

Six Metre Milestones In Australia

IN order to clarify the position regarding DX events on 50/54 Mc/s in Australia since the latter end of 1946, the following highlights are quoted for the benefit of interested readers here and overseas. The VK DX era started in November when VK3HK suddenly heard VK4ZU. Following this, VK2WJ and VK2OC both heard very strong signals from VK3HK, and VK2NO heard a harmonic in the 56-60 Mc/s range from VK3VO, who was operating on "20." *The first interstate QSO on 50-54 Mc/s direct was between VK3MJ, Melbourne, and VK2NO, Sydney.*

This was on the evening of December 7, 1946, at 1800 hours, EAT, during a terrific thunderstorm in Sydney. That night many VK2-3 contacts took place and the Victorians went further afield by working with Brisbane stations also. The first QSO between Sydney and Brisbane on 50/54 Mc/s was between VK4AW and VK2NO on December 9, 1946, at 1800 EAT.

On December 11 at 1930 EAT, VK7CW in Hobart, Tasmania, heard VK2NP and VK2NO strongly for about 15 minutes, but VK7CW did not then have a transmitter on the band. By this date all the interested stations in Melbourne, Sydney and Brisbane had just about tied up with each other at intervals.

On December 22, 1946, at 1720 hours EAT, VK4PG, Bundaberg, Qld., and VK2NO made a brief flash QSO lasting for just about enough time to realise that one was calling the other and vice versa. On December 25, 1946, at 1800 EAT, VK2WJ heard VK5QR, Adelaide, South Australia, for a few seconds, and the next day, December 26, the band went wide open for VK5 and VK3 from Sydney at 1830 EAT. VK2AHF made the first QSO with VK5QR, followed by VK2AZ and 2WJ. Victorians next came through strongly and for a period approximating four hours most VK2 stations on the band tied up with VK3's and 5's. VK3's also worked VK4PG, Bundaberg, on this occasion. There were "flash" periods on December 27 and 29, when for the first time signals showed up in the daytime. At 1100 hours, EAT, on the 27th VK's 3NW, 3MJ and 3YJ roared into Sydney for 30 minutes and the Victorians worked with Brisbane at the same time. VK4PG, Bundaberg, was heard testing from 1100 to 1120 hours on the 29th. On January 6, 1947, VK2AZ, Sydney, and VK5QR, Adelaide, had an amazing full strength QSO for an hour from midday. There was little or no sign of the characteristic E Layer swift fading, indicating the possibility of F2 Layer reflection at the distance.

On the evening of January 20, 1947, the band showed signs of life at 1800 hrs, EAT, when VK2NO heard a VK7 testing speech with rapid fadeout, followed by an excellent opening at 2000 hrs when VK7CW, Hobart, roared through for more than an hour on phone, and VK7NC on CW. All the Sydney stations active on the band worked with the Tasmanians in rapid succession. The position in N.S.W. as this is written is that most Sydney stations only need Westralia to have worked all Australian States on Six metres . . . a state of affairs that only a short while back seemed incredible of achievement. One signal has been heard purporting to have originated in New Zealand, but there is no evidence to hand as to whom the station might have been. A report comes from the Philippines that unidentified signals have been heard there on the band and many Americans are flat out trying to persuade the F Layer to raise the curtain of silence across the Pacific. It has been to date, and will be for two years or more to come, a very interesting period of operation for those who enjoy the certainty of unblemished local communication on 50/54 Mc/s, plus the intriguing uncertainty of unexpected DX QSO's with unexpected places.

—DBK.

HAM NOTES

(Continued)

would change to "Six" and call him. Out of curiosity, VK's 2AHF and 2NO, who were listening in Sydney, also changed to "Six," and sure enough, there was VK3NW at R Max . . . calling 3TD. Both Bob Jones and myself went bald-headed after Ken, but he faded out rapidly. It was one of the now familiar occasions when "Six" opened up with a wallop for a minute or two only. Any suggestions as to the cause? One theory is the passage of meteorites through the earth's atmosphere.

* * *

Reminiscent of better times on the band is 40 metres in the early morning these sunny summer days, for there is interesting DX to be had for the CW man. Being up with the lark the other morning, and by force of habit questing for F2 Layer DX on "Six," I took a look over the popular DX bands and found a welcome surprise on "40." There, almost for the asking, were several G stations on CW, running to R6. It was very much like old times when DX was the primary consideration on the band . . . not quasi-local phone . . . but there was present a vast and ominous menace in the form of broadcasters. At present this disputed band is subject to international broadcasting between 7200 and 7300 Kc/s, which wouldn't be so tough to put up with pro tem if all the BC stations were in that region. But take a quiz over 7000 to 7200 Kc/s from 5 a.m. Sydney time . . . it is virtually a maze of broadcasters. The G's I heard were, of course, in between these signals and Lord knows how many might have been underneath them. Which prompts the thought . . . one might call DX for ages and raise nothing because one's crystal falls at the same spot as Bratislava or Przemzl or somebody. Let me advise those who go seeking DX contacts with the Europeans on 40 in the small hours. It will be a matter of really good radiating systems and the 100-watt rating to do the job consistently. Ask those who oft-times kept European skeds on "40" in the small hours pre-war, and who know what they are talking about!

* * *

Any comments on the following? A reader from Northern N.S.W. says: *"I take this opportunity to state my views on Ham politics. It is becoming increasingly evident that everything is being done to discourage people trying to sit for exams. I have decided not to sit again should I fail in the coming paper, but wait until I can get at someone's throat. Instead of keeping people off the air, they are merely increasing the number of pirates . . . a situation that is far more unsatisfactory."* There are two viewpoints on this subject. I personally would like to see thousands of VK's on the air . . . amateur radio is designed for the many . . . not the few. But there is a remedy. Whether unpopularity is occasioned or not so far as a few miscreants are concerned . . . for the sake of the majority of responsible licencees . . . the Advisory Committees in all States should take swift action to bring offenders to book. The modus operandi of some of the occupants of "popular" bands will not help to improve relations with the PMG. These things were bad pre-war . . . but were much better than in these times. If nobody does anything about it . . . matters will deteriorate further and the whole hobby will suffer.

* * *

Whilst yarning t'other evening with a lad on 40-metre phone, his outfit developed feedback to a persistent degree and finally the signal disappeared. A day or so afterward, I heard a sad story. Simultaneously with the feedback smoke began to arise from the rig, which he tipped up for investigation. Whereupon a small modulation choke underneath the chassis burst into flames. Switching off the power made no difference, the choke flared and burned merrily on. The defunct component was lugged from the chassis by a pair of pliers and put under a water-tap. At least the laminations may be useful. Moral is that chokes to carry a handful of mills are not meant to carry heavy overloads.

AN AMERICAN LETTER FROM W1HDQ

Dear Don:

Many thanks for your letter of December 3, summarising recent activities on 50 Mc/s in Australia. Though no signals have been heard in the United States from Australia or New Zealand thus far, I feel sure that it is possible for contacts to be made betwen our two countries, and a great many American stations are on the look-out for signals from "down under."

You are quite right that next year will afford a much better opportunity than has 1946; however, I feel that the next three or four months should be all right too. Unfortunately for us in the northern part of the United States our prospects do not look too good but for the southern and western United States the prediction for the month of March, in particular, looks very intriguing. From these predictions, issued by our Bureau of Standards, it appears that contacts might be made any month during this winter, with March showing up as the best thus far. The path between your location and the Hawaiian Islands and also the Philippine Islands certainly should be open almost daily, the problem here being to develop activity in those two island groups. I have been trying very hard to work up some interest on the part of various KH6 stations, but have not had too much success thus far.

I suggest that any of your workers who are capable of using both 28 and 50 Mc/s attempt to promote cross-band tests with W and KH6 stations whenever possible. The writer has been in daily contact on 28 Mc/s with G6DH each morning on 28 Mc/s since early November. The m.u.f. across the North Atlantic has been checked by listening to various stations operating in the range between 30 and 50 Mc/s, and whenever conditions have appeared propitious 50Mc/s, tests have been made at this end. You have no doubt heard by now that we were successful in getting across the North Atlantic on 50 Mc/s. on the morning of November 24th. Two stations were contacted, namely G6DH and G5BY, these two replying on 28 Mc/s in response to my 50 Mc/s transmissions. The m.u.f. dropped sharply a few days after these contacts, and until the last few days has not showed any indication of rising even close to 50 Mc/s. In the past few days, however, signals have been heard across the Atlantic very close to 50 Mc/s., and we feel that there is a good chance that we will get across again within the next week.

The predictions for the North Atlantic path show an m.u.f. of only 44 Mc/s, yet signals were in at the two English stations for more than an hour on November 24 with the signal level running well over S9 at times! If that North Atlantic path can open up, then surely the central and southern Pacifics should provide better opportunities. I remain convinced that contact between Australia and the Hawaiian Islands or our West Coast is chiefly a matter of getting the stations together at the right time of day, and with facilities for remaining in contact on 28 or 14 Mc/s while checking conditions on 50 Mc/s.

I was glad to hear of the E-layer activity and I feel sure that a few tastes of DX will go a long ways toward building up interest in 50 Mc/s work in ZL and VK. I am glad to know that you are continuing to run your automatic transmitter, and we will publicise your operating schedule again in QST in the hope that more stations will be on the look-out for it.

It is interesting to note that more countries are coming down to the 50 Mc/s assignments. Here is a good one for you to look out for—XE1KE in Mexico City is on 50,024 Kc/s. He has a four-element rotary and is running 125 watts, so he should be in a position to work you fellows handily on 50 Mc/s. Quite a few v.h.f. enthusiasts in countries not having the 50 Mc/s assignment now have facilities for listening in our band and many are more than willing to co-operate much better than nothing at all! It is hoped that, as time goes on, special permission to operate on 50 Mc/s may be obtained for selected stations in countries not having the 50 Mc/s assignment.

Please pass my best regards along to the v.h.f. enthusiasts of Australia. You may be sure that a great many W's are looking forward to that first 50 Mc/s QSO with VK.

Sincerely yours,
EWDARD P. TILTON,
W1HDQ,
V.H.F. Editor, QST.

REPORTS WANTED

Reception reports of transmissions from the Singapore broadcasting stations are welcomed by the Department of Broadcasting, Cathay Buildings, Singapore, Federated Malay States. Transmissions on 4.78 mcs. are radiated from 1130-1630 B.S.T. and on 7.22 mcs. from 0530-0730. A third transmitter works on 9.54 mcs.

* * *

SOUNDS O.K.!

Polytetrafluorethylene, a new plastic which may find a considerable field of use as a radio-frequency dielectric, was among the materials—most of which were introduced during the war years—recently discussed by the Radio Section of the Institution of Electrical Engineers in England.

* * *

F.M. VERSUS A.M.

The issue between F.M. and A.M. is one that cannot be determined in the laboratory, but only by widespread field test. Consequently, the results of the B.B.C. frequency modulation trials, described by H. L. Kirke (head of the research department) in the current *B.B.C. Quarterly* will be read with particular interest. The general conclusion is very much in favour of F.M. as a means of distributing high-quality noise-free broadcasting.

Shortwave Review

CONDUCTED BY
L. J. KEAST

NOTES FROM MY DIARY

Sunspots

Dr. John Q. Stewart, astronomer of Princeton University, U.S.A., says: "Sunspots—some as big as the earth—will continue to disrupt radio for at least another year. Even then the respite will be brief for one spot cycle is no more completed than another one begins. It usually takes about 11 years for the maximum to be reached. Dr. Stewart predicts that the present cycle will reach its maximum by about the end of 1947.—*Radio News.*

"Radio Australia"

I have received a very fine double-sided pamphlet from the Department of Information, Melbourne, setting out in splendid form the various programmes, schedules and transmitters used by "Radio Australia." In this issue I am showing the call-signs, frequencies and times on the air and it is hoped space will be available in March issue for the various features. The whole set-up compares more than favourably with anything from overseas and it is printed all ready for posting, so should be a splendid advertisement for Australia.

International Shortwave

I was very pleased and proud to receive a card from Kenneth R. Boord, shortwave editor of "Radio News," appointing me as monitor for international shortwave during the year 1946-7. "Radio News" is one of—if not—the best American magazines dealing with radio. It is profusely illustrated and contains most informative notes on shortwave.

SAYS WHO?

Arthur Cushen of Invercargill, N.Z., reports three nice verifications: LJK, Oslo, 9.54mc, 31.45m: this was in the form of a nice card showing photo of Oslo across the harbour. They state they are using 5KW and relay Norwegian National Programmes from 5-5.15 p.m.; 8.45-10.30 p.m.; 2-8 a.m. There are no regular English broadcasts at present. This verification by the way took a little over a year to arrive . . . Cushen's report was dated October 13, 1945. Another was from CE622, Santiago, 6.22 mc, 48.23m. This verification took the form of a letter in Spanish signed by F. Elisso Merino B, Casilla 2626, Santiago. Power is 5000 watts. (Slogan of this station is "Radio Sociedad Nacional de Mineria."—L.J.K.) The final was from Paris for reports on 9.985mc and 11.845mc.—L.J.K.

* * *

Rex Gillett of Adelaide is also proud of his veries and considers the best received for some time is KOFA, Salzburg, 7.22mc, 41.55m. This United States Forces station in Austria uses a power of 725 watts. The manager of the station, Mel. London, said in answer to Rex's question, "Am I the first Australian to pick you up and report the fact?" "The answer is definitely YES and we're quite proud of your report because, although we have been picked up all over the United States and most of Europe, yours in the first from 'down under'."

Another good verie received on Boxing Day was ZNB, Mafeking, Bechuanaland, 5.900mc, 50.85m. Mr. A. P. Brittz, the station's technician, in verifying Mr. Gillett's report stated that ZNB is NOT a broadcasting station. "It is primarily the control station for numerous communication stations up-country in the Bechuanaland Protectorate where there is no telephone communication or telegraph. They average two transmissions a day and all traffic handled is passed through ZNB, who disposes of the stuff to the local post office and other channels. During their spare time ZNB broadcasts records, of which they have approximately 9000, between 1 and 2 p.m. and 7 and 9.30 p.m. South African Standard time (8-9 p.m. and 3-5.30 a.m. Sydney time).

Radio Sofia, Bulgaria

Radio Sofia is State owned, the whole radio service being administered under the name of Bulgarian Broadcasting System. Radio Sofia, using a power of .5 kilowatts, is heard on 7.66mc, 39.16m, and Radio Rodina, 9.35mc, 32.09m, the power on this one being 5 kilowatts. Radio Sofia has five broadcasting studios, four of which are in the central building of Radio Sofia and the fifth at Radio Rodina. Bulgaria has well over 200,000 registered receiving sets, which of course get their programmes from the broadcast band outlets, 650kc (Radio Sofia); 1,402kc (Radio Stara Zagora) and 1,276kc (Radio Varna). Advertising over the air was discontinued some years ago but is likely to be resumed shortly. News and talks in English are given over Radio Sofia from 6.30-6.40 a.m. daily on both 9.35 and 7.66mc.—*Radio Call.*

"Radio Australia"

Overseas Shortwave Service of Department of Information

The following alterations took place as from January 14:

VLA-9, Shepparton, 21.60mc, 13.89m: Programme to North America (East) and Canada is now on the air from 9.30 a.m.-10.45 a.m.

VLA-8, Shepparton, 11.76mc, 25.51m, and VLB-9, Shepparton, 9.615mc, 31.2m: Replace VLA-4 and VLG-2 and have joined VLC-4 and VLG-7 in programme to N. America (West) from 2.45-3.45 p.m. (VLB-9 and VLG-7 are not in use on Saturdays.)

VLA-8, Shepparton, 11.76mc, 25.51m, and VLG-4, Lyndhurst, 11.84mc, 25.35m: Replace VLA-4 and VLG-10 and have joined VLC-6, 9.615mc, in programme to N. America (West) and South Africa.

Radio Newsreel

A special Pacific edition is given every Sunday by Chester Wilmott at 5 p.m. It is a survey of the week's happenings and as usual with items handled by Wilmott is excellent.

Diplomatic Diary

A weekly review of international affairs, seen from the diplomatic standpoint, is being given by the Hon. Harold Nicholson in the Overseas Services. Mr. Nicholson —listeners will remember his analytical commentaries from Paris on the occasion of the recent United Nations Conference there— is well known through his books and broadcasts as an expert interpreter of the international scene. "Diplomatic Diary" is heard in the Pacific Service at 4.15 p.m. on Thursdays.

Latest Loggings

XOPD, Hangchow, 9.555mc, 31.40m: Heard well at 8.30 p.m.—L.J.K.

Radio Kuala Lumpur, 6.165mc, 48.70m: News in English from "Radio Malaya" at 9 p.m.—Cushen.

CHNX, Halifax, 6.13mc, 48.93 m: News at 10 p.m.—Cushen.

VUC-2, Calcutta, 6.01mc, 49.93 m: News at 10.30 p.m.—Cushen.

FFE, Paris, 13.715mc, 21.87m: Has contacts and programme for New York at 5.30 a.m.—Cushen.

KNBA, San Francisco, 9.49mc, 31.61m, and KNBI, San Francisco, 6.06mc, 49.50m: Both in parallel and good at 9 p.m.—L.J.K.

GVS, London, 21.71mc, 13.82 m: Very good from 6-9 p.m.—L.J.K.

FHE3, Dakar, 11.715mc, 25.61 m: Has now been dropped in favour of 15.385mc, 19.49m, and is at good strength till closing at 8 a.m.—Gillett.

NEW STATIONS

CKRZ, Sackville, 6.06mc, 49.50 m: Mr. Cushen reports hearing this new Canadian in Latin-American Service from 9.25-10.35 a.m. This time does not coincide with the schedule I received by air-mail from the Canadian Broadcasting Corporation and which is printed in full in this issue. But one must remember it is the prerogative of ALL shortwave stations to change schedules without notice . . . and don't we know they do it.

ADDIS ABABA, 15.065mc, 19.92m: "Universalite" mentioned this new frequency for the Ethiopian station and says they are on the air from 11.15 a.m.-12.30 p.m. but it is doubtful if they would be heard here at that hour. However, Ray Simpson logged them on this new frequency at a little before midnight. Strength was poor and there was a fair amount of interference, but it is worth trying for, as frequent announcements are made in English. So try from about 11.30 p.m. till 1 a.m. Ern Suffolk of South Australia is hearing them weakly from 11 p.m.

——, Munich, 6.10mc, 49.18m; ——, Munich, 6.17mc, 38.62m; ——, Munich, 7.29mc, 41.15m: Rex Gillett sends advice of these new German stations heard by him from as early as 2.30 a.m. Station announces, "This is Munich relaying The Voice of the United States of America, operating in the 41, 48 and 49 metre bands." Closes at 7.30 a.m. with "Star Spangled Banner." Arthur Cushen also reports Munich as good from 5 till 7.30 a.m.—41 best.

CR8AA, Macau, 9.235mc, 32.48 m: Arthur Cushen reports hearing this new outlet in Portuguese China. At 10 p.m. at fair strength, the announcement is: "This is CR-8AA, Macau Radio Society, on 33 metres, 9.2mc." English programme at 11 p.m.

RADIO OMROEP, Soerabaya, 16.68mc, 17.98m: Another catch by Rex Gillett. Is quite good strength at 11 p.m., but morse occasionally causes trouble.

(Continued on page 41)

"RADIO AUSTRALIA"

Transmitters: VLA (100 kw), VLB (100 kw), VLC (50 kw), situated at Shepparton, Victoria, 110 air miles north of Melbourne. VLG (10 kw), situated at Lyndhurst, Victoria, 24 air miles S.E. of Melbourne. Transmitter and technical services are operated and controlled by the Postmaster-General's Department.

Studios, Newsroom, Offices: Studios are at corner of Lonsdale and William Streets, Melbourne; Newsroom and Offices, 375 Collins Street, Melbourne.

Letters and Cables: Address correspondence: The Director, "Radio Australia," Box 780H, G.P.O., Melbourne, Australia. Address telegrams and cables: Newscast, Melbourne.

Time in Australia: Australian Eastern Time is 10 hours ahead of Greenwich Mean Time. Daylight Saving does not operate in Australia.

NOTE: All Australian shortwave programmes directed to listeners outside Australian territory are prepared and produced by the Commonwealth Department of Information.

Our Time	*News Time*	*Call Sign*	*W/L metres*	*Freq. m/cs*	*Notes*
In English to British Isles and Europe					
1700-1815	7.30 a.m.	VLA9	13.89	21.60	VLB3 ends 8 o'c.;
		VLB3	25.49	11.77	Both not used Sat.
		VLA4	25.49	11.77	Sats. only
		VLC10	13.84	21.68	Sats. only
0100-0200	3.15 p.m.	VLA8	25.51	11.76	VLA8 ends 3.30
		VLB9	30.2	9.615	
		VLC4	19.59	15.32	VLC4 ends 3.45
		VLG9	25.21	11.90	VLG9 ends 3.45
0630-0900	9 p.m. and 9.45 p.m.	VLA4	25.49	11.77	
In English to N. America (East Coast)					
2300-0015	8 a.m. and 9 a.m. EST	VLB	31.45	9.54	
		VLC7	25.35	11.84	
0930-1045	10 p.m. EST	VLA9	13.89	21.60	
In English to N. America (West Coast)					
0200-0300	8 a.m. PST	VLA8	25.51	11.76	
		VLC6	31.2	9.615	
1445-1545	9.15 p.m. P.S.T.	VLA8	25.51	11.76	
		VLB9	31.2	9.615	VLB9 not used Sat.
		VLG7	19.79	15.16	VLG7 not used Sat.
In English to South Africa					
1445-1545	7.15 a.m. S.A.T.	VLC9	16.82	17.84	
2300-0015	3 p.m., 4 p.m., S.A.T.	VLB	31.45	9.54	
		VLC7	25.35	11.84	
0200-0300	6 p.m. S.A.T.	VLG4	25.35	11.84	
In French to Tahiti, N. Caledonia, Indo-China					
1600-1645	8 p.m. Tahiti	VLC4	19.59	15.32	VLG3 not used
		VLG3	25.62	11.71	Saturdays
1730-1845	7 p.m. N. Cal.	VLC4	19.59	15.32	VLC4 not used
		VLG7	19.79	15.16	Saturdays
		VLG	17.79	15.16	
2300-2335	9 p.m. Saigon	VLA8	25.51	11.76	
		VLG9	25.21	11.90	
In Chinese, Dutch, English, Indonesian to Asia and Indonesia					
2000-2015	1800 N & S.	VLC4	19.59	15.32	
		VLG10	25.51	11.76	

RADIO AUSTRALIA

(Continued)

2015-2100		VLC4	19.59	15.32	
		VLG10	25.51	11.76	
2100-2130	1830 Bat.	VLC4	19.59	15.32	
		VLG10	25.51	11.76	
2130-2200	1900 Bat.	VLC4	19.59	15.32	VLG10 ends 1920
		VLG10	25.51	11.76	Batavia Time
1855-2300	1430, 1800 IST	VLA8	25.51	11.76	VLB8 ends
		VLB8	13.89	21.60	1800 IST
		VLC4	19.59	15.32	VLC4 ends
		VLG10	25.51	11.76	1815 IST
0000-0100	2000 IST	VLA8	25.51	11.76	VLB9 begins 2015
		VLB9	31.2	9.615	VLC4 begins 2000
		VLC4	19.59	15.32	
		VLG9	25.21	11.90	
In Siamese to Siam					
2335-2400	2035 Bangkok	VLA8	25.51	11.76	
		VLG9	25.21	11.90	

CANADIAN BROADCASTING CORPORATION

International Service

Schedule of Transmissions from Sackville.
Effective December 1, 1946.

EUROPEAN SERVICE—Weekdays (ex. Mondays)
All Times Aust. East. Stand.

12.30- 3.00 a.m.	CKNC	17.82mc	16.84m.
	CKCX	15.19mc	19.75m
3.00- 3.05 a.m.	CKNC	17.82mc	16.84m
3.05- 3.45 a.m.	CKNC	17.82mc	16.84m
	CKCS	15.32mc	19.58m
3.45- 4.00 a.m.	CKCS	15.32mc	19.58m
4.00- 6.00 a.m.	CKCS	15.32mc	19.58m
	CHOL	11.72mc	25.60m
6.00- 6.15 a.m.	CHOL	11.72mc	25.60m
6.15- 9.05 a.m.	CHOL	11.72mc	25.60m
	CKLO	9.63mc	31.15m

CARIBBEAN SERVICE—Weekdays (ex. Mondays)

4.20- 5.35 a.m.	CKRA	11.76mc	25.51m
	CKRZ	6.06mc	49.50m

EUROPEAN SERVICE—Sundays

10 p.m. - 3 a.m.	CKNC	17.82mc	16.84m
(Monday)	CKCX	15.19mc	19.75m

MONDAYS

3.00- 3.05 a.m.	CKNC	17.82mc	16.84m
3.05- 3.45 a.m.	CKNC	17.82mc	16.84m
	CKCS	15.32mc	19.58m
3.45- 4.00 a.m.	CKCS	15.32mc	19.58m
4.00- 6.00 a.m.	CKCS	15.32mc	19.58m
	CHOL	11.72mc	25.60m
6.00- 6.15 a.m.	CHOL	11.72mc	25.60m
6.15- 9.05 a.m.	CHOL	11.72mc	25.60m
	CKLO	9.63mc	31.15m

SOUTH AND CENTRAL AMERICAN AND WEST INDIAN SERVICE
Mondays. Caribbean Service—English.

4.20- 5.30 a.m.	CKRA	11.76mc	25.51m
	CKRZ	6.06mc	49.50m

SOUTH AMERICA AND WEST INDIES—Portuguese

5.30- 6.00 a.m.	CKRA	11.76mc	25.51m

LATIN AMERICA AND WEST INDIES—Spanish

6.00- 7.05 a.m.	CKRA	11.76mc	25.51m

Notes from My Diary—

(Continued from page 39)

WLKS, Tokyo, 6.105mc, 49.15 m: I must thank Ray Simpson for news about this new Japanese outlet. This station is conducted by the British Commonwealth Occupation Forces and is on the air twice daily—7.30-9.30 a.m. and noon-7.30 p.m. In a letter to Ray, Signaller Henderson of Station WLKS says they are not yet operating of a night as so far they have not been granted a suitable frequency. Station closes following the playing of "God Save the King."

KZPI, Manila, 9.710mc, 30.90 m: Rex Gillett says "Radio Philippines" is operated by the Philippines Broadcasting Corporation and is on the air from about 7 p.m. till after 12.30 a.m. and also again about 7.15 a.m. (Whilst mentioning Manila, I notice our old friend KZRH, "The Voice of the Philippines," is particularly good at 10 p.m. on 9.65mc, 31.09m.—L.J.K.)

Speedy Query Service

M.L. (Healesville) enquires about the official station of the Wireless Institute of Australia.

A.—Yes, there is an official station now operating twice each week, on Sunday mornings at 11.30 a.m. and on Tuesday nights at 8.30. The call is VK3WI and the frequency 7180kc. You should have little difficulty in picking up these transmissions on a good dual-wave receiver.

* * *

S.R. (Adelaide) wants to know whether we could do with an editorial representative in South Australia, working along the lines suggested in the editorial in the January issue, as he has a friend who may be interested.

A.—Yes, we would like to have a complete organisation of editorial representatives, special correspondents and so on. This applies equally to all states and cities, but we would expect trade activity to be on a small scale compared to Sydney and Melbourne. Anyone with interest in the game and a little spare time might put it to good use and make useful contacts for us.

To all suggestions received we give the utmost consideration, whether signed or anonymous. If you don't want to sign your name to a letter it is quite O.K. with us. But please don't trouble to work out a false name and address, as it only gives the postmen a lot of running about. This note is especially intended for the notice of the stinker who sent a letter signed K. Delmas, Huntly Street, Erskinville.

* * *

B.L. (Hurstbridge) has seen a socket hole cutter advertised in an English magazine and asks whether these are available locally.

A.—Yes, these are available at certain Melbourne trade houses, or a locally-made product which does the same job, being screwed with a wrench. Main difference is the price, which is about four times greater than the English price.

* * *

J.C. (Bathurst) asks about the F.F.R. amplifier.

A.—This amplifier is a fine job and cost hundreds of pounds in cash for development work. Ideals were decided upon and the pursuit of these ideals was no easy task. A great many amplifier circuits were tried. It is easy enough to get ten or fifteen watts at the plates of output valves, but this is not in the voice coils. Overall fidelity, when checking with a scope is also harder to get than you might imagine. The F.F.R. is a good amplifier, but you also need good input and a good reproducer to complete the chain. With ordinary pick-ups and speakers you can't expect it to sound so different from an ordinary amplifier.

* * *

R.E.D. (Hamilton) is a gramophone enthusiast.

A.—Maybe it is hardly fair to take things collectively, but to sum up the pick-up position in a few words: Locally-made magnetics are terrible, cheap imported crystal types tend to have arm rattle, more expensive imported types give good performance but are easily damaged if roughly treated. Best of all are the low-output moving coil types, but they are expensive and need pre-amplifiers with compensation, bringing their total cost up to about £20. Tough, but there doesn't seem to be any easy way out.

* * *

T.P. (Carrum) wants to get a list of amateur call signs with their addresses.

A.—The list can be obtained from the Technical Book and Magazine Company of 297 Swanston Street, Melbourne. Price is 2/- plus 2½d. postage. The scheme you have in mind may not work out very well, for there are a lot of non-active hams listed. These fellows may have had a transmitter about ten or twenty years ago, and keep their licence current for sentimental reasons, but are not actively engaged in transmitting at present.

* * *

E.W.S. (Clovelly) can't understand why circuit designs do not use higher audio gain by having more valves.

A.—If you could have a selective aerial circuit, then an efficient detector and followed it by three or four stages of voltage amplification at audio frequencies, you would have lots of gain, theoretically. But in practice you would amplify hum to an intolerable degree and also run into instability, such as motor boating due to interstage coupling and feedback. You can take it from me, lots of intelligent guys spend lots of time working out nicely balanced circuits. It is a tough game bettering them with anything radical.

RED LINE

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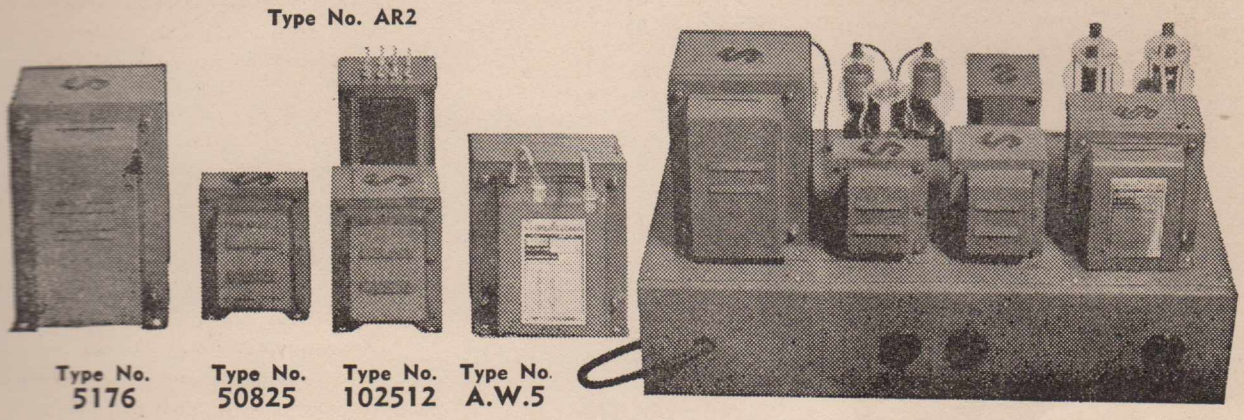

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Train quickly for a profitable career in RADIO . . . or a prosperous business of your own!

One of the most attractive features of Radio in Australia is the scope offered to start your own business. With a total of 1,481,919 licensed radio receivers (remember civilian production ceased during the war), some idea can be gained of the pressing need for more and more trained servicemen . . . Such servicemen make big money, too, in selling valves, components (of which over £1,000,000 annually were sold before the war) as well as associate electrical appliances.

We are entering now a Radio age, an Age which has a place for YOU. Radio, a young industry which has made remarkable progress in the past few years, will want **trained** men urgently to fill vital positions. If you want security, prosperity, and a recognised status in the community, start training NOW.

TRAIN AT HOME, OR AT OUR BENCHES

A.R.C. offers ambitious men a sound proven course in Radio Engineering. Sound because it is the result of many years' successful operation, proven because hundreds of ex-students owe their present success to the College. You can learn with equal facility at home (by means of our correspondence course).

EARN GOOD MONEY WHILST LEARNING

You don't have to wait a year, or even six months, before you are ready to begin "cashing in." We will show you how to earn extra money almost from the word "go." Many students make £4, and up to £8, per week in their spare time whilst studying.

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You don't need a knowledge of Radio or Electricity—we'll give you all you need of both, in a simple, practical manner, that makes learning easy, presented too, in such a way that you remember what you're taught and how to put that knowledge to practical use.

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Think of this—for a few pence per day—actually less than many fellows spend on tobacco—you can prepare yourself for a man-sized job in Radio NOW.

NOW IS THE TIME TO ACT!

Send in today for the free book, "Careers In Radio and Television." It's a book no man can afford to miss. It shows you the steps you can take to get into Radio immediately!

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Broadway, Sydney. Phone M 6391-2.

Dear Sir—I am interested in Radio. Please send me, without obligation on my part, the free book, "Careers in Radio and Television."

NAME .....

ADDRESS .....

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