

# THE T. & R. BULLETIN

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*Honorary Editor :*

H. Bevan Swift (G2TI)

*Secretary-Editor :*

John Clarricoats (G6CL)

*Advertising Manager :*

Horace Freeman

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## PERSONAL CONTACTS

It is perhaps a little too early to judge the effect of the announcement made in our last issue, that a Technical Service is now available to members, but at this writing we are forced to admit that the facility does not appear to have been received with open arms. Time will tell, but we should feel very reluctant to record in a few months' time that our latest efforts to provide a technical service have proved abortive, as happened three years ago, when a Technical Information Bureau was inaugurated.

We are confident, however, that "The Helping Hand" feature will prove an unqualified success, for already our post bag has contained numerous expressions of appreciation from old and new members alike.

These new features have been introduced to meet a long-felt want, but in a Society such as our own, which is growing steadily each year, the task of catering for every type of member becomes increasingly difficult. This is understandable when one remembers that the technical standard varies over extremely wide limits. It is for that reason we invite our readers to give us their views whenever a new feature is projected or introduced.

In an endeavour to more fully appreciate the wishes and requirements of members, arrangements are made for Provincial District Meetings to be held annually in selected centres, at which members have the opportunity of establishing a personal contact with representatives from Headquarters. These contacts enable Council to formulate future policy, for from experience we have found that many members with bright ideas are more ready to expound them in the informal atmosphere of such gatherings than through the medium of pen and paper.

During the next three months meetings will be held in such widely separated towns as York, Cambridge, Stockton, Tunbridge Wells, Great Yarmouth and Southport to mention but six at random. Every member living within a reasonable distance of a venue fixed for an official Society meeting should make a point of attending, because only by establishing personal contact with others who have their interests at heart, can a full understanding of mutual problems be obtained. In particular, it is hoped that all recently elected members will attend their local meeting and "make their number."

\* \* \*

With the passing of the DX Season on the 28 Mc. band, it is appropriate that a survey of the past year's work be recorded. Our May issue, therefore, will be primarily devoted to the high and ultra-high frequencies.



# MATCHING THE AERIAL TO THE P.A. VALVE

By J. H. EDWARDS and H. G. COLEMAN.

IN considering this problem, the wide variety of aerial, feeder and coupling systems makes it necessary to go back right to fundamentals to derive formulæ which will cover all cases.

Let us first consider the functions of the aerial system. These are:—

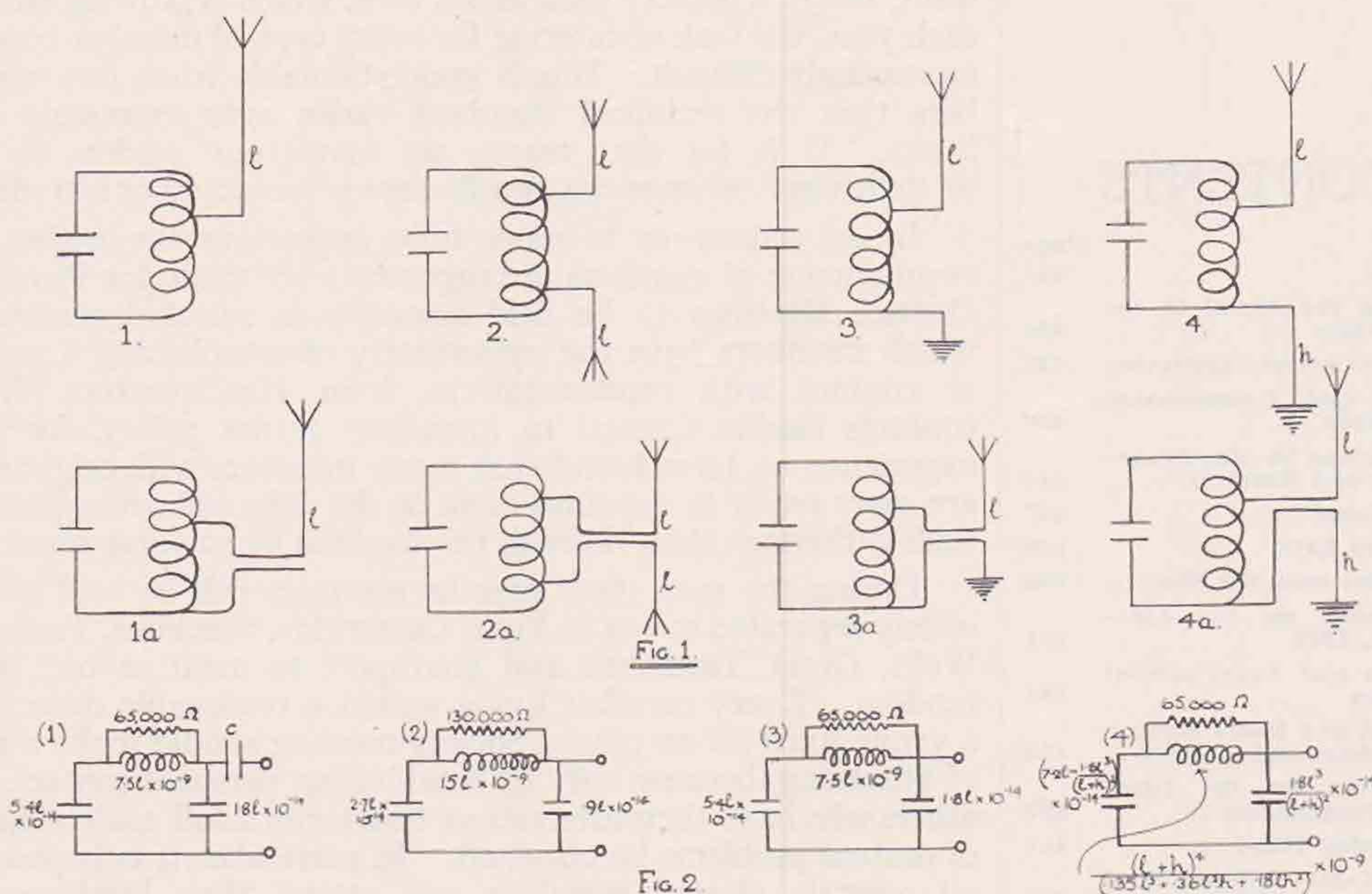
- (1) Efficiently to transform into aerial energy the energy delivered by the P.A. valve.
- (2) To radiate this energy in the required direction or directions.

The aerial may be badly designed in that it does not radiate energy in the direction desired in specific cases which we may call an aerial of *specifically* bad design, or that it does not radiate an adequate proportion of the energy delivered to it which we may call an aerial of *basically* bad design. It should be borne in mind, however, that all the energy delivered to the anode of the valve must go somewhere, and that therefore an aerial of low radiation co-efficient is only an aerial of basically bad design when the loss co-efficient is not correspondingly low. The radiation co-efficient may be represented by an Ohmic Conductance of A Mhos placed between anode and filament of the P.A. valve and the loss co-efficient by an Ohmic Conductance B Mhos in the same place. The efficiency of the aerial system

is now  $A/A+B$  and the value of the basic design may be judged by this figure. However, A may be very large and B very small, so that the aerial system is of high efficiency, but the value of  $A+B/AB$  (the peak impedance of the tank circuit) be unsuitable for matching to the valve, so that the valve only delivers a small proportion of its available power, and the value of the high aerial efficiency is lost. It is this latter condition that we have to avoid by correctly matching the aerial system to the valve, whilst at the same time keeping A large in proportion to B.

## Types of Aerials.

The diagrams in Fig. 1 include all ordinary types of aerials. Some cases where the aerial is tapped at a special point are not included. In such cases it is usually necessary to consider each case on its merits, usually by considering them as a compound of two or more of the above cases. No allowance has been made for the effect of the reflection of the radiation by the earth. This will in general slightly modify the radiation resistance, but, of course, in the case of a horizontal aerial close to the earth (or buildings, etc.), in proportion to its length, the



Figs. 1 and 2. Types of aerials in use by amateurs.

- (1) Single-pole, voltage-fed Hertz.
  - (2) Marconi, voltage-fed Hertz and current-fed Hertz dipoles.
  - (3) Single-pole Marconi, single-pole current-fed Hertz.
  - (4) As in (3), but when transmitter is appreciable distance from earth.
- (1a to 4a) are as (1) to (4), but with pair feeders. Equivalent networks are shown in Fig. 2.



derived formulæ will not apply. Case (1) is a single-pole voltage fed Hertz. Case (2) covers Marconi, voltage-fed Hertz and current-fed Hertz dipoles. Case (3) covers single-pole Marconi, single-pole current-fed Hertz and the comparatively rare voltage-fed Hertz with earth connection. Case (4) covers the same as Case (3), except that the transmitter is an appreciable distance from earth. Cases (1a) to (4a) are cases (1) to (4) respectively, but with pair feeders. In case (4a) it is the feeder end that is removed from earth, the distance of the transmitter from earth not signifying in this case. Equivalent networks are shown under the same case number in Fig. 2. The condenser (C) in Fig. 2,

this condition cannot be accurately achieved as the current leaving the end of one feeder cannot have a counterpart in the other, but where the feeders are very long this condition will only affect the aerial end, and the use of the pair feeders is therefore justified. For short distances, however, it is not justified. In order to keep losses to a minimum the currents in the feeders should be as low as possible. As in general the characteristic impedance of the feeder will not match the impedance of the aerial, reflection occurs at the point of connection, and a standing wave is set up with the result that the currents for the aerial have, in effect, to pass several times through the feeder before they reach the

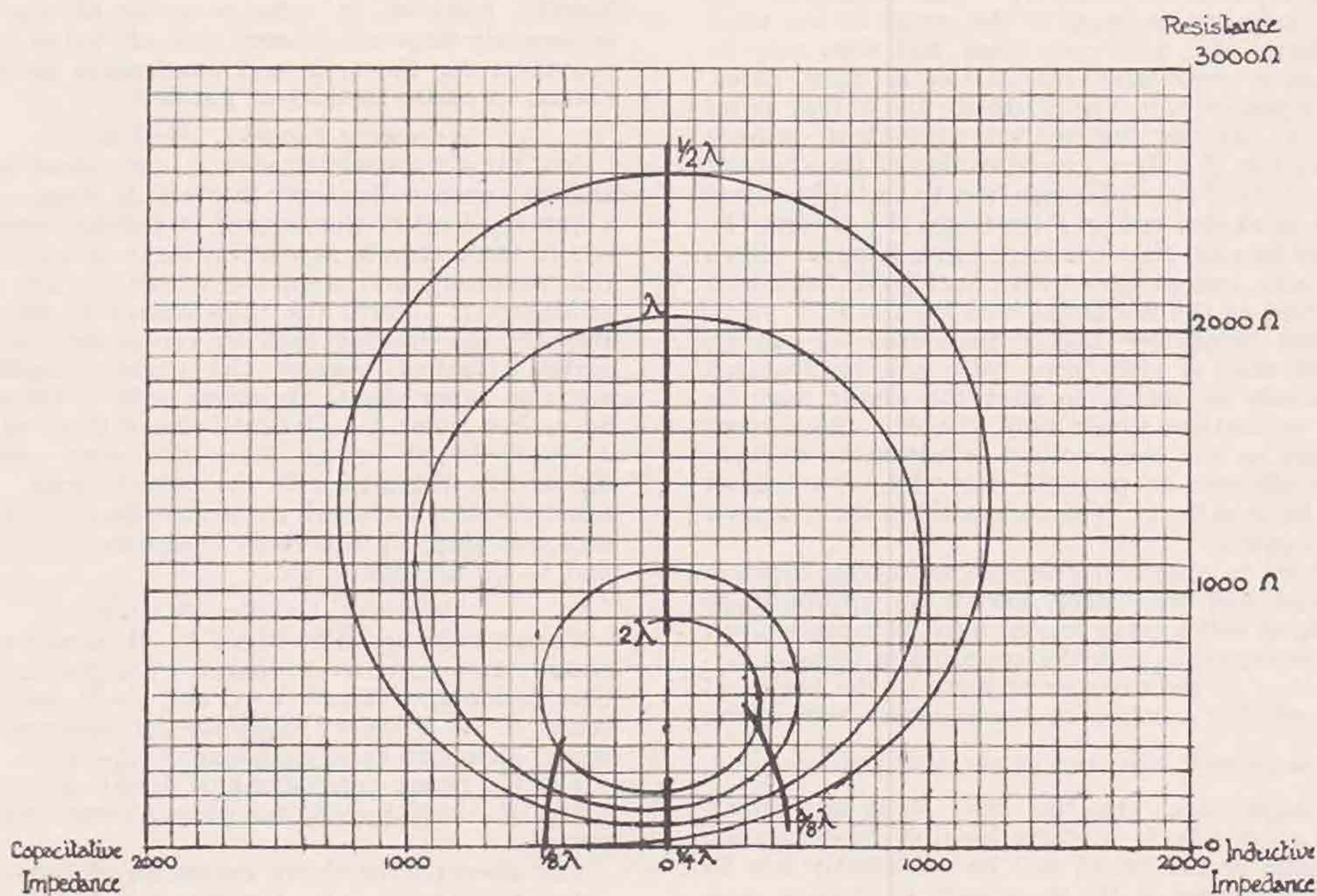


FIG. 3.

*Aerial impedance in both magnitude and phase for Case (c), i.e. single-pole Marconi or single-pole current-fed Hertz.*

Case (1), has a capacity equal to the capacities to infinity of the aerial and tank circuit in series. As this is usually of the order of  $10 \mu\text{mfd.}$ , it is obviously necessary for the aerial to be accurately in resonance to be adequately fed, but in the other cases this is not essential. Cases (2) to (4) and (2a) to (4a) cover also aerials which are current fed through a coil of a few turns coupled to the tank circuit, as in this case the capacity in the tank circuits operates through the transformation effect of the coils to provide the effect of the condensers shown in the diagram.

#### Feeders.

The object of pair feeders is to prevent radiation from the feeder by providing it with another wire immediately adjacent to it, and carrying equal and opposite currents. It is obvious that in Case (1a)

aerial, with a consequent increase of losses. To avoid this it is desirable to match the aerial and feeder impedances whenever possible.

The effects of unmatched feeders are very complicated, and full consideration of them is beyond the scope of this article. In general it can be taken that a feeder whose impedance is higher than that of the aerial has an effect of inductance placed in series with the dummy aerials—Fig. 2—and that a feeder impedance lower than the aerial has an effect of capacity in parallel. Besides the change in impedance and the alteration in the natural wavelength that results, the ratios between the acceptance and rejection frequencies will also be altered. In the case of long feeders, the natural resonance of the feeders still further complicates the problem.

In general it can be assumed that the tank circuit



losses dominate over the aerial and feeder losses. Exceptions are:—

- (1) Too short an aerial.
- (2) Aerials running close to absorptive bodies.
- (3) Matched feeders of inherently low efficiency, such as flex (if low-impedance feeders are used they should always be concentric, and with a good H.F. dielectric).
- (4) Long unmatched feeders, particularly if they are of high inductance or are unbalanced.

It is assumed that the above cases will be avoided.

Fig. 3 shows an aerial impedance in both magnitude and phase for Case (3). The values are, of course, only approximate as the gauge of the wire, aerial form, etc., will vary them, but they may be taken as a reasonable calculation in most cases. (Note impedances in Fig. 3 are for the actual aerial in Fig. 1, not for the nearest equivalent dummy aerial in Fig. 2.) By a consideration of the dummy aerials of Fig. 2 it will be seen how to suitably adjust the values shown in Fig. 3 for Cases (1), (2) and (4).

It will be seen that the impedance is never above 2,600 ohms, except for a very short (and inefficient) aerial, and as the matching load for the P.A. valve is almost invariably higher than this, it can be assumed that a step-down ratio will be required from anode to aerial, so that the anode may be placed across the whole tank circuit. Since most losses are in the tank coil, it is advisable to have this as efficient as possible, for which purpose it should have as high a Q as compatible with adequate tuning control.

In order to obtain the desired matching between the aerial and the valve, aerials an approximate multiple of half a wave length may be tapped down on the tank coil to give the appropriate transformation ratio. If the number of turns in the tank coil is N, and the number of turns across which the aerial is tapped is n, the anode load will be  $\frac{N^2}{n^2} \times$  aerial impedance. In the case of aerials which do not approximate to these lengths, however, the impedance of the aerial will be sufficiently low to upset the tuning of the tank coil, so that in such cases it is desirable to use a coupling circuit such as Fig. 4 in order to obtain the desired matching.

#### Aerial Matching Networks.

The coupler shown in Fig. 4 comprises three ordinary tuners. Tuners A—C and C—D should have straight line capacity condensers of known capacity and their setting point for resonance

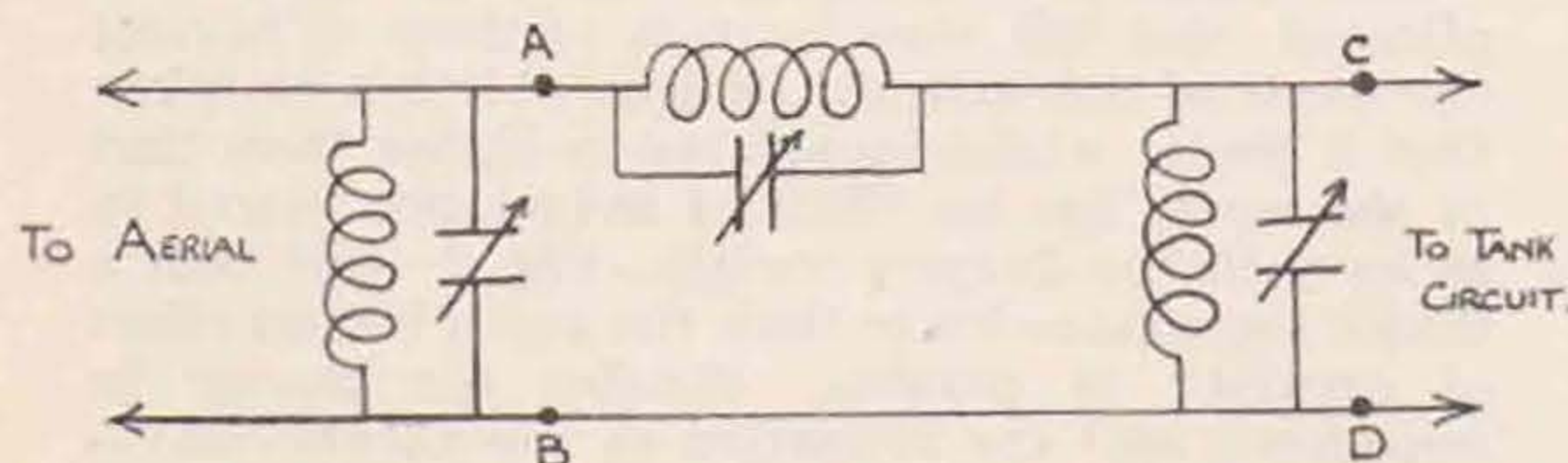


FIG 4.

Coupling circuit for obtaining an efficient aerial-valve matching.

determined beforehand, so that at any particular setting used the capacity above resonance is easily determined. If tie-clip connections to the coils are used, the points of connection of the tie-clips should be plainly marked on the coils, as a fraction of a turn out in replacing the tie-clip may make considerable difference in the results. The tuner A—B is not so important, any tuner which will bring the aerial into resonance being suitable, in fact, when the first method of adjustment described below is used this tuner may not be needed at all unless the aerial is very inefficient, when at least the condenser will be necessary. The coupler, as shown, has a range sufficient to cover all probable aerials on the amateur bands. On longer wave lengths, however, in order to avoid having to use excessively large condensers, it is advisable to make provision for the coils and condensers to be connected in series instead of parallel.

#### Adjusting Coupler, Method 1.

Fix up a transmitter with a very small output, and an anode milliammeter in the P.A. stage. Attach a dummy load of the desired impedance across the whole tank circuit (a carbon lamp is suitable for this purpose), and note the resonance dip on the milliammeter. Leave the tank circuit in resonance. Replace the dummy load by the coupler with the aerial attached, adjust the aerial coupling by varying tuner A—C (bringing into resonance by adjusting tuner C—D) until the setting of tuner A—C is found which gives the same resonance dip as was obtained with the dummy load. If the tuner A—B is included, the aerial should be brought into resonance by this tuner before the tuners A—C and C—D are connected.

#### Adjusting Coupler, Method 2.

Connect the aerial to tuner A—B, attach to tank circuit, and bring to resonance by adjusting A—B, then connect in tuners A—C and C—D, setting the tuner A—C a known capacity off resonance, and bring back into tune by adjusting C—D.

Let C=phase component of aerial conductance.

Let R=load impedance placed across the tank circuit.

Let a=capacity above resonance of tuner A—C.

Let b=capacity above resonance of tuner C—D.

(A negative sign will, of course, indicate that the capacity is below that of resonance.)

Then the aerial phase conductance can be determined by the formula:—

$$C = \omega a \sqrt{b/(a+b)}$$

and the tuners can be re-adjusted to give any desired load across the tank circuit in accordance with the formula:—

$$R = \frac{1}{C} + \frac{C}{\omega^2 a^2}$$

always adjusting first the tuner A—C, and bringing into resonance by adjusting tuner C—D.

Note.—The coupler should always be used across the whole tank circuit.

#### Stray

G6PJ, of Sheffield, is using Break-in with a CO transmitter employing a 47 running at 5 watts input on 7,180 kc. He will be glad to receive reports. G6PJ also requires contacts with W6 and 7 on 14 Mc., on which band his frequency is 14,360 kc.



# A SIMPLE CARRIER SUPPRESSOR

By G. J. SHORTEN (G2SQ).

In the following article the writer will attempt to describe a very simple voice-operated relay or carrier suppressor, which can easily be put into circuit at the average telephony station, and which is being used with every success by him and also at G2NL.

In principle of operation it is exactly similar to the carrier suppressors used on the commercial phone circuits, but of much simpler design and construction. By reason of its simplicity, and incidentally its reliability, it should certainly appeal to the majority of phone users on the grounds of its great potentialities as regards duplex working—without, by the way, contravening any licence regulations—and also its adaptability to normal carrier control of the transmitter. Its more universal use would, beyond all doubt, help greatly in reducing the almost unbearable amount of QRM which exists at the present time on the 7 Mc. band.

## Circuit Arrangements.

The function of the circuit is to provide automatic control of the radiated carrier by means of the audio frequencies impressed on the microphone circuit, so putting the carrier on the air when speaking, keeping the carrier on during normal speech, and breaking it on ceasing to speak.

This is accomplished briefly in the following manner, and a study of Fig. 1 will show the function of the various components used.

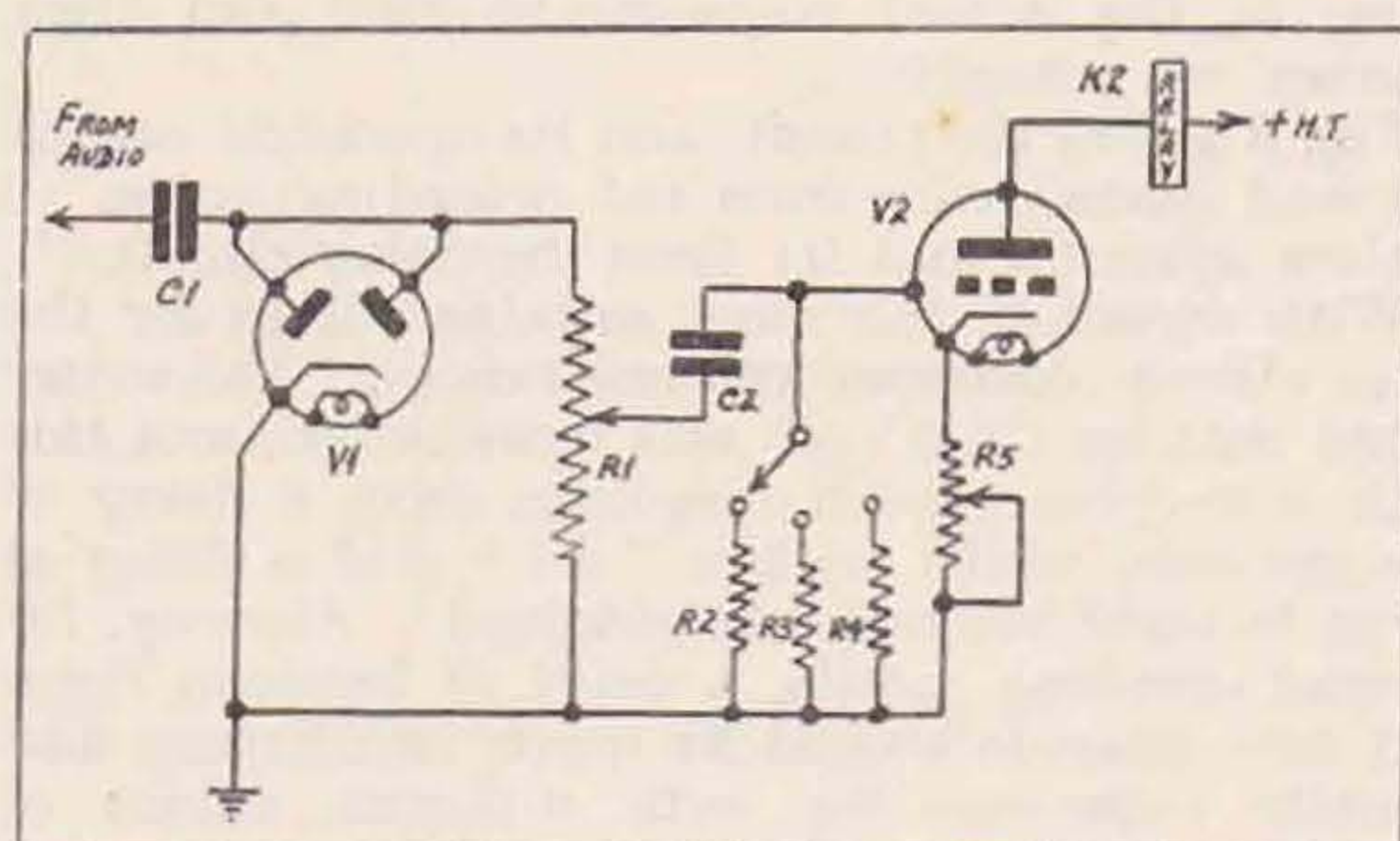


Fig. 1.

Carrier suppression circuit developed by the author.

- C1—.006  $\mu$ F.
- C2—.1  $\mu$ F.
- R1—1 megohm.
- R2—2 "
- R3—5 "
- R4—10 "
- R5—800 ohms.
- K2—Relay.
- V1—Double-diode.
- V2—Triode (medium impedance).

A portion of the audio from the modulator stages is rectified, and the voltage so obtained is utilised as a control bias for an ordinary triode valve having a relay in its anode circuit.

In the normal commercial circuit a part of the actual audio input to the modulator is taken and further amplified before being used for the relay operation, but the use of any additional amplifying stages can be dispensed with if, as in the case of the circuit shown, the required voltage is obtained from a later stage of the audio amplifier.

This A.F. voltage is taken via the condenser C1 0.006  $\mu$ F to the strapped anodes of a double diode, this being the only suitable rectifier available to the writer at the time. Incidentally, as shown in Fig. 3, a Westinghouse H.T. metal rectifier is being used by G2NL with equally good results.

The load resistance for the diode is supplied by the 1 megohm resistance R1, this being in the form of a potentiometer, so enabling a control of the rectified voltage to be obtained at the same time.

The rectified voltage is then applied to the grid of the valve V2 via the delay circuit or time base composed of the condenser C2 and its associated resistances R2, R3, and R4. This is really the heart of the circuit, and upon the correct combination of the resistances and condenser being obtained, depends the whole success of the apparatus.

Quite a good value for C2 is round about 0.1  $\mu$ F, it being noted that a smaller value than this will not only charge more quickly but will also discharge through the associated resistance quicker, whilst a larger value will take longer to completely discharge, thus increasing the delay of V2.

R5, the cathode bias resistance of V2, is in the order of 800 ohms, and is intended to provide bias on V2 of such a value as to ensure the valve working on that part of its curve that the voltage from V1 will be most effective.

The valve V2 can be almost any medium impedance triode. It is preferable, of course, although not absolutely essential to employ a valve with a fairly high mutual conductance.

In the anode circuit will be seen the relay K2. This should be of the low operating current type; somewhere in the region of 6 to 10 milliamps will be quite suitable, although one operating at 2 milliamps will certainly be much better! The only limit to the current required is really the safe dissipation of the valve V2.

On speaking into the microphone, a voltage will appear across R1, the polarity at the top end depending solely on the method of connecting the rectifier whether a valve or metal rectifier is used.

In the connections given in Fig. 1 of the writer's apparatus, this voltage is negative and the connection to C1 is taken from the anode of the second valve in a two-stage transformer coupled amplifier used for grid bias modulation of the transmitter. It is not of paramount importance whether this voltage is positive or negative, our only concern being the operation of the relay in the anode circuit of V2. If the voltage is negative (either intentionally or accidentally!) the relay K2 can be permanently operated and this voltage used to further increase a negative bias on V2, so causing the relay to drop out. If positive it can decrease the standing bias on the last valve and so cause K2 to operate. The function of K2 being the actual control of the radiated carrier by some means such as cutting off the H.T. supply to the transmitter. Fig. 2 will show the circuit used.

Some notes on the actual adjustment would not perhaps be out of place.



*Adjustment.*

If a negative voltage is obtained at the top end of R1, the back contact of the relay should be used to close the H.T. supply to the transmitter, and the cathode resistance R5 should be so adjusted that the static feed to V2 is just in excess of the current required to operate the relay. Under this condition, that is no audio applied to the microphone, the relay will be in the operated position, so breaking the back contact and thus breaking the H.T. supply to the transmitter. On speaking, the voltage developed across R1 will so increase the negative bias to V2 that the relay will drop out, thereby making the back contact and putting the carrier on the air.

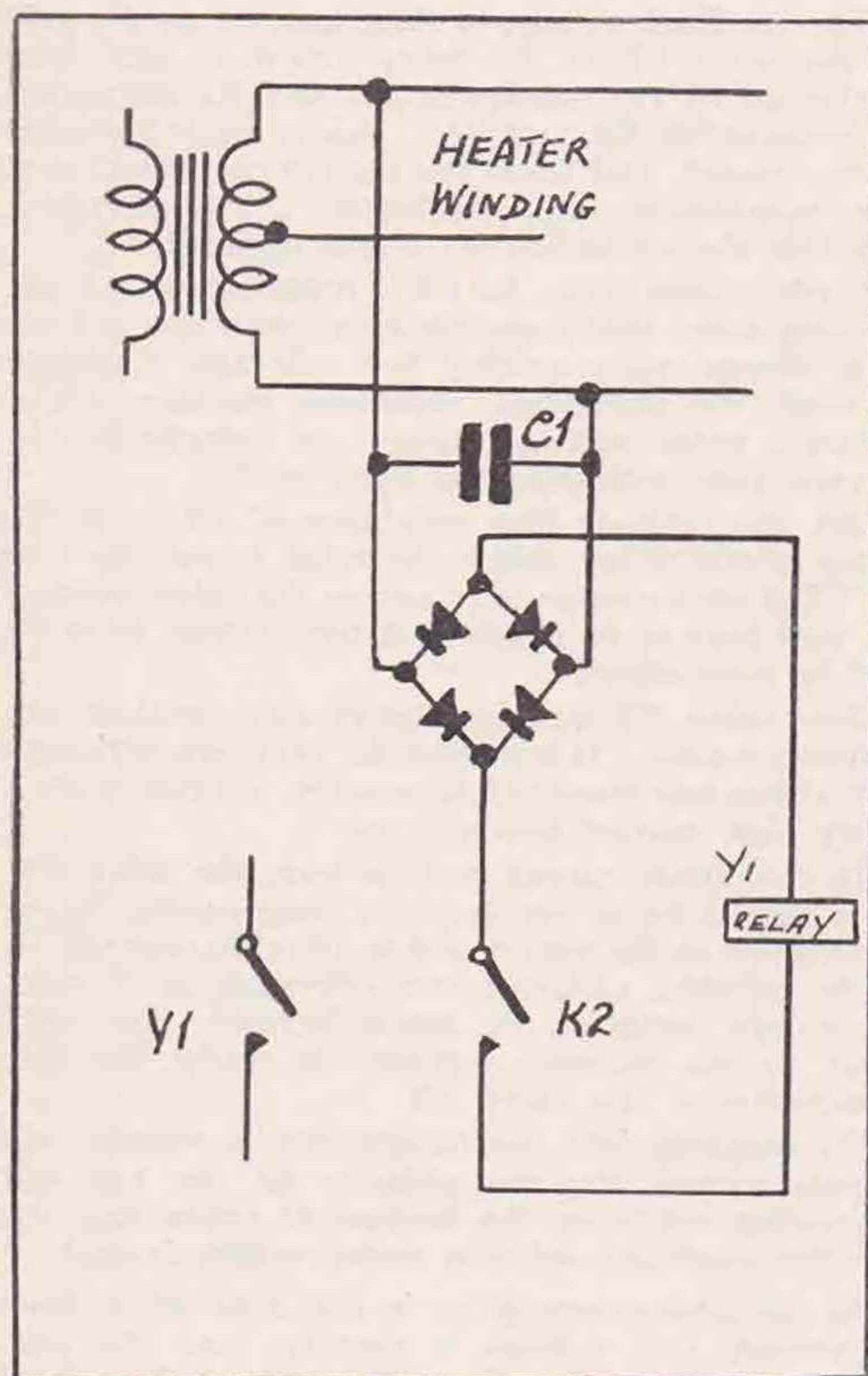


Fig. 2.

*Suggested method of providing an H.T. supply to the transmitter.*

C1—25  $\mu$ F. dry electrolytic.

Y1—Relay.

K2—Relay contact.

Westinghouse L.T. metal rectifier.

*H.T. Supply.*

It will in all probability be advisable to make the H.T. supply to the transmitter, not by the relay K2, but by a further relay circuit; this will isolate the H.T. volts from the suppressor, which will be an advantage if the H.T. voltage is rather large.

In the case of the writer's station, the circuit shown in Fig. 2 has been used for this purpose.

The Relay Y1 was once an ordinary buzzer, and due to the high current required to operate this

particular "relay," use was made of a Westinghouse L.T. metal rectifier. The output voltage obtained by tapping across one of the heater windings of the main transformer is smoothed by means of the condenser C1, an ordinary 25  $\mu$ F dry electrolytic, it being found that the ripple otherwise prevented satisfactory operation of the relay. The contact of this relay was in turn utilised to close the H.T. circuit of the transmitter itself.

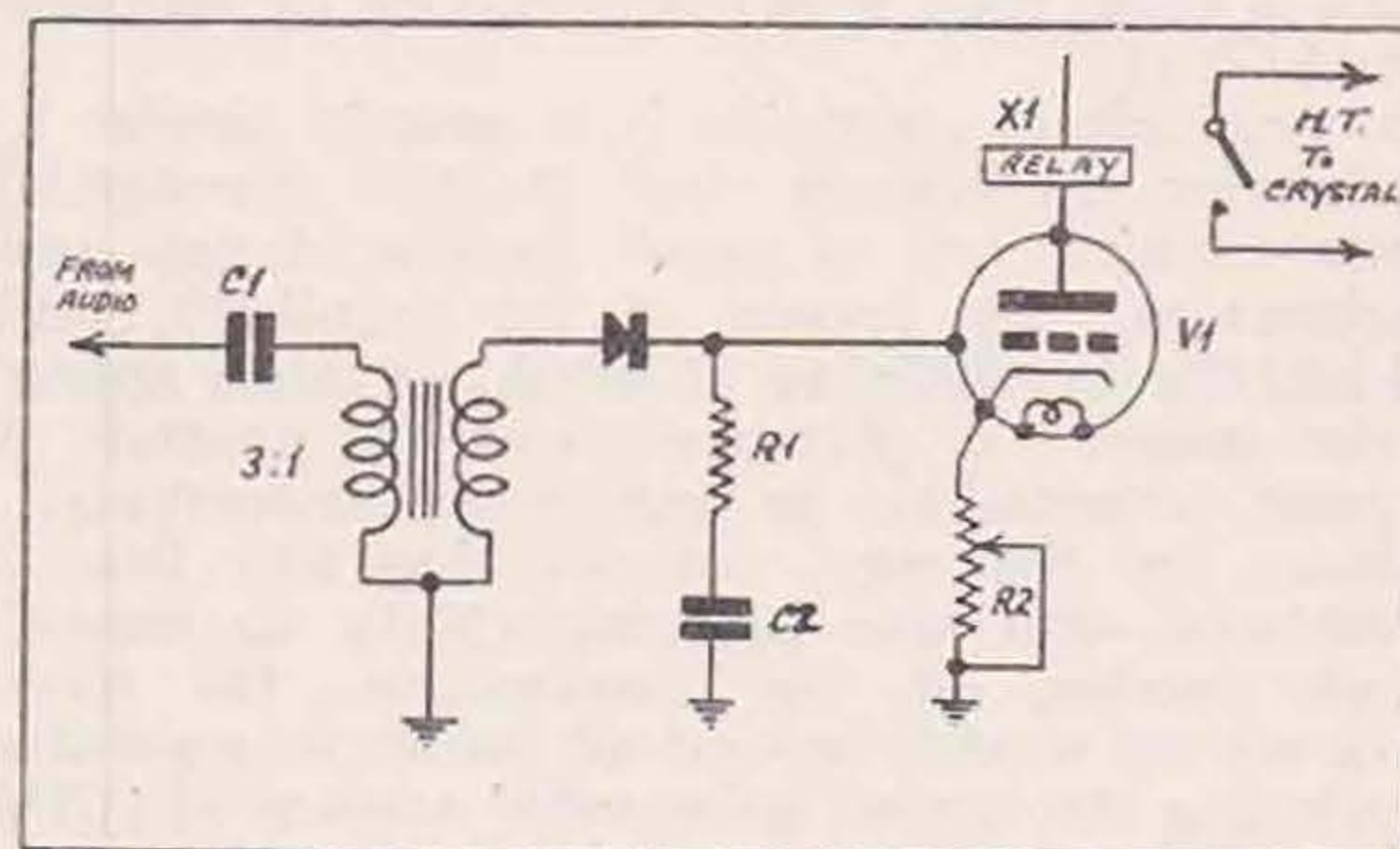


Fig. 3.

*Another suppressed carrier arrangement described by the author.*

C1—1  $\mu$ F.

C2—0.1  $\mu$ F.

R1—5 megohms.

R2—800 ohms.

T1—3:1.

R1 and C2 give a three-second delay.

*A Further Arrangement.*

The circuit in use at G2NL is in basic operation exactly similar to the above, the only difference being in the actual components used and their manner of connection.

Fig. 3 shows the circuit, and its operation can be followed quite easily from the preceding notes.

Here again C2 and R1 form the delay circuit.

With regard to the most suitable values for the delay circuit condenser and resistances. The writer found that for C2 0.1  $\mu$ F was most suited, and this with a resistance of 5 megohms gave a delay of five seconds, whilst with a "dis" grid a delay of seven to eight seconds was obtained. Anyway, for normal speaking speeds, a delay of between three and four seconds should be quite satisfactory and a little experimenting with different values of condenser and resistances will no doubt soon give the required values. The principle holds good for both circuits.

*General Remarks.*

A note should be given to the effect that if the relay K2 requires a fairly heavy current to operate and the back contact is used, that is, the relay is permanently operated under no speech conditions, it may be found that, if the H.T. for V2 is taken from the transmitter the supplies and this latter has not too good a voltage regulation, that when on K2 falling out and so making the transmitter supplies, the volts will have dropped to such an extent that it will be impossible to re-operate K2, the result being that the carrier will remain on the air so defeating our object! The remedy is, of course, to take the H.T. supply in such a case from a separate source, the receiver, for instance.

One further note of warning. Unless the stages of the transmitter are biased well back, it will be obvious that the removal of the excitation will

(Continued on Page 494.)



# DECIBELS AND TRANSMISSION STANDARDS\*

## Elementary Principles Simply Explained

### Introduction.

A DECIBEL is something rather different in its nature from a foot, a pound or a second, and so calls for a little thought for its understanding. Perhaps the reason why many people have failed to make any real effort to understand it is that no simple step-by-step explanation of the decibel principle has been readily available. This article, which avoids logarithms and other mathematics beyond the training or memory of many, is rather long because, even at the expense of some repetition, every care has been taken to make each step simple and easy to follow.

### The Problem Defined.

"The decibel," as we all know, "is a telephone transmission unit and is one-tenth of a bel," and the word "decibel" is usually shortened to "db." Radio amateurs must know something rather more than this about a db—something at least about its nature and magnitude—just as a farmer must know whether a one-acre field is about 7, or 70, or 700 yards square. A knowledge of very simple arithmetic only is required to understand the db principle, a principle which provides an easy way of adding up transmission losses in a manner directly related to their effect on the loudness of received speech.

"Speech" is, of course, one particular way of producing sound waves. Sound waves are one particular way of transmitting energy; electric currents are another way. "Power" is the rate at which energy in any form is produced, transmitted, or expended. The basic unit for measuring electrical power—whether of direct currents or whether, as in telephony, of alternating currents—is the watt. The number of watts equals the number of amps multiplied by the number of volts, suitable average figures being used in the case of alternating currents and voltages. For telephone purposes a much smaller power unit is necessary, namely, a milliwatt (one thousandth of a watt), or a microwatt (one millionth of a watt).

For calculations in telephony we assume that a speaker with an average voice is speaking at normal loudness with his mouth close to a solid back microphone. His voice produces in the air a minute amount of mechanical power which is equivalent on the average, including intervals between words, to an electrical power of ten microwatts. First, as is well known, the speech power in the air is converted by the microphone into electrical power. The microphone, by deriving power from a battery, actually amplifies the speech power considerably, and if the microphone be of standard efficiency and working as part of an ordinary land line telephone through to the local exchange, the average voice will cause speech currents of definite average electrical power, namely, about 200 microwatts, excluding

steady direct current power, to emerge from the telephone terminals. This 200 microwatts (approximately) is a very important quantity because it is our starting-off point. This value is indicated by the left hand pillar of Fig. 1. Instantaneous powers will very greatly exceed the average power, but this does not affect the argument.

Next, the average electrical power is carried through various transmission systems of lines and apparatus, but the further it goes from the microphone the greater will be the proportion of it lost in transmission and the less the power available to operate the receiver. It is with this attenuation of power, due to losses *en route*, that we are primarily concerned. Fig. 1 illustrates this progressive power attenuation, or thinning down, for a typical long distance trunk call, and, in fact, shows the smallest power which may be expected to enter and leave each exchange in turn under full standard loss conditions, *i.e.*, when the loss of each stage is the full amount contemplated by our complete scheme of standards.

Finally, the reduced electrical power is converted back into speech power in the air by the telephone receiver, where the speech is heard (we must assume) by an average human ear. For the received speech to be intelligible to the average ear, it must be of a definite minimum loudness, and if the receiver be of standard efficiency, it must be operated by at least the minimum amount of power which corresponds with minimum loudness. For satisfactory speech under average commercial conditions a minimum of 0.05, or one-twentieth of a microwatt, must reach the telephone terminals. The right-hand pillar of Fig. 1, which is an extremely thin line only, indicates 0.05 microwatt roughly to the same scale as that of the 200 microwatts with which we started. (These powers are average powers, including silent intervals between words).

The decibel system provides an ingenious means of adding up power losses so that we can estimate *how loud received speech will sound*. In particular we can add up decibel losses, either in a schedule or graphically, so that we can readily make certain that *at the worst* 0.05 microwatt will reach the listener's telephone and so give received speech of sufficient loudness to be intelligible under commercial conditions.

For speech to be intelligible, however, whether it is loud or soft, its component frequencies must not be unduly distorted, but in this article we shall omit all incidental complexities concerning frequencies and deal only with transmission power losses and their effect on the loudness of received speech.

"Loudness" is a mental sensation, the magnitude of which can be estimated but not directly measured. We can, however, measure the power of any speech which stimulates the sensation of loudness, and experiments with our sense of hearing will show us just how these two things—power and loudness—are connected. In a similar way we can experiment with our sense of vision—for example, with the

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measured sizes of various objects which we look at and the corresponding mental sensation of length. It will help us to consider vision first.

#### Steps of Uniform Difference.

Fig. 2 shows eleven pillars, which we can imagine represent eleven vertical rods of equal thickness. Suppose these rods be 100, 91, 82, 73, 64, 55, 46, 37, 28, 19 and 10 ins. long respectively. Let us call 100 ins. high a reference or zero level, like we do sea level, as a base from which to measure. Measurements would prove that there is a uniform difference of nine inches in absolute length between

adjacent rods. Our eyes will agree that there is such a uniform difference, our mental impression being that the 100-in. rod is as much longer than the 91-in. rod as the 91-in. rod is longer than the 82-in. rod, and so on.

Progress in such simple steps of uniform difference is called an arithmetical progression. A line joining the tops of the pillars is a straight line (see Fig. 2). Starting from 100 ins., or zero level, we could calculate the value after four steps-down by:  $100 - (4 \times 9) = 100 - 36 = 64$  ins. high for level 4. The level number is shown at the foot of each pillar.

#### Steps-down in Uniform Ratio, or with Uniform Per Cent. Loss.

With sound the connection between power and loudness is not quite so simple. Notice the pillars in Fig. 3, where once more a progression has been chosen which carries us in ten steps-down from the 100 units level of value (this time an absolute value of power), to a value of 10. As before, we will use the 100 pillar as the zero or reference level. Our new pillars are approximately 100, 80, 64, 50, 40, 32, 25, 20, 16, 12½ and 10 units long. In this kind of progression the differences between the successive absolute values are not uniform differences—they are 20, 16, 14, 10, 8, 7, 5, 4, 3½ and 2½ absolute units respectively; but the absolute value of each pillar bears a uniform ratio to the absolute value of the pillar next below it. By this we mean that (approximately)  $\frac{100}{80} = \frac{80}{64} = \frac{64}{50} = \frac{50}{40}$  and

so on. The uniform ratio here chosen is 5 to 4, or 1¼ to 1, or 1.250 to 1.0, or 1.0 to 0.80. The value of each level downwards is thus approximately 4/5th the value of its predecessor. Such steps are, in fact, approximately power steps-down of 1 db from 100 units of power as zero level.

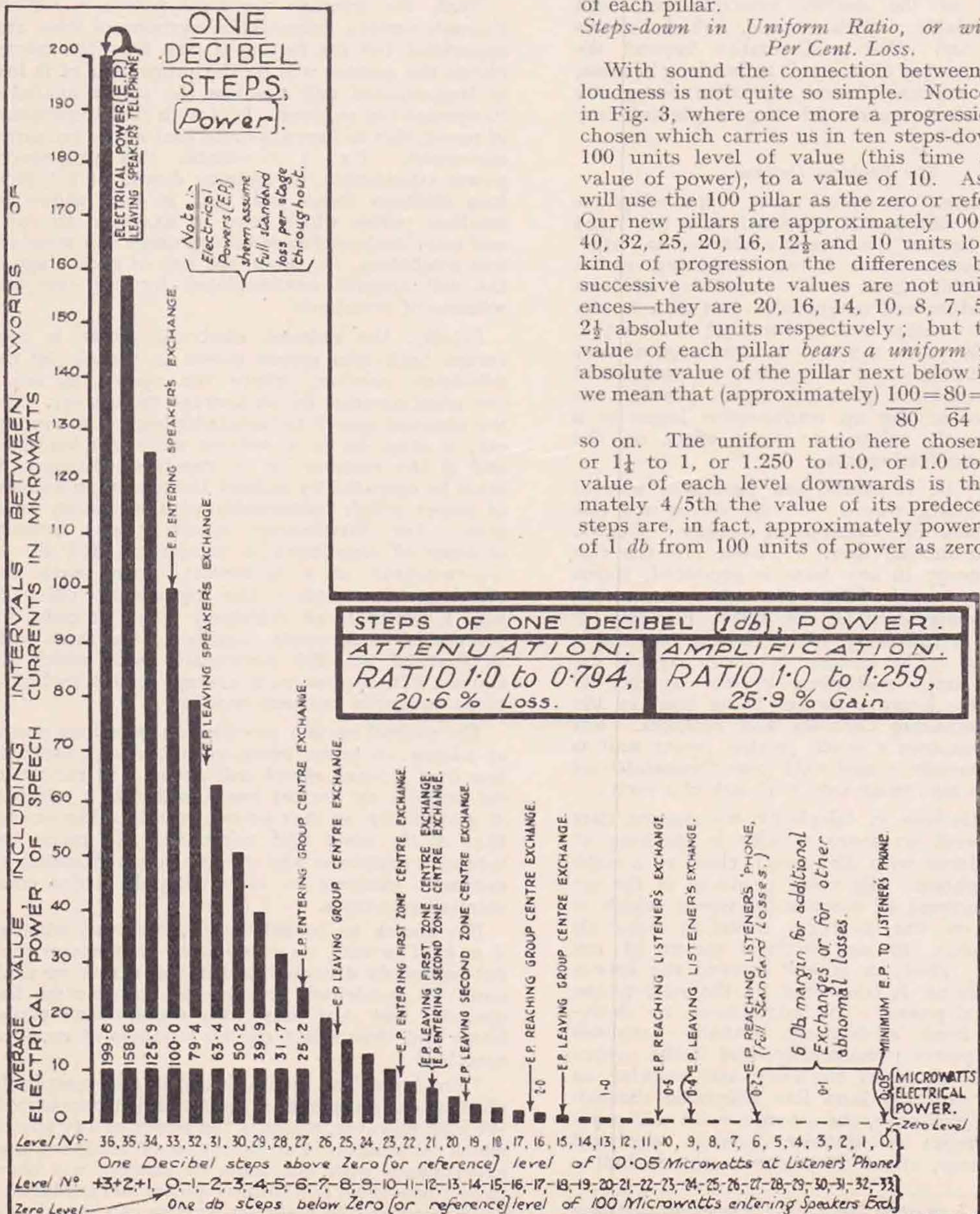


Fig. 1.



An alternative way of expressing such a series of steps-down, each step in uniform ratio, is to say that for each such step-down there is a uniform percentage loss—in this case approximately a 20 per cent. loss. This clearly means that the value of each level downwards is  $(100 - 20)$  per cent. = 80 per cent. of its predecessor approximately. (The question of per cent. gains by steps-up will be considered later. It should, however, already be clear that *db* gains can only be calculated from some definite amount of power as reference or zero level. We cannot add percentage gains on to nothing at all.)

Progress in steps of uniform ratio, or in steps of uniform per cent. loss, is called a geometrical progression. A line joining the tops of the pillars is a concave curve (see Fig. 3). Starting from 100, or zero level, we could calculate the value after four steps-down by:—

$$100 \times \frac{4}{5} \times \frac{4}{5} \times \frac{4}{5} \times \frac{4}{5};$$

or more briefly by:

$$100 \times \frac{(4)^4}{(5)} = 100 \times \frac{256}{625} = 40 \text{ (approx.)};$$

or alternatively, using the 80 per cent. value per step, by:

$$100 \times \frac{(80)^4}{(100)} = 100 \times (.8)^4 = 100 \times .4096 = 40 \text{ power}$$

units as the approximate value for level 4. An everyday practical example might be the second-hand value of a car costing, say, £100. If only a small mileage is run per year, depreciation is likely to be about 20 per cent. per year compound, *i.e.*, the value at the end of each year would be  $100 - 20 = 80$  per cent. of the value at the beginning of this same year. The case would not be altered if the car cost £200 when new and had now been bought second-hand for £100 after three years' use and depreciation. Taking £100 as the value in the year we select as our reference year, the sale value after four years would be £40, which could be calculated exactly as shown above. The pillars of Fig. 3, namely, 80, 64, 50, 40, 32, etc., would represent the sale values as they are depreciated 20 per cent. year by year, just as they represent the power values as they are attenuated 20 per cent. step by step. Our next task is to connect experimentally such measured steps-down or attenuations of power with the corresponding estimated steps-down of loudness.

#### *Loudness and Power Experiments.*

Loudness and power experiments with sound, using many different listeners, have shown that to produce apparently equal or uniform steps-down in the sensation of loudness, similar in character to the uniform difference pillars of Fig. 2, we must approximately reduce the power causing the sounds by steps-down of power in uniform ratio, or by steps-down with uniform percentage power loss. The steps-down of 5 to 4 ratio, or 20 per cent. loss, of the pillars of Fig. 3 illustrate, therefore, a series of power values which will give uniform loss of loudness per step. To give a detailed practical example we could arrange first for 100 units of speech power (zero level), to reach a listener's telephone, and subsequently, by introducing suitable resistances (impedances), for this power to be attenuated by successive steps, each representing a 20 per cent. reduction of power. The left-hand pillar of Fig. 3, marked 0 at its foot, illustrates the starting point, and each of the other pillars bears an appropriate number at its foot to indicate the number of steps-down or level reached. Reducing, or attenuating, the power in the listener's telephone by step 1, *i.e.*, from 100 to 80 units (say microwatts), would give a very small loss of loudness, say from 33 units to 32 units. (The reason for associating loudness level 33 in this example with power value 100 is given later in the description of Fig. 1.) Equal and uniform very small reductions in loudness would be produced one after the other by making in turn the following power attenuations: Step 2 from 80 to 64 microwatts, step 3 from 64 to 50 microwatts, step 4 from 50 to 40, and so on, each step representing a 5 to 4 power attenuation ratio, or a 20 per cent. power loss. Thus, successive power values of 100, 80, 64, 50, 40, 32, 25, 20, 16,  $12\frac{1}{2}$  and 10 would give us successive loudness levels which we could represent by a series of numbers like 33, 32, 31, 30, 29, 28, 27, 26, 25, 24, and 23. (The receiver is assumed to be of uniform efficiency within this power range.) Here, then, level 23 definitely implies 10 microwatts, and with

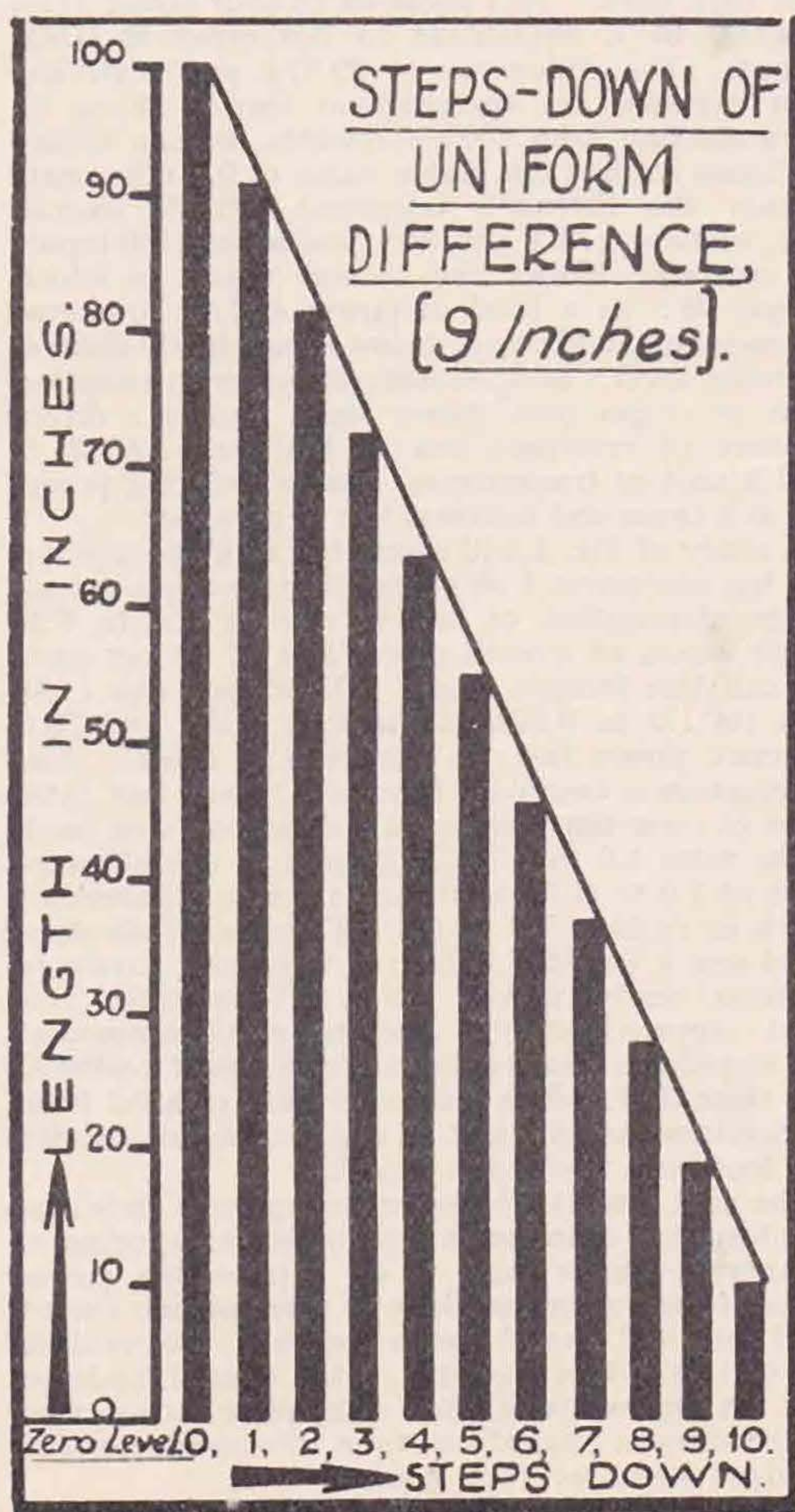


Fig. 2.



experience we always mentally associate power and loudness levels with the corresponding power values.

The steps of Fig. 3 are approximately 1 db steps. It should be noted, however, that only a well-trained ear can detect any difference in loudness level when the power producing the sounds is decreased by as small an amount as 20 per cent., or 1 db (approx.). The average untrained ear can only detect definitely the difference in loudness produced by a minimum power loss of 50 per cent., which we shall find is equivalent to three 1 db steps, i.e., 3 db. The principle for larger steps is, however, precisely the same. Note that in what follows we trace power losses—and the corresponding loudness and power levels—along the two wires of a telephone line jointly, just as though together they formed a kind of pipe line carrying power, or like a somewhat leaky copper pipe carrying water.

Steps of 1 Decibel (1 db).—Fig. 1.

We will now return to the pillars of Fig. 1, where the steps are very slightly larger than those of Fig. 3, and are 1 db steps to a high degree of accuracy, i.e., steps of 20.6 per cent. uniform loss instead of 20.0 per cent. Each pillar has a distinctive "level" number just below it, and its power value to one decimal place is inset into each

of the first ten pillars. The values of the second ten pillars (levels 26 to 17), are one-tenth the values of the first ten (levels 36 to 27); the values of the next ten (levels 16 to 7) are one hundredth of the first ten; and the values of the last seven (levels 6 to 0) are one thousandth of the first seven. Fig. 1 illustrates 36 1 db steps-down from level 36 to level 0. A decibel, therefore, represents, from the power aspect, a uniform power attenuation ratio of 1.0 to 0.794 (or the equivalent 1.259 to 1.0), or a uniform power loss of 20.6 per cent.; and from the loudness aspect, a uniform loudness loss equal to the smallest difference in loudness that a well-trained ear can detect.

The right-hand pillar of Fig. 1 has been given here a power and loudness level of "0," because 0.05 microwatt represents the minimum permissible power output entering the listener's telephone and the corresponding minimum loudness necessary for commercial speech. This 0 or zero level is a reference level, and does not, of course, indicate a total absence of power or loudness. It will be seen that the left-hand pillar, 200 microwatts, is 36 steps or levels, each of 1 db, above the zero level here used. This gives an overall power ratio of 4,000 to 1, equivalent to 100 input to 0.025 output. The difference of 99.975 per cent. has been expended in transmission losses. Even if, again starting from 200 microwatts, we can reduce the losses so that the higher value of 0.2 microwatt reaches the listener's telephone (30 db overall loss), we have a 99.9 per cent. power loss (100 input, 0.1 output). Notice the various senses in which we use db: as a level of power and/or loudness, i.e., so many db above or below some clearly defined reference level; as a measure of power attenuation ratio, or of per cent. power loss; and as a direct measure of resultant loss of loudness. A db is thus a unit of transmission loss, associating power loss as a cause and loudness loss as an effect.

A study of Fig. 1 will show that a jump covering any ten successive 1 db steps-down gives an overall power attenuation of ten to one or 1.0 to 0.1, which means an overall power loss of 90 per cent. We call this jump a "bel." How then can 1 db, with its 1.0 to 0.794 attenuation ratio, and 20.6 per cent. power loss, be one-tenth of a bel? The explanation is twofold. From the power loss ratio point of view ten successive 1 db steps-down, each in the ratio 1.0 to 0.794, will give an overall step-down of 1.0 to  $(1.0 \times 0.794 \text{ ten times in succession})$ , which is, in fact, 1.0 to 0.1. Thus, ten 1 db steps equal one 1 bel step, which is what the phrase in question really means. Fig. 3 illustrates this point (approximately). But as each component 1 db step-down means also a uniform loss of loudness, it is clear that 1 db is truly one tenth of a bel from the loudness aspect, just as one inch is one-twelfth of a foot from the length aspect.

The fact that 1 db power loss always indicates a uniform loss of loudness is of immense importance, because it means that, if we express the power losses of the various sections of a telephonic circuit in db and add the db losses together, the total db loss will be a true measure of the overall loudness loss. In fact, we can allot so many db to each section of the circuit, regarding these allotments as full standard losses for each section.

#### *Amplification and Power Gains.*

In a similar way the speech currents may be

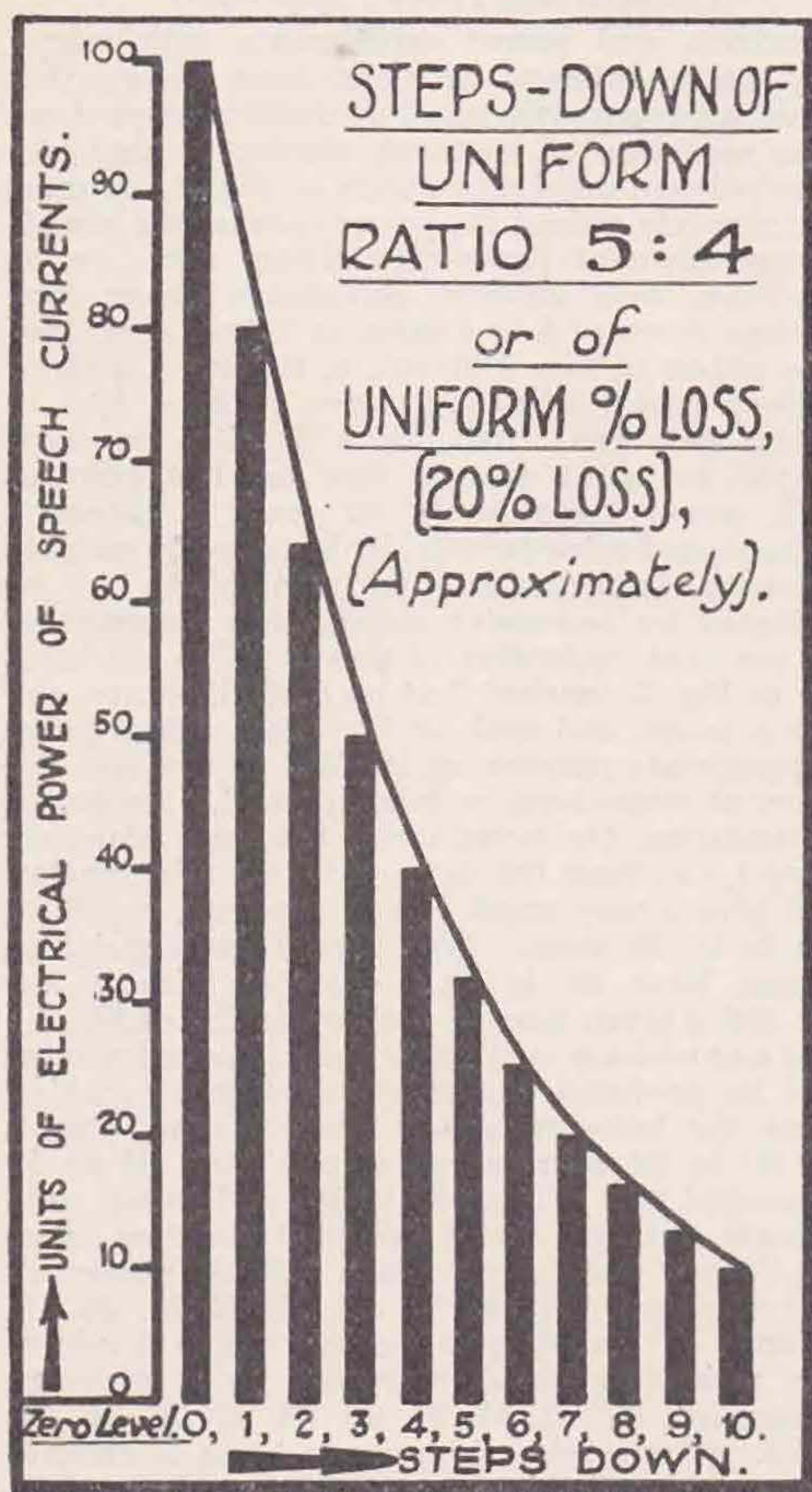


Fig. 3.



passed through one or more amplifiers, which will raise the power and loudness level considerably. This again can best be expressed in *db*. One *db* gain means a power step-up in the ratio 1.0 input to 1.259 output, which means a 25.9 per cent. power gain. Similarly a 3 *db* gain doubles the power and a 10 *db* gain gives a ten-fold amplification. This would be illustrated approximately by following the pillars of Fig. 3 looked at from right to left. Power amplification by *db* gains of 25.9 per cent. per *db* is exactly comparable with capital appreciation by compound interest at 25.9 per cent. per year. At this rate capital would double itself every three years and increase tenfold in ten years. It should be noted that as the per cent. gain (like the loss) is calculated on the input, the per cent. change must clearly be greater for a 1 *db* gain from a relatively low input than it is for a 1 *db* loss from a relatively high input. 1.0 to 1.259 is a 25.9 per cent. gain, 1.259 to 1.0 a 20.6 per cent. loss of power. Each always means a uniform change of loudness.

## LONDON MEETING,

Friday, April 30, 1937

at

**I.E.E., SAVOY PLACE.**

Tea 6 p.m. Commence 6.45 p.m.

Lecture:

**MODERN TELEVISION**

By MR. T. D. HUMPHRIES

It has been shown that, with any circuit we like to select, we can determine the *db* overall loss and so get a measure of the loudness of speech received from a standard telephone through this circuit. Thus, decibels give a measure of the transmission efficiency of a circuit—and also, of course, of each component of the circuit. The higher the *db* loss the lower the efficiency. If we introduce an additional 3 *db* component into a circuit we shall halve the power reaching the listener's telephone and lower the transmission efficiency 3 *db*.

### Power Ratios and Corresponding *db* Losses.

Before concluding this description of the *db* system, it will be well to note again that any 3 *db* loss means a 2 to 1 power attenuation and any 10 *db* means 10 to 1. It should be clear from Fig. 1 that 13 *db* = 10 *db* + 3 *db*, will therefore mean

$$\frac{10}{1} \times \frac{2}{1}$$

or 20 to 1 ratio. In fact, every time we add *db* steps we must multiply the one ratio by the other ratio. For example, 9 *db* = 3 + 3 + 3 *db*, and so the overall ratio for 9 *db* is

$$\frac{2}{1} \times \frac{2}{1} \times \frac{2}{1} = \frac{8}{1}$$

Similarly, 36 *db* equals 10 + 10 + 10 + 3 + 3 *db*, and so the overall ratio is

$$\frac{10}{1} \times \frac{10}{1} \times \frac{10}{1} \times \frac{2}{1} \times \frac{2}{1} = \frac{4,000}{1}$$

The following table is useful as a guide:—

3 <i>db</i>	...	2 to 1	20 <i>db</i>	...	100 to 1
6 <i>db</i>	...	4 to 1	23 <i>db</i>	...	200 to 1
9 <i>db</i>	...	8 to 1	26 <i>db</i>	...	400 to 1
10 <i>db</i>	...	10 to 1	29 <i>db</i>	...	800 to 1
13 <i>db</i>	...	20 to 1	30 <i>db</i>	...	1,000 to 1
16 <i>db</i>	...	40 to 1	33 <i>db</i>	...	2,000 to 1
19 <i>db</i>	...	80 to 1	36 <i>db</i>	...	4,000 to 1

In a similar way, subtracting *db* values entails dividing the corresponding ratios. Thus 7*db* = 10*db* — 3 *db*, and so 7 *db* means a ratio of

$$\frac{10}{1} \div \frac{2}{1} \text{ to } 1,$$

a useful figure to memorise; 17*db* means a ratio of 50 to 1, and 27 *db* of 500 to 1.

### Current and Voltage Ratios and Corresponding *db* Losses.

Sometimes, particularly with amplifiers, it may be easy to measure either the input and output currents, or the input and output voltages, but not the powers. If the resistance (impedance) of the circuit remains constant, doubling the current must have meant doubling also the volts; similarly doubling the volts will give double the current. As the power is current × volts, if either is doubled (which means that both must be doubled) we get the (power × 2 × 2). This means that any current or voltage ratio must be squared to give the power ratio. From this we can deduce the *db* gain or loss as before.

### W.F.S.R.A.

The World Friendship Society of Radio Amateurs is celebrating its second anniversary by an informal "Birthday Party" QSO and Listeners' Contest. Its members are asked to endeavour to contact or log as many fellow-members as possible during the period 00.00-24.00 G.M.T. on April 22, and to forward a log of their results to the President, Mr. D. Magill (W9DQD). Stations taking part should call Test or CQ W.F.S.R.A.

### Co-operation Wanted

Mr. H. Heap (G5HF) will be conducting experiments on 56 Mc. during April and May in the neighbourhood of St. Andrews, Fife. He would like to communicate with amateurs in that area with a view to co-operation in tests.

### Station Descriptions

The Editor will be pleased to consider for publication, descriptions of Amateur Stations. Contributions should, if possible, be typed, and run to not more than 750 words. A photograph, providing it is sharp, may be submitted. Overseas readers are especially invited to furnish descriptions of their stations.

### Bulletin Articles

Several members have responded to our request for technical articles, but more are required if the present size of THE BULLETIN is to be maintained.

We shall be pleased to consider for publication an authoritative article dealing with the theory and practice of Series Modulation. Any offers?



# AN AMERICAN 56 Mc. TRANSMITTER & RECEIVER

By DR. J. WORTLEY-TALBOT, A.M.I.R.E. (G6WT).

**B**Y the courtesy of the Editor the writer is enabled to give particulars of the *Lafayette* Mobile 56 Mc. telephony transmitter and Model 79 "Minute Man" receiver, both of which have recently been imported from New York.

## The Transmitter.

The transmitter can be used either as a mobile unit for portable work or for fixed station experiments using a suitable power pack. The unit employs three valves, the first being a *Raytheon* 6E6 twin triode used as a unity coupled oscillator, modulated by a 6L6 Beam Power metal valve. A 6C5 is used as speech amplifier.

A sensitive microphone of 200 ohms impedance (which can be single or double button type) is necessary, provision being made for either. A separate microphone battery is required, but the associated transformer is incorporated in the set.

The chokes and transformers are manufactured by *The United Transformer Corporation* and, like the rest of the gear, are of precision design and finish.

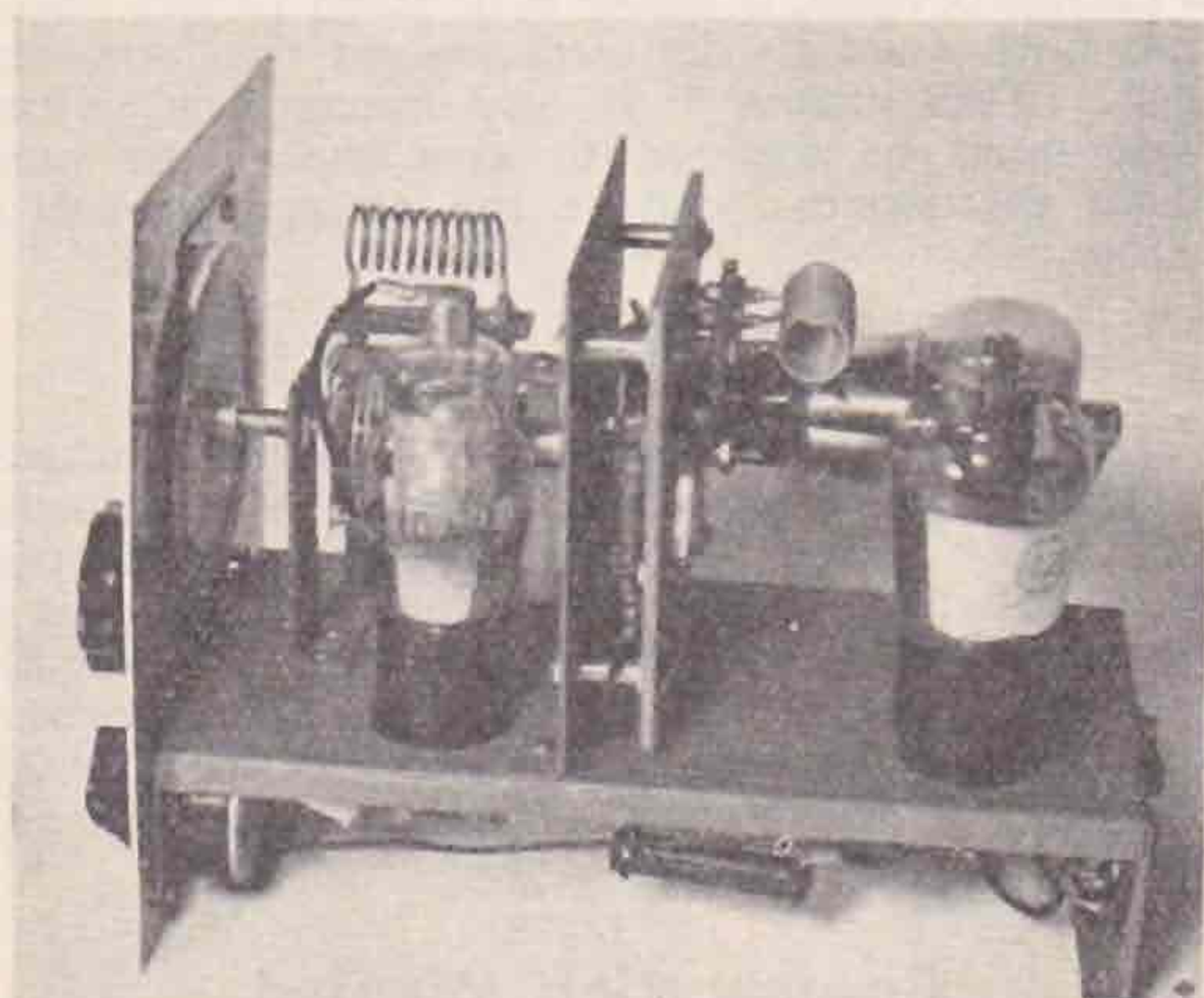


Fig. 1.

The transmitter chassis showing the Beam Power Metal Modulator valve (the larger of the two). The speech amplifier valve is in the centre.

The power supply for mobile use consists of a Gen-E-Motor giving an output of 300 volts at 100 mA when a 6-volt car battery is used for the input. For permanent installation a standard power pack can be employed.

The transmitter under load will give from 5 to 10 watts input, with 100 per cent. modulation.

The insulation throughout is of Mycalex. The base of the 6E6 Oscillator valve holder and the tank coil are of the plug-in type, the coil being made from  $\frac{1}{4}$ -in. copper tubing. These plug-in features enable any future experimental work on higher frequencies to be carried out without difficulty.

Arrangements are made for the unit to be attached to the fascia board of a car if required.

The manufacturers give various suggestions for

coupling the oscillator coil to an aerial. It will be appreciated that the method employed depends upon the type of system used.

At the writer's station an aerial 8 ft.  $1\frac{1}{2}$  ins. long is used with Zepp feeders 12 ft. long. The radiator is vertical and the feeders are separated 2 ins. apart and transposed at intervals. This simple radiating system used at practically sea level and a *Barr* Transceiver put an R5 S6 phone signal into Exmoor 50 miles distant using 2 watts input.



Fig. 2.

A view of the Receiver Chassis showing the plug in coils and two gang condensers. Note the method of shielding employed.

Schedules are being kept nightly at 22.15 G.M.T with G5SY and G2CI using an input of  $7\frac{1}{2}$  watts, and the writer will be glad to hear from any member who receives these transmissions. The transmitter has not yet been used for mobile work as it arrived after the outdoor season ended.

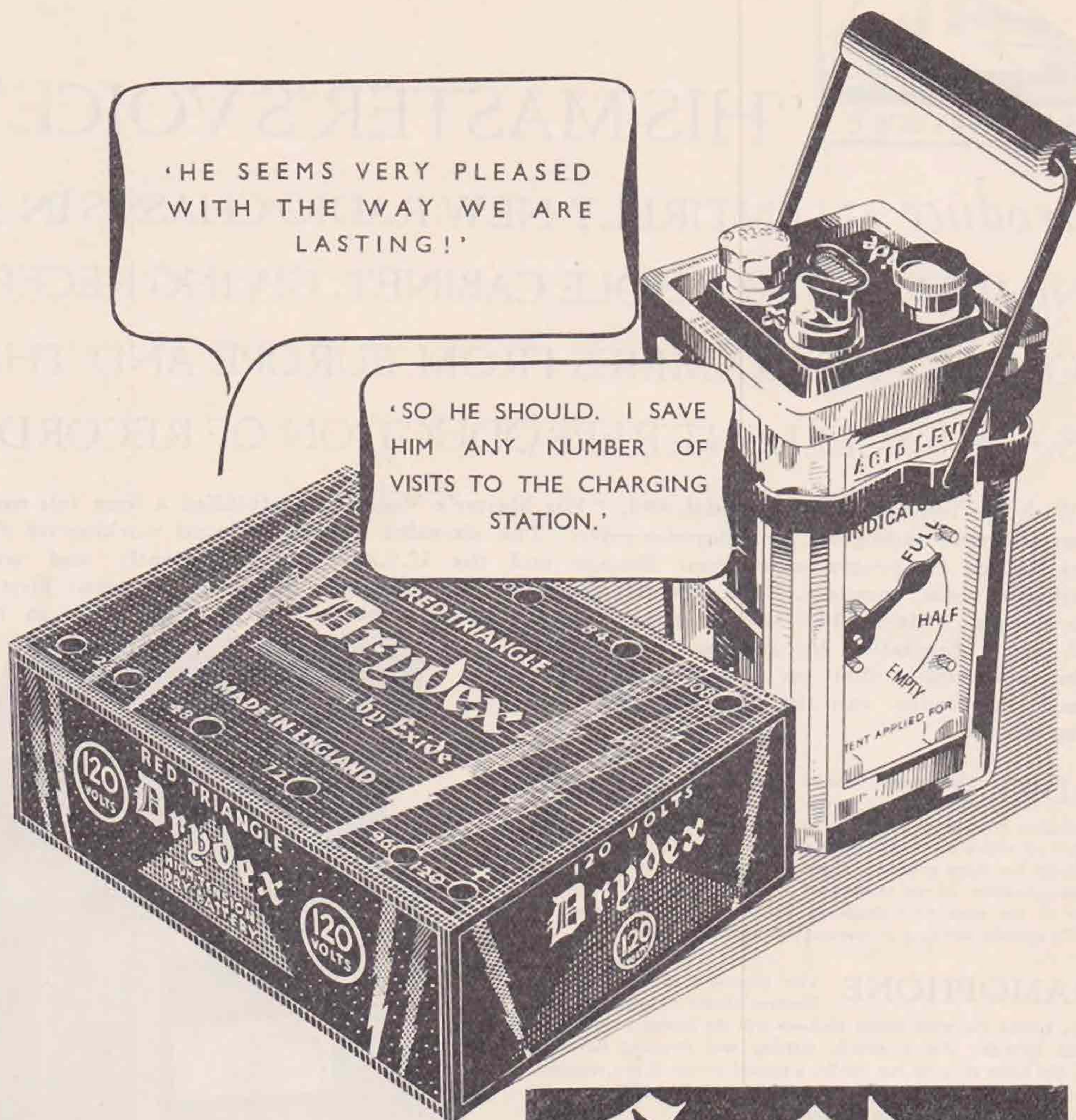
## The Receiver.

The *Lafayette* Model 79 56 Mc. receiver is suitable for fixed station work with an A.C. power pack or with a *Pioneer* Gen-E-Motor for mobile work. The output of the generator is 250 volts at 50 mA.

The circuit employs three valves functioning as four. The first is a pentode of the 78 class used as an R.F. Amplifier, its aerial grid tuning circuit consisting of a plug-in coil and variable condenser with slow motion dial. The output of the 78 works into one section of a Type 79 valve functioning as a self-quench ultraudion super-regenerative detector which is resistance capacity coupled to the second section of the same valve. The output is then passed to a Type 42 pentode which allows signals to be received on the speaker.

The tuning range, using the coils supplied, is





EXIDE 'HYCAP'—the L.T. battery  
for modern sets.

DRYDEX—the Exide dry H.T.  
battery.

Obtainable from all reputable dealers and Exide Service Stations. EXIDE BATTERIES, Exide Works, Clifton Junction, near Manchester. Also at London, Manchester, Birmingham, Bristol, Glasgow, Dublin and Belfast.

# Exide

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## RADIO BATTERIES

*Still keep going when  
the rest have stopped*





**"HIS MASTER'S VOICE"**

*introduce* AN ENTIRELY NEW RADIO CHASSIS IN A FINE WALNUT CONSOLE CABINET, GIVING RECEPTION OF PROGRAMMES FROM EUROPE AND THE U.S.A. & EXCELLENT REPRODUCTION OF RECORDS

With the introduction of Model 495, "His Master's Voice" has fulfilled a long felt need for an all-world radiogram at a popular price. The six-valve superhet circuit working off AC mains brings in programmes from Europe and the U.S.A., easily, efficiently and with remarkable tonal accuracy. The original design of the cabinet is of special interest. Firstly, it occupies as little as 345 square inches of floor space, a point of great importance in the small flat. Secondly, by placing the control knobs and tuning dial on the front of the cabinet the radio can be operated without raising the lid.

**RADIO** The chassis, embodying three wave-length ranges of 16.5-52, 195-580 and 725-2,000 metres, receives programmes from a multitude of stations all over the world, one hundred of which are marked by names on the wavelength scale. Selectivity has been greatly improved, without loss of quality, by the incorporation of an iron-cored I.F. transformer. A further tribute to the man who demands dead-on reception *easily* is a specially smooth working two-speed tuning knob.

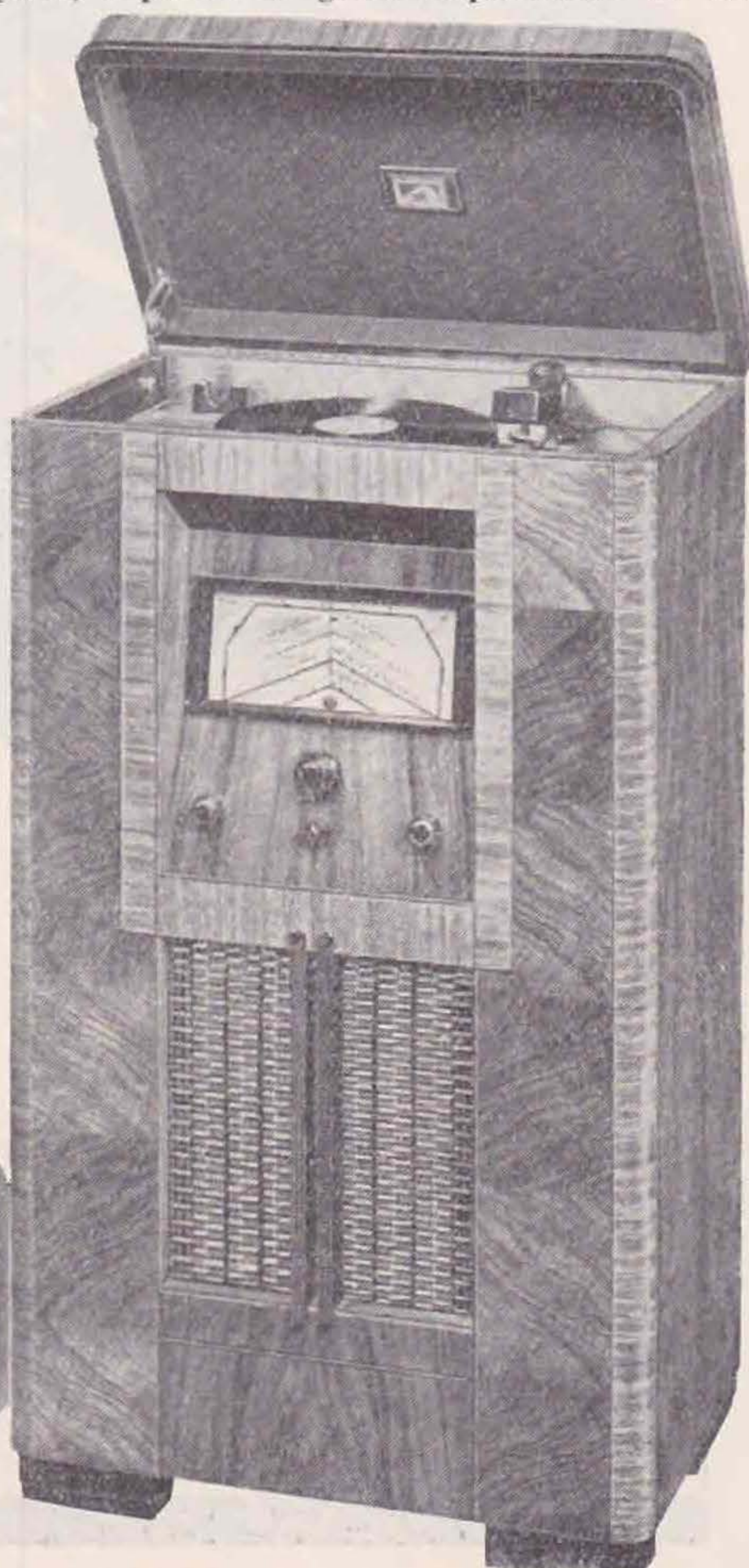
**GRAMOPHONE** The turntable is driven by an Electric Motor of super-efficient design, whilst the wide range pick-up will do justice to the most difficult records. An automatic starting and stopping device is fitted, the latter may be cut out by a special switch if not required. The radio enthusiast will appreciate the specially lined lid to deaden every suggestion of pick-up chatter.

**CABINET** The cabinet, in magnificently grained walnut, follows the "H.M.V." tradition for superlative finish. Its dimensions are height 40 in., width 23 in., depth 14½ in. The speaker has been cleverly concealed by a bronze finished wire mesh grille which harmonises perfectly with the walnut of the cabinet. The listener will find that the wave-length scale set at an angle enables him to tune in equally easily either sitting down or standing up.

AT THE  
POPULAR  
PRICE OF

**22**  
GNS.

OR BY HIRE PURCHASE





from 50 to 62 Mc., but like the transmitter, the range could, if desired, be converted to other frequencies.

The generator employs a specially built-in filter, and is so quiet in operation that it does not interfere with the weakest signal.



Fig. 3.

The two complete units with the receiver on the left. The centre knob controls the main variable condenser. Left-hand knob controls the volume, right-hand knob controls regeneration. The on-off switch cuts off the receiver during transmissions. The aerial terminals are at the top of the transmitter front panel and the main tuning control in the centre. The left-hand knob controls the gain. A filament pilot lamp can be seen at the bottom right-hand corner.

#### The Barr Transceiver.

Mention has been made earlier of a Barr Transceiver, therefore a few comments concerning this piece of apparatus may be of interest. The instrument, which is of American manufacture, can be used for fixed station or portable work.

Used in the hilly county of Devonshire, it is capable with an antenna 8 ft. long of communicating consistently over distances up to 50 miles producing R5 S7/9 signals.

Numerous transceivers, transmitters and receivers for 56 Mc. work have been constructed by the writer in past days, but it is now found to be neither expedient or desirable to continue to spend many hours on the construction of such gear, hence the purchase of commercially produced articles.

### Reports Not Wanted

Mr. L. Salicath (LA1G), of Oslo, in a letter to the Editor states that he positively refuses to answer European listeners' reports on his telephony transmissions. He mentions that his weekly mail contains upwards of 100 useless reports which are sent without return postage enclosed.

Members will, we feel sure, appreciate that a Norwegian high power 'phone station operator who works Great Britain regularly does not need reports from non-transmitters.

### Reports Wanted

G6JM (Chingford) on his 7,160 and 14,320 kc. C.W. transmissions.

## Trade Notes

All Exide wet high-tension batteries will in future be supplied with a novel form of leakage current shield fitted round each of the battery terminals, with an air gap between the terminal and the shield.

These additions are extremely valuable in that they reduce current leakage across the top of the battery from one terminal to the other.

When a battery is charged in an atmosphere containing fine acid spray, such as normally obtains whenever a large number of batteries are being charged simultaneously, some of the spray settles on the sealing compound which covers the tops of the batteries.

Some of the water in the acid film thus formed evaporates, leaving a concentrated film of acid covering the tops of the battery. This provides, between the two 10-volt terminals, a leakage path for current, small in amount, but continuous.

As high-tension batteries are usually only charged at infrequent intervals, this loss in current constitutes a serious drain on the useful working capacity of the battery.

The introduction of the two porcelain collars, one embracing each terminal post, breaks this leakage path, and extended tests in the Exide laboratories have proved most conclusively that batteries equipped with these shields have a longer useful working life than other batteries of the same rated capacity that are not so equipped.

\* \* \*

The introduction by *The High Vacuum Valve Co.* of a mercury vapour half-wave rectifier will meet a popular demand. This rectifier, known as the MR1, is rated to deliver 1,000 volts R.M.S. max. at 250 mA., the filament volts being 4 and the filament current 3 amps. A pair of these rectifiers will yield up to 500 mA. output in a full-wave circuit. The characteristic blue glow is observed during operation due to mercury vapour ionisation. As long as this discharge is maintained the voltage drop across the elements remains constant at about 15 volts.

When used in a bi-phase circuit the D.C. voltage output when delivering 100 mA. is just over 1,200 volts; this falls to 1,100 volts at 250 mA. and 1,000 volts at 500 mA.

The maximum rectified current for instantaneous switching of filament and anode voltages is 60 mA., but under delayed switching conditions the current rises to a maximum of 250 mA. under suitable load. On test full output was obtained 45 seconds after switching on the filaments.

These rectifiers can be strongly recommended to give very satisfactory results: they are rigid, well constructed, and sell at the fair price of 20s. each.



## A VISIT TO EI9D

BY S. JOHNSON, GI5SJ AND T. P. ALLEN, GI6YW.

THE signals, CW and phone, from EI9D, must be well known to most of our readers. The station is situated at Barleyhill House, near Westport, Co. Mayo, and is operated by Capt. G. H. Noblett, M.C., B.E.R.U. Representative for the I.F.S. Capt. Noblett served during the Great War with the Dublin Fusiliers, and later was a District Inspector in the Royal Irish Constabulary during the "trouble" in Ireland.

Barleyhill House is a fine old country residence situated in its own grounds, and in every direction there is wonderful country: standing at the base of the aerial mast one has a view out across Clew Bay to where the mass of Clare Island rises like some great sea monster, and to the left the holy mountain, Croagh Patrick, rises as a purple cone with the little chapel at the summit quite clearly outlined, some 2,500 feet up. In the distance the Twelve Pins remind us that we are on the edge of Connemara, while on the right the mountains of Achill and the dim peak of Nephin form the Western ramparts of Europe; EI9D is Europe's most westerly amateur, and the next parish is America! The sweet smell of the turf smoke, delicate but so distinctive to our city noses, combined with the soft cadences of the "West" make one wonder how any emigrant ever came to a decision.

Then we talk radio; and realise that though there is little QRM and plenty of space for aerials the power question is a constant problem. Until now, EI9D has used a small motor-generator driven from a 32-volt house lighting plant. This is sufficient to give an input of 10 watts, and with this power all transmissions have been made since 1932 (when the station was licensed). The 14, 7, 3.5 Mc bands are used, and the station has worked all continents except Asia. Some phone is used, Canada and U.S.A. having been worked on 3.5 Mc., but 9D considers his interests are essentially in CW. Modulation is by grid control, made necessary by lack of power, and the microphone is an ordinary solid-back. The quality shows that 9D has obtained the best out of the system.

During the visit certain experiments with a new power unit were being made, and the transmitter

then in use was a rack and panel job with a 47 oscillator and a couple of 46's in parallel as P.A. A 14 Mc. crystal is used for that band. But normally the C.O. was a DE5 driving an LS5B as P.A.

The aerial is a 132 ft. end-fed Hertz; the mast end is 48 ft. high, the house end is 40 ft., and the aerial

can be adjusted in length by an ingenious system of short lengths just outside the window of the operating room. This is found to be very useful for correcting the different crystals and when changing band.

The gales from the Atlantic set a problem not usually confronting amateurs, therefore 9D decided to build a concrete support for his mast. To make it efficient and not an eye-sore, it was decided to build it in the form of a small "keep." When digging the foundations a spring was discovered; this is now connected to a pump and tank in the base of the keep, and forms a useful supply to the house.

Concrete is the motif of the station; at the moment a small concrete room is being built for an Austin 7 car engine, which will supply the power for the transmitter. This room is just outside the window of the "shack," and the engine will be operated by remote control. Also, there is a miniature cottage in the grounds, constructed of concrete, which is a "dolls house" for the children

and in which they can sleep in the summer-time. At the entrance to Barleyhill House one encounters the strangest piece of concrete work of all; to avoid opening the gates, and climbing into and out of the car, Capt. Noblett has built a couple of almost semi-circular ramps at the side of the gates. They are too steep for cattle to climb, but it is one of the sights of Westport to see 9D putting his car at the ditch and going over for all the world like a chorus girl shaking the tails of her skirt at the stalls! The car has become such a "leaper" that the Dublin Horse Show may receive the surprise of its life some day.

The receiver at 9D is a revamped Pilot all-wave battery model, fitted into a rack. A beat oscillator has been added, together with an extension drive employing an extra slow-motion dial to band



Here EI9D, Westport.



spread the amateur bands. This also is unique. At first, the tuning was so slow when tuned to BC waves that one commenced working at 5.45 p.m. to receive the 6 p.m. news! A drill fitted with a rubber bit pushed against the dial acted as a temporary relief, but the present arrangement is amusing. When 9D wishes to go to the other end of the band, or tune BC, one of two buttons is pressed. This energises a small car-horn motor, and the dial is driven round by means of a band and a rubber clutch. When he hears an interesting signal he releases pressure on the button and the drive stops. The other button drives the dial back again when desired!



*The Noblett Half-Wave Gate with Miss 9D at Antinode.*

A card index beside the transmitter is in constant use. Details of every transmission are entered at the time, and 9D is certain of having a card *about* if not *from* each station he works.

9D is an amateur to the core and in the best sense of the word; when one considers his power difficulties, not to mention the question of gear and customs troubles, the extent of his enthusiasm is



*Night Owls and a Turf Fire. Palmer Allen, G6YW, George Noblett, EI9D, and Stanley Johnson, G5SJ.*

apparent. His ingenuity is able for any problem that arises, and is refreshing to see.

Few amateurs pass through Westport except in the summer, but all are welcomed; nothing could have exceeded the warmth of the welcome extended to the writers who, along with Mrs. 5SJ and Mrs. 6YW, motored about 450 miles in two days to get this "exclusive" story. That drive is a story in itself. On the way out the 225 miles was a nightmare taking eight hours. We had 17 snowstorms, mostly after dark; roads with prominent 17th harmonics through the mountains; and a gale which at times blew the windscreen wipers vertically upwards every few minutes. Two unions in the petrol feed worked loose and we ran out of petrol at night in a heavy snowstorm . . . 300 yards from EI9D! The run home the next day started with a puncture, and the help of a junior operator aged  $3\frac{1}{2}$  who put a pint of water into the petrol tank!

A lucky glance noticed the spare wheel disappearing after dark in the worst of the mountain roads near the customs border. Then at 11 p.m. the back axle gave some R9 QRM, and it was necessary to take out the half-shaft to fix matters. The return journey took 11 hours; in December, too. But we were really very lucky, for it did not snow coming back!

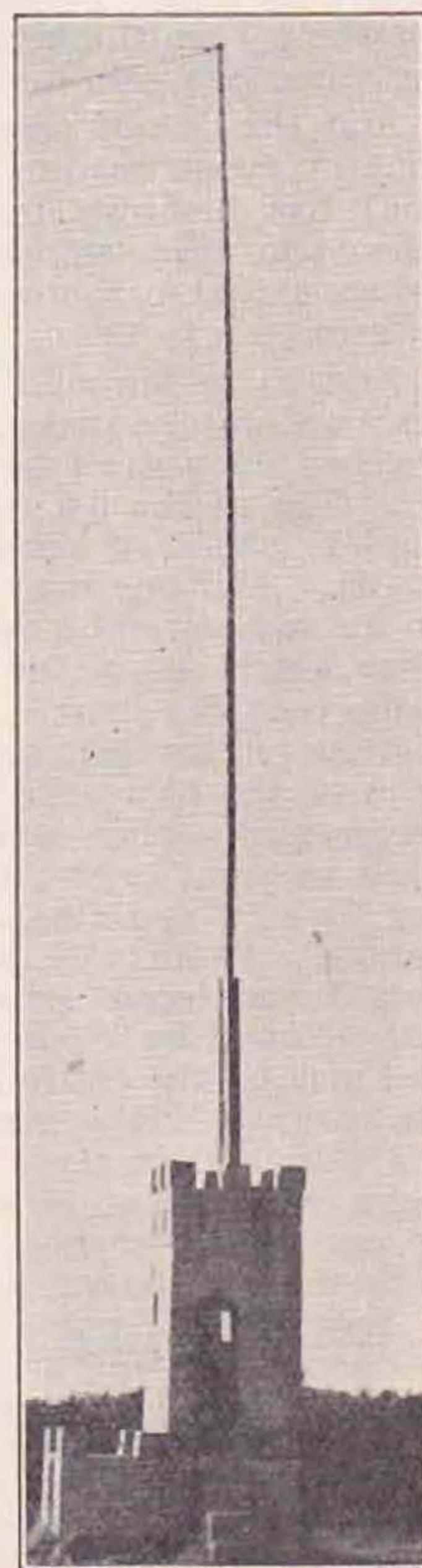
So this article was really obtained at great risk and foolhardiness . . . between ourselves, the car was a substitute one which was quite unknown to us, and had practically no tools. But we had a real hamfest with 9D, and the journey was well worth it. The photos and the driving were G5SJ's, the "blather" is G6YW's, but the thanks to EI9D are "ours."

(Just as we go to press news of the latest phone arrangement at EI9D is received; those lusty 3.5 Mc. signals are the result of grid modulating the 46's with 900 volts on their plates and a plate current of 12 milliamps . . . someone should start a society for the prevention of croolty to tooBs.)

### Reports Wanted

G2LT (Sheffield) on his 7,036 kc. transmissions. All reports will be acknowledged.

GM8MQ (Fife) on his 7,096 and 14,192 kc. C.W. and telephony transmissions.



*Westport's Landmark.*



# SOLILOQUIES FROM THE SHACK

By UNCLE TOM.

*(Our tame song-bird, alas! is too busy laying his eggs elsewhere to deliver them into our basket with his erstwhile regularity—but now and then he breaks out again—and this is one of the nows.)*

I F I were to take a cowardly advantage (which I have never done since I pushed a little squirt of a First-Former into a prickly hedge) I could get out of this page by writing about two lines. To wit: G8ZQ de G::—GM OMs. Hr nr 599.999. Gud luck. Cheerio. Dah, dit, dit-dit-dit, daaaaaah.

Which, being interpreted, meaneth, "Your sigs 100 per cent. readable (unfortunately), a darn' sight too strong for my liking, and please, for the luvva mike, get off the air."

That could be said, with truth, to a good many who shall remain nameless; but amongst you there are some dear, sweet ones, whose signals will always remain beautifully weak to me; and some, sweeter far, whose signals I have never heard and never shall hear at all. And they are the ones I like most.

There's something that seems to pall in the charm of receiving even the cleanest, clearest, best-operated transmission, when it hits your ear-drums at a steady R9 plus. Perhaps even G2—and G6—(of whom I am thinking) sound absolutely enchanting when one gets far enough away from them.

And this is not personal prejudice, for I wager that everyone reading these words (yes, both of you) has his own local bugbears. Nice fellows when you meet 'em—but over the ether, Grrrrr! Where's that carborundum wheel, boy?—I want to grind my teeth.

And so to fan-mail, which is pretty numerous, and moderately sticky, since a lot of the subjects touched upon can't be dealt with in cold print at all. Top of the list is—Duplex. Gosh, how that duplex 'phone racket gets some people's goat (or goats). And one man mentions a QSO that went on for an hour and a quarter without any call-signs, after which one of the ops. said he would have to make the QSO short.

Next on the list, strangely enough, is that old echo of the past—the use of supposedly slick and clever terms when working 'phone. "Turning it back to you," and "take it away," and "What say, Doc?" and all the rest of the little children's babble. Admittedly, some of the all-British 'phone plus Oxford accent seems to go to the other extreme, but we can't be Yanks unless we go the whole hog and pick up the entire American vocabulary, which the average Englishman couldn't do in a lifetime.

I admit that the "slick" method sounds all right from the other side, but when I hear some of our crowd trying to copy it—well, it's just pathetic, and makes me shed salt tears.

Another little point in the way of utter lack of co-operation: why must some British stations still amuse themselves working local 'phone on 14 Mc. when the B.E.R.U. and A.R.R.L. C.W. Contests are on? We may not all want to enter for the awful "Hr nr 599.999" craze—but why work local 'phone on 14, anyway?

I have got so hardened to 7 Mc. that I don't care what happens there. Keep it as the band for

learners and never-will-learn-ers; but save us our 14 Mc. for a few more months. Still, it isn't all British, and once 14 gets filled up with French spitch (mostly unlicensed) what *can* we do?

Yet another grouse. You like being sworn at, so I'll continue—John Hunter will give you all the good news on his page! Some time ago I poured ridicule on the 'phone pest who "sends double" by a kind of verbal paraphrase of every sentence. "I am getting you R7; your sigs are coming in here R7"—and so on.

Now here's another pest—the 'phone man who has only about 200 words in his vocabulary, and who repeats them with monotonous regularity to everyone with whom he works. I heard a G station describing his rig to another man one day recently, and it was an interesting rig, too. I listened and learned much—the *first* time.

But ever since then I have been fated to hear the same old voice describing the same old rig in the same old words, and I wonder why he can't have a gramophone record made of the tale, with vacant spaces left for call-signs and reports.

I suppose someone will say I'm just looking for something to grouse about; but I don't get up on this old tub to tell you how lovely everything is in the game of Amateur Radio. Much of it's lovely, but some of it's lousy, and that's got to go. If a few more would come on my side and openly ridicule the mad-hats, they would soon die off.

One of the first to go might well be the bloke who still puts out complete *programmes* of gramophone records on Sunday mornings. Either he hasn't read the latest licence or else the G.P.O. have forgotten him altogether, but he just broadcasts a complete programme. I'd sooner have an honest pirate any day.

Just a minor laugh, by the way—a European station (not G) heard announcing his frequency as 14082.5 kc., and drifting over more than two degrees on the dial of my superhet! He would do better to call it 14080 plus or minus 5 kc.

Oh, and another—a 'phone bloke (G this time) announcing that he was modulating exactly 100 per cent. by his neon tube. Incidentally, later cross-examination revealed the fact that he was using grid modulation. Lucky we can afford to laugh at these minor calamities.

Finally, a new definition of A Cad—supplied by a visiting ham: A man who soaks the stamps off listeners' stamped addressed envelopes to buy himself some new QSL cards!

## A Useful Hint

Have you noticed that the blank space at the right-hand side of the cover title block provides a useful place to jot down a brief note of the contents of any particular issue of this Journal? We are indebted to Mr. S. Lewer (G6LJ) for this Bright Idea.



# THE MONTH ON THE AIR—MARCH, 1937

By JOHN HUNTER (G2ZQ).\*

**T**HIS month's notes will be briefer than usual owing to the fact that I am holidaying in a cottage somewhere by the sea, and radio is not by any means uppermost in my mind!

The Iranian P.T.T. have sent registered letters to all amateurs who endeavoured to QSL EP1A as they also would like to know his QRA. G6HB answered in French as immaculate as that of the enquiry.

G5RR is heard calling "CQ 20 metre phone." The genuine owner of the call-sign may be interested to hear this.

A QSO with GM6IS proved that Scotsmen live up to their reputation even when they are hams. He is WAC and WBE on ten watts and his final stage uses two fourpenny valves in pp.

G2WV uses a keying relay, and during a DX QSO the thing got stuck, so WV had to crawl on his hands and knees and operate it with his fingers.

G8JK reports many cards from stations he has never worked, and VS1AA also states that his call was pirated during the time he was QRT between November 9, 1936, and February 7, 1937.

News of HZ1AA comes from SU2TW and ex QY6, who is now G5ZC again. The former says he is an American in a German-American oilfield near the Gulf. However, QY6 copied 3,000 groups of HZ1AA's traffic when he was in Jerusalem, and found out that the HZ was operating a transportable for an Arab potentate and that if anyone tried to locate him he would have upsticked and shifted to another part of the desert before they arrived. In ZC's opinion HZ1AA is "a shady gent playing a lone hand in the desert."

G5YH works UCB1 on Bielo Island 73.20 N. 70.06 E. near Nova Zemlya for a new country, but does not state the frequency used.

The A.R.R.L. contest produced much activity on all bands, G2PL working VE1EA on 5 bands in the first few days, while G2DQ was heard by BRS2373 working W1BB and W3EMM on 1.7 Mc. EI8B had over 100,000 points, G6NF some 80,000, and G2PL 74,960. Most Gs, even those new to the band, worked all W and VE districts on 28 Mc. G6VP is a welcome addition to the growing list of well-known contributors; he states that he is WAC at R9++, and only wants New Mexico and zone 23 for WAS and WAZ respectively. This elusive zone is active on 28 Mc. phone, AC4UU in Tibet being the representative; he has been heard QSO W's by G2QT and worked G5KH. W2JAJ, studying medicine at Edinburgh University, is surprised at the US phone QRM on 14 Mc. Does anyone know FY8C's QRA? BRS2178 would like to know. G6WY raised ZL4BR on 3.5 Mc. during the A.R.R.L. tests by accident.

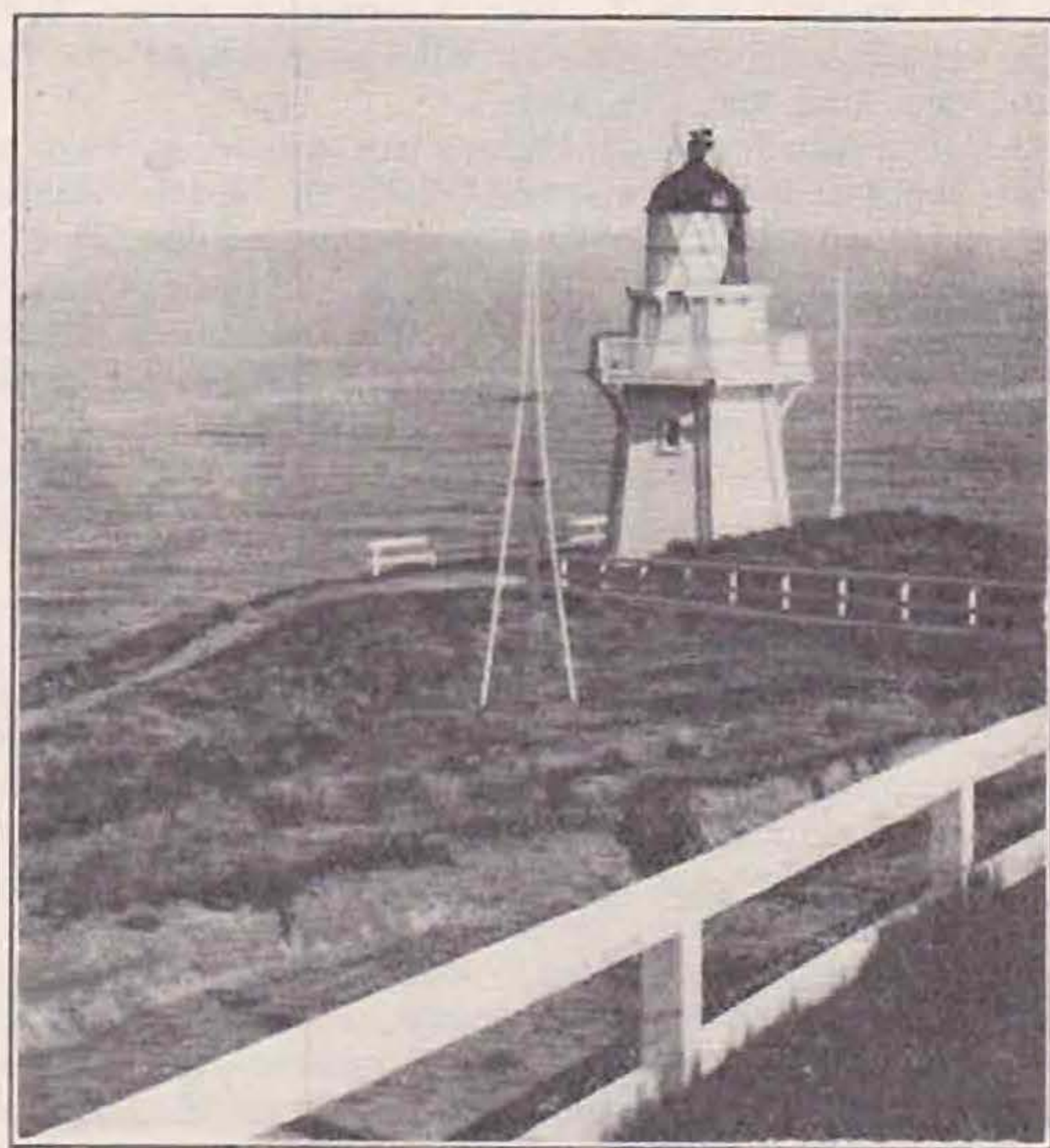
On 7 Mc. CN1CR is worked by G8IX on 7,230 and by G8HA on 7,110. His QRA is Signor Cristiani, Italian General Consultate, Tangier, and he QSL's.

More commercials than ever are reported on 14 Mc. by SU2TW and BERS311; these include RFF14380, EAN14170, FFS14370, IUP14360, HSK, RTMA and F9B. BERS311 hopes that Cairo will rigidly exclude commercials from amateur

bands—first we must take greater care to keep inside them ourselves. Also on this band G2PL keeps up his world reputation by raising EL2M, the only Liberian now that malaria-stricken EL2A has returned to the States. The QRA is Henry Grimes, P.O. Box 72, Monrovia. BRS1535 hears OQ5AE on 14,350 QSO U.S.A., but no details are known. NX2AP is in Greenland, maintains BRS2178. From 08.30 to 12.00 K6ILT pounds through to G2IM. G6ZO hears HZ1AA 14110, PYROOI 14025, TFGA (ss. Gullfoss) 14200 spark, VP8B 14300 chirpy T6, BZ2C 14150, XU3AR 14180, J9CA 14010 T5, FQ3AA (Dakar, Senegal) 14040 T5 chirpy, and works PX2B and PX1UL, of Andorra, both R.A.C. on L.F. end of the band. AR8MO on 14 Mc. is not in Syria, states G2PL. G5LP asks if XU3AX Cheefo is genuine as he was surprised to QSO on ten watts, thought the XU a U.S.S.R. portable. There is nothing against XU3AX in the records; he should be genuine. BRS2317 hears VS2AK's 14 Mc. phone S5 at midnight, while BRS1679 hears HH2B, VP9R, HI6O, YV5AA, VP5PZ, HI7I, KA1MD on phone.

On 28 Mc. phone all U.S. districts are heard in three hours by 2BSL, including W5WX, W6NLS, and W7AYQ. G6QZ is one of the first to work FQ3AA on this band, and he also hears ZA2E.

I shall be back home by next month's issue, so it should resume its normal form.



## An Interesting QRA

Our photograph shows the QRA of Mr. S. Schofield (ZL3CU), at Akaroa Head Lighthouse, Banks Peninsula, Canterbury, New Zealand. The station operates with an input of only 7 watts from dry batteries and its signals are frequently heard at good strength in England. Mr. Schofield has worked 38 countries in five continents and only requires Africa for W.A.C.

\*63, Hervey Road, Blackheath, S.E.3.



## The 56 Mc. Band

By L. G. BLUNDELL (G5LB). \*

THE tests between C.W. stations in this country and others in the W3 district of U.S.A., which started on February 28 and continued on each Sunday since, have so far produced negative results. However, as will be seen later in this column, more and more American C.W. stations are working to regular schedules and there is every hope (so often expressed!) that the near future will produce the long-awaited DX contact.

G2HG has been chasing up stations *via* 28 Mc. and has had several special 56 Mc. tests with various stations in the States—all producing negative results. As really regular transmissions are to everybody's good, 2HG has arranged with the stations below, schedules which are "cast iron" and can be relied upon. These are as follows:—

W6DOB, Saturdays from 1500 to 1700 and Sundays from 1600 to 1900 G.M.T.

W3GLV, 1300 to 1700 G.M.T. on the following days: April 17 and 18, May 8 and 9, June 5 and 6, and July 3 and 4. All these transmissions will be on 56.004 kc., with a power of 250 watts C.C.

W3FPL will, if possible, be active at the same times as 3GLV.

W2JZX will be pleased to QRX on 56 Mc. if request is first made *via* 28 Mc.

The writer has been additionally active on the last-mentioned frequency with a view to supporting 2HG in his efforts. Conditions on that band, however, have been very erratic and of little use for check work.

A test was arranged with W1ELR on March 18 at 1915 to 1945 G.M.T., but in common with G2HG the result was apparently nil, as nothing to the contrary has been heard.

As a reminder that things are never so bad as they seem is a report from G2PN in North Shields to the effect that the first harmonic of his 28 Mc. signals was heard by W3FZA in Philadelphia on February 28 at 0935 E.S.T., the harmonic signal being RST569. This news was received *via* radio and a written confirmation is awaited. It seems that the tests arranged on that date by G6FO were a little too late in the day!! However, we shall see ere long!

The situation as it stands now is in one sense—that of general activity and interest—satisfactory, and yet in another—concerted effort—is not so good, and it seems that the time is ripe for the institution of internationally known and recognised scheduled transmissions and proper advertisement of such by all the national organisations concerned.

There is known to be C.W. activity and interest in the following countries: Australia, New Zealand, South Africa, Morocco, France, Finland, Holland, Switzerland, Germany and, of course, the United States. All these could put at least one regular transmission on the air, maybe two or three in some cases, and perhaps a dozen as regards U.S.A. and the British Isles. So all that is necessary is to rally the interested parties, get out internationally composed schedules to cover, say, six months ahead, and stick to the job. You will remember that 28 Mc. did not provide any real incentive for DX work until contacts were made in the first place during previously arranged schedules.

With the daylight hours lengthening there is the sympathetically increasing degree of ionisation and consequent changing of skip distances, and we can expect the appearance of sundry commercial harmonics in the near future. In the meantime—just keep trying, and send along frequent reports as to your findings for inclusion in these columns from month to month.

## The 28 Mc. Band

By NELLY CORRY (G2YL).

MARCH started off with excellent conditions' but, as was the case last year, after the middle of the month the band became more erratic, and there were several very poor days when no W's were heard. Competitors in both sections of the A.R.R.L. Contest used the band more than on any other occasion, though conditions probably favoured the C.W. Contest most.

As usual, G6DH was the outstanding station for regular early morning work, and during the month he had contacts with the following Oceanic and Asiatic stations:—VK2GU, 3CP, 4AP, 7KV, ZL3DJ, J8CF, and J2CF (several times). A new station heard twice around mid-day by 2BFL, of Croydon, is AC4UU in Tibet. G5KH was his first G contact (March 24). Other Asiatic stations heard by 2BFL were VU2AU and VS6AH: the latter's 'phone and C.W. were audible up till 15.00 G.M.T. on March 27.

European signals came in regularly, the more distant ones being the loudest as a general rule. G6DH and 6CL worked TF5C. Africans were heard spasmodically and included FA8IH, SUIJT, SUIRO, ZE1JJ, ZE1JU, ZS1C, ZS2N, ZU5B, ZU6P, and FB8AB.

Activity in Central and South America increased during the DX Contests, and it is hoped that this will be maintained. Stations reported heard were CM7AB, FM8AD, HK1JB, K4CQO, K5AY, LU7AZ, LU9BV, PY2AC, VP2AT, VP5PZ, and TI2RC. VP5PZ has been putting out some good 'phone and made the first VP5/G 'phone contact with G6LK on March 18. PY2AC's first G, and first European, 'phone contact was also made with G6LK, whom he worked on March 28. Other stations presumably active, as W's were heard calling them, were HP1A, OA4J, XE1AM, XE1CM, and XE2N.

North Americans were heard exceptionally well during the month, up till 22.00 G.M.T. on several occasions. G6LK, who made 357 'phone QSO's in the A.R.R.L. Contest, used 28 Mc. a good part of the time, and worked all VE and W districts. March 21 was a particularly good day, when W 'phones were exceptionally loud, and BRS25 heard VE5GI, VE5LX, and VE5QP between 18.25 and 19.00 G.M.T. G6CL worked VE5QP that evening, his first VE5 on 28 Mc.

(During Easter, G5LB and 6CL called ZB1L many times but no contact was established. Was this station on 28 Mc.?)

Many regular 28 Mc. workers report the almost entire absence of C.W. on 28 Mc. at times when DX telephony stations are being heard and worked. Any theories?—G6CL.)

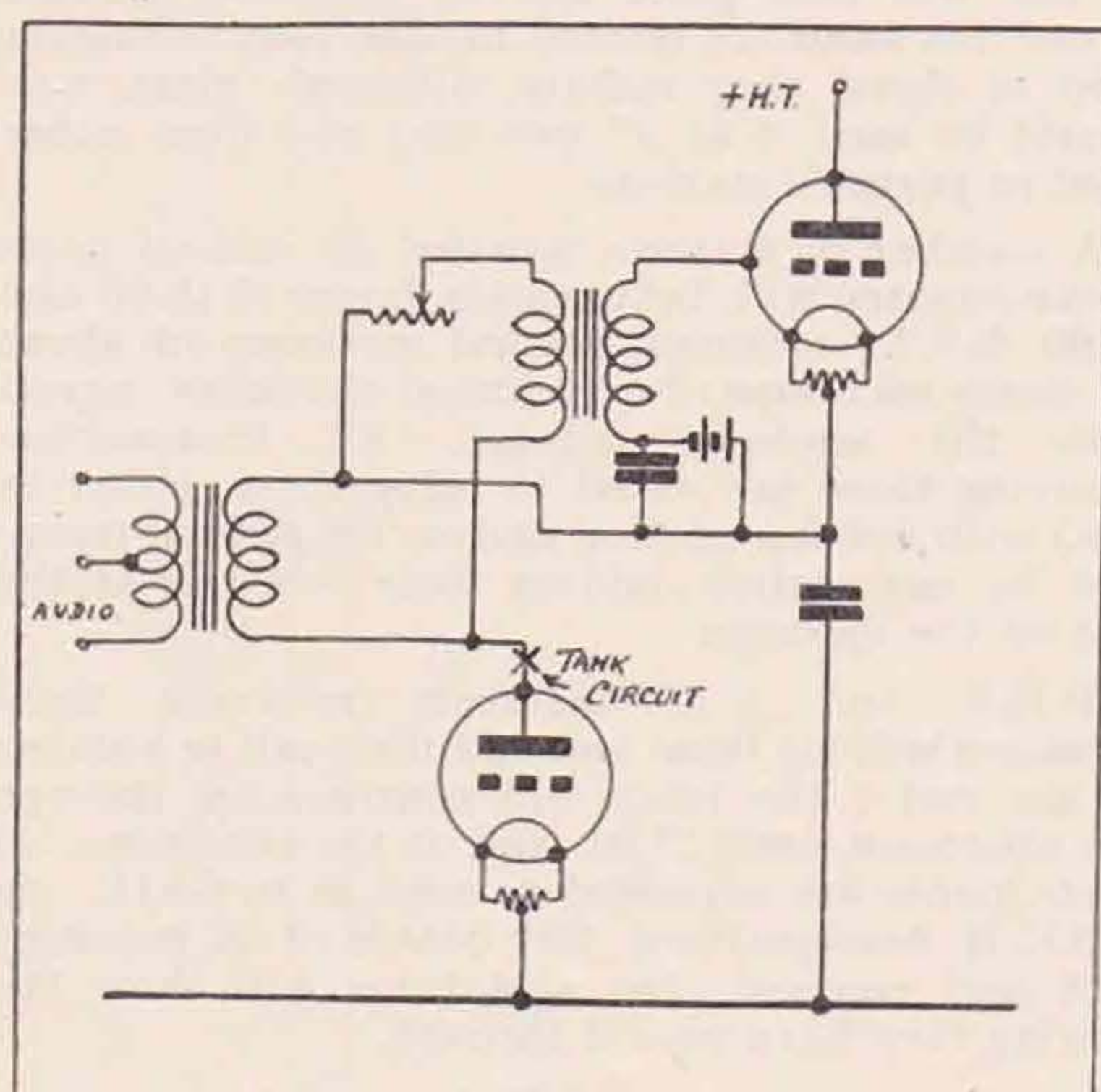
News of any unusual signals heard on the band will be welcomed, and should arrive not later than the 28th of the month.

\* 45, Monivea Road, Beckenham, Kent.



## A Simple Carrier Control System

**N**O extravagant claims are made for this circuit but it is simple and can be made up by anyone who has a spare P.A. and 1:1 transformer. It will even work well with a condenser input power pack swinging from 1,400 to 700 volts. Quality can be of a good communications type or with bias adjusted, so that there is about 10 per cent. spacer, quality becomes almost first-class. The receiving end, however, is an important factor, some detectors cannot follow the carrier average quickly and slow A.V.C. gets the "hump"!



The circuit is self-explanatory, but a few notes may help.

The by-pass condenser can be 2  $\mu$ F and of a high voltage type if the power pack has poor regulation.

A small step up in the control-valve driving transformer may help, but a 1:1 transformer will suffice.

The power-drive limiting resistance is the critical control; with this the amount of audio power taken to drive the control valve positive can be balanced against the minimum voltage drop across the control valve. If one has plenty of spare voltage for the P.A. the limiting resistance can be made large and the control valve run Class A taking no audio power. The bias battery should be placed on glass.

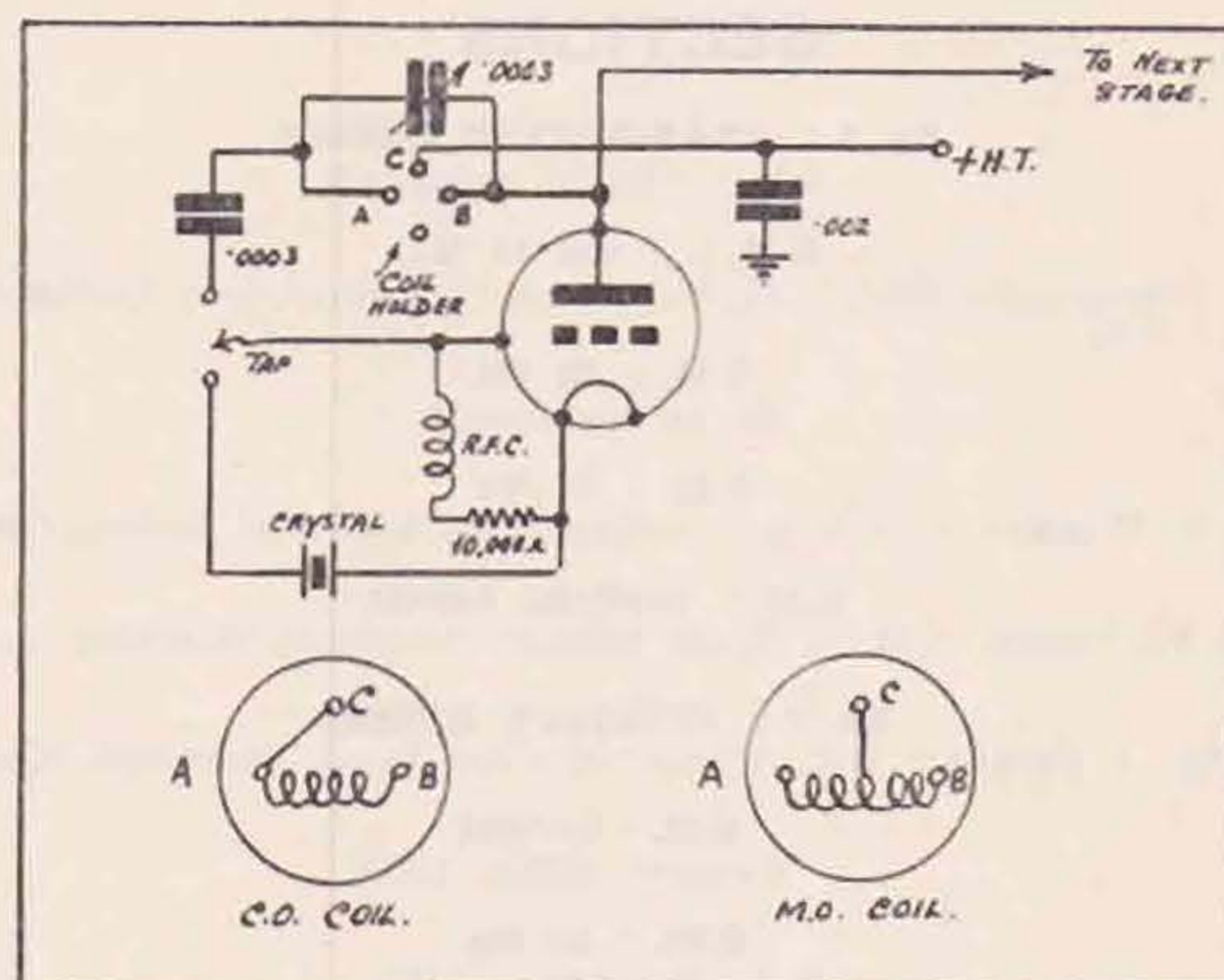
If the circuit should "motor-boat," reverse the connections to the 1:1 transformer.

G6GO.

## A Simple M.O./C.O. with High-speed Change-over

During some experiments with a new transmitter the following simple M.O./C.O. was evolved. It is very suitable for a low-power transmitter, and the C.O. of the low-power transmitter described by G6RI in the February BULLETIN could easily be modified to the circuit. The advantages of a quick means of frequency change to a low-power station are too obvious to warrant discussion. As will be

seen from the diagram all that is required to change from C.O. to M.O. is to move a tapping clip and change the coil. The coils are wound on four-pin formers as follows: the C.O. coil from A to B with A and C shorted together (the number of turns will depend on the frequency of the crystal); the M.O. coil from A to B with a centre tap to C (for 7 Mc. this coil should consist of 8 turns on each side of the centre tap, and for 14 Mc. four). The wire being 24 gauge.



When the C.O. coil is inserted and the tapping clip taken from the grid of the valve to the crystal holder we have a triode crystal oscillator. When the M.O. coil is inserted and the tapping clip taken to the .0003  $\mu$ F condenser we have an oscillator of the Ultraudion type.

With this circuit a change can be made from crystal control in the centre of the band to M.O. on the edge in less than thirty seconds. That time includes retuning the P.A.

The writer would like to hear from any station who uses this circuit.

2BDT.

### Stray

The London Instrument Co., 51a, Bridge Street, Cambridge, are makers of crocodile clips covering various jaw capacities. They also manufacture different types and sizes of rod ranging from 0 B.A. to  $\frac{3}{4}$  in.

### Knock, Knock!

Mr. R. M. McRobb (GM5LF) sends us our third "Knock Knock" item. Where can he obtain resistance wire (preferably Nichrome) with a resistance of not less than 6 ohms per yard and capable of carrying 1.5 to 2 amps?

Next, please!

### Radio and Rotary

Rotarian W. A. Scarr (G2WS) is anxious to get in touch with transmitting amateurs who are members of Rotary Clubs at home and abroad with a view to extending the hand of Rotary friendship through the channel of Amateur Radio.

Mr. Scarr, who is a member of the International Service Committee of the Ilkeston (Derbyshire) Rotary Club, hopes to make contacts personally, by letter and by QSO with "Rotary Hams," and would greatly appreciate letters from anyone interested. His address is Heanor Road, Ilkeston, Derbyshire, England.



# RESEARCH AND EXPERIMENTAL SECTIONS

## MANAGER :

H. C. PAGE (G6PA), "Warren House," Warren Road, Bexleyheath, Kent.

ASSISTANT MANAGER :

J. C. ELMER (G2GD), "Aethelmar," Seabrook Road, Hythe, Kent.

### SECTIONS :

#### No. 1 : TRANSMITTER DESIGN

S.M. : (To be appointed)

G.M. : 7 and 14 Mc.

S. BUCKINGHAM (G5QF), 41, Brunswick Park Road, New Southgate, N.11.

G.M. : 28 Mc.

(To be appointed)

G.M. : 56 Mc.

J. N. WALKER (G5JU), 4, Frenchay Road, Downend, Bristol, Glos.

G.M. : Artificial Aerials

A. W. LISTER (G5LG), Royal Military Academy, Woolwich, S.E.

#### No. 2 : RECEIVER DESIGN

S.M. : J. MAWBEY (BRS. 1300), 109, Clare Road, Tankerton, Kent.

G.M. : General

J. MAWBEY (BRS. 1300)

G.M. : 56 Mc.

J. N. WALKER (G5JU)

#### No. 3 : AERIAL DESIGN

S.M. : F. CHARMAN (G6CJ), Orchard Cottage, Stoke Poges, Bucks.

G.M. : General

F. WILSON (G2XX), 85, Risca Road, Newport, Mon.

G.M. : 28 Mc.

L. O. ROGERS (G2HX), "Audwen," Estcourt Road, Gloucester.

G.M. : Joint Group with Propagation

G. A. H. ECKLES (G5GC), 57, Sutton Road, Beverley High Road, Hull.

#### No. 4 : PROPAGATION

S.M. : J. C. ELMER (G2GD), "Aethelmar," Seabrook Road, Hythe, Kent.

G.M. : 56 Mc.

D. W. HEIGHTMAN (G6DH), 59, Burrs Road, Gt. Clacton, Essex.

G.M. : 28 Mc.

Miss N. CORRY (G2YL), "Redholm," Walton-on-the-Hill, Tadworth, Surrey.

G.M. : Conditions

J. HAIGH (G6HA), 2, Greenock Terrace, Leeds, 12.

G.M. : Joint Group with Aerial Design

G. A. H. ECKLES (G5GC).

#### No. 5 : VALVES AND INSTRUMENTS

S.M. : D. N. CORFIELD (G5CD), 10, Holders Hill Gardens, Hendon, N.W.4.

#### No. 6 : AUXILIARY APPARATUS

S.M. : A. O. MILNE (G2MI), "Twemigh" Kechill, Gardens, Hayes, Kent.

G.M. :

F. W. BENSON (2BWF), 53, Corona Drive, Thorne, Doncaster.

#### No. 7 : MICRO-WAVES (112 Mc. and above)

S.M. : DR. C. G. LEMON (G2GL), 19, Lena Gardens, Hammersmith, W.6.

#### No. 8 : CONTEMPORARY LITERATURE

S.M. : L. FRYER (GM2FR) 2, Murray Villas, Heugh Road, Portpatrick, Wigtownshire.

#### No. 9 : TELEVISION

S.M. : E. L. GARDINER (G6GR), The Nyth, Norwich Road, Northwood, Middlesex.

G.M. : Contemporary Literature

E. J. SCUDDER (BRS. 981), 32, Queen Street, Folkestone, Kent.

## NEWS OF THE MONTH

### 56 Mc Relay Test.

On Sunday, May 2, a special series of tests on 56 Mc. will take place and all members licenced to use this band are invited to take part, whatever kind of signal they radiate (although plain c.w. should be used if at all possible) and from either fixed or portable stations.

A number of stations situated in various parts of the country will, between the hours of 10.00 and 13.00 B.S.T., originate several messages of about 24 words each and of a technical character, signed with the sender's call-sign. All transmitters receiving these are asked to relay them, either in QSO with another station and/or for general reception by any station, adding their own call at the end of the message.

B.R.S. and A.A. members receiving these messages will log them and add their call or number to the end. The relay will continue on through the afternoon until 16.00, and at the conclusion all participants are requested to send in to G5JU, via R.S.G.B. headquarters, full details of all messages sent and received—the signatures will show the routing they have passed through.

The following stations will originate the messages, plain c.w. being used by the majority, although telephony and modulated C.W. may also be used :—G6FO, 2WO, 2JL, 6YP, 5MI, 6QZ, 2HG, 5LB, 5JU, 5SY, 2CI, 6DO, 5CX, 6GR, 2GK, 6RS, 5WW, 5RD.

It is thought that if a large number of stations are active on the 56 Mc. band simultaneously much better results will be obtained than if only a few are operating haphazardly. These tests will ensure that many transmitters are definitely using the band and B.R.S. and A.A. stations are particularly requested to put in as much time as possible, there being every chance of signals being received over fairly long distances.

Finally, will all those 56 Mc. enthusiasts who are mentioned in District Notes please make a note of the date, May 2, and do their utmost to make these tests a success ?

G5JU.

### R.E.S. Individual Members.

The following have recently joined as Individual members :—

No. 1 Section.—2AUQ, 2AQO, 2AKR, 2BBB.

No. 2 Section.—2AKR, 2BBB.

No. 3 Section.—2AUQ, 2BBB, BRS2784.

No. 4 Section.—G5NG, 2AKR, BRS2784.

No. 7 Section.—G5NG.

No. 9 Section.—BRS2784.

Unposted.—W2IXY, BRS2788.



# ELECTRICAL AND RADIO SCIENCE IN MEDICINE AND SURGERY

By E. DE COTTIGNIES (2AWD).

## THE REPRODUCTION AND RECORDING OF HEART SOUNDS.

IN writing these notes, it is intended to outline the latest work on this subject, and to survey certain allied processes; it is assumed that the reader is acquainted with the physiology of the human heart and with the fundamental principles of high-fidelity reproduction and recording.

A faithful reproduction and recording of heart sounds for purposes of clinical teaching has long been desired by certain clinicians. Hitherto, however, certain apparently insuperable technical difficulties have prevented the solution of this problem.

Recently there has been evolved a technique, published in *The Lancet*, which has eliminated the former obstacles. For those interested a short synopsis of this recent method might prove acceptable. We regret, however, the inability to supply, as yet, full details of the apparatus.

### *The Microphone.*

A special small microphone of the carbon-granule type has been designed; and this is urged against the chest-wall in such a way as to fulfil three conditions:

(a) To pick up heart sounds transmitted through the chest wall.

(b) Not to be affected by movements of the chest wall.

(c) Not to pick up any incidental noises. The patient is placed on a couch, with the microphone in position, and the microphone is connected, via accumulator and transformer, to the amplifier. A special speech microphone is mounted near the recorder and faders are fixed to both microphones; thus when reproduction or recording is carried out comments may be added by the operator.

### *The Amplifier.*

The amplifier is a specially constructed portable device and the circuit is such that high gain and exceptionally good quality are combined. The output is high and the range of faithful frequency reproduction wide. The amplifier incorporates an efficient, specially designed frequency filter; by means of this, low, middle or high frequencies may be attenuated or exaggerated at will. By means of switches the amplifier output can be connected to two sets of apparatus:—

(a) To an efficient, mains-energised, moving-coil loudspeaker.

(b) Record-cutting head and telephone monitor. The heart sounds can thus be immediately reproduced on the speaker. It is of interest to note, as an indication of efficiency, that when the loudspeaker is on the speech microphone can be used, two feet in front of the speaker, without any trace of feedback occurring. When a record is desired the output is switched over to the cutter head.

### *The Recorder.*

The recorder is a specially designed, efficient high fidelity, direct recording unit which cuts discs up

to 16 inches in diameter. Records are fixed and ready for replay in 30 seconds after completion of the cut. These master discs are unbreakable and may be used for the purpose of obtaining any number of copies required. The one important point about them is that they are entirely devoid of surface scratch.

### *Results.*

The workers appear confident that their work will provide a means by which medical students can be taught normal and abnormal heart sounds. Indeed, it is hoped that the method will find an application in actual diagnosis. In all, about 200 cases of normal and diseased hearts have been dealt with with very encouraging results. The technique has been applied to recording breath sounds, and though still in the experimental stage, the results are very encouraging.

While dealing with "hearts," it would be well to enlarge on certain of the subjects mentioned in the first of this series owing to their direct relation to reproduction of heart sounds. We refer to cardiography.

### *The Heart.*

During action the heart undergoes cyclic voltage changes which follow a certain definite law. A part of the muscle about to contract becomes negative relative to its surroundings, then as it contracts an iso-electric phase occurs; then during relaxation it becomes more positive than parts around it. In disease these cycles become unbalanced and the change is of much diagnostic importance. It is found that these cyclic changes are conducted to parts where they can be detected, i.e., the limbs. Non-polarisable electrodes are used and consist of lint pads soaked in saline, or equivalent solution, and surrounded by zinc plates.

### *The Electro-Cardiograph.*

The impulses are led away to the measuring apparatus. In its simplest form, as first used by the Dutch physiologist Einthoven, it consists of a sensitive galvanometer, which has a fine silvered-quartz fibre, suspended in the field of a powerful electro-magnet. The tension of the fibre can be altered. The currents from the patient-electrodes cause deflections, which are magnified by an optical system and thrown on to a moving film, by which a record in the form of a wave-form is made (see diagram). By means of special switching systems two sources of low E.M.F. are thrown into the fibre circuit: one is to neutralise any E.M.F. arising from the skin, while the other is used for calibration. It allows an E.M.F. of one milli-volt to be put across the fibre; a given deflection is produced and this deflection is taken as a standard against which the cardiac voltages are recorded.

### *The Valve-Cardiograph.*

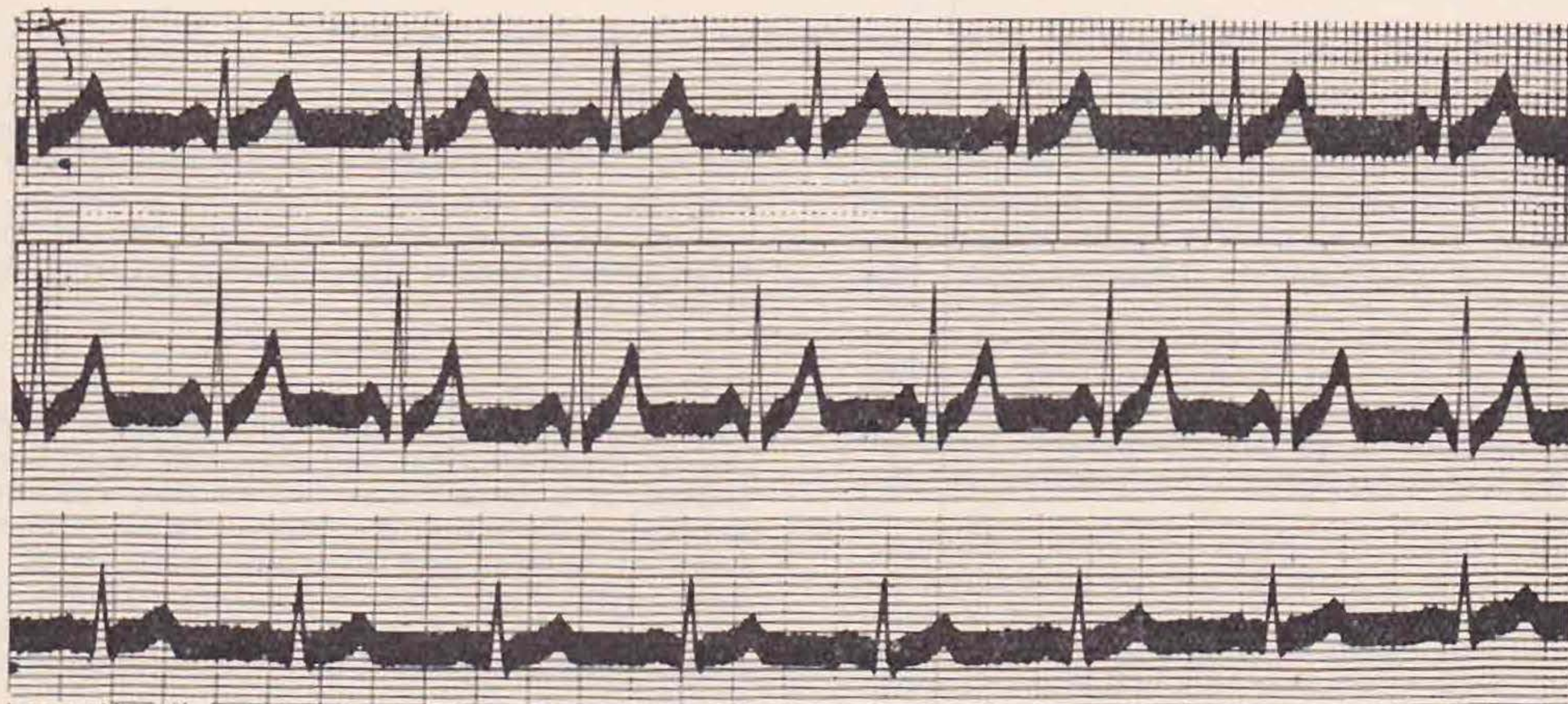
In more modern apparatus the cardiac voltage swings are amplified first, then fed into a galvano-



meter and recorded. The voltage cycles control the anode current of the first tube of the amplifier. This allows a smaller amplification to be used in the optical system, thereby reducing distortion and error due to inertia in that optical system.

beats. Finally, to complete the picture, two other processes are carried out; these will only be mentioned at present. They are:—

(a) The heart-sound amplifier output is fed to another cathode-ray tube and time-base circuit,



[By courtesy of King's College Hospital, Cardiological Department.]

### *The Cathode-ray Cardiograph.*

In the latest method a more powerful amplifier is used, and the output is fed, together with the output from a time base, into the deflecting plates of a cathode-ray tube. This enables the observer to see directly the wave form of the cardiac cycles. The amplified patient-voltage gives a vertical component and the time base gives the horizontal component. The screen is coated with a special fluorescent material which gives a long "after-glow," to make up for the pauses between the heart

by which the sounds are analysed, producing a wave-form which can be directly correlated with the heart sounds.

(b) An X-ray film of the heart in action is made and synchronised with the other "records" made, thus producing a complete picture.

The first step towards a "consultation by radio" is shortly to be made, inasmuch that an attempt will be made in the near future to broadcast the recorded heart sounds to America. It will be interesting to observe the results.

## FIRST EXPERIMENTS IN RADIO-TRANSMISSION OF HEART-SOUNDS

By E. DE COTTIGNIES (2AWD).

**A**N interesting experiment took place in London on Saturday, February 27, 1937, when G6QB broadcast a record of normal heart sounds (made at King's College Hospital) to G6BW. G6BW gave a very satisfactory report, and, in addition, recorded the transmission, with his own recording gear. He then re-transmitted the record back to G6QB, and these were amazingly faithful reproductions. This is of interest, as the heart sounds had by now passed through the following six amplifications:—

- (a) The original recording-amplifier at King's College Hospital.
- (b) The amplifier-modulator at G6QB.
- (c) The receiver at G6BW.
- (d) The recording amplifier at G6BW.
- (e) The amplifier-modulator at G6BW.
- (f) The receiver at G6QB.

In spite of mush and QRM, the final reception at G6QB was extremely good. Later in the day and in the presence of G6NF, BRS2612, and 2AWD, reception of the transmission from G6BW again took place.

Immediately following these tests a QSO took place, with G8JQ, to whom a record of the heart-sounds was transmitted.

The main difficulty in carrying out these experiments was that of obtaining sufficient modulation, but thanks to the indefatigability of Mr. L. H. Thomas, who built a special amplifier-modulator, this difficulty was overcome.

BRS reports on any of these transmissions are requested, and these, if useful, will be rewarded by a special QSL card. Please send your reports to G6QB or to 2AWD, or to the "Electrical Research Department," King's College Hospital, Denmark Hill, London, S.E.5.

[We now learn that the transmission of heart sounds to the U.S.A. has been successfully accomplished.—Ed.]



# A RECEIVER FOR THE ULTRA HIGH FREQUENCIES

By S. RAYNER (G5ZR).

## Introduction.

The tendency to-day when building a transmitter for the ultra high frequencies is to incorporate circuits resulting in a frequency stabilised output. The benefit of this is not appreciated when receivers of the super regenerative type are employed, and the need is being felt for a receiver suitable for modern conditions. At the same time, it is thought that, whilst a super-heterodyne is the ideal, something less expensive and less complicated is desirable, and the one to be described is an attempt to meet this demand. Absolute originality is not claimed for it; nevertheless, several unique features are incorporated, details of which have not, within the author's knowledge, previously been made public.

It is designed essentially for the reception of weak C.W. signals, but super-regeneration is included in order that the receiver may be used for co-operation with portable equipment.

## Description.

Our knowledge of frequencies of the order of 56 megacycles being comparatively small, it was decided to collect all the ideas which had previously proven their worth on the medium frequencies, together with those evolved by the 56 Mc. R.E.S. Groups.

Taking the detector first, various arrangements were tried, and the electron-coupled oscillator proved the most satisfactory, oscillation being very smooth, and no difficulty being experienced in maintaining it up to 224 Mc. The first valve is normally used as a regenerative detector, and is not actually allowed to oscillate, the beat frequency with an incoming signal being produced by an auxiliary oscillator. When, however, the receiver is used as a super-regenerative type, this valve is allowed to operate in the manner usual in such receivers, that is, oscillate very strongly when no quenching voltage is applied. Actually, it is possible

to receive C.W. with both quench and oscillator valves in operation, but careful tuning is necessary in order to obtain the marker wave, and not what we might call the "spacer" wave, this latter being due to the quench noise.

Turning to the separate oscillator, the advantages of this are fairly well known, and the principle has been in use on lower frequencies for many years. With a self-oscillating detector the input circuit has to be de-tuned in order to produce an audible beat-note, and, therefore, sensitivity is lost. When a separate oscillator is used the input circuit is adjusted exactly to the frequency of the incoming signal, whilst the oscillator is adjusted to a frequency such that a beat of 1,000 c.p.s. is produced. Again, the separate oscillator does not need critical adjustment to the threshold point but can be allowed to oscillate fairly strongly. It has a constant anode load, and works with excellent frequency stability.

It will be noticed that coils of the same size are specified for both the detector and oscillator, but a larger condenser is used in the oscillator to enable this circuit to tune to half the detector frequency. At the same time the frequency stability of the oscillator is improved by the use of a comparatively low L.C. ratio.

The trouble with this system in the past has been that the input and oscillator circuits have tended to lock to the frequency of the oscillator, this effect increasing with the frequency. It was therefore, necessary to use much screening, and results generally were not satisfactory.

The solution of this has been the use of an oscillator working on a lower frequency, the second harmonic being used to produce the desired beat, by electronic injection into the detector valve. It is then found that the tendency to lock is negligible. In actual practice, maximum isolation is achieved by the use of an R.F. pentode as detector,

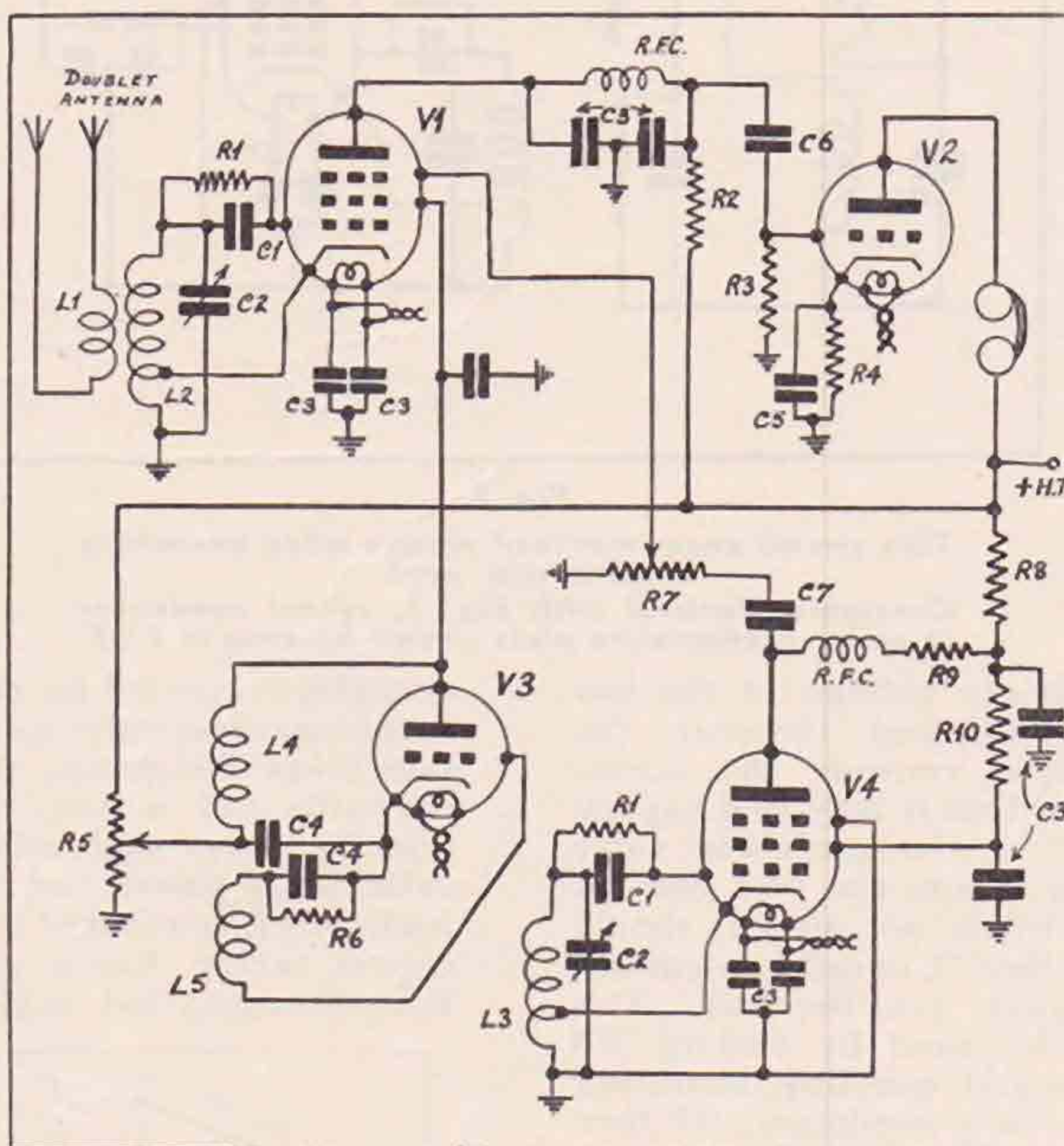


Fig. 1.  
Circuit suited to reception of weak C.W.

- C1—100  $\mu\mu\text{F}$ .
- C2—25  $\mu\mu\text{F}$ . (see text).
- C3—.003  $\mu\text{F}$  (mica).
- C4—.1  $\mu\text{F}$ .
- C5—2  $\mu\text{F}$ .
- C6—.01  $\mu\text{F}$  (mica).
- C7—Mica trimmer (Eddystone No. 1023).
- R1—5 megohms.
- R2, 5, 10—150,000 ohms.
- R3—250,000 ohms.
- R4, 6—Bias resistors.
- R7, 8, 9—50,000 ohms.
- V1—Type 58 (F.C. detector).
- V2—56 (audio).
- V3—56 (quench).
- V4—58 (auxiliary oscillator).



and the oscillator voltage is injected into the suppressor grid. British valves with the suppressor grid brought out separately being almost non-existent, resort was made to the American Type 58, which gives excellent results.

In Fig. 1 is given the circuit diagram when the reception of weak C.W. is the main objective. A low pass filter is included in the anode circuit, resistance capacity coupling being employed to the output stage, as this reduces background noise and improves stability. The heaters of the detector and oscillator valves are bypassed to earth in order to prevent modulation hum, but this precaution is unnecessary with the other two valves. The oscillator and detector circuits are practically identical. The strength of the oscillator harmonic injected is controlled by potentiometer R7, which should preferably be of the composition type.

This circuit is not altogether satisfactory when the receiver is used as a super-regenerative. For one thing, the incoming signal has to be extremely strong to break down the quench noise. For another, potentiometer R5 controls both the anode voltage of the low frequency (quench) oscillator, and, therefore, the output of this; it also controls the screen voltage of the detector, so that it may well happen that the correct setting for the quenching valve output voltage is by no means the best one for detector efficiency. A switch, not shown, should be fitted at the point marked X in order to cut out the quenching valve when not required. This trouble could probably be cured by feeding V3 through a fixed resistance and coupling the output to the screen grid of V1 via a condenser, R5 then being used for the control of V1, but with a broadcast type choke in series between the screen grid and the moving arm of the potentiometer.

However, it was discovered that the circuit given in Fig. 2, whilst not quite so sensitive, gave better results when the quenching valve was used. Here, it will be seen, the suppressor grid is directly earthed (note, not connected to the cathode), whilst the oscillator output is fed to the anode of V1 via a screened lead. The tendency to lock becomes evident again, and greater care in adjustment is needed when used as a straight receiver.

#### Construction.

It cannot be too strongly stressed that careful

construction is the main factor in the efficiency of any ultra high frequency receiver. The physical design, which is shown in the accompanying drawings, holds good for most types of U.H.F. receivers. During the original tests, the receiver described by G5JU in the March, 1936, issue of the BULLETIN

was constructed in this fashion and gave excellent results. In this particular case, the input grid circuit R.F. choke was replaced by a tuned circuit, with improved performance but more critical tuning.

Whilst the drawings explain themselves, a few hints will perhaps not be out of place. All the metal work, such as screening boxes, chassis, etc., is constructed of No. 18 s.w.g. aluminium, each piece being made a good fit and firmly bolted down. Small shields are fitted underneath the chassis to screen condensers, chokes, and R.F. wiring associated with the oscillator and detector circuits. The wiring itself is carried out with No. 12 s.w.g. copper wire.

The tuning coils have tags soldered to their ends, enabling them to be directly mounted on the Eddy-stone condensers. Band

changing is effected by changing the coil.

Hammarlund valve sockets are mounted with the tags below the chassis, the cathode tags being bent outwards and a  $\frac{1}{2}$ -in. hole drilled in the chassis directly above each one. Through this hole the cathode tap passes, and is soldered to the tag. This lead, which consists of a suitable length of  $\frac{3}{16}$  in. copper tubing, has a short length of No. 6 B.A. brass-threaded rod soldered into the top. The

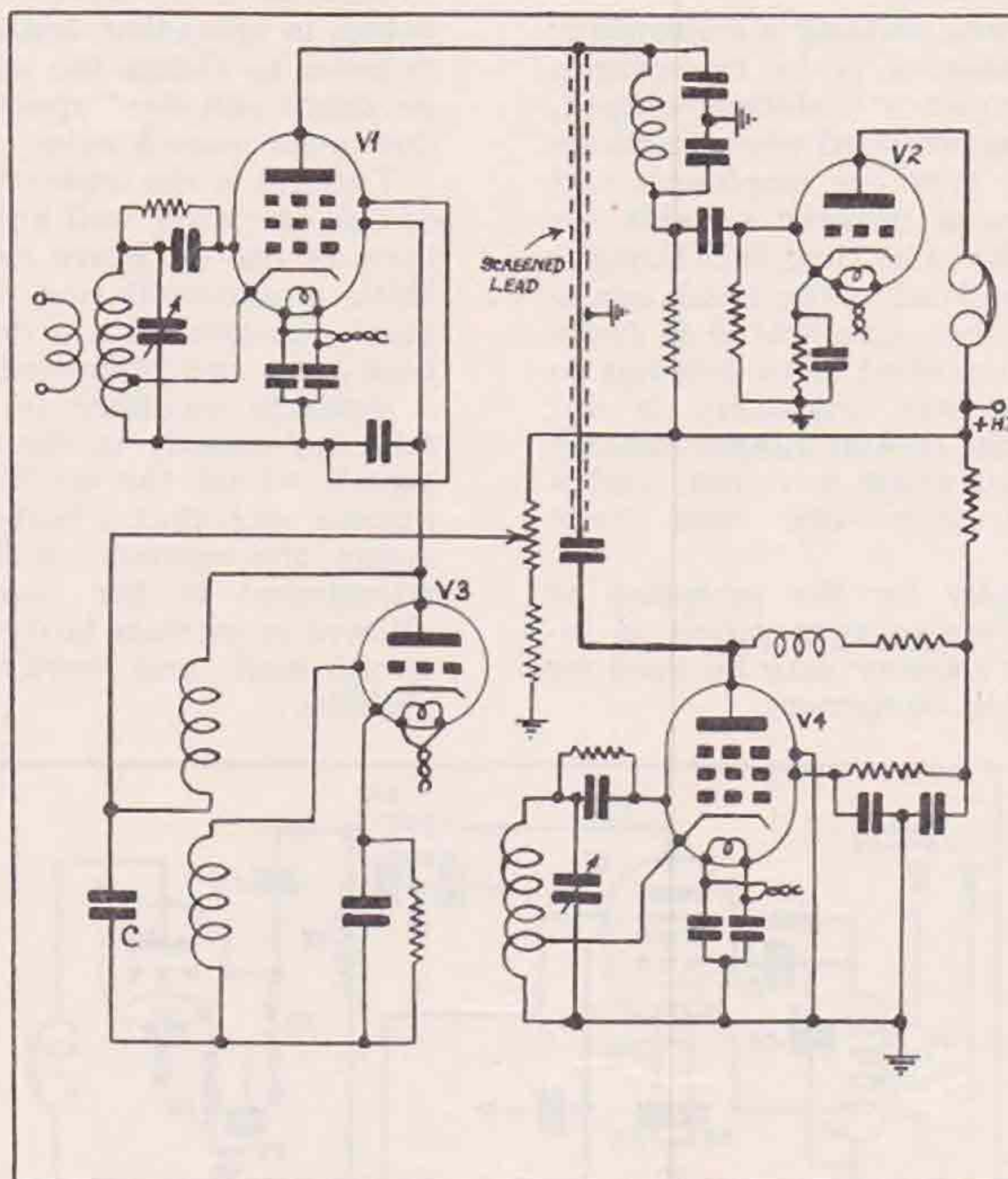


Fig. 2.

*This circuit gave improved results when quenching valve was used.*

*Constants identical with Fig. 1, except condenser in super-regenerative plate circuit by-pass is 2  $\mu$ F.*

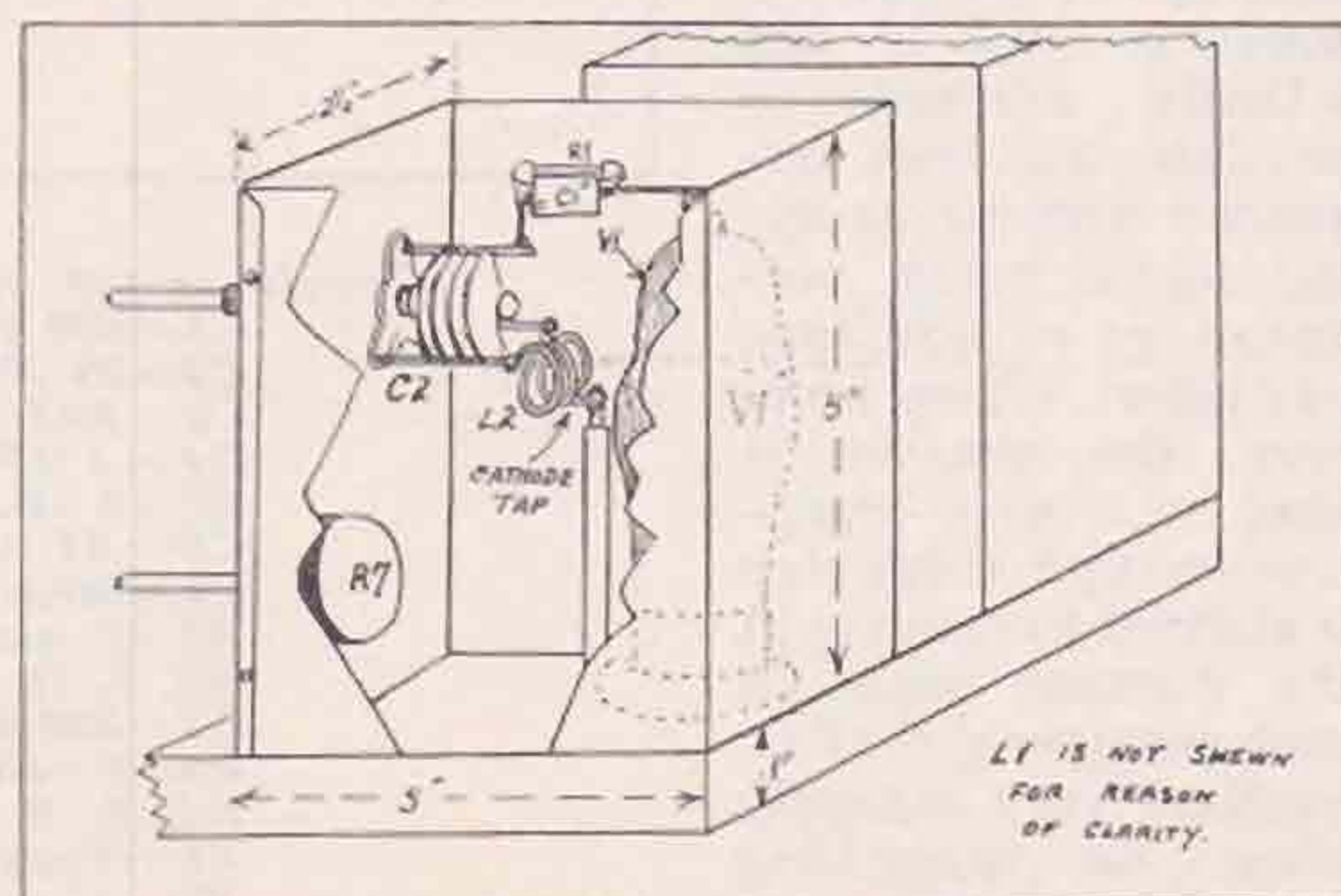


Fig. 3.  
Side elevation of receiver.



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cathode tapping point on the tuning coil is brought out to a soldering tag which fits on top of the rod.

On the side of the detector screen are mounted two midget stand-off insulators, the bolts of which have been replaced by lengths of No. 6 B.A. screwed rod, which pass through holes in the screen. The ends of the aerial coupling coil are soldered to these rods.

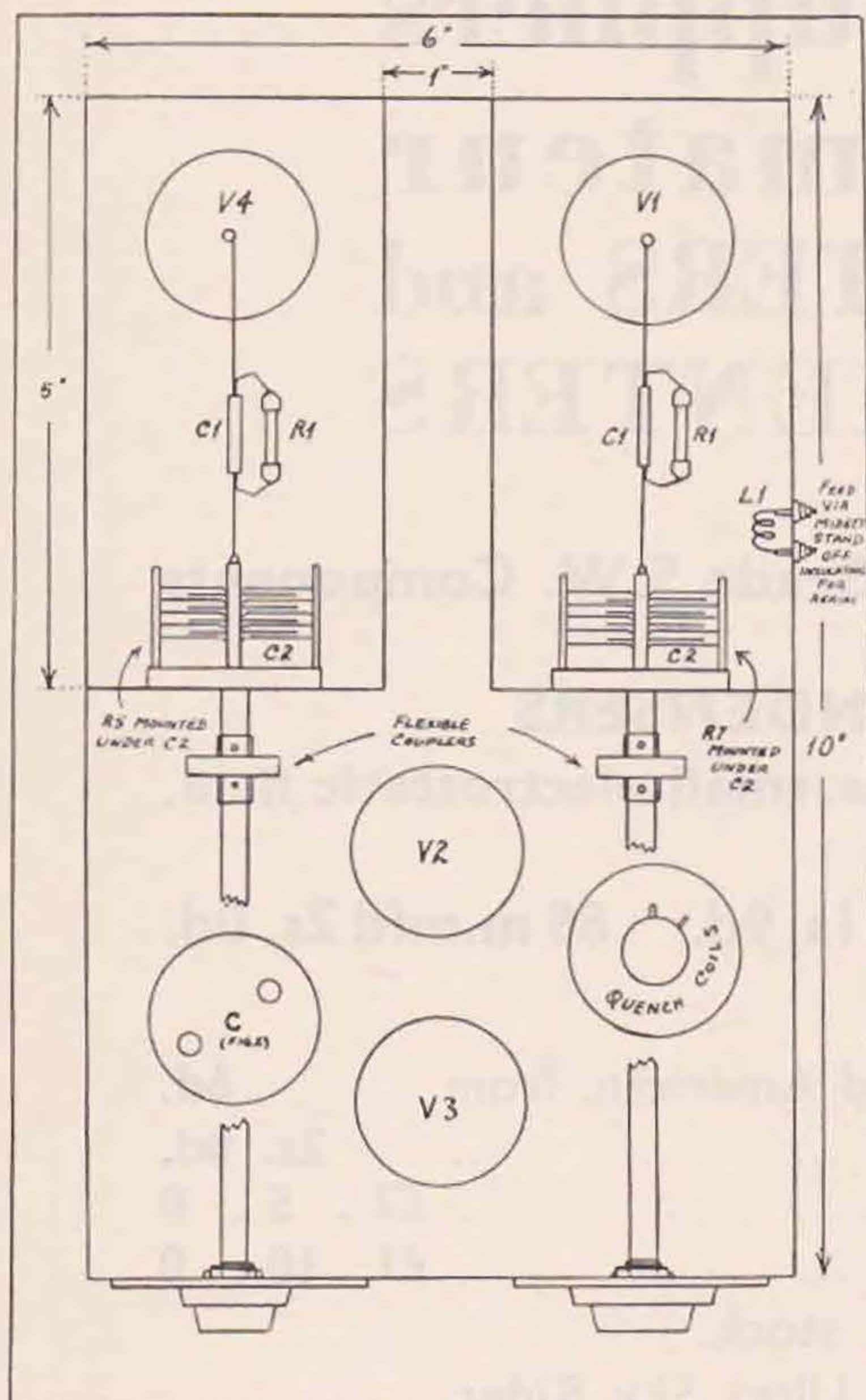


Fig. 4.  
Lay-out of components.

#### Operation.

When searching for signals the detector is allowed, by adjustment of R5, to oscillate weakly and tuning is carried out in the normal manner. On tuning in a signal the oscillator circuit is brought

#### COIL DATA.

Coil.	Turns.	s.w.g.	Dia.	Tap.	Band.
L	3	12	$\frac{1}{2}$ -in.	3	All
L2-3	9	16	$\frac{1}{2}$ -in.	$3\frac{1}{4}$ *	56 Mc.
L2-3	5	12	$\frac{1}{2}$ -in.	$2\frac{3}{4}$ *	112 "
L2-3	4	12	$\frac{5}{16}$ -in.	$1\frac{3}{4}$ *	224 "
L4-5			Quench Coil.		

All R.F. coils are self-supporting, and spacing must be found by trial.

\* From grid end.

into resonance, indicated by the beat note. The detector valve is then adjusted to just below the point of oscillation, where it is working with maximum sensitivity, and the oscillator tuned so that the signal is again audible.

It must be pointed out that as adjustments are rather critical and the background noise so low as to be almost non-existent the performance may apparently appear below expectations. When once the extra skill required is acquired the results are such as to warrant the extra trouble involved.

In conclusion, the author would welcome reports from those who construct this receiver, whilst suggestions for improvement will be appreciated.

## Contemporary Literature

REGENERATIVE - SUPER - REGENERATIVE DX "CLIPPER." A. J. HAYNES. (RADIO NEWS. FEBRUARY, 1937.)

Full constructional article describing 4-valve receiver. Valves used: 6K7, 6J5G, 6J5G, 6L6 and 80 rectifier. Range 5-550 metres. Bandspread 10-550 metres, with range switching, plug-in coils below 10 metres. Low noise level. Power output about 4 watts. H.T. drain less than 60 mA.

\* \* \*

CATHODE RAY OSCILLOGRAPH. (RADIO NEWS. FEBRUARY, 1937.)

Description of instrument costing between 12 and 15 dollars to construct. Uses R.C.A. 913 cathode ray tube. Applications showing modulation percentage, audio and amplitude distortion, regeneration in radio and audio stages, character and amplitude of stray fields. With a sweep circuit R.F. resonance curves, audio frequency response curves and harmonic distortion may be studied.

\* \* \*

"TRF-3" RECEIVER. HARRY D. HOOTON W8KPX. (SHORT WAVE AND TELEVISION.) (FEBRUARY, 1937.)

The author describes a three-valve receiver with plug-in coils. Covering a range of 13 to 250 metres using new types of valves. The H.F. is a 1A4, the detector a 1B4, and the resistance capacity coupled L.F. a 1F4. The two former are tetrodes and the output valve a new power amplifier pentode with an H.T. drain of 8 milliamps. Full constructional details, including coil winding specifications, are given. The set is designed primarily for use with headphones.

\* \* \*

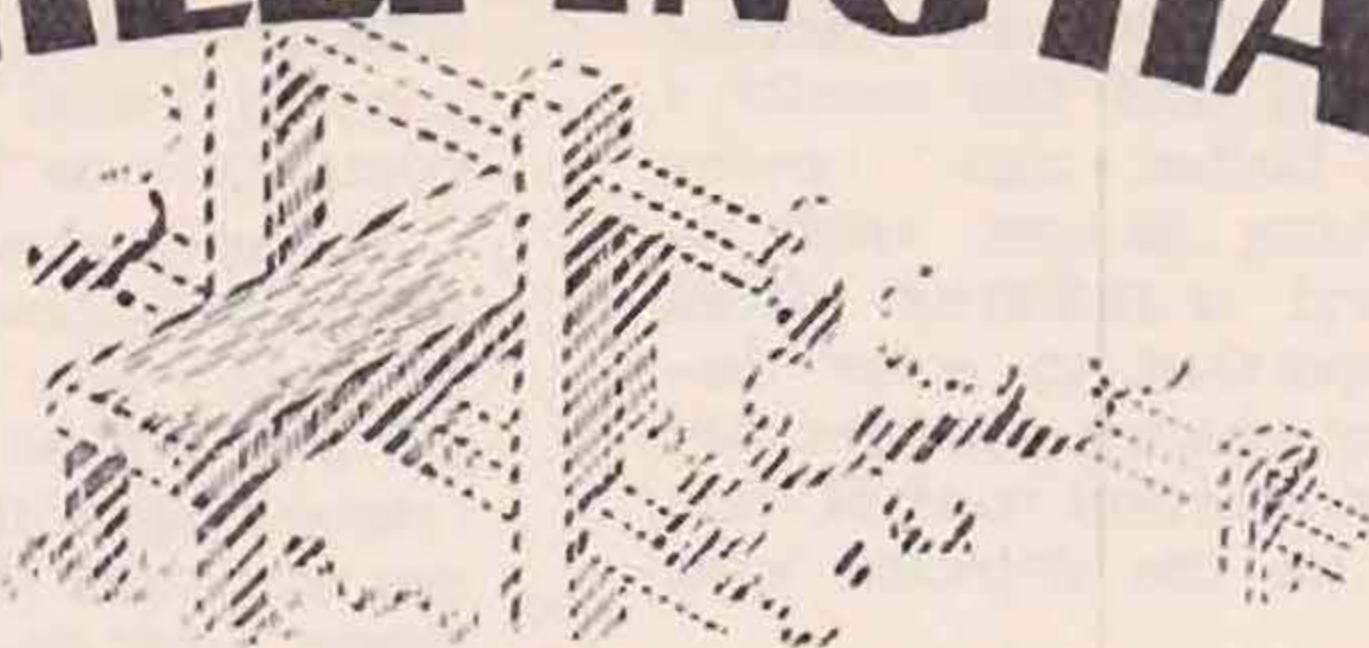
50-WATT RACK-MOUNTED 'PHONE USING BEAM TYPE VALVES. R. E. Herbert (W8NMY) AND STEVE TUNDER (W8QCF). (QST. JANUARY, 1937.)

This is a description of a radio telephony transmitter using a 6F6 crystal oscillator link-coupled to a 6L6G buffer-doubler which is again link-coupled to a pair of parallel 807's as the final amplifier. The speech amplifier and modulator unit uses two 6J7's, a 6F6, and two push-pull 6L6's. A full description and circuit diagrams are given.





# THE HELPING HAND



BY AUSTIN FORSYTH (G6FO)

## PART II—RECEIVING AND FREQUENCY MEASURING EQUIPMENT

### *The Receiver—General.*

**T**HOUGH we have no wish to waste space stating the obvious, it is a fact that over-all station efficiency depends as much on the receiver as on the transmitter, or any other part of the equipment in the chain. We are prompted to make this assertion here because it is surprising the number of amateur stations at which one finds inefficiency on the receiving side. It seems that what happens in many cases is that instead of working out a plan in connection with the design of the station as a whole, which at the start would involve the installation of the owner's idea of the best type of receiver for his purpose, as soon as the transmitting licence comes through all interest in the receiver—except in so far as it can make QSOs possible—is abandoned. This is quite natural, as the transmitting angle has a much greater appeal in the initial stages, and so our amateur sooner or later comes to the point where he begins to find his receiver is the weak link; the whole trouble in this, as in every side of radio, being that almost anything will give results of a sort.

Now, we do not propose to try and lay down hard-and-fast rules as to what is the "best receiver," because the best receiver depends on the individual case where constructional ability and finance will be important considerations. Rather, we shall attempt to outline a number of points in connection with the receiving side from which readers should be able to extract sufficient data to guide them in arriving at something which will cover their own requirements. Further, as this section is concerned solely with the practical side, and because we shall always try and remember the matter of expense, we do not propose to enter into any discussion on the merits and demerits of the various commercial amateur-receivers now available, except to say that the so-called "communication-type" are not always entirely suitable for amateur work, particularly for the beginner, who should start with a set the advantages and limitations of which he thoroughly understands.

It is a surprising thing that there are amateurs who are actually using commercial "all-wave" receivers, of the broadcast variety, for amateur band reception. These sets, while they may fulfil the claims of the manufacturers as regards general S/W listening, are utterly useless for amateur work. Due to the fact that the design necessarily involves the covering of big slices of frequency with large tuning condensers, the amateur bands are inevitably squeezed into two or three degrees of the

dial. This is particularly the case on 14 Mc. Unfortunately, many of these sets, while being advertised as the last word in short-wave design, also offer as an additional inducement the fact that the amateur bands are covered; they are, but far too quickly for any practical use to be made of them. Nor is it possible to fit band-spread on such receivers, not only because of the electrical complications involved but also the modern form of construction. And you will never *know* the amateur bands till you get close to them with a pair of headphones and a receiver fitted with band-spread.

### *Amateur Receiver Design.*

Having thus cleared the air on these points, let us consider what we need in an amateur-band receiver—requirements, incidentally, which are easier to catalogue than to meet. They are band-spread, stability, sensitivity, selectivity, a tuning range covering the amateur bands from 1.5–30 Mc., provision for loud-speaker output, and a quiet background, i.e., high signal-noise ratio. While some of the latest multi-valve designs, fitted with crystal-gate, noise suppression, A.V.C., pre-selection and so on, give remarkable results and will fulfil most of our desiderata, what it often boils down to is that these super-receivers merely produce at loud-speaker strength signals which are just as readable on headphones with a "straight three." Actually, the beginner cannot go wrong in starting with a simpler type of receiver, designed specifically for amateur band reception.

A good example of such a set, which can form the basis of our design, is given on page 80 of the current (1936) *Guide*. We assume our readers are possessed of a copy, as it will be more or less necessary for us to refer from time to time not only to the *Guide* but to other standard publications. The circuit mentioned shows a tuned RF stage, followed by a triode detector and pentode output. To this, we suggest certain modifications.

### *The RF Stage.*

First, as to the RF stage—VI which, in these days, is a *sine qua non* in any short-wave receiver which is expected to be stable in operation and consistent in performance. Our own suggestion is to tune it on 1.7 and 3.5 Mc., on both of which bands there is a definite improvement in sensitivity, but to use it untuned (aperiodic) on 7, 14 and 28 Mc. We do not deny that there is, in a good design, a lot to be said for tuning the RF stage on all bands, but the gain in signal strength falls off



rapidly as the frequency increases, and our candid opinion is that below 3.5 Mc. it is better to forget any possible amplifying properties of the RF stage, regarding it rather as a stabilising influence acting as a buffer between the aerial and the sensitive detector grid circuit. This "buffer value" covers all sorts of possibly disturbing factors, such as aerial swing, dead spots, and re-radiation from the oscillating detector (important in some districts), so that the culminating effect is considerably improved stability and better reaction control, due to the more constant load on the detector grid circuit.

However, for those who like to try it, there is no reason why a tuned RF stage should not be used on all bands, though complications arise due to the multiplicity of controls, since, in practice, the resonance peak of the RF stage is not nearly so sharp as that of the detector grid circuit. Consequently, it becomes a question of which condensers to gang, or whether to gang at all. If the input tuning condenser of the RF stage is ganged with the band-setter in the detector, the RF tuning has to "stay put" when the detector band-spreader is used. But the RF tuning is not as flat as all that, so that the next point is whether to gang the band-spreader with the RF input condenser. This is a feasible solution, but only for the amateur bands (or any given frequency range), i.e., where each set of coils is only required to cover the tuning range obtained on the detector band-spreader, as it is evident that without a band-setter in the RF stage as well the latter would be out of tune when listening outside the amateur frequencies. But where the amateur bands only are required the coil/condenser values can be determined experimentally so that the input tuning capacity and detector band-spread condensers are in step on all five bands. Not so easy when one remembers the difficulty that the coverage of the band-spread condenser falls off as the frequency is lowered. This latter point is dealt with more fully later on. Another scheme is to have two sets of ganged condensers, band-spread and band-set, but this means an array of knobs on the panel. A third alternative is that of using tapped coils, such that full spreading is obtained on all bands by tapping the tuning condenser down the coils. This is quite practicable and is also explained later, but if listening outside the amateur frequencies is desired we still need band-setting in the RF stage! A fourth idea is to switch fixed condensers in series with the RF tuning condenser to reduce its capacity to that required to track with the detector band-spreader on each band, but this involves more complication, and the losses across switches, etc., would probably nullify any gain that might be obtained.

Actually, therefore, if you must tune the RF stage all the way down, it is better to have a condenser which will give complete coverage on 1.7 Mc. and then use RF stage coils of the correct values to peak nicely with this condenser on the other bands, noting that the tuning range on it—reckoned in terms of dial divisions—will get smaller and smaller as the frequency increases. This is not of vital importance because, as we have already said, the peak is anyway much flatter on the RF tuning at high frequencies than in the detector stage. The reason for this is that the aerial imposes a far greater load on the RF stage than the

latter does on the detector, though the RF tuning can be sharpened up considerably by using either a variable aerial series condenser (another control which requires re-setting for each band!) or a loose-coupled aerial coil designed for each band (more complications!).

So we arrive at the conclusion that for the RF stage it is going to be wiser to keep it untuned below 3.5 Mc., and tune it as a separate circuit on 1.7 and 3.5 Mc. This introduces a small point in connection with the RF stage wiring. As we do not want the RF tuning condenser across the input choke (grid-filament impedance) at the high or untuned frequencies, a DPDT switch can be arranged to cut out the coil/condenser circuit and bring in the choke. If a centre-tapped coil of the right size is used, both 1.7 and 3.5 Mc. can be tuned without coil changing, switching being arranged to adjust the circuit as required. This will set readers a little problem which will test their ingenuity. No looking up allowed!

#### *The Detector Stage.*

Instead of transformer coupling to the grid circuit of V2, the detector, use the coupling method shown in Fig. 1 herewith, where C1 is a midget variable condenser of 50 or 75  $\mu\mu\text{F}$ . This allows variable input to the detector stage, and also acts as a selectivity control, both these features being of great importance when working through QRM. For instance, local-station interference—meaning a near-by amateur transmitter—can be minimised by reducing on C1, which, though it will decrease sensitivity, will increase selectivity, and, therefore, enable one to work much closer to the interfering signal. In practice, luckily, it is usually found that the increase in selectivity is greater than the decrease in general signal strength, which is just the way we want it. The band-spread arrangement is shown by C2, the band-setter, and C3, the band-spreader. In case this business of band-spreading is a mystery to some readers, the idea simply is that one has a very small capacity C3 in parallel with the normal tuning condenser C2.

Assuming for the moment some figures, we can imagine a 200  $\mu\mu\text{F}$  condenser C2 and a 25  $\mu\mu\text{F}$  condenser C3. What happens? The ratio between the two is 8:1 (200/25). That means that if C3 covers 300 kc. in its movement from maximum to minimum capacity, C2 will cover approximately eight times that range, or 2,400 kc. This in turn means that tuning on C2, the large condenser, will be much "quicker" or sharper than on C3, and hence it will be difficult to find and hold weak signals. Looking at it another way, assuming an 0-100 degree dial on both condensers, each degree on C2 covers 24 kc., whereas on C3 each degree will only cover 3 kc. Thinking now of the 7 Mc. amateur band, which is 290 kc. wide, C2 would run through it in about 12 degrees, but on C3 97 degrees, or practically the whole scale, would be required. Thus, the 7 Mc. band would be spread on C3, and tuning is therefore very much easier.

From this it is plain that if we want to cover the amateur bands only with given coils it is simply a matter of design to dispense altogether with the band-setter C3. As, however, it is an advantage to be able to listen outside the amateur bands for one thing, and for another, because it would require a lot of trimming and tapping of the different coils for



the various bands to get them exactly right for our small tuning condenser, it is advisable to use the two-condenser arrangement shown, where C2 is used to find the band—hence *band-setter*—the actual tuning being done on C3. In the same way, it is possible to tune over frequencies outside the amateur bands by getting somewhere near where it is desired to listen on C2, using C3 for closer searching.

This discussion brings out the reason why the commercial "all-wave" b-c receiver is unsuitable for amateur work, since it has only the one tuning capacity, corresponding to C2. As the medium and long-wave broadcast bands have to be covered as well as the short waves, this capacity is usually about 500  $\mu\mu\text{F}$ . Hence, from our example, 300 kc. on the 7 Mc. band would be tuned in less than 5 degrees of the dial!

In connection with band-spreading, another point crops up which is worth detailed attention. Due to the fact that much smaller capacities are required to cover a given frequency range on, say, 14 Mc. than on 1.7 Mc., it follows from this that what may be adequate band-spread on 14 Mc. will be much too "slow" on 1.7 Mc. The ratio might be 5:1. That is, if we are getting full coverage on 14 Mc. through the whole range of C3, on 1.7 Mc. only about one-fifth of the band will be covered by C3. This can be overcome in two ways: (1) On 1.7 and 3.5 Mc., use C2 for tuning with C3 as a vernier, for which purpose C2 should be fitted with slow-motion. A modification of this is to mark the settings of C2 which give coverage with C3. There will probably be two points on 3.5 Mc. and three or four on 1.7 Mc. (2) A better but more complicated method involves tapping the grid coils for each band. C3 is made sufficiently large, about 75  $\mu\mu\text{F}$ ., to cover 1.7 Mc. in one maximum to minimum movement of its dial. On the next and all other bands the same condenser is used, but instead of being placed right across the grid coils in each case, it is tapped down sufficiently far to produce the electrical effect of reducing its capacity, thus giving full band-spread. This is shown diagrammatically in Fig. 2. Obviously, the tapping point P must be found for the grid coil L1 for each band, such that the low-frequency edge of the particular band is obtained with the condenser all-in. This is rather a bothersome proceeding, and on 14 and 28 Mc. begins to get ticklish. But by juggling with the tap and the number of turns, as well as the spacing between them, it is possible to get all five bands spread over more or less the full tuning range of one band-spread condenser. An important point to notice here is that a band-setter must be used with this system. Variation of the feed condenser C1 affects the

grid tuning, so that without a band-setter it is possible for tuning to be thrown off the band. A further point is that full spreading is not necessarily obtained outside a given adjustment of the band-setter, which would naturally first be set to suit the amateur band for which the tap P of C3 is being found. To express this in figures, supposing the tap had been found for 7 Mc., with the band-setter at, say, 60 degrees dial reading, this giving full spreading of the 7 Mc. band on C3. Then suppose for any reason C2 had to be adjusted to 35 degrees, then the spread

on C3 would not be exactly the same. This may raise doubts as to what happens to the spreading when C1 is varied, but the fact is that any change in tuning due to C1 can be taken up on the band-setter C2 without upsetting the band-spreading, because it is unlikely that C2 will have to be moved more than 5 degrees plus or minus the normal setting, and this is not nearly enough to affect the band-spreading to any noticeable extent. It is only when C2 is well off the normal position that the spreading be-

gins to change. Note that C2 is placed across the *whole* coil in each case.

Owing to the fact that receiver constants vary widely, it would be inadvisable for us to attempt to give here any exact data for C3, L1, P in Fig. 2, as they would probably only be misleading; those who wish to adopt or investigate this method of band-spread can start with normal coil values and "feel" for the tap, using a 75  $\mu\mu\text{F}$ . condenser for C3. This value, incidentally, is also about right for tuning the RF stage. We should be interested to hear from readers who try or are already using this arrangement.

In our diagram, Fig. 1, notice that a screen-grid valve is shown in the detector position V2. The use of a SG valve has decided advantages. Sensitivity is improved, and reaction control is easier, though some people appear to have difficulty in getting SG valves to function as detectors. Adjustment of the potentiometer R1 is of vital importance in this connection, though actually the values of R1, L2, C4 and C1 are more or less interdependent. The best value of R1 for most valves, and H.T. voltages of 120-150 volts, is 50,000 ohms. Since this component can be a source of noise at high frequencies, it should be a good one—such as the Varley CP.159—with a 1  $\mu\text{F}$  non-inductive by-pass condenser at C5, connected as close as possible to the valve-holder.

The reaction adjustment consists in finding the position on R1 which enables smooth oscillation to be obtained, reaction control then being carried out on C4 in the usual way. If there are too many turns at L2, the reaction winding, oscillation will take place with insufficient screen voltage, causing

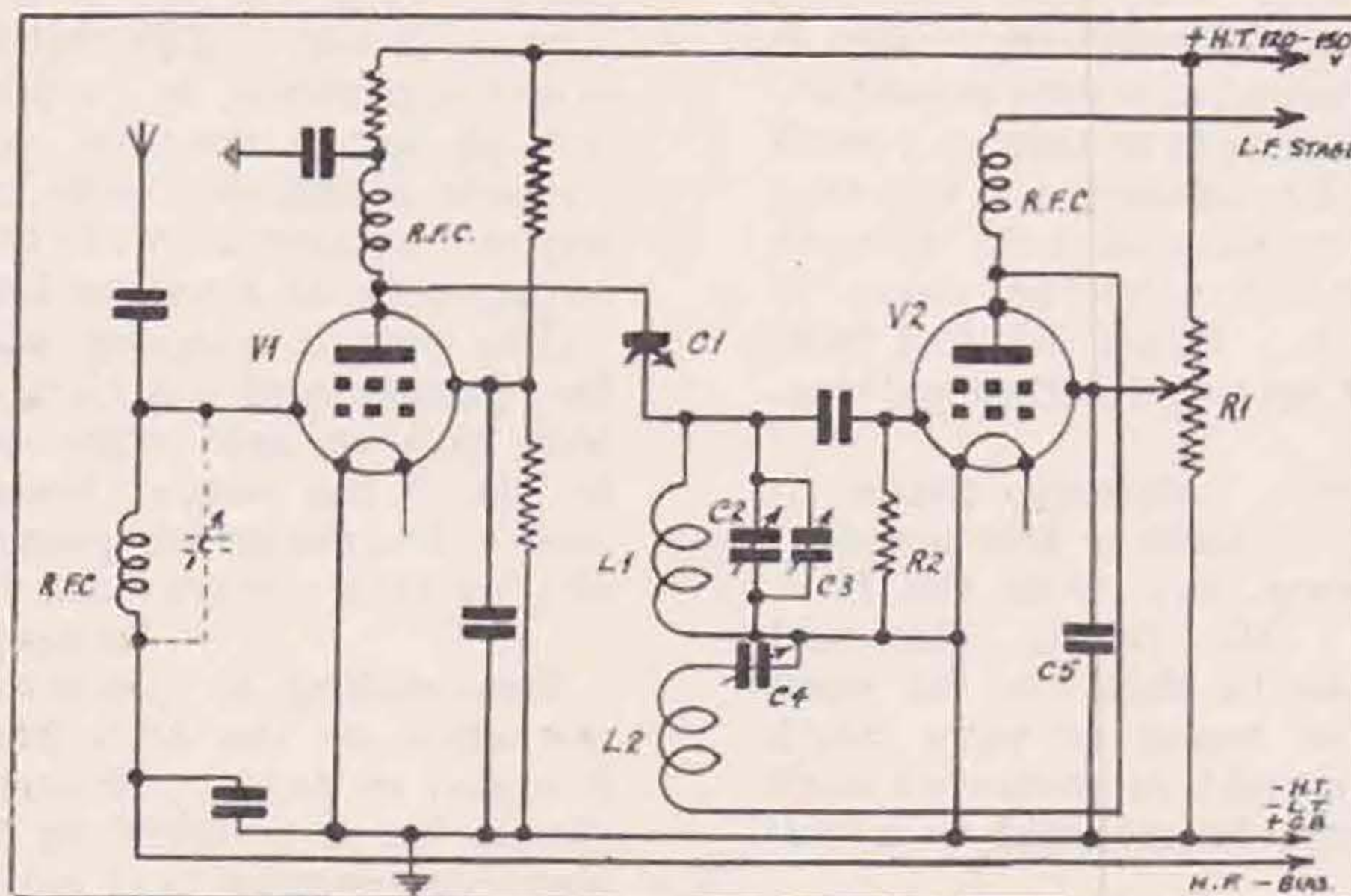


Fig. 1.

*Circuit arrangement for straight receiver suitable for Amateur Band working, 10-160 metres. Keyed components are discussed in text. De-coupling resistors for V1 should be calculated for the valve used.*



low sensitivity and backlash on C4. If the reaction winding is too small, R1 has to be turned further towards the H.T. end and C4 nearer maximum capacity, producing high anode current and unstable operation. With a 150  $\mu\mu\text{F}$  condenser at C4 the reaction turns should be adjusted till the valve goes smoothly into oscillation with C4 about half-mesh and the slider of R1 approximately one-third to half-way from the negative end. At the higher frequencies some adjustment of C1 may be necessary as well. Some valves work better with more screen potential, others with less, and the best setting is usually found where smooth oscillation is obtained. A further adjustment of screen potential/reaction condenser setting consists in tuning a weak signal and then varying R1 against C4 till that signal is at its loudest—consistent with smooth reaction—which automatically sets the valve in its most sensitive condition. When R1 has been so adjusted it is left at that setting for that particular coil.

With these adjustments correctly made it should be found that C4 holds more or less constant over large slices of frequency, say, from the H.F. to the L.F. end of the 7 Mc. band. The best setting of R1 is worked out in this way for each coil, though it may not be found to vary much from band to band; R1 should be mounted such that the various settings can be referred to a dial of some kind.

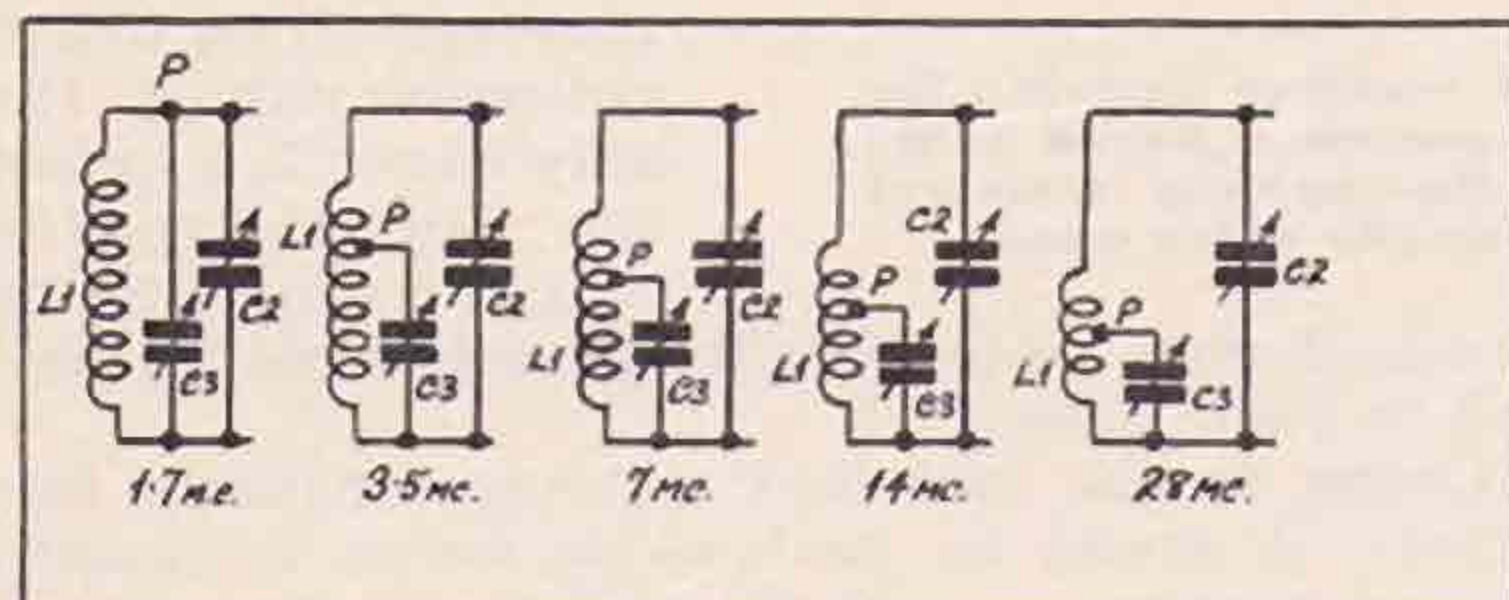


Fig. 2.

Showing how band-spread condenser C3 is tapped across the grid coil L1 for each band, where full band-spread is required with the same condenser. L1, C2, C3 correspond to Fig. 1. Tapping point P is covered in text.

#### Valves.

As regards valves for use in V1 and V2 positions, though ordinary screen grids, or, for V1, H.F. pentodes, will give good results, the *Hivac* SG220.SW is definitely recommended for both. These valves are of special low-loss construction, and if the lay-out of the receiver is designed to take advantage of them, with good-quality parts in the R.F. and detector stages, there is a definite gain in performance. The control-grid connection is taken to the top cap, which also facilitates lay-out.

#### R.F. Chokes.

Proceeding with our circuit the next point is R.F. chokes. Those of *Eddystone* manufacture are very good and can be used with confidence, type No. 1010 being most suitable in this case. However, even the best R.F. chokes can give resonance effects—due to their very efficiency—if they are not intelligently used. Referring to Fig. 1, it will be seen that under certain conditions the choke in the grid circuit of V1 can resonate with that in the plate circuit. Another possible difficulty is that the grid choke may resonate at some commercial or broadcast frequency, causing break-through of unwanted signals if one happens to be near the interfering station. In this case it is worth trying

short and long-wave (broadcast) chokes in series, and in our experience it is always advisable to have two chokes in series in the plate of V1.

R.F. chokes can be home-made quite easily, and data covering this and many other similar points will be given in this section from time to time.

#### The Output Stage.

With regard to the output stage, a pentode is the obvious choice, with a high-ratio coupling transformer, which may or may not be parallel-fed, between detector and output valve. The *Varley* Niclet, type DP.22, is a suitable transformer to feed a *Hivac* Y.220 output valve. Strictly, this is not a pentode, but a four-electrode valve having critical anode spacing, which is claimed to give pentode sensitivity with triode quality, though we are not concerned with good quality as a primary requisite in an amateur-band receiver.

The output coupling should be choke-condenser for 'phones and matching transformer for speaker with this or any other output valve. As shown in Fig. 3 the output transformer primary can be used as the choke for 'phones, and a simple switching or plug-jack system used to select one or the other.

#### De-coupling.

De-coupling is absolutely essential for efficient operation on the high frequencies whether the set is mains or battery driven, and all H.T. feed leads should be de-coupled by the usual method. One-watt compression-type resistors should be used, such as the *Dubilier*, with 1  $\mu\text{F}$  non-inductive by-pass condensers, for which *Dubilier* type BB are suitable.

#### General Notes.

Though this summary covers the general design of an R.F., detector and Pen. Receiver for the amateur bands, we do not suggest that it is the last word on the subject, nor that there are not a number of other points which should be considered. One

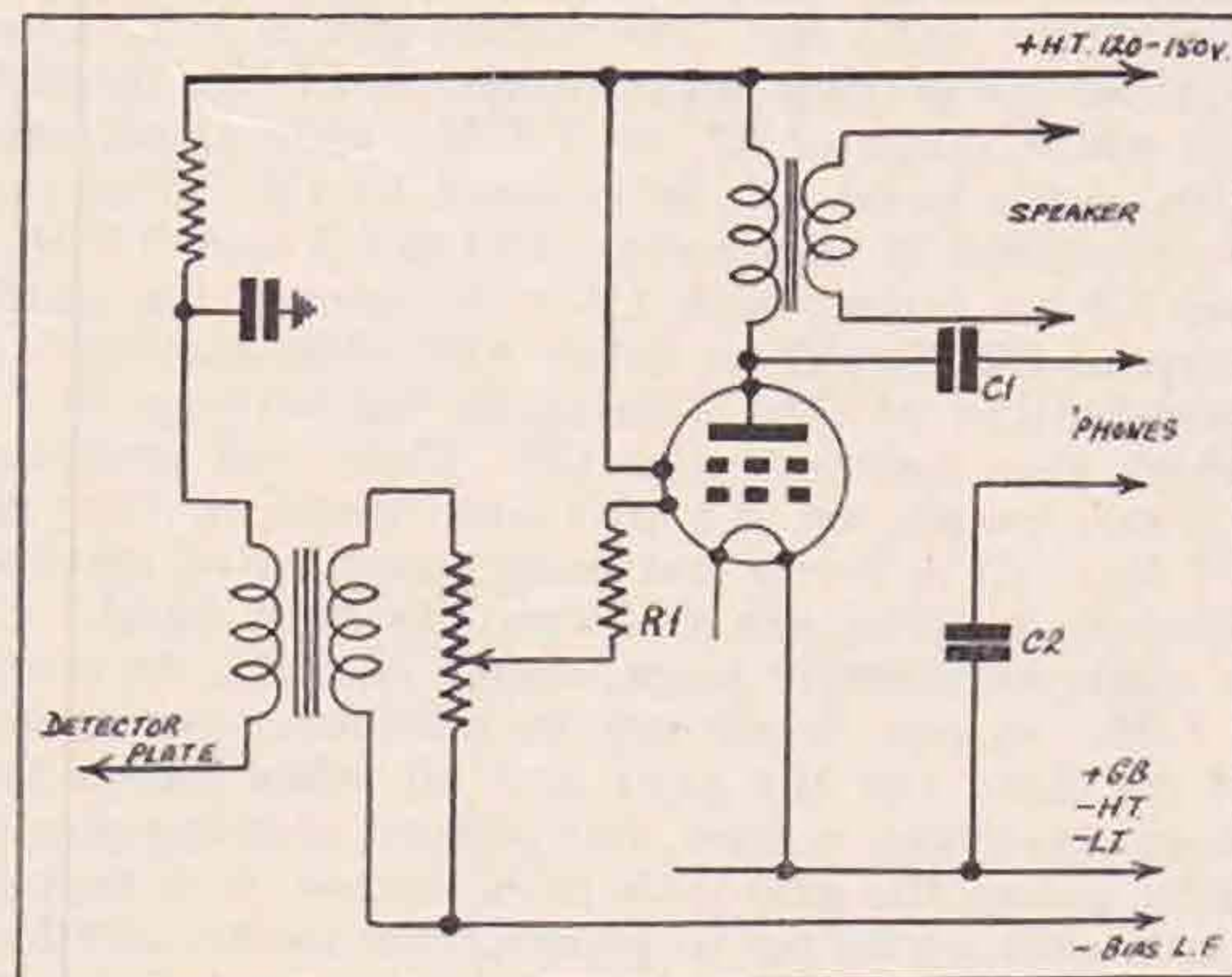


Fig. 3.

Showing arrangement of Output Stage. C1, C2 should be 2  $\mu\text{F}$  and R1, 25,000 ohms  $\frac{1}{2}$ -watt. All other values as normally obtain for the L.F. side.

is whether the set is to be mains or battery operated. A mains receiver on the lines indicated would be a very fine job and would represent a modern design which could be relied upon for a long period of useful and—if well constructed with good components—trouble-free service. Hum, which becomes more difficult to deal with as the frequency increases, can be eliminated or largely minimised by using shielded cable for the heater connections and keeping them well away from the rest of the wiring, while the H.T. supply should be well smoothed. Screening

(Continued on page 494.)



# THE VK-ZL INTERNATIONAL DX CONTEST, 1936

By G. B. RAGLESS, VK5GR, Contest Manager.

**A**S was the case with the two previous contests the last event held during October, 1936, again proved an outstanding success. The contest was organised by the South Australian Division of the Wireless Institute of Australia in co-operation with the New Zealand Association of Radio Transmitters and under the patronage of the W.I.A. Federal Headquarters.

Many were the expressions of appreciation made by entrants and general satisfaction was shown with the new scoring methods. It will be remembered that a sliding scale of points were arranged for the first 12 contacts with a particular country or zone and that only one contact on the same band with the same station during the whole contest (except 28 Mc.) could be counted. The last rule had the desired effect of making listening important and encouraged the low-power station whose weaker signals were eagerly sought after.

The 28 Mc. band again proved very reliable, particularly for VK2-3-4 stations, who made many DX contacts.

The Committee desire to thank all the overseas societies for giving the contest so much publicity and the competitors whose keenness during the contest made it such a success.

The outstanding performance during the contest was the wonderful work of VK3EG, who easily won the Australian section. He worked 70 countries for his score of 235,970 points and his log reads more like a list of the countries of the world.

The New Zealand top scorer was ZL1DV with 95,964 points and 44 countries. Other high scores were: VK2AE, 55 countries; VK4BB, 54 countries; VK2HF and VK4YL, 47 countries; VK3MR, 45 countries; VK3KX, 41 countries; and ZL1FT, 40 countries.

With 28 Mc. proving so reliable between VK-ZL and North America it was not surprising that U.S.A. stations would lead the overseas contingent. The first station was W5EHM, 8,850, followed by W6HX, 8,460; W9TB, 8,390; W6FZL, 8,300; W3BES, 7,290; W9AEH, 7,550; and G6CJ, 6,970.

The VK Handicap Section proved a close contest between VK2HV and VK3HK, who worked 27 and 26 countries respectively. Considering the opposition from higher power stations the performance of these two was really outstanding.

In VK-ZL the receiving section was almost neglected, but excellent scores were returned by VK3ERS and ZL166.

The receiving section was well supported overseas, particularly by German and British listeners, who registered some very good scores. The top score was made by 2CAR, 7,780, followed by BRS1535, 7,710; BRS1173, 7,470; BER5311, 7,290; DE2415H, 7,230; DE1729U, 7,180.

## Competitors' Comments.

D4BUF sent a fine report showing the participation in Germany. G2ZQ was too busy to send in a report, but he made a score of over 6,000.

G2TH, G6IJ and G5VQ had only 10 watts and G6ZO used 11 watts. ZS5U was very active on 7 Mc. and found conditions good. 28 Mc. contacts were made by OE1ER and VK4BB, EI5F and VK6AA.

SM6WL, VK2LZ, OK2RM, VK4EI, K5AY and XE1AY were good stations on 28 Mc., the latter making 51 contacts on that band.

VE3AU, after waiting six months for his first VK7, worked two within ten minutes; he also got ZL1GX during the last few minutes of the test, after calling him every morning, K5AC called VK4UR five times without luck.

Z5IH made all his score on the 28 Mc. band, ZT6Y had four 28 Mc. contacts.

G6CJ sent a very complete description of his gear and of observations made during the contest on all bands.

LA2Q sent his log in twice to make sure it was received!

VU2LJ had no intention of entering and did not trouble until the last two week-ends when VK-ZL was calling him hotly.

G2LB, G6RB and HB9AT and many others expressed their appreciation of the contest.

OK2OP used 28 Mc. and heard many VK-ZL stations.

G5YG was operated by G5ZX and in sending in a very complete report said he worked 67 per cent. of stations called!

Many stations found VK-ZL stations coming the long way, and East Coast USA had many good contacts.

The best score outside VK-ZL was put up by W5EHM. He used 1 kw. with Johnson Q Antenna on 7 Mc., 1 kw. with V beam on 14 Mc., and 800 watts with V beam on 28 Mc. He and W6FZL had nearly 70 contacts on the 28 Mc. band.

## Late Returns.

The following B.E. stations sent in late reports:—VE1EA 2916, VE5HR 236.

## British Empire Transmitting Stations

### GREAT BRITAIN.

G6CJ	...	...	...	6970
2YL	...	...	...	6540
5YG	...	...	...	6420
6RB	...	...	...	4910
5KG	...	...	...	4430
5MS	...	...	...	4390
6XN	...	...	...	3360
2IO	...	...	...	3168
6BS	...	...	...	2940
6XL	...	...	...	2808
2WQ	...	...	...	2016
2LB	...	...	...	1792
5TB	...	...	...	1656
5VB	...	...	...	1592
2TH	...	...	...	1050
5VQ	...	...	...	900
6IJ	...	...	...	705
5SR	...	...	...	564
6GH	...	...	...	355
6ZO	...	...	...	70

### IRISH FREE STATE.

EI8B	...	...	...	5650
EI5F	...	...	...	3720

### NORTHERN IRELAND.

GI5UR	...	...	...	460
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CANADA.			
VE1IW	...	...	4350
VE2AX	...	...	3850
VE3AU	...	...	3096
VE5BI	...	...	3042
VE5PW	...	...	2106
VE1HK	...	...	835
VE3GT	...	...	294
VE4ABH	...	...	141
INDIA.			
VU2LJ	...	...	2288
VU2EB	...	...	48
MALAYA.			
VS1AL	...	...	1869
MAURITIUS.			
VQ8AA	...	...	1170
VQ8AF	...	...	440
VQ8AE	...	...	276
SOUTH AFRICA.			
ZS5U	...	...	2034
ZS1H	...	...	1869
ZT6Y	...	...	1750
KENYA.			
VQ4NSB	...	...	236
EGYPT.			
SU1WM	...	...	3510
RHODESIA.			
ZE1JV	...	...	1740

### British Empire Receiving Stations

GREAT BRITAIN.			
2CAR	...	...	7780
BRS1535	...	...	7710
BRS1173	...	...	7470
BRS1885	...	...	6720
2AZX	...	...	6540
2AWX	...	...	6530
2AOU	...	...	6300
2ADC	...	...	5760
2AOZ	...	...	5720
2AZF	...	...	5620
2ASH	...	...	5250
2ADY	...	...	4570
2BIU	...	...	4300
BRS720	...	...	3590
BRS1948	...	...	4010
BRS1371	...	...	3420
2BDT	...	...	3360
CANADA.			
Allan H. Pratt	...	...	2610
S. G. Clark	...	...	850
HONG KONG.			
BERS265	...	...	3040
INDIA.			
BERS311	...	...	7270

#### Editorial Note.

We regret that space limitations do not permit us to reproduce the list of VK, ZL, and foreign contestants, but the return may be examined by any member visiting Headquarters.

#### Break-in

G5NU uses break-in on 7,180 kc. with a 6 watts input to a CO BA link coupled to a P.A. Keying is in the oscillator screen.

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## AROUND THE EMPIRE No. 6

**S**TATION VK4GK is located in Wynnum on the shores of Moreton Bay, and about 10 miles air-line from Brisbane, the capital of Queensland.

Although the operator has more or less dabbled in radio since the days before Australia boasted a regular broadcasting station, it was not until transferred to the present QRA that any serious effort was made to qualify for a transmitting licence.

The station first made its appearance on the air towards the end of June, 1930. The rig then in use being a T.N.T. with a *Philips* TB 04/10 as oscillator, the plate supply being obtained from a B.C. power pack, input varied from 12 to 15 watts.

Four months with this transmitter saw us W.A.C. and W.B.E., but as activities were confined chiefly to 14 Mc., there was nothing very remarkable in this feat.



VK4GK-VK4YL.

Later a DET1 was purchased. We found that this tube worked excellently in an Ultraudion hook-up and functioned equally well on all frequencies from 56 Mc. down; in fact, we believe the first 56 Mc. 'phone ever listened to in VK was from this old rig.

A schedule was run with VK4GW, of Northgate, about 10 miles away during June, 1931. Telefunken modulation was used.

In the 1932 B.E.R.U. Contest, in which VK4GK had a rather easy win for VK, this same outfit did the job. We must confess that our greatest thrills in radio are associated with a S.E. Ultraudion.

The present TX consists of four stages, using a '47 as C.O., followed by a '46 as 1st buffer or doubler, a TC 04/10 acting as 2nd doubler, linked-coupled to an R.C.A. 800 as final amplifier.

A 7 Mc. crystal is used, thus allowing the P.A. to operate straight on 28 Mc., on which band we are W.A.C.

The receiver is an eight tube (plus rectifier), single-signal super of our construction. The filter circuit is a copy of a Comet Pro Model, i.e. step-down, step-up transformer arrangement, no switch needed to cut out the crystal, this being done by the phasing condenser, which in one position shorts itself; this is entirely our own idea, and may not be altogether good practice, but it works.

*Varley* I.F.'s are used, the gain from them is so high that the control on the I.F. stages is only about half-on most times.

For those interested, the line-up is as follows:—'58 R.F., '57 1st Det., '58 H.F.Osc., '58 1st I.F., '58 2nd I.F., '56 2nd Det., '58 C.W. Beat Osc., and 2A5 Pentode output.

There are two sensitivity controls, one being on the cathode of the R.F. tube, and the other on the cathodes of the I.F. amplifiers; after some experimenting, this arrangement appears to be the most satisfactory.

The antenna in use at present is a 66 ft. Zepp, which appears to radiate fairly well in all directions; other types have been tried from time to time with varying results.

Most of the gear we have constructed ourselves, power transformers, filter chokes, R.F. chokes, coupling and by-pass condensers, etc.

Various little gadgets useful about a ham shack have been built up at odd times, including a vacuum-tube voltmeter, and a field-strength meter.

The four Juniors are all at home in the shack, Arthur, the eldest qualifying for his call, VK4HJ, when he was only fifteen; Madeline, VK4YL, when twelve (almost a record we think). Neil and Harry, nine and ten respectively, could quite easily pass the code test any time, but perhaps we are too Scotch to pay for any more licences, which are 30s. per annum in VK.

VK4YL is at present attending college and has little time to devote to radio, but no doubt she will be looking for Empire contacts again in the 1938 B.E.R.U. Contest.

[Although our contributor has not mentioned it, we should record that station VK4GK has for three years in succession won the cup donated by VK4CG for the best Queensland station.—Ed.]

### Listen for VP2LA

Mr. Cyril Volney, P.O. Box 8, Castries, St. Lucia, B.W.I., who has recently been licensed under the VP2LA, owns the first official amateur station in his Island. He uses a pair of 45s in push pull with an input of 10 watts, and is usually active between 2100 and 2300 G.M.T. on 7 Mc., and occasionally between 0800 and 1100 G.M.T. He is looking for G contacts.

It will be remembered that the R.S.G.B. played an active part in obtaining licences for amateurs in the Windward and Leeward Islands.

### A Silent Key

Capt. Alex Paterson (SUIAP) was the pilot of the ill-fated Imperial Airways liner "Capricornius" which crashed in France on March 24. Our sympathies are extended to his wife and family.



## TRADE NOTES.

Readers of national newspapers cannot have failed to notice the full-page advertisements which preceded the arrival of a new *Amalgamated Press* part work *Wonders of World Engineering*. Without question this is one of the finest engineering publications it has been our pleasure to read, for besides containing most meticulously worded descriptions, the pictorial illustrations are of outstanding merit.

The Editor is Mr. Clarence Winchester, who was also responsible for *Railway Wonders of the World* and *Shipping Wonders of the World*.

In a world where so much is taken for granted, it is of importance that the epic conquests of man in the field of engineering should be brought before us with forcefulness.

*Wonders of World Engineering* should be in the home of every English-speaking person who seeks for authentic knowledge attractively presented. The price is 7d. per part weekly, from any bookseller.

*Webbs Radio*, 14, Soho Street, London, W.1, have submitted for examination samples of their new "Economy" valveholders and condensers. The former are available in 5 and 7-pin sizes, and list at 6d. and 9d. each respectively. The condensers are made in three capacity sizes, 15  $\mu$ F. at 1s. 6d., 40  $\mu$ F. at 1s. 9d., and 100  $\mu$ F. at 2s.

The valveholders are made from a ceramic material drilled and fitted with plated brass valve pins. By an ingenious manufacturing process the

soldering tag forms part of the pin itself, thus ensuring perfect contact.

The midget condensers are of solid brass construction with ceramic insulation. A phosphor-bronze spring washer bearing provides an efficient contact to the rotor plates.

These two lines can be most strongly recommended.

\* \* \*

Mr. J. H. Farrer, 2A YA, informs us that silver-plated copper wire (annealed) can be obtained from the Johnson & Matthey Co., Ltd., 73-82, Hatton Garden, London.

He also asks for the address of a firm who will supply *enamelled* silver wire in small quantities, or alternatively one which will enamel silver wire supplied in 2 oz. quantities.

**Spring Call Books and  
1937 Editions of the  
A.R.R.L. Handbooks are  
now in stock.**

**AMPLIFIERS.** 4 valve, 5 watt Output. Ideal for P.A. or Modulation. **£3 19s. 0d.** with valves.

**SPEAKERS.** Rola G12 P.M. **63/-**.

**TRAPS.** TX's, Stop interference with B.C.L.'s. For 20 or 40 m. band, **1/3** each, **14/6** doz.

**Q.S.L. CARDS.** Our prices are competitive. Let us have your enquiries. Prompt Service.

**CONDENSERS.** Lotus 2 gang **4/9**. Utility 3 gang **5/3**.

**ELECTROLYTICS.** T.C.C. 500v. Canister type, 8 mfd. **2/6**. 8 + 8 mfd. **3/-**. Cardboard type, 4 mfd. **1/4**. 8 mfd. **1/8**.

**VALVES at Competitive Prices:** National Union, Arcturus, etc. 1st grade only.

All goods offered last month can be supplied.

**POSTAGE EXTRA** on orders **under 5/-**.

Send for Complete Lists.

**H.E.D. SERVICES** Gloucester Place,  
Monument Street, Peterborough

### "T. & R. Bulletin." ADVERTISEMENT RATES.

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Series Discounts—5% for 6 or 10% for 12 consecutive insertions. Full-page type area  $7\frac{1}{4}" \times 5\frac{1}{4}"$ .

Advertisements specified for *Covers and Facing Matter* Positions are not subject to series discounts.

The T. & R. BULLETIN is published on the 15th of each month. Orders, Copy and Blocks should reach us by the 25th of each month for the following month's issue.

All applications for space or specimen copies should, please, be sent to Advertisement Manager,

**PARR'S ADVERTISING LTD.,**

Craven House, Kingsway, W.C.2.

Telephone: Holborn 2494.

# 362

## A NEW HIGH EFFICIENCY R.F. PENTODE VALVE JUST RELEASED

### RFP. 30 Price £2 5s.

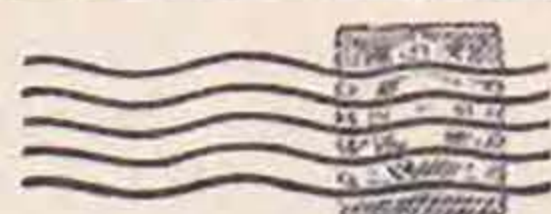
Fil. Volts ...	4	Sup. Load ...	15,000
Fil. Amps. ...	2	Screen V. ...	400
Anode Volts ...	650	Screen Current ...	25
Anode Current ...	75	Screen Rest ...	10,000
Max. Anode Dis. ...	30	Grid Bias ...	25
Anode Input ...	50	Grid Current ...	2
Anode Output ...	37	RF Input ...	20
Anode Load ...	10,000	Grid Rest ...	12,000
Sup. Bias C.W. ...	100 Pos.	Mut. Cond. ...	5
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Speech ...	100 Neg.	A-F Cap ...	20
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# To The Editor



## EMERGENCY NETWORK

To the Editor of THE T. & R. BULLETIN.

DEAR SIR,—Radio propaganda and traffic handling have played a prominent part in the Spanish Civil War; that they will play an even greater part in any future war, affecting this country, goes without saying. It is highly probable that in the event of hostilities occurring, our broadcast stations would be systematically jammed from without our borders, whilst unauthorised transmissions of a local nature would help to confuse the public.

On the eve of hostilities licenced British amateur stations would be closed down and our years of experience would be wasted.

Subject, therefore, to the raising of the war-time ban on transmitting, I would suggest that in the event of breakdown or jamming of the B.B.C. transmissions, the interruption or overburdening of normal telephonic communication or the disorganisation during air raids of runner and messenger systems, an emergency network of amateur stations working in co-operation with the local police would not only preserve our amateur status but prove of immense value to the authorities.

Using mains supply where possible or batteries in extremity our stations would give:—

1. An additional aid or complete substitute for normal communication between local bodies of police, ambulance, warden, fire, rescue or gas squads.
2. A link between town air-raid precaution headquarters and civilian inhabitants; or
3. A channel for purely official traffic between town officials and other county authorities.

Bournemouth members are in agreement on this subject and also with the statement made recently by Commander Morrison, of the Home Office, that although air-raid precautions are a nuisance, people are asked to regard them as a reasonable form of insurance against something it is hoped will never occur. Perhaps other members will state their views.

Yours faithfully,

N. P. SPOONER (G2NS).

[We shall be pleased to hear from members who would be willing to co-operate in such a scheme as suggested.—ED.]

## DUPLEX TELEPHONY

To the Editor of THE T. & R. BULLETIN.

DEAR SIR,—I have taken the last paragraph of your February editorial to heart, and feel that a few comments based on my past work may interest your readers.

Amateurs have used Duplex for many years, and my own experiments in this field date back to September, 1935, when PA0FB and I began a nightly schedule on 1.7 and 3.5 Mc. We learnt to

overcome many of the attendant difficulties such as beats between our carrier and commercials. Later on, the higher frequencies were used and co-operation was obtained from G5KJ, PK4AU, VO1I and W1CND. Some sort of perfection has at times been obtained, though often the 14 Mc. band is blotted out by a beat falling on the I.F. The 28 Mc. band is a problem in itself, tremendous "break-through" being experienced.

Duplex workers do not abuse the "search your own frequency" clause more than others. How many amateurs who work unilaterally search their own frequency until the QSO is completed?

Further, those of us who work duplex do not cause QRM because, unless quite heartless, when an operator reports interference we cut out and wait until the "all clear" is given. This is, I think, a powerful vindication in itself; but to satisfy those who think otherwise and as a contribution to the general interference problem, the writer has developed a system of controlled carrier which leaves no spacer, and in which, as seen on a cathode ray tube, the carrier envelope follows faithfully the modulation, except for a barely visible lag on opening up.

I have had the pleasure of demonstrating the lower interference factor of this system to a G.P.O. engineer. A local station relayed back my transmissions at a time when another station was on the same frequency as me: that station was very definitely more readable than if I had been using constant carrier.

The aim of my experiments has been to speed up communication and to avoid unnecessary repetition. I am convinced that duplex speech provides the best method of communication and that to avoid delay each station should always be able to hear the other all the time, even if this should necessitate at times the running of both carriers simultaneously. Any method of automatically cutting off between words is, I consider, yet a further advance in technique and is an ideal way of getting through QRM without increasing it.

As a practical man I am better able to convey the results of my experience by word of mouth than through the medium of the written word. As a result I find it difficult to prepare a technical article, although as many members know I have tried to help them over the air to the best of my ability.

Yours faithfully,

JOHN GOODACRE (G6GO).

To the Editor of THE T. & R. BULLETIN.

DEAR SIR,—In my short but eventful life I have been called a few names and mistaken for a good many people; but never have I been pulled up with such a jerk as when I read, on page 400 of last month's BULLETIN, "Soliloquies from the Shack, by Mr. L. H. Thomas, G6QB."

Of all the ghastly mistakes you have ever committed (and I don't suppose they have been many, after all) this is surely the most horrible. I thought every child knew that "Soliloquies from the Shack" were (or was) written by that old crab who nestles in the safety of his *nom de plume* "Uncle Tom."

Why, in the name of Amateur Radio, pick on me? All my intimates know that I own a commercial receiver; that I use Goyder lock, and do 'phone on it; that I sometimes send doubles;



that I ask for QSL's; that I put the said QSL's up on the wall; and that I attend radio meetings and behave in quite a friendly way (I hope) towards "young squirts."

I ask you—does this sound like "Uncle Tom"? No, Sir; you're barking up the wrong tree, and who gave you the idea I don't know.

So please leave no stone unturned to remove the last straw which shows the way the wind blows from off the camel's back, and explore every avenue to remove at least one of the horns of this awful dilemma.

I leave "Uncle Tom" to deal with you as he thinks fit—but I don't expect you'll get off so lightly from that quarter. And I'm not looking forward to receiving a letter from him, either.

Yours faithfully,

L. H. THOMAS (G6QB).

## COMMERCIAL AMATEUR EQUIPMENT

To the Editor of THE T. & R. BULLETIN.

SIR,—I have read your editorial in the March issue with interest, and am confident that all members of the Society will agree with the statements made therein with respect to the sale of transmitting equipment to persons possessing no authority for its use.

I do not, however, agree, and I feel my opinion is shared by others, with the veiled criticism that appears in the article, and has previously been mentioned in the BULLETIN regarding the use by amateurs of commercially built transmitters and receivers.

I contend that our licences are issued to us for experimental purposes, and many of us devote our efforts in ascertaining the effects associated with our signals once they have been emitted. These experiments can be equally or even better carried out by the use of commercial equipment. Further, I feel that only a small number of us have the facilities, the tools and the ability to construct equipment either for transmission or reception to bear comparison with those marketed by certain firms in this country, and more especially by the American companies, who have specialised in this direction. Surely but a small majority of us could successfully construct a receiving set in any way comparable with the American communication receivers. One must obviously be in possession of the most efficient receiver possible to gauge the real efficiency of one's transmitting equipment.

Does a really keen amateur astronomer or photographer construct his own telescope or camera? No, sir. He proceeds to purchase the best equipment that his purse will allow, in order that he may obtain the best results.

Personally, my equipment has been constructed by myself, but I fail to see why we should deride those fortunate enough to possess commercially built sets, and I for one envy them.

Yours very truly,

ROGER P. HAWKEY (G5ZG)

EDITOR'S NOTE.—No criticism, veiled or otherwise, has been made editorially on the question of commercially produced amateur gear. The matter is one of individual concern.

## WINDOM AERIALS

The Editor, T. & R. BULLETIN.

DEAR SIR,—Having successfully used a Windom aerial since 1934, I was interested in G2UJ's recent article.

In the course of the article, Mr. Allen stated that his conclusions are the result of practical experience only, and this would certainly appear to be the case, as theoretically the formula given is not by any means accurate.

Let us take, for example, the case of the half-wave horizontal aerial used as a Windom (or as anything else for that matter) on the 14 Mc. band. Taking the frequency of the crystal as 14,082 kc. (7,041 kc. fundamental), then according to the formula given, the length should be

$$\frac{475200}{14082}$$

$$= 33 \text{ ft. } 7 \text{ ins.}$$

$$14082$$

Unfortunately, however, no account has been taken of radiation and earth loss, which in practice reduces the length of the aerial by, in some cases, 2 feet.

Theory tells us that in the case of a wire half a wavelength long, energised at its response frequency, a wave starting at one end will reach the other end exactly half a cycle later, and the returning wave will reach the starting point at exactly the correct instant to start off with the next half cycle: *always provided that the velocity of the wave is the same on the wire as in space.*

It should be obvious, however, that owing to radiation taking place, this condition is not fulfilled, and the wire consequently is too long. The amount by which it is too long depends, among other factors, upon the gauge of the wire used.

Furthermore, if as is usual with amateur aerials, the height above ground is not more than half a wavelength, the length will be reduced by about another 2 per cent. to allow for capacity to earth.

I have said nothing so far regarding the position of the Windom feeder, and before passing judgment upon G2UJ's formula for this, I should like to hear how it is compiled.

The Windom is certainly not an easy aerial to erect (although the half wave is much less complicated than the full wave) and I most certainly do not recommend it to the beginner.

I do not doubt that in the cases cited by G2UJ, aerials erected to his specification were successful, but I suggest to him that they cannot be Windoms!

In conclusion, I hope that Mr. Allen will not mind my criticism of his article, as it is only by the exchange of opinions that we can hope to learn.

Yours faithfully,

R. K. SHEARGOLD,

G6RS.

The Editor, T. & R. BULLETIN.

DEAR SIR,—I have to thank you for giving me the opportunity of replying to Mr. Sheargold's letter quoted above, and would first of all say that I, personally, take no credit for the formulæ for Windom aerials given in my article in the February BULLETIN. If Mr. Sheargold will refer to the article in question, and also to the original notes by G2BI on the subject in the BULLETIN for August,

(Continued on Page 494).



# BETWEEN



# OURSELVES

## London Meeting

We are pleased to announce that Mr. T. D. Humphreys will give a lecture on "Some Aspects of High Definition Television Reception" at the last meeting of the present session to be held at the I.E.E. on Friday, April 30.

Tea will be served free of charge from 6 p.m. and the lecture will commence at 6.45 p.m. We would remind members that the I.E.E. is open from 5 p.m., thus permitting those who arrive early to exchange "Ham" yarns!

## York and Stockton Meetings

During our recent visit to Northumberland a promise was given that if an attendance of 20 could be guaranteed a special meeting would be held in Stockton-on-Tees the evening before the York P.D.M.

We are glad to announce that through the good offices of Mr. R. Bradley (G2FO), a meeting, preceded by dinner, will take place at The Vane Arms Hotel, Stockton, on Saturday evening, May 1.

Our President and Secretary will attend this meeting and will then proceed across to York for the meeting in that town on the following day.

It is hoped that these arrangements will enable all members in Districts 1, 18 and 19 to attend at least one of the meetings.

## Watch Your Postage

During the past month we have received over 50 batches of QSL cards insufficiently stamped and for which a postage due fee has been demanded. In future, insufficiently stamped packages will be refused by Headquarters.

We have also on several occasions been called upon to pay a postage due fee on unregistered letters which contain coin of the realm. This practice is illegal and future letters of this type will be returned unopened to the G.P.O.

## New D.R. for Northern Ireland

Council are pleased to announce that Mr. T. Palmer Allen (GI6YW) has been appointed the R.S.G.B. Representative for Northern Ireland in succession to Mr. W. Graham (GI5GV), who has been compelled to resign owing to pressure of private business.

Mr. Allen, who is one of the senior Irish amateurs, is already well known to members for his contributions to this Journal, and to *A Guide to Amateur Radio*.

The opportunity is taken of thanking Mr. Graham for his past services, and to wish his successor a happy term of office.

## Jones Radio Handbook

In view of the difficulty in obtaining supplies of this Handbook from the publishers we regret

we are unable to accept further orders for the current or future editions.

Every endeavour is being made to meet the large batch of orders received recently from members.

## High Power Permits

In submitting applications for an increase in power in excess of 25 watts, members are required to note the following information:

1. The application must be based on sound technical grounds. In this connection the notice published in the November, 1936, T. & R. BULLETIN (page 197) should be studied.

2. Details should be given of past and projected experiments, with an explanation as to the reason why the present power is insufficient for the contemplated experiments.

3. Applicants must give an assurance that crystal control or some other recognised form of frequency stabilising will be used for high-power tests.

4. Applications must be addressed to the Secretary, R.S.G.B., and forwarded via a member's D.R., who is required to comment upon the application.

5. Members, after being recommended by the Council, must hold themselves in readiness for a G.P.O. inspection of their station.

The inspecting officer will, in particular, require to examine the station log and crystal certificate, and will seek evidence of past experiments and enquire for particulars of projected work. A log containing only a record of transmissions made, is not evidence of their experimental value.

6. The requisitioned higher power may not be used until a definite authorisation in writing has been received from the G.P.O.

7. The charges for high-power permits are given on page 414 of the March, 1937, T. & R. BULLETIN.

Members are reminded that their applications, or a copy thereof, are submitted by the Council to the G.P.O., therefore they should be written in official style and submitted as a separate communication to any other correspondence forwarded to their D.R.

Careful attention to these points will facilitate due consideration of each application.

## Town Representatives

The following Town Representatives have been appointed recently:—

District 15.

Hayes: Mr. E. J. Napier, G8FA.

District 16.

Medway Area: Mr. W. Nutton, G6NU.

District 18.

Hull: Mr. J. A. Hay, BRS1948, 1, Stafford Street, Hull.

Scotland.

Dundee: Mr. J. G. Halley, G8CF.



## An Important QSL Decision

We have received the following communication from the American Radio Relay League:—

"The QSL-forwarding system in this country, handled by volunteer workers in each of the District areas, is now badly clogged by virtue of the large number of listener cards sent to United States and Canadian amateurs by foreign listeners. In the majority of cases it is practically impossible for the QSL Managers to handle this large bulk of cards in addition to the regular 'worked' cards. Most of the amateurs in this country request that listener cards not be forwarded to them, leaving the QSL Manager no option but to destroy them, since we have no facilities for returning them to individual senders. In the meantime, however, much time is consumed in transporting and sorting the cards.

"We appreciate that in some countries (and the bulk of the cards come only from certain countries) prospective amateurs need to have some evidence, such as acknowledgment of listener reports, in order to qualify for licences. The call-book is available in such cases, and, in fact, it is likely that if our amateurs are not subjected to such huge quantities of unsolicited cards they would be more likely to reply.

"The time has come, therefore, when we have to say that hereafter we can give no promises of forwarding-service in the case of listeners' reports, and that such cards, if sent in, will be sent solely at the owner's risk. We request also that, if listener cards are sent, they be sent in separate packages, as otherwise there is an excellent possibility that legitimate QSL cards enclosed with the listener cards will be lost.

"We regret that this step must be taken, but it has become necessary. The growth of international radio has become so great in recent years that we do not have the facilities to maintain an efficient card-forwarding system and handle listener cards as well. The result of the new arrangement will be that listeners will receive more replies by sending their cards directly, and the QSL cards in acknowledgment of two-way communication will be handled with greater despatch than was possible in the past."

Non-transmitting members are requested to note that, in accordance with the expressed wish of the A.R.R.L., we shall be unable to accept listeners' reports for U.S.A. amateurs as from May 1 next.

It will be remembered that some months ago the R.S.G.B. Council were compelled to refuse British listening reports addressed to European transmitters working on 3.5, 7 and 14 Mc.

We feel sure that our non-transmitting members will agree that no useful purpose is served to-day by sending report cards to U.S.A. stations which are regularly in communication with Europe.

## University College, London, Engineering Society

The above-mentioned Society has in preparation the first issue of a year book, which will be sent free to former students.

Will old members kindly send in their names, addresses, years at college, academic and professional qualifications, present appointment, and news of their contemporaries to P. H. Walker, Engineering Department, University College, Gower Street, W.C.1.

## Olympia Exhibition, 1937

Although this event is still very far ahead, we are already making plans for our stand. This year we are desirous of exhibiting a selection of ultra-high frequency receivers and transmitters which have been constructed by *Provincial* members. The standard of workmanship must, of course, be high but not necessarily highbrow.

Members who are willing to contribute are requested to send a photograph of the gear to

## CALIBRATION SERVICE

Crystals should be sent direct to the Calibration Manager enclosed in a small tin, and securely packed to avoid loss in transit. The Society cannot be responsible for any loss that might occur in sending crystals through the post.

Return postage must be enclosed as postage stamps, and not attached to the Postal Order.

Calibration fees: 1.7, 3.5 and 7 Mc. crystals, 1s. 6d.; 100 kc. crystals, 2s. 6d.

All communications should be addressed to:—

Mr. A. D. Gay (G6NF),

"Oak Dene,"

156, Devonshire Way,

Shirley,

Croydon,

Surrey.

See page 117 *A Guide to Amateur Radio* for particulars of frequency meters, etc.

Headquarters, together with a brief description of the circuit and results obtained.

Auxiliary apparatus, providing it is well constructed, will also be considered for display.

## Our Next Issue

Due to the incidence of the Coronation and Whitsun holidays, our next issue will appear as soon after May 18 as possible.

All D.R.'s and regular contributions are requested to submit their material not later than Thursday April 29. Copy received after that date may be held over until the following month.

## A Guide to Amateur Radio

The "Guide" Committee will be pleased to receive close-up photographs of well-constructed straight receivers and modulators. Senders of selected photographs will be invited to contribute circuit and component information for inclusion with the photographs in the fifth edition of the Guide now being prepared.



## Correspondence to D.R.'s and T.R.'s

Members are again reminded that when a reply is required a stamped addressed envelope should be included in any letter sent to a D.R. or T.R.

These officers hold honorary positions in the Society and in many cases they find the burden of personal postage expenses unreasonably heavy.

## Questions and Answers Bureau

To remove any misunderstanding which may have arisen, we wish to inform members that the term "financial standing," as mentioned in the Rules governing the operation of this Service, refers to "financial standing" in the Society. In other words, the service is only available to fully paid-up members.

## QRA Section

Manager: M. WILLIAMS (G6PP).

### NEW PREFIX

GM—Scotland.

### New QRA's—March List

- G2XK.—L. A. C. KNOWLES, Hut 9G SHQ, R.A.F., Finningley, Doncaster, Yorks.  
 G5FD.—F. D. CLOUGH, Ridge Road, Kempston, Bedford.  
 G5SZ.—J. W. RIDDIOUGH, 35, Ferncliffe Drive, West Lane, Baildon, Yorks.  
 G5ZB.—H. BEARDWOOD, 8, Huddersfield Road, Millbridge, Liverpool, Yorks.  
 G6PZ.—R. F. WESTON, 21, Huntingtower Road, Grantham, Lincs.  
 G6ZP.—J. ROSS, 207, George Street, Aberdeen.  
 G8CJ.—V. I. ELLESMERE, 10, Patterdale Road, Liverpool, 15.  
 G8DY.—H. I. POPAY, Signals Section, Station H.Q., R.A.F., Usworth, Castletown, Co. Durham.  
 G8GP.—E. NEAL, 55, Angus Street, New Cross, London, S.E.14.  
 G8GT.—H. R. SCOBELL, 6, Meadow Road, Watford, Herts.  
 G8HR.—F. J. MAGARRY, 38, Spinney Rise, Birstall, Leicester.  
 G8ID.—J. H. HEMINGWAY, 16, Thwaites Avenue, Leeds Road, Ilkley, Yorks.  
 G8IK.—V. D. MORSE, 162, Newcombe Road, Handsworth, Birmingham.  
 G8JM.—W. G. HALL, 48, Hawkdene, Chingford, London, E.4.  
 G8JO.—JAMES ORR, 43, Stanhope Road, [South Shields, Co. Durham.  
 G8JQ.—J. F. S. CARPENTER, 9, Brock Street, Bath, Somerset.  
 G8JR.—N. P. HASKINS, Dancers End, Fitzroy Park, Highgate, London, N.6.  
 G8JV.—G. HENDERSON, 18, Burleigh Road, West Bridgford, Notts.  
 G8JW.—JACK WILSON, Hawthorn Cottage, Cambusnethan Street, Wishaw, Lanarkshire.  
 G8KD.—G. W. BAGSHAW, 200, Baslow Road, Totley, Sheffield, Yorks.  
 G8KF.—Portable of G8KD.  
 G8KI.—P. C. MORTIMORE, Burnworthy, South Nutfield, Surrey.  
 G8KJ.—A. W. WRIGHT, Sonning Dairy, Sonning, Berks.  
 G8KP.—W. T. PICKARD, 125, Oakwood Avenue, Flanshaw Park, Wakefield, Yorks.  
 G8KR.—C. CLARKSON, 15, Norval Place, Rosyth, Fife.  
 G8KT.—T. D. H. BABER, 23, Newington Road, Sheffield, 11, Yorks.  
 G8KW.—R. G. SHEARS, 52, Lytton Road, New Barnet, Herts.  
 G8KZ.—P. G. BRADLEY, 348, Portobello Road, London, W.10.  
 G8LA.—P. W. BORTHWICK, 75, Mayfield Road, Edinburgh.  
 G8LB.—N. E. BAKER, 112, Gloucester Road, Cheltenham, Glos.  
 G8LD.—ARTHUR TETSTALL, 33, Noel Street, Leicester.  
 G8LF.—E. O. BYRNE, Ulster Bank House, Clogher, Co. Tyrone, N. Ireland.  
 G8LG.—L. H. GRAY, Windlesham, Surrey.  
 G8LI.—F. M. BABCOCK, Littlefield, Marlborough, Wilts.  
 2AAR.—P. ARNOLD, 155, Brunswick Road, London, W.5.  
 2ACG.—L. HILL, 14A MQ., Hilsea Barracks, Portsmouth, Hants.  
 2ACN.—B. H. LAGDEN, 9, Pollard Road, Whetstone, London, N.20.  
 2AFU.—J. T. SAWYER, 16, Sanctuary Road, Gillingham, Kent.  
 2AGQ.—P. W. GAZE, St. Mary's, Teigngrace, Newton Abbot, S. Devon.  
 2AIK.—H. G. SMITH, 68, Balfour Street, Leicester.  
 2AND.—D. L. DAVIS, 160, Desborough Road, Eastleigh, Hants.  
 2ANT.—D. A. EDWARDS, Selwyn House, Pilkington Avenue, Sutton Coldfield, Warwickshire.

- 2AUH.—G. SKEWIS, 31, Farncombe Road, Tunbridge Wells, Kent.  
 2AXU.—K. MALLETT, "Henbury," Tankerton Road, Tankerton, Kent.  
 2AYO.—D. R. TAYLORS, Marlborough House, Greenhill.  
 2AZO.—J. HUNTER, 155, Kentish Town Road, London, N.W.1.  
 2BFY.—FRANK BOTTOM, "Branksome," Lakes Road, Dukinfield, Cheshire.  
 2BOZ.—J. E. BAZLEY, 31, Valentine Road, King's Heath, Birmingham.  
 2BSF.—ERIC SUTCLIFFE, King's Arms, Garstang, near Preston, Lancs.  
 2BYJ.—C. E. BEYTS, "Little Orchard," Normandy, near Guildford, Surrey; and at Emmanuel College, Cambridge.  
 2CBG.—D. W. MORGAN, 15, Grange Road, Kenton, Middlesex.  
 2CFJ.—W. N. FOLLIS, 47, Stonerwood Avenue, Hall Green, Birmingham.  
 2CGP.—W. DALL, 9, Ivanhoe Place, Taybank, Dundee.  
 2CGT.—F. J. DAWES, 2, Greengates, Breckhill Road, Mapperley, Notts.  
 2CHI.—R. L. CLARK, 120, Nether Street, London, N.2.  
 2CIJ.—J. J. E. BLACK, "Elderslie," Craiglockhart Quadrant, Edinburgh, 11.  
 2CIN.—T. M. LOTT, 14, Sandon Street, Liverpool, 8.  
 2CJI.—R. B. MANCUS, A7, Calthorpe Mansions, Five Ways, Birmingham.  
 2CJO.—H. G. WOOD, "Pendleton," Port Hill Road, Shrewsbury.  
 2CJY.—J. I. M. SINCLAIR, 50, Ralston Avenue, Crookston, Glasgow, S.W.2.  
 2CJZ.—G. A. PARRIS, "South Lodge," Harley Lane, Heathfield, Sussex.  
 2CKL.—E. W. PRICE, 101, Old Farm Road, Stechford, Birmingham, 9.  
 2CKQ.—P. CONGREVE, 8, Ilkeston Road, Bramcote, Notts.  
 2CKU.—R. J. CRUTCHLEY, 7/62, Great Colmore Street, Edgbaston, Birmingham.  
 2CKY.—W. F. TAYLOR, 285, Heysham Road, Morecambe, Lancs.  
 2CLO.—J. K. McDOWELL, 15, Ruthven Avenue, Giffnock, Scotland.  
 The following are cancelled: 2AAB, 2AAW, 2ACK, 2AIG, 2AIW, 2AMJ, 2AUT, 2AVH, 2AWD, 2BAZ, 2BCU, 2BNM, 2BVC, 2BXL, 2BYG, 2BYN.

### NEW QRA'S—April List.

- GM2DI.—JAMES W. JEFFREY, Craigmara, Coronation Street, Wishaw, Lanarkshire.  
 G2GN.—E. D. GRIESS, 37, Parker's Road, Sheffield, 10, Yorks.  
 G2IY.—A. C. WILBERFORCE, Lindum, Syke Cluan, Iver, Bucks.  
 G2LT.—E. WALKER, 2, Harbord Road, Sheffield, 8, Yorks.  
 G2ML.—D. H. PRIEST, Bawdsey Manor, Woodbridge, Suffolk.  
 GM2MP.—J. J. HENNEY, 48, St. Mary's Street, Kirkcudbright, Scotland.  
 G2XG.—J. M. DAVIE, 7, Cranworth Crescent, off Balgonie Road, Chingford, London, E.4.  
 G5GH.—C. R. EMARY, 39, Bishop's Road, Fulham, London, S.W.6.  
 G5HB.—H. BILTCLIFFE, 28, Campbell Avenue, Holgate, Yorks.  
 G5KW (ex 2C6NX).—Cpl. K. E. S. ELLIS, 2nd Battalion Scots Guards, Stanhope Lines, Aldershot, Hants.  
 G5LT.—E. S. ELLIOTT, 70, Carterknowle Road, Sheffield, Yorks.  
 G5VD.—JOHN DALE, 12, Langley Terrace, Crosland Road, Oakes, Huddersfield, Yorks.  
 G5VG.—W. J. MILLER, Cramond, Gordon Avenue, Stanmore, Middlesex.  
 G6BS.—B. M. SCUDAMORE, "The Plot," Manton Drive, Luton, Beds.  
 G6SM.—S. G. MORGAN, "Beggar's Roost," Glebe Hyrst, Sanderstead, Surrey.  
 G8IZ.—S. PALMER, 21, Picton Avenue, Runcorn, Cheshire.  
 G8JH.—G. F. BUDDEN, 82, Kenton Road, Northwick Park, Harrow, Middlesex.  
 GM8KQ.—A. & J. DUNSIRE, 21, College Street, Buckhaven, Fife, Scotland.  
 G8KU.—P. B. BRISCOMBE, 48, Fieldside, Northstead, Scarborough, Yorks.  
 G8LU.—W. A. HOSKINS, 46, Woodside Green, South Norwood, London, S.E.25.  
 G8MD.—J. A. DRINKALL, Cuerdale Hall, Samlesbury, Lancs.  
 GM8MN.—W. F. McAINSH, Kinrara, Crieff, Perthshire, Scotland.  
 GM8MQ.—JACK MILLIE, 79, Omar Crescent, Buckhaven, Fife, Scotland.  
 2ADB.—D. L. BREEDEN, 4, St. Andrew's Street, Cambridge.  
 2AMF.—P. A. TREMAINE, "Rose Cottage," Rivenhall, Witham, Essex.  
 2AUR.—N. T. HODGSON, "Shirley," Boston Road, Spilsby, Lincs.  
 2BJC.—J. ELPHICK, Burnham College, Somerset.  
 2BJQ.—J. M. BARRETT, c/o Bank House, Greaves Street, Oldham, Lancs.  
 2BKC.—B. COIA, 14, Waterside Street, Strathaven.  
 2BND.—D. E. DAVY, 59, East Road, Maygrove, Great Yarmouth.  
 2BNM.—J. B. LONGRIDGE, Rathlin, Mobberley, Cheshire.  
 2BUJ.—J. TROY, 35, Hermiston Avenue, Springboig, Glasgow.  
 2CFG.—W. C. HOLLEY, "Grafton," Locking Road East, Weston-super-Mare, Somerset.



2CIW.—S. STEPHENSON, 21, North Marine Road, Scarborough, Yorks.  
 2CMG.—G. A. TIBBITTS, 6, Cactus Walk, London, W.12.  
 2CMN.—N. WHYVEL, 245, Geneva Road East, Darlington, Co. Durham.  
 2CNT.—W. A. MILLER, 37, Bee Fold Lane, Atherton, Lancs.  
 The following are cancelled:—G6BP, 2ASP, 2AWQ, 2BBF, 2BGS.

## NEW MEMBERS

### HOME CORPORATES.

E. HARGREAVES (G6BB), 21, Agincourt Road, Hampstead, N.W.3.  
 W. DAVIDSON (GM6TF), 12A, Erskine Street, Alloa, Scotland.  
 S. R. WATSON (G18GK), 11, Salisbury Gardens, Antrim Road, Belfast, N.I.  
 W. H. SKIDMORE (G8JS), 19, Milton Road, Wallington, Surrey.  
 H. G. HANLEY (G8LP), 20, Uplands Avenue, Bradmore, Wolverhampton.  
 H. S. TRIM (2AAO), 133, Wavertree Road, Streatham Hill, S.W.2.  
 D. L. LEETE (2AFZ), 43A, Cannon Hill, Southgate, N.14.  
 A. LEESE (2ATI), 12, Sherwood Road, Lightwood, Stoke-on-Trent, Staffs.  
 G. BELSEY (2BIX), 70, York Road, King's Heath, Birmingham, 14.  
 J. H. LAMBERT (2BNL), 4, Bridge Road West, Battersea, S.W.11.  
 L. F. WILLIS-BRANDT (2BNT), 9, Chapel Hill, Harrow Weald, Middlesex.  
 P. H. ASKEW (2BPH), 96, Main Street, Sedburgh, Yorks.  
 K. H. MAWER (2CDR), 35, Kent Road, Littlehampton, Sussex.  
 A. S. THOMAS (2CFX), Roseland, Kittle, Bishopston, Swansea, Glam.  
 G. STRACHAN (2CJR), Station Square, Aboyne, Aberdeenshire.  
 C. LANCASTER (2CKD), 12, Stanley Road, Lytham, Lancs.  
 M. N. SALMON (2CKM), Southesk, 1, Finch Lane, Bushey, Herts.  
 K. W. HARBRIDGE (2CLN), "Emrick," Hampton Gardens, Prittlewell, Essex.  
 J. EDDY (BRS2807), 55, Greenbank Avenue, Lipson, Plymouth, Devon.  
 J. K. FISH (BRS2808), 10, Victoria Avenue, Sleaford, Lincs.  
 W. K. MITCHELL (BRS2809), High Street, Moffat, Dumfries.  
 W. McCANN (BRS2810), Radio House, Todd Lane, Lostock Hall, Lancs.  
 R. J. PULLIN (BRS2811), Linwood, Staysden Road, Bromham, Bedford.  
 E. T. WEBSTER, B.Sc., Ph.D. (BRS2812), 5, Diglands Avenue, New Mills, Stockport.  
 P. J. WELBOURNE (BRS2813), St. Stephens Road, Bridlington, Yorks, Ches.  
 K. M. WICKER (BRS2814), "Hillside," Cressage, near Shrewsbury, Salop.  
 A. L. FORGE (BRS2815), 61, Pettycur Road, Kinghorn, Fife.  
 M. S. MOORE (BRS2816), 7, St. Margaret's Avenue, Westhill, Torquay, Devon.  
 A. J. MARSHALL (BRS2817), Hill View, Meigle Street, Galashiels, Scotland.  
 T. W. BEHARRELL (BRS2818), 57, Belgrave Drive, Anlaby Road, Hull, Yorks.  
 W. H. BAKER (BRS2819), 16, Devonia Terrace, Alphington, Exeter, Devon.  
 R. R. RIX (BRS2820), 4, Glen Road, Lennoxton, Stirlingshire.  
 V. G. E. RANT (BRS2821), Edgcote, The Causeway, Steventon, Berks.  
 W. R. EADIE (BRS2822), 15, The Loaning, Whitecraigs, Renfrewshire.  
 R. SUNTER (BRS2823), Springbridge Road, Manchester, 16.  
 A. H. HOOKE (BRS2824), 14, Cedars Gardens, Brighton, 6, Sussex.  
 A. V. LORD (BRS2825), 41, Suthers Street, Redcliffe, Manchester.  
 R. A. FELL (BRS2826), Flan How, Ulverston, Lancs.  
 H. G. MEPHAM (BRS2827), 33, Balaclava Road, Derby.  
 W. R. NEWELL (BRS2828), 24, Shrubbery Road, Southall, Middlesex.  
 N. A. W. HOW, B.Sc. (BRS2829), 109, Thorlow Park Road, Dulwich, S.E.21.  
 J. J. COCKRILL (BRS2830), Junipers, Somerset Crescent, Westcliff-on-Sea, Essex.  
 B. T. KING (BRS2831), 146A, Queen Victoria Street, E.C.4.  
 W. H. SHIRLEY (BRS2832), Cross Gareg, Tutshill, Chepstow, Mon.  
 A. W. GOVER (BRS2833), 11, Rolfe Road, Charlton, S.E.7.  
 L. J. CLEGGETT (BRS2834), 2, White Cottages, Detling Hill, near Maidstone, Kent.  
 L. CARTER (BRS2835), 13, Letchworth Road, Ebbw Vale, Mon.  
 L. H. WEBBER (BRS2836), 18, Jesmond Crescent, Crewe, Cheshire.  
 D. SARSON (BRS2837), 366, Finchley Road, Hampstead, N.W.3.  
 P. KENYON (BRS2838), 30, Hartington Road, West Derby, Liverpool, Lancs.  
 W. GRANT (BRS2839), 136, High Road, Leyton, E.15.  
 K. W. TAUNTON (BRS2840), 238, Manningham Lane, Bradford, Yorks.  
 R. F. LAURENCE (BRS2841), Elsfeld, Ashley Road, Walton-on-Thames, Surrey.  
 G. J. CAYLESS (BRS2842), 46, Eastlake House, North Street, Marylebone, N.W.8.

G. E. PENNINGTON (BRS2843), The Hall, South Scarle, Newark, Notts.  
 S. G. NICHOLSON (BRS2844), "Sunnycroft," Cottingham, Newark, Notts.  
 J. TURNBULL (BRS2845), 106, Scott Street, Galashiels, Scotland.  
 W. A. COWAN (BRS2846), 4, Strathaven Terrace, Oban, Argyle.  
 R. HAILSTONE (BRS2847), 33, Etherington Road, Beverley High Road, Hull, E. Yorks.  
 J. R. BEE (BRS2848), 25, Craven Park Road, Stamford Hill, N.15.  
 DOMINION AND FOREIGN.  
 JEAN REGNAUD (VQ8AA), Box 163, Port Louis, Mauritius.  
 E. J. GRABB (W8DOD), 242, Herald Street, Rochester, New York, U.S.A.  
 L. MADGWICK (ZEIJG), Box 424, Bulawayo, S. Rhodesia.  
 A. C. DAVIDSON (ZS5AK), 20, Orange Grove, Greenwood Park, Natal, via Durban, S. Africa.  
 G. J. DENT (ZS6AM), Room 48, City Deep, Single Quarters, City Deep, Johannesburg.  
 A. H. DA FONSECA (BERS393), 587, Stamford Hill Road, Durban, S. Africa.  
 R. J. MOTASHAPUR (BERS394), New Ministry Building, Balaram Street, Bombay, No. 7.  
 H. E. HUNTER (BERS395), 97, Hamilton Avenue, Brakpan, Transvaal, S.A.

## R.S.G.B. Slow Morse Practices.

Details will be found below of the slow Morse practices organised by the Society for those members wishing to learn or improve their code. As usual, test matter will be taken from recent issues of THE T. & R. BULLETIN. The page number and month of issue will be given at the end of each test—by telephony. A telephony announcement will also be given at the commencement of each test to assist those interested in tuning in the sending station. It is emphasised that reports will be appreciated and are desired, in order to ascertain useful range of transmission and numbers utilising the service. If, however, a reply is desired, a stamp should be sent. Will stations in areas not at present served offer their services to Mr. T. A. St. Johnston (G6UT), 28, Douglas Road, Chingford, E.4. (Telephone: Silverthorn 2285.)

### SCHEDULE OF SLOW MORSE TRANSMISSIONS.

		B.S.T.	k.c.	Stations
April	21	Wednesday	2300	1775 G6ZQ
	21	Wednesday	2315	1741 GI6XS
	22	Thursday	2200	7184 G6UA
	23	Friday	2315	1852 G5DY
	24	Saturday	2300	7145 GI5QX
	25	Sunday	0915	1775 G6ZQ
	25	Sunday	0945	7155 GI5UR
	25	Sunday	1000	7260 G5JL
	25	Sunday	1015	1825 G5SU
	25	Sunday	1330	7180 G2YV
	26	Monday	2300	1741 GI6XS
	27	Tuesday	2200	7184 G6UA
	28	Wednesday	2300	1775 G6ZQ
	28	Wednesday	2315	1741 GI6XS
	29	Thursday	2200	7184 G6UA
	30	Friday	2315	1852 G5DY
May	1	Saturday	2300	7145 GI5QX
	2	Sunday	0915	1775 G6ZQ
	2	Sunday	0945	7155 GI5UR
	2	Sunday	1000	7260 G5JL
	2	Sunday	1015	1825 G5SU
	2	Sunday	1330	7180 G2YV
	3	Monday	2300	1741 GI6XS
	4	Tuesday	2200	7184 G6UA
	5	Wednesday	2300	1775 G6ZQ
	5	Wednesday	2315	1741 GI6XS
	6	Thursday	2200	7184 G6UA
	7	Friday	2315	1852 G5DY
	8	Saturday	2300	7145 GI5QX
	9	Sunday	0915	1775 G6ZQ
	9	Sunday	0945	7155 GI5UR



		B.S.T.	k.c.	Stations
May	9	Sunday	1000	7260 G5JL
"	9	Sunday	1015	1825 G5SU
"	9	Sunday	1330	7180 G2YV
"	10	Monday	2300	1741 GI6XS
"	11	Tuesday	2200	7184 G6UA
"	12	Wednesday	2300	1775 G6ZQ
"	12	Wednesday	2315	1741 GI6XS
"	13	Thursday	2200	7184 G6UA
"	14	Friday	2315	1852 G5DY
"	15	Saturday	2300	7145 GI5QX
"	16	Sunday	0915	1775 G6ZQ
"	16	Sunday	0945	7155 GI5UR
"	16	Sunday	1000	7260 G5JL
"	16	Sunday	1015	1825 G5SU
"	16	Sunday	1330	7180 G2YV
"	18	Tuesday	2200	7184 G6UA
"	19	Wednesday	2300	1775 G6ZQ
"	19	Wednesday	2315	1741 GI6XS
"	20	Thursday	2200	7184 G6UA

### Visit to Paris

Mr. Max Buckwell (G5UK), 19, Meadway, West-cliff-on-Sea, is again arranging a Continental trip during the August Bank Holiday period. Members who took part in the previous visits abroad under Mr. Buckwell's direction need no reminding that a good time is assured.

The party will leave London at 8.20 p.m. on Friday, July 30, and will return at 6 a.m. Tuesday, August 3.

The fare has been tentatively fixed at £4 10s. and this will include :—

Return fare (2nd class).

Reserved accommodation on the train.

Accommodation in Paris (bedroom and plain breakfast, commencing July 31, and terminating August 2).

Gratuities to hotel servants to the extent of accommodation provided.

Transfer between station and hotel on arrival and departure from Paris.

No passports will be required.

Mr. Buckwell is arranging some interesting visits, but it is imperative that he should be advised as early as possible of those attending, because hotel accommodation is difficult to secure owing to the overcrowding in Paris caused by the Exhibition. Members who wish to join the party are asked to communicate with G5UK direct, enclosing a stamped, addressed envelope.

### Reports Wanted

ZB1L (Malta) on his 14,240 kc. transmissions. Reports will be acknowledged.

VS2AK, whose QRA is c/o General Electric Co., Kuala Lumpur, F.M.S., is using telephony on 14,095 kc., and is looking for G contacts. Best time around 17.00 G.M.T.

G2JY (Sheffield) would appreciate reports on his 1,746.5 kc. transmissions. All reports will be acknowledged.

## DEATH OF BRIG.-GENERAL SIR CAPEL HOLDEN

It is with great regret we have to record the passing of another of our Past Presidents: Brig.-General Sir Capel Holden, K.C.B., F.R.S., who died on March 30 at the advanced age of 81. Sir Capel was President during the years 1926-1927 and was well known to many of our older members. In addition to his two years as President he had taken the chair during the Presidency of Sir Oliver Lodge and took a prominent part in the reorganisation of the Society, including the Incorporation. He also represented the Society on the Committee of the House of Commons during the drafting of the Wireless Telegraph Act.

Sir Capel was keenly interested in the radio developments after the War and was enthusiastic for the well-being of the Society. He rarely missed a Council meeting or a lecture during his term of office and in spite of his advanced age he adapted himself to the interests of the younger members for it was plain to him that they were destined to form the backbone of the Society in the future.

Apart from his interests in radio, Sir Capel was well known in other branches of science. He was a pioneer motorist, and the writer well remembers an early motor tricycle

constructed by him in the very early days. He afterwards became chairman of the Royal Automobile Club and during the War came out of his retirement to serve his country as Director of Transport. He was also a Vice-President of the Institution of Electrical Engineers and one of the founders of the Royal Aero Club.

In his military career he had seen long service in India, where his scientific knowledge was of great service in the establishment of field telegraphs in the Army. He related to the writer many anecdotes of his experiences, which were most entertaining, and on one occasion gave a lecture on the subject before the R.S.G.B. He subsequently took up inspection work at Woolwich Arsenal, where he remained until his retirement.

The writer served as Secretary during the Presidency of Sir Capel Holden and will always remember the assistance given by him in the work of the Society and the kindly sympathy he extended to the younger members. Like our other Presidents who have passed away, he will retain a place in the memory of all those who knew him.

H. B. S.



# NOTES and NEWS



# BRITISH ISLES

## DISTRICT REPRESENTATIVES.

### DISTRICT 1 (North-Western).

(Cumberland, Westmorland, Cheshire, Lancashire.)  
Mr. J. NODEN (G6TW), Fern Villa, Coppice Road, Willaston,  
near Nantwich, Cheshire.

### DISTRICT 2 (North-Eastern).

Yorkshire (West Riding, and part of North Riding).  
Mr. L. W. PARRY (G6PY), 13, Huddersfield Road, Barnsley,  
Yorks.

### DISTRICT 3 (West Midlands).

(Warwick, Worcester, Staffordshire, Shropshire.)  
Mr. V. M. DESMOND (G5VM), 199, Russell Road, Moseley,  
Birmingham.

### DISTRICT 4 (East Midlands).

(Derby, Leicester, Northants, Notts.)  
Mr. J. J. CURNOW (G6CW), "St. Anns," Bramcote Lane, Wollaton  
Notts.

### DISTRICT 5 (Western).

(Hereford, Oxford, Wiltshire, Gloucester.)  
Mr. J. N. WALKER (G5JU), 4, Frenchay Road, Downend, Bristol.

### DISTRICT 6 (South-Western).

(Cornwall, Devon, Dorset, Somerset.)  
Mr. W. B. SYDENHAM (G5SY), "Sherrington," Cleveland Road,  
Torquay.

### DISTRICT 7 (Southern).

(Berkshire, Hampshire, Surrey.)  
Mr. E. A. DEDMAN (G2NH), 75, Woodlands Avenue, Coombe,  
New Malden, Surrey.

### DISTRICT 8 (Home Counties).

(Beds., Cambs., Hunts., Rutland and the town of Peterborough.)  
Mr. G. JEAPE (G2XV), 89, Perne Road, Cambridge.

### DISTRICT 9 (East Anglia).

(Norfolk and Suffolk.)  
Mr. H. W. SADLER (G2XS), "The Warren Farm," South Wootton,  
King's Lynn, Norfolk.

### DISTRICT 10 (South Wales and Monmouth).

Capt. G. C. PRICE (G2OP), The Mount, Pembroke Dock.

### DISTRICT 11 (North Wales).

(Anglesey, Carnarvon, Denbighshire, Flintshire, Merioneth,  
Montgomery, Radnorshire.)  
Mr. D. S. MITCHELL (G6AA), "The Flagstaff," Colwyn Bay,  
Denbighshire.

### DISTRICT 12 (London North and Hertford).

(North London Postal Districts and Hertford, together with the  
area known as North Middlesex.)  
Mr. S. BUCKINGHAM (G5QF), 41, Brunswick Park Road, New  
Southgate, N.11.

### DISTRICT 13 (London South).

Mr. J. B. KERSHAW (G2WV), 13, Montpelier Row, Blackheath  
S.E.3.

### DISTRICT 14 (East London).

(East London and Essex.)  
Mr. T. A. ST. JOHNSTON (G6UT), 28, Douglas Road, Chingford, E.4.

### DISTRICT 15 (London West).

(West London Postal Districts, Bucks, and that part of Middlesex  
not included in District 12.)  
Mr. H. V. WILKINS (G6WN), 81, Studland Road, Hanwell, W.7.

### DISTRICT 16 (South-Eastern).

(Kent and Sussex.)  
Mr. W. H. ALLEN (G2UJ), 32, Earls Road, Tunbridge Wells.

### DISTRICT 17 (Mid-East).

(Lincolnshire and Rutland.)  
Rev. L. C. HODGE (G6LH), 4, Thorold Street, Boston.

### DISTRICT 18 (East Yorkshire).

(East Riding and part of North Riding.)  
Mr. W. A. CLARK (G5FV), "Lynton," Hull Road, Keyingham,  
E. Yorks.

### DISTRICT 19 (Northern).

(Northumberland, Durham, and North Yorks.)  
Mr. H. C. D. HORNSBY (G5QY), "Newlands," 105, Kenton Lane  
Newcastle-on-Tyne, 3.

### SCOTLAND.

Mr. JAMES HUNTER (G6ZV), Records Office, 51, Camphill Avenue,  
Langside, Glasgow.

### NORTHERN IRELAND.

Mr. T. P. ALLEN (G16YW), 62, Balmoral Avenue, Belfast.

NEW MEMBERS ARE CORDIALLY INVITED TO WRITE TO THEIR LOCAL DISTRICT REPRESENTATIVE.

### DISTRICT 1 (North-Western).

**M**ANCHESTER and District.—An attendance of 27 was recorded at the last Manchester meeting, 2DF (the TR for Warrington) bringing with him 2CDC, 2AUQ and G8IZ, who were very welcome.

The night was given over to 56 Mc. tests, a number of members bringing 56 Mc. receivers, while G2RA kindly put out test transmissions from his own station, attempts being made to receive these on the various sets at the meeting. It is proposed to hold another 56 Mc. night in the near future, and to have two or three mobile transmitters out during the tests, so please watch for further announcements.

### Radio Exhibition

We are pleased to announce that the London Radio Exhibition will be held between Wednesday, August 25, and Saturday, September 4.

Steps are being taken to organise a Society Stand at Olympia, and, as usual, we shall be grateful for any offers of assistance.

Convention will be arranged for the period September 2-4. We hope to arrange an interesting programme, details of which will appear later in the year.

The following stations report active: G5YD 2BDA, 5OZ, 2HW, BRS2674, 2BMG, BRS2657 6KS, 8BI, 5PX, 6TL, BRS2793 (a new member to whom we extend a hearty welcome), 2GA

BRS2045, 2ATZ, 2BCL 2ARC, 2DH, 2OI, 5WR 2RA and 2WQ. Three prospective new members also attended the last meeting.

Please note that members having spare apparatus for disposal should bring it along to the next meeting for sale. A deduction of 10 per cent will be made from the proceeds towards N.F.I.

funds. Gifts of spare apparatus will also be appreciated by the group.

Please remember N.F.D. on June 5, also the 56 Mc. Field Day on Sunday, July 4. Any sug



gestions or offers are welcome and should be sent to G2OI, whose address as from May 1 will be 25, Boothfields, Winton, near Manchester.

*Birkenhead, Wirral and District.*—Reports are very scarce again, but G8AA is active on 1.7 Mc., 2BDT has been working hard at B.E.R.U. receiving contest, and congratulations are due to 2BXO, who has passed Morse Test and awaits call sign. Other active stations include 2AHG, 2FZ and 6GL. 2BON has not given up radio, but is temporarily off the air with exams. 6CX is testing new telephony transmitter on dummy antenna

and hopes to be radiating by the time these notes are in print.

It is hoped to run a 56 Mc. portable station during the 56 Mc. National Field Day in the Birkenhead district, and the T.R. will be glad if members who can help will get into touch with him.

*Blackpool.*—The Annual General Meeting of the Blackpool and Fylde Short Wave Radio Society was held on March 4, and all officers were re-elected as follows:—

BRS2269, President; G6MI, Chairman; 5MS, Vice-Chairman; 8AK, Treasurer; 8GG,

## FORTHCOMING EVENTS

April 16.—Scotland "H" District Annual Dance, at the "Rialto," High Street, Kirkcaldy, 8 p.m. to 2 a.m. Tickets 2s. each.

„ 17.—Southend Radio Society Dinner and Dance. London Hotel, High Street, Southend-on-Sea.

„ 18.—Scotland "H" District, 2.30 p.m., at 3a, Bank Street, Kirkcaldy.

„ 18.—District 4 Conventionette, 3.30 p.m., at Trent Bridge Hotel, Nottingham. Discussion on Crystals by Mr. E. A. Dedman (G2NH).

„ 20.—District 12 (N. London), 7.30 p.m., at The Café, Landers Corner, Waterfall Lane, N.11.

„ 21.—Scotland "H" District, 7.30 p.m., at 3a, Bank Street, Kirkcaldy.

„ 21.—District 6 (Exeter Section), 8 p.m., at the Y.W.C.A., Exeter.

„ 21.—Scotland "D" District, 7.30 p.m., in the R.S.A. Rooms, 16, Royal Terrace, Edinburgh.

„ 21.—District 13 (Wandsworth Area), 8 p.m., at the Collingwood, 7, Plough Road, Battersea.

„ 21.—District 1 (Liverpool Section), 7.30 p.m., at 38, Mason Street, Paddington, Liverpool.

„ 21\*.—District 15, 7.30 p.m., at G8IH, Lyndon Lodge, Golden Manor, Church Road, Hanwell. Discussion on Field Days.

„ 22.—District 6 (Torquay Section), 7 p.m., at G5SY, "Sherrington," Cleveland Road, Torquay.

„ 22.—District 13 (Anerley, Tooting, Brixton, Kennington, and New Cross Area), 8 p.m., at the Brotherhood Hall, West Norwood.

„ 23.—District 14 (East Essex Section), 8 p.m., at G2KT, "Newsonia," Bull Lane, Rayleigh.

„ 25.—Scotland "H" District, 2.30 p.m., at 3a, Bank Street, Kirkcaldy.

„ 25.—District 8 Conventionette, at Cambridge. (See separate announcement.)

April 27.—District 14 (East London), 8 p.m., at G8AB, "Tree Tops," 35, Priory Road, Loughton.

„ 27.—District 12 (Watford Group), 7.30 p.m., at G5RD, "Ashleigh," 71, Abbots Road, Abbots Langley, Herts.

„ 28.—Scotland "A" and "E" Districts, 7.30 p.m., in Room "A," Institution of Shipbuilders and Engineers, 39, Elmbank Crescent, Glasgow.

„ 30.—London Meeting at I.E.E. Tea at 6 p.m. Lecture on "Some Aspects of High Definition Television Reception" by Mr. T. D. Humphreys, at 6.45 p.m.

May 1.—District 17 Conventionette, 5 p.m., at Vane Arms Hotel, Stockton-on-Tees. (See separate announcement.)

„ 2.—North-Eastern Provincial District Meeting, at Windmill Hotel, Blossom Street, York. (See separate announcement.)

„ 2.—Scotland "H" District, 2.30 p.m., at 3a, Bank Street, Kirkcaldy.

„ 2.—District 7, 2.30 p.m., at the Royal Hotel, Stoughton, Guildford, Surrey.

„ 5.—District 6 (Exeter Section), 8 p.m., at the Y.W.C.A., Exeter.

„ 5.—S.L.D.R.T.S., 8 p.m., at the Brotherhood Hall, West Norwood.

„ 5.—Scotland "H" District, 7.30 p.m., at 3a, Bank Street, Kirkcaldy.

„ 5.—Scotland "D" District, 7.30 p.m., in the R.S.A. Rooms, 16, Royal Terrace, Edinburgh.

„ 5\*.—District 1 (Manchester Section) Meeting at Brookes Café, 1, Hilton Street, off Oldham Street, Manchester. Discussion on N.F.D. and 56 Mc. Field Days.

„ 9.—Scotland "H" District, 2.30 p.m., at 3a, Bank Street, Kirkcaldy.

„ 9.—District 6 Conventionette at Plymouth. (See separate announcement.)

\* Sale of disused apparatus at these meetings.



Secretary; 6VQ and Mr. Duckworth making up the Committee.

The Society is making arrangements for some intensive 56 Mc. work during the summer, due largely to the keenness of G6MI and 2CJP.

Stations active include G5MS on 14 Mc. and 6VQ, 6YV, 8AK and 8GG on 7 Mc. 2ARL is awaiting news from G.P.O. re application for full licence; 6MI and 2CJP have now been successful with MOPA on 56 Mc., and are waiting for a QSO. What about it, Southport and District 1 generally? 6MI is willing to arrange schedules at almost any time and day. 2CKD is a new call and a new member who is busy collecting apparatus.

*Rochdale.*—Active stations include G8DJ, 6AX, 6QA and BRS1152. 6QA is active on 14 Mc., but finds conditions very patchy. He is of the opinion that link coupling between the Zepp tuning coil and receiver input helps to eliminate images in the single signal super.

*Liverpool and District.*—The monthly meetings continue to be well attended and it is hoped that the forthcoming summer period will see active co-operation between the Liverpool, Manchester and North Wales groups, particularly on 56 Mc.

Members listened with interest to a talk by Mr. Ellis on Rediffusion of Broadcast programmes, given at the March meeting, and the remainder

## NORTH EASTERN PROVINCIAL DISTRICT MEETING

SUNDAY, MAY 2, 1937

at

WINDMILL HOTEL, BLOSSOM STREET,  
YORK

Assemble	...	...	1 p.m.
Lunch	...	...	1.30 p.m.
Business Meeting	...	...	2.30 p.m.
Tea	...	...	4.30 p.m.

Inclusive Charge 5/-

Reservations to Mr. L. W. Parry, G6PY, 13,  
Huddersfield Road, Barnsley, not later than  
Wednesday, April 28.

of the time was devoted to the subject of N.F.D. The site to be selected this year will be in the Heswall district of the Wirral peninsular, and members residing in that area are asked to look out for a suitable situation.

There are no individual reports of sufficient interest for publication this month, but the usual activity prevails.

### DISTRICT 2 (North Eastern).

Members are asked to make a note of the Provincial Meeting at York on May 2, and to send a note to G6PY, if they intend being present.

*Barnsley.*—There was a very fine attendance at the demonstration of the cathode ray oscillograph given by Mr. Shaw, of Messrs. Cossor, Ltd., and as a result a few more members were enrolled. Active stations include G6PY, 6LZ, 5KM, 5UA, 5IV, 2BH, 8IJ, 2BNN, 2BHM and 2CGD.

*Huddersfield.*—Reports are nil, but very interesting meetings are held at G6RO and 2ALU.

A letter budget, started by 5VD, has been well received. Six members have promised to attend York and those desiring transport should contact the T.R., who has moved to a new QRA, 12, Langley Terrace, Crosland Road, Oakes, Huddersfield, where he has more scope for the erection of aërials.

*Leeds.*—At a meeting of the Leeds Radio Society G6GA gave an interesting talk on "Valves and Their Characteristics"; another talk on "Aërials" is promised in the near future. G6GA is rebuilding for 50 watts, 6HA is testing a W3EDP aërial, BRS2317 active on 14 Mc. and 2439 on 28 and 56 Mc. The T.R. asks for more co-operation and hopes to see all local members at York.

*Bradford.*—Membership is slowly increasing and we are pleased to record the re-entry into amateur radio of an old-timer, Mr. L. Waddington (G8LW). Reports on his 1.75 Mc. signals will be welcomed.

## DISTRICT 4 CONVENTIONETTE

SUNDAY, APRIL 18, 1937

at

TRENT BRIDGE HOTEL, NOTTINGHAM

Assemble ... .. 3 p.m.

Talk by Mr. E. A. Dedman on "Quartz Crystals."

Most stations appear to be active and it is hoped that a good attendance at York will be made by the district. It would be appreciated if members going by car and having a spare seat would take along a fellow member, as the railway facilities are not too good.

*Sheffield.*—The T.R., in company with 2CFA, has just completed a series of visits to the local members, and thanks are extended to them for their hospitality. Members are asked to assist in the work of the N.F.D. and to turn up in good numbers at York. Most stations are active, including G8IN testing aërials, 8KT on 7 Mc., 6LF on 14 and 28 Mc., 5TO testing doublet on 28 Mc., 8JP on 7 Mc. after illness, 6PJ on 14 Mc. and now WAC and WBE, 5HK rebuilding, 2JY on 1.75 Mc., 2MF and 2AS on 14 Mc., 2CHA building transmitter, 2AWQ now G2LT and active on 7 Mc., 2BXA preparing for morse test, 2CFA busy with Morse, 2CBQ building transmitter, 2BGM passed Morse test and awaits call. Other active stations include G2DJ, 8IO, BRS2282 and 2293. Best wishes are sent to our new member, Mr. Beardow, who is applying for an AA licence.

### DISTRICT 4 (East Midlands)

The meetings held at Nottingham are very creditable in that a regular attendance of between 30 and 35 members can be relied upon, and considering the journey some make, it is very encouraging for the D.R. The meeting held at Nottingham on March 21 was no exception to this rule, Leicester being well represented. After tea several items were discussed, and 2WS gave a very interesting discourse on 56 Mc. The District is sitting up and taking notice in and around 56 Mc., and 2WS should now obtain all the co-operation he needs. Field Day arrangements were finally settled, no blows



being exchanged regarding choice of bands or locations—in fact it was a case of "After You" between two of the sections!

The D.R. made some very strong pointers regarding Pirates, and stated that co-operation was necessary to exterminate this very unnecessary evil, so now is the time for "Spring Cleaning." Unsavoury matters are always cropping up, and here is another, i.e., Terrible Spitch; some members have other names for it, but the 7 Mc. band sounds like a hot bed of conspiracy, and Foreign Hams are not always to blame. Attention was drawn to District Notes by 5TT owing to remarks made to the effect that only certain of the "Upper Ten" are fortunate enough to have their Calls printed free gratis by the Society! It should be clear that others read the BULLETIN besides those who insist upon having their pound of flesh; if matter of interest is forwarded it will be included.

Reverting back to Field Day, several 56 Mc. stations will be in operation, and it is believed that several new permits will be in vogue by then.

The next Meeting, which is our Annual Conventionette, will be held at the Trent Bridge Hotel, Nottingham, on April 18, 1937, at 3.30 p.m. Mr. E. A. Dedman, *Quartz Crystal Co.*, has kindly consented to give a talk on crystals and other items of interest.

G6MN, 5KG, 2BKI and another represented No. 4 District at the Coventry P.D.M. 8CR is temporarily inactive, but has been fortunate to contact several North American stations using less than 10 watts, and at present is re-designing his TX and installing a Jones Exciter; he also reports hearing K6-K7 on 7 Mc. Several A.A.s are believed to be completing that little bit extra towards their full licence: these include 2AII, 2BIC, 2CAJ, and exclude 8NI (ex-2AKF) and 8LD (ex-2AAW). To these last we offer congratulations, and the best of luck to the three AAs, in fact to all the AAs.

#### DISTRICT 5 (Western)

Now that the B.E.R.U. and A.R.R.L. contests are over, much thought and preparation is being made for the N.F.D. event in June. The new arrangements will entail considerably more work, but they are welcomed by all. Bristol will run two separate stations, several miles apart, one on 14 Mc. and another on 1.7 Mc. Gloucester is looking after the 7 Mc. and Cheltenham the 3.5 Mc. station.

Activity is well maintained in Bristol, all bands being in use. G5FS has built and is testing 56 Mc. gear and will be taking part in the 56 Mc. N.F.D., is also will G5JU. Will other stations who intend participating in this event please notify the D.R. so that ample separation between stations can be arranged?

2BHV had the pleasure of visiting G6GM, of Iolsworthy, during the month—the latter would like to see other Bristol members who pass his way. BHV and 5KT gave a talk and demonstration on "Amateur Radio" before a local Boy Scout association and aroused a good deal of interest.

The Committee recently formed have been getting down to business and have an interesting report to make at the next meeting.

The B.A.R.S. is making good progress and is now fully licensed under the call G8LL, for all amateur bands.

G8DP gave an interesting lecture recently on the design of receivers.

The Cheltenham members paid an enjoyable visit to the Post Office Repeater Station at Gloucester and found the apparatus used extremely interesting. G5BM awaits cards for W.B.E. and W.A.C., whilst 2BLS has become G8ML.

In and near Gloucester, G2HX, 5JH, and 5HC are active. 2HX has been doing well on 28 Mc. and has worked all W and VE districts several times. 2AYP is building a new receiver.

### DISTRICT 6 CONVENTIONETTE

SUNDAY, MAY 9, 1937

at

CONTINENTAL HOTEL

(near Millbay Station), PLYMOUTH

Assemble ...	...	12 noon
Luncheon ...	...	1 p.m.
Station Visits ...	...	2 p.m.
High Tea ...	...	5 p.m.
Discussion and N.F.D.		
Films ...	...	6 p.m.

#### DISTRICT 6 (South-Western)

There are two matters requiring special mention this month. The first is the District 6 Conventionette, which is due to take place at Plymouth next month. It is sincerely hoped that this function will be every bit as successful as that of last year, when, thanks to the efforts of the Exeter members, there was a record attendance. The date of this event is Sunday, May 9, and it will be held at the Continental Hotel, near Millbay station, Plymouth. Will all and sundry please keep this date in mind? All District 6 members will be circularised early and the D.R. would be grateful if members who intend coming would reply as soon as possible.

The other point is in connection with the district's activities on 56 Mc. It has been decided to extend the range of competition in connection with the G2CI Cup. This year there will be two distinct Field Days on 56 Mc., the first, probably held some time in July, will be confined to pure CW transmission and reception, while the second, in August, will be for 'phone and ICW. For purposes of the Cup competition the scores for the two days will be added together. It has also been decided to hold a reception contest at the same times. There will be a trophy for this as well, but this competition will be restricted to those who are not in possession of a G.P.O. portable 56 Mc. permit.

*Exeter.*—Meetings continue to be well attended. Discussions on various types of receivers still hold the field. The reason last month's notes were missing was that the T.R. had been very ill. We all sincerely hope that he is fit again and able to carry on his good work.

*Taunton.*—The March meeting consisted of a visit to the Taunton Automatic Telephone Exchange. Members present were 5AK, 6LQ, 8JF, 8GB, 2BAM, 2BJC, 2BVC and 2CFG. The D.R. hopes the missing Budget is under way again.



*Penryn.*—We are sorry to announce that the T.R. for Penryn, G6LV, has had to give up his office. Private circumstances have forced him to this decision. We shall all be very sorry to lose him as he has done his work during the past year or so most nobly. We all thank you very much, LV, for what you have done for us and we wish you the best of luck.

*Torquay.*—A very successful meeting was held, there being a total attendance of fourteen, including one prospective member. N.F.D., Conventionette and the 56 Mc. Field Days were all discussed. Members were interested in a demonstration of the 1937 Super Sky rider. BRS1581 is now 2CMF. Congratulations!

### DISTRICT 7 (Southern).

At the March meeting at Guildford N.F.D. was discussed and it was decided to put four stations on the air: 1.7 Mc. near Guildford, 3.5 Mc. at Southsea, 7 Mc. at either Walton-on-the-Hill or Pitch Hill, and 14 Mc. at Reading. The next meeting will be held at Guildford on Sunday, May 2, at 2.30 p.m.

*Guildford.*—G6LK made first contact on 28 Mc. with VP5PZ, with 6GS standing by for second contact, this being accomplished. 6GS was only on for two days in the 'phone contest, but had a "beanfeast" on the first Sunday, making 65 contacts on 28 Mc. 5WP active on 28 Mc. 'phone. 5CM worked HK1JB on 28 Mc., which qualifies him for W.A.C. All contacts have been made with  $7\frac{1}{2}$  watts input. He has also worked W6DOB, SU1JT, W9BU, W4BSJ, W6CXW (R7), W6BYB (R6), W5LW, on 28 Mc., and on 14 Mc. raised W6OAJ and VK7KR. BRS1535, who is confining his activities to 56 Mc., heard the following stations at a distance of more than ten miles: G2MV, 6RS, 5JW and 8IX.

*Croydon.*—There is a lot of activity amongst the Croydon members, and several are finding the QRM on 14 Mc. rather trying, hence the building of Supers by G2KU, 2CHQ, and 2BFQ. 5XH has his S.S. Super working well. 5AN is still contacting a number of W and VE Stations with a vertical dipole, reflector and director. 2KU only requires a South American for W.A.C. 2MV has been concentrating solely on 56 Mc., but will probably soon be heard again on 28 Mc. 5XW is chiefly on 7, both with C.W. and 'phone. (Reports please OM's by the 20th.—D.R.)

*Bournemouth.*—5PB is trying out a Collins Coupler, and has been keeping a daily schedule with W2IXY on 14 Mc. 'phone for over a month. 2NS has forsaken 7 Mc. for 14 Mc. and is getting good reports from SU and W, using his new transmitter and a 68-ft. aerial with 27-ft. feeders tuned in parallel. 5OH is pursuing quality on 14 Mc. and is testing out a beamed Windom aerial. He reports his call is being pirated on 1.7 Mc. and as he has not been on that band for some weeks, he will be glad of any information that will help in locating the offender, who is believed to be local. 8KX has joined the Society and is welcomed to the fold. 2ACA, who is having trouble with his speech amplifier/modulator, is building monitors for C.W. and 'phone, and is compiling a frequency register. Will all local members send him their

frequencies and ask neighbouring non-members to do so as well so that the register may be as complete as possible? (Please send your reports to the T.R. not later than the 20th of each month, otherwise they cannot be published.—D.R.)

*Kingston.*—G8HN is now constructing a 14 Mc. transmitter of special design for C.W. and 'phone. 56 Mc. activity is increasing. 6RS is working nightly; 6BI of Egham, 8IX, and 5MA of Ashstead are starting up; whilst 5JW of Wimbledon is crystal-controlled with comparatively high power, judged by the customary power portable 5-meter rig. The Kingston and District Society's 56 Mc. group is now issuing schedule cards which will gladly be sent to members who apply to 6RS. BRS2326 of Morden reports good listening on 28 Mc.; and BRS2716, a new member from Kingston Hill will be using a new receiver soon.

*Portsmouth.*—The South Hants R.T.S. at the March meeting discussed the forthcoming summer activities, including N.F.D. arrangements. Congratulations to G8LO on his full call, he is on 7 and 14 with break-in. 8BD is now licensed for 28 Mc., whilst 6NZ has built a 50-watt P.A. for that band, and is trying link-coupled aerial. 2XC continues his excellent work on 28 Mc., and is trying a superhet shortly. 5XY is active once again with a pair of 6L6's. 2ZR is doing well under difficulties, no mains. 6WS is once more rebuilding. 2BCM, 2CBL, 2AZX busy with receiving data. BRS1319, 1907, 2727, 2VH—all active.

*Southampton.*—G5PT had no success with Windom aerial, and has now replaced it by his original Zepp. He has worked VU2CQ and thus obtained his phone W.A.C. G2IL on 7 Mc. is planning comprehensive rebuild. G5OB is using full-wave Zepp on 14 Mc., and has had better results than with any other type he has tried. 2ATT has erected 7 and 14 Mc. aeriels, and is looking forward to the day when he will have two-letter call. 2AND is applying for full licence. 2BFS and BRS207 active. G8DM is testing matched impedance feeder systems. At the March meeting an interesting talk was given by BRS207 on "Propagation."

*Reading.*—At the March meeting of the R.T. and R.S. 12 members were present, and once again a radio questionnaire was put up, this time by G5RT, the prize being won by G2IT. General discussion followed mostly on Field Day topics. We are pleased to welcome BRS2794 to the district. G5AO has W.A.C. certificate. G2YB and 5HF now partly active on 28 Mc. G5HH and 6GI heard working break-in and telephony on 14 Mc. G5TB has gone to Bahrain Island, and we hope soon to work him under a VS8 call. Most stations are active, particularly G2YB, 2IT, 5AO, 5HH, 6GT, 6WO, and 8JL. The next meeting will be on Wednesday, April 14.

### DISTRICT 8 (Home Counties)

At a meeting held at The Fitzroy Arms in Cambridge on March 12 it was encouraging to note that the attendance had increased to 18; an interesting evening was spent by all. After opening remarks by the D.R., matters such as N.F.D. and the forthcoming Conventionette were discussed and



some length. Certain members enrolled as operators for the N.F.D. event, but more are needed, so will those willing to help please notify the D.R. without delay. It was decided to temporarily postpone meetings at Peterborough and St. Ives due to poor attendances, and to hold the district meetings at Cambridge on the first Friday in each month. A junk sale was held which would have been more successful if more members had brought along unwanted gear for sale. On the following Friday another special meeting was held at the same venue for the purpose of showing the N.F.D. film, which projection was much enjoyed by all present.

The scarcity of notes this month is deplorable, but activity on most bands is noticed upon switching on a receiver! G5DR is putting out some good 14 Mc. 'phone and has already had several W contacts. 5JO put in some good work in the W and VE contest and should be in a prominent position. 2PL works hard on 28 and 14 Mc. with satisfying results. 6FL and 5OV are in evidence on the bands, and 6HD is to be heard on 1.6 Mc. 'phone. 2XV is getting consistently good results on 14 Mc. 'phone and has invested in a new receiver of the SS type with which he is pleased beyond expectations. 2CDX is working on 56 Mc. with only a small measure of success so far. 6BS is permanently

it is only fair for those attending to notify the D.R. at an early date, stating whether they will be bringing friends or relations. The caterers only allow a small latitude one way or the other, so the D.R. *must* know who is coming. Please drop a card at once. The programme is as follows:—

10.45 a.m.—A visit to Post Office Radiotelephone Station, Baldock, Herts, which is situated on main road between Baldock and Royston, about midway between these two towns.

1 p.m.—Assemble at The University Arms Hotel, Regent Street, Cambridge, where an excellent lunch will be followed by a very short discussion.

3 p.m.—Assemble at The Cambridge Solar Physics Observatory, St. Neots Road, Cambridge, where the special transmitting and receiving gear used in stratosphere research will be viewed and described.

5 p.m.—Again assemble at The University Arms for a light tea, followed by the usual "rag chew."

#### DISTRICT 9 (East Anglia)

The first District meeting of the year is due to take place at Marchesi's, Prince of Wales Road, Norwich, on Sunday afternoon, April 18, commencing at 3 p.m. All members are cordially welcomed.

On the following Sunday the Cambridge Conventionette takes place. A party from District 9 hope to give support to what should be an outstanding social event. A postcard to Mr. G. Jeapes, please, if you are planning to be present.

Reports have improved this month, may they continue so to do. G2JS is testing 14 Mc. 'phone; 5UD, after a change of house, is active with rebuilt gear; 2XS is using QRP on 1.7 and 3.5 Mc.; 8FL is on 7 and 14 Mc.

From Great Yarmouth 2BND reports fair activity. 2AIO, who is now G8IS, is on 7 Mc.; 6TI prefers radio to gardening; 5IX and 6QZ are rebuilding their receivers to improve results on 28 Mc. Others active are G2UT, 2MN, 5QO, 6UA and 8DD.

#### DISTRICT 10 (South Wales and Monmouth)

First we must apologise for the absence of last month's notes, but being a short month, the Scribe failed to get them compiled in time. The chief item of interest was the Hamfest held at Barry's Hotel on February 11, where there was a record attendance of 33, including our late D.R., G5WU, who kindly consented to take the chair. A very enjoyable evening was spent, and it was more or less decided to hold another one before the year was out. Activity in the district is on the increase, as is shown by the Cardiff Club, who hold fortnightly meetings during the summer months, and who now have two new A.A. licences, 2BLH and 2CMX, and one new R.S.G.B. member (BRS2583), who has also applied for his A.A. 2BPN has passed his Morse test, and by the time this is in print, he will be putting out the first licensed transmission in Cardiff for over twelve years. This must surely be a record for a city of its size. Other stations active include 2BHZ, 2BQB and 2BSN, while 5BI is rebuilding prior to starting up again, but he is handicapped by poor aerial facilities.

#### DISTRICT 8 CONVENTIONETTE

SUNDAY, APRIL 25, 1937

10.45 a.m.—Assemble at Post Office Radiotelephone Station, Baldock, Herts.

1 p.m.—Assemble for lunch at "The University Arms Hotel," Regent Street, Cambridge.

3 p.m.—Visit to The Cambridge Stratosphere Research Transmitting and Receiving Station (Solar Physics Observatory).

5 p.m.—Return to Hotel for light Tea.

Inclusive charges: Adults, 6s. per head; children under ten years, 4s. 6d. per head. These charges include 6d. per head for waiters.

All reservations to Mr. G. Jeapes, 89, Perne Road, Cambridge, by April 22.

settled at Luton after taking unto himself a wife, and has now got his gear on the air again with good DX results. 5CS has finished a new receiver and is busy with the transmitter for 7 and 14 Mc.

Peterborough.—6PD has collected some interesting dope on 14 Mc. aerials. (What about a "Bull" article OM?) 2UQ has been making elaborate alterations to his rig. 2NJ and 5NX are both busy with 7 Mc. 'phone; other stations active in this area are 2BQC, 2CCF and BRS2075.

Now a word on the question of our Conventionette which takes place on April 25. Owing to its magnitude it is necessary to make arrangements for this function with caterers well in advance, and



In Penarth, 8AM is getting trouble with BCLs. 5XN is going strong on 7 Mc. 'phone, and is rebuilding his P.A. to four PX4s in parallel push-pull.

In Newport, 2JL and 2XX are active, the former on 1.7 and 56 Mc., and the latter on 3.5 Mc. 'phone. He has built a SSS receiver and results are good so far.

The Blackwood Club seem to have the star DX stations these days, 8CT has qualified for his W.B.E., having recently contacted VU, and is now trying S. America to give him W.A.C. He is fortunate in having means of altering the direction of his aerial for the particular zone he wishes to work.

G6BK has not been getting out very well on 14 Mc., SU being his best DX; but on 7 Mc. he has worked all districts of U.S.A. (except W6 and W7), ZL (getting R5/6) and had a reply from VK, but, unfortunately, lost him in QRM. He had a QSA5 contact recently with a W3, with only 6 watts to his C.O. 2NG is using 6A6-210, chiefly on 14 Mc., and recently got R8/9 from a W6. He has put up a 14 Mc. Windom, cut for 14,300 kc.

In Merthyr 5FI and 5TJ are active on 3.5 Mc., the latter on 'phone only. 2APF has recently passed his Morse test.

No report has been received from Swansea this month, but looking at last month's notes we see that the Swansea Club are now holding regular fortnightly meetings.

G6JW has been rebuilding and also contemplates tackling a Super RX for 14, 28 and 56 Mc. 5VX is known to be very active with his QRP 'phone on 7 Mc.

On March 18 the second annual general meeting of the Cardiff Club was held at Barry's Hotel, when the three chief officers were re-elected. It was unanimously decided to continue at the present club-rooms in City Road.

It has been suggested by 2BHZ that a crystal register be started in the district, and comments on this would be appreciated.

#### DISTRICT 12 (London North and Hertford)

At the meeting held on March 16 preliminary arrangements for N.F.D. were discussed, and in connection with this the D.R. would be pleased to hear from any member who has a generator with an input of 12 volts and an output of 400 to 600 volts, willing to loan it to the district.

Contests have increased the activity in the district. G6XN has been in the Senior and Junior B.E.R.U., also the A.R.R.L. DX Contest, in the latter working all VE and W districts on 28 Mc., with the exception of VE4, and all but VE2 and 5 were worked on 14 Mc.

2AKP has only to pass the morse test to obtain his full ticket. He has just built up a 1.7 Mc. transmitter using suppressor grid modulation.

G6CL had 156 contacts in the A.R.R.L. Contest and scored 12,000 points. Five new States were worked. Much of his activity is on 28 Mc., on which band he has recently worked VK4, VE5 and ZE.

G8KW is active on 14 Mc. G5FA is working on 7 Mc. with a DX Two. BRS2970 hopes to have a three-letter call very soon. G6QM has obtained a 56 Mc. permit and would welcome co-operation on this band. G8JR (ex 2AXJ) has been on 7 Mc. with a battery-operated transmitter. YR and OZ have been worked with an input of 1½ watts. This

state of QRP has been brought about by the untimely end of his power pack.

G2CN has been in Ireland and has had the opportunity of carrying out some tests with a 56 Mc. portable transceiver. Some useful contacts were made.

The N.W. District (Kentish Town) report active and are holding fortnightly meetings. Morse instruction general talks and discussions make up the programme. Any members who are interested should get into touch with G6PI, who will be pleased to give the dates and times of the meetings.

G2RX has built up a universal single-signal superhet which is giving splendid results, whilst G6NR is building a long-lines 56 Mc. transmitter.

2BCV and 2BNY are both active. G2XJ is busy on a new power-pack. G6PI is building up a new exciter unit.

Watford.—The March meeting held at Bushey was attended by seven members. Although this was a smaller number than at the first meeting, it is felt that the keenness of the members justifies the continuance of the monthly fixtures. The chief

### NORTH WESTERN PROVINCIAL DISTRICT MEETING

to be held on

**SUNDAY, MAY 23, 1937,**

in

### SUNNY SOUTHPORT

Book the date and watch for full details next month.

Reservations to MR. J. DAVIES, G2OA, 13, Exeter Road, Wallasey.

interest appears to be centred around 56 and 112 Mc. and it is hoped to be able to have some gear working on the latter band in the summer.

Ex-2ANS was inadvertently given as G6MH in the March BULLETIN notes. This should be G8MH.

#### DISTRICT 13 (London South).

An excellent attendance was recorded at the general district meeting held at the Brotherhood hall on March 18. The balance of the district fund was increased considerably by the sale of junk and the D.R. would like to express his sincere thanks to those members who took part in making it a success. A last request was made for volunteers for operating on N.F.D. and as no further offers have been received by post it is presumed that all those wishing to take part have already made their application.

It is regretted that very few reports have been received this month, and we should like to remind the T.R.'s that it is up to them to forward their notes and news for these pages to the D.R. by the 20th of every month.

Anerley, Tooting, Kennington, Brixton and New Cross Areas.—G5PY is planning a rebuild, and in the meantime maintaining regular contacts with U.S.A. on 7 Mc. in the morning. 2UX has contacted



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**HORDARSON** 6L6 Transformers, T8458, 24/-; T8459, 36/-; T5741, 16/-; T84701 7/-  
**ARRL HANDBOOK**, 5/3. **JONES** 1937 Handbook, 7/-. **JONES** 1937 Antenna Handbook, 2/6.  
**CA** Valve Data Handbook, 1/3. **HALLICRAFTER** Sky Challenger, 9 tubes, 7.5 to 550 metres, 230 input, 23; with Xtal gate, £25. All other Hallicrafters in stock.

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CR7GF and HS4T the supposedly Siamese station. He has now worked 35 zones, although only 30 can be confirmed owing to the non-receipt of QSL cards. He is experimenting with a 6L6 Jones exciter and finds it rather tricky, but it has distinct possibilities as a neat N.F.D. transmitter. 2ADY has a 56 Mc. receiver measuring 3 ins. by 3 ins. by 3 ins.—or so it looks! He has also been experimenting with a Jones 53 exciter. G2LW and 2JB are active. The next joint meeting of the above areas will take place at the Brotherhood Hall on Thursday, April 22.

*Wandsworth Area.*—A hearty welcome is extended to 2BNL. G2TH is experimenting with modulators, and occasionally working 'phone on 7 and 14 Mc. G2RC and 5SH are known to be active. The next meeting in this area will be held as usual at the "Collingwood," on Wednesday, April 21.

*Blackheath Area.*—G8IV is active on 7 Mc., using CW and 'phone. He is building a mains driven receiver, but has not had much spare time lately owing to the demands of television. 2ZQ and 2WV are active as usual.

*Wimbledon Area.*—G5HF and 5JW are known to be active. No reports have been received from this area.

We should like to extend a hearty welcome to LA3G, Vice-President of the N.R.R.L., 1934-35, who is staying in South London for some months. He hopes to make the acquaintance of a number of London amateurs.

In conclusion, we wish to remind the membership of District 13 that offers of transport for N.F.D. will be most welcome. This is always a difficulty and anyone who is in a position to transport either gear or operators on the week-end in question is asked to write to the D.R. without delay. A postcard is all that is required.

#### DISTRICT 14 (Eastern).

*East London.*—A good attendance was recorded at the March meeting, held at 2BPY, Barkingside, when N.F.D. was the chief topic. An offer to run a 3.5 Mc. station is still to be received. A collection was made to partly defray expenses, further help including personnel and gear, will be appreciated. The loan of a tent, also a 12-volt generator, is specially requested. BRS2839, of Leyton, a new member, was introduced at the meeting. A newcomer to the district, 2CCQ, of North Woolwich, also attended.

*East Essex.*—There was an attendance of 20 at the March meeting held at G2SO, Leigh-on-Sea. The chief matter for discussion was N.F.D. The 7 Mc. transmitter is being built and supplied by G5UK. It is hoped to obtain permission to erect the transmitter at Thundersley Glen. Offers of apparatus and accessories will be considered at the next meeting.

Details of the Southend Radio Society's dinner and dance appeared last month; it is hoped there will be a very good representation from the R.S.G.B. membership in this district.

Most stations rebuilt either their transmitters or receivers for the Southend Radio Exhibition, which will have taken place by the time these notes appear. G6IF has been busy in the A.R.R.L. phone contest; G2KT has completed his 200-watt

speech amplifier; G2UK's second contact with his new transmitter was with PY.

Congratulations to BRS2568, of Pitsea, now 2BXB.

*Brentwood.*—BRS2592 is now G8KM, at Shenfield. G8HV is the call sign of the Brentwood and District Radio Society.

*Chelmsford.*—2AMF, of Witham, and 2ADP, of Colchester, await their full permit.

#### DISTRICT 15 (London West, Middlesex and Buckinghamshire).

An emergency meeting of sixteen regular attenders to District meetings was called during the month to consider a proposal from G5CV concerning a clubroom, but owing to the high rental it was turned down.

Thirty-two members attended the March meeting to find G8KZ had taken the precaution of hiring a hall for the occasion. Our thanks to him and to Mrs. Crowe and Mrs. Bradley for the catering. A good junk sale was held which, together with the collection, swelled District funds.

Arrangements for N.F.D. are well in hand, but offers of help and finance are still needed.

We congratulate 2AIB, now G8MK, and BRS2239, now 2CMG. We are sorry to hear that BRS2697 has been unwell, but hope he will be quite fit soon.

*London West.*—Nine members attended one meeting. G8KZ worked W on telephony, 6CO not on much, 2CMG building and hearing plenty of W stations on 28 Mc. BRS2242, a new member, wants to learn Morse and is building power pack for receiver; G8IL worked W, PY, FT and U9 with indoor aerial; 2BWU and BRS2746 busy with Tobe receiver; G6WN on both 28 and 14 Mc.; 8IH contacted W2, 3, 4 and 8 on 7 Mc. He is also on 56 Mc.

*Middlesex.*—G2KI wants reports on 56 Mc., had R8/9 report from VK on 14 Mc.; 2LA rebuilt transmitter; 8FV using grid modulation on 7 Mc. telephony; 6GB has new superhet working; 5VB testing exciter units; 8MK hopes to be on 7 Mc. soon; 2NN worked PK4, and J9, BRS2697 logged 160 DX stations on 28 and 14 Mc. during first week in March. Mr. Clark (Isleworth) is now 2CMB. G6LJ is back working DX after visiting it. Others active, G2ZY, 8IP, 8HN.

*Bucks.*—2BVX experimenting with home-made ribbon microphone and learning Morse. BRS2498 has been active on all four low frequency bands.

Mr. H. T. Stott, of Messrs. A. F. Bulgin, Ltd., dealt with Short-Wave Receivers and Components at the March meeting of the T.V.A.R.T.S. The talk was much appreciated, many questions were asked, and the meeting did not terminate until nearly 11 p.m.

#### DISTRICT 16 (South-Eastern).

The attention of members in all districts is drawn to the South of England P.D.M. to be held on June 20, probably at Tonbridge, Kent. Full details will be published next month, and all who can are cordially invited to attend. Meanwhile, book the date—Sunday, June 20.

*Ashford.*—Most members are on the active list, but there is nothing special to report.

*Brighton and Hove.*—At the meeting held on March 4, Captain Hoghton (G2OJ) delivered a talk on "Modern Physics" to an interested audience of 40. Next month he is to continue his series of



lectures with one on "Atomic Structure." We take pleasure in welcoming to the district BRS2489 and BRS2647.

*Eastbourne.*—The following stations report active: G2KV on 14 Mc., 5IH on 1.7 and 3.5 and trying 14 Mc., and 2BIU, who is busy on all bands.

*Gravesend.*—G2MI gave an interesting talk on "Relays and Things" at the last meeting on March 8. The group, together with Chatham and Gillingham, have accepted the 7 Mc. N.F.D. station and are now busy arranging the details.

*Heathfield.*—This group are running the 14 Mc. N.F.D. station, with the call G5JZP. The following are active: G5JZ, 5PR, 5PN, 5AQ, 2BRI, 2CJZ and BRS1173.

*Tunbridge Wells.*—G2UJ is receiving the television sound transmissions well without an aerial of any sort on a super regen. receiver, and would like to know why the addition of an aerial, however coupled, makes no improvement in results! 5OQ, 6OB, 5KV and 2AKQ are active, and it is hoped that some more 56 Mc. receivers will be forthcoming in the near future. 2UJ is again on this band at irregular intervals.

*Whitstable.*—At the last meeting of the W.R.A. three short talks were given: "Ultra-high Frequency Stabilisation Possibilities" by 2BIB, "Aerial Coupling Systems" by 2BUC, and "A Two-Valve Short-Wave Superhet Design" by 2CMI. The 56 Mc. DX reception by 2AAN has now been confirmed as being a transmission by W8XF on 7 metres. Not quite 56 Mc. OM, but a very good effort all the same! By the way, has anyone else in the district heard any American station, on this or any higher frequency?

BRS2763 of Snodland and 2834 of Detling Hill near Maidstone have reported and are welcomed to the district.

#### DISTRICT 17 (Mid-East).

The arrangements for N.F.D. are beginning to take shape. A good deal depends on Grimsby at the moment of writing, but it is hoped that the northern members of the county will be running the 7 Mc. station. The 1.7 Mc. and 3.5 Mc. bands will be taken by one station situated in the neighbourhood of Cranwell. The 14 Mc. station will be near Horncastle and will be using the call G6GH. Members who will be attending N.F.D. are requested to get in touch with the T.R.'s concerned (G6AC, G6AK and G6GH), who will furnish all the necessary information.

*Cranwell.*—The Society station is now WAC, but awaits a VE contact for WBE. The 70-ft. masts are not being allowed owing to the proximity of the aerodrome. The technical experts are trying to secure a phased aerial, which will give low-angle radiation without entailing high masts. BRS2426 awaits the result of application for a full call. A Field Day is planned as a rehearsal for N.F.D. No contact has yet been obtained with their African representative but hopes are running high. (We are all looking out for your Wally.—D.R.)

The CARTS take pleasure in thanking all those who have applied for Associate Membership and are particularly honoured to place Mr. J. Clarricoats No. 1 on the list. G6CL served with the R.F.C. and R.A.F. in France and Belgium during the War. Membership certificates and a Bulletin will follow in due course.

*Brigg.*—8AP has worked W7 and is looking forward to a new QRA, where he will be able to get a good 69-ft. Zepp 40 ft. high.

*Cleethorpes.*—2AZH has an AA for 28 and 112 Mc. and would like to get in touch with other district members who are interested in these frequencies. He is using a 5-valve superhet and also a straight Sg.-Det. Quench-Pentode on 56 Mc., as well as several transceivers. His transmitter uses three 6A6's.

*Sleaford.*—8GI sends in a long report. Having taken to himself a wife and moved his QRA, he has now rebuilt his transmitter to CO-BA-PA, using American-type valves 47, 46, 45. He is using a centre-fed aerial. He reports that someone is pirating his call with a fist and note which reflects no credit to its rightful owner.

*Boston.*—6LH is inactive at the present owing to an impending change of QRA to 4, Thorold Street, where he will have a useful shack in the attic. He is commencing construction of the Single-Signal Superhet described by G6ZZ and 6WY. 6GH needs some new key points after indulging in the A.R.R.L. contest with excellent results. He is chartering the *Queen Mary* to bring his cards! A contact with XU6 has added an elusive country to his DX list.

#### DISTRICT 18 (East Yorkshire)

*Hull.*—Will all members of the district who anticipate attending the York P.D.M. please notify G6PY without fail before Wednesday, April 28?

With regard to district notes a new arrangement is now in force: all members are requested to report to their respective T.R.'s by the 17th of the month and T.R.'s to send their reports to the D.R. by the 20th.

A fresh series of meetings, the first of which was held on Wednesday, March 24, started on a very optimistic note and augurs well for the future. It is solely through the generosity of Mr. Wright (G6FQ) that we are able to hold these meetings and to him we are very grateful. The affairs of the district were placed on a new footing, both as regards finances and calendar, and it is sincerely hoped that the fine attendance recorded at the first will be upheld and, maybe, surpassed in the future. For the benefit of those who were absent these meetings are to be held at 341, Beverley Road Hull, on each fourth Wednesday of the month at 8.15 p.m. prompt. Members are invited to bring a visitor.

The general activities of the Hull membership seem to show an interest in 56 Mc. work, and it is hoped that this sphere of work will be cultivated. For the present, however, N.F.D. is calling for all available attention and we are hoping to give very good show in June.

It is fitting that we should express our grateful thanks to Mr. Dearlove (G2QO), our retiring T.R. and hope that, although he has been forced to leave his position, he will still be able to look in on us at the meetings.

At an election of the local membership M. J. A. Hay (BRS1948), whose QRA is 1, Staffor Street, Hull, was appointed as succeeding T.R. and he hopes to be able to give good and lasting service. Further, a committee has been formed to deal with N.F.D. and general affairs of the area.

Remember our next meeting is on April 21.



when General Business, N.F.D. and other scientific topics will be discussed.

Most members are active and it is pleasing to hear our old friend, Mr. C. Stainton G2KM (one of the earliest amateurs in the country) on the air again and getting out well after changing QRA and from D.C. to A.C. His new QRA is Holmes Lane, Bilton, Hull, East Yorks. G8IM is pleased with his C.O. change-over to 6L6 and is getting very good results. 2ARB is experimenting with modulators. G5GC is rebuilding. 2AAX has built CO, PA rig, using 59, and is trying various experiments with PA valves.

## NORTHERN DISTRICT CONVENTIONETTE

SATURDAY, MAY 1, 1937

at

### VANE ARMS HOTEL, STOCKTON- ON-TEES

Assemble ... 5 p.m.  
Dinner ... 6 p.m.  
Business Meeting ... 7 p.m.

Inclusive cost, 2s. 6d. per head.

Reservations to Mr. R. J. Bradley,  
G2FO, 5, Roker Terrace, Yarm Road,  
Stockton-on-Tees, not later than  
Wednesday, April 28.

### DISTRICT 19 (Northern).

Our first Conventionette will be held on May 1, at the Vane Arms, Stockton, commencing 5 p.m. The D.R. appeals to Newcastle members to support his, our first official gathering, by turning up in full force. Those intending to attend should send P.C. to G2FO before April 27. It is expected that our President and Secretary will be in attendance.

*Stockton and Darlington.*—G2FO is busy with N.F.D. gear and a new receiver, while 6ZT is on 56 Mc. 8GL and 5QU are working 7 Mc. phone. XT is rebuilding speech amplifier. 8CL has moved to a shack in the garden and is on 7 and 14 Mc. BQO is busy with petrol engine for N.F.D. CBA and 2AHK are also active.

G8HQ is on 14 Mc. and is testing out peaked audio stage with good results. 2BYY and 2CKN are experimenting with new rigs. BRS1895 is busy with a H.T. transformer. 8HQ would like to have regular reports from Darlington members before the 25th of each month.

*South Shields and Sunderland.*—G5YO and 8KK are working DX on 14 Mc. and getting ready for 8 Mc. 6XO is rebuilding. 8JO, 8IF and 8AO are all on 7 Mc. c.w. or phone. 6PB is active again after long QRT. 5WZ reports regular meetings at his shack are very well attended. UD is now on 14 Mc. phone. 5AC is rebuilding his 14 Mc. rig. 6TR is busy with aerial work, while 8AR is planning out new aerials for his new RA. 5NS and 6GY are very active on 7 Mc. phone. 6HV had a blow up in his final, but is now working again.

*Newcastle and District.*—Active on 28 and 14 Mc. are G2PN, 6IR, 5QY, 6YL. G6YL has had many good contacts with W5, 6, 7 on 28 Mc. G5QY has had 106 contacts with W5DRF on 28 Mc. on daily sked. G5QY and 5RI visited G6YL to get some hints for 28 Mc. G2XT is busy on a 40-ft. mast and hopes to be on 1.7 Mc. soon.

## Scotland

Most districts are now actively making preparations for N.F.D. and it is expected that they will all succeed in placing at least one station in operation. Many favourable comments are to hand regarding the new BULLETIN feature, "The Helping Hand," which fills a decided gap in the contents of the BULLETIN.

*"A" District.*—Everyone will extend their sympathies to Mr. Tyre (GM5TY) on his loss by the death of his father. Several stations took part in the A.R.R.L. contest, but the only score to hand is that of GM5YG, who amassed the fine total of 68,000 odd points. It is understood that Mr. Sey (2BIJ) and Mr. Ellis (BRS1076) have been issued the calls GM8MJ and GM8LS, respectively.

*"B" District.*—As mentioned last month, several stations were active during Junior B.E.R.U., and the following scores were made: GM6IZ, 368; 5YN, 188; 6VO, 85; and 6BM, 15. In the A.R.R.L. contest GM6IZ made 2,035 points. The main event of the month was the visit of "C" district on March 21, which was enjoyed very much by all. GM2SB has recently arrived in the district from Dundee. A new member is GM8LR, a brother of GM5YN. An entirely new receiver for 56 Mc. is being experimented with by GM6IZ and promises to be something revolutionary. We hope to hear more about this new development in the future. Reports will be appreciated by GM5YN, who will be testing a new QRP rig during the next month. Experiments with oscillators are in progress at GM2OX and he is open for break-in contacts. GM8LR, although only two weeks on the air, is doing well in the DX line. Other stations active include 6ZP, 2JF and 6BM, who is testing a new type of aerial which is proving good on 14 Mc., but so far results on 7 Mc. have not been encouraging.

*"C" District.*—The district enjoyed their visit to Aberdeen and hope to return the hospitality during April in Dundee. Activity continues very high and all stations are active. There are three new artificial aerial licences: Messrs. T. Reay (BRS2434), G. Matthew (BRS2567) and E. Ritchie (BRS2574) having been granted the calls 2CLA, 2CLD and 2CMA, respectively. GM6LD has now left the district. GM6RT, 5SC and 8HM are all active. Rebuilding is in progress at GM8CF.

*"D" District.*—News is somewhat scarce this month. GM2MW and 6LD both formerly of "C" district have arrived in Edinburgh. The extensive rebuild at GM6SR is now rapidly approaching completion, the first QSO on 14 Mc. producing a report of RST589 from VK3VF. GM2TM has also rebuilt his transmitter. Several stations, GM2TM, 6XI and 5YX, took part in the A.R.R.L. contest. Preparations for N.F.D. are now well in hand.

*"E" District.*—News from this district is also somewhat lacking. Mr. Henney (2BBF) has been



granted the call GM2MP. GM6KH made 6,747 points in the A.R.R.L. contest.

"F" District.—Using his new aerial, GM6RV is working K6 and K7. GM6NX made 468 and 6RV 660 points during Senior B.E.R.U. contest. GM6NX will welcome reports from members in the district. GM6RV is receiving R6 reports on his 7 Mc. 'phone from W. Experiments with Ostar Ganz valves for receiver use are bringing promising results at GM2UD. In the A.R.R.L. contest, GM6NX scored 51,208 points.

"G" District.—Activity is at a high pitch, although there are no items of news of interest. The members enjoyed the lecture given by Mr. Rix. The district hope to be able to run two stations during N.F.D.

"H" District.—Mr. Millie (2AJM) has been granted the call GM8MQ. Meetings are proving very successful and additional meetings have been arranged to be held every Sunday afternoon. The district hope to place a station in operation for N.F.D., but are handicapped at present by a lack of fully licensed members. We were very pleased to have the opportunity of meeting a large number of the members of the district at a special meeting on March 21 and we enjoyed this occasion very much. The district have decided to hold a dance at the "Rialto," High Street, Kirkcaldy, on April 16 at 8 p.m.; tickets are 5s. and the district will be pleased to welcome anyone who can manage to attend.

### Northern Ireland

These notes are being prepared by the Belfast T.R., pending the new D.R. taking office. Our old friend Mr. Billy Graham finds business pressure can be very awkward, and so he has found it necessary to resign his office. We in Northern Ireland regret this very much, for he has served us well. At times his job was no sinecure, but he succeeded in carrying out his duties in a manner which earned his colleagues' respect. He is still a GI "ham," for which we are glad.

Very few stations report this month, although many are known to be active. GI8PA is using phone on 7 and 14 Mc., and employs a 6L6 Tritet driving an 841. Plate modulation is used, and although the recent blizzard wrecked his antenna, he is still doing good work on a "clothes line" average 7 ft. high! 5MZ has worked U.S.A. on 14 Mc. phone; 6XS is using a Lestet in his new transmitter, his final being an Eimac 35T, an RME69 is expected; 5UR is rebuilding; 2KR, 5QX, 5WD, 6TK, and 6WG are all active; 5SJ had visit from G.P.O., but hastens to add that it was of the most friendly description!

Considerable interest is being shown in N.F.D.

The R.T.U. has just published the second number of "Gist," which has been received, as was No. 1, with great enthusiasm and appreciation. "Gist" contains local gossip, humour, technical articles, hints, and kinks, gear for sale, etc., and is written and produced by R.T.U. members. It provides an excellent link between members, many of whom are far removed from the main centre—Belfast. The subscription is 5s. per annum, post free. Any R.S.G.B. member who is interested should write to GI6YW, enclosing stamp for reply. [Having read the first two issues we can endorse Mr. Johnson's statement that it is a most excellent publication. —Ed.]

### Medway Society's Radio Exhibition

THE Queen's Hall, Military Road, Chatham, was chosen for a recent exhibition of amateur equipment mostly of up-to-date design, but some of vintage unknown. The show was admirably backed by trade exhibits which gave the hall an appearance of a miniature Radiolympia.

The General Electric Co. displayed a wide range of valves suitable for amateur use, ranging from Magnetrons and Acorns up to the DET8. Messrs. Lissen, Ltd., showed all-wave receivers and a complete range of Hi-Q S/W components. Messrs. Kolster Brandes exhibited a good range of broadcast and all-wave receivers; whilst Messrs. Ekco Ltd., provided a modernistic display of "Coronation Receivers." Messrs. Bakers Wireless Stores went all cosmopolitan and provided the B.C.L. with a big choice of receivers and components.

The amateur stations on show were:—G6BA, 6NU, 6QC, 6VV, 5FN, 2CS, 2CM, 5MM, 2AFT, 2BOL, 2BKV, 2AOM, 2BAY, BRS2668, together with the Medway receiving stations MRS1, 22, 24, 25, 27 and 28.

It is said that Mrs. G6NU was overjoyed when the OM took his gear out for its annual airing so that she could give the shack the clean up it so well deserved!

The public were mystified by the radio control apparatus shown by 2BOL (BULLETIN article later).

The Society welcomed four important personages to the show in Capt. L. Plugge, M.P., the Mayor and Mayoress of Chatham, and our old friend "Clarry."

The show proved to be a trysting place for amateurs living in the Kentish area, and our thanks are due to the Gravesend branch of the M.A.T.S. who turned up *en bloc*.

Capt. Plugge, patron of the M.A.T.S. when he visited the show in the evening, addressed a large audience, and said: "You, the public, do not realise what the radio amateur has done and is doing to progress the science. He has had his wavebands poached upon by commercial concerns, his ideas stolen, and in spite of it all he keeps a smiling face. I am pleased to see such a large attendance to pay tribute to their efforts, I myself being proud to be associated with them." G6NU, president of the Society, then conducted Capt. Plugge on a tour of the exhibition.

The Society's stand, with a map of the six continental areas as a background displayed a number of fine trophies which keep the competitive spirit alive. G6VV and G5FN acted as publicity manager and persuaded many a likely lad to buy a copy of the "Guide" and join the Society.

In the "wee sma' hours" of the following morning, cars and lorries (to say nothing of the perambulator which G6NU used to take his gear home in) caused a minor traffic jam in the main thoroughfare.

It was a great day and, above all, we have gathered in many prospective members.

G5FN.

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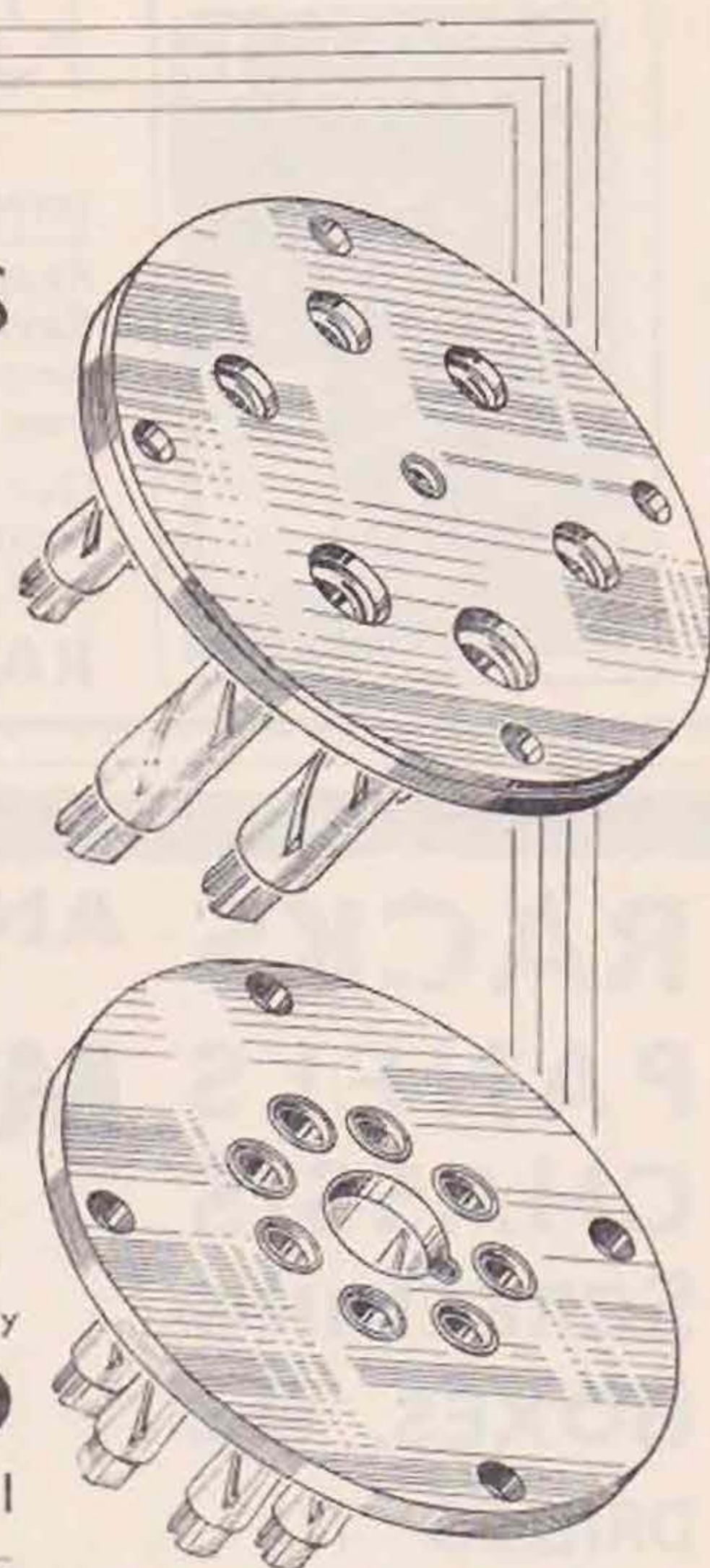
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## Empire



## News.

## B.E.R.U. SECTION REPRESENTATIVES.

**Australia:** I. V. Miller (VK3EG), P.O. Box 41, Tallangatta, Victoria; Sub Representatives: J. B. Corbin (VK2YC), 39, Mitchell Street, McMahon's Point, Sydney, N.S.W.; R. Ohrbom (VK3OC), 22, Gordon Street, Coburg, N.13, Victoria; A. H. Mackenzie (VK4GK), Fire Station, Wynnum, Brisbane; G. Ragless (VK5GR), South Road P.O., St. Mary's, S.A.; J. C. Batchler (VK7JB), 21, Quarry Street, North Hobart, Tasmania.

**Bahamas, Bermuda and the Eastern Part of the West Indies:**

**Burma:** W. G. F. Wedderspoon (VU2JB), Government High School, Maymyo, Burma.

**Canada:** Earle H. Turner (VE2CA), 267, Notre Dame Street, St. Lambert, P.Q.; W. P. C. Andrew (VE3WA), Dominion Boulevard, South Windsor, Ont.; F. Taylor (VE5GI), 4374, Locarno Crescent, Vancouver, B.C.

**Channel Islands:** J. le Cornu (G2UR), 1, Les Vaux Villas, Valley Road, St. Helier, Jersey.

**Egypt, Sudan and Transjordan:** F. H. Pettitt (SU1SG), Catholic Club, Mustapha Barracks, Alexandria.

**Hong Kong:** G. Merriman, (VS6AH), Box 414, Hong Kong.

**Irish Free State:** Captain G. Noblett, M.C. (EI9D), Barley Hill House, Westport, Co. Mayo.

**Kenya, Uganda and Tanganyika:** W. E. Lane (VQ4CRH), P.O. Box 570, Nairobi.

**Malaya and Borneo:** J. MacIntosh (VS1AA), Posts and Telegraphs, Penang, S.S.

**Malta:** L. Grech (ZB1C), 18, Constitution Street, Zeitun, Malta.

**Newfoundland:** E. S. Holden (VO1H), Box 650, St. John's, Newfoundland.

**New Zealand:** R. T. Stanton (ZL3AZ), 17, Martin Avenue, Beckenham, Christchurch.

**North and South Rhodesia:** R. A. Hill (ZE1JB), P.O. Box 612, Salisbury, S. Rhodesia.

**North India:** J. G. McIntosh (VU2LJ), Bukhia Tea Estate, Letekujan P.O., Assam.

**South Africa:** W. H. Heathcote (ZT6X), 3, North Avenue, Bezuidenhout Valley, Johannesburg.

**South India:** J. S. Nicholson (VU2JP), c/o Kanan Devan Hills Produce Co., Ltd., Munnar P.O., Travancore.

## Australia

By VK4GK via GM6XI and G6HL.

Conditions on all bands remain erratic. Many stations are again active on 28 Mc. now that contests are over. VK4KH is on 14 Mc. with a new rig using 800's PP in final, he has super with crystal filter and is looking for contacts with G stations. 4YL also wants a G contact for her 28 Mc. WBE.

## Canada (Third District)

By VE3WA via G2DH.

The B.E.R.U. Contest has come and gone and those of us in VE3 who entered are looking forward with keenness to the next. VE3LU made many new contacts, and on several occasions we heard 'half the band' calling him. VE3WA made N.A.C. in six hours, a feat he has been near to achieving in the past, but Asia has always been the stop-gap.

The 14 Mc. band was very good during the night, but in the day-time interference from U.S.A. stations spoilt many contacts. Very little was done on 28 Mc., but since the Contest, activity on this band has increased.

## Egypt, Sudan and Transjordan

By SU1SG via G6BQ.

SU1CH has just received his new N.C.100 and is delighted with results.

SU5NK has wound his own Class B transformer

but is having a little difficulty in getting satisfactory results.

SU2TW has been troubled with a defective T25D and is now using a pair of 46's in push-pull. He is getting out remarkably well, and kept the flag flying for Cairo during both Senior and Junior B.E.R.U. tests.

SU1RO has daily 'phone schedules with SVIKE, and is working DX on 28 Mc., using a pair of 800's in push-pull.

SU1FS left for home on March 14. The SU Group wish him success and happiness in England.

In Alexandria, SU1WM entered both Senior and Junior B.E.R.U. contests, and it is anticipated that he has won the zone award for both events. This station was also successful in making the first SU/VE5 contact.

SUITM has been trying a D.E.T.1 and continues to radiate a nice signal.

SUIKG has had the misfortune to blow up his Class B transformer and is now busy repairing it.

SU1SG has just completed another rebuild, using four stages with an E.C.O. oscillator, operated on four bands during the A.R.R.L. contest, best contacts being VE1EA on 3.5 Mc., VE5EO on 14 Mc. and W6JJU on 28 Mc.

ZC6AQ is active on 14 and 7 Mc. and entered B.E.R.U. test.

ST2LR is understood to be operating occasionally and has contacted SU1TM and SUIKG. His QRA is required for the forwarding of QSL cards.



## Hong Kong

By VS6AH via G6GM.

It is with very deep regret we have to record the death of Mr. Barlow (VS6BD), ex G5UC, who was killed in a shooting accident.

VS6AS and 6AH continue their work on 28 Mc., the latter having worked North America to give him W.A.C. on that band. Most of the normal activity in recent months has been on 14 Mc., on which band VS6AH has W.A.C. on 'phone. VS6AB, AG, AH and AS are active.

## Irish Free State

By EI9D.

We were all very sorry to hear of EI2B's recent bereavement and we extend to him our very deepest sympathy.

EI8G did very well in the B.E.R.U. tests and it seems fairly certain that he is the winner of the I.R.T.S. sub-contest. Congratulations, OM!

EI5J has worked VK3GG on 7 Mc. with 10 watts, using a 99-ft. top current fed. He has not yet worked the States or VE, being usually very QRP, but this is certainly a good start at real DX.

EI8G and EI6L are visiting EI9D at time of writing, and much experimental work is being done in the rather unusual field of remote-controlled petrol engines.

EI6F has been putting out good 'phone on 3.5 Mc. whilst home on holidays, while EI6J has worked W and VE on 'phone at R7 on the same band.

## Malaya and Borneo

By VS1AA.

We welcome the return of VS2AE and trust he had a nice leave. By the time these notes appear in print 2AG will have packed up preparatory to proceeding to G. We wish him a pleasant leave.

2AK has qualified for his WAC. Congratulations, OM.

1AJ received a special certificate from the A.R.R.L. for meritorious performance in the last W-VE contest. It is regretted this item of news is rather belated.

1AA is putting the finishing touches to his transmitter: 838's have been fitted in the final. It is hoped to work on 28 Mc. shortly. He has evolved a somewhat unorthodox method of connecting a crystal in a pentode oscillator. The arrangement works very well and oscillation is excellent (details later).

1AF has a grouse against the telephony stations working on the band edges, but under the present regulations nothing can be done. They have as much right to be there as have the CW stations.

BERS295 is now operating under the call VS2AQ. Good DX, OM.

## Malta

By ZB1C via G2KV.

The March meeting was held at the home of ZB1H when matters concerning radio telephony, N.F.D., and the provision of local Branch Headquarters were discussed.

As a result of negotiations conducted by ZB1E the local B.E.R.U. members have been given permission to hold monthly meetings at the Malta Society of Arts. The next meeting will be held

at 6 p.m. on April 28 at the Palazzo de la Salle 219, sda Reale, Valletta.

As from June 1 all ZB amateur stations will be required to use crystal control. This decision has been made by the authorities at the request of the local Group.

ZB1C is now on 28 Mc., 1H is using 'phone on 14 Mc., 1E has a YL operator, 1J is in trouble with his push-pull amplifier, 1P is active.

## New Zealand.

By ZL3AZ.

The holiday season is responsible for a lack of reports at the moment, but most active stations got busy during the January, February and March Contests.

The 28 Mc. band has come to life at odd times and a few DX contacts have been established although the majority of European work has taken place on 14 Mc. ZL3CK reports hearing on 28 Mc. all U.S.A. Districts on 'phone and c.w. during a two-hours' listening period from 00.00 to 02.00 G.M.T. on February 2. J, VK and ZU were also logged.

Reports of contacts with South Africa continue to come to hand and by some strange chance most are from QRP stations. The latest to work this elusive country is ZL3JX who with an input of 36 watts also added CR7 to his bag. This station employs a Bruce folded beam aerial trained on South Africa by great circle route. ZE1JR was a consistent signal in January around 19.30 G.M.T.

ZL3AZ has recently worked J9CA and SV1KE on 14 Mc. and his Wednesday skeds have been continued successfully with G6CL.

## Northern India.

By VU2LJ.

Unfortunately, owing to the difficulties involved in obtaining licences under the new regime, very few VU amateurs took an active part in the B.E.R.U. Contests, although several members entered the Receiving Contest.

VU2AM and 2LJ have been with the W/T section of the local corps at their annual camp in Dibrugarh, but due to lack of time no DX was attempted, although VU2JP was contacted.

BERS311, after burning out a set of American valves, has decided that British 2-volters give better results! He is planning to erect a new S.W. transmitter for the R.A.F. at Ambala, the power supply of which will consist of eight 1½-kw. and six 1-kw. alternators. The transmitter will use a Franklin oscillator on about 300 metres, followed by strings of doublers. The H.T. for the oscillator and multipliers will be obtained from metal rectifiers—56 of them!

## Rhodesia.

By ZB1JB.

A scheme is being considered for assistance to be rendered to the postal authorities in connection with the granting and renewal of licences in Southern Rhodesia and, if a suitable scheme can be arrived at, we have great hopes of its being put into force with beneficial results to everybody concerned.

ZE1JB eventually went in for the Junior B.E.R.U. contest in order to make up a sufficient quota to ensure the winner receiving a certificate, since it



the past there have sometimes been less than three stations competing. He also entered the A.R.R.L. DX Contest, but did not put in much time. A regenerative preselector has been built for use in front of the Super Sky rider, and this greatly improves signals down to about 13 metres, but it is not yet working satisfactorily on 10 metres, where it is most needed.

ZE1JC is still using his small transmitter, which consists of a 250-volt 50 mA. generator for power supply and he is trying to contact his VK friends, but although he hears them he is unable to QSO. He thinks it may be due to his small power, but it is more likely QRM.

ZE1JE has at last contacted VE4OG for his WBE, thus making every station in Umtali WAC and WBE. He reports ZL's still coming in at good strength from 1730 till 1930 G.M.T., and he has logged ZL1BC, IHY, 1KE, 2FX, 2QM, and 3HK, and has QSO'd 1BC and IHY, the latter for about an hour at QSA5 R5 throughout. JE uses a National HRO receiver. He is going on leave during April and May, so will be off the air for those months.

ZE1JF has also built a regenerative preselector for his Super Sky rider and hears a lot of stations on 28 Mc., but has only managed to QSO Ws and VU. A card from PY1DK confirming his RST 589 'phone QSO gives him WAC on 'phone. JF has made his preselector work well on 28 Mc., but finds no advantage on 14 Mc.

ZE1JG is generally active from 1600 to 2000 G.M.T. and from 0400 to 0600 G.M.T., and is on the look out for further calls from aeroplanes in distress. JJ is receiving European signals at R9 plus on 28 Mc., on which band he reports VE's again breaking through after a lapse of some months. When conditions are good on 28 Mc. JJ telephones JN, who then listens on 14 Mc., and has so far found that if conditions are good on the former band, they are hopeless on the latter. JN reports hearing strong signals one afternoon from VK, W, XE, as well as ZE1JB and a number of ZS stations. As he points out, it is exceptional to hear DX at good strength when locals are strong, and also exceptional to hear W3s and W6s together and at the same time as VKs. JB has noticed this peculiarity in Salisbury. JN complains of an absence of ZLs, but there are large numbers on the air because JB has heard the Americans working them one after the other, but has never yet heard the ZLs.

ZE1JU has worked ZL3DJ at 0900 G.M.T. on 8 Mc., both signals being RST 449. JU has also worked VE3KF, thus qualifying for his WBE. He also worked VQ4CRE and 4CRO at 2000 G.M.T. on 28 Mc., and considers this unusual. Stations lower than this have, however, been worked on 8 Mc., as JR has had several 'phone contacts with S6 stations.

ZE1JZ is on the look out for a ZL contact and has received a report of R4 from ZL3RX, who also heard JV and JF during December, 1936.

## South Africa

*Division One.*—Amateur Radio in South Africa has suffered a great loss in the death of Raymond Combs, the Hon. Organising Secretary of the A.R.R.L., who passed away on Friday, March 5,

1937. "Hos," as he was affectionately known, was one of the foundation members of the League. A real ham who was beloved by all.

Conditions on 14 Mc. were very erratic during the B.E.R.U. contest, in direct contrast to that of 1936.

ZS1H, who has been operating on 56 Mc. for some weeks, has up to the time of writing these notes heard nothing except a few local harmonies. He has converted his FB7X for 56 Mc. work as the receiver imported did not come up to expectations.

ZS1AH piled up a very good score in the American contest and incidentally lost a lot of sleep doing it.

*Division Five.*—Winter conditions are gradually creeping in, and it will not be long ere the 3.5 Mc. band is in great demand, as Division 6 then becomes DX to Division 5!

The weather forecasting scheme organised by the A.R.R.U., under the direction of Mr. Egenes (ZT5R), is proving a huge success. Reports are gathered from all over the Union at 7 p.m. S.A. time and passed on to ZT5R, who forecasts the weather and DX signals for the next 24 hours. The forecast is then put over on 'phone by a Durban station (ZU5L) and a Pietermaritzburg station (ZU5AC). The forecasts, which have proved to be very accurate, are of exceptional value to our DX friends.

The following additions to B.E.R.U. ranks in Division 5 have to be recorded: A. de Fonseca and J. Scott-Allan (ZU5L).

ZU5AC is putting over good 'phone, as usual, and many listeners enjoy the A.R.R.U. bulletins from that station on Sunday mornings.

The following B.E.R.U. members have also been active: ZS5Z, 5U, 5AK, 5M, 5R, ZT5Y, 5R, ZU5AF, 5D, 5V, and 5Q. ZU5Q.

*Division Six.*—The Editorial recently published in the BULLETIN, dealing with the subjects of Break-in and Duplex Operation, had much to commend it. The two contributions in the same issue dealing with "break-in" operation further enhanced the subjects, with the result that a few Division Six members tried the system. ZU6E worked "break-in" with ZU6V, and results were satisfactory in the initial contacts. Further experiments in this field are necessary, and it is hoped that they will achieve a modern and efficient operation of the system.

The 3.5 Mc. band is proving an efficient channel for medium-distance contacts this season; but we wish that many more amateurs would use this frequency.

7 Mc. operation is still popular and is the medium used by many South African licensees who delight in lengthy "rag-chews."

DX schedules on 14 Mc. have gone off recently, due no doubt to the contrary weather conditions.

A veritable hunting ground for DX is 28 Mc., but contacts seem to be few. Recently ZS6Q managed a 'phone chat with W4EEV, and ZE1JR can be heard around R7/8 on telephony.

ZS6C, ZS6Q, ZS6T, ZT6K, ZT6X, ZT6AD, ZT6AQ, ZU6C, ZU6P, and ZU6V are all active, notably ZU6C, who is exploiting the uses of the 6C5 tube. He states that this valve makes an excellent oscillator and recommends a 6C5 into a 6L6 as an ultra-modern three-band transmitter!

We welcome among our ranks Mr. C. J. Berry, ex-VQ2CJB. ZU6V.



### CARRIER SUPPRESSOR (Continued from page 438.)

cause terrific audio feed-back if both the modulator and loud-speaker are switched on. The use of phones will overcome this trouble, but if a loud-speaker is preferred it will only be necessary to provide the relay with a second contact which can be used to break the H.T. supply to the receiver.

Although the writer has not up to the present used either of these circuits for both suppression and carrier control, it is not beyond the possibilities of the circuit to be used for the latter also, and the writer would be pleased to hear from anyone who has either previously tried it, or who tries it after reading this article.

### THE HELPING HAND (Continued from p. 464.)

helps a lot in the direction of hum control, as well as improving stability and performance, and the form of construction we suggest—*whether the set is mains or battery*—is to build each of the three stages separately in screening boxes, which are then bolted down side by side to a wooden base-board overlaid with aluminium (or zinc) sheet. All tuning condensers should be on extension controls and particular attention paid to the lay-out of the detector stage, tuning condensers, valve and coil position being so grouped that leads are as short as possible. The tuning controls can either be on the fronts of the screening boxes, or on an ebonite or metal panel fixed an inch or two away and in line with them.

Mains valves suitable in the *Hivac* series are AC/VH for V1, AC/SH for V2 and AC/Z for the output stage, while similar valves will suggest themselves in other makes. At the moment we do not know of any mains valves specifically designed for short-wave work, so that by using the battery-operated S/W type previously mentioned, the constructor will score somewhat.

In any case, the question of whether the receiving equipment is to be battery or mains depends entirely on individual circumstances. Our advice is to go all-mains if possible.

With regard to component values: We have given in this article certain figures which can be accepted for the amateur bands 1.7-28 Mc. They are not, and cannot be, the best for either end of this range, since it will be clear from the various points which have been discussed that we are necessarily involved in compromise in designing apparatus to cover such an enormous frequency range as 1,500-30,000 kc. In the L.F. stage, of course, the usual values are in order. All through, fixed condensers must be non-inductive. .0001  $\mu$ F is suitable for the grid condenser, while leak values depend on the valve used, and are sometimes suggested by the manufacturer. We find a 4-megohm leak gets the *Hivac* SG220.SW going nicely on all bands down to ten metres.

We have not mentioned the matter of coils, but, as most readers will have various types already available, we propose dealing with this point in the next article, when some data will be given.

Nor have we been able to go into the question of frequency measuring equipment, which is coupled with the receiving side in the title-piece of this article; some readers may wonder why, so we shall try and show that they are not independent.

### CORRESPONDENCE (Continued from page 470.)

1932, he will see that the formulæ given are identical.

Now as to results. In the third and fourth paragraphs of my article, I made the following statements:—

"... the aerial is cut to length and the feeder in the proper place if the feeder can be clipped on to the tank coil of the P.A. . . . without necessitating *any* alteration to the tuning of that circuit. . . . if the feeder was *not* acting as a true feeder, but had standing waves on it, it would add to the length of the "top" and the effect of attaching the aerial would be that of adding an odd length of wire to the P.A. tank circuit, which would, of course, throw it out of tune." I may be wrong in this assumption, but I cannot at the moment see where the error lies.

As G6RS rightly remarks, the article was based on practical experience only, and as the aerials perform excellently, and as some more have been constructed since the article was written which also work according to plan, there seems no point in applying the corrections mentioned by 6RS in his letter.

As to how the position of the feeder tapping point is arrived at, I can only refer Mr. Sheargold to G2BI, who, so far as I know, originated the formula.

Personally, I cannot understand what difficulty 6RS has found in erecting Windoms, and far from discouraging a beginner from using one, I would suggest it is one of the simplest of aerials, involving none of the feeder tuning arrangements necessary with aerials using feeders with standing waves on them.

Yours faithfully,

W. H. ALLEN, G2UJ.

### Paris Exhibition

On the occasion of the Universal Exhibition, which will be opened at Paris on May 1, the Réseau des Emetteurs Français informs amateurs of all countries that they will be welcome at the offices of the Réseau every Monday from 17.00 to 19.00, and every Thursday from 11.00 to 12.00. The address of the R.E.F. is 6, Square de la Dordogne (122 bvd Berthier, Paris 17°.)

The annual banquet of the R.E.F. will take place on Sunday, May 23, at 20.00, in the Hotel Bohy Lafayette, 28, rue Montholon (rue Lafayette) Paris, 9°. The price of a ticket to the banquet is 35 francs, inclusive of all expenses. Amateurs who find themselves in Paris on the date mentioned are cordially invited to attend.

### British Mechanical Productions Ltd.

As from April 1 last, the businesses of British Mechanical Productions, Ltd., and Lectro Linx Ltd., were merged under the style and title of the first-mentioned concern.

### LX QSL Bureau

We are informed by Réseau Luxembourgeois that their address is now Rue Pierre A'Aspelt; Luxembourg, to which address all cards for LX amateurs should be sent.