THE AUSTRALASIAN

Radio World

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VOL. 7 . . . . . NO. 12 MAY 15 1942

Some unusual facts explained and strange theories exposed.

Receiver uses single valve as three ordinary valves.

Receiver alignment explained in detail for novice and expert.

Guide to short-wave reception and list of stations heard.

Price 1/-

THE AUSTRALASIAN RADIO WORLD

Devoted entirely to Technical Radio

and incorporating

ALL-WAVE ALL-WORLD DX NEWS

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Vol. 6 MAY, 1942 No. 12

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EDITORIAL

The recent increases in sales tax on radio parts appear to place a most unfortunate load on an industry which is already carrying more than a fair share of the war's unavoidable burdens.

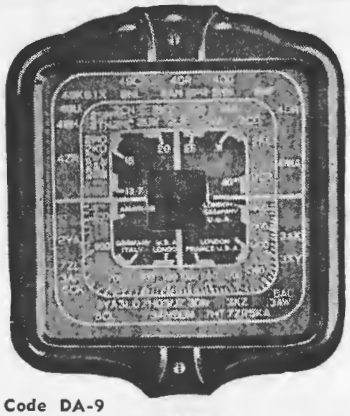
The possibility of a long war makes it desirable to think of the rising lads who will be swelling the ranks of the air crews and the signals section in a year or two. Steps are being taken to train them for service in the R.A.A.F. by that most worthy effort, the Air Training Service. Yet, so far as we know, there is nothing being done to encourage youngsters to study the practice of radio communication, in fact they are being discouraged. The heavier sales tax makes it difficult for them to afford to buy the necessary parts with which to experiment.

Even so, we can readily imagine what a rush there would be from modern lads if they were given the opportunity to enlist in a radio training corps with permission to build, erect and operate their own transmitting and receiving centres. Even whilst training they could be put to good use for N.E.S. and other emergency work.

Yet we hesitate to push the suggestion for already there seems to be enough talking and wrangling; enough man-power spent at the income tax office to put up a good war effort if only directed at some better purpose than struggling for a tupenny-ha'penny refund.

And so we appeal to the radio enthusiasts and the radio trade to bear the burden of increased sales tax as best they can, accepting it as part of their war effort.

SOLVE YOUR PROBLEMS before they START!..



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The new D.W. Kit Dial, Code DA-9, has all parts supplied ready to assemble. This is an excellent replacement dial and is suited for crystal and small T.R.F. sets. The special walnut escutcheon is easy to fit and requires on aperture 3 in. x 3 in. Available for use with "H" type Gang Condenser on 1600 and 550 k.c. and 13.7 to 40 metres, S.W. bands.

Code		Price
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DA-6	Mantel Set Dial, D.W. "H" gang	18/9
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R.C.S. TROLITUL BROADCAST COILS

These coils are available in both Air Core and Permeability tuned types. The latter are adjusted to ensure maximum efficiency in our laboratories.

AIR CORE "H" GANG

E342 Aerial 6/6
E343 R.F. 6/6
E344 Osc. .. 6/6

PERM. TUNED "H" GANG

E345 Aerial 8/6
E346 R.F. 8/6
E347 Osc. 8/6

T.R.F. TYPE-AIR CORE

T88	Aerial	6/6
T89	R.F.	6/6
T87	R.F. with reaction	6/6
T81	Reinartz	6/6

For the construction of the new version of the "Little Companion"— and for all amateur construction work — there can be no better choice of component parts and coils than those bearing the R.C.S. trademark. Built to extreme precision limits, they are the constructor's best guarantee of perfect results and a safeguard against "disappointments." For the "Little Companion" circuit we recommend: Coil Kit Code K198, consisting of R.C.S. DW Bracket and 2 permeability I.F.'s £2 15 0
R.C.S. Dial DA-8 ..... 13 6

Code DW36

R.C.S. TROLITUL D.W. UNIT

Type DW-36, as illustrated, consists of Aerial and Oscillator Coils, Wave Change Switch, the necessary B.C. and S.W. Trimmers and Padder mounted together, wired up ready to assemble into a set utilising 465 k.c., the bands being S.W. 13.7 to 40 metres, and B.C. 1600 to 550 k.c.
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"The Coil People" lead in the use of Trolitul insulating material just as they lead in every other worthwhile coil development. Trolitul ensures high "Q," maximum sensitivity and selectivity — to be sure of really successful results you MUST use R.C.S. Trolitul coils and components.

R.C.S. TROLITUL MIDGET CONDENSERS

R.C.S. Midget Condensers are made in two types, using Trolitul supports, thus guaranteeing practically no loss.

M.C. Type

The 14-plate equals old style 23-plate capacity. The M.C. type may be ganged.

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The new R.C.S. permeability-tuned I.F.'s are wound on special Trolitul formers into which are 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.

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IF163 2nd 13/9

When three I.F.'s are used:
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IF164 2nd 13/9
IF163 3rd .. 13/9
465 K.C. I.F.'s
IF166 1st 7/6
IF167 2nd .. 7/6
Air Core 175 K.C.
1E68 1st 7/6
1E69 2nd 7/6
IF162
465 K.C. I.F.'s

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ADDING A.V.C. TO "LITTLE COMPANION"

THE little dual-wave mantel model, which we described in our March issue under the title of "Little Companion," has proved a most popular little job.

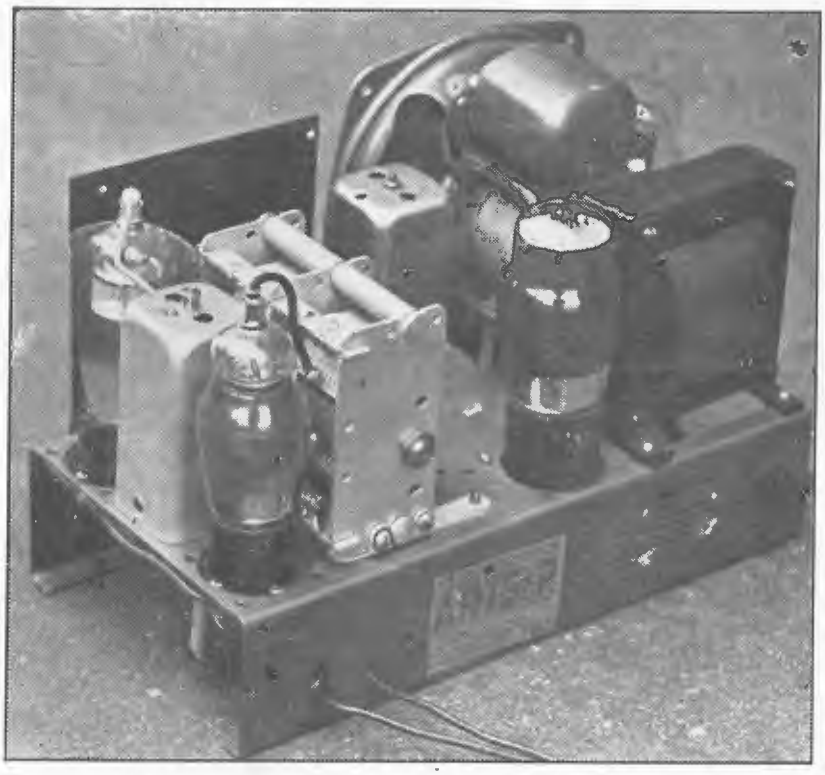
Doubtless a big factor in this popularity was the marketing methods, the complete kit being readily available as a unit, thereby saving the shopping difficulties which are sometimes encountered in these difficult times.

However, the little set had plenty of other attractions, being a neat little job in every way and yet capable of splendid performances on both broadcast and short-wave bands.

Just one minor trifle has come in for a little criticism, the absence of automatic volume control. Fortunately there is little difficulty in fitting this refinement and so in response to numerous requests, here are a few words about adding a.v.c.

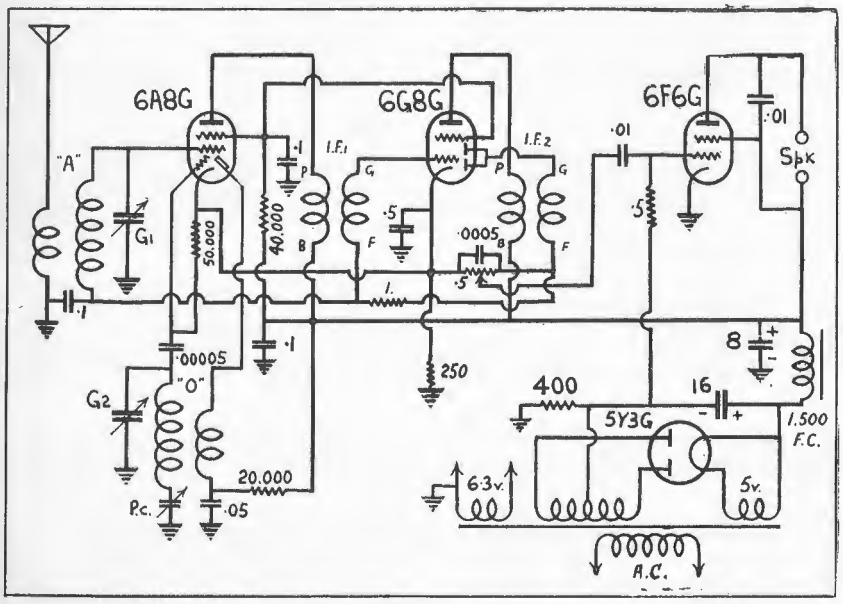
When it comes to playing local stations, there is little need of a.v.c., the stations all having signal strength of about the same level, and there is seldom any question of fading until the signal has travelled at least a hundred miles.

On the short-wave band, however, the automatic volume control feature is really worth while, bringing all stations up to approximately the same strength, provided they are within range. Should the strength vary with fading, the a.v.c. will do its utmost to hold the signal steady.



The original "Little Companion."

Of course there is no actual increase in the effective sensitivity of the receiver, so that in cases where the signal fades to a low level, the automatic volume control can only do its best to hold the signal.



The modified circuit.

Parts Required

The only extra parts required are: A .5 megohm volume control potentiometer; a 1 megohm 1-watt resistor; and a .1 mfd. tubular condenser.

These are fitted as shown in the amended circuit diagram herewith, the bulk of the circuit arrangement remaining without any modification.

The Manual Control

The manual volume control can be retained as a sensitivity control, the actual potentiometer being moved to the back of the chassis, where the control can be set to give best results and then left in this position.

A sensitivity control of this type is handy to make certain of stability as any tendency towards oscillation can be checked by using this control to steady down the overall gain of the set. Later, in the course of months, maybe the valves will be settling down a bit, when it may be found possible to again advance the stability control and thereby bring the sensitivity back to maximum.

On the other hand, those who want

(Continued on page 26)

STRANGE THEORIES AND FACTS

Sidebands

If we comment upon the lack of "life" in the reproduction from a super-selective set we immediately get the cry: "The sidebands are cut." What are the sidebands? Are they something real or just an excuse for poor tone? Let us first consider the facts: If selectivity of a receiver is too great, the higher A.F.'s of a modulated wave are attenuated though not completely lost.

Mathematicians explained the fact thus: A wave modulated at a certain A.F. is equivalent to the sum of two waves one of which has a frequency lower than the original by the particular A.F., the other having its frequency increased by the same amount. The waves modulated at highest frequencies are then equivalent to two other waves which, being away from the original frequency, are chopped off in a selective receiver. Note the words "equivalent to." Now, according to this theory, at 100 per cent. modulation or when the high A.F. transmitted is **loudest**, the entire original wave is destroyed and is completely replaced by these two waves (or side-bands) so that if a very selective receiver is used, it should receive very **little** when the original signal is completely modulated at high A.F. But does it?

By —

JOHN W. STRAEDE

B.Sc., A.M.I.R.E.

7 Adeline Street, Preston, Victoria

This diagram shows the manner in which modulation practically disappears if the damping is low.

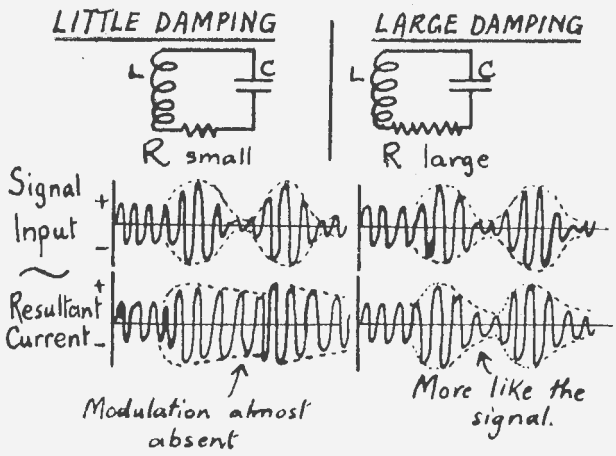


FIG. 1. EFFECT OF DAMPING.

Now for a different explanation: What really happens in a super-selective receiver is this: If a circuit is very lightly "damped" by resistance, then any oscillation tends to keep on going. If a rapidly-modulated signal is being received, the modulation or "increasing-and-decreasing" of the oscillation does not occur — the oscillation builds up to a maximum and stays there so that the modulated signal has been replaced by an unmodulated one. (According to the sideband cutting theory, it's just wiped out). But all tuned circuits have some resistance, so the modulation remains to a certain extent (see Fig. 1). The attenuation can be compensated for by various types of high-boost circuit as in the "Stenode" or "Radiostat" circuit invented by Dr. James Robinson. A block diagram of this circuit is shown in Fig. 2 and in Fig. 3 is a circuit to correct for the high-note attenuation due to selective tuning circuits.

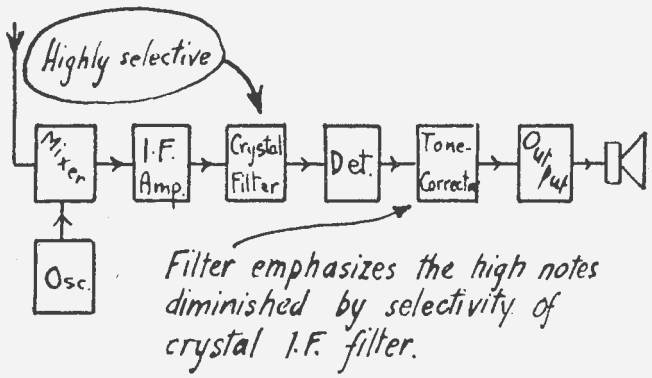


Diagram to illustrate the theory of the "Stenode" and other circuits featuring tone correction.

FIG. 2. BLOCK DIAGRAM OF STENODE.

Output Curves

Sales managers once discovered that amplifiers could be more easily sold if supplied with a graph made by ruling a straight horizontal line on a sheet of graph paper.

When public opinion became too strong, the vertical axis of the graph was labelled "db" and the horizontal axes "cycles." To add conviction, the straight line was given a very slight bump at each end and a tail (also at each end). Most of these output curves are now honestly obtained, but are **no guide whatever** to the tone of the sound to be obtained from the speaker. Very often the amplifier with the straightest graph has the dullest tone. Why?

The answer is: The graphs are voltage-frequency response curves. What really counts is not the voltage across the loudspeaker, but the power supplied to it. Apply plenty of inverse feedback (voltage) to a beam or pentode and you get a beautifully straight voltage-frequency graph. The brilliance, however, has departed. If you must use a terrific amount of inverse feedback, then use part voltage feedback and part current feedback. Back to the curves: The voltage

shown may be across a resistive load, across the primary of the usual speaker transformer or across the voice coil. If the impedance-frequency relation of the voice coil and the efficiency-frequency graph of the speaker were known, then an idea could be obtained of the real acoustic power/frequency response.

Microphone Response and Level Ratings

Recently I was asked about the Shure crystal "mike" I generally use, and was rash enough to state that I didn't know what its response curve was like and that all I cared about was: "It sounds nice." I was then promptly attacked by enthusiasts whose microphones were "+ or — 2db from 30 to 30,000 cycles" (They meant "within + or —," and "cycles per second" or "hertz.")

Now such a statement is meaningless. The load on a microphone affects its frequency response, the nature of the response change depending on the type of microphone. An increased load (due to a decreased load resistance) causes a bass-loss with capacity microphones such as condenser and crystal types and a high note-loss with inductive microphones such as dynamic and ribbon types.

Another factor affecting frequency response is the angle at which sound arrives at the microphone. Figure 4 shows the effect of angle on frequency for a dynamic microphone while Fig. 5 shows a crystal microphone with a .25 meg. load to give bass suppression on speech and a 5 meg. load to give full bass for the reproduction of music.

Microphone output levels are probably the most meaningless of all published data. A microphone may be labelled "—55 db," but it is not stated which of three or four standard reference levels it is 55 db. below, what acoustic power is being supplied to the microphone or what the

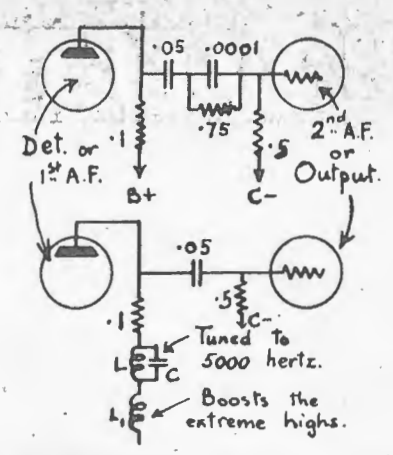


FIG. 3. CIRCUITS TO COMPENSATE FOR "SIDE-BAND CUTTING" (sic.).

peak air pressure generated by the sound of the microphone is, what the load on the microphone is or what frequency. A really complete specification might read: — 55 db below 1 volt per bar with 1 megohm load, at a frequency of 400 hertz. (The "bar" is a unit of air pressure —"hertz" means "cycles per second" and is the unit of frequency.)

Amplifier Gain in Decibels

The "decibel" is a ratio of one power to another. Because power often varies as the square of a voltage, engineers have come to compare voltages in decibels. So far, so good. The trouble starts when voltages are compared with powers. An "amplifier" is a voltage operated device but has a power output. Some manufacturers publish statements such as "120 db gain from microphone to speaker." That only means that the output power is one billion times the input **power.** But the input power depends on the grid resistor of the first tube and is no guide to the **voltage** required. By having a large grid re-

(Continued on page 9)

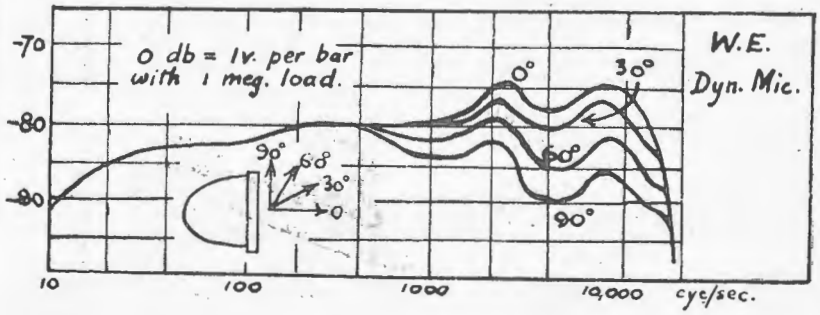
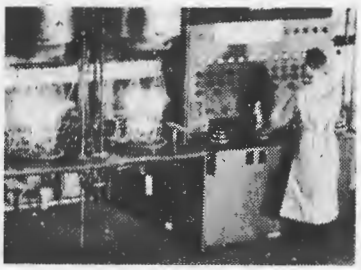


FIG. 4. EFFECT of ANGLE on MICROPHONE RESPONSE.

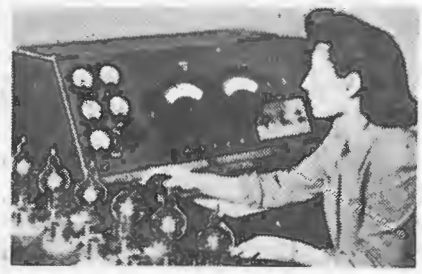
ELECTRONS IN ACTION!

With the aid of this Electron Microscope, one can actually observe the action of electrons being emitted from a heated filament. Like a moving picture, the emission characteristics of a filament are projected on a lens-like screen. Observations, thus made, enable Eimac engineers to maintain the enviable record of dependability and superior performance enjoyed by Eimac valves.

Before filament assemblies are sealed into the valves they are placed under a temporary vacuum and heated to much higher temperatures than normal. This vital test enables technicians to weed out faulty parts before valve is actually pumped.



Hard vacuum is essential to preserve peak filament emission. Special pumps are built in the Eimac laboratories to fit the exact requirements of Eimac valves. During the pumping process, plate dissipation is run up to ten times normal. Valves that cannot stand this abuse never leave the factory.



Here is a special Emission Tester which enables laboratory men to ascertain the actual performance capabilities of filaments after the valves are completed. Under this test filaments are made to perform much more difficult tasks than could possibly be required under normal operating conditions.

MAXIMUM FILAMENT EMISSION ASSURED IN EIMAC VALVES

All Eimac valves are unconditionally guaranteed against valve failures resulting from gas released internally. No other valve carries such a guarantee. This guarantee plus the fact that leading engineers throughout the world use and recommend them provides ample reasons for you to consider Eimac valves for your application.

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Eimac's unusual performance capabilities are receiving the enthusiastic acceptance in all branches of the service ARMY, NAVY, AIR CORPS.

EIMAC 450T

(In use by practically every major airline in the U. S. A.!)

Filament Voltage	7.5 to 7.7 Volts
Filament Current (approx.) . . .	12 Amperes
Maximum Plate Voltage	6000 Volts
Continuous Plate Dissipation . .	450 Watts
Power output at 75% efficiency	1350 Watts

Foreign Division: FRAZAR & CO., LTD., 301 Clay Street, San Francisco, California, U. S. A.

STRANGE THEORIES

(Continued from page 7)

sistor for the first tube, the power supplied is very minute and the power gain in db. is very high.

In Figure 6 are shown two circuits each of the same sensitivity, that is, giving the same power output for the same input voltage. The power gains are quite different and the one with the larger value of grid resistor has a more impressive "gain in db." figure!

The best way to rate amplifier gain would be the same as for output valve sensitivity. After all, the simplest type of amplifier is just an output valve! Either "watts output per (microvolt)^2" or " microvolts required for one watt input" would be satisfactory.

High Fidelity

The best receivers on the Australian market (and probably on any market) give a reproduction that, from a scientific viewpoint, is far from the original but which is, nevertheless, pleasant to listen to. Is reality desired? Many a brass band or screeching singer sounds better if some of the highs-and-harmonics are eliminated.

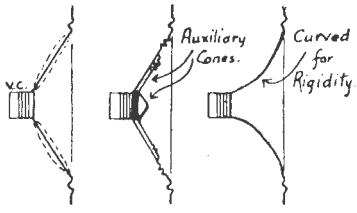

FIG. 7. SECTIONS of SPEAKER CONES
Dotted Lines indicate Vibration possible with straight-sided cones.

Receivers with a frequency range greater than usual are termed high-fidelity, but an extended frequency range does not mean more pleasant listening. Very often the reverse.

Frequency distortion is the least objectionable of all types — a restricted frequency range actually compensates for some other types of distortion. Any DX enthusiast knows the reduction of noise that is obtained when the tone-control is turned to the "bass" (high- note loss) position. Public Address specialists use bass-suppression to make speech more intelligible.

The worst type of distortion is undoubtedly "harmonic" or amplitude" distortion and is overcome only by using output valves of high power and efficient speakers (so that the output valves are not driven to the limit).

American "hi-fi" circuit designers appear to be unanimous on four points: accurate tuning, ample power, inverse feedback and a "super" speaker. To reduce resonances in the speaker cone itself, auxiliary cones may be added or the cone may be curved-sided instead of straight-sided (see Figure 7).

Australian designers are not so fond of the words "High Fidelity" but employ the same principles, though to a lesser extent. The H.M.V. Model 425 was a good example of "hi-fi" Australian design.

The circuit embodies high output, inverse feedback, special I.F. transformer design to give sufficient damping, fully energized speaker. A 6U5 tuning indicator is provided.

Popular Misconceptions

"My set has a 12-inch speaker, so I get good bass." An efficient well-energized 8-inch speaker is far better than a larger one with low field excitation and of low efficiency. It's the performance that counts. A large, under-energized speaker may seem to accentuate bass because of resonance and distortion making the bass more noticeable.

Class A operation is better than class AB1. Is it? With class AB1 the reserve power is greater, resulting in lower distortion on peaks and transients, the valves are usually working under easier conditions most of the time, and grid current distortion is less likely.

What is the definition of a class B amplifier? In answer to a question, a certain American magazine stated: "A linear class B amplifier is one in which the output power is proportional to the square of the input voltage." Unfortunately, many people got the idea that this was a definition of class B. It isn't. It's a definition of "linear." Actually a class B amplifier is one that is biassed practically to cut-off.

Just to conclude: Have you heard of the jewel-wave receivers (jewelled in every wave)?

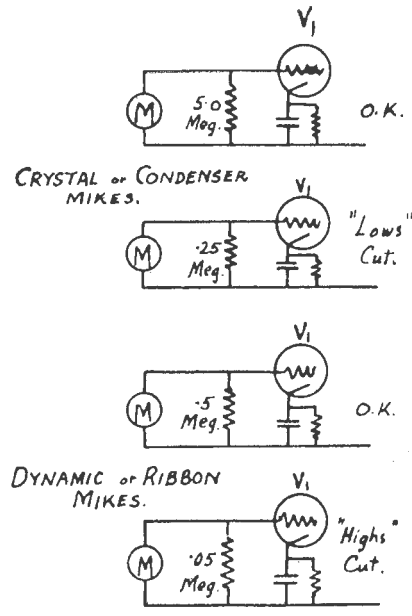

FIG. 5. MICROPHONE LOAD AFFECTS THE RESPONSE.

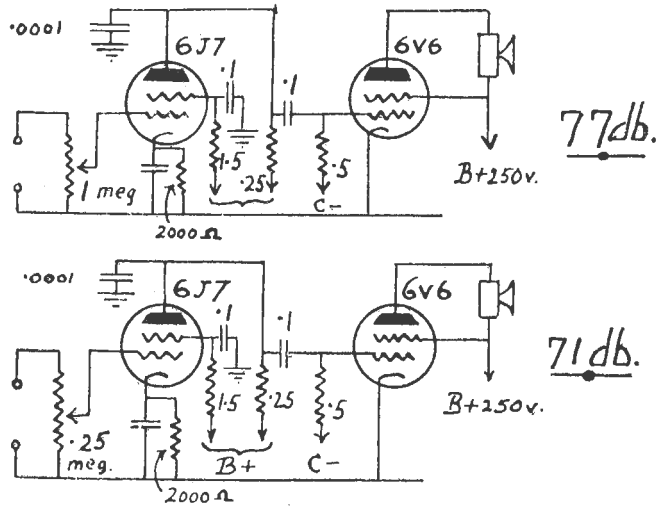

FIG. 6. SIMPLE AMPLIFIER CIRCUITS.
Same amplification but different "gain in db".

THE ALIGNMENT OF MODERN RECEIVERS

MANY volumes have been written on this subject, both from a technical and a serviceman's viewpoint, and justly, because improper alignment is one of the most common ailments encountered in service work to-day, especially in receivers of the all-wave type. Many servicemen are somewhat afraid to make adjustments on receivers, as long as the set plays at all, because they are not familiar with the various functions and workings of modern receivers. This article is intended to help clarify to the serviceman who wishes to learn the why of such adjustments, how the various radio frequency circuits of a radio receiver function, and how to make practical adjustments necessary in order to restore a set to its original factory performance and efficiency.

A vitally important part of a radio receiver is the small compensating condenser used to make adjustments of the various tuned circuits. These small adjustable condensers, usually called padders or trimmers, are constructed in various ways. They usually consist of two or more plates insulated from each other, one plate being made of spring material, so it will hold the adjustment or spacing given it by means of turning a screw or nut.

These condensers are used to obtain fine adjustment of the tuned circuits, so that they may be completely in resonance and perform at their highest efficiency. Since it is commercially impractical to construct coils or tuning condensers which would be accurate at every point on the dial, these trimmer condensers are placed across them so as to provide an accurate and easy means of making each circuit resonate at the proper dial position.

T.R.F. Receivers

In a tuned radio frequency type of receiver the adjustments of these padders are usually made at the high frequency end of the dial using a signal generator or a station as a signal source, and adjusting the trimmers until maximum output is obtained. In some of the older type receivers, where the tuning coils were not properly impregnated, they absorbed moisture through exposure, which causes considerable losses or reduces their Q, and appreciably reduces the already none too abundant selectivity. Replacement or a baking and re-impregnating process is recommended for such cases before adjusting the trimmers.

Selected from the "N.Z. Radiogram" on account of its comprehensive coverage, this article should clear up all points of this important subject.

In some of the older sets not using screen grid tubes, it is necessary to neutralise the circuits to prevent oscillations or howling, before the resonant circuit trimmer condensers are adjusted. Neutralisation was usually accomplished by means of small trimmer type condensers, which served to compensate for the grid to plate energy transfer due to the grid to plate capacity of the triode tubes then used.

Superheterodynes

The modern superheterodyne is considerably more complicated than these older type receivers and a brief review of the elementary theory involved in this type of receiver is necessary, so that the importance of making accurate adjustments on these receivers may be more fully appreciated. In this type of receiver circuit, the incoming R.F. signal is usually impressed across the primary of an antenna coil. The antenna coils' secondary is tuned over the desired frequency range by a variable condenser, which in turn is adjusted by means of the trimmer condenser connected across it. The signal usually goes from there into the grid of the first tube. In smaller sets the tube may be a detector oscillator or in larger sets it may be the first R.F. tube. In other cases, the signal may be fed from the first coil into another coil which is also tuned over the range by a condenser across it. This is commonly called a band pass filter type circuit. The signal then goes to the first tube. In the circuits having a combination detector oscillator tube, the incoming signal is mixed with the local oscillator signal producing a beat note, or the frequency difference between the incoming R.F. signal and the local oscillator signal.

Some of the larger sets employ a separate oscillator tube and a separate first detector tube. In such cases, the oscillator tube generates the oscillator signal frequency which is combined with the R.F. signal in the first detector or modulator tube. In both cases the two frequencies are mixed in the first detector tube, so as to produce another frequency, which is the difference between the two. When the circuits are operating correctly, this frequency difference is equal to the intermediate frequency (I.F.) of the set. The local oscillator and the R.F. sections of the set are both tuned by means of variable condensers and the circuits are so adjusted that the beat note produced by the mixing of the two frequencies is always equal to the I.F. frequency of the set throughout their tuning range.

Commercial Design

Commercial design uses an oscillator frequency higher than the incoming R.F. signal, because it is more economical to build a set with less capacity and inductance (required to produce the higher osc. frequency) than when it is lower, requiring more capacity and inductance. Capacity and inductance values when higher oscillator frequencies are employed, are much lower than would be required if the oscillator frequency were lower than the incoming frequency (R.F.). When a gang type tuning condenser is employed this requires that the capacity of the oscillator section be less than that of the R.F. sections. Commercially, this is done by either making all condenser sections alike and inserting a small padder type condenser in series with the oscillator section capacity across the oscillator coil, or by using a cut plate type oscillator section, which has the required reduced capacity. In either case, a small trimmer condenser is also connected across the oscillator condenser so as to correctly adjust the minimum capacity of the combination or adjust the highest frequency end of the oscillator range.

The Intermediate Frequency

The signal resulting from the mixing of the incoming R.F. signal and the local oscillator is fed into the intermediate frequency amplifier. The first I.F. transformer serves to couple the output from the first detector into the grid circuit of the first I.F. amplifier tube. The signal is amplified by this tube and then passes through a second I.F. transformer, which may feed it into a second I.F. tube or the second detector tube, depending on the size of the set. I.F. transformers are designed so that their natural resonant frequency is approximately the required I.F. frequency. In order to obtain maximum selectivity and sensitivity, both their primaries and secondaries are tuned to the exact I.F. frequency of the set by means of trimmer condensers.

The advantages of this system are: that since it is easier to design an amplifier for lower frequencies, an I.F. amplifier can be designed to operate at one fixed frequency much more efficiently, resulting in far higher amplifications and increased sensitivity and selectivity than an amplifier designed to operate at higher frequencies and over a wide frequency range.

Adjusting Compensating Condensers

Adjustment of these condensers should be made when the set lacks selectivity or sensitivity after other possible sources of this trouble have been checked and eliminated; such as weak tubes, poor aerial, improper tube voltages, etc.

I.F. Alignment

The I. F. trimmer condensers should be adjusted before the R.F. section is adjusted. This is best done by using a signal generator with an audio modulated signal tuned to the exact I.F. frequency of the set. The signal from the generator is fed into the grid of the first detector tube. In some cases it is desirable to "kill" the local set oscillator by placing a bypass condenser across the oscillator section of the tuning condenser to eliminate any erroneous beats which may be produced. An output meter should be connected from the plate

(Continued on next page)

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(Continued from page 11)

of the last audio tube to ground or from plate to plate in case of push pull output.

If one owns a meter of sufficient sensitivity, it may be connected across the voice coil of the set. Sets using automatic volume control should be adjusted either by **reducing the signal output of the service oscillator** to a point where the **A.V.C. does not function,** and using the output meter, or by inserting a milliameter in series with the load resistor in the A.V.C. network or connecting a vacuum tube voltage across the A.V.C. network, so as to read the A.V.C. voltage developed.

If the set is provided with a resonance indicator such as the "Shadow Meter" or cathode ray "Magic Eye" this will provide an excellent indicator for adjustment purposes. After having made suitable provision for indicating resonance, the I.F. trimmer condensers should be adjusted for maximum output, or so as to tune the I.F. circuits to their exact resonant frequency.

A signal generator should always be used for aligning the I.F. transformers. If a station signal is used one is apt to get the entire I.F. system "off" frequency, although it may be set for maximum output thus causing poor tracking of the oscillator and R circuits, producing dead spots on the dial and in most cases whistles and birdies. In high fidelity sets where the fidelity is variable, it is usually advisable to set the fidelity control to the low fidelity or sharp tuning position of the I.F. circuits, and adjust the I.F. trimmers so as to produce an overall I.F. tuning curve with a "flat top." Possibly the most accurate method and easiest of adjusting such high fidelity sets is to use a cathode ray tube in conjunction with a frequency modulated test oscillator, so as to reproduce the entire tuning curve of the I.F. system on the screen of the screen of the tube. However, this is a subject requiring volumes for satisfactory explanation, and cannot be included in this article. Sets which are equipped with automatic frequency control should be adjusted with the A.F.C. control turned off.

After these adjustments have been made, the I.F. system of the set will respond to a signal which is exactly equal to a frequency for which the circuit has been adjusted.

In many modern superheterodynes, a wave trap is provided in series with the antenna circuit which is tuned to the I.F. frequency of the set, so as to prevent any unwanted signals of this frequency from entering the set and getting to the first detector and coming on through the I.F. system. The proper adjustment of such a wave trap is to connect the signal generator to the antenna post of the set and then adjust it to the I.F. frequency. Then turn the generator to maximum output. The trimmer condenser across the wave trap should be adjusted until minimum response is obtained in the output of the set.

R.F. Alignment

After the I.F. section of the set has been aligned to the proper frequency, the next job is to align the R.F. and oscillator sections. Compensating or trimmer condensers are connected across the R.F. and oscillator coils in order to provide a means of accurately adjusting these circuits.

The test oscillator should be connected to the antenna and ground terminals of the set and adjusted for a frequency close to the highest frequency portion of the range being adjusted. On the broadcast band, the adjustment is usually made at 1400 kc. The trimmer condenser provided across the oscillator condenser is for the purpose of making the oscillator track at the high frequency end of the dial.

For instance, in a superheterodyne with an I.F. frequency of 465 kc., when the R.F. sections are tuned to 1400 kc., the oscillator must oscillate at 1400 kc. plus 465 kc. or 1865 kc.

This frequency difference must be maintained between the oscillator and R.F. sections throughout the tuning range of the set. In order to maintain this frequency difference at the low frequency end of the dial, there is a compensating condenser placed in series with the oscillator gang.

On broadcast, this adjustment is usually made at 600 kc. If the R.F. is set at 600 kc., a set with a 465 kc. I.F. would have the oscillator oscillating at 600 kc. plus 465 kc, or 1065 kc. Therefore, the high and low frequency padders provide the necessary tracking adjustments for two points on the dial.

Modern receivers are designed for three point tracking for instance, on the broadcast band at 1400 kc., 9000 kc., and 600 kc. The tracking at the **third point, or 900 kc.,** is determined by the **oscillator coil inductance.** Although this is entirely a matter of set design, occasionally a serviceman gets a set in which oscillator inductance trouble is suspected and in which case he usually tries to obtain a new one. Unfortunately, however, they are sometimes unobtainable at any price, so the only choice he has is to repair the one available.

Tracking Oscillator Coil with R.F. Coils

First, the local set oscillator should be killed by shunting bypass condenser across the oscillating gang section, and the set operated as a T.R.F. set and the dial calibration checked at several points across the band. The R.F. should be adjusted so that the dial corresponds as nearly as possible with the R.F. tuning. Also, the extreme ends of the range should be noted. Say that they are 1500 kc. and 550 kc.

Second, connect the test oscillator so that it will beat with the local set oscillator into the first detector.

Next Month:

An article dealing with every aspect of instability is due to appear in next month's issue. Order your copy now.

The R.F. tubes should be taken out so as to prevent any unwanted signal coming through. A pair of bypassed ear phones in the oscillator plate or first detector plate circuit will allow one to detect the beat between the two oscillators. Then set the dial exactly to the previously noted high position, say, 1500 kc., and set the test oscillator to 1965 kc. (I.F. frequency equals 465 kc. plus R.F. frequency). Then adjust the high frequency padder so that the local oscillator comes to zero beat with the test oscillator. Repeat the same performance at the low frequency end, setting the dial at exactly 550 kc., and the test oscillator to 1015 kc. Then adjust the series padder so that the local oscillator comes to zero beat with the test oscillator.

Third, set the dial to 900 kc. and determine what frequency the set oscillator now has by beating it against the test oscillator. It should be 1365 kc. If it is above this, the inductance of the oscillator coil is too low. If it is below this value, the inductance is too high. Turns are added to increase the inductance and taken off to decrease it, one turn being a large amount unless the frequency discrepancy is extremely large. The easiest way of increasing the coil inductance is to arrange a piece of radio frequency iron on a screw, so as to move it up into the coil, or if the inductance is already too high, arrange a copper penny in similar fashion, in this manner, the coil inductance may be adjusted "on the nose" so as to make the oscillator's frequency 1365 kc. when the dial is set at 900 kc.

Fourth, after the midpoint has been made to coincide, the set should again be operated as a super and the padding and trimming of the local oscillator completed or redone at 600 and 1400 kc.

This method is not perfect, since changing the inductance to make it coincide at 900 kc. changes the other two points but by working back and forth a fairly good job can be done of tracking the oscillator with the R.F. and the dial and a great improvement can be made in the sensitivity and reduction of squeals over the entire band.

Adjustments of R. F. Circuits in All-wave Receivers

Adjustment of all-wave receivers is somewhat more involved than a broadcast band receiver due to the multiplicity of circuits involved and consequent increase in number of necessary adjustments. Before adjusting any all-wave set, it is good practice to allow the set to warm up for approximately 30 minutes to allow for thermal expansion of the parts.

Each band of an all-wave receiver must be adjusted separately in the same fashion as an ordinary broadcast receiver is adusted; that is, connect the signal generator to the set's

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(Continued from previous page)

antenna and ground (usually doublet antenna-equipped sets should have the two antenna posts connected together), and adjust the generator to some frequency near the high frequency portion of the band. Note: In some cases it is extremely important that a dummy antenna be provided as recommended by the manufacturer. This is usually a carbon resistor and a small condenser.

Then the oscillator trimmer (shunt) condenser should be adjusted until the generator's signal comes in at the desired point on the dial. Incidentally, it is extremely important that the oscillator trimmer be adjusted to the fundamental and not the image frequency. This can be assured by backing the trimmer screw entirely out, then slowly turning it in, until a maximum peak occurs. Turning the condenser slightly beyond this point will bring in another peak somewhat weaker than the first which is the image frequency.

Another check is to set the trimmer on the fundamental and leaving the generator at the same frequency, rotate the gang condenser to a lower frequency position until the image signal is heard. This signal should be lower in frequency than the generator frequency by twice the value of the set's I.F. frequency.

Double responses or image interference is due to a lack of R.F. selectivity before the first detector tube, and is especially noticeable in the higher frequency bands. Very few manufacturers use more than one tuned R.F. stage ahead of the first detector on their high frequency bands, and some do not use any.

After the oscillator has been adjusted, the R.F. trimmers for the band being adjusted should be adjusted for maximum output. Then if there is a low frequency oscillator padder for the band concerned, it should be adjusted so as to make some known signal generator frequency near the low frequency end of the band come in at the correct dial setting.

Each band is adjusted in the same manner until the R.F. section of the set is completely adjusted. In some all-wave sets, the circuit arrangement is such that there is an interlocking of adjustments between bands. In this case, the highest frequency band must be adjusted first, the next highest frequency band, and so on, until all bands have been adjusted, unless otherwise recommended by the set manufacturer.

Adjusting the Signal Generator

Most generators have compensating condensers which can be adjusted to correct for any shifting of calibration that may have occurred. Their adjustment is simple, since it only involves:

First, tuning in a broadcast station near the high frequency portion of the generator's band.

Second, connecting the generator to the antenna of the set and beating it against the station.

Third, adjusting the generator's compensating condenser until the dial reading obtained on the generator at zero beat corresponds with the known station frequency.

Fourth, repeating the same process for some known station frequency near the low frequency end of the generator's dial and adjusting the series padder condenser until zero beat is obtained between the station and the generator, until the calibration of the generator corresponds to the known station frequency.

Some signal generators are not provided with a means of making their generated frequency track with the dial at the low frequency ends of the various bands. In such cases, nearly perfect tracking can be effected by arranging a means of varying the inductance of the oscillator coil. If the inductance is too high, it can be lowered by moving a copper penny on a screw into the coil, or if it is too low, by moving a piece of R.F. iron on a screw into the coil. There is probably nothing more time-wasting in adjusting a set, than attempting to correctly adjust it with a generator whose dial calibration is incorrect.

VOLTS, AMPERES AND OHMS

IN last month's article it was explained how a current of electricity flowing through a conductor is merely a drift of electrons moving through the conductor under the influence of an electric field set up by a battery.

Thus, a wire carrying a current of electricity can be likened to a hose-pipe carrying water, where the molecules correspond to the moving electrons in the conductor.

Electrons are so tiny, however, that a measure of electric current in terms of them would be impracticable, so a much larger unit, the ampere, is used. To show how tiny the electron really is, nearly 10^{19} (ten million, million million) of them should flow past a point in one second to represent a current of one ampere.

Last month, we saw that to start or maintain an electric current, some form of driving force is necessary, just as pressure is required to drive water through a hose-pipe. This electrical driving force is called an electromotive force (E.M.F.).

FIG. 2

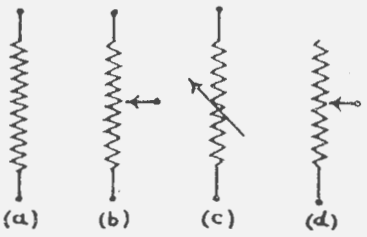


FIG. 3

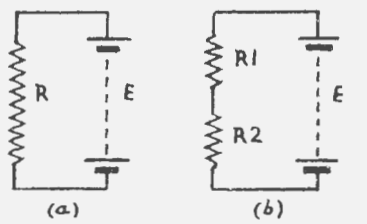
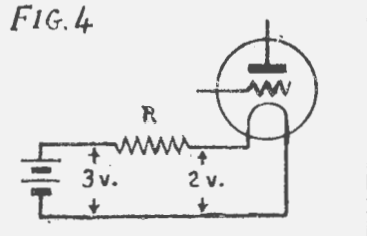


FIG. 4



In the case of a simple conductor this force is utilised in forcing the stream of electrons through the conductor against the resisting force opposing their transfer from one atom to the next. It is this resisting force which constitutes the resistance of the conductor.

Resistance depends on the length of the conductor, the material of which it is made, its cross-sectional area, and to some extent, its temperature. Resistance can be merely an incidental property of a conductor, or it can be deliberately inserted in the path of the current for a special reason, as is often done in radio.

A poor conducting material has a high resistance; so it is quite easy to choose a suitable material and insert it in a circuit so that it impedes the flow of current.

Amperes, Volts and Ohms

The practical unit of current is the ampere, which is not a quantity of electricity, as so often imagined, but a rate of flow. In other words, in the hose-pipe analogy mentioned above, the equivalent of the ampere is not the gallon, but gallons per second, or rate of flow.

Part 1 of this series was in the April issue.

The electrical quantity corresponding to the gallon is the coulomb, and a flow of one coulomb per second is one ampere.

The unit of voltage is the volt, which is the electrical difference of potential required to cause a current of one ampere to flow in a circuit having one ohm resistance. The ohm, by the way, is the unit of resistance.

Factors Governing Current Flow

The number of amperes that flow round a circuit when a given electromotive force is applied is controlled by the resistance of that circuit. That is to say, if the circuit has a low resistance, a smaller voltage will be needed to force a given current along the wire than if the circuit had a high resistance.

Hence, voltage, resistance and current are closely inter-related, and any one of them can be calculated, provided the other two are known. The law connecting the three is known as Ohm's law, named after Professor Ohm, a noted early electrical pioneer.

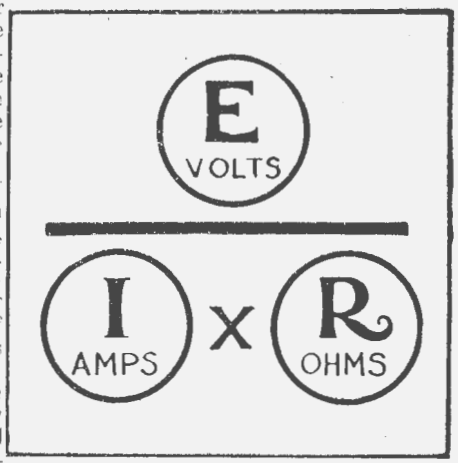


Fig. 1.— As explained in the text, this sketch will be found very handy for working out Ohm's Law problems.

It is a very simple law, but a sound working knowledge of its applications is essential to anybody studying radio.

Ohm's Law Explained

Stated simply, Ohm's law says that the current in amperes is equal to the electro-motive force (pressure in volts). It is usually expressed in the form $I = \frac{E}{R}$, where I stands for current (in amperes), E for electromotive force (in volts), and R for resistance (in ohms).

The law can be expressed in three ways, namely $I = \frac{E}{R}$ amperes; $R = \frac{E}{I}$ ohms, and $E = IR$ volts, enabling any one of the three quantities to be found when the other two are known.

The sketch on this page (Fig. 1) will be found very handy for working out Ohm's law problems. To use it, cover up with a finger the letter representing the unknown, and the way to deal with the other two quantities will be revealed.

Thus by covering up E, I and R are left together and should be multiplied to obtain the result. If I is covered, then it becomes obvious that E should be divided by R.

How Resistances Are Drawn

A zig-zag line is used to depict all kinds of resistances, minor variations being added to differentiate between various types.

Fig. 2 (a) shows the way an ordin-

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ary fixed resistance is represented, while the symbol for a potentiometer, which is a special kind of variable resistance, is illustrated in Fig. 2 (b). An ordinary kind of variable resistance such as a rheostat is indicated in Fig. 2(c). An alternative way of indicating a variable resistance is to use the potentiometer symbol, but omitting the connection at one end, as shown in Fig. 2 (d).

The symbol for a battery of any kind was described and illustrated last month, so the meaning of Fig. 3(a) now becomes apparent. It shows a resistance R connected across a battery of voltage E.

Some Practical Eamples

If the resistance R, which will be taken as representing the entire resistance in the circuit, has a value of 500 ohms, and the voltage E of the battery is 100 volts, then the current that flows through the resistance can be found from Ohm's law. From the formula $I = \frac{E}{R}$, we obtain $I = \frac{100}{500}$ = 1/5 or .2 ampere.

Ohm's law is particularly useful in radio for working out the voltages which are developed across resistances. In Fig. 3(b) is shown a battery of E volts, across which are connected two separate resistances, R1 and R2, which we will assume have values of 600 and 400 ohms respectively.

The current flowing through both resistances will be the same. If the voltage E equals 100 volts, the current I will be $\frac{100}{600 + 400}$ = .1 ampere

Now, to find out the voltage dropped across either resistance, all that is necessary is to multiply the resistance in question by this current. Thus, 60 volts are dropped across R1 and 40 across R2, giving a total drop equal to the battery voltage.

In radio, it is often necessary to reduce voltage available to a value required. For example, if the filament of a 2-volt valve is to be supplied by two 1½-volt cells connected in series, making 3 volts, a resistance has to be inserted to drop one volt, as shown in Fig. 4. If the filament current is .1 ampere, then from the formula $R = \frac{E}{I}$ we find that $R = \frac{1}{.1}$ = 10 ohms.

Some Common Prefixes

In radio, it often happens that in the one calculation one unit is being considered in thousands and even millions, while the same problem may

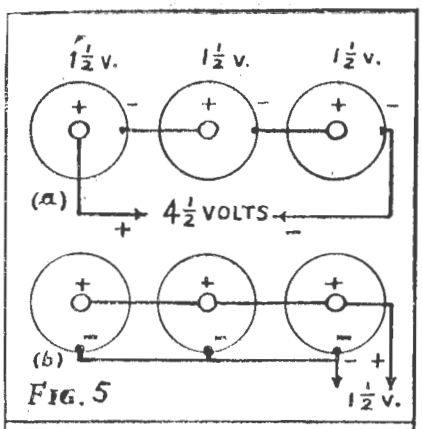


FIG. 5

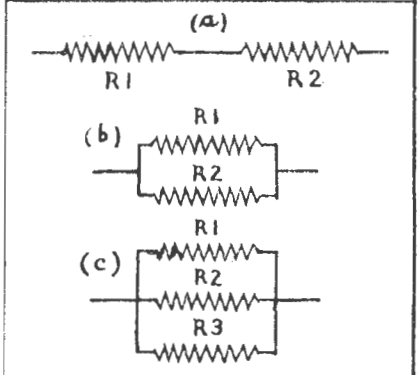


FIG. 6

involve only a one-millionth part of another unit. To overcome this apparent difficulty in the tremendous range of quantities, prefixes are used.

To reduce the unit to a smaller dimension, we have —

Milli = one thousandth

Micro = one millionth

Thus one milliampere is one thousandth of an ampere, and to convert the latter to the former it should be multiplied by 1000. For example, .03 ampere equals 30 milliamperes. Similarly .02 volt equals 20 milli-volts, or 20,000 microvolts.

To increase the unit to a larger dimension we have —

Kilo means 1000.

Meg (or mega) means 1,000,000. Thus, one megohm is one million ohms, and 500 kilocycles equal 500,000 cycles.

Series and Parallel Connections

Last month it was explained that when any number of cells are connected together, positive of one to negative of the next and so on, then the voltage between the free positive and negative terminals is equal to the voltage of each cell multiplied by the number of cells. This is illustrated in Fig. 5(b). Cells, or in fact anything at all, so linked are said to be connected in series.

There is also another type of connection equally widely used in radio — the parallel connection. To link cells in this way, all the positive terminals are connected together, and all the negative, as shown in Fig. 5(b). The voltage of the combination is not increased, but the advantage of this connection is that the current drain that can be taken from cells so joined is equal to the maximum drain that can be taken with safety from one cell, multiplied by the number of cells. For example, if .5 ampere can be taken from one of the cells shown in Fig. 5(b) without overloading it, then 1.5 amperes can be taken with safety from the three joined in parallel.

Resistances in Series and Parallel

Fig. 6(a) shows a pair of resistors connected in series, and Fig. 6(b) shows the parallel connection.

As with cells, when two or more resistors are connected in series, the total resistance of the combination is equal to the sum of the separate resistors. For example, if R_1 in Fig. 6(a) has a value of 600 ohms and R_2 400 ohms, the total resistance is 1000 ohms.

With any number of resistors connected in parallel, the total resistance is always less than that of the smallest resistor. If R1 and R2 in Fig. 6(b) have the same values as for the previous example, then the equivalent resistance R of the combination is given by the formula:—

$$\frac{1}{R} = \frac{1}{R1} + \frac{1}{R2}$$

$$\text{Thus } \frac{1}{R} = \frac{1}{600} + \frac{1}{400}$$

$$= \frac{2 + 3}{1200}$$

$$\text{Therefore, } R = \frac{1200}{5} = 240 \text{ ohms.}$$

The same formula, extended according to the number of resistors, always applies. For example, if four resistors of 120, 40, 60 and 30 ohms are connected in parallel, then the resultant resistance is given by:—

$$\frac{1}{R} = \frac{1}{120} + \frac{1}{40} + \frac{1}{60} + \frac{1}{30}$$

$$= \frac{1 + 3 + 2 + 4}{120}$$

Thus, R = 12 ohms.

Calculating Electrical Power

The unit of power is the watt, denoted by the letter W, while the formula for power is W (Watts) = E (Volts) × I (Amps).

So if a pressure of one volt is causing a flow of one amp. (which incidentally infers a resistance of one ohm)

(Continued on next page)

The TRIPLEX SINGLE

Reprinted from "The N.Z. Radiogram."

THERE are doubtless many who have made up single tube sets using the 1D8GT and who would like to try "something different." Although this tube is really three tubes in the one envelope (consisting of diode detector, triode and output pentode) in all small sets to date the diode has been either disregarded altogether or perhaps earthed as an after thought. The set to be described uses it for its proper purpose as a detector, and also to provide AVC.

AVC may seem to be unusual in a set of this type, but it is well worth experimenting with and can easily be omitted if it is not wanted.

Otherwise there is nothing unusual in the circuit except that the triode is used as an R.F. amplifier instead of a detector or A.F. amplifier. The following points will bear noting, however.

The coils should be high gain, iron-cored types in order to get as much lift as possible. This is so that the set may be used with only a short length of aerial and still give good results. When wiring the aerial coil be careful not to earth the bottom of the secondary, as if this is done the AVC will be shorted out.

The tuning condensers are ganged, but two separate single gang condensers could be used if desired, in which case the exact capacity would not be very critical. The only disadvantage of this arrangement is that there is an extra control. When a ganged condenser is used with commercial coils, be sure it is the correct capacity to match the coils or else it may not track.

Connections to the tube are quite easy and the only thing to watch is to keep R.F. and A.F. leads apart as much as possible. In a few instances it may be necessary to shield the tube, but this will depend upon the individual case.

A bias of 9 volts is necessary for the pentode and this may either be obtained by using an 800 ohm resistor by-passed with a 10 M.F. 25-volt electrolytic between B— and earth or by using a separate bias battery as shown in the circuit diagram. The latter method is recommended as it allows the full 90 volts on the plate and full power, whereas the former method drops the plate voltage by 9 volts and the output correspondingly. The set only has one tube after all, and it is only fair to give it every chance possible!

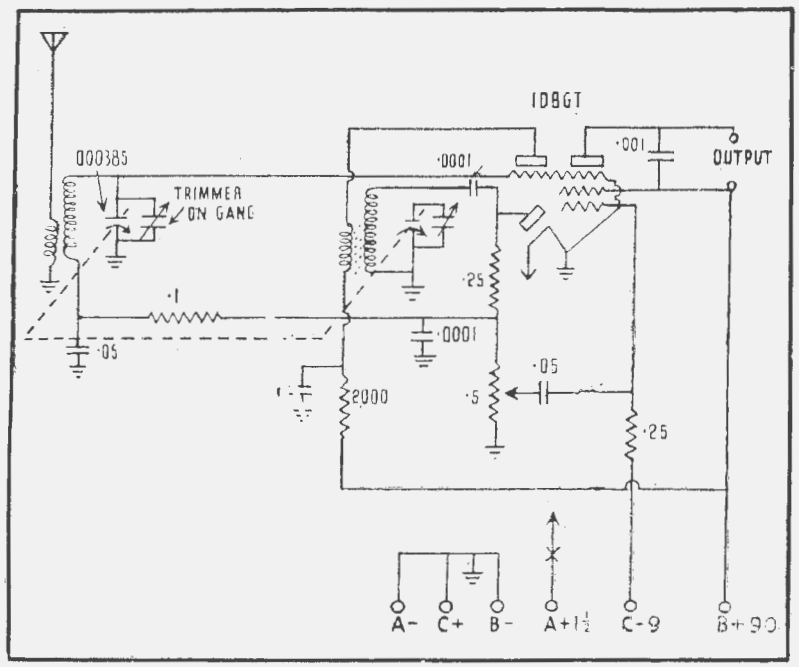
The resistor in the plate lead of the triode acts as an R.F. filter and may be omitted if satisfactory operation can be obtained without it, but it will usually be found necessary to prevent parasitic feedback.

The by-pass condenser between B + and earth is given at .25 M,F,, but a larger value than this will do no harm, in fact, to do the thing properly, a 16 M.F. would be best of all.

No special chassis dimensions are given because individual constructors will vary as to their choice. If the set is to be used as a portable it may be built into a very compact unit indeed. In this case the aerial coil may be removed from its shield to save space, but leave the R.F. coil as it is.

Either headphones or speaker may be used with this set, although it was originally designed for use with phones and any convenient piece of wire as an aerial. With a good speaker and aerial-earth system the results are surprising, and the AVC helps to overcome fading.

There is plenty of room for experiment with this set, including short wave but as yet this has not been tried on the original model.



STEP BY STEP

(Continued from previous page)

the power being expended is exactly one watt.

Because of the relation between E, I and R given by Ohm's law, power in watts can be defined in two ways additional to the formula given above. From Ohm's law we know that $I = \frac{E}{R}$. Substituting in the equation for power given above, we obtain $W = \frac{E \times E}{R}$.

Thus, $W = \frac{E^2}{R}$.

Again, as $E = IR$, $W = I \times IR$. Or, $W = I^2 R$.

Some Practical Problems

Set-builders are chiefly concerned with power in choosing resistors to carry a certain current safely. Supposing a 450-ohm resistor is required to pass a current of 50 milliamps, what should be the watts rating of the resistor? In this instance, the formula $W = I^2 R$ is used. From it we have $W = \frac{50}{1000} \times \frac{50}{1000} \times \frac{450}{1}$ (remembering that milliamps must be divided by 1000 to bring them to amps. to make the calculation correct). This gives $W = 1.125$ watts, and to ensure an adequate margin of safety, a 2-watt resistor should be chosen.

If the voltage drop across the resistor is required, it can be found from $E = \frac{50}{1000} \times \frac{450}{1} = 22.5$ volts.

Next month: Direct and Alternating Currents.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Shortwave Review

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NOTES FROM MY DIARY

Winter-time is Daytime

Even if the weather is not indicative of winter, the B.B.C. about this time of the year make the suggestion by an alteration in the Pacific schedule. Since April 19, they open up this service at 2.57 p.m. instead of 4.15 p.m. and close at 6.15 whereas formerly they continued till 8 p.m.

The Eastern service now opens at 8.45 p.m. with interesting announcements and at 9 the news is read by Robert Harris, Pat Butler or Derrick Prentice. I have given more information under "Loggings" than is usual but with the great number of occasions on which they broadcast in foreign languages, it will assist readers in checking their sheets.

Listeners will find from now on, daylight signals will improve very rapidly, in fact it may be possible, probably before the next issue of "A.R.W." is on sale to listen to London and Europe right throughout the day. By the same token, evening signals will be zizzy in some instances.

Yes, winter-time is daytime for overseas reception.

Winter-time is 7.20 p.m.

This sounds like a contradiction of the above paragraph, but with the entry of the U.S.A. into the war we met William Winter through KGEI, 'Frisco, and his talks were most interesting. Evidence of this is shown by the A.B.C., who at 7.20 p.m on Saturdays put over a talk by Winter, taken by radiophone earlier in the day—result, excellent transmission and from "Ladies and Gentlemen, how do you do." is most informative.

HELP WANTED

Location and call sign unknown, 15,075kc, 19.9m

Has been heard for several weeks from about 8 p.m. till 9.50 p.m. or so. Plays same records night after night and at intervals announces five times: "ABC." Is undoubtedly a test being conducted — probably a Jap. Signal is very strong — drifts a little and from 9.30 is often overpowered by morse. First heard by myself on 16th April.— Ed.

Dr. Gaden telegraphed me. He was hearing a stranger on approximately 20 metres and thought call sign sounded like KET. Another report heard ABC called several times on 18.75 metres, while Mr. Hooper, of Wahroonga, figured he heard call on 17 metres.

Z——, South Africa

Mr. Condon of South Australia reports hearing a station around 6.30 a.m. on approximately 50.32m. Plays popular dance numbers. English announcements. S.A.B.C. Station. B.B.C. news at 6.45 a.m., closes 7 a.m.

Listen and Talk

I was very touched by the reference Mr. Ray Simpson, S.W. Editor of "Radio and Hobbies" made to our AWDXAW Club in May issue of his magazine. There has always been a friendly co-operation between "R.&H." and "A.R.W." I know Ted Whiting who has taken up the reins now that Mr. Simpson has enlisted, and he can feel assured of any help I can give in the interests of our mutual hobby.

I am sure all members of the AWDXAW club join with me in congratulating Mr. Whiting and wishing Ray best of luck.

With this ace listener away it behoves every member to not only listen but to talk or in other words write about what they heard and where and when. Remember only a very small number send in reports, in fact one could be pardoned for coining Mr. Churchill's famous reference to the R.A.F. "Never before have so many owed so much to so few." Your report need not be a long one, just mention anything unusual.

An instance of interest in shortwave listening is shown by Mr. Mitchellhill of Muswellbrook who, still in hospital following an operation, used an improvised receiver to keep in touch with things overseas and with commendable thoughtfulness sent a list of his loggings.

Hong Kong

I read where someone was asking the call-sign of the station heard on the wavelength of our old ZBW-3, Hong Kong.

I figure the letters JTHK as used by the "A.B.C. Weekly" fits the bill as JTHK could stand for Japanese Territory, Hong Kong. We might prefix JTHK with another T for Temporary Japanese Territory.

AW720DX

We welcome a new member, Mr. T. L. Hooper of Wahroonga, who sends in some interesting loggings.

Brief mention:

On Saturday, 2nd May, at 8.50 p.m. heard sports commentary by Bill Stern; Station WCRC, New York, 11,837kc., 25.3 metres. Excellent signal and at 8.59 p.m. we were invited to have a seat in the grandstand again next week and Bill Stern says "Goodbye." At 9 p.m. C.B.S. announcement: "Reports on quality of test transmission would be appreciated by Columbia Broadcasting System, New York, U.S.A." Then followed musical programme by Eileen Gerard.

CBFY, Montreal, who are now on 25.54m were heard on 30th April at 10.20 p.m. in "morning devotion." Excellent signal.

ALL-WAVE ALL-WORLD DX CLUB

Application for Membership

The Secretary,
All-Wave All-World DX Club,
117 Reservoir Street, Sydney, N.S.W.
Dear Sir,

I am very interested in dxing, and am keen to join your Club.

Name .....

Address .....
(Please print both plainly) .....

.....

My set is a .....

I enclose herewith the Life Membership fee of 3/6 (Postal Notes or Money Order), for which I will receive, post free, a Club Badge and a Membership Certificate showing my Official Club Number.

(Signed) .....

(Readers who do not want to mutilate their copies can write out the details required.)

WCBX, New York, 15,270kc, 19.64m Good signal at 9.32 p.m. Robert Taylor and Barbara Stanwyck in plav sponsored by company advertising chrysanthemum plants.

Heard Radio Saigon, 25.47m say the other night " Roy Hallett of Sydney requested some time last year 'Over the Rainbow' so here it is again." They played it so take a bow, Roy.

VUD-3, Delhi, 19.63m, are being heard at surprisingly good strength around about 8.30 p.m. Speak a lot of Hindustani, but All India Radio, of Delhi, is mentioned quite often.

NEW STATIONS

Radio Metropole, Location Unknown 11,740kc, 25.56m
A definitely pro-Fascist station heard in the Ukranian language and occasionally Russian from 1.15 to 1.25 a.m. (Probably Japanese operated).

ZNB, Mafeking 5895kc, 50.90m
I don't think this is actually a new station, but it is new to our columns. Mr. Perkins reports this as being heard in parallel with ZRH, Johannesburg, at 6.45 a.m.

Deutscher Volkssender, Location Unknown 15,310kc, 19.60m
This station whose call sign is "German People's Transmitter" is anti-Fascist and is heard in German from 12 to 12.20 a.m. At 4 a.m. the same station is heard on 32 metres.

Brief Mention

The Sudeten German Freedom Radio has now moved from 19.60m to 25.15m and transmission 1 is heard from 9.30 to 9.50 p.m. Transmission 2 is heard on 30.36m from 4 to 4.45 a.m.

XGOI at 10 p.m. says: "Here is XGOI, Shanghai, China, on 9.66mc. and 9.3mc." Signal on 31.06m is R7 to 8, but on 32.26m is only faint, say R4-5. News in English is given at 10.10 p.m.

At 9.40 p.m., "Hullo everybody, here is Radio Centre Moscow, transmitting on 38.61 and 40.6 metres. I was listening on 31.36 and 25.24 metres, but could find no trace on their claim.

Talking of Russia, Khabarovsk on 50.76m gives the same programme as 31.36m nightly, excepting from 9 to 9.30 p.m. and 10.30 p.m. to 11.15 p.m., in between, from 10 p.m. to 10.15 p.m., you will hear Yiddish — not Hebrew — Yiddish.

Moscow or Kuibyshev is heard on 32.87m at 8.45 p.m. and on 24.61 at 9-10 p.m., while at 10.45 p.m. English news is heard from Kuibyshev on 29.88 metres with an R7-8 signal.

And here is a new Russian station: Situated in Aschehabad or Askabad the capital of Transcaspian Territory, the name of the station is given at 9 p.m. and 10 p.m., but no call sign. Transmission is on 29.50 metres and Turkistan dialect is used. Do not confuse with Jap. station on 29.45m. Askabad is not heard on Saturday or Sunday.

The MONTH'S LOGGINGS

ALL TIMES ARE AUSTRALIAN EASTERN STANDARD TIME

Further pressure on space makes it imperative to only record changes or items of outstanding interest. Enemy stations are only briefly referred to.

AUSTRALIA

VLG-6, Melbourne 15,230kc, 19.69m
3.55 to 4.40 p.m., French session for Tahiti. 4.55 to 5.25 p.m., for British Isles.

VLG-7, Melbourne 15,160kc, 19.79m
National Programme from 6.30 a.m. to 8.10 a.m.; 12 noon to 3.40 p.m.; 7 p.m. to 7.18 p.m. Could not be bettered when transmitting. (Mitchellhill).

VLR-3, Melbourne 11,880kc, 25.25m
Nat. Prog., 12 noon to 6.15 p.m.

VLQ-2, Sydney 11,870kc, 25.27m
8.40 p.m. to 9.15 p.m. for North-East Asia. 2.55 p.m. to 3.40 p.m., for Western States of North America.

VLR-8, Melbourne 11,760kc, 25.51m
Nat. Prog. 6.30 a.m. to 10.15 a.m.

VLG-3, Melbourne 11,710kc, 25.62m
For Western States of N. America, 2.55 p.m. to 3.40 p.m.

VLQ, Sydney 9615kc, 31.21m
R max. at 6.30 p.m.
Programme for New Caledonia and French Oceania in French from 6.25 pm. to 7.25 p.m.

VLW-5, Wanneroo 9610kc, 31.22m
For South-East Asia in Dutch, French and English from 11.15 p.m. to 1 a.m.

VLQ-6, Sydney 9580kc, 31.32m
For British Isles from 4.55 p.m. to 5.25 p.m.

VLR, Melbourne 9580kc, 31.32m
Nat. Prog., 6.45 p.m. to 11.30 p.m.

VLG-2, Melbourne 9540kc, 31.45m
9.25 p.m. to 10.10 p.m., for Eastern States of North America. For South-East Asia in Dutch, French and English, 11.15 p.m. to 1 a.m.

VLQ-9, Sydney 7250kc, 41.38m
9.25 p.m. to 10.10 p.m. for Eastern States of North America.

VLQ-4, Sydney 7220kc, 41.55m
For Western States of North America, from 12.25 a.m. to 1.10 a.m.

OCEANIA

Fiji:

VPD-2, Suva 15,160kc, 19.79m
Schedule: 2 p.m. to 2.30 p.m.
French session. Excellent strength. Have had no opportunity of checking this lately.

New Caledonia:

FK8AA, Noumea 6130kc, 48.94m
This country is well in the limelight and can be heard from 5.30 p.m. till 6.30 p.m. Would not be surprised, because of newspaper reference to happenings there, that longer programmes and perhaps English sessions will be heard.

AFRICA

Algeria:

TPZ, Algiers 12,120kc, 24.76m
Broadcasts Vichy-French programme at 7 a.m. and again at 5.45 p.m.

TPZ-2, Algiers 8960kc, 33.48m
Vichy-French programme at 7 a.m.

Bechuanaland:

ZNB, Mafeking 5895kc, 50.90m
Mr. Perkins is first with this one. Says "Heard in parallel with ZRH at 6.45 a.m. Closes 7 a.m. Mr. Condon of Laura, South Australia, refers being heard weakly there.

Belgian Congo:

OPM, Leopoldville 10,140kc, 29.59m
Being heard weakly. Asking for reports. Closes at 5.45 a.m. with Belgian National Anthem.

Egypt:

Radio Cairo, Cairo 5980kc, 50.17m
Music till 6 a.m. News in English till 6.15 a.m., when same News is given in French. Closes at 6.30 a.m.

SUX, Cairo 7865kc, 38.15m
Fair signal at 6 a.m. No English (Condon).

Ethiopia:

——, Addis Ababa 9625kc, 31.17m
From just after midnight till 1.30 a.m.

French Equatorial Africa:

FZI, Brazzaville 11,965kc, 25.06m
News in English at 5.45 a.m.
Heard concluding News in English at 2 p.m. Sunday (Hallett). Heard at 4 p.m. in Free French programme.—Ed.

Kenya Colony:

VQ7LO, Nairobi 6060kc, 49.5m
2.15 to 5.15 a.m. News, 2.30 a.m. and 4 a.m.

Morocco:

CNR, Rabat 8035kc, 37.34m
4 a.m. to 10 a.m. R5 at 7.38 a.m. (Perkins).

Portuguese East Africa:
Mozambique:

CR7BE, Lourenco Marques 9840kc, 30.48m
News at 6 a.m. Closes 7.20 a.m. (Gaden).

Portuguese West Africa;

CR6RA, Luanda Angola 9470kc, 31.68m
Monday, Tuesday, Wednesday and Thursday, 5.30 a.m. and 6.30 a.m.

CR7BD, Lourenco Marques .. 15,250kc, 19.66m
From 7-8 a.m. (Gaden).

Senegal:

FGR, Dakar 9410kc, 31.88m
Opens at 5.15 a.m. Signal now better.

Transvaal:

ZRH, Johannesburg 6007kc, 49.95m
Schedule: 1.30 a.m. to 7 a.m. News 5.30. News in Afrikaans at 5.45 a.m. B.B.C. News at 6.45. R5 at 6.45 a.m. with re-broadcast of B.B.C. news. (Perkins).

AMERICA

NOTE: America is now on War Time, which brings the Eastern States within four hours of G.M.T. i.e. New York, 8 a.m.; London, noon; Sydney, 10 p.m.

Central:

Costa Rica:

TIEMC, San Jose 11,900kc, 25.21m
May just be heard after **XGOY** leaves the air.

TIJMT, San Jose 11,900kc, 25.21m
"Radio America Latina." Address: Apartado 849, San Jose.

TIPG, San Jose
Opens at 10 p.m. (Condon).

Nicaragua:

YNRS, Managua 8585kc, 34.95m
"Radio Nicaraguense." Heard about 11 p.m. Weak and plenty of morst interference. (Condon).

Panama:

HP5A, Ponama City 11,700kc, 25.64m
Good at 4 p.m. (Ferguson).

North:

WNBI, New York 17,780kc, 16.87m
Carries same programme at 11.30 p.m. as on 19.81 but not quite so loud.— Ed.

KGEI, San Francisco
"This is the United States of America broadcasting from the Fairmount Hotel in a round-the-world service." Transmitting on the . . . Various bands are mentioned, to suit the particular hour. Apart from News, some splendid tolks are given. Excellent musical sessions are also given.
15,330kc, 19.57m: News 11 a.m. and 1 p.m. Closes at 2 p.m. Neorly midday before pleasant signal at present.
7250kc, 41.38m: Opens at 4 p.m. with News. Also News at 5, 6, 7, 9.30, 10.30 p.m., 12.30 a.m. and 1.45 a.m. Excellent at 7 p.m. Talk on Japan at 5 p.m. "Victory for China in Chinese" at 9.45 p.m.
6860kc, 43.73m: Opens at 6 with News. News also at 7, 9.30, 10.30 p.m., 12.30 a.m. and 1.45 a.m. News in Chinese at 9.45 p.m. Very good signal at 10.30 p.m. but may be spoilt by morse.

WGEA, Schenectady 15,330kc, 19.57m
Listen to "March of Time," 7 a.m. to 7.30 a.m. Sundays. Closes at 8.30 a.m. with fair signal.

WCBX, New York 15,270kc, 19.64m
Very good signal at 11 a.m. with news (Condon). Very good at 9.14 p.m. Heard Robert Taylor and Barbara Stanwyck — Ed.

WLWO, Cincinnati 15,250kc, 19.67m
News at 7 a.m. and 3 p.m.

WBOS, Boston 15,210kc, 19.72m
News at midnight and 1 a.m.
Mr. Perkins says news at 11 p.m.

WNBI, New York 15,150kc, 19.81m
Fairly good at 11.30 p.m., but better in news at midnight.— Ed.

WRCA, New York 15,145kc, 19.81m
News at Midnight.

KKQ, Bolinas 11,950kc, 25.11m
Heard at 4 p.m. when News from Fairmount Hotel is given.

WBOS, Boston 11,870kc, 25.27m
Good at 9 a.m. in News.

WBOS 25.26m
Heard well at 9-9.30 a.m. in English (Gaden).

WCRC, New York 11,830kc, 25.36m
Irregular, but heard accasionally about 5 a.m.

WRUL, Boston 11,790kc, 25.45m
Excellent signal every morning. News by Volney Hurd, "Christian Science Monitor," at 7 a.m. Special session for Australia on Tuesdays, Thursdays and Saturdays at 7.15 a.m. Closes at 8.25 a.m.

WRUL, Boston 11,730kc, 25.58m
R4 at 9 a.m.

WLWO, Cincinnati 11,710kc. 25.62m
Opens nicely at 8.30 a.m., closes 9.45 a.m. (Gaden). Opens again on 31.28 at 10 a.m.—Ed.

KJE-9, Los Angeles 10,750kc, 27.90m
Opens about 1 a.m. (Perkins).

WRUW, Boston 9700kc, 30.93m
Opens at 6.50 a.m. Signal erratic at 9 a.m.

WRCA, New York 9670kc, 31.02m
8 a.m. to 7 p.m. News 4 p.m. and 6.45 p.m. Now very good at mid-day.— Ed. R6-7 at 6.45 p.m. (Perkins).

WLWO, Cincinnati 9590kc, 31.28m
Opens at 10 a.m. with splendid signal. (Gaden). News at 10.30 a.m.

WGEA, Schenectady 9,550kc, 31.41m
In splendid form at 9.30 a.m. and R7 with news at 10.15 a.m. (Gaden).

WGEO, Schenectady 9530kc, 31.48m
Only fair in mornings.

KRCA, 'Frisco 9480kc, 31.65m
News at 4 p.m. (Hooper). Talk at 5 p.m. (Mitchellhill) (Reports are asked for.— Ed.)

KRCA, San Francisco 9480kc, 31.65m
Opens at 2.15 p.m. with news. Also news again at 4 p.m., 5 p.m., 6 p.m., 7 p.m., 9.30 p.m., 10.30 p.m., 12.30 p.m.

KJE-8, Los Angeles 9390kc, 31.94m
Heard transmitting test programme with R7 signal at midnight (Perkins).

KEQ, Honolulu 7370kc, 40.70m
Irregularly heard around 10 p.m. talking to U.S.A.

KTG-3, Los Angeles 6920kc, 43.35m
Heard closing on February 28 at 12.04 a.m. Gave location and frequency; said would return to air in one hour on 1750kc (Byard).

Mexico:

XEQQ, Mexico City 9680kc, 30.99m
Fair just after midnight. Best at 3 p.m.

XEWW, Mexico City 9503kc, 31.57m
Good in afternoon and at 11 p.m. (Perkins).

South:

Argentina

LRX, Buenos Aires 9660kc, 31.06m
Heard at R4-5 on 26th April at 8.30 p.m. Heard on Good Friday around 9 a.m., when it was fair. (Condon).

LSX, Buenos Aires 10,350kc, 28.98m
Heard weakly on Good Friday at 9 a.m. (Condon). (On looking up my records, find note that this station was heard transmitting to U.S.A., April, 1941, at 9 a.m.—Ed.)

Brazil:

PRE-9, Forteleza 6105kc, 49.14m
Reported being heard around about 6 a.m.

PRA-8, Pernambuco 6010kc, 49.92m
Heard at 5.30 a.m.

Chile:

CB-1180, Santiago 11,975kc, 25.05m
Heard at good strength at 2.30 p.m. in languages, etc. (Gaden). Splendid at 9.30 p.m.

Ecuador:

HCJB 12,460kc, 24.08m
Appears to have regular schedule and signal is quite good. 9-10 a.m., noon to 1 p.m., 10 to 11.30 p.m. Very good in English at noon. (Cushen).

Peru:

OAX4J, Lima 9340kc, 32.12m
Nightly at 11 p.m., Sundays at 2 p.m.

OAX5C, Ica 9540kc, 31.45m
This well known Peruvian station who has had many frequencies, is now heard at 3 p.m. on 9540kc. Slogan "Los ondas di Ica para tod el pois." ("The waves of Ica for all the country.")

THE EAST

Burma: ....

XYZ, Rangoon 6007kc, 49.94m
Heard for about an hour from 10 p.m.

China:

XGOX, Chungking 15,190kc, 19.75m
News at 7.30 p.m. and also heard at 10 a.m. with news.

FFZ, Shanghai 12,068kc, 24.86m
Gives News in Russian at 8.30 p.m. Better signal lately. Heard opening weakly at 4.45 p.m. (Gaden). Talk in English at 9.15 p.m. At 8 p.m. French-English lessons.

XIRS, Shanghai 11,980kc, 25.02m
Excepting for morse, this Italian owned station has good signal. News at 9.15 p.m.

XGOY, Chungking 11,900kc, 25.21m
Note slight change in frequency. Good in early evenings. News at 8.15.—Ed.

XMHA, Shanghai 11,855kc, 25.3m
This Jap-controlled station, "Call of the Orient," gives news at 8.30 p.m.

XGRS, Shanghai 11,675kc, 25.7m
This German owned station still has a good signal nightly. News at 9.45 and 10.30.

XGOA, Chungking 9720kc, 30.86m
English News at midnight.

XGOI, Shanghai 9665kc, 31.04m
On Sundays appears to give news at 9.30 while at 9.15 on week days.

JTHK, Hongkong 9525kc, 31.49m
Heard from 8 p.m. (Jap-controlsd). News at 11.10 p.m.

XLMA, — 9370kc, 32.02m
From 9 to 11 p.m. only fair. R3-4 at 10 p.m. (Perkins).

XGAP, Peking 6100kc, 49.18m
Opens at 11 p.m. in English.

XGOY, Chungking 5950kc, 50.42m
News at 9.30 p.m. and 11.30 p.m.

Portuguese China:

CR8AA, Macao 6250kc, 48.00m
R5 at 10.15 p.m. (Byard).

XGEI, Kuoiming (Free China)
This station reported by Mr. Perkins in April issue, has also been heard by Dr. Gaden on 42.5m, when at 9.40 p.m. announcement in perfect English was made that XGEI was testing on 49.41, 31.25, 19 and 16 metres.

Caroline Islands:

—— 11,740kc, 25.55m
This Jap-controlled station, is said to be located in Palao, Coroline Islands, and uses 10 k.w. of power, hence excellent signal.

— 9565kc, 31.37m
Also said to be in Caroline Islands.

French Indo-China:

Radio Saigon, Saigon 11,780kc, 25.47m
9.30 p.m. and 1.45 a.m. Closes at 2 a.m. Excellent in news at 8.15 p.m. and 9.30 p.m. (Mitchellhill).

Radio Saigon, Saigon 6188kc, 48.48m
Opens at 10 p.m. Loud signal. News 10.15 p.m. and 1.45 a.m., closes at 2 a.m.

Dutch East Indies:

YDB, Soerabaya 9550kc, 31.41m
Splendid at 11.25 p.m. Dutch spoken (Gaden).

India:

VUD-3, Delhi 15,290kc, 19.62m
News gives News at 6 p.m. Heard well at 8.30 p.m. (Gaden). Heard with an R6 signal at 9.37 p.m. (Perkins).

VUD-4, Delhi 11,830kc, 25.36m
In view of terrific interest in the East, News 10.30 **p.m.**

VUD-2, Delhi 9590kc, 31.28m
News 10.30 p.m. and 1 a.m. After news at 10.30, presents "Counter Attack." (Perkins).

Indian Freedom Station 9380kc, 31.98m
1 to 1.30 a.m. Now reported to be heard on 11,500kc, 26.09m from 1.35 a.m. to 1.55 a.m. Its anti-British attitude would, as Mr. Cushen suggests, class it as a Jap.

VWY, Kirkee 9045kc, 33.17m
Announcing as "Radio Francais libre d'orient" is heard at 3.30 a.m. Radiating programmes directed to Syria. (R. & H.).

VUD-2, Delhi 6130kc, 48.94m
Opens up at 11.15 p.m. News heard here also at 1.50 a.m.

Japan:

JLU-4, Tokyo 17,790kc, 16.86m
News at 5.45 p.m.

JZK, Tokyo 15,160kc, 19.79m
Nippon calling U.S.A. at 3 p.m. (Mitchellhill).

JZJ, Tokyo 11,800kc, 25.42m
News at 7 p.m. and 10 p.m.

JZI, Tokyo 9530kc, 31.46m
Gives News at 7 p.m. and 1 a.m.

JVW, Tokyo 7257kc, 41.34m
Announced on March 29, "As from April 1, **JVW** will be discontinued, and programme will be heard on **JZK,** 19.79m."

JLG-4 .... 15,105kc, 19.86m
Announcements and News at 8.55 a.m. Heard again at 12.10 p.m. in News for U.S.A.

JUZ-2, Tokyo 11,825kc, 25.37m
News at 10 p.m. and 12.30 a.m.

JIE-2, Taiwan (Formosa) 9695kc, 30.96m
Very good with news at 9.30 and 11.30 p.m. (Cushen).

JLG-2, Tokyo 9505kc, 31.57m
Talk on Indio in pidgin English at 10.45 p.m. (Gaden) R4 at 6.55 a.m. (Perkins).

Malaya:

ZHJ, Penang 6095kc, 49.23m
Altough English is heard till station closes at 9.45 p.m., remember Japanese-controlled.

Manchuria:

MTCY, Hsinking 11,775kc, 25.48m
Heard at 4.15 p.m.

—— 31.35m
Undoubtedly the old **KZRM.** News at 4.30 p.m.

MTCY, Hsinking 9545kc, 31.43m
News at 7 a.m.

MTCY, Hsinking 6125kc, 48.98m
Heard nightly.

Philippines:

KZRC, Cebu 6100kc, 49.18m
The only Philippine station left under old regime and still being heard.

KZRH, Manila 9640kc, 31.12m
Now back on air under Japs. News at 11.30 p.m. and 11.45 p.m.

KZRF, Manila 6140kc, 48.86m
News at 10.15 p.m. Closes at 11 p.m. and apens again at 11.15 p.m. (Gaden) (Jap.-controlled of course.—Ed.)

Secret Philippine Station 9643kc, 31.11m
"The Voice of Freedom, broadcasting from somewhere in the Philippines," opens with News nightly at 8.30 p.m. in parallel with 48.94m also heard at 7.30 a.m. (Just afraid these two stations are now unfortunately silent.—Ed.)

Thai:

HSP-5, Bangkok 11,715kc, 25.61m
News at 10.35 p.m.

GREAT BRITAIN

"This is London calling."

As is usual at this time of the year, London makes many changes in frequencies and schedules. The Pacific service now opens at 2.57 p.m. and closes at 6.15 p.m. while the Eastern service opens at 8.45 p.m. These transmissions will probably remain until October.

African service opens at 1.30 a.m., closes 7 a.m. Radio Newsreel (Pacific edition) is heard at 5 p.m.

GRQ 18,030kc, 16.64m
Too hard to enjoy.

GRP 17,890kc, 16.77m
Eastern service 8.45 p.m.

GSV 17,810kc, 16.84m
Opens at 8.45 p.m. in Eastern service.

GSG 17,790kc, 16.86m
Will gradually fade out.

GRD 15,440kc, 19.42m
Excellent signal in Eastern service opening at 8.45 p.m.

GRE, London 15,375kc, 19.51m
Tuesdays and Fridays from 8.30 to 8.45 p.m. and at 11.30 p.m. on Wednesdays and Saturdays.

GSF 15,140kc, 19.82m
Excellent transmitter at 9 p.m. Good in South American programme at 7.45 a.m.

GRV 12,040kc, 24.92m
Special session for South America from 8.30 a.m. to 12.45 p.m. Opens at 4.45 p.m. Great strength.

GSN, ... 11,820kc, 25.38m
Swedish at 3 a.m.

GSD 11,750kc, 25.53m
Probably the most consistent of the B.B.C. transmitters and one of the earliest of the after-lunch stations. N. America service heard from 11 a.m. till 2.45 p.m. News at 2.30 p.m. Pacific service now opens at 2.57 p.m. and is heard till 6.15 p.m.

GRG 11,680kc, 25.68m
Used in African service. Weak towards day-break.

GRH 9825kc, 30.53m
Another transmitter used in N. America service. Closes at 2.15 p.m.

GRX 9690kc, 30.96m
3-4 a.m. French, German, Dutch; English 6 a.m., but getting weak then.

GRY 9600kc, 31.25m
Heard in afternoons.

GSC 9580kc, 31.32m
Used in special session to North America. Audible from 11.30 a.m. till closing at 2.45 p.m. News at 2.30 p.m.

GSB 9510kc, 31.55m
Good afternoon station for Pacific service 2.57 to 6.15 p.m.

GRU 9450kc, 31.75m
Excellent towards midnight.

GRI 9515kc, 31.86m
Not sure of schedule but heard occasionally around 9.30 p.m. Often very noisy.

GRJ 7320kc, 40.98m
Splendid at 5.45 a.m. (Gaden).

GRM 7250kc, 41.38m
African service 1.30 a.m. to 2.15 a.m.

GRK 7185kc, 41.75m
Home service, but often audible here early mornings and again late afternoan.

GRS 7065kc, 42.49m
Reliable transmitter for Pacific service 2.57 p.m. to 6.15 p.m.

GRN 6194kc, 48.43m
Good at 6.20.

GRO 6180kc, 48.54m
Another of the African transmitters and in early mornings.

GRW 6145kc, 48.82m
Heard from after midnight and good signal at 6 a.m.

GSL 6110kc, 49.10m
Heard morning and evening in home service.

GRR 6080kc, 49.34m
News at 5 a.m. Good signal at 6 a.m.

GSA 6050kc, 49.59m
Spoilt at 5.45 a.m. by terrific interference.

EUROPE

Bohemia:

DHE4A, Prague .... 11,840kc, 25.34m Heard at 6.30 a.m. Can be identified by old Czechoslovakian nine-note signal. No English.

France:

Radio Vichy, Vichy .... 15,245kc, 19.69m Delightful at midnight. (Gaden).

Radio Vichy, Vichy .... 11,880kc, 25.25m Heard opening at 5.45 p.m. Also good at 8.30 a.m. (Hallett).

Radio Vichy, Vichy .... 9520kc, 31.51m Closes at 5.30 p.m. (Perkins).

Paris Mondial, Vichy or Paris, 6200kc, 48.39m Heard at 5 a.m. Good signal.

Germany:

DJR, Berlin .... 15,340kc, 19.56m Listen to "Anzac Tattoo" on Saturdays at 10.15 p.m. As recommended tuned in — very interesting. (Hooper) News in Dutch at midnight.

DJQ, Berlin .... 15,280kc, 19.63m R7-8 at 3.45 p.m. (Perkins).

DJB, Berlin .... 15,220kc, 19.74m News at 3.30 p.m., also news at 11.30 p.m.

DJL, Berlin .... 15,110kc, 19.85m Lord Haw Haw 10.30p.m. News 11.30 p.m.

DZH, Berlin .... 14,460kc, 20.75m Have been heard at 1 p.m. in programme for Sth. America.

——, Berlin .... 12,775kc, 23.48m At 12.30 a.m. announces in English "This is Berlin calling," and then gives News in Hindustani.

DZE, Berlin .... 12,130kc, 24.73m Good from 2 to 3 p.m.

DJP, Berlin .... 11,855kc, 25.31m Good signal in afternoons, late evening and eorly morning.

DXR, Berlin .... 11,760kc, 25.51m Good at 3.15 p.m. Also heard at 6 a.m.

DXC-2, Berlin .... 11,740kc, 25.55m News at 3 p.m. Followed by "Triple B" or B.B.B. programme. Very funny. (Gaden).

DZC, Berlin .... 10,290kc, 29.15m Good at 1.30 p.m.

DJW. Berlin .... 9650kc, 31.09m "Ghost Voice" can be heard nightly in Germon between 11 ond midnight. "Ghost Voice" was also heard on 26th April ot 9.30 p.m. News at midnight. (Hooper). Good at 1.30 p.m.

DXZ, Berlin .... 9570kc, 31.35m News and talk at 3.30 and 4.30 a.m.

DJA, Berlin .... 9560kc, 31.38m Fair signal at 1.30 p.m.

DXM, Berlin .... 7270kc, 41.27m News at 2.30 a.m., 4.30 a.m. and 5.30 a.m.

DXJ, Berlin .... 7240kc, 41.44m News at 3.30 a.m., and in German at 4 a.m.

DXX, Berlin .... 6140kc, 48.86m News in English at 6.30 a.m. Very nice signal (Gaden).

DWX, Berlin .... 6130kc, 48.95m This new German gives English News at 4.30 a.m.

Holland:

PCJ-2, Huizen .... 15,220kc, 19.71m This German-controlled station announces at 9.45 p.m., "Here is Holland calling." News follows and again at 10.45 p.m. Just before opening with music at 9.30, beautiful harpischord effect is heard.— Ed. Heard at 10.30 p.m. free of swirling noise (Condon).

PCV, Amsterdam .... 18,070kc, 16.6m In parallel with **PCJ-2.**

Italy.

Rome:

2RO-17, ... 19,590kc 15.37m Russian at 10.30 p.m.

2RO-6 .... 15,300kc, 19.61m Programme for Narth America closes at 3.50 a.m. Good in News at 8.20 a.m. and terrific signal in News at 5.20 p.m.

2RO-, ... 14,760kc, 20.33m Russian from 1.15 to 1.30 a.m. and from 5.15 to 5.30 p.m.

2RO-, ... 11,950kc, 25.10m Think this is the station Dr. Gaden is hearing in French at 3.45 p.m., closed at 4.45 p.m.— Ed. Also heard in foreign languages at 3.30 a.m.

2RO-4 .... 11,810kc, 25.40m News at 7.12 a.m. followed by names of prisoners of war at 7.25 a.m. Close at 7.30 a.m. and re-open at 8.20 a.m. (Mitchellhill).

——, ... 11,695kc, 25.65m Announces "Here is Italian Broadcasting Station," and news in Russian is given at 5.15 p.m. and 1.15 a.m.

2RO-? .... 10,320kc, 29.07m Also good signal at 3.40 a.m.

2RO-18 .... 9765kc, 30.74m Good signal at 3.35 a.m.

2RO-18, Rome .... 9760kc, 30.74m Very good at 2.30 p.m. (Gaden).

2RO-3 .... 9630kc, 31.15m News in English for Australia at 5.20 p.m. Excellent signal (Hallett).

—— .... 34.76m "Here is Italian Broadcasting Station." News in Russian 12.15 to 12.30 a.m.

Vatican City:

HVJ .... 15,120kc, 19.84m Time of opening seems to vary, but generally around 4.30 p.m. and in Italian.

HVJ .... 11,740kc, 25.55m Prisoners-of-war announced at 5 p.m.

HVJ .... 9660kc, 31.06m Information re English prisoners-of-war at 3.10 a.m. (Perkins).

HVJ .... 6005kc, 49.96m Heard in English from 5.15 a.m. to 5.30 a.m. (Condon).

Portugal:

CSW-6, Lisbon .... 11,040kc, 27.17m Talk in Portuguese from 3.30 to 3.45 a.m. Station closes, but heard again at 5 a.m. with talk at 6 a.m., closes 6.30 a.m.

CSW-7, Lisbon .... 9740kc, 30.8m Opens at 6.40 with music.

CS2WD, Lisbon .... 6200kc, 48.38m Heard as early as 9.30 p.m. All announcements in Portuguese, and closes with Portuguese National Anthem at 11 p.m. Also heard occasionally at 7 a.m.

Roumania:

Radio Bucharesti, ... 9255kc, 32.41m News at 6.50.

Russia:

Transmission from either Moscow or Kuibyshev.

——, Kuibyshev .... 15,230kc, 19.69m U.S.A. programme at 10 p.m. Good morning session at 7.15. Also heard occasionally from 8.45 a.m. for about an hour.

——, Kuibyshev .... 15,180kc, 19.76m Good from 11 p.m. till midnight.

——,Sverdlovsk .... 12,225kc, 24.54m Russian at 12.30 a.m.

——, Sverdlovsk .... 12,060kc, 24.88m English from 11 p.m. to midnight.

——, Kuibyshev .... 11,885kc, 25.24m Not a clear signal but loud at 10 p.m. Calls Columbia Broadcasting System. Says: "This is Kuibyshev" and time check is given, (female announcer.) C.B.S. representative spoke at 10.10 p.m.

——, Askabad .... 10,150kc, 29.50m Name of station given at 9 and 10 p.m. But no call sign. This station must not be confused with Jap. station a whisper away. (See new stations).

——, Kuibyshev .... 10,040kc, 29.88m News at 3 p.m. and 11.30 p.m.

——, Moscow .... 9585kc, 31.30m News at 9.40 p.m. (Cushen).

RV-96, Moscow .... 9520kc, 31.51m News at 6.30 a.m., morse interference (Mitchellhill). Heard at 10 p.m. on April 8, "This is Kuibyshev calling N.B.C.." Reporter spoke then another to C.B.S.— splendid signal. (Gaden).

——, Kuibyshev .... 8050kc, 37.27m English at 6 a.m. Swirling background noise, R4, fades at 6.30 a.m. (Mitchellhill)

——, Kuibyshev .... 6115kc 49.08m N.B.C. and C.B.S. talks to U.S.A. at 10 p.m. (Gaden) News at 9.45 p.m. (Cushen).

RW-96, Moscow .... 6061kc, 49.5m English at 10 p.m. but much better signal on 31.30m.

——, U.S.S.R. .... 5910kc, 50.76m Great signal at 9.45 p.m. Closed at 10.15 p.m.— opened again later (Gaden).

Siberia:

——, Khabarovsk .... 9566kc, 31.36m Relays Moscow at 8 p.m. Heard in news at 10.07 p.m. (Perkins). See "Notes from My Diary."— Ed.)

Spain:

Radio Malaga, Malaga .... 7210kc, 41.61m Good most morning. News in Spanish at 7 a.m. (Condon).

EAJ22, Oviedo .... 7140kc, 42.02m Heard weakly at 7 a.m. relaying Radio Malago. Suffers from interference. (Condon).

Radio Mediterrania, Valencia, 70.35kc, 42.66m Opens at 6 a.m. with march. Slogan, "Voz Espana." R4 at 7.35 a.m. (Perkins) Takes Radio Malaga, 41.61 from 7 a.m. ta 7.20 (Condon).

Switzerland:
HER-3, Schwarzenburg 6165kc, 48.66m
Still heard of a morning with a musical programme and talks.

Scandanavia:

Sweden:
SBP, Stockholm 11,710kc, 25.63m
Now being heard from 4.40 p.m. till 5.30 p.m. Heard again in early morning about 4 o'clock.
SBU, Motala 9530kc, 31.46m
Heard call sign at 5.30 p.m. (Gaden)

Finland:
OFE, Lahti 11,785kc, 25.46m
Heard in late afternoon. News at 2.45 a.m. and 4.15 a.m.
OFD, Lahti 9500kc, 31.58m
Also heard in late afternoon and at 6 a.m. Gives news at 4.15 a.m.

MISCELLANEOUS

Canada:
CBFY, Montreal 11,745kc, 25.54m
Heard at good strength about 10.30 p.m. Note change in frequency. Heard morning devotion at 10.20 p.m. Had call sign at 10.30 p.m.— Ed.
News at 10 p.m. (Hooper) Only fair at midnight (Gaden).
CFRX, Toronto 6070kc, 49.42m
Opens around 9.30 p.m., but best at midnight.

CJCX, Sydney (Nova Scotia) 6010kc, 49.92m
Reported fair at 10 p.m.— but not at Carlingford — Ed.
CBRX, Vancouver 6160kc, 40.7m
This is a new one opening at 12.30 a.m. —see New Stations.

Iran:
EQB, Teheran 6155kc, 48.74m
News at 4.50 a.m.

Turkey:
TAP, Ankara 9465kc, 31.70m
News at 4.15 a.m., closes at 6 a.m.

Location Unknown:
——, ... 15,360kc, 19.53m
Transmitter of the friends of the S.A. (S.A. equals German abbreviation for Storm Troops). Another anti-Fascist station, location unknown, heard in German between 8.30 and 9 p.m.
——, ... 15,310kc, 19.60m
No call sign but this anti-Fascist station is heard from 9.30 to 9.50 p.m. in German.
"Deutscher Volkssender", ... 15,310kc, 19.60m
This "German Peoples' Transmitter" whose location is unknown and uses German only from 12 to 12.30 a.m. Definitely anti-Fascist, announces on 32 metres from 4 to 5.35 a.m.

"Radio Metropole,".... .... 11,735kc, 25.56m
This pro-Fascist station talking in Ukranian and Russian is heard from 1.15 to 1.25 a.m. (Most likely a Jap.)
——, ... 10,525kc, 28.50m
This anti-British station has now been heard on this frequency from 12.30 to 12.53 a.m. At 12.53 a.m. announcer says: "We are now signing off. Don't forget to listen on 9650kc at this is Broadcasting station."
(Can someone fill the blanks? — Ed.)
——, ... 9880kc, 30.36m
Sudeten German Freedom Station announcement in German or Czech ("Sudeten Deutsche Faciheits Station") 4 to 4.25 a.m. Czechoslovakian, 4.25 to 4.45 a.m. German.
——, ... 9750kc, 30.77m
This Free French station heard signing at 3.30 p.m. Good strength. (Cushen).

European Revolutionary Station 9640kc, 31.12m
Invariably announce they are on 31.20m. Heard every morning from 4 a.m.

Arabia:
ZNR, Aden 12,110kc, 24.76m
R3 at 3.40 a.m., closed 3.45 (Perkins).

(Continued on page 26)

SPEEDY QUERY SERVICE

Conducted under the personal supervision of A. G. HULL

"Ex-ham" (Newcastle) enquires about the use of transmitting gear as suggested in the latest (March) issue of "Q.S.T."

A.—Yes, we noticed the article and appreciate it as being most interesting We would not, however, accept the responsibility of recommending our readers to dabble in such matters as we feel sure that they would run foul of the radio inspectors sooner or later. In the U.S. they have definite rules which were introduced to cover the mystery gramoplayer outfits, and these rules can be watched, as suggested in the article. But, so far as we have been able to find out, there are no definite rules here to cover this subject, and it is pretty safe to assume that if such an outfit was heard on a broadcast receiver a report to the R.I. would follow, and then you would have to talk mighty fast to keep out of jail. For the benefit of those other readers who have not seen the article we might mention that the American hams, in an endeavour to keep active in spite of war restrictions, are suggesting to use induction transmission over short distances, being allowed to do so provided that the signal strength does not exceed 15 microvolts at a distance equal to the wavelength divided by twice pi. For a suitable wovelength in the broadcast band this works out at a hundred yards or so.

In the same issue there is a suggestion for using low frequency communication transmission via the power lines, but again we hesitate to think that it would be a suitable field for experiment in our particular case, our line voltages being so much higher. Both schemes sound interesting but dangerous.

★

P.E.P. (Torrensville, S.A.) has bought a speaker with a special transformer and finds that the original impedance has been scratched out and a new number scrawled on the transformer in pencil. He asks whether this is likely to have been done by a big speaker factory, also as to whether he can check the ratio by means of a multimeter and a small a.c. voltage.

A.— It is quite possible that the scrowl on the transformer was done at the speaker factory, such things being done even in the best of circles. However, it is quite a sound scheme to test the actual ratio by comparing voltages. We suggest, however, that the best way would be to connect a 2½ volt filament winding across the voice coil leads, with the transformer removed from the speaker. Then by measuring the voltage across the input leads you should get the overall turns ratio. You will not need to allow for inefficiency. The turns ratio, squared, should give you a key to the impedance ratio.

The baffle in the December, 1938 issue should be quite suitable for your speaker.

LOGGINGS

(Continued from previous page)

Newfoundland:

VONH, St. John's 5970kc, 50.25m
It is just about a year ago, in fact in April issue, 1941, I mentioned Mr. Roy Taylor of Mosman had reported hearing this station at 11.30 p.m.

West Indies:

COCY, Havana 11,740kc, 25.55m
Good at 3 p.m., fair at 7 a.m.—Ed.

COK, Havana 11,620kc, 25.82m
Good, morning, afternoon and night. English spoken frequently. Heard on most mornings around 7.30. (Condon).

COCH, Havana 9435kc, 31.80m
Heard at 9.45 p.m. (Gaden). Suffers from morse interference.— Ed.

COCO, Havana 8700kc, 34.48m
Heard nightly from 10 o'clock.

COCQ, Havana 8850kc, 33.9m
Can be heard morning, afternoon and night. (Condon).

COHI, Havana 6455kc, 46.48m
Heard around 10 p.m.

COCQ, Havana 6375kc, 47.06m
Fair from 9.40 p.m.

Haiti:

HH3W,Port ou Prince 10,130kc, 29.62m
Good in morning around 6 a.m.

Dominican Republic:

HI2G, Cuidad Trujillo 32.28m
Heard opening around 7.45 a.m., strength varies quite a lot. Ploys Blue Danube Waltz on opening. Mainly a musical programme. (Condon).

LITTLE COMPANION

(Continued from page 5)

the simplest circuit arrangement can follow our diagram, fitting a single resistor of about 250 ohms, instead of the original 100 ohm resistor and 5,000 ohm potentiometer. We say about 250, for in actual practice it may be found possible with some sets to use a resistor of only 100 ohms, thereby getting maximum performance. With another set of identical appearance, it may be found that 100 ohms will give instability trouble, making it necessary to use a resistor of 250 or even 500 ohms. A little experimenting is the only way to discover the best valve to use.

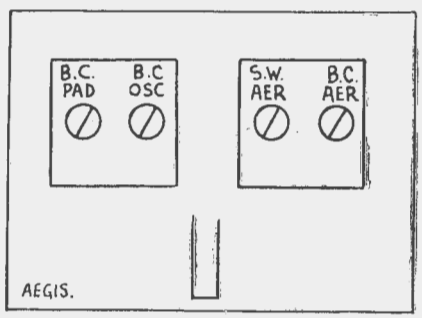
VARIABLE I.F.

Builders of "The Acoustic Compensated Superhet with Variable Selectivity," "My Own" and other receivers using the Britannic intermediate transformer with the tertiary wiring, should beware of a minor point which makes a whale of a difference in results. Some of these transformers are supplied with an internal wiring arrangement which connects the secondary trimmer to earth, instead of directly across the winding as required.

An inspection of the transformer will soon reveal this connection as a bare wire soldered across to the frame bolt on the top of the unit, inside the can.

The solution to the problem is to remove this wire and re-connect according to the original diagram.

Receivers using the earthed transformer will be found to lack sensitivity and tone and yet all voltages check normally, presenting quite a problem to anyone looking for the cause of the trouble.



THE "AEGIS" COLOUR CODE

The coil unit supplied with the "Little Companion" kit as marketed by J .H. Magrath Pty. Ltd., contains an "Aegis" coil kit with the following colour code:

Red — High Tension.
Orange — Osc. Grid.
Black — Aerial.
Yellow — Earth.
Green — Osc. Plate.
Brown — Control Grid.

The trimmers on the unit, looking at it from the front are (left to right) B.C. Padder, B.C. Oscillator, S.W. Aerial, B.C. Aerial.

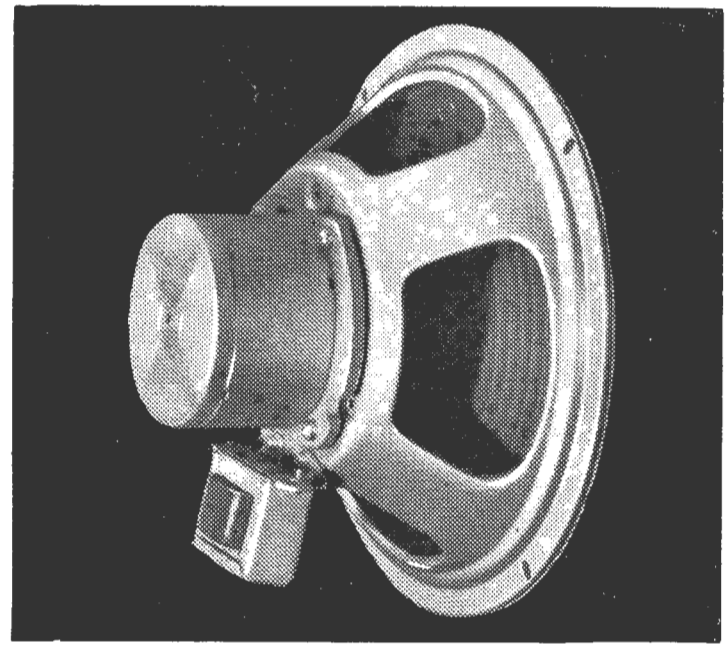
It will be noticed that there is no oscillator trimmer for short-waves and no short-wave padder. Both these are unnecessary and the short-wave band should fall according to the dial.

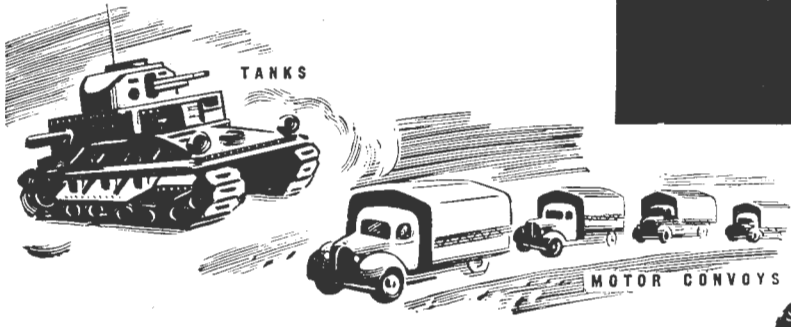
"Orders are Orders!"

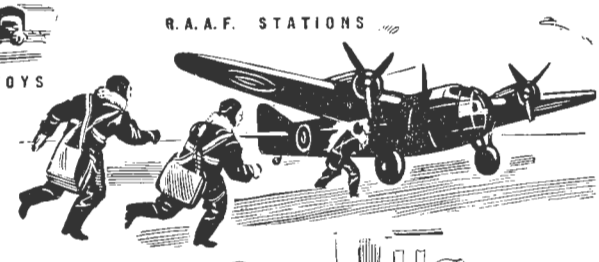
and they come clear and undistorted through

ROLA

LOUD SPEAKERS







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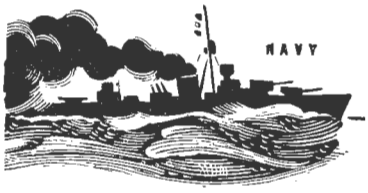

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LOOK WHAT A.R.C. HAS DONE FOR THESE MEN

"I would like to thank you for my Certificate, which I received quite safely. I would also like to thank you and the staff for your sincere co-operation while and since doing my course. I have also just received a position in the control room of one of our national stations, and like this work very much."

H. L., Hobart, Tas.

"I am writing to let you know that I, who took your service engineering course, am now in camp with the 1st Corps, H.Q. Sigs. of the 2nd A.I.F. I am in as a radio maintenance man and instrument (radio) mechanic. Because of the training I received from you I am able to take my place as engineer in a wireless station or mobile van radio station. Because of the training I have had I am able to pass tests set by the instructors where many fail, and it will probably mean two or three stripes for me as N.C.O. in charge of full transmitting equipment.

C.T.S., - Melbourne

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