THE AUSTRALASIAN

Radio World

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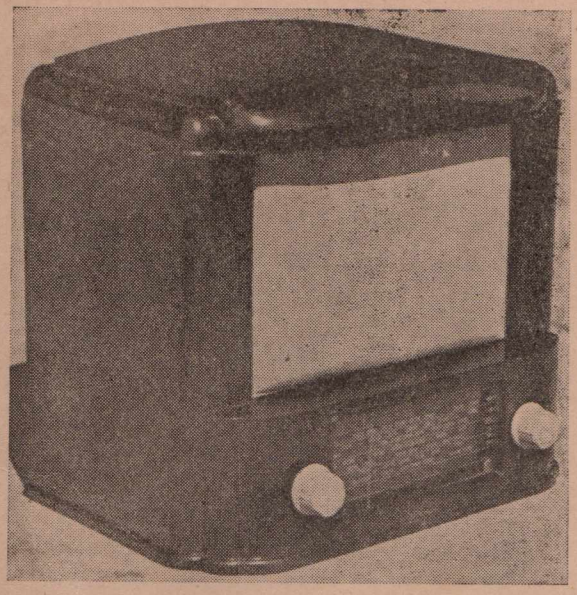

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FEATURE ARTICLES

BY

DON B. KNOCK
L. J. KEAST
CHARLES ASTON
C. H. MUTTON
J. G. DUFAUR B.Sc.
PAUL STEVENS
And others.

PUBLISHED BY
A.G. HULL

SPECIAL

10th BIRTHDAY

ISSUE

LET US BE PRACTICAL

It is possible to quench a two-gallon thirst with two-ounce drinks—providing there are plenty of them. But it is not practical.

By the same token, it is possible to build a Radio Set that will work using inadequate parts, providing you have plenty of them—for replacement. But this also is not practical. Plan wisely when you are building your Radio Set—make sure that each part of your equipment is capable of fulfilling its part 100% in the finished circuit.

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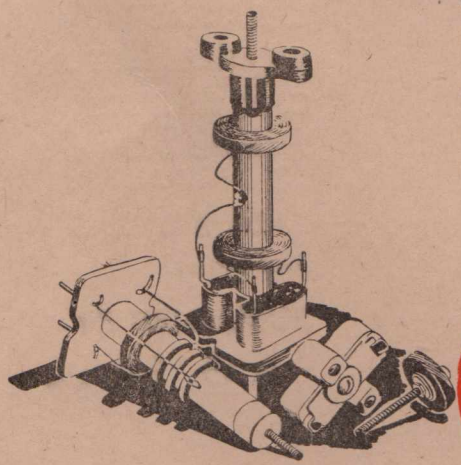

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3 Fitzgerald Road, Ermington, N.S.W.

★ HAM NOTES By—

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CONTENTS

EDITORIAL

Ten years ago "Australasian Radio World" was launched. Since then, despite the eventful times, it has made steady progress and gained the widest coverage of the Commonwealth and New Zealand.

Every reader is a keen and active radio enthusiast, varying in status from amateur to professional. All are associated in the turnover of a big amount of money in the radio trade. Our recent co-operative effort with Mr. Magrath and his "Little Companion" kitset brought in orders for many thousands of pounds' worth of kits.

That we know, but just who are our readers, how they are connected with technical radio and why they read "Radio World," are a few of the things we would like to know more about. In a nutshell: we'd like a closer personal contact with our readers.

To start the ball rolling, we have in this issue a number of personal paragraphs telling the background of some of the contributors who have done so much to provide fine technical articles.

This is just a step in the general direction of a new trend in editorial policy: the introduction of the personality angle. In this issue we deal with ourselves, but in future issues we hope to deal with you—our readers.

After you have read this month's issue, we expect that you will find it easy to sit down and write us a line, telling about yourself and your work. All letters will be gratefully received; paragraphs from them will be used in future issues and are sure to interest all our readers.

A. G. HULL.

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WHAT OF THE FUTURE OF "HAM" RADIO?

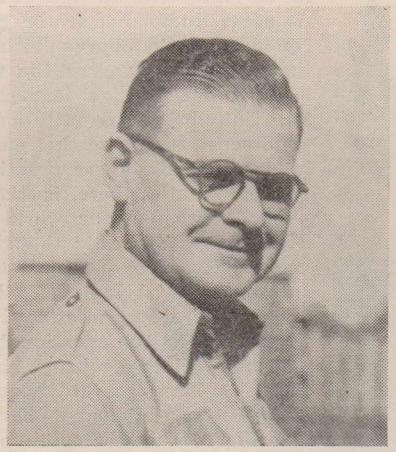
By
DON B. KNOCK
(VK2NO)

I SUPPOSE that in a veritable lifetime of amateur radio, during which my association with this evergreen hobby has enabled me to put much of my thought into print, I must have written tomes on the subject of the genus Ham, his welfare, activities, likes and dislikes. So that when your Editor (who comes from a brilliant radio family, and is at heart really a "Ham" himself) asked me to say something about Amateur Radio in general for this tenth birthday issue, I had no qualms. You see, I never get tired of writing about Amateur Radio, because this remarkably interesting phase of the 20th Century is something of which in itself I never tire. In other words, since I first broke the ice in the game (and that was 35 years ago), I have always found something fresh to think about and consider, afresh to think about and consider, or something to plan about, technically. There is always something that can be done in Amateur Radio . . . something . . . or a thousand and one things that one wishes to try. First let me say that in connection with the last 10 years I consider that "A.R.W." has been well to the forefront in catering for the Australian amateur radioman. True, little could be said about the VK's during the recent grim years, but right through that difficult period your Editor has maintained a delightfully refreshing flavour in his material. During the war many an erstwhile transmitting amateur turned over the pages of "A.R.W." and found lots of interesting reading, whilst amateur switches were off, with plenty of first-rate technical information. How well I remember the birth of this publication in 1936, and how the Ham flavour persisted throughout. And when your Editor purchased the Mag. from the originator, it was a certainty that with A.G.H. at the helm, brother of one who was this planet's No. 1 all-round Ham, there was likely to be much more than casual interest in the purely amateur side of Radio.

When the Jap war boomed to an end and matters began to stir somewhat in VK circles, it came as no surprise to me that A.G.H. set aside

(Continued on next page)

Personal



★

DON B. KNOCK

★

HAS been an active Ham for no less than 35 years, getting first insight into early day amateur radio in Colchester, England, in 1911.

Can justly lay claim to be an "Old Timer" in radio. Born in Manchester, England, 1898. Started life as engineer apprentice and by 1916 was on active service in World War I with R.N.A.S., serving in Middle East and Russia. Later served two years afloat as marine engineer with P. and O. Co. In radio trade in England with Sterling (now Marconiphone) Co., Burndept Co., and later engineer with BBC. Operated Ham station from London, G6XG, and was first G to QSO U.S.A. with low power (5 watts) on "95 metres" in 1924. In 1926 began to feel cramped in G.B. and came to Australia. Held position of C/Engr. with original Amplion Co., Sydney, in 1927, thence Technical Editor of "Wireless Weekly" and "Radio in Australia and N.Z." Had established station A2NO shortly after settling in Sydney and this call sign quickly became known everywhere where there were Hams. Established radio stations at Wyndham, Nth. West Aust., for W.A. Government in 1930. Operated Ham station VK6NK from Wyndham and figured in radio rescue of stranded fliers Smith and Shiers. In 1931 designed and installed N.S.W. Country B/C station 2MO Gunnedah, but with radio journalism in blood returned to Sydney to become technical editor "Radio Monthly." During this period did considerable VHF work, some in conjunction with N.S.W. Police Dept. 1933 joined staff of Sydney "Bulletin" as editor "Australian Radio News" and in 1934 became Radio Editor of "The Bulletin." In between Ham activities held commission in Militia Sigs, and when September, '39, struck went into camp, as Lieutenant. Finished military service as Major, A.I.F. (Army Inspection) when obtained release from Army April, 1945, and placed on Reserve of Officers. Joined Philips organisation in June, 1945, and now engaged under Chief Engineer S. O. Jones on special developmental work.

HAMS

(Continued)

a liberal amount of space for writings of, by, and for the Ham in "A.R.W." and suggested that in my spare (?) time, I might like to put pen to paper. Thus, perhaps, I may write caustically of those who would deprive the transmitting Ham of his rights . . . and he **has** rights . . . as his history shows clearly enough. Or the Notes may take the form of doings around the bands, or may go into the merits of Ham aparratus by technical articles. You may be assured that whatever form it takes in these pages it will be of primary interest to the Ham, and in his interests. In the future of Amateur Radio, I have the greatest confidence, and above all the hope that those who govern the welfare of mankind through leadership of the United Nations will have the good sense to realise that embodied in Amateur Radio, as practiced by modern youth, there is the most powerful weapon for world peace. That isn't a fantastic thought, but cold logic. Do you think that if, Internationally, Hams of all countries were given unfettered facilities for intercommunication, by wide and appropriate frequency channels, they wouldn't get to know each other better? Of course they woud, and there would be more progress toward world peace than national leaders realise.

Getting to know the other man and his viewpoint over th eair is a much better thing than hauling out lethal weapons, and setting out to obliterate him. You say: "But he might strike first." Answer to that is that he wouldn't feel that way about it if he were fully familiar with **our** point of view. Wise governments and leaders worthy of the name will encourage their radio-communing youth to the utmost, which means simply: cut out fettering restrictions, permit reasonable power ratings, don't rate a man's intelligence solely by his Morse code speed, and above all, make wide frequency allocations. Not only should the pre-war amateur frequency channels be restored forthwith everywhere: they should be considerably augmented. I suggest that the future of Amateur Radio in U.S.A. will be worth observance. Does anybody suggest that in commercial radio circles, industrially or in communications, there is chaos because a really Democratic nation gives its Hams a power rating of a kilowatt, permits traffic with message handling for third parties, and gets the war ban on frequencies removed without much delay. There were 60,000 Hams in U.S.A. before 1941 . . . the estimate in a year or so is at least 250,000. That means lots of business for the radio manufacturers, which ever way you look at it. Here in Australia we had 2,000 pre-war licencees. My guess is that future devotees of the wholesome hobby of Amateur Radio in this country will, in a few years, also run into the thousands. That being so, I take this opportunity of extending, well ahead, a welcome to the Hams, the VK's of the future years, and with "A.R.W." another decade of good writing and reading in the interest of radio experimenters, Hams, S.W.L's and constructors.

—DON KNOCK (VK2NO)

★

PHILIPS TO RELEASE NEW CONVERTER VALVE

News of a further addition to their range of valve types is announced by the Philips' organisation. The type is known as the ECH-35 and the following details have been made available pending the release of the valve in about two months time.

Type ECH-35 is a frequency changer valve comprising a triode oscillator and hexode modulator on a common cathode — the triode being mounted vertically below the hexode part.

The signal is applied to the innermost grid of the hexode which has variable mu properties and is connected to the top cap of the valve. The oscillator grid is internally connected to the third (injector) grid of the hexode, which is isolated from signal grid and anode by the second and fourth grids which are connected together and comprise the screen.

Type ECH-35 is particularly well suited for short wave operation because of its high conversion conductance of 650 uA/V at full gain and remarkably low frequency drift; the latter remaining low when the valve is under A.V.C. control.

Personal — A. G. HULL

OF the Hull brothers it was Ross A. Hull who achieved widest fame in radio before his untimely death from accidental electrocution whilst carrying out television experiments in America in 1938. Ross earned for himself world-wide recognition as a great radio scientist and still, eight years after his passing, his theories and findings are often quoted in overseas articles on the propagation of the ultra-high-frequency bands, the co-relation between weather and reception conditions and the remote control of aircraft by radio.

'Way Back in 1915

But the connection between radio and the Hull brothers dates back to the World War I, when in 1915 the eldest brother, William Howard Hull, was an instructor in wireless telegraphy at the Moore Park camp in Sydney, later serving in Mesopotamia with the Australian Light Motor Wireless Squadron. When "Bill" returned home to St. Kilda in 1918 he found that Ross, then a lad of 16, had been "bitten by the radio bug," and was co-operating with a telegraphist named Fred Whiter in the construction of a receiver consisting of a piece of lead from a pencil resting on the edges of two razor blades mounted vertically. With this "detector" and headphones it was possible to hear the morse signals being sent out from VIM, the big station operating from the Melbourne Domain.

By about 1922 Ross was operating his own experimental transmitter, working American Hams across the Pacific and broadcasting recorded music — some years before any broadcasting as we know it today. Keenly interested, but "too young" to be allowed to operate the amateur transmitter was Ross's younger brother, A.G., baby of the Hull family.

By 1929 Ross had been to America —held the position of technical editor of "QST" at the headquarters of the A.R.R.L., and been sent home to Australia again by the American immigration authorities as he was only in the U.S. on a visitor's passport. On his return to Australia Ross became technical editor of the Sydney "Wireless Weekly," which made rapid progress under his guidance. After about a year Ross managed to get on to the American quota and rushed off back to the US. to resume his position with "QST."

The directors of "Wireless Weekly" gladly accepted a suggestion from Ross that his young brother might take his place as their Technical Editor, and so A.G. came into the radio limelight. He was able to carry on the good work started by Ross, and by 1934 the circulation of "Wireless Weekly" was up to 84,000 copies per week.

In 1936 A. G. Hull made a world

(Continued on next page)

A photograph taken last New Year's Day on a shooting trip, when two foxes were bagged by A. G. Hull. Both were running shots, which is pretty good with a .22 calibre rifle.

A. G. HULL

(Continued)

tour on behalf of "Wireless Weekly," visiting the United States, England, Holland, France and Germany to investigate television and radio developments.

By 1939 the old "Wireless Weekly" had waned considerably and it was decided by Associated Newspapers that it would be better to start a new monthly publication to carry the technical articles which had been appearing in the "Weekly." The new periodical was called "Radio and Hobbies," and A. G. Hull was its editor.

Successful Venture

"Radio and Hobbies" was an instant success, and continued to be such a success that after watching nine issues into production, A. G. Hull decided to venture forth into the publication business on his own account, and purchased the goodwill of "Australasian Radio World" from Earl Read, who had come across from New Zealand to start it a few years before. With Read carrying on as Advertising Manager the "Radio World" made great progress under its new ownership, then the war clouds thickened, paper rationing was introduced and "Radio World" had to carry on as best it could through the war years, whilst A.G. went to Melbourne to do a spot of war effort, having been rejected from military service on account of medical unfitness.

Two and a half years of managing a factory running 24 hours a day, 7 days per week, on munitions work, with over a hundred female "engineers," brought about a thorough crack-up in health, but a splendid recovery was made later when putting in eight months of work under the kindly eye of Colonel Jones of the Directorate of Radio and Signal Supplies, Ministry of Munitions.

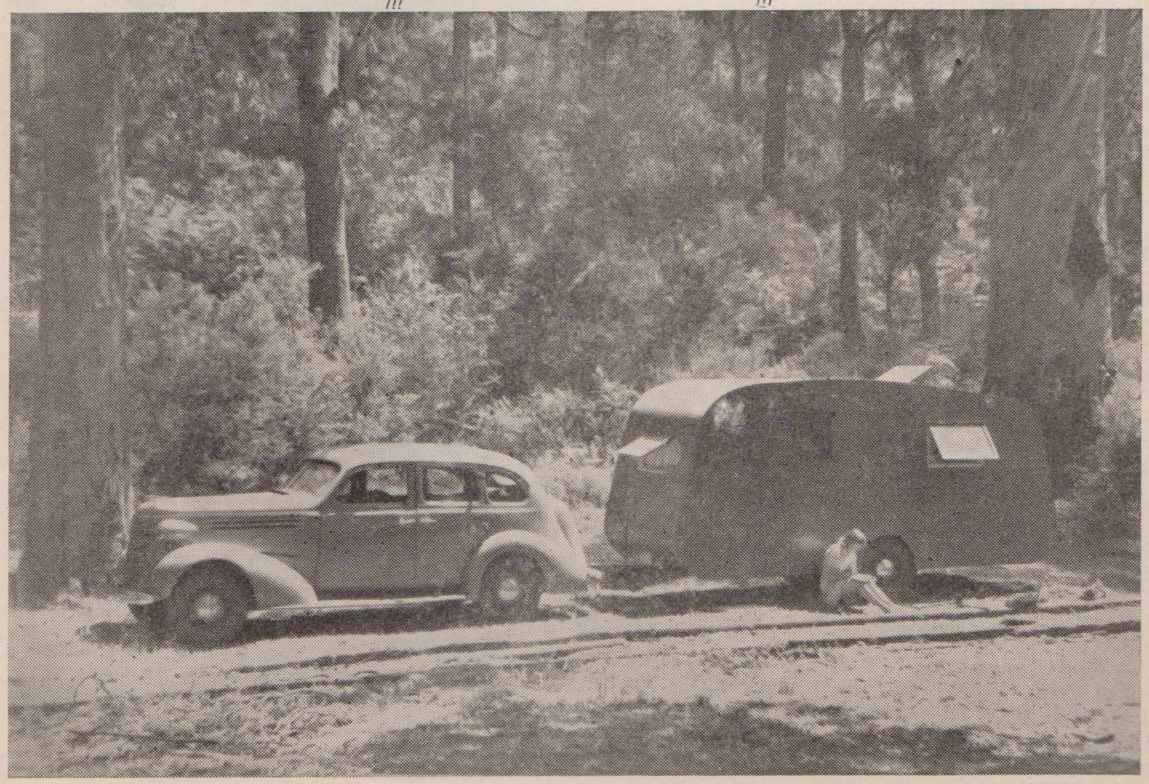
Today

And so we come to today when difficulties abound, but slowly and surely the "Australasian Radio World" is emerging from the clouds of war and, as doubtless you will agree after reading this issue, is well on the way to regaining its prewar style.

Strictly Personal

Personally, A. G. Hull likes to be considered as just another man-in-the-street, and although radio is his main hobby, he has other hobbies as well. Pride of place goes to his fleet of contest model aeroplanes, with their tiny petrol motors. He will go any distance for a contest and has had many major successes, holding the Australasian National Championship and other titles. Next comes photography, and although still in the soup-plates-on-the-kitchen-table style, he does all the photos for "Radio World," as well as a terrific number of pictorial shots. Speaking of shots, A.G. is also a keen rifle shot, a winner of championships in this sport. He joins all his hobbies together by putting in his holidays and spare time cruising in his caravan into the back country in search of foxes and pictures to shoot, stopping over at the open spaces to test the air for thermal currents with his model planes.

SIESTA



Noontide siesta. The Hull caravan rests beside a timber track in the Cumberland Valley.. Photo by A. G. Hull.

SIMPLE IMPEDANCE MEASUREMENTS

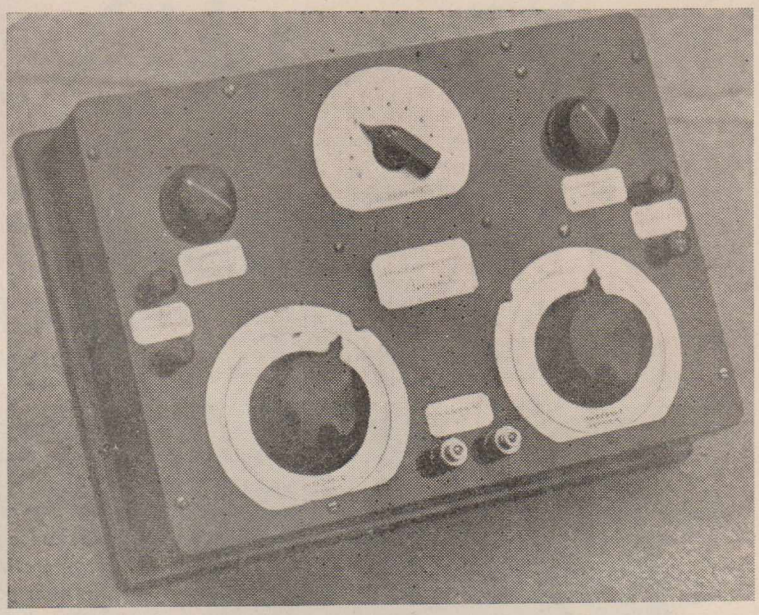
THE unit about to be described should be of particular interest to amateurs and experimenters owing to its versatility, simplicity and ease of construction It may be used to measure the inductance of audio chokes, filter chokes, etc., and the impedance of any resistance, capacity, induct-

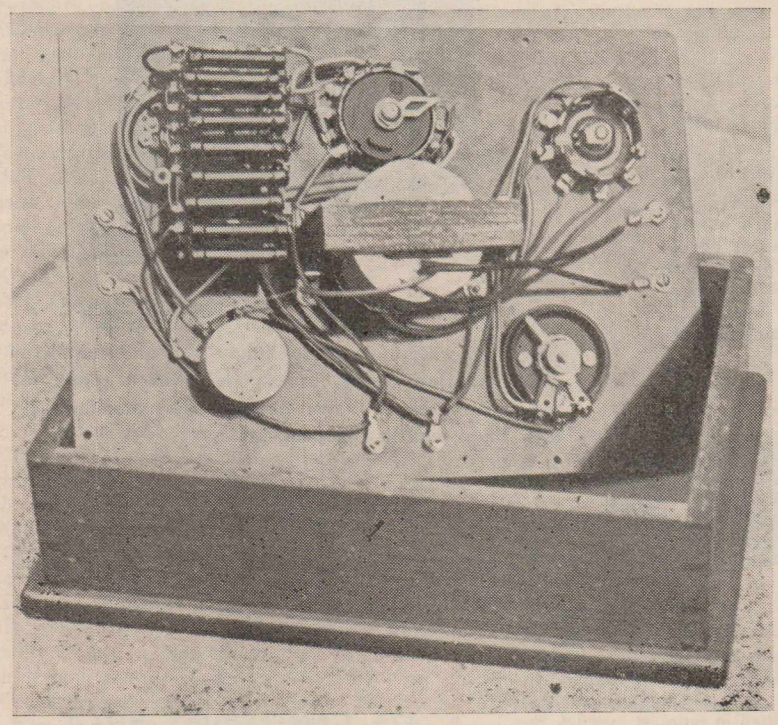
By
J. G. DU FAUR
B.E., A.M.I.E. (Aust.),
A.M.I.R.E. (Aust)

ance combination exceeding 10 ohms at audio frequencies. It will measure impedances up to a maximum value of 50,000 ohms, which is found to be adequate for general use. However, should it be desired to increase the range, this may be effected by the addition of more resistance in series with the potentiometer R_2 in Fig. 2.

Technicalities

A brief summary of the terms impedance, reactance and resistance may not be out of place, before describing the equipment. If we consider a long piece of straight wire, for all practical purposes we can say that, at audio frequencies, the only characteristic is possesses which will limit the current flowing through it when an A.C. voltage is connected between its ends, is its resistance. In other words, its inductance and self capacity are negligible. If the wire is now wound around a laminated steel core so that it becomes a choke it will possess inductance as well as its original resistance. The unit will also contain some capacitance, since there is a certain amount of capacity between adjacent turns and between adjacent layers of the winding.





Top: Front view of the piece of laboratory equipment. Below: A view of the internal arrangements.

The inductance of the coil tends to restrict the flow of current through it in a similar manner to the resistance, but the capacity increases it.

We see that this so called choke contains resistance, inductance and capacity, and is a parallel circuit, as illustrated in Fig. 1. In this diagram each of these three properties are, for convenience, shown separately, although in actual fact they are lumped together.

The inductive reactance of the

(Continued on page 11)

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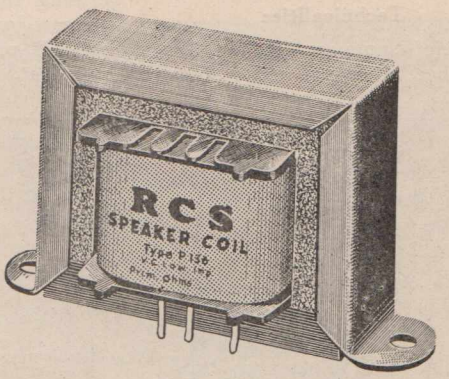
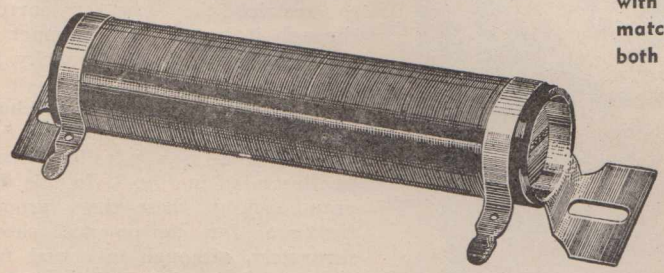


R.C.S. SPEAKER TRANSFORMERS

laminated with high-grade stalloy iron and complete with mounting clamp, are available in a range to match any output valve and speaker combination, both single-ended and push-pull.



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Where additional resistance is required in B plus supply, these units, in standard 1,000 ohm, 70 m.a. form, may be used in series or parallel, to give the desired value in conjunction with a standard R.C.S. Filter Choke, when replacing an electro-dynamic speaker with the permanent magnet type. Wound with heavy gauge resistance wire on 3¼" x 7/8" former, fully impregnated and complete with mounting feet.

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IMPEDANCE

(Continued)

circuit is defined as:

$$Xl = 2pfL$$

When Xl = inductive reactance in ohms.
p = 3.14 approx. (constant).
f = frequency in cycles per sec. at which the reactance is measured.
L = inductance of the choke in henries.

Similarly, the capacitive reactance of the circuit is:

$$Xc = \frac{1}{2pfC}$$

where Xc = capacitive reactance in ohms.
p = 3.14
f = frequency in cycles per sec.at which the reactance is measured.
C = Capacitance in farads.

The impedance of a circuit is its ability to resist alternating current flowing through it from an external source, and is a function of its resistance, inductance and capacity. If the capacitive reactance is made equal to the inductive reactance, resonance occurs. In this case, with a parallel circuit, relatively large currents flow within the network. If the resistance in the circuit could be reduced to zero the current through the condenser would be exactly 180 degrees out of phase with that in the inductance and the external line current becomes zero; thus the impedance of the network as a while is infinity. In practice, such conditions never occur, as there is always some resistance in the circuit. It should be clear, however, that the circuit impedance can be many times greater than its resistance, or reactance, if the inductance and capacity are of certain proportions.

Practical Application

In practice we are really concerned with the impedance of chokes and A.C. networks rather than their individual reactances, but often the impedance and the reactances are almost equal. As an example, consider a power supply filter network using a 10 henry choke with a resistance of 500 ohms in a circuit which has to filter 100 cycle/sec. ripple.

The reactance of the choke at 100 c.p.s. is:

$$2pfL = 2 \times 3.14 \times 100 \times 10 = 6280 \text{ ohms.}$$

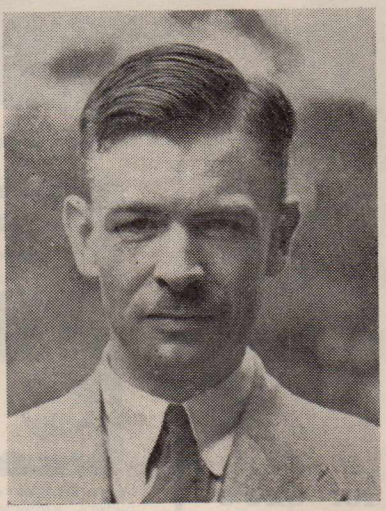
For general use this figure is sufficiently accurate, but it does not tell us the true ability of the choke to do its job. The impedance gives the correct answer and is determined as follows:—

$$Z = \sqrt{R^2 + Xl^2} = \sqrt{500^2 + 6280^2} = 6300 \text{ ohms.}$$

This calculation assumes that the

(Continued on page 13)

Personal



★

J. G. DuFAUR

★

JOHN GUY DuFAUR, in spite of his French-sounding name, is a Britisher, 30 years of age and married.

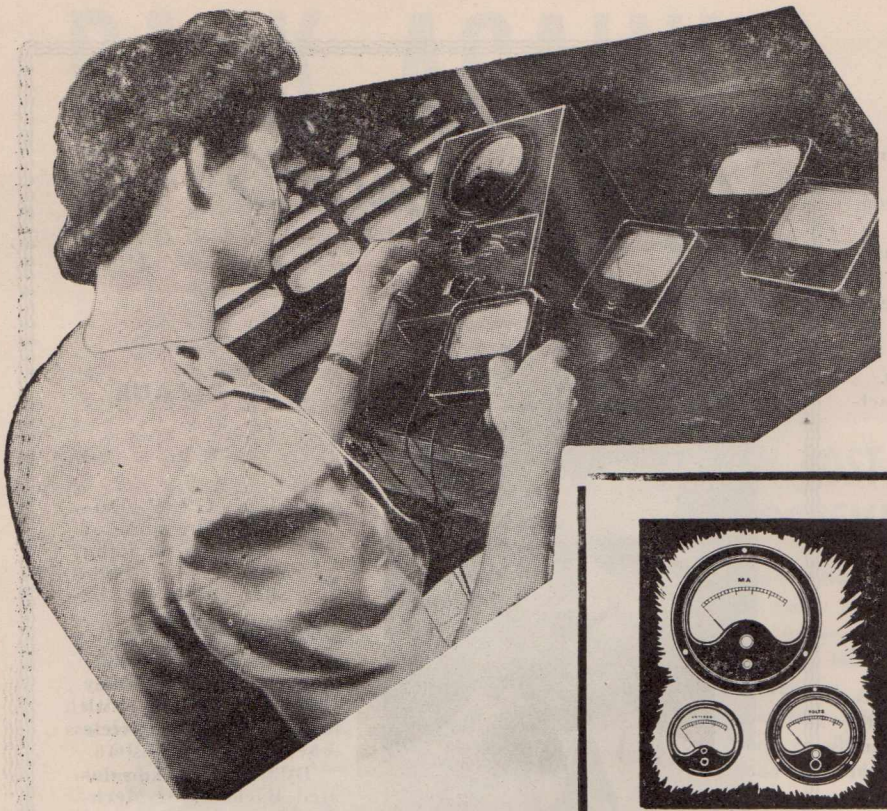
He started off in radio by winning a hobby prize at the Sydney Grammar School with his home-built wireless set when he was 16.

By 1939 he had graduated Bachelor of Mechanical and Electrical Engineering at Sydney University. His business career started off with a position with the Australian General Electric Company at Auburn, N.S.W., but after a couple of years there he sought further experience in Melbourne, joining the staff of the Standards Association.

A couple of years later and the war had become serious business, so John joined up with the Radio and Signal Supply Directorate, Ministry of Munitions, in the Radar Division. Invaluable work was done by this Division during the war, and John is still there, engaged on cleaning up uncompleted projects and getting things on to a peace-time basis.

Like many radio enthusiasts Mr. DuFaur makes radio a hobby as well as business, and in his spare time he has carried out a remarkable programme of making up laboratory equipment for himself. Hunting around the radio junk shops in Chapel Street, he takes home all manner of old-fashioned dials, knobs and other bits, and the next time you see them they will be the controls of a Q meter, or a beat frequency oscillator! Never discouraged by the fact that the American manufacturers can get thousands of dollars for a piece of laboratory equipment, you will find an equally effective counterpart in the DuFaur flat, having cost only a few shillings worth of bits and a few thousand hours of patient effort.

At this very moment John will be found, in all probability, with phones on his head listening to morse code signals, brushing up for the next examination for a "ham" licence.



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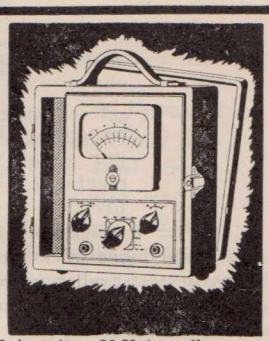
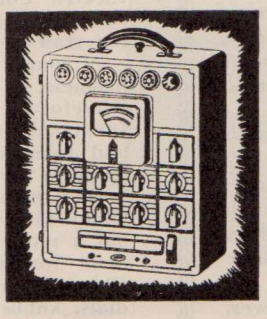
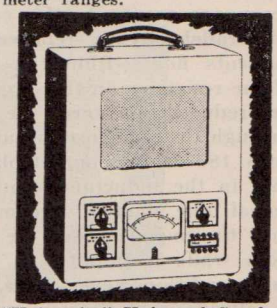


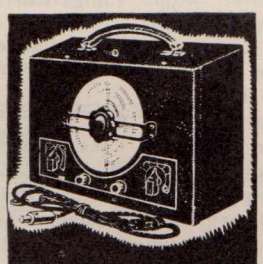
University M.V.A. all-purpose Multimeter (bench or portable) giving complete AC/DC measurements together with output meter ranges.



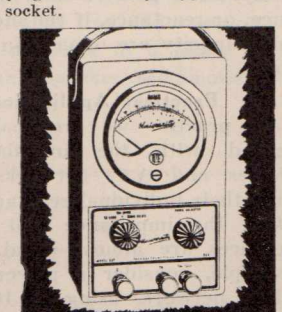
University Supertester is an extremely versatile Valve and Circuit Tester featuring an extraordinary valve and condenser roller test chart.



"University" Universal Speaker and Output Meters make set testing quick and easy. No power connections required, just plug in to any type speaker socket.



A new "University" five band oscillator for the alignment of all types of radio receivers.



"University" Earthing Resistance Tester is much sought after by maintenance electricians, and is typical of University's industrial test gear.

Fully illustrated literature available upon request.

IMPEDANCE

(Continued)

capacity in the circuit may be neglected.

In the above example it will be seen that the impedance and the reactance of the choke at 100 c.p.s. are almost equal. However, if the choke was used to filter a frequency of 10 c.p.s. such would not be the case. It is therefore apparent that in a reactance network where the resistance is comparatively large, the item of interest in practice is the impedance of the circuit.

The above preamble has been written to illustrate the difference between reactance and impedance for the following reason. The properties of a choke are generally measured in terms of its inductance in henries. Such measurements are performed by using an inductance bridge on which, in most cases, the resistance of the unit is purposely ignored. When the inductance in henries is determined, it is necessary to separately measure the D.C. resistance in ohms of the choke and then calculate its impedance from these two figures. The measuring equipment about to be described has the advantage that it measures impedance directly, automatically taking resistance, inductance and capacity into account at once.

The circuit diagram of the equipment is shown in Fig. 2 and photographs of the finished article appear in the text. The theory is as follows: A pure sine wave signal which preferably has a frequency of 400 c.p.s. is fed into the primary of the transformer at the terminals marked "A." The transformer secondary is tapped so that it can be used as a 2:1, 1:1 or 1:2 ratio unit. The output voltage from the secondary which should be in the vicinity of 5 to 10 volts, is applied across the unknown impedance in series with a known resistance which, in the actual unit is either R_1 — a 250 ohm potentiometer, R_2 — a 5,000 ohm potentiometer, or R_2 plus one or more 5,000 ohm resistances. The value of whichever branch of resistance is in use, is adjusted until the voltage across it is equal to the voltage across the unknown impedance. This equalisation of voltage is determined by an external vacuum tube voltmeter which can be switched alternatively across the impedance and the resistance by means of the switch S_1.

Secondary Voltage

When the voltages across both are equal the impedance of the unknown is equal to the resistance of of the resistor. Thus the potentiometers R_1 and R_2 can be calibrated directly to read impedance in ohms. If the impedance of the unknown is greater than 5,000 ohms, sufficient 5,000 ohm resistances are switched in series with R_2 by means of S^2 until a balance can be obtained by varying R_2.

It is to be noted that the impedance of the unknown is proportional to the frequency of the testing signal. As it is generally accepted that tests of this nature are carried out at a frequency of 400 c.p.s. it is recommended that this frequency be adopted. However, if no oscillator capable of producing a pure sine wave at 400 c.p.s. is available the 50 c.p.s. mains have be used instead with fairly satisfactory results. In this instance an ordinary power transformer can be used for T, one of the filament windings being used as the secondary.

It should be noted that a certain amount of power is absorbed by the unit when a test is being carried out, and therefore an oscillator with a power valve in its output circuit is necessary. An ordinary signal generator will not produce sufficient output if the impedance to be measured is small in value.

Components

The transformer T should preferably have low resistance windings. Fairly satisfactory results can be obtained by using a standard power transformer with a centre tapped high tension secondary. The main point is that in use the flux in the core should be kept low to prevent distortion of the signal. The writer wound his own transformer on an audio transformer laminated steel core of approximately 3/4 sq. inch cross sectional area. 2,000 turns

(Continued on page 14)

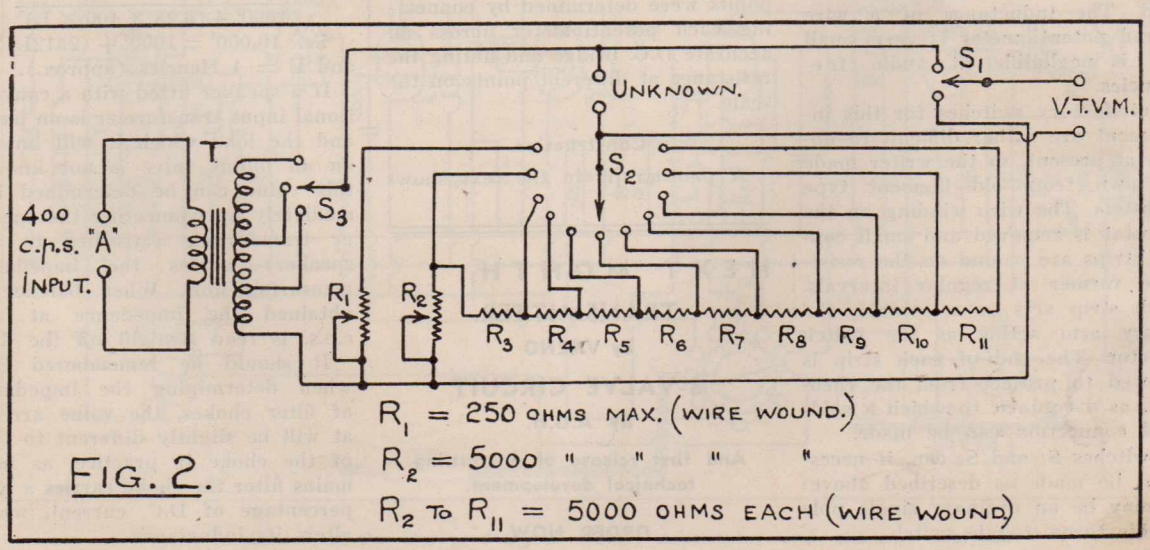


FIG. 2.

IMPEDANCE

(Continued)

were put on the primary, and a total of 4,000 turns applied to the secondary, it being tapped at 1,000 and 2,000 turns. A tapped secondary is required so that the transformer can be used as either a "step up"or "step down" unit. Any tapping found to give satisfactory readings on the V.T.V.M. can be used in practice.

It is necessary to have a step down ratio from primary to secondary, when the unknown impedance is of low value and the testing signal is being obtained from the plate circuit of an oscillator or amplifier. As an example let us consider what would happen if a step up transformer of 1:2 ratio was used when measuring an unknown impedance of 50 ohms. Considering the resistance alone in the secondary circuit, it becomes 50 divided by the square of the turns ratio when reflected into the primary, i.e., 12½ ohms. If a load as small as this is connected across the plate load resistance of the oscillator it may stop oscillating completely, or alternatively the output will be so low that satisfactory readings cannot be obtained on the V.T.V.M. balance indicator.

Potentiometers

Ordinary commercial wire wound potentiometers may be used for R_1 and R_2, although care should be taken that they are of a type which which will retain accurate calibration. Also pots, with low capacity between their terminals should be used. The inductance of a wire wound potentiometer is very small and is negligible at audio frequencies.

Satisfactory switches for this instrument are rather difficult to obtain at present, so the writer made his own from old filament type rheostats. The wire winding on the rheostat is removed and small copper strips are wound on the resistance former at regular intervals. Each strip acts as a contact, the rotary arm acting as the switch selector. The end of each strip is allowed to project from the rheostat, as a contact, to which a soldered connection can be made.

Switches S_1 and S_3 can, if necessary, be made as described above: S_1 may be an ordinary single pole double throw toggle switch.

The resistance R_3 to R11 are all 5,000 ohm wire wound units. Each should be correct to within plus or minus 1 per cent if possible, so that accurate measurements may be made when necessary. However, standard wire wound types with plus or minus 5 per cent tolerance, which are readily available from radio dealers at present, may be used if nothing better is available. The writer overcame this problem by borrowing a large number from a radio shop and selecting the nine most accurate ones, after checking the resistance of each one on a bridge. Carbon resistors, although they have the advantage of being non-inductive, are not desirable in this instance, as their resistance generally varies with age.

The type of dial knobs used on the original unit may be seen in a photograph in the text. It is not necessary to use vernier dials on the potentiometers, but large pointer knobs are necessary to enable reasonably accurate readings to be obtained.

Calibration

If made carefully from good quality components this impedance measuring device should easily give results accurate to within plus or minus 2 per cent.

On the instrument described, the potentiometers R_1 and R^2 were calibrated by gluing stiff paper discs to the panel. A circle of a size to suit the pointer knobs was drawn on each disc, and the resistance markings printed around its circumference. The actual calibration points were determined by connecting each potentiometer across an accurate D.C. bridge and noting the resistance at different points on the scale.

Construction

A photograph in the text shows

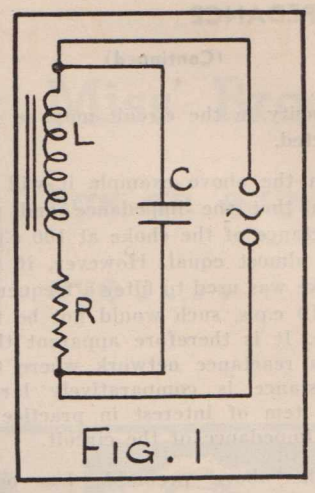


FIG. 1

the lay-out of the assembly. All components can be fitted on to a bakelite panel 9-in. x 12-in. The panel is screwed on to a wooden box 2¾-in. deep, which houses the unit.

Uses

Some of the more common uses of this instrument are as follows:

Firstly, it can be employed to determine the impedance or inductance of audio and filter chokes of unknown value. Suppose it is found that the impedance of a choke is 10,000 ohms at 400 cycles. The D.C. resistance of the choke is then measured on an ohmmeter, or D.C. bridge and is found to be 1,000 ohms.

Then since

$$Z = \sqrt{R^2+(2pfL)^2}$$

(neglecting stray capacity).

Therefore $10{,}000 = \sqrt{1000^2+(6.28 \times 400 \times L)^2}$

i.e. $10{,}000^2 = 1000^2 + (2512L)^2$

and L = 4 Henries (approx.).

If a speaker fitted with a conventional input transformer is on hand, and the load which it will impose on an ouput valve is not known, this value can be determined immediately by connecting the speaker transformer (attached to the speaker) across the impedance measuring unit. When balance is obtained the impedance at 400 c.p.s. is read straight off the dial.

It should be remembered that when determining the impedance of filter chokes, the value arrived at will be slightly different to that of the choke in practice, as in a mains filter the choke carries a high percentage of D.C. current, which alters its inductance.

THE CHANNEL ANALYSER

— combining signal tracer and substituter

By

PAUL STEVENS

21 Fletchers Avenue, Bondi

WHEN the "Radio World" published the first articles on signal tracers some years ago, I was very enthusiastic about these gadgets and really expected the arrival of a new era in radio servicing. But nothing of the kind happened. This instrument, in my opinion second only in importance to a valve circuit tester, does not seem to have found its way into servicemen's hearts. Oscillographs, audio-signal generators, v.t.vm's and other things relatively unimportant to radio repairing can be found far more often in radiomen's dens than signal tracers; and those who have not got one, do not know what they are missing. Apart from conservatism on the side of radio repairers who reject them because it is something new, and instrument manufacturers who consequently do not make them, I also blame the attitude of those who wrote the articles on them for the failure of the signal tracer to gain the place it so richly deserves. Nearly all the articles tell us first of all, and as a main point, how to use the tracer to find the fault in a set which has completely stopped. They tell you how to put the probe on the grid of the lrst valve, then on its plate, then on the grid of the second valve, then on its plate and —ha! — the signal is not there any more! The trouble must be somewhere round here!

Kindergarten Stuff

So we take our multimeter and find no plate voltage on that valve and further investigations reveal the smoking remains of a burnt out decoupling resistor and a shorting condenser. All this is, of course, radio kindergarten stuff. A stopped set is usually the easiest thing in the world to repair, even for the beginner. Touching of the grid caps with some metal tool and a voltage check will quickly reveal the cause of the trouble. So if somebody wants to bring the signal tracer into discredit by showing it off as an unnecessary instrument, he just has to enlarge on its ability of locating the fault in a "dead" receiver. Of course, if the tracer happens to be connected and ready on the test bench, it should certainly be used to track down such troubles, just the same as we often use our precision ohmmeter for a simle continuity test, for instance, to find out whether a dial lamp is burnt out or not. The real purpose of a signal tracer is the location of more complicated faults, such as the causes of distortion, hum, many kinds of oscillation, noises, spurious signals, cross-modulation, double spotting of strong locals, due to poor coils; bad tracking or direct coupling between unshielded coils, checking of the time lag in A.V.C. circuits, testing of pick-ups, microphones, speakers and so on. A good signal tracer is such a versatile instrument that one finds new uses for it all the time. It is like a magic wand that allows us to watch the complicated happenings within a radio set almost as clearly as if we could see the electrons flow.

The Principle

A signal tracer is nothing but an

(Continued on page 17)

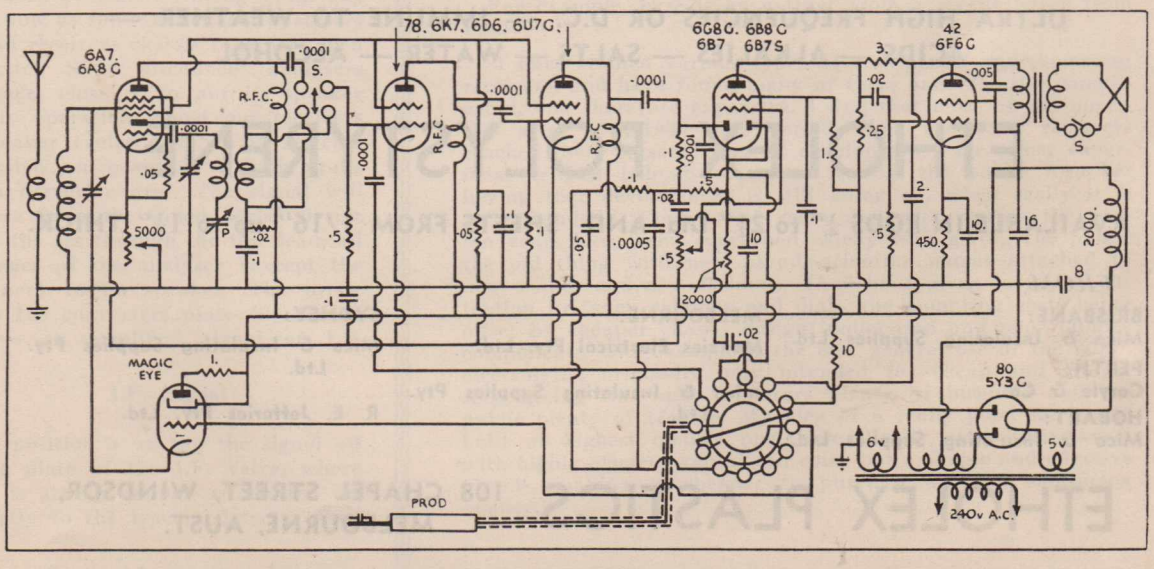


Figure 2. Circuit of the improved signal tracer, substituter and channel analyser.

About Disposal Bargains

BY VK2NO

THE seemingly inexhaustible supply of Disposals ex-Service gear gives keen experimenters access to material that cost normally would render prohibitive. Most days of the week there may be seen Hams with a glint in the eye, browsing over the "sixpenny dip" in certain dealers' premises in and around Sydney. I suppose the same is true also of other cities. Don't run away with the idea that the figure I refer to is the average price of things — it applies to "bits and pieces" ad lib, but you will pay much more than that for gear in working, or "almost working," complete and semi-complete order. Three years ago I would certainly have dismissed the idea of this post-war "junk" picture as fantastic, as with military care I nursed equipment in the field and checked up meticulously on the smallest detail. Now I pass by the windows of these stores (but mostly fall for the attractions displayed therein and stand amazed at such gear as "No. 11 Set," "109 Mk 2," "101," "FS 6" and the like, offering at anything from £2 to £12. "108's" I have seen for as little as 10/-, battered about it is true, but with most of the useful components thereon. What's wrong with a couple of perfectly good 1600 kc/s LFT's for that figure? There are two on each of those chassis. One day I ran across an English "19 Set" chassis, not minus too many of the essentials, and the price asked was two bob. Needless to say, I didn't pass that one by! For that figure I acquired a chassis full of perfectly good resistors and tubular condensers, and all for the price of **one** resistor or condenser. And if anyone tells you that English made components are NG, take my tip and don't believe 'em! A few Sydney VK's acquired 109 receivers for a reasonable price and some of those old army jobs are now doing Ham service as the I.F. channel for superhet converters taking in 28 and 50 mc/s. Not a bad idea, and the receiver itself is no slouch between 2.5 and 5 mc/s, as I well know. The aforementioned "sixpenny dip" can often produce unexpected wonders. It pays to delve into things a bit and to try to fathom out just what this or that item might have been designed for, and above all—what the Ham can **use** it for. It is is easy to pass over a gem without assessing its true worth. For instance, a little gadget on a jack assembly looking like a telephone fuse holder I recognised as a most useful "box of tricks." It is an opposed copper oxide "crash limiter" from the audio channel of a British Admiralty receiver. On 28 and 50 mc/s that little gadget now does first rate service in reducing car ignition disturbances to a murmur instead of the nerve-wracking popping din that tends to drive the DX man to profanity, or to keeping white mice instead of radio. In case, brethren, you think that your scribe is in a position to get in early on the ex-service bargains around this metropolis, let me prove to the contrary. I heard of the whereabouts of some strong lightweight Dural tubing, "ideal for rotary beams," but found little of value, as others of the gang had had first selection.

ANALYSER

(Continued)

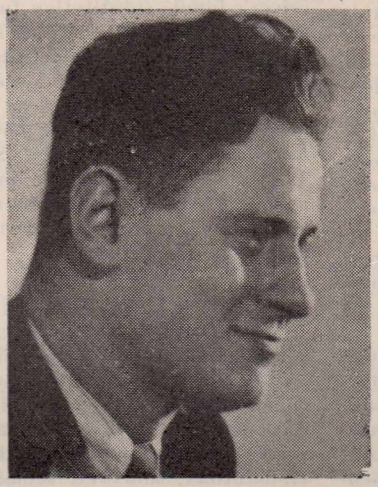
untuned (or very broadly tuned) radio set, by means of which we can tap off the signal from any stage of the receiver under test and make it audible through the tracer's speaker. The particular tracer described here is also a substituter, which reverses the tracing process by feeding a signal into the receiver at any desired point, which will then be reproduced by the receiver's speaker. This instrument is therefore a complete channel analyser. The tracing resp. substituting takes place by bringing the analysers probe into contact with any stage of the receiver whereby the tracer takes the place of the rest of the receiver from the point of contact to the speaker for tracing, from the aerial to the point of contact for substituting. To avoid two signals coming through to the speaker when substituting, the receiver's aerial should be disconnected while in the case of tracing its speaker's voice coil should be shorted out to avoid a duet, Fig. 1 (+ b) show the principles for tracing and substituting respectively. It shows clearly how, in the first case (1a) the analyser's tuner, in the second (1b) its speaker are put out of action to avoid double signals. The five probes shown on each drawing are really only a single one connected to a selector switch on the analyser. The procedure of signal tracing (Fig. 1a) is now as follows: connect analysers and receivers chassis together, open switch S to disconnect analysers tuner; close S, to put its speaker into operation. Short out receivers speaker (voice coil). With selector switch on position A, put probe on cerverter grid. The signal will pass from the tuned aerial circuit of the set through the test lead, all stages of the analyser (except the tuner) to its speaker. The probe on the converters plate (2) should give an amplified signal of I.F.

I.F. Signal

In position 3 we tap the signal off the plate of the I.F. valve, where it is strong enough to be fed directly to the tracers detector (sel-

(Continued on page 18)

Personal



★

PAUL STEVENS

★

PAUL STEVENS was born in Vienna, Austria, the only son of an American father and a Moravian mother. Conditions were extremely bad in Austria, so Paul left the country as soon as he finished his high school leaving exam, and eventually landed in Australia. He volunteered for the army, but an X-ray examination revealed chest trouble and he was rejected.

Paul became interested in radio before he was 14 years old and he has been keen ever since. His contributions to "Australasian Radio World" have aroused lots of controversy among enthusiasts and even those who don't like some of the "knocks" they contain must admit that Paul has a different angle on circuit design which is well worth taking into consideration.

It is so easy to drift along with the general trend that it is invigorating to read the stuff which Paul punches out.

For example, here is an extract from a recent letter from Paul:—

"I have studied various types of continental and American receivers, and have found many of them unnecessarily complicated, and therefore expensive. I find that most of the novelties after 1934-1935 (the period when broadcast receivers reached their present stage of development) are either superficial or just baloney, designed to fool the public into believing that development is still going on, when really it is at a standstill. Commercial radio designers, during the past ten years have been concerned chiefly with giving the public the old thing with new pseudo-scientific names attached to new shapes and new fashions. They have given increased attention to fancy cabinets and dials, the mounting costs being offset by cheaper chassis design, undersized and poor quality components. One example is the now general use of the "dry" electrolytic, originally only intended for cheap and midget sets, giving the radio repairers plenty of business and the public plenty of trouble. My idea of a really good set is one built of highest quality parts, electrically over-dimensioned, with highly-efficient valves and coils, but a simple and effective circuit, making it cheaper to purchase without sacrificing quality."

ANALYSER

(Continued)

ector pos. B). At test point 4 the signal is after detection and, therefore, only the tracer's audio amplifier is required (selector pos. C), while finally, at test point 5, only the tracer's speaker is in operation (selector pos. D.), the "treatment" of the signal being entirely left to the receiver. It is clear that this stage-by-stage elimination process will quickly indicate the source of any irregularity, such as distortion, noise, hum, lack of power, etc., provided, of course, the tracer itself is in perfect condition. Signal substitution (Fig. 1b) is the exact opposite of tracing. Now the analyser's speaker is out of action, but its tuner is connected and the signal (any suitable radio programme from a local) is fed through the probe and the desired stages of the receiver to its speaker. Although theoretically tracing and substituting lead to exactly the same result, practice shows that certain faults can be tracked down much easier by one method than the other. Generally speaking tracing should be used for troubles closer to the receiver's input; substitution for those in the audio and output section. For elusive flaws double check by using both methods. The channel analyser can also be used as a good local receiver, by closing both tuner and speaker switches (S, S1). The selectivity should be just sufficient to separate the locals and the tone quality as good as that of any average set.

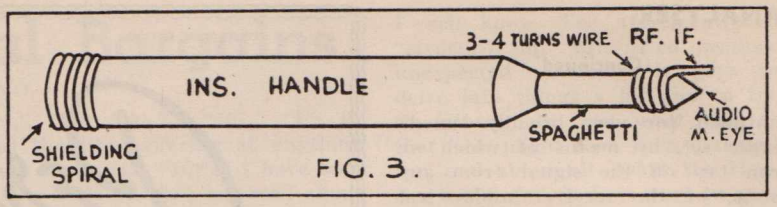


FIG. 3.

The Design

Fig. 2 shows the circuit diagram. In the input is a simple superhet tuner, which is of completely standard design up to the plate circuit. The secondary of the I.F. transformer, however, remains disconnected, the signal being fed directly from the plate of the converter over a .0001 condenser to the switch S. The purpose of this arrangement is to keep the selectivity low and the gain high. Low selectivity is desirable to have the whole range of standard I.F. frequencies from about 445 to 470 effectively covered by tuning to about 460 kc/s. We can thus do signal substituting without bothering much about the exact I.F. frequency of a receiver under test, as long as it is not a T.R.F. set, or one with 175 kc I.F. in which two cases no substituting can be done with this analyser, but tracing still works. S is a two-way switch, which in the "off" position not only breaks the circuit, but also shorts out the oscillator plate coil.

The two following valves are choke coupled for both R.F. and I.F. frequencies, but the stage gain is low, so that the two of them have only about the same amplification as one single I.F. valve in a standard receiver. The converter, as well as the two H.F. valves have their screens and cathodes tied together, a 5,000 ohm bias gain control is being used. Unnecessary to mention that A.V.C. is out of the question in a channel analyser, as it would rob us of the possibility of checking the stage gain of a receiver. I have, however, included a magic indicator of the sharp cut off variety for visual checking of signal strength. The audio section is quite normal. It consists of a diode-pentode a driver and output pentode (42, 6F6, etc.). A single 3 meg. resistor between the output and driver plates provides some inverse feedback. Otherwise there is no attempt being made to incorporate any form of tone correction. The frequency range should be as wide as possible, at least as wide as that of any household receiver, especially at the high frequency end. This may not give a very pleasant tone, but it enables us to check up on distortions in the higher regions, such as harshness. The speaker must be of good quality, should be no smaller than 8 inches

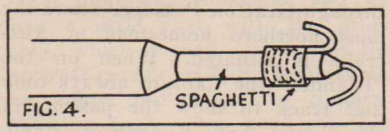


FIG. 4.

and housed in a good cabinet or mounted on a large baffle. As mentioned before, the tone quality of the tracer must be of high standard, so that any present distortion can safely be attributed to a fault in the receiver under test. A switch (S1) is inserted in the voice coil circuit to silence the speaker.

The Probe

And now to the switching arrangement for the probe. We use a 2×5 position single bank Yaxley switch. The wiper of the first set of contacts connected to the test lead, the 5 contacts to H.F. detector, audio, output, and magic eye respectively. The second set of contacts connects the timing indicator to the diode in the first 4, to the probe in the fifth position. The test

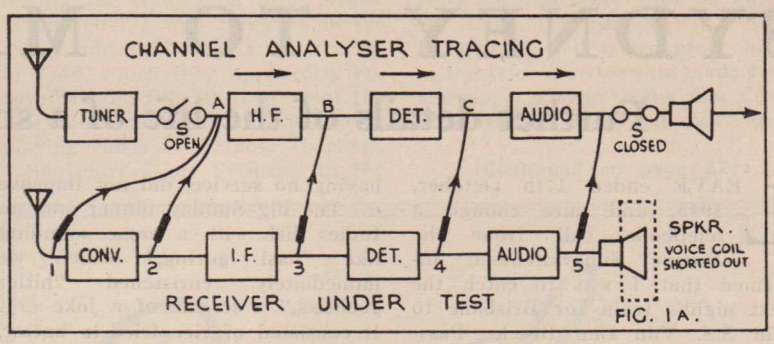


FIG. 1A.

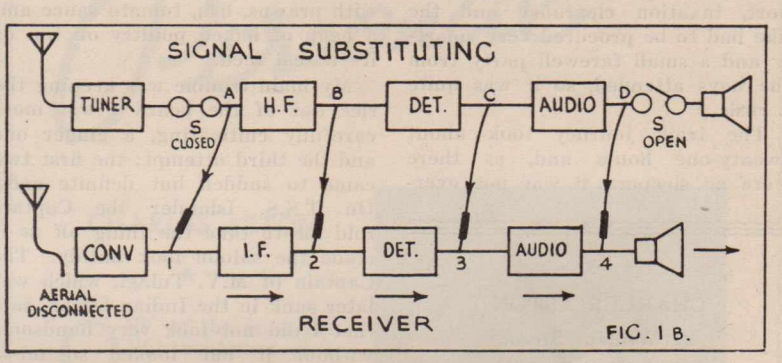


FIG. 1B.

lead itself has to be shielded to prevent it from picking up any signals but those fed in through the test prod.

Audio Probe

It should be made of low capacity copper braided wire. But a very satisfactory way of shielding can be provided by winding a turn-on-turn spiral of bell wire of the desired length with an inside diameter of an ordinary pencil, pull the test lead through and solder the end of the spiral to chassis. The other end of the shielding spiral should be firmly tied to the test prod's handle so that it cannot slip back or unwind. The test prod I used is of standard meter type, but specially treated for our purpose (Fig. 3). A piece of fitting spaghetti tubing is slipped over the bare shaft, so that only the conic point protrudes. This main tip of the probe is only used for audio signals and tuning indicator tests. A small capacitor with a second point for R.F. and I.F. tests is provided by winding 3 or 4 turns of 22 gauge bare wire round the spaghetti near the end of the shaft, leaving a short piece of wire sticking out as shown in Fig. 3. The turns of that "condenser wire" should be lightly soldered together to prevent them from unwinding and getting loose, and then covered with insulating tape or a piece of fitting spaghetti (not shown in Fig. 3). If desired the wire end can be bent into a hook and a second hook soldered on to the main tip, to enable us to fasten the probe to any desired point of the circuit whenever required (Fig. 4). This arrangement of a two pointed probe proved extremely simple to make and very handy in practical use. It is definitely an improvement on the older method of using separate probes for H.F. and audio tests.

Wiring and Layout

There is no need for me to give the exact wiring diagram and chassis lay-out of the channel analyser as this article is intended for radiomen, who know how to build a receiver, for which the same rules apply as for the tracer. And now a final warning: use second hand chassis, dial, gang condenser or speaker, if you like, as long as they are O.K. But never use second hand valves, electrolytics, condensers, or resistors. One never knows when these things are going to give trouble, even when they are new; but using second hand ones just means asking for trouble. It is also good practice to run the tracer as a receiver every now and then, to make sure that everything is O.K.

SYDNEY TO MACASSAR

Further details of the life of a ship's operator

By

CHARLES ASTON

21 William Street

Double Bay, N.S.W.

LEAVE ended 17th October, 1945, and sure enough a telephone call from the Marine Superintendent informed that I was to catch the next night's train for Brisbane to join S.S. Van Den Bosch. Passport, taxation clearance and the like had to be procured very smartly and a small farewell party from the boys attended, so it was quite a rush.

The train journey took about twenty-one hours and, as there were no sleepers, it was not overenjoyable. The only excitement was the rush for the dining room when the train stopped for meals and, in contrast, the 5 m.p.h. crawl across the Hawkesbury River bridge, which gave me an opportunity to have a good look at the new railway bridge under construction and the completed road bridge a couple of miles up the river.

On arrival in Brisbane there was a bellow from the loudspeaker system: "Radio Officer Aston, come to the Station Master's Office," making me feel most important. Awaiting me there was Assistant Radio Officer Max Dwyer in a taxi. We went on board, where I indulged in a "deep-sea" bath. This consists of pouring water over yourself out of a dipper.

After a short rest, I went up to have a look at the night life of Brisbane, or what the servicemen had left of it, but, as usual, thoroughly enjoyed myself.

One of the most apparent features of the Van Den Bosch was the absence of cooks and stewards, these, being Javanese, had deserted the previous day, due to the trouble in Java and not my pending arrival.

The cooking was under the supervision of the Second Mate, and was good, considering, but, having no service, did not improve it. The big Sunday dinner was an Indies dish with a name sounding like "nasi goring," which we immediately christened "hitler goebeles," a scream of a joke (?). It consisted of rice fried in butter, with prawns, fish, tomato sauce and a heap of baked poultry on top of it—a real feed.

My main trouble was keeping the rice out of the beard I was most carefully cultivating, a ginger one and the third attempt; the first two came to sudden but definite ends. On T.S.S. Islander the Captain told me to take the thing off as it made the saloon look untidy. The Captain of M.V. Tulagi, which was later sunk in the Indian Ocean, said that I did not look very handsome without it but looked so-and-so worse with it. This discouraged me for some while, but could not resist the opportunity of growing another, as I was sure that by hiding my face more than sufficient reason.

Leaving port on a Saturday is most depressing, but this is what we did, anchoring at the Pile Light in the mouth of the Brisbane River, remaining there for one week without any means of getting ashore, which did not help things at all, but it gave me a good opportunity to get busy on the station and make the gear presentable. Unfortunately, I am unable to describe the radio equipment, owing to a new regulation of my employers. However, it was of Australian manufacture and up to a standard equal to any, in my humble opinion.

All Ashore!

A visual signal from the Pile Light said that a pilot was on his way, so a hasty two hours was spent in writing letters which the most obliging pilot took ashore, together with farewell telegrams, and he was our last personal touch with Australia.

The wharf labourers in Australia had declared Dutch ships black and would not load or bunker them. As our bunker position was rather acute, we had to proceed to Gloucester Island, where we met the S.S. apara with a load of coal from Sydney. Loading operations commenced; some of the Dutch officers worked as coal trimmers and hatchmen, which is an example of what men have to do when without the backing of a good trade union.

Gloucester Island is across the bay from the small town fo Bowen, inside the Great Barrier Reef and about halfway between Brisbane and Thursday Island, but, once again we were too far away to get ashore. I had been there previously in Steam Tug Heroine (registered tonnage 2.90 tons) for a few hours only and remember it as a congenial country town but would have been pleased with a further opportunity to look around.

Tropic Seas

Two days later the Van Den Bosch was ploughing her way through tropic seas with sufficient bunkers and water, with next stop Macassar.

The Barrier Reef is a paradise of islands and it would take a writer with greater descriptive ability than myself to do it justice. Unfortunately, we did not go through Grafton Passage, where the most northern homestead in Australia is situated. When on the "Islander" the Captain always took that track to show the passengers this house and Kangaroo Island, where several blasts on the ship's whistle would cause dozens of kangaroos to hop around the island in great style—a sight well worth seeing.

River Trip

On a trip to Merauki, Dutch New Guinea, the owner of this northern homestead acted as our pilot on the Islander, for he was one of the few available who had had experience of navigating the Merauki River. The trip was not very pleasant, for the ship was sitting on the bottom of the river for twelve hours at low tide and it was at the time the Japs had practically complete control of Dutch New Guinea and we would have made a sitting target for a plane, but the daily visit from Tojo must have been postponed, due probably to a

consultation with most honourable ancestors.

The voyage from Thursday Island to Macassar at a steady 8 knots through the Arafura and Flores Seas with a following sea and breeze was uneventful, except for a few minor incidents.

Tropic Humidity

An unpleasant feature of the wind and the ship travelling in the same direction is that practically all the breeze is lost and the cabins become extremely hot. For any kind of a sleep in the tropics an electric fan blowing on a more or less nude body is a necessity. However, you do not enjoy the cool comfort of the fan alone, as cockroaches also appear to like to keep cool. When the light is switched off one or two bed companions in the form of cockies pay a visit and, after a while, feel like some supper, so chew a toenail. Little cockies are fairly polite company, but the big ones make hogs of themselves, and you wake up to find a large animal on your foot—another of the lesser joys of the seafarer.

On Thursday night, November 13th, the Fourth Mate came down for me to go up on the bridge, as a ship was calling with a signalling lamp. Great excitement . . . the first ship sighted since leaving Bowen. After a little fumbling, the Aldis light was connected and we had a little chat with the other ship, which turned out to be the aircraft-carrier H.M.S. Implacable, en route Balikpapen to Sydney. Wishing each other good weather and good-bye, we passed into the night. Van Den Bosch, 8 knots; Implacable, 18 knots.

Netherland Indies

The next day I had my first glimpse of the N.E.I., a small island about 8 miles away—it did not look very impressive.

The crew were all Indian Lascars and their "Christmas" day is on November 16th, and was celebrated by them with due ceremony. They were so anxious to enjoy themselves they asked the Captain to put one of the white officers steering. For their trouble the Skipper gave them a good tongue blasting.

They held their prayers in the 'tween decks with the burning of incense. When I had a quick look-in, there was one in the back row having the traditional forty winks. Much cooking was going on in the galley and there was a great mass of food, which they apparently enjoyed to the full, as they spent the afternoon sleeping on the deck, playing cards or Chinese checkers.

Souvenirs from Brisbane in the form of flies were with us during the trip. The Skipper and Chief (Engineer) had many great hunts in the saloon with swats made from newspaper and gave the flies a hell of a bashing. It was almost a com-

(Continued on page 22)

Personal

★

CHARLES ASTON

★

ONE of the most prolific contributors to "Australasian Radio World" is a young fellow of 24 summers, Charles Aston. By profession a radio operator on a boat "cruising the seven seas," Charles has enough time on his hands to allow him to type out his articles on fundamentals in a personal style which makes interesting reading out of a dull study.

Charles Aston was only thirteen years of age when his school teacher caught him reading one of A. G. Hull's articles from a "Wireless Weekly" held under the desk. The teacher promptly tore up the "Wireless Weekly", but he did not destroy the lad's interest in technical radio.

Starting with crystal sets, Charles soon graduated to a big superhet, but it was here that he nearly met his Waterloo. in difficulty with this set he sent out an appeal for help to the designer, A. G. Hull, who was at that time Technical Editor of "Wireless Weekly." Mr. Hull happened to find it convenient to drop in on his way home and look over the set. He pointed the lad's errors to him and left with a few words of encouragement.

About eight years later Mr. Hull was surprised to hear from the lad again, this time a grown-up man, a fully qualified operator with a sound knowledge of theory and practice, and a most commendable gratitude for the few fateful words of encouragement which were given so long before.

Away on duty in the Celebes Sea at the moment, it has not been possible to obtain further personal details from Charles for this special column, but an appeal to his father brought forth a reply that his principal hobby is radio, next photography and that he is fond of good music, a lover of the sea, and a keen swimmer, and concludes: "I need hardly add that he is a wonderful son, most thoughtful and considerate to his Mother, sister and elderly folk, and last, but not least, his Father."

TO MACASSAR

(Continued)

mon occurrence for half a newspaper to land in the soup as the Skipper made a vicious swipe at a fly about to land on the jam.

Macassar appeared over the horizon on Sunday, 18th November, 1945, 29 days after leaving the wharf at Brisbane; the longest trip I had done since leaving Motor Tanker "Pan Scandia." There were plenty of sailing craft around and was reminiscent of Sydney Harbour on Sunday. Through this crowd of boats came a Jap invasion barge flying the British White Ensign, still manned by Japs, and carrying the Dutch pilot. In there were the Australian corvettes, H.M.A.S. Inverell and Junee.

I believe there were 60,000 captured Japs in the vicinity and 1,500 Australians, and everything around the town appeared to be quiet, probably only due to presence of the troops.

Clothing was in short supply, but there was plenty of dress material on the black market; otherwise, the inhabitants were faring rather well. During the Jap occupation the civilians around Macassar were fortunate in being treated reasonably well if they used a bit of commonsense.

Stepping ashore, I hired a "tricycle taxi," which is similar to boxes fitted on the front of pushbikes in Australia, used for deliveries, except that a seat replaced the box. The motive power likewise was supplied by a native boy, anything from about thirteen years up, a unique form of transport, and the Aussies were making good use of it.

The currency was naturally Dutch guilders and the rate of exchange was 6.08 guilders to one pound Australian. Jap invasion money was still legal tender and was worth about one-tenth its face value.

Also in port at the time were the "Kanto Maru," Osaka; and the "Kita Maru," two small Jap merchant ships, still being completely manned by Japs, and they were living very well. There was plenty of poultry on deck and every day native canoes came trading such things as eggs, fruit, vegetables, prawns, fish and crabs enough to satisfy anyone's palate. I was told that all Japs received Australian army rations but of course they were in a restricted area and, when out, had to salute every white man they passed.

I had often heard of the peculiar Jap outlook and mentality and had a good opportunity to observe this. When H.M.A.S. Inverell was leaving port it had a bit of a practice shoot, probably to impress the locals; there were about 200 Aussies on board and they were waving goodbye to everyone in general. On the "Kanto Maru" all the Japs were waving anything that happened to be handy and they looked as happy as if they were saying farewell to their best friend. The most feasible explanation is that they act as they would have expected us to act if we had been defeated.

During the Jap occupation the inhabitants around Macassar were fortunate in having a moderately fair time, although a continuous diet of rice must have been very monotonous, and it seems a shame that these people are unable to obtain any food from Australia when they are almost in dire need, especially as so many Dutch ships had come with nothing but a load of Australian air—air that perhaps did not smell too well.

World-wide Fame

Dutch children were frequent visitors to the ship and thoroughly enjoyed themselves, consuming large quantities of the ship's stores. One afternoon there was a great commotion, as screams rose from over the ship's side; a small boy, going down the gangway, fell into the water and was fished out shortly after by one of the crew. Kids seem always to be getting into trouble.

What it is to be famous! When up at the Aust. Army Sign.s, I introduced myself to a chap, and he said: "You are the chap who writes for the 'Radio World,' aren't you?" A big thrill to know I had been heard of in Macassar .

I visited the ex-Jap naval radio station, now being used by the Australian army. There was a one kilowatt and two quarter kilowatt transmitters and four Japs were still on the job. One, a civilian, could speak passable English and it would have been easy to have felt friendly towards him if one did not stop and think of the atrocities committed by his like, and our chances of winning the peace will undoubtedly be increased if we all continue to remember this.

Jap invasion money, although illegal, was nearly always used by the natives and it was easy to obtain one-tenth in Dutch money of its face value.

A most notable day was 28th November, as we received our first mail and, even though it was three weeks' old, it was very welcome. It was reported that the first two bags of mail went astray and there were certainly some earlier letters missing. Three cheers for some bright person; I hope they do not make a habit of it!

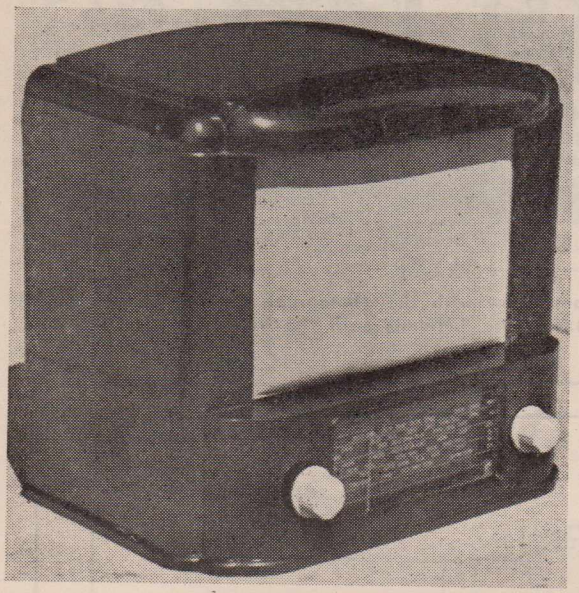
One of the best things I have done for a long time was building up a receiver for use on the ship. The mains voltage was only sixty-five and was used for the series heater circuit and on the plate of the output valve, 25LGT/G, while all the other valves obtained their high tension from batteries. Many hours were spent listening to short-wave broadcasts, which made me realise how essential such transmission is for remote places and how it will survive for many years.

As a break I often went to the pictures at the Y.M.C.A. One night the first part was entertainment by the Chinese community. It started off a bit corny, but there were acrobatics which were surprisingly good, and concluded with an orchestra playing Chinese music; the numbers were "Lovely Flower" and "Happy Spring," their translated titles anyway. Maybe I lack musical taste, but they did not appeal to me; I think I prefer boogy-woogy.

I also heard the local four-piece brass band playing at the opening of the "New York" cafe, making most ghastly noises. A small boy aged about six was most vigorously beating the bass drum and a very worn-out cymbal; occasionally a tune could be picked out—really a grand opening. All the grog is made locally and all out of rice and is about in the class of jungle-juice. I have seen some very sorry men.

This brings the story up-to-date and I am writing this on 6th December with the ship awaiting orders, practically no bunkers and it is raining nicely as the monsoon season has just about arrived and with no prospect of getting back to a white man's country for some while. I realise now what a wonderful place Sydney is.

"METROPOLIS FOUR"



ATTRACTIVE MANTEL MODEL AVAILABLE IN KIT FORM INCLUDING PLASTIC BAKELITE CABINET.

★

Designed and Described by

AEGIS MANUFACTURING CO. PTY. LTD.

208 Lt. Lonsdale St., Melbourne

★

HAVING to design a small local receiver to suit a particular cabinet and use the present somewhat limited range of parts, the first apraisal of space and components indicated a three/four valve type of receiver; that is, three valves and rectifier.

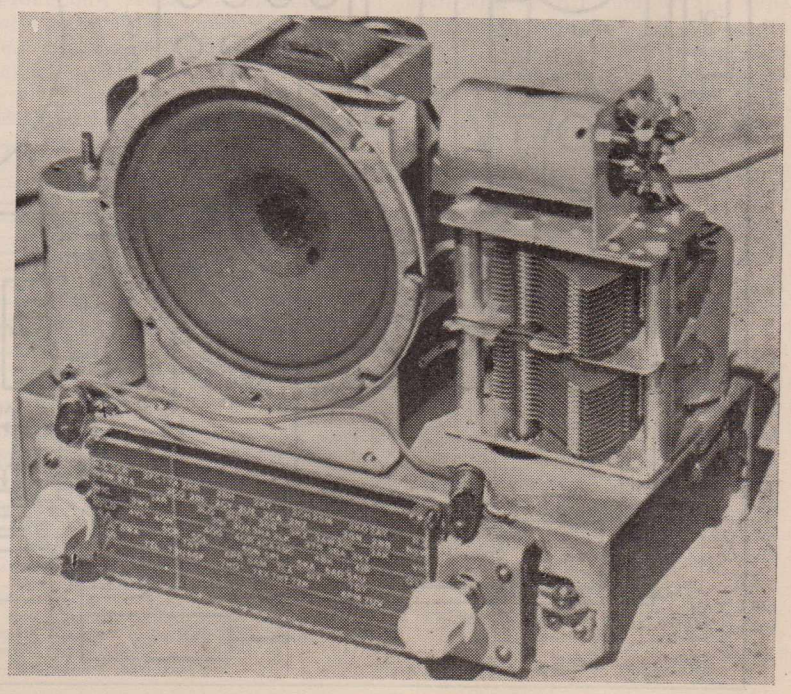
A convenient type of power transformer for size proved to be 250 volts-a-side at 40 mA with a 5 volt and 6.3 volt filament winding. Now if one rushes into the building of a receiver without due consideration of power consumption from the power transformer, excessive expense and disappointment can result from damage to the said transformer.

Power Rating

One gets so used to using a 6V6G or 6F6G, or similar tube at full ratings that it becomes habit, without thought of the type of power transformer, be it 40 mA or 140 mA.

A 6V6G at full rating — 50 mA at 250 volts — can make a 40 mA transformer look a bit sick without the drain of the rest of the set — another 10 to 20 mA — and a midget 40 mA transformer is of necessity operating near its limit, and has very little overload reserve. So a receiver with 40 mA total drain is the order of the day. Being a mantel receiver anyway, 4.5 watts is going to make the speaker and cabinet suffer. So perusal of valve characteristics show that a 6V6G operated with 250 volts on the plate and 100 volts on the screen will

(Continued on next page)



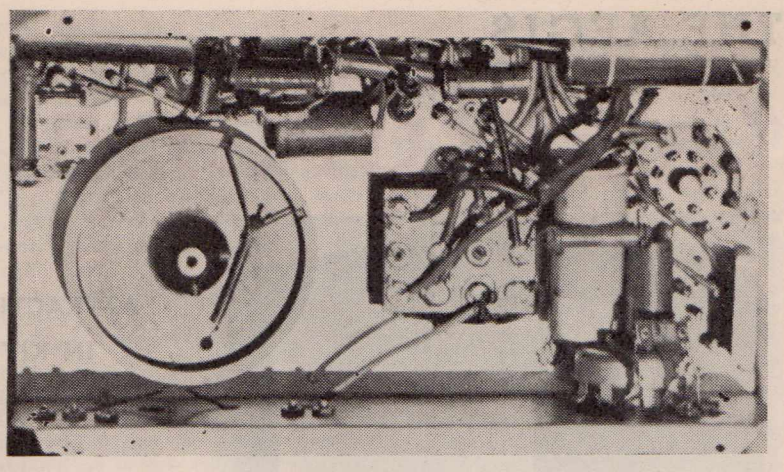
A photograph of the chassis showing unusual gang mounting and aerial coil arrangement.

METROPOLIS 4

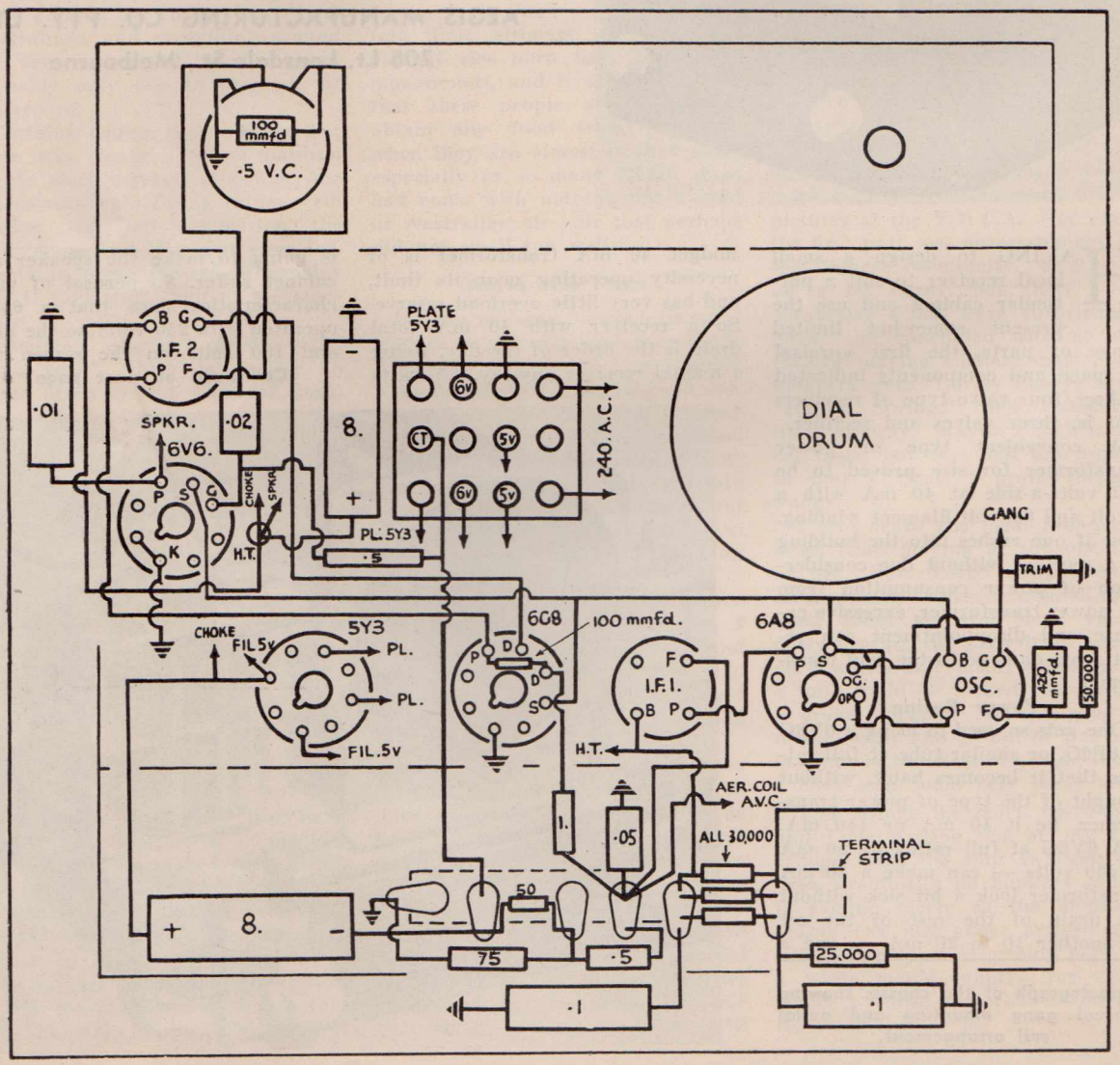
(Continued)

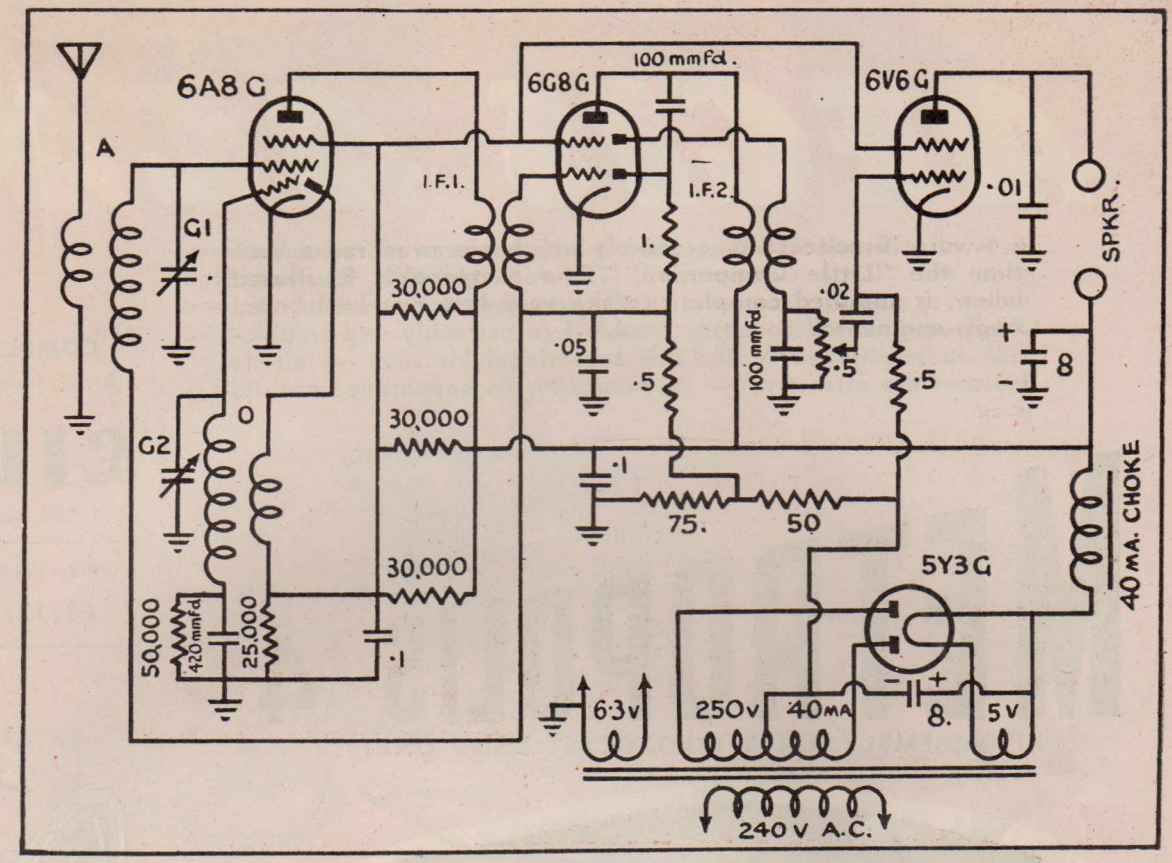
give 1.5 watts output with a total current consumption of 20 mA and only requires 5 volts to drive it. This looks promising, as we still have 20 mA left for the rest of the set and have made enough noise for any mantel receiver.

Having two tubes left we are faced with "What's to do?" Reflex, no I.F. amplifier, or no audio amplifier? Reflex — not at this stage, it can be very troublesome and not very economical. No. I.F. amplifier might sound a bit better, but who can think in terms of better high frequency response with a mantel receiver? So in the interests of improved selectivity it becomes no audio amp. In the interests of economy the number of bits



Compare the diagram below with the photograph above and you should have 'ittle difficulty with the wiring.





have been kept to a minimum.

The three screens are all operated at 100 volts from the same voltage divider consisting of three 30,000 ohms resistors in parallel to give 10,000 ohms at 3 watts and a 25,000 ohm resistor as a bleed.

Back bias has also been used throughout, thus eliminating all cathode resistors and condensers, and also supplying the three volts delay for the A.V.C. circuit. The A.V.C. voltage has been reduced from that which would normally be used with an R.F. unit of this type because of the lack of an audio driver. This has been accomplished by means of the A.V.C. diode load being split to form a voltage divider, the A.V.C. voltage being taken from the junction of the 1 meg. and 500,000 ohm resistors forming the load.

The usual grid condenser on the oscillator has been eliminated, as it is not being used for shortwave, and the padder condenser does the job just as well.

No decoupling has been found necessary even though the leads of the second I.F. are a little long. Experience has proved that a lot of feedback troubles are caused by high-gain audio amplifiers, particularly with feedback, acting as good R.F. amplifiers and causing overall feedback.

PARTS SUPPLIED WITH "AEGIS" KIT

1—Condenser 2 Gang Type A.W.A.
1—Aerial coil — Aegis "Hi Core" type M.9.
1—Oscillator Coil — Aegis "Hi Core" type M.11.
1—No. 1 I.F. Transformer — Aegis "Hi Core" type, J.9
1—No. 2 I.F. Transformer — Aegis "Hi Core type J.10.
2—Trimmers, Type M.E.C.
1—Power Transformer 250-0-250V-40mA 6.3V-3A 5V-2A (Trimax).
1—Permag. Speaker Rola 5C 5000 ohms to 15000 ohms.
1—Filter Choke 40 mA.
1—Valve Shield.
4—Valve Sockets.
1—Resistor Mounting Strip.
1—Chassis.
1—Speaker Mounting Bracket.
1—Choke Mounting Bracket.
1—Coil Mounting Bracket.
1—Dial Plate.
1—Dial Glass.
1—Tuning Spindle and Bush.
1—Dial Guide Rail.
1—Pointer and Carriage.
2—Pulley Brackets.
2—¼-in. Pulleys.
1—½-in. Pulley
1—Dial Drum 2 7/8-in Bakelite.
2—Condensers Mica 100 mmfd. 10%.
1—Condenser Mica 420 mmfd. 2½%.
1—Condenser Mica .01 mfd. 10%.
1—Condenser Paper .02 mfd. 400V.
1—Condenser Paper .05 mfd. 400V.
2—Condenser Paper .1 mfd. 400V.
2—Condenser Electro. 8 mfd. 525V.
1—Resistor Carbon 50 ohms 1/3 watt.
1—Resistor Carbon 75 ohms 1/3 watt.
1—Resistor Carbon 25,000 ohms, 1/2 watt
3—Resistor Carbon 30,000 ohms 1 watt.
1—Resistor Carbon 50,000 ohms 1/3 watt.
2—Resistor Carbon 500,000 ohm, 1/3 watt.
1—Resistor Carbon 1 megohm 1/3 watt.
1—Potentiometer Carbon 500,000 ohm.
2—Grid Clips.
1—Dial Spring.
1—½-in. Grommet.
4 feet Dial cord.
4—Rubber Dial Glass Mounts.
1—Cabinet Bakelite.
1—Baffle and Silk.
2—Knobs Bakelite.
1/8-in. Bolts — Nuts — Eyelets — Solder Lugs — etc.
Tinned Copper and Hook-up Wire.
Power Flex.
2—Dial Lights and Holders

Assembly and Wiring

Assemble the sockets, I.F's, gang

(Continued on page 28)

AEGIS AGAI

A 4-valve Broadcast kit assembly which has even more features than the "Little Companian"! The Metropolis 4, illustrated below, is supplied complete to the very last nut and bolt, and Aegis-engineered to ensure trouble-free assembly and trouble-free radio enjoyment. See this sensational kit soon — all its features are attractive — its simplicity, its appearance and its price.

COMPLETE PA

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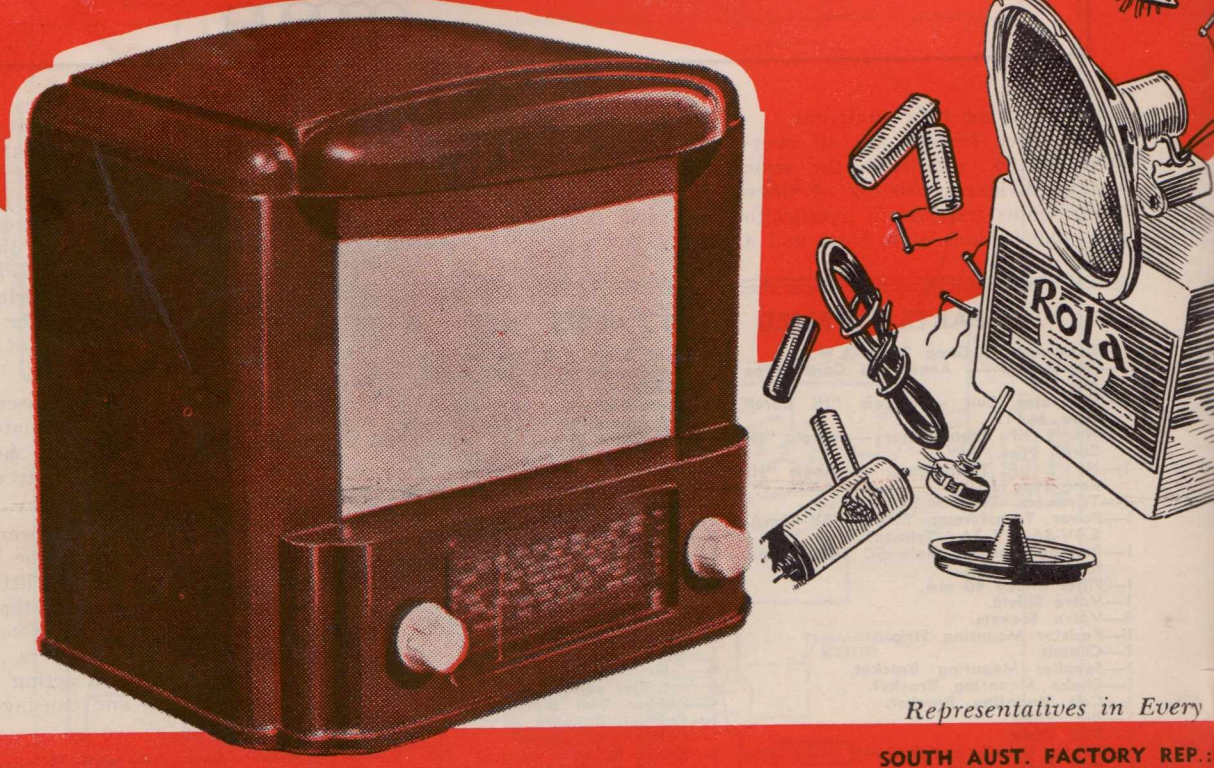
£11/17

(Slightly variable Inte

Plus Valves
£3/12/7

METROPOLIS 4

KIT ASSEMBLY KS4/B (BROADCAST BAND ONLY)



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- ★ ROLA SPEAKER with new Anisotropic Alnico.
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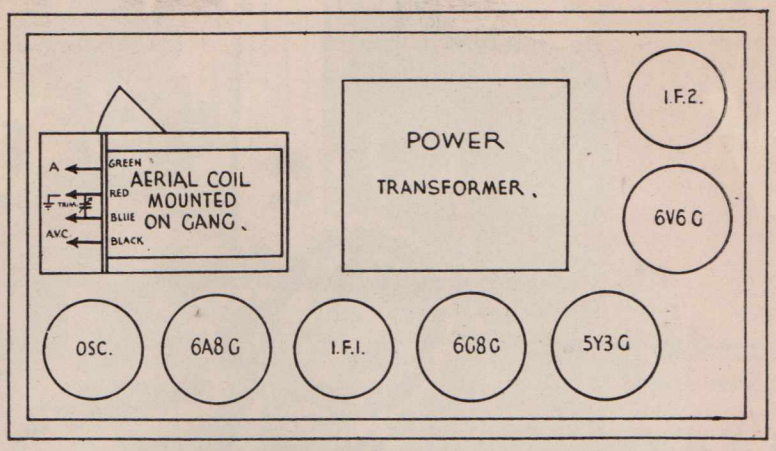
METROPOLIS 4

(Continued)

coils and power transformer, wire the filaments H.T. and screens, then the I.F's and coils. Locate the position of the .1 H.T. bypass under the resistor strip and solder to the chassis, mount the trip and finish the wiring underneath. Mount the speaker and choke and wire these into the circuit. Then mount the dial plate with the pulleys and the guide rail and pointer carriage.

Alignment Procedure

Having got the receiver to work and if possible checked, the voltages should be H.T. — 250 volts, Screens — 100 volts, C.T. of H.T. Secondary (Bias) — 5 volts, Junction of the 50 and 75 ohm resistors (Bias for the R.F. tubes) — 3 volts; if no test oscillator is available the factory setting must be relied on to give the I.F. frequency and the iron cores adjusted to give maximum output. In using a test oscillator to line the I.F's feed it through a condenser to the grid of the I.F. and mixer tube in turn without removing the grid caps so that the bias is maintained on the tubes.



Plan of layout, showing also the aerial coil connections.

After aligning the I.F. channel, bring the aerial and oscillator circuits into line, using a signal of 600 kc/s from the test oscillator (if it has no dummy antenna use a 100 mmfd condenser in series with the aerial lead and the oscillator) for those without an oscillator use a station as near to 600 kc/s as possible and adjust the iron core in the oscillator coil until it comes on the correct position on the dial.

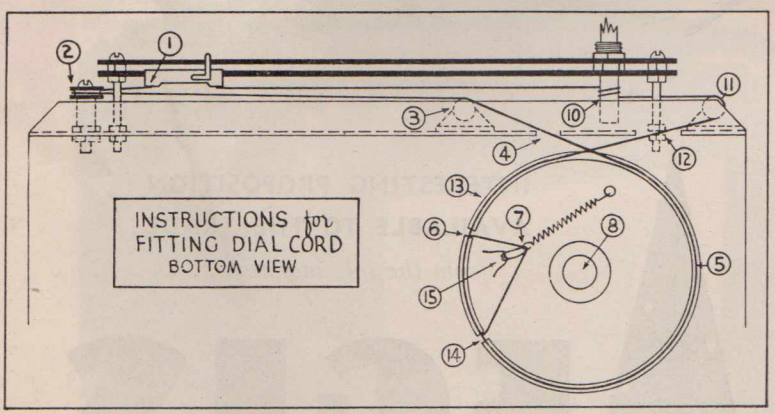
Next, using a signal of 1400 kc/s or a station as near as possible to it, adjust the oscillator trimmer until it comes on the correct position on the dial.

Repeat these first two adjustments until both are correct, always making the final adjustment with the trimmer.

Then, at 600 kc/s adjust the iron core in the aerial coil for maximum output.

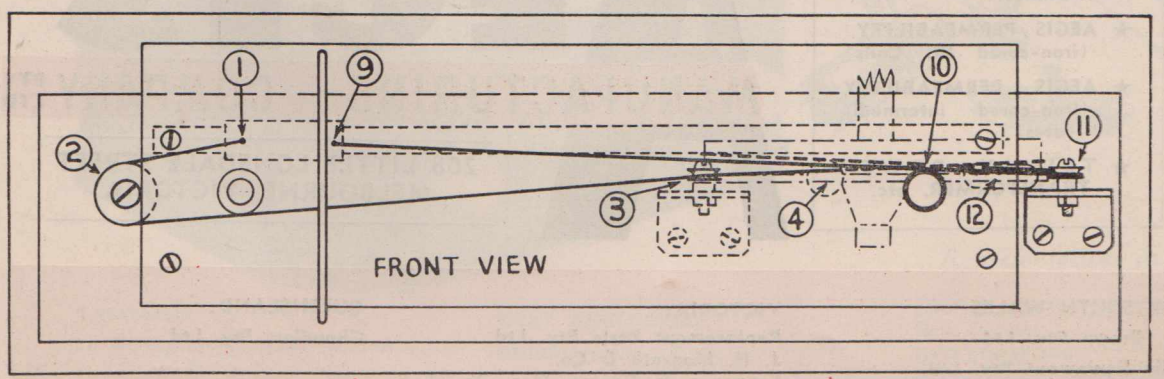
Next, at 1400 kc/s adjust the aerial trimmer for maximum output.

Repeat these third and fourth adjustments until both are correct once again, making the final adjustment with trimmer.



Speaker Load

Although the operation of the 6V6G under the conditions used calls for an output transformer of 15,000 ohms, tests we have conducted show that a standard 5000 ohm transformer only reduced the output 1 DB. When one considers that the loss in the output trans-



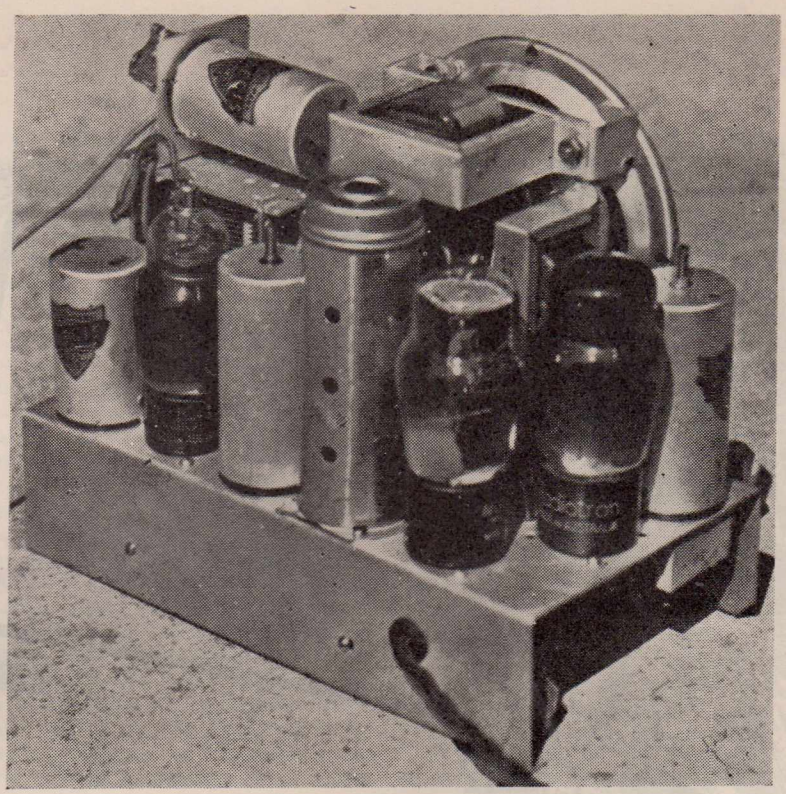
former is supplying a large part of the load the theoretical application of output load matching does not have a very good hearing. Thereforefore as 5000 ohm speaker transformers are likely to be in much more plentiful supply than 15,000 ohm types, no loss in performance will be noticed in using the 5000 ohm transformer. In fact on aural tests we found the 5000 ohm one the better, so we leave it to you.

Suffice it to say that this little set, which started out as a local receiver is giving surprising results on country reception, but as it is limited by the small audio channel, we are content to call it a local receiver and leave it to you to form your own conclusion.

Instructions for Fitting Dial Cord

Having assembled the dial plates and pulleys as shown in the sketch, start with the pointer carriage and attach the dial cord to the carriage so that 24 inches of cord is left free from point 1. With the gang condenser at maximum capacity adjust the dial drum so that the cord slots are in the position shown.

Pass the cord around pulley 2, then pulley 3, through the hole in the chassis 4, around the drum 5, through the slot 6, through the tension spring 7, and without tying any knots on the spring, attach the cord to a screw in the centre of the drum 8, temporarily. Taking the rest of the cord attached to the pointer carriage 9, put two turns around the tuning spindle 10, making sure to start from the front and top of the spindle. Then pass the cord around pulley 11 through the hole in the chassis 12, around the drum 13, through the slot 14, and pass through the tension spring 7, from the opposite side to the first cord. Free the first cord and, holding one cord in each hand, tie a single overhand knot, as though tying a bottlace.



Rear view of the chassis of the "Metropolis 4" kit.

Then by pulling with both cords the tension can be increased until it is satisfactory and the knot pulled tight at the same time. When the dial runs O.K., a couple of extra knots can be tied and the surplus cord cut off.

After attaching the dial glass loosen the grub-screws in the dial drum and with the gang condenser at maximum move the drum until the pointer coincides with the end of the dial glass scale — not the 550 kc mark. Tighten the grub-screws, making sure that the drum is in line with the pulleys. Check the cord from pulley 3 to see that it is higher than the cord from pulley 11, looking at the chassis right way up. Adjust pulley 3 up and pulley 11 down slightly if necessary, so that the two cords do not rub one another.

A drop of thin oil on the pulleys slide and tuning spindle will improve the running of the dial, but make sure that no oil gets on the spindle where the cord runs around it.

Ten Years of Printing Service

THIS tenth birthday issue would hardly be complete without tribute being paid to the printers who have done the actual job of mechanical production of the issues.

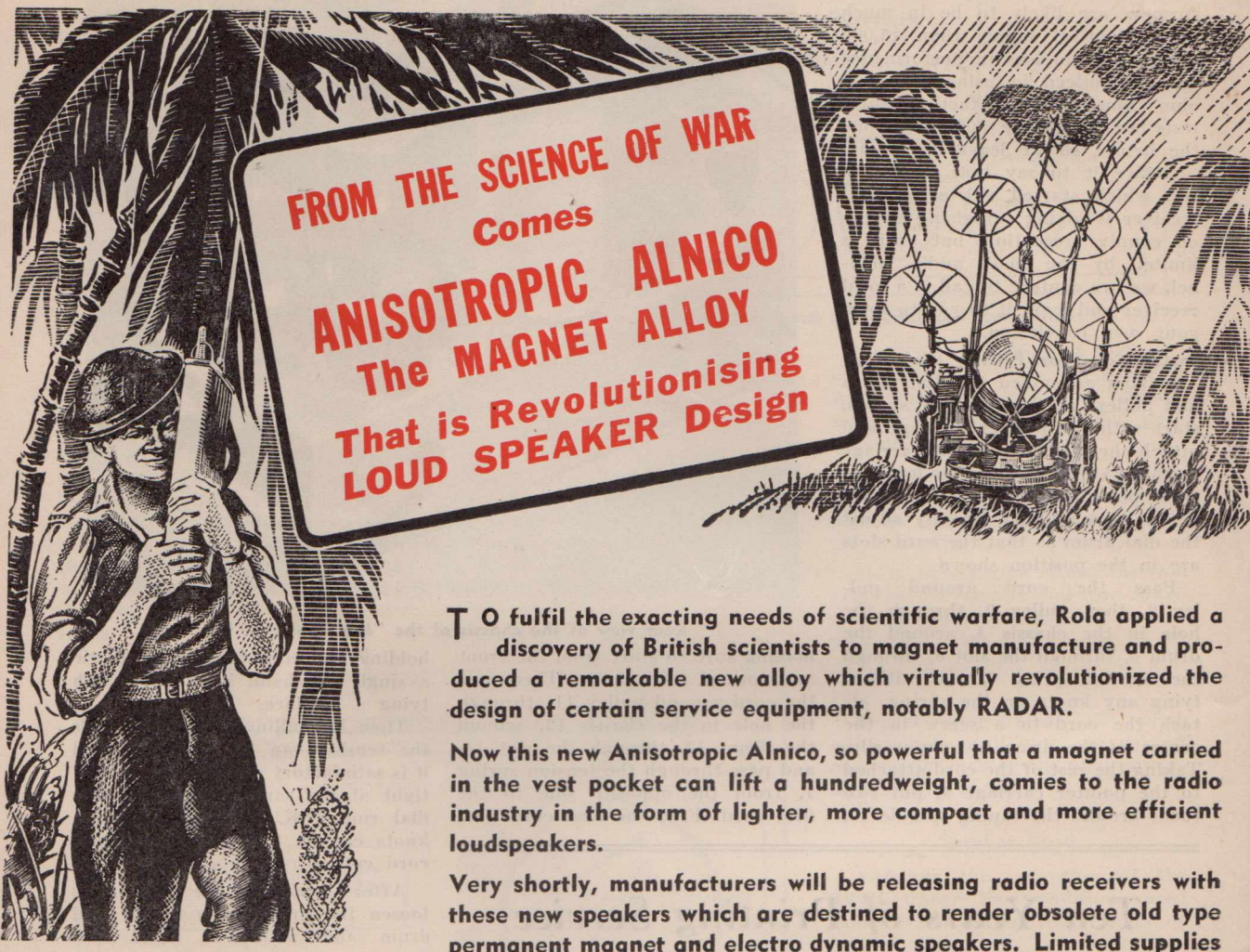
For the whole ten years the work has been done by the Bridge Printery Pty. Ltd., under the personal supervison of Mr. Fred Wales and his son Noel.

As any publisher will readily agree with us, one of the biggest problems in the publishing game is to get a printer with a conscience who will get your magazine out on time, without too many errors and at a reasonable price.

In our particular case the printing problem has been further aggravated by war-time circumstances which made it necessary for the editorial work to be done in Melbourne with the printer more than 500 miles away in Sydney. Even when you can sit on the printer's doorstep it is difficult enough, but to supervise a printer by mail—well, most experienced editors will tell you that it would be an impossibility.

That it was managed, and highly successfully, too, is a splendid testimonial for the Bridge Printery.

The wrapping of subscribers' issues and the bulk postage of them is also carried out by the Bridge Printery and the fact that complaints about non-delivery don't amount to one-twentieth part of a per cent. indicate that this job is also done thoroughly.



FROM THE SCIENCE OF WAR Comes ANISOTROPIC ALNICO The MAGNET ALLOY That is Revolutionising LOUD SPEAKER Design

TO fulfil the exacting needs of scientific warfare, Rola applied a discovery of British scientists to magnet manufacture and produced a remarkable new alloy which virtually revolutionized the design of certain service equipment, notably RADAR.

Now this new Anisotropic Alnico, so powerful that a magnet carried in the vest pocket can lift a hundredweight, comies to the radio industry in the form of lighter, more compact and more efficient loudspeakers.

Very shortly, manufacturers will be releasing radio receivers with these new speakers which are destined to render obsolete old type permanent magnet and electro dynamic speakers. Limited supplies will shortly be available for the general resale trade. Watch for further announcements of the new Rola models using Anisotropic Alnico.

ROLA LOUD SPEAKERS with ANISOTROPIC ALNICO

ROLA CO. (AUST.) PTY. LTD., The Boulevard, Richmond, Victoria. 116 Clarence Street, Sydney.

LOUD SPEAKER BAFFLING SYSTEMS

A SURVEY of the recent Victorian Amplifier Contest disclosed that there were a large number of the contestants using the ordinary flat baffle, and among these was included the writer. It might be inferred from this that the writer favours the flat baffle in preference to possibly three other mostly used systems, namely the bass reflex or vented enclosure type, the infinite baffle, and finally, the folded horn. From a personal point of view, however, and this may seem rather contradictory, the flat baffle is the least preferable of any

By
C. H. MUTTON
Victorian Amplifier Champion

baffle as far as a smooth response is concerned. In the writer's case, lack of correct materials and limited time factor were the contributing factors involved in the use of the flat baffle.

Generally speaking, however, the subject of correct baffling seems for the most part to be shrouded in an air of mystery. However, reference to standard works on acoustics reveals many, generally misunderstood, facts which, for the most part, remain hidden to the average enthusiast.

When it is seen that there are whole text books devoted solely to the discussion of loud speaker design alone, it will be readily apparent to the reader that all aspects of the extremely important function played by the reproducer cannot be covered in one single article. Before discussing such things as the practical design of baffles of various types, and such things as dividing networks, let us first get an understanding of the reproducer itself.

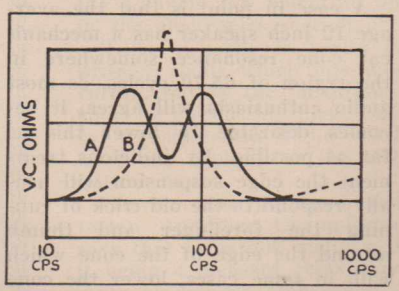
Direct Radiator Loud Speaker

A loud speaker is an electro-acoustic tranducer designed to radiate acoustic energy into a room or open air. Of the two types in general use, namely: the horn type and the direct radiator, it is felt that most readers will only be concerned with the latter type, more commonly known as the familiar electro-dynamic cone speaker. This type of speaker, referred to as the direct radiator type, derives its name due to the fact that the diaphragm is coupled directly to surrounding air.

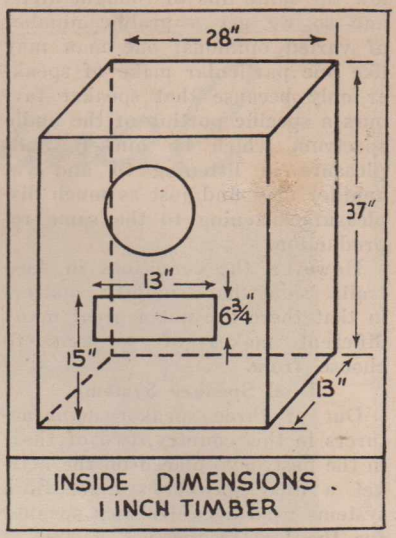
Cone Speakers

The almost universal use of the cone type speaker is due to its simplicity of construction, small space requirements and the relatively uniform response characteristic. The uniform response referred to, however, is only obtainable over a moderate frequency band, when a single cone single voice coil is used. In the average single cone speaker the efficiency at the extreme ends of the audio spectrum is fairly low in comparison to the efficiency obtained in the mid-frequency range. Taking the low end the inefficiency is mainly due to radiation resistance, which can be increased, however, by the use of a large cone or the alternate method of a completely enclosed cabinet with a vent which will undoubtedly extend the low frequency range. Considering the high frequency end, the efficiency here is limited by the mass reactance of the vibrating system, in this connection the usual remedies are: (1) Two or more separate loud speakers are used, each covering a limited range.

(2) Multiple cones driven by a single voice coil may be arranged so that the mass of the system decreases at high frequencies. Yet again the voice coil may be sectionalised to decrease the mass and inductance at the high frequencies hence increasing the high frequency range.



Simple graph to show two small peaks of resonance with box baffle as against one large peak with flat baffle.



Dimensions suggested for a vented enclosure baffle.

While admitting that reasonably good performance may be obtained from the average single cone, single voice coil speaker, it must also be admitted that vastly superior results may be obtained from the use of two or more speakers, each handling only a portion of the audio spectrum, provided, of course, each individual speaker has desirable characteristics which make each particular speaker suitable for that particular range which it is handling.

For Home Use

Generally speaking, speaker systems for home use resolve themselves down to a mass of compromise and because of the many factors involved, the artifices used in many so called high fidelity systems for the ardent music lover and technician alike, never seem to approach the problem of "What is the best speaker system to use?"—with any degree of finality.

In view of the many compromises made in the choice of a speaker system one can only discuss the problem in a general sort of fashion, pointing out the advantages and disadvantages of each particular system and leave the choice to the individual. This problem of the loud speaker system becomes more

(Continued on next page)

SPEAKERS

(Continued)

difficult still when it can be safely stated that no two technicians follow the same line of thought alike, and so we get a prolific number of varied opinions; one man may like one particular make of speaker only because that speaker favours a specific portion of the audio spectrum which he himself finds pleasure in listening to and yet another may find just as much displeasure listening to the same reproduction.

However, the conditions in Australia somewhat simplify matters in that there are not a great many different makes of speakers to choose from.

Dual Speaker Systems

Out of three speaker manufacturers in this country, two of these in the past have placed on the market a dual speaker system. Both systems used a twelve inch speaker for the low frequencies where, as the high frequency end differed somewhat in each case. In the system advocated by the Rola Company the output stage was matched to a 500 ohm line, the 12 inch speaker having its own matching transformer 500 line to voice coil. Paralleled across the 500 line was the primary of another matching transformer which had special design characteristics to match the five inch tweeter speaker, by the simple expedient of varying the value of a series condenser the band of frequencies fed into the high note speaker could be altered.

The other system used an eight inch speaker for the high frequency range in conjunction with a frequency dividing network, consisting of a high pass and low pass filter, which fixed the cross over point at 400 cycles. Thus in this system the 12 inch speaker handled frequencies up to 400 cycles and the eight inch job handled from 400 to 10,000 c.p.s. It is not the purpose of this article to discuss the relative merits and demrits of any specific makes of speakers, so let us confine ourselves to generalities.

From the outset it can be said that possibly the most important point about systems using two reproducers both handling different ranges, is that the problem of intermodulation is overcome. This effect is quite noticeable on single diaphragm speakers, particularly when sounds of a complex nature are being reproduced. Intermodulation becomes most noticeable when the cone of a large speaker is handling comparatively low frequencies and high frequencies simultaneously, and is due to the fact that, while the cone is executing large excursions due to low frequencies, these same low frequencies tend to modulate the higher tones which are being reproduced at the same instant. The resultant sound has a very rough and mushy characteristic and lacks that clean cut type of quality, and can only be listened to for short periods, after which it becomes very distressing to listen to.

Reviewing most of the imported speaker systems, including British and American types, the better class systems invariably use two speakears. Going into the matter thoroughly, and having worked on speaker systems of all types has convinced the writer that vastly superior results may be obtained with a comparatively large number of small speakers arranged in series or series parallel. For instance, it is a far better policy to use for a bass channel four eight inch units, each handling about 3 watts, than to buy a much higher priced 12 inch unit, and expect the same performance by pushing 12 watts into the one unit. Yet again two cheap 12 inch units will give better all round performance than one expensive 12 inch unit. It is extremely difficult to get a speaker which will handle large amounts of power and still expect that same speaker to be satisfactory in all other respects. Where one finds this is the case, the high power handling capacity is also accompanied by sharp peaks somewhere in the audio spectrum.

Cone Resonance

A case in point is that the average 12 inch speaker has a mechanical cone resonance somewhere in the region of 65-70 cycles, as most audio enthusiasts will agree, it becomes desirable to lower this as far as possible. By judicious treatment the edge suspension will usually respond to the old trick of running the forefinger and thumb around the edge of the cone which will, in some cases, lower the cone resonance to 55 cycles, but then we find that blasting takes place if we wind up the gain.

Quite a good combination is to use three 8 inch units for the bass end and three to four six inch units placed at various angles for the middle and top range. In fact as far as range goes a standard 6 inch speaker, when correctly loaded is capable of exceptionally good reproduction.

Personally, the writer feels that the most frequently missed point about speakers is their exceptionally low efficiency, in fact of all equipment used in the reproduction of sound the speaker, considering its faults, receives less attention than any other piece of associated equipment, and yet here is the weakest link in the chain. It does really seem to be a most illogical state of affairs.

To the obvious question, "which is the mast satisfactory way out of the difficulty," comes the equally obvious answer: Use more efficient driving units; but as we are mainly concerned with cone type speakers of the usual commercial type, in the moderate price range of the 12 inch variety, we come to a brick wall when we find that for a given electrical input the conversion to acoustic power leaves us with efficiencies in the region of 3 to 5 per cent.

Low Efficiency

Statistics will show that the highest efficiencies are reached in the horn type loud speakers, some makkers claiming figures as high as 40 to 50 per cent. To the average man who listens at home the straight exponential horn is not a practical proposition, due to its cumbersome size, to say nothing of its appearance. The next best solution is the folded horn, which is more or less an exponential horn folded back on itself to reduce the size; here again physical size becomes a problem if it is desired to use a 12 inch unit. It is quite an established fact that to design a folded horn of the correct design for use with a 12 inch speaker, one would require a room as big as the average small dwelling in which to house it. Reasonable dimensions for a folded horn, however, become a practical proposition by the use of an 8 inch speaker. Used in conjunction with a four watt amplifier, such a system will emit more sound than the most hardened amplifier fan can stand with comfort.

Possibly the reason why folded horns are not popular is that they require no mean skill in carpentry

and are relatively expensive if the job is done properly and the right materials used. It is for this reason the writer suggests that for ease of construction and general all round performance the vented enclosure, or bass reflex type of baffle is the better proposition. While not as efficient as the folded horn the vented enclosure still raises the efficiency an appreciable amount due to the fact that the back wave is used and not cancelled out as in the infinite baffle; it also extends the low frequency range and provides reasonably good loading for the cone.

Interesting data published by the Magnavox Speaker Co. of America tells its own story and explains by the simple graph the difference in performance of a speaker mounted on a flat baffle and also in a vented enclosure. Note the two peaks in the case of the vented enclosure, both much smaller in amplitude than the very large peak in the case of the flat baffle. Hence it can be easily seen why the low frequencies are extended, we actually get a peak lower in frequency than the resonant frequency of the cone.

Resonance Peaks

If the speaker resonant frequency is lower than the box vent resonant frequency the first peak greater, but if the box vent resonant point is lower than the speaker resonance point the second peak will be higher.

The box sides and back must be lined with hair felt or other sound absorbent material to eliminate reflections which would otherwise be set up at high frequencies; the back, of course, is completely closed in. Magnavox give the dimensions for a speaker 12 inch in diameter, having a cone resonance of 60 c.p.s. as 30 c.m. deep — 50 c,m, wide and 125 c,m, high.

The vent would be a single circular hole 22.5 c.m. in diameter, or a rectangular hole 10×40 c.m. Converted to inches these measurements would become 11.8 inches deep — 19.6 inches wide and 49.212 inches high. Circular hole 8.09 inches diameter, or a rectangle 3.9 inches wide and 15.748 inches long. As the dimensions are by no means critical, these could be taken to the nearest inch.

In conclusion, the writer can only say, from personal experience that the vented enclosure, in view of its simplicity, is definitely superior in every way to the flat baffle, or infinite baffle and gives very much improved low note response.

It is hoped to feature a further article on dividing networks in the near future.

Personal

★

CHARLES MUTTON

★

CHARLES MUTTON originally came from England. His father came to Australia in 1913 as chief engineer of the old H.M.A.S. "Australia."

After some years at the Naval College at Jervis Bay, young Charlie came to Sydney to finish his education in time to catch the full effects of the depression. Instead of the commercial career he had expected, he soon found himself glad to be able to earn 13/6 a week as a process worker in a radio factory.

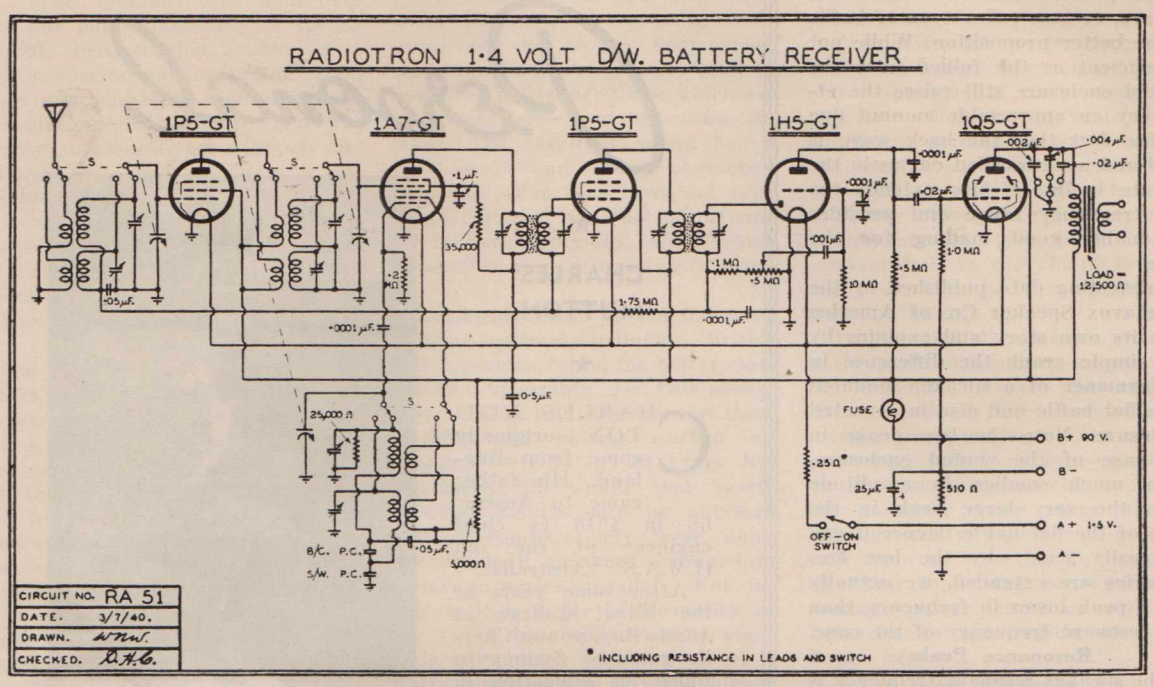
But Charlie strove for better things, did a four-year diploma course at the Sydney Technical School in his spare time and also battled himself into a better job with the Lekmek Radio Laboratories, where he gained four years' valuable experience in the finer things of radio. From then on Charlie ranged around the country gaining experience in factory production and outside maintenance and repair, until the war.

Charlie entered the Army in the Sound Ranging Section of the 2nd Survey Regiment, but this was shortlived, as the powers-that-be decided that he could better serve his country by going to Kingsley Radio, where he spent three years in the Test Laboratory checking over the communications receivers which were being made for the Services. After doing the final test of over 2,000 of these big sets, Charlie joined the Council for Scientific and Industrial Research, working in the electronics section at Melbourne University.

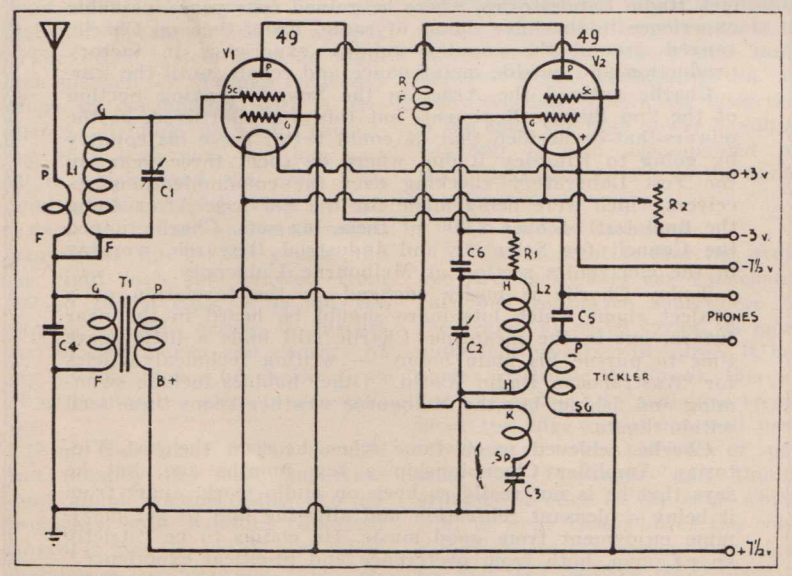
Today Charlie is busily engaged on the formation of a project about which lots more should be heard in the near future, but in the meantime Charlie still finds a little spare time to pursue his main hobby — writing technical articles for "Australasian Radio World." Other hobbies include swimming and fishing, but the Melbourne weather keeps these well within limits.

Charlie achieved much fame when he won the last Victorian Amplifier Championship a few months ago, but he says that he is not really so keen on audio work, apart from it being a pleasant relaxation and allowing him to get maximum enjoyment from good music. He claims to be "strictly an r.f. man, both from preference and practical experience," and it is in this direction that the future technical articles from the Mutton pen hold most promise.

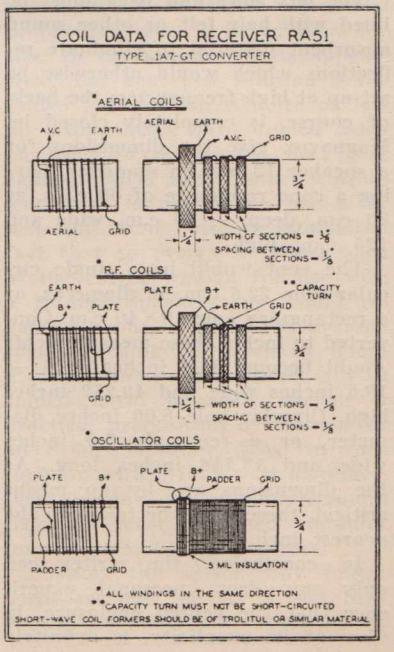
A DECADE OF GOOD



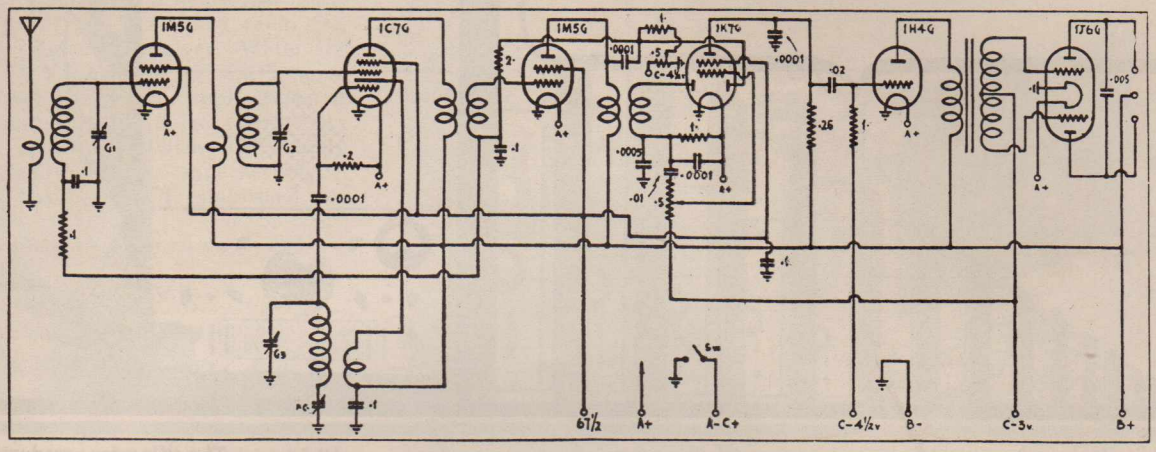
A well-engineered circuit to get maximum performance from 1.4-volt battery-operated valves. Coil winding data as recommended for this circuit is given in the diagram below.



A remarkable design which is claimed to give satisfactory results with a high tension voltage of only 7½ volts.

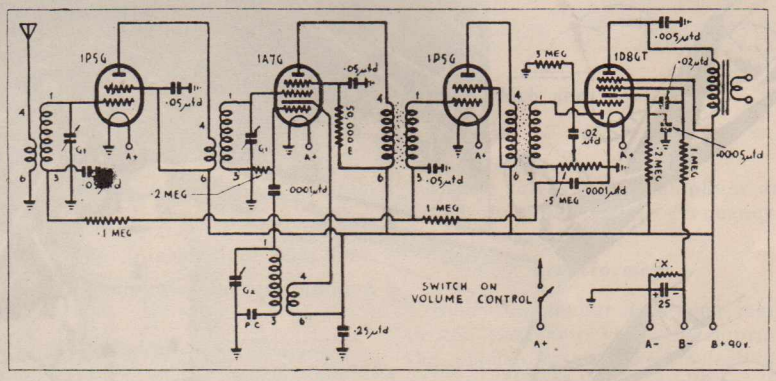


BATTERY CIRCUITS

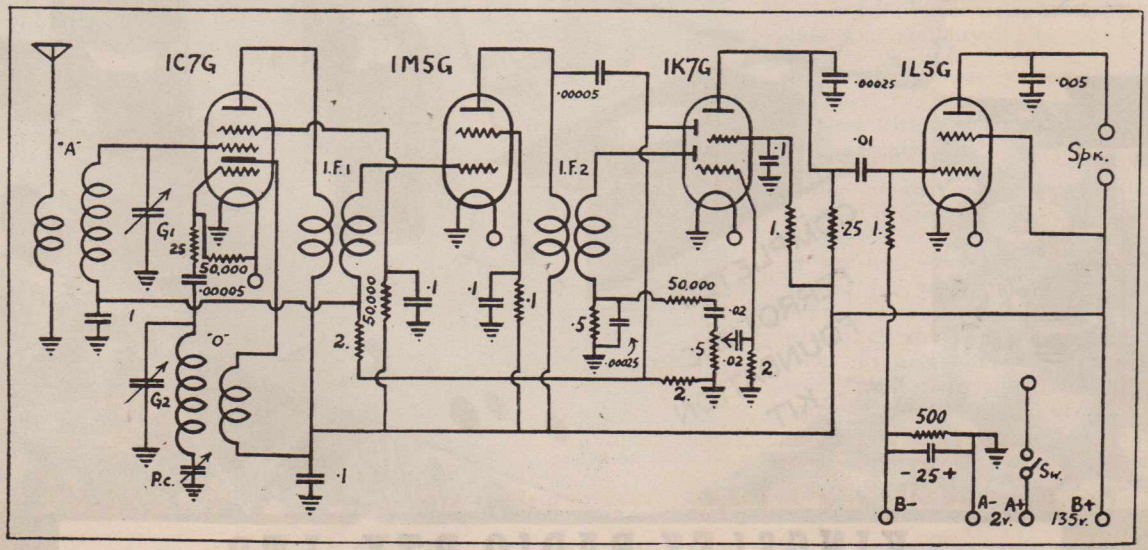


Top—A powerful two-volt battery set with r.f. stage and class B audio.

Right—An ideal battery circuit for a portable or compact table model.



Be'ow—A reliable circuit for an economical battery set to use two-volt valves.



THE "FERROTUNE" SUPERHETERODYNE

FIRST RELEASE OF CONSTRUCTIONAL DETAILS OF A SET FEATURING PERMEABILITY TUNING

By

L. CRANCH

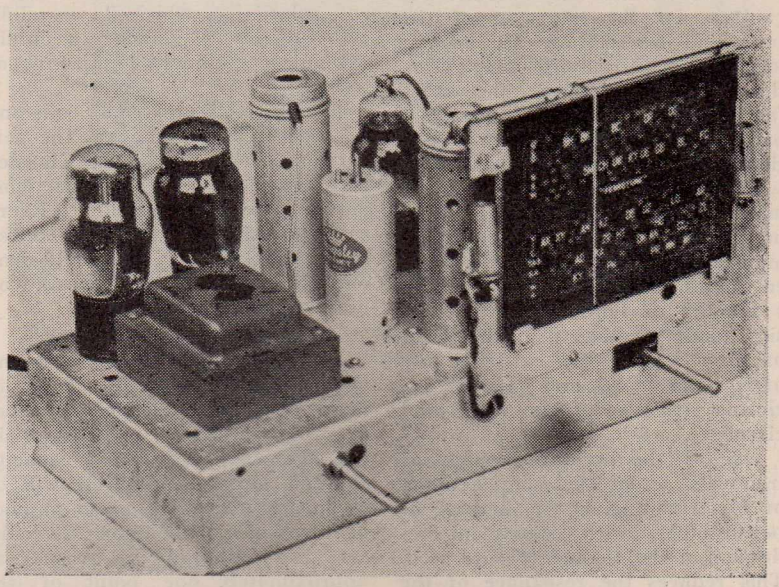
Kingsley Radio Pty. Ltd.

Melbourne

VERY little is heard these days of the old tuned radio frequency receiver. While the T.R.F. type is still a good receiver for certain applications, it is limited in that it lacks sensitivity and selectivity which are readily obtained with the superhetrodyne.

It has been well established for many years that the maximum gain can be achieved in radio frequency circuits peaked to the optimum valves of capacity and inductance. Any attempt to cover a wide band of frequencies by varying the capacity, results in peak performance of the fixed amplifier being disturbed, i.e., peak amplification is obtained at one point representing the best values of Inductance (L) and Capacity (C).

In the superhetrodyne circuit, advantage is taken of this fact and the peaked, fixed amplifier is called the intermediate amplifier, and the coils used in conjunction with the valves in this amplifier are called the intermediate frequency.



Front view of the "Ferrotune" superhet which does not have a conventional gang.

Rear view showing the "Ferrotune" unit fitting through the chassis.

Transformers

Every endeavour has been made in the past few years to improve the efficiency, gain and selectivity of the intermediate amplifier; the valve design has produced better valves with lower noise level, higher gain and stability.

To match these valves the coil designer has designed I.F. transformers with better gain, selectivity and stability.

One of the major contributions to the improved coils and transformers has been the introduction of the iron dust core. It has been known for years that iron, which is finely divided in the form of dust, with each speck of dust insulated from it's neighbour can, when introduced into a winding designed to carry radio frequency current, improve the goodness of "Q" of the coil. The introduction of compact iron-dust shapes or cores is not

(Continued on next page)

FERROTUNE (Continued)

by any means haphazard, but must be done in accordance with well established laws.

The use of iron has a further advantage for the trimming of the tuning of the coil by the adjustment of an iron-dust slug core, this type of trimming is more satisfactory than trimming by small capacities which change with variations of climatic conditions.

During the war years, while manufacturers were concentrating on the production of radio communication equipment for the armed forces, necessity brought along a number of improvements in design and practice, not the least of these was a very extensive use of iron-dust cores and pots for enclosing and adjusting coils and circuits.

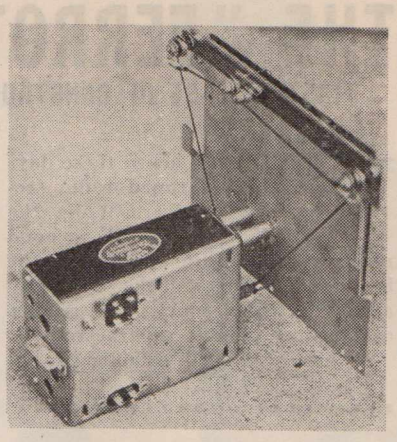
One of the major functions of iron used as an enclosing medium, or for trimming, is the increase of permeability, with consequent reduction of the amount of wire used. This reduces the resistance of the coil for a given inductance.

The foregoing is the basis of design of the Kingsley "Permaclad" coils and intermediate transformers. The advantages of these coils and I.F.'s when built into a superhetrodyne receiver, achieve gain and selectivity, which it was difficult for the kit builder to obtain without a considerable amount of test gear.

The use of "Permaclad" coils and I.F's ensures that you get the performance built in at the Kingsley factory and tested by the most modern methods available. Every coil and I.F. is individually tested before it is packed, and provided no damage occurs to it in transit, you use a tested component.

Gangless Superhetrodyne

Until late 1945 there were no available means in Australia to build a superhetrodyne receiver or, for that matter, a T.R.F. without the use of variable capacity shunted across the coil. It will be obvious that, with a given number of turns (i.e. inductance "L") the L.C. ratio can only be at peak at approximately one point of the combination of the two. This is evident in some receivers, particularly of the T.R.F. type, by the fact that the increase of the capacity of the variable condenser shows flatness of tuning when approaching the top or low frequency end of the band. This is roughly caused by the fact that the inductance is swamped by capacity.



The "Ferrotune" unit is supplied complete with calibrated dial.

A system of varying the inductance with the capacity fixed, would be a better method of tuning. If the inductance is increased by more turns being added, resistance (R) will at once rise, and too much (R) will also flatten the tuning due to reduction of "Q".

Iron core tuning can do the job nicely — a given number of turns is employed on the coil, together with just the right amount of shunt capacity to give good "Q" and consequent gain; then by arranging for a slug to be pushed into the coil. Its inductance rises rapidly as the core goes in — "C" remains constant and, what is more important, "R" remains constant.

This roughly is what "Ferrotune" does, but it does more — it eliminates the necessity for padding condensers, and as the two cores, which tune the aerial and oscillator coils are mechanically driven, the unit is mechanically tracked during manufacture.

Building a superhetrodyne with this unit is just too easy.

Lining Up Procedure

The gangless "Ferrotune" unit is built into a self-contained case, complete with dust cover. It contains the necessary fixed and trimming capacity coils, cores and a mechanical arrangement to provide for the movement of the cores when the control is rotated. By this ar-

rangement, the variable factors usually encountered when assembling a condenser coil, arrangement due to variable length of leads, placement of parts etc., are all under control.

Alignment

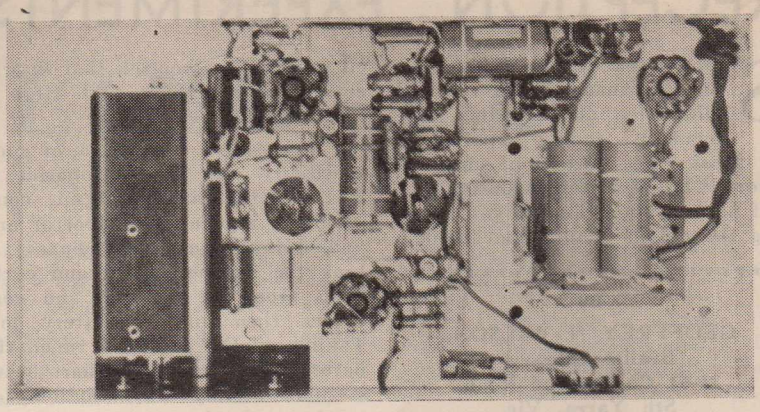
To align the receiver, the use of a calibrated signal generator is helpful, but in the case of not having access to one, the factory setting of the I.F. transformers can be relied to give approximately the correct intermediate frequency and the iron cores purely trimmed for maximum output. For those with a generator, the I.F. transformers should be aligned to 455 kc's.

To check the "Ferrotune" unit, first check the position of the pointer in relation to the stop lines on the ends of the dial scale when the tuning spindle is against the appropriate stop. Second, tune in an identifiable station on the high frequency end, or use the generator, and adjust the oscillator trimmer marked "A" to bring it to it's correct position on the dial. Last, adjust the aerial trimmer marked "B" for maximum output. These trimmers are located on the back of the "Ferrotune" unit.

The underlying idea in providing the home builder with a chassis which places the "Ferrotune" unit and the I.F's in the **intended position,** is to ensure that only the simple adjustments outlined above are necessary in order to make it function correctly.

AVAILABILITY

Owing to the keen demand for "Ferrotune" units and the limited production at present, due to scarcity of essential raw materials, there may be delays in deliveries, but every effort is being made to meet all orders.



Photograph of underside of chassis, showing wiring and layout of components.

Warning

The following notes of caution are set out for the aid of the home builder:—

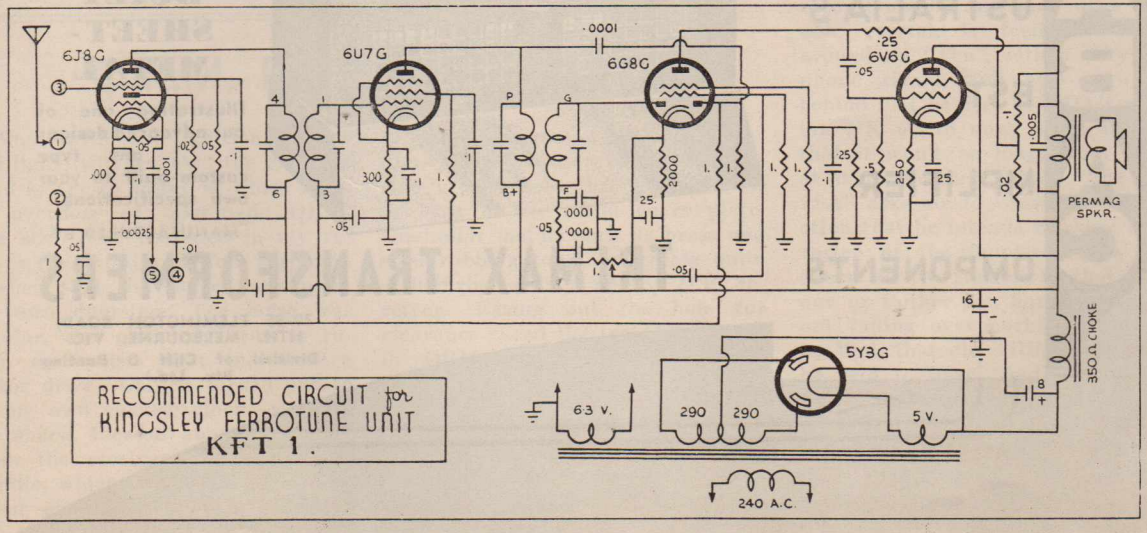
(1) **I.F's must be on 455 kc, as the unit is lined in the factory into I.F's tuned to this frequency.** All "Permaclad" Kingsley I.F's are brought to this frequency during manufacture. The merest touch of the iron-core trimmer should be sufficient to compensate for capacity due to leads, etc.

(2) Breaking of the seal and interfering with the electrical or mechanical adjustment of the tuning unit will upset the lining, and it will be unlikely that the home builder will have means to restore the unit to its original condition. In such case, it should be returned to the factory for service, which will be charged for.

Circuit

We publish herein a suggested circuit arrangement for a receiver embodying the "Ferrotune" unit. While the R.F. circuit should be, in the main, adhered to, the audio amplifier can be of any type to suit the taste and requirements of the intending builder.

The "Ferrotune" unit should be used only in conjunction with the special dials designed for it, just as one would not attempt to use an "F" gang dial on "H" gang condenser set-up, so the correct dial should be applied to the "Ferrotune."



RECEPTION EXPERIMENTS

SOME weeks ago I carried out an experiment which I found eliminated most of the "momentary" fading experienced in short wave reception, and improved fidelity tremendously.

I have no objections to you printing the details I am about to describe, and believe that the principals involved would be of the greatest advantage to S.W. rebroadcasting, radio-telephone and other H.F. communication systems.

By
GEOFFREY N. WILSON,
Braille Library,
31-51 Commercial Road,
Sth Yarra, Vic.

It seems that the only bug-bear to short wave transmission these days is the "momentary" fading that causes so much distortion. I say, without a doubt, that the set-up I used reduced fading and distortion to a minimum, and provided shortwave reception that knocked ordinary methods cold. Here is the formula.

I was using a superhet 5, of good sensitivity and tone. Alongside it was a little battery circuit, comprising a regenerative detector and audio stage that used phones. I took the outdoor aerial and earth leads from the big set, and connected them to the battery job. Taking up the phones I tuned the battery receiver to a short wave station,, setting the reaction for maximum loudness and clarity.

Normally the big set, having only a few inches of aerial pick-up, would bring in very little; but with the regen. circuit in operation, a tremendous boost was given to the superhet. on the surrounding frequencies. Both sets being tuned to the one station, a truely remarkable result was heard from the loud speaker. Although tuning of the little set was not critical, results depended largely on the adjustment of the reaction control. The set needed to operate at the point of oscillation, but not to cause distortion, which was transferred in some measure to the superhet. A good aerial and earth system were essential to provide stability to the small set, with full h.t. and L.t. — preferably batteries; but I used a B eliminator with success.

I have always considered that the best short wave listening is from small battery sets actually oscillating, or on the verge. Using headphones on these sets is far clearer than large superhets., with their emphasis on fading and static. My experiment was a happy compromise; but having something new in fidelity. Perhaps you, or your readers have had similar results, and I would like your comment.

Although still a young chap, I am practically blind, and my knowledge of radio is mostly theoretical. I follow the text and diagrams of A.R.W. with the aid of magnifying glasses, and miss nothing. I have been a subscriber to your journal for many years, and find every page of vital interest. Good luck; and may it always prosper under your expert guidance.

CALLING CQ!

By Don Knock, VK2NO

I.F. CHANNELS, Etc.

For the benefit of Hams who may not be aware of it, the broadcast band (M.F.) now extends from 550 kc/s to 1600 kc/s — **not** 1500 kc/s. Reason I mention this is not that I expect the average Ham to show much interest in B.C.L. regions, but to issue a warning. Those with I.F's of 1500—1600 kc/s in receivers may, at some future date, run into Q.R.M. from B.C. stations in the extended region. If so, it will be easy enough to doctor I.F.T's to go to 1800 or 2000 kc/s. Those in the Sydney Metropolitan area should avoid peaking I.F's at 1700 kc/s, otherwise VKG, the police transmitter, may find its way across the dial. An obvious remedy for these forms of QRM is, of course, adequate screening to ensure that the I.F. channel doesn't pick up unwanted signals. By the way, a tip for the constructor Ham wanting ready made 1600 kc/s I.F.T.'s Those ex-Army 108 Mk.11 sets selling so cheaply in the centre of Sydney include two perfectly good iron-cored 1600 kc/s I.F.T's, and considering that the price asked for the chassis complete with meter and all essentials is ridiculously low, it's a good buy for the impecunious Ham. I don't know of any commercially made 1600 (or thereabouts) kc/s I.F.T.'s on the market at the moment, but the job of making up one's own wouldn't deter experienced constructors. Easiest way is to remodel some types of lower frequency I.F.T's where mechanical and electrical design permit easy conversion. It's worth it to get those 465 kc/s images out of the way! And talking of Australian radio components in general — it doesn't require much examination to reveal that the war-time high standard attained by **all** manufacturers no longer exists for **some.** During the war there were rigid Service specifications to be met, otherwise the inspecting officers rejected the goods in no uncertain manner. Specification CL1001 in particular was a tough one, but it was met by most manufacturers worthy of the name, and the resulting components were equal to the best from overseas. Thus the experimenter finds excellent parts in **Disposals gear,** particularly the tropic-treated (not dipped-in-varnish) variety. But, trying to find good quality items in many or most major components of post-war breed is to be faced with a mess of slipshod rubbish. The Australian parts manufacturer will have to do better if he wants to compete with British and American goods. Recently I have seen so-called variable condensers that are a disgrace to those who foist them upon suffering dealers. This rubbish may be sold for the time being, because there is little competition, but **all** the radio buying public won't be fooled **all** the time. Whilst admitting that cost of production of war standard components **is** high, I contend that the average radio constructor would gladly pay the higher price for items that will at least function well and won't break down. A name for high quality pays the reputable manufacturer in the long run, and the stigma of shoddiness is not easily cast off by those who acquire it.

VK2CE Again Active

The VK2 I referred to as "Rolling his own" in the March issue, has now got his gear on the air. VK2CE, after months of chafing at the shackles of post-war Ham reconstruction and lack of a suitable crystal, is feeling his way around on "Ten" with a very nice phone signal, and also a wallop behind it. I haven't heard Alf working DX up to now, but I imagine that it won't be long. Your close-at-hand brother Ham "the Ole 2SA" asks me to convey the intimation that he intends working out a roster of the "movie nights" between the two stations so that either one or t'other can have a go without falling over each other. Truth is, Wal, that old TRF receiver can be said to have "had it", when a nearby colleague decides to start up his gear. There's a moral in this for new Ham readers: if you will be

(Continued on next page)

Q.R.M. EXTRAORDINARY

What with car ignition, power and light switches, etc., the 28 Mc/s band is apt to suffer at times from an overdose of man-made QRM. One such dose persisted in my receiver for two days before suspicion dawned that the source was upon my own doorstep. The noise was regular, and obviously from a rotary mechanism that indicated a motor drive. Culprit turned out to be my own electric clock—right **in** the shack, located about four feet from the receiver. The re-setting spindle, which makes one revolution about every 2 seconds, had, after 12 years of running without attention, started to scrape against the side of the hole through which it projects in the metal cover plate. Dissimilar metals such as brass and steel rubbing together, create quite a disturbance in a nearby H.F. receiver. Easing out the hole for clearance cured the trouble. A gem in QRM comes from VK2ABD, who told me about a YL combing her hair near his receiver, and the resulting din was terrific! Maybe t'was red hair? I must try stroking the cat some time!

HAM NOTES
(Continued)

advised by one who has used 'em all, don't be tempted to start off reception on "Ten" with a "blooper." Even the simplest form of superhet is preferable. The "Detector and audio" type of RX was all right in the pioneering days on "Ten" when those who struggled to develop the band were looked upon as mentally deficient. Population was very, very sparse, and phone didn't exist. In the wide open spaces even an R2-3 signal could be picked out of the ionosphere with RX's of the "Reinartz" ilk, and there was no QRM to say Nay. But don't think you can use such a receiver in these populated times for 28 mc/s **communication.** Sooner or later, and probably sooner, local QRM will swamp the dial. Incidentally, the bugbear of car ignition QRM makes an interesting comparison with those days. In 1928 to 1933, we didn't seem to notice car noises on "Ten" very much. Reason wasn't far to seek . . . lack of sensitivity my friend! Hams using good receivers and working consistent communication on "Ten" in these times, are at the sensitivity threshold of One Microvolt and better. Only way to cut the car QRM is by crash limiters, or better still, noise silencers of the Lamb type. Some of the "noise-balancing-out" antenna systems as described in a pre-war Jones Handbook might also be worth a trial.

Rotaries or Long Wires?

Two schools of thought exist in the 28 mc/s DX antenna problem, and they both appear to be right. But at the tame time, theoretical considerations and antenna radiation characteristics veer heavily in favour of the "rotaries," assuming that those soul-satisfying accessories to DX are functioning as well as the book says. But the long wire . . . **it** also goes out after the DX and grabs it, and if you don't believe that listen to VK2TI and his "Zepp," or, for that matter, myself with any of the long wires I ofttimes exploit. It's all a matter of convenience, and perhaps time and space to erect the desired type of rotary. And don't forget there are also those who cherish the thought that sooner or later the Service Panjandrums will release their grip on "20" and "40", etc., and are half afraid to go to too much trouble on "Ten." Look at it this way, the resonant rotary beam adjusted to near perfection is 100 per cent or so efficient at the designed frequency. Its virtues are in the gain, and above all the variable directivity. If it is anything other than a two element bi-directional type then it must be rotatable through 360 degrees. In most cases operation is confined to the one frequency range, although some types, of the W8JK variety can be used harmonically. The long wire can be designed for the lowest usable amateur band, which (we hope) will again be "80 metres," and can put up a jolly good showing on "40," "20" and "10." It cannot be moved about and it's directivity is fixed. But that directivity, by reason of many lobes at the higher frequencies, is quite comprehensive, although with very little "beaming" gain. There are long wires of all kinds, and they all work very well indeed, but I think that in this connection the Ham that can erect a Vee antenna with at least 4 full waves per leg for "Ten," and apply it bi-directionally, is on a "long wire" winner. If you doubt that, then listen to VK2RA working the DX on "Ten." After that, move around the dial a little and listen to some of the "Beam Boys" on the job. There are, no doubt, lots of them in other States, but around Sydney I note some sterling results obtained by VK's 2AKR,

A.O.C.P. Exams

Aspirants for A.O.C.P. are reminded that application should be made one month before the exam. Next exam. is in July, so apply now.

LOCAL Q.R.M. MUST BE ACCEPTED
Sporting Outlook Essential

Well, it is, of course, inevitable and not surprising, that our one DX band is rapidly reaching the "local QRM" stage. With "Ten" behaving itself in a manner to put "Twenty" to shame as a DX band, more and more stations are appearing, daily and nightly, in and around Sydney. As may be expected, the boys are beginning to fall over each other a little. So be it, there's plenty of room for all . . . come on in, the DX water's fine! If you feel a little peeved because somebody else has a burl on your pet frequency, take it philosophically and reflect that, after all QRM is part of the wherewithal of radio communication, and that any of us are lucky to be on the air at all. Also, that other VK you don't know so well, who is struggling along trying to iron the "bugs" out of his gear and unwittingly cluttering up half a hundred kc/s may possess, morally, every right to trying his luck as a Ham. Whilst you might have enjoyed the comparative luxury of the home front in the Big Unpleasantness No. 2, **he** might have sweated over the Kokoda nightmare, or dreamed helplessly of life back home and on the air again, whilst slant-eyed guards looked on. If you are also a telegraphic man by preference, don't imagine that you have a prior claim to any portion of the band, and that phones should be excluded therefrom. You have no kick coming unless Regulating Authority decrees that phone goes there, and CW here, or vice versa. And if you are a phone man, don't fly off the handle because Johnny Keypuncher smears your QSO as he chases after an R3 sig from an elusive country. There is a Forum for settlement of these apparent differences which is at your local W.I.A. meeting, and it can all be ironed out by amicable and co-operative discussion. I have heard phone and CW arguments for almost two decades, and have come to the conclusion that both are equally essential in the make-up of the Ham, and that International agreement **should** define channels for both purposes. Not enough room, says who? Then allocate **more** frequencies to Amateur Radio, never mind trying to portion off the already meagre bands. And as for my personal feelings about phone and CW . . . I like 'em both equally well, brother, and I indulge in both, as anybody can hear for themselves.

2AHP, 2AGU, and 2AEC. These are using on an average of 45 watts input, and remarks of most of the W's they QSO are to astonished effect that such should be the power rating. Probably best example is that of VK2AKR, who has a 2 element forward gain array that more than compares favourably with much more pretentous affairs. Engaged on structural design of 3 element beams are VK's 2ABD and 2QR, and by reason of the excellent Dural tubing picked up ex-Disoposals, these two stations should sport some nice looking light-weight "squishers." 2ABD is going the whole way and installing motor drive, with azimuthal map in the operating room, plus coloured indicator lights to show just where the Sigs are taking off for. As for myself, with a 50 mc/s rotary already providing a perch for sceptical kookaburras, the 84 feet W3EDP I am at present using, or the Jones multiband SWF antenna will have to suffice.

SWL Reporters on the Job

One of the good things that "A.R.W." started early in it's career was the "All-Wave All-World DX News" Club which mushroomed from small dimensions to a large following of enthusiastic shortwave listeners. Proof of the enthusiasm of SWL's is afforded me by casual observation of the large mail received monthly from reporters by Les Keast, that peer among you brothers of the midnight SWL oil. I have also received proof of the keenness of the SWL by reason of the vast number of reports resulting from operation of my own station through the pre-war years. They came from far and wide, from every country on earth, and I have, since commencing operation in this new era, been the recipient of a few SWL reports from Maoriland. Unlike many Hams who see no value in such reports, my feelings are otherwise. They have value in that they are tangible proof that lots of people other than active transmitting amateurs are inerested in amateur radio. Further, from the SWL is born many a Ham. I have in my possession treasured SWL cards of many years ago from men who have since become known far and wide as amateurs of wide experience and standing. And I feel, also, that if, instead of spurning even the humblest report, a courteous reply goes back on a station card, the foundation is laid for goodwill. There is, however, only one thing that the very active phone Ham asks of the SWL . . . **please** don't expect a reply unless postage stamps are included with the report for that purpose. The volume of reports can become so considerable as to involve much mailing expense, and brother Ham will rightly baulk at that, unless he is a retired Moneybags who doesn't mind. L.J.K. passed on an interesting report on 28 mc phone reception of VK's from Len Poynter URDX760 of 155 Mitchell St., E. Brunswick, Vic. He says:

"Just a few lines to let you know of my latest loggings on the 10 and 6 meter Ham bands. A very good friend of mine, who lives a few doors away, kindly consented to allow me the use of his V.H.F. receiver last Sunday afternoon, February 24. As conditions were very suitable for long distance QSO's, many VK4, VK3 and VK2's were heard working in their own State and Interstate, and W9's in Honolulu.

One very good station in Melbourne was VK3XA at Armidale, who was putting in a R9T signal at our location, which was just near a tram-line, and we suffered terrific QRM from auto ignition. Here is the list of those heard from 4-6 p.m. Sunday afternoon:

VK4EL, VK3ED, VK3RZ.
WIHCH, portable K6.
VK3UM.
K6QUD to VK3VM.
VK2EZ calling CQ.
VK2MI? to VK5GS. Murray Heights?
VK2EU calling CQ.
VK3ADT working with VK3VM.
VK2AHA working with VK3IG, Mitcham.
VK2NO worked VK3XA, Armidale, R9.
VK3XA to VK2NO.
VK3VM to VK2IQ.
VK3IK to VK2ADT.
VK2QL to VK3IG.
VK2AQ to VK3IFQ.
VK2NO to VK3XG.
VK2ADT to VK3IK.
VK2DK calling CQ.
VK3IG to W2—? (CQ).
VK2TI R8 calling VK3ASQ.
VK3XJ working VK2ADT.
VK3XA working VK2EK.
VK2AHA calling CQ.
VK2IQ working VK3AFQ.
VK3IG working VK2ADT.
VK2ADT.

(Continued on next page)

ALL CONTINENTS WORKED ON "10"

Several VK's have, since the reopening of activity this year already made WAC on 28 mc/s, which in itself would have been looked upon as something of an achievement a decade ago. Not so in these times, with the band laying down signals at unexpected times from equally unexpected parts of the world. For instance, on April 2, '46, at 7 p.m., I heard a lone phone signal at the LF end calling "CQ DX", and was prepared to accept it as another American operating fixed portable in China . . . call sign sounding like XU1MW. But when he added . . . "in Cairo, Egypt," I realised the error, and that I was hearing SU-1MW. The TX happened to be warmed up, so I answered the call and landed the QSO, which lasted about 5 minutes at Q5 R5 both ends. Which episode goes to show how one may get that African contact "out of the blue." Main snag with the WAC hunters appears to be South America, and reports from W's say that the PY's, etc., are hearing and calling VK's very frequently. In Sydney VK2NP has made WAC on the key, and in all probability three or four have done the trick on phone. One lad well away from this part of VK told me that he had made his phone WAC. This was VK4LP fixed-portable-VK6 located at an RAAF LORAN station on Graham Moore Island of the north west coast "up top." Power there was 40 watts to an 815 final and half-wave vertical antenna suspended from a 35 foot mast. Whilst talking to him recently he mentioned having QSO'd 20 G's, and 20 Sth. Africans, all on phone. VK4LP has since come south. WAC's have no doubt been accelerated by the presence of European signals on occasions around 2200 hrs E.A.T., several G's, F's, and miscellaneous Central Europeans having been heard. Despite the appearance of Europeans at times, such periods don't hold for long, and one lacks the feeling of "20 metre" consistency.

HAM NOTES
(Continued)

VK3XA calling VK2ADT.
VK3IK calling CQ.
VK3XA calling CQ.
VK2AGD to VK3IK calling to VK2NG calling CQ.

On 6 metres very little was heard owing to the set not working too well on that band. The only two we did hear were on Wednesday, 26.

VK3MJ working VK3JG at R5.

VK2NO (Don Knock) works 100 watts on 50.4 together with VK2WJ —2LS, 2ABZ, 2LZ.

Our Victorian VK3 have a schedule for 6 metres at 8 p.m. daily, but so far only VK3MJ has been heard.

I hope to have my own 5-10 metre converter going soon."

This report is interesting as giving a picture of the 28 mc/s band to VK2's from an Interstate location, and also that SWL's are looking for different fields for DX. From one angle particularly am I interested in a report such as this, and th[illegible] observance of happenings on [illegible]4 mc/s. Communications between amateur stations will only become fully popular by **occupancy** of a band . . . if the band is left unoccupied little or nothing ever happens there. Thus the checking of conditions and the observance of signals, local and possible DX, at scattered listening posts can be of great assistance.

Pertinent Ponderings

One afternoon recently I held phone converse with the operator of an American Naval Radio station at an island location who, despite the fact that the call used was a W3 Ham call sign, appeared to hold but a passing interest in amateur radio generally. This seems to be true of many of the "fixed/portable" ops handling the gear at some of the stations, the object being to use amateur radio as a stepping stone only . . . that is, to handle traffic with the folks back home. That in itself is a laudable objective and a first class service which Amateur Radio renders . . . for **American** subjects. I asked the "W3" if he had any information regarding the future occupancy of "40" and "20" by W's, and he replied in unmistakable fashion that "he didn't think anyway that the Navy and other Services would be giving up the pre-war amateur allocations . . . they had proved to be so valuable for general communications, etc., etc." Probably that is the opinion of one individual only, and I doubt if it is a straw in the F.C.C. wind. What strikes me forcibly is the obviously "dog-in-the-manger" attitude adopted by so many Service people about our pre-war bands. Assume, for instance, that 14 to 14.4 mc/s **has** proved to be particularly suitable for Service work . . . likewise 7 to 7.3 mc/s. Is the inference that these ranges have, inside the 400 and 300 kc/s respectively, outstanding characteristics of an exclusive nature in comparison to adjacent frequencies? Wouldn't communication over wanted paths be equally proficient at say, 7.3 to 7.6 or 14.4 to 14.8 mc/s, or do the Service Sig wallahs expect oldtimers to agree to a notion that they (the Sig wallahs) have found Black Magic or other miraculous powers extant in our bands, that **we** didn't know about? A too-polite expression for it all is "applesauce!"

* * *

For those who want something really effective in the way of receiving gear for "Six," and, for that matter for "Ten," I can strongly recommend an "acorn" converter with 955 mixer and similar oscillator, plus I.F. coupling stage using an EF50. Such a converter was made up with a coil turret mechanism, the design being for commercial applications to cover everything between 30 mc/s and 170 mc/s. This was achieved, with single tuning control operation and the result, when used with a Philips' R163 receiver is about the sweetset VHF combination I have yet handled. With gaseous VR tube control of oscillator anode voltage, the signals stay "put," and don't drift about. It has been interesting too, in connection with Ionosphere Prediction charts, to observe conditions on frequency ranges between 30 and 50 mc/s, indicating that the maximum usable frequency is creeping steadily upward. Around 35 and 40 mc/s can be heard lots of DX in the form of American police stations in New York and other cities, also the weird mushy sound of FM utility services. Such a converter, used with a combination AM/FM I.F. channel, etc., would be a handy gadget in these times. It is planned to build one with plug-in coil arrangements for 50 and 166 mc/s and when that is done, details will be described in "A.R.W."

Chaos?

A press item in Sydney quoted RAAF officers as saying that chaos exists in Service Sigs because of wholesale demobbing of personnel. It may be too bad for the gentlemen concerned, but wars have a habit of wearing inevitably to an end, and then, willy nilly, men who like to think for themselves and act upon the thoughts, want to go home. It certainly sounds at times as if there might be some form of chaos about by the way automatically keyed stations blare away for hours with call sign repetitions on frequencies that could be put to much better use. All the transmitting amateur asks for is the return of territory he willingly gave up when the big show-down came. If only for the reason that he took his knowledge and experience with him into the Services he is entitled to due consideration.

ZL's on "TEN"

After being confined to domestic QSO's on 3.5 mc/s for some months now, the New Zealand authorities have given the green light to the ZL gang to go ahead on "Ten." First intimation of this came from a local who told me he overheard a conversation on "80" between two of the trans-Tasman boys to the effect that "noon on Saturday, March 30, '46 was the deadline for "Ten." The information proved correct, for from 10.30 a.m. that date, the dial was interspersed with ZL's calling and working VK's and W's. An amusing aspect of that day's communications on the band was that our American friends seemed to have little or no ears for VK's, but were hard on the heels of ZL all day. Which was understandable with a new country on the DX scene. Now, with ZL's on our "top" band, perhaps **our** authorities might do something about "80" etc? As this is being written a press item states that Australian amateur frequencies are being discussed by Service and other authorities, so where there's smoke there may be fire.

Shortwave Review

CONDUCTED BY
L. J. KEAST

NOTES FROM MY DIARY

Autumnal Tints

What is this life if, full of care,
We have no time to stand and stare?
No time to stand beneath the boughs
And stare as long as sheep and cows?

—Wordsworth.

From the window of my den I have a fine view of the delightful undulating hills of Eastwood, and in the foreground the trees are gently reminding me that winter is not far off. But even if unable to take the hint visually, I am prompted orally by the daily-growing strength of the daylight stations. Night reception is still holding out well and from the selected 'Frisco Yanks and the many BBC transmitters one can find many hours of enjoyment.

And I wonder how many tune to the good old Australian shortwave stations, sending out their story of this great country to thousands of eagerly awaiting listeners all over the world. The news one hears and the talks and the general set-up of the programmes suggest that those in charge of this important part of broadcasting know they have a WORLD audience. "Radio Australia" is doing a fine job.

And reports from all over Australia would confirm the selections of frequencies and transmission hours by the ABC for their many transmitters in Melbourne, Lyndhurst, Brisbane and Perth are correct. Yes, Australia, despite the opposition at the start, is now on the Radio Map.

A Very Old Identification Signal

Yes, wedding bells, used long before shortwave stations selected various types of musical notes to distinguish them. But this time the wedding bells were for a jolly good Dx-er, Arthur Thomas Cushen, who married charming Miss Ralda Macdonald. The station was St. Peter's Methodist Church, Invercargill, and the date when they tuned in was March 12th. Here's wishing them the best of luck.

SAYS WHO ?

KRHO, Honolulu, is now back on 9.65mc, 31.06m from 7 p.m. They are of course still on 17.80mc, 16.85m in the mornings and now close at 3 p.m.—L.J.K.

Radio Luxembourg heard very well on Monday mornings when they have a request session for English listeners. Closes at 6 a.m. after asking for reports and giving address for same as 2 Bishops Court, London. Are heard on 6.09mc, 49.26m.—Cushen.

Arthur Cushen reports hearing for some weeks now a Chinese station on 6.235mc, opening at about 9 p.m. and mentioning as the Chinese Army Station. This is most likely XMEX referred to under "New Stations." Neither Mr. Cushen nor Ern Suffolk appear to have heard the location mentioned.

KNBA, 7.8mc, 38.43m, and KNBI, 6.06mc, 49.50m, are heard opening at 7 p.m.

Rex Gillett sends along a bunch of loggings and says, inter alia: "Received a very nice letter a few days ago from 1st Lt. W. Werner, of Radio Balikpapan, who verified my report of March 3rd by stating that mine was the first report he had received from Australia. This 125-watt station operates on 9.125 mc from 10 p.m. till 12.30 a.m., the first hour of which is given to gramophone records (obtained from Australian Amenities station 9AG, which operated on broadcast band from Balikpapan). At 11 p.m., when conditions permit, the station relays PCJ. The Hilversum broadcasts are picked up on a Wells Gardner RAO-5 Communications receiver."

Dr. Gaden writes: "VLR-2 splendid station, a.m. and p.m. All the 19-metre Australians put in wonderful signals. Remarkable band to be so fine at so many different hours, day and night."

"Cards from KWIX, 11.89mc, and XEWW, 9.55mc—third shot to get a card from them. Also one from KWID/X—no frequencies mentioned. Singapore sent me the plain "Invitation" type card for 25, 31 and 41 metre bands. The most important item has been forgotten—FOUR copies of "Universalite" now here—very nice, too, thank you very much."—Gaden.

Arthur Cushen sends some welly good Chinese news: XGRA, Shanghai, verified by letter from F. Chung, Director, Shanghai Broadcasting Station of Central Broadcasting Administration, 7 Chung Cheng Road (Western), Shanghai. Requests further reports. Call XGOO dropped when station taken over by Chinese authorities. XGRA is heard on 11.70 mc, 25.65m. XGOL, Foochow, 9.995 mc, 30.01m, just clear of WWV, heard well until signing at 1 a.m.

Heard the call XGNC on 9.625 mc, 31.17m at 9 p.m. Signal is at good strength. XTPA, Canton, 11.65 mc, 25.75m. Call heard at 11 p.m. but only fair signal.

"This is WLWO, The Crosley Corporation, Cincinnati, transmitting on 11,710 kilocycles. This programme of recorded music is being transmitted for test purposes only."

That was the announcement I heard when waiting to see who was putting in such a wonderful signal at 6.55 p.m. on Thursday, April 18th. —L.J.K.

William Winter can be heard over KCBR, 9.7mc, 30.93m, and also on KNBX, 9.49mc, 31.61m, at 8.15 p.m.—L.J.K.

Paris on 11.845mc, 25.23m, and on 9.55mc, 31.41m, puts over a special programme for Tahiti from 3-3.45 p.m. Signal quite good, the former being the better.—L.J.K.

Received a letter from Finlay A. Buchester, of New Farm, Brisbane, who since his discharge from the R.A.A.F. has been "listening-in" again. Before the war, Mr. Buchester was DX writer for "Teleradio." Most of his tuning of late has been on the high frequency end of the dial, and I have sent his loggings on to Don Knock. However, he mentions what great signals are coming from KWID and KGEX in the late afternoons and evenings. They certainly are great signals and, knowing the interest in the 'Frisco transmitters, I have prepared a list for this issue. He finds TAP very good in the mornings and is particularly interested in the fine talks from The World Radio University through WRUL at that time.

KWIX, on 11.89mc, 25.23m, is out of luck in the afternoons till closing at 4 o'clock, as Moscow, on the same frequency, badly heterodynes them, but when KWIX returns at 5.15, beamed to New Zealand, although Moscow is still there the position is reversed.—L.J.K.

Have you noticed the great similarity in the voices of the male readers of the BBC? When listening to Radio News-Reel on Good Friday I heard the announcement: "Your narrator was Robin Holmes." Excellent reader, too, and wearing the old school tie.—L.J.K.

Radio Paris is certainly spending some time on the air and is beaming programmes during the 24 hours to the following 25 countries: Antilles-Guinea, Austria, Belgium, Bulgaria, Czechoslovakia, Denmark, England, Greece, Holland, Hungary, Indo-China, Italy, Madagascar, Near East, New Caledonia, North Africa, North America, Norway, Poland, Portugal, Roumania, South America, Sweden and Yugoslovakia. They can be heard in the afternoon from 2-2.45 directed to New Caledonia, on 15.24mc, 19.69m, and 11.845mc, 25.33m; to Tahiti from 3-3.45 on 11.845mc, and 9.55 mc, 31.41m; at night from 8.30-8.45 are in Arabic to the Near East on 11.885mc, 25.23m, 11.70mc, 26.64m, and 9.56mc, 31.38m; and from 10 p.m. till midnight, directed to Indo-China on 17.765mc, 16.88m, 15.35mc, 19.54m, and 15.24mc, 19.69m.—L.J.K.

VJZ, Rabaul, 9.31mc, 32.24m, uses a power of 500 watts fed into a Rhombic Antenna directed on Sydney.

HI1Z, Ciudad Trujillo, Dominican Republic, 6.315mc, 47.50m, is heard on Sundays at 11.30 p.m., giving lottery results.—Cushen.

NEW STATIONS

KOFA, Salzburg (Austria), 7.21mc, 41.61 m: Arthur Cushen reports hearing this one opening at 4 p.m. and announcing as the "Blue Danube Network." He says signal is fair, but fair in N.Z. may mean very very poor here. I cannot hear them.

VLC-9, Shepparton, 17.84mc, 16.82m: Used by The Department of Information in transmission to North America from 9.40-11.50 a.m. News is given at 9.45 and 11.30.—L.J.K.

XMEX, China, 6.23mc, 48.15m: Ern Suffolk, of Lobethal, S.A., says: "Signals of better quality and strength are now being heard from a Chinese station on 6.23mc, 48.15m. I have now confirmed the call of XMEX, which was considered the probable call some months ago. Programmes, although distinctly of an Oriental flavour, can be copied without difficulty. Schedule appears to be 10 p.m.-midnight."

KCBR, San Francisco, 17.77mc, 16.88m: Another new outlet for the Columbia Broadcasting System and heard from 1-4 p.m. with excellent signals. Carries usual Armed Forces programmes.—L.J.K.

VUD, Delhi, 17.76mc, 16.89m: Here is a further Indian reported by Ern Suffolk. Opens at 6.30 for half an hour but returns at 7.30 with news in English directed to East Africa and Asia. Following the news session, schedules of many of the All India Radio services are announced.

The MONTH'S LOGGINGS

ALL TIMES ARE EASTERN AUSTRALIAN STANDARD TIME

Pressure on space only permits of unusual Loggings or alterations in schedules or frequencies.

Readers will show a grateful consideration for others if they will notify me of any alterations. Please send reports to L. J. Keast, 3 Fitzgerald Road, Ermington, N.S.W.

Java

——, Djokjakarta, ... 15.95mc, 18.80m
A Javanese giving location as Djokjakarta is heard with good signal and usual type programme around 8.30 p.m. (Gillett). News in English at 9.30 p.m. (Suffolk). (This is probably another "Free Indonesian." I have a note in my diary—"hearing Japan here on 27th September, 1944."—L.J.K.)

Radio Bandoeng 12.27mc, 24.45m
News and music at 8.45 p.m. (Miss Sanderson).

Marianas

KU5Q, Guam 13.39mc, 22.40m
Heard conducting special tests of music until 10.30 p.m. with WLXJ, Shanghai. Was also using 9.76, 9.29 and 7.63mc. Reports requested to be sent to Public Information Radio, Guam, Marianas (Gillett).

New Britain

VJZ, Rabaul 9.31mc, 32.24m
On an announced frequency of 9.31mc, has been heard calling La Perouse, Sydney, at 9.30 p.m. (Gillett).

MISCELLANEOUS

Albania

ZAA, Tirana 7.85mc, 38.22m
Now closes at 7.15 a.m. with an anthem (Gillett, Cushen). Weak most mornings at 6 o'clock (Suffolk).

Anglo-Egyptian Sudan

Radio Omdurman 13.32mc, 23.92m
Is fair about 3 a.m. with Eastern type programme (Gillett).

Angola

CR-6RA, Loanda 9.47mc, 31.69m
Very poor signal when closing at 6.30 a.m. (Cushen).

Belgium

Radio National Belge, Brussels 17.845mc, 16.81m
Being heard, on favourable nights only, at 7.30, with programmes of variety and light music. They either close or fade out by 8 p.m. (Suffolk). Weak signal at 8.30 p.m. (Miss Sanderson).

Czechoslovakia

OLR-2A, Prague 6.01mc, 49.92m
Heard well now with news in English at 6 a.m. and 7.30 a.m. (Cushen).

Canada

VE-9AI, Edmonton 9.54mc, 31.45m
Have been hearing a Canadian at midnight with news in English and advertising . . . has been too weak to identify and the Yank on 9.55mc spreads right across the Canadian (Suffolk). (I am assuming it is VE-9AI that Mr. Suffolk is hearing, as it is scheduled for that hour.—L.J.K.)

Egypt

SUX, Cairo 7.86mc, 38.15m
Heard at 6 a.m. at good strength (Cushen).

Finland

OIX-4, Lahti 15.19mc, 19.75m
Heard late at night. Has 12 bells as interval signal (Miss Sanderson).

OIX-3, Lahti 11.78mc, 25.47m
In parallel with 9.506mc, at 10.15 p.m., but signal very poor (Cushen).

OIX-2, Helsinki 9.506mc, 31.56m
Has news in English at 10.15 p.m. (Cushen). (Note slight change in frequency.—L.J.K.)

France

Radio Paris 11.885mc, 25.23m
Good level with classical music at 3.45 a.m. (Gillett). (This pre-war frequency was known as Radio Mondial.—L.J.K.)

—— 11.705mc, 25.63m
Heard signing off at 9.15 p.m. and reopening at 9.30 . . . weak both times (Suffolk).

Ethiopia

Radio Addis Ababa 9.62mc, 31.19m
On Sundays a talk on world affairs is given in English at 1.30 a.m. Classical music follows (Gillett).

Germany

A.F.N., Frankfurt 6.078mc, 49.35m
Heard in early morning with announcement, "American Forces Network" (Gillett).

Greece

——, Athens 7.295mc, 41.13m
See "New Stations."

Holland

PCJ, Hilversum 17.775mc, 16.88m
Well received 11 p.m.-midnight and later (Cushen, Miss Sanderson).

PCJ, Hilversum 11.735mc, 25.58m
Extremely poor signal on this new frequency at 5.45 a.m. This one in relay with 9.59mc, which is often good . . . too much opposition on former (Gillett).

Italy

Radio Italy, Milan 9.635mc, 31.14m
Heard in three different schedules—at 6 p.m., 1 a.m. and 5 a.m. Signals fair (Suffolk).

Luxembourg

Radio Luxembourg 6.09mc, 49.26m
Have heard a dance music session compered in English at 7.15 a.m.—good signals (Gillett).

Norway

LKJ, Oslo 9.54mc, 31.45m
Think I have been hearing this station at 12.30 a.m. and again at 4 o'clock (Suffolk). (Mr. Edel reported last month he was hearing them between 9.50 and 10.30 p.m.—L.J.K.)

Portugal

CSW-6, Lisbon 11.04mc, 27.17m
News in Portuguese at 7.15 a.m. followed by Bing Crosby session. Call-sign given on the hour (Miss Sanderson).

Spain

Radio National Espana, Madrid 9.375mc, 32.02m
Musical programme at 5.45 a.m. (Miss Sanderson).

Switzerland

HBZ-2, Berne 14.538mc, 20.64m
Good programme of music and talks (Miss Sanderson).

HEI-5, Berne 11.71mc, 25.6m
Good on Tuesdays and Saturdays at 5 p.m. (Miss Sanderson).

HEF-4, Berne 9.185mc, 32.66m
News in English at 6.45 a.m. (Miss Sanderson).

Yugoslovakia

Radio Belgrad, Belgrade, 9.42mc, 31.85m
Well received at 5 p.m. in French (Cushen).

WEST INDIES

Cuba

COBL, Havana 9.833mc, 30.51m
Fair in early a.m.

COCX, Havana 9.265mc, 32.38m
Sometimes comes out from under the blanket of morse (Gillett).

COKG, Havana 8.955mc, 33.48m
This is the one I heard in Spanish late at night, although did not hear call-sign (Edel).

COCQ, Havana 8.83mc, 33.98m
By far the best Cuban; is really good at 10.30 p.m. (Gaden).

Haiti

HH3W, Port-au-Prince, 10.13mc, 29.62m
Heard Russian Cossack songs at 9.30 p.m. but interference from morse (Edel).

AUSTRALIAN SHORTWAVE STATIONS

COMPILED BY L. J. KEAST,

Callsign	Location	Freq. m.c.	W./L. met.	On the Air
VLC-9	Shepparton	17.84	16.82	9.40-11.50 a.m.
VLC-4	Shepparton	15.315	19.59	Noon-2 p.m.; 3-3.45 p.m.; 4-4.40 p.m. (French).
VLG-6	Melbourne	15.23	19.69	Noon-2 p.m.; 3-3.45 p.m.
VLH-5	Lyndhurst	15.24	19.69	Sun. 9 a.m.-3 p.m.; daily 10 a.m.-4 p.m. (Sat. to 5.30)
VLA-6	Shepparton	15.2	19.74	7.15-9 a.m.; 9-9.30 a.m. (Jap.); noon-2 p.m. (Sats. only 1.15-5.25 p.m., Sports); 5.30-6.14 p.m. (Jap.); 6.35-10.15 p.m.
VLG-7	Melbourne	15.16	19.79	Sun. 6.45-8.15 a.m.; daily 6-8 a.m.
VLG-5	Melbourne	11.88	25.25	Idle.
VLH-4	Lyndhurst	11.88	25.25	Sun. 6.45-8.30 a.m.; 3.30-6 p.m.; daily 6-8.15 a.m.; 4.30-6.30 p.m.
VLG-4	Melbourne	11.84	25.35	2-3 a.m.
VLC-7	Shepparton	11.84	25.35	Idle.
VLW-3	Perth	11.83	25.36	1.30-8.15 p.m.
VLA-4	Shepparton	11.77	25.49	Idle.
VLG-10	Melbourne	11.76	25.51	6.15-6.53 p.m. (French to New Caledonia).
VLG-3	Melbourne	11.71	25.62	4-4.40 p.m. (Fr.); 5.30-5.55 p.m. (Jap.); 6.58-11 p.m. (Var.); 11 p.m.-midnight (Fr. and Siamese).
VLA-3	Shepparton	9.68	30.99	1-2 a.m.
VLC-2	Shepparton	9.68	30.99	Idle.
VLW-6	Perth	9.68	30.99	Idle.
VLQ-3	Brisbane	9.66	31.06	Sun. 11 a.m.-5.15 p.m.; daily 11.45 a.m.-5.15 p.m.
VLC-6	Shepparton	9.615	31.2	6.58-11 p.m. (Various Lang.); midnight-12.50 a.m.; 2-3 a.m.
VLG	Melbourne	9.58	31.32	12.15-1 a.m.; 1-1.45 a.m.
VLH-3	Lyndhurst	9.58	31.32	Sun. 6.30-11.30 p.m.; daily 6.45-11.30 p.m.; Sat. 5.45-midnight.
VLC-5	Shepparton	9.54	31.45	11-11.50 p.m.
VLR	Melbourne	9.54	31.45	Sun. 9.30 a.m.-6.30 p.m.; daily 7.20-10 a.m.; 11.45 a.m.-5.20 p.m.
VLW-7	Perth	9.52	31.51	8-11.45 a.m.; 8.30 p.m.-1.30 a.m.
VLA	Shepparton	7.28	41.21	11 p.m.-midnight (Fr. and Siamese); midnight-12.29 (Eng.).
VLC-8	Shepparton	7.28	41.21	6-6.53 p.m.; 1-2 a.m.
VLQ	Brisbane	7.24	41.44	Sun. 6.45-10.45 a.m.; daily 6-10 a.m
VLQ-2	Brisbane	7.215	41.58	5.30-11.30 p.m.
VLR-2	Melbourne	6.15	48.78	Sun. 6.45-9.15 a.m.; 6.58-11.30 p.m.; daily 6-7.10 a.m.; 5.30-11.30 p.m. (Sats. to midnight).

Stations in bold type carry Dept. of Information programmes.

'FRISCO CHANGES

Callsign	Freq.	Wavelength	Time on the Air
KGEI	17.78	16.87	11 a.m.-3 p.m.
KCBR	17.77	16.88	1 p.m.-4 p.m.
KNBX	15.33	19.56	1 p.m.-2.45 p.m.
KNBI	15.34	19.56	4.15 p.m.-6.45 p.m.
KCBF	15.27	19.64	4 a.m.-7.45 a.m.
KGEX	15.21	19.72	1 p.m.-4.45 p.m.
KGEI	15.13	19.83	4 a.m.-7.45 a.m.
KWIX	11.89	25.23	1-4.45 p.m.; 5.15 p.m.-6.45 p.m.
KNBX	11.79	25.45	2.15 a.m.-6.30 a.m.
KNBA	11.79	25.45	4.15 p.m.-6.45 p.m.
KGEX	11.73	25.58	1.15 a.m.-3 a.m.; 5 p.m.-7.45 p.m.
KCBF	9.75	30.77	7 p.m.-3 a.m.
KCBR	9.7	30.93	5 p.m.-4 a.m.
KWID	9.57	31.35	5.15 p.m.-9.30 p.m.
KGEI	9.55	31.41	7 p.m.-1 a.m.
KNBX	9.49	31.61	8 p.m.-2 a.m.
KNBA	7.805	38.43	7 p.m.-3 a.m.
KGEX	7.25	41.38	8 p.m.-2.45 a.m.
KWIX	7.23	41.49	7 p.m.-4 a.m.
KCBA	6.17	48.62	7 p.m.-3 a.m.
KNBI	6.06	49.50	7 p.m.-3 a.m.
KRHO*	17.80	16.85	9 a.m.-3 p.m.
KRHO*	9.65	31.06	7 p.m.-3 a.m.

* Honolulu

Wins New Honour

Lowell Thomas, noted NBC news reporter, heard regularly over the Crosley stations, has a new honour — the Alfred I. du Pont Radio Foundation Commentator Award. The award carries a cash prize of 1,000 dollars. The Commentator Award is given annually for "distinguished and meritorious performance of public service by aggressive, consistently excellent and accurate gathering and reporting of news by radio, and the presentation of expert, informed and reliable interpretation of news and opinion through the medium of radio."

They're the Tops

See where my old favourites, Fibber McGee and Molly won a double first as top commercial radio programme and top ranking comedy team in a recent survey of 1,100 newspapermen by Radio Daily, broadcasting trade paper.

Language Mangling Manager

Here's how "Duffy's Tavern" came to be made. A radio series was to be made known as "This is New York" and to be produced by Ed. Gardner, (Archie). Archie was to be a minor character in the show, but search as he might, Gardner couldn't find the right actor to play the language-mangling manager. In vain he auditioned actor after actor. At last, storming out of the production booth, he faced a group of perspiring character actors with his own impression of how the role should be played. Silently they watched him. Then they nodded in solemn agreement. "You're right," they agreed, "you're Archie." And Archie he has been for a long time, and I never tire of him.

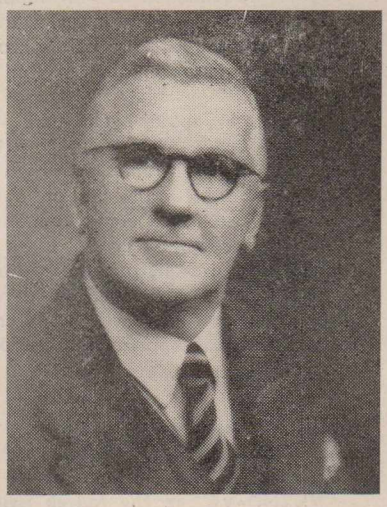
New Address

Will reporters please note my address is now:

L. J. KEAST
3 Fitzgerald Road
Ermington
N.S.W.

Removal of 'phone has been applied for and if the number is known before going to press, will be shown in Stop Press.

Personal



★

L. J. KEAST

★

L. J. KEAST, who has been our Short-wave Editor for the last five years, commenced listening to overseas stations as far back as 1927, and one of his most cherished verifications is from Radio Saigon at that date. The receiver was a little 2-valver, especially built for an Adelaide broadcast station.

Figuring that a hobby is good for one, he quickly saw that this was one that would be handy later on in life, and it certainly has turned out to be very lucrative, as he is so well-known in Sydney that he is sought by the big set manufacturers as to the wave-length to employ, and scarcely does a new receiver go into production until it is "tried on the air" by our Mr. Keast.

At the beginning of the war he wrote many articles for "Smith's Weekly" and later became radio adviser to David Jones Limited. It was whilst there that his pages in "Australasian Radio World" caught the eye of the United States Office of War Information officials in San Francisco. On opening their radio division in Sydney he was sent for and engaged to conduct their listening-post, which he did till the cessation of hostilities in the Pacific. At his residence in Carlingford he installed two Hallicrafter SX-28 Receivers, an S.T.C. and an A.W.A. No. 100 Communication Set and an R163 Philips Communication Receiver. Of course his "Ultimate," which he affectionately dubs his "Bureau of Standards," also did yeoman service. For recording, a Telediphone continuous recorder was installed, as also G.E. Wire Recorder.

References to his work from the Head Office in San Francisco during the three years with that Department, are a very nice tribute to his work. He is a member of several Overseas Radio Clubs and is representative for Oceania of the Universal DX Radio Club of Oakland, California.

Unlike a lot of listeners, who hold the information regarding any new stations until such time as their logging is well on the way to the station for a verification, he immediately makes known his latest find, and, as a matter of fact, for years has not bothered about sending for Q.S.L. cards.

He has designed a logging card, which enables at a glance, a listener to see all the information he has collected regarding a particular station. Several firms are anxious to have the exclusive distribution of this, and it will shortly be available to listeners.

Speedy Query Service

(Conducted under the personal supervision of A. G. Hull)

C.M.V. (Wagga) is interested in a "trick" circuit from the U.S.A.

A.—There are no valves listed in the diode-triode type with separate cathodes, but you can make one up by using the 6SN7GT. These are now readily available and for the purpose of your particular circuit you can join plate and grid of one section to form a diode, and use the other section as a triode amplifier. The entirely separate cathode circuits of the two sections of the 6SN7GT make it a most handy valve for a number of unusual applications.

* * *

L.D. (Maffra) makes a suggestion which has just been taken care of by a coincidence.

A.—Full details for a channel analyser are scheduled to appear in the May issue, which is a special bumper issue to celebrate the tenth birthday of this publication. The article has been written for us by Paul Stevens, who has had plenty of practical experience with it under normal working conditions on the repairman's bench.

* * *

"VK2" (Box Hill) asks about an English type converter valve.

A.—Philips have just released an announcement that the ECH35 is to be made available in the near future. It is a hexode type valve with a wonderful reputation in England and on the Continent. It is particularly effective at the higher frequencies. Loose coupling is desirable and the best way to check this is by measuring the grid current, which should be about 200 microamps, with a 50,000 ohm grid leak.

* * *

S.B. (North Sydney) wants to build a superhet, but is scared of alignment problems as he has run into trouble this way in the past.

A.—The new Kingsley "Ferrotune" unit should be a help to you, as the intention is to market this kit with dial mounted on the coil unit and the whole completely aligned and tested. As the drilled chassis is also supplied as part of the kit you can't go wrong by using longer leads than those for which the unit is designed. They are not yet released, but should be ready soon.

L.C. (Carrum) asks about quartz crystals for Ham transmitters.

A.—Crystals have been ground for higher frequencies, but for reliability and all-round service it seems that it is not a practical proposition to use crystals with a frequency higher than about 7,000 kc/s. For these the thickness is about twenty-five thousands of an inch. Modern twin tubes and beam power valves with high harmonic content in the output make it easy to get frequency doubling to allow a 7,000 kc/s crystal to be used even for the 6-metre band. A transmitter circuit for a job to work on this band from a 7,000 kc/s crystal is scheduled to appear in next month's issue.

* * *

E.D. (Essendon) points out the omission of the 20-metre coil data from the table supplied for the "VK2NO-V6" in the March issue.

A.—Yes, this was an unfortunate oversight, but will be remedied in the June issue. There was also another minor tragedy in the article on the ground-plane antenna, the main diagram being omitted. This, too, should be cleared up in the June issue.

* * *

A.E.L. (Albert Park) wants to know whether figures are given in the morse code test for the Amateur Operator's Certificate exam.

A.—Yes, figures are included but one figure is taken as equal to two letters when working out the speed of 14 words per minute of five letters per word.

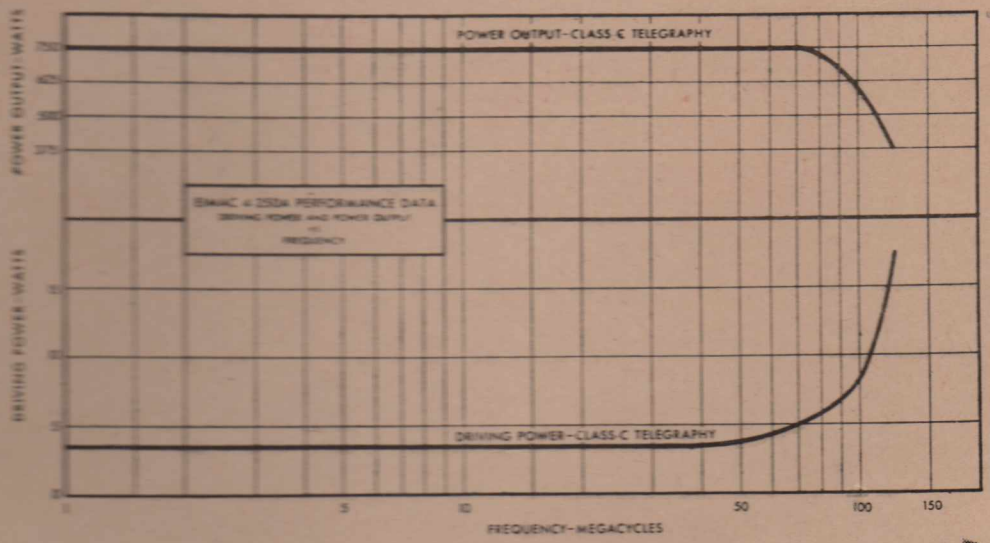
* * *

P.R.C. (Maryborough) wants to know whether we have actually handled a set fitted with the Kingsley "Ferrotune" unit.

A.—Yes, we have had one on the bench for some time now and there is not the slightest doubt about the unit covering the broadcast band easily enough, with nice action and an even spacing of the stations. The action of the control is smooth and performance quite up to standard. There does not appear to be any possible objection to the use of the permeability tuning system.

Eimac VALVES

THE COUNTERSIGN OF DEPENDABILITY IN ANY ELECTRONIC EQUIPMENT



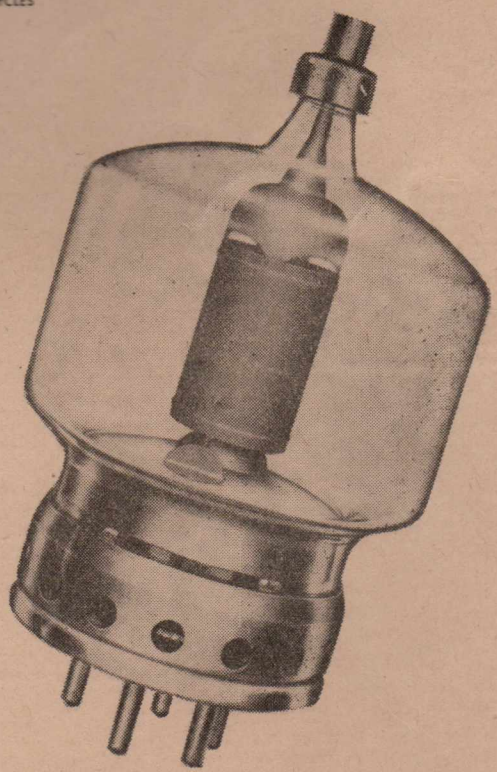
NEW EIMAC 4-250A TETRODE

Heading a parade of sensational new valves now in production, the Eimac 4-250A Tetrode—introduced several months ago—is already in great demand. It may pay to check these performance characteristics against your own requirements.

As can be seen by the chart above, the new Eimac 4-250A Tetrode will deliver 750 watts output at frequencies up to 70 Mc. with a driving power of only 5 watts. At frequencies up to 40 Mc. an output of 750 watts may be obtained with a driving power of 3.5 watts.

The grid-plate capacitance of 0.12 *uu*fd. is extremely low, allowing operation at high frequencies without neutralization. Use of Eimac "X" process control grid reduces both primary and secondary emission which provides utmost stability.

You are invited to supplement the information given here with a technical bulletin on Eimac 4-250A Power Tetrode. It contains an elaboration of the valve's characteristics and constant current curves. Send your name and address and a copy will go to you by return mail.



The Lid's Coming Off...
Watch your favorite trade journals for announcements of other new Eimac valves to be released this year.

CAUTION! Check serial numbers on Eimac valves before you buy. Be sure you're getting newest types. Look for latest serial numbers.

TYPE 4-250A—POWER TETRODE
ELECTRICAL CHARACTERISTICS

Filament: Thoriated Tungsten	
Voltage	5.0 volts
Current	14.5 amperes
Plate Dissipation (Maximum)	250 watts
Direct Interelectrode Capacitances (Average)	
Grid-Plate	0.12 *uu*fd.
Input	12.7 *uu*fd.
Output	4.5 *uu*fd.
Transconductance (i_B = 80 ma., E_B = 3000 v., E_{C2} = 500 v.).	4000 *u*mhos

FOLLOW THE LEADERS TO

Eimac REG. U. S. PAT. OFF. VALVES

EITEL-McCULLOUGH, INC., 1086 San Mateo Avenue, San Bruno, Calif.
Plants located at: San Bruno, California and Salt Lake City, Utah
Export Agents: Frazar & Hansen, 301 Clay St., San Francisco 11, Calif., U. S. A.

AUSTRALIA NEEDS THOUSANDS MORE COMPETENT RADIO SERVICEMEN!

With a prewar turnover of £8,000,000, the number of male personnel alone engaged in the Radio receiver field runs into thousands and the need for more grows each week.

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, wants **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.

PREVIOUS KNOWLEDGE UNNECESSARY

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.

COSTS LITTLE

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!

RADIO IS STILL A NEW INDUSTRY GROWING FAST!

£8,000,000 was estimated prewar sales of radio receivers and parts. The next few years should see these figures doubled.

Pre-war Radio Set output reached an estimated 280,000. All records are expected to be broken in near future.

Even a 25 per cent increase in set sales will mean openings for perhaps 1,000 more Radio dealers—Over 130 Australian Radio Stations employ a vast number of skilled personnel—a team of specialists which would probably be tripled with the advent of F.M. transmission.

GET THIS BIG FREE BOOK NOW!

To Mr. L. B. GRAHAM, Principal,
Australian Radio College, Pty. Ltd.,
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 .....

10/46

AUSTRALIAN RADIO COLLEGE PTY. LTD.

Cnr. Broadway and City Roads, Sydney.

Phones: M 6391, M 5392

10/462

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