THE AUSTRALASIAN

Radio World

VOL. 7 . . . . . NO. 1 JUNE 15 1942

Why tone compensation is necessary to offset scale distortion.

A radio cross-word puzzle to test your technical knowledge.

Full explanation of construction and operation of radio meters.

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Devoted entirely to Technical Radio

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ALL-WAVE ALL-WORLD DX NEWS

★ Proprietor —

★ Publisher —

★ Editor —

A. G. HULL

★ Editorial Offices —

117 Reservoir Street, Sydney

Phones: M 4078 - M 4079

★ Office Hours —

Week-days: 9 a.m. - 5 p.m.

Not open Saturday morning

★ Subscription Rates —

6 issues 5/3

12 issues 10/6

24 issues £1

Post free to any address

★ Service Departments —

Back Numbers, 6d. ea., post free

Reply-by-mail Queries, 1/- each

Laboratory Service, 2/6 per set

Vol. 7 JUNE, 1942 No. 1

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EDITORIAL

There is plenty of important work for every man in Australia who has any knowledge of technical radio.

The spheres of war are now so close that the big bombers come home to roost, often with their radio equipment riddled with bullets. Repairs must be made immediately, as we cannot afford to have any bombers idle. What splendid work for the radio repair man.

Not so spectacular, yet mighty important, however, is the maintenance of the modest home receiver. Through it comes the news and the propaganda which forges the national spirit, the will to win and right angle from which to view the set-backs and disasters which are inevitable, even when winning. If there were no radio broadcasting or newspapers there would be only rumour to spread such news.

Yes, every radio receiver in Australia, and there are over a million and a half of them, must be kept in perfect condition, especially since the manufacture of new receivers is restricted.

The job of keeping the sets in good operating condition calls for plenty of replacement parts and also a lot of work by those with technical knowledge. Anyone who has this knowledge should not have a spare moment of time. Every set he can keep in operating condition means that another man is available for reconditioning the transceivers of the big bombers. So we appeal to all our readers; use your technical knowledge now, as it is certain to be either of direct or indirect assistance to the war effort!

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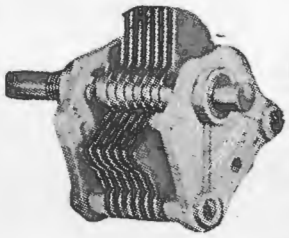

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TB6—"B" Class

TB6	Input "B" Class, bakelite case	18/6
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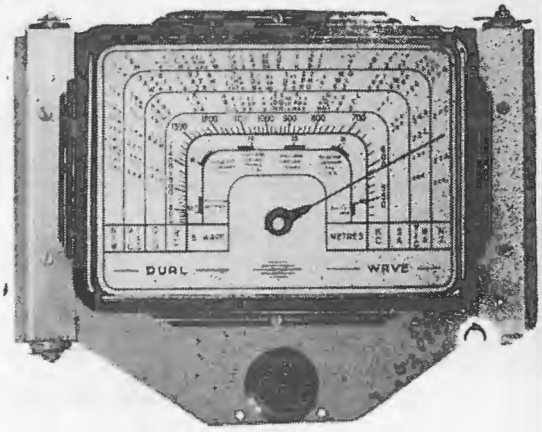
E346	R.F.	8/6
E347	Osc.	8/6

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



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Types DA1 and DA2 are single glass dual-wave, the type DA2 having been designed especially for use with the Five-Band Communications Coil Kit and "H" type condenser. Type DA1 is a standard dual-wave dial for use with R.C.S. coils and "F" type condenser. The DA-5 dial is for use on the 1600 to 550 k.c. and 13.7 to 40 metre bands, with "H" type condenser. All this series is edge-lit and wedge-driven. Aperture for the escutcheon is approximately 7" x 4-7/8."

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TONE COMPENSATION FOR SCALE DISTORTION

Tone compensation circuits have been most popular with our readers, and so this article should be of great interest.

By

A. S. EVANS

(Reprinted from the "Wireless World" England.)

DISTORTION is an ugly word, and to the quality enthusiast it conjures up visions of conditions which are insufferable and demand instant correction. It is, perhaps, because of this that there has been much confused thinking about the subjct of scale distortion.

It would appear from the many articles written on the subject that scale distortion is met with only when sound is reproduced by a loud speaker fed by an uncorrected straight-line amplifier, and this argument seems to have sprung from the false premise that the output from such a loud speaker and amplifier is itself level in regard to frequency.

The argument develops along the line that while the sound output at full orchestral volume is satisfactory, at lower levels of volume there is a disproportionate loss of the upper and lower frequencies. The cause of this, it is stated, is scale distortion.

Now in disproving this argument it is necessary to agree that scale distortion is not peculiar to mechanically or electrically reproduced sound, but is due to the comparative insensitivity of the ear to the extreme sound frequencies — a condition which becomes more pronounced at lower volume levels — and that no matter what the source of sound, the ear reacts in exactly the same way, and the result is scale distortion.

Natural "Scale Distortion"

In the concert hall, no matter where one sits or stands, the volume varies from one place to another, and because of this one has to put up with that nightmare of the quality radio enthusiast, scale distortion. The farther from the orchestra, generally speaking, the worse the distortion, but does one worry about it or complain or use some frequency-correcting gadget to clamp over one's ears? No!

It seems clear, then, that for the full enjoyment of a "live" performance, no matter how far from the orchestra one sits, so long as the sound is loud enough for comfortable listening there is no need for frequency-correcting devices, although scale distortion is inevitably present. The balance is automatically corrected by that very peculiarity of the ear over which we have worried unduly.

In short, scale distortion is both necessary and desirable for realistic listening, because if correction is not needed when listening to a "live" performance, then it should not be necessary, or needed, when listening to radio reproduction, provided that the reproducing chain is itself not introducing distortion.

Assuming Good Transmission

Now, granted all this, if we have a good radio transmission of an orchestral performance received by a good receiver coupled to an amplifier which will deliver to the loud speaker an exact copy of the original in terms of electrical energy, then we should be able to vary the volume of sound by means of the volume control in exactly the same way as we can vary the volume of the sound at the ear by moving away from the orchestra in the concert hall, and at the same time similarly to preserve the original musical balance at each gradation of volume. The effect, as heard, should be the same, because scale distortion is purely a product of frequency, volume of sound, and the peculiarity of the ear, which latter is totally indifferent as to the actual source of the sound.

In practice, however, there is no doubt that this most desirable result is not obtained when we listen to the sound reproduced by our baffle-mounted loud speakers.

Why not? Not because of scale distortion, because enough has been stated to show that this is necessary and desirable because it is present when listening to the original performance. So, if the sound as heard from the loud speaker is lacking in balance, then the fault lies elsewhere.

As already stated, the false premise is that the sound output of a baffle-mounted loud speaker fed by a straight-line amplifier is itself level and gives faithful reproduction at full orchestral voulme. If it does so, then, with the lowering of volume, scale distortion by the ear would, as it does in the concert hall, automatically adjust the balance for realistic listening.

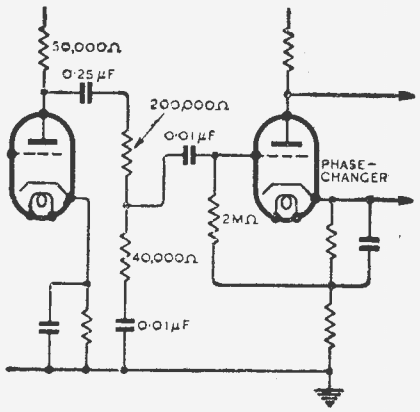

Figure 2.: The suggested correction circuit, designed for English valves, but readily adaptable for our types.

The fact is that the sound output of a reproducing equipment given a straight-line amplifier, follows the loud speaker frequency response

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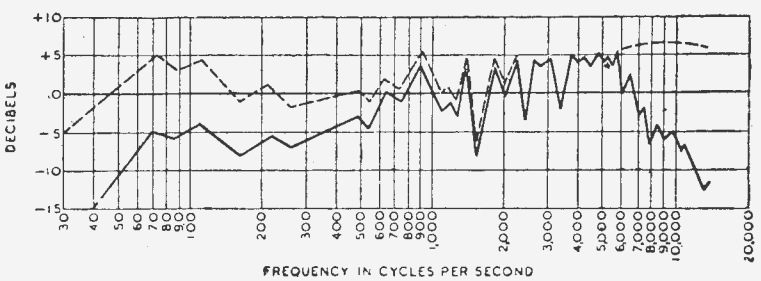


Figure 1.: The heavy line shows the response of the author's loud-speaker before correction, and the dotted line the approximate curve after correction.

SCALE DISTORTION

(Continued from page 5)

curve. The writer suggests that to say that the loud speaker with a response curve which falls by even only 5 decibels at the upper and lower extremities will give well-balanced reproduction at full volume under the aforesaid conditions is simply not true. To give full orchestral volume, a baffle-mounted loud speaker must be fed with something like 600 watts, and though under certain conditions about 50 watts will give the impression of full volume, it seems too much to expect any single loud speaker to handle this input. Even if a bank of loud speakers was to be fed with this input in a sufficiently large hall, it would be found that the result would be as lacking in balance, as might be expected from a study of the response curves.

The fault would appear to be, therefore, in the loud speaker; this, the writer believes, has been appreciated only by P. G. A. H. Voigt, whose horn-loaded loud speaker has been corrected for deficiencies in the bass by means of a "bass-chamber," making further correction in the associated amplifier unnecessary.

"Straight-line" Sound Output

It follows, then, as we cannot alter or improve the loud speaker itself — we must wait for the manufacturers to do this — that some correction must be introduced in the amplifier to make the sound output from our equipment truly "straight-line," and the writer will explain how this was done with his own equipment.

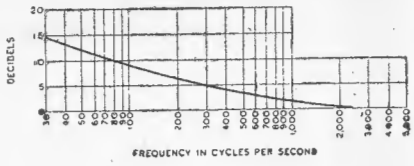
Most good loud speakers of today, especially the double-cone type, have a fairly uniform output upwards of about 700 c/s, but below this frequency the output is on a lower level, albeit only a few decibels, and this lower output must be brought up to the level of that above 700 c/s. Where the curve is level up to about 8,000 c/s, and then falls by up to 5 decibels to 10,000 c/s, correction at this end of the scale is not worth while in practice owing to the difficulty of avoiding an undesirable rise between 6,000 and 8,000 c/s. A circuit tuned to resonance at 10,000 c/s might answer, but under listening conditions the curve seems to be sufficiently satisfactory as it is. Of course, great care must be taken to prevent loss of top in the input to the loud speaker, the tuned circuits of the RF stages needing special attention.

The loud speaker used by the writer is of a famous make, and though it has not been extensively advertised in recent years, it is widely used where quality of reproduction is a first consideration. It has a 10 in. curved cone — the curve being of small radius — with a felt surround which results in a remarkably uniform and non-resonant output in the bass.

Bass and Treble Correction

The heavy line in Fig. 1 shows the makers' response curve. It will be seen that correction is needed at both ends of the frequency range. The output has been corrected up to at least 15,000 c/s by using a small horn-loaded moving coil tweeter fed through a suitable filter and connected across the main loud speaker.

The output below 700 c/s needs to be boosted by about 10 decibels. The



Curve of result to be expected from a circuit arrangement as shown in figure 2.

most practical method of bass boost, the resistance-condenser network, however, gives a rising bass characteristic which is, strictly speaking, not good enough. The writer, however, decided to use this method, but to use a combination which would give a slowly rising curve. The correction at 70 c/s, allowing for the fact that the loud speaker is mounted on a 4ft. by 7ft. baffle fixed in a corner of the room, should give a rise of about 10 decibels, or a voltage ratio of 3.2/1. To allow for a continuance of the rise below this frequency to compensate for losses owing to limitation of baffle area, resistances of 200,000 and 40,000 ohms were chosen with a condenser of 0.01 mfd. The resulting output is roughly as the dotted curve in Fig. 1, which, it will be admitted, is much better than the original.

Diode Needs Full Loading

As the receiver was used near the local station it was found that with a fully loaded diode detector it was not necessary to employ a separate tone-control stage. The resistance-condenser network (shown in Fig. 2) was placed between the diode load and the phase-changer valve with very satisfactory results.

Now the proof of the pudding is in the eating, and one has only to listen to the reproduction from a loud speaker, of which the response curve has been corrected in the way described, to realise that we no

(Continued on page 10)

THE CONSTRUCTION AND OPERATION OF METERS

An instructive description of the various types of meters used for radio work.

ENGINEERS recognise two methods of testing, namely qualitative and quantitative. The two terms are almost self-explanatory, but a simple example will serve to show the real difference between the two. Suppose you find that your radio receiver is not giving the volume to which you are accustomed; for some reason or another you suspect that all is not well with the output stage. You remove the output valve from its holder and replace it temporarily with one borrowed from a confiding friend. It operates perfectly and volume is restored; you had hit upon the faulty spot first time.

Apt to be Slow

But it does not always work out thus. Suppose that when you fitted the substitute valve things were no better than before. Then you would have to suspect some other part of the equipment and examine or replace each in turn until at last you found the seat of the trouble. Or, worse still, what if the original trouble was that your valve had been ruined by some wrong connection or short circuit within the set, and that when you experimented with your friend's valve you ruined that too? No, except for a few simple and obvious faults, qualitative testing is too slow, too uncertain, and sometimes too dangerous.

On the other hand, imagine that you possess some simple and cheap measuring instruments — a milliammeter, say, and a voltmeter. When your set showed symptoms of trouble you could have measured the anode current of the output valve. If you found the reading was below normal, you would know at once that one of a certain number of things had occurred. Either the valve had lost a part of its emission, or the high-tension voltage had fallen considerably or the grid-bias voltage was too high and so on. Then you could make further tests in order to discover the exact cause of the poor performance. Quantitative testing is quick, simple, and final.

In the early days of radio, when sets and circuits were comparatively simple and the average standard of performance low, qualitative testing was sufficiently speedy and accurate for most amateur needs. To-day, however, circuits are relatively complicated, and components have a high order of efficiency. Mathematically accurate adjustment is the order of the day, and very small errors in adjustment bring serious consequences in loss of selectivity, sensitivity, stability, and quality.

A Mistaken Impression

It is often thought that testing instruments are an expensive luxury, and this accounts for the fact that only a very small proportion of even those who call themselves serious radio amateurs possess even the simplest gear for carrying out accurate tests. This is, however, quite a mistaken notion, for quite valuable results can be obtained by means of most inexpensive and simple equipment.

Before describing the various types of instruments available and the quickest methods of conducting tests with their aid, it may be of assistance to outline briefly what quantities are most suitable for measurement, and the principles involved in the process.

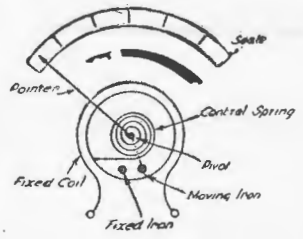
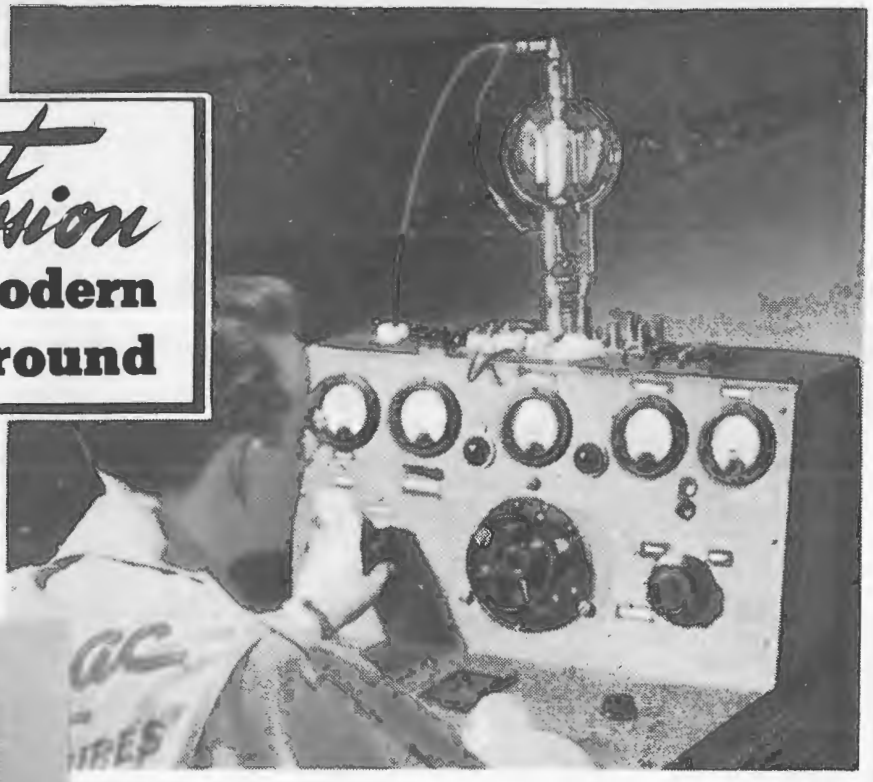


Figure 1

In the first place it is necessary to realise that all the happenings in a radio set are, in effect, the passage of electric currents of different kinds, some constant in value, and some of varying strength. It is upon the correct values and be-

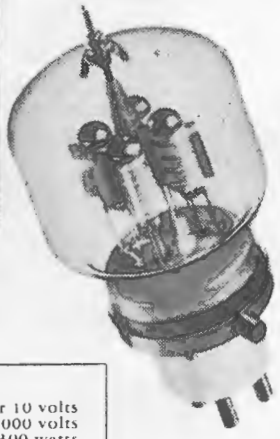
(Continued on page 9)

Filament Emission Makes the Modern World Go Around



Close observation of the flow of electrons from a heated filament is made possible with this Electron Microscope. This instrument, designed and constructed in the Eimac laboratories, virtually gives a motion picture projection of the electron movement.

Before filaments are sealed into the triode they are placed in a temporary vacuum where they undergo their first emission test. Thus faulty filaments may be weeded out without further processing.



THE LIFE of radio communications hangs by a tiny thread of filament wire. If the steady flow of electrons from the vacuum valve filaments ceases, the transmitter is off the air no matter how excellent the other components may be performing. To assure peak emission under the most severe operation conditions; many exacting tests are conducted during the process of manufacture.

Above is an Eimac technician checking an Eimac valve on the Peak Emission Tester. This device, designed and constructed in the Eimac laboratories, measures the flow of electrons emitted from the completed valve. Of a long series of filament tests conducted at various stages of manufacture, this test is the final. Other important controls are illustrated at left.

From beginning to end, Eimac valves are designed and constructed to give vastly superior performance. The proof that they do is made clear by the fact that Eimac valves enjoy first choice in the minds of leading radio engineers throughout the world.

EIMAC 304T	
Filament Voltage	5 or 10 volts
Plate Voltage (D. C.)	3000 volts
Plate Dissipation	300 watts
Power Output 3000 volts at 75% eff.	900 watts

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METERS

(Continued from page 7)

haviour of these currents that the set operates.

Like all electric currents, those occurring in a radio receiver are primarily due to the existence of electric pressure — voltage — applied by some apparatus capable of developing that pressure. This may be an electric battery, as in the case of an accumulator for low-tension supply, or a dry high-tension battery; or again, it may be the electric light mains, the pressure of which is generated by a dynamo at the power station. In any case, there must be a voltage before an electric current can pass.

Two Factors

Further, however great the voltage, no current can exist unless there is a complete circuit along

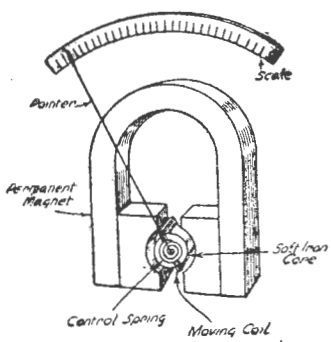


Figure 2

which it can pass. The breakage of a wire, the disconnection of some component, or the fracture of a soldered joint will interrupt the path along which a current should travel, and the current will no longer exist.

The strength of the current depends upon two factors: first the amount of the voltage, and second the extend to which the circuit offers opposition to the passing of the current. This opposition is termed resistance, which is property possessed by all materials to a greater or less degree. It is clear, therefore, that for a large current to pass through a circuit of a given resistance a bigger voltage will be required than for a small current; and similarly for a current of given value to pass through a high resistance, a larger voltage will be required than will be necessary to drive the same amount of current through a smaller resistance.

Thus it will be seen that, in the great majority of instances, tests upon the condition of a receiver will consist of ascertaining whether currents of the correct strength are passing in the different circuits forming the set; so that it is desirable to have at hand apparatus for measuring fairly accurately the strength of electric currents.

Then, if our current tests show that the current values are not correct, we shall know for certain that one or other of the factors which govern the correct length is at fault.

In order to measure anything, be it length, weight, or electrical quantities, it is necessary to have a standard or unit of comparison. Thus lengths are measured in feet or yards; weights in pounds or tons; and electrical quantities have a special set of units of their own.

Current Strength

Electric current strength is, as most listeners know, expressed in amperes. Very few currents in a receiver amount to more than a fraction of an ampere — the exception is the low-tension current of an A.C. mains set which amounts to about one ampere per valve. So quantities less than a tenth of an ampere are usually measured in milliamperes one milliamp. being one thousandth part of an inch.

Electric pressure is measured in volts. Very small voltages may be expressed in millivolts (thousandths of a volt) or even micro-volts (millionths of a volt) but such delicate measurements need very expensive instruments usually beyond the reach of amateur listeners.

Finally, resistance is measured in ohms, very high resistances being sometimes expressed in megohms. A megohm is, of course, one million ohms.

Following a Law

Next, it is important to remember that there is an exact and never varying relation between the direct current flowing in a circuit, the voltage producing it, and the resistance which limits its value. This relation is contained in a formula, commonly known as Ohm's Law, which states that the current in amperes is equal to the pressure in volts, divided by the resistance in ohms.

The simplest form of measuring instrument, and that upon which all

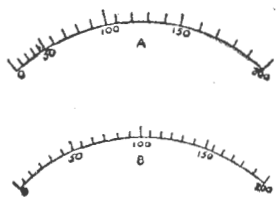


Figure 3

other indicating meters are based is the ammeter or milliammeter (the name depends upon whether it will measure currents of large or small intensity). Of the many types of these instruments, only two are likely to be handled by the amateur, namely moving-iron instruments and moving-coil instruments.

In the moving-iron instrument the current to be measured is passed through a fixed coil of wire within which are two pieces of iron, one fixed in position and the other capable of moving about a central pivot, see Fig. 1. When the current to be measured passes through the coil it produces a magnetic field, and both pieces of iron are magnetised in the same direction. They consequently repel each other, with the result that the piece which is pivoted moves away from the fixed piece.

The movement of this piece is opposed by a spiral spring, and the amount of movement depends upon the magnetising force which, in its

(Continued on next page)

A BATTERY QUIZ

1. How may the chemical action in a lead acid battery be entirely suspended?
2. What would you do if battery acid were spilled on your carpet or your clothes?
3. Why cannot a lead acid battery be sealed like a dry primary ("B") battery?
4. When mixing sulphuric acid and distilled water, is it correct to pour water on acid or acid on water?
5. If you accidentally swallowed a mouthful of battery acid —
   (a) What effect would it have?
   (b) What would you do (first aid)?
6. What is the chemical symbol for lead?
7. What is the chemical symbol for sulphuric acid?
8. What is the specific gravity of pure undiluted sulphuric acid?
9. Why does a homelight cell require more electrolyte surrounding the element than is the case with a car or radio battery?
10. What is the correct name for a lead acid battery of the pasted plate type?

If you get stumped, look for the answers on page 10.

METERS

(Continued)

turn, depends upon the strength of the current. A pointer attached to the pivot moves over a scale, thus indicating the amount of deflection of the iron and hence the strength of the current.

Moving Coil Instrument

The second type of instrument is known as the moving-coil instrument. It consists of a permanent magnet, usually of the horse-shoe type, between the poles of which is pivoted a coil of wire as indicated in Fig. 2. The current to be measured passes through the coil of wire which is, of course, magnetised. Mutual attraction and repulsion between the poles of the magnet and the poles of the coil takes place, and the coil, being free to move against the pressure of a spiral spring, is deflected to an extent depending upon the current strength, its deflection being indicated by a pointer which passes over a graduated scale.

In practice the moving-coil instrument is preferred to the moving-iron, chiefly because it is more accurate, and because the scale is more "open." Fig. 3.

It must be remembered, however, that moving-coil instruments are only serviceable for direct current measurements, while moving-iron instruments may be used for either direct or alternating currents.

COLOUR HARMONY

The well-known psychological effect of colour is now being used in the design of machines. In a recent survey it was found that for a certain lathe a "spotlight" buff at the working areas and a "horizon" grey on the machine body increased operating efficiency. The accident hazard is reduced through proper colour selection by increasing the visibility of moving parts by "spotlighting" with colour or by silhouetting against a background.

NEW IRON ALLOY

Another hitherto rare metal is now going into use with the development of columbium-iron alloys. The addition of 3 per cent. of columbium to carbon-free iron produces a metal having good anti-creep properties at temperatures as high as 1100 deg. F. Steel for use at such temperatures is of interest for use in steam turbines.

SCALE DISTORTION

(Continued from page 6)

longer need to worry about scale distortion. It would be better to convince the loud-speaker manufacturers that they must redouble their efforts to produce a straight-line output loud speaker. The writer is convinced that the remedy will be found in the infinite-baffle type of loud speaker. This type is capable of an extremely smooth and low bass response, but care must be taken not to mask this by the usual rise in output between 1,000 and 6,000 c/s, which rise, besides robbing the bass of its beauty, results in a certain thinness of reproduction, if not a tendency to hardness.

The writer concludes with the hope that when loud-speaker manufacturers resume their advertising in the piping days of peace, they will be able to add to the claims they make for the merits of their products the one that no frequency correction is necessary in the amplifier to realise truly realistic reproduction.

ANSWER TO BATTERY QUIZ

1. Only by drying out the elements thoroughly.
2. Apply washing or baking soda or cloudy ammonia generously.
3. Because gas formed by natural action must be allowed to escape.
4. Acid on water — gradually and keep stirring.
5. (a) Will burn the skin in mouth, throat and stomach.
   (b) Swallow whites of several eggs. Send for doctor.
6. Pb.
7. H_2SO_4.
8. 1.830.
9. Because working on a lower specific gravity range it requires extra volume for sufficient acid content.
10. Faure.

— Vesta Vamp

TECHNICAL PRESS DOES A VITAL JOB

MR. JOHN PASCOE, one of England's leading industrialists and head of a large firm, recently made an appeal for co-operation between the technical press and industry. The technical press, he said, helped to build successful businesses and he paid a compliment to the manner in which the technical press is doing its important war-time job amid difficult conditions of paper supply and manpower. It is doing real and vital service to industry, and its work is an essential part of the drive for higher production. It is, in fact, an essential industry in itself, for all executives know how valuable it is to get together with fellow technicians. Technical journals stage a conference of the industries they serve once a week, bi-monthly or monthly. They give us news of the latest results of research, and the practical application of new production ideas. They abstract the essential points from overseas journals and save industry an immense amount of time and trouble in so doing. They assiduously work, issue by issue, to serve industry, executives and personnel.

News Service

They provide a valuable news service, and place before readers the services of skilled technicians who contribute to their pages. In articles we are able to read the views of experts, to talk with whom we would gladly travel from one end of the country to the other or pay many guineas for a conference. They act as an exchange of information on welfare and other works problems.

A technical journalist has to be doubly skilled; he has to be a good journalist to start with and a responsible one. He must also possess a high degree of technical knowledge covering a large number of subjects and a large number of industries. He must be au fait with the particular trade covered by his journal; he must understand trade agreements, trade politics, Board of Trade requirements; he must know all the important sources of information, the leaders of the industry, and where to check his facts. He must be on the qui vive for the whole time attending trade meetings and lectures, inspecting new inventions, visiting factories, telephoning here, interviewing there. He must give a prompt service to his readers otherwise his journal would shop up badly by comparison with his competitors.

Technical periodicals and technical books exist for all industries, and the wise technician follows his trade and technical press. The great demand for technical books and technical periodicals exists because there is an equivalent demand for technicians anxious to make up for lost time. They want to acquire technical knowledge quickly.

—"Practical Wireless" (Eng.)

DRAUGHTSMEN NEEDED

Consider the complexity of modern defence needs: A modern battleship requires 30 tons of blueprints before construction is even started; 5,000 different blueprints must be drawn for a combat plane, 2,500 for a tank, 250 for a rifle, and 40 for even a simple looking object such as a shell.

DEALING With The PROBLEM Of INSTABILITY

A set which is stable is more efficient. Stability is easy to obtain when you look for it systematically.

By
JAMES GIBBONS
(Reprinted from the "Wireless World" England.)

AMONG the many faults which a wireless receiver can develop, and one of the hardest to locate, is that of instability. Like many other defects, it may be just perceptible, or immediately obvious, and ranges from hardly audible "motor-boating" at full volume to a violent succession of whistles as the tuning condenser is rotated. Again, the cause of such instability may be a change of circuit conditions in either the A.F., R.F., or I.F. circuits. It is widely known that this effect is always caused by unwanted reaction, and is the result of spurious coupling between two or more circuits in cascade, or to self-oscillation of any particular stage.

Whistles in superhets need not be regarded with grave concern in every case. All receivers of the low-I.F. type and particularly those without any signal-frequency amplification have self-generated whistles, usually on that part of the band which coincides with a wavelength equal to the 2nd harmonic of the intermediate frequency. This is, of course, due to a beat effect between the output of the second detector and a received signal. It is one of those self-generated whistles which have to be considered when the receiver is designed, because very little can be done about it afterwards.

Typical Causes

The cause of instability in a wireless receiver may be fairly simple, such as wrong operating voltages on I.F. or F.C. valves, or more elusive, perhaps being due to S.G. by-pass condensers having become open-circuited, or to the screening of coils, or leads, become disconnected from, or developed high resistance contact to, earth. Metallised valves, too, develop queer tricks. The connection between the metal coating and the cathode sometimes works a little loose, and often provokes acute instability. Anything, therefore, which tends to reduce the efficiency of inter-circuit screening, and decoupling, or introduces unwanted coupling by high-resistance contacts, must be suspected when normal stability is affected.

A systematic check of all the possible causes, starting with the simplest, is the best procedure. First of all it should be noted what type of instability has developed. Is it present all the time, or only on the weaker stations? Does it occur only at certain positions of the wave scale? Does the set seem lively, etc.? A careful test will often give a clue to the whereabouts of the trouble; for instance, unstable conditions which show up only at certain positions on the tuning scale are quite often caused by poor contact to the different rotor sections of the gang tuning condenser. If this is suspected, and, for that matter, at any time a set is being given a "surface" overhaul, these contacts should be removed and their surfaces cleaned with petrol and fine glass paper. On replacing, the contact tension should be increased, and a smear of vaseline

applied to the bearing surfaces. It is also advisable to examine carefully the continuity of the earth wire, and earthing device. There are many commercial superhets that are not at all happy when worked without an earth, while nearly all high-gain T.R.F. sets develop self-oscillation at the high-frequency end of the band without its stabilising influence.

Visual Indications

Keen visual observation has always been a necessary asset to rapid fault-tracing in radio receivers. Quick perception will often reveal in a fraction of the time faults which could only be found in a general way by much tiresome routine testing. It is, therefore, good practice to make a careful examination for obvious defects. Be always on the lookout for traces of electrolyte round the bases of tubular electrolytic condensers. This sometimes dries and makes detection difficult, but it always impairs good contact, and increases the apparent power factor of the condenser, causing reduced general performance, abnormal hum level and reduced H.T. voltage in the case of reservoir condensers, and low volume, thin reproduction, and instability in the case of smoothing condensers. Press all coil cans, valve screens, etc., firmly down on their bases, giving them at the same time a screwing motion to make sure of a good biting contact. Be suspicious of all earthing tags making sure of their electrical connection to the chassis; remember that high-resistance contact to earth of screening and decoupling components has been productive of more cases of instability than any other single cause. Check carefully all soldered connections to valve-holders and decoupling components. It takes very little time to re-solder many joints, while a poor one which goes undetected is probably the most difficult of all faults.

Informative Tests

Many rough, but informative tests can be made before the chassis is removed from the cabinet. If the main smoothing condenser is suspected of being open-circuited, a substitute can be tried between the H.T. side of the output transformer and chassis, or between the S.G. of an output pentode and chassis. Sometimes, too, stability can be restored by touching the metal coating of one of the valves. The implication here is obvious, and that particular valve and stage should be checked without delay. S.G. decoupling condensers can likewise be temporarily connected between the appropriate contact on the valve-holder and chassis, if the mechanical design and layout will

(Continued on page 17)

A RADIO CROSSWORD PUZZLE

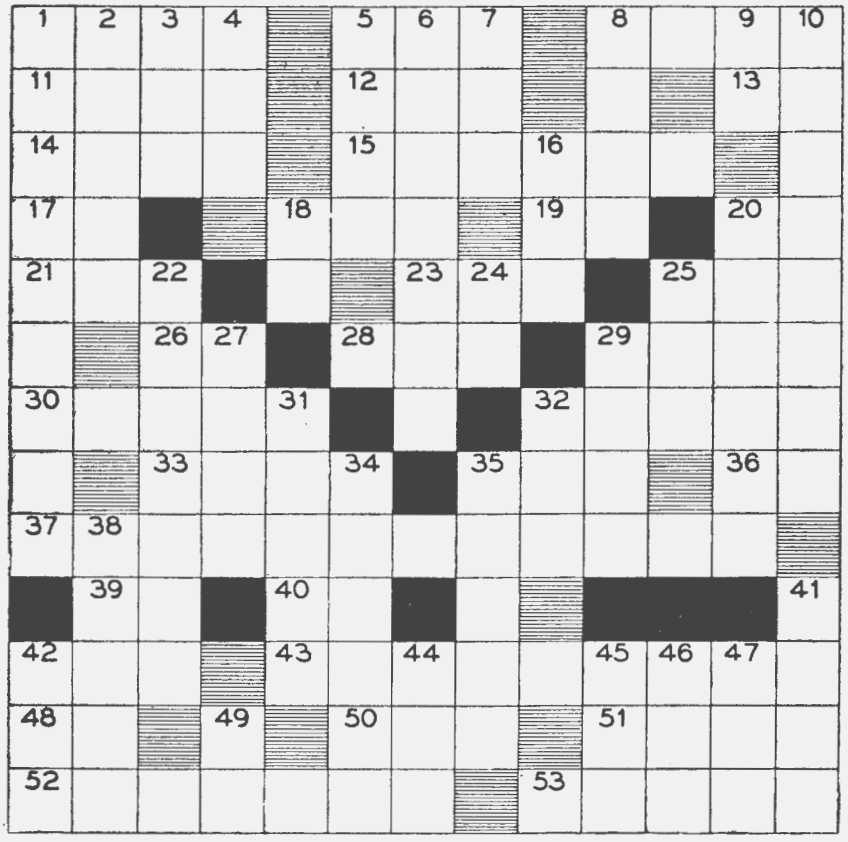
Many a radio enthusiast is also keen on cross-word puzzles. Here is one which tests radio knowledge as well as cross-word skill. It is reprinted by kind permission of the technical journal "Radio" from U.S.A. An interesting point is the "V for Victory" theme in the layout.

DOWN

1. Capacitor.
2. Type of rounded convex moulding.
3. Group of coactive stations.
4. Point of the compass.
5. Counterweight used in physics.
6. Doctrine contending the universe to be composed of minute particles.
7. Combining form meaning "foot."
8. Negative voltage applied to amplifier grids.
9. New Hampshire (abbr.)
10. Oscillator with "negative-resistance" characteristic.
16. When you hear this in the rig, pull the switches and grab it.
18. Go ahead.
20. Positive ion (abbr.).
22. This polygon has nine sides, nine angles.
24. Fifth part of a nickel (abbr.)
25. Resistive circuit used in mixing.
27. Transmission of a speech-modulated carrier.
29. Scrambled vowels ("u" excluded).
31. Maximum horizontal projectile distance (ballistics).
32. Legal exclamation of annoyance for fone men.
34. Bisector of a triangle.
35. Middle part of a ship.
38. Work measured in terms of its heat equivalent.
41. First transmitter stage (abbr.).
42. Triumphant ejaculation upon catching neighbourhood children uprooting antenna poles.
44. National Recovery Administration.
45. Symbols of Ohm's Law.
46. Electrified particle.
47. Symbols for: number of turns; time, in seconds; current in amperes.

ACROSS

1. Speaker component.
5. Variable position on a resistor.
8. Group of frequencies.
11. Device for maintenance of constant crystal temperature.
12. Suffix for naming certain salts and esters.
13. Inductance unit (abbr.).
14. Quality of a c.w. signal.
15. Surveyor's assistant.
17. One-tenth liter (abbr.).
18. Precious stone.
19. And.
20. Audio system for group consumption (abbr.).
21. Great geological time unit.



RADIO v. DISEASE

Sound, of which there are so many pleasing and annoying variations, may be used in the future to help fight disease. A new short wave sound generator has been constructed that produces sound that will kill staphylococci bacteria which cause boils and carbuncles. The device consists of a nickel tube in a fluctuating magnetic field. The resultant rapid oscillating motion of the tube produces sound with a high frequency of 9,300 cycles a second, which is deadly to certain bacteria.

23. Type of transmission.
25. Instrument used in volume control (abbr.).
26. Preposition.
28. Amateur signal reporting system.
29. Symbols for: electric field intensity, gain, switch, resistance.
30. XE title of courtesy.
32. Three guesses on this one.
33. Indo-Chinese Kingdom.
35. This is pitched widely.
36. Switch position.
37. Condition in which a portion of circuit output is applied, in phase, to the input.
39. Symbol for output load resistance (letter and subscript).
40. Good.
42. Another time.
43. Developer of the theory of Relativity (possess.).
48. Put some of these together, and you'll have a good laugh.
50. Skill of performance.
51. Reserve Officer's Training Corp. (abbr.).
52. Device used as a radiator.
53. Xmtr stage preceding antenna.

CIRCUIT FOR A TWO-VALVE PORTABLE SET

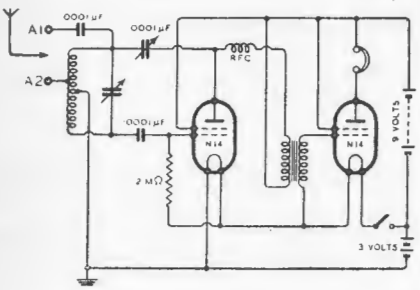
Should give good headphone reception, yet needs only nine volts of high-tension.

An interesting little circuit appeared in a recent issue of the English "Wireless World." As we feel sure it will interest a large number of our readers we are reprinting it on this page.

The circuit is designed to provide a compact portable set for headphone use, having as its big attraction a high tension voltage of only 9 volts, which can be obtained from a "C" battery or other small source of current. The filaments are operated from a couple of small torch batteries, and are wired in series so that the current drain is kept at a minimum.

The Valves

The valve type specified is in the 1.4 volt range and is an English



Suggested circuit diagram for two-valve headphone set to use a very low high-tension voltage. The valves are both of the "beam power" output type.

type of output valve, equivalent to our 1Q5GT. As doubtless most of our readers already know, valves of this type are rather scarce at present, but there seems to be no reason why other types of output pentodes should not be used in a similar circuit, with modification to the filament circuit if they are not of the 1.4 volt type. Doubtless many of our readers have spare output valves of some kind which can be used for experimenting with this circuit.

The Coil

Another interesting feature of the circuit is the reaction arrangement, a single coil winding being used with tappings. The coil can be of any suitable number of turns according to the size of the former. Any winding which will cover the broadcasting band with a tuning condenser should be O.K. Incidentally the earth tapping will be about the middle of the coil, with the alternative tapping for the earth connection about one fifth of the way out from the centre.

As is usual with regenerative circuits of this kind, it is possible for the set to radiate whistles unless the reaction control is handled intelligently. Under no circumstances should the set be allowed to oscillate.

The Audio Transformer

The audio transformer should have a ratio of 3½ or 5 to 1, any serviceable transformer from any old set being suitable for experimenting in this circuit.

On Short-waves

The circuit should be equally suitable for operation on the short-wave bands, the only modification being in the matter of the coil and condenser, which will need only low inductance and capacity if used to cover the short-wave band.

DIRECT and ALTERNATING CURRENTS

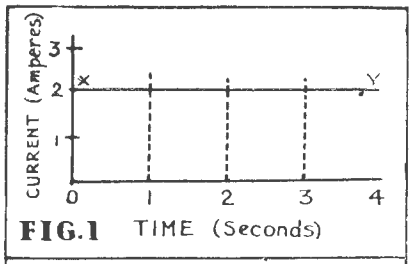


FIG.1

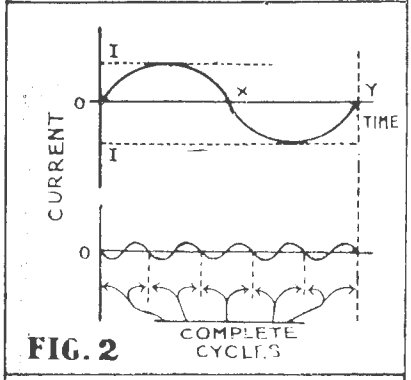


FIG. 2

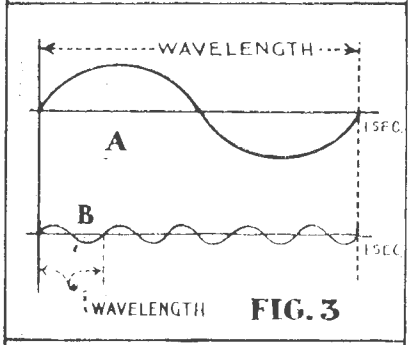


FIG. 3

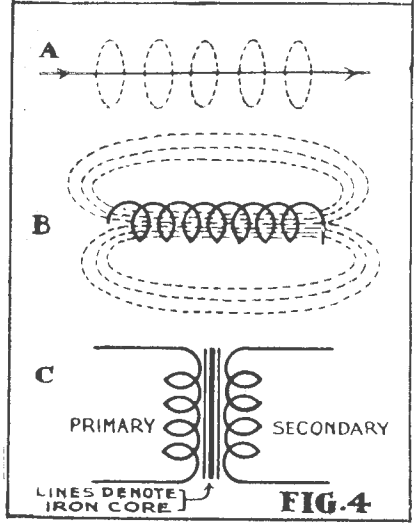


FIG.4

SO far only one kind of current, that known as direct current, has been considered. There is another variety — alternating current — that is just as important as d.c., if not more so, because the principles governing radio transmission and reception depend on its action.

Direct current flows in one direction only, i.e., is uni-directional. Fig. 1 shows a graphical representation of a steady direct current of 2 amperes. The time is taken from the moment the switch controlling the circuit in which the current flows, is turned on. Because neither the voltage nor the resistance changes, then from Ohm's Law ($I = \frac{E}{R}$) the current must remain the same, and so it is represented by the straight line "XY."

Under certain conditions the current might not remain constant, but no matter how much it fluctuates, as long as it always flows in the same direction it is still direct current.

A.C. Changes Direction Regularly

Alternating current, just as its name implies, alternates, or changes its direction of flow from time to time. Its action can also be best explained graphically.

At the point "O" on figure 2, both time and current values are at zero. Starting at this point, the current steadily increases until it attains a maximum value "I," and then it decreases at exactly the same rate until at the point "X" on the "Time" axis it has fallen to zero. Now it changes its direction and flows the other way. This is shown on the graph by drawing the curve representing its progress below, instead of above, the "Time" axis.

Once again, the current steadily builds up to a maximum value "I," but in the opposite direction this time — and returns to zero again (at the point "Y"). From this point on the whole process is repeated again and again until the circuit is broken.

Each completed operation — current starting from zero, building up to maximum, returning to zero, reversing direction and again building to maximum and returning to zero — is termed a cycle. If the time taken from "O" to "Y" is 1 second, then the frequency of the current is 1 cycle per second.

If, as shown in the lower portion of the sketch, 5 complete cycles are performed in the one second, then the frequency is 5 cycles per second. Most alternating current mains supplies have a frequency of 50 cycles per second.

Audio and Radio Frequencies

So far we have dealt only with low frequencies, which are measured in cycles. Low frequencies, or audio frequencies as they are often called in radio, extend upwards to the upper limit of audibility, which is about 18,000 cycles per second. Frequencies much greater than this are spoken of as high, or radio frequencies, though there is no clear-cut line of division between the two.

High frequencies such as those used in radio are measured in kilocycles (thousands of cycles) or megacycles (millions of cycles) per second.

Thus station 2FC, transmitting on a frequency of 610 kilocycles per second, has no less than 610,000 cycles of high frequency alternating current flowing in its transmitting aerial every second.

Part 4 of this series of instructional articles on radio theory will appear in next month's issue.

Wavelength and Frequency

There is a simple relationship between wavelength and frequency that will become obvious after figure 3 has been studied a little.

The length of one complete wave is shown in figure 3(a), where the frequency is one cycle per second. In 3(b), where the frequency is 5 cycles per second, the wavelength must obviously be one-fifth of what it is in 3(a). It is clear that the more waves there are every second (the greater the frequency, in other words) the shorter is the wavelength. In fact, the two are inversely proportional — double one and the other is halved.

Speed of Radio Waves

All radio waves travel at the same speed — that of light. This is 186,000 miles per second, which is approximately equal to 300,000,000 metres per second.

It now becomes clear that if a station operates on a frequency of 1,000 kilocycles per second, which equals 1,000,000 cycles per second, the length of each wave in metres must equal the distance covered in one

second divided by the number of cycles per second — in this case, 300,000,000 ÷ 1,000,000, which equals 300 metres.

So we see that the frequency with which the waves are created governs the wavelength, and if either wavelength or frequency in cycles is known, the other can be found by dividing the known quantity into 300,000,000. (If the frequency is in kilocycles, then 300,000 is the figure to use.)

Measuring A.C.

Some further qualities of alternating current will now be considered. First of all, as a.c. is always changing in value, it is measured in terms of its average, or Root Mean Square, value.

This gives in amperes the current which would be required with d.c. to provide the same heating effect. The R.M.S. value of an alternating current is approximately .707 of the peak value. The voltage of an a.c. supply, which alternates in the same way as the current and at the same frequency, is measured in exactly the same way.

A.C. Superior to D.C.

The main advantage of a.c. over d.c. for a mains supply is that it can be easily transformed to any desired votage. By stepping it up to a high voltage and low current, it can be transmitted over long distances with little loss. Where required, it is easily stepped down again to a lower voltage by a transformer.

How a Transformer Works

If a direct current is passed through a length of wire, a magnetic field surrounding it is set up, as shown in figure 4(a). This field can be strengthened greatly by winding the wire in the form of a coil, as shown in 4(b). The lines of force surrounding the coil remain steady until the current is cut off, when they collapse and disappear.

If a.c. is applied to the winding instead of d.c., it can be seen that the magnetic field will build up and collapse twice for every cycle of the alternating current, because the a.c. itself builds up and returns to zero twice during every cycle.

Now, if we were to place another winding in close proximity to the first, as shown in 4(c), it would be found that the fluctuating magnetic field in the first coil would induce an alternating E.M.F. or voltage in the second. This action is known as mutual induction.

The amount of transfer that takes place depends on the degree of coupling that exists between the two windings. This can be greatly increased by providing both coils with an iron core, as is done in audio and power transformers.

If both coils have the same number of turns, then theoretically the voltage induced in the second will equal that applied to the first. If 250 volts a.c. be put across the primary, which is always the winding across which the voltage is first applied, and the secondary has twice the number of turns the primary has, then a voltage of 500 will be available across the terminals of the secondary.

Of course, this is assuming that there are no losses; actually a transformer has an efficiency of about 85 per cent., which means that if a voltage is required to be stepped up to twice its value, slightly more than twice the number of primary turns are needed for the secondary to allow for loss during the transfer.

Next month: Inductance and Capacity.

INSTABILITY

(Continued from page 13)

allow. If not, remove the chassis right at the start and work in comfort. Always re-arrange as before, any inter-circuit wiring disturbed during tests. This is important, as neglect to do it may provoke further instability, and even A.F. circuits are sometimes quite critical.

Stray Couplings

Volume control wiring should always be treated with respect. The controlling potentiometer in many sets is used as, or part of, the signal diode load resistance; it is therefore in circuit with the high-gain end of the I.F. amplifier and second detector. Any careless derangement of its attendant wiring may cause unwanted self-generated whistles by reaction between nearby leads carrying R.F. currents. The writer knows of at least one commercial superhet which was cured of a nasty whistle by altering the run of wiring to the volume control, thereby eliminating acute 2nd-I.F. harmonic feedback. It is so often the small things which make the big differences.

A flat, unchanging howl and/or "motor-boating" are manifestations of instability which are peculiar to A.F. circuits. Again the most likely causes are O-C anode de-coupling components, or cathode resistor bypass condensers, and/or a partially O-C smoothing condenser. This latter component, if its capacity has become low, can cause most puzzling faults, ranging from an 80 per cent. reduction in general performance, or perhaps whistles on all but the strongest signals, to barely perceptible "motor-boating." Further, there is never any rise in hum level, as might be expected. As a potential destroyer of performance this component is nothing if not versatile, as many service-men will ruefully testify. Accordingly, it should be checked at an early stage.

Finally, the writer would like to repeat an axiom that is well known wherever successful radio servicing is performed. It is this: "Never take anything for granted, test it, and be sure, or surprised."

—"Wireless World" (England)

SIMPLE SET TESTING WITHOUT METERS

So the set that you wired up so carefully won't work! Well, the same thing has happened to many a good man so there is nothing to worry about. Generally it is not particularly difficult to find the cause of the trouble. By using a No. 6 cell, a 1½ volt globe, a few odd pieces of wire and a piece of tin, you can make up a tester to give you "continuity" tests. That is to say, you can find out if there is a continuous path for electric current where there should be one and also if a path exists where there should not be one.

Lamp as Indicator

The sketch will give you an idea of what the device looks like. Alligator clips on the test-ends of the wires of leads (pronounced leeds) as they are called, are an advantage. If you want to be really up to date you can invest in a pair of test prods. An ordinary torch battery with the appropriate globe will function quite well, but the beginner will have a No. 6 cell for his set and this cell is more easily adapted to the described set-up.

Mind Your Fingers

From a tobacco tin or similar tin, cut a strip about 3 in. x 1 in. Drill an 11/32 inch hole near one end, to take the globe. The globe will screw into an 11/32 inch hole, but if you haven't a drill of this size, you can easily open up a smaller hole with a round file. Mind your fingers though, because if the tin slips you may get a nasty cut. Bend the tin to fit close round the No. 6 Cell and hold it in place with a few rubber bands.

Take a piece of ordinary double-wire lighting flex and tin the ends with solder so that they will not untwist. The two wires at one end we will call the "test ends," while at the other end we will call them the "lamp ends." One of the lamp ends is soldered to the tin while its fellow is clamped under the positive clip of our cell. The tin is adjusted under the rubber bands until the centre contact of the globe is pressing against the outside or negative clip of the cell.

Touching the test ends together will complete the circuit and the lamp will light. The path of the current, which is conveniently assumed to flow from the positive clip or terminal and is usually indicated in diagrams by means of arrowheads pointing in this direction, is from this terminal to the test end of the wire, across to the other wire and along to the tin, from the tin to the metal screw of the globe, through the filament, which heats up and glows, to the centre contact of the globe and from there to the negative terminal of the cell, thus completing the circuit.

Proving Continuity

Any circuit that provides a complete continuous path for the current, which is conveniently assumed test ends, carry the current from one test end to the other and thus enable the lamp to light. If on the other hand, the circuit does not provide a complete path, the current cannot flow and the lamp will not light.

Now, to use our gadget to test. Examine the circuit carefully and note where each wire starts and finishes and where the various paths for the current exist. Check each test given below on your circuit, so that you can see just what you are doing and what the test will tell you. Let us start with the coil because this component gives more trouble than anything else, with the exception of badly soldered joints.

Testing the Aerial Coil

Test 1. Connect one lead to the aerial terminal and the other to the earth terminal. If your lamp lights, the windings are all right. The test will not show if the aerial end of the coil is connected to the earth terminal and vice versa, but that may be easily checked. Incidentally, it is a good idea to put the holes in the former for No. 2 coil further round than those of No. 1 coil, and those of No. 3 coil further round again. If you do this you will not mix the top of No. 3 coil with the bottom of No. 2 coil and so on.

Testing the Grid Coil

Test 2. Test from the fixed plates of the condenser or the wires connected to them, to the earth terminal. This checks Coil 2. The lamp will probably be a shade dimmer in this test because of the resistance of the long length of wire in this coil.

The Third Coil

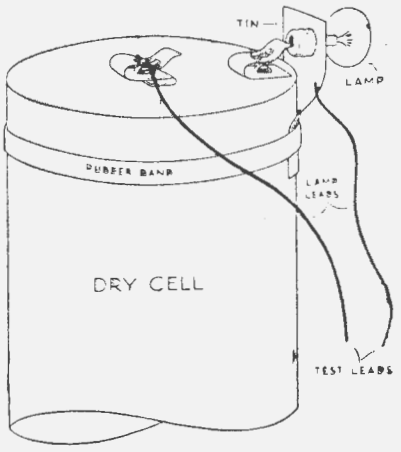
Test 3. Terminal A on valve socket to centre of potentiometer to test Coil 3.

Test 4. Test all connections that go to earth by connecting one test lead to the earth terminal and the other lead in turn to A+, B—, F—, on valve socket condenser frame.

Test 5. Test phone terminal to B+9.

In all cases the wires should be tugged to make sure that the soldering is properly done. Any flickering indicates a poor connection which should be resoldered.

Test 6. Test from one side of the switch on the potentiometer to the other to check its action when turned on.



A drawing of the simple test equipment.

The Filament Circuit Test

Test 7. Disconnect the lamp and leads from the cell and connect all batteries to the set. Thrust one test end into each filament hole in the valve socket and jam them into place with a match stick. Alternatively, the leads could be screwed under the F screw terminals on the socket or clipped on to these, if alligator clips are used. Be careful, however, that the clips are kept well away from all other connections or terminals. Hold the loose lamp lead against the centre contact of the globe. The lamp is now connected across the F terminals of the valve socket in place of the valve filament. Switch on and if the lamp lights, it is safe to put the valve in place. If the lamp flashes brilliantly and burns out, owing to incorrect battery connections, you have saved yourself 8/8, the difference between the cost of a new valve and a new 1½ volt globe. From this you will realise that it is a good idea to apply this test before you attempt to use the set at all just to be on the safe side.

—"N.Z. Radiogram."


Wireless alone can meet the exacting needs of communication for Mobile Units...
INSTANT ★ CONSTANT CERTAIN
AUSTRALIAN-MADE
RADIOTRON*
RADIO VALVES
* STANDARD TO ARMY TRANSMITTERS & RECEIVERS

Shortwave Review

CONDUCTED BY
L. J. KEAST

NOTES FROM MY DIARY

Amongst loggings for the month will be found quite a number of notes culled from a long and informative letter just received and written by a great Dx-er, Ray Dissinger of Lawrence, Kansas, U.S.A. It is possible many of the loggings will not be heard in this country but I figure we should know some of the stations they receive in America which to us do not exist except in overseas lists. By the same token they in U.S.A. express great interest in so many of the Orientals we hear but which are silent over there. Power, direction and general improvement of short wave transmissions together with the interest in Australia may provide us with a few surprises.

At last we can enjoy almost a twenty four hour service from U.S.A. The two newcomers, WJQ, New York, and KWID, 'Frisco have certainly been very welcome. The wave-lengths chosen, 29.97 metres and 19.62 metres make possible a splendid signal right throughout the transmissions.

Shaw Remembers

Among the many wires drawing my attention to WJQ, New York, was one from my old friend and incidentally the friend of many overseas listeners, R. N. Shaw, until a few months ago the editor of the Short Wave pages of "Wireless Weekly." In a letter confirming the wire, Mr. Shaw tells me his many duties prevent him from spending the amount of time at the receiver he was wont to do but like the fine fellow he is he sends a wire to make sure his old pals will be advised the minute he hears something unusual.

In Argentina

Sergeant Clack who has a habit of catching something good every time he has the opportunity of using his portable dual-waver, mentions hearing LRX, Buenos Aires on 9,660 kc, 31.06 metres from 8.30 p.m. till closing at 9.05 p.m.

And listen to this for another from the portable: WCBX, New York, on 15,270kc, 19.64 metres listed with a QSA 4-5, R 5-6 signal at 9 p.m.

WCRC was also heard testing on an announced frequency of 11,835kc, 25.3 metres. And to show the coverage of the little receiver he gives KGEI, on 6,860kc, an R-6 signal after 9 p.m.

He concludes his camp memo by referring to his latest verification received from COK, Havana. In addition to a letter, veri-card, and two postcards they enclosed a copper car registration plate. Well, even if I knew, I couldn't advise listeners when the next mail goes but I guess some letters will be dropped into the G.P.O. consigned to Cuba.

Further Car Registrations

Mr. Condon of Laura, South Australia, also received a Car registration plate in addition to veri-card and postcards. In the letter from the Sports Palaist, the director, Jaime Marine, asked for a photo of the plate on his car as they are starting a photo gallery in their studios of these plates fitted to listeners' cars.

"The Voice of Batavia"

Mr. Condon reports hearing "The Voice of Batavia" on 31.92 metres closing at 1.30 a.m. The programme was anti-British directed to India. With a fair signal, they closed playing "The Liberty Bell March." I do not know this wave-length but your guess as to who it was is as good as mine. The Americans call them "The Dagger in the Backs."

VLG-6, Melbourne, 15,230kc, 19.69 metres is heard in Japanese for New Guinea from 6.15 to 6.30 p.m.

WGEO and WGEA use no fewer than eight languages in their news sessions.

The Russian on 31.36 metres situated in Khabarovsk now gives English at 9.40 p.m.

A popular session from the B.B.C. is "Sound Effects" or "Lend Us Your Ears." Broadcast on Fridays at 10 p.m., Saturdays at 10.45 a.m., and on Wednesdays at 3.30 p.m. Reports from listeners are requested.

Mr. Condon mentions a new one on me, Rome on 47.60 metres. See New Stations.

Listeners whose sets tune to the 41 metre band will find morning signals excellent and those covering the 42 and 50 metre bands will have a still further opportunity to explore the ether. Running over the bands this morning, 2nd June, I could hardly hear a thing on 19 metres while 25 was a little better, 31 still better but those mentioned at the commencement of the paragraph excellent.

I have consistently recommended to manufacturers to make as a general coverage, 19 to 50 metres and sacrifice the 13 and 16 metre bands which as far as we are concerned would not be missed. I am mindful of the B.B.C. request to include the 13 metre band but the very little time we can hear them through

the summer does not justify its inclusion in my opinion.

Help Wanted!

Mr. Condon of Laura, South Australia, says, "For the past few evenings, I have been hearing a Spanish speaking station on about 46.06 metres around 10.45 p.m. It has been just a bit weak to really identify."

NEW STATIONS

KWID, San Francisco, 15,290kc, 19.62m: This long expected station was heard on May 7 by Mr. Roy Hallett and a letter from him and a telegram from Hugh Perkins, Malanda, resulted in me logging KWID on May 9. I first heard them at 2.45 p.m. reading news. Signal very fair. This station which is the short wave outlet of KFSO, San Francisco with studios at Mark Hopkins Hotel, opens at 11 a.m. and uses foreign and oriental languages till 1 p.m. when news is given in English. News again at 2.45 p.m. Station closes at 3 with announcement, "This is the United States of America, station KWID, international short wave station in San Francisco. KWID returns to the air tomorrow on 15.29mc, 15,290kc, 19.62 metres at 6 p.m. Pacific War Time, corresponding to 1.00 Greenwich Meridan time." Station closes with "Star Spangled Banner." (Since writing, above station continues till 5 p.m. Baseball scores given at 3 p.m.)

DXL-7, Berlin, 11,855kc, 25.30m: A new German outlet heard at 7.50 a.m.

DXL-24, Berlin, 9,620kc, 31.18m: This new German is also heard at 7.50 a.m.

WJQ, New York, 10,010kc, 30 metres: "This is the voice of America. Heard over station WJQ, New York city, United States of America, operating on a frequency of 10,010 kilocycles and wave length of 30 metres. I first heard it at 8.23 p.m. on 9th May with terrific signal. Reception was still excellent at 10 p.m. when news was heard. Probably the best signal since we were first astounded by WLWO a year or so ago. There is a tendency for signal to fade towards 11 o'clock on some nights, but I have carried them right through from 8 p.m. till closing at 12.15 p.m. without touching the set. Excellent programmes and novel presentation of news should make this a very popular station. Station, I believe, is owned and operated by Press Wireless Inc.

2RO—, Rome, 6,300kc, 47.60m: Mr. Condon of Laura, S.A., first drew my attention to this new E.I.A.R. outlet. Splendid signal from round about 6.45 a.m. In same programme as 41.5m and 31.15m and probably the loudest and clearest signal.

Radio Caledonia, location unknown, 7,007 kc, 42.81m: Mr. Condon of Laura, South Australia, reports this station operating from 6.45 am. to 7 a.m. daily. This is an anti-British station and is trying to drag the Scottish away from the English. Good signal. On closing said it operated daily at 9.45 p.m. and 11.15 p.m.

"The Voice of Batavia," location unknown, 3846kc, 31.92m: Another one new to us. Reported by Mr. Condon. It was heard closing at 1.30 a.m. Signal from this anti-British station directed to India was fair. Closed with "Liberty Bell March."

———, Delhi, 11,790kc, 25.44m: Mr. Hallett reports this new outlet of All India Radio. Heard around 9.30 and 10 p.m. on approximately 25.44 metres with Burmese and other Asiatic programmes.

AND HERE ARE SOME THAT MAY BE HEARD ANY DAY NOW

WCDA, New York, 6,170kc, 48.6m: See loggings.

WCDA, New York, 17,830kc, 48.6m: See 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 2.25 p.m. to 3.10 p.m. for Western States of North America. 3.55 to 4.40 p.m., French session for Tahiti. 4.55 to 5.25 p.m., for British Isles. 6.15 p.m. to 6.30 p.m., for New Guinea (in Japanese).

VLG-7, Melbourne .... 15,160kc, 19.79m National Programme from 6.30 o.m. to 8.10 a.m., 12 noon to 2 p.m.; 7 p.m. to 7.18 p.m., news.

VLR-3, Melbourne .... 11,880kc, 25.25m Nat. Prog., 12.30 p.m. to 6.15 p.m. daily. 12.50 p.m. to 6.15 p.m., Sunaays

VLQ-2, Sydney .... 11,870kc, 25.27m 8.40 p.m. to 9.15 p.m. for North-East Asia. 1 a.m. to 1.45 a.m., for Western States of North America.

VLW-3, Wanneroo .... 11,830kc, 25.36m R6 at 9.09 a.m. (Perkins).

VLR-8, Melbourne .... 11,760kc, 25.51m Nat. Prog., 6.30 o.m. to 10.15 a.m. daily. 6.45 a.m. to 12.45 a.m.

VLW-2, ... 9665kc, 31.04m 11.15 p.m. to 12.55 a.m., for South-East Asia (in Dutch, Malay, French and English).

VLQ, Sydney .... 9615kc, 31.21m R max. at 6.30 p.m.
Programme for New Coledonia and French Oceania in French from 6.25 pm. to 7.25 p.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. Closes at 11 p.m. on Sundays.

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.

OCEANIA

Fiji:

VPD-2, Suva .... 15,160kc, 19.79m Is anyone hearing Suva now?

New Caledania:

FK8AA, Noumea .... 6130kc, 48.94m Can be heard around 5.30 p.m. but always noisy at my listening post.— Ed.

THE PACIFIC

Hawaii:

KIO, Kahuku, ... 11,680kc, 25.68m Heard at 10.09 p.m. (Perkins).

KKH, Kahuku .... 7,520kc, 39.89m Heard at 10.09 p.m. (Perkins).

KIO, Kahuku .... 8,420kc, 35.63m Heard between 10 and 10.13 p.m. on 19th May. (Clack)
(The above are R.C.A. Communications Inc. point-to-point service and must not be reported.— Ed.)

AFRICA

Algeria:

TPZ, Algiers .... 12,120kc, 24.76m "Radia Algier" (pronounced Radio Alzhay). 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 R4 at 6.45 a.m. with B.B.C. news.

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).

SUP-2, Cairo .... 6320kc, 47.47m Awkward hour but good signal at 2.30 a.m.

Ethiopia:

——, Addis Ababa .... 9625kc, 31.17m Heard closing at 1.30 a.m. 2RO3 interferes a bit. (Condon)

French Equatorial Africa:

FZI, Brozzaville .... 11,965kc, 25.06m News in English at 5.45 a.m.
Heard daily from 4 to 5 p.m. (Candon)

Kenya Colony:

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

Madagascar:

Radio Tananarive, Tananarive 6063kc, 49.48m
The war has brought this country into the limelight. Now being heard from 2 to 3 a.m.

Morocco:

CNR, Rabat .... 8035kc, 37.34m 4 a.m. to 10 a.m. Will get better as winter draws on.

Portuguese East Africa:

Mozambique:

CR7BE, Lourenco Marques .... 9840kc, 30.48m News at 6 a.m. Closes 7.20 a.m. Very good signal when giving news at 6 a.m. (Condon). Mr. Perkins soys now on approximately 30.7m.

Portuguese West Africa;

CR6RA, Luanda Angoło .... 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. and often heard till 8 a.m. Announces "Allo allo ici Radio Dakor." French talks and operatic music. Signs off with "Marsellaise." (Dissinger)

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).

Southern Rhodesia:

Post Office Station, Salisbury .. 7317kc, 41m Schedule: 3 to 6 a.m. (Mr. Perkins advises having received verification.— Ed.)

AMERICA

Central:

Costa Rica:

TIEMC, San Jose .... 11,900kc, 25.21m Heord around 11 p.m. Fades by m/n. Call letters easly reod. (Condon)

TI4NRH, Heredia .... 9740kc, 30.80m Heard with an excellent signal on the schedule noted in "A.R.W." (Dissinger, U.S.A.) (Mr. Dissinger is referring to 2 p.m. on Sundays, Wednesdays and Friday. — Ed.). Colls listeners 2.45 to 3 p.m. (Cushen). Mr. Condon, Laura, S.A., heard them at 10.10 p.m.

TIPG, San Jose .... 9620kc, 31.19m Was off the air for about three weeks but heard again at 10 p.m. (Condon)

El Salvador:

HUB, San Salvador .... 5560kc, 54.00m Heard on same schedule with YSD and same programme. (Dissinger, U.S.A.)
(Schedule of YSD, 37.99m, is 10 a.m. to 2 p.m. so unlikely here.— Ed.)

Guatemala:

TGWA, Guatemala City .... 9685kc, 30.98m Heard May 18, closing at 3 p.m. with fair signal. English announcements frequently. (Condon).

Honduras:

HRP-1, San Pedra Sula .... 6357kc, 47.20m "El eco de Honduras" heard 9 a.m. to 1 p.m. with strong signal. (Dissinger, U.S.A.)

HRN, Tegucigalpa .... 5875kc, 51.11m "La voz de Honduras" is being heard 9 a.m. to 2 p.m. (Dissinger, U.S.A.) (By the way, Mr. Dissinger says this station now verifies. I'll bet Arthur Cushen has one.— Ed.)

Nicaragua:

YNRS, Managua .... 8585kc, 34.95m "Radio Nicaraguense." Heard about 11 p.m.

YN2FT, Granada .... 7490kc, 40.05m "La voz de la Sultana." 11 a.m. to 1 p.m. Verifies with a beautiful card. (Dissinger, U.S.A.)

YNOW, Managua, ... 6860kc, 43.73m "La voz de America Central" heard from 10 a.m. with fair signal. A real catch for Australia — verifies. (Dissinger, U.S.A.)

Panama:

HP5G, Panama City .... .. 11,780kc 25.47m Heard various hours of the morning and until 1 p.m. (Dissinger, U.S.A.)

HP5A, Panama City .... 11,700kc, 25.64m Can be heard in mornng and late at night.

North:

WCDA, New York .... 17,830kc, 16.38m This 10 k.w. station is beamed to Europe from 5.30 to 6.45 a.m., and from 7 to 9.45 a.m. directed to Central America. Doubtful if these times would suit us at present.— Ed.

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 talks are given. Excellent musical sessions ore also given.
15,330kc, 19.57m: News 11 a.m. and 1 p.m. Closes at 2 p.m. Nearly 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. Fareign languages at 11 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. News and talks in foreign languages at 11 p.m.

WRUW, Boston .... 15,350kc, 19.54m Special session for U.S. troops from 2 to 2.30 p.m.

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.

KWID, San Froncisco .... 15,290kc, 19.62m 11 a.m. to 4 p.m. Foreign programme till 1 p.m. News 1 p.m. and 2.45 p.m. Good signal. See "New Stotions." Good at 2 p.m. Some signal in news at 2.45 p.m. (Condon, Gaden, Hallett). Closes at 3 p.m. with R6 signal. (Perkins) (Now continues till 5 p.m. (Hallett)

WCBX, New York .... 15,270kc, 19.64m Heard from 9 p.m., Q4-5, R5-6. (Clack) This 50,000 watt station beamed to Europe 8.15 p.m. to 5.45 a.m.; beamed to East coast of South America, 6 a.m. to 1 p.m. (Hallett)

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 Sandwiched in between JZK and GSF at 11 p.m.— result unfortunate.

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.

WNBI, New York ....11,890kc, 25.23m R8 at 7.08 a.m. (Perkins)

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

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

WCRC, New York .... 11,835kc, 25.35m This is their announced frequency.— Ed. As mentioned in May issue, this station is heard before 9 p.m. Good at 9 p.m. (Gaden) Heard testing. (Clack) Heard signing off at 10 p.m. on May 27, after a programme for American Forces. Announcer said, "We are now signing off with our Latin-America antenna, but we will be back on the air again for L.-America at 4 p.m., E.W.T. (6 a.m. Sydney time). (Hallett)

WRUL, Boston .... 11,790kc, 25.45m Excellent signal every morning. News by Volney Hurd, "Christian Science Monitor," at 7.15 a.m. Special session for Australia on Tuesdays, Thursdays and Saturdays at 7.30 a.m. Special session for U.S.A. Forces from 2 to 2.30 p.m.

WRUL, Boston .... 11,730kc, 25.58m News at 8.45 a.m.

WLWO, Cincinnati .... 11,710kc, 25.62m Now opens at 10 a.m. News, 10.30 a.m. Only a fair signal. In Queensland signal is splendid. (Gaden).

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

WJQ, New York .... 10,010kc, 29.97m "The voice of America." Present schedule is 8 p.m. till midnight. Novel way of presenting news at short intervals. Excellent signals. See "New Stations." (Reported by R. N. Shaw, O'Brien, Clack, Perkins, Gaden, Rogers, Maguire and Hurst).

WRUW, Boston .... 9700kc, 30.93m Opens at 6.50 a.m. News at 8.45 a.m.

WRCA, New York .... 9670kc, 31.02m 8 a.m. to 7 p.m. News 4 p.m. and 6.45 p.m. Heard well after 1.30 p.m. (Condon) News at 4 p.m. and 6.45 p.m., splendid French at 6 p.m. Spanish 6.15 p.m. (Gaden).

WLWO, Cincinnati .... 9590kc, 31.28m Very good at 10 a.m. (Gaden)

WGEA, Schenectady ....9,550kc, 31.41m R4-5 at 9.15 a.m. (Perkins)

WGEO, Schenectady .... 9530kc, 31.48m Signal improving. Fair around 8.15 a.m. Not bad at 10.15 a.m. (Gaden)

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.

WCDA, New York .... 6170kc, 48.6m Beamed to Mexico and Central America from 10 a.m. to 1 p.m.
This C.B.S. station should be heard any day now. This is an outlet of the Columbia Broadcasting System.— Ed.

WRUS, Boston .... 6040kc, 49.66m Just fair at 9 a.m. Better on 30.93 and still better on 25.58m but not nearly up to WLWO, 25.62m (Gaden). Announcements at 3 p.m. Bill Chamberlain commenced new session for beginners (morse code) on May 26 at 9 a.m.— Ed.

Mexico:

XEQQ, Mexico City .... 9680kc, 30.99m Fair just after midnight. Best at 3 p.m. Continues till 4.30 p.m. (Perkins)

XEFT, Vera Cruz .... 9543kc, 31.44m Has a much improved signal now throughout the day. (Dissinger, U.S.A.) (Slogan: "La voz de Vera Cruz").

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

XEXA, Mexico City .... 6170kc, 48.62m Heard May 25 around 11 p.m. with good signal. Physical exercises, station faded out at m/n. (Condon)

XETW, Tampico .... 6045kc, 49.66m Is again being heard around noon (Dissinger, U.S.A.)

South:

Argentina

LSX, Buenos Aires .... 10,350kc, 28.98m Heard Weakly.

LRX, Buenos Aires .... 9660kc, 31.06m Heard on May 19 from 8.30 p.m. till closing at 9.05 p.m. Q5 R8 max. (Clack)

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). Heard relaying the news from WBOS, 9.10 a.m. (Perkins, Condon).

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 "Las ondas di Ica para tod el pais." ("The waves of Ica for all the country.")

THE EAST

China:

XGOX, Chungking .... 15,190kc, 19.75m Heard calling KRCA at 9.09 a.m. Heard giving news in English, 9.30 to 9.45 a.m. (Perkins).

FFZ, Shanghai .... 12,068kc, 24.86m Gives news in Russian at 8.30 p.m. 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 Good in early evenings. News at 8.15 p.m. and also news at 7.30 a.m.

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. Heard well. (O'Brien)

XGAP, Peking .... 10,260kc, 29.24m Now back on this frequency at good strength. (Matthews, W. A.). (Opens at 11 p.m. in English.— Ed.)

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

XGOI, Shanghai .... 9665kc, 31.04m News at 10.10 p.m.

XGOY, Chungking .... 9625kc, 31.17m News at 10.30 p.m., 11.30 p.m., m/n, and 1 a.m.

JTHK, Hongkong .... 9525kc, 31.49m Heard from 8 p.m. (Jap-controlled) News at 11.10 p.m. Gave a two letter call sign at 11.26 p.m. which I missed. Call sign in American papers is shown as JZHA.

XLMA, — .... 9370kc, 32.02m R4 around 10.30 p.m. (Perkins).

XPSA, Kweiyang .... 8484kc, 35.36m Heard at 9 p.m. and 6.45 a.m. (Perkins)

XGUY, Chungking .... 5950kc, 50.42m Heard at 6.15 a.m. (Condon)

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

Portuguese China:

CR8AA, Macao .... 6250kc, 48.00m Generally noisy around 10.30 p.m.

French Indo-China:

Radio Saigon, Saigon .... 11,780kc, 25.47m News, 9.30 p.m. and 1.45 a.m. Closes at 2 a.m.

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

"The Voice of Batavia," —— —— 8846kc, 31.92m Heard closing at 2 a.m. It was directing anti-British programme to India. Closed with "Liberty Bell March." (Condon)

India:

VUD-3, Delhi .... 15,290kc, 19.62m News 12.30 p.m. and at 6 p.m. Heard well at 8.30 p.m.

Indian Freedom Station .... 14,750kc 20.34m This anti-British station whose location is still unknown has been heard at 1.37 a.m. with a talk in English at 1.40 a.m. Announced, "This is the voice of Adazinabad, this is the voice of Free India." At 1.54 a.m. announcement repeated, also wave lengths 20.34m and 26.16metres. Transmission is in 6 different languages, Bengazi, Persian, Hindustani, English and two that I did not catch. Went off the air at 1.55 a.m. with anthem.
This station was previously heard on 9380kc, 31.98metres. Remarks would suggest definitely a Jap station.— Ed.
Mr. Condon writes he also heard above station on 26.16m. Closing at 1.55 a.m. with "Liberty Bell March."

VUD-4, Delhi .... 11,830kc, 25.36m News, 10.30 p.m.

VUD—, Delhi .... 11,790kc, 25.44m Recently heard around 9.30 and 10 p.m. R8 with Burmese and other Asiatic programme. (Hallett).

VUD-2, Delhi .... 9590kc, 31.28m News 10.30 p.m. and 1 a.m
Mr. Hallett reports hearing VUD-2 on 25.36m at 12.30 p.m. on May 25. When giving news in English signal was R-6.

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—, Delhi .... 7240kc, 41.44m News at 10.30 p.m.

VUD-2, Delhi .... 6130kc, 48.94m R5 at 1.15 a.m. (Perkins)

Japan:

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

JZK, Tokyo .... 15,160kc, 19.79m News at 4 p.m.

JLG-4 .... 15,105kc, 19.86m Heard calling and talking Rome at 6.22 p.m. (Perkins)

JZJ, Tokyo .... 11,800kc, 25.42m News at 7 p.m., 10 p.m. and 1 a.m.

J——, Tokyo .... 9565kc, 31.37m Good signal when giving news in Dutch at 11.30 p.m.— Ed.

JZI, Tokyo .... 9530kc, 31.46m Gives news at 7 p.m., 10 p.m., 1 a.m. and 5 a.m. News in Dutch at 11.30 p.m. Very strong signal.

JLG-2, Tokyo .... 9505kc, 31.57m News at 5 a.m.

Malaya:

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

Manchuria:

MTCY, Hsinking .... 9545kc, 31.43m News at 7 a.m. News 11 p.m., 12.30 a.m. and 7.03 a.m. (Hallett) News at 10 p.m. is very strong. Announcement in English at 11.30 p.m.

Philippines:

KZRH, Manila .... 9640kc, 31.12m At 10.30 p.m. announced: "This is the voice of the **new** Philippines on 618kc, 31 and 49 metre band." Schedule given for next day.— Ed.
Mr. Hallett says he heard them one night recently on 25.8m at 11 p.m.— weak signal.
Mr. Condon (S.A.) heard them at 6.20 p.m. on May 25 on 25.88 metres in same programme as 31.12m.

Thai:

HSP-5, Bangkok .... 11,715kc, 25.61m News at 10.55 p.m. and 11.35 p.m.

GREAT BRITAIN

"This is London calling."

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. R6-7 (Perkins).

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
Appears to be on nightly now from 8.45 p.m.

GSF 15,140kc, 19.82m
News at 6.45 a.m. and 7.45 a.m. Closes 8.45 a.m. The news at 9 p.m. is now very zizzy, improves at 11, but at 1 a.m., 2 a.m. and 4 a.m., O.K.

GRF 12,095kc 24.80m
I thought I heard this transmitter in parallel with GRV, 24.92, at 11 a.m. — Ed.

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. News at 12.45 p.m. Splendid. (Gaden)

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

GRY 9600kc, 31.25m
Used in N. American session till 8.45 a.m.

GSC 9580kc, 31.32m
Signal now very good in North American session, opens 7.15 a.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).
Very loud in Czechoslovakian language. — Ed.

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 afternoon.

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 in foreign languages. News in English at 8 a.m.

GRW 6140kc, 48.86m
Heard from after midnight and good signal at 6 a.m. Also heard in afternoons, news at 3 p.m. and 4 p.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. Closes after news at 8 a.m.

GSA 6050kc, 49.59m
Used in foreign languages. Good signal if not spoiled by interference. News in English at 8 a.m.

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
News at 1.15 a.m. (Hallett)

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

Germany:

DJR, Berlin 15,340kc, 19.56m
News at 5 p.m., talk 5.45 p.m., news 10 p.m.

DJO, Berlin 15,280kc, 19.63m
News, 5 p.m., 10 p.m. and midnight. — Ed.

DJB, Berlin 15,220kc, 19.74m
News at 11 a.m. Good signal, (Gaden). 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.

DXL-7, Berlin 11,855kc, 25.30m
This is a new one and is heard at 7.50 a.m.

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

DJD, Berlin 11,770kc, 25.49m
News for Africa at 5.15 a.m. Also news at 1 p.m.

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.

DZD, Berlin 10,543kc, 28.45m
Lord Haw Haw at 2.30 p.m. News at 6.30 a.m.

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

DJW, Berlin 9650kc, 31.09m
News at 5 p.m. Talk, 5.45 p.m.

DXL-24, Berlin 9620kc, 31.18m
Heard at 7.50 a.m.

DXZ, Berlin 9570kc, 31.35m
Very strong signal at m/n. News, 1 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. 6.30 a.m. and 7.30 a.m.

DXJ, Berlin 7240kc, 41.44m
News at 3.30 a.m., and in German at 4 a.m. News at 5.30 a.m.

DJC, Berlin 6020kc, 49.83m
News at 5.15 a.m. for Africa.

Holland:

PCJ-2, Huizen 15,220kc, 19.71m
This German-controlled station announces at 9.45 p.m., "Here is Holland calling." News at 9.45 p.m. and 10.45 p.m.

PCV, Amsterdom 18,070kc, 16.6m
In parallel with **PCJ-2.**
Not heard nowadays.

Italy.

Rome:

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

2RO-6 .... 15,300kc, 19.61m
Programme for North 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. Excellent signal at 3 p.m. (Rogers).

2RO-4 .... 11,810kc, 25.40m
News at 7.12 a.m. fallowed 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.

——, ... 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
Alsa good signal at 3.40 a.m.

IRF, ... 9835kc, 30.52m
Heard with an R6 signal at 9.11 a.m. (Perkins).

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

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

2RO-3 .. .. 9630kc, 31.15m
Talk, 7 a.m. News, 7.12 a.m., 8.20 a.m., 3 p.m., 5.20 p.m., 11.20 p.m., 1.40 a.m.

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

2RO-11, Rome 7220kc, 41.55m
Good at 6 a.m.

2RO—, Rome 6300kc, 47.60m
Heard this first on May 13 around 7 a.m. Good signal. Closed at 7.30 At 8 a.m. heord birdies again. (Condon).
(And is as to be expected at this time of the year, an excellent signal. Heard at 6.45 a.m. also on 41.55m and 31.15m giving news in Italian.— Ed.)

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. Good signal. (Gaden).

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.

Portugal:

CSW-6, Lisbon 11,040kc, 27.17m
Talk in Portuguese from 3.30 to 3.45 a.m. Closes at 6 a.m. Excellent signal.

CSW-7, Lisbon 9740kc, 30.8m
Opens at 6.15 a.m. Also good signal till about 8.30 a.m.

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.

NOTICE TO DX CLUB MEMBERS

Members of the All-Wave All-World DX Club are advised that they should make a point of replenishing their stock of stationery immediately, as all paper prices have risen, and we expect that it will be necessary to increase prices by at least 25%.

Already it has been found necessary to abandon the log-sheets and club stickers. However, while stocks last, the following stationery is available at the old prices, as shown.

REPORT FORMS.—Save time and make sure of supplying all the information required by using these official forms, which identify you with an established DX organisation.
Price .... 1/6 for 50, post free

NOTEPAPER.—Headed Club notepaper for members' correspondence is also available.
Price .... 1/6 for 50 sheets, post free
ALL-WAVE ALL-WORLD DX CLUB, 119 Reservoir Street, Sydney

Roumania:
Radio Bucharesti, ... 9255kc, 32.41m
News at 6.50 a.m.
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. English programme from 7.15 to 7.40 a.m. for U.S.A.
——, Kuibyshev 13,010kc, 23.06m
Heard in afternoons with programmes for England at 3 p.m. Also programmes to America from 9.40 p.m. Special session for England at 11.30 p.m.
——,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.
——, Kuibyshev 10,040kc, 29.88m
News at 3 p.m. and 11.30 p.m. Excellent at 3 p.m. (Cushen). News in English at 10.58 p.m. (Perkins).
RV-96, Moscow 9520kc, 31.51m
News at 7 a.m.
——, Moscow 7652kc, 39.21m
News at 7 a.m. Good signal.
——, Moscow 7310kc, 41.04m
English session at 6.30 a.m.
——, Moscow 7227kc, 41.51m
News at 7 a.m. Fair signal.
RW-96, Moscow 6061kc, 49.5m
English at 10 p.m. but much better signal on 31.30m.
Siberia:
——, Khabarovsk 9566kc, 31.36m
9 to 9.30 p.m. Chinese. Strong signal. 9.40 p.m. opening in English transmission. At 10.30 p.m. call N.B.C., New York. At 10.55 p.m. Russian news is overpowered by Jap on 31.37m.
——, Khabarovsk 5910kc, 50.76m
Relays Moscow at 10.55 p.m.— noisy. Closes at m/n.
Spain:
Radio Malaga, Malaga 7210kc, 41.61m
Good most morning. News in Spanish at 7 a.m. (Condon).
EA——, Madrid 7205kc
EAJ-9, Malaga 7140kc, 42.02m
"Radio Silva" heard from 6 a.m. (Gaden)
EAJ22, Oviedo 7130kc, 42.08m
Relays 'Radio Nacional de Espano" 6.45 a.m.
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." Signs off with "Valencia."
Switzerland:
HER-3, Schwarzenburg 6165kc, 48.66m
Heard closing at 7.30 a.m. (Condon).
Yugoslavia:
YUB, Belgrade 6100kc, 49.18m
Heard well at 7.15 a.m. (Gaden).

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 at 3 p.m. (Hallett).
SBO, Motala 6065kc, 49.46m
Very good at 7.15 a.m. (Gaden)
Finland:
OIX-3, Helsinki 11,785kc, 25.46m
Heard in afternoon. News, 1.10 p.m. Also heard giving news in English at 2.45 a.m. and 4.15 a.m.
OIX-2 Helsinki 9500kc, 31.58m
News at 2.45 a.m. and 4.15 am.

(Continued on next page)

LOGGINGS

(Continued from page 25)

MISCELLANEOUS

Arabia:

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

Canada:

CBFY, Montreal 11,705kc, 25.63m
Heard at good strength with news at 9.30 p.m., 10 p.m., 11 p.m. and m/n. Fair at 9.30 p.m. (Gaden).
(Fades out about 11 p.m.— Ed.)

CBFW, Montreal 6090kc, 49.25m
Now being heard on this frequency and Qrm'ing ZNS (Dissinger, U.S.A.)
(Believe schedule is 9.30 p.m. till 3 p.m. ZNS-2, Nassau, closes at 11.15 p.m.—Ed.)

CFRX, Toronto 6070kc, 49.42m
Opens around 9.30 p.m., but best at midnight.

CJCX, Sydney (Nova Scotia)
6010kc, 49.92m
Still on the air until 1.15 p.m. Cannot be heard until PRA-8, Pernambuco, leaves the air. (Dissinger, U.S.A.)

CBRX, Vancouver 6160kc, 48.70m
This is a new one opening at 12.30 a.m. News at 1 a.m. Relays CBR.

CFVP, Calgary (Alberta) .. 6030kc, 49.73m
"The Voice of the Prairies" announce simply "CFCN, Calgary." CFCN is their long wave station. (Dissinger, U.S.A.)
(Schedule according to my records is 1 a.m. to 5 p.m.— Ed.)

Iceland:

TFJ, Reykjavik 12,235kc, 24.52m
American magazines refer to this station being on the air again from 8.17 a.m. on Fridays. On Monday heard around 7 a.m.

Iran:

EQB, Teheran 6155kc, 48.74m
News at 4.50 a.m., followed by musical programme.

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.

"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. Mr. Hallett reports hearing them on approximately 31.6m at 2 p.m. R6 signal all in German.

——, ... 11,935kc, 25.14m
Heard from 9.30 to 9.50 p.m. in German. Good signal but suffers from interference. Concluding announcement in German. "Make an end of this war, make an end with Hitler. Freedom for the Sudeten Germans."

"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.

Syria:

Radio Levant, Beirut 37.37m
This station is being heard again at 2 a.m. Records were being played at 2.25 a.m. "This is Levant calling. This concludes our musical programme." At 2.26 English news was read. At 2.40 "You have been listening to Free French Station Levant." Then announcement in French. 2.41 popular records. Do not confuse female announcer with Russian — they have similar voices. 2.59 news in French. 3.2 a.m. "Ici Radio Beirut" still going at 3.25 in French.— Ed.
Mr. Matthews of W.A. Short Wave League wrote me re this station.

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:

Bahamas:

ZNS-2, Nassau, ... 6090kc, 49.25m
Puts in an excellent signal until 1 p.m. (Dissinger, U.S.A.) (I doubt if this station will be heard here as schedule is: 11 p.m. to 11.15 p.m., 4 a.m. to 4.30 a.m. and 9 a.m. to noon.)
By the way, no advertising is heard from ZNS, but general information particularly relating to approaching hurricanes (the dread period is July to October) is heard during their brief period on the air.

Radio Antiqua, Antiqua 7060kc, 42.49m
Said to be heard in French from 8 to 8.20 a.m. (This is an American report, but this band is so good of a morning it is worth trying.— Ed.)

Cuba:

COCY, Havana 11,740kc, 25.55m
Spoilt by German station at 3.15 p.m. (Condon)

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.

COCX, Havana 9270kc, 32.36m
Heard May 24 around 10.30 p.m. with fair signal. Very erratic station in mornings at present. (Condon).

COCQ, Havana 8850kc, 33.9m
Can be heard morning, afternoon and night. Splendid at 8.45 p.m. and at 9.45 p.m. in Religious Programme in English. (Condon).

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

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

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

Haiti:

HH3W,Port au 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. Plays Blue Danube Waltz on opening. Mainly a musical programme. (Condon).

SPEEDY QUERY SERVICE

Conducted under the personal supervision of A. G. HULL

S.D. (Brisbane) says he noticed in a magazine that brass tips for soldering irons are preferable to the copper ones usually fitted. He enquires whether we have had any experience with such brass bits.

A.—Yes, we have used brass tips for the electric soldering iron and found them perfectly satisfactory for ordinary radio work and less likely to become dirty and pitted with the flux. It is quite a sound scheme to get hold of some scrap brass rod and make up two or three different bits, with different shapes and weights of tips. A fine tip is a great assistance for fine work, and a long one is handy to get into distant corners of a set with a deep chassis.

★

M.M. (Cremorne) debates some points about amplifier design.

A.—We repeat that we find the triodes are preferable and in your particular amplifier we feel sure that you will find a definite improvement if you connect the screen of the first valve to the plate, removing the screen feed and by-pass, and altering the bias resistor value from 2,000 to 10,000 ohms. The 6J7G, when operating like this should have ample gain to drive the 2A3, provided you are using a reasonably high output voltage.

R.C. (Camperdown, Vic.) enquires about our Editor.

A.— No, it wos John Moyle, editor of "Radio and Hobbies" who joined up with the R.A.A.F. Our Editor, A. G. Hull, is at present working in Melbourne as Production Manager of a "declared" factory, engaged mainly on replacement parts for grounded aircraft. He is putting in about fourteen hours a day for six days a week on this job, but keeps his eye on "Radio World" in his spare time.

★

E.R.C. (Bondi) is hard pressed for a 2A3 valve for replacement, but has a couple of old 45 type on hand.

A.—As you suggest, the two 45 type valves are practically the same as the 2A3 when wired in parallel and the only real problem is the mechanical one of arranging for the extra valve socket. You might get away with the idea of mounting the valve on its side under the base, but you will need to provide some ventilation. Even at the best the valve is certain to radiate a fair amount of heat, so make sure that you do not put it alongside a condenser or other wax-filled unit. Try and get it out in the clear if at all possible.

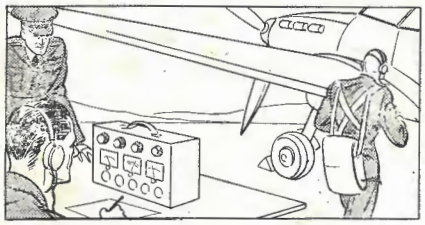
How John Stepped

Not so very long ago, there was a young shop assistant named John, who wanted to do his best in the War effort. . . . Being untrained, he did not know what to do about it.

Until he heard about A.R.C. Radio Engineering training, and wrote for details of the course. He quickly saw the advantages of learning Radio Engineering, and started the A.R.C. course in his spare time.

John quickly learned enough to take a position at Radio Defence work, which was found for him by the College. This meant more money and good opportunities for advancement.

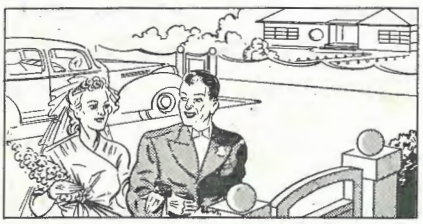
Had he wished at that time, he could have joined a Radio Unit in the Army at communications work, radio maintenance, or some other form of military radio work.



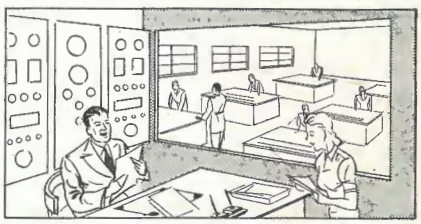
Or in the R.A.A.F. as a Radio Operator in air crew, or on the ground staff. Radio maintenance work, and radio location work, were also open to him.

Still on Defence Work, he carries on with his spare-time Radio training with the Australian Radio College. All the time making himself more and more proficient at Radio work.

Soon, by reason of his training, he is promoted to take control of his section of work. This means another rise and prospects of even more promotion.



This extra money means wedding bells for John, and a home of his own. He can see the fulfilment of his highest ambitions quickly taking shape.



When his Radio Training is completed he will be ready to take up an executive Radio position. This may come during or after the end of the War. What is most important— HIS FUTURE IS ASSURED.

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