

THE T. & R. BULLETIN

The Official Organ of the

INCORPORATED

RADIO SOCIETY OF GREAT BRITAIN

AND

BRITISH EMPIRE RADIO UNION

Honorary Editor :

H. Bevan Swift (G2TI)

Advertising Manager :

Horace Freeman, Esq.

CONTENTS

Editorial	187
The Design of an All-Mains Crystal Gate Receiver	188
A Silent Key	192
Some Experimental Work with Aerials	193
DX Scoring	196
Stabilised Grid Bias	198
A Simple Automatic Morse Sender	201
A Transverse Current Micro- phone	203
" GI " Gets Its Long Trousers	204
Scottish Radio Exhibition	206
Soliloquies from the Shack	207
The Month on the Air	208
The 56 Mc. Band	209
The 28 Mc. Band	207
B.E.R.U. Contests, 1937	210
Valve Review	211
Research and Experimental Sections	212
A Tuned-Aerial System for 56 Mc. Receivers	213
The Ionosphere	214
Between Ourselves	217
QRA Sections	217
New Members	218
Book Reviews	219
Notes and News from the British Isles	220
Forthcoming Events	223
Empire News	233

OUR COUNCIL

Every home member will receive with this copy of the BULLETIN a Council Ballot form. Attached to the form will be found a brief autobiography of those who have been nominated to serve on the executive body next year. The purpose of the autobiography is to give all members a few brief facts concerning those who have volunteered to do service in the cause of the Society, if they are elected.

It is impossible to give more than a meagre account of their past labours, but we believe that the innovation will be welcomed even if it falls far short of an election address.

The duties of a Council member are multitudinous, and particularly so if he is also responsible for other Society activities such as those undertaken by a D.R. or a Section Manager.

During each year he is called upon to attend twelve statutory meetings, lasting from three to three and a half hours each, at a time of the day when a book by the fireside or a set at tennis would perhaps have a bigger appeal. As a body the Council are responsible among other duties for the election of members, the approval of expenditure and recommendations for increased licensing facilities. They must also give judgment on all matters of policy, involving such diverse problems as Licences, Finance, QSL, Tests, Awards, Convention and Propaganda.

Those who serve on the Council are invariably owners of active amateur stations, thus they are in touch in a practical manner with radio conditions. Many of those who have served us so well in the past have had sound engineering or business training, both attributes highly desirable in a scientific society which is run on common sense business lines. Age and youth, too, have been blended to preserve an even keel, and as time passes it will be one of our aims to bring forward each year that new blood which is so essential to the progress of a healthy organisation.

In presenting the names of ten members for election we are conscious of the fact that three of that number will not be elected, but the mere fact that a ballot has become necessary shows that our members are taking a keen interest in Executive matters.

The success of the past year's work is reflected in the highly satisfactory financial report presented by our Treasurer, and enclosed with this issue. The new Council will take charge of a ship which has weathered many storms, and will, we feel sure, give of their best to the membership during their term of office.

J. C.

THE DESIGN OF AN ALL-MAINS CRYSTAL GATE RECEIVER

A Discussion of the Practical and Constructional Considerations Involved.

By R. H. HAMMANS (G2IG) and A. O. MILNE (G2MI).*

PART 2.

THE authors wish to offer their apologies for the delayed appearance of the second part of this article, the first instalment of which appeared in the August issue.

Introduction.

A very full consideration has been given to the question, whether this article should deal with its subject on the lines of a general technical survey, or pursue the more familiar course of the "nut for bolt" constructional description of a particular receiver. It is felt, however, that the second scheme is rather apt to mislead the prospective builder into thinking that, if he departs from the specification by one iota, his receiver will prove a failure. It is far better, therefore, to indicate broad outlines in regard to layout and to emphasise possible pitfalls, leaving the actual details of design to the builder himself.

Screening.

In the construction of a superheterodyne receiver, the secret of success may be said to be chiefly, that amount of care expended on adequate screening in both the R.F. and I.F. stages of the circuit.

The main point to be remembered, when deciding layout, size and shape of the chassis, is the importance of isolating the aerial, local first and second oscillators from any parts of the circuit except those to which coupling is intended. For example: if the aerial should accidentally couple with the first detector, signals will, to some extent, appear in the tuned grid circuit of that valve without having experienced the initial R.F. amplifier selectivity. Similarly, comprehensive screening will prevent any possible radiation of amateur-band harmonics from the beat oscillator.

Rigidity of the metal used for screening is a very important factor, where a high degree of stability is necessary. The use of stout sheet aluminium not only results in a rigid and much more attractive finish, but proves an economy, since the low resistance eliminates the otherwise essential complete isolation of each stage in its own separate screening box. Further, there is no need for each stage to be totally enclosed if the layout is carefully planned. Suitable aluminium is obtainable from the *British Aluminium Co., Ltd.*, who supply any gauge of aluminium sheet, cut to the purchaser's requirements, at extremely reasonable prices. For an extra small payment the metal may be had with a non-oxidizing surface.

All non-R.F. components are mounted under the baseplate. The layout is determined very largely by the type of main tuning condenser used. Three suggested arrangements are shown in Fig. 1, and in this connection it is stressed that the first oscillator tuning condenser should be mounted next to the tuning dial. This is especially important

where a system of flexible coupling joints is employed, as it prevents "back-lash" during tuning. The other two circuits, being less sharply tuned, are not so vital.

In each stage, the valve itself is included inside the screen, and the anode lead is screened and made as short as possible. Where "grid-circuit" is mentioned throughout this article, the term implies everything at that level of amplification obtaining at the grid of the valve in question.

A final point about screening lies in the use of a false front panel. This is clearly shown in the photograph, Fig. 2. The actual receiver is closed at the front by a complete sheet of aluminium which is only drilled to take the spindles of the various controls. It should be obvious that it is useless taking great care and trouble over screening, if the front panel is to have a large hole cut in it for the tuning dial and other controls. The dial is, therefore, mounted on a second panel,

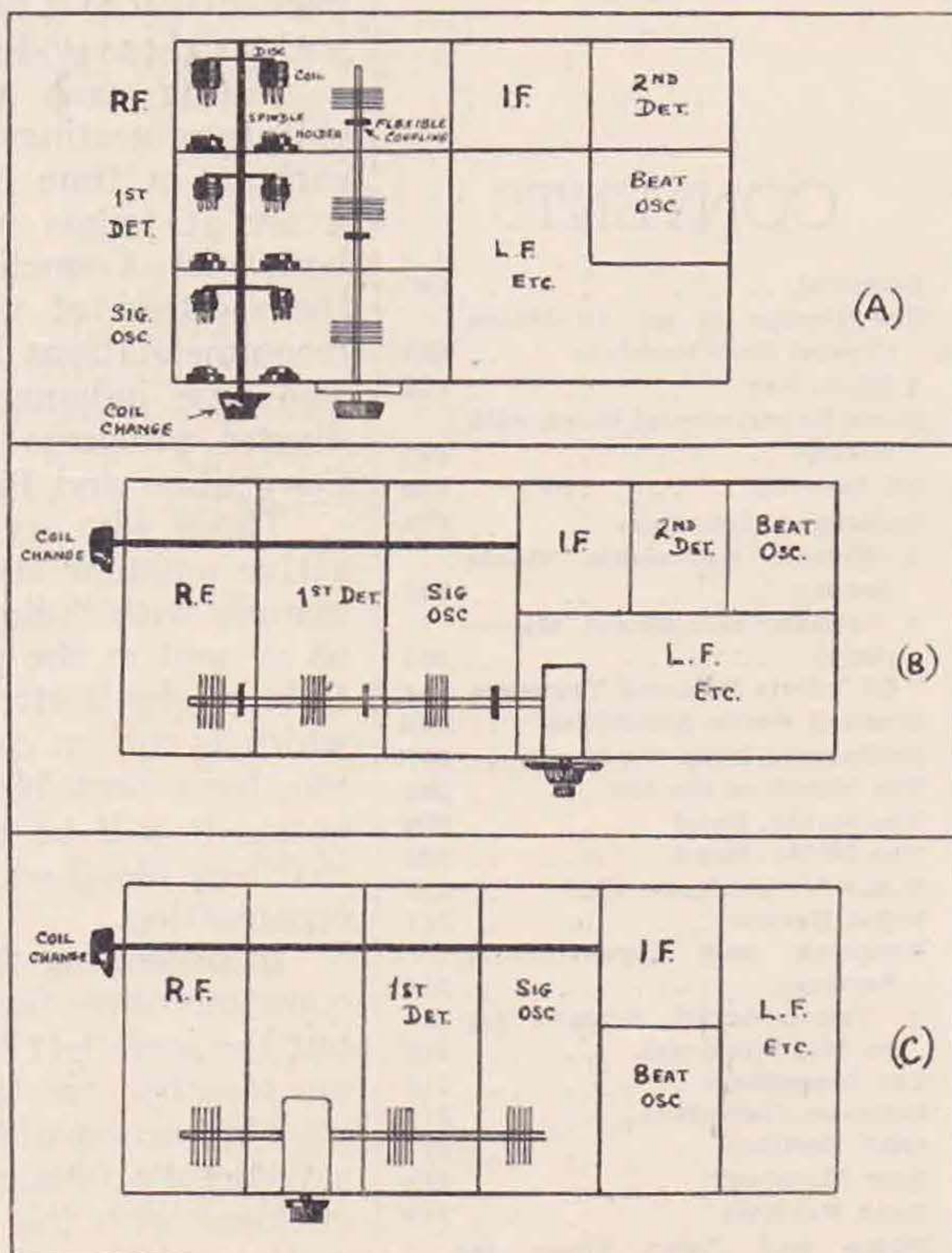


Fig. 1.
Suggested layout for three most common types of main tuning condenser.

*Individual Members—R.E.S.

which is offset from the receiver proper by a matter of 3 ins. This point is of great importance where duplex telephony is employed, and where naturally a high degree of external screening is absolutely essential.

Components.

Consultation with the manufacturers of T.C.C. condensers revealed the fact that .003 μ F. is the most satisfactory value for the bye-pass condensers used in the R.F. portion of the receiver as this value assures a minimum impedance, similarly 1 μ F. was recommended for the intermediate frequency stage. It will be noticed, with reference to Fig. 3 that where frequencies at both R.F. and I.F. are present, two condensers are connected in parallel, one for each. This is quite an important point and greatly enhanced the stability of the first detector circuit. Incidentally, all bye-pass condensers are of the T.C.C. non-inductive tubular pattern.

Valve-holders should be clear of the baseplate and should not be of the chassis-mounting type. Those used were manufactured by Eddystone.

The I.F. coupling transformer must be home-made, as it is unobtainable on the British market. Suitable values are: Primary, 250 turns of No. 34 D.S.C. on a 1-in. diameter former; secondary (which is centre-tapped), 200 turns on a $2\frac{1}{2}$ in. former. The two coils are fitted concentrically, one inside the other, and the secondary is tuned with a 500 μ F. pre-set condenser. All resistances are Dubilier.

The R.F. Oscillator.

The first oscillator (R.F.) is electron-coupled for stability. A metallised valve is essential, and a screen bye-pass condenser of 2 μ F. is absolutely necessary. These two precautions completely overcome the bugbear of modulation hum, but before they were applied, all C.W. signals were T6. The cure mentioned can be confidently recommended to all amateurs who have experienced this trouble.

Beat Oscillator.

The beat frequency oscillator need not necessarily be electron-coupled, as it is only very lightly loaded, and at such a low frequency (400 kc.) is inherently stable. A triode is quite suitable and saves the extra expense of a tetrode or other type of valve. As mentioned above, screening is of paramount importance, especially from the aerial and input circuits and also from the I.F. grid circuit. The beat oscillator is coupled to the grid of the second detector by overlapping the two leads and thereby forming a very small condenser. The small condenser (C.A. in Fig. 3) should not be larger than is necessary to shift the beat frequency 10 kc. each side of zero.

Second Detector.

This valve can also be a triode and is resistance-capacity coupled to the pentode output valve. The second detector is made regenerative by means of a reaction coil, tuned by a pre-set condenser. This is adjusted to the most sensitive point, consistent with stability, and then left alone.

Valves.

Whilst it is not claimed that the valves used by the writers are the only types suitable, they have proved best for the receiver under review. Taken in order they are as follows:—

Preselector (R.F. Amplifier).—Metallised VP4 (Mullard). This valve is a variable-mu H.F. pentode. The metallising is important, as it was found that a clear-glass valve proved very unstable. A multi-mu type H.F. pentode was also tried, but gave inferior results.

First Oscillator.—This has been quite fully dealt with already. For some reason, as yet quite unaccountable, a metallised ACSGVM (Mazda) was found to be much superior to any other type. The reason for metallising has already been explained, but why a variable-mu tetrode should prove so much more stable and efficient is puzzling.

First Detector.—Tetrode MS4B (Osram).

I.F. Amplifier.—Metallised VP4 (Mullard).

Second Detector.—Metallised 904V (Mullard).

Beat Oscillator.—

Practically any triode is suitable. The valve actually in use is a HLA1 (Micromesh).

Output Pentode.—

Pen. 4VA (Mullard) or any other comparable valve. This is coupled to the loudspeaker or headphones through a 1:1 transformer. Potentiometer volume control is provided on the headphones circuit, but this is cut out when the loudspeaker is used. Three jacks are fitted to the front panel: two via the potentiometer, for headphones, and the

other direct across the transformer secondary, automatically cutting the headphones and potentiometer out of circuit.

Power Supply.

The power transformer is arranged to deliver 250-0-250 volts 60 mA. A rectifier valve of the Mazda UU120/350 class is preferable to the 250 volt 60 ma. type, owing to its much smaller voltage drop. Other windings on the transformer are provided for the rectifier filament 4 volts 2.5 amps., and for the other valves, dial lights, etc., in the receiver, 4 volts 7 amps.

Smoothing consists of a 20 henry choke and two 8 μ F. electrolytic condensers. Modulation hum blocking condensers are fitted across the H.T. secondary, whilst R.F. chokes are inserted in the A.C. mains leads and in the headphone leads.

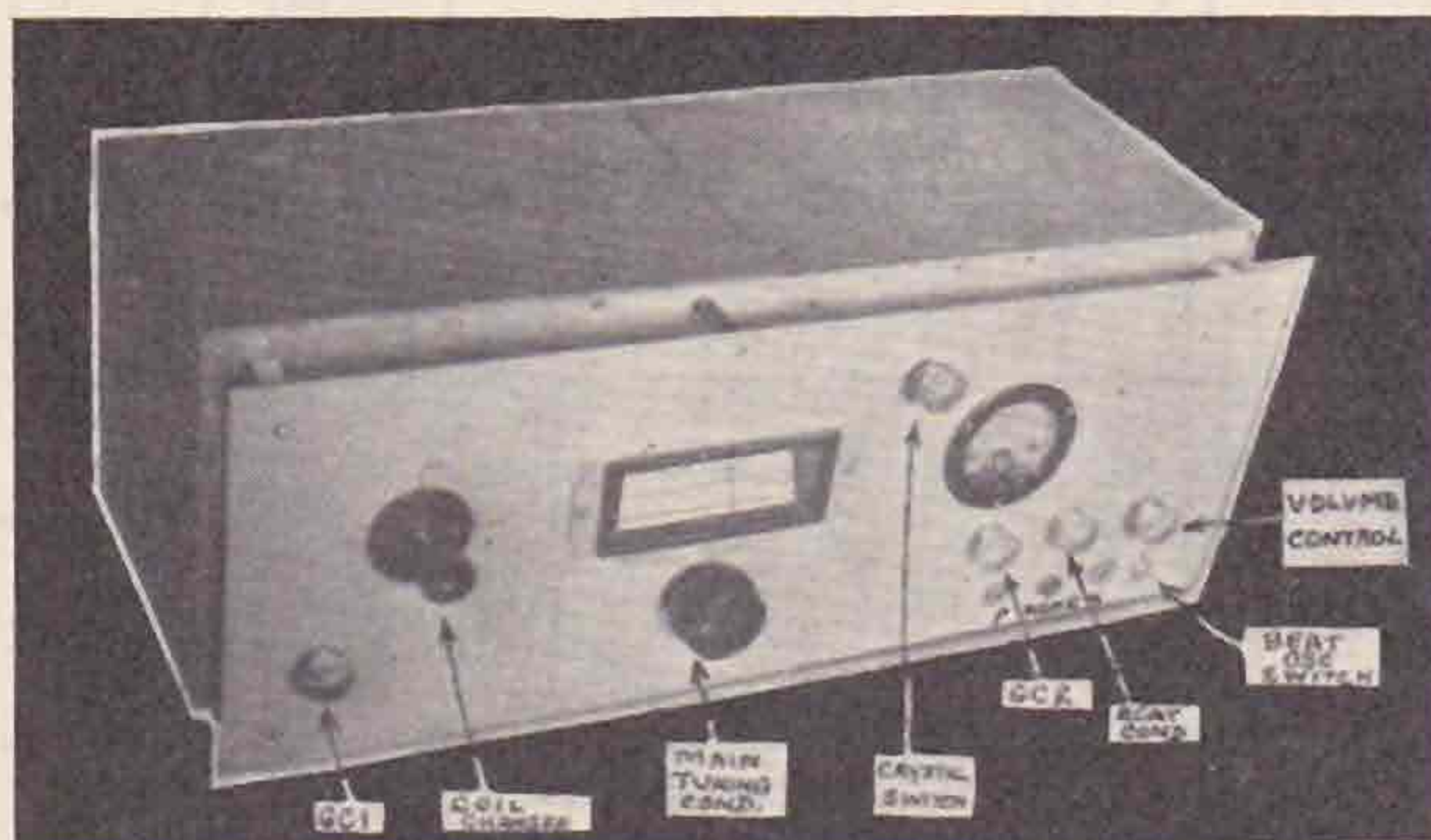


Fig. 2.
Photograph of the authors' single-signal super-heterodyne receiver.

Lining-up.

As explained in Part I, the making and lining-up of the tuning coils requires considerable time and patience. As this matter is of such importance, the writers have no hesitation in treating it at some length.

In this connection it is noted that the existing amateur-band receiver in use at the constructor's station is of great assistance, if its band-spread is approximately known.

The I.F. amplifier, 2nd detector and pentode part of the superhet can be treated as a straight receiver, and may be lined-up and trimmed as such, with an aerial coupled to the grid of the I.F. amplifier. If an intermediate frequency of 400 kc. is employed, the second harmonic of Droitwich can be used as lining-up signal.

R.F. Oscillator Coil.

The 7 Mc. band is probably the best for which to make the first set of coils, and for obvious

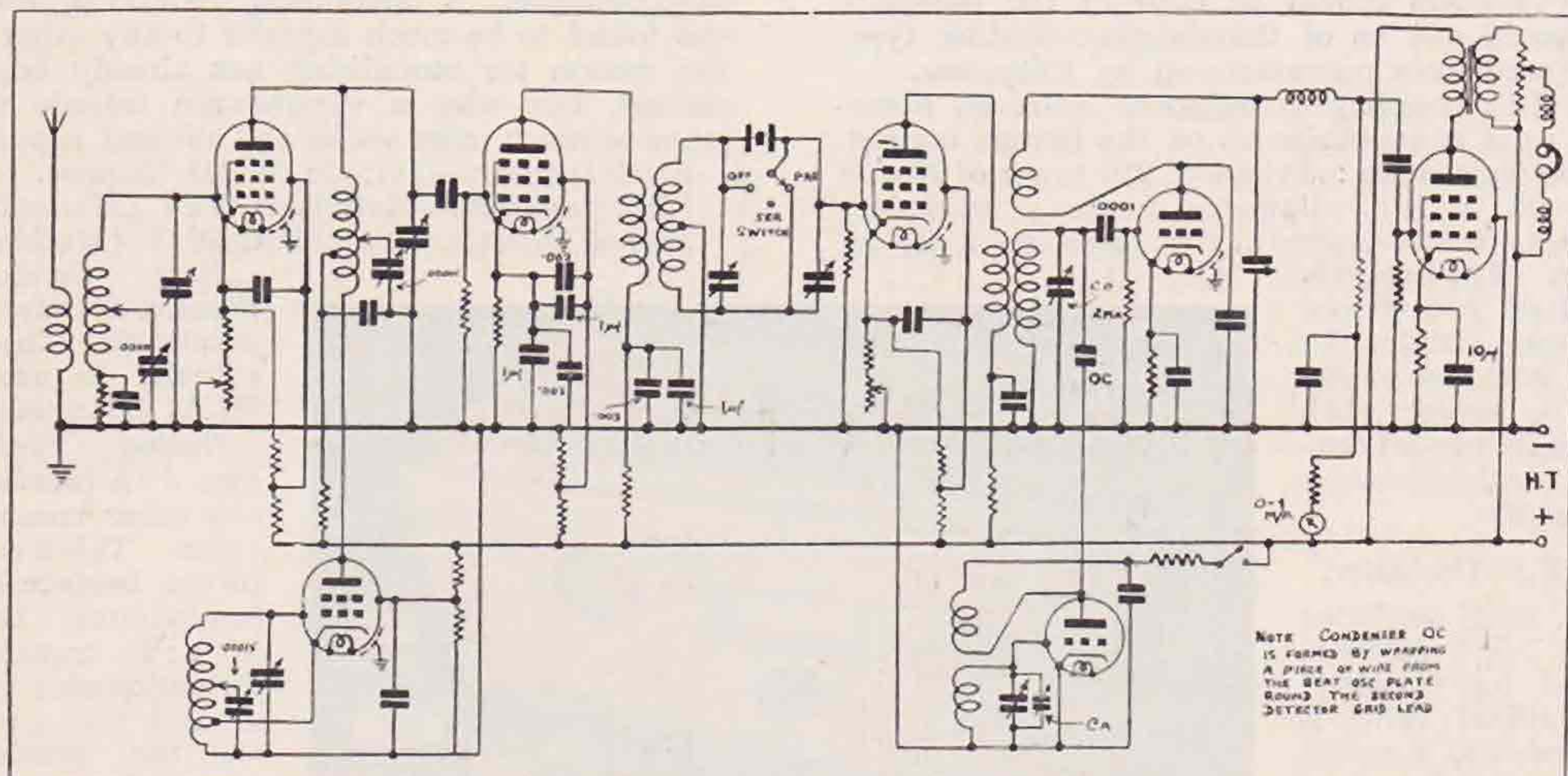
turns on the coil being adjusted, if necessary, to ensure that this spot is well within the limits of the trimmer capacity range.

Next tune the straight receiver to the H.F. end of the 7 Mc. band and then the superhet until the characteristic "swish" of an unheterodyned carrier denotes resonance with the straight receiver tuning. The straight receiver is actually working as a very low power transmitter.

At this point it will be necessary to check up the dial reading on the gauged drive and make the final adjustments to the oscillator coil so as to bring the position of the straight receiver "signal" at the minimum reading of the superhet dial scale.

Similar slight adjustment of the first detector coil turns may be necessary if maximum signal strength is unobtainable by adjustment of its trimmer.

The next step is to move the tuning of the straight

**Fig. 3.**

Typical circuit of single-signal superheterodyne receiver.

reasons, the oscillator coil must be made first. This circuit is made "High-C," and the trimmer, which in this case is really a padding condenser, is set towards the maximum capacity end of its scale. A coil should first be wound to approximately the right size and plugged into its appropriate holder. Set the dial of the straight receiver to 400 kc. outside the high frequency end of the 7 Mc. band and adjust the turns on the oscillator coil until the heterodyne due to the superhet oscillator is heard in the straight receiver 'phones, when the superhet main tuning condenser is set to minimum capacity. The oscillator coil is correct so far. Next wind the first detector grid coil, bearing in mind that as this circuit is high L, with only a trimmer, more turns will be required.

Insert the coil and very loosely couple an aerial to the grid circuit of the first detector. Just a turn of wire placed near it should suffice.

On rotating the main tuning condenser of the super, signals in the 7 Mc. band will be heard. The first detector trimmer should now be rotated until a signal is heard at maximum strength, the

receiver to the limit of the low-frequency end of the 7 Mc. band, and again, by rotation of the superhet tuning, bring about resonance.

Spot the new position on the superhet dial; this will show its existing bandspread, as estimated by the position of the bandspread tap on the oscillator coil. This tap will then have to be altered until, by trial and error, the L.F. end of 7 Mc. coincides with the full-in position of the superhet tuning condenser.

Band Spreading.

To check bandspread of the first detector tuning, the setting of the trimmer, when the superhet is tuned to the H.F. end of the band, should be marked. Then if, when both the straight receiver and the superhet are tuned to the L.F. end of the band, it becomes necessary to alter the trimmer, for maximum signal strength as heard in the superhet 'phones, the tap must be moved until the trimmer setting is the same for both ends of the tuning scale. An increase of trimmer capacity will show that the tap is too near the earthy end

of the coil, whilst a decrease in capacity will indicate that the tap is too far the other way.

The making of the R.F. coil is exactly similar, and does not call for any special comment. Care must be taken, however, when adjusting the band-spread, as the peak point of maximum signal strength will not be clearly defined as in the case of the first detector.

The aerial is so loosely coupled that it has no appreciable effect on the grid circuit tuning.

Coils for the other bands are made and trimmed in an exactly similar manner, the only additional difficulty being that the trimmer must be left at the original setting found for the 7 Mc. coils, after each band is checked. Fine adjustment on the 14 and 28 Mc. coils may be made by altering the turn spacing with the tip of a screwdriver.

To make a neat job, it is a good idea, once the coil is right, to make an exact copy on a similar former for actual incorporation in the set.

General Remarks on Coils.

No attempt has been made to specify coil data. This, it is felt, would only mislead the reader, as everyone has his own methods for making the tuning unit. It is possible that some may prefer not to include the coil changer, or may favour some other system. The coils in the receiver illustrated, were wound on straight-sided valve bases. Should there be a demand for a detailed descriptive article, the writers are prepared to produce one, but they feel at the moment that too much "advice" may tend to cramp the style of the individual experimenter, and although they claim to have produced a first-class receiver, they do not maintain that it is necessarily the last word on the subject!

Lining-up the Crystal Filter.

A full description of the crystal filter circuit employed, appeared in Part I; the present duty is to give a few hints on its proper adjustment and a guide to some of the snags to avoid.

First of all tune the straight receiver to any band and adjust the superhet to resonance. At this juncture the beat oscillator can be switched in and its tuning condenser rotated until the heterodyne note is heard, and thence to zero beat. The condenser CA is in parallel with the beat oscillator condenser, and the tuning of the beat oscillator should be set so that zero beat coincides with the half-way-in position of this small condenser.

The beat oscillator is now functioning. Switch the oscillator off for a moment and set the crystal switch to the "series" position. The signal due to the straight receiver, as shown on the second detector plate milliammeter, will appear much sharper and probably weaker, as it is tuned through resonance. The I.F. trimmers, with the exception of condenser CB must now be adjusted for maximum signal strength as indicated on the meter, and the beat oscillator again switched in.

Readjustment of the beat oscillator note will probably be necessary, and the signal should be tuned in on the main condenser for maximum signal strength, irrespective of the pitch of the note. Condenser CB will allow of selectivity in the crystal filter to be brought to the optimum point, this point being consistent with maximum selectivity and the minimum of crystal "ring." The small condenser CA allows of adjustment

of the pitch of the beat note to any frequency up to 10 kc. either side of resonance, to suit the operator's personal taste as to the pitch of the note he wishes to read.

Selectivity increase (CB) beyond a certain point reduces the decrement of the crystal circuit to such an extent that signals lose their definition, and the crystal tends to impart a "pinging" characteristic to both signals and general background. Reduction of capacity too far, tends to nullify the effect of the crystal altogether. If the crystal is cut out of circuit, the resonant point of CB provides a datum level, on the higher side of which will be found the optimum operating condition. An illustration of the effect of crystal selectivity is shown in Fig. 4.

Crystal in Parallel.

C.W. interference on telephony or a heterodyne whistle between two adjacent telephony stations, can be eliminated by use of the parallel position of the crystal switch. Tuning of the main condenser must be carefully set so that the *interfering* carrier is exactly in resonance with the crystal. Due to the manner in which the crystal is connected in the parallel position, it functions as a short circuit for on-tune signals, whilst leaving off-tune signals unaffected by its presence. Thus, although the wanted signal is slightly off resonance, the unwanted carrier is shunted through the crystal, to earth, before it can reach the grid of the I.F. amplifier. Owing to the relatively low

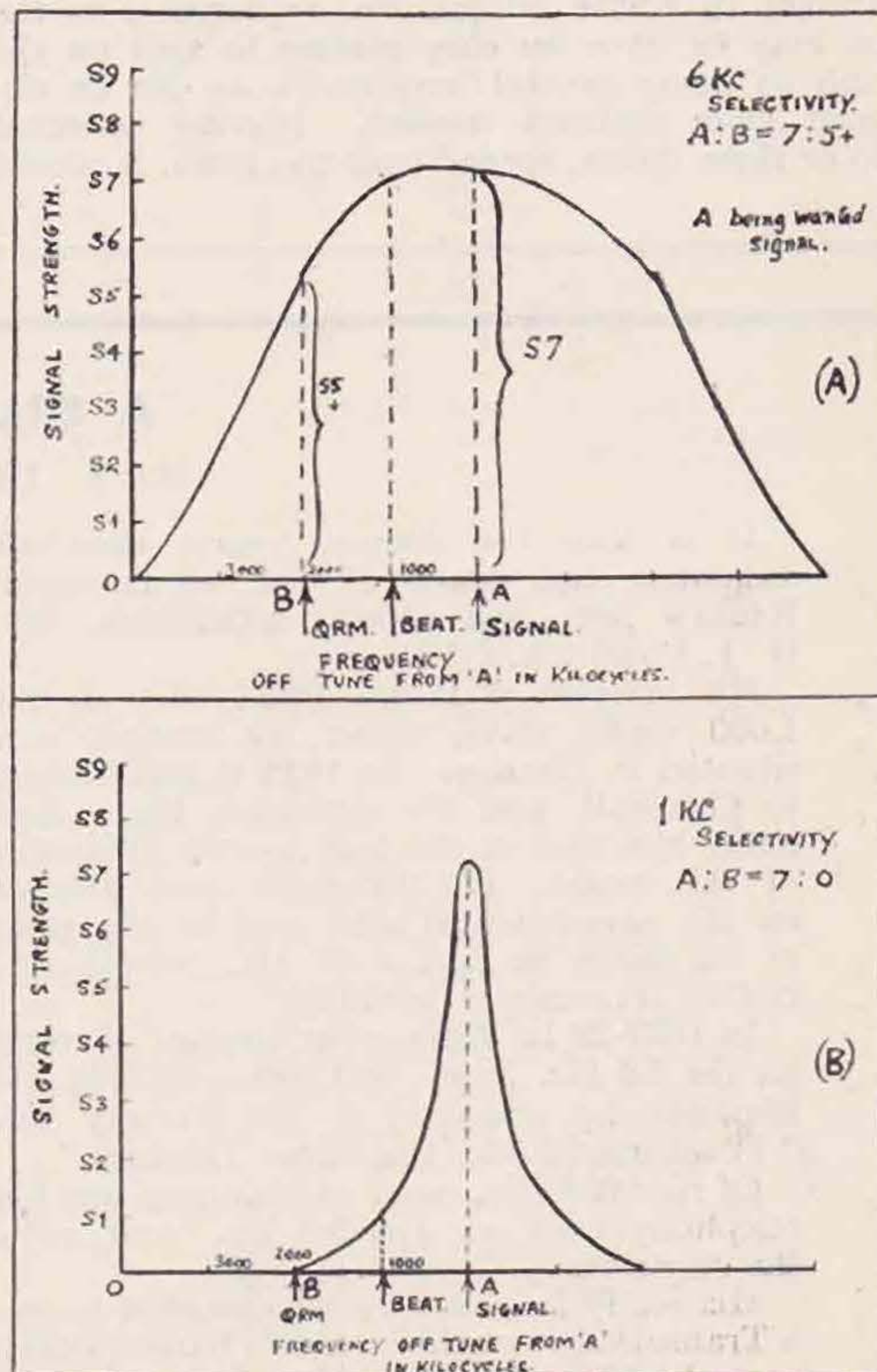


Fig. 4.
Diagram showing effect of crystal on interference.

selectivity of the "straight" superhet when the crystal is in parallel, this off-tuning of the wanted signal leaves it practically unaffected. This particularly applies where the heterodyne whistle is low in frequency, as this involves less detuning.

Calibration.

As we are discussing a receiver for the amateur band only, it is clear that, as the bandspread on each set of coils will be in the order of 500 kc., it will be an easy matter to permanently calibrate the dial for each band.

This has been done in the writers' receiver, and it is interesting to note that this calibration has been maintained at a very high level of accuracy, $3 \text{ kc.} \pm$ being the greatest deviation so far recorded, this, after nearly eleven hours' continuous operation of the receiver on one specific occasion.

It is surprising how few amateurs have any form of calibration on their receivers apart from knowing roughly the extent of the band. It is the more surprising because calibration is not difficult and need not involve any expense. For those who do not possess a 100 kc. bar, the method of calibration, although somewhat tedious, is simplicity itself, if the tuning condenser is straight-line frequency.

First divide the dial into 1 millimetre sections, or in the case of a circular dial, the marking in degrees will suffice. By means of a graph, the base of which is marked off in kilocycles and the mantissa in either millimetres or degrees, as the case may be, it is an easy matter to spot on the graph as many crystal frequencies as can be obtained from stations worked. Having collected two or three dozen, spread over the band, it should

be possible to join up the majority of the spots on the graph by means of a straight line. The greater the number of checks obtained, the smaller the chance of error, by the common law of averages. This calibration may now be transferred to the dial itself.

An accurately calibrated receiver is a valuable and interesting asset to any station, and incidentally, the source of much surprising information on the vagaries of certain crystals!

In connection with the subject of calibration, reference to the rules of the forthcoming B.E.R.U. Contests will show that an opportunity is to be given to everyone to calibrate their receivers, if they so desire.

General Notes.

It is realised that many things remain unsaid even in the best of articles (which this one is not claimed to be).

The subject of automatic volume control, for example, has not been mentioned, for the simple reason that the writers have not yet tried it. If, however, they have stimulated a technical controversy, or in some small measure added to the sum total of knowledge, then their object has been achieved. One thing is certain: any experimenter who decides to build himself a super-heterodyne receiver along the lines indicated, will never go back to a straight receiver again, and will probably find before very long that he has lost the art of pinning down a DX signal with a well-aimed biff with the reaction condenser of a straight receiver. The luxury of real single-dial tuning along a calibrated scale, is ample reward for the time, trouble and ingenuity expended on its realisation.

A SILENT KEY

H. J. POWDITCH (G5VL).

It is with the deepest regret that we announce the death of one of Amateur Radio's best and oldest enthusiasts, Mr. H. J. Powditch, G5VL.

His interest in Radio dated back to the 1,000 metre days, when his station was situated in Harrow. In 1925 it was moved to Cornwall, and his activities there had made him one of the best known amateurs of the world. His interests were always on the experimental side, and at the time of his death he had a 56 Mc. crystal-controlled transmitter working.

In 1927-29 he did a great amount of work on the 28 Mc. band, and demonstrated his keenness by donating to the Society the "Powditch 28 Mc. Challenge Trophies."

Of recent years, most outstanding was his telephony work, on the 3.5 Mc. band, with the American Continent.

His ready help to any who wanted to try a Transatlantic contact on this band quickly earned him a place in their esteem.

His loss will be mourned, too, by his many friends on the 14 Mc. band, where his signals were renowned for their strength and quality in every part of the world.

His work on Society affairs also showed his keenness in Amateur Radio. For some years he was Manager of Contact Bureau, a post which he filled admirably, never sparing himself to make it a success.

It is difficult to express in words just what we have lost. To his many friends on the air he will be long remembered for his cheery humour, candid remarks and ready help.

To those of us who were privileged to know him personally, his loss will seem much greater. His ready wit, charming personality, generosity and nobility of character will live in our memories always. With his death Radio loses one of its best amateurs, and the world is poorer for the loss of a great gentleman.

J. W. M.

SOME EXPERIMENTAL WORK WITH AERIALS

By J. MacINTOSH, VS1AA (ex VS2AF).

THESE experiments were carried out in connection with the station VS2AF and they may prove of interest to some of our readers. It is not the intention to attempt to give a treatise on antennas as other more competent authorities have dealt with the different types from time to time.

Experiments were carried out using different forms of radiating systems, and with due respect to the pros and cons of the various types, no aerial tried has failed to produce results. However, all those erected have had three points in common; firstly, insulation has been of the highest order; secondly, the radiator was erected at the greatest possible height; and thirdly, heavy gauge wire was used for the top in all but the initial experiments.

Taking the various aerials as they were erected, we will deal first with the "Windom."

The Windom.

This is a Hertz antenna, fed by a single feeder line. There are two general types of "feed" systems employed by amateurs:—

(1) Those utilising a tuned non-radiating twin-feeder system; and

(2) Those employing an untuned matched impedance system.

The matched impedance type may be of either the single or twin variety. The "Windom" belongs to the single-feeder matched impedance class. It has always appealed to the writer chiefly owing to its ease of erection and to the fact that, despite what may be technically levelled against it, results are fairly easily obtainable. Technically, the Windom is intriguing. It is said to work well on its harmonics; but it ought not to, which is what we shall attempt to prove in the following paragraph.

In a "Windom" Hertz, we endeavour to tap on the feeder line at a point where the impedance of that particular point on the top matches the impedance of the feeder. The latter must operate purely as a feeder and it must on no account have standing waves on it, otherwise it will itself operate as a radiator of energy and spoil results. Now the impedance of a single wire feeder line may lie between the values of 400 and 1,000 ohms; the use of thin wire increases the impedance while thick wire reduces it. Impedance in a top depends on the point at which measurement is made. In a half wave top, e.g., 67 feet on 7 Mc., it varies from a high value at the ends to a comparatively low value at the centre. Similarly, the impedance will vary throughout each half wave on a multi-wave top. See Fig. 1. Suppose we take the point X as representing the correct spot at which to place our feeder when operating on 7 Mc., then when we change to 14 Mc., the point X can no longer represent the correct impedance matching point on the half wave C E since, according to the chart shown in the Radio Amateur's Handbook, the feeder position should now be 4 feet 8 inches distant from the centre point D, on the half wave C E. Actually, point X is about 7 feet 5 inches distant from D. The same thing happens when operating on 28 Mc. Here the feeder is supposed to be matched on the half wave C D, but we find it positioned at about 11½ inches from the centre point F, instead of, according to the chart, 2 feet 4 inches. It therefore would appear that while we can match our feeder on the half wave, when operating on harmonics the feeder cannot possibly be matched without adjusting its position on the top. Contrary to expectations, however, the Windom antenna does

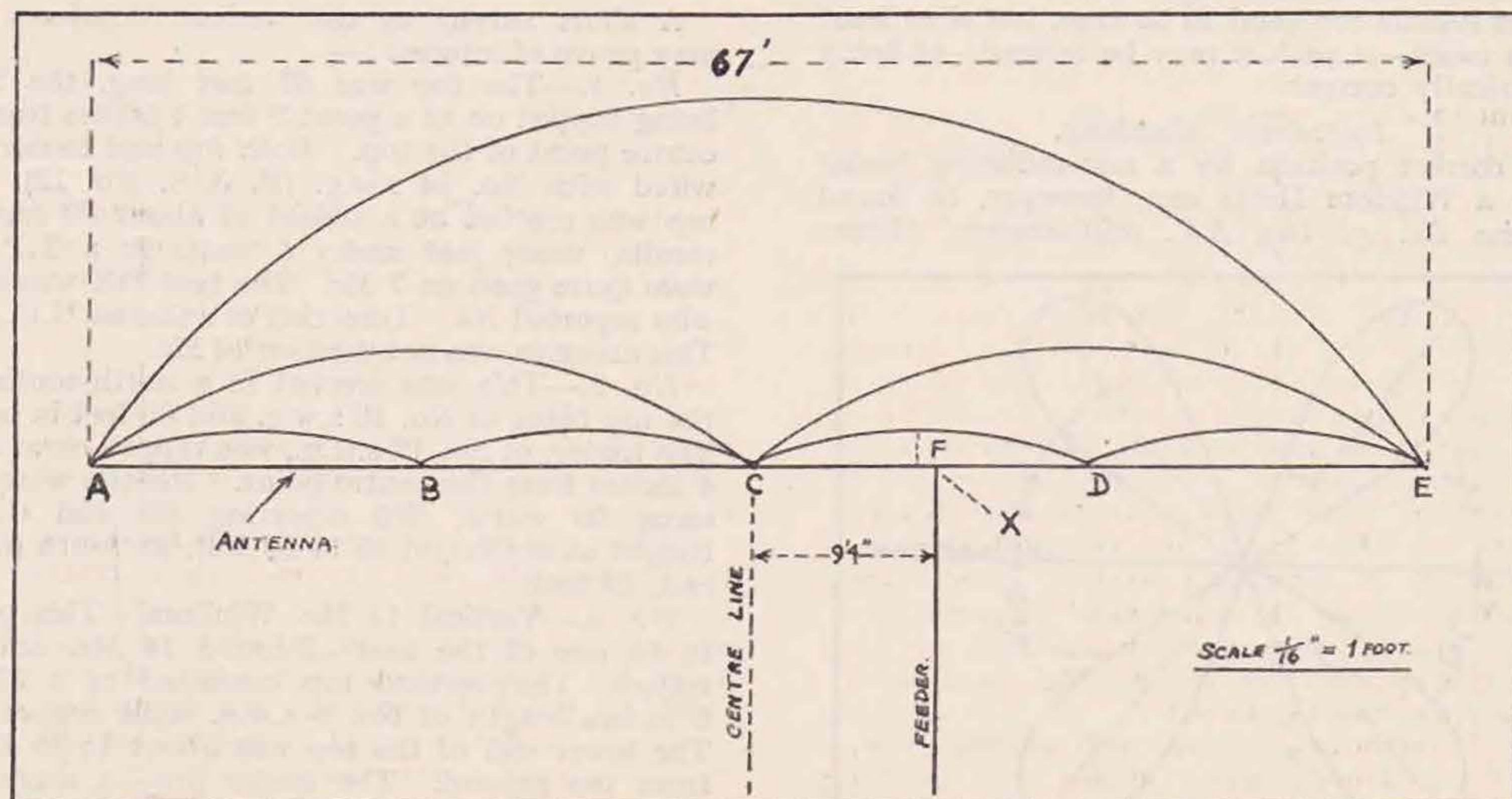


Fig. 1.

Impedance of an aerial at its various harmonics.

work well on its harmonics. Incidentally, when using our 67 feet top on 14 Mc., we can place the feeder at no less than four different points on the top and still match the impedance, i.e., to the left or right of the centre point B on the half wave A C and to the left or right of the centre point D on the half wave C E. On 28 Mc. there are eight such points. During the course of experiments with a 264 feet Windom, it occurred to the writer that there must be an arithmetical relation between these somewhat mythical tapping points, and after a little juggling with pencil and paper, the fraction one-sixth ($\frac{1}{6}$) was evolved. Let us explain further.

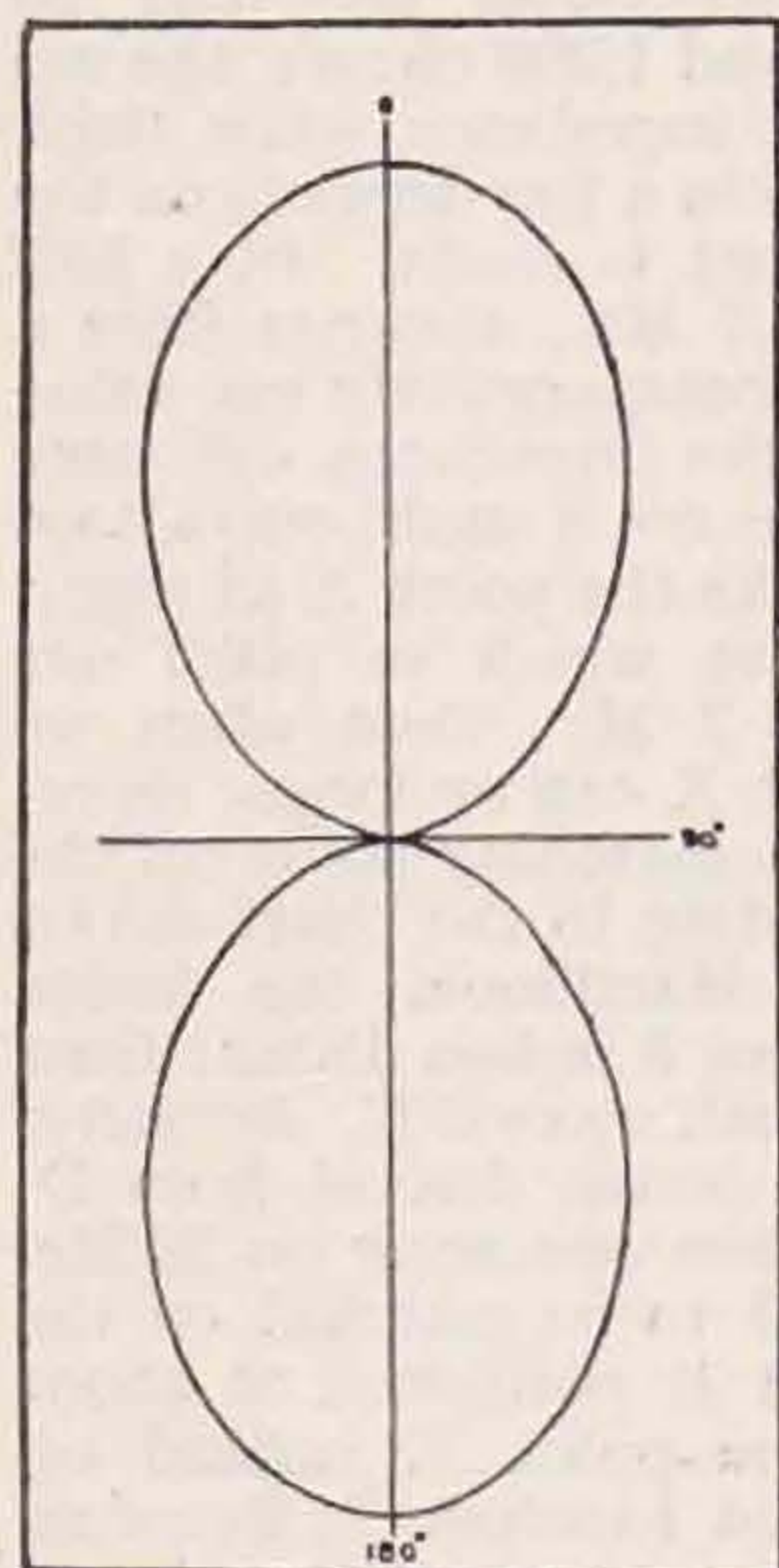


Fig. 2.
Field radiated by a half-wave aerial.

distance from the centre of the antenna top to the spot where the feeder taps on. This one-sixth business sounds too good to be true, but it at least has the merit—if such it may be termed—of being geometrically correct.

Impedance Matching.

The correct position for a non-radiating feeder line to a Windom Hertz can, however, be found with the aid of two A.C. milliammeters. Meters

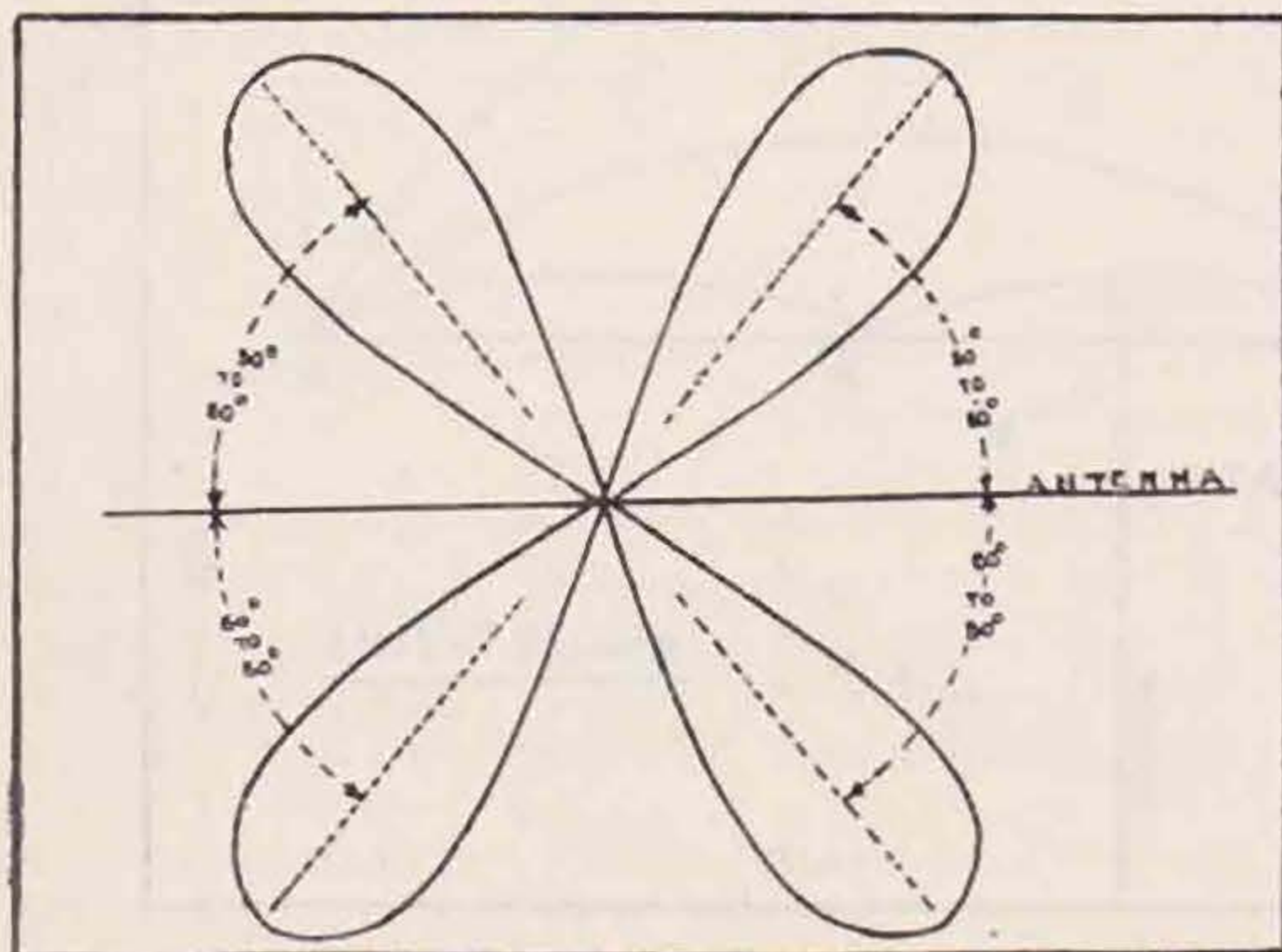


Fig. 3.
Field radiated by a full-wave aerial.

The top is, say, 66 feet in length and we require to tap on a single feeder line. Divide the length of the top by 6, in this case 11 feet, and this is the distance from the centre of the top to the point where we attach our feeder. From an examination of Fig. 1 it will be found that this fraction one-sixth holds good throughout the harmonics. The feeder in Fig. 1 would be positioned at a point—let it be X— $11\frac{1}{6}$ feet distant from C. On 14 Mc., this point X should now be $\frac{11\frac{1}{6}}{2}$ feet distant from D, and on measuring this distance we find it to be 5 feet 7 inches exactly. In short, divide the length of the top by 6 and the figure given is the

of the thermo-couple type are very suitable and for a power of about 50 watts, they should have a scale reading up to 100 milliamps. For higher powered transmitters, meters reading up to 500 milliamps should be used. The single feeder has comparatively little current flowing along it, and as this current should be the same at any and all points in the feeder if we are to avoid standing waves and consequent radiation, we can test whether the system is working correctly or not. At the transmitter end of the feeder line insert one of the meters, placing the other in the feeder line one quarter wave distant from the transmitter. If there is no radiation from the feeder, these two meters will read alike. If not, we must move the position of the feeder on the antenna top until the readings are alike. One meter only could be used but it is anything but pleasant chasing up and down

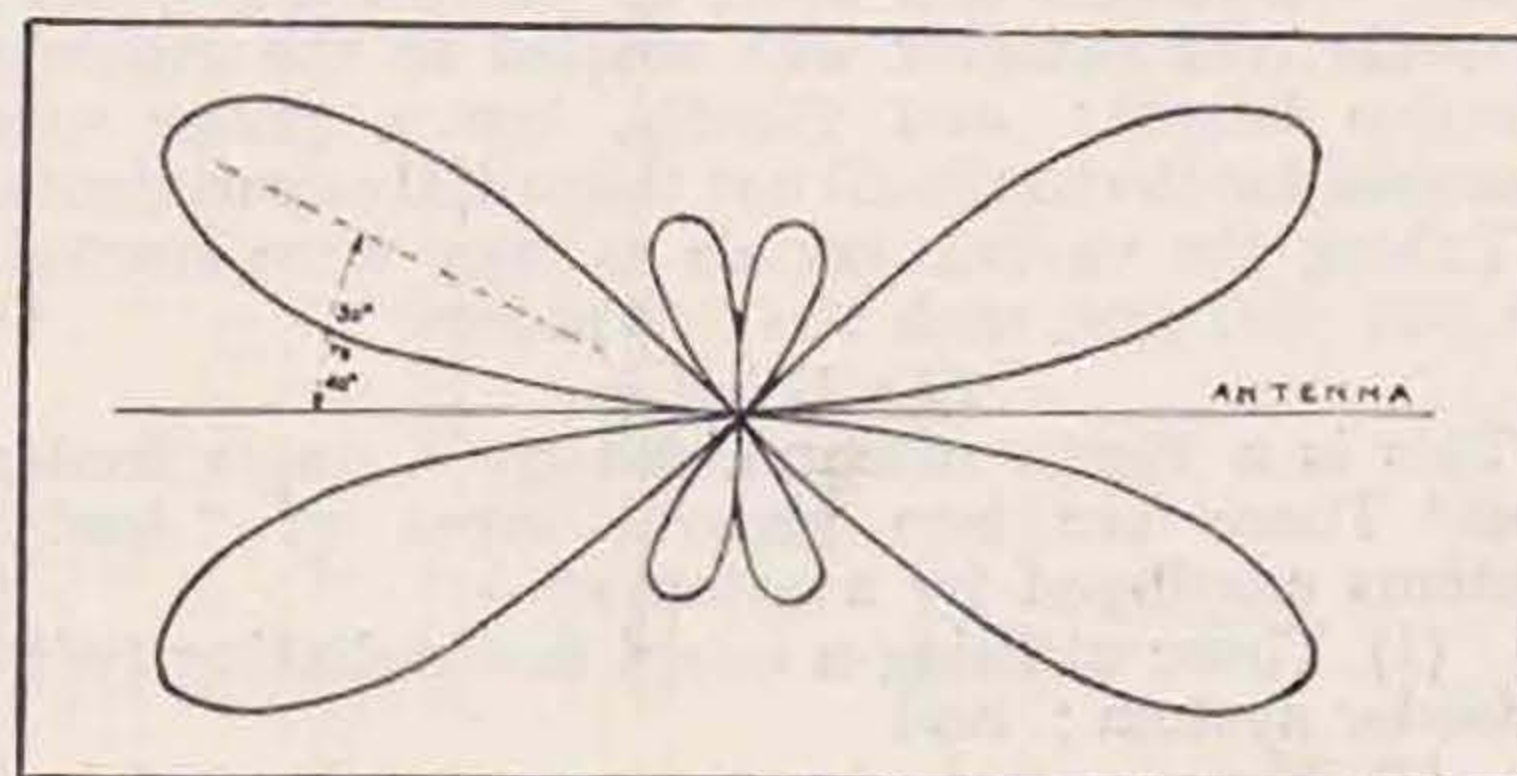


Fig. 4.
Field radiated by a fourth harmonic aerial.

a ladder with a valuable instrument. The process sounds much easier than it actually is! If one is testing the feeder for work on 14 Mc., this will mean that the second meter will be situated about 16 feet 6 inches from the transmitter, but on 7 Mc. it will be 33 feet away—possibly well up in the air and necessitating a pair of binoculars to read it accurately. Still, it's all good fun!

"Windom" Aerials Used.

A short survey of the various Windoms used may prove of interest:—

No. 1.—The top was 67 feet long, the feeder being tapped on at a point 9 feet 4 inches from the centre point of the top. Both top and feeder were wired with No. 14 s.w.g. (B. & S. No. 12). The top was erected at a height of about 60 feet and results, using just under 5 watts in a T.P.T.G., were quite good on 7 Mc. The best DX was a W6, who reported R4. Direction of antenna N.E./S.W. This antenna was not used on 14 Mc.

No. 2.—This was erected in a north-south line, the top being of No. 10 s.w.g. and 66 feet in length. The feeder, of No. 12 s.w.g., was tapped on at 9 feet 4 inches from the centre point. Results were good using 20 watts, W6 reporting R5 and G, R3. Height at north end 45 to 50 feet, at South (house) end, 25 feet.

No. 3.—Vertical 14 Mc. Windom. This proved to be one of the best all-round 14 Mc. antennas tested. The vertical top consisted of a 33 feet 6 inches length of No. 6 s.w.g. solid copper wire. The lower end of the top was about 15 to 16 feet from the ground. The feeder line—a single wire of No. 12 s.w.g.—was tapped on to the vertical top at a point 4 feet 4 inches down from the centre point. The feeder was 62 feet in length. A vertical

reflector consisting of a 33 feet 6 inches length of No. 10 s.w.g. was erected at a distance of 16 feet 9 inches to the due South of the vertical top of the antenna. The whole system was slung from a wire supported by two conveniently situated trees—the supporting wire being suitably broken into sections by insulators, care being taken to ensure that none of the sections in length fell too dangerously near a multiple of 33 feet 6 inches. This system was tested over quite a long period and yielded very good results indeed, in view of the low power of 20 watts employed. The writer did not ascertain how much, if any, signal strength was added by the reflector when transmitting to the North. Towards the South, however, it was definitely proved that the reflector reduced signal strength appreciably, thanks to a test with VK4EI. Conversely, signal strength increased when the reflector was lowered.

No. 4.—This was 264 feet in length and obviously no good for the man living in a city. Running in a N.W./S.E. line, the top, of No. 12 s.w.g., rose from 25 feet high at the S.E. end to 40 feet at or near the centre and falling to 20 feet at the N.W. end. The position of the feeder was experimented with to a considerable extent, but the writer is not convinced that one position was definitely much better than another. The feeder was No. 12 s.w.g. and was tapped on to the S.E. side of the centre point of the top at points ranging from 35 feet to 46 feet from the centre. The millimeter test in the feeder showed the best point to be about 46 feet from the centre point of the top when operating on 14 Mc. Some of the practical results obtained were:—

Tap at :	Band.	Reports from
46 feet	14 Mc.	YP, R3 ; OH5, R4
45 feet	do.	G6, R3 ; F8, R5
37 feet	do.	ON4, R5 ; PAO, R5 ; D4, R3 ; G6, R6
35 feet	do.	OH, R4 ; PAO, R4 ; W6, R4

On 7 Mc. results were up to expectations, although at the time conditions were very variable.

Before finishing with Windoms, one or two points need stressing. The feeder line should be run away from the top at right angles to it for at least 20 feet in the case of a 7 Mc. half wave and for correspondingly longer distances in the case of longer antennas. The writer always employs a separate antenna coil loosely coupled to the anode tank circuit and the feeder is tapped on to one end

of the antenna coil, generally the end nearest the tank coil. An earth wire is used to earth H.T. negative.

The Zeppelin Antenna.

For a very complete description of this antenna, the writer cannot do better than refer the reader to the article by G6LI in the T. & R. BULLETIN, No. 6, Vol. 7, dated December, 1931. As a standard for comparison, a 67 feet Zepp was erected early on in the experiments. The top, of No. 6 s.w.g., was 67 feet in length and the twin feeders, 58 feet long, were spaced 6 inches apart. The antenna lay in a N.E. S.W. line, the feeders being attached at the N.E. end. The top was approximately 60

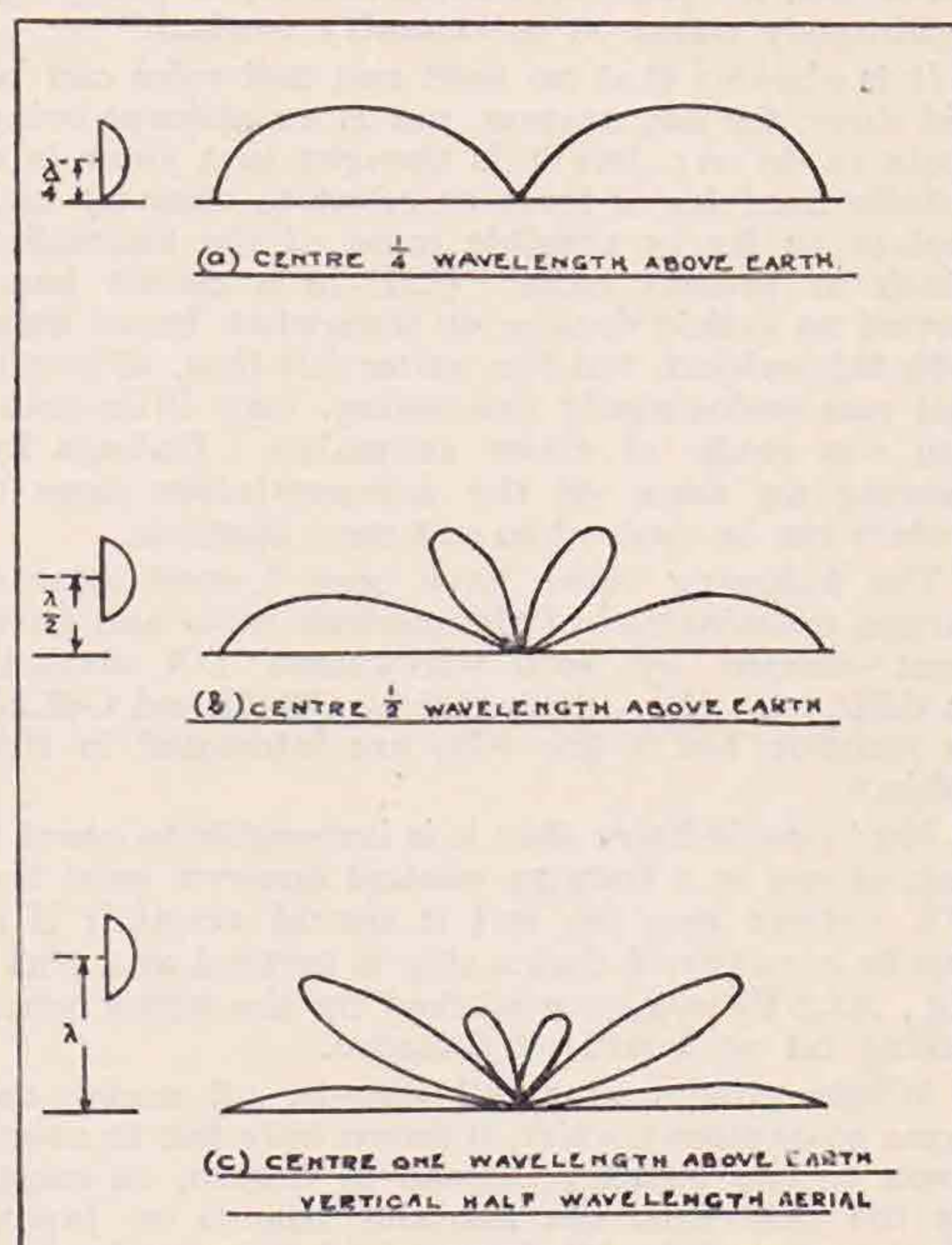


Fig. 6.

Shows the effect of the height of the aerial above earth.

feet above ground and was exceptionally well insulated. It is considered, however, that quite an appreciable loss must take place in the feeders, especially in tropical climates, where condensation is heavy. This is where the Windom scores, as the losses in a single wire feeder need scarcely be considered. Despite this apparent drawback, the efficiency of the Zepp may be gauged from the fact that it has produced W.A.C. and W.B.E., the elusive South American (Ecuador) reporting the 20 watter as R4, while VE5 reported R4 on 7 Mc. Results were equally good on 7 and 14 Mc.

Radiation Diagrams.

Figures 2, 3 and 4 show respectively the fields radiated by a half wave, a full wave (two half waves) and a fourth harmonic (four half waves) horizontal top antenna. As can be seen, the field radiated in Fig. 2 is at right angles to the top. In Fig. 3, the field has now divided itself, radiation taking place along lines about 50 to 60 degrees

(Continued on page 236.)

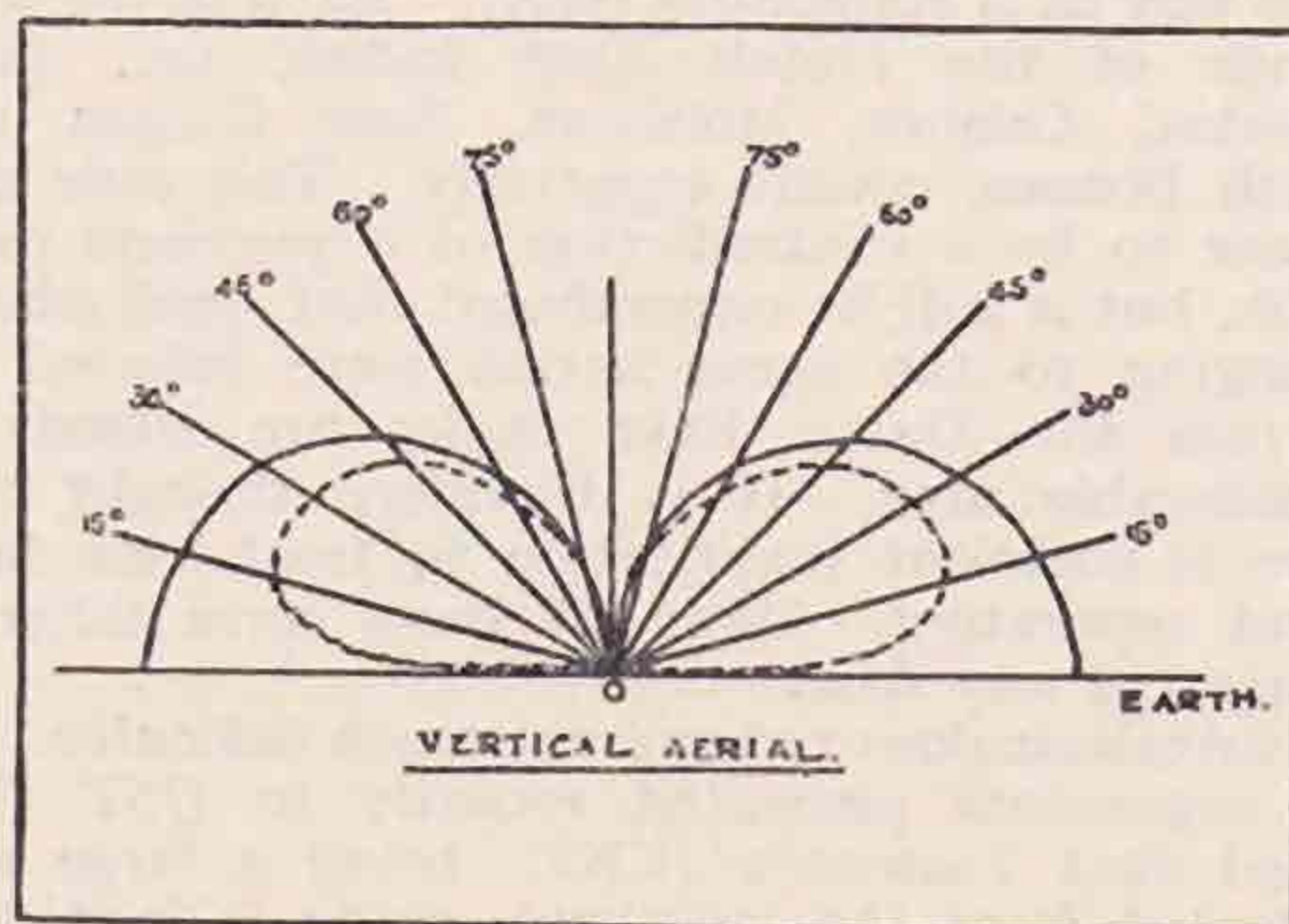


Fig. 5.

Polar Diagram of Vertical Aerial. Low angle radiation.

DX SCORING

By H. A. M. WHYTE (G6WY).

AT this year's Convention we were informed that the majority of the members [of the Society] were genuine experimenters and were not interested in the recreation of chasing elusive DX. However, the writer is of the opinion that there are some to whom this article will be of interest and its purpose is an effort to give some indication, for those interested in DX, of what may legitimately count as a "country worked."

It is obvious that no hard and fast rules can be laid down for any system, nor is an attempt being made to do so; but it is thought that there is a definite need for at least an effort to clear up and explain as far as possible some of the anomalies which at present exist. *QST* in a recent issue carried an article dealing on somewhat broad lines with this subject, but the writer felt that, although this was undoubtedly interesting, very little mention was made of these anomalies. Perhaps by clearing up some of the argumentative cases a system can be evolved to suit most opinions.

The following views have been formed after a careful examination of the modern Atlas and have been studied by such well-known DX stations as G2ZQ, G5YH, G6NJ, G2PL, G6GH and G6LH, to mention but a few who are interested in this subject.

Most people know that it is impossible to count a ship at sea as a country worked however good the DX contact may be, but it should count it if it can be ascertained that a ship is berthed at a port: e.g., XLAIS was once worked by the writer when taking oil on board at Cucaçao.

Where groups of small islands, all under the same government, exist, it seems only fair to count them as one country instead of dozens, as might be the case with the Mariana Islands or Japan. In the case of the Mariana Islands, Guam, being a United States possession with a separate prefix, will of course count separately. The West Indies (which consist of many islands belonging to different nations) will count separately providing the island, or group of islands, comes under different rule: e.g., the Bahamas group, having one prefix, count as one country. Any separately named group in the Pacific counts as one: e.g., Hawaii Islands (K6).

One of the most debatable cases occurs right here at home. Before the Washington prefixes came into existence the old prefixes for the British Isles were G—England and Wales; GC—Scotland; GI—Northern Ireland; GW—Irish Free State. As we know, G and GI are the only two that remain, GW now being EI and Scotland taking G. Before the present prefixes, then, it was felt legitimate to count four countries for these four prefixes, Wales counting one with England, and the writer considers that it is still fair to count Scotland as a separate country. Channel Islands being essentially a British colony can therefore be counted as another. G6NJ is of the opinion that the Isle of Man should count as another, but the writer considers that we should stop somewhere, and accordingly this island is counted in with England

and Wales. Still in Europe, the Balearic Islands (EA6) count as a separate country because it is a Spanish possession situated away from the mainland, in the same way as is Malta; under the same argument, Corsica and Sardinia would both count if there were amateur stations there. There are several independencies in Europe, such as Andorra and Monaco and the League of Nations State of Danzig. Saar would appear now to be part of the main German territory, and the writer is not quite clear whether this should be counted separately or not and would welcome opinions. East Prussia, although separated from the rest of Germany by the Polish Corridor, is not considered to count separately.

The biggest anomaly of all would appear to be the U.S.S.R. Many people count this as two countries, U.S.S.R. in Europe and U.S.S.R. in Asia. However, quoting from the most modern atlas, we find that the Union of Soviet Socialist Republics is in reality a federation of separate republics, these being the Russian S.F.S. Republic, which is described as the largest of the constituent republics of the U.S.S.R. and covers by far the greater portion of the Union, partly in Europe and partly in Asia, containing eleven autonomous republics and fifteen autonomous areas; White Russia; Ukraine; Georgia; Armenia; Azerbaijan; Turkoman S.S.R.; Uzbek S.S.R.; and Tadzhik S.S.R. One of the autonomous areas of the Russian S.F.S. Republic is Siberia and this, being in a different continent, can therefore count as a different country. Under this ruling, therefore, the U.S.S.R. gives us ten possible countries to work instead of two. If the Call Book is referred to, the prefixes for these ten in the order given above will be as follow: U1, U3, and U4—Russian S.F.S. Republic (one country); U2—White Russia; U5—Ukraine; U6S—Georgia; U6W—Armenia; U6M—Azerbaijan; U8E—Turkoman S.S.R.; U8I—Uzbek S.S.R.; and as there appear to be no amateurs in Tadzhik no prefix is known. Siberia is U9 and UO.

Turning to Asia, Burma being a vast area to the east of the Indian States is generally considered to be a separate country. Korea (J8), although belonging to Japan, is a separate colony in the same way as is Manchuria (MX). Each of the large islands of the Dutch East Indies, i.e., Java, Sumatra, Celebes, Moluccas, New Guinea and Dutch Borneo, counts separately. This case may appear to be a contradiction of a previous paragraph, but it will be remembered that *small* islands belonging to the same nation were referred to, whereas the Dutch East Indies are islands of considerable area. It is therefore thought that there is sufficient justification to treat each large island separately. Many of them have different prefixes in any case.

Australasia does not present much difficulty. In the arguments presented recently in *QST* they stated that Tasmania (VK7), being a large area separated from the mainland, made it legitimate to be counted separately. The writer agrees with this. North and South Island of New Zealand,

being only separated by a narrow strait, count together as one country.

North America is fairly easy if one bears in mind the remarks in a previous paragraph with regard to groups of islands belonging to different nations. There is one exception, however, and that is Porto Rico and Virgin Islands, both carrying the same prefix but being sufficiently separated to count as two different countries. The U.S.A. counts as one country.

South America is straightforward and no peculiarities seem to exist there as each separate country has its own prefix.

Africa is fairly easy, but South-West Africa (ZS3), being a mandated territory and not part of the Union of South Africa, is separate. The Sahara, which used to carry the old prefix FF8, is looked upon as separate, although no boundary lines appear to exist between the desert and Algeria and Morocco. French West Africa is divided into many separate territories familiar to philatelists, and each of these can count separately, although there have only been two known cases of amateurs in these territories, one in Gabon and one in Niger.

Obviously, if a territory carries its own prefix it requires no explanation, but argumentative cases are bound to crop up in the future which, if dealt with in the same way as those mentioned, should be satisfactorily dealt with without much difficulty.

The writer wishes to repeat that this article is not meant to give definite rulings, but is rather a determined effort to put before the members of the R.S.G.B. and the B.E.R.U. a general idea on which to work. It is hoped as a result that the claims on QSL cards will be more uniform, instead of one's own ideas of what does, or what does not, count for our DX total.

APPLICATIONS FOR POWER IN EXCESS OF 25 WATTS

Two years ago we published in this journal a copy of the instructions used by the G.P.O. when deciding whether a transmitting amateur should be granted permission to use input powers exceeding 25 watts.

As the issue containing this information is now out of print, and enquiries have been received from more recently elected members, we are reprinting the essential paragraphs with the permission of the G.P.O., Radio Section.

G.P.O. Instructions

"(1) Transmitter and Receiver Design.

"Experiments conducted on transmitting or receiving circuits, modulation, components, etc., do not in general justify facilities for high aerial power. Such experiments can be conducted just as usefully on an artificial aerial, or, if some radiation is essential by a shunted aerial arrangement. Tests on special equipment for mobile work, such as aircraft, police, mines, etc., would be exceptions to the above.

"New systems of transmission involving both transmitting and receiving equipment, can be developed without radiation, but in special circumstances long-distance transmission with reasonably high power may be necessary as a final proof of

the efficacy of the system. Such special circumstances would include those in which the system may be affected by propagation conditions, or where the receiving equipment needs to be tested under such conditions. Typical systems of this class might be single side band, quiescent carrier, privacy, special modulation systems, picture transmission, etc.

"(2) Aerial Design.

"Experiments on transmitting aeriels can be conveniently carried out with low power or by using the aerial for reception. If transmission is used, polar diagrams can be obtained by local measurement, or, if long-distance measurements are necessary, by comparison between the aerial under test and a standard omni-directional aerial.

"There will always be exceptions in which new types of array having highly directive properties are undergoing test, and it is desired to check polar curves by local or remote measurement for comparison, say, with theoretical curves. In such cases the licensee would normally have to obtain permission for the use of an extensive aerial system prior to applying for high power.

"(3) Propagation Research.

"Amateurs are now restricted to particular wavebands, and thus their research into the propagation of waves is limited to a comparison between those bands and to diurnal and annual variations therein, etc. For the collection of reliable data on such work it is necessary to employ some form of measuring apparatus at the receiving end. The usefulness of the information collected will depend entirely on the sensitivity and accuracy of this apparatus. Increase in power at the transmitting station will decrease the sensitivity necessary, and so should enable more reliable information to be obtained with simple apparatus.

"One qualification for the use of high power for this work should be the possession of such apparatus. All stations, co-operating together in such tests and possessing such apparatus, should not need high power. In such cases it is assumed that an applicant is working in association with amateurs abroad who have corresponding facilities. Evidence of this fact is desirable.

"In addition to such work, research workers are studying the physical aspects of propagation phenomena, and for this work high power may be essential. In addition, the receiving apparatus in use at the receiving station may be intricate and costly, and it may then be very much more economical to increase the power of the transmitter."

* * *

It is hoped that the publication of these instructions will enable members to frame their applications for increased power on sound technical lines.

In all cases, the application must be sent to Headquarters *via* a member's District Representative, who is required to comment upon the application.

As a general rule, the Council are prepared to recommend a member for an increase in power after he has been licensed for 12 months. Increases are recommended in 50 watts stages, except under special circumstances.

An applicant is required to give an assurance that crystal control or some other method of frequency stabilisation will be used for all high power tests.

STABILISED GRID BIAS

By J. N. WALKER (G5JU)*

GRID bias is essential for all valves and the methods of obtaining it vary considerably.

In the case of small receivers, a common method employed is that of putting a resistance in series with the high tension supply, either in the common negative lead or in series with the valve cathodes. Since comparatively small voltages only are required, this method is fairly satisfactory, although it has recently come to light that where an electrolytic condenser is used to bypass the audio frequency currents of an output valve, an appreciable lapse of time occurs after switching on during which the condenser acts as a short circuit to the resistance and a high and damaging current momentarily passes.

When Class B or "low-loading" (Class A-B) low frequency amplifiers are used, this method of bias is useless, since the anode currents are fluctuating violently and so the grid bias fluctuates also, introducing severe distortion.

Cathode (or filament) bias is sometimes used in the early stages of a transmitter, but is not practicable in power-handling stages. These generally require a fairly high value of bias and every volt available is wanted in the anode of the valve. In the case of power amplifier stages, negative voltage sufficient to bias the grid two or three times greater than the cut-off voltage is required and, in the case of low impedance valves especially, this means a value in the region of 300 volts.

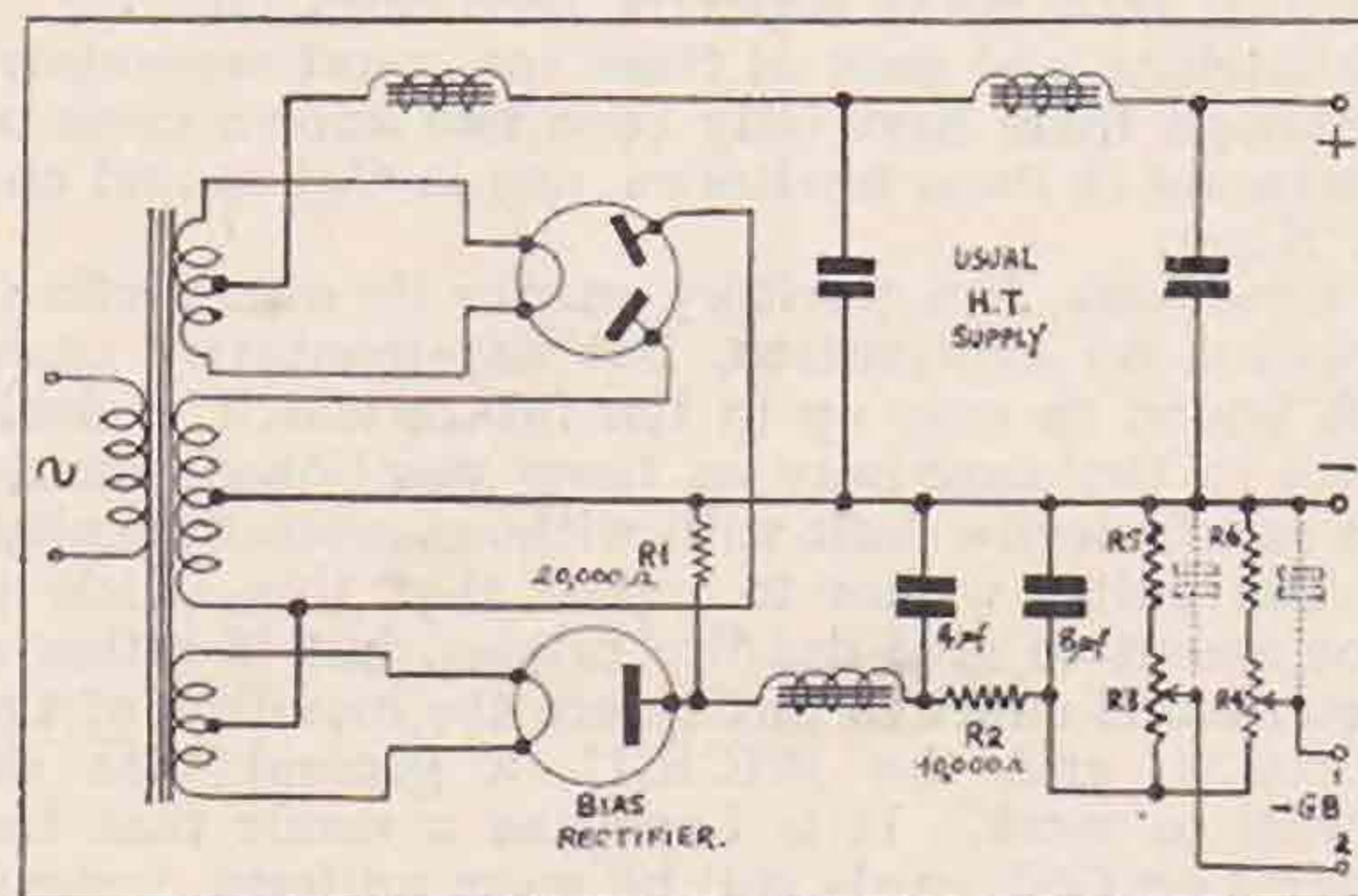
Grid leak bias for a transmitter has several disadvantages, the chief of which, of course, is that should the drive fail, the valve is deprived of all bias and would probably be damaged. Considerable power must be developed in the grid resistance in order that a high voltage will appear across it, and this power is derived from the radio frequency output of the previous stage, after rectification by the grid-filament path of the driven valve. That power is dissipated in this resistance is evident from the fact that often ratings as high as 10 watts are specified, whilst one watt types become decidedly warm in use. When a separate source of bias is used, most of this wasted power is saved, which means that either a higher R.F. voltage is applied to the driven valve, or, alternatively, less output is required from the previous stage.

Dry batteries, although finding favour with many amateurs, have the drawbacks of increasing their voltage, due to the charging effect of the grid current and of their resistance increasing with age. On the other hand, installing a separate bias eliminator entails considerable cost and duplication. The system described is a simple one and the bias voltages obtained can be utilised for either radio or audio-frequency amplifiers.

We will start from the fact that in the case of a centre tapped high tension transformer, each secondary carries current only every alternate half-cycle and we therefore make use of the unused half-cycle by applying it to another rectifier. If a 4-volt winding is idle, as is often the case, this can be utilised for a half-wave valve rectifier, but should this not be the case, a metal rectifier can be employed. If only comparatively low voltages are required, a small

metal rectifier or receiving valve with grid and anode strapped will be suitable, but for supplying the bias to the P.A. stage of a transmitter, a valve of the 250 v/60 mA type should be used.

It will be seen from the circuit that this valve is connected in the reverse direction, i.e., the filament is connected to one end of the high tension secondary winding of say, a 350-0-350 volt transformer which is being used to provide power for the sub-stages. A small choke prevents high condenser-charging currents being passed through the valve and a filter system follows, comprising the condensers C_1 , C_2 and resistance R_2 . Where high bias voltages are required, R_2 will necessarily be fairly low in value, but can be increased to cut



down the voltage if only low values are desired. The actual voltage available can be found by Ohm's Law, first calculating the current flowing and then deducting the voltage lost in R_2 . For example, assuming 300 volts across C_1 , and values of 10,000 Ohms for R_2 , 5,000 Ohms for R_5 and R_6 , and the two potentiometers R_3 and R_4 , 50,000 Ohms each, we have:—

$$I_{mA} = \frac{E}{R} \times 1000 = \frac{300}{10,000 + 27,500} \times 1000 = 8mA \text{ (nearly)}$$

NOTE.—27,500 Ohms is the total resistance of the network of R_3 , R_4 , R_5 , R_6 .

Volts dropped in R_2 are therefore $10,000 \times .008 = 80$, leaving 220 volts available for bias purposes. Of this, 20 volts are dropped in R_5 and R_6 , giving this value of minimum bias. This is the reason for the presence of R_5 and R_6 , and they can be varied to give any value of minimum bias desired.

For other values of R_3 , R_4 , R_5 and R_6 , the total resistance is found as follows:—

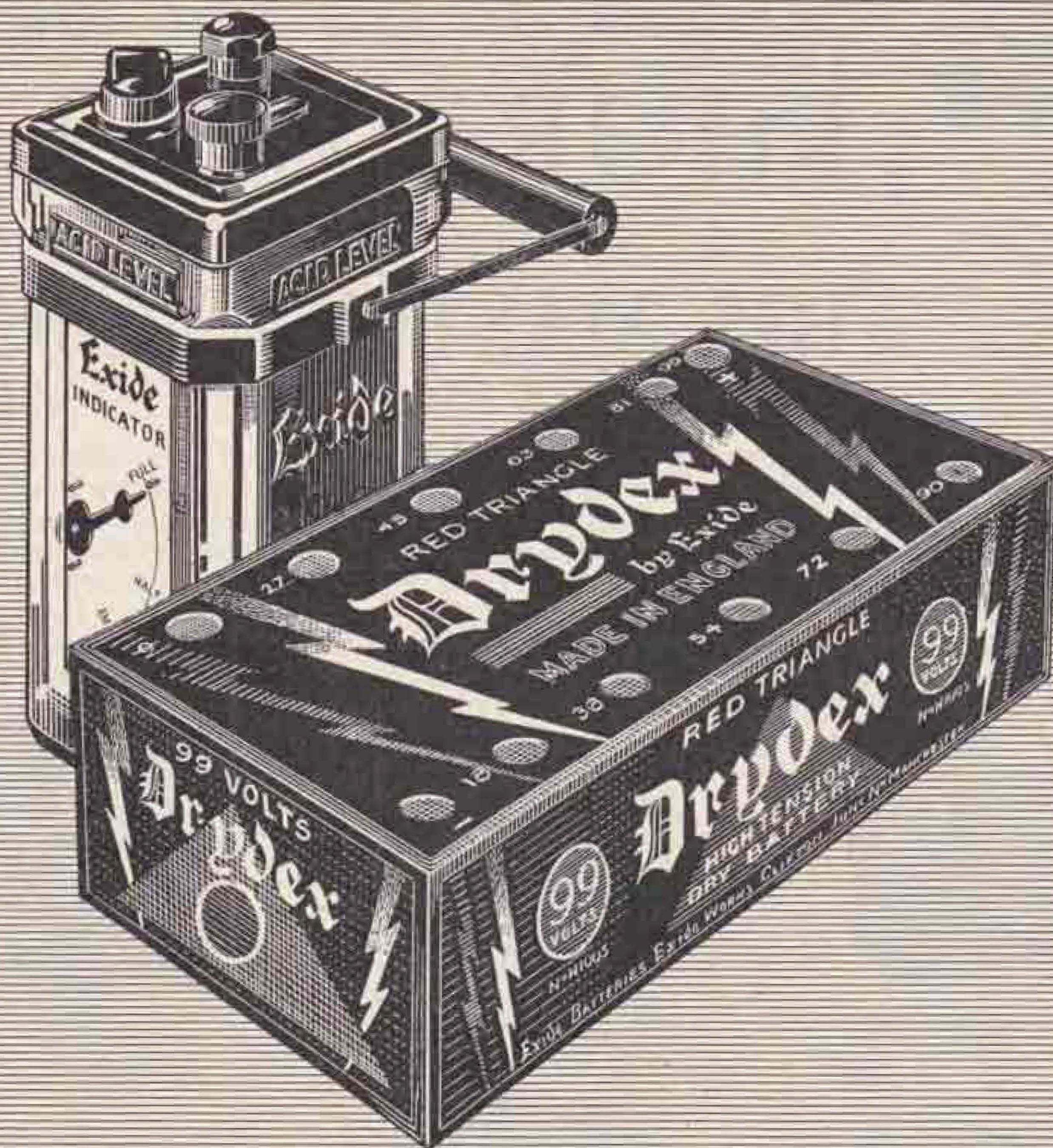
$$(R_3 + R_5) \times (R_4 + R_6)$$

$$(R_3 + R_5) + (R_4 + R_6)$$

Grid current will flow through the potentiometers and in order to prevent this affecting the overall voltage, the resistances of the potentiometers should not be higher than those specified—if one only is used, 25,000 Ohms will be a more suitable value. A ballast resistance R_1 , of a suitable rating (5 watts in the example given) is connected as shown and prevents any fluctuation of the overall voltage.

(Continued on page 236.)

* R.E.S. Member.



Exide AND Drydex BATTERIES

"Still keep going when the rest have stopped"

● Obtainable from Exide Service Stations and all reputable dealers

Exide and Drydex Batteries are exclusively specified for all battery operated sets described in the Guide to Amateur Radio . .

Exide Service Stations give service on every make of Battery. EXIDE AND DRYDEX BATTERIES, Exide Works, Clifton Junction, near Manchester. Branches at London, Manchester, Birmingham, Bristol, Glasgow, and Belfast.



You can get the best out of
SHORT WAVES
with a
"HIS MASTER'S VOICE"
ALL-WAVE RECEIVER

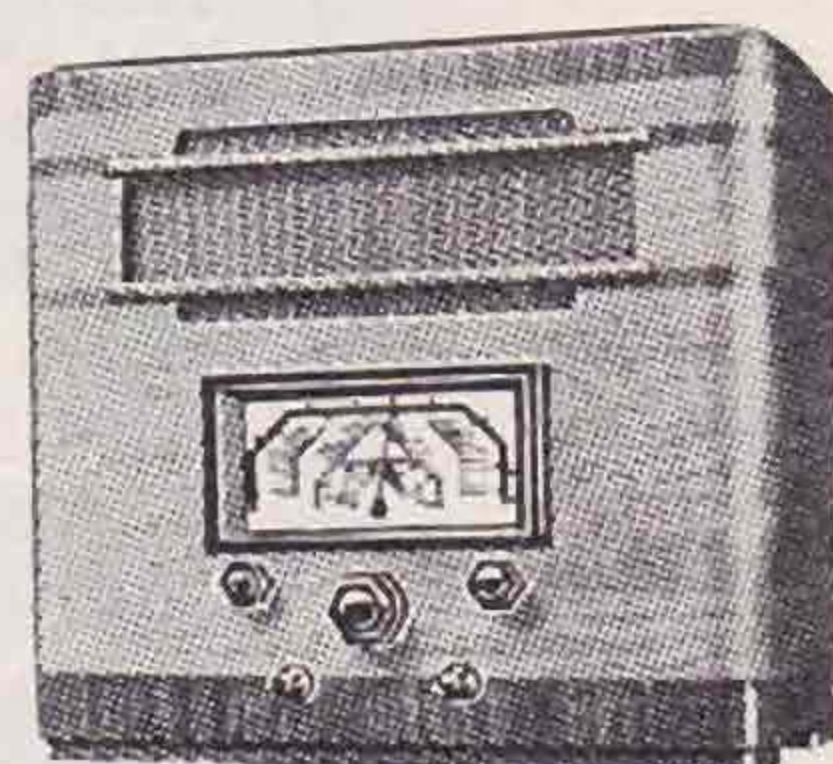
"His Master's Voice" engineers at the "H.M.V." Research Laboratories at Hayes, Middlesex, the largest of their kind in the Empire, have devoted many years to the design of all-wave receivers and radiograms. Many owners of amateur transmitters use "His Master's Voice" all-wave receivers, because of their efficiency on short waves, for two way working with other amateurs in all parts of the world. The circuit design of "His Master's Voice" all-wave instruments enables them to receive quite low-powered transmitters in U.S.A., Australia and other distant countries with good regularity and the best possible reproduction. Before you buy an all-wave or short-wave receiver you are advised to compare its performance with an "H.M.V."



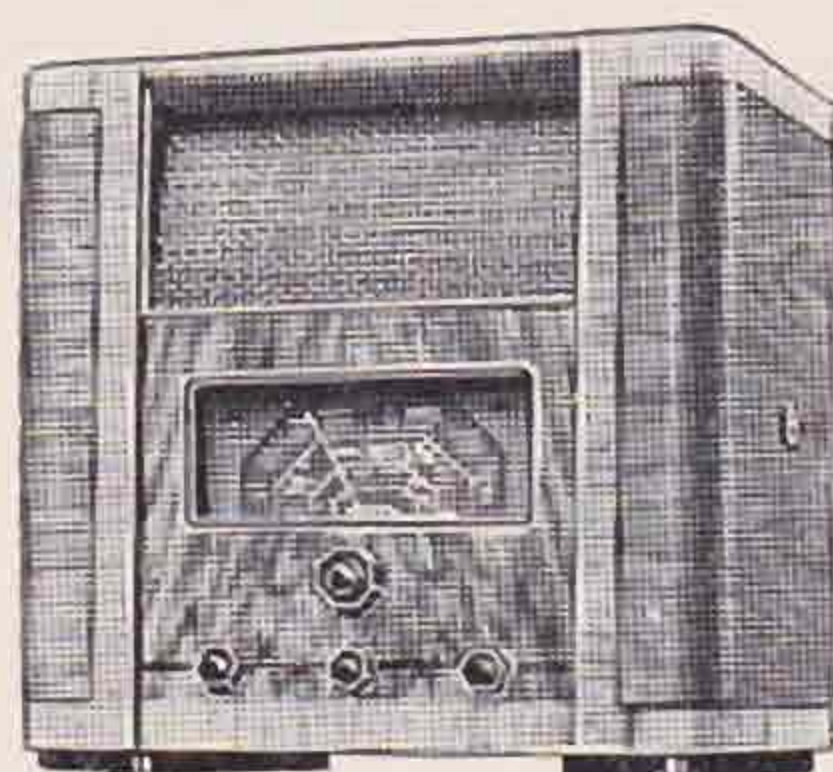
149. All-Wave Battery Receiver, 3 valves. 18-50, 195-560, 785-2000 metres. **9½ GNS.**



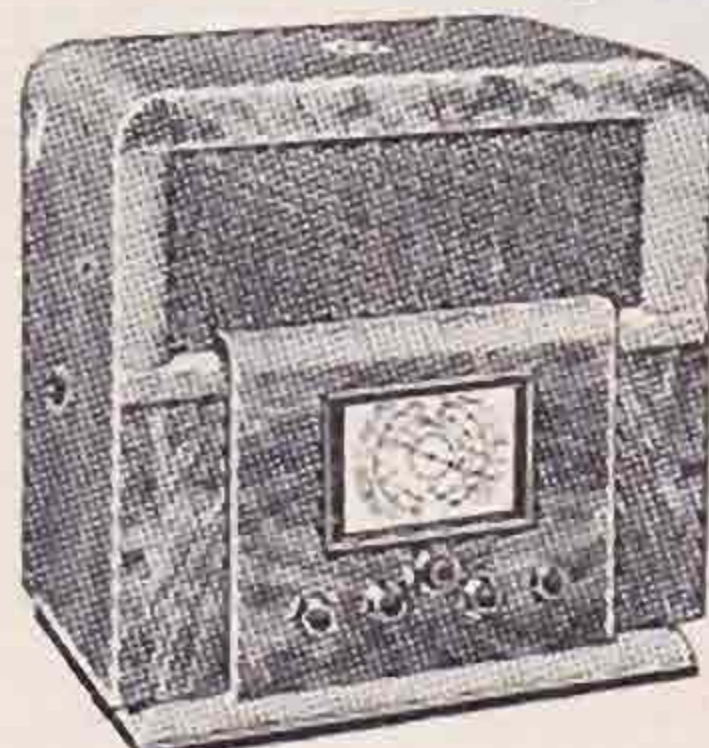
486AC/DC. All-Wave Superhet. 4 valves (plus detector) with AVC. 16-50, 198-580, 750-2000 metres. **13½ GNS.**



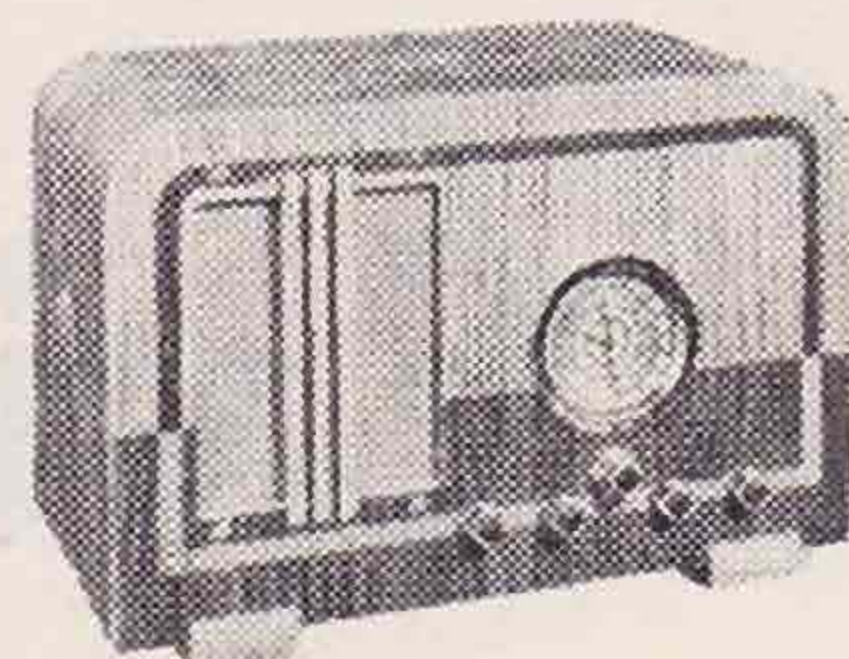
491AC. All-Wave Superhet. 5 valves (plus detector) with AVC. 16.5-52, 195-575, 725-2000 metres. **13½ GNS.**



482AC. All-Wave Superhet. 6 valves (plus detector) with AVC. 16.5-51.5, 200-580, 725-2000 metres. **16 GNS.**



481AC. All-Wave Superhet. 6 valves with AVC. 7-16 (covers Television Sound Transmission). 16.7-53, 46-140, 185-560, 750-2200 metres. **18½ GNS.**



480AC. All-Wave Superhet. 6 valves with AVC. 16.7-53, 46-140, 185-560, 750-2200 metres. **17½ GNS.**

Among the refinements incorporated in "His Master's Voice" All-Wave receivers and radiograms are two-speed tuning knobs, Vernier scales, enabling the precise position for the reception of each station to be noted, and cathode ray fluid light tuning indicators. Some "H.M.V." models have a short wave range commencing at 7 metres, enabling the television sound transmissions and amateur broadcasts on 10 metres to be heard, under favourable conditions.

A SIMPLE AUTOMATIC MORSE SENDER

By H. D. BICKLEY (G5QB)

THE object of this device is to send test calls automatically. Since there are several advantages in so doing, it will suffice to mention a few of them: (i) During a long spell of working, such as in N.F.D. tests, an automatic sender for test calls provides the operator with welcome periods of relief. (ii) Many amateurs jot down particulars of stations worked in the form of rough notes, with the intention of writing them up in the log later; very often this is left over, but, if after a QSO, the next test call is sent automatically, the log can be written up whilst the call is going

retirement, but a little gentle persuasion soon eliminated these. Having thus obtained a driving unit, the next point to be considered was the method of bringing about the interruptions of the keying-current; it should be mentioned here that a single current relay was already installed at G5QB for keying purposes, so that the contacts on the machine would have only to make and break the energising current to the relay. This makes the machine much simpler than the Wheatstone transmitter, which sends a current one way for "mark" and reverses it for "space."

The first method considered involved the use of a disc of wood like a gramophone record, having sectors of metal foil fixed around its periphery. It was intended to run this with a brush bearing on it, so that a dot or dash was sent according to the width of the sector passing under the brush. However, a little mental arithmetic soon showed this to

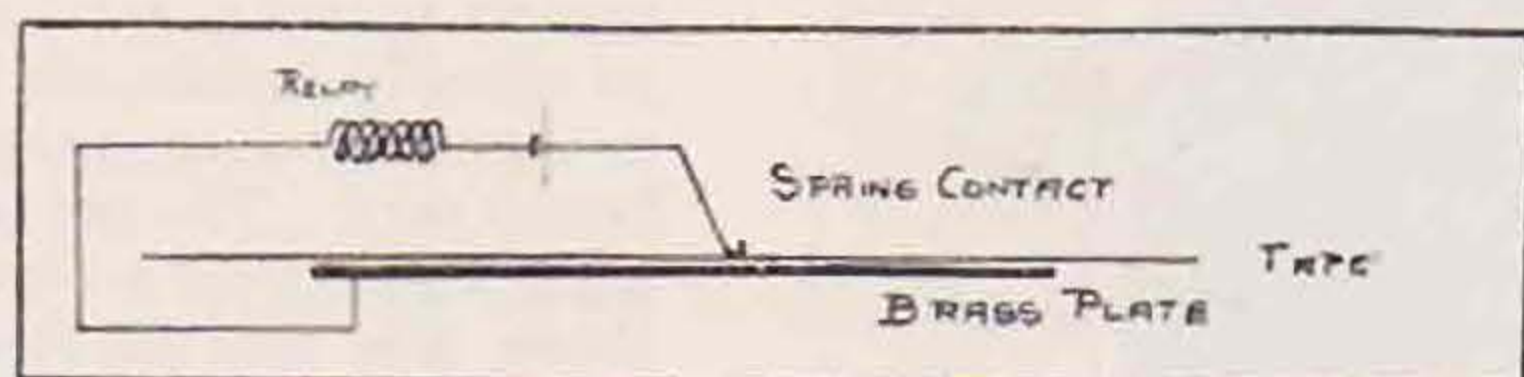


Fig. 1.

The circuit used with the sender. The tape runs over the brass plate, while a spring contact bears on the upper surface of the paper. When a hole is under the contact, the spring touches the plate and closes the relay circuit.

out. (iii) Work which requires the transmitter to be keyed, such as the investigation of complaints of interference with broadcast receivers, can be carried on without external assistance.

A Wheatstone transmitter is obviously out of the question for amateur use, so it is necessary to devise something which will be simple to construct and inexpensive at the same time. It was decided at the outset that the controlling element must be easily removable, so that it could be replaced by a different type designed to call a given station in the event of any prolonged tests being carried out in conjunction with that station.

An old single-spring gramophone motor which had been superseded in its original duties by an electric motor was exhumed and found to be in working order; it emitted a few groans of protest on being disturbed from its state of honourable

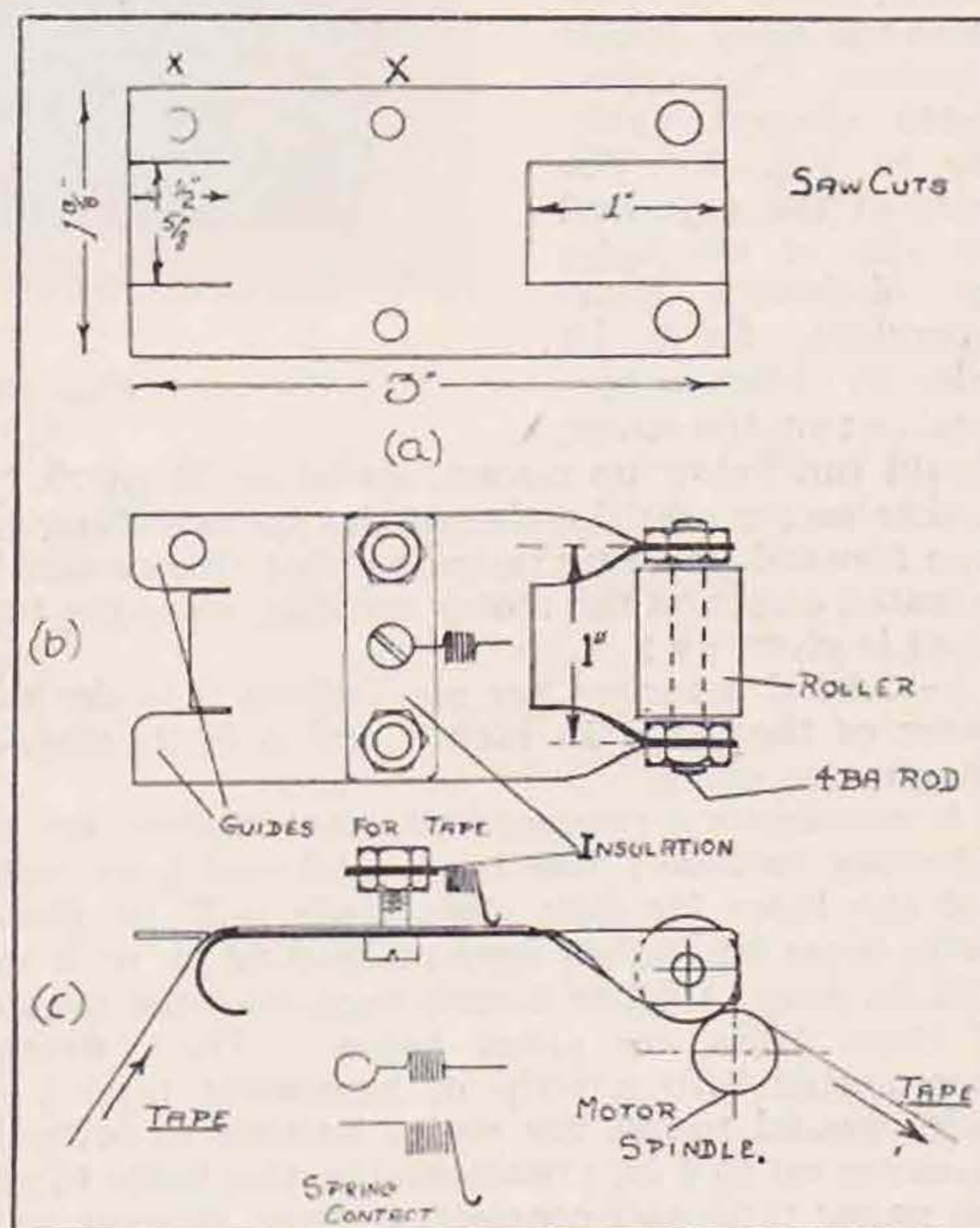
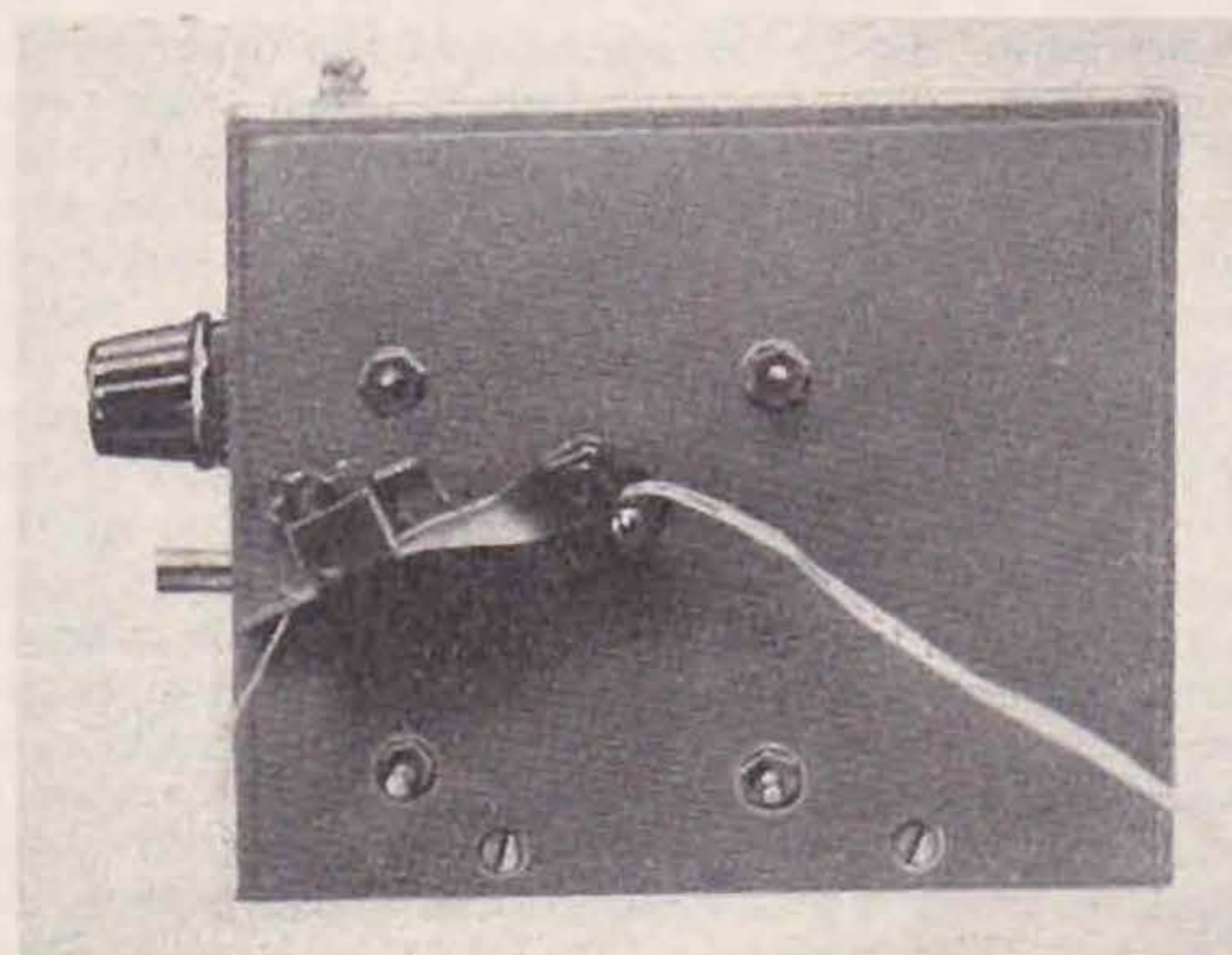


Fig. 2.

Constructional details of the automatic sender described.

be impracticable; it was required to send "Test" three times, followed by "G5QB" three times, "de" being sent once between the last "Test" and the first "G5QB." This amounts to 26 letters, or 70 characters, and with these occupying one revolution of the disc, the latter would have to turn at 2 r.p.m. to give a sending speed of 10 words per minute. This was not possible without gearing down from the motor spindle on which the turntable fitted, so the idea was abandoned. The next scheme considered was to provide a wheel with projections on its rim running with its axis in a horizontal plane. The projections were to be of lengths corresponding to dots and dashes, and the wheel was to be so fixed



The knob on the left is the speed control, while the projection below it is the winding spindle to which the winding handle is coupled in the usual manner.

that they just touched the surface of a small quantity of mercury. As the wheel revolved, the circuit would be made and broken as the projections entered or left the mercury. In view of constructional difficulties, this scheme was not given further consideration.

Ultimately, it was decided to use a paper tape to control the keying current, and eventually the following method was evolved: Long and short holes, corresponding to dashes and dots respectively control the making and breaking of a pair of contacts; this is done by causing the tape to run over a brass plate, while a spring contact bears on the upper surface of the paper. When a hole is under the contact, the latter is able to touch the plate and complete the relay circuit, while at other times the relay circuit is broken. This is illustrated diagrammatically in Fig. 1. The speed of the tape and the size of the holes are obviously interdependent, and in order to obtain a reasonable run, the motor should run below its normal speed of 78 r.p.m. A further factor was the size of the drum pulling the tape forward (it being intended that this should be mounted direct on the motor spindle), since the tape speed is given by:

$S = 3.14 d n$ inches per sec., where d is the diameter of the drum in inches and n is its angular velocity in r.p.m.

A satisfactory compromise was reached by the following method: The tape used was $\frac{1}{2}$ in. wide, and the holes for dots were made 3-32 in. diam., while those for dashes were made 3-32 in. wide and 9-32 in. long; further details regarding the making of these holes are given below. The "drum" degenerated into a strip of insulating tape $\frac{1}{2}$ in. wide, wound round the motor spindle to bring its diameter up to $\frac{3}{8}$ in.; incidentally, this helps to grip the paper tape and prevents it from slipping as it is pulled forward.

Fig. 2 gives some constructional details. At (a) is shown the brass contact plate in plan, before

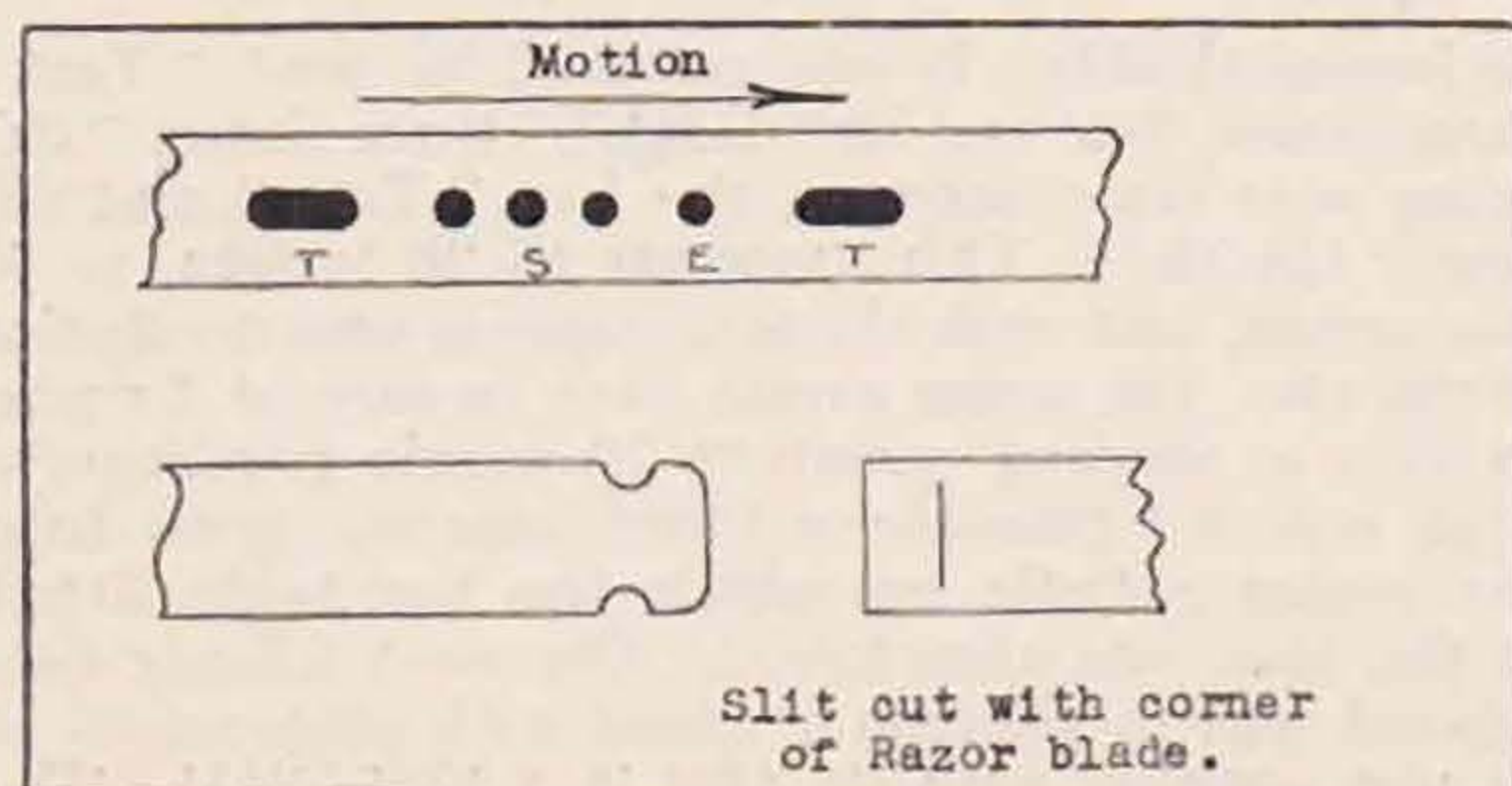


Fig. 3.

The method used for making the tape joint.

bending to its final shape, while at (b) and (c) are shown the plan and elevation of the complete contact assembly. The central tongue at the left hand end is curled down, leaving the two side pieces to act as guides for the tape; the spring contact is mounted on a bridge of insulating material which is shown supported by two bolts. A hole is drilled in the middle of the bridge, and a small bolt inserted to clamp down the spring and the wire leading from

it to the terminal (see below). The roller shown is a piece of brass tube (actually an old panel bush), covered with a piece of rubber tubing. This roller bears on the motor spindle, which, as already mentioned, is covered with insulating tape. The paper tape runs between these, and the friction must be sufficient to overcome the drag imposed by the spring contact. This spring consists of steel wire of about No. 24 S.W.G., and is $\frac{1}{4}$ in. in diameter; the ends are shaped as shown in the plan and elevation in Fig. 2 (c). The end which bears on the paper needs a

little care; it should be rounded so that it does not tear the paper, but the radius should not be too great, otherwise it will not drop into the holes properly, and the dots will be clipped. If facilities are available for making a spring-loaded rocker arm having a small contact on the end, this would be better, although the spring contact is quite satisfactory when once adjusted.

The motor is mounted on a piece of wood which in the original was 7 in. by 6 in. by $\frac{3}{8}$ in., and this forms one side of the case of the finished instrument. The actual size used will, of course, depend on the motor, so no details need be given. A pair of terminals is mounted on the top of the case, one being connected to the spring and the other to the brass plate. This latter is bolted to an angle-piece by means of the holes XX, and this is in turn screwed to the motor board in such a position that the roller engages the motor spindle with sufficient pressure to pull the tape forward when the motor spindle revolves.

The holes in the tape were made with a punch of the kind used in fancy leather work, but if one of these is not available, a piece of tubing of the correct diameter, sharpened at the end, can be used. For a dot, a single hole is punched, while for a dash, three contiguous holes are made, and the intervening "webs" removed. To provide repetition of the message, the tape must be in the form of a continuous loop, while at the same time, the joint must be easily unfastened to allow the tape to be changed. The method of making the joint is illustrated in Fig. 3. The tab is folded down the middle and inserted in the slit; it is then unfolded, and a

(Continued on page 236.)

A TRANSVERSE CURRENT MICROPHONE

By W. H. M.

THE microphone under review is one of several made by Mr. A. C. Webb (G6WQ) and, because of its many merits, it is a pleasure to have received permission to write this description.

To use wood for the body of a microphone may seem a little unorthodox, as the marble block idea dies hard, and to use the soft varieties of wood may seem "softer" still, but whitewood (bass), cedar or mahogany will be quite suitable. These woods will be much easier to work than harder varieties.

Five carbons, such as are normally used in pocket dry batteries, are required—new ones were used in the finished models. As new carbons may be difficult to obtain, used ones may have to be pressed into service, but in the original experiments these proved to be somewhat noisy. The background noise was undoubtedly due to the condition of the used carbons, but as new ones were available no steps were taken to seek a solution of the problem.

To assist those who will have to rely upon carbons from batteries, the following treatment is suggested, and there appears to be no reason why success should not be obtained.

The salammoniac of dry batteries may be held in suspension by a "fatty" substance, and therefore a good washing in carbon tetrachloride, or some petroleum solvent, will be necessary to remove the fat. Salammoniac is soluble in water, so the carbons must now have a good bath in warm or, as the carbons are usually hard, hot water.

Manganese dioxide has probably been used as the depolariser in the battery, therefore the carbons only (not the metal caps) must now be immersed in spirits of salts, which will remove the dioxide and will leave the carbons strongly acid, but otherwise clean.

The carbons are very absorbent and, therefore, they will have to be well washed with several changes of water, until the water is no longer acid. Blue litmus paper, by remaining blue after immersion in the wash water, will indicate when the carbons are free from acid.

Gently bake the carbons until dry, and then they should be as good as new ones.

It is recommended that all parts, after assembly, should have a good baking, and that the outside of the microphone receive a good over all doping against moisture, which is the only enemy of this particular instrument.

The sketch will show just how the microphone is assembled and, if the directions are followed, no

great difficulty should be encountered, excepting, may be, in the drilling of the five holes for the carbons. This must be carefully done, and the holes made perfectly straight.

The brass caps on the carbons are just $\frac{1}{4}$ in. across, so if five are to go into a space of $1\frac{1}{2}$ in. the distance between the caps will be $\frac{1}{16}$ in., but do not forget that the carbons are thinner than the caps, and that the holes must be drilled to the diameter of the carbons. The brass caps must also be $\frac{1}{16}$ in. from the front edge of the wood (see "A").

This operation calls for quite a pretty piece of drilling, as can be imagined, but as it is not a long job, it is worth doing again if the first attempt is not too successful.

Now mark out the 2 in. by $1\frac{1}{4}$ in. cavity, as indicated, and carve it out

cleanly to a depth of $\frac{1}{8}$ in. "B" and "D" will show how this must be done. The wood left between the carbons at "B" will be about $\frac{3}{32}$ in. and just sufficient to prevent the carbons coming forward, yet enough has been carved away to allow the carbons to protrude from the back of the cavity.

The cavity should be smooth, and to this end there appears to be no reason why it should not be treated with dope, either shellac in spirit or cellulose varnish, although this was not done in the original models.

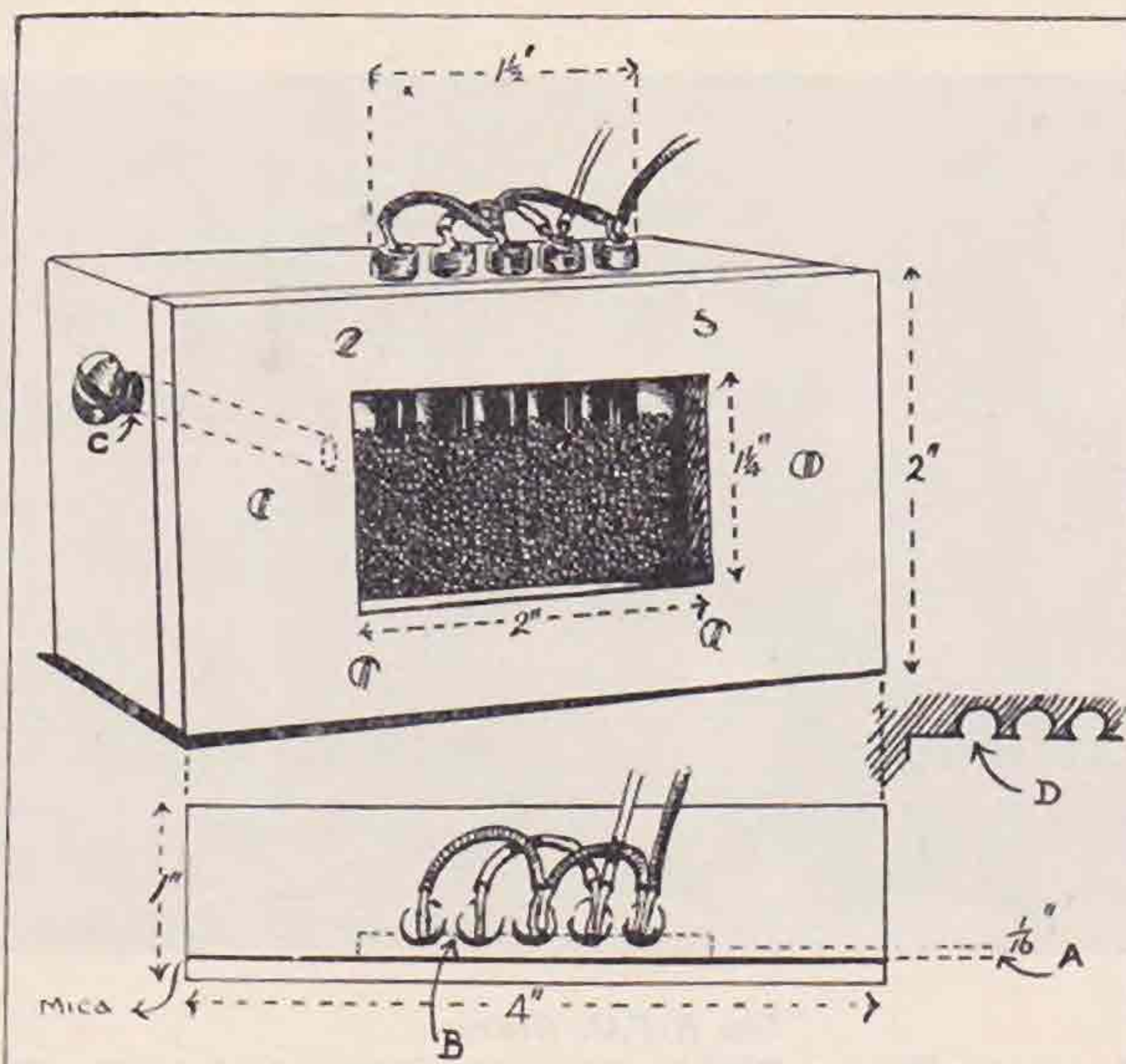
Drill a hole, "C," for filling or changing the carbon granules. Fit the upright carbons, and

join numbers 1, 3 and 5 for one pole, and numbers 2 and 4 for the other.

Cover the cavity with $\frac{2}{1000}$ in. mica (approx.), or waterproof cellophane, as was once suggested by G2CD in R.E.S. notes. This need not be stuck down, but later experiments seem to indicate that this might be an advantage. A thin layer of rubber (Woolworth's aprons) between the diaphragm and the wood seems to improve operation, as small dents in the surface of the diaphragm material, or its looseness, sometimes allow a granule or so to slip out of place, with resultant noise in the transmission. The smoothness of the cavity was stressed for the same reason. If an adhesive is required, try celluloid dissolved in acetone or casein and borax in solution, or even rubber cycle solution. None of the original models have the diaphragm stuck down, but the added precaution may bring the instrument nearer 100 per cent. perfection.

The face piece is of three-ply wood, now hidden by a piece of ebonite, and the whole microphone has been painted black. These refinements can

(Continued on page 236.)



"GI" GETS ITS LONG TROUSERS

By "RED HAND."

WE have been celebrating over here. The Radio Transmitters' Union is ten years old, so we had a birthday party.

Away back in 1926 nine GI amateurs founded the Union which has been active ever since, and has striven for all that is best in amateur radio. They were GI5NJ, 6TB, 2WK, 6WG, 6MU, 5SQ, 2IT, 5GH, and 6YW—pioneers all, several of whom have left their mark on amateur radio, notably Frank Neill (5NJ), Eric Megaw (6MU), Bertie Walsh (2IT) and Palmer Allen (6YW). After ten years it is good to know that at least five are still active in amateur matters. During these ten years no official visit had been made by anyone from R.S.G.B. Headquarters to Northern Ireland, so we invited G6CL to come over and help us to celebrate,

party then drove out to Lisnagarvey (pronounced "Blaris") to see the most powerful GI phone transmitter . . . the B.B.C. Northern Ireland Regional with its 500-ft. mast-aerial. Mr. Williams, the engineer-in-charge, was kindness itself in showing us the wheels going round.

Returning to Belfast, GI5GV came along, and our Secretary was able to talk R.S.G.B. matters with both D.R.'s into the wee sma' hours.

Saturday morning was occupied by a visit to the Houses of Parliament and the College of Technology. In the afternoon there was a meeting for R.S.G.B. members at 3 p.m. Here we met J. Wyllie (G5YG), Vice-President of R.S.G.B., and an hon. member of R.T.U., who had very sportingly come over from Glasgow by air; also W. H. Coombs (EI6J), Hon.



The R.T.U. Dinner.

Left to right: Mr. E. V. Wilson, GI2OY, PA-R261, GI5GV, 5NJ, 6YW, 6TB, 2BFJ (Hon. Secretary), 8DB, EI9D, EI8G, EI6J and G6CL. GI5WD in supplication!

and to meet us all. It transpired that it was his first visit to Ireland, so we hope we have made a worthy impression.

Eight ack emma on Friday, October 16, saw a not too-depressed "Clarry" descending the gangway of the Heysham steamer after a fair night-crossing, and the commencement of what has been voted by everyone a most enjoyable week-end.

The day was spent in showing the Sassenach a bit of the country. After visiting the 12th century castle at Carrickfergus, where another distinguished man landed, we drove up the famous 40-mile coast road which skirts the edge of the sea all the way, to the Glens of Antrim. At Parkmore, until recently one of the highest railway stations in Great Britain, Clarry was introduced to a turf-bog—in fact, to miles of them.

Arriving back in Belfast after seeing about 120 miles of scenery, we found that EI9D, the B.E.R.U. representative for the Irish Free State, had arrived from Westport; so the augmented

Secretary Irish Radio Transmitters' Society, and F. B. Whyte (EI8G), Hon. Treasurer I.R.T.S.

Clarry spoke on R.S.G.B. matters for a solid 85 minutes, and held our attention for every second of the time. Both the subject-matter and his personality made a tremendous impression, and we envy our G friends, who have more frequent talks of this kind. Many questions were asked and answered, mainly being concerned with licence and N.F.D. subjects.

At 6.30 p.m. a cheery crowd of twenty-three dined together to celebrate the R.T.U.'s tenth birthday. Special souvenir menu cards translating the courses into radio language were also used for autographs, and a large sheet of autographs was prepared for exhibition at the *twentieth* anniversary dinner!

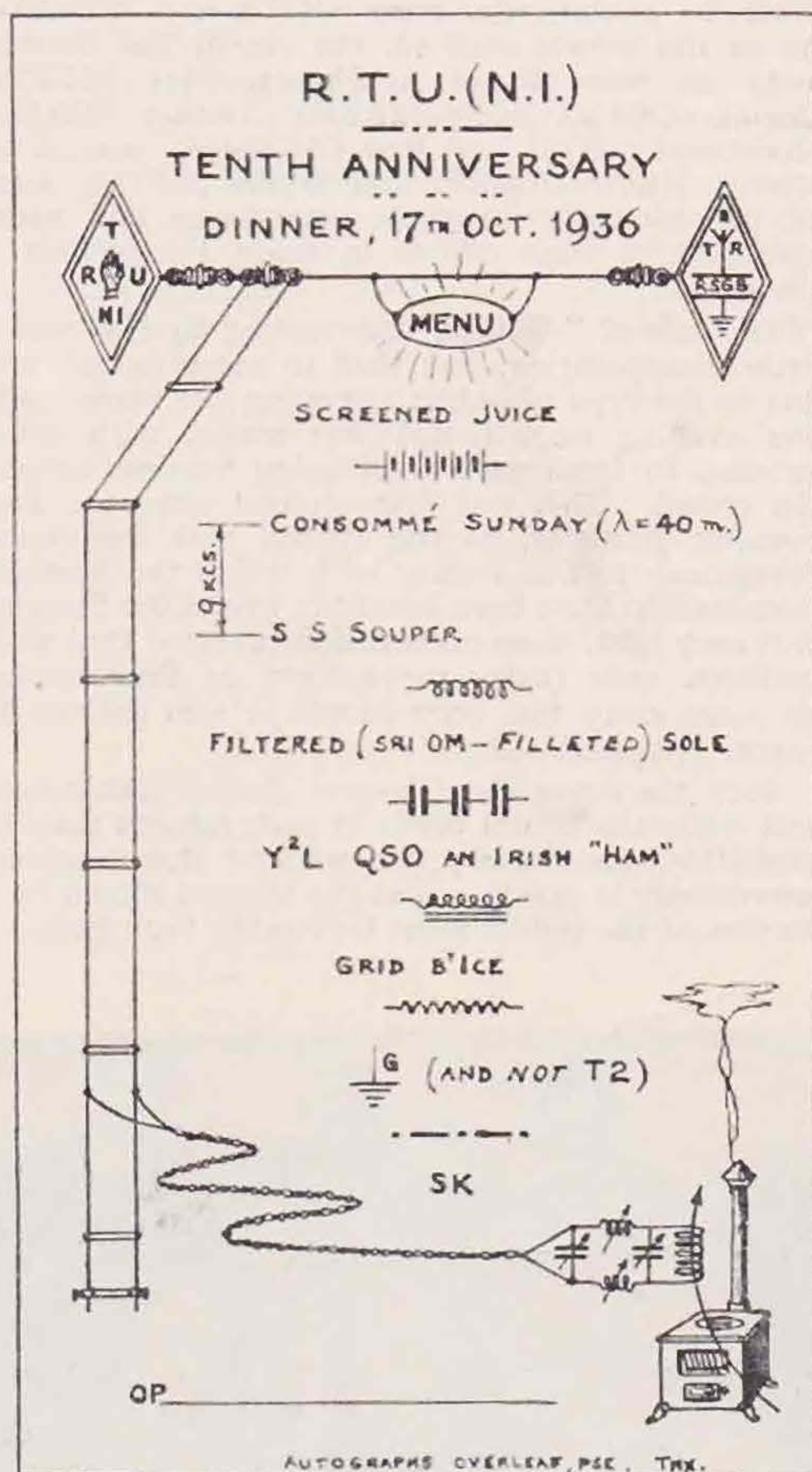
After the toast of "The King," Mr. Sang (GI6TB) (Chairman R.T.U.) welcomed the visitors who now included J. A. Verhoef (PA-R261), of N.V.I.R.

GI6WG, in proposing the toast of "R.S.G.B.,"

mentioned the assistance given to the R.T.U. by 5YG nine years ago. 5YG, in reply, said that in those days he found the members of the R.T.U. "meant business," and that it was obvious that, after ten years' activity, they still "mean business."

G6CL proposed the toast of "R.T.U.," and stressed the friendships which were being formed between experimenters in different countries, and how that fellowship, if it could be conveyed to the peoples of the world, would dispel all talk of war. GI5NJ replied on behalf of the R.T.U.

At the Chairman's request the company stood in silence for a few moments in memory of our "Silent Keys."



The R.T.U. Dinner Menu.

GI2KR, in a racy speech, proposed the toast of "Amateur Radio in the Irish Free State"; EI9D and EI6J replied in western and southern accents respectively.

GI5HV proposed, and GI6YW seconded, a motion that Clarry be elected an honorary member of the R.T.U. The motion was carried unanimously and vociferously, and GI5SJ was called upon by the Chairman to present him with a little souvenir of his election—a real knobby Irish shillelagh with the date inscribed on a small silver plate.

Our tame photographer, 5SJ, obtained some "intimate" photographs during the dinner by wandering around with a concealed camera; here is a selection.

On Sunday morning G6CL, in company with GI5HV, EI6J and EI8G, visited GI5NJ's station at Whitehead, after which the Dublin boys left for the "Border." In the afternoon a visit was paid to the site of the "A" N.F.D. station, and the famous Ards T.T. motor-race circuit. At night G6CL and EI9D visited the station of GI2KR, who is fast becoming our best DX man.

Monday morning was spent in showing 6CL the city, the B.B.C. studios and the control room. The afternoon saw us again in the country, ending up eventually at the G.P.O. Ballygomartin 5-metre station which works across the North Channel to Scotland.

At 9.40 p.m. the ropes were cast off, and as the steamer moved out into mid-stream our celebration closed; but it has, thanks to our visitors, been a delightful time, and we begin our second decade with renewed enthusiasm.

More than ever do the members of R.T.U. appreciate the administration of the parent body, realise its guidance, and renew their staunch support.

A Bright Idea

In transmitters constructed on the rack principle, a convenient method of carrying power supplies to each stage is by the use of copper wire "busbars" held in position by "insulator pins," which can be obtained cheaply at any radio dealer's. The pins are fixed at convenient points on the sides or back of the racks, and the wire slipped through. It is only necessary to anchor the wire at each end. If the power and earth connections are made by crocodile clips from each stage it is an easy matter to isolate any part of the transmitter in order to make circuit and power changes, while the working of the rest of the system is not impaired.

G2YS.



G6CL with the EI visitors. Standing, EI9D and EI6J Seated, G6CL and EI8G.

SCOTTISH RADIO EXHIBITION

By "SCRUTATOR."

THE period September 16 to 26 marked an epoch in the history of the Scottish Section of the Society, as between these dates the Society was represented for the first time in Scotland at a public Exhibition.

On September 16 there opened in St. Andrews Halls, Glasgow, the Scottish Radio Exhibition, promoted by the *Glasgow Weekly Herald*. Through the good offices of Mr. Paterson, the organiser, and the courtesy of the newspaper, the Society was permitted to rent a small portion of their stand. The space was very small, amounting to 4 ft. by 7 ft., but the newspaper staff were very tolerant of such encroachments as were made on their space, so that the Society exhibit was not too bad.

Unfortunately, arrangements for the Society's participation in the Show were not completed until the last moment, with the result that it was only possible to make the slightest of preparations in order to render the exhibit attractive to the public. All that could be done with the time and space available was done, and fortunately G6ZX's very fine 100-watt outfit was available for the principal show piece on the stand.

There were also on display an interesting little "S.S. Super" receiver by G2WL, which attracted considerable attention, and a portable 56 Mc. outfit by G2QU, contained in a suitcase.

Dignified "ballyhoo" was provided by G5TY's bug key coupled to a very loud buzzer, which made the welkin ring. This little "dingus" was responsible for much gnashing of teeth on the part of the gramophone recording people, the G.P.O. (our immediate neighbours) and the cabaret orchestra. As the G.P.O. "interference" staff had been making plentiful horrid noises and odours with their exhibit, however, no sympathy was extended to them!

It must be borne in mind that this Exhibition was on a very small scale, there being only some 50 stands, amongst whom were no manufacturers. Consequently, the public attracted conformed for the most part to a type which came in quest of amusement rather than information.

The Society exhibit received considerable attention however, sufficient to reveal that had it been equipped with adequate gear and space, it would have done enormously better. As it was, the more desirable section of the public were drawn to the stand, and many had their interest in short wave work awakened to an extent they had never believed possible.

The missionary work carried out by our staff in this connection, while producing satisfactory immediate results, must also be undoubtedly regarded as an excellent investment for the future.

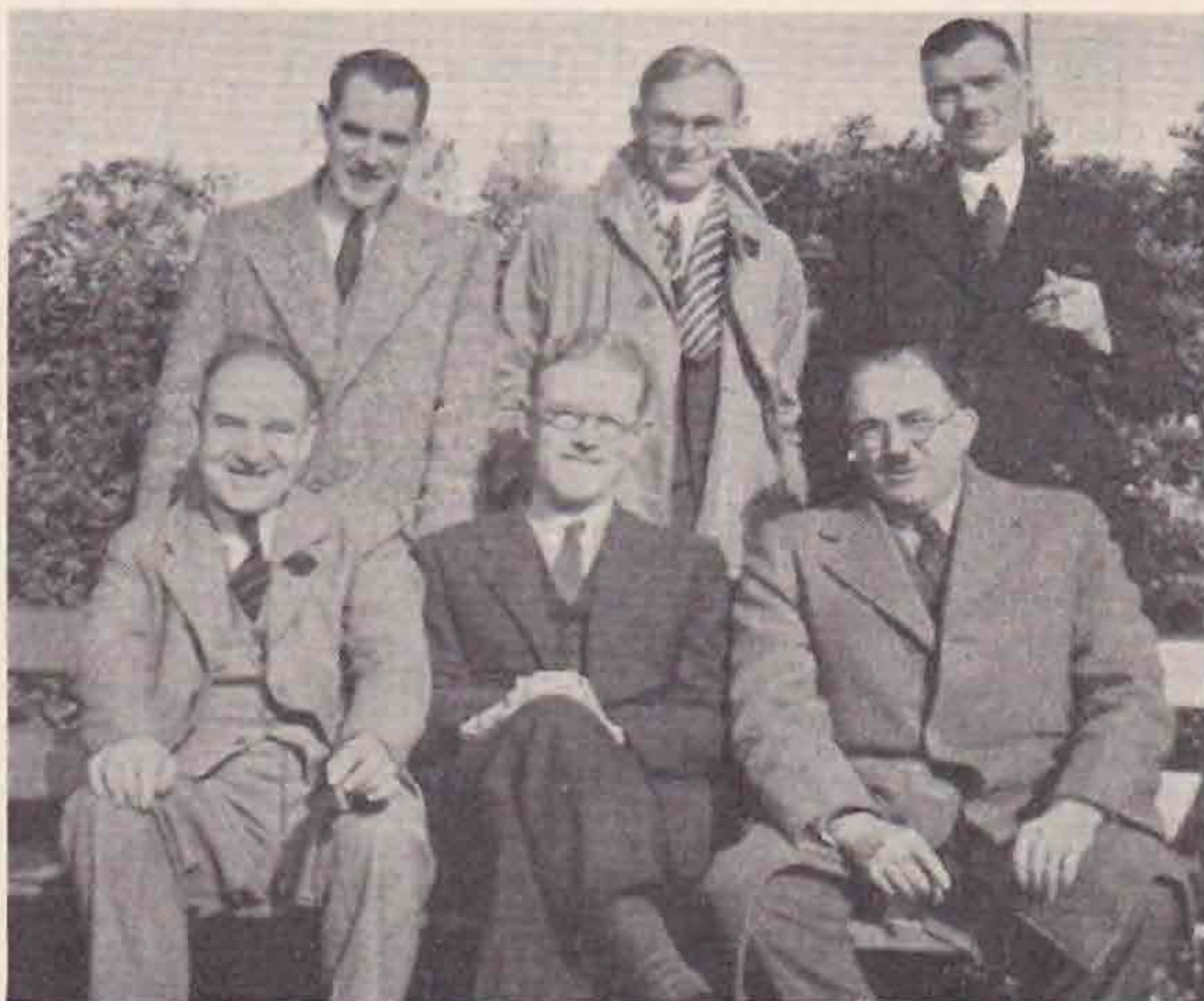
It was particularly pleasant to note the interest shown by the technical staffs of the G.P.O. and B.B.C., many of whom have signified their intention of joining up almost at once. Among the prospects made are a number of gentlemen who are the possessors of University degrees, and, in short, the efforts of the Society exhibit were directed towards fostering the interests of the type of man liable to become the most satisfactory member. This was the result of a definite policy. In all, there

are upon the exhibit books some 50 likely prospects who will be pursued immediately the Exhibition closes down.

A few words must be said of the personnel of the Society stand. The organisation and responsibility for the exhibit devolved, as a matter of course, upon Messrs. Hunter and Wyllie, who both had their hands full with the urgent necessary preparations. The members supported the Exhibition well and our Visitors' Book recorded some 64 of them. Welcome visitors also were VE5GS and W2HMG. As to the actual staff on the stand, the Society owes its best thanks to Messrs. Tyre (G5TY), Brown (G6ZX), Kerr (2AZK), Duthie (2BQL), Shankland (2BJS), and Roy (BRS2414), who, with Messrs. Hunter (G6ZV) and Wyllie (G5YG), were all in practically constant attendance and most assiduous in their efforts to make the exhibit a success.

The sale of "Guides," amounting to 479, was a little disappointing, but that to some extent was due to the type of public attending the Show. On one evening an attempt was made, with some success, to force sales by placing vendors among the crowd. This was discontinued after the first evening, however, as the system was considered derogatory to the dignity with which the Scottish membership have been taught to invest the Society. Not only that, close observation revealed that such methods were faulty psychology, as they tended to scare away the very people it was desired to reach. (Agreed.—ED.)

Such then was the Glasgow Radio Exhibition, and while the actual profit in cash returns may be negligible, the Society has without doubt gained enormously in prestige, and the interest shown by a section of the public must inevitably bear fruit.



A Group taken at the home of Frank Neill (GI5NJ).
Back row: EI6J (Secretary, I.R.T.S.), EI9G (Treasurer, I.R.T.S.), EI9D (B.E.R.U. Rep. for I.F.S.). Front row: GI5HV (QSL Manager, R.T.U.), GI5NJ, G6CL.

SOLILOQUIES FROM THE SHACK

BY UNCLE TOM.

(In which our tame horn-rimmed poodle comments on a subject that has hitherto been left severely alone.)

FIRST of all, my dear, dear children, I have to report that last month's Angling Expedition has been successful. They always rise, bless 'em, and I've had a *beautiful* crop of letters justifying the practice of "sending double" on 'phone. Most of them are just a sheer admission that the writer's transmitter is so punk that he can't get there without doing it, so no more need be said.

Just one single one shows a sense of humour, and I would like to quote from it: "*Good morning you old blBLAR y TEE o BLAR g TEE orn BLAR BLAR you TEE bl BLAR yo WHOOPEEEeee you old blister BLAR TEE go BLAR mo TEE EEEEEeee WHOOPEEEeee BLAR BLAR TEE WHOOPE BLAR BLAR TE BLAR hope TEE BLAR TEE well old BLAR TEE BLAR I hope you're still getting me O.K. you charming old gumboil WHOOPEEEEEEEEEeee eeeeEEEEWHOOPE over to you.*"

"Sorry old man, although you were QSA 5 when I called you, I didn't get much that time. I know Uncle Tom doesn't like we low-power chaps sending doubles on fone, but what is one to do on 40, you never know how long you're going to be QSA 5 with 5 watts. Say o.m. I send double as well on C.W.—you never know whether the other is a beginner or not, and if he sends doubles to me I always do likewise, and I sorta gets a habit of doing that sort of thing—perhaps its done sub-consciously." And so on.

Well, the cryptic stuff up above may be deciphered by reading the capital letters as Morse, and what's left of the small ones as 'phone. As far as the rest goes, I won't pass any more opinions, except to say this: If everyone who, at present, sends doubles, would in future send *singles*, the QRM caused would be exactly *halved*. (Advanced maths.) It's all very well saying that one *must* send doubles because of QRM, but one is just making it a darn' sight worse by doing so.

Well, that old horse has been flogged so much that it's just a mass of skin, bone and bruises, so let's leave it alone and start on another one. By special request I am bringing up the subject of *pirates* (shush, my dear, it's quite polite, really).

These blisters on the face of amateur radio crop up from time to time. In their most nauseous form they pinch the call-sign of a licensed station, do outrageous things on the air, and cause the owner of that station to get into trouble, until he proves that he wasn't responsible.

If they operated decently and put out respectable signals, no one would know that they *were* pirates—but anyone with a few years of experience can spot the breed at once. Sloppy sending, punk note, fatuous chat of the "all O.K., please repeat" type—don't we know it all? And the Continental pirates are responsible for the complete and utter uselessness, at times, of the 7 Mc. band, as pioneers of "spitch," the most ghastly form of electrical disturbance yet discovered.

Well, where do we come in? A spot of D.F. occasionally might take one right to the home of

one of these birds, and then one could beat him up in any desired fashion. That used to be done with considerable success in the days of 180 and 440 metres. Nowadays, unfortunately, the brute may be 600 miles away, and it would prove an expensive business.

So it seems as if the only weapon left to us is boycott. *Do not* reply to calls from stations with foul notes, punk sending and a general air of lunacy about them. They'll get tired soon enough.

I tracked one down only the other day, and the story is funny enough to bear repeating. With my little D.F. outfit I went out into the wilds and finally came upon a very suspicious-looking antenna. On the bottom end of it there was an American commercial receiver and (apparently) nothing else.

But I missed the turning for the stairs as I was being shown out, and there, in the *sanctum sanctorum*, was a peculiar array of radio apparatus. It appeared that the Johnny concerned was endeavouring to signal with a light-beam to a pal a few miles away. But he insisted that his light must be frequency stabilised (Council not having insisted, as yet, on crystal-control), and so he started off with an 80-metre stage and just pegged away, adding doublers until he got down in the region of light waves.

I forget how many doublers there were—about 343, I think. At any rate, the makers of milliammeters would have been pleased to have a glance at that room. He finally got his modulated light-beam O.K., but the trouble was that stray coupling from some of the earlier F-D's resulted in a fine signal going out on 7, 14, 28, 56 and 112 Mc.

Now, obviously, this man didn't need to apply for a licence to transmit light-waves (he'd been doing it for years with an electric torch, anyway). So how could he be blamed for the fact that people would keep coming back to him on other bands in which he was not interested?

He kept asking them to QSY to a higher frequency, but hardly any of them managed to stay the course after 56 Mc., although a few got down to 112.

It occurs to me that possibly this accounts for some of the spitch-merchants. They never get any replies, anyway, and their speech (?) is quite unreadable. Are they working on some wave-band of which we know nothing, and is stray coupling (undesired, of course) responsible for the raucous noises that we hear from them?

Incidentally, my light-beam bloke had no end of trouble neutralising his final PA. He couldn't find a neutralising condenser small enough for the job, and now he has to get out his microscope every time he wants to look at the thing. The tubes, of course, are very hush-hush, but I hope to reveal more details later.

It isn't often that technical advances of the first magnitude are revealed in this way by your elderly relative, and he gratefully accepts the offer of any nephew who will put up a special cup for presentation to the contributor of the most startling revelation published during the current year.

THE MONTH ON THE AIR

By JOHN HUNTER (G2ZQ).

LET us begin by thanking those few enthusiasts who sent along their observations in order to make this article of more general interest.

October started below the standard set by September, but towards the end things improved considerably. FR8VX reappeared with a T6 note outside the high frequency end of the band, but as he is self-excited he may well be found on any frequency!

In the course of a few weeks it may be possible to give some information about OS1BR, as he has given an address which he says will reach him. This is c/o Suliman, Suez, Egypt. He has been asked to send proof that he really is in Jeddah, or, better still, to QSL all the stations to whom he owes cards. He told the writer that he used a directional aerial pointing to the U.S.A., but that now he has a more all-round type.

G6CJ sends a very interesting report on his experiences in the VK/ZL contest. (He is bound to be winner of the G section, by the way.) He noticed during the third week-end that conditions had suddenly shifted over to "winter," with the VK's coming in on 7 Mc. in the late afternoon, and starting much later than usual in the morning on 14 Mc. He suggests this means that we are on the down grade again, that 28 Mc. will be dead in a year's time and that in two years we shall be back to conditions similar to those obtaining in 1933, when the majority of the DX was found on 7 Mc.

However, there is still some DX to be worked on 14 Mc. G2WQ has worked MX2B—if you can get a card out of him, you're a better man than I am, WQ! However, G6KP, who worked MX2B on 7 Mc. over a year ago, has succeeded in obtaining the necessary confirmation.

An interesting station is VE5TV (also reported by G2WQ), located on Nottingham Island, N.W.T., Canada. He is the operator of the Government station there (VCB on 12,825 kc.). His next mail arrives in August, 1937, so don't be in a hurry for your cards! He was previously VE5QC on Southampton Island, which is more or less next door to Nottingham Island, as things go in the Arctic. He is using 100 watts at the high frequency end of the band, and says that the temperature hasn't gone above 32°F. yet this year! Anyhow, he doesn't have to bother about winter coming on.

An old friend is back on the air in VS8AA on Bahrein Island, who was VU1AA. If you want a really candid opinion on the merits of living on Bahrein, ask VS8AA; he's been there ten years so far. He is arranging skeds with G6MT, well known to most of us as YI2DC and VU2BL.

G8DA has been listening to telephony and says that VP9G is putting over a good signal in the evenings on 14,250 kc. VP9R has also been heard on 'phone. Bermuda is a country few of our DX men have worked, so we hope they won't forget the CW men. G8DA has been listening on 3.5 Mc. and hearing American 'phones well after midnight. By the time this appears there will be a good chance of the VKs and ZLs coming through on that band at the times mentioned by G6WY in last month's BULLETIN, so let's hear from some of the BRS members if they log any.

BRS2178 in a long letter tells us that he also noticed the general falling off of conditions around the third week-end of October. He reports hearing, among others, K7UA, CR9AB, VP6AM, VP2BX, CP3ANE, EP1A, VS7RF, and PZ1PA on CW, and PK4AU, YV5AA, CE5AG and KA1ME on 'phone. On 7 Mc. he has heard W6AL.

G2IM has confirmed the turnover to winter conditions by consistent observations at times when most amateurs cannot be on the air. He has noticed the gradual falling off of VK and ZL in the mornings, the few J's at the same time, and, "wintriest" touch of all, the W6's in the afternoon.

By the way, before we forget it, this month's gold-plated raspberry goes to SP1IO, for sending CQ for six minutes without signing. Can you beat it?



W9TSV, well-known Chicago DX worker and traffic handler, comes from a ham family. Her brother is W9RIA, and two cousins hold VE4 calls.

A few snaps from the log for the month; VQ2RS is workable after all! HH5PA has been pounding in of an evening—(her many friends will be glad to hear that Lillian, the second operator at this station, has arrived home safely from her tour of G, W and VE and is swinging a wicked bug as usual)—the Chinese are getting over well; XU8OP, S7 at noon reported using only 50 watts; also XU6SW heard. G6WY raised ZP6AB one evening and very sportingly put G2ZQ through to him—sporting, as this act made our scores in countries equal at 130. Of the rarer American States, W9PQW in ND and W9WEL in SD have been worked. Has anyone heard Nevada? Don't be fooled by W6AWP—he's in most Call Books as Nevada, but when we worked him he had left a month back and now resides in Los Angeles!

Just to encourage you to report, here's the QRA again: G2ZQ, 63, Hervey Road, Blackheath, London, S.E.3. Do tell me all about your DX, but please don't claim the first contact with Czechoslovakia, as one member has just done! The date is September, 1936. So what?

(Sure it wasn't on 56 Mc. ?—ED.)

Stray

G2XK, R.A.F., Cranwell, is working on 14,300 kc. every Wednesday and Saturday between 18.00 and 23.00 G.M.T. He is anxious to contact other R.A.F. stations.

THE 56 Mc. BAND

By L. G. BLUNDELL (G5LB).

IN spite of words of prophesy and wisdom, and fervent expressions of a hopeful nature, the band has not yet renewed its one-time quota of commercial signals, and to all intents and purposes has been utterly devoid of "life."

However, in spite of this regrettable state of affairs, it is good to know that the band is still being kept under regular observation, and that the first spasms of returning conditions will not go unnoticed. Those who have been active on 28 Mc. experienced a similar patience-trying deadness of long duration just before that band started providing "the goods," and they are of the opinion that 56 Mc. will behave in a similar fashion, and will, before long, provide something of interest. Further information on the ZMO signal (heard by G2HG—see last issue) has been received, and it now transpires that this transmission originated from the Dominion Observatory, Wellington, N.Z., and was actually coming through ZLW (the observatory station) as part of a time signal. There are six different fundamental frequencies in use at different times, and both ICW and CW are used. Thanks are due to G6YL and BERS250 for their assistance in this matter.

Unfortunately, there is still no further news on the CN8?? signal (also heard by 2HG) mentioned last month, although efforts are still being made to get some information of a confirmatory nature from that territory. (Confirmation has now been received that CN8MQ was on 28 Mc. at time stated.—ED.) In the meantime, therefore, it is just a matter of keeping the decks cleared for action, and all being "at the ready."

Schedules.

There is one amendment to the list of scheduled

transmissions as given in the August notes, viz.: G6PG is now active on Monday to Saturday, inclusive, at 2230-45, and on Sundays at 0900-15 and 1600-15 G.M.T. Other listed stations continue as usual.

G2RD, whose C.W. activity was mentioned last month, is now to be heard regularly on Sundays at 1200 to 1300 G.M.T., and is putting out a very useful signal over the South London areas. G6PK is another new C.W. signal on the band, and has recently been heard on several days of the week at about 2230-2300 G.M.T. This station is located in Surbiton, Surrey.

Whilst on the subject of regular transmissions, it is necessary to point out that at present there is only one station active during the daylight hours on weekdays (Mondays to Fridays), consequently there is little to encourage (a) the station concerned; and (b) those who could show some activity at such times, but under the circumstances do not. It is of course realised that for a very large percentage of us such times of activity are prohibited for vocational reasons alone, but at the same time it is hoped that there may be a few more fortunate ones who could, perhaps, provide an occasional (but regular) morning or afternoon transmission. Such additional activity would be of great value both as regards keeping the band under more extended observation and also providing some incentive for those with gear to test to get going and "see about it." So for those who can—and will—thanks in advance, and to those who are at present doing good work—good luck!

In conclusion, please advise G5LB as to any alterations or additions to existing schedules.

The 28 Mc. Band

By NELLY CORRY (G2YL).

DURING October conditions were excellent, and signals were heard from 34 countries in all continents. There were a few poor days, but as a general rule the band was open from 08.00 to 20.00 G.M.T., and at times the L.F. end sounded like 14 Mc., though there are still some wide open spaces above 28,200 kc. It is difficult to give a comprehensive account of everything heard during the month, but reports furnished by two G stations who work exclusively on this band give a good idea of what can be accomplished under present conditions.

G6DH worked 153 U.S.A. stations up to October 25, including 13 W6's and 7's, several on phone. His Oceanic contacts included 6 with ZL1GX, ZL3DJ, and ZL2BP (on 'phone), and a dozen different Australians. Other unusual stations worked include J2IN, J2IS, J2LU, J3FJ, U9ML, VU2AU, VP2AT and PY1BR. On October 25 he worked five continents in three hours, and heard VU2AU, but not appreciating the possibility of a quick WAC did not even call him.

G6LK, another 28 Mc. "addict," worked all continents eight times from October 1 to 25, and

received R8 or 9 reports from VK, VS6, LU, W6 and ZS. His 222 contacts during this period included 15 European, 27 African, 11 South American, 129 North American (all districts except VE5), 32 Oceanic and eight Asiatic. He worked ZL3DJ eight times on "sked" at 08.00 G.M.T., and also had QSO's with ZL2BP, VK2, 3, 4, 5, 6, 7, VS6AH, VU2AU, U9AZ, J2IN, J218, J2JK, J2LU, J3FJ, PY1BR and PY5QA.

The VK-ZL Contest undoubtedly encouraged a number of Australians to "get down to Ten" for the first time, and on Sunday mornings in October more were heard than ever before. They included VK2GU, 2JT, 2LZ, 3BQ, 3CP, 3XP, 3YP, 4AP, 4EI, 5LJ, 5WJ, 6AA, 6CA, 6FO, 6MW, 6SA and 7AB. G6LK has worked VK4AP as late as 15.00 G.M.T.

Though VU2AU appears to be the only Indian active on the band, Japanese and Siberians have been coming through well, so that Asia is now easier to work than ever before. KA1AN reports hearing G2YL, but has not yet raised a G station.

Other countries where the "28 Mc. bug" is apparently spreading are Russia and Finland, and during the month G6DH worked eight different U's, and G2XC worked eight OH's. African and North and South American stations have been as

consistent as last month, and on several days W6ITH, W6MFR and other West Coast signals were R7/8 on 'phone.

ZS1H reported on October 21 that conditions were "not so good as a few weeks ago, when stations were coming through like 14 Mc.," but from North Africa CN8MQ reports hearing all continents between 12.30 and 13.00 G.M.T. on October 24, and says that VK, ZL, ZS, PY, LU, W6 and 7 are very good at present. The majority of British stations reporting have found conditions excellent on most days, and even QRP transmitters are getting out well, e.g., G5CM, using 6 watts to a single 59 in E.C.O., has worked ZS and W3, receiving reports of R8 and R6.

G6DH informs us that VE4PH made the first VE4 W.A.C. on 28 Mc.

A Good Achievement

We offer our congratulations to Miss Barbara Dunn, G6YL, who has now made W.B.E. and W.A.C. on 28 Mc., using an input power of between 6 and 10 watts. This is probably a world record for low power work on this band, and those who remember Miss Dunn's splendid QRP work in past years on other bands will join us in felicitations.

B.E.R.U. Contests, 1937

It is with some satisfaction that the Tests and Awards Committee present the Rules for the 1937 B.E.R.U. Contests, for it would seem that, as was forecast last year, a reasonably "Fair to All" system of scoring has at last been evolved. The system has been retained with slight modifications in detail. As there has been certain alterations in the zoning, compensation has been introduced in the form of awarding 15 points instead of 10 for the first contact in each zone. The score then descending to 14 points for the second contact, 13 for the third, and so on to the 15th contact, which counts one point. It is clear, therefore, that, in effect, an extra 65 possible points has been added to each zone before unit scoring begins.

The Awards Committee wish to emphasise the necessity for each competitor to fill in the Analysis. In almost every case where this was not done last year, a mistake had been made in the total claim, which would have shown up if the entrant had taken the trouble to fill in his analysis. It will be noticed that this point has been specifically mentioned in the Rules this year. Competitors who do not complete the analysis will be disqualified.

Duration of the Contest

It is felt that 24 hours of continuous operation is the maximum time which can be endured in an unbroken sequence, both from the point of efficiency and personal safety. This last point in particular is important, for it is certain that no one is in a fit condition to make adjustments to circuits involving high voltages, after more than twenty-four hours of continuous operation. The contest is not intended as an endurance test, nor do we want it to be the cause of some regrettable accident.

In starting the Junior Contest two hours later than the Senior, the Committee have in mind the large number of would-be competitors who, having to work late on Saturday evenings, have hitherto felt handicapped by their not being able to start until several hours of the contest have already

elapsed. It is hoped that this concession will result in a very much larger entry this year.

General Notes.

Competitors are advised to carefully read Rule 12 and to see that they conform to the requirements laid down in order to avoid disappointment.

It is hoped that, in view of the concessions obtained from the G.P.O. in regard to band tolerances, entrants will take especial care to see that they are within the band limits.

It will be seen that by rearrangement of the entry form, no fewer than 108 contacts may now be recorded on the one sheet. Please see that your form is written legibly, preferably in block letters and, above all, in INK.

Crystal Frequencies.

On another page in this issue will be found some interesting views in regard to receiver calibration. In order to stimulate this very desirable feature, the Committee have asked each transmitting entrant to record all frequencies used by him during the contest, under the appropriate heading on the form.

Members who wish to calibrate their receivers will now have the opportunity of doing so by merely taking care to record the exact dial reading of each Empire station they hear during the contests.

The information on the log sheets will be extracted as soon after the closing date of the contest as possible, and will, it is hoped, be published in the May issue of the BULLETIN. Everyone should then be able to accurately calibrate their receivers, with the aid of this information.

In this connection, in order to make this experiment a real success may we urge all prospective transmitting competitors to verify the accuracy of their crystal calibration prior to the contest?

Competitors are not asked to sign their frequency during the contest but merely to record all frequencies used on their entry form.

The Awards Committee hope that the Rules will meet with general approval and in their turn take this opportunity of wishing all competitors "Good huntin'."

A. O. M.

(Continued from next page.)

was obtained, disregarding, of course, frequency modulation.

Both valves ran quite cool, and the indications were that the input could be raised very considerably without any undue strain on the valves.

It is not considered essential that a valve as large as an ESW501 is required to drive the two 4304A's, but it happened to be a convenient valve to use for the purpose.

No comment is required on the result of the power output tests, the results speak for themselves. The valves were noted to be a mechanically robust job considering the type of construction and, treated with care, they should not be in any way fragile.

The transmitter as described has been used on several occasions on the air with a reduced input of 50 watts, and has been reported to give a good signal of excellent quality. It is proposed to carry out further tests in due course, and the results of these tests will appear in the BULLETIN.

D. N. C.

VALVE REVIEW

Standard Telephones and Cables, Type 4304A.

The 4304A is a directly heated triode having a graphite anode, and the grid and anode leads brought out through the top of the bulb terminating in short rods. The valve is primarily designed as a power amplifier or oscillator for power inputs up to 125 watts for frequencies up to 100 Mc. and at lower inputs up to 300 Mc. The valve is also suitable for audio frequencies as a Class B amplifier or modulator.

The valve is fitted with a 4-pin American base arranged to fit either a Standard Telephone's 4002 socket or an 80 type socket.

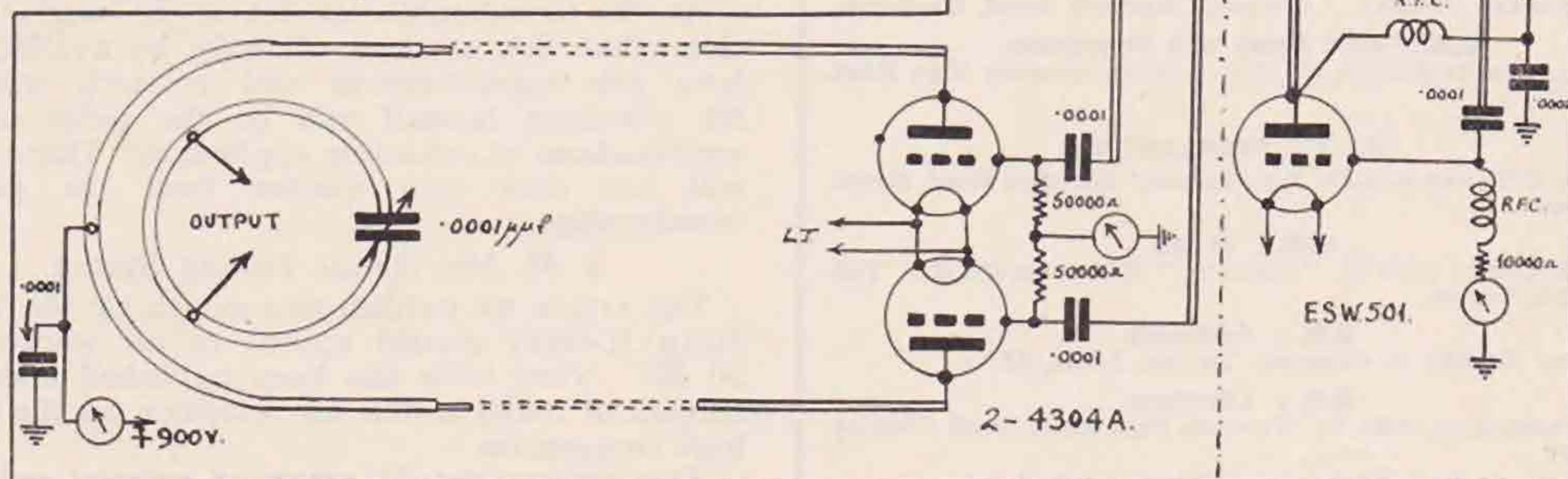
Characteristics :

Filament volts...	...	7.5 volts.
Filament current	...	3.25 amps.
Anode voltage (max.)	...	1,250 volts.
Anode current (max.)	...	100 mA.
Anode dissipation	...	50 watts.
Amplification factor	...	11.
Mutual conductance	...	2.3.
Impedance	...	4,800 ohms.
R.F. grid current (max.)	...	5 amps.
D.C. grid current (max.)	...	20 mA.
Cut-off at anode volts, 1,000	...	120 volts
		(approx.).

Inter-electrode Capacities :

Grid, Anode	...	2.5 $\mu\mu\text{F}$.
Grid, Filament...	...	2.0 $\mu\mu\text{F}$.
Anode, Filament	...	0.7 $\mu\mu\text{F}$.

In the case of a valve of this type, there appeared to be nothing to be gained by checking the maker's



figures or taking characteristic curves, so that it was decided to ascertain what output the valves were capable of under R.F. conditions.

Two valves were consequently set up in a push-pull circuit in such a way that they could be tested both as a self-excited oscillator or as a driven amplifier on a frequency of approximately 60 Mc. The basis circuit used is shown herewith and the part to the left of the dotted line comprises a T.P.T.G. push-pull oscillator using both grid and anode lecher wires. The anode and grid lecher wires were made of 3-16th inch copper tube, except that the adjustable end section of the anode lecher was of $\frac{3}{8}$ -inch tube, as it was found that the 3-16th inch tube became hot. The output circuit was formed by a single turn of 3-16th-inch tube series tuned with a .0001 $\mu\mu\text{F}$ brass-vaed ceramic insulation condenser. The part of the circuit to the right of the dotted line was a single-ended master oscillator, whose grid and anode lecher wires were inductively coupled to the two 4304A valves. The 4304A valves were neutralized, when being driven

by cross-connecting grids and anodes with 2.5 $\mu\mu\text{F}$ condensers.

(a) Self Excited : T.P.T.G. Circuit.

Anode volts	...	900 volts.
Anode current	...	130 mA.
Input	...	117 watts.
Total grid current (both valves)	...	10 mA.
Equivalent grid bias	...	250 volts.
Power output in 500 ohm. load	...	51 watts.
Efficiency	...	39 per cent.

The power output was measured by measuring the current into the 500 ohm. load, also the output was roughly cross-checked by obtaining a brilliant light on a 110-volt 40-watt lamp, and also a bright light on a 240-volt 60-watt lamp as the load. The current into nominally 400 ohm. feeders to an aerial was 0.4 amp.

(b) Driven P.A. Circuit.

Driver M.O. E.S.W. 501 Valve—

Anode volts	...	400 volts.
-------------	-----	------------

Anode current	...	55 mA.
Grid current	...	10 mA.

P.A. 2, 4304A Valves—

Anode volts	...	900 volts.
Anode current	...	103 mA.
Input	...	93 watts.
Grid current	...	9.5 mA.
Equivalent grid bias	...	240 volts.
Power output into 500 ohm. load	...	45 watts.
Efficiency	...	48.5 per cent.

In the above case the output just lit the 40-watt lamp to full brilliance.

No serious difficulty was found in neutralising the P.A., and the anode tuning showed a nice sharp dip, etc., in a normal manner. Under both conditions the valves were modulated for test purposes by choke control, using a 4212D as a driven Class A loaded grid modulator. Perfectly satisfactory upward modulation of excellent quality

(Continued at foot of previous page.)

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.

NEWS OF THE MONTH

Television.

It is some considerable time since anything was written in these columns on the subject of television. For a long while television has been coming, and now it really does seem to be here.

With the opening of the Alexandra Palace Station of the B.B.C. has come the desired transmission for the experimenter to work upon with his receiver. Let it be noted that the receiver only is mentioned. It is not felt that there will be many, if indeed, any at all, who have the facilities for transmitting a high definition vision signal at this stage of development.

It is now proposed to consider the formation of a Television Section, to devote itself to the problems attendant upon the reception of high definition signals. We have been fortunate to obtain the good services of Mr. E. L. Gardiner (G6GR) as Manager of the section. Members interested in the problems entailed should, if they wish to join the section, apply to the Assistant R.E.S. Manager in the usual way, when they will be put in touch with G6GR.

At the commencement let it be made quite clear that this section will only be available to *bona fide* experimenters and research workers. Mr. Gardiner himself will be the judge of the qualifications of intending applicants. This section will not deal with queries from the general membership.

A 56 Mc. Aerial Tuning System.

The article we publish this month by Mr. H. R. Heap (G5HF) should appeal to all workers on 56 Mc. Very little has been published upon the subject of tuned aerials for reception on the ultra-high frequencies.

This system should prove of especial value to those who are using straight receivers for reception of crystal-controlled C.W. Such receivers are, at present usually less efficient than the ordinary super-regenerative type, and any method of increasing the signal voltage to the detector is to be desired.

G6PA.

Individual Members.

The following have enrolled as Individual Members since September 29 :—

No. 1 Section.—2AFO, BERS374.

No. 2 Section.—2AFO, BRS2534.

No. 3 Section.—G6TY.

No. 4 Section.—G6TY, G5JF, G6LM, Ex ZB1F, BRS1948.

Unallotted to Sections.—BRS2562, BERS379, BERS372.

* * *

In the August issue we recorded Mr. Heine's call as VK4JK. This should have read VK4JX.

SECTIONS :

No. 1 : TRANSMITTER DESIGN

S.M. : (To be appointed)

G.M. : 7 and 14 Mc.

S. BUCKINGHAM (G5QF), 9, 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. : 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. : Literature

A. T. MATHEWS (G5AM), 24, Woodside Park Road, North Finchley N.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. : A. T. MATHEWS (G5AM), 24, Woodside Park Road, North Finchley, N.12.

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.

A TUNED AERIAL SYSTEM FOR 56 Mc. RECEIVERS

By H. R. HEAP (G5HF).

THERE can be very few amateurs who are not interested in a piece of apparatus which will increase the strength of signals at the receiving end, and here is an idea which really *works!* The writer does not claim any originality in the idea, but after twelve months' experience on the 56 Mc. band he has come to the conclusion that aerial couplings on both the transmitter and receiver are relatively more important than the actual apparatus themselves.

Most amateurs working on this band take great care to match up the aerial and its feeders to the transmitter, and to get the best position for aerial coupling (which is usually fairly critical), but more often than not the receiving aerial system is left to work as it will. Now, if so much care is taken in transferring the R.F. from the transmitter to the

Armstrong circuit are used, this connection should be made to the correct tapping point on the tuning coil. The other end of the flex is left free. It may be found that even with the link coupling there is a "dead spot" on the dial, and if this is the case a large variable condenser (about .0001) should be put in series, as shown at X in Fig. 1. Too loose a coupling also gives this effect.

Next connect the aerial (assuming this to be of no particular length) to A (Fig. 1) and the coupler is ready for testing. The adjustment of the coupler is critical and varies with the tuning of the receiver, so that it is best to mount it on or near the set, at the end of extension rods, and in this way it can be adjusted along with the tuning condenser.

Operation.

To make sure that the coupler is working, it is advisable to arrange matters so that the aerial can be connected to the set normally in order that a quick change over to the coupler is possible.

With the coupler condenser at either maximum or minimum the set should not quench, but tuning this condenser will give some point when the quench will rise to maximum. If this is not so, insert the series condenser, as explained above, but use the maximum capacity that will allow the quench to operate, as this condenser cuts down the signal strength considerably at low capacities. Why? Assuming, then, that the quench can be "tuned in" by the coupler, switch over to the ordinary coupling and tune in a fairly loud signal. Then switch back to the coupler and tune it until the signal is again audible; slight readjustment of the main tuning condenser will be necessary for best results. On this signal (if sufficiently loud) there may be no increase in strength with the coupler, due to the A.V.C. action of the set, so

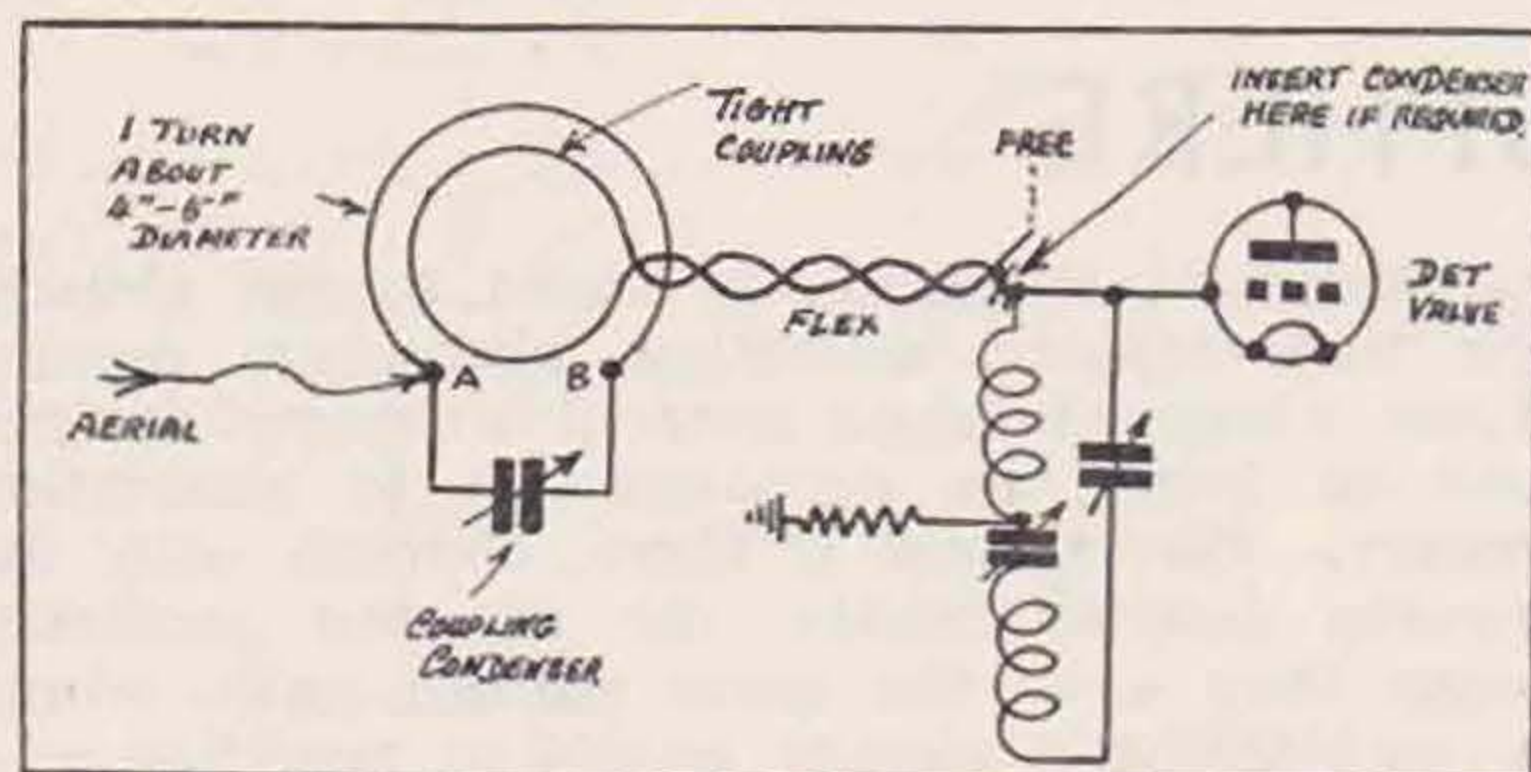


Fig. 1.

Arrangement for any length aerial.

aerial, why is not the same care taken to transfer the same R.F. from the receiving aerial to the receiver?

The principle of the idea set out in this article is to tune the receiving aerial to the incoming signal, but in such a way as to prevent the aerial "loading" the set out of oscillation. This is done by connecting the aerial to a tuned circuit, which is tuned to the signal, and this is link-coupled to the receiver. The receiver used in the experiments was an Armstrong Super-Regenerative receiver.

Construction.

Across a small variable condenser, of about two fixed and two moving vanes, place one turn coil of about 4 to 5 inches diameter. This circuit should be arranged so that with the condenser at about $\frac{1}{2}$ setting the circuit tunes to the middle of the 56 Mc. band.

This allows for any effect that the aerial and the set will have on the tuning. Next obtain a piece of well-insulated set-connecting wire (filament "push-back" wire is very good), so that its length is twice the distance between the coupler and the set. Then, beginning at the middle of the wire and leaving a loop of the same size and shape as the coupling coil, twist this wire into a piece of flex with open ends nearest the set (lengths up to 7 ft. have been used with little or no loss in signal strength, but within reason the shorter the better). The loop is then strapped *very tightly* to the coil of the coupler and one end of the flex is connected to the grid of the detector valve. When receivers other than the

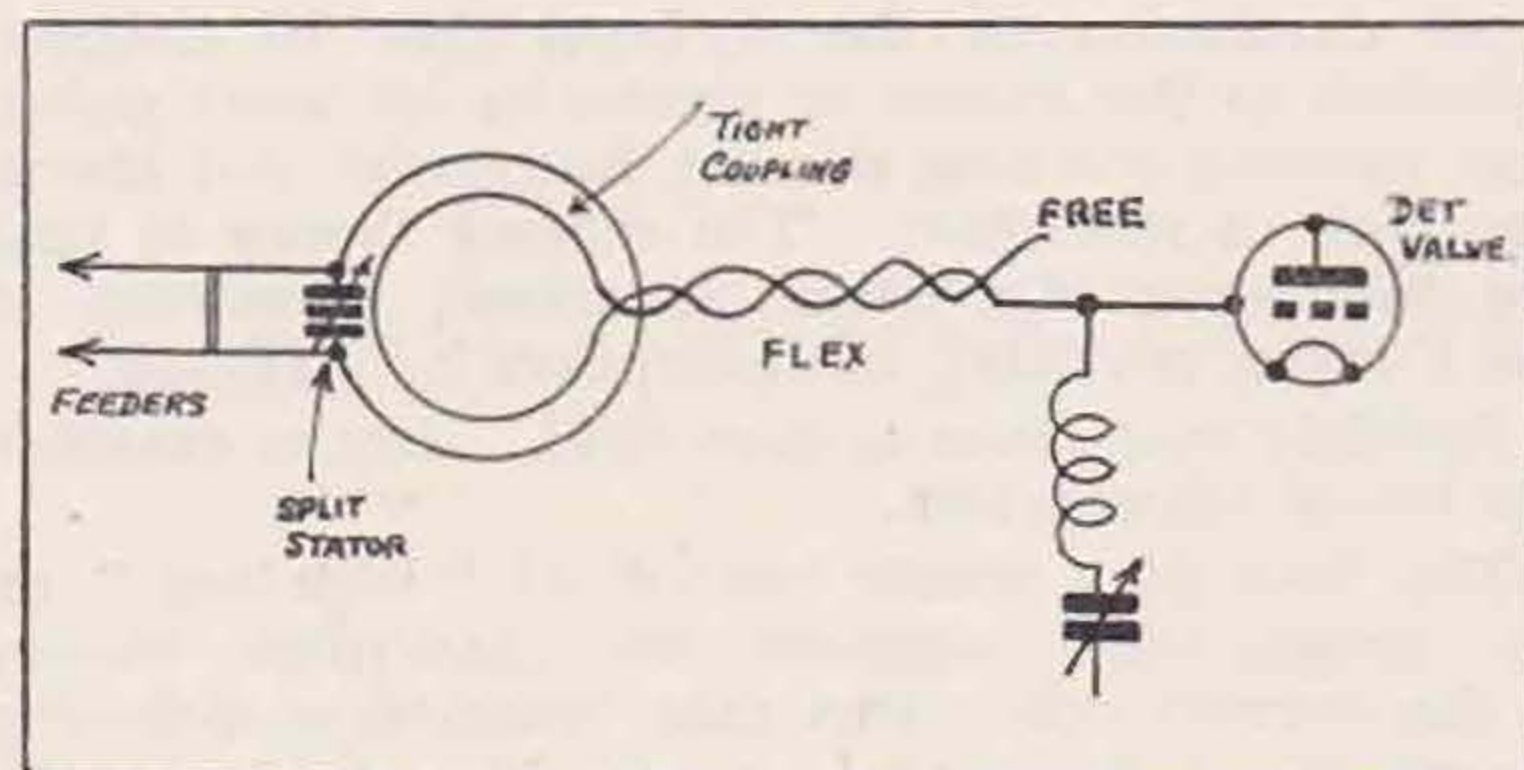


Fig. 2.

Arrangement for twin feeders

without altering the coupler tune in a much weaker station on about the same frequency, continually readjusting the main tuning and coupler condensers alternately until maximum signals are obtained.

It may be some time before one becomes sufficiently skilled to search for stations with the coupler connected, because this entails knowing roughly what setting on the coupler corresponds with the various positions of the main tuning for the best results, but after a little practice this difficulty can be overcome.

When using twin wire feeders from the receiving aerial the circuit shown in Fig. 2 works very well and gives the same satisfactory results. A split stator condenser is recommended for use here.

Precautions.

(1) It may be found that connecting the aerial to B (Fig. 1) will give very much better results, and after some experience in working the coupler, the writer found that tapping the aerial a little way up the coil from A (or B) gave still better results.

(2) It is essential to mount the coupler condenser on an extension rod, as the hand capacity otherwise encountered renders the coupler useless.

(3) Do not expect outstanding results right away, as some experience must be gained with the coupler on signals which can be heard quite well on the ordinary coupling. When searching for stations, it is best to be continually adjusting the coupling condenser on both sides of its estimated setting.

(4) On *no* account should any part of the coupler

be earthed, otherwise the set will be rendered "dead" on tuning.

(5) The coupler does affect tuning of the set and this makes it impossible to calibrate the set directly.

(6) Inductive coupling between the flex and the receiver gives very poor results and is not to be recommended.

Results.

At the writer's station the results were almost too good to be true! R4 signals were R9 with the coupler, R2 signals were brought up to R7, and at least one station which was inaudible on normal coupling was received at R5! Another interesting property of the coupler is that it suppresses to a large extent the radiation of the quench.

In conclusion, the writer would like to state that there are further possibilities for this coupler, but at the time of writing only a limited amount of work has been done on it. The writer would also be very pleased to hear from anyone who tries the idea, together with suggestions, criticism and results.

THE IONOSPHERE*

The Dellinger Wipe Out.

IN the September BULLETIN mention was made of a "wipe-out" of short wave signals on August 25, and information was sought as to the behaviour of the longer short waves from 30 to 80 metres. It is interesting to hear from W6HIW that the "wipe-out" was observed by WVB and WVV who were working on about 36 M. Their signals disappeared at 18.50 G.M.T. and reappeared at about 19.50 G.M.T. Compare these times with those published for the trans-Atlantic "wipe-out" on 22 to 15 M., namely 18.40 to 18.55 G.M.T., and we see that 36 M. vanished ten minutes later than 22 M. and stayed out for an hour, compared with 15 M. which was out for some fifteen minutes.

There are two theories put forward in explanation of this phenomenon: the first that there is a rapid expansion of the F layer due to thermal agitation of the atoms or molecules by solar radiation, causing electron density limitation and therefore lack of reflection. The second theory is that the bombardment causes increased ionisation in the F layer, resulting in absorption by collision.

Possibly both theories may hold. Let us examine the latest information.

The fact of a longer period of "wipe-out" on the longer wave suggests the absorption theory is the correct one. But then there is a difficulty inasmuch as the signals on 36 M. vanished *after* those on 22 M. If absorption is the cause we should expect the longer wave to vanish first. To find an explanation we must turn to the map. WVV is situated at Fort Warren, Wyoming, and WVB in Texas almost due south. The local solar time is some seven hours behind G.M.T., so the wipe-out occurred from 11.50 to 12.50 local time. Now the time of the trans-Atlantic "wipe-out" was the afternoon of the mean path across the Atlantic, with the result that the ionisation density would be on the down grade though starting richer than that over Wyoming, which would be increasing from a lower starting richness. Hence, when the

bombardment ionisation is added to the already rich trans-Atlantic ionisation, absorption rapidly occurs, whereas a longer interval is required further west to bring the ionisation up to absorption density. Having got it there, coupled with the growing diurnal density, the wipe-out continues longer than over the more eastern path, where re-combination is already setting in, resulting in a more rapid emergence of the shorter waves.

This theory is supported by other writers. W2BSR writes as follows:—"Information received from Cable & Wireless, Ltd., in your country checks our observations that the higher frequencies (18 Mc. and above, i.e., below 17 M.) are in general the least affected. They find, as we do, that in some cases trans-Atlantic working is limited to such frequencies. Also in other cases recovery has been earlier on the higher frequencies. . . ." Such a theory would partially account for the fact that the medium wave broadcast band is unaffected."

Further evidence in support of the absorption theory is supplied by an abstract, published in the *Wireless Engineer* for October, of research carried out by the German P.O. on the ionosphere records of the F layer for February 14, 1936. They say:—"Between about 16.20 and 16.40 on February 14 the short wave reception from directions west of Berlin was completely suspended, whereas eastwards communication (e.g. with Japan) remained normal. The records show clearly the sudden disappearance of F layer reflections at 16.25, lasting till about 16.45, full strength regained at about 16.55. Soon after 17.00 the appearance of multiple reflections from the F layer is visible, showing abnormally strong F ionisation." They then go on to show that on the following morning the continuous F layer record shows an unbroken transition into the daylight height, whereas on the preceding morning, before any abnormal bombardment, there was no F layer reflection for about an hour before sunrise. They argue the matter of the "wipe-out" in this manner:—"Over the western daylight path, where ionisation was already

* Notes compiled by the Propagation Section. R.E.S.

strong, the extra ionisation caused by bombardment was sufficient to cause absorption by collision, whereas over the eastern path, where re-combination had already set in, the extra ionisation was able to restore and so improve conditions.

From the fact that the magnetic records at the time show that no auroral phenomenon occurred, they conclude that the bombardment was electronic, the time of transit from the sun being two hours, giving a velocity of 207,000 km/sec.

Some Comments

All the above seems very possible as the explanation. We must not forget, however, the very rapid rise in the height of the F layer reported as coincident with the "wipe-out" in October, 1935.

Again, we must remember that at the time of the "wipe-out" for August this year, the very long wave trans-Atlantic signals showed a decrease in strength, indicating a change in the E layer.

One further point relating to the longer short waves, 40 to 80 M. The effect we are considering is a daylight effect, so that these waves are not being used for any long-distance communication but only local. It is therefore probable that any "Dellinger" effect which may exist would be masked.

For the same reason that it is a daylight effect is it possible that the Berlin-Japan signals do not come into the discussion at all?

The C Regions.

Two interesting papers have recently been published in *Nature*. In that for August 15, 1936, H. Rakshit, J. N. Bhar and S. K. Mitra give an account of their observations on these regions. There are three regions which they name, C1, C2, C3, at heights of 55 kms., 20-35 kms., 5-15 kms. respectively. Echoes from C1 are much more frequent and of greater strength than those from C2 and C3; day-time echoes are weaker than night-time echoes; echoes are more frequent during the afternoon and usually too weak to be detected at noon. The average values of penetration frequency are all of the same order.

The second paper was published on August 8, 1936, in which R. C. Colwell, A. W. Friend, N. I. Hall, L. R. Hill have noted the seasonal behaviour of the C and D regions (D being the abnormally low E), and find turbulence of the C regions during thunderstorms and strong winds. Fluctuation and lowness of C region coincided with magnetic disturbance and absence of signals on 20 M. (Conditions Groups please note.—G2GD.) *Signals from a balloon situated above the C region were reflected into space from its upper boundary.* Here is much food for thought.

Solar Eclipse (June 19, 1936).

In a paper by S. S. Kirby, T. R. Gilliland, N. Smith, and S. E. Reymer published in the *Phys. Review* for August 1, 1936, the authors came to the conclusion that any unusual "conditions" were due to a simultaneous magnetic storm rather than the eclipse. They summarise the general effects of a magnetic storm as follows:—

- (1) Disturbed radio conditions correlate much more closely with disturbances of the vertical component of the earth's magnetic field than with the horizontal.
- (2) A severe magnetic disturbance beginning before sunrise shows much closer correlation

with disturbed radio conditions than one beginning during the daytime.

- (3) Disturbed radio conditions include lowered critical frequencies, increased absorption, and increased virtual heights indicating a diffusion of the ionosphere.

- (4) During a magnetic disturbance the higher part of the ionosphere is the most disturbed.

Now (1) above is interesting because it fits in with the lunar tidal theory. In the article published in the BULLETIN for March, 1936, it was pointed out that the moon might cause a tidal action resulting in a motion of the charges in the ionosphere at right angles to the vertical component of the earth's field. It is reasonable to expect that a disturbance of this vertical component itself would produce similar results. (3) above is interesting in view of the "wipe-out" of October, 1935, referred to before in these notes.

It is hoped that these notes will once more stimulate research into that very elusive region, the Ionosphere.

G2GD.

TRADE NOTICES

"Ham-Aids" is the name used by *Tillotson Bros.*, 55, Commercial Street, Morley, Yorks, to draw attention to several new lines they have introduced this winter. "Ham-Aid" transmitter panel transfers are a novel addition to their already existing range of useful gadgets. The transfers are sold in sheets to be cut up as required, and can be easily fixed on ebonite, glass, metal, plywood, etc. The names are printed in black on white panels, and are suitable for 22 different positions on a transmitter. The retail price is 1s. 9d. per packet.

"Ham-Aid" QSL cards are well printed in strong, clean colours, and should find favour amongst those who require a good-looking card at a reasonable price. The samples submitted introduce novelty in design, and from the R.S.G.B. QSL Bureau point of view will be welcomed, as they are of standard postcard size. We have but one criticism to offer, and that applies to the majority of QSL cards, why does the use of radioese persist? International abbreviations are understandable, but we can see no reason for the continued use of such contractions as "Mni," "Tnx," "Fer," "Ur," etc., etc. Where space is not at a premium we think it would be advisable to print the abbreviated word in English.

Two Hundred Metres and Down

For the first time the story of amateur radio has been told in the language of the man in the street. True the story is viewed through the eyes of an American, Clinton B. de Soto, the assistant secretary of the A.R.R.L., but the book makes good honest reading and should find a place in the home of every radio amateur. Although scarcely a novel, it is phrased to appeal to all classes who appreciate good literature.

A review will appear in our next issue, meanwhile order your copy from Headquarter's to-day. The price is 4s. 3d. post free.

Reports Wanted

ZS5Z (Durban) on his 14252 kc. phone transmissions.



R.S.G.B. SALES DEPT.

53, VICTORIA STREET, LONDON, S.W.1



PUBLICATIONS

RADIO AMATEURS' CALL BOOK

(Published quarterly in U.S.A. on the 15th of March, June, September and December.)

Contains Call-Signs, Names and Addresses of all Transmitting Amateurs.

PRICE : To Members, 6/- ; Non-Members, 6/6

LOG BOOKS

Five types are available. Each book contains 400 sheets bound between stiff cloth covers. Sample sheets free on request.

PRICES from 3/9 to 5/9

HINTS AND KINKS FOR THE RADIO AMATEUR

(Published by the American Radio Relay League.)

A Symposium of Practical Ideas of Value to the Radio Amateur.

PRICE : To Members, 2/6 ; Non-Members, 2/9

RADIO AMATEURS' HANDBOOK

(Reprinted at frequent intervals by the American Radio Relay League.)

A Manual of Amateur High-Frequency Radio Communication.

PRICE : To Members, 5/- ; Non-Members, 5/6

LOG PADS

Two types are available. Each pad contains 100 leaves punched at the top for filing purposes.

Type LP16, price 1/4, or three for 3/6.

Type LP17, price 1/9, or three for 4/-

RADIO ANTENNA HANDBOOK

(Published by Radio Ltd.)

An up-to-date treatise of Amateur Antenna Design.

PRICE : 2/6 post free.

CALCULATORS

(Published by the American Radio Relay League.)

These calculators are great time-savers for all who are engaged in engineering problems.

Type A. Frequency, Inductance and Capacity.

Type B. Current, Resistance, Voltage and Power

Type C. Wire data.

Type D. Decibel Calculator.

Type E. Resistances in parallel, and condensers in series.

Type F. Measurements of Resistance.

PRICES : Types A and B, 4/6 each ; Types C, D, E and F, 2/3 each.

FOR MEMBERS ONLY

NOTEpaper

Members' Correspondence Headed Notepaper. A good quality quarto paper with heading in black.

PRICE : Per 100 sheets, 2/6

CAR PLAQUES

Plain Type (with Emblem).

PRICE : 3/6 each.

Call Sign Type (with Emblem).

PRICE : 4/6 each.

(Delivery 14 days.)

LAPEL BADGES OF EMBLEM

PRICE : 1/6 each.

CALL SIGN BROOCHES

PRICE : 2/6 each up to 5 characters ; 3/- each over 5 characters.

(Delivery 10-14 days.)

ALL ITEMS LISTED ARE PCST FREE, BUT A REMITTANCE MUST ACCOMPANY EACH ORDER

Order Your Winter Call Book Now

BETWEEN



OURSELVES

I.E.E. Meeting

Mr. R. H. Hammans (G2IG), co-author with Mr. Milne, of the receiver article published in this issue, will open a discussion on "Single Signal Super-heterodyne Receivers for Amateur Use" at the meeting to be held on Friday, November 27, at the Institution of Electrical Engineers, London. The meeting will commence at 6.15 p.m., and will be preceded by tea served free of charge from 5.30 p.m. It is hoped that a good attendance will be recorded at this meeting.

The Annual General Meeting will take place at the I.E.E., on Friday, December 18.

R.S.G.B. Ties

The Council has decided to discontinue the sale of R.S.G.B. Ties, due to the fact that the original order was executed at a loss to the suppliers.

Radio Antenna Handbook

Arrangements have been made to supply members with the above handbook at 2s. 6d. per copy, post free. A review appears in another page.

New QSL Bureau Address

The address of the New Zealand Association of Radio Transmitters QSL Bureau has been changed to P.O. Box 374, Dunedin.

QSL Section

Manager: J. D. CHISHOLM (G2CX).

We have been approached recently by several members who are in doubt as to the correct postage for QSL cards. With a view to obtaining a ruling on the subject, we have seen the appropriate authority at the G.P.O., who states that QSL cards are *not* eligible at Printed Paper Rate either for Inland or Foreign and Imperial destinations, unless no additions, except the date, have been made, in writing, to the text.

There seems to be some misapprehension as to the meaning of "Five Words" which are permitted on cards sent at the halfpenny rate. These words must *not* convey any message and must be in the form of a conventional greeting, i.e., "With best wishes from Jack" is acceptable, but "See you all on Monday" would be an infringement of the regulations. The Post Office regards QSA, QRK, and T numerals as substitutes for phrases and therefore not admissible.

I.E.E. Wireless Section

London members will be interested to learn that the Honorary Editor is to deliver a lecture on "The Radio Amateur Movement" before the Wireless Section of the Institution of Electrical Engineers on Tuesday, November 24. The lecture will commence at 6 p.m. and admission is by ticket obtainable from the Secretary, I.E.E.

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 transmissions and numbers utilising the service. If, however, a reply is desired, a stamp should be sent. Will stations in areas at present not 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

			G.M.T.	KC.	Stations.
Nov.	25	Wednesday...	2300	1775	G6ZQ
"	27	Friday ...	2300	1785	G6QI
"	29	Sunday ...	0915	1775	G6ZQ
"	29	Sunday ...	0930	1852.5	G5DY
"	29	Sunday ...	1000	7260	G5JL
"	29	Sunday ...	1015	1930	G5SU
Dec.	2	Wednesday...	2300	1775	G6ZQ
"	4	Friday ...	2300	1785	G6QI
"	6	Sunday ...	0915	1775	G6ZQ
"	6	Sunday ...	0930	1852.5	G5DY
"	6	Sunday ...	1000	7260	G5JL
"	6	Sunday ...	1015	1930	G5SU
"	9	Wednesday...	2300	1775	G6ZQ
"	11	Friday ...	2300	1785	G6QI
"	13	Sunday ...	0915	1775	G6ZQ
"	13	Sunday ...	0930	1852.5	G5DY
"	13	Sunday ...	1000	7260	G5JL
"	13	Sunday ...	1015	1930	G5SU
"	16	Wednesday...	2300	1775	G6ZQ
"	18	Friday ...	2300	1785	G6QI
"	20	Sunday ...	0915	1775	G6ZQ
"	20	Sunday ...	0930	1852.5	G5DY
"	20	Sunday ...	1000	7260	G5JL
"	20	Sunday ...	1015	1930	G5SU

QRA Section.

Manager: M. WILLIAMS (G6PP).

NEW QRA'S.

G2AT.—REV. A. B. TREWIN, The Vicarage, Exminster, Devon.
 G2BY.—H. E. WHATLEY, 14, The Glen, Norwood Green, Southall, Mddx.
 G2CN.—C. B. CLELAND, 21, Coneydale, Sherrardspark, Welwyn Garden City, Herts.
 G2DR and G5QR.—S. R. WRIGHT, Tummell, Main Avenue, Moor Park, Northwood, Mddx.
 G2DZ.—B. HALL, The Inlands, Daventry, Northants.
 G2GN.—E. D. GRIESS, c/o Mrs. GREEN, Fernbank, Broomfield Road, Chelmsford.
 G2HC.—E. A. HARVEY, 28, Crowley Street, Derby.
 G2IT.—E. P. BROWN, 24, Cressingham Road, Reading, Berks.
 G2JX.—J. P. COVENEY, 47, Onslow Gardens, London, S.W.7.
 G2QN.—A. TOMLINSON, Waverley, Feniscowles, Blackburn, Lancs.
 G2XT.—J. R. WILSON, South Cottage, Police Station, Morpeth Northumberland.

- G2YB.—C. A. BUTLER, 11, Kidmore Road, Caversham, Reading, Berks.
 G5AO.—A. LAMBOURNE, 31, Baker Street, Reading, Berks.
 G5BO.—A. BOA, 11, The Drive, Bounds Green Road, London, N.11.
 G5BR.—G. F. MASON, Highbury Road, Streetly, Birmingham.
 G5BT.—C. W. CROOK, 47, Leechcroft Road, Wallington, Surrey.
 G5FD.—F. D. CLOUGH, Devon, Home Close, Histon, Cambs.
 G5JH.—J. W. HAMILTON, Brook Cottage, Bristol Road, Hardwicke, Glos.
 G5LL.—A. H. LUNN, 32, Johnsdale Estate, Oxted, Surrey.
 G5LQ.—J. TOVELL, 15, Hedge Place Road, Horns Cross, Greenhithe, Kent.
 G5LT.—E. S. ELLIOTT, 113, Springfield Road, Ecclesall, Sheffield, Yorks.
 G5WS.—F. WARRINGTON-STRONG, H.M.S. *Active*, c/o G.P.O., London, E.C.1.
 G6BY.—W. E. PARKER, 9, Deanhill Road, London, S.W.14.
 G6GY.—C. H. GOWDY, "Brooklands," Dunelm South, Sunderland, Co. Durham.
 G6JH.—P. H. HARDIE, "Crossford," Linlithgow, Scotland.
 G6OM.—I. D. AUCHTERLONIE, Tarlscro House, Crumpsall Lane, Higher Crumpsall, Manchester, Lancs.
 G6QL.—P. H. BERRY, 4, Pinner Hill Road, Pinner, Mddx.
 G6QO.—H. FEARNLEY, 10, Leeds Road, West Ardsley, near Wakefield, Yorks.
 G6SI.—J. E. SIMMONDS, 871, Coventry Road, Small Heath, Birmingham.
 G6XD.—J. J. G. TAYLOR, 56, Quarry Park Road, Plymstock, Plymouth, Devon.
 G8BN.—G. A. BRYAN, 150, Littleover Lane, Derby.
 G8CJ.—V. I. ELLESMERE, 2, Bedford Drive, Timperley, Altrincham, Ches.
 G8CT.—G. A. JAMES, "Lynwood," Cefn Road, Blackwood, Mon.
 G8DZ.—A. E. CLIPSTONE, 15, Epperstone Road, West Bridgford, Notts.
 G8FA.—E. NAPIER, 44, Cranmer Road, Hayes End, Mddx.
 G8FF.—S. SOUTHGATE, 26, Fulbrooke Road, Cambridge.
 G8FG.—J. L. CORBETT-WINDER, Vaynor Park, Berriew, Montgomeryshire.
 G8FJ.—H. S. NORRIS, 56, Victoria Road, Ebbw Vale, Mon.
 G8FM.—J. H. SHANKLAND, "Coila," Thorn Drive, Bearsden, Glasgow.
 G8FO.—F. BOOTH, 26, Upper Bridge, Holmfirth, Yorks.
 G8FP.—W. KIRKLAND, 26, Rufford Drive, Yeadon, Leeds, Yorks.
 G8FY.—N. F. BURSLEM, Randolph House, Woodthorn Road, Tetterhall, Staffs.
 G8GA.—G. AUSTIN, 26, Woodland Avenue, Goole, Yorks.
 G8LY.—MISS CONSTANCE HALL, North Waltham Rectory, Winchester, Hants.
 2ACV.—E. S. G. K. VANCE, White Hart Inn, Blackwell Road, Huthwaite, near Mansfield, Notts.
 2AHL.—H. M. RUSSELL, 59, Cameron Street, Burmantofts, Leeds, 9.
 2AKR.—F. W. D. ROUSE, Orchard Dene House, Sedgberrow, near Evesham, Worcs.
 2APN.—R. A. PERRYMAN, "Hillside," Whitehill, Bordon, Hants.
 2ATF.—W. A. FISHER, 54, Ashbourne Road, Leek, Staffs.
 2AUB.—HUGH DE L. BANTING, 35, Lime Grove, London, W.12.
 2AYV.—R. H. PENNINGTON, Lynbrook, Marple, Ches.
 2BCL.—W. D. MANSON, 6, Wigsley Avenue, off Nuthurst Road, Moston, Manchester, 10.
 2BDA.—W. B. BENNETT, 357, Chorley Old Road, Bolton, Lancs.
 2BDN.—J. R. WILLIAMSON, 49, Neville Road, Bromborough.
 2BFL.—This call-sign was incorrectly published in the September BULLETIN as 2BSL.
 2BGM.—G. L. BENBOW, "Two Ways," Anson Street, Rugeley, Staffs.
 2BKD.—J. BUDD, 39, Bedford Road, Reading, Berks.
 2BLM.—W. J. MUNRO, 45, Whitehall Road, Grays, Essex.
 2BMH.—H. M. BLABER, 9, Stanton Road, West Wimbeldon, London, S.W.20.
 2BMY.—H. W. COLLINS, Oban House, Belgrave Drive, Whitby, Writal.
 2BQL.—D. R. L. DUTHIE, The Park, High Blantyre, Lanarkshire.
 2BRA.—S. BRADBURY, 25, Templars Way, Fairweather Green, Bradford, Yorks.
 2BRB.—R. J. BRANDON, 49, Wick Hall, Furze Hill, Hove, 2, Sussex.
 2BRF.—J. FRANCOMBE, 2, Park Way, Ruislip, Mddx.
 2BTA.—G. T. TYLER, 20, Pembroke Road, Wembley, Mddx.
 2BUP.—T. DE PUTRON, Les Hubits, St. Martins, Guernsey, C.I.
 2BVI.—A. G. BALMER, "Northmuir," Greenlaw, Berwickshire.
 2BYX.—J. P. TOURLE, "St. Ives," Leicester Road, Laindon, Essex.
 2CAA.—G. CLAYTON, "Friern," Barton Road, Torquay, Devon.
 2CAJ.—A. BRYAN, 11, West Furlong, Retford, Notts.
 2CAK.—D. A. BAILEY, "Standeford," Langland, Swansea, Glamorgan.
 2CAQ.—G. W. MOWER, 6, St. Silas Street, Hull, Yorks.
 2CAW.—G. L. MOSES, 109, Grafton Road, Keighley, Yorks.
 2CAX.—R. WAITE, 61, Broadway, Northampton.
 EI6J.—W. HOWARD COOMBS, 6, Maretimo Gardens West, Blackrock, Co. Dublin, I.F.S.
 The following are cancelled: G2FX, 2AFV, 2AHA, 2AIC, 2ANR, 2AOL, 2AQF, 2BFV, 2BJS, 2BNB, 2BRH.

NEW MEMBERS.

HOME CORPORATES.

- F. J. RUMARY (G2YT), "The Rosary," Down Road, Redcliffe Bay, Portishead, Somerset.
 S. N. JOHNSON (G15SJ), 10, Cyprus Avenue, Belfast, N. Ireland.
 R. W. WELDRICK (G5UA), 30, Central Street, Hoyland Common, near Barnsley, Yorks.
 T. F. HERDSON (G6ZN), 50, Lawnswood Road, Keighley, Yorks.
 W. H. HILL (G8BP), "Newin House," Uplands Avenue, Wolverhampton, Staffs.
 S. R. PHILLIPS (G8DL), 74, Bowyer Road, Alum Rock, Birmingham, 8.
 R. FREW (G8FR), 89, Gala Street, Glasgow, E.1, Scotland.
 W. T. J. COX (2ACD), Post Office, Stackpole, Pembroke.
 N. A. OWEN (2AFO), 19, Northampton Road, Broughton, Kettering.
 H. JACKSON (2AJK), Barrington Cottage, Bedlington Colliery, Northumberland.
 G. T. GIBSON (2AKF), 104, Evington Drive, Leicester.
 M. T. ELVY (2AMY), Thirlmere, Northwood Road, Tankerton, Kent.
 C. B. RAITHBY (2AQX), Station House, Rippingale, Bourne, Lincs.
 L. S. FRATER (2AZR), 133, Marlborough Avenue, Broomhill, Glasgow, W.1.
 K. BUTT (2BKT), 81, Clark Road, Wolverhampton, Staffs.
 C. LINGARD (2BQP), Alasdair, Chester Road, Poynton, Cheshire.
 T. C. BRYANT (2BXZ), Beaconwood Hotel, Minehead, Somerset.
 G. L. MCKILLOP (2CAF), 3, Turnberry Road, Hyndland, Glasgow, W.1.
 G. W. SANDS (BRS2579), 127, Eccles New Road, Salford, 5, Lancs.
 G. H. W. SEWELL (BRS2580), 42, Mulgrave Street, Liverpool, 8.
 F. J. BEHN (BRS2581), Aberford, Court Hey Avenue, Broad Green, Liverpool, 14.
 A. PRINCE (BRS2582), 9, Fernhill Avenue, Bootle, Liverpool, 20.
 P. R. JENKINS (BRS2583), 56, Pautbach Road, Birchgrove, Cardiff.
 P. A. FROST (BRS2584), 103, Thoday Street, Cambridge.
 R. J. H. GUY (BRS2585), 64, Brookside Road, Hayes Bridge, Middlesex.
 L. WADDINGTON (BRS2586), 14, Thorn Lane, Heaton, Bradford, Yorks.
 T. L. DELVIN (BRS2587), 2, Carlton Road, Kentish Town, N.W.5.
 H. DOBSON (BRS2588), 3, Lidgett Walk, Leeds, 8, Yorks.
 J. I. HERD (BRS2589), Levenbank, Markinch, Fife, Scotland.
 G. PROCTOR (BRS2590), 7, York Place, Dunfermline, Fife, Scotland.
 F. S. STONE (BRS2591), 7, Luccombe Hill, Redland, Bristol, 6.
 S. D. JONES (BRS2592), Old Basing, Alwyne Avenue, Shenfield, Essex.
 A. N. SIMMONS (BRS2593), Chester Terrace, Chester Square, Westminster, S.W.1.
 R. A. LOVELAND (BRS2594), Handcross, Haywards Heath, Sussex.
 J. W. BIRD (BRS2595), 16, Haslemere Avenue, Cranford, Middlesex.
 I. MACKENZIE (BRS2596), 29, Pilton Place, Edinburgh, 5, Scotland.
 J. M. WATT (BRS2597), 35, Comistoi Road, Morningside, Edinburgh, Scotland.
 G. KEYWORTH (BRS2598), 89, Bannerdale Road, Sheffield, Yorks.
 R. COX (BRS2599), 21, Paxton Road, Coventry, Warwickshire.
 N. F. DRUCE (BRS2600), 16, Whitethorn Gardens, Croydon, Surrey.
 H. W. PARKER (BRS2601), 28, Rosedale Road, Stoneleigh, Ewell, Surrey.
 L. E. OWEN (BRS2602), 70a, High Street, Beckenham, Kent.
 C. B. S. SEAMAN (BRS2603), 21, Sydney Road, Bexley Heath, Kent.
 F. S. BRIGHAM (BRS2604), 43, Northumberland Road, Tweedmouth, Berwick-on-Tweed.
 R. L. CLARK (BRS2605), 120, Nether Street, North Finchley, N.12.
 R. HILTON (BRS2606), 181, Bradway Road, Bradway, Sheffield, Yorks.
 W. ROGERS (BRS2607), 12, Meadows, Leasowe Road, Wallasey, Cheshire.
 G. HARROWER (BRS2608), Abbot Street, Craigie, Perth, N.B.
 F. J. DAWES (BRS2609), "Barton House," Burgh, Lincs.
 A. PARRY (BRS2610), Grosvenor House, High Street, Gillingham, Dorset.
 R. A. BROWN (BRS2611), 91, Crescent Road, Alexandra Park, N.22.
 E. J. BUCHAN (BRS2612), Cliff House, Shorefield Gardens, West-cliff-on-Sea, Essex.
 J. E. H. JONES (BRS2613), "Gwernant," Kingstonbridge, Lewes, Sussex.
 H. T. STOTT (BRS2614), 17, Sylvan Avenue, Mill Hill, N.W.7.
 W. F. CHAPPELL (BRS2615), 88, Strathmore Avenue, Beverley High Road, Hull, E. Yorks.
 K. D. KING (BRS2616), 97, Church Lane, Marple, Cheshire.
 G. A. POWELL (BRS2617), 104, Loughborough Road, West Bridgford, Notts.
 E. WAKE (BRS2618), Old Gaol House, Abingdon, Berks.
 R. B. MANCUS (BRS2619), A7, Calthorpe Mansions, Five Ways, Birmingham, 15.

- J. ROBERTS (BRS2620), 88, Coldharbour Lane, Camberwell, S.E.5.
 H. OWENS (BRS2621), 25, Adeline Street, Goole, Yorkshire.
 K. F. CRISPIN (BRS2622), "Chagford," Thurston Avenue, Southend.
 B. ARNOLD (BRS2623), "Draycott," 976, Bristol Road South, Northfield, Birmingham.
 T. S. TATTON (BRS2624), 15a, Derby Grove, Lenton, Nottingham.
 K. A. COOK (BRS2625), 28, St. George's Park Avenue, Westcliff-on-Sea.
 J. F. CHITTENDEN (BRS2626), 50, Osborne Road, Willesborough, Ashford, Kent.
 W. S. EADIE (BRS2627), 16, George Street, Coupar Angus, Perthshire, Scotland.
 A. MACKENZIE (BRS2628), 35, Wellpark Road, Saltcoats, Ayr, N.B.
 J. I. M. SINCLAIR (BRS2629), 50, Ralston Avenue, Crookston, Glasgow, S.W.2, Scotland.
 D. L. PELHAM (BRS2630), "Annan," 18, Selva Lane, Mill Hill, N.W.7.
 A. McCABE (BRS2631), 13, Havelock Street, Glasgow, W.1, Scotland.
 A. W. GRICE (BRS2632), 6, Bradmore Avenue, Ruddington, Nottingham.
 F. T. BUTLER (BRS2633), 166-168, High Street, Rayleigh, Essex.
 G. L. ZECH (BRS2634), Temple House, Baldernock, near Torrence, Stirlingshire.
 G. J. PALMER (BRS2635), 5, Old Leigh Road, Leigh-on-Sea, Essex.
 W. A. ROSS (BRS2636), 36, Atholl Avenue, Giffnock, Glasgow, Scotland.
 P. SIMPSON (BRS2637), 287, Hilltown, Dundee, Angus, Scotland.
 M. A. NEWMAN (A), 87, Colborne Way, Worcester Park, Surrey.

DOMINION AND FOREIGN.

- W. G. SOUTHAM (VE2AX), 15, Ellerdale Road, Hampstead, Quebec, Canada.
 D. W. R. MCKINLEY (VE3AU), Unionville, Ontario, Canada.
 REV. J. R. DELBRIDGE (VK4RJ), Methodist Parsonage, Booval, Ipswich, Queensland, Australia.
 E. A. FERGUSON (VP7NR), Branch Post Office, Box 74, Nassau, N.P., Bahama Islands.
 T. A. DINEEN (VS2AK), 15, Seavoy Road, Kuala Lumpur, F.M.S.
 C. GANT (VU2FT), "A" Corps Signals, Cambridge Barracks, Rawalpindi, India.
 J. HEMLEY (W5BNO), Box 305, Grapevine, Texas, U.S.A.
 A. A. T. COOKE (ZS6T), 73, Fraser Street, Turfloop, Johannesburg, South Africa.
 B. COLERIDGE (ZT6M), P.O. Box 6246, Johannesburg, South Africa.
 S. E. PETERSSON (SM6QN), Stralsnas, near Mjölby, Sweden.
 GUNNAR JANSSON (SM6VX), Nordhemsg 39, Gothenburg, Sweden.
 M. KOVACEVICH (BERS372), 1133, Market Street, De Kalb, Illinois, U.S.A.
 R. C. H. BROADHURST (BERS373), 234, Turf Club Street, Kenilworth, Johannesburg, South Africa.
 D. W. H. PATERSON (BERS374), Gondalpara Mills, Chandernagore, E.I. Railway, Bengal, India.
 A. R. VELLA (BERS375), 14, Depiro Street, Extension, Sliema, Malta.
 G. S. STRITCH (BERS376), 17, Belvedere Place, Dublin, I.F.S.
 W. A. CAMPBELL-GILLIES (BERS377), P.O. Box 97, Nairobi, Kenya Colony.
 D. A. VINCENT (BERS378), H.M.S. Hermes, c/o G.P.O., London.
 W. G. IRVINE (BERS379), Telegraph Inspector, Posts and Telegraphs, Blantyre, Nyasaland, British Central Africa.
 J. F. GREGORY (BERS380), 4, Mess, H.M.S. Sturdy, c/o G.P.O., London.

Philatelists

Members interested in Philately are reminded that an active Stamp Club is being run by Mr. M. Williams, G6PP. Communications should be sent to Mr. Williams, at 7, Woodberry Down, London, N.4. Overseas members are also invited to join the Section which now has contributors in New Zealand, Australia, U.S.A., etc.

Reports Wanted

G5FD (Cambridge) on his 7 and 14 Mc. phone and c.w. transmissions.

Appreciations

Mr. J. C. Elmer (G2GD), Assistant R.E.S. Manager, wishes to record his thanks to all who signed the photograph presented to him after the recent meeting held in Hythe.

BOOK REVIEWS

THE RADIO ANTENNA HANDBOOK. Published by "Radio," Ltd., Los Angeles, Calif.

This excellent book contains 80 pages packed with all the best of the information which has been published about "Ham" aerials. A short introductory chapter is followed by the main section of the book, which describes in detail the mode of operation of all the "standard" types, feeder design and operation, coupling to the transmitter, complete with a multitude of illustrations, curves, formulæ, and useful tables, polar diagrams—in fact, everything needed to design systems to suit one's location or ambition.

A further 20 pages deals with the various types of directive aerials, whilst the final section covers various B.C.L. noise-free systems, miscellaneous special aerials, field strength meters and masts.

There are two points calling for criticism. Firstly, on page 32 there is a table of characteristic impedances of wires at various frequencies, in which the figures do not agree with the formula given, but show a systematic error making all values 138 ohms too high. Further, the values are quoted as being of use for feeder calculations, whereas they actually refer to wires with standing waves, transmission lines having higher impedances than such.

The other point is that the "end" correction of wires does not appear to be well understood, though as far as radiator wires are concerned the information given is near enough for all practical purposes. On the other hand, we find throughout the book that this same end-correction is applied to non-radiating tuned feeders, such as, for example, quarter-wave stubs for zepps or for phase reversal. Our own theory and practical experience lead us to believe that "end correction" is a function of a radiating system only, and that a quarter wave stub for, say, 14 Mc. requires the full free-space length of $17\frac{1}{2}$ ft., and not the usual $16\frac{1}{2}$ ft. needed for half of a dipole.

Whilst in practice this is not likely to lead to any very serious trouble, it is pointed out, as it may save a certain amount of puzzling.

The book cannot fail to be of enormous value, not only to the beginner, but also to the more advanced worker. It is recommended as a good investment at 2s. 6d.

G6CJ.

EMPIRE CALLS HEARD.

R. J. Lee (BRS1173), Sussex, 0-v-Pen. During VK/ZL Contest:—

14 Mc.: vk2, abc, ae, as, cn, da, eg, el, fm, hv, hz, jc, jx, ks, la, lw, lz, no, ny, oj, oq, px, qe, rb, sy, tf, ti, ud, xt, yc, yl, zc, 3bj, cp, dm, eg, fm, gp, gq, gu, hk, jk, jx, kk, kx, mk, mr, oc, sn, uw, zb, zz, 4ap, bb, do, hr, jb, le, yl, 5by, fm, hd, hw, lb, lj, md, ml, wj, zx, 6fl, fo, je, mw, sa, 7ab, jb, kv, zllaa, bc, cb, cd, di, dv, fe, gx, hy, ke, lm, 2bp, cp, ds, jq, lb, od, oq, qm, qt, 3ab, aj, ax, cs, gk, gn, gr, ja, jx, kg, 4ac, ao, bq, ck, fo.

28 Mc.: vk2jt, 2lz, 3bq.

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), Durham,
and Northumberland (Middlesbrough is in this district.)
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. R. A. BARTLETT (G6RB), 31, King's Drive, Bishopston, Bristol,
Glos.

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

DISTRICT 17 (Mid-East).

(Lincolnshire and Rutland.)
Rev. L. C. HODGE (G6LH), The Bungalow, Skirbeck Road, Boston,
Lincs.

DISTRICT 18 (East Yorkshire).

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

SCOTLAND.

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

NORTHERN IRELAND.

Mr. W. GRAHAM (G15GV), 5 Ratcliffe Street, Donegal Pass, Belfast.

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

DISTRICT 1 (North-Western)

THE event of the month was the North-Western
Provincial Meeting at Liverpool, when about
40 members met at the Angel Hotel. No. 11
District was also represented.

After the lunch and the usual toasts had been
given, the meeting followed. Each T.R. present
gave a resumé of the year's work, then followed our
Secretary, "Clarry," who gave us an excellent talk
which lasted over one hour, and I feel sure that this
visit was a means of clearing up a few of the mis-
understandings in the District.

It was rather disappointing that so few of the
Liverpool members were present. As D.R., I
would like to say how much I appreciate the efforts
of their T.R., G2RF, and his colleagues, for the
trouble they had gone to in the arrangement for
this meeting.

Anyway, we had an excellent meeting, and after
a vote of thanks to G6CL the meeting closed,
and members mixed with one another while par-
taking of tea, after which Station visits took place,
and our thanks are due to those who made this
possible.

Finally, I must not overlook the services of my
scribe, G6CX; he is a very valuable help, and many
thanks are due to him.

As the result of a vote taken at the meeting it
was decided that the next North-Western Pro-
vincial District Meeting will take place in Southport
on May 23, 1937.

G6TW.

Manchester.—An attendance of 32 was recorded
at the last Manchester meeting, which was devoted
to 56 Mc. G2OI, with a mobile car transmitter
working on 56 Mc., toured round Manchester
within a radius of three miles, and his transmissions
were received at the meeting during most of the
tests.

The following stations report active: G5YD,
2GA, 2ATZ, 5WR, 2ARC, 2DH, 5OZ, 5CH, 2WQ,
6TL, 5PX, 6GV, 2JC, 2HW, 2LK, 6KS, 2AJA,
2AOV, 2AXH, BRS1579, 2BDA, 2BMG, 8BI, 8FI
and 2AQY. The last five members are to be
congratulated on their successful applications to the
G.P.O., and congratulations are also due to 2ARC

McGRAW-HILL**PRINCIPLES OF
RADIO ENGINEERING**By **R. S. GLASGOW***Associate Professor of Electrical Engineering, Washington University***511 pages, 9×6, illustrated. 24/- net, 1936**

IN this important new book, intended primarily as a text for senior electrical engineering students, the author aims to give a thorough presentation of the fundamentals of radio communication and the application of these principles. Considerable space is devoted to the theory and application of the vacuum tube and its associated circuits to communication systems.

**RADIO RECEIVING
AND
TELEVISION TUBES**

Including Applications for Distant Control of Industrial Processes and Precision Measurements.

By **JAMES F. MOYER***Director of University Extension, Massachusetts Department of Education, Member of Federal Commission on Radio Education.*and **JOHN F. WOSTREL***Instructor in Radio Engineering, and Supervisor in Charge of Industrial Subjects, Division of University Extension, Massachusetts Department of Education.***635 pages, 5½×8, 485 illustrations.****Third Edition. 24/- net, 1936**

THIS book covers principles, theories, fundamental actions in vacuum and gaseous tubes, making clear how they are constructed and what goes on inside them, and relating this in a clear, practical manner to the circuits in which the tubes are used, and the various radio and industrial applications to which they may be put. In all ways the treatment has been made as comprehensive and understandable as possible.

**PRACTICAL RADIO
COMMUNICATION**

Principles — Systems — Equipment — Operation. Including Short-wave and Ultra-short-wave Radio.

By **ARTHUR N. NILSON***Lieutenant (Technician) (Communications) U.S.N.R. (Rtd.)*and **J. L. HORNING***Formerly Radio Instructor, Guggenheim School of Aeronautics, New York University.***754 pages, 9×6, 435 illustrations, flexible. 30/- net (Late 1935)**

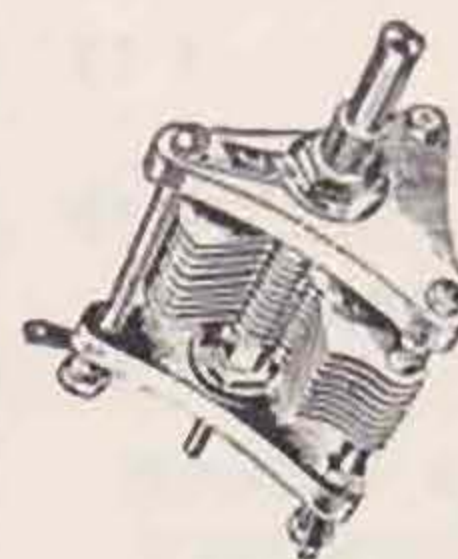
A handbook for engineers and technicians on Radio station operation.

BESIDE providing the undirected newcomer to radio with complete, progressive material to prepare him to pass license examinations and to get a job in radio, this book presents much of value to the experienced operator and technician. Covering practical radio communication completely and its essential theory, the book is in effect a handbook, making available in concise, clear-cut form, adaptable for handy reference, a great deal of otherwise inaccessible material.

**McGraw-Hill Publishing Co. Ltd.
Aldwych House, London, W.C.2**

**B.T.S.
ACKNOWLEDGED
THE BEST****GM OMS!**

**AT LAST — QUALITY VARIABLES
AT A REASONABLE PRICE!**

B.T.S. S.W. Tuning Condensers

These condensers have extended spindle for ganging purposes. Brass vanes and spindle ensure minimum H.F. resistance. Ceramic end plate and general low loss construction renders them eminently suitable for 56 Mc. work. Made in three capacities:

STC425	...	0.000025	3/3
STC445	...	0.000045	3/6
STC316	...	0.00016	4/6

**—AND A REAL S.M.
DIAL, DUAL RATIO:
100:1 and 8:1**

**B.T.S. Aeroplane Dials**

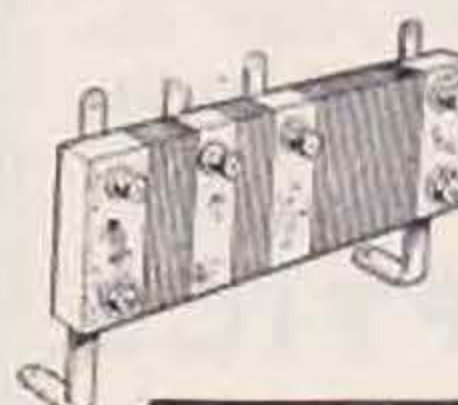
Designed to fit standard ½ in. spindle condenser, are ideal for all short and ultra-short wave circuits, where extreme precision is required. Their extremely attractive and workman-like finish renders them ideal for the new RX. Slipping is impossible, and the smooth action has to be tried to be appreciated.

Type ASD, **6/-**

With escutcheon, convex glass, and retaining ring, 2/6 extra.

GOING QRO?

**B.T.S. AC/DC POWER RESISTANCES
WILL ENSURE RELIABILITY**



Best quality nickel chrome wire, wound on special heat-resisting former. Air cooling by adequate spacing. The ideal mains resistance for the amateur transmitter.

Prices from 3/6
Let us quote you.

B.T.S. Quality Short Wave Components are designed specially for the Ham! Let us quote you for Transmitting Racks and all types of chassis!

All good dealers Stock B.T.S.

If any difficulty, send order direct with remittance and name and address of nearest dealer for immediate delivery.



BRITISH TELEVISION SUPPLIES LTD.
Faraday House, 8, Charing X Road, London, W.C.2
'Phone: Tem. Bar 0134-5. 'Grams: Televue, Lesquars, London.

COMMUNICATION RECEIVERS AND EQUIPMENT

TOBE DEUTSCHMANN KIT, built-up tuner, valves, power pack and speaker...	£15 10 0
R.C.A. MODEL ACR. 175, valves, crystal, speaker and power pack ...	38 0 0
A.C.S.-KENCO "BUG" KEYS ...	1 10 0
MILLER PRE-SELECTOR UNIT, complete ...	7 10 0
PEAK PRE-SELECTOR UNIT, complete ...	6 10 0
NOISEMASTER ANTI-STATIC AERIAL ...	1 15 0
R.C.A. SPIDER WEB ANTENNAE, with 5-metre Kit ...	2 10 0
JOHNSON Q 20-Metre ANTENNAE KIT ...	1 17 6

Also available : Hallicrafters range, National, Hammarlund and all Eddystone Components. Part Exchanges. Easy Payments. Full lists free.

A.C.S. LIMITED

52/4, Widmore Road, Bromley, Kent
(20 minutes from Charing Cross) Phone : Ravensbourne 1926

Just Published

TELEVISION TECHNICAL TERMS AND DEFINITIONS

By E. J. G. LEWIS. This is a complete, up-to-date, and authoritative work of reference containing over 1,000 detailed explanations of technical terms used in television, as well as a number of illustrations. All television enthusiasts should possess a copy. 108 pages. 5/- net (by post 5/3).

TELEVISION OPTICS

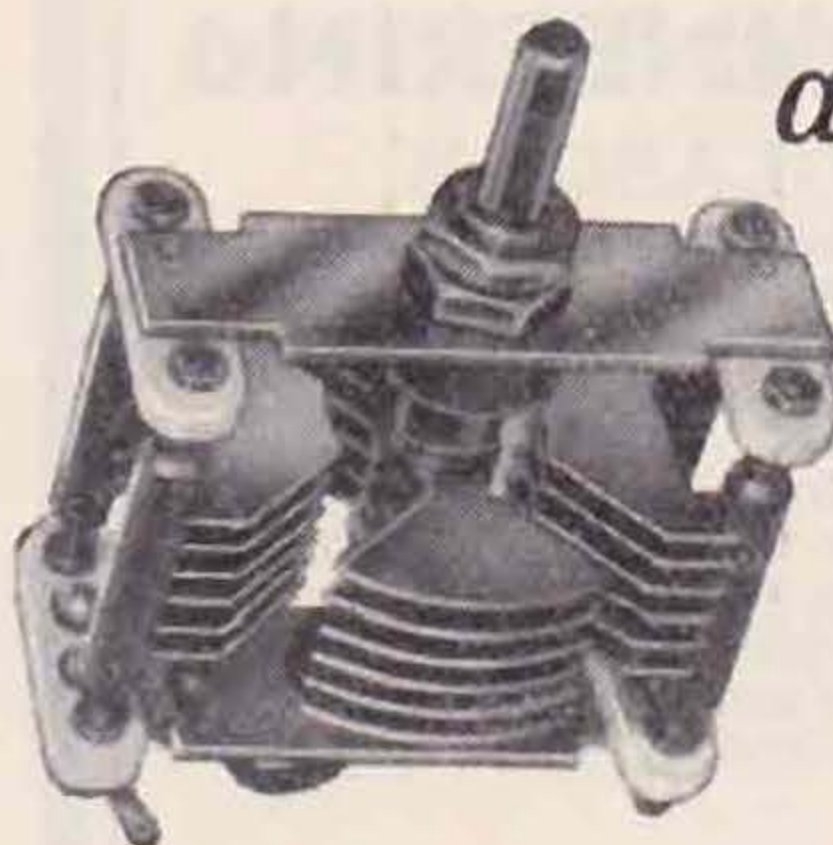
By L. M. MYERS, Research Department, Marconi's Wireless Telegraph Co., Ltd. A useful introduction to a rapidly developing branch of applied science. It deals fully with the optical and electron-optical aspects of television technique. The mathematics employed is of the simplest. 350 pages. 30/- net (by post 30/6).

Order from a bookseller or direct from

PITMAN

Parker Street, Kingsway, London, W.C.2

New HAM Lines at WEBB'S



G2CY and G6VA

EDDYSTONE SPLIT STATOR CONDENSER.

An instrument built condenser which will find many uses. Heavy brass construction, plates with polished edges, soldered together. Insulated bearings. Screened non-inductive pigtail. Frequentite insulation.

Capacity—One side:

Min 5 m.mfd. Max. 40 m.mfd.

Two sides in parallel:

Min. 10 m.mfd. Max. 80 m.mfd.

As series gap:

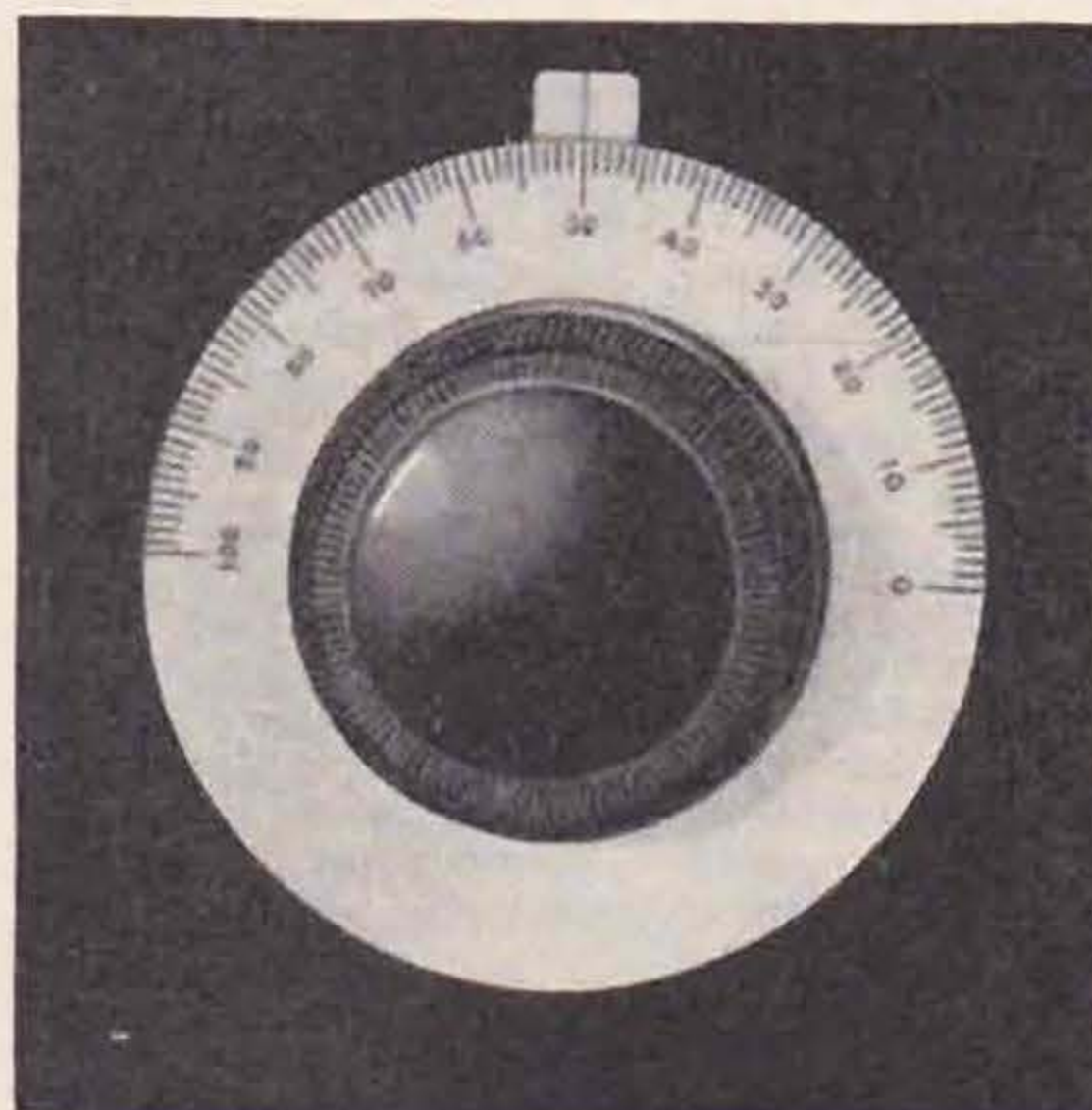
Min 3 m.mfd. Max. 20 m.mfd.

No. 1068. Price 12/6.

TELEPHONE HANDSET

P.O. pattern in moulded black bakelite case. Immersed electrode microphone gives strong and good quality speech. Highly sensitive, 1,000-ohm ear-piece. Very suitable for ultra short-wave Radio Telephones.

No. 1071. Price 25/-.



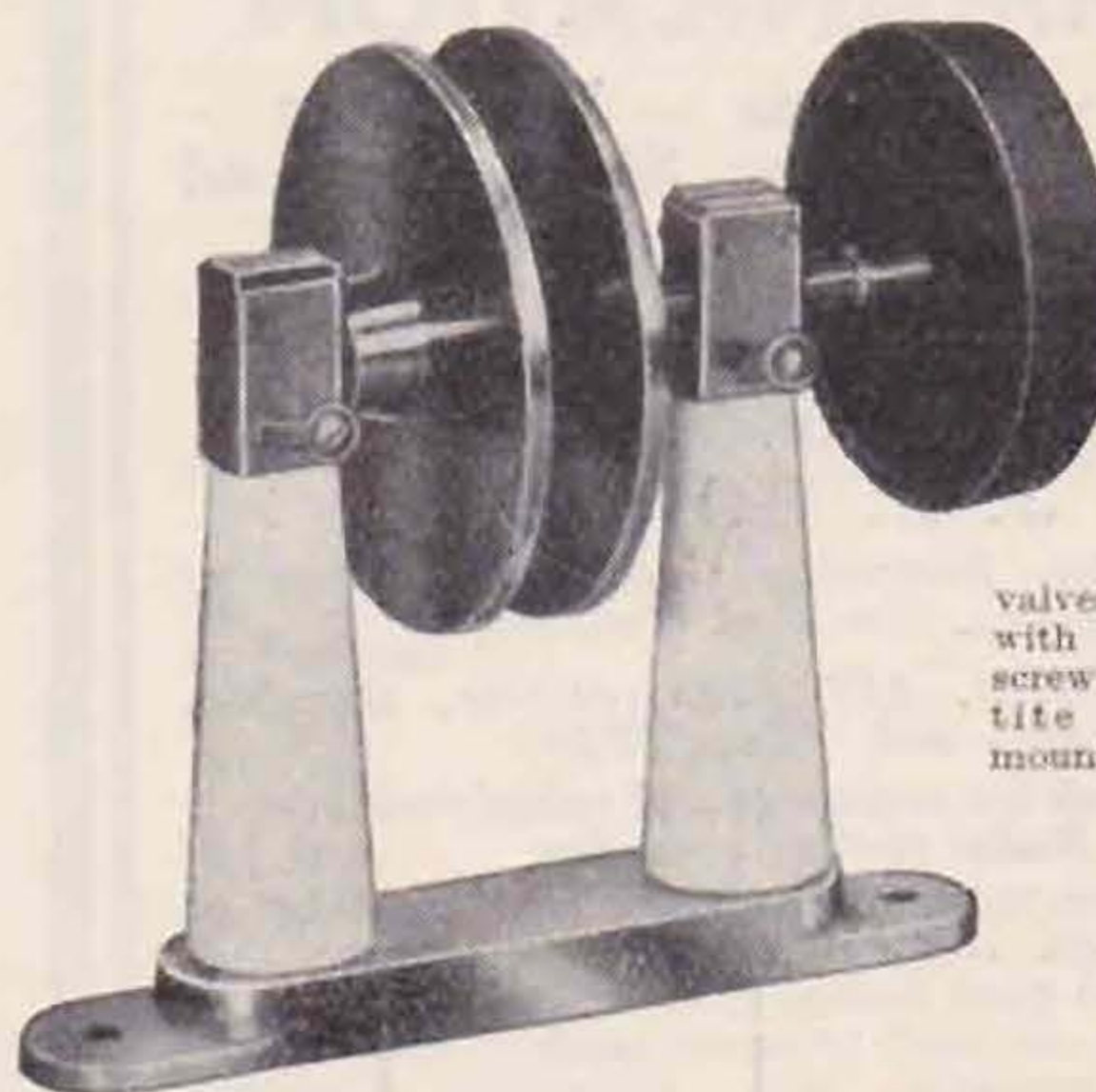
EDDYSTONE PRECISION 4\"/>

An accurate and powerful drive for high-class test and laboratory equipment or transmitters.

5/64\"/>

No. 1069.

Price 15/-.



EDDYSTONE NEUTRALISING CONDENSER.

Designed for circuits using modern low capacity S.W. transmitting

valves. Of solid construction, with turned brass plates, screw adjustment. Frequentite insulating pillars, mounted on cast base. Ideal for Eimac 150 T. and similar valves.

Capacity: 2.5 to 5 m.mfd.

No. 1067.

Price 12/6.

WEBB'S

14, Soho St., off Oxford St., London, W.1. EDDYSTONE and American Apparatus in stock. HAM REQUIREMENTS OUR SPECIALITY

and 2AXH on winning prizes in the *Evening Chronicle* Short Wave 5-metre Contest.

Activity on 56 Mc. is steadily increasing in this District and each month a list of stations active will be given in these notes with their times of operation, together with a list of stations willing to listen for test schedules.

The 56 Mc. test transmissions from G2OI and G5YD have now been changed by arrangement with the Liverpool and North Wales Districts to Sunday mornings. The object is to form a chain of 56 Mc. stations between Manchester, Liverpool and Wales with the possibility of direct contacts. The following schedule has been arranged: All Manchester and District Stations will call Liverpool and Wales between 11 a.m. and 11.10 a.m. every Sunday morning. North Wales and Liverpool Stations will call Manchester between 11.10 a.m. and 11.20 a.m. The co-operation of both Districts is requested in these 56 Mc. tests, both for transmitting and receiving. It is also proposed to have one station in Liverpool and another in Manchester working on 1.75 Mc. to check up on contacts. These stations will each make a general call for five minutes and then give details of the proposed tests. The Manchester Station will call at 10.30 a.m., and the Liverpool Station at 10.45 a.m., so for latest information on the tests members should tune in to the 1.7 Mc. band at these times.

The following stations are transmitting on 56 Mc. as under:—

G2OI—Tuesdays, from 10.30 p.m. to 10.45 p.m.
Thursdays, from 10.30 p.m. to 11.45 p.m.
Sundays, from 10.45 a.m. to 1.00 p.m.

G5YD—Thursdays, as above.
Sundays, as above.

G2RA—Thursdays, as above.
Sundays, as above.

2ARC and 2AXH are acting as check stations during these tests.

About ten Manchester members attended the North-Western District meeting at Liverpool, and thanks are due to G2RF and his helpers for all the arrangements made. Station visits were made to G2DC and 2OA, both of whom are thanked for a most enjoyable evening.

Liverpool.—The meeting held in October was well attended, and after the T.R. had spoken his mind about the lack of support given by the members to the North-Western meeting, the evening was devoted to a talk by Mr. Davies (G2OA) on the subject of "Transmitting Antennæ." The proposals for linking up the Liverpool, Manchester, Southport and North Wales area by a number of 56 Mc. stations suggested by the Manchester group were also discussed, and as there is now plenty of enthusiasm for this band on the part of several members here, it is hoped that the scheme will soon be put into operation.

Rochdale.—Stations active are G8DJ, 6AX, 6QA and BRS1152. G8DJ reports wonderful results at his new address with a "Ham Band Two" receiver, VK and ZL being received every morning on an aerial 10 ft. long and only 7 ft. high.

Hoylake.—The Wirral Amateur Transmitters' and Short Wave Club held their monthly meeting on September 30, when G2OA gave a most interesting talk on "The First Essentials of Transmitters." Active stations include G2FZ, using ECO and PA; 6GL, testing vertical antenna on 14 Mc.; 2BDT,

FORTHCOMING EVENTS

- Nov. 16.—District 12, 7.30 p.m., at Parade Café, Landers Corner, New Southgate.
- Nov. 18.—*District 15, 7.30 p.m., at 2ANS, 11, Nightingale Road, Bushey.
- Nov. 18.—Scotland "H" District, 7.30 p.m., at Abbotshall Hotel, Milton Road, Kirkcaldy.
- Nov. 19.—District 6 (Torquay Section), 7.30 p.m., at G5SY, "Sherrington," Cleveland Road, Torquay.
- Nov. 19.—District 13, 8 p.m., at Brotherhood Hall, West Norwood.
- Nov. 22.—District 4, 3.30 p.m., at Trent Bridge Hotel, Nottingham.
- Nov. 24.—District 14 (East London Section), 8 p.m. at G6AU, 63, Margery Park Road, Forest Gate, E.7.
- Nov. 25.—District 14 (East Essex Section), 8 p.m., at G2MY, "De Lorna," Bradley Avenue, Thundersley, (nr. top of Bread and Cheese Hill).
- Nov. 25.—Scotland "A" and "E" Districts, 7.30 p.m., at Room "A," Institution of Engineers and Shipbuilders, 39, Elmbank Crescent, Glasgow. Lecture by J. R. Brinkley, BRS2336.
- Nov. 25.—Scotland "D" District, 7.30 p.m. at R.S.A. Rooms, 16, Royal Terrace, Edinburgh.
- Nov. 25.—District 6 (Exeter Section), 7.30 p.m., at Y.W.C.A.
- Nov. 27.—London Meeting at Institution of Electrical Engineers, 6.15 p.m. Lecture by R. H. Hammans, G2IG, on "Single Signal Crystal Gate Superheterodyne Receivers."
- DEC. 2.—Scotland "H" District, 7.30 p.m., at Abbotshall Hotel, Milton Road, Kirkcaldy.
- DEC. 2.—S.L.D.R.T.S., 8 p.m., at Brotherhood Hall, West Norwood.
- DEC. 2.—District 1, 7.30 p.m., at Brookes Café, 1, Hilton Street, Manchester. Open night.
- DEC. 6.—Scotland "F" District, 7.30 p.m., at The County Hotel, Murray Place, Stirling.
- DEC. 6.—*District 7, 2.30 p.m., at G2YL, "Redholm," Walton-on-the-Hill, Tadworth, Surrey.
- DEC. 9.—Scotland "D" District, 7.30 p.m., at R.S.A. Rooms, 16, Royal Terrace, Edinburgh.
- DEC. 11.—Scotland "B" District, 8 p.m., in Empress Café, Aberdeen.
- DEC. 16.—Scotland "H" District, 7.30 p.m., at Abbotshall Hotel, Milton Road, Kirkcaldy.
- DEC. 18.—Annual General Meeting, 6.15 p.m., at I.E.E. Tea at 5.30 p.m. Lecture and demonstration by Mr. Angier, Decca Record Company. Subject: "Gramophone Recording."

* Sale of disused apparatus at these meetings.

engaged with commercial radio and VK/ZL receiving contest, 2BON, and 6CX, who is re-erecting antenna for more satisfactory radiation on 14 Mc. 2AHG is believed to be active but has not reported. Hoylake was well represented at the No. 1 District Conventionette.

G2FZ and 6GL have had a visit from EI6F, who is now living in Liverpool for a short period.

Nelson.—The October meeting was well attended, and the various methods of coupling transmitter stages were discussed. The next meeting will be held on November 18.

The following members have reported active:—G5ZN, 5XC, 8DC, 8FI, 2RB, 2BAB, 2AQY, and BRS2221. There is nothing outstanding to report apart from the following personal details:—Congratulations to 2AQY on the arrival of a YL junior op.; to 2BWW on obtaining his full ticket, now G8FI—incidentally G8FI attended the christening of 2AQY's junior op. in "full regalia." It is quite probable that the majority of the G stations already know that 8FI is on the air as he has worked 103 stations on 'phone since obtaining his ticket!

Blackpool.—The local club is organising a winter programme and hopes to increase the membership.

G5MS is still working DX on 14 Mc., including KA, K4, 5, 6 and 7, CP and MX. 6MI hopes to be on the air again soon. 6VQ is working OX on 7 and 14 Mc., and is co-operating with 5MS and SUIWM on schedule. 8AK is still working Europe on 7 Mc. with CO and hopes to get R.F. pentode to run in a tri-tet for 7 and 14 Mc. 2AMH is waiting for two-letter call and should be on the air by the time this is in print, and 2BSF is preparing to apply for full ticket.

Mr. H. Fenton (2AMH) has been elected T.R. for Blackpool.

DISTRICT 2 (North-Eastern)

Huddersfield.—Activity is increasing rapidly in this area. Congrats to 2AHA, who is now G8FO; 6RO is experimenting with aerials, and 5VD has rebuilt entirely. The November meeting will be at G5VD, and all members are invited to attend.

Leeds.—All members report active, and the Leeds Radio Society continues to thrive. The meetings of the L.R.S. are now held in the school-room, Azalea Street, Beckett Street, every Monday evening. We welcome two new members, BRS2546 and 2557. On October 19 a most interesting lecture on Talkie Apparatus was given by Mr. Barnett. Owing to 2AHM's anticipated removal to London, BRS2317, Mr. W. F. Wilson, whose QRA is 4, Stratford Street, Dewsbury Road, Leeds 11, has been nominated as T.R. for Leeds.

Sheffield.—Membership is steadily increasing and the majority of members are active. At the last meeting 30 persons were present, including the DR. A 56 Mc. Field Day was held recently, but owing to bad weather the attendance and the QSO's suffered somewhat; it is hoped that members will co-operate more on this band during the winter months. Active stations are: G6PJ, who is building a Jones exciter and is on 56 Mc.; 2MF, who is on 14 Mc. 'phone and erecting 80-ft. mast for a beam; 2BOU, who is now G6TY, has joined the RES micro-wave section; 2DJ is testing QRP fone, and made personal QSO with D4ZOI when on holiday at Bonn; 2AWQ is

busy with morse; 5FZ has built up transmitter and hopes to be on 56 Mc. soon; BRS1851 is now 2BXA; BRS2282 is applying for AA; 2ASF busy with morse for P.O. test; G2XH expects to start up again in a short while. Other active stations include G2AS and YL operator, 2HQ, 2JY, 5TO, 5UJ, 6LF, 2BGN, 2BKN, BRS1625, 1800, 2282, 2293. Best wishes are sent to our new members, Mr. Keyworth and Mr. Hilton.

Darlington.—Report from Mr. Fletcher (2BHF), 68, Willow Road, Darlington, gives activities as follows: 2BHF testing choke and series modulation, and putting up a 20-metre Windom; 2BQA active and has built rack and pane transmitter; 2BLG building all-mains receiver. No reports from other BRS stations.

Bradford.—Most stations are active. G6XL has been busy in VK tests, and has erected many aerials, beam and otherwise, with success. G6KU and 8CA tested a Hertz and a Marconi aerial on the 1.7 Mc. band, and found that for a given input the field strength at 8CA was better when using the Marconi. 5VC has started up again after a period of test. A good attendance was a pleasing feature of the opening meeting of the winter session of the Bradford Radio Society. 2CAW, of Keighley, sends a report of activity and stations heard, and is building a transmitter. 2BLA hopes to take morse exam before long. G5QS, of Brighouse, is on the higher frequency bands and informs us of an active radio society in that town. No requests for station visits up to date, so these will not be arranged unless requested.

DISTRICT 5 (Western)

A good deal of activity is now taking place on 28 Mc. and several stations in the district have accomplished some very successful work on this band. Noteworthy are G2GQ, who is now both W.B.E. and W.A.C., and G5BM, who has worked all districts of U.S.A. Other stations known to be active on this band are G2HX, G5BK, G5JU, G6VF, G6VK, and G6RB.

Bristol.—The Bristol monthly meeting was held in the B.A.R.C. clubroom for the first time on October 23. It was decided that, in future, R.S.G.B. meetings would be held on the first Thursday in each month, thus reverting to the old meeting time. The local clubroom was opened with a very successful meeting on October 22, the number attending being 30.

Cheltenham.—G5BM has "Skybuddy" receiver and is now testing a new 7 Mc. rig. G5BK rebuilt speech amplifier with pair of 46's. G8DA active and 8DT building 7 Mc. transmitter. 2BNM has new sensitive 1-v-2.

Oxford.—Fortnightly meetings are held at various members' QRAs. A visit is planned to the R.A.F. wireless station at Abingdon. Stations active: 5HS, 5LO, 2CL, 2DL, 2AKB.

DISTRICT 6 (South-Western)

One sad event overshadows all others in the thoughts of all the members of No. 6 District this month. The district has suffered a tremendous loss in the passing of our dear old friend, Mr. Powditch, G5VL. It is, of course, also a great loss to R.S.G.B. as a whole. We in the South West, however, probably knew him more intimately, and we would like, in our own special paragraph, to try to express our feelings to the rest of the Society.

The D.R. mourns him as a personal friend, and there must be many who do likewise. Those of us who were privileged to meet him will like to remember him as the source of those never-ending jokes which hid an active mind and a keen brain. For, although on the surface he was for ever pulling our ideas to pieces, he never failed to end with an appreciation of our efforts. He was always on the alert to help others, and almost before he was asked, was ready to give of the vast store of knowledge he possessed, not only of technical things, but also of administrative work.

The D.R. has been privileged to know him since the very beginnings of the old Contact Bureau, when he was associated with 5VL and 6LL in the early struggles with the beginnings of 28 Mc. work. He can testify to the tremendous amount of work done by 5VL on behalf of Contact Bureau and also the Society in general.

G5VL the man has passed on, but his spirit and the results of his labours and influence remain, and Amateur Radio is the richer for his sojourn among us.

The D.R. would like to record his appreciation of the little band of amateurs in Cornwall who journeyed to Newquay in order to pay their last respects, and also to represent the membership of R.S.G.B. The Cornish meeting for October was also cancelled.

* * *

As regards the activities of the District, very few individual reports are to hand. There have been further increases in membership, and all the area meetings have now got into full swing. A District article is being considered, and also a scheme to provide a District fund for various expenses.

Torquay.—A very successful meeting was held on Thursday, October 22. There was an attendance of fourteen. The "Wright" Shield was presented to BRS1581 for his good work in the B.E.R.U. contest, and the "2CI" Cup for 56 Mc. work, was presented by the donor to G5GD. The question of District finance and District articles were discussed.

Taunton.—The meeting on October 15 took the form of a visit to the B.B.C. station at Washford. Those who attended were 2JM, 2VZ, 5AK, 6LQ, 2BJQ, 2ASI, 2ANN, 2BAM, BRSs 1744, 2027, 2445. New members welcomed were 2VZ and BRS2496.

Penryn.—As stated above, a group visited Newquay for 5VL's funeral, and also took a very fine wreath with them. In addition all the transmitters kept off the air from October 20 till October 25. Practically all the members report active.

Exeter.—Monthly meetings are now being held at a room at the Y.W.C.A., Exeter. At the last meeting there was an attendance of ten. The next one will take place on Wednesday, November 25.

Plymouth.—The first meeting of the winter took place on October 23 at the QRA of 2ALA. There was only an attendance of four, but the D.R. hopes sincerely that the rest of the membership round Plymouth will see that it is to their advantage to attend these meetings.

DISTRICT 7 (Southern).

An outspoken discussion on the policy of future monthly meetings in No. 7 District was the main feature of the October meeting, held at Farnborough. Several constructive suggestions were made, and as a result the meetings are to continue as heretofore, with the difference that a definite

talk is to be given at each meeting, and questions from new members are invited for answer at the meeting by various members. A Junk Sale, which is an innovation for this district, will be held at the next meeting, and members are invited to bring their disused apparatus for disposal, and also full pocket-books in order that they may go home with as much gear as they bring!

Plenty of individual reports this month.

Guildford.—G8CV is waiting only for cards to claim WAC, he is using a type 59 tritet, link coupled to a 2A3 in a TPTG circuit. 5CM is doing well on low power, having worked ZS1H on 28 Mc. with 7 watts input. On 14 Mc. he worked W1WV to give WV his 600th G contact. We are pleased to welcome G6NA back in the district after his sojourn at Cambridge; he has been putting out some very good 'phone on 7 Mc. at week-ends, using grid modulation to an Eimac 35T. 5RS is only active occasionally, and we are all pleased to hear that his YF has recovered from a long illness. 6LK still manages to keep ahead of most of us in working all kinds of rare stations on 28 Mc., including many Asian contacts. 5WP is active on both 28 and 14 Mc. 6GS is dissatisfied with his receiver experiments, and has turned to 28 and 14 Mc. dx work for a rest from design troubles! Congratulations to 2AAF, who has passed his Morse test and awaits his new call. 2BKK has applied for his full licence. BRS2007 is now 2BNI, 1847 is 2CAR, and 1848 is 2BYT. Congratulations. BRS1535 did well in the VK contest.

Farnham.—Although there are many stations in the Farnham area, the only report comes from 2ACV, now G8LY, who has been active on 7 Mc., carrying out 'phone tests with 6OU. 8AJ requires an Asian contact for WAC, and has been experimenting with neutralised p.a. stages.

Portsmouth.—At the October meeting of the South Hants R.T.S., Mr. Allerton gave a talk on "Chassis Construction." G2XC has now worked J and VK on 28 Mc., and 2AIV and BRS2482 continue to show excellent logs on this band. Welcome to BRS2537. 2AZX is active in the VK contest. 2BYZ is trying out various types of frequency doublers. 5XY hopes to get a 6L6 going on 56 Mc. BRS1907, assisted by 2VH, has had some surprising results with H.F. loss measurement. (Why not give us a BULLETIN article, o.m.?—D.R.) BRS2105 finds the correct termination of a Zepp. aerial as important for reception as for transmission. 2ZR, 8BD, 6SS, 6WS, 6NZ all report usual activity.

Reading.—Most of the Reading members were present at the October meeting, and after general business and discussion, a short paper on 112 Mc. work in the U.S.A. was read by 5AO. A novel pocket-book receiver was shown by 2GG. A visit was received from G2NS, of Bournemouth, at the end of September, and he spent the evening visiting local members. G2IT has changed QRA. 2AIW has crystal controlled gear going. We are pleased to welcome BRS2314 to Berkshire, and hope to see him at the local meetings. The next Reading meeting will be held on November 18.

Kingston.—G6BI has installed a very successful remote control system, enabling him to work from the house, a distance of 75 yards. He will be glad to give details to anyone interested. (Again, o.m., why not a BULLETIN article or a talk at a District meeting?—D.R.) 2BIP has obtained his full

licence, and only awaits actual call. 2KX has been working early morning DX. 6RS has been inactive, due to business, but hopes to be on again shortly. He is contemplating fitting RK20's. 5IU is temporarily outside our District, but hopes to return shortly. The Kingston A.R.S. recently held a very successful conventionette at Brighton. BRS1820 now 2BOF, and busy with code practice.

No report to hand from the Reigate district.

Finally, remember that the next District meeting is at G2YL's, Redholm, Walton-on-the-Hill, Tadworth station. Sunday, December 6, at 2.30 p.m. Don't forget the Junk Sale!

DISTRICT 8 (Home Counties)

At a meeting held at the Lamb Hotel, St. Ives, Hunts, on October 9, at which twelve members were present, the D.R. welcomed the new members present, including Mr. Frost (BRS2584). Certain notes were read from the monthly headquarters' report and presentation walking-sticks were handed to Messrs. 6FL and 6DX for transmission to the parties concerned who rendered assistance in the form of sites for the N.F.D. stations operated in the past event. Details of the Cambridge Short-wave Society were discussed and explained by G5JO, and particulars of their listening contest were made known to members. This active society has since been granted affiliation to the R.S.G.B.

A district frequency register was commenced and members in the district who have not yet notified their crystal frequencies to the D.R. should do so without further delay in order that the register may be as complete as possible.

It is very pleasing to receive some details of activity from the Bedfordshire section of the district, and it is hoped that those members in that area will make a regular feature of this by sending in *individual* reports of their activities each month in future.

G2PL has been doing some very good work on 28 Mc. and has installed an American T55 valve with much improved results. 5JO continues to use huge quantities of wire in aerial experiments and has the craze for testing phased systems, but results so far are disappointing. 6HD has erected a 2BI type Windom and has commenced activities on 7 and 14 Mc.; he also reports regular reception of the B.B.C. television transmissions. 5DR hopes to be going at his new QRA before this is in print. 2QX is active on occasions but sends no definite report. (What about it, OM?) 2MD is on 7 Mc. and is rebuilding. 6HB is active on all the bands, but finds he is getting best results at the moment on 14 Mc.; he has recently installed 'phone, which he is at present confining to 7 Mc. Now you Bedfordshire lads, let us consider these reports the thin edge of the wedge for you to continue with them.

Peterborough.—6PD is away at Notts University. 2NJ is active on 1.7 Mc. at his Heacham QRA and on 7 Mc. at Peterborough; he thoroughly recommends 6FY's pentode portable for the 1.7 Mc. band. 6LX is back at Cambridge University and has completed his new transmitter. 2UQ is doing good DX on 7 Mc. in the early mornings. BRS2171 and 2075 are active.

As announced previously, the district meetings which take place on the second Friday evening in each month are now to be held alternately at Cambridge, St. Ives, and Peterborough; the next

will be at the Fitzroy Arms, Fitzroy Street, Cambridge, on December 11, and it is hoped to get a really bumper attendance for the last meeting of the year.

DISTRICT 9 (East Anglia)

Having received comments from various sources, we had better start by apologising for the non-appearance of these notes last month. But it might be pointed out that it is very hard to send in a monthly summary of the District's activity when members are still endeavouring to remove the cobwebs from their pens. However, as one or two reports are forthcoming, it seems that spring cleaning has started earlier than was anticipated!

It is hoped to hold a District meeting in the near future. Any bright ideas regarding this would be very helpful.

G2XS is on the air again, using 1.6 watts of 'phone. 6TI is back on 14 Mc., and, since replacing the Windom aerial with an A.O.G., has raised a J amongst other DX. The recently formed local society at Ipswich is holding regular meetings: these are getting good support.

The outpost of the District, 5MG, is busy with 56 Mc. gear and will, we understand, be very glad of reports on his transmissions. 5QO, at Lowestoft, is also on 56 Mc. Initial tests are being conducted with a Unity-coupled oscillator and an Electron-coupled receiver. Later he proposes to use C.C.

6QZ is using a RK25 on 28 Mc. with very good results, a VK being all that is required for 28 Mc. W.B.E. and W.A.C. But 28 Mc., like the lower frequency bands, is suffering from QRM, hence endeavours are being made to make things work on 56 Mc. 6UA has been carrying out some interesting speech amplifier experiments and is very active on 7 and 14 Mc.

The following stations are also known to be active: 2JS, 2MN, 2UT, 5IX, 8AN, and 8DD.

DISTRICT 10 (South Wales and Monmouth)

First the D.S. wishes to apologise for the absence of notes last month. They were sent in too late for publication. One report only has been received this month, so wake up, you T.R.'s, and let us have some news. The October meeting at Newport was attended by four members only, two of that vast assembly being from Cardiff, so the T.R. has decided to cancel the monthly meetings after writing to all members. The Cardiff Club is still going strong, and a visit was made to the South Wales Power Station at Pontypridd on Sunday, October 25. A very interesting afternoon was spent inspecting the equipment, which included a new 25,000 Kw. generator, one of ten in the whole country. Thanks are due to Mr. Roper, the engineer-in-charge, for the facilities extended to the club, which included a very excellent meal after the tour of the station.

Activity in the area seems rather poor at the moment, but G8FJ (ex G5NS) is on the air, and with an input of only 7 watts, has worked U9 and ZT on 14 Mc. His TX is CO-FD.

G5FI was heard using fone on 3.5 Mc. recently. We all extend our deepest sympathy to him on his recent bereavement.

6BK and 8CT are very active in Blackwood, the latter having made contact with the States after two days on the air.

2JL is on 1.7 Mc. at week-ends. 2BHZ and

2BSN are having trouble with their new transmitters, while 2BQB seems busy chasing pirates! 5BI is still inactive as far as radio is concerned, and is sorry to report that he will not be starting up in Tredegar again. We feel sure that 6GW will be on the air again after reading this glad news! Other stations known to be active include 2QL, 5KJ, 6JW, 5PH, and 2OP. 2SN and 2WO are off for the winter, while 2UL is preparing to be very active on 28 Mc. 2BSI is active with a receiver on 28 and 56 Mc., and he has a very creditable list of DX heard on 28 Mc., though he only hears the harmonic of his local station on 56 Mc. 5VX is slowly rebuilding for QRO, and his ultimate aim is two RFP60's in push-pull.

More reports please by the 25th of each month at the latest.



*On Snowdon.
G6KY, 2AKD and 5YP at the summit of Snowdon during the 56 Mc. tests reported last month.*

DISTRICT 11 (North Wales).

The past four months have been devoted almost entirely to portable work on the 56 Mc. band. A full report of the Snowdon tests, and of certain other field day activities was given last month, so need not be mentioned here. It is interesting to note that on the evening of August 22, EI8B's C.C. 56 Mc. C.W. signals were heard at R4/5 by G6AA on Holyhead Mountain. G5BYP, at a distance of 100 miles, was hearing G6AAP at R5/8 throughout the following day, but no reception was reported from Ireland.

The D.R. has made a collection of photographs of North Wales 56 Mc. field activities. The Album will be on show at the next meeting, and will be loaned to any member on application.

Now that the summer is over, we are settling down to regular 56 Mc. work at our home stations. As contacts of 25 to 35 miles are everyday occurrences, no mention of these will be made in future notes.

G6OK and 6AA are experimenting with straight receivers for the reception of 56 Mc. C.W. signals. G5YP, 5FU, and 6YQ have already worked 6AA on C.W. and I.C.W., being received at QSA5 on a straight receiver. Many stations, totally inaudible

on a super-regen. receiver, have been revealed when using the straight type. More news of C.W. work on 56 Mc. is sure to come to hand shortly.

Meetings were suspended during the summer, but the first of a new series will take place on November 22. Will everyone please do his best to attend? The D.R. understands that in a large country district, such as North Wales, it is often due to transport difficulties that members do not attend meetings regularly. In order to help those so affected, G6OK and 6AA will meet any member at Colwyn Bay station, and take him to the meeting place and back by car. Just send a post-card if you want to avail yourself of this service. Don't forget the sale of gear, and if you have any interesting pieces of apparatus, bring them along to show.

DISTRICT 12 (London North and Hertford)

A disappointing attendance at the first District Conventionette, held on October 4, caused a change in the order of programme, the business meeting being postponed in favour of a general chat. The Secretary invited discussion on means of improving BULLETIN articles. An interesting afternoon followed, and a variety of subjects were reviewed. It was agreed that the District should concentrate on the design of measuring equipment, eventually producing a BULLETIN article on the subject. Following tea at the hotel, the party adjourned on station visits, which concluded at a late hour. The monthly District meeting held at Southgate was attended by 21 members, when Mr. H. A. M. Clark (G6OT) gave a talk on "Resistance." We were pleased to welcome some of our Hertfordshire members at this meeting. The talk given by Mr. Clark is the first of a series on the fundamental principles of radio, and is the outcome of suggestions made at the Conventionette. Offers of further talks in this series will be appreciated by the D.R. There appears to be general activity in the District on all bands but nothing outstanding to report. We are sorry to lose G2AT, who is leaving the district. Owing to Town Planning scheme, the D.R.'s address has been changed to 41, Brunswick Park Road, N.11. Will those concerned please note that District meetings are announced under the heading "Forthcoming Events."



Kentish Town and District Radio Society 56 Mc. Field Day at Hadley Highstone, Barnet. Excellent contacts up to 20 miles were established and reliable communications were maintained throughout the day, using an input of 8 watts to a half wave vertical aerial 30 ft. high, fed by 29½-ft. feeders.

DISTRICT 13 (London South).

The monthly District meeting held at the Brotherhood Hall on October 22 was very well supported, and we are pleased to record that the District Fund was considerably swelled by the addition of 25 per cent. of the proceeds of the Junk Sale which took place. The D.R. wishes to express his thanks to all those who assisted.

Those members who have read these notes in past months will be aware that Town Representatives are now in existence in South London and it is hoped in the near future to have the full T.R. scheme working in this district. One portion of this scheme, which so far has not been put into operation, is the holding of small monthly gatherings or meetings by each T.R. in his particular area. This, of course, obviates the necessity of monthly district meetings such as have been held within District 13 for the last two years. It will naturally take some time before the new scheme is working smoothly, but it is hoped by this means to bring into personal contact many of those members who have found themselves for one reason or another unable to attend at the Brotherhood Hall.

It is proposed, therefore, to discontinue the district meetings as from January 1 and it is hoped that everyone will endeavour to make the new arrangement successful. It may be well to mention that the D.R. has been in close touch with the president and secretary of the R.S.G.B. before suggesting this course. Further details will be explained at the next district meeting on November 19.

As those members who attended last meeting will know, the idea of putting up a South London trophy has been abandoned.

DISTRICT 14 (Eastern).

East London.—The October meeting was held at G5AR Woodford, but, owing to the inclement weather, only a small attendance was recorded. An offer of a QRA for the December meeting will be appreciated.

Chelmsford.—Mr. L. J. Fuller (G6LB), who intends to become active again, has consented to be nominated as T.R. for Chelmsford; under his experienced guidance, activity around Chelmsford must prevail.

Brentwood.—The party of 24 who attended the visit made to the Brentwood (Doddinghurst) Radio Receiving Station by the courtesy of Cable and Wireless, Ltd., were greatly intrigued by the way Mr. Keen, the chief engineer, had prepared beforehand, and for the able way he described the various apparatuses, aerial arrays, etc. Mr. Keen also arranged for Ongar to send out a special impulse signal for our benefit, and the oscillograph clearly showed the effect of the Appleton Layer on the signal, which appeared to bounce between the earth and the layer a number of times before finally disappearing. Tea was afterwards taken at the "Rendezvous" Café, Brentwood, and a meeting followed. Mr. M. B. Edwards (2ALX), who was the organiser for the day, was then nominated as T.R. for Brentwood, where membership is growing fast and is being fostered by the Brentwood Radio Society, who, it is expected, will apply for affiliation shortly.

East Essex.—The October meeting held at 2BNR, of Southend, was attended by sixteen members.

Max Buckwell (G5UK) (to an accompaniment of "Shame!") announced his decision to resign the T.R.-ship, explaining that, although quite willing to carry on, he considered, having held this office for three years, he should now step out and allow someone else to take his place. Accordingly, after some discussion, a ballot was taken, and it was decided to put forward G2LC as a prospective T.R. A hearty vote of thanks was passed to G5UK for his really admirable work in this district as C.R. and T.R. during the past three years. It was, by the way, only through G5UK's efforts that the very successful monthly meetings in this area were inaugurated some years ago, before even he was C.R.

The remainder of the time was chiefly occupied with a discussion and suggestions concerning the proposed U.H.F. co-operative tests in this district. By the time these notes appear it is hoped to have several stations operating on 56 Mc. in Southend.

Another very interesting "hidden station" field day under the auspices of the Southend Radio Society was held on October 18. A further one will be held shortly.

The following new members are welcomed: 2AYG, BRS2538, 2562, 2568 and 2572.

DISTRICT 15 (London West, Middlesex and Buckinghamshire)

Thirty-two members and visitors taxed the accommodation of 2ADA at the October meeting. A District dinner was decided upon, and G2IY, G6CO and 2BAZ were appointed to work out the details and sponsor the evening. It is necessary to have a rather large minimum number present if it is to be held in the venue suggested, and it is hoped that all will rally in support of the venture. On vote it was decided that ladies should not be invited.

The November meeting is to be held just over the boundary of the District, at the address of a member who attaches himself to us on account of his nearness. (See Forthcoming Events.) It is near the Red Lion, Bushey, and can be reached by train, coach or bus. Any trouble ring Bushey Heath 1449.

London West.—G6WN had forty contacts with ten countries and four continents on 28 Mc. Believes he contacted VK4EI on this band. 2AUB returned to winter address and busy with transmitter. 2ASW finding more time for radio.

Middlesex.—G2BY is in his new ideal QRA, which he chose firstly for radio, secondly for the YF and thirdly and by no means least the pocket book. Is getting R8 'phone reports from ZL and VK. G6LJ worked his first J and been on 14 Mc. nearly every day, also interested in 56 Mc. 2BLX (ex BRS2475) hard at morse.

Twickenham.—Active: G2LA, 2KX, 2NN, 2VV, 5VB, 6GB. G2KI changing from D.C. to A.C. mains. The T.V.A.R.T.S. are holding their annual dinner on Saturday, December 5 at the Albany Hotel, Twickenham. Tickets will be 3s. 6d. each, and members of the R.S.G.B. are cordially invited to attend. Ladies invited. Dress optional. Further information from G2VV, 27, Baronsfield Road, St. Margarets-on-Thames. The local press reports the recent Field Day won by G2KI; G2VV was second and G6GB third.

Bucks.—G6RP does not use 'phone and those

hearing telephony under this call sign can suspect a pirate. 2BVX attended the meeting and pays tribute to the cordiality. BRS2498 wants more local activity, and we suggest the hope that the TR scheme is receiving his attention. The DR would certainly like to see some local meetings there if they can be arranged, and promises to get along when time permits.

DISTRICT 16 (South-Eastern).

On behalf of the District, the DR has presented G2GD with a group photograph autographed by all members present at the District Conventionette.

Brighton and Hove.—The Group were not able to attend Conventionette on account of distance, but they were asked by the Kingston and District Group to arrange a meeting at Brighton on September 27, which they accordingly supported. The local meetings have been merged with those of the Brighton and District Amateur Radio Society. G6CY and 8AC are active on 28 Mc., and would like reports.

Heathfield are all active, and a new member, 2BRI, is welcomed.

Eastbourne.—G2AO and 2BIU are active on 28 Mc.

Tunbridge Wells.—G5OQ and 2UJ are again active on 56 Mc., and the group are renewing interest in the band. 2AVN is observing on their signals.

Medway Towns.—All stations are preparing for the "Observer" Contest. The annual dinner is on Wednesday, November 25, and reservations should be made to 5FN by the 18th (3s. 6d.). The group

are sorry to lose G2IG, who has recently married, and has moved to Petts Wood.

Folkestone are working on CC and straight receivers on 56 Mc.

DISTRICT 17 (Mid-East).

Reports this month come only from Cranwell and Boston. Now that the winter is again with us, and members are returning to their shacks, it is hoped that they will report regularly to their TR or the D.R.

The DR much regretted that owing to a cold he was unable to be present at the farewell dinner to "Wally" Dunn (G2LR), a dear friend he had met through amateur radio, and whose absence we shall all feel very much.

G6GH, G8BQ, and Mr. Dawes, whom we welcome this month as a new member, attended the dinner given by the Cranwell Society in honour of G2LR, and joined with those present in wishing him happy landings and good DX in his new location. During the evening a congratulatory telegram was read from "Clarry," who that day was in Belfast. After the usual after-dinner speeches, the chairman (Flight-Lieut. Keens) handed to 2LR an embossed travelling clock presented by the Cranwell Society, in recognition of his labours in founding the Cranwell Society and building up enthusiasm amongst its members. 2LR suitably responded, and assured the gathering that the clock would, when installed on his operating desk, remind him of happy times while at Cranwell.

Cranwell.—The C.A.R.T.S. now possess a 100-watt station under the call G8FC. It is hoped that



A group taken at the Folkestone Conventionette, September, 1936. Front: G6CL, 6PA, 2GD, 6UN and 2IC. Back: G2MI and 6WY.

this will be on the air towards the end of the month, feeding a 14 Mc. array. 2XK has been QRT, awaiting the arrival of a 6A6 which he is now using as a push-pull parallel doubler, with very satisfactory results. 6AC is trying out two RFP 15s and the Wimbush aerial recently described in the "BULL." 8DY is a new call—congratulations. ZC6FF is a new arrival, and it is very much hoped that when he has settled down after his recent marriage he will get on the air again. Welcome to the district, OM.

Boston.—6GH continues to work DX, but has been unable to get RF on 28 Mc. with his 211E. Probably his new Tungram OQ70/1000 will be a more effective valve for this frequency. 6LH has worked PY and is now waiting to claim a WAC certificate. 8BQ continues active.

It is about time the Crystal Frequency Register was revised. Will anyone who has any corrections or additions to make either in his QRA or frequency please notify 8BQ, 51, Fydell Street, Boston, by December 1. New calls are particularly requested to report, as the value of such a list depends on its accuracy and completeness.

Scotland

Many stations are now busy repairing the serious damage caused by the violent gale which swept Scotland on October 23. Several stations lost all their aerial equipment, but at the time of writing a comprehensive list of victims is not to hand.

"A" District.—The district has suffered the loss of one of its most enthusiastic members, Mr. A. C. Brown (G6ZX), who has left to take up an appointment in London. We all wish him the best of luck in his new sphere. At the monthly meeting a debate took place on that thorny question QRP versus QRO. The attendance was again satisfactory. Mr. Shankland (2BJS) is now G8FM, while Messrs. Joyce and Roy (BRS2139 and 2414) have been issued the calls 2ATY and 2ARO respectively. Mr. Brinkley (BRS2336) will deliver a lecture at the November meeting.

"B" District.—Mr. Ross (2AUT) is now G6ZP, and he will welcome reports, as will G5LF on his 7 Mc. transmissions. G6BM has been working a good deal of DX. A spot of bother has been experienced with the converter recently acquired by G5TA. The results obtained by G5TA are satisfactory on all bands but 7 Mc. on which band the QRN caused by the converter is very bad. Experiments are being conducted with various chokes, etc., with a view to cure the trouble.

"C" District.—Successful meetings are being held with good attendances. At the meeting on October 20, G8CF delivered a lecture on a reliable two-valve receiver, which was much appreciated. G6LD has been working much DX; G6RI recently worked J3DE while using an input of only 8 watts; G2SB, who was a member of "A" District some time ago before going to England, has arrived in the district.

"D" District.—The meetings are being well attended and will be held fortnightly in future in the R.S.A. Rooms, 16, Royal Terrace. Frequency meters are occupying the attention of G6SR meantime, whose new antenna is also a decided success. G2TM has gained the distinction of being the only "G" station to be placed in the recent A.R.R.L. copying bee. He is also very active on most bands. Experiments with British Class B valves are being

conducted by G6RZ, who hopes to have some interesting news to give soon. G6HZ and G5HL are working DX on 7 Mc. A new "rig" has reached the planning stage in G6FN's shack. G2BD has erected a new antenna and is busy building and testing various accessories. After a spell of inactivity, G6AM is reported to be returning to activity. A tritet using a 6L6 valve is undergoing test at G6XI, who reports excellent performance.

"E" District.—G6IS has the distinction of being the second Scottish station to work VQ8AF (Mauritius). G6KH had the misfortune to lose both of his masts during the big gale.

"F" District.—Meetings are arranged to take place on the first Sunday of every month in the County Hotel, Murray Place, Stirling, at 7.30 p.m. Mr. Burton (G2UG) has left for England to take up an appointment there. G6NX has erected a mast, as described in a recent issue of the "BULL." by G6US.

"G" District.—The first meeting took place on October 22 at Galashiels, and eight members were present. It has been decided to hold meetings fortnightly in future. Mr. Balmer (BRS2313) has been granted the artificial aerial licence 2BVI. G2IA and G6RG are both busy preparing their gear and expect to be active soon.

"H" District.—It has been decided to hold meetings fortnightly at the Abbotshall Hotel, Milton Road, Kirkcaldy. Details of forthcoming meetings will be found in the Calendar of Forthcoming Events. Morse practice will be given and a short lecture will also be delivered. It is proposed to build a district receiver and transmitter. We are pleased to note the rapid increase in membership in this area, and we trust that this will continue.

Northern Ireland

On the occasion of our District meeting on October 17 we were privileged to have present Mr. J. Wyllie, Vice-President; Mr. J. Clarricoats, Secretary; and Capt. Noblett, D.R. for the Irish Free State.

A full report of this meeting and the R.T.U. Dinner appears elsewhere.

The Hon. Secretary of the R.T.U. is now J. E. Maxwell (2BFJ), who succeeds the D.R., who resigned for business reasons. GI6TK is Hon. Secretary of the Y.M.C.A. Radio Club, GI6YM, and reports that Morse classes are regularly being held. GI5UR has worked PK1, CR9AB, VS8AA, MX2B (Manchukuo), VK4 and XLI. GI6YW has obtained the first H.B.E. certificate in GI.

GI5TK has heard six continents on 28 Mc., and sends a long list of DX heard on the band, using a O.V. Pen. receiver.

As last year, subscriptions at the rate of 1s. per month for the N.F.D. fund will be received. Subscriptions should be sent to the D.R. each month, and those members who wish to participate should inform him as soon as possible. Thank you.

Stray.

Mr. E. Trebilcock (BERS195), holder of the B.E.R.U. Receiving Trophy, wishes to thank those members who offered him congratulations on his success. Mr. Trebilcock is now located at 2, Henry Street, Maryland, St. Peter's, South Australia.

QRI?**QRH?****QRG?**

We are pleased to announce that, as the result of research work carried on for the past twelve months, we are now in a position to supply Quartz Crystals of a type which will meet your most exacting demands.

In accordance with our policy we are directing our efforts entirely towards a product of high quality, and for this reason the supply will be somewhat limited.

Three classes of crystals can be supplied, and details of these are given in the following table. If your requirements are not covered by any of the stated types we shall be pleased to study your problems and make suitable quotations.

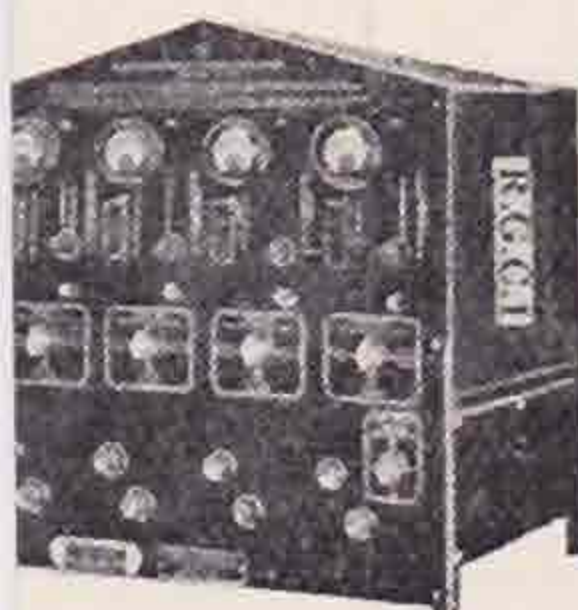
All the crystals have one frequency only, and are stable in operation, provided they are worked between perfectly flat unpolished electrodes, in normal circuits, and with anode voltages not exceeding the stated values. In this connection we would recommend the use of the crystal holder which we supply, as these are tested by us, and, if necessary, the electrodes are re-faced.

	Amateur Band K.C.	Type NT.	Type ZT. (Zero Temp. Cut).	Type PT.
		Transmitter Control.	Transmitter Control. Calibration Experimental Work.	Transmitter Control. Power Type.
Guaranteed limit of a stated Frequency at 20° C.	All Bands	$\pm 0.05\%$	$\pm 0.05\%$	$\pm 0.05\%$
Maximum Frequency drift from Valve at 20° C. to $\pm 10^\circ$ C.	1,900 3,600 7,200	1.50 kc. 2.90 kc. 5.90 kc.	0.1 kc. 0.18 kc. 0.36 kc.	0.5 kc. 0.9 kc. 1.8 kc.
Maximum Anode Voltage Triode ...	1,900 3,600 7,200	250 250 250	400 400 300	500 500 500
Price for Crystal within Band		15/-	24/-	20/-
Price for Crystal selected on High or Low Frequency end of Band		16/6	26/-	22/6
Price for a Crystal within Band at a Frequency $\pm 0.05\%$ selected by Cus- tomer		18/-	30/-	25/-

N. E. READ, 57, Willow St., Oswestry, Shropshire

Phone : Oswestry 18
Grams : Read Radio, Oswestry

ELECTRADIX CHARGERS



BATTERY CHARGERS FOR A.C. MAINS.
DAVENSET ASC 4, as illus. 4-Circuit Charger for up to 80 cells. Trade price 23 guineas and it is a very fine set that will quickly earn its cost and a good profit, fully guaranteed for £14.
3-Circuit DAVENSET MG3. 200/250 v. A.C. to D.C. 30 v. 6 amps. 3 circuits, 3 meters, 3 controls. Up to 32 cells at once. As new, £8 10s. Also brand new model A.C.108 200/250 v. A.C. 50 cycles, 75 volts, 6 amps. Three circuits ($\frac{1}{2}$, 2, $3\frac{1}{2}$ amps.). 3 meters, 3 controls, fuses and circuit breaker. Dimensions as RCG1 above. £23.

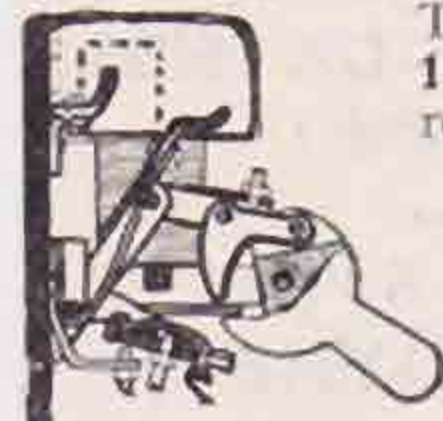
£40 WESTINGHOUSE BATTERY CHARGER
RCG1, 200/230 v. A.C. mains, very posh, as new, and 4 meters, 4 controls, and auto circuit breaker, 4-circuit Charger, only one left, £21 10s.

RCG1

TRANSMITTERS, PEDESTAL PANELS, ETC.

SWITCHGEAR BUILT TO ANY SPECIFICATION AT LOWEST PRICES.

OVERLOAD CIRCUIT BREAKERS replace fuses now. Magnetic Trip, 2 to 4 amps., 7/6; 6 amps., 10/-; 10 amps., 12/-; 15 amps., 14/-; 20 amps., 16/-. Useful for remote control jobs. Illustration shows cover removed. D.P. and triple poles with trips and thermal delays. Cheap. Reyrolle Power Plugs, 15 amp., shrouded panel wall, two pairs on iron box, unused, 10/-.



Transmitters, 10 amp. Sound Relays, 15/-.
TIME SWITCHES, CLOCKDRIVE.

Switch on-off any time, 6 amps., 35/-; 10 amps., 40/-; 25 amps., 55/-

WEGGERS, 100 to 500 volts, 1,000 ohms to 20 mega. cheap. Wheatstone Bridges and Galvos. Oscillators and Cathode Tubes in stock. 500 cycles, 250 watt Alternators, £3 10s. **SET TESTING OSCILLATORS AND ANALYSERS, WAVEMETERS, ETC.** Panel 0-50 mma. Micro-Ammeters, 40/-

BOTTLES and Amplifying Valves, 100 watt Osram, T3, T2A, all £6 valves at 10/- each; 50 watt Det. 1, 25/-; 30 watt VT13B, 22/-. 300 watt AB500 Mullard and T7A Osrams, 55/-

Write for New Bargain List "T.R." 100 Illustrations, Free.

ELECTRADIX RADIOS

218, UPPER THAMES STREET, LONDON, E.C.4

Telephone: Central 4611



PIEZO QUARTZ CRYSTALS

1.7, 3.5 and 7.0 Mc.

Amateur Bands

**STANDARD
TYPE**

15/-

Post Free.

**POWER
TYPE**

20/-

Post Free.

A.T. CUT CRYSTALS

1.7 Mc. and 3.5 Mc. Bands. Accuracy of Calibration 0.05%. Temperature Co-efficient less than 5 parts in a million.

25/-

Post
Free.

CRYSTAL HOLDERS

Open Type 4/6

Enclosed Type 8/6

Either type sent post free.

SEND A POSTCARD TODAY FOR OUR FULL ILLUSTRATED PRICE LIST OF CRYSTALS AND SHORT WAVE COMPONENTS.

THE QUARTZ CRYSTAL CO. LTD.

KINGSTON ROAD, NEW MALDEN, Surrey

Contractors for Crystals to the B.B.C., Admiralty, War Office, etc.

Telephone: MALDEN 0334

For
**SHORT
WAVE**
Enthusiasts

Get your
copy early!

Illustrated constructional articles for building simple S.W. battery sets; battery and A.C. mains superhet. S.W. receivers with A.V.C.; Ultra S.W. Radio Telephone; Transceiver; S.W. Converters; Crystal-controlled Amateur Bands Transmitter, etc. From your Radio Dealer, W. H. Smith & Sons, or from Stratton & Co., Eddystone Works, Birmingham, 5. London service:—Webb's, 14, Soho Street, W.1.



EDDYSTONE 1937 SHORT WAVE MANUAL

CRYSTAL CONTROL FOR ALL—

BAND.	ACCURACY.
(a) 1.75 Mc. ...	16/6 ± 1 kc.
„ 3.5 and 7 Mc. ...	15/- ± 2 kc.
„ 14 Mc. ...	30/- ± 5 „
(b) 100 kc. ...	15/6 ± 0.1 kc.
Temp. Coeff. (a)— (23×10^6)	
(b)— (5×10^6)	

Enclosed Holders, plug-in type, suitable all bands 12/6

BROOKES MEASURING TOOLS,
51-53, Church Street, Greenwich, London, S.E.10
Tel.: Greenwich 1828

“T. & R. Bulletin.” ADVERTISEMENT RATES.

Per insertion.	Per insertion.
Full Page .. 26 0 0	Half Page.. 23 0 0
Quarter Page 1 10 0	Eighth Page 0 15 0

Series Discounts—5% for 6 or 10% for 12 consecutive insertions. Full-page type area $7\frac{1}{2}'' \times 5\frac{1}{2}''$. 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.

RADIO ENGINEERS

IN the rapidly growing field of radio transmission and reception, a large Engineering and Manufacturing Company in England is augmenting its staff.

The following positions require to be filled

1. **RADIO TRANSMITTING EXPERTS**, familiar with present-day practice and design. The applicant must have laboratory experience, together with proved ability to give practical manufacturing expression to his work.
2. **RADIO RECEIVER ENGINEERS**, with up-to-date knowledge of radio application. First-class theoretical and practical experience. A knowledge of modern Ultra-short-wave practice and cathode-ray technique would be advantageous.

Write, stating age, past experience in detail, and salary required, to:

BOX No. 26,

PARRS ADVERTISING LIMITED
121 Kingsway, London, W.C.2

QSA

NOT



?

WHY PUT UP WITH ENDLESS QRM ON AN UNSELECTIVE RX WHEN YOU CAN BUY AN **EVRIZONE SINGLE SIGNAL** AND HEAR THOSE DX SIGS ONE AT A TIME!

AN ALL BRITISH 6 VALVE SUPERHETERODYNE

Price **£20** complete.

Send for Illustrated Booklet:

EVRIZONE RADIO & TELEVISION CO., LTD.

2, SOUTHLANDS ROAD,
BROMLEY, KENT, ENGLAND

Telephone No.: Ravensbourne 1957.

Empire



News.

B.E.R.U. 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: P. H. B. Trasler (VP4TA), Point à Pierre, Trinidad, B.W.I.

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. Andrew (VE3WA), 1337, Dougall Avenue, 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, Zejtun, Malta.

Newfoundland: E. S. Holden (VO1H), Box 650, St. John's, Newfoundland.

New Zealand: C. W. Parton (ZL3CP), 69, Hackthorne Road, Cashmere Hills, Christchurch.

North and South Rhodesia: R. A. Hill (ZE1JB), P.O. Box 612, Salisbury, S. Rhodesia.

North India: J. G. McIntosh (VU2LJ), Baghjan T.E., Doom Dooma 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 VK3EG.

THE 28 Mc. band had shown little improvement up to October 2, although G2PL contacted VK3CP in late September; East Coast W stations come through some days, and West Coast stations on others.

The 14 Mc. band is well populated with Empire stations, ZS, VQ4, VQ8 and VU being heard when both G and VE stations are audible about 14.00 G.M.T. Although 7 Mc. seems rather late this year, the VK/ZL test will have shown it is merely due to lack of activity, as G6CJ's signals were a good R7 on schedule. The lack of Africans is also noticeable with this migration to the higher frequencies, although consistent signals have been heard and worked from ZS1S, ZS6Y, ZT5AQ and VQ8, while the CR7 stations are very regular, as are VQ4CRE and 4CRO.

European commercials are audible again on 3.5 Mc.; in another month VK3EG will be working this band round 19.00 G.M.T., and looking for Europeans.

VK4GK still keeps his weekly sked with VE5BI, they are very consistent in this respect.

The local Fisk contest did not seem to be as popular as usual, and no results are yet to hand. If VK3 or VK4 win (the combined score counting), they retain the Trophy for good.

The D.J.D.C. resulted in nice work by VK3MR, VK2LZ, VK2AS and VK3KX, all of whom worked

many stations in 15 or more countries of Europe. D4ARR, 4JKP and 4XCG seemed the pick of the D stations.

The Newcastle amateurs held another Convention recently with highly successful results. This is becoming a habit, and is an exceedingly good one, judging by the enthusiasm accorded.

Finally, we wish to repeat the desire that G stations look over the 3.5 Mc. band around 19.00-20.00 G.M.T. during December, the signals peak just on sunrise here, and last half-an-hour.

Egypt, Sudan and Transjordan

By SU1SG via G5YN.

This month has seen the return of the last of our members from vacation; the monthly meetings and other usual amateur activities are once again in full swing.

In Cairo SUIRO has been busy on 56 Mc. experimenting with a long lines transmitter, but it is understood that the usual trouble of lack of excitation in the final P.A. has been experienced; this station is on 28 Mc., using a pair of 800's in p.p. with 150 watts input.

In Alexandria SUIWM entered the VK-ZL contest, and despite poor conditions compiled a very creditable score.

SUIKG has been on 'phone for some time, and is putting out a very nice signal, using Class B modulation with an input of 28 watts; he is W.B.E. several times.

Extending over a period of some two or three

months, daily schedules have been kept between SUIKG, G5XG and G6JF, with the object of collecting data on conditions.

During these schedules various antenna systems have been tried by all three stations, the contacts have been most interesting, but we are still waiting for a unanimous decision as to which is the best antenna.

SUITM is at present QRT owing to a change of QRA.

Some months ago members were asked to send along their crystal frequencies with the object of forming a crystal register, but not a single member responded. Several new crystals have been purchased since, and further orders are contemplated, so it is felt that in the interests of all, and to prevent possible duplication, members should respond to this request at their earliest opportunity. On completion the register will be circulated to all members.

Hong Kong.

By VS6AH via G6CJ.

With the fall of summer the VS6 group is once more able to resume activity. Conditions on 14 and 28 Mc. are vastly improved, and 6AH is now WAC on 10. 6AS is also active on 10. G stations should look for us on this band from 0800 to 1300 G.M.T.

VS6AL deserted bachelor life on October 31. VS6AQ sails for home on November 20. Active stations are 6AB, AF, AG, AH, and AS.

Irish Free State.

By EI9D.

We are very pleased to welcome as new members EI6L, Mr. G. S. Stritch, 17, Belvedere Place, Dublin, and BRS2539, Mr. E. Myles-Hook, of Cable Station, Valentia Island. EI6L is a new licence and very QRP. He is at present QRT but will be on the air soon again from a new QRA in Monkstown.

EI9D, 8G, and 6J were guests at the tenth anniversary dinner of the R.T.U. in Belfast on October 17 and had a very enjoyable evening. They had also the pleasure of attending the R.S.G.B. Conventionette earlier in the afternoon. It was very pleasant indeed to renew old friendships in GI and to meet again G5YG and "Clarry" complete with little black book. Transport facilities very kindly provided by GI6YW and GI5HV enabled visits to be paid to GI5NJ, GI2KR and the B.B.C. transmitter at Lisburn. To all we say, "Thank you, OMs."

Reports from stations this month indicate the usual activity, but there is nothing of sufficient interest to justify record. Will EI5L please report QRA for these notes?

Malta

By ZB1C via G6TD.

Conditions during October have been rather erratic, although patches of good DX have been observed. ZB1J has just finished building his new TX. ZB1H is experimenting with a pair of RK20's, while ZB1C and ZB1E are working with 6L6 metal tubes.

We are pleased to announce that another licence has been issued, ZB1K being the latest call. ZB1C has also asked for a 28 and 56 Mc. permit.

Until further notice the ZB1 group meetings will be held on the last Sunday of each month. The next meeting will be held at ZB1H on November 29 at 6 p.m.

Northern India.

By VU2LJ, via G6PY, 6HB and 5TO.

BERS311, while waiting for his licence has been testing receiving aerials. He reports that the Dellinger effect was noticed on September 19 at 1615 G.M.T. after dark. There was no trace of signals of any description between ten and fifty metres for 15 minutes, after which time signals were much stronger than before. In the first week-end of the VK/ZL contest he amassed 2,104 points for the receiving section.

The 28 Mc. band is open until 1530 G.M.T., and is again justifying its name for DX.

Little has been done during the past month at VU2LJ except eliminating parasitics from the new transmitter, faulty by-pass condensers and superfluous R.F. chokes, were chiefly to blame.

As from December 1 next VU2LJ will be transferred to Bukhial Tea Estate, Letekujan P.O., Assam.

VU2AM will shortly be on 28 Mc. using a Unity Coupled Transmitter. BERS295 now VU2GB, is putting out a good signal from a MOPA rig.

Rhodesia

By ZE1JB.

There is practically nothing to report this month, and although the Bulawayo division promised to supply information monthly for these notes, nothing has arrived. We must again appeal to members to let us know what they are doing as it is impossible for us to guess, and it is very difficult to keep these notes going on the present basis.

We have to congratulate Mr. Arnott (ZE1JO) on winning the Ross-Kent Trophy in the Junior B.E.R.U. Contest, and we hope that from now on it will remain in Rhodesia.

ZE1JB is not yet using telephony, because, contrary to expectations, the RFP60 failed to work properly, and he found it necessary not only to shield it, but also to neutralise it. ZE1JE has now purchased some Class B transformers, and will be on soon with Class B telephony instead of suppressor grid modulation. ZE1JH has bought some of the apparatus which belonged to ZE1JM, and will soon be re-assembling it, together with his own apparatus.

ZE1JO has returned from leave, but is not likely to be active for some time. Incidentally, he is finding difficulty in using the RK25, which is the approximate equivalent of the RFP15 as a straight amplifier without neutralisation. This tube has a higher inter-electrode capacity than the RK20.

ZE1JY has not yet been heard by us, but we believe he is again on the air.

South Africa

Division One.—Conditions on 14 Mc. have improved, judging by the way a number of Cape stations are working DX. During the period 14.00—16.30 G.M.T. signals from U.S.A. come in at good strength; later European signals are heard.

ZUID achieved some good work in connection with an S.O.S. put out by the local B.C. station; through his efforts much time was saved.

ZS1B has obtained his W.B.E. for C.W. by contacting VE1BV after many years trying, but it now looks as if he will have to wait twice as long for the QSL. What about it, VE1BV! ZS1B only wants VK for W.B.E. on phone, having

worked VE5OT. ZS1H reports conditions on 28 Mc. are on the upgrade, VK coming through well during the early mornings. Europeans are audible all day, while U.S.A. signals are erratic but good. During October LU1EP and LU9AX were heard at R9.

ZU1C has been putting out very fine phone, using 10 watts; reports from DX QSO's are most gratifying, which proves that low power, coupled with efficiency, will do wonders.

W2BEG passed through Cape Town and was given a great welcome.

Late Report.—Owing to unforeseen difficulties it has been found impossible to hold the Johannesburg Jubilee Contest during November, 1936. The date has therefore been changed to the first four week-ends of January, 1937, details of which will be announced shortly.

ZS1H reports conditions on 28 are still holding good. VK's are coming through well. ZL3DJ was heard and worked. During the mornings J2IS comes through at great strength, while VU2AU is good in the mornings and late afternoons. Many European and U.S.A. stations have been worked. LU9AX, LU6AX and LU3DH are audible in the afternoons and late evenings. VE4IG, VE4PH and VE5GI were worked as late as 20.00 G.M.T. ZS1H considers that generally conditions on 28 Mc. are very similar to that on 14 Mc. in 1933. The following S.A. amateurs are active on 28 Mc.:—ZU1C, ZT2B, ZS5U, ZU5B, ZT6M, ZU6P, ZS6AN, ZT6Y, ZS6T.

Conditions on 14 Mc. have been excellent during the last two months. ZS1B heard ZL1FT at QSA4 R4 but was unable to hook up. This is the first ZL ever heard by 1B on any band. ZUIT is back on the air again after a spell in hospital. He considers 28 Mc. is dead but 14 Mc. excellent. ZS1AH is on 14 Mc. after rebuilding, and is doing some very fine DX.

56 Mc. activity has died down somewhat owing to there being only two stations on this band in Cape Town. It is hoped, however, that more will become active in the near future.

Will Division One members please forward interesting items to ZS1B for inclusion in these notes?

ZS1B.

Division Five.—Telephony is still very much in evidence on 7 Mc., especially at week-ends, and although some of our stations take up more than

their fair share of the band everyone seems to enjoy the contacts established.

ZS5AB is an active 'phone station, his transmissions being of a high order of quality. 5AH is working DX with a new C.C. rig.

DX is being worked on 14 Mc., and among our most active stations must be included ZS5U.

South India

By VU2JP.

No reports are to hand, so will members please see that this is rectified. Complaints regarding the interference caused by VU2CQ are still coming in and the matter has been taken up with the authorities as other stations have also started up who have apparently little regard for the QRM they cause. From conversations carried on it would appear that little or no experimenting is done. In such cases the new Morse test of 16 words per minute will be most welcome. The code is never used by these stations and one wonders what knowledge of the code, if any, these operators possess.

Indiscriminate buying of crystals still goes on. Several new frequencies have been allotted but a few more are being held up pending receipt of a note of the call sign, because new frequencies allotted are being passed on to the authorities for information. A full list of the frequencies occupied by stations was published in the July/August budget.

VU2JP has been allotted the call sign of VU7JP. This call will be used while he is resident in Travancore.

"RADIO" ANTENNA HANDBOOK

by the Technical Staff of "RADIO" (Magazine). Only book of its kind. Eighty pages of nothing but antennas! All types, receiving, transmitting, "all-wave," arrays, "V's," diamonds, etc.

Eminently practical; detailed tables make calculations unnecessary. Profusely illustrated. "Its particular value lies in its completeness," says *All-Wave Radio*.

2/6 (or 60c.), post free.

(British postal notes accepted)

RADIO, LTD. 7460 Beverly Blvd., Los Angeles (U.S.A.)



RAYMART
CRAFT A CREED

**(G5NI) HAS PLEASURE IN
ANNOUNCING THE 1937 SHORT-WAVE MANUAL**

48 PAGES of practical circuits and data on short-wave receivers, transmitters, modulators, transceivers, etc., including dope on neutralization class B modulation, aeriels, etc.

7 1/2d.

POST FREE

**PLEASE REMEMBER WE ARE SOLE AUTHORISED DISTRIBUTORS for
R.M.E., THORDARSON, COLLINS TAYLOR TUBES AND
DISTRIBUTORS FOR HAMMALUND NATIONAL, BLILEY, Etc.**

We carry the largest stocks of Ham material in the country. Get our Catalogue, 1 1/2d. post free.

RADIOMART, 44, Holloway Head, Birmingham.

EXPERIMENTS WITH AERIALS—(Continued from page 195).

away from the plane of the top. In Fig. 4 we now begin to appreciate what is happening. The field has further sub-divided and main radiation tends to take place in directions not far removed from the line of the top. At the same time, radiation is now re-established in a broadside direction.

The polar diagrams shown in Figs. 5 and 6 relate to a vertical antenna. Fig. 5 shows that the angle of radiation is a fairly low one, i.e., radiation takes place in all directions at a low angle to the surface of the earth. Figs. 6 (a) (b) and (c) show the effect of the height above earth. The VS2AF vertical antenna was erected at a height of about one-half wavelength above the earth. In conclusion, the writer wishes to thank those amateurs who so kindly co-operated with him in the experiments.

STABILISED GRID BIAS—(Continued from page 198.)

The condensers shown in dotted lines are optional. Their purpose is to by-pass any audio frequency or residual radio frequency currents present in the grid-bias leads and values of 1 μ F (non-inductive) will be suitable.

The potentiometers should be of the wire wound type and those of *Reliance* manufacture are in use, and have been found good. The power dissipated is quite low and convenient control of the grid bias applied can be had by mounting the potentiometers on the panel with other controls.

In conclusion, acknowledgment is made to the Editor of *Radio Amateur*, Vienna, for the basic idea of the circuit, which has been adapted by the writer for use in amateur transmitters.

SEMI-AUTOMATIC KEY—(Continued from page 202.)

serviceable joint results. The tape itself is made from strong thin paper, and a length of about 2 ft. 6 in. will be required for a call of the length mentioned above. In use, the machine is connected in parallel with the hand key, so that no extra switching is needed.

The author is indebted to G5PP, who has tested the machine under working conditions. He has found that the insulating tape on the motor spindle wears smooth and fails to grip the paper tape; this has been remedied by replacing the tape by a rubber bush similar to that used on the roller. G5PP also reports that adhesive parcel tape is very suitable for the keying tape if the gummed side is first sprinkled with French chalk. The tape

may be joined by a small patch of adhesive plaster, but in the author's opinion this is not so serviceable as the joint described above. Of course, if it is not desired to change the tape, it may be glued up permanently.

It should be remembered that good sending depends on the care taken in punching the tape, and that nothing sounds worse than a bad fist at high speed.

TRANSVERSE CURRENT MICROPHONE—(Continued from page 203.)

come later, and have nothing to do with the efficiency of the instrument.

Partially fill the cavity with carbon granules, perhaps just slightly more than indicated in the illustration. Fine granules give higher background noise, but more sensitivity. A medium grade, which takes about 30 mA at 6 volts appears satisfactory, but there is no reason why a constructor should not mix granules or try different grades. Having finally tested the microphone, the screw "C" can be discarded and the hole blocked up with plastic wood prior to mounting. The instrument can be used with either the brass caps up, or down.

Accumulators are the most satisfactory method of excitation because of their lower internal resistance, and there appears to be no advantage in exceeding 6 volts. Two standard 3 v. dry batteries will also give good service.

With Heising type of modulation, this instrument requires two stages of speech magnification before the modulator, and resistance coupling followed by transformer or choke coupling is suggested. This instrument is coupled to the first speech amplifier by the normal high step-up microphone transformer.

362

NEW VALVE CATALOGUE

NOW READY

32 PAGES

Battery and Mains types.

Transmitting and Public Address types.

Catalogue 1½d. Post Free.

THE 362 RADIO VALVE CO., LTD. North
324/326 Liverpool Road, London, N.17 1853

Varley

FOREMOST AS PIONEERS

INTERMEDIATE FREQUENCY TRANSFORMER. The BP96 I.F. Transformer employs fixed coupling between coils. Litz-wound iron cored coils are fitted, with mica di-electric trimming condensers. Particularly suited to all-wave receivers. (465 K.C.). Price 8/6
LOW FREQUENCY CHOKE. DP31 (Centre Tapped) is so well-known as to need little introduction. Inductance 40 Henries. D.C. Resistance 450 ohms and maximum current 120 m.a. Price 25/-
WRITE TO VARLEY OF WOOLWICH FOR FREE CATALOGUE

OLIVER PELL CONTROL, LTD., BLOOMFIELD ROAD, WOOLWICH, S.E.18. WOOLWICH 2345