THE AUSTRALASIAN

Radio World

PRICE, 1/-

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

VOL. 6 ..... NO. 5

OCTOBER 15 1941

CIRCUIT CONTEST CASH PRIZES

LOCAL STATION FIDELITY SET

FULL DETAILS 5w. AMPLIFIER

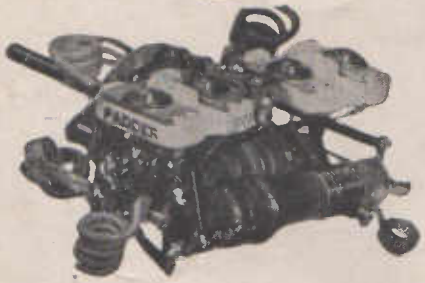
FIVE - WAY TONE CONTROL

VALVE ASSEMBLY AT PHILIPS' AUSTRALIAN FACTORY

For the "NUGGET" D/W and "DANDY 1941" B/C

Choose Crown Coil Kits!

NUGGET D/W Receiver



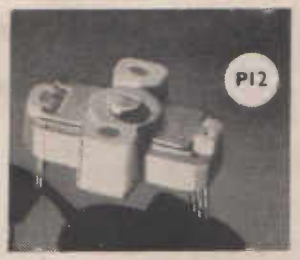
★ "Nugget" D/W Receiver Kit comprises:

1 x Crown A.U.2 Unit
1 x Crown FD3B Dial
2 x Crown "Perm" I.F.'s, type P.T.31 and P.T.32

DANDY 1941 B/C

★ "Dandy 1941" B/C Kit Comprises:

1 x Crown Aer. Coil, type A.C.47
1 x Crown Osc. Coil, type A.C.49
2 x Crown Perm. I.F.'s, type P.T.31 and 32
1 x Crown Padder, type P.12
1 x Crown STI B/C Dial or Portable type



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The Australasian
RADIO WORLD
Incorporating the
ALL-WAVE ALL-WORLD DX NEWS

Vol. 6 OCTOBER, 1941 No. 5

CONTENTS:

EDITORIAL

You may be a good radio engineer, but can you prove it?

Recently there has been a strong call for radio engineers to serve their country in connection with the construction and maintenance of radio location equipment.

Wonderful scope is offered, together with quite good pay and excellent conditions, apart from the patriotic appeal.

Many of our readers have responded and are now on the job, but one or two have found to their amazement that they have not been able to prove their ability. Although thoroughly capable on the practical side they have not possessed any university degrees or diplomas.

When faced with a qualifying examination they have not been able to fully reveal their ability, and wish that they had taken the precaution of associating themselves with an organisation of some kind, such as a radio college, technical school or that worthy organisotion, the Institution of Radio Engineers.

The "Australasian Radio World" is published monthly by A. G. Hull.

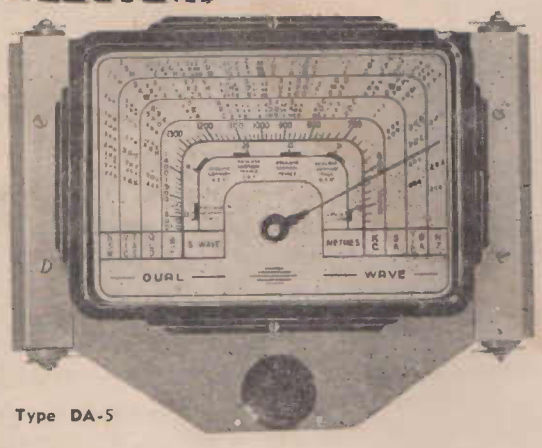
Editorial Offices: 117 Reservoir St., Sydney, N.S.W. Telephone: MA 2455.

Subscription rates: 1/- per copy, 10/6 per year (12 issues), post free to Australia and New Zealand.

R.C.S TROLITUL COILS and DIALS

HIT THE SPOT!

In keeping with the constant improvements in radio, R.C.S., "The Coil People," are continually developing and pioneering improved methods of design and production. Thus R.C.S. can offer you a standard of achievement unequalled in Australia. Why hamper your construction by using inferior parts? USE R.C.S. — SPECIFIED BY AUSTRALIA'S LEADING RADIO MANUFACTURERS.



Type DA-5

R.C.S. DIAL DA-5

DA-1, DA-2 are single glass D/W Dials. The DA-1 is a standard dial for use with R.C.S. coils and "F" type condenser, and the DA-2 is for use with the "H" type. The DA-5 dial is for 1600 to 550 k.c. and 13.7 to 40 metres, with an "H" type condenser. All this series are edge-lit and wedge-driven, and the escutcheon aperture is approximately 7" x 4-7/8."

DA-1 Standard D/W Dial	22/6
DA-2 Communications Dial	22/6
DA-5 13.7 to 40 metres D/W Dial, "H" Condenser	22/6
DA-6 Mantel Set Dial, D/W "H" gang	18/9
DA-7 Portable Kit Dial, D/W "H" gang	9/-
DA-8 Same as DA-7, but ready assembled	13/6

A newly-released R.C.S. Kit Dial has 0-100 scale. This dial with all parts supplied is suitable for replacement and for crystal and small T.R.F. sets. Code DA-9 ..... 9/-

R.C.S. PERM. TUNED I.F.'s

The new R.C.S. permeability-tuned I.F.'s are wound on special Trolitul formers into which ore inserted the adjustable iron cores. These R.C.S. permeability-tuned I.F.'s are the most dependable and efficient I.F.'s it is possible to produce. They should be used whenever the optimum in results is required.

IF162

465 K.C. I.F.'s

When two I.F.'s are used:

IF162 1st	13/9
IF163 2nd	13/9

When three I.F.'s are used:

IF164 1st	13/9
IF164 2nd	13/9
IF163 3rd	13/9

Air Core I.F.'s

Air Core 465 K.C.

IF107 1st	7/6
IF108 2nd	7/6

Air Core 175 K.C.

1E68 1st	7/6
1E69 2nd	7/6

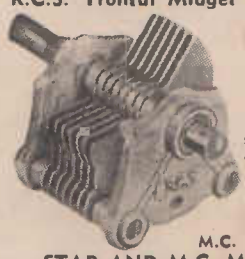
Code DW36

R.C.S. DUAL-WAVE UNIT DW36

Type DW36, as illustrated, consists of Aerial and Oscillator Coils, Wave Change Switch, the necessary B.C. and S.W. Trimmers and Padders mounted together, wired up, ready to assemble in a set utilising 465 k.c. Bands are: S.W. 13.7 to 40 metres and B.C. 1600 to 550 k.c. For "H" gang.

Code DW36. Price £1/7/6

R.C.S. Trolitul Midget Condensers



Made in two types with Trolitul supports. The 14 plate equals old style 23 plate capacity. The M.C. Type may be ganged.

M.C. Type

STAR AND M.C. MIDGETS

Max. Cap. mmfd.	Min. Cap. mmfd.	Plates	Star Cat. No.	Retail Price	M.C. Cat. No.	Retail Price
10	3	2	CV34	4/-	CV41	7/3
15	3	3	CV35	4/3	CV42	7/9
25	3.5	4	CV36	4/6	CV43	8/4
35	4	5	CV37	4/9	CV44	9/-
50	4	7	CV38	5/3	CV45	9/6
70	5	9	CV39	5/10	CV46	10/-
100	6	14	CV40	6/5	CV47	11/3

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BRISBANE: Chandler's — Trackson's — Homecrafts.

TASMANIA: W. & G. Genders, Launceston — W. & G. Genders, Hobart — W. & G. Genders, Burnie.

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DO NOT WRITE DIRECT TO —

R.C.S. RADIO Pty. Ltd.

SYDNEY, AUSTRALIA

BATTERY CIRCUIT CONTEST

OPEN TO ALL READERS

A GLANCE through the mail always gives us the impression that there is vast scope for improvement in the design of battery-operated receivers.

It is also very evident that there are many views as to just how much should be expected from a battery set, and quite a division of opinion as to which particular feature is most desirable.

It seems to us that there is an excellent opportunity for a little contest amongst ourselves to see just what the users of battery sets think about it.

So here it is.

The general idea is simply that we will offer a prize for the best essay on battery-set design, or on the design of receivers for country use.

The Prizes

For the essay we consider the best we will award a cash prize of £5. A free annual subscription, valued at 10/6, will be awarded to the writer of every other essay considered by us to be worthy of publishing.

Essays can be of any length, and no account will be taken of neatness, spelling or anything like that. What we are after is simply some practical ideas that are likely to help the thousands of our readers who are located away from the power supply mains.

Wherever possible, a rough sketch of a recommended circuit design should be included, mentioning where it was first seen, unless it is of your own origin.

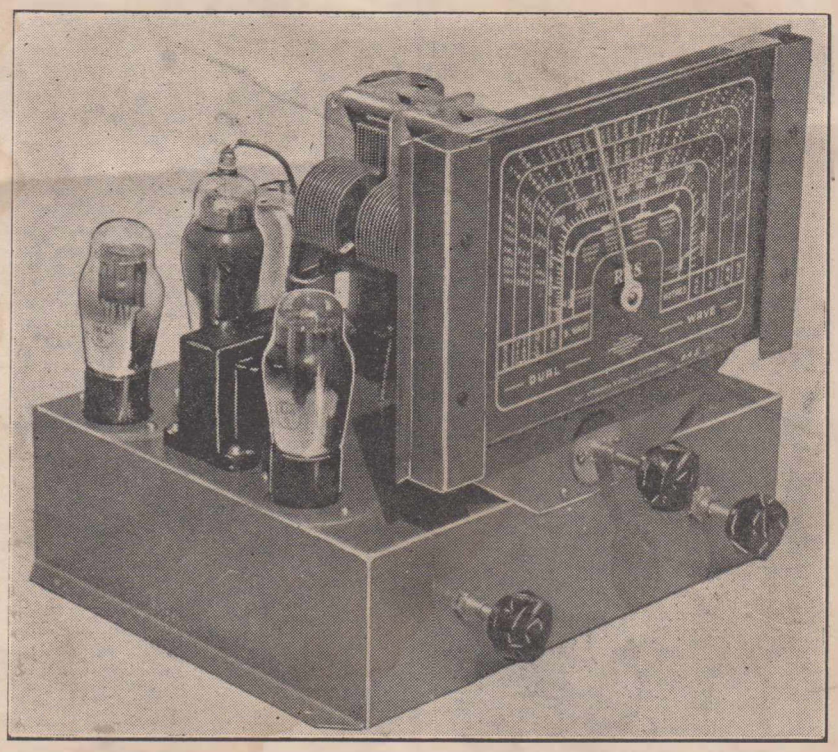
Entries must be received by us not later than December 1, and results will be published in the January issue.

Entries received before November 1 will be eligible for special awards if they are published in the November issue, so don't delay, write your essay now.

Don't let the term "essay" worry you; just drop along a letter as though to an old pal, and we'll appreciate it if it contains some interesting ideas or suggestions.

Editor's Verdict Final

As is usual with these sort of contests, we must insist that the verdict of the Editor be considered as final in all cases.



This receiver, the "Countryman's Six," from the January issue, was designed by one of our readers. You are invited to let us have your ideas about battery circuits.

Trade Entries Invited

The contest is open to all readers and there is no restriction on entries from those who carry out their radio work as a profession.

At the same time we would like to point out that private readers are just as likely to have worthwhile ideas to express and suggestions to make.

We feel sure that little contests of this kind should be of great interest to a large number of readers. We also hope that they will uncover many helpful hints and tips.

Do your bit to help us make the contest a grand success — get a pen and paper.

Do it NOW!

THE AUSTRALASIAN RADIO WORLD

Battery Circuit Essay Contest — First Prize £5 cash

ENTRY FORM

NAME (in block letters) .....

ADDRESS .....

..... **(State)**

To: A. G. HULL,
117 Reservoir Street, Sydney.

I enclose herewith essay on battery circuit design for the above contest. I agree to accept your verdict as final.

Signature.....

Entries close on December 1, 1941 **Results in January issue**

STABILITY BY NEUTRALISATION

WITH low-gain and careful shielding an intermediate frequency amplifier is normally stable even though there is some degree of feedback through the grid-plate capacitance of the valve. As the gain is increased, either through the use of a valve having greater mutual conductance or I.F. transformers having higher "Q," the "selectivity" curve tends to become unsymmetrical or lopsided, and in the extreme case oscillation may occur.

In receiver production it is found that it is necessary to guard against incipient instability which, in some cases at least, may develop into actual instability at some time during the life of the set. In addition, there is the danger of the I.F. transformer in the plate circuit becoming detuned and so causing oscillation. Finally, there is the difficulty in quantity production of making allowances for working tolerances between receivers, some of which will necessarily be less stable than others.

Summing up, there are very good reasons for the maintenance of complete I.F. stability by means of neutralisation, provided that a simple and cheap arrangement is available. One such method is shown in Fig. 1, in which the secondary of the first I.F. transformer is returned to earth for radio frequencies by means of the condenser C, and a neutralising condenser Cn is connected between the plate and the cathode end (x) of the secondary or I.F.1. A.V.C. may be applied through the resistor R1, which should have a resistance very much greater than the reactance of C.

The operation of this circuit depends upon the total capacitances from grid to plate and from grid to cathode, and these are shown in broken lines in Fig. 1. The capacitance bridge by which neutralisation is obtained is shown more clearly in Fig. 2, from which all non-essential components have been omitted. Balance is obtained when

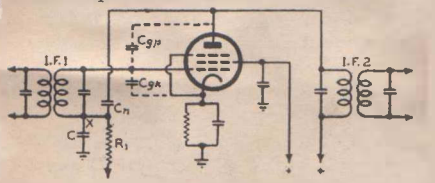


Figure 1

$$\frac{Cn}{C} = \frac{Cgp}{Cgk}$$

so that

$$Cn = C.\frac{Cgp}{Cgk}$$

In a typical case, Cgp may be 0.007 mmF., Cgk may be 15 mmF., and C may be selected to be 0.01 mF. Balance will be obtained when

$$Cn = .01 \times 10^{-6} \times \frac{.007}{15} = 4.67 \text{ mmF.}$$

In practical cases Cgk may vary considerably, since it is mainly composed of stray capacitances from the grid circuit to earth, and Cn will therefore require to be adjusted to correspond. In the more highly priced receivers it might be possible to make an individual adjustment of Cn for each receiver, but in the case of quantity production it will normally be satisfactory to select a value of fixed capacitance which is reasonably close in all cases.

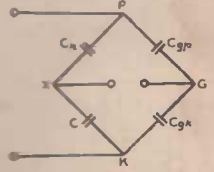


Figure 2

With this circuit, and a fixed capacitor Cn, the additional cost is only the cost of one capacitor and its wiring, since C and R1 normally form part of the A.V.C. network.

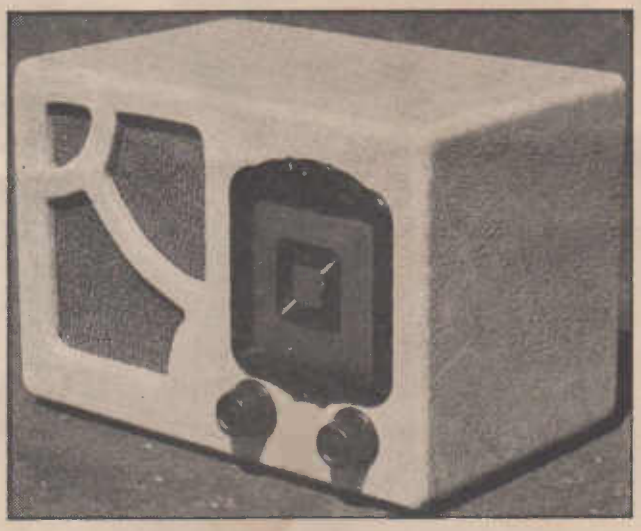
— Radiotronics.

COMPACT SET USES ODD VALVES

THE use of standard valve types has everything to recommend it, but there are times when a set designer feels that it is a pity that he cannot take advantage of the special types which have been introduced on the overseas market to do some particular job.

This thought was brought home to us quite strongly the other day when we talked over set designs with some of the lads who work at the radio warehouse of John Martin Pty. Ltd., up in Clarence Street.

Being in a position to obtain almost any type of equipment and wanting to build a simple set each for themselves, they have been working along the lines suggested in the article on the "Dandy" which was published in our March issue of last year.



A general view of the small cabinet which measures only 9¼" x 6" x 6½."

High-voltage Heaters

This little set was unique in several ways, and was about the only circuit ever suggested in this country to make use of the American high-voltage valves, such as the 70L7GT, which takes a heater voltage of 70 volts.

The Dandy was a fine little set, but we got into a lot of trouble, because these special types of valves were not readily available in all brands or through all dealers. By the time a couple of hundred sets had been built to the Dandy circuit there were no more converter valves available to suit the original circuit.

Now we find that limited stocks of similar valves are available, and so we feel sure that many of our readers will be interested in the circuit which has been used by three of the lads at John Martin's.

One of the biggest advantages of the design is the way in which a full-power superhet can be packed into a tiny cabinet, made possible by the use of multi-purpose valves, such as the type mentioned above, which combines an output pentode with an indirectly-heated rectifier.

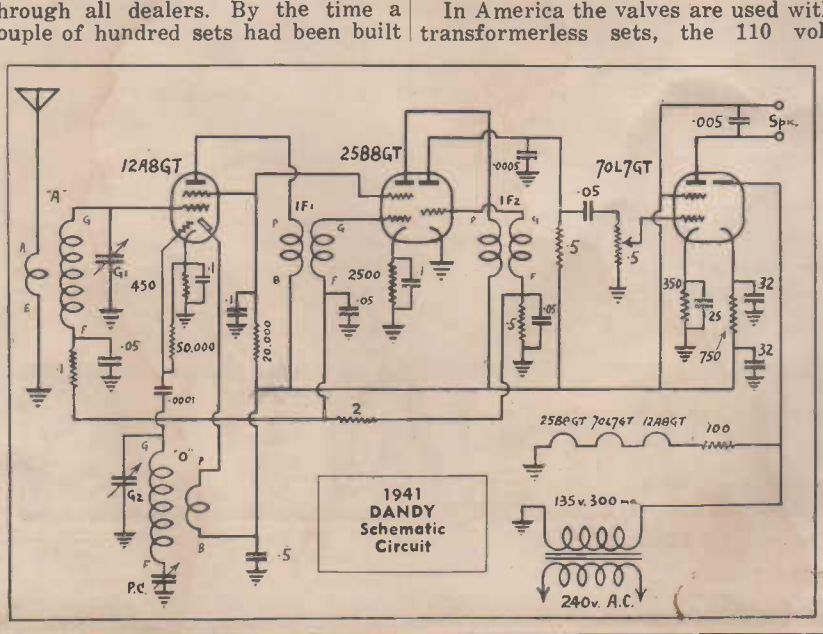
The Circuit

In America the valves are used with transformerless sets, the 110 volt American power lines being fed straight into the rectifier, and the heaters connected in series across them. Such a practice would be undesirable with our 240-volt power supplies, but it offers a great attraction if we use a simple step-down transformer instead of the usual power transformer with its several secondary windings.

From this simple transformer we take the 110-volt (or a little higher)

(Continued on page 29)

Circuit design by
JIM HUNTER
of John Martin Pty. Ltd.



1941 "DANDY"— Parts List

1—Base, 8½" x 6" x 2."
1—Power transformer (see text).
1—2-gang tuning condenser (Stromberg-Carlson).
1—Coil kit with intermediates.
1—Dial to suit.

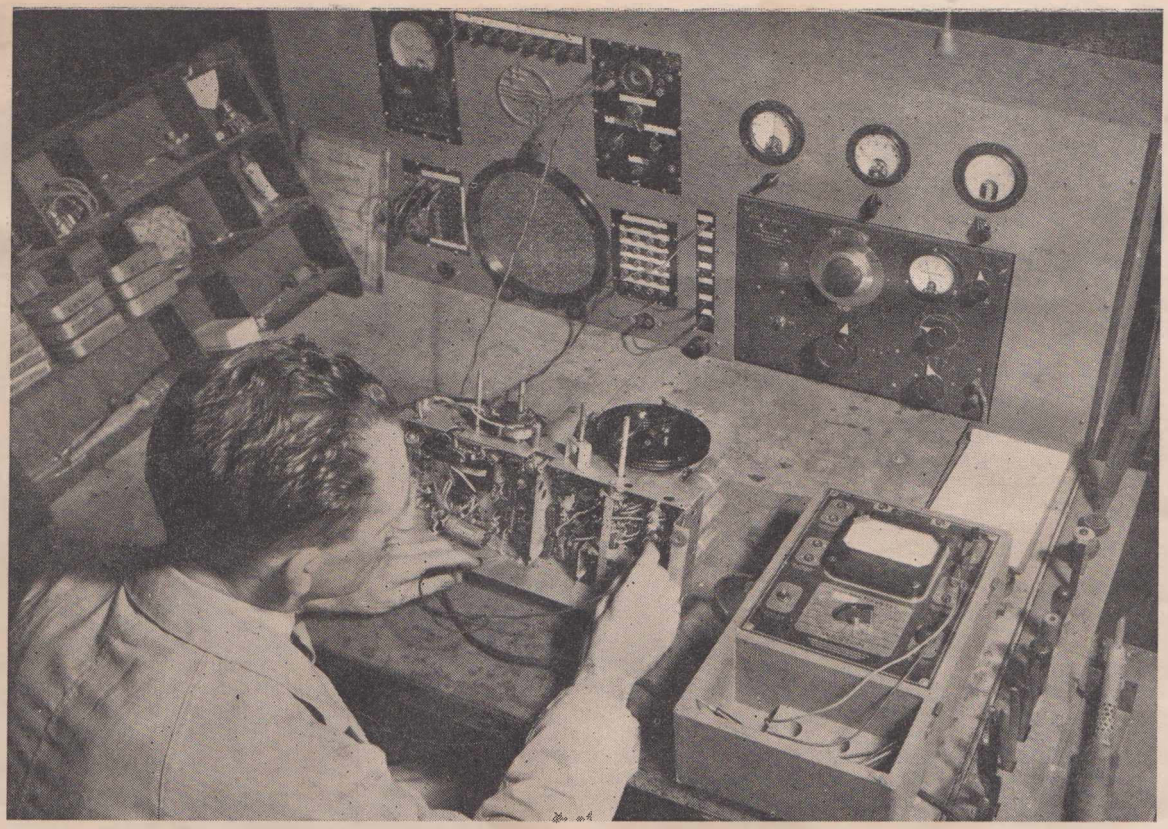
CONDENSERS:
2—32 mfd. electrolytic condensers (T.C.C.).
1—25 mfd. electrolytic condenser (T.C.C.).
1—.5 mfd. tubular condenser (T.C.C.).
2—.1 mfd. tubular condensers (T.C.C.).
4—.05 mfd. mica condensers (T.C.C.).
1—.005 mfd. mica condensers (T.C.C.).
1—.0005 mfd. mica condenser (T.C.C.).
1—.0001 mfd. mica condenser (T.C.C.).
1—Padding condenser.

RESISTORS:
1—2 megohm (I.R.C.).
2—.5 megohm (I.R.C.).
1—.1 megohm (I.R.C.).
1—2,500 ohm wire-wound (I.R.C.).
1—750 ohm wire-wound (I.R.C.).
1—450 ohm wire-wound (I.R.C.).
1—350 ohm wire-wound (I.R.C.).
1—100 ohm wire-wound (I.R.C.).
1—50,000 ohm (I.R.C.).
1—20,000 ohm (I.R.C.).
1—500,000 ohm volume control (I.R.C.).

VALVES:
1—12A8GT, 1—25B8GT, 1—70L7GT.

SPEAKER:
1—5-inch permagnetic type (Rola or Amplion).

SUNDRIES:
3—Octal sockets, power flex, hook-up wire, solder lugs, screws, nuts, etc.



Service is as service does . . .

. . . and if service DOES give a customer entire satisfaction, then it IS service. Real service.

Naturally it is your aim to make your repair facilities as adequate and as efficient as possible . . . in other words, to inspire the complete confidence of your customers. But no matter how well equipped your service section may be, no matter what degree of technical skill you can bring to bear on radio problems — you cannot do a 100% service job unless you replace worn-out valves with Philips.

ALWAYS REPLACE WITH

Philips valves, made in a modern Sydney factory to the world's highest standards of efficiency, are giving unexcelled performance in thousands of receivers throughout the Commonwealth, because the public, educated by Philips advertising over many years, know the importance of thoroughly reliable valves in any set. You'll get more profit from your service work and valve replacement sales if you pin your faith on Philips valves.

PHILIPS VALVES

THERE IS A PHILIPS VALVE FOR EVERY SOCKET OF EVERY RECEIVER

A TECHNICAL EXPLANATION OF LOADING

By "ENGINEER"

YES, what is a load? You hear radio engineers talking about inductive, resistive, and capacitive loads, about speaker loads, about optimum loads on power valves, about load matching, and about line-to-load transformers, but none of these things looks much like the contents of a railway truck, nor a heavy weight of any description. This is just another of those terms that are ill-defined in text-books, and it is just so easy to grasp when you probe deeply enough into the meaning of the word.

In our often justly despised language, the ideas conveyed by words are very often quite dissimilar in different environments. Take the word "sock" for example. In a bedroom or men's wear department, a sock is a knitted covering for the foot and lower part of the leg; in an argument, it is the brutal conclusion; in the air, it is the pilot's ground-wind indicator. The three ideas are linked by scarcely anything but the word, yet somewhere, way back, there must be a link.

To find the link, we have to look back. Let us wend our way back along the idea of a load.

Pulling a Load

The conventional conception of a load has, for years, been a heavy weight. But that is not all. It has always been a heavy weight which had to be carried — it meant a burden. A load could always be carried by a beast of burden, and when it was made to walk around a mill, yoked to the bar through the old millstone, it was pulling a load. Likewise, a horse that was used to draw coal up from a mine was still a beast of burden, and pulled a load.

After the time of James Watt, when steam and other engines replaced animal labour, the loads were taken by the engines. With his famous enterprise, Watt invented a unit to measure the load-handling capability of his engines. He called it the "horse power" and it was based on English units of weight, time and distance. Since the introduction of metric units, another power unit has been developed, and its name is a perpetual memorial — Watt.

Electrical machines followed steam and internal combustion engines for many industrial purposes, and the rate of work they made on their jobs remained a measure of the loading imposed on them. Since the rate of work was simply the rate at which the power supply gave out its energy, the idea of loading could be applied to lamps, motors, transmitters or anything else that used energy. The power supply could be a battery, an accumulator, a charged condenser, small generator set, or a huge powerhouse.

The most obvious loss of energy occurs in pure resistances, and electric lamps and radiators may be taken as examples. You can feel the energy lost by them. You can see the work done by an electric motor, and you know that it must act as a resistance, because current passes through its windings. If it is used to rotate the inner vanes of a vacuum cleaner turbine, you can hear the note of the motor fall a couple of tones when the cleaning nozzle is dragged across a carpet. A meter in the circuit would indicate that the current had increased, and the load on the motor is "reflected" into the power supply.

If a condenser is connected to a D.C. power supply (Fig. 1), through a resistance, it commences to charge, and the combination of C and R present a load on the power supply. As the charge builds up in the condenser. the voltage across R becomes less and less, and the current falls away, very gradually, almost to nothing. There

(Continued on page 27)

INTERESTING FIDELITY CIRCUIT from U.S.

Recently published in "Radio" (U.S.A.), this circuit should be of vast interest to the large number of our readers who aim to have exceptional fidelity from simple sets. Many of the remarks by the author, Woodey Smith, offer scope for thought by the keen student of receiver design.

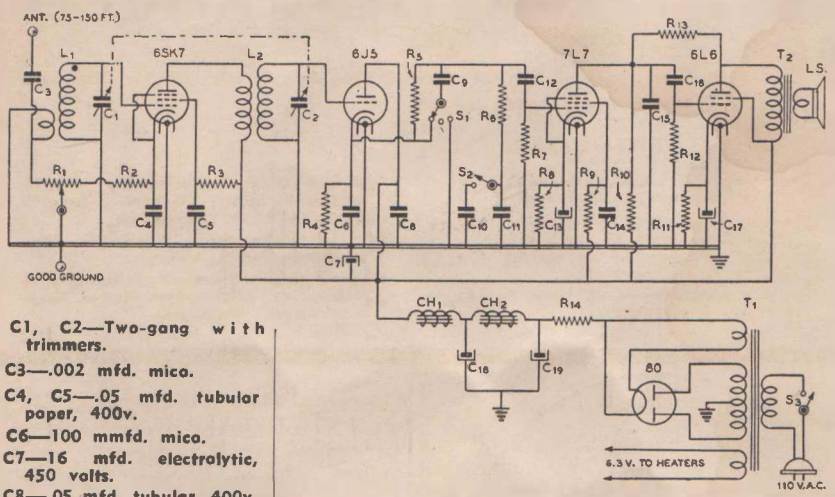
FEW broadcast receivers have really good fidelity, or as good fidelity as can be utilised for standard broadcast reception. Usually the response is down considerably at audio frequencies as low as 5 k.c., though admittedly in many cases the bass response is adequate and harmonic distortion low.

For standard broadcast reception a good single speaker is perfectly satisfactory if one is content with bass response down to 40 or 50 cycles, because single unit speakers are now available which cover the range from 40 or 50 cycles (when proper baffling is used) up to 8,000 or 10,000 cycles. This range will do justice to practically any station in the regular broadcast band so far as the upper register goes, because very few stations ever transmit anything over 7,500 cycles. The F.C.C. requires that when interference is caused to reception of adjacent channel stations by transmission of frequencies above 7,500 cycles, the station incorporate a filter to prohibit transmission of such frequencies. Incorporation of such a filter has become virtually standard practice among a.m. broadcast stations, not only to assure compliance with the F.C.C. requirement but because such a filter cuts out the objectionable high frequency line noises which are common to network programmes.

There is room for argument as to just how low a set should go in the bass register to be worthy of the term high fidelity. Most of the better broadcast stations are capable of transmitting stuff down to 30 cycles, but except for certain pipe organ passages, seldom is there need for response below 40 or 50 cycles. If the bass is good down to 50 cycles, with a broad hump of 6 to 12 db around 100 cycles, the bass response will sound full, adequate and natural to the most critical listener. If one doesn't insist upon response down to 30 cycles, the receiver problem is greatly simplified and the cost greatly reduced.

It is natural when appropriating a limited amount of cash for a receiver for high quality broadcast reception that a substantial portion of the total outlay be assigned to the speaker. The choice of speaker and its method of baffling has more bearing upon the fidelity than has the choice of circuit or particular components used in the receiver itself.

The receiver which is the subject of this article is built around one of the high fidelity permanent magnet dynamic speakers. This speaker, when properly baffled, will show good response from below 50 cycles to over 10,000 cycles. Not only is the high frequency response good, but the speaker is relatively free from the high frequency "beam effect" common to large dynamic speakers. Many speakers which respond to frequencies above 7,500 cycles tend to confine the higher frequencies to a narrow beam, so that the listener must be located directly in front of the speaker to get the benefit of the high frequency response. Small dynamic speakers and speakers with "trick" curved cones do not confine the high frequencies to a narrow arc directly in front of the loudspeaker.



C1, C2—Two-gang with trimmers.

C3—.002 mfd. mica.

C4, C5—.05 mfd. tubular paper, 400v.

C6—100 mmfd. mica.

C7—16 mfd. electrolytic, 450 volts.

C8—.05 mfd. tubular, 400v.

C9—200 mmfd. mica.

C10—.05 mfd. tubular, 400v.

C11—.01 mfd. tubular, 400v.

C12—.02 mfd. tubular, 600v.

C13—25 mfd. 25v. electrolytic.

C14—0.25 mfd. tubular, 400v.

C15—100 mmfd. mica.

C16—.05 mfd. tubular, 400v.

C17—25 mfd. 25v. electrolytic.

C18, C19—16 mfd. 450v. electrolytics.

L1—Broadcast antenna coil, shielded, high imp. pri.

L2—Broadcast band r.f. coil.

R1 — 25,000 ohm pot., "double ended" taper for combined bias and antenna shunt.

R2—300 ohms, ½ watt.

R3—125,000 ohms, 1 watt.

R4—75,000 ohms, 1 watt.

R5—500,000 ohms, ½ watt.

R6—250,000 ohms, ½ watt.

R7—1 meg., ½ watt.

R8—500 ohms, ½ watt.

R9—500,000 ohms, ½ watt.

R10—100,000 ohms, 1 watt.

R11—200 ohms, 5 or 10 watts.

R12—250,000 ohms, ½ watt.

R13—400,000 ohms, ½ watt.

R14—10 watt wire wound resistor (about 750 ohms; see text).

T1—385v., 100 ma., with 6.3 and 5v. fil. windings.

T2—Husky (preferably 3 lbs. or so) output transformer to handle 80 ma. and reflect 2,500 ohm load on 6L6 for particular voice coil impedance of speaker used.

CH1, CH2—15 hy. or more, 100 ma. or more.

LS—12-inch high fidelity p.m. dynamic speaker in infinite baffle type cabinet.

S1—Single pole 3-throw switch.

S2—S.p.s.t. toggle switch.

Single R.F. Stage

The receiver proper consists of a single r.f. stage feeding an infinite impedance detector, with a single ended a.f. amplifier consisting of a glass type 7L7 into a 6L6 with shunt type inverse feedback.

The set is designed only for local reception (1 to 5 kw. stations up to 20 miles or so, and 25 to 50 kw. stations up to 30 miles or so). It is designed for use with an outside antenna of from 75 to 150 feet over all, preferably over 100 feet. Under these conditions there will be no pick-up of dial telephone or electrical appliance clicks, as is so often the case when a short indoor antenna or loop is used. There will be no difficulty from adjacent channel interference or 10 k.c. whistles because the desired station must be putting in a pretty good sig-

nal in order to provide good volume. This means that no 10 k.c. filter need be employed, in spite of the comparatively broad response provided by the two tuned circuits.

This broad response avoids clipping of sidebands, but may give trouble if there happens to be a powerful station within a mile or so on a frequency only 30 or 40 k.c. away from a weaker, desired station. In such a case a wave trap can be inserted in series with the antenna and tuned to the frequency of the nearby station. Such a trap may consist of a midget r.f. coil across which is placed an adjustable mica trimmer of suitable capacity. An idea of the correct size trimmer may be obtained by tuning in the offending station and observing approximately how much tuning capacity it takes to hit.

A.V.C. Not Desirable

It will be noted that no a.v.c. has been incorporated. A.v.c. would complicate the circuit considerably, and would be none too effective anyhow, when applied to the single r.f. stage. It is a simple matter to turn down the gain when tuning to the frequency of another station, then turn up the gain to the desired level.

A slight amount of bass boost is provided, and made optional. The frequency of maximum boost is considerably below the average fundamental voice frequency, and therefore the boost will not tend to make speech "boomy" as do so many bass boost arrangements. The bass boost will be found particularly pleasant when the volume is turned down low, because the ear imagines an apparent loss in bass when volume is turned down. On good broadcast receivers bass compensation is incorporated in the volume control, so that the bass is boosted automatically when the volume is turned down low. However, the arrangement used here is satisfactory and is much simpler.

Bass Control

It should be borne in mind that there will be no noticeable increase in the bass when S_2 is opened unless the music contains a substantial amount of stuff below 100 cycles. Too much bass boost becomes very tiresome in time, the amount of boost deliberately was limited to approximately 9 db.

It will be observed that the boost

(Continued on next page)

FIDELITY CIRCUIT (Continued)

is not obtained by means of a resonant tuned circuit. Such boost circuits tend to have "hangover" unless critically damped, which means that but little boost can be obtained from a single tuned circuit without encountering hangover effects. While 9 db boost can be obtained from a single tuned circuit (with suitable damping) without too much hangover, the R-C circuit used here is just as effective and less expensive.

Music is given more brilliance and dialogue more "presence" by boosting the highs above 2,000 cycles. The booster circuit may either have a broad hump around 2,500 cycles, or else may rise from 1,500 to 4,000 and remain substantially flat from 4,000 on out. On dialogue, the former characteristic seems more pleasing (except on an occasional speaker with excessive sibilance, in which case any type of high boost aggravates this objectionable quality). On music the latter type of boost appears more pleasing, but only when both transmitter and receiver are relatively free from harmonic distortion.

The high frequency booster circuit used in this receiver combines simplicity with versatility. It can be seen from the foregoing discussion that high boost is not always desirable.

High-note Control

The circuit shown permits the highs to be raised slightly, left alone, or attenuated. The latter sometimes is desirable when listening to stations that are playing regular phonograph records (not high quality transcriptions) in which considerable scratch is present. Such records actually sound better with frequencies above 4,000 cycles attenuated considerably, because higher frequency components are almost entirely masked by needle scratch. This assumes that the station is using either a magnetic pickup or equalised crystal pickup. If the station uses an unequalised crystal pickup (as do some of the 100 watters) the highs will be so attenuated that further attenuation at the receiver will be undesirable. The important thing is that when one has the option of boosting the highs, lopping them off, or leaving them alone, one can suit the receiver characteristic to the particular programme and station being received.

No particular care need be taken in the construction of the receiver except to isolate the input and output circuits of the 6SK7 r.f. amplifier in order to avoid regeneration or oscil-

(Continued on page 27)

HOW TO BUILD —

Radiotronics Tone-Control Amplifier

IN "Radiotronics 108" a circuit was given for a simple 4.5-watt amplifier using a single type 6V6-G as output valve and providing for voltage negative feedback to the plate circuit of the 6J7-G voltage amplifier. The characteristics of this amplifier were very satisfactory both with respect to overall frequency response and harmonic distortion percentage. When used with a medium-priced loudspeaker of modern design the output was ample for a very large room or for a small hall.

In the case of simple amplifiers incorporating negative voltage feedback, conventional "top-cut" tone controls are, for the most part, unnecessary since the reproduction of the higher frequencies never becomes strident, as happens when an amplifier uses uncompensated pentode output valves. Actually tone-controls were almost unknown before the days of pentode output valves.

However, in cases where the input source is lacking at certain frequencies or where the loudspeaker has a non-level frequency response, a means for varying the response of the amplifier itself is often helpful in obtaining a more natural tonal balance. A further advantage is, that it is often possible, with a tone control, to minimise the effects of unwanted noise from one source or another.

Design Considerations

Ideally, a tone-control system should permit the frequencies above and below certain limits to be independently accentuated or attenuated at will. This naturally requires the use of at least two separate tone-control knobs and the manipulation of these knobs calls for a reasonable amount of discernment on the part of the operator. A further disadvantage is the disproportionate cost of incorporating such a system in a simple amplifier or receiver.

Published in the latest issue of "Radiotronics," technical bulletin of the Amalgamated Wireless Valve Company, this interesting circuit for an amplifier with controlled tone has many attractive features.

We have carried out practical experiments with it and can give it a thorough endorsement.

The technical data is reprinted from "Radiotronics," and we have added our own photographs and diagrams to suggest a suitable layout and constructional design.

An alternative arrangement, which has the advantage of simplicity, is to use a single control for the purpose of accentuating or attenuating the higher frequencies only. Although the bass response may not be affected, there is a certain amount of illusion in that the bass appears to be accentuated if the treble is attenuated and vice-versa.

A tone-control system preferably should not be included at any point within a feedback network, for the reason that the feedback will tend to resist any change in frequency response. The system would therefore need to be made sufficiently severe to provide the desired acoustic effect in addition to overcoming the effect of the feedback. For this reason a tone-control system preferably should be included at some point external to the feedback network.

An alternative is to effect tone-control by means of the feedback by introducing frequency discrimination into the feedback network. In so doing it is very necessary to guard against the possibility of excessive phase rotation leading to instability at certain frequencies. Provided that the feedback is only taken back over one stage, however, there is no chance of this since the phase rotation will not exceed 90 degrees.

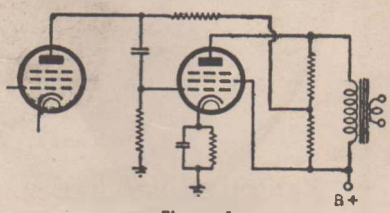
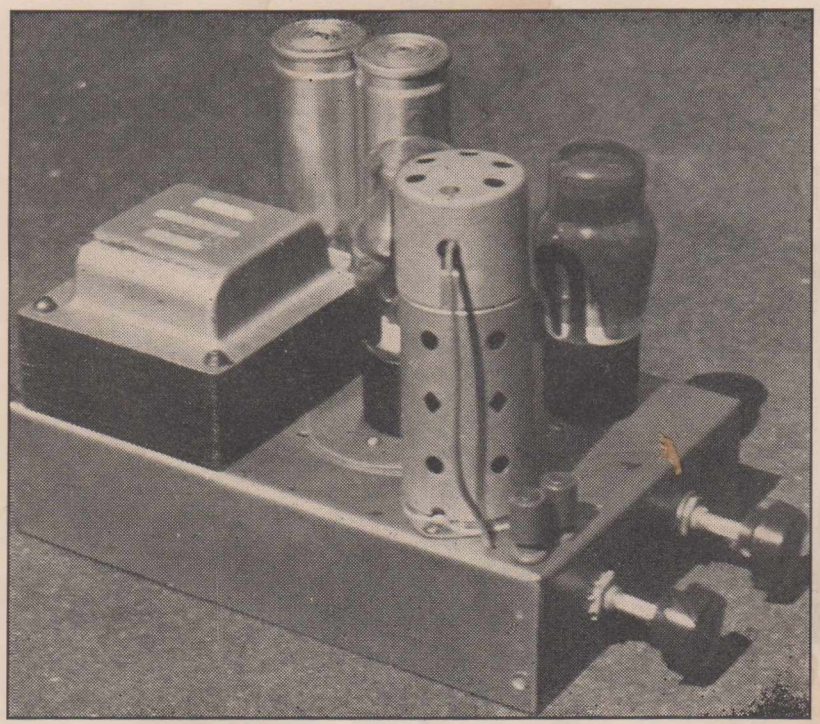


Figure 1

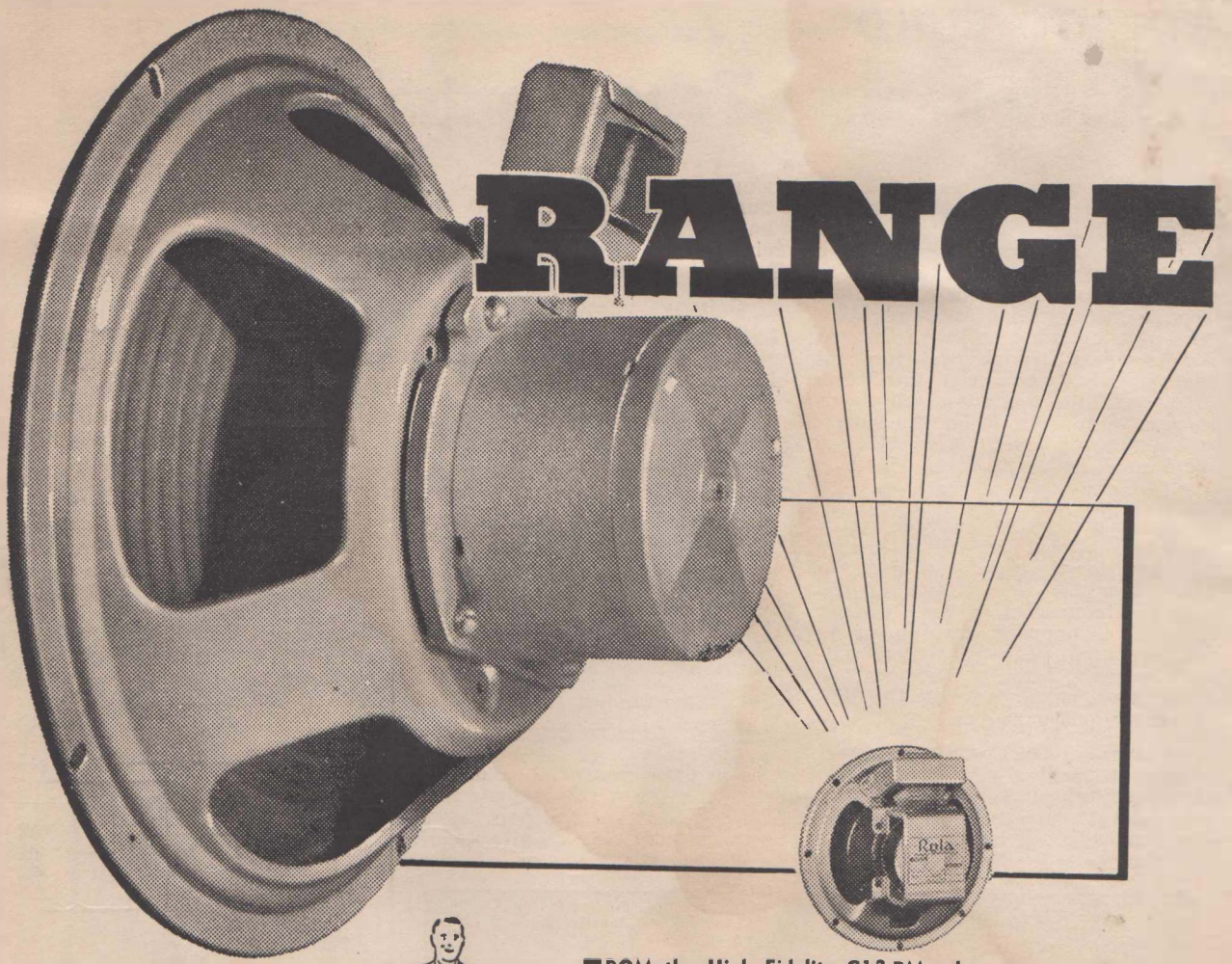
A well known method of obtaining feedback voltage is from a divider network across the primary of the output transformer (see Fig. 1). Since the network is purely resistive there is no frequency discrimination and the feedback is equally effective at all frequencies.

It follows, however, that if a condenser having suitable capacitance is connected in parallel with either arm (or portion of either arm) the feedback factor will vary with frequency and the gain of the amplifier will likewise vary with frequency. For example, a condenser connected across all or portion of the lower resistor will have the effect of reducing the



Photograph of our amplifier built to the "Radiotronics" circuit.

RANGE



FROM the High Fidelity G12.PM. above — a speaker weighing more than 22 lbs.— to the little K5, a mere handful of 18 ozs., Rola provides a complete range of the world's finest Loud Speakers.

G12.PM., the giant of all permonent magnet speakers, has a magnet which weighs 4½ lbs. (72 ozs.). This true High Fidelity speaker repraduces flawlessly fram 50 to 7500 cycles, and is admirably suited to public address and home radio.

In size, K5 is the smallest of electro-dynamic speakers but it far out-performs many larger types. It is ideal for your PERSONAL radia.

ROLA

LOUD SPEAKERS

THE BEST SETS USE ROLA LOUD SPEAKERS

THE ROLA COMPANY (AUST.) PTY. LTD. THE BOULEVARD, RICHMOND, VICTORIA

RADIOTRONICS AMPLIFIER (Continued)

feedback factor at the higher frequencies, thereby increasing the gain.

It is also apparent that the effect of capacitance in parallel with one arm of the divider may be neutralised completely or in part, by adding another capacitance of suitable value across the other arm.

In Fig. 2 is shown a network involving resistance and capacitance which, if desired, can be arranged to have negligible frequency discrimination. Resistors R3 and R4 may obviously be replaced by a potentiometer having a resistance equal to the sum of their resistances; provided the moving arm is in the proper position the characteristics of the circuit will be unchanged. However, if the arm is rotated away from the end connected to B+ the feedback factor will be reduced at the higher frequencies and treble accentuation will result. Conversely, as the arm is moved towards the B+ connection, the treble will be attenuated.

If desired, resistors R1 and R2 may also be replaced by a potentiometer, the two potentiometers being ganged together and operated as a single control. In one extreme position of the control the lower portion of the divider network would be completely bypassed for high frequencies, there being no bypass across the upper portion. In the other extreme position the reverse would be true; in between these two extremes it would be possible to achieve a state of balance. This arrangement, using two ganged potentiometers, would afford a wide range of control but is more complicated than that using a single potentiometer. It should be noted that for smooth control the potentiometers should have a linear resistance characteristic.

Typical Response Curves

There is an endless number of possible combinations of resistance and capacitance. The amount of treble attenuation possible with a single potentiometer is governed largely by the value of C1, and by the ratio of R1 to R2. The treble accentuation de-

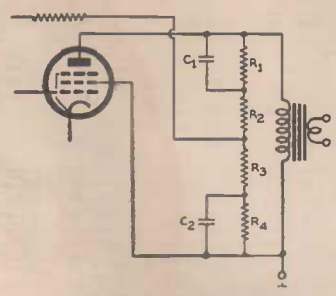


Figure 2

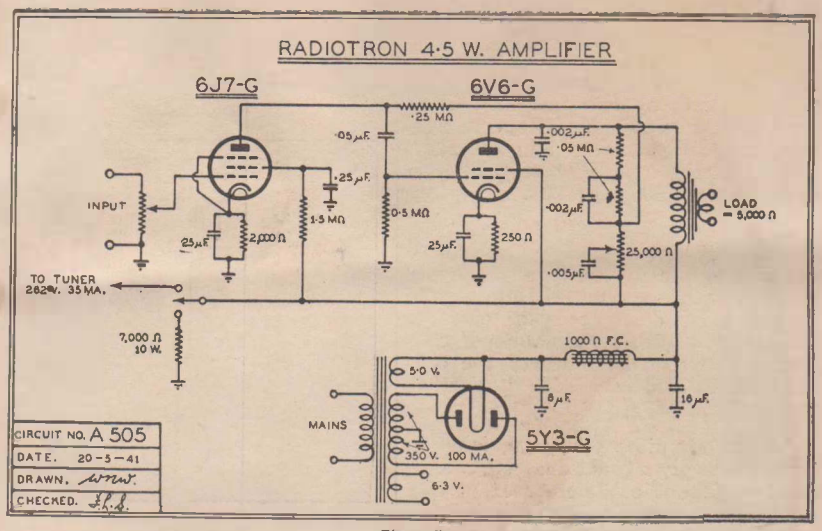


Figure 7.

Schematic diagram of the circuit.

depends on the initial feedback factor and on the natural tendency for the output valve to accentuate the higher frequencies (being a tetrode with loudspeaker load and little or no feedback).

Figures 3 to 6 show a number of curves taken with various capacitances and for extreme and intermediate settings of a tone-control potentiometer in place of R3 and R4. In each case maximum treble accentuation is of the order of +10 decibels and the attentuation −2 decibels. The latter could be increased by suitable modification to the circuit. However, for ordinary radio reception at least, it is seldom necessary further to attenuate the treble when the overall response of the audio amplifier is initially level.

The most desirable curve depends on the particular conditions. The conditions for Fig. 3 give the most obvious effect to the listener, but accentuate the frequencies in the vicinity of 3,000 cycles, which may or may not be deemed desirable. On the other hand, the conditions for Fig. 6 affect the middle frequencies little, but give full boost at 10 k.c.'s. With a speaker having a reasonable high-frequency response, the effect on music is quite apparent, but with speakers having a deliberate "top-cut" the effect of a boost at 10 k.c.'s may largely be lost. It is not suggested that the amount of control afforded is sufficient to offset marked deficiencies elsewhere in the equipment but it does provide a simple means for varying the treble response within certain limits.

RADIOTRONICS AMPLIFIER
Parts List

1—Base, 9" x 6" x 2" (Arcadian).
1—Power transformer, 80 mA. (Henderson).
CONDENSERS:
2—8 mfd. 500v. electrolytics.
3—25 mfd. 40v. electrolytics.
1—.05 mfd. 400v. tubular paper condenser.
1—.005 mica condenser.
2—.002 mica condensers.
RESISTORS:
1—500,000 ohm potentiometer.
1—25,000 ohm potentiometer.
1—1.5 megohm.
1—.5 megohm 1-watt.
1—.25 megohm 1-watt.
2—50,000 ohm 1-watt.
1—2,000 ohm wire-wound.
1—250 ohm wire-wound.
VALVES:
1—6J7G, 1—6V6G, 1—5Y3G (Mullard, Philips, Brimar or Radiotron).
SPEAKER:
To suit 6V6G, 2,500 ohm field (see text). (Rola or Amplion).
SUNDRIES:
3—octal sockets, 1—4-pin socket, 1—valve can, terminals, solder lugs, hook-up wire, knobs, power flex, screws, etc.

Complete Amplifier Circuit

Fig. 7 shows the circuit of a complete amplifier incorporating the constants used for Fig. 6. The circuit is generally similar to the previous circuit A502 and does not call for special comment. The sensitivity is sufficient to allow full output when

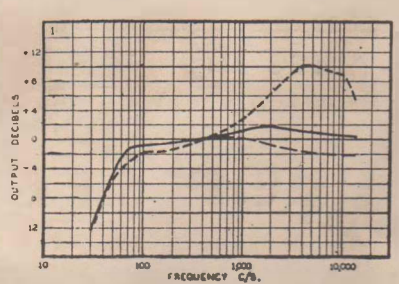


Figure 3

RADIOTRONICS AMPLIFIER (Continued)

used with a radio tuner or with an ordinary gramophone pickup. When used with a microphone it will normally be necessary to add an additional voltage amplifier stage. (See Radiotronics 110, page 20).

As a precaution against capacitive feedback at high frequencies, it is wise to arrange the layout in such a way that the plate circuit wiring of the output valve does not pass close to the input terminals. The .002mF condenser between the plate of the output valve and B+ is a further precaution.

As the circuit stands, provision is made to supply a tuner drawing a high tension current of 35 mA. If at any time the tuner is disconnected or switched off, the equivalent current should be passed in a special bleed resistance of 7,000 ohms (10 W.). If, on the other hand, a tuner is never

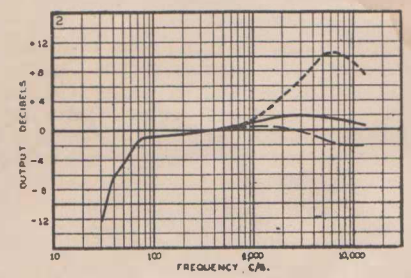


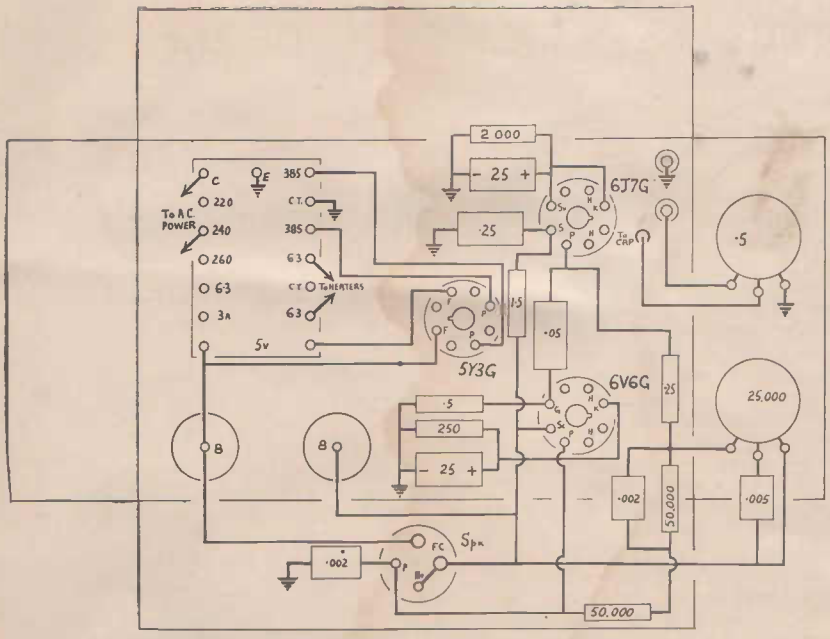
Figure 4

to be used, the power supply may be modified as follows:—

Transformer, secondary voltage 350V. RMS., 60 mA.
Field coil resistance .... 2,500 ohms

In cases where it is desired to use a larger loud-speaker requiring a field excitation of about 11.0 watts, the value of the field resistance may be increased from 1,000 ohms to 1,500 ohms and the voltage rating of the transformer to 375 volts R.M.S. Once again when the tuner is disconnected or switched off the equivalent current should be passed through a special bleed resistance of 7,000 ohms.

If the amplifier is built up on a



Layout used by us when building up the "Radiotronics" amplifier.

very small chassis, difficulty may be experienced owing to hum arising from eddy currents induced in the chassis by the power transformer. The simplest way to combat this is to return the cathode bypass and bias resistor (for the first valve), the screen bypass, the grid resistor or volume control, the lower input ter-

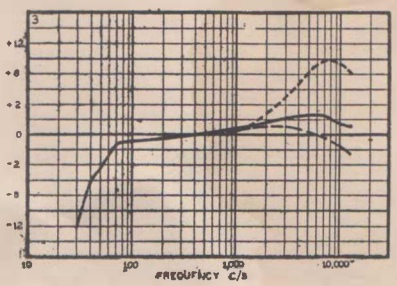
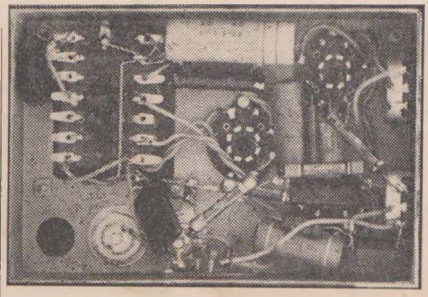


Figure 5

minal and the input circuit shielding to a single point insulated from the chassis. This central point is then earthed to some point on the chassis which gives the least hum. This scheme, of course, necessitates using an initially insulating earth terminal and covering any copper braiding where it passes close to the chassis. Another point to watch is, that the first valve is not mounted any closer than necessary to the power transformer.

Hum is not normally picked up by the output stage.



The 6J7-G, 6V6-G combination used in this amplifier makes a very satisfactory amplifier for operation from a vibrator or motor-generator power supply. For this purpose the a.c. power supply unit is disregarded and a permanent magnet speaker is used. The external power supply would be required to deliver an output of 250 volts at 50 milliamps. Should a tuner be required the current rating of the supply would need to be increased.

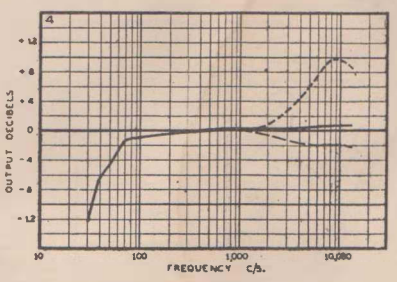


Figure 6

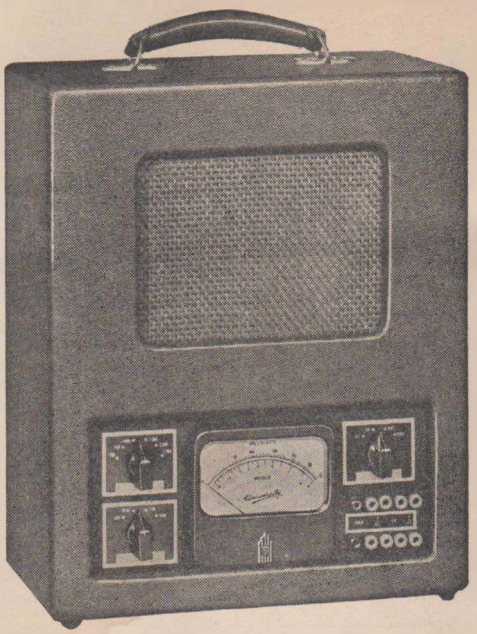
TEST SPEAKER FOR DEALERS

Radio Equipment Pty. Ltd. have developed an interesting new Universal testing speaker combined with a multi-range output meter which should be of particular interest to all servicemen because of the manner in which it will simplify and speed up the servicing of radio receivers. Every serviceman knows the problems which confront him in the nature of sets designed for speakers of particular field coil resistances or input transformer impedances and also receivers in which the loudspeaker socket is wired up in a non-standard manner necessitating a lot of soldering and changing over of connections before the receiver can be tested effectively. The new Universal speaker is designed to simplify the testing of receivers of this nature by combining a truly universal speaker, both in respect of input impedances, field coil resistances and connections with a multi-range power output meter, directly calibrated in watts, which is ideal for carrying out alignment and sensitivity tests on radio sets.

★

The Universal testing speaker just released by Radio Equipment Pty. Ltd. is a valuable addition to any radio serviceman's kit, and attractive for counter displays of service equipment.

★



Permag Unit

The Universal speaker is built around an 8" permanent magnet type speaker which can be used with any battery, A.C., vibrator or A.C./D.C. receiver of ancient or modern construction. In the case of A.C. operated and A.C./D.C. receivers, an artificial field coil is provided which can be switched to provide any desired standard value of resistance between 500 and 7,500 ohms. In testing battery receivers, of course no connection is made to the field coil terminals, but in testing A.C. sets the normal field connections to the speaker connect to the artificial field which is adjusted by means of a simple switch on the panel to have the desired value of resistance.

Input Transformer

In a similar manner, the input transformer on the speaker is tapped to provide impedances to match single triode valves, single pentode valves, push-pull triodes, or push-pull pentodes. Another switch on the panel selects the desired impedance, and the range of impedances provided is satisfactory to ensure efficient operation on practically any type of receiver.

To accommodate receivers in which the speaker socket is wired in a non-standard manner, the cable connecting to the receiver is fitted with a number of plugs at one end and these can be inserted in any of the double row of pin jacks arranged on the panel of the instrument. This simplified jacking arrangement provides a simple and speedy means for accommodating any variations in loud-speaker wiring.

Output Meter

The built-in output meter consists of a high-quality University square, rectifier type meter, fitted with a clearly-marked scale directly calibrated from zero to 500 milliwatts. A multiplying switch is provided on the panel which enables the meter to be switched off, to be used for a full-scale deflection of 500 milliwatts, 5 watts or 50 watts, depending upon the power of the receiver or amplifier under test. As a level of 50 milliwatts is the standard power used in making sensitivity checks on receivers, the meter is also provided with a range of decibels calibrated with 50 milliwatts as the zero reference level. The meter scale is accurately calibrated for operation at 400 cycles per second, and the accuracy is also quite good at 50 cycles per second.

No Power Needed

There are no power connections of any description required. It is simply necessary to plug the unit into the receiver's loudspeaker socket and set the controls at the desired position. The outside measurements, excluding the handles, are 15½" high by 12½" by 7" deep. The unit is finished in a "University" smart brown, pin leatherette carrying case and comes complete with all accessories and full operating instructions.

CAVIN YOUNG STEPS UP

Now Sales Manager for Clyde Engineering Co.

Mr. CAVIN YOUNG

Meet Mr. Cavin Young, recently appointed sales manager for the Clyde Engineering Co. Ltd., with his territory covering Australia.

This appointment marks yet another progressive step in the life of one who has given his best to this old-established engineering firm. Cavin Young joined Clyde in his early youth, serving his apprenticeship in the engineering shops. The call of the sea found him a certified engineer with the British India S.N. Co., but a sterner call in 1914 took him into the ranks of the A.I.F., where promotion to lieutenant rewarded four years' overseas service.

After the war he returned to the bench and lathe as engineer-fitter at Mort's Dock until, in 1921, he returned to Clyde.

From foreman of fitters and assemblers of electric steel carriage construction, he became production manager of the Battery Department. Again, in 1935, further promotion found him sales manager for Clyde Batteries for N.S.W.

His breezy personality, sincerity and energy have brought him many friends in the trade, and our best wishes for success go to him in these somewhat difficult times.

Shortwave Review

CONDUCTED BY
L. J. KEAST

NOTES FROM MY DIARY

Dr. Gaden tells me he heard Presiden Roosevelt's speech through KGEI (19.57m), and it was a fair signal but noisy. I did not get an opportunity to hear it by short-wave, but I heard the relay from **2FC**. I venture to suggest that the relay we got was by radiophone and the responsible parties made a good job of it.

I was reading the other day about the President's earlier speech, and the statistics are very interesting. It is estimated 65,650,000 people in 20,510,000 American homes or 70% of the total home audience in the United States listened in.

Seven hundred and ninety stations were linked together by wires or radio beams for the occasion. The basic N.B.C. system, comprising 275 stations, the C.B.S. network added 126, Mutual 178, and Canada, Mexico, Cuba, Alaska, Hawaii and various Latin-American republics 180.

To that impressive list of American broadcasters were added at least 11 international short-wave stations heard regularly throughout the world in many languages.

Intercepting the American waves, the full force of the powerful B.B.C. Home and Empire Services joined the ethereal chorus to spray President Roosevelt's words farther afield over Germany, France, Italy, Russia, Spain, Australia, New Zealand and the Far East in 32 languages. Reports show that adds another 20,000,000 to the American 65,000,000.

A New York Edison representative said that the increase in current by the turning on of the sets jumped up 13.6% above normal. When the speech ended, the demand dropped to normal.

Yes, I was one trying to tune-in on Thursday, September 18, but it did not take me long to reckon "all was not well." But if you want to hear a sad story just imagine me supervising the erection of an aerial on the roof of a big city emporium and wondering why the all-wave anti-static aerial would not get over the noise level. By the way more radio trouble or Aurora is tipped for October 15.

From Auroras, my thoughts travel to blackouts. Tried to raise **KGEI** at 10.05 p.m. on Sunday, September 21, but just the faintest indication they were there. At 10.30 little better, but some of those 50,000 watts appeared to be shorting or something. The poorest signal I remember from **KGEI**.

Always glad when September is over. Firstly, because the equinoxial gales have told whether the guy wires of our aerial are O.K., and the fact that it augers well, as a rule, for long and good night listening. No doubt daylight reception has become very poor and, beyond one or two isolated cases, there is very little of interest from, say, 8.30 a.m. until after lunch.

If you are unable to tune to **WRUL** on Tuesdays for the morse code practice, **2BL** give a lesson from 9.45 a.m. on Sundays.

While the following will not be guaranteed as a complete list of the Russian transmitters, they will most likely be useful for reference: **RW-96**, Moscow, 19.47, 19.76, 31.51 and 49.50m. These are the regulars, and maybe our N.Z. friends will be glad to know the long-wave and medium-wave lengths: **RW-1**, 1744m.; **RW-88**, 1875m; **RW-84**, 1050m; **RW-49**, 531m; **RW-39**, 741m; **RW-69**, 555.55m; **RW-54**, 882m. (**RW-88**, **39**, **69** and **54** are from Khabarovsk).

Here are two the call-signs of which I do not know: 19.34 and 19.63m. The former is excellent strength at 10 p.m. and at 11 p.m. gives news in about 10 or 12 foreign languages for South America. The latter is heard at 2 p.m. and 2 a.m. with First-line News for soldiers, and often gives messages from the soldiers to their families, but no English is spoken. Here are some more Moscow wavelengths, but must be classed as irregular, although times shown are pretty right: 19.78m, at 2 a.m.; 20.11m, also at 2 a.m.; 22.71m and 24.51m, most nights at 2 a.m.; 25.77m, no information; 31.17m, 1.30 p.m.; 31.71m, at 2 a.m.; 31.82m, 2 p.m. and 2 a.m.; 40.65m, no information; 50.93m, very loud at midnight and again at 2 a.m.

The Khabarovsk stations are: **RW-15**, 31.36, 31.43, 49.06, 49.30, 49.58 and 70.2m. The 31.36 and 49.58 laddies seem to have a regular schedule, which is 6.25 a.m. to noon and 5 p.m. till midnight.

Here is another without a known call-sign, 28.76m, which relays Moscow news in English at 8.50 a.m. and 12.30 a.m.

And this, I think, will be a new one for most of us: Leningrad on 49.50 and 60.2m, at 11.15 p.m., when they broadcast greetings from workers to

comrades in the Soviet Union. (N.Z. please note, also on 288.6m.)

Remember when we heard SVM every morning on 30.19m? Well, the identification signal, the shepherd's flute and the cow and goat bells have been given to the B.B.C. for safe keeping. "The Voice of Greece," said M. Simopolus, the Greek Minister in London, when handing them over, "is no longer heard from the Holy Rock of the Acropolis. The present announcer of the Athens Radio Station may be Greek-speaking, but he is not in touch with the Greek soul, for he now acts under the immediate orders of the invader. I now entrust to the safe keeping of the London radio station the station of that very great island from which the fight for freedom is being carried on, the signal of the Athens free station until the dawn of that happy day when the ether will reverberate again with the voice of Free Greece."

In May issue I referred to the last broadcast that I heard from the Athens transmitter — Thursday, April 24.

It was September 10, 10.15 p.m., and, running over the 19-metre band, I was surprised to find such a great signal from WCBX, New York, 19.65m. The news was coming through and a run around the various cities added realism.

Excellent Signal

Another excellent signal at this hour is **RW-96**, on 19.76m. The American news commentators are heard from here also and then a very good talk.

Yes, I think we can now look forward to some good listening on the 19-metre band for many months from early evening.

Those who are interested are cordially invited to come up to my listening-post, Radio Hall, on the third floor of David Jones,' George Street, where they will see these notes being compiled and the Kingsley-Love Communication Set, the finest short-wave receiver built in Australia.

Listeners are reminded that most of the American stations will be opening an hour later as and from September 29. This chiefly refers to the Eastern States of the U.S.A. KGEI, San Francisco, will not be affected.

I had been listening to the American reporters over DJL, Berlin, 19.85m, when, at 10.10 p.m., just as they had finished, the interval "thump" of des Deutschen Kurzwellensender was heard and the chimes so much like the opening bars of "The Marseillaise." This carried on till 10.30, when the opening bars of Beethoven's Fifth Symphony was given three times. Then, "This is Germany calling Bremen, Calais, Frankfurt, Luxembourg, and here is the German Official Headquarters News of to-day."

The "news" was very brief, but for a quarter of an hour what they said about Mr. Churchill and President Roosevelt was dreadful. At 10.30 the - - - — bars of the symphony again.

An Early Summer

I notice another thing that predicts early summer, the loudest of the three transmitters in the North American service is NOW (at my location) GSD, whereas until recently it was GRY.

In the Pacific service tune to GRS, 42.49m, the signal is a pippin.

We welcome a new member to the All-Wave All-World DX Club, Mr. Ronald Collins, Glanville, South Australia. Well, Mr. Collins, you have started off with a very good list and very nicely set out. Will be particularly interested in your further reports, as I am South Australian-born.

Dr. Gaden reminds me that some good listening is to be had on and around 51 metres. Here will be found quite a number of U.S.A. airports. Don't send reports, as you are not permitted to do so. Around 63 metres you might find the same class of listening, but the location is Canada.

Shanghai Weak

Our friend, **XCDN**, appeared to be missing to-night (September 1) or that weak as almost impossible to hear. There was someone there, but I took it to be GSD, as it was so weak. Talking of XCDN, here is a clipping from "The Broadcaster," Perth: "Dorothy Vickers, of Central Arcade, Perth, writes: 'Looking through the pages of "The Broadcaster" I noticed a paragraph about a new Shanghai station — XCDM. Having recently come from Shanghai, I wonder if the listeners who heard it mean XCDN, which is a powerful pro-British station and popular for its talks and variety shows."

Another Khabarovsk station heard in same programme as 31.36 and 31.43 is on 49.58m. The first two close at midnight, but the newcomer continues and gives news in Russian for the country newspapers.

By the way when sending notes in earlier, I referred to a Russian on 24.61; this should read 24.51m.

STOP PRESS

XCDN NOW XGDN

I have just received (September 24) a verification from **XCDN**, Shanghai, of my report of August 7. It is in the form of a letter from the Technical Adviser. It appears they have been transmitting on 1440kc or a wavelength of 208 metres for over a year, but they have only recently completed their 1 k.w. shortwave transmitter.

Schedule is: 8.30 a.m. to 9 a.m.: Chinese news programme; 1.10 p.m. to 3.30 p.m.: English and foreign news bulletins; 5.30 p.m. to 9.30 p.m.: Chinese programme; 9.30 p.m. to 10 p.m.: Foreign language programme; 10 p.m. to 1 a.m.: English programme.

They say the call-sign may be changed to **XGDN** to comply with international call-sign allocations.

Now, as regards frequency. Their letter is dated September 2, and they intend to remain on 11.75mc until London commences to transmit its Far Eastern programme on 11.75mc, when in order to avoid local interference to London listeners in Shanghai, they intend to move to 11.62mc.

Well, apparently plans were changed, as they were for some time on 11,830kc, 25.36m. I had made up my mind to let them fight it out with **VUD-4**, as the noise was too much for me, when Sgt. Clack rang me up and said he had heard them on 11.62mc and that they had announced the frequency. Last night (September 23) I tried 11.62 mc at 9.40 and found a strong signal, but badly QRM'd. Hanging on till 9.58½ I then got the call-sign and the frequency. At 10 p.m. when the news was read by a lady the signal was good. On Friday, September 24, at 12.5 a.m., there was no sign of them on 11.62 mc, but, running down the 25-metre band, I found a strong signal on approximately 11.9 mc. Sure enough when the news in English concluded at 12.9½, the announcement came: "This is **XCDN**, the Voice of Democracy, Shanghai, broadcasting . . . etc., and on **11.62** mc." Evidently the studio had not been advised of the alteration. They were actually on 11.90 mc. On September 25 at 9.15 p.m. they had moved again, but slightly, and now are on their announced frequency of **11.92** mc, and the call is **XGDN.**

Re **XCDN,** I must mention I met a lady from Shanghai who told me the studio is situated on top of the North China Daily News and is supported by subscriptions from Britishers resident in that part of the Globe. So you can show your appreciation of this fine effort by sending reports.

The MONTH'S LOGGINGS

ALL TIMES ARE AUSTRALIAN EASTERN STANDARD

AUSTRALIA

VLG-6, Melbourne 15,230kc, 19.69m

VLR-3, Melbourne 11,880kc, 25.25m
Schedule: Noon to 6.15 p.m. Relays national programme.
Great strength at 7 p.m. with news (Rogers). Often inaudible (Gaden).

VLW-3, Perth 11,830kc, 25.36m
Schedule: Daily, 8.30 a.m. to 11.45 a.m.; 1.30 p.m. to 8.45 p.m.: Relays W.A. national programmes. Sundays, 9 a.m. to 8.45 p.m.

VLR-8, Melbourne 11,760kc, 25.51m
Schedule: 6.30 a.m. to 10.15 a.m.: Relays national programme.

VLR, Melbourne 9580kc, 31.32m
Schedule: 6.30 p.m. to 11.35 p.m.: Relays national programme.
Has hit summer form and is very fine (Gaden).

VLW-2, Perth 9560kc, 31.38m
Schedule: 9 p.m. to 1.30 a.m.: Relays W.A. national programme. 11.10 p.m. to 1 a.m.: To South-east Asia. Sundays: 9 p.m. to 1 a.m.

Department of Information Broadcasts

VLQ-3, Sydney 15,315kc, 19.59m
Trans. VI.a: To A.I.F. abroad, 3.04 p.m. to 3.30 p.m.

VLG-6, Melbourne 15,230kc, 19.69m
Trans. VI.: In English to North America (West Coast). 3.55 p.m. to 4.40 p.m. (also on **VLQ-2**).
Excellent at 4 p.m. (Cushen, Schodel).

VLQ-2, Sydney 11,870kc, 25.27m
Trans. VI.: See **VLG-6.**
Trans. II.: In English to North-east Asia, 8.40 p.m. to 9.15 p.m.

VLQ-5, Sydney 9680kc, 30.99m
Trans. III.: In English to North America (East Coast), 10.20 p.m. to 11.05 p.m. (also on **VLG-2**).

VLW-2, Perth 9650kc, 31.09m
Trans. IV.: In Dutch, French and English to South-east Asia, 11.10 p.m. to 1 a.m. (also on **VLQ** and **VLG-2**).

VLQ, Sydney 9615kc, 31.2m
Trans. I.: In French to New Caledonia and French Oceania, 6.25 p.m. to 7.25 p.m.
Trans. IV.: See **VLW-2.**

VLG, Melbourne 9580kc, 31.32m
Trans. V.: In English to North America (West Coast), 1.25 a.m. to 2.10 a.m.

VLG-2, Melbourne 9540kc, 31.45m
Trans. III.: See **VLQ-5.** Trans. IV.: See **VLW-2** or **VLQ.** (This is a new transmitter and was very good strength at 9.50 p.m., 19/9/41.—Ed.) Trans. V.a: To A.I.F. abroad, 2.29 a.m. to 3 a.m.

OCEANIA

Fiji:

VPD-2, Suva 9535kc. 31.46m
Schedule: 7-8 p.m. except Sunday.
Very nice, 7-8 p.m. (Gaden).
French session 3 to 3.30 p.m. Poor signal. (Bad fade at Randwick most nights.—Ed.)

New Caledonia:

FK8AA, Noumea 6130kc, 48.94m
Schedule: 5.30 to 6.25 p.m., except Sundays. On opening and closing plays "Marseillaise," "God Save the King" and "The Star-Spangled Banner."
Now uses - - - — when opening (Cushen). Veri received (Clack). (I've tried for years.—Ed.)

Papua:

VIG, Port Moresby 15,770kc, 19.02m
Reported heard around 10.30a.m.

Tahiti:

FO8AA, Papeete 7100kc, 42.25m
Monday and Thursday afternoons around 3.30 p.m.

AFRICA

Algeria:

TPZ, Algiers 12,120kc, 24.76m
Schedule: 5 a.m. to 9 a.m.
Weak at 7 a.m. (Nelson, Cushen).

TPZ-2, Algiers 8960kc, 33.48m
Schedule: 5 a.m. to 9 a.m.
Louder than **TPZ,** but weak (Nelson).

Belgian Congo:

OPM, Leopoldville 10,140kc, 29.59m
Schedule: 4.55 a.m. to 5.45 a.m.

Egypt:

SUV, Cairo 10,055kc, 29.84m
Some mornings, round about 5.30. Fair signal.

SUX, Cairo 7865kc, 38.15m
Schedule: 4.30 a.m. to 6.30 a.m.

French Equatorial Africa:

FZI, Brazzaville 11,965kc, 25.06m
From 1.45 to 2 p.m.
Weak at 4.15 p.m. (Nelson). (This service, which was for U.S.A. at 4 p.m., is now off the air, I think.—Ed.)

Gold Coast:

British West Africa:

ZOY, Accra 6000kc, 50.00m
Relays B.B.C. at 4 a.m.
Very weak at 5.30 a.m. (Cushen).

Kenya:

VQ7LO, Nairobi 6080kc, 49.33m
Schedule: 2.15 to 5.15 a.m. (News, 2.30 and 4 a.m.).
At 3 p.m., R4 (Cushen).

South Africa:

Rhodesia:

The Post Office Station, Salisbury, 7317kc, 41m
Schedule: 2 a.m. to 6 a.m. Relays Daventry at 4 a.m. Closes with "God Save the King."
Fair signal just before closing.

Portuguese East Africa:

Mozambique:

CR7BD, Lourenco Marques 15,250kc, 19.66m
English by a woman, Portuguese by man, between 3 and 4 p.m. Chimes are given between various items. Heard announcement and music till 3.50 p.m. Then Portuguese. At 3.54 woman announced in English. Closed 4.1 p.m. (Gaden).

CR7BE, Lourenco Marques 9710kc, 30.9m
Schedule: 5 to 7 a.m. except Mondays. News 5.55.
R7-8 at 7 a.m. (Nelson).

CR7AA, Lourenco Marques 6175kc, 48.58m
Not heard yet (Gaden). (Reported being heard between 7 and 8 a.m.—Ed.)

AMERICA

Central:

Costa Rica:

TIPG, San Jose 9620kc, 31.19m
Schedule: 10 p.m. to midnight.
Loudest of the Central Americans and sometimes heard from 2 p.m. to 4.45 p.m. R9 at 10.15 p.m., R5 at 2.30 p.m. (Nelson).
Excellent in afternoon (Cushen).

TILS, San Jose 6165kc, 48.66m
Opens at 10 p.m. with "Stars and Stripes."

TIGPH, San Jose 5910kc, 50.76m
Good around 10.15 p.m., but weak at 2 p.m. (Cushen). (At 2 p.m. call is **TIX;** at 10 p.m., **TIGPH.**—Ed.)

El Salvador:

YSM, San Salvador 11,720kc, 25.62m
Another Nacional. Schedule: 4-5 a.m. and occasionally 11 a.m. to 1.30 p.m. (Dissinger, U.S.A.).

YSD, San Salvador 7894kc, 37.99m
"Radio Difusora Nacional Alma Cuscatleca."
Schedule: 10 a.m. - 2 p.m. (Dissinger, U.S.A.).

YSPB, San Salvador 6575kc, 45.63m
Only fair when conditions good (Cushen). (Kind of reversal of form, see September issue.—Ed.)

Guatemala:

TGWA, Guatemala 9685kc, 30.98m
Schedule: 2 p.m. to 2.45 p.m.
Excellent, better in fact than **WRCA.** Now closes at 2.45 p.m. (Cushen).

Nicaragua:

YNPR, Managua 8580kc, 34.97m
R5 when opening at 11 p.m., fades by 11.30 a.m. (Nelson). (This station is no longer listed in U.S.A. magazines. See below.—Ed.)

YNRS, Managua 8585kc, 34.95m
"Radio Nicaraguense," relays **YNCH,** "Radio Philips." Schedule: 11 p.m. to midnight, and 9.40 a.m. to 1.40 p.m. (Dissinger, U.S.A.).
(This station is reported being heard in Sydney at night.—Ed.)

Panama:

HP5A, Panama City 11,700kc, 25.64m
Schedule: 2 p.m. to 3 p.m., 10 p.m. to midnight.
Can be heard 1-3 p.m. (Gaden). Good strength, but mixed with **CBFY** (Cushen). Either erratic or irregular, as not always heard at night.—Ed.)

HP5J, Panama City 9607kc, 31.22m
Schedule: 10 p.m. till midnight.
R6 at 10 p.m. some nights (Nelson).

HP5B, Panama City 6030kc, 49.75m
"Radio Estafion Mundial."
HP5K, Colon 6005kc, 49.96m
Heard occasionally from 10 p.m. English announcements.

North:

EGBL, Tresco 15,330kc, 19.56m
Schedule: 10 a.m. to 3 p.m. News, 10.45 a.m. 2.55 p.m.
Heard Roosevelt's speech. Bit noisy, but good signal (Gaden). (No good at Randwick till 1.30 or 2 p.m.—Ed.) R7 at 2.45 p.m. (morse interference) (Nelson). Great strength with news at 2.55 p.m. (Cushen).

WCBX, New York 15,270kc, 19.65m
Improving in strength from 10 p.m. onwards. News at 10.30.

WLWO, Cincinnati 15,250kc, 19.67m
2.30 to 11.45. Some nice signals around 7 a.m. (Gaden, Nelson).

WRUL, Boston 15,130kc, 19.83m
O.K. round about 7 a.m. (Gaden).

KKQ, Bolinas 11,950kc, 25.11m
Good Sunday afternoons (Gaden).

NEW STATIONS

VLG-2, Melbourne, 9540kc, 31.45m: This is another transmitter brought into operation by the Department of Information and is used in Transmission 3 to North America (East Coast). It took the air in the second week of September. See Loggings for schedule.

XLMA, ——, 9240kc, 32.46m: Address unknown. This is the station referred to in September issue under "Diary." Heard from 10 p.m. Call-sign is given at 12.40 a.m.

XUD/P, ——, 10,250kc, 29.23m: Another Chinese territory station, address of which is so far unknown and a doubt as to its call-sign. I am told they open at 9.30 p.m. This was said erroneously in September issue as the Asiatic next to **PMY.** It should have read **PMN.**

JVW-4, Tokyo, 15,235kc, 19.69m: First heard at 9.20 p.m., September 24. Carries same programme at **JVW-3.** Chimes are heard at 10.20 p.m. and call-sign (in English) is given at 10.30 p.m.

VLQ-3, Sydney, 15,315kc, 19.59m: Transmission VI.a to A.I.F. abroad, 3.04 p.m. to 3.30 p.m. (Not actually a new station, but brought into use again.—Ed.)

And here are two taken from the "Globe Circler":

"Radio Bratislava," Bratislava, 9525kc, 31.49m: Broadcasts Tuesday to Saturday, 9 to 10 a.m. in English and Slovak. Badly QRM'd by **"Y."** (I doubt if this will be heard in Sydney suburbs at this hour, but our Queenslanders may make the grade.—Ed.)

"Radio Mediterranee" (Spain?), 7130kc, 42.07m: No time given, but they may have replaced **EAQ,** 9850kc, 30.43m, who seems to have left the air. Dr. Gaden reports the return of the Oviedo station, **EAJ-22,** on 7140kc, 42.02m. Their schedule is 6 to 8 a.m.—Ed.

WNBI, Boundbrook 11,890kc, 25.23m
Schedule: 11 p.m. to 9.45 a.m. R5-6 at 8.15 a.m. (Nelson). Fine at 11 p.m. and improving (Gaden).

WBOS, Boston 11,870kc, 25.26m
Schedule: 7 a.m. to 2 p.m. News, 9 a.m. and 1 p.m.
R8 at 8 a.m. (Nelson, Perkins, Gaden). Good at 2 p.m. (Cushen, Gaden).

WRUL, Boston 11,790kc, 25.45m
Schedule: 4 a.m. to 7.30 a.m. (News 6.30 a.m.)
R7 at 7.30 a.m. occasionally (Nelson, Perkins).

WRUW, Boston 11,730kc, 25.58m
Schedule: 8 a.m. to 12.30 p.m. (News 8.30 a.m. and 10.15 a.m.).
Not good as a rule after breakfast (Gaden). R6 at 9 a.m. occasionally (Nelson).

WLWO, Cincinnati 11,710kc, 25.62m
Schedule: 11 a.m. to 3 p.m. (News at 1 p.m.).
(Probably the most disappointing of all the

LOGGINGS (Continued)

American stations as regards strength and clarity.—Ed.)

KGEI, 'Frisco 9670kc, 31.02m
Schedule: 3.30 to 7 p.m. (News 4 p.m. and 5.55 p.m.). From 6 to 7 p.m. session is "Good Neighbour Hour" in Chinese from Chinatown, San Francisco. 10 p.m. to 3.10 (News 10.30 p.m., 12.30 a.m., 1.30 a.m., 3 a.m.).
R5-7 at 4 p.m., R9 at 6 p.m. (Perkins, Gaden, Nelson, Cushen).

WRCA, Boundbrook 9670kc, 31.02m
Schedule: 6 a.m. to 3 p.m.
Good from 2-3 p.m. (Gaden). Easily the best Yank. Closes just before 3 (Cushen).

WLWO, Cincinnati 9590kc, 31.28m
Schedule: 11 a.m. to 3 p.m.

WGEA, Schenectady 9550kc, 31.41m
Schedule: 8.15 a.m. to 11.15 a.m.

WGEO, Schenectady 9530kc, 31.48m
Schedule: 5 a.m. to 7.45 a.m., 8 a.m. to —2 p.m. (News 6.55 and 8.25 a.m.).
Best of the morning Yanks (Perkins). (I concur.—Ed.)

KEI, Bolinas 9490kc, 31.61m
Not as good as **KKQ** (Gaden).

Mexico:

XEBR, Hermosillo 11,820kc, 25.38m
"Radio Difusora de Sonora." 11 p.m. to 4 p.m.
Heard nicely here when not covered by **GSN.** Relays **XEBH** (Dissinger, U.S.A.).

XEQQ, Mexico City 9680kc, 30.99m
Heard between 2 and 4 p.m.
R5 afternoons (Nelson, Perkins). O.K. after **TGWA** signs (Cushen).

XEYU, Mexico City 9605kc, 31.24m
Can merely hear a male voice between 2.45 and 3.15 p.m. (Gaden).

XEFT, Vera Cruz 9543kc, 31.44m
"La Voz de Vera Cruz." Relays **XETF.**
Schedule: 11 p.m. to 3 p.m.
Very weak signal here, so would be a good catch in Australia, but they do not verify (Dissinger, U.S.A.).

XEWW, Mexico City 9503kc, 31.57m
Between 2 and 3.30 p.m.
R8 at 4 p.m. (Nelson). The best Latin-American (Cushen).

XEXA, Mexico 6190kc, 48.54m
Good at 3 p.m., but slight interference (Cushen).

XEUZ, Vera Cruz 6120kc, 49.02m
Good at 3 p.m. (Cushen).

XEUW, Vera Cruz 6023kc, 49.78m
Good on closing at 4 p.m. (Cushen). Opens at 10 p.m. Very weak signal.—Ed.

XEBT, Mexico City 6005kc, 49.96m
Great last week, signing at 3.30 p.m. (Cushen).

South:

Argentine:

LSX, Buenos Aires 10,350kc, 28.98m
Appears to be only audible on Sunday mornings.

LRX, Buenos Aires 9660kc, 31.06m
R4 at 10 p.m. in French session (Nelson).

Bolivia:

CP-5, La Paz 6200kc, 48.39m
Good signal when closing at 2 p.m. (Cushen).

CP-2, La Paz 6110kc, 49.10m
R5 at 2.30 p.m. (Cushen).

Brazil:

PRA-8, Pernambuco 6010kc, 49.92m
Heard around 6.30 at good strength (Cushen).

PSF, Rio de Janiero 14,690kc, 20.42m
Heard in same programme as **PSH** between 9 and 10 a.m.

PSH, Rio de Janiero 10,220kc, 29.35m
Opens at 8.30 a.m. Very foir signal.

British Guiana:

VP3BG, Georgetown 6130kc, 48.94m
Heard weakly at 7 a.m. (Gaden).

Chile:

CB-1180, Santiago 11,975kc, 25.05m
Good till 3 p.m. (Cushen, Gaden). (Call-sign is now a little misleading, with alteration in frequency.—Ed.) R8 when opening at 9.30 p.m. some nights (Nelson).

CB-1174, Santiago 11,740kc, 25.55m
Slogan: Radio Hucke. Schedule: 9.30 a.m. to 3 p.m. (Dissinger, U.S.A.). (Doubt if able to hear in Sydney.—Ed.)

CB-1170, Santiago 11,700kc, 25.64m
Mr. Cushen says he is hearing **CB-1170** well till 3 p.m. (Cushen). (Not heard at Randwick.—Ed.)

CB-970, Valparaiso 9730kc, 30.83m
Schedule: 11 p.m. to 3 p.m.
Radio la Cooperativa Vitalicia. Slogan is: "La Vuz de Chile para toda America."
Heard in the evening (around noon, Sydney time) (Dissinger, U.S.A.).
R3 occasionally at 10 p.m. (Nelson).

CB960, Santiago 9600kc, 31.25m
Reported heard at 3 p.m. and again at 10 p.m.

Colombia:

HJCT, Bogota 9630kc, 31.15m
Closes weakly at 2.30 p.m. Suffers interference from **2RO-3** (Cushen). Can still separate from the Italian at 2.30 p.m. (Gaden).

HJFB, Manizales 6110kc, 49.10m
R6 when closing at 1 p.m. (Cushen).

HJFK, Pereira 6090kc, 49.20m
Heard in afternoons and sometimes till 5 p.m. on Sundays. On recent week-ends has been the best signal on 49m at 3 p.m. (Cushen).

HJCX, Bogota 6018kc, 49.85m
Excellent at 4 p.m. Specialises in dance items Sunday afternoons.

Ecuador:

HJCB, Quito 12,460kc, 24.08m
Noon to 12.40 p.m.; 9.55 p.m. to 11 p.m. Excellent at mid-day (Cushen). R5 at 10 p.m. (Nelson).

HCJK, Guayaquil 9420kc, 31.85m
Very good on Sunday afternoons.

HC2AK, Guayaquil 9410kc, 31.88m
Relays **HC2AJ.** Schedule: 9 a.m. to 2 p.m. (Dissinger, U.S.A.). (Listen for Palmolive advertisements.—Ed.)

HCETC, Quito 9355kc, 32.05m
"Teatro Bolivar." Relays **HCNQ** or **HCMQ.**
Schedule: 10.45 a.m. to 1.15 p.m. and Sundays 6 a.m. to 8 a.m. (Dissinger, U.S.A.).
(Best time for us is around 1 p.m.—Ed.)

HC2ET, Guayaquil 9190kc, 32.64m
"Radio el Telegrafo." Schedule: 11 p.m. to 3.30 a.m. Sunday, 11.30 p.m. to 1.30 p.m.
Not a strong signal (Dissinger, U.S.A.).

HCQRX, Quito 5975kc, 50.21m
"Radio Quito" opens at 9.45 p.m. with march. Great strength the other night at 10 p.m. Signature to news is the "Stars and Stripes" (Cushen).

Paraguay:

ZP-14, Villarica 11,720kc, 25.60m
"Radio Cultura de Villarica — La Voz del Sudamerica." Schedule: 7 a.m. to 10.50 a.m. (daily), 2 a.m. to 10 p.m. (Sundays).
At present very difficult to hear because **WLWO** is operating on that frequency (Dissinger, U.S.A.).

Peru:

OAX5C, Ica 9810kc, 30.58m
Schedule is 11 a.m. to 2 p.m. Sign off with organ selection, "Estrelita" or "Little

Star" (Dissinger, U.S.A.). Fair on this new frequency (Cushen).

OAX4J, Lima 9340kc, 32.12m
Always loggable. Heard as early as noon (Cushen).

OAX6D, Arequipa ... 9455kc, 31.73m
R7 till **GRU** opens at 2.55 p.m. (Cushen). "Radio Continental." Schedule: 8 a.m. to 3 p.m. or later (Dissinger, U.S.A.).

OAX4G, Lima 6190kc, 48.47m
Fair on Sundays till 5 p.m. (Rogers).

Uruguay:

CXA-19, Montevideo 11,705kc, 25.63m
"Difusora de el Espectador." Schedule: 9.30 a.m. to noon.
Now being completely drowned by **CBFY** (Dissinger, U.S.A.).

CXA-8, Colonia ... 9640kc, 31.12m
"Radio Real de San Carlos." Usually heard relaying "Radio Belgrano," **LR-3,** Buenos Aires. Schedule: 11 a.m.-2 p.m., Saturday to 4 p.m. (Dissinger, U.S.A.).

CXA-6, Montevideo 9620kc, 31.17m
Servicio Oficial de Difusion Radio Electrica. Schedule: 1.30 a.m. to 3.30 a.m. and 6.30 a.m. to 12.15 p.m. (Dissinger, U.S.A.).

Venezuela:

YV5RM, Caracas 4890kc, 61.35m
Note slight change in frequency (Cushen).

THE EAST

Burma:

XYZ, Rangoon 6007kc, 49.94m
Schedule: 9.45 p.m. to 1 a.m. News at 12.30 a.m.
Excellent at 12.30 a.m. (Cushen).

XZZ, Rangoon 3488kc, 86.00m
Now only weak (Cushen).

China:

FFZ, Shanghai 12,068kc, 24.86m
Schedule: 7 p.m. to 12.05 a.m. (News 10 p.m.).
Good when free of interference (Rogers, Schodel).

XGRS, Shanghai 12,000kc, 25.00m
Schedule: 6.30 p.m. to 1 a.m. "The Voice of Europe." News 8.45 p.m., 9.30 p.m., 11.15 p.m. and 12.15 a.m.
Good to fair (Schodel). Very erratic (Cushen). (Note change in frequency.—Ed.)

XIRS, Shanghai 11,980kc, 25.02m
Schedule: 7.30 p.m. to 11.30 p.m.
News in English at 9.15 p.m. (Nelson).

XGOY, Chungking 11,900kc, 25.21m
Schedule: 8.15 to 10.15 p.m. (News, 8.15 p.m.).

XMHA, Shanghai 11,853kc, 25.31m
Schedule: 6.30 p.m. to 1 a.m. News, 9 p.m. and 11.15 p.m.
Erratic (Cushen).

XGDN, Shanghai 11,920kc, 25.16m
Schedule: 5.30 p.m. to 1 a.m. (News 10 p.m., midnight and 12.40 a.m.).
See Stop Press.

XGOK, Canton 11,650kc, 25.75m
Schedule: 8 p.m.-midnight (News at 10.30).
R5 at 9 p.m. but noisy (Perkins, Schodel).

XUD/P, Peiping 10,250kc, 29.23m
Heard opening at 9.30 p.m. (Perkins). (Another doubtful call-sign. See Loggings.—Ed.)

XGOA, Chungking 9720kc, 30.85m
Good at 9 p.m. News at midnight (Schodel).

XGOY, Chungking ... 9620kc, 31.17m
Schedule: Midnight to 2 a.m. News at midnight and 1 a.m.

XLMA, —— 9240kc, 32.46m
Heard from 10 p.m. Listen for call-sign at 12.40 a.m.

XPSA, Kweiyang 8484kc, 35.36m
Schedule: 9 p.m. to 1 a.m.
R5 at 6.45 a.m. and at 9 p.m. (Perkins, Schodel).

XOZS, Peiping 10,050kc, 29.85m

XGOY, Chungking 5950kc, 50.42m
Schedule: 6-7 a.m.; 10.20 p.m. to 11.55 p.m. News at 10.30.
Excellent with news at 10.30 p.m. (Cushen, Perkins).

Dutch East Indies:

YDC, Bandoeng 15,150kc, 19.81m
Weak at 7.35 p.m., good at 10.15 p.m. (Schodel).

PLJ, Bandoeng 14,630kc, 20.51m
Heard from 7.30 p.m. to 3 a.m. in Malay programme. Good when opening (Schodel).

PLP, Bandoeng 11,000kc, 27.27m
Very good at night.

PMN, Bandoeng 10,260kc, 29.24m
(Not heard since **PLS** came on the air.—Ed.)

PLS, Bandoeng 10,365kc, 28.94m
7.30 p.m. to 1.30 a.m.
Very nice signal (Nelson).

YDB, Bandoeng 9550kc, 31.41m
Weak at 9.15 p.m. (Schodel). (Badly QRM'd here.—Ed.)

YDX, Medan (Sumatra) 7210kc, 41.55m
Schedule: 8 p.m. to 3 a.m.

PMH, Bandoeng 6720kc, 44.64m
Excellent at 5.30 a.m. (Cushen).

PMY, Bandoeng 5145kc, 58.31m
7.30 p.m. to 1.30 a.m.

YDA, Bandoeng 3040kc, 98.68m
Heard from about 9 p.m.

French Indo-China:

Radio Saigan, Saigon 11,780kc, 25.47m
Schedule: 8.40 p.m. to 2 a.m. News, 9.15 p.m., 1.45 a.m.
Heard with R5-6 signal at 3.15 p.m. in French (Nelson).

Radio Saigan, Saigon 6180kc, 48.54m
Scredule: 8.15 p.m. to 2 a.m. News at 9.15 p.m. and 1.45 a.m.
Very loud signal.

Hong Kong:

ZBW-3 .... 9525kc, 31.49m
Schedule: 7 p.m. to 12.15 a.m. Relays B.B.C. News at 11 p.m.
Excellent at night (Cushen).

India:

VUD-3, Delhi 15,290kc, 19.62m
Schedule: 12.05 p.m. to 3.05 p.m.
News in English at 1.20 p.m.

VUD-4, Delhi 11,830kc, 25.36m
Schedule: 9.30 p.m. to 3.20 a.m.
News, 10.30 p.m., 1.50 a.m., 3.15 a.m.

VUD-2, Delhi 9590kc, 31.28m
Schedule: 9.30 to 2 a.m. News, 10.30 p.m., 1.50 a.m.

VUD-2, Delhi 7290kc, 41.15m
Schedule: 9.30 p.m. to 2 a.m. News 10.30

VUB-2, Bombay 7240kc, 41.44m
News at 10.30 p.m. English at 1 a.m. Closes at 1.15 a.m. (Cushen).

VUC-2, Calcutta 7210kc, 41.61m
Fair about 10.30 p.m.

VUD-8, Delhi .... 4920kc, 60.98m.
Schedule: 10.30 p.m. to 2 a.m.

VUB-2, Bombay 4880kc, 61.48m
Good at 3 a.m. (Cushen).

Japan:
(Tokyo considered source of supply unless otherwise mentioned)

Pressure on space does not permit of full schedules.

JLU-4 .... 17,795kc, 16.86m
11 a.m. to 1 p.m. (News 11.05 a.m.).
Only fair at 11 a.m. (Cushen).
Only fair at 11.15 a.m. (Cushen). Talk in English at 5 p.m.—Ed.

MTCY, Hsinking 15,320kc, 19.58m
Schedule: 7 a.m. to 8 a.m.
News at 7 a.m., good signal (Gaden). Only fair at 7 a.m. (Cushen).

JVW-4, Tokyo 15,235kc, 19.69m
(Heard at good strength at 9.20 p.m. and carrying same programme as **JVW-3.** First heard September 24.—Ed.)

JZK, Tokyo 15,160kc, 19.79m
Schedule: 1 a.m. to 2.55 a.m. News 1.45 a.m. 3 a.m. to 4.30 a.m. News 4 a.m. 4.30 p.m. to 6.30 p.m. (News 4.35 p.m.).

JLG-4, —— 15,105kc, 19.86m
5 a.m. to 8.30 a.m. (News 7.30 a.m.).
Good strength at 7.30 a.m. in news (Cushen, Schodel).

JVZ 11,815kc, 25.39m
7 p.m. to 12.30 a.m. (News 11.55 p.m.).

JZJ 11,800kc, 25.42m
Schedule: 1 a.m. to 2.55 a.m. News 1.45 a.m. 3 a.m. to 4.30 a.m. News 4 a.m. 5 a.m. to 8.30 a.m. 7 p.m. to 12.30 a.m. News 8.30 p.m.
Excellent 8-10 p.m.

—— 11,740kc, 25.55m
Schedule: 7 p.m. to 1 a.m. (News at 11.15 p.m.).

(Continued on next page)

LOGGINGS (Continued)

Parallels with **JLU-4**, opening at 4.30 p.m. (Nelson).

JVW-3 .... 11,720kc, 25.6m
Schedule: 6.45 a.m. to 8.30 a.m. (Exercises 7.7 a.m.). 6.45 p.m. to 12.30 a.m.
Fair 7.20 a.m., strong 9.55 p.m. (Schodel).
——, ... 10,274kc, 29.20m
Opens with Japanese national anthem at 9 p.m.

JIE-2, Formosa 9690kc, 30.95m
R5 at night. News at 12.15 a.m. (Nelson).

Malaya:

ZHP-1, Singapore 9700kc, 30.92m
Schedule: 7.30 p.m. to 1.15 a.m. B.B.C. News at 9 p.m. and 12.30 a.m.
R7 at 1015 p.m. (Perkins). Heard some mornings weakly between 9 and 10 (Gaden). (Note new starting time.—Ed.)

ZHP-3, Singapore 7250kc, 41.38m
R6 at 10.30 p.m. (Byard).

ZHP-2, Singapore 6175kc, 48.58m
Schedule: 7.30 to 1.15 a.m. (B.B.C. News at 9 and 11 p.m.).

ZHJ, Penang 6095kc, 49.23m
Schedule: 8.35 p.m. to 11.45 p.m. News 9 p.m. and 11 p.m.

Philippines:

(Manila, unless otherwise stated)

KZRH 9640kc, 31.12m
Schedule: 7.30 a.m. to 9.30 a.m. (News 8.15 a.m.). 6 p.m. to 2 a.m. (News 6.10 p.m.. 10.30 p.m and midnight).
R7 at 8 a.m., R8 at 8 p.m. (Nelson).

KZRM 9570kc, 31.35m
Schedule: 6.45 p.m. to 1.30 a.m. News, 8.35, 10.45 and 11.45 p.m., also 12.45 a.m. Occasionally leaks through QRM (Nelson).

KZIB, Manila 9520kc, 31.58m
R7 at 9 p.m. (Nelson, Cushen).

KZND, Manila 8790kc, 34.13m
Schedule: 9.25 p.m. to 10.30 p.m.
Fair 9.20 p.m. (Schodel).
R8 when clear of C.W. (Nelson, Cushen). Best of the Manila stations (Gaden, Perkins).

KZRF, Manila 6140kc, 48.86m
Schedule: 7 p.m. to 2 a.m.
Signal improving.

Thai:

HSP-5, Bangkok 11,715kc, 25.61m
Schedule: 9.30 p.m. to 1 a.m. (except Mondays). (News 10 p.m.).
Heard opening at 9.30 (Perkins). Quite a lot of English (Nelson). Very weak now (Cushen). (Very poor reception at Randwick.—Ed.)

——, Bangkok 6040kc, 49.66m
Reported heard between 11 and 1 a.m. ("Globe Circler").

GREAT BRITAIN
"This Is London Calling"

GST 21,550kc, 13.92m
GSJ 21,530kc, 13.93m
GSH 21,470kc, 13.97m
(Will most likely be heard from 9 p.m. onward before this issue is published.—Ed.)
A 13m whistle a la Daventry at 9.10 p.m. Opened 9.15 p.m. in what sounded like French, but was very weak (Gaden).

GSV 17,810kc, 16.84m
E.T., 8.55 p.m. to 2.30 a.m. News 9 p.m., 11 p.m. and 2 a.m.
Reception getting better each week (Gaden). ((Hear, here.—Ed.)

GSG 17,790kc, 16.86m
Session for China at 8.30 p.m. Heard weekly and weakly (Gaden). (**GSG** improving rapidly.—Ed.).

GSP 15,310kc, 19.60m
P.T., 5.30 p.m. to 6.15 p.m.; Af.T., 5.30 a.m. to 7.45 a.m.
Turkish at 8.30 p.m., very nice (Gaden).

GSI 15,260kc, 19.66m
P.T., 2.57 to 6.15 p.m.

GSF 15,140kc, 19.82m
Eur., 3 p.m. to 6.15 p.m.; E.T., 8.55 p.m. to 2.30 a.m.; Af.T., 2.55 a.m. to 5.15 a.m., Eur., 6.45 a.m. to 7.45 a.m.
Very good.

GRV 12,040kc, 24.92m
Eur., 2.55 a.m. to 4.15 a.m. (News at 4 a.m.).
Heard in French at 7 a.m. Spanish at 7.30 a.m.

GSN 11,820kc, 25.38m
Eur., 11 p.m. to 1.30 a.m. (News 11.30 p.m.). 8.40 a.m. to 12.30 p.m. (Spanish and Portuguese).
Intended for Latin America.

GSD 11,750kc, 25.53m
2.57 p.m. to 6.15 p.m.; E.T., 8.55 p.m. to 2.30 a.m.; Af.T., 2.55 a.m. to 7.45 a.m.; Am.T., 8.20 a.m. to 2.45 p.m. Radio Newsreel at 1.30 p.m.
A great warrior, day and night (Gaden).

GRX 9690kc, 30.96m
Eur., 2.55 a.m. to 8.30 a.m., 8.40 a.m. to 12.30 p.m. (Spanish and Portuguese), 6.30 p.m. to 8 p.m. News, 8 a.m. and 6 p.m.

GRY 9600kc, 31.25m
P.T., 3 p.m. to 5 p.m. (News 4.15 p.m.). E.S., 3 a.m. to 7.45 a.m. (News 4 a.m. and 6.45 a.m.). N.A.S., 8.15 a.m. to 2.45 p.m. (News 8.45 a.m., 10 a.m., 11 a.m., 2.30 p.m. (Radio Newsreel 1.30 p.m.).
(N.A. service still heard **in city** till closing at 2.45 p.m.—Ed.)

GSC 9580kc, 31.32m
Am.T., 8.10 a.m. to 2.45 p.m. Radio Newsreel 1.30 p.m. News 2.30 p.m.

GSB 9510kc, 31.55m
P.T., 2.57 p.m. to 6.15 p.m. (News 4.15 p.m.). 8.40 a.m. to 12.30 p.m. (Spanish and Portuguese).

GRU 9450kc, 31.75m
E.T., 11.45 p.m. to 2.30 a.m.

GSW 7230kc, 41.49m
1.55 p.m. to 6 p.m. in European service.

GRS 7065kc, 42.49m
Excellent from opening at 2.57 p.m. till closing at 3.45 p.m.

GRW 6145kc, 48.82m
Home Service, 2.30 p.m. to 6 p.m. (News 3 p.m. and 4 p.m.). 2 a.m. to 7.15 a.m. (News 2 and 5 a.m.).

GRR 6075kc, 49.38m
3.30 p.m. to 6.30 p.m. (News 4 p.m. and 5 p.m.). 2 a.m. to 8.30 a.m. (News 3 a.m., 6 a.m. and 8 a.m.)
R5 at 7 a.m. (Perkins).

GSA 6050kc, 49.59m
Eur., 1.55 p.m. to 8 p.m., 2.55 a.m. to 8.30 a.m. (News 6 p.m. and 8 a.m.).

EUROPE

Czecho-Slovakia:

"Radio Bratislava," Bratislava 9525kc, 31.49m
See under "New Stations."

France:

(Of course, Nazi controlled)

Paris Mondial 15,240kc, 19.68m
Between 3 p.m. and midnight. Daytime no good; some nights at 8.30, good. Heard opening at midnight with Marseillaise (Gaden).

Radio Vichy, Vichy 11,840kc, 25.33m
Does not seem to be a regular schedule, but heard between 2.15 p.m. and 5.15 p.m., Also sometimes between 1 a.m. and 7.30 a.m. Marseillaise at 4.30 p.m., followed by news. Excellent strength (Cushen).

"Y" 9520kc, 31.51m
Schedule: 7.50 a.m. to 2 p.m. (News 1.30 p.m.).
Quite good (Gaden). See French stations also under Miscellaneous.

Germany:

"Station Ananias," Berlin

Most Berlin transmitters put in very loud signals for most part of the day, but from early evening are subject to interference of a swirling sound nature.

DJH 17,840kc, 16.81m
5.30 p.m. to 2 a.m. News 7.30 p.m. and 10 p.m.
From 7.30 p.m., good as a rule (Gaden).

DZG 15,360kc, 19.53m
Reported being heard in late afternoons.

DJR 15,340kc, 19.56m
Schedule: 3 p.m. to 2 a.m. News 5 p.m. and 10 p.m.
(Reception from opening rapidly improving. —Ed.) R6 at 4.27 p.m. (Perkins). Good from 7.30 p.m. (Gaden).

DJQ 15,280kc, 19.63m
3 p.m. to 2 a.m. News 5 p.m., 10 p.m. and midnight.
Good from 7.30 p.m. (Gaden).

DJB 15,200kc, 19.74m
7.50 a.m. to 2.05 p.m. News 9 a.m., 11.15 a.m. and 1.30 p.m.

DJL 15,100kc, 19.85m
1.40 a.m. to 3.15 a.m. News at 2.15 a.m.

DZE 12,130kc, 24.73m
R9 at 7 a.m. (Cushen).

DJP 11,855kc, 25.31m
8 p.m. to 2 a.m. News ot 10 p.m.
Would be good if no hum (Gaden).

DXC-2 .... 11,740kc, 25.55m
Schedule: 3.40 a.m. to 7.25 a.m. News 6.15 and 7.15 a.m.
R6 at 7 a.m. (Perkins, Schodel).

DZD 10,530kc, 28.45m
7.50 a.m. to 4 p.m. News 1.30 p.m. and 3 p.m.

DZC 10,290kc, 29.25m
Very loud before mid-day.

DJD 11,770kc, 25.49m
Schedule: 1.40 to 7.25 a.m. News, 2.15, 5.15 and 7.15 a.m. Talk at 3.30 a.m.
7.50 a.m. to 2.05 p.m. (News 9 a.m., 11.15 a.m. and 1.30 p.m.

DJX 9670kc, 31.01m
1.40 a.m. to 7.25 a.m. News 2.15 a.m. and 7.15 a.m.

DJW 9650kc, 31.09m
3 p.m. to 8 p.m. News at 8 p.m.

DXB 9610kc, 31.22m
Heard opening at 3.15 p.m. (Gaden).

DJA 9560kc, 31.38m
Schedule: 3.30 a.m. to 6 a.m. News 3.30 and 4.30 a.m., and 5.30 "Lord Haw-Haw."

DXM 7270kc, 41.27m
Schedule: 6 to 8 a.m. "Lord Haw-Haw" 6.30 and 7.30 a.m.

DJC 6020kc, 49.83m
3.40 a.m. to 7.25 a.m. News at 6.15 and 7.15.

Holland:

PCJ-2, Huizen 15,220kc, 19.71m
Heard once after 9.30 p.m. through the noise (Gaden).

Hungary:

HAT-4, Budapest 9123kc, 32.88m
Still heard at good strength at 11 a.m. (Cushen).

IRW 19,520kc, 15.37m
Excellent at 9.15 p.m. (Nelson, Gaden).

Italy:

"This is Radio Roma"

2RO-8 .... 17,820kc, 16.83m
Heard in Arabic on September 2 at 8.30 p.m. (Gaden).

2RO-6 .... 15,300kc, 19.61m
12.30 a.m. to 8.55 a.m.; 11 a.m. to 3.20 p.m.; 5 p.m. to 5.30 p.m.; 6.10 p.m. to 6.20 p.m. News: 1.40 a.m., 7.12 a.m., 8.20 a.m., noon, 1.30 p.m., 3 p.m., 5.20 p.m., 6.10 p.m.

2RO-4 .... 11,810kc, 25.4m
12.30 a.m. to 8.55 a.m., 11 a.m. to 2.20 p.m., 2.30 p.m. to 3.30 p.m., 6.10 p.m. to 6.20 p.m.

2RO-15 .... 11,760kc, 25.51m
2.30 a.m. to 8.55 a.m.

2RO-18 .... 9765kc, 30.74m
11 a.m. to 2.20 p.m.

2RO-9 .... 9670kc, 31.03m
2.30 a.m. to 8.55 a.m.

2RO-3 .... 9630kc, 31.15m
2.30 a.m. to 8.55 a.m.; 11 a.m. to 2.20 p.m.; 2.30 p.m. to 3.30 p.m.; 5 p.m. to 5.30 p.m.

2RO-11 .... 7220kc, 41.55m
2.30 a.m. to 8.55 a.m.

HVJ, Vatican City 11,740kc, 25.55m
Heard between 4 and 6 p.m. Wednesdays and Fridays, giving names of prisoners of war.
R6 at 4.25 p.m. (Perkins).

HVJ, Vatican City 48.47m
5.15 a.m. to 5.30 a.m. Talks.

Portugal:

CSW-6, Lisbon 11,040kc, 27.17m

Schedule: 3 a.m. to 6.35 a.m., except Sundays.
Splendid signal.

CSW-7, Lisbon 9740kc, 30.8m
Schedule: 6.45 to 9 a.m. Talks: On Wednesday, Friday and Sunday from 6.50 a.m. to 7.15 a.m.
Good signal at 7 a.m. (Nelson, Schodel).

CS2WD, Portugal 6200kc, 48.38m
Schedule: 6 to 9 a.m.
Very faint and fades out by 6 o'clock.

Rumania:

Radio Bucharesti, Bucharest 9234kc, 32.44m
Heard at great strength at 2 p.m. (Cushen).

Russia:

("This is Radio Centre, Moscow, calling")
——, Moscow 15,500kc, 19.34m
(Foreign broadcasts: German for South America, 11 to 11.30 p.m. Frequently Leningrad is connected and English is sometimes heard.—Ed.)

RW-96, Moscow 15,410kc, 19.47m
Schedule: 7 p.m. to 11.50 p.m.
Strong and good music, but no English (Gaden). (Also heard at 2 p.m. with news in Russian.—Ed.)

——, Moscow 15,282kc, 19.63m
Heard in speech and music at night (Gaden). (This station, call-sign unknown, is heard at 2 p.m., and at 2 a.m. gives First-line news for soldiers and sometimes gives letters to families, but no English is heard.—Ed.)

RW-96, Moscow 15,180kc, 19.76m
2 p.m. to 5 p.m. (News 3.34 p.m.); 10 p.m. to 10.30 p.m. (News 10.05 p.m.); midnight to 3.30 a.m. (News 1.10 a.m.).
A beauty at 3.34 p.m., very colourful, and again at 10 p.m. (Gaden).

——, Moscow 14,920kc, 20.11m
Heard at 1.55 p.m., 3.30 p.m. and sometimes at night.—Ed.)

——, Moscow or Khabarovsk 24.61m
(Lithuanian, Latvian and other languages at night.—Ed.)

RW-96, Moscow 11,645kc, 25.77m
(Hard to separate from **XGOK,** Canton, but heard some nights at 10.55.

RW-15, Khabarovsk 9566kc, 31.36m
Schedule: 5 p.m. to midnight; 5.50 a.m. to 7.30 a.m.

RW-15, Khabarovsk 9546kc, 31.43m
5 p.m. to midnight.
Irregular now.

RW-96, Moscow 9520kc, 31.51m
10.30 p.m. to 9 a.m. (News 6 a.m., 7.15 a.m.).

——, Leningrad 49.59m
——, Leningrad 60.20m
5.15 p.m. to midnight. At 11.15 they broadcast greetings from workers to comrades in the U.S.S.R.

RV-15, Khabarovsk 4457kc, 67.31m
R6 at 9.35 p.m. (Perkins).

RW-15, Khabarovsk 4273kc, 70.2m
5 p.m. to midnight.

Spain:

Radio Malaga, Malaga 7210kc, 41.61m
Fairly good strength at 6.30 a.m. (News at 6.15 a.m. Weak.—Ed.)

EAJ22, Oviedo 7140kc, 42.02m
Being heard again in the mornings, opening at 6 (Gaden).

"Radio Mediterranee" (Spain?)
7130kc, 42.07m
See "New Stations."

——, Malaga 6993kc, 42.9m
Between 6 and 7 a.m., good signal.

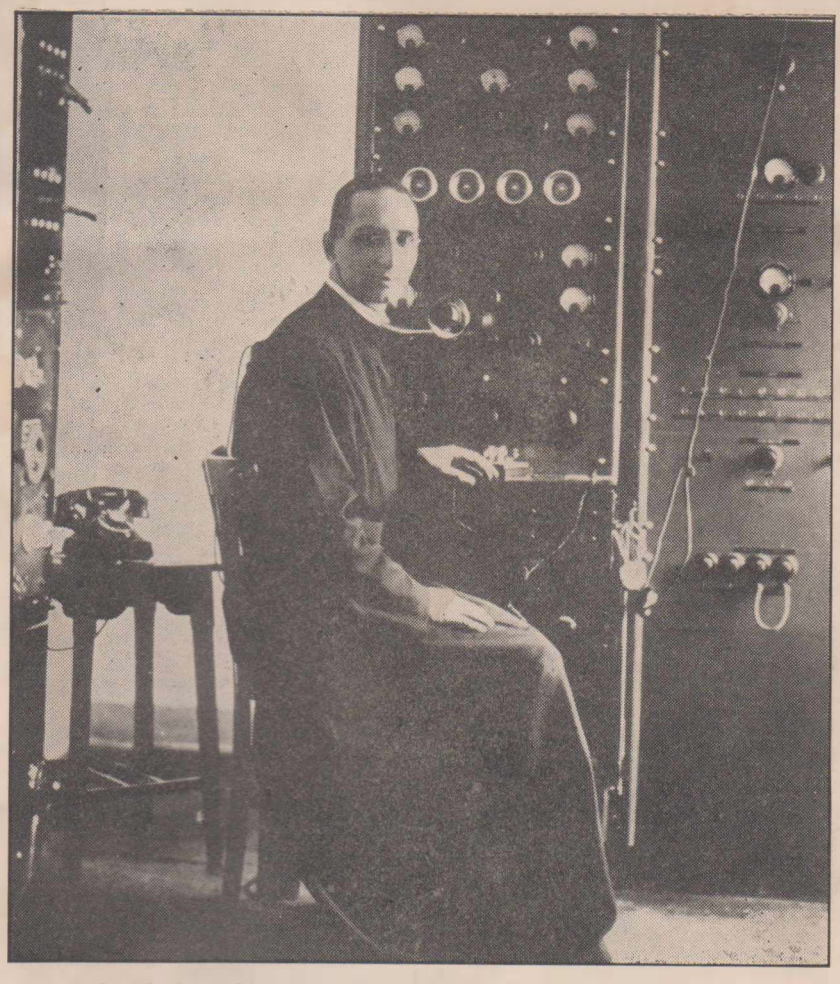
Switzerland:

HBH, Geneva 18,480kc, 16.23m
Schedule: 10.45 p.m. Fridays to 12.10 a.m. Saturdays. Mostly English, little French. News 10.45 p.m. Mondays to 12.10 a.m. Tuesdays, Italian, German and French.

HBJ, Geneva 14,535kc, 20.65m
First Sunday in the month. 2.45 p.m. to 4.10 p.m.

HBO, Geneva 11,420kc, 26.31m
Same remarks as **HBJ.**

HER-3, Schwarzenburg 6165kc, 48.66m
Schedule: 3 a.m. to 7.05 a.m.
Only Swiss and French heard.



Rev. Professor Filippo Soccorsi, Director of the Vatican Radio Station.

SCANDINAVIA

Denmark:

Radio Denmark, Copenhagen 9710kc, 30.9m
Terrific strength at 3.30 p.m. (Rogers, Perkins).

Finland:

OIE, Lahti 15,190kc, 19.75m
1.30 a.m. to 8 a.m. News 4.15 a.m. and 7.15 a.m.
Think I heard them at 10 p.m. (Gaden). (Said to give news in English at 10.30 p.m.—Ed.)

OFE, Lahti 11,708kc, 25.47m
Schedule: 1.30 a.m. to 8 a.m. (News, 4.15 and 7.15 a.m.); 4 p.m. to 7.30 p.m. (News 5.50 p.m.).
Best of the Finns, but not as good as **LKQ** (Gaden). R5 at 4.15 a.m. (Cushen). Heard news in English at 7.15 a.m. Fair strength (Nelson).

OFD, Lahti 9500kc, 31.58m
Schedule: 1.30 a.m. to 8 a.m. News, 4.15 and 7.15 a.m.
R8 at 7.15 a.m. (Byard).

Norway:

LKQ, Oslo 11,735kc, 25.57m
Schedule: 3.05 to 6 p.m.; 12.30 to 7.30 a.m.
Exercises at 3.10 p.m.
Some nice signals even after 7.30 a.m. (Gaden, Perkins).

Sweden:

SBT, Stockholm 15,150kc, 19.8m
Schedule: 6 p.m. Sundays to 7 a.m. Mondays. Daily: 3.56 a.m. to 7.15 a.m.

SBP, Stockholm 11,710kc, 25.63m
Schedule: 3.56 a.m. to 7.15 a.m. Opens again at 11 a.m. with News for U.S.A. 4.40 p.m. to 6 p.m. (Sundays 6 p.m. to 7 a.m. Mondays).
(Doubt if 11 a.m. session now audible.—Ed.)
R7 with news at 11 a.m. (Cushen). R7 when closing at 7.15 a.m. (Nelson).

SBO, Stockholm 6060kc, 49.46m
Schedule: 7.18 a.m. to 8 a.m. News, 7.20 a.m.

MISCELLANEOUS

Arabia:

ZNR, Aden 12,110kc, 24.76m
This is a 500-watt station operated by Cable and Wireless Ltd. Heard at 3.45 a.m. Have received verification at last (Cushen).

Canada:

CBFY, Montreal 11,705kc, 25.63m
Heard from noon to 2 p.m. Closes with announcement in French, then slow march and "God Save the King." Heard at great strength when opening at 9.30 p.m. News in English at 10 p.m. (Perkins). Excellent till 2 p.m. (Cushen). Pretty consistently O.K. (Gaden). Heard irregularly at 9.30 p.m. (Nelson, Perkins). Great signal (Dissinger, U.S.A.).

CJRO, Winnipeg 6150kc, 48.78m
Heard till 3.30 p.m. on occasions (Cushen).

CKFX 6080kc, 49.34m
Fair, but interfered with at 5 p.m. (Cushen).

(Continued on next page)

FIDELITY CIRCUIT

(Continued from page 12)

lation. Reasonable care should be taken to keep the grid circuit components of the 7L7 close to the tube and the "hot" leads short. If this is not done, some "grid hum" may be picked up.

The resistor R14 is chosen so that the voltage at the screen of the 6L6 is between 260 and 280 volts to ground. It should be of the wire-wound type. At this voltage the 6L6 will deliver 5 or 6 watts of audio with very low distortion, the distortion being mostly 2nd harmonic if the load on the 6L6 is close to the recommended value of 2,500 ohms. Second harmonic is not nearly so objectionable as 3rd harmonic, the latter type distortion usually predominating in a push-pull amplifier. Thus, a single-ended stage with inverse feedback appears to be preferable to a push-pull stage (employing the same class of output tube) without feedback. Of course the ideal amplifier would consist of push-pull 2A3's in the output stage with inverse feedback on all audio stages. However, there seems little point in having an a.f. amplifier capable of delivering the desired output at less than 1 per cent. distortion when few people can detect 1 per cent. and there is already more than 1 per cent. distortion in the signal anyhow, some being present at the transmitter and some being contributed by the detector, even when an infinite impedance detector is used.

Good Room Volume

The output of the single 6L6 is sufficient for good room volume even when a moderate amount of bass boost is employed, provided an efficient speaker is used. The single ended output stage does have two disadvantages, though they are not serious. More power supply filter is required than is needed for a push-pull output stage, and the output transformer must be larger for a given power output, because the saturating effect of the d.c. in the primary does not cancel out as it does with a push-pull stage.

As the receiver tunes rather broadly, a vernier type dial is not necessary, and need not be incorporated unless it is desired to "doll up" the receiver. A large, pointer-type knob can be used for direct drive, with the stations marked directly on a hand-lettered scale.

Speaker Baffle

The method of baffling the speaker is every bit as important as the choice of a speaker unit. If the speaker is to be mounted in a "box," the box should be constructed of heavy wood and be ruggedly put together. About 2 db. of bass boost can be obtained by utilising the "bass" reflex principle, in which the cabinet contains a bass reinforcement port and is made broadly resonant in the lower register (say, 85 cycles) by proper proportioning of dimensions and using only a moderate amount of damping in the cabinet.

Infinite Baffle

Much simpler to construct is an "infinite baffle" cabinet. The cabinet is nothing but a completely enclosed box (air tight except for a small "breather"), of any convenient shape or size so long as it contains at least 9 cubic feet of air space. The inside of the cabinet should be lined with rug cushion felt, and further dampened by stuffing various old pieces of wool clothing into the corners and tacking a piece of vest or trouser here and there on the sides. The box should be solidly constructed so as to avoid any possibility of vibration. For best high frequency response the speaker grill cloth (if used) should not be of too heavy material.

Antenna

A good external ground should be used (such as a waterpipe). The antenna, discussed previously, should be as high and in the clear as possible. A "T" type is to be preferred to an "L" type for local ground wave reception. An excellent antenna consists of a "T" with the flat top suspended from two 20-foot 2 x 2's placed atop the house as far apart as possible.

It should be borne in mind that the performance of a high fidelity receiver is no better than that of the signal being received. In fact, a station with bad harmonic distortion actually will sound worse on a high fidelity receiver, unless the highs deliberately are lopped off to correspond to the response of a "bargain" console.

LOGGINGS (Continued)

(Interference is probably caused by **GRR**.—Ed.)

CBFW, Quebec 6160kc, 48.70m
Heard opening in same programme as **CBFY** at 9.30 p.m. Good at 9.30 p.m. (Cushen).

Iran:

EQC, Teheran 9680kc, 30.98m
Schedule: 11.45 p.m. to 3.30 a.m.

EQB, Teheran 6155kc, 48.74m
Schedule: 4 a.m. to 6 a.m. (News 4.30 a.m.).
Man and woman announcers. Woman generally gives News. The Persian stations are of great interest now.—Ed.

Turkey:

TAP, Ankara 9465kc, 31.70m
Schedule is: 12.15 a.m. to 6 a.m. News at 4.15, and on Sundays English at 5.50. Excellent signals. Splendid dance records N.Y. Times' correspondent at 9 or 9.15. Heard Richard Dimbleby, of the B.B.C., through this station at 6.30 a.m. on September 5 (Perkins).

Location Unknown:

European Revolutionary Station 9658kc, 31.06m
Heard from 7 to 7.20 a.m. and from 3 to 3.14 p.m.

Radio Antoine 9750kc, 30.77m
This station which appears to be the same as **Unconnu,** is heard from 4 to 4.15 p.m., at good strength.—Ed. R9 at 4 p.m., also heard at 6 a.m. (Cushen). R4 from 4-4.15 (Perkins, Gaden).

WEST INDIES

Cuba:

Havana unless otherwise mentioned

COGF, Matanzas 11,805kc, 25.41m
"Radio-Emisoras **CMGF** and **COGF."**
Schedule: Midnight to 2 p.m. occasionally. One you have to fish for (Dissinger, U.S.A.).

COK 11,620kc, 25.82m
Ministerio de Educacion, Direccion General Nacional de Deportes (National Sports Director). Schedule: 4 a.m. to 4 p.m. Announces in both English and Spanish (Dissinger, U.S.A.). (Note slight change in frequency.—Ed.)

COCY 11,465kc, 26.17m
Heard weakly, morning, afternoon and night (Rogers, Schodel).

COCM, Cadena Sauritos 9810kc, 30.58m
R7 at 2 p.m. (Cushen). R8 when opening at 9.30 p.m. (Nelson, Cushen). Good signal here (Dissinger, U.S.A.).

COCH 9435kc, 31.82m
R7-8 at 4 p.m. Fair opening at 10.15 p.m. (Nelson).

COBC 9360kc, 32.05m
R4-5 at 3.30 p.m. R7 at 10 p.m. (Nelson).

COCX 9200kc, 32.61m
Appears to have moved to 32.25m. R6 at 8.30 a.m., R8 at 10 p.m. (Nelson).

COKG, Santiago 8920kc, 33.50m
Weak and only seldom heard at night.—Ed.

COCQ 8850kc, 33.9m
Best Cuban from as early as 8.30 p.m. Religious service now heard at 10 p.m. Signal R8 (Nelson, Schodel). Closes at 11.30 p.m.—Ed.

COCO 8700kc, 34.48m
Often heard from 8 p.m.—Ed.

COHI, Santa Clara 6455kc, 46.48m
Opens at 8.30 and is heard till 11.30 p.m. Ed.

COCQ 6375kc, 47.06m
Schedule: 2 p.m. to 3.15 p.m.; 8.30 p.m. to 11.30 p.m.
Strong at 9.20 p.m., but spoilt by morse (Schodel).

COCW 6320kc, 47.47m
Very poor signal at night.

Dominican Republic:

HI1N, Trujillo 12,480kc, 24.03m
Heard weakly on occasions after 10 p.m. (Nelson).

HI2G 9295kc, 32.28m
Received veri for report, September, 1940. Give schedule as 10.30 p.m. to 1.30 p.m. (Cushen). Often heard in parallel with **HIG** and **HIIG** (Dissinger, U.S.A.).

HIG 6280kc

HI3C, Larumana 6145kc, 84.82m
Fair from just after 10 p.m.

Martinique:

Radio Martinique, Forte-de-France 9705kc, 30.92m
Schedule: 8.30 a.m. to 11.30 a.m.
Excellent on July 6 (Gaden). R7 when closing at 11 a.m. (Cushen).

LOADING

(Continued from page 9)

is no longer any load on the supply, but there is energy stored in the condenser.

Alternating Current

Supposing the supply is changed to A.C. The current will tend first to charge, and then to discharge the condenser. When the voltage across C is small, the current is high, and as the voltage rises, so the current falls. There is a current flowing in and out of the condenser, but C itself does not dissipate any energy within itself, and the current and voltage in it do not rise and fall together. The current must rise and fall ahead of the voltage in order to build and destroy the charge.

We call the difference in timing a phase difference, and where the voltage is minimum when the current is maximum, the phase difference is 90° — a right-angle. In a condenser, where the current is ahead of the voltage, the current is said to "lead" by 90°.

Effect of Resistance

The resistance, because it is a resistance, does dissipate energy, and its current is always in phase with the voltage across it. The same current passes through both R and C, and, in consequence, the supply voltage is split between them. In C there must be a "lag" in the voltage, and the total voltage must lag somewhat behind the current; that is to say, the current leads somewhat. If the frequency is increased, the condenser does not have to store so much energy during each cycle, and the voltage across C does not run so high. The voltage across R is greater, and the current does not lead by so much.

Together, R and C present what is an **impedance** or a complex load on the power supply. The energy is lost only in R, and the ordinary product of E and I is not the rate of dissipation of energy. The ratio of voltage Ec and I in the condenser is called the **reactance** (Xc) and it may be calculated from —

$$Xc = \frac{Ec}{I} = \frac{1}{2\pi fC}$$

where f is the frequency.

The impedance (z) of the circuit may then be calculated from the formula —

$$Z = \frac{E}{I} = \sqrt{(R^2 + RXc^2)}$$

And the power loss is —

$$W = I^2R = E^2R/Z^2 = (E^2/Z)\ (R/Z)$$

which may also be written —

$$W = (EI)\ (R/Z)$$

R/Z, the ratio of resistance to impedance, is called the "power factor," and it is the cosine of the phase difference, and must always be less than one — until we have perpetual motion, i.e., energy for nothing.

A coil and resistance in a circuit behave somewhat similarly, but where a voltage takes time to build in the condenser, the current (Fig. 2) takes its time to develop in the coil, as the energy is transferred to its magnetic field.

In an A.C. circuit, the current lags behind the voltage, and the load is still complex. The "inductive reactance" of a coil is $2\pi fL$, and it is seen to increase with frequency. The power is still lost in R, which must include the actual wire loss resistance in the coil. and the power factor is the same, R/Z.

When L, C, and R are in circuit together as in Fig. 3, at a certain frequency the inductive and capacitive reactances are equal and opposite — one leading, the other lagging — and the energy-storing capability of the circuit is very great. In fact, the only loss occurs in R, without which no current would flow at the point X.

The loading becomes purely resistive, and is equal to the dynamic resistance of the circuit, or L/CR. The circuit is said to be "tuned," and it may be loaded further by placing resistance across the condenser. Above and below the resonance frequency, the circuit becomes a complex load, and the current leads and lags, respectively.

Pure Inductance

When a pure inductance is placed across an A.C. line, if its reactance is high enough very little alternating

(Continued on page 34)

DANDY

(Continued from page 7)

secondary voltage and use it in exactly the same way as the Yanks do with their power mains.

The first valve is a converter of the normal type, but the second is a twin valve, with triode and pentode sections which allow it to be used as both intermediate amplifier and detector.

For detection a rather unusual arrangement is used, allowing high gain and supplying a suitable voltage for automatic volume control, yet not requiring a diode plate. Resistance coupling follows to the pentode audio section of the 70L7GT.

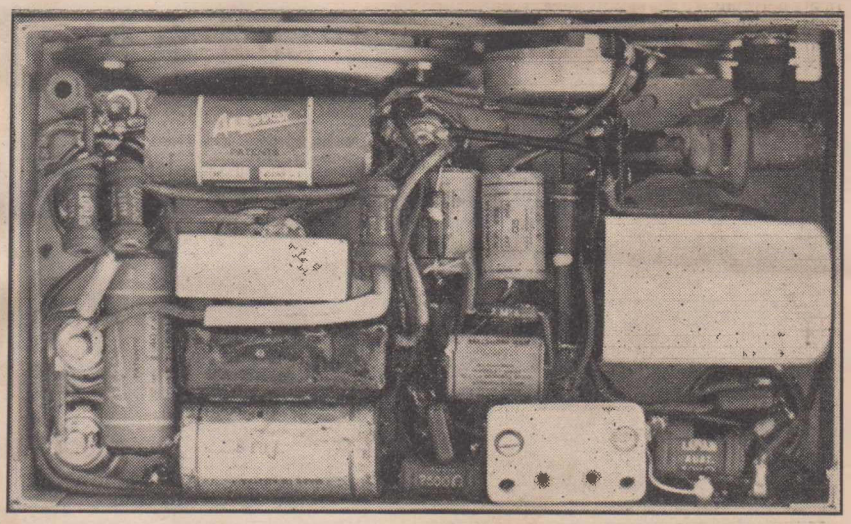
Filtering

No filter choke is used to smooth the rectified high tension, a simple resistance of 750 ohms serving the purpose. Large capacity filter condensers are used to make sure that the hum is kept at a low level. These large capacity condensers are easy in electrolytics as the working voltages are much lower than in conventional filter circuits.

There not being any surplus power around for the energising of an electro-magnetic type speaker, one of the permagnetic types is fitted.

Results

Although we did not build the original receiver, shown in the photographs, we did have the pleasure of giving it a thorough test on the air, and we can vouch for the performance as being something quite worthwhile, and well beyond the normal expectations of a set using only three valves in all.



A photograph which gives some idea of the neat way in which the components are packed under the small base.

NEW DIAL FOR OLD — A Practical Hint

The once popular front-of-panel vernier dials, known in early radio days as the "Marco" types, had their uses for experimental short-wave receivers. The wedge drive functioned smoothly without backlash, although there was a tendency for slipping in some makes. Needing a front-of-panel dial with plenty of indicator space for marked calibrations, the writer went through the scrap box, and finally hit upon the re-vamping of parts as an idea. The revolving disk with 0 to 100 degrees scale was removed from an old "Marco" dial which suffered from a broken bakelite frame. This scale plate was clamped to the receiver panel by the one-hole fixing of the variable condenser. A drive mechanism from an early type small aperture Efco dial was then rigged externally, and fitted with an indicator made from a brass strip and gramophone needle.

With a large-sized knob, the result is a sweet running dial for positive tuning and with plenty of calibration space on the white scale. It is not unsightly and has a somewhat professional appearance; all for a shilling or so. The junk stores still have old dials on hand suitable for such conversion.

FIVE-WAY TONE CONTROL SWITCH

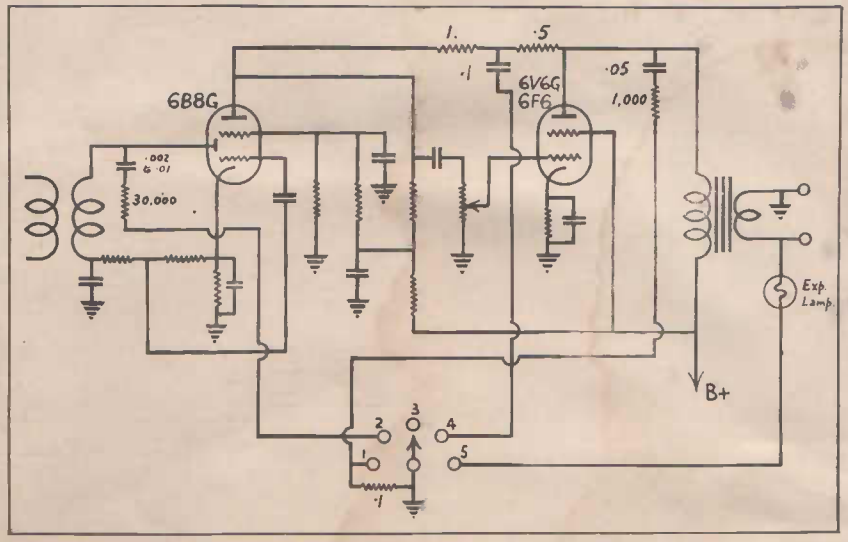
By JOHN W. STRAEDE
B.Sc., A.M.I.R.E.

A SIMPLE 5-point tapping switch which has the moving contact earthed may be used to provide any one of the following at will:

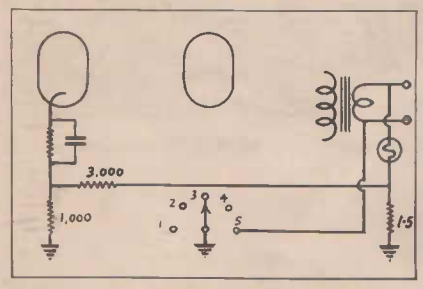
1. Bass (some of the highs reduced).
2. High-fidelity.
3. Normal.
4. Extra gain for "DX" (inverse feedback removed).
5. Volume expansion.

In position 1, a condenser-resistor filter is shunted across the speaker. For "high-fidelity," a resistor across an I.F. secondary broadens the tuning slightly to prevent loss of the higher highs. The size of the resistor depends on the gain that can be sacrificed (30,000 ohms is suitable for the "Local-Tone Four"), the type of I.F. transformer, amount of pre-selection, etc. Inverse feedback, obtained by connecting the plate of the output valve to that of the driver with a total resistance of 1.5 megohm is used on all positions except that of "DX." In that position a tap on the feedback line is earthed as regards A.C. by a .1 mF. condenser.

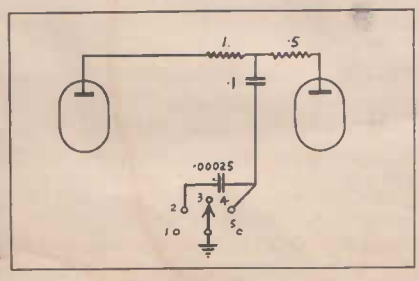
For volume expansion, either a pilot light shunted across the voice coil of the speaker or Parry's system using feedback may be used. Both circuits are shown. For amplifiers, position 2 may be changed to a "Treble Boost" effect.



Circuit of conventional audio end of a receiver, showing the addition of the five-way tone control. It is a wise precaution to keep lead for "bass" well away from lead for "high-fidelity," otherwise positive feedback may occur.



Circuit for a modification of Parry's acoustic compensation amplifier design.



A treble-boosting arrangement which may be used in place of the "high-fidelity" setting.

"NUGGET" Dual-Wave Receiver

featuring

STRIP WIRING

with

STEP-BY-STEP DIAGRAMS

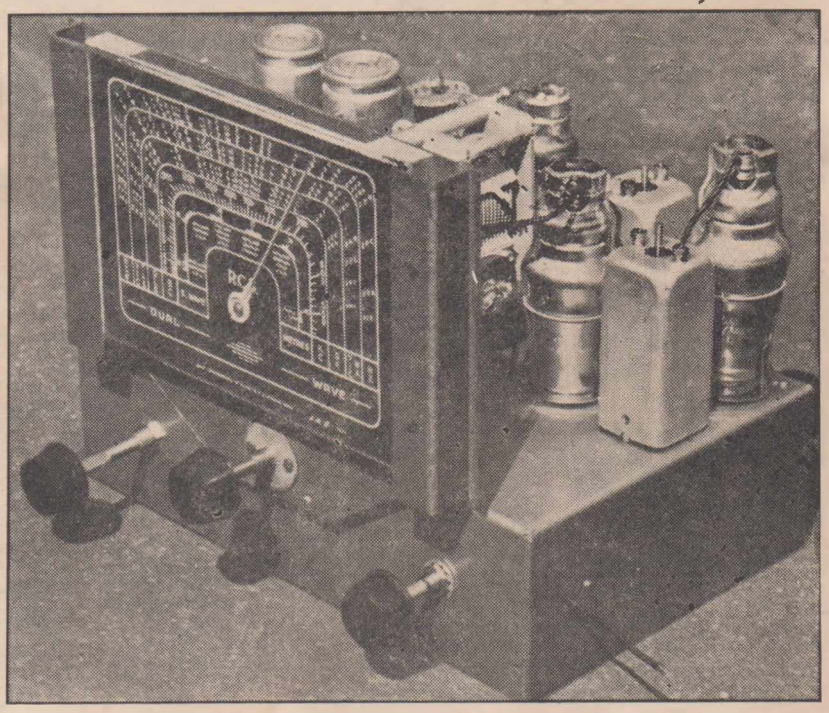
★

PROMISED for this issue, but unavoidably held over until the November issue, is the full description of a most attractive dual-wave receiver.

Most of our articles on the construction of receivers have been written in a style to suit those radio men who at least know the fundamentals of hook-up assembly and soldering. To go into the smallest details in every constructional article would mean a useless repetition of certain phrases and instructions.

Once in a while, however, we feel that it is good policy to cover every step in the construction and assembly of a reliable and popular type of set. Such is the one which should be ready for next month's issue.

Watch for full details of this attractive set in next month's issue.

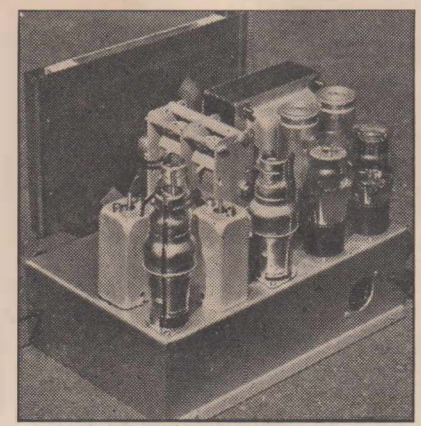


A general view of the "Nugget" chassis, showing the compact but efficient layout.

The Circuit

The circuit embodies every modern improvement, but at the same time does not contain any doubtful experiments.

Five valves are used in all, with the types all selected from the standard range of Australian-made types.



Another view of the chassis, which is featured in full in next month's issue.

"SUPER SEVEN" HINT

•

In cases where the "Super Seven" is found to motorboat at certain settings of the tone control patentiameter, it is merely a matter of fitting a small mica condenser from the plate of one of the output valves to earth. A capacity of somewhere between .0001 and .001 is suggested, with .00025 mfd. recommended.

Inverse feedback is provided by means of the simplest circuit arrangement, consisting of a single resistor running from the plate of the output valve back to the plate of the detector. This arrangement, described for the first time in Australia about two years ago in "Radio World," has proved to be particularly effective in improving tonal quality and lowering distortion.

Strip Wiring

Instead of the minor components being wired into the set individually, there are two strips of mounting lugs to carry them. This strip arrangement makes for more rigid assembly and makes the wiring process easier to follow, as the work is then divided into four separate steps.

A series of diagrams and photographs have been prepared to cover each of these steps and they should prove of great benefit to those who are going to make this job their first effort at building a full-powered receiver.

Other Features

Other features for next month's issue, subject to the limitations of man-power, accidents and unforeseen circumstances, include a simple form of signal tracer for servicemen, the first of a series of articles on the use of the cathode ray oscilloscope and a constructional feature dealing with a simple but effective form of beat frequency oscillator. An article on the subject of a battery-operated intercommunication system is also being prepared for publication in an early issue.

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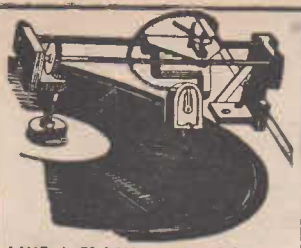
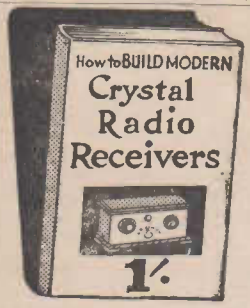
'Phones: M 2525 and M 2526-7. Goods forwarded C.O.D. Post or Rail. (C.O.D. Mail within N.S.W. only. Not Interstate). We welcome Prepaid Telegrams and Long-Distance 'Phone Calls.



LIKE-A-FLASH Overhead Cutting Head and Cutting Gear £5/5/-. MAKE YOUR OWN RECORDINGS. Cutting head and overhead cutting unit complete, £5/5/-. Plain Records, 2/11, 3/11, 4/11, 5/11. Cutting Needles, 2/-. Aluminium discs, 1/-, 1/6.



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Cosmocord Crystal Pickup
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84/-
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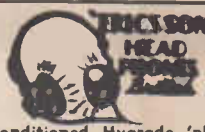
Special price to traders, lots of 6 or more.

COSMOCORD CRYSTAL TYPE BRITISH BUILT AND DESIGNED GRAMOPHONE PICK-UP DE LUXE, with volume control built in as illustrated, 59/6.

AMPLION British built Gramo-Radio Pick-up with volume control. Moulded bakelite tone arm. List Price 37/6 Now 32/6. Dealers write for wholesale price.

COLLARO Spring Gramophone Motor and Turntable, 27/6.



Reconditioned Hygrade 'phones, 15/-, 17/6, 20/-. Headphones—13/6, 15/-, 17/6, 21/-. Ericsson's Professional 4,000-ohm 'phones, 47/6.

Just arrived! British - made Gramophone Pickup Needles. Will play 10 records. 100 in tin, 2/6.
Extra loud and medium, 2/6.

"Vico" Electric Dry Shavers. Brand new, original cartons. A.C. - D.C. 240 - volt, 110 and 240 - volt, 6 - volt, 32 - volt, 50 - volt, £5/5/- list price. NOW 50/-.

VALVES AT SANE PROFIT PRICES. ALL GUARANTEED.

New 227 Valves, 5/9; used, 3/6. New 4XP, 5/-; S215, 5/-; MH4, 2/6. 38, 78, used 5/6. Raythean B.H. Rectifier, new, 15/-; DU10, 5/-; 2A6, 35, used, 5/6. Used 224, 5/6. 610RC, 610XP, new, 6/6. Used 42, 5/6. New 41MRC, ML4, 3/-. 44SU Rectifier, 5/-. PM22, new, 7/6. Used 1C6, 6A7, 6A8, 6B7, 6U7, 6F6, 6F7, 6L7, 6/6. Used 57, 58, 59, 6/6; 201A, 3/6; A409, 6/6; A615, E406; E452, 6/6. Used PM6, PM5B, A609, 6/6. Used 6J7, 6J8, AL2, EK2, 2B7, 226, 5/6. New PM12, PM2A, 18/-. Let's know your valve wants.

How to Build Modern Crystal Sets, 1/2 posted free.

Radiokes Straight-vision Illuminated Dials, 5/-. Circular Stop Light type, 4/-.

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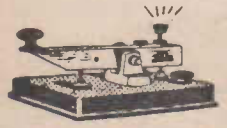
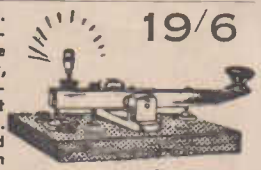
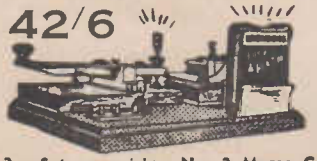
Pick-up Heads. Fit and suit all tone arms and gramophones. For operating gramophone through radio. 15/-, 19/6 each.



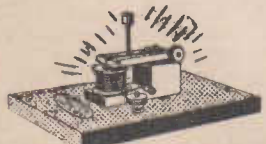
No. 1. — Adjustable Morse Code Key, with long or short tapper arms, splendidly made and finished. Strong reliable heavy plated fittings mounted on bakelite moulded base, 12/6.
P.M.G. Type Sounders 35/-.



No. 2.—P.M.G. Type adjustable Morse Code Key, strong and reliable; will last a lifetime. Heavy plated fittings on thick solid wooden base. Perfect action.

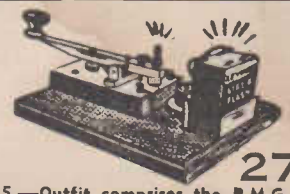


No. 3.—Set comprising No. 2 Morse Code Key P.M.G. Type, with light. Professional De Luxe Buzzer Battery. Throw-over Switch for buzzer or light. Use as required. Mounted on baseboard. Complete.



Highest-pitch Buzzer, finger-tip adjustment for professional or amateur use, 11/3.

At left: PYREX TYPE INSULATORS. 3" barrel type, 1/-. Pyrex, 4," 3/6; 5½," 6/6; 7½," 30/-.



No. 5.—Outfit comprises the P.M.G. No. 2 Morse Code Key, with adjustable buzzer and battery all mounted on a stained baseboard, ready for immediate operation. Battery included.

No. 6.—A real good little outfit which incorporates the No. 1 adjustable Morse Code Key, in moulded bakelite base, with a smart little adjustable buzzer all complete to operate. Junior model, 13/6.

Remote controls for Car Radios, U.S.A. make, 25/-.

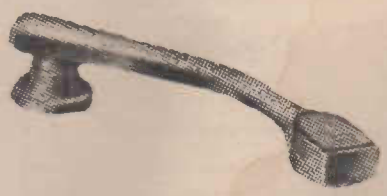
Ormond Slow Motion Front Panel 2-action Vernier Dial, 8/6.

Model Electric MOTORS. Work off small wet or dry batteries. 5/9, 10/6, 12/6.

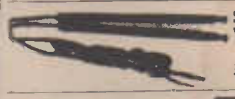
MICROPHONES

Batteryless hand-holding type, 30/-. Others, bench type, 15/-, 17/-, 21/-, 30/-.

High-pitched "Stay Put" adjustable Tone Buzzer, 3/9. Adjustable Buzzers in Bakelite cases, 4/6, 5/6. Special price to traders. Write for lists.



Collaro Highest Definition Pickup. New needle holder. Sturdy, compact, well made, with Volume Control. 50/-.



SET TESTING LEADS WITH SILK FLEX and METAL TIP ENDS. 3/9 value. NOW 2/6

Police Patrol Multi-Strand Rubber-covered Aerial. Needs no separate lead - in. 50ft., 3/3; 100ft., 6/6.
Man - o'- war Heavy Duty Insulated Aerial, multi-strand wires, 50ft., 6/6; 100ft., 13/-.

SPEEDY QUERY SERVICE

Conducted under the personal supervision of A. G. HULL

J.C.J. (Bondi) asks about paper rationing.

A.—Naturally we have to take our share of the burden of paper rationing, but, as you have probably noticed, it doesn't mean that we can't maintain our technical policy. Immediately the rationing was suggested, about the middle of last year, we cut down the size of each page by using a smaller margin and less space between columns. This allowed us to publish the same amount of reading matter, or even more, without using the weight of paper. At the moment our relatively large list of subscribers is doing us a good turn, as it eliminates wastage, every ounce of paper going right into the hands of the kind of fellows who appreciate the type of editorial matter printed on it. Many thanks for the good wishes.

o o o

W.A.A. (Lismore) wants a circuit for a battery set which can be built up step by step.

A.—There was a description of a set of this type in our issue of September, 1938. The detector stage is built first, and then an audio and next an r.f. stage is added. The circuit is suitable for two-volt valves or far those with the 1.4-volt filaments. We have plenty of copies of this issue in stock, available at 6d. each, post free.

o o o

W.H. (Mereweather) has built the "Club Special," but the oscillator section of the 6J8G will not operate.

A.—The most likely cause of the trouble would be the oscillator coil having wrong connections to the B and P terminals. This sometimes happens when coils are being assembled, and, although they show continuity when checked, they may still be connected to the wrong terminals.

The easiest way out of this difficulty is to reverse the leads to the oscillator coil, and possibly this will cure the trouble. Otherwise we are at a loss for an explanation as to why the converter valve fails to oscillate.

o o o

A.L. (Coogee) has a receiver which has developed a bad hum in the speaker and he wants to know what to do to cure same.

A.—There are quite a few things which could cause this hum. First we would suggest that you examine the smoothing system for leaky or dried up electrolytic condensers, as they are often a source of bother.

Then again, it may be an open grid circuit, as one of the caps on the valves may have become loose, or the lead become unsoldered due to corrosion. Another point may be the gramophone pickup terminals which have become open circuited, or maybe some by-pass condenser has broken down.

All these things individually or collectively will cause various degrees of hum, and we would suggest that you examine your receiver along these lines.

o o o

N.D. (Rose Bay) has built an amplifier and finds that the volume control is not as gradual as it should be, and wants to know the reason for this.

A.—As all potentiometers are built with a gradual increase in one direction, it would seem as if you have the potentiometer connected back to front, thus getting a sudden increase at one end.

We would suggest that you reverse the leads on the potentiometer and this may rectify your trouble. The potentiometer should always work in a clockwise direction to increase volume.

o o o

F.D.L. (Campsie) complains of a sizzling noise coming from the rectifier valve, an EZ3.

A.—This valve has a P base, and the noise may be caused by one of the plate lugs being loose in the socket, and the current arcing across between the lug and the side of the socket. This may be overcome by removing the valve and increasing the tension of the small metal contacts in the base.

(Continued on next page)

BATTERY SET PERFORMANCE

What do you think?

Mr. J. J. Martin, of Lornook, via Lismore, writes:"In the June issue you refer to the fact that manufacturers of some brands of receivers were not giving the country people a fair go. I am a country dealer and have tested out scores of well-known brands of sets, and in my experience there is very little difference in any of the better-known makes of receivers. Also, when given a side-by-side test, the battery sets compared favourably with any a.c. type of similar valve number. My opinion is that the average country person who owns a battery set expects the receiver to compare favourably with an a.c. operated set, even when the battery high tension voltage has dropped as low as from 40 to 60 volts. Countless times we have made service calls and found the owner in an ugly mood, because of the fact that he cannot receive the mid-day news. On testing the "B" batteries we have found them as low as the abovementioned voltages. Candidly, the battery sets of to-day are all that they should be, but the country man expects too much for nothing."

What do you think about battery set performance? See details of the contest announced on page 5.

QUERIES (Continued)

R.H.J. (Sydney) wants to know the meaning of Q.R.M. and Q.R.N. in R7 of the R code.

A.—Q.R.M. means "Are you being interfered with?" or "I am being interfered with," as the case may be. Q.R.N. means, "Are you troubled with atmospherics?" or "I am troubled with atmospherics." We would suggest that you obtain a copy of the Handbook for Wireless Operators, priced at 1/6, which is obtainable at Angus and Robertson.

o o o

W.P. (Gladesville) after saying many nice things about the magazine, asks for a circuit of a crystal set.

A.—In the April issue we printed the circuit of a crystal set which we believe would suit your purpose, as it has the necessary coil data and also a picture diagram. Glad to hear you like the improvements.

o o o

A.L.J. (Ryde) wants a good amplifier circuit with a tone control.

A.—The circuit in this issue should fulfil your requirements exactly, as this is the latest development along tone control lines.

o o o

R.B. (Manly) wants to know the cause of hum in his receiver when tuned to a station.

A.—This is probably due to what is known as modulation hum, and can quite often be cured by earthing one side of the heater circuit at the R.F. end.

o o o

A.R. (Bondi) enquires about a suitable aerial for short-wave reception.

A.—We agree that it is remarkable how results can be obtained with short indoor aerials, but it is always a good plan to erect an outdoor aerial, as high as possible and clear of the building, but not necessarily long as regards actual length. An aerial of this type should help you to get a better signal-to-noise ratio, which is very important when trying to log a weak station with a powerful set working "flat out."

D.J.L. (King's Cross) has a receiver of well-known make, which he claims to have had to several different servicemen for attention, but without obtaining satisfaction.

A.—We can only suggest that you take the receiver direct to the manufacturers, who maintain a service department, where the mechanics are certain to have had a lot of experience with similar sets. The original circuits should be available to them and they should be in a position to give you guaranteed results. Glad to know you appreciate the short-wave section.

Radio Dealers and Servicemen —

From Mr. John Bristoe, author of the article on the Signal Tracer in the September issue, we have two further articles, one dealing with a much simpler a.c.-operated signal tracer, and the other a one-valve battery-operated elementary signal tracer which should prove especially interesting. These articles are set down for publication in our November and December issues. Order your copies NOW.

K.B.M. (Camden) enquires whether we have any back numbers in which test equipment construction is described.

A.—Yes, there must be at least eight issues available, with details of building multimeters, vacuum-tube voltmeters, output meters and suchlike test equipment. These are available at 6d. each post free.

o o o

K.H. (Clovelly) wants some information on an oscillator and its uses in service work.

A.—An article covering the construction and uses of an oscillator was published in the July, 1941, issue, which should contain the information you require. Copies of this issue are still available, priced at 6d., post free.

o o o

K.C. (Hornsby) finds that the valves in his set get very hot and is worried in case this indicates trouble.

A.—Most modern valves run very hot, much too hot to touch, and yet this does not indicate that anything is wrong, providing the set appears to be operating in the normal way with plenty of power and no distortion.

LOADING

(Continued from page 27)

current will pass. If D.C. were present, however, it provides a short circuit. An inductance can be regarded as a D.C. by-passed A.C. reactive load, and if it is shunted by resistance, there is a complex A.C. load with a D.C. by-pass.

If the energy stored in the core of an inductance is dissipated through a secondary coil in another resistance, then the load is still complex to A.C., and still also short circuit for D.C.

It is the duty of all power amplifying valves, R.F. and A.F., to convert the D.C. of the plate power supply to A.C. for the load (aerial, speaker, or next stage). The actual current in the valve flows only in one direction, so there must be a free D.C. path across the load.

However, for greatest efficiency, the A.C. impedance of the load must be high, and in most A.F. output valves its value is specified by the makers for set conditions of plate and grid voltages. Further, most speakers have A.C. impedances of less than ten ohms at their voice coils. It is the work of the speaker transformer —

(1) to by-pass the D.C.;

(2) to impede the A.C. and set up an audio voltage;

(3) to "match" the voice coil impedance to the "optimum" load for the valve.

"Matching" just means charging the ratio of E/I without charging the product E x I (the power).

Assume a transformer without any energy loss. If its primary is connected to a 100-volt A.C. line, and it has ten times the number of turns on its secondary as its primary, the output voltage across the secondary would be 1,000. If it has a resistance of 1,000 ohms across the secondary, one ampere would flow, and 1,000 watts would be lost in the resistance. Since there is no loss in the transformer, the primary must pass 10 amps at 100 volts to make 1,000 watts, and the primary resistance, E/I, becomes 10, which is just $1,000/10^2$.

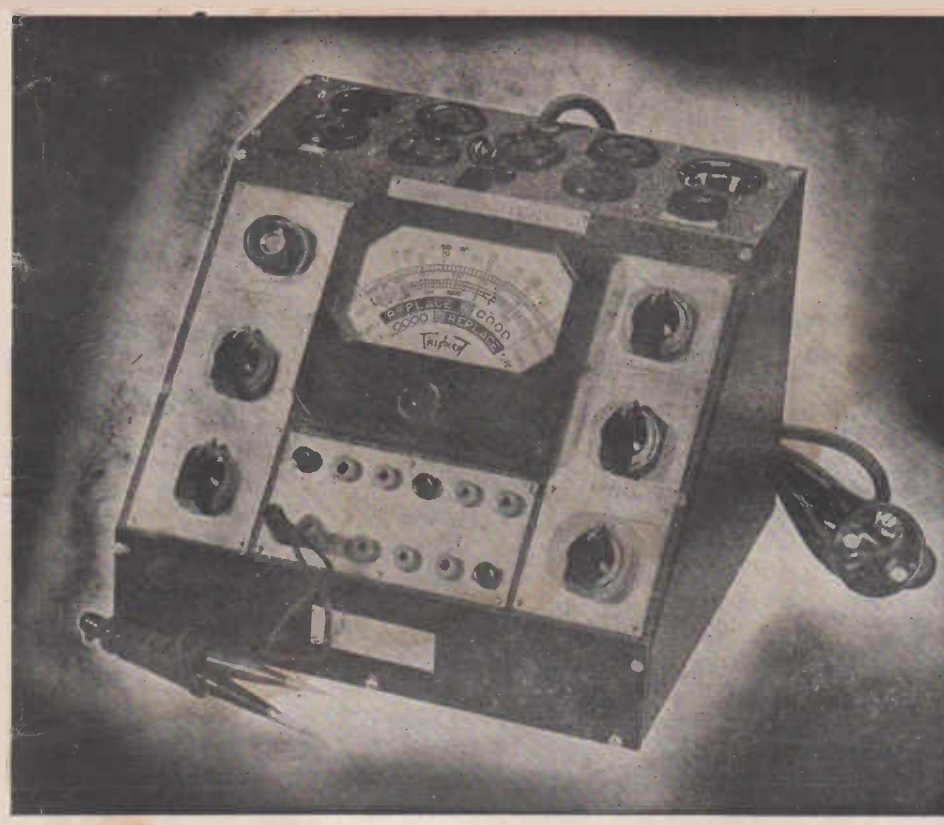
If the turns ratio were 5, the 1,000 ohm resistance would "reflect" a load of $1,000/5^2 = 40$ ohms. Where a voice coil has a "nominal" impedance of six ohms, and a valve requires a load of 5,000 ohms, the turns ratio is the square root of their quotient, or —

$\sqrt{(5,000/6)} = 29$ times (approx.)

In similar manner, modulators are matched to class "C" stages, valves are matched to lines, aerials are matched to feeders, and lines are matched to loads.

When it is considered, this word load removes a weight of phraseology from our radio language.

What the well-equipped Serviceman should possess



THE Delta MODEL D1506 Component Tester

PROVIDES TESTS FOR —

- The quality (emission) of valves.
- Shorts and leakages between valve elements.
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- The condition of electrolytic condensers.
- The condition of electrostatic (paper) condensers.
- Resistance tests from 5 ohms to 5 megohms.
- The condition of dry batteries by voltage test.
- Pilot lamp tests.

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Glance to the panel above and see the tests the D1506 will do. With this versatile instrument the serviceman can make all the tests enumerated — and make them to a high degree of accuracy.

The D1506 is extremely simple to operate and will quickly pay for itself in new business.

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"It may interest you to know that I have been passed into the R.A.A.F. Reserve as an electrician. While I had some experience in electricity, I should like to acknowledge the great assistance I have received from the course."
—J.P., Cooma.

"During the last two weeks I have added over £33 with sales and repair work exclusive from my regular weekly wage, to my bank account. I cannot stress enough my appreciation of the benefit and pleasure I have received since I began your instructional course."
—J.R., Lismore.

"Just a letter of appreciation and thanks for what your radio course has done for me. Since obtaining my Certificate in December, I have serviced 145 receivers, and I am proud to say that not one of them had me beat, thanks to your wonderful course and advice."
—D.R., Home Hill, Q'ld.

FREE BOOK

First thing to do if you want to secure the facts about Radio is to send in for "Careers in Radio and Television," a lavishly-illustrated book published by the College and available to approved enquirers. Send in coupon for your copy now. It's free and post free!

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