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AUSTRALASIAN

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# Radio World

VOL. 5 . . . . . NO. 9

FEBRUARY . . . . . 1941

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ACOUSTICS

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FOUR

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# The Australasian RADIO WORLD

Incorporating the  
ALL-WAVE ALL-WORLD DX NEWS

Vol. 5 FEBRUARY, 1941 No. 9

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

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

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## PERSONAL

As regards the number of pages, this issue is not up to our standard, due mainly to the holiday season spreading over into the New Year.

Paper rationing makes it impossible for us to waste paper, so we have cut down on this issue. By doing so we allow ourselves ample paper for a bumper March issue. Several feature articles have not been quite ready for this February issue and have been held over. The March "Radio World" should be easily the biggest and best issue ever produced.

Getting back to this February issue, however, the quality of the editorial matter should go a long way towards making up for the lack of quantity.

Our feature article, dealing with every aspect of circuits to provide compensated acoustics, is surely one of the finest and most comprehensive technical articles ever published in Australia. The many factors involved are covered by an engineer who really knows his subject. We make no apology for the length of this article, for we feel sure that it contains valuable information which will be appreciated by all radio designers and enthusiasts.

A. G. HULL

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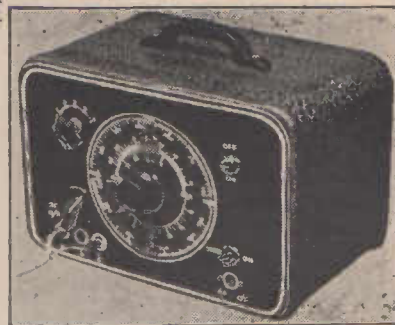
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## New Aspects of

# COMPENSATED ACOUSTICS

*A revolutionary circuit development of vital interest to all set designers.*

By **C. PARRY, A.M.I.R.E.**  
Developmental Engineer

**E**NGINEERS for a long time have been trying to develop a simple system of tone control in modern sets which would vary any part of the audio spectrum independently of the rest.

Herein is described a scheme which gives a result so near to perfect tone control that it may be regarded as one of radio's major developments. In conclusion, its application to a new type of circuit is discussed.

### Efficiency of the Tonal System

The efficiency of the tonal system may be judged when the following figures, relating to a typical five-valve receiver, are quoted. These are applicable with the tone control turned only a quarter of full rotation.

Distortion at 3 watts output is less than 3% for any frequency from 50-15,000 cycles, for any modulation depth up to 80%, for any input signal up to ½-volt. At middle frequencies modulation may be as high as 90% without increasing distortion. In addition, using 400 c.p.s. as a constant reference, the low register may be varied -1 + 9 D.B. independently, and the high frequency, when low register is +6 D.B., may be varied: -3 + 9 D.B., independently.

In addition, the circuit automatically provides without the use of tapped pots, and the like, a pleasing measure of automatic tone compensation on the volume control circuit. The transient response is likewise excellent.

### Rapid Development

Radio receivers have developed so rapidly in the last few years that the peak of efficiency is rapidly being reached in nearly all sections of operation. Sensitivity, selectivity and frequency range are at an optimum.

Each new range sees some small feature which increases the commercial attraction of the line concerned. Small wonder then that engineers are striving to develop every avenue to widen the selling field.

Still lacking in maximum efficiency is the audio reproduction of receivers.

For the past twelve months engineers have increased their energies in this field to reach the ultimate.

Thus "high fidelity" has been in vogue for some time, bringing with it inverse feedback, infinite baffles, and so on. The art has progressed, in fact, to the point where it may well be asked, "What is high fidelity and do the public want it?"

With this thought in mind, leading engineers devoted themselves to the study of sound reproduction to see whether something nearer the public desire than anything before released could be developed.

Before any worthwhile changes can be done, an intensive analysis of all

## FOR THE FIRST TIME IN ANY RADIO PUBLICATION

factors involved must be made. What may please the ear may not please the engineer, but the knowledge of what the ear wants helps him in his search.

### Extensive Experiments

Extensive experiments by U.S.A. field workers have shown that the idea of high fidelity is not altogether correct.

The ear desires naturalness, or a near approach to actual conditions. This fact has perhaps not been fully realised before, or perhaps the factors involved to produce this effect have not been fully realised. Thus, receivers had sensitivity curves similar to that of the ear, and so on.

This, of course, is quite incorrect.

But, we may say, we are not after "high fidelity" or "fidelity" at all, but rather naturalness — which we desire, irrespective of how our graphs, curves and so on look like, and which will give our set spectacular performance when compared with others.

Naturalness really means that every original sound must be reproduced as it occurred, and every reproduced sound must bear the same relation to every other as it did in the studio. An amplifier is hardly likely to have a "flat" characteristic to give us this result, as it must compensate for all the losses and changes from studio to speaker.

On close inspection, it will be realised how difficult this is to obtain.

### Volume Range

Firstly, the volume range to be handled is about 80 D.B. But our receiver will only handle about 30 D.B.

We rarely get a pick-up from microphones on a parity with that from our own two microphones — our ears.

The speaker system rarely handles the frequency range required, and of course can give no perception of "depth."

The selectivity characteristic of our set further affects reproduction. Add to this, overall distortions — distortion varying with modulation depth — varying speaker loads, room acoustics and the like and we get a very sorry picture.

However, if we overcome distortion troubles we have a simple solution to all this:

### Variable Frequency Range

A variable (preferably continuously so) audio frequency range, capable of changing the relative levels of either low, middle or high frequency portions of the spectrum. Also this will greatly help us to achieve that tonal balance which will give an effect to our ear similar to our perfect "naturalness."

Certainly its characteristics will not be the same as our ideal amplifier, but the changes will be sufficient to create an illusion, and that is all we want.

A matter of experiment decides just what frequencies must be varied and by how much.

Speaking generally, it seems that,

(Continued on page 6)

## ACOUSTICS

(continued)

using an ordinary 12-inch speaker, the frequency range should extend down to 50 cycles. While we may go as low as 30 cycles, these notes are felt rather than heard, and occur so rarely in programmes that it is not necessary to worry about response below about 45 cycles.

The efficiency above 3500 c.p.s. is very low, and the sound pressure may drop as much as 40 D.B. between this and 10,000 c.p.s.

Nevertheless, these high notes are necessary despite their weakness. The upper limit necessary seems about

12,000 c.p.s. for critical listeners and no useful point seems served in going higher.

It is one of the characteristics of the ear that if a complex sound is heard first at high, then at low level, the high notes seem to predominate. Actually it is the range, 1500-3000 cycles, which is most pronounced.

### Note

Remember, our set usually produces sound at lower volume than the original; remember, too, the various influencing factors, and it will be realised an ideal frequency characteristic will probably be one in which the middle frequency range is much lower in level than the rest of the

spectrum. Numbers of experiments have shown this to be so—the exact opposite to the overall result usually achieved in modern sets.

Fig. 1 shows the overall desired, compensatory and usual characteristics (see opposite page).

The actual relative levels naturally vary. However, it is safe to say, the following holds:—Using 400 cycles as reference, the low frequency should extend to 45 cycles, and should be able to be raised about 12 d.b. At 10,000 cycles it should be raised 15 d.b.; 100 c.p.s., not less than 3 d.b. below 50 c.p.s. and 7500, not less than 3 d.b. below 10,000 c.p.s., under these conditions.

These figures refer to measurements from the diode load to the speaker voice coil.

This variation represents the maximum likely to be necessary in any conditions, and, of course, we may get

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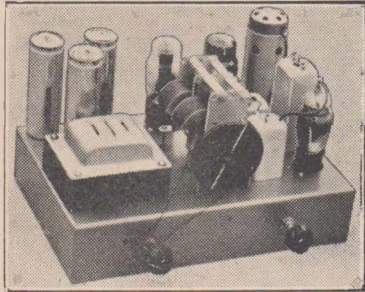
cases in which the levels mentioned are widely varied within those limits. Rarely do we need to drop more than 3 d.b. below 400 cycles at either end. This is probably due to the losses already occurring before the signals reach an audio channel.

It will be understood that sound pressure levels will be different to the above, and that actually all we are striving for is to reproduce each note at its correct relative level, as it was in its original source.

The above figures, by the way, re-

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are specified for these "Radio World" receivers . . . follow the designer's lead and ensure maximum results.



## LOCAL-TONE FOUR

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# Mullard

## RADIO AND RADIO VALVES

fer to the requirements in a receiver with normal present-day selectivity, also when normal pick-up and recordings are used.

A number of interesting facts about distortion are worth while mentioning.

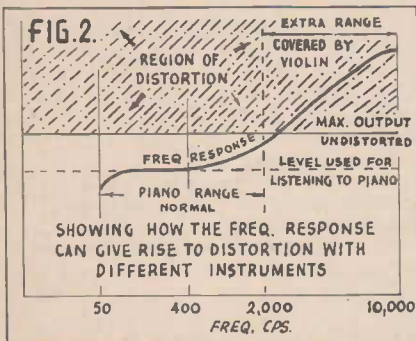
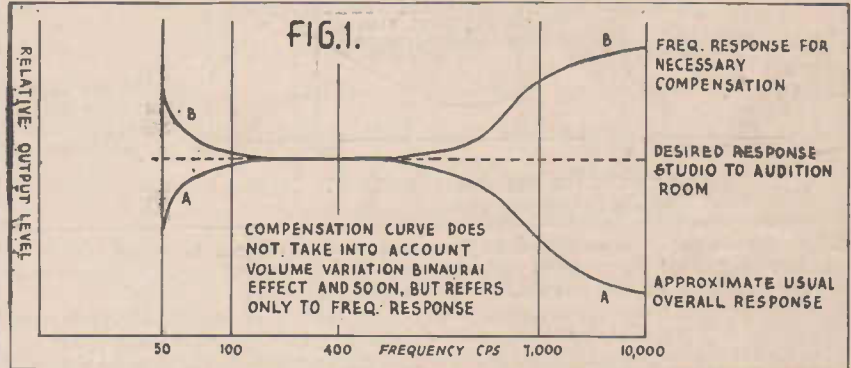
Distortion above 5000 c.p.s. and below 50 per cent. is hardly noticeable, as the harmonics are out of audibility, and the introduction of the harmonic is apparent only as a change in amplitude. "Harshness" is due to harmonics and not to any particular shape of the frequency response. This latter usually produces "tinniness," "hollowness" and "boominess."

### Distortion

Distortion may be severe without necessarily having a high percentage;

Distortion below 100 c.p.s. is noticeable, but unless fairly high is not objectionable and in fact may even im-

Usually this is quite erroneous. The improvement in reproduction is usually due, not from lowered distort-



it depends where and how it occurs. It may be produced through a poor frequency response—if the set is turned to a normal level for a piano piece the violins may occupy part of the frequency range which is at higher level than the rest, and so overload the output stage and distort.

Spurious oscillations usually produce tearing, rattling sounds which cannot be classed as distortions, but rather "objections."

prove the "apparent tone" in some peculiar psychological way.

Nevertheless, it is undesirable.

In developing any reproductive circuit, attention naturally turns to the possibilities of inverse feedback, which has been extensively used to date.

At this point let me clear up something that is not apparent to many. Usually it is considered, since using X per cent. feedback, the distortion is X per cent. less and the quality much improved.

tion (which probably wasn't noticed before, anyway), but from a more pleasing frequency response which has resulted from the characteristics of the particular feedback circuit applied.

In other words, we have improved the "naturalness."

As a matter of fact, the level of distortion at some frequencies may be higher.

Elimination of harshness may not be due purely to a limitation of har-

(Continued on page 8)



# BRITANNIC

"RULES THE RADIO WAVES"



# ACOUSTICS

(continued)

monics, but to a straightening of the frequency characteristic, so preventing overload.

## Bear in Mind

Also bear in mind a complex sound will cover, say, 50-12,000 cycles. It must sound just like the original would sound if we were there to hear it. It must not be harsh. Therefore, no part of it must overload the output stage. Also the frequency response of the amplifier must compensate for all the droops, losses and so on between studio and audition room and so will by no means be "flat."

Thus it is quite understandable how part of this signal may cause harshness because the relative gain at this particular frequency is greater. The

were "flat," i.e., if the amplifier had the compensatory curve as in Fig. 3(a).

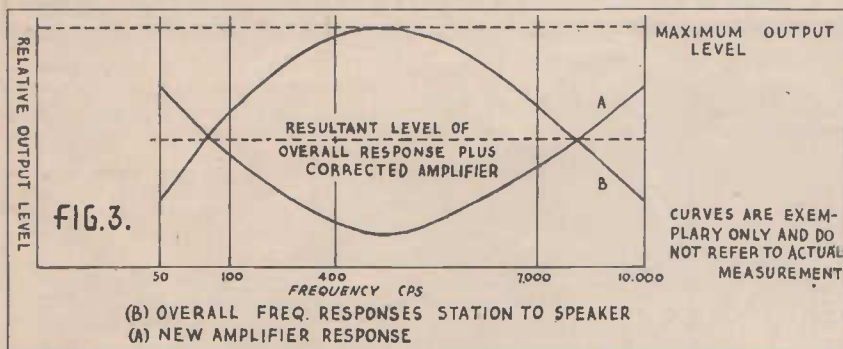
This is not strictly true, because of relative levels. Actually the greater predominance of lows and highs and the extreme sensitivity of the ear to "middles" may make the volume seem greater, unless of course the resultant level is too far down at these mid-frequencies. In using these two curves it must be appreciated that in each case the output must not exceed the overload line.

Compensated frequency characteristics, as they are called, are very deceptive in output, and in not one case has a listener guessed how low the actual power level concerned really was.

Naturally this illusion will be dispelled if we are only comparing on speech and our set is adjusted for the wider frequency range of music, because in this case the volume avail-

One more thing: when all the above factors are taken into account we must still have good transient response, i.e., "attack."

This means that if resonances occur, they must be well damped, and our circuit should not be too close to oscillation at any frequency. This has



maximum output is determined by the set, but this must be reached only by certain portions of our signal.

If we say we have 3 watts at 400 c.p.s., that is very nice, but if we have 12 d.b. lift at 50 c.p.s., then for the same level input signal at these frequencies the set will be terribly overloaded at 50 c.p.s. So our output must be adjusted so the maximum rating is not exceeded at any particular frequency.

Actually the action is far more complex than this, but the above explains the matter simply.

Now, take the case of the usual overall frequency response curve, as in Fig. 3(b); then it would seem to prevent harshness that the output would sound much less if the response

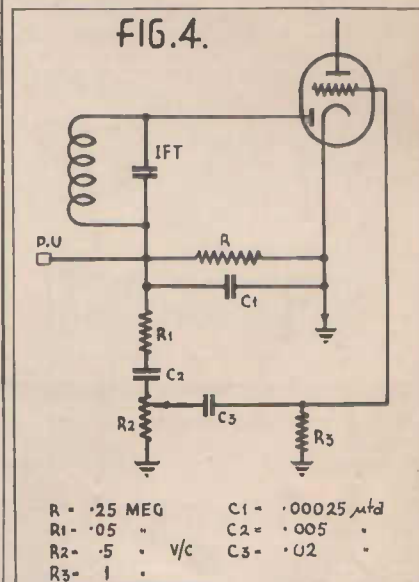
able at speech has been cut down to prevent distortion at the other ends of the spectrum.

The ear is a great deceiver, and possibly the greater approach to naturalness has something to do with the greater apparent volume.

It will be appreciated here how easily it would be to get harsh reception if the frequency characteristic were not known or understood, and how often in the past such reception may have been blamed incorrectly on to many things.

For instance, one speaker may sound better than another because it is a poorer speaker and does not reproduce high harmonics as well!

Think it over.



been well looked after in "Miroscopic" reproduction.

In using feedback to obtain the desirable level variations, we strike several advantages. It can be easily adapted for this purpose. It is simple and cheap, and it can be made to lower existing distortion.

It will improve transient response.

It should go back from output to input and so correct all faults occurring in between.

Further, it would be excellent if it could help to cancel some of the distortion in the diode circuit. Now this latter may be done in part, so before we continue it is necessary to minimize distortion occurring before its point of application.

This means we must principally concern ourselves with lowering diode distortion.

This may be very high at high levels of modulation. However, if we can make the ratio of D.C. to dynamic loads approach 1, then we approach the ideal condition.

So, let us take the circuit of Fig. 4.

The dynamic load is very complex, but at low frequencies may be shown to be nearly equal to:—

$$\frac{1}{R} + \sqrt{\frac{\{(WC_2R_1)^2 + 1\} \{1 + WC_3R_2^2\} + \{R_2^2 \sqrt{(WC_3R_2)^2 + 1}\} \{WC_2\}^2}{(WC_2)^2 \sqrt{1 + WC_3R_2^2}}}$$

$\frac{W}{2\pi}$  - FREQUENCY UNDER CONSIDERATION

If the values shown are used, this



# BRITANNIC

"RULES THE RADIO WAVES"



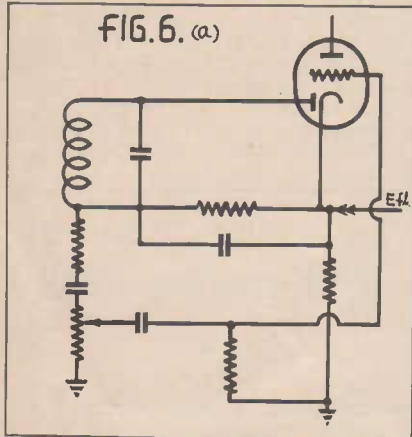


will be found to give a dynamic D.C. ratio of over .7, or more than twice as high as normal.

At normal listening there will be a little feedback applied and, although the above figure drops slightly at mid frequencies, the greater feedback overcomes any increase in distortion. At high frequencies C1 modifies the formula, but, as before mentioned, the harmonics here are not serious.

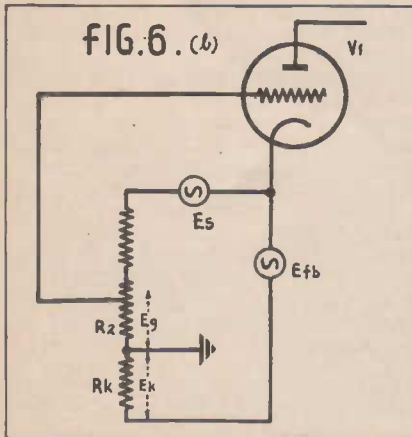
It will be noticed that C1 is returned to the cathode to provide a short R.F. return for the I.F. transformer.

So far no feedback has been considered, but without it, the modula-



tion depth may reach 75 per cent. at 50 c.p.s. with 50 volts peak input to the diode without exceeding 3 per cent. distortion. The efficiency of the diode circuit will thus be seen. With feedback the distortion figures are truly remarkable.

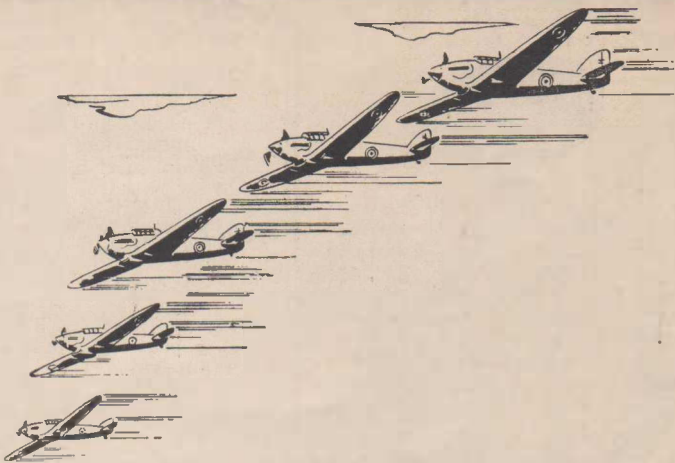
Although several overall feedback systems have been introduced, little use has been made of that using cath-



ode coupling as in Fig. 5. Yet there are immediate advantages:—

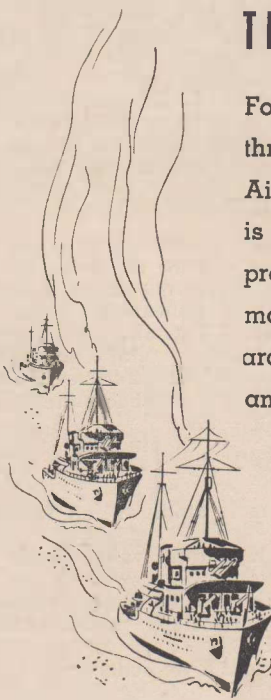
1. Overall feedback results.
2. Portion of feedback introduced into diode.
3. No tapped volume control required.

(Continued on next page)

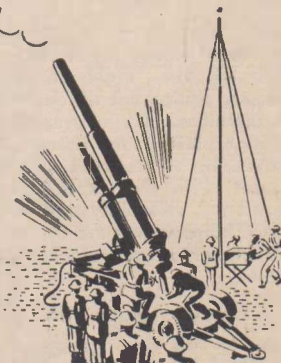


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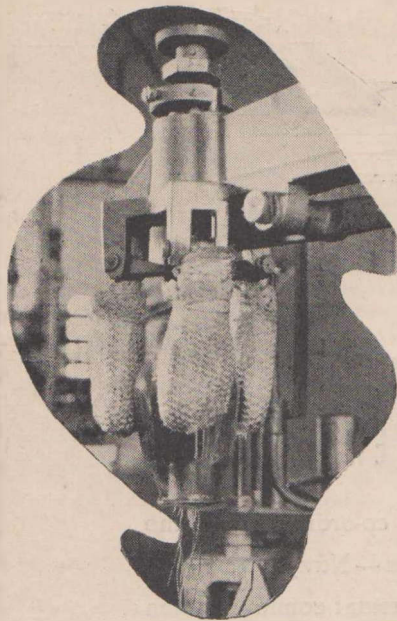


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**ACOUSTICS**  
(continued)

4. Feedback factor related to grid circuit impedance, and this can be used to provide automatic tone compensation.
5. Feedback factor does not greatly vary with volume control setting.

In understanding how feedback is applied right at the input, consider the circuit of Fig. 6A and its equivalent, Fig. 6B (see page 9).

It will be seen that the feedback voltage is generated across a resistor forming part of a parallel branch of the input (diode) circuit. Thus, due to the amplification of V1, a counter voltage is developed across RK, in opposition to that developed by Es and which, of course, limits the voltage across R2 in a like manner.

The feedback voltage EF introduced into cathode may assist or retard this voltage (in itself negative feedback due to the valve K) and so likewise affect the diode circuit. Its effect obviously will depend on its phase relative to the voltage due to Es.

**Of Primary Interest**

Of primary interest to us is the way in which a change of phase of this feedback voltage may effect a change in overall amplification. Take the simple case of Fig. 6B.

Eg produces a voltage across RK due to V1, and the difference between these is the grid cathode voltage Egk.  
Egk = Eg - Ek

$$= Eg - Egk \left( \frac{m Rk}{Z} \right) \dots \dots 1$$

Where m is amplification factor of V1.

Where Z is total valve circuit impedance.

Now Efb must be some constant of Egk, which initially produces it, or  
Efb = K Egk . . . . . 2

From 1 and 2 we deduce:—  
K Eg Z

$$Efb = \frac{K Eg Z}{Z + m Rk}$$

Now, just suppose we introduce Efb into the circuit and let K be such that it equals 1. Then, referring again to Egn 1 and including Efb, we have:—

$$Egk = \frac{Eg Z}{Z + m Rk} \pm \frac{Eg Z}{Z + m Rk}$$

If the sign is + then Egk is doubled.

If the sign is 0 (90° phase shift), it remains the same. As the phase shifts and becomes negative, we finally reach a limiting value, because Egk must produce Efb and therefore can never be truly cancelled by it. However, it need only shift 45° negative to halve the value.

It will be understood that the above simple relationships must be modified

in actual calculation because each voltage affects the other.

The important point is noted that, provided the phase shifts, the amplification varies and this amplification is not altered by altering the percentage feedback.

The actual change in amplification will depend both on the per cent. feedback and its phase relative to the input in this particular application, and we must carefully correlate both to achieve best results. It will be realised here, too, that if we have a certain value of feedback producing a certain output, then by shifting the phase so that its effect is zero, the amplification will be equal to that without feedback, and we may even shift the phase a little further to produce positive feedback or regeneration.

This is what our circuit does at low frequencies. It will immediately be said that if - feedback decreases dis-

**To be concluded in  
NEXT MONTH'S ISSUE**

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NOW**

tortion, + feedback will increase it. However, this is not so. It might if the feedback were + over the whole audio spectrum.

**Positive Feedback**

If we have positive feedback at a certain frequency and it is negative at its harmonics, then the distortion will be less than if it is negative over the whole range. While at higher frequencies, if the harmonics are beyond audibility, it doesn't matter much whether we have feedback or not as far as distortion is concerned.

It will be understood, too, that by using a slight positive feedback at some frequencies we may use a lower percentage to produce a certain difference in power levels, than if we use negative feedback in varying percentages.

The amplification, of course, varies directly as the feedback factor, which in our case is a simple trigonometrical junction of phase difference and amplitude. Consequently, by deciding upon a fixed per cent. at one frequency, we may vary our amplifier frequency response at will, either by phase shift or by varying the percentage. Suitable filtering and so on in the feed-

(Continued on page 24)

# The CLUB SPECIAL

To be described in detail  
in the March issue.

**R**ECENT advances in the design of simple circuits for mantel model receivers have brought to light quite a few ideas which are applicable to other types of sets.

Keeping in mind a constant demand from readers for a truly effective short-wave receiver at a reasonable price, we have thought along these lines to mighty good purpose.

The nett result is due to appear in next month's issue as a feature article covering the construction of the "Club Special" receiver.

## Short-wave Only

This receiver tunes only the short-wave band from 13 to 40 metres, so that no coil switching or complication is introduced and maximum efficiency can be obtained on this band.

The band tuned is a particularly useful one in practice and covers all the principal overseas short-wave stations.

No great amount of power output or exceptional fidelity has been aimed at, and on this account considerable saving has been possible. Maximum power output is limited to about half a watt, but this is just a nice amount to bring through the distant stations cleanly and clearly on the little five-inch speaker which is built into the special cabinet.

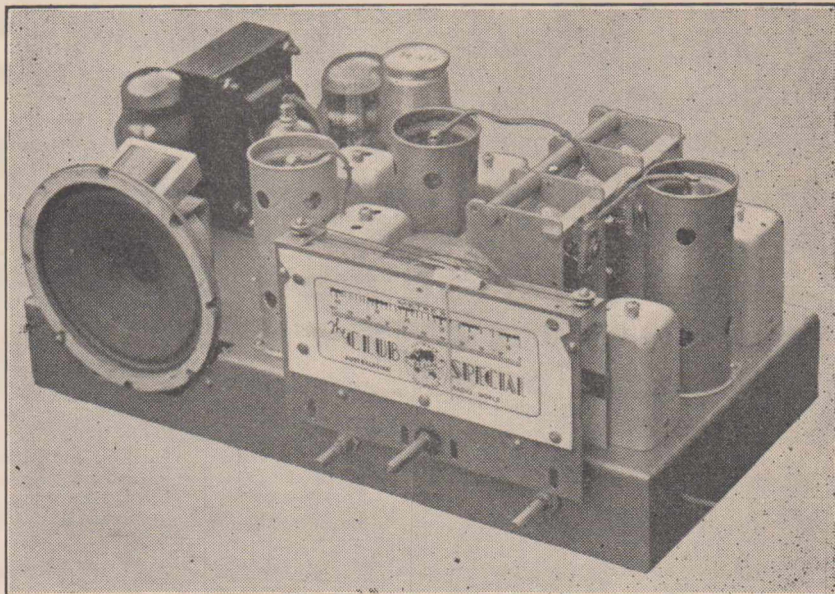
The cabinet, as will be seen from the advance photographs on this page,

is in keeping with the spirit of the design.

A point about the appearance of the set which is sure to catch your eye is the dial. No suitable dial being available for the special short-wave tuning of this set, "The Australasian Radio World" artist set about designing one.

Special dial plates of this design will be made available free of charge to all readers who want to build this set for themselves.

They can be readily fitted to the "Crown" type ST1 dial, the job being only a matter of taking out and replacing a couple of small screws.



Above: A chassis photo of the Club Special, note the special dial.

## Uses R.F. Stage

One of the reasons for the exceptional long-range of the "Club Special" is the use of an r.f. stage ahead of the converter valve. It has always been recognised that an r.f. stage is highly desirable as it gives greater range without greater noise; in other words, improves the signal to noise ratio.

## Acoustic Compensation

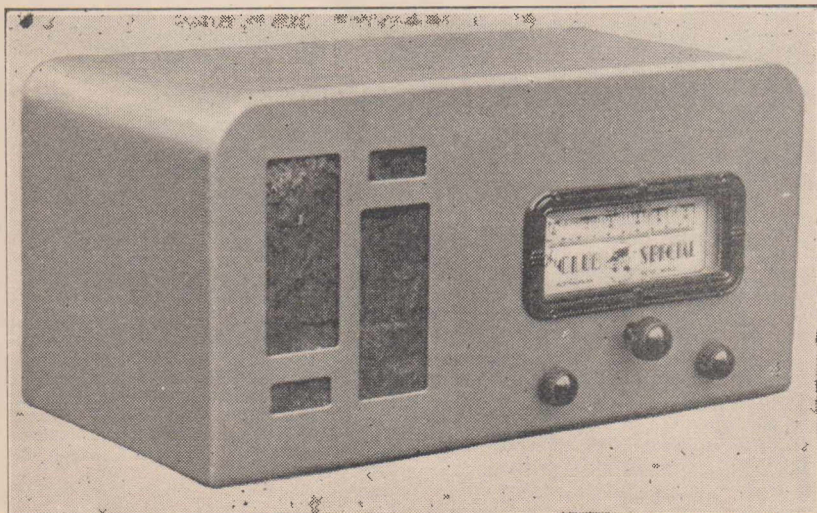
Another feature of our bumper March issue will be the constructional details of a dual-wave receiver designed to take full advantage of the latest circuit development of acoustic com-

Left: In its handsome metal cabinet it's something to be proud of isn't it. Just the thing for DX Club members.

pensation as so fully covered in the feature technical article by Parry in this issue.

This receiver design is one of the most advanced designs ever offered in an Australian technical publication and should be of vital interest to all professional set designers as well as amateur enthusiasts.

The March issue, containing these two big features, should be on sale on March 5. Only a limited number of copies can be printed, and if you want to make sure of securing a copy an order should be placed with your news-agent, now!





*I always thought...*



*I never knew...*

*I had an idea...*



# here are facts about... **R.C.S. TROLITUL COILS**

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

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



IF162

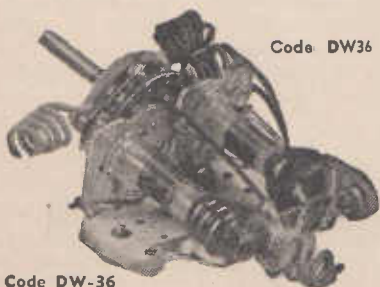
Perm. Tuned 465 k.c.

| Code                     | Price each |
|--------------------------|------------|
| When two I.F.'s are used |            |
| IF162 1st I.F. ....      | 13/9       |
| IF163 2nd I.F. ....      | 13/9       |

|                            |      |
|----------------------------|------|
| When three I.F.'s are used |      |
| IF164 1st I.F. ....        | 13/9 |
| IF164 2nd I.F. ....        | 13/9 |
| IF163 3rd I.F. ....        | 13/9 |

## R.C.S. DUAL-WAVE UNIT

Type DW-36, as illustrated, consists of Aerial and Oscillator Coils, Wave Change Switch, the necessary B/C and S/W Trimmers and Padder mounted together, wired up ready to assemble into a set utilising 465 k.c., the bands being S/W 13.7 to 40 metres, and B/C 1500 to 550 k.c.



Code DW36

Code DW-36  
R.C.S. Type DW-36 Dual-wave Unit —  
Price ..... £1/7/6

Trolitul stands unequalled as the perfect insulating material for coils — the consistent use of Trolitul wherever possible by R.C.S.—"The Coil People"—is your guarantee of High "Q," Great Sensitivity and Keener Selectivity. Many outstanding developments have been made possible by the use of Trolitul. Your guarantee of really successful results is to specify R.C.S. Trolitul Components always.

## "THE LOCAL-TONE FOUR"

You'll get an amazing clarity of reception and superb tone with this easy-to-build, economical set — if you use the R.C.S. Coil Kit featured below. Specially designed by R.C.S. engineers for the "Local-Tone Four," Coil Kit K169, with Dial DA-7 to track, will ensure the highest possible gain combined with micro-accurate tuning. Specify Coil Kit K169 ..... £1/9/-  
Dial to track, DA-7 ..... 9/-

## "THE CLUB SPECIAL"

To duplicate the outstanding performance of the original laboratory model, specify R.C.S. Coil Kit K170. R.C.S. have perfected specially-designed coils for the "Club Special"—insulated throughout with Trolitul, designed for easy mounting, the last word in sensitivity and selectivity. Specify Coil Kit K170 ..... £1/14/6



Type E344

## R.C.S. TROLITUL BROADCAST COILS

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

| AIR CORE "H" GANG |     |
|-------------------|-----|
| E342 Aerial ..... | 6/6 |
| E343 R.F. ....    | 6/6 |
| E344 Osc. ....    | 6/6 |

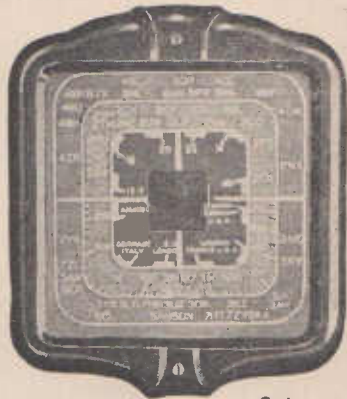
| PERM. TUNED "H" GANG |     |
|----------------------|-----|
| E345 Aerial .....    | 8/6 |
| E346 R.F. ....       | 8/6 |
| E347 Osc. ....       | 8/6 |

| T.R.F. TYPE — AIR CORE       |     |
|------------------------------|-----|
| T88 Aerial .....             | 6/6 |
| T89 R.F. ....                | 6/6 |
| T87 R.F. with reaction ..... | 6/6 |

Obtainable from your local dealer

# R.C.S. RADIO

50 GLEBE STREET, GLEBE  
Telephone: MW 2405



Code DA-7



DA-7 DIAL

The new D.W. Portable Kit Dial, Code DA-7, has all parts supplied ready to assemble, and it has a glass scale with both B.C. and S.W. Bands clearly marked, finished in white with green background. The special walnut escutcheon is easy to fit and requires an aperture of 3" by 3". It is the only portable dial which can be edge-lit. Available for use with "H" type gang condenser on 1600 to 550 k.c. and 13.7 to 40 metres S.W. Bands.  
Code DA-7 ..... Price 9/-

# LOCAL-TONE FOUR

An economical four-valve receiver with superlative tone, designed specially for the "locals." Why not make one yourself? When housed in a handsome cabinet it becomes a set anyone would be proud to own.

MUCH development has taken place in the past couple of years in the direction of improving the performance of the four-valve a.c. sets. Little sets like our "Tip-Top" of a few months ago have enjoyed great popularity on account of their remarkable performance in proportion to their cost; in other words, on account of the value they present.

## The Performance

The performance, however, has been improved mainly in the direction of range, selectivity and general reliability. Improved tonal quality has not been aimed at, and as a result some of these little sets are not to be considered as suitable for fitting to full-sized consoles. A certain amount of tolerance is permissible with small mantel models in the matter of tone, as even at its best, the frequency response must be considerably curtailed by the lack of effective baffling of the speaker. With a small speaker

in a midget cabinet, the lows cannot be reproduced fully, and so it is possible to have an equally attenuated high note response without detriment to the overall effect. In fact, a suitable attenuated high end will give a

more balanced reproduction, at the same time cutting out some of the harmonic distortion. The result, however, is not completely satisfying, especially to anyone who has been accustomed to quality reproduction from a full-sized console receiver.

## Mantel-type Circuits

Putting one of the mantel-type circuits to use in a full-sized console is disastrous, as was brought home very fully to the writer during a recent holiday in Melbourne, where the radio equipment happened to consist of a low-priced console which had been manufactured along these lines. The reproduction, to a fairly sensitive ear, was distressing. It immediately brought the resolve to see what could be done in the way of a four-valve a.c. set with proper tonal quality.

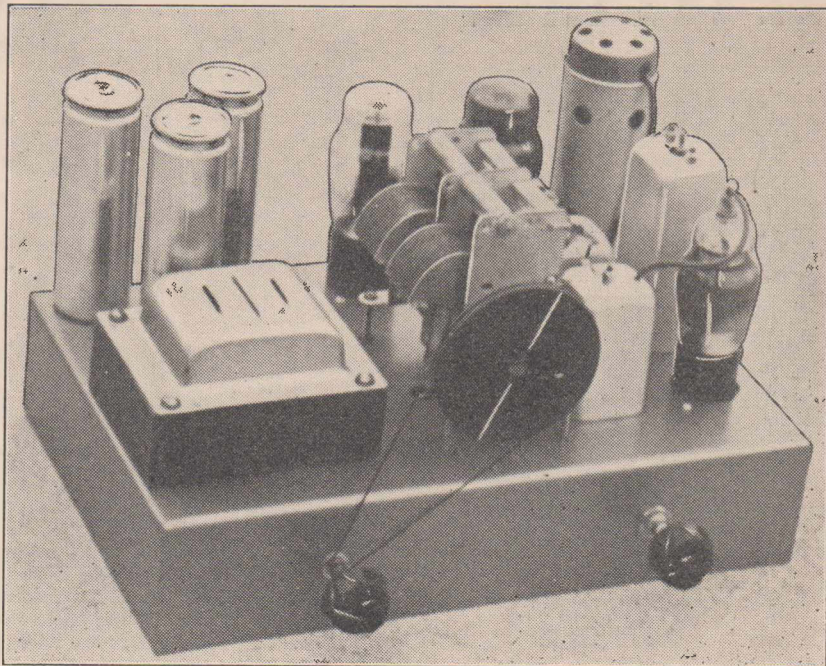
Here is the result, and it surpasses all expectations, with a degree of

Left: Another view from the back of the chassis. Note midget trimmers mounted on the gang. Socket at the rear is for the speaker.

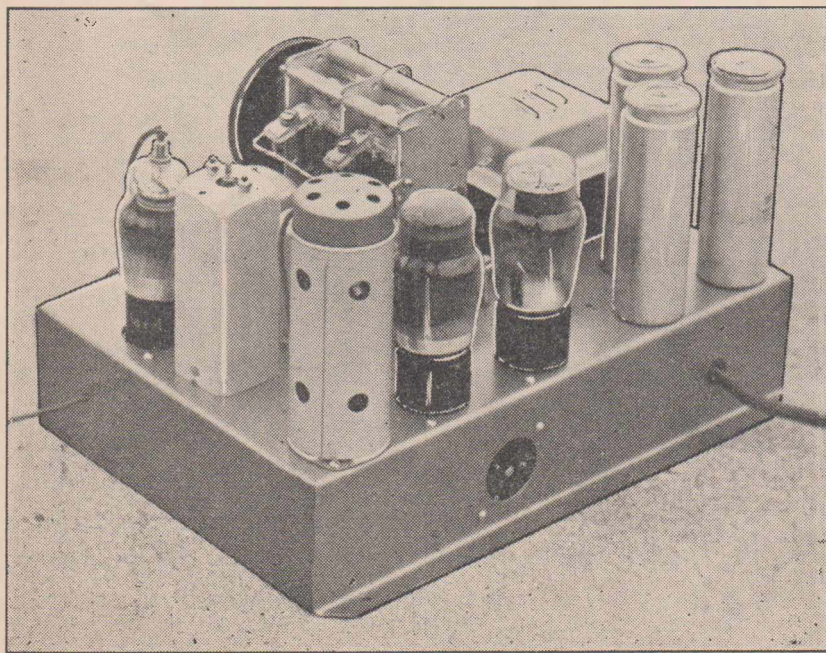
fidelity far beyond that attained in any ordinary commercial receiver of up to seven valves.

As usual, you don't get anything

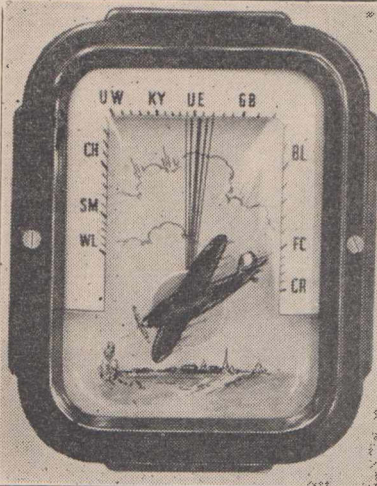
(Continued on page 14)



Above: A chassis view of the Local Tone. A big type of dial can be used if desired.



# Have you SEEN THE ARCADIAN SPITFIRE?



## NEW . . . STRIKING . . . . . . DIFFERENT

The Arcadian Spitfire Dial is the perfect kit dial for home constructors, servicemen and manufacturers alike.

Modern as the next minute . . . Easy to mount . . . Perfect alignment . . . Pleasing to the eye . . . Economical in price.

Watch for new dials as they become available.

A complete range to suit every need.  
**ASK YOUR DEALER ABOUT THEM**

## "CLUB SPECIAL" and "LOCAL-TONE FOUR" CHASSIS NOW AVAILABLE

Your dealer can supply an Arcadian chassis and cabinet for the above receivers, guaranteed built exactly to the designer's specifications.

Don't forget our SPECIAL CHASSIS Service. Every Thursday at your Wholesaler.

Chassis for all popular circuits at shortest notice.

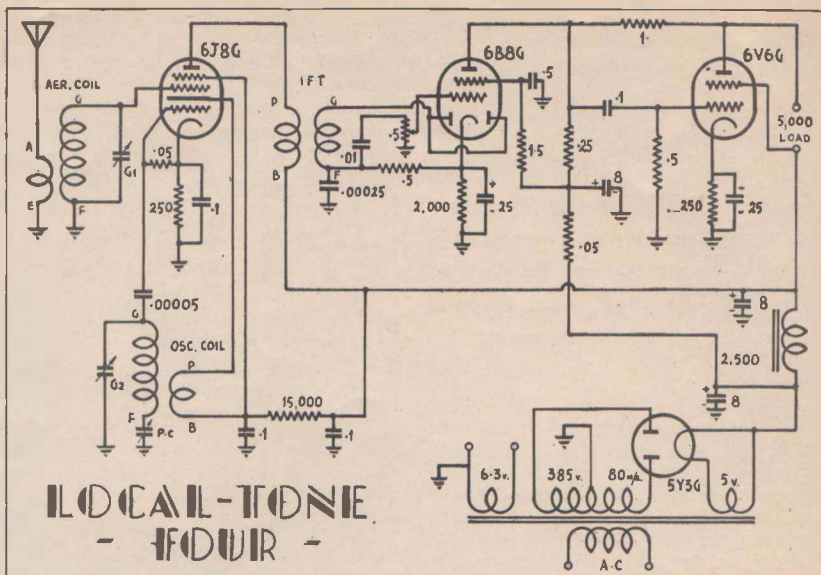
BUILD YOUR SET ON A FIRM  
FOUNDATION

USE AN ARCADIAN CHASSIS

A product of

**Arcadian Radio Pty. Ltd.**

Trade only supplied



## LOCAL-TONE (continued)

for nothing. Something had to be sacrificed, and in this case it was range. The set does not have long range; in fact, it has only sufficient range to bring in the local stations at full power. Interstate stations which can be brought in on an ordinary superhet can only be heard at a whisper. We mention this point merely as a safeguard against misunderstanding.

### Special T.R.F. Tuners

Taking an entirely different standard for comparison, let us consider this new set in respect to some of the special t.r.f. tuners which have been designed to allow good tonal quality from locals. Such sets have their good features, but if of only one stage they seldom have sufficient gain and require very accurate adjustment. A trimmer across one of the tuned r.f. circuits is nearly always essential. Often enough a little controlled or fixed regeneration has to be applied, immediately spoiling the quality and tending to give instability at the high frequency end of the tuning band and yet insufficient gain at the low frequency end.

With two stages of r.f. the position is better, but still a trimmer is desirable, and there is always the tendency towards uneven gain at the two ends of the tuning band.

### Our Scheme

In a nutshell, our scheme gets on to new ground by using a superhet circuit, but without an intermediate amplifier.

A converter valve is used, but is followed by a single intermediate frequency transformer instead of the

Above: Circuit of the Local-Tone Four. Study in conjunction with the picture diagram on the following page.

usual intermediate amplifier. This transformer feeds the output of the converter valve straight through to the detector-audio amplifier. The

## LOCAL-TONE FOUR

### Parts List

- 1—Base 12" x 8" x 2 1/2" (Arcadian)
- 1—Coil kit, with intermediate and padder. (R.C.S., Radiokes, Crown).
- 2—Trimmers (R.C.S., Radiokes)
- 1—Two-gang condenser (Stromberg "H")
- 1—Dial to suit (R.C.S., Radiokes, Crown).
- 1—Power transformer, 80 m.a.

### CONDENSERS:

- 1—.00005 mfd. mica (T.C.C.)
- 1—.00025 mfd. mica (T.C.C.)
- 1—.01 mfd. tubular (T.C.C.)
- 4—.1 mfd. tubular (T.C.C.)
- 1—.5 mfd. tubular (T.C.C.)
- 1—.25 mfd. electrolytic 25 v. (T.C.C.)
- 3—.8 mfd. electrolytic 500 v. (T.C.C.)

### RESISTORS:

- 1—.5 meg. potentiometer (I.R.C.)
- 1—200 ohm 1-watt (I.R.C.)
- 1—250 ohm 1-watt (I.R.C.)
- 1—2,000 ohm 1-watt (I.R.C.)
- 1—15,000 ohm 2-watt (I.R.C.)
- 2—.05 meg. 1-watt (I.R.C.)
- 1—.25 meg. 1-watt (I.R.C.)
- 2—.5 meg. 1-watt (I.R.C.)
- 1—1 meg. 1-watt (I.R.C.)
- 1—1.5 meg. 1-watt (I.R.C.)

### VALVES:

- 1—6J8G, 1—6B8G, 1—6V6G, 1—5Y3G (Mullard, Brimar, Philips, Radiatron)

### SPEAKER:

- 1—12" 2,500 ohm to suit single 6V6G.

### SUNDRIES:

- 4—Octal sockets, 1—4-pin wafer socket, 1—coil can, 2—knobs, hook-up wire, terminal strips, solder lugs, screws, nuts, etc.

single intermediate does not give any extreme selectivity, but ample to separate the local stations. It is, however, broad enough in its tuning to pass a wide-band of audio frequency

in the modulated r.f. which it is handling.

Tuning in becomes most sweet in action, as there is not the slightest sign of instability, the stations just slipping in and out, without the usual distortion which occurs when the stations are not tuned in quite accurately.

### We Can Recommend the Idea

We can strongly recommend the idea of the tuner to anyone wanting a single valve to go ahead of a fidelity amplifier in order to make it suitable for radio reproduction. There is no trouble about getting suitable voltages, and, generally speaking, it appears an ideal arrangement for the purpose.

In case there are any readers who still fear superhets, and imagine that

they are difficult to get into operation and alignment, we might offer an assurance that this little set uses the most elementary of superhet coils.

| HANDY RESISTOR | COLOUR | CODE |
|----------------|--------|------|
| Black          | .....  | 0    |
| Brown          | .....  | 1    |
| Red            | .....  | 2    |
| Orange         | .....  | 3    |
| Yellow         | .....  | 4    |
| Green          | .....  | 5    |
| Blue           | .....  | 6    |
| Violet         | .....  | 7    |
| Grey           | .....  | 8    |
| White          | .....  | 9    |

Construction and adjustment is just as simple or simpler than with a t.r.f. set of similar performance.

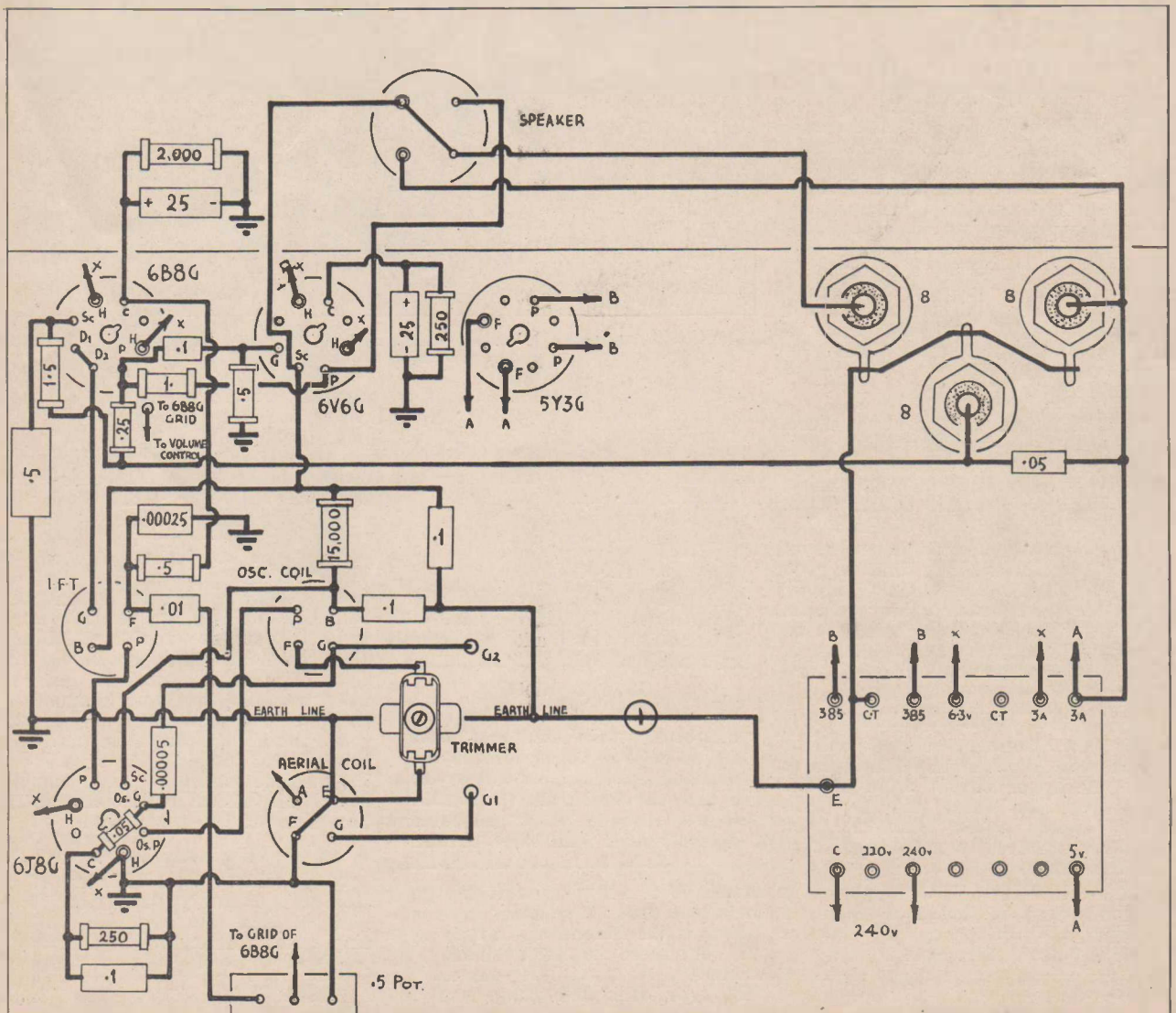
### The Audio Amplifier

The use of a tuner which passes a brilliance of high notes warrants the

use of a good audio amplifier. There are limiting factors, however. We wanted to use only two valves, and these two had to be of types locally made, to make sure that adequate stocks are available at all dealers throughout the Commonwealth and that replacements will always be readily available. This ruled out the use of the 2A3 or 6A3 type triodes, as these are only available in imported types. And so we turned to the 6V6G as the most versatile and deservedly popular valve. The application of inverse feedback was considered essential, but we also felt that no trace of hum could be tolerated, and so the usual type of inverse-feedback circuit could not be used.

Referring back to our issues of

(Continued on page 16)



Above: Picture diagram shows the simplicity of the wiring. A good "earth line" of tinned copper wire is essential.

## LOCAL-TONE

(continued)

June and July of 1939, we found an inverse feedback circuit which allows full de-coupling, so that hum is entirely eliminated. Previous experiments with this circuit had proved its splendid performance with the 6L6, and further experimenting proved that it was also ideal for the 6V6G, as in this circuit.

### Plate Feed

An interesting feature of the circuit design is the way in which the plate feed for the first audio valve is taken from the high tension at the rectifier side of the field coil and then filtered with a 50,000 ohm resistor and an ordinary 8 mfd. (500 volt) wet electrolytic. In practice this works out fine, giving the valve ample effective plate voltage to put it on to a nice working position on its curve and allowing full drive for the output valve long before the output of the first valve gets anywhere near a point where excessive distortion might be introduced. It entirely eliminates hum and, even without any additional filtering to the speaker field coil, there is absolutely no hum in the output. With the original set it was impossible to tell whether the set was switched on or off at a distance of six feet from the speaker. That's just how we like it, and how we think it ought to be with any set which is going to attempt to give realism in reproduction.

### Performance

And so, to cut a long story short, we have a four-valve set which gives the most excellent reproduction from the local stations with a full 4 watts of undistorted output, positively no hum, and yet is cheap to build.

In the matter of cost, however, we would issue a warning that a good quality twelve-inch speaker is highly desirable to handle the splendid quality, and this speaker needs to be mounted in a good quality cabinet, or else on a baffle board about a yard square.

### Good Aerial Required

In most suburban areas it will be found that ample gain is obtained to get full power output from all the local stations. There may be, however, certain areas where a good aerial is required to make quite sure on this point.

If any difficulty is encountered in this direction, it should be simply a matter of putting up an outdoor aerial of about fifty feet in order to get the strong signal input required.

### Construction

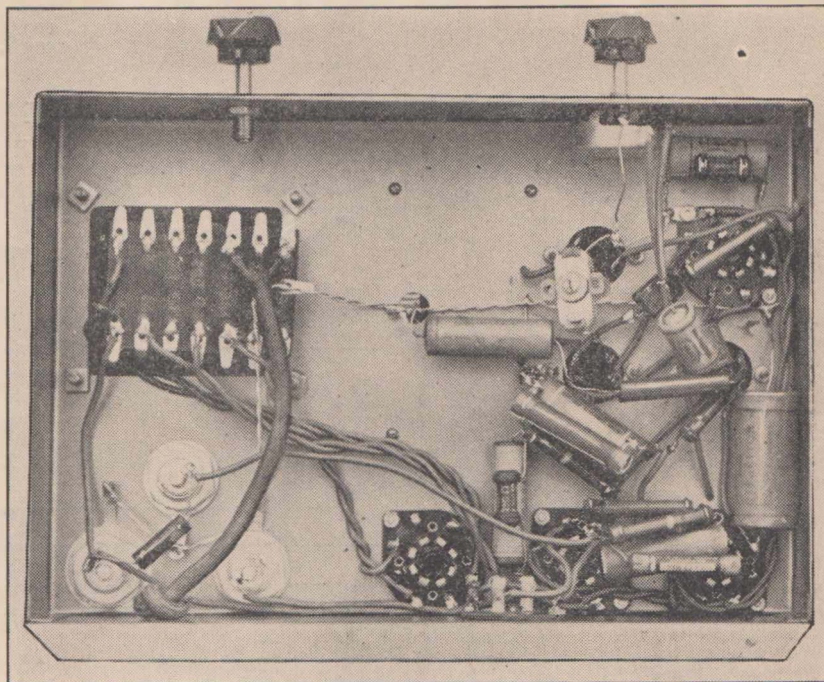
The job of building this little set

is simple enough, following normal practice in most respects. In fact, it might be said that the set consists of a normal five-valve set, but with the intermediate amplifier removed.

A special base has been designed for the job, and the template has been

two sections of the gang, as shown clearly in the photograph of the set. It is then a matter of getting an "H" type dial to suit the coils and gang, and the station tracking should be correct.

On the other hand, there is little



Above: Not much to it, is there? Photograph of the wiring shows the simple layout employed in this receiver.

given to the Arcadian base people, so that there is no trouble about getting a ready-drilled base through any radio dealer. With this ready-drilled base there can be no difficulty about layout and the task of assembly is merely a matter of half an hour pastime with a screwdriver.

### The Coils

The coils required consist of an aerial and a 460 k.c. oscillator coil, with suitable padder unit. These coils

### SAFETY HINT

After the wiring of this set has been completed, make sure that there are no blobs of solder between the terminals on the valve sockets or, in fact, anywhere under the chassis. If not removed they can cause serious trouble with short circuits.

should be of a type to suit the gang condenser used. The latest type condenser is the Stromberg-Carlson type "H," but these are not available with trimmers. As a result, if you use the "H" type coils and gang, you will need to have a pair of small adjustable condensers to solder across the

disadvantage in using an "F" type gang with coils and dial to suit. As "F" gangs are available with trimmers, there is then no need to worry about adding trimmers to the gang. Otherwise there is nothing to it.

### The Dial

Any type of desired dial can be used with this set, but since it is intended to be used only on the local stations, it seems hardly worth while to put on one of the elaborate dials which are marked with the call signs of a hundred stations. As a result, we felt that any simple and cheap type of dial would be suitable.

We found that the little assembly-type dial of the portable type served the purpose admirably, tuning not being at all critical on account of the broadness of the selectivity.

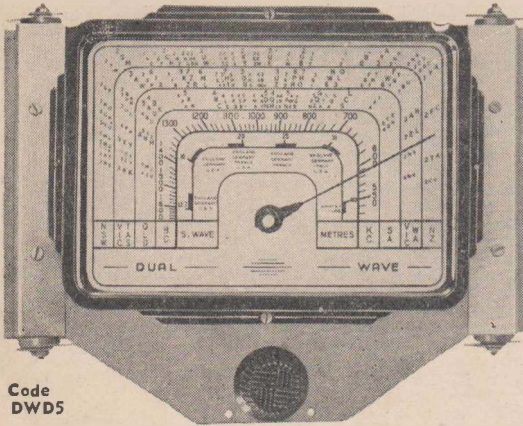
### The Intermediate

Any ordinary type of intermediate transformer can be used, and it is unlikely that the selectivity of the single transformer will be sufficiently sharp to cause undesirable cut-off of the "highs." To make quite sure on the point, however, we made a point

(Continued on page 29)



# RADIOKES



Code DWD5

### NEW RADIOKES DIALS

Radiokes Dials DWD-1, DWD-2, DWD-5, are edge lit and wedge driven, and dial apertures required are 7" x 4 7/8".  
 DWD-1 Standard D.W., "F" Type Condenser ..... 22/6  
 DWD-2 Communications Dial, "H" Type Condenser .... 22/6  
 DWD-5 13.7 to 40 metres D.W. Dial, "H" Condenser .... 22/6

## Your Guarantee of Perfect Set Construction Radiokes Trolitul Coils

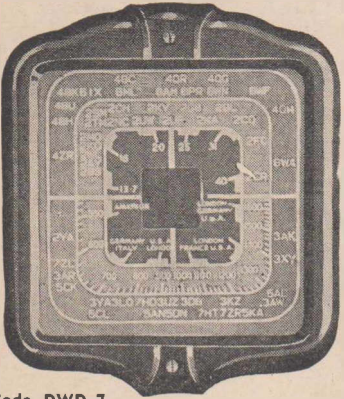
### Radiokes Coil Kit for "The Local-Tone Four"

Technically superior, Radiokes Trolitul Components will enable you to get the best out of the "Local-Tone Four." Exclusive design and production processes ensure the greatest sensitivity and selectivity. You can't go wrong with Radiokes Trolitul Coil Kits. Specify Coil Kit CK1028 ..... £1/9/-  
 Radiokes Dial, to track, DWD-7 ..... 9/-

### Radiokes Coil Kit for "The Club Special"

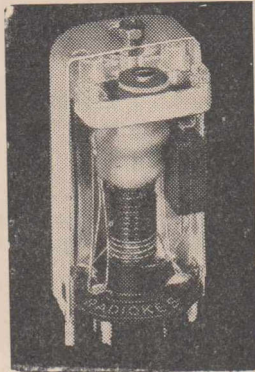
Perfectly matched and tested before dispatch, Radiokes Coil Kit CK1029 will guarantee you the same outstanding results with the "Club Special" as the Editor achieved with the original model. Specify Coil Kit CK1029 ..... £1/14/6

NEW RADIOKES DUAL-WAVE COIL (below at left). Litz wire windings; lugs already tinned. Short-wave range 16 to 50 metres. B.C. range 1500 to 550 k.c. Type D.W.C. .... List Price 14/-



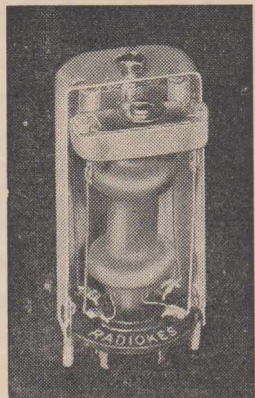
Code DWD-7

RADIOKES "H" TYPE COILS WILL TRACK ONLY WITH RADIOKES "H" TYPE DIALS



### NEW RADIOKES INTERMEDIATE TRANSFORMER (at right)

One - piece mechanically sound Trolitul formers and base — the highest standard I.F.'s available. A special feature is the round base suitable for round or square cans. Type List Price  
 A.I.F. (air core) ..... 7/6  
 I.I.F. (iron core) ..... 11/-  
 P.I.F. (Perm.)... 13/9



Radiokes can give you delivery of any of the following Precision Products— Audio Transformers, Audio Chokes, Bakelite Stampings, Coils of all types, Coil Units, Dials, I.F. Transformers, Line Filters, Laminations, Midget Condensers, Power Chokes, Solder Lugs, Terminals, Trimmers, Volume Controls, "Trolitul" Mouldings, Formers, Etc.

### RADIOKES DIAL FOR THE "LOCAL-TONE FOUR"

This new Radiokes Portable Dial is supplied ready assembled.

- All that is needed to fit the dial to chassis is the insertion of one screw.
- Dial shows broadcast and dual-wave stations clearly marked in white on green.
- This dial can be edge-lit!
- Neatly finished walnut escutcheon of attractive design.
- The aperture required for the dial is 3" x 3"
- For "H" Gang, B.C. 1600 to 550 k.c., and S.W. 13.7 to 40 metres.

Radiokes Dial, Type DWD-7 ..... 9/-

**RADIO SUPPLIERS PTY. LTD.**  
 Sole Agents for Radiokes Products,  
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# The MONTH'S LOGGINGS

ALL TIMES ARE AUSTRALIAN EASTERN STANDARD

## AUSTRALIA AND OCEANIA

The Department of Information can feel justifiably proud of the short-wave broadcasts to overseas. The letters I have seen, particularly from America, speak in eulogistic terms of the service, and the A.B.C. and the Postmaster-General's Department must feel equally pleased with the kind references to the quality of the transmissions. Listeners have probably noted that the transmissions are now directed to New Caledonia, French Oceania, North-East Asia, South-East Asia, North America, Latin America, South Africa, the British Isles and the A.I.F. in Palestine. The transmissions to Europe were discontinued some time ago.

**VLQ-8, Sydney** ..... 17,800kc, 16.85m  
Very good from 7.05 to 7.50 a.m. in Trans- mission VIII. to Latin America, in which news and a talk in Spanish is heard. Strong 7.30 a.m. (Beattie, Gaden, Taylor).

**VLQ-7, Sydney** ..... 11,880kc, 25.25m  
Excellent at 5 a.m. and 6.30 a.m. (Cushen, Keats). Strong 8.15 to 8.45 a.m. (Bantow, Flegg). Excellent at 4 p.m. (Cushen, Dep- peler, Knewstubb, Nelson, Beattie, Mitchel- hill, Gaden). Schedule: Trans. V. to North America, 1.25 to 2.10 a.m.; Trans. VII. to British Isles, 6.25 to 7 a.m.; Trans. IX. to North America, 7.55 to 8.45 a.m.; Trans. X. to North America, 3.55 to 4.45 p.m.; Trans. to A.I.F. in Palestine, 5 to 5.30 a.m.

**VLQ-2, Sydney** ..... 11,870kc, 25.27m  
Schedule: Trans. II. to North-East Asia, 9.40 to 10.15 p.m. Trans. IV. to South-East Asia, 11.10 p.m. to 12.45 a.m. Several re- ports have come in for loggings previous to above schedule, so are not shown for ob- vious reasons.

**VLR-7, Lyndhurst** ..... 11,840kc, 25.33m  
Schedule: Relays A.B.C. National pro- grammes from 6.30 a.m. to 6.15 p.m. Good reliable day signal (all reporters).

**VLW-3, Wanneroo** ..... 11,830kc, 25.36m  
Schedule: 8.30 a.m. to 11.45 a.m.; 1.30 p.m. to 8.45 p.m.; Sundays, 9 a.m. to 2.15 p.m.; 3 p.m. to 8.45 p.m. Good in after- noons (all reporters).

**VLQ-5, Sydney** ..... 9680kc, 30.99m  
Trans. III. to North America, 10.20 to 11.05 p.m.; Trans. VI. to South Africa, 4.10 to 4.45 a.m. Strong at 10.15 p.m. (Nelson, Bantow, Stanke, Flegg, Taylor, Beattie, Knewstubb, Cushen). (Understand this fre- quency now used for A.I.F. in Great Britain from 5 to 5.30 p.m.—Ed.)

**VLQ, Sydney** ..... 9615kc, 31.2m  
Trans. to A.I.F. in Great Britain, 5 to 5.30 p.m.; Trans. I. to New Caledonia and French Oceania, 6.25 to 7.25 p.m.; Trans. to A.I.F. in Palestine, 5 to 5.30 a.m. Good from 5 to 5.30 p.m. (Deppeler, Keats, Flegg, Tay- lor, Knewstubb). Strong at 10.15 p.m. (Bantow, Stanke, Nelson, Beattie, Cal- lender).

**VLR, Melbourne** ..... 9580kc, 31.32m  
Relays A.B.C. programme from 6.30 p.m. till midnight. Good at night (all reporters).

**VLW-2, Wanneroo** ..... 9560kc, 31.38m  
Trans. IV. to South-East Africa, 11.10 p.m. to 12.45 a.m. Good nightly (Nelson, Flegg, Knewstubb, Beattie, Keats, Callender, Gaden, Taylor).

**VLW-5, Wanneroo** ..... 6180kc, 48.54m  
Trans. VI. to South Africa, 4.10 a.m. to 4.45 a.m. Heard at R6 at 4.10 a.m. (Cushen, Gaden).

**Fiji:**  
**VPD-2, Suva** ..... 9535kc, 31.46m  
Have heard of an afternoon, but poor qual- ity (Schooth, Knewstubb). Very good at an evening (Beattie, Taylor, Flegg, Nelson,

Schooth, Gaden). Being received better than any Aussie (Gandy).

## New Caledonia:

**FK8AA, Noumea** ..... 6130kc, 48.94m  
Fair around 5.45 p.m. (Deppeler, Knew- stubb). Putting in a nice signal lately, and seem to have landed some good and new records (Schooth). (Schedule is: 5.30 to 6.30 p.m.—Ed.)

**Radio Pacifique, Noumea** ..... 4050kc, 74.07m  
Heard testing at night, R7 (Taylor).

## AFRICA

### Algeria:

**TPZ, Algiers** ..... 12,120kc, 24.76m  
These people when announcing at 6.25 a.m. appear to say, "Ici Radio d' Algee," give wavelength, also refer to 33.46m and **Radio Maroc**, 25.13m (Muller, Cushen). (I saw their schedule given as 5 to 7.30 a.m., but they seem to me to close at any time be- tween 6.15 and 6.30 and open up again at 7.—Ed) Heard at good strength every morning (Cushen, Gaden, Taylor, Keats, Nelson). Good at 6 p.m. (Gaden).

**TPZ-2, Algiers** ..... 8960kc, 33.48m  
Same remarks apply re schedule. Strong at 6 a.m. (Nelson, Taylor, Beattie, Keats). Good at 6 p.m. (Gaden).

### Belgian Congo:

**OPM, Leopoldville** ..... 10,140kc, 29.59m  
Still good at 5 a.m. (Cushen, Nelson, Flegg,

Gaden, Taylor, Keats). Good till closing at 5.45 a.m. (Beattie). Said the other morn- ing, operating simultaneously on 19.67, 25.58, 31.40 and 49.42m (Muller).

## Egypt:

**SUX, Cairo** ..... 7865kc, 38.15m  
Heard regularly with good signal when open- ing at 4.30 a.m. (Knewstubb). Still good signal till 6.30 a.m. (Nelson, Taylor).

## French Equatorial Africa:

**FZI, Brazzaville** ..... 11,965kc, 25.06m  
Now very weak at 6.30 a.m., but audible as late as 7 a.m. (Cushen, Nelson, Taylor, Beattie, Keats, Gaden). Think I heard them one afternoon about 4 p.m. (Beattie, Schooth). (Some time ago FZI announced they were on at 4 p.m. and 11 p.m.—Ed.) Morning schedule is 6 to 7. Announced this morning (January 28) that as and from February 1 will be giving an English session from 5.45 a.m. direct to U.S.A. (Muller).

## French Morocco:

**CNR-2, Rabat** ..... 11,940kc, 25.13m  
Heard quite well at 4 p.m. (Beattie). Morn- ing schedule is 4 to 7.—Ed.

## French West Africa:

### Senegal:

**FGA, Dakar** ..... (9405kc, 31.90m)  
Very weak at 5.15 a.m. (Gaden, Cushen, Per- kins). R7 at 7 a.m. (Taylor, Keats). Talks in English that were heard every Wednesday and Saturday at 7 a.m. and lately every day seem to have been discontinued. Fair signal till 7.15 (Nelson).

## Gold Coast:

### British West Africa:

**ZOY, Accra** ..... 4915kc, 61.04m  
See particulars under New Stations in this issue.

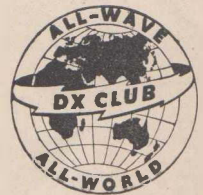
## South Africa:

### Kenya:

**VQ7LO, Nairobi** ..... 6083kc, 49.31m  
Good at 4 a.m. with news (Taylor, Cushen, Gaden).

## ALL-WAVE ALL-WORLD DX CLUB

### Application for Membership



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

*I am very interested in dxing, and am keen to join your Club. The details you require are given below:*

Name.....

Address.....

[Please print both plainly.].....

My set is a.....

(Give make or type, number of valves, and state whether battery or mains operated). .....

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

(Signed).....

(Note: Readers who do not want to mutilate their copies of the "Radio World" by cutting out this form can write out the details required).

**Portuguese East Africa:**

**Mozambique:**

**CR7BE**, Lourenco Marques .... 9710kc, 30.9m  
Excellent signal daily (Nelson, Gaden, Keats). Schedule is: 5 to 7 a.m. except Mondays. News, 5.55.

**CR7AA**, Lourenco Marques .... 6035kc, 49.75m  
Badly interfered with at 4.30 a.m. (Cushen).

**Natal:**

**ZRO**, Durban ..... 9750kc, 30.75m  
Fair signal, closes at 7 a.m. after relaying B.B.C. news (Nelson).

**Spanish Morocco:**

**Radio Falange**, Tangiers .... 7090kc, 42.31m  
6 to 8 a.m. All Spanish; pretty good signal (Muller).

**CJR**, Tangiers ..... kc, 31m band  
Heard on January 6 at 1.25 p.m., closing at 1.35. Announced in English (Callender). (Unfortunately Mr. Callender omitted to mention frequency.—Ed.)

**Tunisia:**

**Radio Tunis**, Tunis ..... 15,650kc, 19.17m  
May be heard between 2.30 and 6 a.m. See Station Particulars.

**TG5JG**, Guatemala City .... 11,440kc, 26.22m  
Heard on January 6 from 3.30 to 4 p.m., but signal spoilt by Morse station (Schooth).  
**TGWA**, Guatemala City .... 9658kc, 30.98m  
Still being heard at 3 p.m. (Knewstubb, Gaden). Heard at good strength till 7 p.m. on January 1 (Nelson).

**Panama:**

**HP5G**, Panama City ..... 11,780kc, 25.47m  
Heard testing at 4 p.m. on 11,775kc. Announced **HP5G** and **HOA** testing in Panama, Republic of Panama (Cushen).

**HP5A, Panama City**

Only heard weakly now after 10 p.m. (Nelson, Gaden). (Almost inaudible at Randwick.—Ed.)

**HP5J**, Panama City ..... 9607kc, 31.22m  
Weak, now, after 10 p.m. (Nelson, Gaden, Keats). Schedule: 10 p.m. till midnight.

**HP5K**, Colon ..... 6005kc, 49.97m

**North:**

**WCBX**, New York ..... 21,570kc, 13.91m  
R5 after midnight (Taylor).

**WCBX**, New York ..... 17,830kc, 16.81m  
R7 at 11 p.m. (Taylor, Keats).

**WNBI**, Boundbrook ..... 17,780kc, 16.87m

Not as strong in the mornings as formerly (Beattie, Keats, Gaden).

**WRUW**, Boston ..... 15,350kc, 19.54m  
Fair in morning (Beattie, Gaden). Schedule: 5 to 8.35 a.m. News at 6.30 and 7.30 a.m.

**KGEI**, Frisco ..... 15,330kc, 19.56m  
Have heard this open weakly at 10 a.m. (Gaden). Heard sometimes from 1.30 p.m. with fair to weak signals (Schooth, Keats, Gaden, Beattie, Nelson). Not very loud but always audible (Cushen, Taylor).

**WGEA**, Schenectady ..... 15,330kc, 19.56m  
Very good at 7 a.m. (Stanke, Taylor, Beattie, Gaden, Knewstubb, Nelson, Keats).

**WCBX**, New York ..... 15,270kc, 19.63m  
Weak at 7.30 a.m. (Taylor, Gaden, Keats).

**WLWO**, Cincinnati ..... 15,250kc, 19.67m  
Excellent in mornings (Gaden, Beattie, Schooth, Deppeler, Knewstubb, Nelson, Callender, Keats).

**WPIT**, Pittsburg ..... 15,210kc, 19.72m  
Heard occasionally at 11 p.m. (Knewstubb, Taylor, Keats, Gaden).

**KKZ**, Bolinas ..... 13,690kc, 21.93m  
Sundays at 2 p.m. (Taylor, Keats).

(Continued overleaf)

**WITH THE REPORTERS**

I am truly grateful to the twenty-two Reporters who have enabled me to prepare such a fine list of loggings this month.

They are:—

- Wm. Bantow, Edithvale, Vic.
- A. Beattie, New Lambton, N.S.W.
- H. A. Callender, Hobart, Tas.
- A. T. Cushen, Invercargill, N.Z.
- A. Deppeler, Edmonton, Q.
- A. L. Flegg, Melbourne, Vic.
- Dr. K. B. Gaden, Wallumbilla, Q.
- N. E. Gandy, Wellington, N.Z.
- R. Hallett, Enfield, Sydney.
- D. J. Hastings, Ashgrove, Q.
- B. W. Keats, Launceston, Tas.
- E. Knewstubb, Lyttelton, N.Z.
- K. B. Mitchellhill, Muswellbrook, N.S.W.
- G. Muller, Newtown, Sydney.
- S. I. Nelson, Cairns, Q.
- W. H. Pepin, Maylands, W.A.
- H. Perkins, Malanda, Q.
- M. Rogers, Hunter's Hill, Sydney.
- R. C. Schooth, Deagon, Q.
- P. L. Smith, Dunsborough, W.A.
- E. J. Stanke, Mt. Gambier, S.A.
- R. Taylor, Mosman, Sydney.

Gentlemen, I thank you.

Will be glad to receive reports for March issue by February 10.

**AMERICA**

**Central:**

**Costa Rica:**

**TIPG**, San Jose ..... 9620kc, 31.19m  
Still reliable, closes at 2.30 p.m. (Cushen, Knewstubb). Excellent signal at 10 p.m. (Nelson, Taylor, Gaden, Keats). I concur.—Ed.

**TIEP**, San Jose ..... 6695kc, 44.82m  
Not so good at 10 p.m. (Gaden).

**El Salvador:**

**YSPA**, San Salvador ..... 10,400kc, 28.55m  
Hardly audible at 11 p.m.—Keats. Note change in call-sign.—Ed.

**YSPB**, San Salvador ..... 6575kc, 45.63m  
This is a new station often in chain with **YSP**. Signal good. Heard closing with march at 3 p.m. (Cushen).

**Guatemala:**

**TGWA**, Guatemala City .... 15,170kc, 19.79m  
R7 on occasions (Cushen). Good till 8.15 Monday mornings, sometimes later (Nelson, Beattie, Taylor, Gaden).

**STATION PARTICULARS**

(Under this heading, as space permits, we will give brief details of stations) (See October, December and Xmas issues for previous notes)

**AFRICA (continued)**

**Kenya**

**VQ7LO**, Nairobi (6083kc, 49.31m): 2.15 to 5.15 a.m. News at 2.30 and 4. This is one of the old reliables and is easily identified by frequent male announcements, "This is Nairobi calling." Owned and operated by Cables and Wireless Ltd., Box 777, Nairobi. Nairobi, with a population of 24,500, is the capital of Kenya Colony, and the centre of the Uganda railway and for big game shooting. Kenya Colony is the new name for British East Africa.

**VQ63**, Nairobi (10,730kc, 27.95m): This station has been reported as heard weakly, carrying the same programme as **VQ7LO**. No details available so far.

**Mozambique**

**CR7BE**, Lourenco Marques (9710kc, 30.9m): Daily except Mondays, 5 to 7 a.m., with news at 5.55. Of the 6 or more frequencies allotted to the Radio Club de Mozambique, this, and that which parallels with **CR7AA**, 6035kc, 49.75m, are the two most likely to be heard in this country. The latter has been reported audible at 2 a.m., but at that hour fades quickly and sometimes right out. Identification apart from announcements is helped by an interval signal consisting of chimes in groups of four notes cadenced "Fa re mi do," precede transmissions. Closes with "A Portuguesa National Anthem." Power is 10 k.w. Owned and operated by Radio Club de Mozambique, P.O. Box 594. Lourenco Marques is a port and the capital of Portuguese East Africa on Delagoa Bay. Population, just under 10,000. The allotted frequencies are: **CR7BI**, 17,915kc, 16.53m; **CR7BG**, 15,285kc, 19.62m; **CR7BE**, 9710 kc, 30.9m; **CR7BD**, 15,255kc, 19.66m; **CR7AA**, 6137kc, 48.88m; **CR7BF**, 11,835 kc, 25.35m; **CR7AA**, 6035kc, 49.75m; **CR7BH**, 11,718kc, 25.6m; **CR7AB**, 3490 kc, 85.92m.

**South**

**ZRO**, Durban (9750kc, 30.75m): Midnight to 2.30 a.m.; 2.45 to 7 a.m. Usually quite good from 3 a.m., fades after 6.

**ZRL**, Capetown (9615kc, 31.23m): 6.15 p.m. to 2.45 a.m.

**ZRK**, Klipheuvall (6097kc, 49.20m): 3 to 6.50 a.m.

**ZRH**, Pretoria (6007kc, 49.94m): 1.30 to 7 a.m.

**ZNB**, Mafeking (5900kc, 50.95m): Schedule unknown, but being heard till closing at 5.30 a.m.

The above schedule does not represent the full time the stations are on the air, but have been selected as the most likely sessions to be heard in Australia. If sending reports for which a verification is expected, enclose an Imperial Reply Coupon and address: The Chief Engineer, South African Broadcasting Corp., P.O. Box 4559, Johannesburg, South Africa.

**Northern Rhodesia**

**VQ2CM**, Luanshya (7500kc, 40.00m): Present schedule, according to latest advices, is of very short duration—3 to 3.30 a.m. on Tuesdays and Saturdays. Announces in English and Matabele. However, the unusual ones look more prominent in that QSL album, so if you are lucky, send reports to: C. Miller, owner and operator, under Government control.

**Tunisia**

**RADIO TUNIS**, Tunis (15,650kc, 19.17m): Said to be off the air since French capitulation, but may bob up again at any time. Although generally heard on this wavelength, are likely to say they are on 19.30m irrespective of where they are. May be heard any day between 2.30 and 6 a.m. Programme is chiefly in Arabic and French. Is listed in overseas magazines as on 15,544kc, 19.30m and 15,496kc, 19.36m. While, of course, mail will not be accepted at the G.P.O., Sydney, at present for this territory, the address is: Resident Generale de la Republique France a Tunis State.

**Gold Coast Colony**

**ZOY**, Accra (4915kc, 61.04m): See particulars under New Stations in this issue. Accra is a town and British settlement on the Gold Coast, West Africa, seat of government of the colony. Population, 60,000. Gold Coast is a British West African colony on Gulf of Guinea; population, 2,035,000. As mentioned elsewhere, it is doubtful if this station has the power to reach here, but it is expected that the present range for the Gold Coast colony will be increased to cover the other British West African colonies of Gambia, Nigeria and Sierra Leone, and to Kenya in East Africa.

**AFRICA**

Please add to particulars previously given:

- Call sign of **Radio Brazzaville** is .... **FZI**
- Call sign of **Radio Dakar** is ..... **FGA**
- Call sign of **Radio Maroc III.** is .... **CNR-2**

# LOGGINGS

(continued)

**WPIT**, Pittsburg ..... 11,870kc, 25.26m  
 Heard opening at 6 a.m.; good (Deppeler, Beattie, Keats, Taylor). Nice and clear in 9 a.m. News (Gaden). Excellent signal Sunday afternoons (Cushen). Schedule: 6 a.m. to 2 p.m.—Ed.

**WCBX**, New York ..... (11,830kc, 25.36m)  
 Opens at 4.30 a.m. with News (Cushen, Flegg, Beattie). Latin-America trans. at 7.30 (Nelson).

**WRUL**, Boston ..... 11,790kc, 25.45m  
 General opinion is: Best American signal on any band. 5 a.m. to 8.35 a.m. (Cushen, Knewstubb, Flegg, Beattie, Gaden, Rogers, Bantow, Stanke). Good news commentary at 6.30 a.m. (Deppeler).

**WBOS**, Boston ..... 11,870kc, 25.26m  
 Heard opening at 7 a.m. Very good (Gaden). (That upsets my WPIT schedule.—Ed.)

**WRUW**, Boston ..... 11,730kc, 25.58m  
 Heard weekly at 12.30 p.m. broadcasting President Roosevelt's speech (Nelson). Strong, 10 a.m. News (Gaden, Keats).

**WLWO**, Cincinnati ..... 11,710kc, 25.62m  
 Very good on opening at 8.15 a.m. (Flegg, Beattie, Keats, Taylor). Going well at 10 a.m. (Gaden).

**KGEI**, Frisco ..... 9670kc, 31.02m  
 While general opinion is that signal is poor, there are signs of improvement. Opens at 4 p.m. when WRCA closes and is on till 6 p.m. with good signal, but interfered with by DJW, 31.09m (Schooth, Gaden, Keats). Just audible at 6 p.m., very disappointing (Knewstubb, Nelson). Bit of a washout in afternoon, but improving (Deppeler). Back here and very poor at 4 p.m. (Cushen). R6 at 5 p.m. Good at 10 p.m. (Nelson). Seems to have dropped Mail-bag; good at midnight (Cushen, Flegg, Taylor). Dr. Gaden says, "Improved after 4, and by 6 full of pep."

**WRCA**, Boundbrook ..... 9670kc, 31.02m  
 Rivals WRUL in volume, excellent on Sundays till a few minutes to 4 p.m. (Cushen, Schooth, Knewstubb, Gaden, Taylor, Beattie).

**WCBX**, New York ..... 9650kc, 31.09m  
 Fairly strong a.m. (Bantow, Stanke, Nelson, Flegg, Beattie).

**WLWO**, Cincinnati ..... 9590kc, 31.28m  
 Very weak of an afternoon (Schooth, Beattie, Bantow, Stanke). Somewhat weakened; good Mail-bag session at 4 p.m. on Sundays, conducted by Lon Clark (Cushen, Knewstubb).

## SPECIAL 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 within a few weeks it will be necessary to increase prices by at least 25%.

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.

**DX CLUB STICKERS.**—Enlarged two-colour replicas of the Club badge, in the form of gummed stickers, designed for attaching to envelopes, QSL cards, etc.

Price ..... 5 dozen for 1/6, post free.



**WCAB**, Philadelphia ..... 9590kc, 31.28m  
 Seems to have gone (Cushen).

**WBOS**, Boston ..... 9570kc, 31.36m  
 These people seem to have gone also (Cushen). (Last mail brought news that they would soon be on the air again.—Ed.)

**WGEO**, Schenectady ..... 9530kc, 31.48m  
 Fine 9 a.m. and 2 p.m. (all reporters). Good strength 6.30 onwards. (Excellent at Randwick at 6.30 and 8.40 a.m.—Ed.)

**KEI**, Bolinas ..... 9490kc, 31.61m  
 Good when on (Knewstubb).

**WCBX**, New York ..... 6170kc, 48.62m  
 Good in closing at 6 p.m. (Knewstubb, Taylor). This is interesting, as they are only shown in latest advices as operating for 90 minutes, from 11.30 p.m. to 1 a.m. E.S.T., or 2.30 to 4 p.m. our time.—Ed.)

**WCAB**, Philadelphia ..... 6060kc, 49.5m  
 Not as loud as WCBX (Knewstubb). R7 in late afternoon (Taylor).

**Mexico:**  
**XEQQ**, Mexico City ..... 9680kc, 30.99m  
 Excellent (Cushen, Gaden). Fair, but stays on longer than XEWW (Knewstubb). Fair signal sometimes as late as 5 p.m. (Nelson, Keats).

**XEWW**, Mexico City ..... 9503kc, 31.57m  
 Good from 3.30 p.m. (Schooth, Nelson, Taylor, Keats, Beattie, Gaden, Knewstubb). Excellent at 5 p.m. Better than GSB (Cushen, Deppeler).

**XEXA**, Mexico City ..... 6160kc, 48.54m  
 Heard till after 6 p.m. on Xmas Day (Cushen).

### South:

#### Brazil:

**PSE**, Rio de Janeiro ..... 14,935kc, 20.08m  
 Thursdays round about 7.15 a.m. (Gaden, Keats, Taylor).

**PSH**, Rio de Janeiro ..... 10,220kc, 29.35m  
 Very nice at 9 a.m. (Gaden).

#### British Guiana:

**VP3BG**, Georgetown ..... 6130kc, 48.94m  
 This country is in the news again, so maybe this seldom-reported station will bob up again. Seems to be best in winter time round about 7.15 a.m.

#### Ecuador:

**HCJB**, Quito ..... 12,460kc, 24.08m  
 Hardly audible now at noon (Cushen, Taylor). Fair signal from approximately 9.50 to 11 p.m. (Nelson, Beattie). (Mr. Nelson's time is the new schedule.—Ed.)

Make sure of  
 maximum efficiency  
 and longest life—

ADOPT AS YOUR  
 STANDARD—

# Mullard

## M A S T E R

### RADIOVALVES

MULLARD - AUSTRALIA PTY. LTD., 367 KENT STREET, SYDNEY TELEPHONE: MJ 4688

**Chile:**  
**CB-1180**, Santiago ..... 11,945kc, 25.12m  
 Mr. Schooth, of Brisbane, advises it is fair when not drowned by morse.  
**CD-1190**, Valdivia ..... 11,910kc, 25.19m  
 Very good at 9.45 p.m. (Gaden).  
**CB-1170**, Santiago ..... 11,700kc, 25.64m  
 Can still be heard after 7 a.m. (Gaden).  
**CB-970**, Valparaiso ..... 9730kc, 30.83m  
 Only reliable Chilean; good till 2.30 p.m. (Cushen). R6 early morning (Taylor).  
 (From 10 p.m. splendid at my listening post.—Ed.)

**Peru:**  
**OAX5C**, Ica ..... 9430kc, 31.82m  
 Good in afternoon (Schooth, Taylor, Gaden).

**Uruguay:**  
**CXA-8**, Montevideo ..... 9640kc, 31.12m  
 R7 at 4 p.m. Sundays (Taylor).  
**CXA-19**, Montevideo ..... 11,705kc, 25.63m  
 Quite good at 7 a.m. (Keats). (This is the earliest this station has been reported.—Ed.)

**THE EAST**

**Burma:**  
**XYZ**, Rangoon ..... 6007kc, 49.94m  
 Fairly strong at times. News at 12.30 a.m. (Bantow, Cushen, Taylor).

**XZZ**, ..... 3490kc, 86.00m  
 In parallel with XYZ (Taylor).

**China:**  
**XG0X**, Chungking ..... 15,190kc, 19.75m  
 Fair at 7 a.m. (Gandy). Have logged at mid-day, but only fair signal (Schooth). Heard in English News at 5.20 p.m. (Deppeler, Beattie, Keats).

Owing to pressure on space, we have been compelled to omit Germany, Russia, Italy, Cuba, Dutch East Indies, French Indo China, Hong Kong, Phillipines and Notes From My Diary.

**FFZ**, Shanghai ..... 12,090kc, 24.83m  
 Fair at 10 p.m. (Nelson, Flegg, Deppeler, Gaden, Bantow, Hastings, Taylor, Knewstubb, Keats). (At times, when free of morse interference, bursts of excellence.—Ed.)

**XGR5**, Shanghai ..... 12,030kc, 24.93m  
 "The Voice of Europe," notwithstanding announcement that they are on 25.25m, is just about here and the signal is very good. As before, definitely anti-British. Just before German session, announce "Deutscher Rundfunk Sender Shanghai."—Ed. Much better on this wave-length (Muller, Schooth, Nelson). Commence English concert at about 7.12 p.m. and announce 25.25 (Hallett). Very strong on this frequency (Gaden). Address is: 3 Great Western Road.

**XGR5**, Shanghai ..... 11,910kc, 25.15m  
 Prior to change was reported by: Hastings, Schooth, Gandy, Knewstubb, Flegg, Beattie, Taylor, Keats.

**XGOY**, Shanghai ..... 11,900kc, 25.21m  
 News at 8.15 p.m. (Beattie). Strong at 9.15 p.m. (Gaden, Nelson, Keats, Taylor, Knewstubb, Bantow, Stanke, Gandy, Flegg, Hastings).

**XMHA**, Shanghai ..... 11,885kc, 25.24m  
 Note change in frequency. Here is another Shanghai station that has improved with a change in wave-length. Very strong now (Gaden, Muller).

**XGOK**, Canton ..... 11,605kc, 25.75m  
 Strong each night (Hastings, Schooth, Nelson, Flegg, Gaden, Taylor, Keats, Beattie). (News at 10.30 p.m.—Ed.)

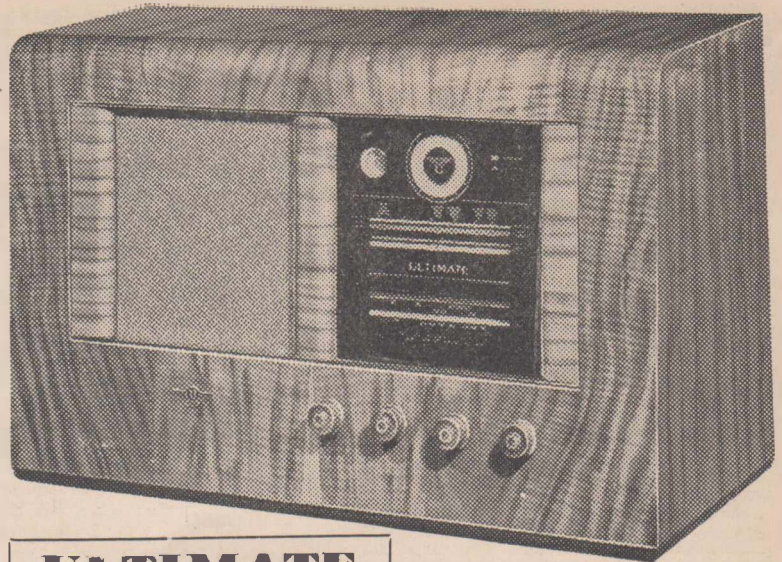
**XGOA-XGOY**, Chungking ..... 9710kc, 30.9m  
 Now heard well nightly. Both call-signs given (Nelson). Good at 12.15 a.m. (Flegg, Knewstubb).

**XPSA**, Kweiyang ..... 8540kc, 35.10m  
 Opens at 9.15 p.m. Terrific signal (Knewstubb, Nelson, Beattie, Keats, Gaden).

**XGOY**, Chungking ..... 9635kc, 31.14m  
 Note slight change in frequency. Midnight to 12.55 a.m. News at 12.30 a.m.

**XHHB**, Shanghai ..... 7970kc, 37.6m  
 Being reported again, but have not verified

(Continued on next page)



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# LOGGINGS

(continued)

my report of last January (Cushen). Heard occasionally (Keats).

## Portuguese China:

**CRY-9**, Macao ..... 6080kc, 49.34m  
Weak Monday nights. Hastings, Taylor, Rogers. Almost blotted out by morse (Cushen).

## Thai:

**HS6PJ**, Bangkok ..... 19,020kc, 15.72m  
Good station on Monday nights from 11 p.m. till 1 a.m. (Nelson, Taylor, Keats).

**HSP5**, Bangkok ..... 11,715kc, 25.61m  
Fair signal, but interference bad (Nelson, Taylor, Keats, Flegg). Mr. Pepin, Maylands, W.A., advises hearing Thai on 32 metres, but gives no time. This would be a new frequency for them. We used to hear them on 7968kc, 37.65m, nightly with exception of Mondays.

## GREAT BRITAIN

"This is London calling; you are listening to a News Bulletin in the overseas service of the British Broadcasting Corporation." What comforting words—a sure sign all's well. If you should detect a slight weariness when Robert Harris or Bob Douglal (the latter says he never exceeds 120 words per minute) are reading the News, there is some justification for it. Do you know the conditions under which the B.B.C. staff are compelled to work?

At 10.30 each night a uniformed officer requests quiet from everyone, and in the great concert hall at Broadcasting House—women on one side, men on the other—with curtains between them, settle down to snatch what rest they can, or what repose is possible during a bombing raid. But there are others who are not sleeping; they are telling America from midnight till 6 a.m. what is happening in London. And right through the night news in every language is going out on the air, telling the truth, the truth that many a European risks the death penalty to hear, now going out in thirty foreign languages, occupying 144 hours a week in the telling, as compared to 16 languages, taking 6½ hours, a year ago. And then there is the staff preparing short snappy programmes of light entertainment. And, don't forget, the choice of entertainment is the result of a world-wide questionnaire, so if it does not please you, somebody, and presumably a large number, asked for it. And all the time the engineers are keeping the transmitters on the air—"This is London calling. Here is the News."

**GST** ..... 21,550kc, 13.92m  
Excellent at 9 p.m. (Gaden, Flegg, Beattie, Keats, Taylor).

**GSH** ..... 21,470kc, 13.97m  
Fair after 9.30 p.m. (Gandy, Gaden, Nelson, Taylor, Keats, Beattie).

**GSV** ..... 17,810kc, 16.84m  
Splendid at 10 p.m. (Stanke, Flegg, Beattie, Keats, Taylor).

**GSG** ..... 17,790kc, 15.86m  
Fair after 9.30 p.m. (Gaden, Gandy, Deppler, Taylor, Keats, Schooth, Nelson). (Definitely going off.—Ed.)

**GSP** ..... 15,310kc, 19.60m  
Good in morning (Stanke, Schooth, Taylor, Flegg, Keats). Weakest of the Daventry stations at 6 p.m.: (Beattie).

**GSI** ..... 15,260kc, 19.66m  
Good after 5 p.m. (Gandy, Schooth). Loud at night (Nelson, Keats, Taylor).

**GSO** ..... 15,180kc, 19.76m  
Good from 9-11 p.m. (Keats).

**GSF** ..... 15,140kc, 19.82m  
One of the best signals on the dial (all reporters). (Excellent at 11 p.m.—Ed.)

**GSE** ..... 11,860kc, 25.29m  
Good afternoon and night (all reporters).

**GSN** ..... 11,820kc, 25.38m  
Very good, 6.30 to 7 a.m. (Gaden). Good at night (Beattie, Taylor, Keats).

**GSD** ..... 11,750kc, 25.53m  
Splendid whenever on (all reporters). Best transmitter in 8.55 p.m. to midnight session (Gaden, Nelson). (In this I thoroughly concur.—Ed.)

**GRX** ..... 9690kc, 30.96m  
Very good in late evenings (Schooth, Nelson, Keats, Taylor, Gaden). Fair strength in European service at 6.30 p.m. (Deppeler). (I think this transmitter is now dispensed with in evening session.—Ed.)

**GRY** ..... 9600kc, 31.25m  
Very good early morning (Flegg, Keats, Taylor, Gaden). (This is the African session from 5.30 a.m. to 8.25 a.m. It is also heard from 8.55 to 10 p.m.—Ed.) Fair 9 p.m. (Beattie).

**GSC** ..... 9580kc, 31.32m  
Very good 6.30 to 7 a.m. (Gaden, Keats). Good in evening (Flegg, Beattie, Taylor).

**GSB** ..... 9510kc, 31.55m  
Excellent from 5 p.m. (Schooth, Gandy, Deppler, Nelson, Keats, Beattie, Callender, Flegg, Taylor).

**GRU** ..... 9450kc, 31.76m  
"U" for unity. Appears to open at midnight. Very loud, but morse often on top (Hallett, Muller). (Not certain, but think this is on in afternoon in Italian session.—Ed.)

**GSW** ..... 7230kc, 41.49m  
Seems to have been discontinued.

**GRW** ..... 7132kc, 42.06m  
Heard at 6 a.m. (Muller).

**GRW** ..... 6140kc, 48.82m  
Another that appears to have become silent.

**GSL** ..... 6110kc, 49.10m  
Midnight to 2.30 a.m.

**GRW** ..... 6080kc, 49.34m  
Very good in mornings (Muller). Schedule is: Midnight to 8.30 a.m. (Cushen). One of the loudest and clearest of the morning stations.—Ed.

**GSA** ..... 6050kc, 49.59m  
Excellent (Schooth, Taylor). Schedule: 3.30 to 8 p.m., midnight to 2.30 a.m., 2.55 a.m. to 8.30 a.m.

## EUROPE

**Holland:**

**PCV**, Amsterdam ..... 18,070kc, 16.6m  
Only noise on carrier now audible (Nelson, Keats, Gaden, Beattie).

**PCJ-2**, Huizen ..... 15,220kc, 19.71m  
Opens at 9.30 p.m. (Nelson, Gaden, Bantow, Stanke, Taylor, Keats, Beattie). (Subject to the swirling noise on PCV.—Ed.)

**Italy:**  
(Source of supply counted as Rome)

**IRW** ..... 19,520kc, 15.37m  
Very good with News at 11.35 p.m. (Flegg, Keats, Beattie).

## NEW STATIONS

**RADIO FALANGE**, Tangiers (7090kc, 42.31m): Mr. Gus Muller, of Newtown, rang me, saying he was hearing this station at pretty good strength from 6 a.m. As is to be expected, speech is in Spanish. This is another town that has come into the limelight again and will be worth watching. —, Rome (9765kc, 30.72m): Another find by Mr. Muller. Puts in a signal louder than **ZRO-3** at 5.30 a.m. Closes at 6.15.

**Location unknown** (9440kc, 31.76m): Still another for which I am indebted to Mr. Muller. This is "The Christian Peace Movement," who speak in English from 5 to 6 a.m. Hymns and frequent quotations from the Bible are heard. At 5.55 announcement: "We are heard every day at 7 G.M.T." (5 a.m. Sydney). No call-sign or location is given, but station leaves the air at 6, after a hymn. Signal is strong and clear.

**ZOY**, Accra, Gold Coast, Africa (4915kc, 61.04m): This station was opened on October 24. Power is only small as it is intended to cover the Gold Coast only, but there is a likelihood of it being increased. Schedule: Tuesday, Thursday and Saturday, 2.30 to 3 a.m. Daily, News in French, 4 to 4.30 a.m. Daily, Native dialects, 3 to 4 and 4.30 to 5 a.m. Thursday, Sessions for schools, 1.10 a.m. (This information comes from "The Broadcaster." I doubt if we would hear some here, but it is certainly worth trying.—Ed.)

**ZNR**, Aden, Arabia (12,115kc, 24.76m): A short story was prepared for this, but was

unfortunately left out of Xmas issue. However, I sent word to several reporters and doubtless word will come back in time for "The Month's Loggings."

I received advice from Perth that **ZNR** was being heard from 3 to 4 a.m., that a man was speaking in "Italian," followed by records but just before 4 a.m. announced, "This is **ZNR**, Aden, Arabia, broadcasting on 12,115kc, or a wavelength of 24.76m. We shall be broadcasting again to-morrow night at the same time." I have made several attempts to hear them but without success. A letter from Mr. Cushen, Invercargill, says, "Thanks indeed for information about **ZNR**. I listened yesterday morning (December 20) at 3 a.m. and could hear the station very faintly. Tuning away and going back, heard what sounded like Indian announcements. At 3.45 when signal was R6, Q4, a male announced, "You are listening to short-wave station **ZNR**, operating on a frequency of 12.11mc, 24.—m, from Aden, Arabia." (The announcement was blotted out by QRM). At 3.50 a long whistle was broadcasted till 3.55 a.m., when the station signed." (Aden is a British colony, since April, 1937, 100 miles east of State of Bab-el-Mandeb, Arabia. Area, 75 square miles. Important oil fuel and bunkering State. Population, 46,638. Arabian time is 7 hours behind Sydney.—Ed.)

**VUD**, Delhi (3450kc, 87.00m): This is a new one to me and is introduced by Mr. Cushen, Invercargill, who says, "**VUD-2** appears to leave 60.48m at 11.45 p.m. and open here. Signal is good but noisy."

And four more from Mr. Muller, of Newtown:—

—, Rome (15,053kc, 19.93m): Same programme as **IRW**, 19,520kc, 15.3m. News at 11.35 p.m.

—, Rome (9765kc, 30.72m): Splendid signal till closing at 6.15 a.m.

—, Rome (9683kc, 30.98m): This one with a fine signal also; opens at 6.15 a.m.

—, Moscow (7194kc, 41.7m): Very loud till 6 a.m., then dies off.

**GRW**, London (6080kc, 49.34m): Seems to have forsaken 48.82 for here. Excellent signal at 6 a.m. Schedule is: Midnight to 8.30 a.m., News at 3 and 6.

—, London (7132kc, 42.06m): Heard at 6 a.m. Good signal.



# BRITANNIC

"RULES THE RADIO WAVES"



**Vatican City:**  
**HVJ** ..... 15,120kc, 19.84m  
 Still puts over "Cheerio" on a Friday  
 afternoon (Schooth).  
**HVJ** ..... 6190kc, 48.47m  
 R6 in mornings (Taylor). (English session is:  
 5.15 to 5.30.—Ed.)

**Portugal:**  
**CTV-2, Monsanto** ..... 11,148kc, 26.91m  
 Heard at 3 a.m. one morning going at  
 full strength (Gaden). (This is fine business  
 and a new one to our readers.—Ed.)  
**CSW-6, Lisbon** ..... 11,040kc, 27.17m  
 Very good at 5 a.m. (Cushen, Taylor,  
 Beattie, Knewstubb, Flegg). Best on any  
 band at 6 a.m. (Keats).  
**CSW-7, Lisbon** ..... 9740kc, 30.8m  
 Fairly good at 7 a.m.; lot of C.W. (Nelson,  
 Flegg, Keats, Beattie, Gaden).

**Roumania:**  
**Radio Bucharest** ..... 9245kc, 32.45m  
 Weak at 6 a.m. (Keats). (Now closes at  
 6.30.—Ed.)

**Spain:**  
**EAQ, Madrid** ..... 9860kc, 30.43m  
 R4 in mornings (Knewstubb, Nelson, Keats).  
**EAJ-9, Malaga** ..... 7220kc, 41.55m  
 Very good in mornings (Schooth).  
**Radio Espagna, San Sebastian, 7210kc.** 41.6m  
 Fair at 6.30 a.m. (Nelson).  
**Radio Malaga, Malaga** ..... 7120kc, 42.1m  
 Sometimes heard at fair strength at 6.30  
 a.m. (Nelson).

**Switzerland:**  
**HBH, Geneva** ..... 18,480kc, 16.23m  
 R7 at midnight on Fridays (Taylor, Keats).  
**Radio Suisse, Schwarzenburg, 11,870kc,** 25.28m  
 R7 at 10 p.m. (Taylor, Beattie).  
**Radio Suisse, Schwarzenburg, 6165kc,** 48.56m  
 Not heard during last week.—Ed

**Yugoslavia:**  
**YUF, Belgrade** ..... 15,240kc, 19.68m  
 Still heard with fair signals from 5 to 6  
 p.m. (Beattie, Nelson, Taylor, Keats). Not  
 heard lately (Schooth).

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**YUC, Belgrade** ..... 9505kc, 31.56m  
 R7 at 6.30 a.m. (Taylor).  
**SCANDINAVIA**

**Norway:**  
**LKQ, Oslo** ..... 11,735kc, 25.57m  
 Not as good in the mornings as a few  
 weeks ago (Schooth, Taylor, Keats). Heard  
 very weakly at 4 p.m. (Beattie, Keats).  
**MISCELLANEOUS**

**Arabia:**  
**ZNR, Aden** ..... 12,110kc, 24.76m  
 Heard from 3 to 3.35 a.m., R6, Q4 (Cushen,  
 N.Z.). Later: Only heard once at good  
 strength. Very weak now (Cushen). (This  
 was erroneously shown in last issue as:  
 From 11 p.m.—Ed.)

**Canada:**  
**CKFX, Vancouver** ..... 6070kc, 49.42m  
 Heard best at 5 p.m., closes at 5.30 on  
 week days, 7 p.m. on Sundays (Cushen).

**Greece:**  
**SVJ, Athens** ..... 9825kc, 30.54m  
 Mr. Taylor, of Mosman, says he is hearing  
 this station R5 at midnight.

**SVM, Athens** ..... 9935kc, 30.196m  
 Heard on January 18 at 6.19 a.m. an-  
 nouncement in English, "This is Athens. We  
 will open again to-morrow at 8 p.m. G.M.T."  
 Station left air at 6.20 a.m. (Muller). Later:  
 5.45 to 6 a.m. in English. Terrific signal.—  
 Ed.

**SVM, Athens** ..... 7075kc, 42.4m  
 According to advice given to me by the  
 Secretary to the Greece Consulate-General,  
 Athens on 7075kc, 42.4m are broadcasting  
 news in 14 different languages from 4.45  
 to 8.50 a.m. English was listed for 7 a.m.  
 So far I cannot truthfully say I have heard  
 them, although on their frequency a carrier  
 was picked up but far too weak to learn  
 who it was. I rang my friend, Mr. G.  
 Muller, a champion at early morning sta-  
 tions and able to speak several languages,  
 feeling certain if it could be heard he  
 would get it. While hunting he happened  
 on 30.10 and was astounded to hear the  
 statement shown just above this paragraph.  
 23/1/41: Mr. Muller rang today: "At 5.40  
 a.m. this morning, heard Athens on 30.19  
 in Italian. At 5.45 a.m. they played what  
 sounded like an anthem, previously "God  
 Save the King." Then in English, "This is  
 Athens speaking. In order to ensure better  
 reception in the United Kingdom we are  
 broadcasting on a third wave-length, which  
 is 30.196m or 9935kc. We are on the air  
 only from 7.45 to 8 p.m., G.M.T., or 9.45 to  
 10 p.m., Athens time (5.45 to 6 a.m., Syd-  
 ney time). Call-sign is SVM.. We are also  
 on 42.4m and medium wave 499.2m or  
 611kc." Signal on 30.19 is excellent. (Ow-  
 ning to noise, could not hear them, but on  
 30.19 strong signal.—Ed.)

**Iran (Persia):**  
**EPB, Teheran** ..... 15,100kc, 19.85m  
 Heard clock striking 12 at 7 p.m.  
 our time on January 7 (Gaden).  
 (Schedule is supposed to be: 6 to 8.30  
 p.m., but, while I heard what I took  
 to be this station on January 15 at terrific

strength at 7.50 p.m., it continued until  
 DJL on almost the same frequency "put  
 them out of business." Whether "Lord  
 Haw-Haw" talked them down or whether  
 they became disgested, I don't know, but  
 they soon faded out. I have not heard  
 them since.—Ed.)

**EQC, Teheran** ..... 9680kc, 30.99m  
 Heard fairly well around midnight. Schedule  
 is: 11.45 p.m. to 2.45 p.m.  
**EQB, Teheran** ..... 6155kc 48.74m  
 Better than recently at 5.30 a.m. and quite  
 good and clear when closing at 6 on  
 January 7. Schedule is: 3 to 6 a.m.—Ed.

**Turkey:**  
**TAQ, Ankara** ..... 15,190kc, 19.74m  
 Only fair of an afternoon (Schooth). Good  
 with News at 9.15 p.m., strong at 10.15  
 (Nelson, Callender, Bantow, Stanke, Schooth,  
 Gaden, Beattie, Keats).  
**TAP, Ankara** ..... 9465kc, 31.70m  
 Good in mornings (Schooth, Deppeler,  
 Knewstubb, Nelson, Flegg, Taylor, Gaden,  
 Beattie, Keats). (Schedule is: Midnight to  
 6.30 a.m., News at 4.15, and on Sundays a  
 talk in English at 5.50.—Ed.)

**Location Unknown:**  
**"Christian Peace Movement,"** 9440kc, 31.76m  
 5 to 6 a.m. Talks, hymns, etc., in English  
 (Muller). (See announcement under "New  
 Stations"). Have now moved to 31.46m  
 (Muller).

**German Freedom Station** ... 9804kc, 30.6m  
 Our old friend of last year. Opens at 6  
 a.m. and on air for about forty-five minutes.  
 Signal quite good. Opens with familiar  
 "Achtung! Achtung!" (Muller). Also heard  
 weakly at 8 p.m. (Muller).

**My 41m Stranger:**  
 This station, which plays "God Save the  
 King" punctually at 6 a.m., is being heard  
 again by Mr. Muller, but marse, opening  
 sharp at 6, prevents call-sign and location  
 being heard. (The marse culprit, I think,  
 is **VJR**, Rockhampton.—Ed.)

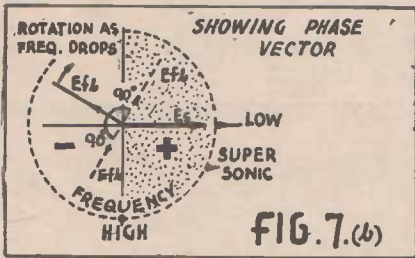
# ACOUSTICS (continued)

back line for either of these effects has in fact become popular, and such filters are usually switched in. In our case, it is continuously variable.

Before continuing further, it is fitting to discuss here our particular volume control circuit (Fig. 4) and its effect on our chosen method of feedback. As the control is turned to zero, due to the effect of  $C_2$ , the positive feedback is increased slightly on the low frequencies, and so we have automatic tone compensation, since in this way the aural tone balance we achieve at higher control settings is automatically maintained at low levels, and so no change in the tone control setting is necessary. This is one of the pleasant advantages of Kriesler Mirrosonic reproduction.

## The Time Constant

The time constant, C3R3, Fig. 4, has been chosen at 60 c.p.s. over 90%, so that no loss occurs above 50 cycles. The response of the complete circuit devolves therefore on  $C_2$ , which may be varied within small limits to change the whole of the register below 100



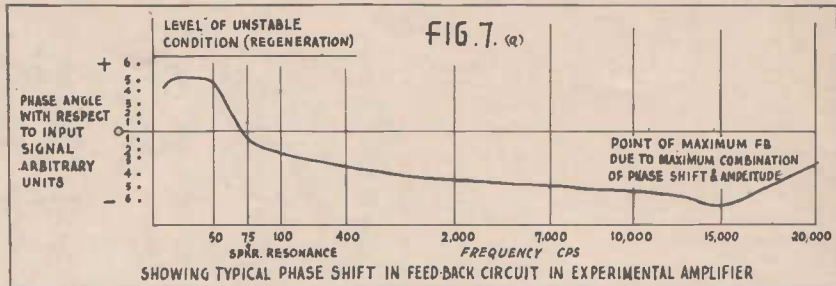
c.p.s., logarithmically, and so serve as a simple means of altering the overall low frequency response of the system when once set up.  $C_2$  also is limited by the earlier mentioned formula relating to diode load and should not be greater than .01 mfd.

Such a simple variation is helpful, as the constants of the rest of the circuit are all so correlated that they cannot be easily changed without upsetting the whole response in some way.

It will be realised now that we will vary our frequency response by some means in the feedback line and that this means will include some method

of phase shift; the principal points of phase shift with frequency will naturally occur at points A, B and C (Fig. 5).

must refer to some frequency at which exactly 180° phase difference results (Fig. 7). This may not actually occur in practice due to various factors.



Let us consider the total phase shift occurring and what happens.

Suppose the input grid is 0°  
the plate is +180°  
Following grid +180° + a°  
Following plate 180° + a° + 180°  
Voice coil 180° + a + 180° ± 180° ± b°  
Input to cathode from line = 180° + a + 180° ± 180° ± b° + c°

Now, if we make a and c very small, then our maximum variation is due to b.

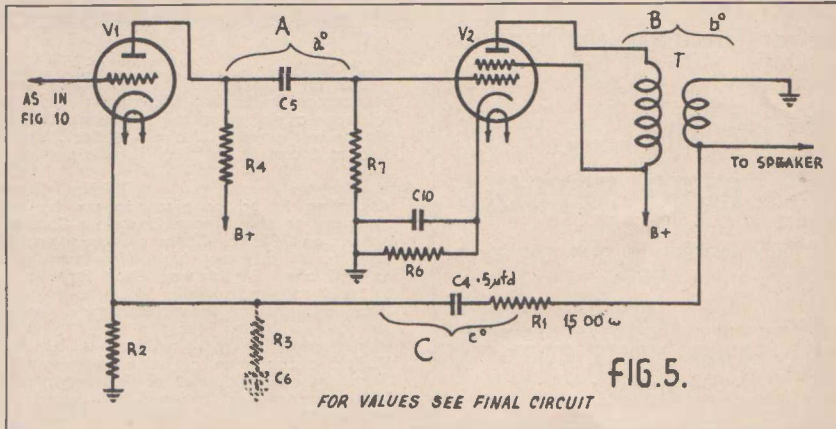
Now, by correctly choosing voice coil polarity, the above phase shift will be somewhat negative at mid-frequency range. Thus, remembering our previous discussion, it will be

However, we must arrange our circuit so that the phase vector follows the arrow as the frequency is lowered, if we wish the amplification at low frequencies greater than that at the middle.

The value of b° is due to the extremely complex nature of the speaker load, and the speaker transformer.

At mid-frequencies their effect will be to produce a phase angle, say b1°. As the frequency is lowered, this varies somewhat until it comes near the resonance point.

Here the speaker impedance is very high and the phase angle changes.



realised it need only shift 90° to go through the region representing zero feedback, to positive, and, of course, depending just on its particular phase, it may be much less. Of course, we

This means that, since the phase shifts, and we utilise this shift in the right direction, the feedback line coupled to this will cause the output to gradually rise. Now, if we choose our components correctly it is obvious that we may arrange matters so that at resonance the feedback is still in effect negative with respect to the input.

As we go over resonance, the phase of the feedback changes rapidly and so the effect rapidly approaches the condition of positive feedback. Consequently we may raise the amplification below the resonance point, and still have negative feedback at resonance. However, once the phase has shifted to its maximum possible posi-



tive position, it starts toward negative again, and, because of the speaker, extremely rapidly, so that the response drops rapidly.

The important point to realise is that the electrical resonance point or maximum output can be made considerably lower than speaker resonance, so extending the lower register. In this way the output of a 45-cycle speaker has been raised 8 d.b. at 30 cycles over its response at 45 cy. In our finalised circuit the 75-cycle speaker is brought down to 55-60 cycles. The need for low values of a and b are obvious, for if these contribute anything, being positive they assist the change, and it will be almost impossible to separate speaker and electrical resonance—and this will mean poor transients at this point.

#### Phase Shift

Actually the phase shift at these two points helps the point at which electrical resonance occurs, and generally, increasing the time constant tends to lower this point. However, as the speaker falls away so rapidly below its own resonance, usually too much gain is lost trying to extend the range beyond a certain point. We have no difficulty, however, in obtaining as much as 15 d.b. increase at 50 c.p.s., over 400 c.p.s., by this means if we desire.

To achieve this it is of course necessary to correctly proportion the various resistors in the feedback and  $V_2$  coupling networks. The grid of this has a high time constant, but performs satisfactorily.

If we make  $R1R_2$  (Fig. 5) too small, the electrical control is inclined to be too rapid, and peaky bass will result. If too large, the capacities must be too large or the phase shift is too great. As a large voltage is developed in the voice coil, due to the rise in speaker impedance at resonance, we must be careful, otherwise this will feed back a large positive voltage and cause oscillation. If oscillation does not quite occur, it may cause a very "peaked" resonance spot which sounds most distressing. A graph is shown of the response from Fig. 5 in Fig. 8. (see next page). It will be seen that we have practically achieved the desired maximum at the low frequency end of the band.

In order to produce this result, it is apparent that a good speaker transformer is necessary, as its own losses and phase shifts will cause trouble. There must be sufficient inductance to load the valve at low frequencies. If the leakage is at a minimum, then from the mid-frequencies upwards the phase shift at this point will not be sufficient to greatly affect response.

Having discussed the low frequency section, it remains to affect the highs

(Continued on next page)

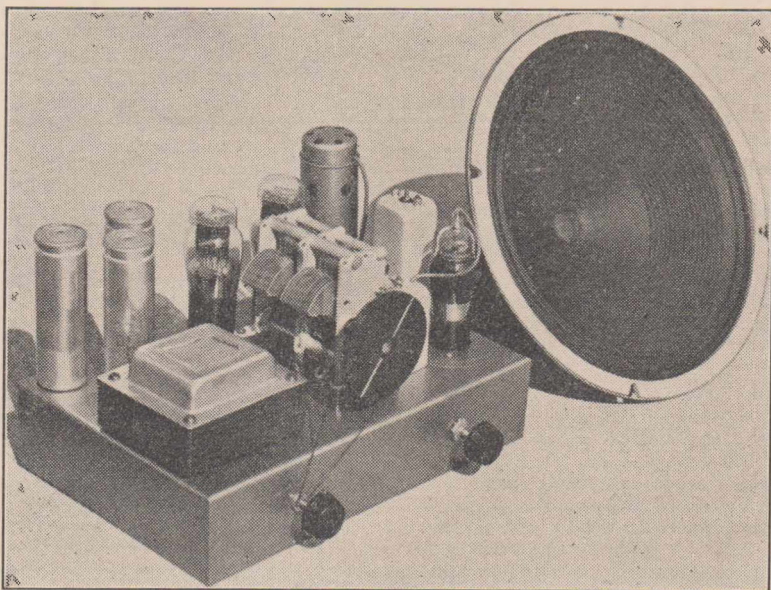
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- Pleasing absence of spurious frequencies common to speakers of poorer design.
- Smooth and effortless handling of low and high volume levels.
- Good transient response responsible for clean speech and faithful reproduction of "clipped" notes.

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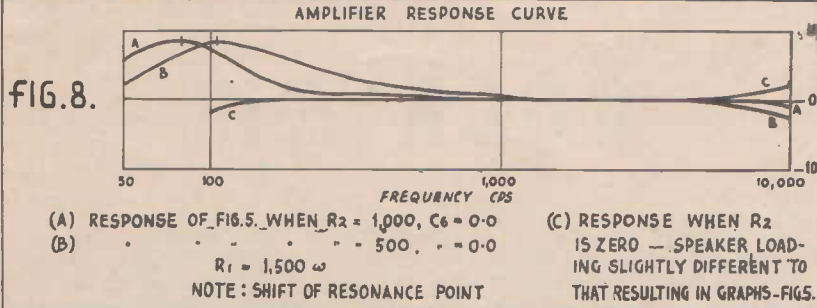
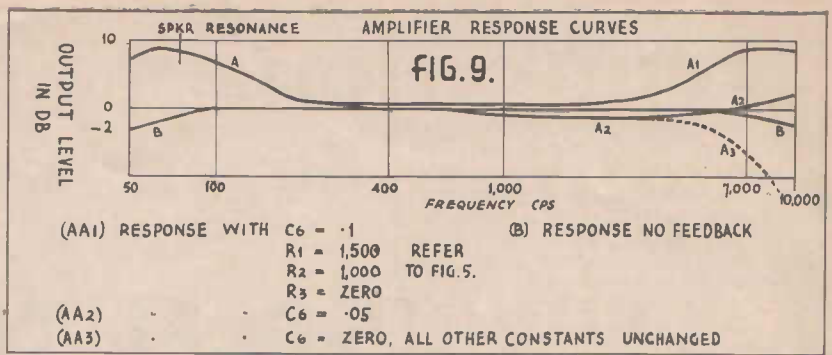
Rola Speakers are made in New Zealand by Swan Electric Co. Ltd., Wellington.

# ACOUSTICS (continued)

without upsetting our other levels.

Again we may consider phase reversal and also amplitude change. If a small condenser is placed across  $R_2$ , the impedance of this combination is less, while at the same time the phase shifts considerably at high frequencies. The feedback factor is lowered by a minimum value of  $(R_j\omega C + 1)$ , while the phase (in our case) brings the actual feedback factor to almost zero, at the frequencies desired.

It will be realised here that in order



to obviate spurious effects various capacity shunts and losses in the rest of the amplifier should be as low as possible to prevent undesirable phase shifts destroying our feedback and also to prevent too great a loss of high frequencies so that removal of feedback would have little, if any, effect. Thus the amplifier shown has a better response at 10,000 c.p.s. than the average one under similar conditions to-day.

The presence of  $C_6$  if large will affect our calculations at middle and even low frequencies, but by choosing suitable values extremely large variations in high frequency response will result without upsetting the feedback and thus the gain at the rest of the spectrum. Graphs, using two values, are shown in Fig. 9.

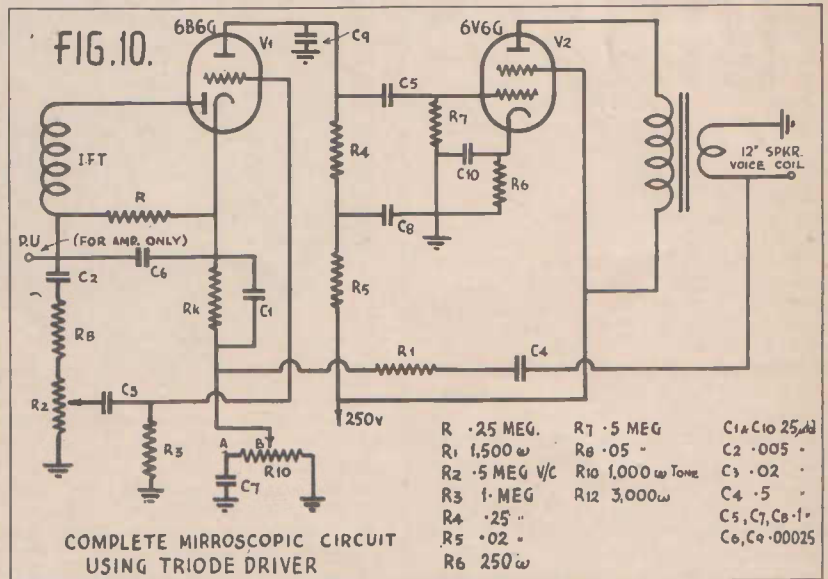
It will be realised that here is a most satisfactory amplifier response according to our requirements — but how may we vary it? Firstly, neglecting  $C_6$ , we need only vary  $R_2$  (Fig. 5) in order to alter the amount of feedback and therefore the low frequency level. If  $R_2$  is not greater than half

$R_1$  at its maximum position, then its action is somewhat tapered to this extent. That after it reaches a value in

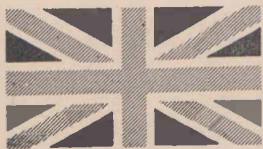
this case of about 500 ohms, the feedback factor is not directly proportional to the resistance and therefore the degree of rotation of the control arm; thus the change in level over the last half of the movement is not nearly so great as the change over the first half. This has an important aspect later.

## Vary High Frequency Level

Now, we must be able to vary the high frequency level also. Without  $C_6$ , the feedback is quite high at these limits. We have seen from our graphs the effect of varying  $C_6$ . To vary this would be out of the question, but we may vary something which will have the same effect, and that is a resistor



in series with it. If a resistor equal in value to the reactance at the high frequency concerned is used, or large comparable to this reactance, then the effect of  $C_6$  is almost entirely eliminated at all frequencies below this. Now, as we see from our graphs and from previous reasoning, this means we may vary the high frequency response without materially affecting the rest of the register, for if the effect of  $C_6$  be eliminated, this means full feedback operates and the gain is down, while, as  $R_2$  is varying, feedback



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Standard Telephones & Cables Pty. Ltd., 71 Magellan Street, Lismore.

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Queensland: Trackson Bros. Pty. Ltd., 157-9 Elizabeth St., Brisbane.

Victoria: Noyes Bros. (Melbourne) Ltd., 597-603 Lonsdale St., Melbourne.

Standard Telephones & Cables Pty. Ltd., Bourke Street, Melbourne.

Western Australia: M. J. Bateman Ltd., Milligan Street, Perth.

Tasmania: W. & G. Genders Pty. Ltd., 69 Liverpool Street, Hobart, and 53 Cameron Street, Launceston.

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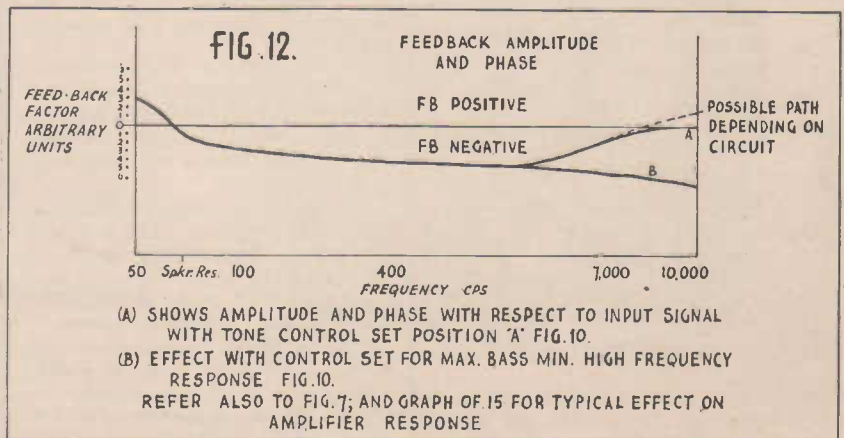
New Zealand: Standard Telephones & Cables Pty. Ltd., Trojan House, Manners Street, Wellington.

gradually becomes less, the phase shifts and the gain gradually rises.

At this point it is interesting to realise that if we utilise a full 12 d.b. variation the distortion is dropped by 75 per cent.

From this point it is a simple matter to put  $R_2R_3$  on the one control and so use the one potentiometer to vary each resistance, as in Fig. 10. Taking this finalised case and remembering what was said about the amount of feedback compared to rotation, we realise that with a 1000-ohm pot., at the 500 ohms position, we still have a curve similar to Fig. 8 possible, for feedback is still applied, and at this stage there is 500 ohms in series with  $C_6$ . This is sufficient to greatly minimise its effect and so the negative

(Continued on page 34)



# TWO MULLARD PORTABLES

Shown below are two new Mullard releases — both 1.4-volt portables.

Mullard Model 44 is a four-valve broadcast receiver of particularly compact design, while Model 68 is a five-valve dual-waver.

Power for each model is derived from one PR8 and two PR45 batteries, giving approximately 200 hours of operation. Both models incorporate built-in loop aerials, provision also be-



ing made for attaching external aerial and earth leads for DX reception.

Both dial scales are calibrated for approximately 100 Australian call-signs divided into State zones.

A particularly valuable feature common to both models is the safety switch, which turns the set off automatically when the lid is closed.

Air-test reports on both models, together with further technical data, will be published in a future issue. In the meantime, readers can obtain further details from any Mullard distributor, or direct from Mullard-Australia Pty. Ltd., 367-371 Kent Street, Sydney.

★ ★ ★

## FREE FOXRADIO ORDER PADS

For the convenience of their many thousands of clients throughout the Commonwealth, Fox and MacGillycuddy Ltd., of 47 York Street, Sydney, have had printed special order pads that are available to "Radio World" readers free on request.

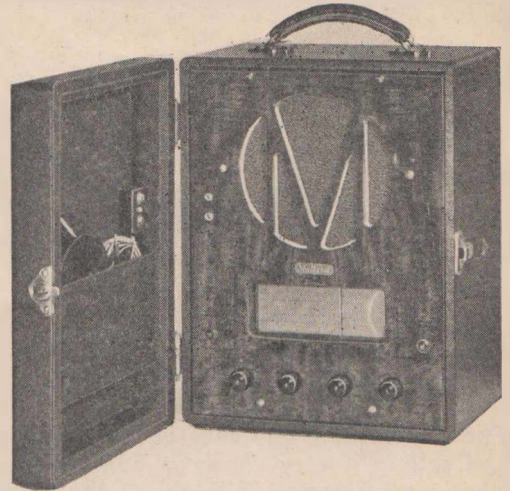
These pads greatly simplify ordering in that spaces are provided for all necessary details of lines handled by this well-known firm. In addition, postage is paid by Fox and MacGillycuddy.

★

Right: Illustrated here is the Mullard Model 68, a five valve dual-wave portable housed in a handsome carrying case.

Below: Mullard Model 44, a four valve broadcast receiver built into a very compact case for easier carrying.

★



## LOCAL-TONE (continued)

of using the broadest intermediate obtainable, one which was primarily designed for use with push-tuning sets.

In order to avoid the effects of slight mis-adjustment of the push-button tuning it was made particularly broad in tuning, just the way we wanted it. This particular intermediate is listed by R.C.S. as the type 114. Similar transformers are also available in Radiokes and Crown brands.

### The Power Transformer

The total high tension current drain is about 60 milliamperes, so that an 80 milliamp transformer is operating well within its limits. A point to watch, however, is the no-load voltage. For the few seconds between the time that the set is switched on and the valves warm up there is no current drain on the power transformer and there is always the tendency for the actual high-tension voltage to peak during this period.

With a 500-volt electrolytic condenser there may be a chance of the condenser sizzling during this period, an indication that it is being overloaded and a warning sign which should be heeded. One solution of the problem is to fit a 600-volt electrolytic to take this overload safely. Another solution would be to fit a voltage divider across from high tension to earth to cause a bleed current to flow all the time, and to thereby impose a slight load, even before the heaters of the valves warm up sufficiently to allow them to draw plate current. The tapings on the divider, of course, will be neglected and left vacant.

## Mullard Valve Chart Re-printed

The latest Mullard Valve Characteristics Chart has enjoyed an unprecedented demand among technical men all over the Commonwealth. Actually, stocks are now completely exhausted, necessitating an immediate re-print.

The popularity of this latest edition is easily understandable when it is realised that it is one of the most comprehensive publications of its kind ever compiled in Australia. No less than 318 valve types are listed, with full data.

The old system of valve grouping employed previously has been discarded as being too complicated. Instead, there are only two groups, comprising American and English types, the valves in each being arranged alphabetically and numerically.

Useful additional information that could not be included in tabulated form (e.g. data concerning alternative ratings and special precautions, etc.) is contained in a special four-page section.

Another admirable feature of the chart is that electrical and physical characteristics (including under-socket connections) have been separated, being arranged on facing pages for easy reference.

"Radio World" readers can now obtain copies of the re-printed edition by forwarding sixpence in stamps to Mullard-Australia Pty. Ltd., 367-371 Kent Street, Sydney.

# PARADE

**COUNTER CHECKERS.** — According to reports, the Delta Model D 2000 Appliance Tester is enjoying great popularity at the present time in the large circle of radio and electrical dealers.

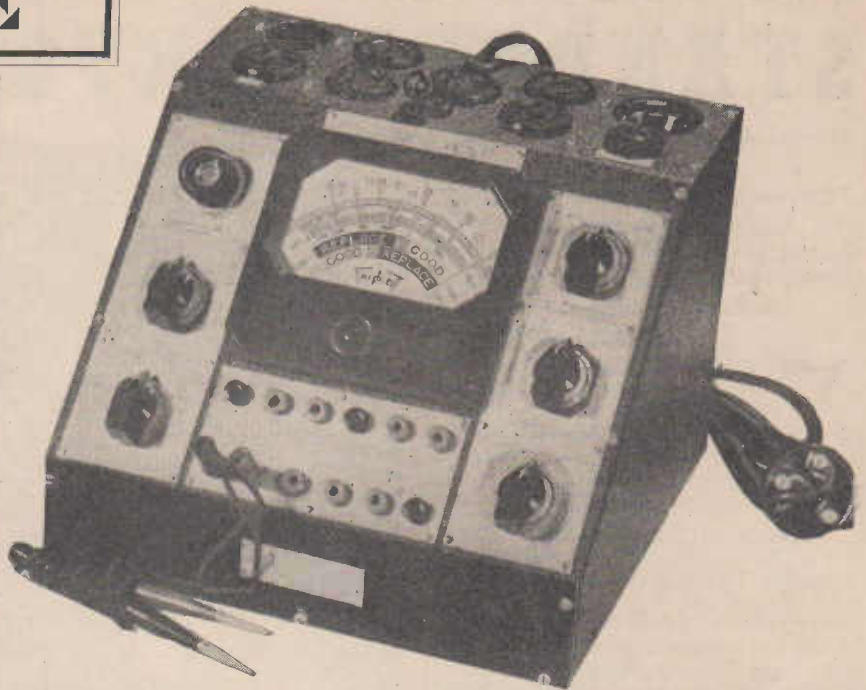
This instrument provides a quick and accurate means of testing power consumption of radios, refrigerators, fractional horse-power motors and household appliances generally under actual running conditions. An invaluable feature is the "Hours Per Unit Cost" scale, which indicates the number of hours that the appliance under test will operate for the cost of one unit.

Power factor adjustment can be made when testing fractional horse-power motors, fans, etc., or any inductive loads, while another selector switch adjusts the line voltage from 200/250 to correspond with the operating voltage.

In addition to the above applications, the Model D200 can be used as a wattmeter (ranges, 0-25-100-250-1000-2500), as an ammeter (ranges, 0-0.1-0.5-1.25-5-12.5) and as a voltmeter (ranges, 0-125-250). The instrument also incorporates a neon

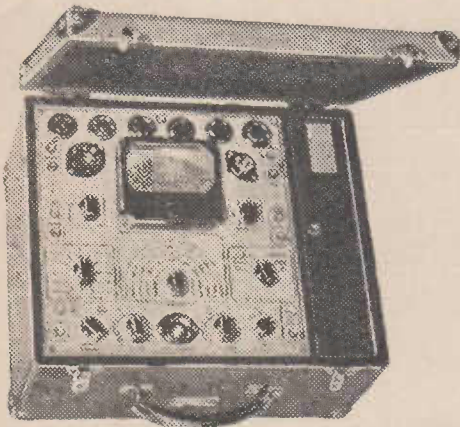
earth leakage indicator and continuity tester.

Further information on the above in-



struments is available free to readers writing Messrs. W. G. Watson at 279 Clarence Street, Sydney.

## TEST EQUIPMENT



Illustrated is the Model 223A Multi-meter — a combined Tube-checker and Multi-meter with all ranges clearly readable. Tests every valve on the Australian market. Operates from either 6-volt accumulator or A.C. supply. A.C. volts to 1,250. O/P volts to 1,250. D.C. volts to 1,250. M.A. to 250. Ohms  $\frac{1}{2}$  to 10 meg. Price, £17/17/-. or on easy terms to Victorian dealers.

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# The STANDARD CRYSTAL SET

By GEO. LOMAS

This article, by the designer of the "Criterion Crystal Set," which appeared in the November issue, 1940, is sure to interest our many crystal set constructors.

VERY popular among young lads of 17 or 18, these general articles on advanced type crystal sets are enjoying great popularity in the "Radio World" pages at the present time.

## Great Rivalry

An instance is of great rivalry between two young chaps, one being a frequent visitor to the office. They both have had crystal sets, home-made from a circuit that appeared in a popular magazine, but since super-sets have been reproduced in "Radio World" the boys have really and truly got down to business. The "Criterion" is no doubt the popular crystal set of the moment for city readers who are close to broadcasting stations, where all that is needed in selectivity.

The "Criterion," with its many varied stages of tuning, incorporated everything that could be desired in this direction.

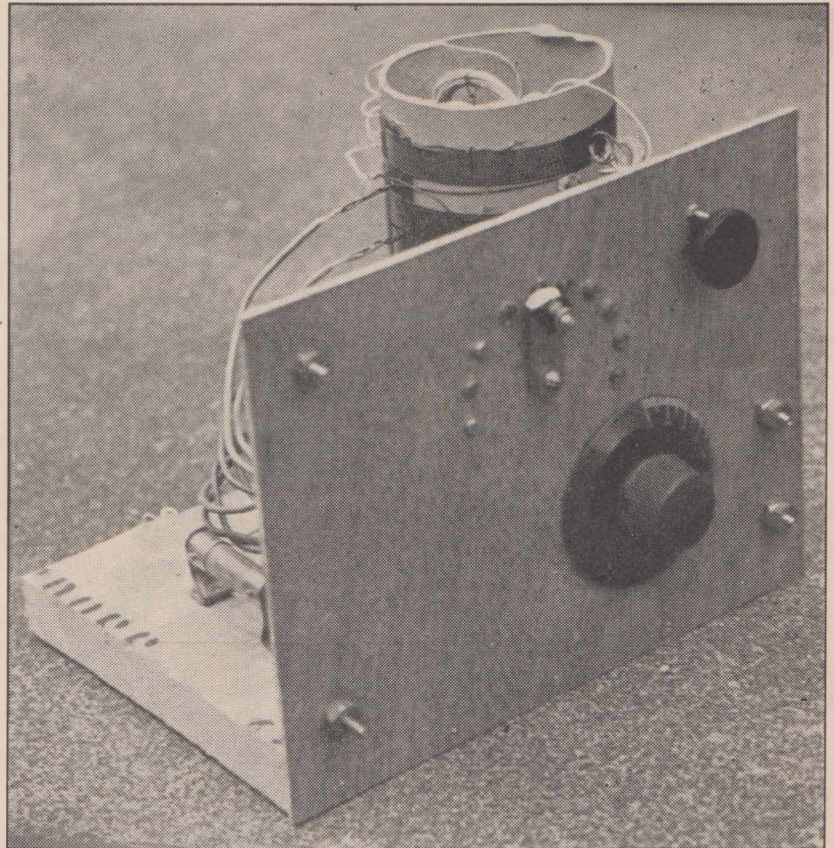
However, we are describing here a set that is not new in any shape or form. In fact, the same circuit was used by the designer ten years ago, when he was residing at Blackheath, in the Blue Mountains. With quite a good outdoor aerial, he was able to receive various Sydney stations at good 'phone strength. Now, with Sydney stations stronger and country stations much the same way, the field is open for new achievements.

## Construction

Actually, the coil is the main unit in the crystal receiver. Once the coil is made there is little else to worry the constructor. So, take extra time over the coil and make a good job of it. See that all the tappings are neatly made and in line. The coil should be wound as tightly as possible, so as to assure that the windings will not slip off after being in use for a short time. It will pay you a thousand fold, to note these points and see that they are all O.K.

The main coil consists of 135 turns of 18 gauge wire.

Starting from the bottom, fasten the wire to the former by threading it through two holes made in the cardboard about half-inch from the end.



Above: This photograph of the Standard Crystal Set shows the layout of the front panel. Note fixed crystal on extreme left.

Make sure to leave a good six inches of wire protruding for connections.

## STANDARD CRYSTAL SET

### Parts List

- 1—Front panel, 10" x 8."
- 1—Wooden base, 10" x 7."
- 1—Top switch, i.e., 8 studs and switch arm to suit.
- 4—Terminals.
- 1—Crystal detector.
- 1—Dial.
- 1—Reel of 18 gauge enamelled copper wire.
- 1—Reel of 20 gauge cotton-covered copper wire.
- 1—7" length of cardboard coil; former, 3½" diameter.
- 1—Variable condenser, .0005 or .00035.
- 1—Solid block of wood, 2" x 1½" x 2."
- 1—Wooden meat skewer.
- 1—Knob to fit meat skewer.

### SUNDRIES:

- Rubber-covered hook-up wire; nuts; bolts; woodscrews.

Now, start winding, and when you have 15 turns on (remembering to keep the turns tight, as I advised), double the wire back about one inch

and twist it, thus making tap No. 1. Now, wind on another 15 turns and make tap No. 2 directly in line with No. 1. Continue winding and tapping at every 15 turns until you have 8 taps, i.e., 120 turns. By bringing the wire up off the other turns, leave half-inch space on the former and end the coil in the same way as it was commenced. The plan of leaving half-inch space on the former is to compensate for the holes that the skewer turning the coupling coil runs in.

## Aerial Coupling Coil

Our next problem is the aerial coupling coil. Although I say problem, it should give you no worry if you follow the instructions.

Take one of the ordinary quarter-pint milk bottles that are so common about the house, and wind on to the body of it 25 turns of 20 gauge cotton-covered copper wire, again leaving six

inches to allow for connections. Actually, it is desirable to wind on 25½ turns, so as to bring one end opposite to the other. Finish the coil by slipping it off the bottle and looping the ends round the turns, thus securing them.

### General Assembly

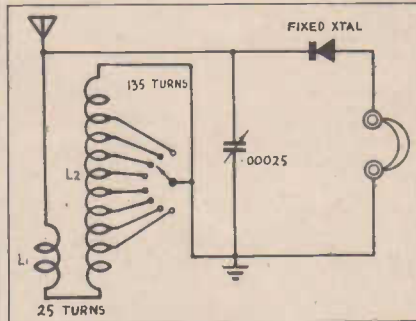
At this stage, we begin the general assembly. First, screw the front panel to the base board and take the wooden block and mount it flat on the base in a horizontal position to the front panel. This is done by means of wood screws from under the base, but don't forget to countersink them or your base will be uneven. The main coil is slipped over this, so that the tappings face the left-hand side, looking straight at the assembly from the front. The space on the former should be at the top. The coil should be a neat fit over the wooden block so that it will not sway or get loose.

If the coil should be loose owing to the various thicknesses of cardboard formers, the slack can be taken out by pushing wooden wedges between the block and the former.

With the coil securely mounted, our next job is to put in the coupling coil.

Below: The layout of the base can be seen at a glance in this photo. Note that a couple of the studs are left blank.

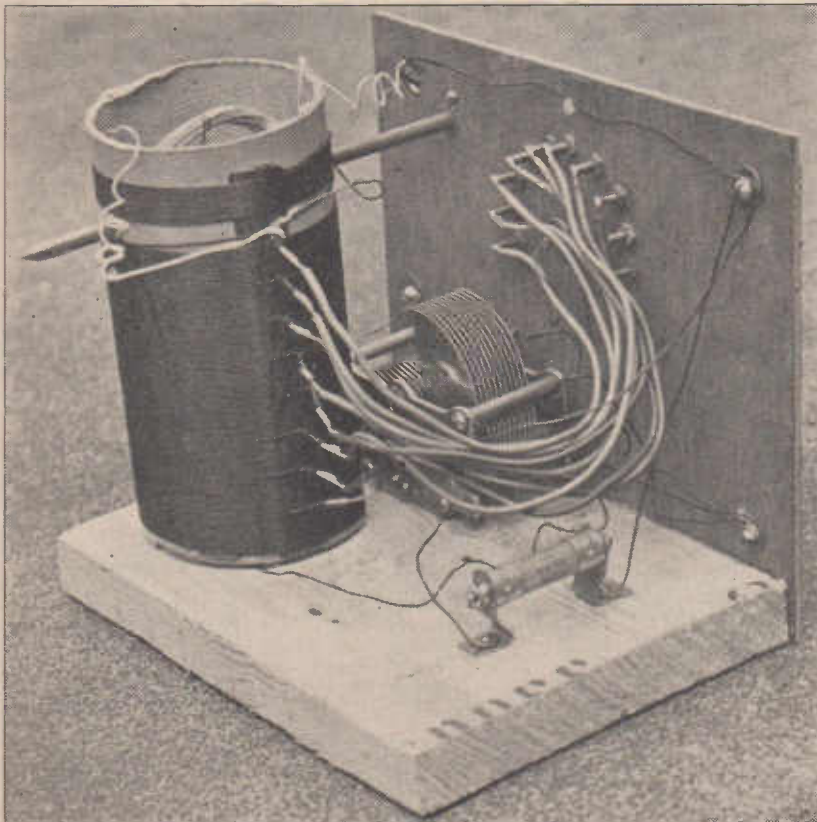
The skewer is passed through holes in the former at the space left in the windings. Now, a hole should be drilled in the front panel directly in line with the other two holes, so that the skewer will turn evenly by the knob on the panel end of it. By sub-



The Circuit

stituting a long round head screw for the usual grub screw found in small knobs, and passing a ½" x ⅛" nut and bolt through the front panel, overlapping enough as to hit on the screw when it comes around. By this means we are able to make a very efficient stop so that the leads from the coupling coil will not be severed by turning too far.

(Continued on page 34)

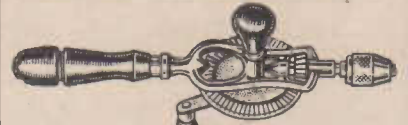


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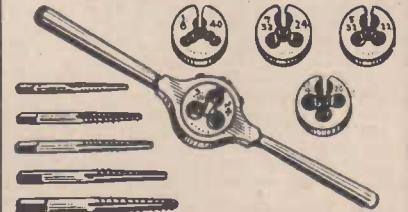
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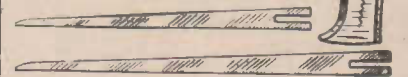
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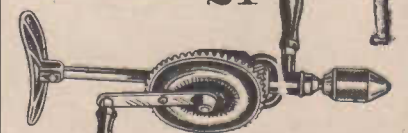


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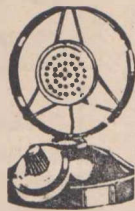
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B.G.E. Table Type Microphone, highly recommended for amateur or professional use. Built-in Transformer and Battery, with volume control incorporated. Just plug into pick-up terminals of any set or amplifier. 39/6.



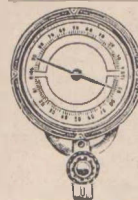
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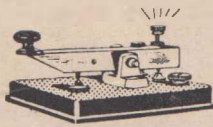
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Ormond Slow Motion Front Panel 2-action Vernier Dial, 8/6. Panel Illuminated, 5/-.

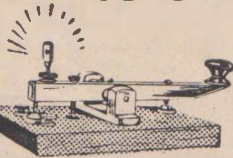


No. 1.—Adjustable Morse Code Key, with long or short taper arms, splendidly made and finished. Strong reliable

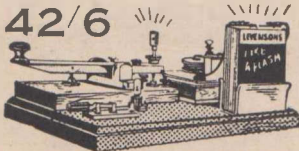
heavy plated fittings mounted on bakelite moulded base, 12/6. P.M.G. Type Saunders 35/-.

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

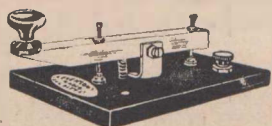
19/6



42/6

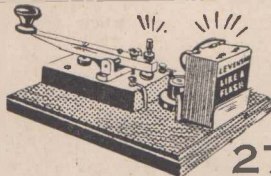


No. 3.—Set comprising No. 2 Morse Code Key P.M.G. Type, with light. Professional De Luxe Buzzer Battery. Throw-over Switch for buzzer or light. Use as required. Mounted on baseboard. Complete.



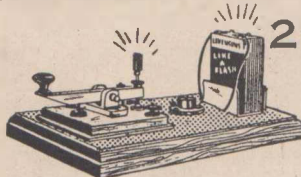
No. 4.—Junior de luxe Morse Code Key, Chromed fittings on wood base, adjustable all ways.

7/11



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

27/6



No. 6.—A real good little outfit which incorporates the No. 1 adjustable Morse Code Key, in moulded bakelite base, with a smart little adjustable buzzer all complete to operate. Junior model, 12/6.

22/6

No. 1.—"Like-a-Flash" adjustable Buzzer. 4/6. Bakelite Case High Pitched.



No. 2.—Bakelite Cased adjustable High Pitched Buzzer. Price, 5/6.

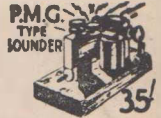
No. 3.—Buzzer, Metal Cased High Pitched adjustable. Price, 4/9.



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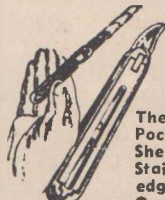
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6/6

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# SPEEDY QUERY SERVICE

Conducted under the personal supervision of A. G. HULL

**C.R.B. (Wollongong)** wants to know whether he can have his issues posted flat, instead of rolled or folded.

A.—Yes, this can be arranged. We have had the thought in mind for quite a while and the only drawback is the extra cost of suitable envelopes, which are about a half-penny each. This doesn't sound much but with a large number of subscribers we have to be careful. We suggest that when your renewal falls due you pay an extra six-pence. In the mean time we will make a special point of using an envelope for your copy.

**H.D. (H.M.A.S. Canberra)** has a set on board running from 240 d.c. mains and is getting trouble with noise from fans operating near the set and close to the aerial.

A.—We don't think anything is likely to be wrong in the set; in fact, the better the set the more clearly it will pick up and reproduce noise. By-pass condensers across the speaker to eliminate the high tones would tend to cut down the intensity of the noise, but of the same time tend to spoil the quality of reproduction. The only really effective way to tackle the problem is to get a cleaner pick-up of signal by having an aerial well clear of the wiring and gear and then feeding the signal to the set through a shielded lead-in, or by using a transposed lead-in with suitable aerial matching transformers.

**E.D. (Glen Iris)** enquires whether ten-metre amateurs are coming in during the daytime in Melbourne at present.

A.—Sorry, but we haven't any reports from Melbourne dealing with ten metres, but will see what we can do for you. Glad to hear how successful you have been with the two "American-style Communications" jobs. The amateur who was operating from St. Kilda, way back in 1920, was Ross Hull, who was accidentally electrocuted in U.S.A. while carrying out television experiments a couple of years ago. Our "A.G." is a younger brother.

**B.C. (Yinnor)** wants to know whether he can join the DX Club.

A.—Yes, you would be quite eligible to join the DX Club, the only requirement being an interest in long-distance reception. The life membership fee is 3/6, and for this amount you get your membership certificate and badge. Members can obtain the special club stationery, report forms, etc., as listed elsewhere. Reporting on the official club stationery gives you a far better chance of getting a verification, as the station realises that it is dealing with an organisation, not an individual. Reports to our short-wave loggings pages are not essential, and can be made just when you feel inclined.

## General.

**Mr. R. Snell, of Box 194, Biloela, Queensland,** wants to know if any readers can supply circuits of high-powered amplifiers to work from accumulators or batteries. He wants about 30 watts of output. At present he is using a 75, 6C6 and a pair of 6L6G's, working from an inverter driven from a 12-volt accumulator.

**R.P. (Caulfield, Vic.)** wants to build a set using old-style valves.

A.—Provided the valves you have on hand are in perfect condition, we don't hesitate to recommend you to use them. As regards the 58, 57 and 2A5 types, these are all capable of doing anything possible with their later equivalent types in the more advanced styles, such as 6U7G, 6J7G and 6V6G. In the matter of converter valves, however, some advances have been made, especially as regards performance on short-waves, and the 6J8G or 6K8G might be worth while fitting, even if it means a special 6-volt filament transformer.

**M.L. (Masterton, N.Z.)** says he has built the resistance and capacity bridge as detailed some time ago, and is so pleased with it that he doesn't know how he got along without it.

A.—Glad to know the job was so successful. Sorry, but we couldn't possibly deal with power factor fully in these columns. Will keep the idea in mind for a future article. It is quite normal to find that the current of an oscillator will vary as the frequency is changed, but it should be a much steadier movement than anything in the way of a "dip."

**J.A. (City)** challenges some recently-published remarks about distortion in the original "1933 Standard."

A.—We agree that these were just the usual reckless statements, made in an off-hand way by someone who does not know what he is talking about, obviously never having attempted to take any measurements on such circuits. As it happens to suit his purpose at the moment, he has let his imagination run away with him. The finest curves we've ever seen were those obtained with a "Standard" type phase changer, driving a pair of 227's, then driving a pair of 50 type valves.

**L.J.S. (Kalgoorlie)** wants to know if a crystal can be used to give distortionless detection in an a.c. set.

A.—Yes, the crystal can be used in the same way as a diode, and is usually considered to give fairly distortionless detection

at low signal inputs, although we have seen such statements challenged. The crystal is a messy thing to get into proper adjustment, however, and the adjustment is likely to be affected by vibration and so on. Best plan seems to be to use the diode and arrange the circuit to provide ample loading for it. Suggestions for Amplifier Championship judging have been noted for future reference.

**L.J.W. (Kinchilo)** complains of lack of courtesy in failing to acknowledge an unofficial amplifier championship entry, which was made on paper only.

A.—Sorry, old chap, but surely you didn't imagine that we could accept the entry and award it a prize. It was only a suggestion apparently, not having even been assembled, and might or might not prove O.K. in practice. We readily admit that an acknowledgement should have been made, but unfortunately your letter was filed away in the drawer marked "Amplifier Championship," and as such was entirely overlooked when dealing with ordinary correspondence or with ordinary queries.

**P.W.T. (Auckland, N.Z.)** wants to know if a 6K8G could be used in an "Itsy-Bitsy" circuit, instead of the 6J8G.

A.—We wouldn't advise any change in this circuit. Even with the original circuit and layout, and using the special coils produced for the job, there is always a chance of running into instability trouble.

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# ACOUSTICS

(continued)

feedback also applies at high frequencies, i.e., the gain is much less than when the control is turned, so  $R_2$  is 1000 ohms and  $R_1$  is zero; for in this case, of course, the negative feedback is greatest at mid-fre-



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## QUERIES

(continued)

C.M. (Redfern) wants a circuit similar to the "Economy Fidelity," but with push-pull output, but no audio transformer.

A.—What you really want under these circumstances is the "Big Boy" circuit, as published in the April issue, except that you would want to substitute 6V6G for the 6L6G. This, however, is a simple affair. Another suggestion would be to use the direct-coupled phase-changer circuit which was detailed on page 9 of the November issue, and which is dealt with so thoroughly in the article on inverse-feedback in this issue.



M.P. (Mortdale) asks about .1 condensers across the electrolytic filter condenser.

A.—It is always good practice to put a 1 mfd. tunular by-pass condenser across the main high tension, even if the 8 mfd. electrolytic is actually in parallel to it. In many cases it is found that the electrolytic is not a good by-pass for high frequency, and instability results. Sometimes you can get away without it, but our advice is to fit it in all cases. We note that in some of the latest American circuits even the 25 mfd. electrolytic by-pass condensers are paralleled with a .1 to get most efficient by-passing of the higher audio frequencies.



H. Liston.

Please note. We have your letter of January 10, but you have forgotten to put any address at the top. Although you mention that you are a regular reader, we are unable to find your address, and so we are not able to answer or acknowledge other than in this way. Please let us have your address.



J.M. (Larnook) writes about some circuits he has designed.

A.—Very glad to get your letter and to see the circuits. We are not using either of them, however, at the moment. The use of any odd valve, such as the 6F8G, makes any circuit unsuitable, from our point of view. Only limited stocks of these valves are available, and at any moment supplies may be stopped, leaving the replacement position most difficult. With regard to the deaf aid outfit, we really would appreciate further details about this, not so much from the circuit angle as from the angle of how and where to purchase the necessary microphone and earphone, batteries, etc. Hope to hear from you about these points.



F.D.M. (Five Dock) brings up a couple of points about design.

A.—It is quite a simple matter to design audio amplifier circuits with higher gain, but the problem is to know how to make use of it in practice. High audio gain is not desirable with modern pick-ups, and from a set point of view it is only going to make the set more noisy and give you hum trouble, distortion

and instability. A single high-gain triode stage driving a beam power valve is ample for all normal requirements and that is why the hook-up is so popular.



## CRYSTAL SET

(continued)

When the skewer is in place mark in pencil where the coupling coil should fit inside the main coil. Take out the skewer and, by spreading the windings on the coupling coil apart at approximately half-way through, push the skewer through it. Make sure it seats properly and, when on the pencil marks, drill a small hole through the skewer at approximately the middle of the coil. If no fine drill is available, a red hot needle and a pair of pliers will burn it through quite neatly.

Now re-assemble the skewer unit and attach the coil inside the former to the skewer. This is done by passing a strand of copper wire through the hole and on to the coil at both sides. (Copper wire is essential, as steel wire may effect the inductance.)

The other components can be mounted as shown in the photos and wired as in the circuit diagram. This is all straightforward work and should create no bother.

### Detectors

As was stated in the article in the November 1940 issue, it is purely a matter of taste as to the type of detector that is used. The same rule applies to this receiver.

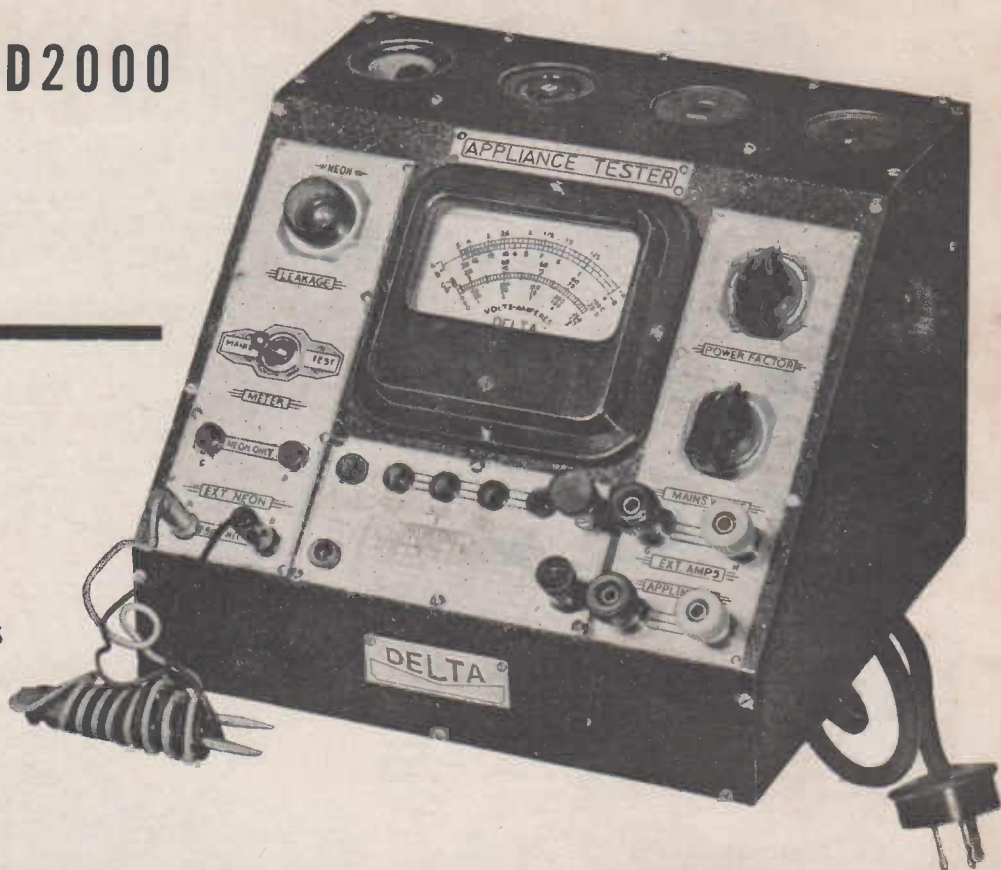
An efficient outdoor aerial and an effective earth is desirable for good reception.

### General

We will be only too pleased to hear from readers who have anything to say about crystal receivers they have constructed or have intentions of constructing. Also reports of any outstanding feats achieved by a crystal set will be gladly received. Address all correspondence to "Crystal Set," C/-Radio World Publishers, 117 Reservoir Street, Sydney. So, remember the crystal set operators' byword: "Listen intently and tune carefully," and see what records can be broken in the crystal set field.

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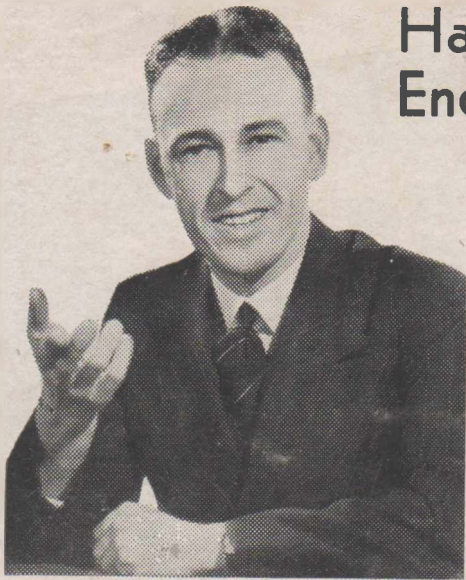
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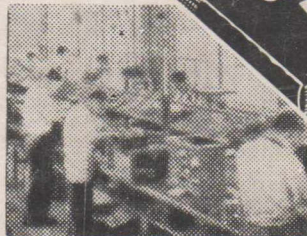
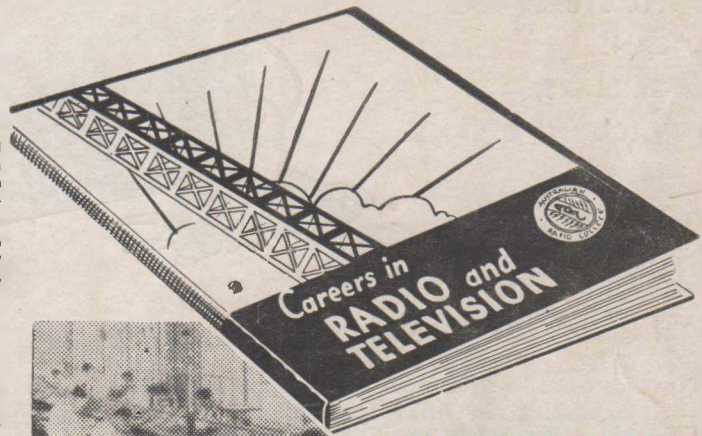
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