THE T&R

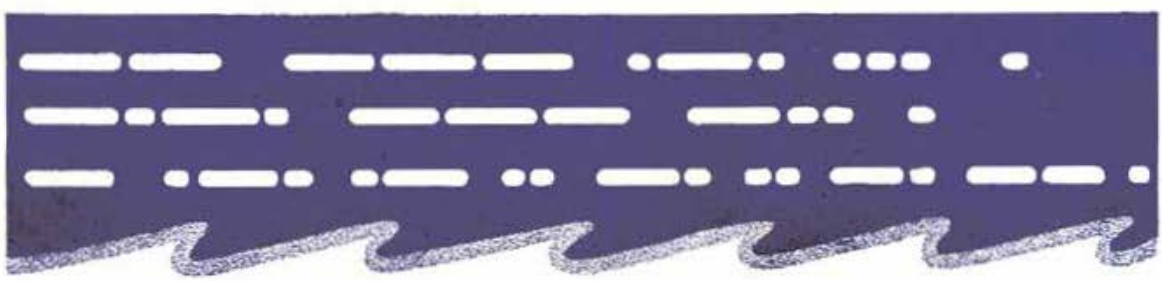
BULLETIN

A JOURNAL FOR

RADIO EXPERIMENTERS

Vol. 16 No. 10 APRIL 1941 (Copyright) Price 1/6

POSTAL CENSORSHIP PERMIT No. B.305



The Incorporated

RADIO SOCIETY OF GREAT BRITAIN

Registered Office:—
115 HIGH HOLBORN
LONDON, W.C.1

Temporary Office:—
16 ASHRIDGE GARDENS
LONDON, N.13
Telephone: Palmers Green 3255.

COUNCIL 1941.

PRESIDENT:
ALFRED D. GAY (G6NF)

EXECUTIVE VICE-PRESIDENT:
E. L. GARDINER, B.Sc. (G6GR)

IMMEDIATE PAST PRESIDENT:
A. E. WATTS (G6UN)

HONORARY TREASURER:
H. A. M. CLARK, B.Sc., (G6OT)

HONORARY EDITOR:
J. W. MATHEWS (G6LL)

SECRETARY-EDITOR:
JOHN CLARRICOATS (G6CL)

MEMBERS:

D. N. CORFIELD, D.L.C. (G5CD)
E. A. DEDMAN (G2NH)
S. K. LEWER, B.Sc. (G6LJ)
W. H. MATTHEWS (G2CD)
W. A. SCARR, M.A. (G2WS)
A. J. H. WATSON (G2YD)
H. V. WILKINS (G6WN)

THE T. & R. BULLETIN

OFFICIAL JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN

DEVOTED TO THE SCIENCE AND ADVANCEMENT OF AMATEUR RADIO

Hon. Editor: JAMES W. MATHEWS. Secretary-Editor: JOHN CLARRICOATS

Advertisement Manager: HORACE FREEMAN

Vol. XVI. No. 10 APRIL, 1941

CONTENTS

COMRADES IN ARMS

NOT a week passes without some fresh news reaching us concerning the arrival in this country of amateurs from across the seas. Personal QSO's, so often visualised in the DX days of yore, have materialised by the dozen, and already many of our overseas friends have found a warm welcome awaiting them in the homes of those who rose in the wee small hours of a winter morn to keep a sked with them, when they were in their native land.

Last month it was our privilege to visit Blackpool and to meet many of our home members located in or around that town, but the greatest thrill of the day came when we were introduced to six well-known Polish hams, three of whom we had contacted in past years. Their presence seemed to bring home to us all the *real* meaning of Ham Spirit and comradeship. War, the destroyer of life and property, seemed so far away on that warm sunny Spring afternoon as we listened to one of our Polish friends telling us, in excellent English, of the aims and ambitions of our sister society, the Polski Zwiasek Krotkofalowcow. Comparatively small in numbers, but with ideals similar to our own, PZK had, in the days before the war, made valuable contacts with its Government, and had rendered a fine service to the amateur cause by publishing an informative, technical monthly journal.

We, who have been privileged to extend a personal welcome to many of our comrades in arms from abroad, rejoice to know that ham radio has enabled them to enter into so full an understanding of the British characteristic.

Poles and Czechs, Free French and Belgians, Norwegians, Danes and Dutch, we, the amateurs of the British Empire, extend to you our hands in friendship. Whilst you are here we want you to get to know us better, as we for our part wish to know more about you and your friends. Already many of you are members of our Society. Already you are taking a full share of ham life in the towns where you are stationed, but there may be others whom we have not yet contacted. To them, through you, we would ask that our greetings and good wishes be extended.

Now that you have no monthly journal of your own, we reiterate the promise made at Blackpool, that we shall be happy to publish notes from any representative group of Free European amateurs. Let THE T. & R. BULLETIN be for you the connecting link, even as it is the link between all British amateurs who support the R.S.G.B.

The comradeship of amateur radio will defy for all time the horrors of war. Let us link arms and march on together to that victory which will bring with it a return to Peace and International DX.

J. C.

An Introduction to the Design of Amateur Constructed Measuring Apparatus

By I. B. CLARK (2BIB)

SPARE-TIME, now that active transmitting is at a standstill, can well be utilised to prepare for the resumption of these interests when the war is over. There can hardly be a better way of doing this than by the construction of reliable apparatus which can be used for measuring the many different currents and voltages met with in modern amateur equipment.

It is with this in mind that the present article has been prepared and it is hoped that its subject matter will prove of interest to many readers.

General Considerations

Although the design from first principles of a highly accurate multi-range test-set is beyond the means and capabilities of nearly all amateurs, the construction of an instrument having an accuracy comparable with, if not equal to, some grades of commercial apparatus, is within the ability of most, provided due care is taken and good materials used.

To achieve this condition a test-set must conform to the requirements of the British Standard Institution, Grade BS1. The percentage accuracy requirements as laid down in British Standard, No. 89/1937 for portable type instruments of the moving coil pattern are :—

Voltmeter, multi-range, self contained, D.C. 1·2 per cent., A.C. 3·5 per cent.

Ammeter, multi-range, self contained, D.C. 1·2 per cent., A.C. —.

Millivoltmeter, with leads, single range, D.C.1·2 per cent., A.C. —.

It may be said that these percentage accuracy figures represent the goal towards which the average amateur constructor should work. It must not be forgotten that the figures apply to the overall instrument and will therefore include such parts as the indicator, rectifier and resistances, as well as errors due to temperature variation. The lower the individual errors, the lower will be the final overall error.

It is with these errors and the ways of overcoming them that the first part of this article mainly deals. Constructional suggestions will be made later.

Indicating Devices

The choice of an indicator for the test-set is governed by three factors, namely :

(*a*) Power available in the circuits to be measured.
(*b*) Type of current or voltage, whether A.C., D.C. or audio, either separately or in combination.
(*c*) Lowest required range.

There are two alternative types of indicator, namely moving coil and moving iron, one of which must be chosen so that it will best fulfil the requirements of the three factors mentioned.

It is a fallacy to assert that the moving iron type is of no use as an accurate measuring instrument because of its scale shape, for this is entirely dependent upon the shape and type of moving iron used. Whilst the scale shape of a cheap moving iron instrument is poor, that of a good meter can be practically even from 10 per cent. upwards, except for a very gradual closing up towards the upper end. This is therefore a very near approximation to the evenly divided, theoretically perfect scale of a moving coil meter.

The moving iron meter thus affords a very good starting point for an A.C./D.C. measuring instrument, but it has the double drawback of consuming a good deal of power for a given deflection, as well as being difficult, owing to its self-inductance, to shunt for use as an ammeter.

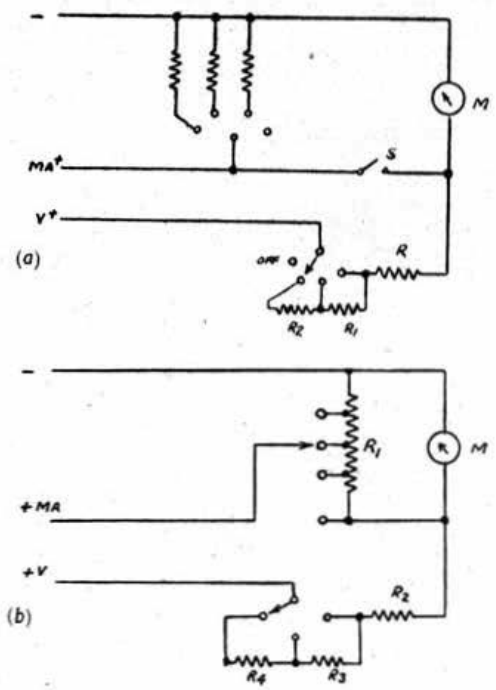


Fig. 1.

(a) Circuit employing separate shunts for each range to be covered by the test set.

R	1,000 ohms (less value of M). For 1 volt.
R_1	99,000 ohms. For 100 volts.
R_2	50,000 ohms. For 150 volts.
S	Single-pole switch (opened for voltage measurements).

(b) Circuit of Universal shunt.

R_1	Shunt. Total current 500 microamps.
R_2	1,000 ohms (less $\frac{R1 \times M}{R1 + M}$). For 1 volt.
R_3	99,000 ohms. For 100 volts.
R_4	50,000 ohms. For 150 volts.

For those who wish to measure only A.C. or D.C. volts and can afford a large current drain on the measured circuit, there is nothing better than a moving iron type of meter.

For the great majority of measurements however, the moving coil type is better. It has an almost equally divided scale and requires very little power to operate. Further it has a much lower temperature coefficient than the moving iron type, owing to the smaller amount of copper in its construction. Copper has a large temperature coefficient, being + 0·4 per cent. per degree Centigrade. The smaller copper coils in the moving coil instrument have a lower inductance than the corresponding coils in the moving iron type, and therefore are more easily shunted for use as an ammeter.

Against these advantages the moving coil instrument will operate only on D.C., but owing to its small power consumption it can easily be operated, in conjunction with a metal oxide rectifier, on A.C. It may therefore be said that the most general type of multi-range test-set will utilise a moving coil indicator. From this stage on, the article deals with the use of this type of indicator as incorporated in a multi-range measuring device.

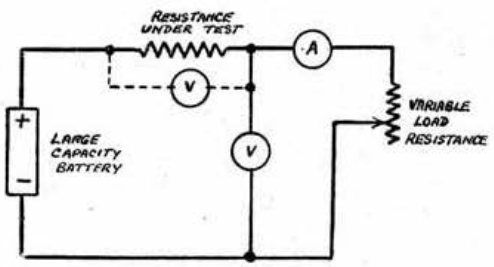


Fig. 2.

Circuit for checking the values of home-made or commercial resistances to an accuracy of 1 per cent. The accuracy of the results obtained depends upon the accuracy of the measuring instruments used in the device. Dotted lines represent alternative connection if voltmeter is of very high resistance.

Choice of Rectifier

The next item to consider is the metal oxide rectifier, but there is little to say about this component that comes within the scope of this article. The subject is well set out in the *Westinghouse Brake and Signal Co.'s* booklet on instrument rectifiers. Suffice it to be said that the rectifier-operated instrument will measure only the R.M.S. and not the peak value of the wave, assuming a pure sine wave form. The main source of error with a metal oxide rectifier is its temperature coefficient, but as this is never the same in different specimens, it is difficult to give exact figures. In a good rectifier the error should be small, but the only practical method of determining it is by actual use.

Instrument rectifiers are rated according to the maximum current permitted; the 10, 5, or 1 mA. types are more usual, but special types, such as those in which the maximum rating is 100 or 500 micro-amps, are also obtainable. The choice of the correct type is governed by the current taken by the moving coil instrument, and it is advisable to use the nearest rectifier rating suitable, and not, for the sake of economy as is sometimes done, a higher rated rectifier.

Selection of Resistances and Shunts

The only other primary components of a multi-range test-set are its resistances, whether these are used for voltage or current measurements. Again the main source of error will be the temperature coefficients, but these can be made to cancel out to a certain extent.

The lower range shunts, from 1 mA. to perhaps 100 mA. should be made of copper, so that their temperature coefficient will be the same as that of the copper coil in the meter. The resistances used for voltage dropping should either have a zero co-efficient or one slightly negative. If they are of the former type, it will be necessary to provide, in series with the meter, a small swamp coil with a negative coefficient of such proportions as to overcome the positive coefficient of the moving coil.

The everyday type of resistance, as used in radio work, is not suitable for use in a measuring instrument owing to its large temperature coefficient. Prior to the war, the most suitable type for this work was a compound resistance manufactured by *Siemens A.-G.*, but these are now unobtainable. The nearest equivalent type is probably a metallised resistance such as those manufactured by *Dubilier*, but the characteristics of the resistances should be obtained from the manufacturer concerned before a final choice is made.

Resistances of odd values can be quite well made up of Eureka wire, wound on small bakelite bobbins. The actual method of determining their value, as well as that of other types, is dealt with later.

Switches

Such secondary components as terminals, switches, etc., can well be left to the choice of the individual constructor, but in passing it must be emphasised that a poor range-switch can easily spoil the final design. The points to be noted in this respect are, first, switch contact resistance, and second, the mechanical soundness against wear and tear.

Ranges and Voltages

Before use can be made of the materials collected, it is necessary to consider the number of ranges and types of voltage to be measured. In the instrument under consideration let us suppose that the ranges are to be 0 to 500 volts A.C. and D.C., 0 to 1 amp. D.C. (lowest range 0 to 1 mA.) and 0 to 50 watts audio. It is considered that an A.C. amp or milliamp range is of no great use to the amateur, and it has therefore been omitted. Actually the only use for an A.C. milliampere meter is for measuring condenser capacities and this can be better done by a separate piece of apparatus.

When designing multi-range test-gear it should be borne in mind that it is inadvisable to attempt too universal an instrument. It is better to construct an accurate meter for a few purposes, than an indifferent one for many.

Having selected the ranges it will be seen that the lowest to be measured are 1 mA. and 1 volt D.C. Therefore the moving coil meter to be chosen must have a voltage drop equal to, or lower than, 1 volt and must pass a maximum current of 1 mA. For the

case in question, it is better to employ a meter which has a voltage drop of 0·1 volts and a current consumption of 500 microamperes. The reasons for this are indicated later.

Current Shunts

The initial task to be undertaken is to calculate the values of the current shunts. There are two methods of arranging these. One is to use separate shunts for each range, and the other is to use the universal shunt. These methods are illustrated in Figs. 1 (*a*) and (*b*). In Fig. 1 (*a*) the switch contact resistance is part of the instrument circuit, whereas in Fig. 1 (*b*) it is part of the circuit to be measured. Thus in the former method a small value of contact resistance will lead to greater error than in the latter. For this reason it is usually preferable to use the universal shunt.

If, however, a reliable range switch is used, in which the contact resistance is very small, it is possible to use the separate shunt method, thereby enabling the instrument movement to be switched in by itself, and each range adjusted separately. This of course is not possible with the other method since each range is dependent upon the other. If the universal shunt is used the reason for using a meter, which consumes less current than the lowest current range required, becomes apparent.

Resistance Calculations

The calculation of resistance values is but a simple application of Ohm's Law, and these can be obtained from first principles if it is required to do so. For separate shunts the values may be worked out from the formula:

$$\text{Shunt resistance} = \frac{\text{Meter resistance.}}{(N - 1)}$$

Where N = the number of times the full scale current reading of the meter is to be increased.

For the calculation of the values of resistance and tappings for a universal shunt it is first necessary to determine its total value which is the same as the shunt required for the lowest range. Thus if the meter takes 500 microamperes for full scale deflection, and the lowest range required is 1 mA., this total shunt must take 500 microamps as well. The value of the shunt is calculated from the above formula, and having determined the total value, the intermediate tapping points for the higher ranges are a matter of simple proportion.

Thus supposing the next required range is 10 mA., then the ratio between the full scale current with the total shunt (*i.e.* 1 mA.) gives the proportion the shunt resistance is to the tapping point. Let I_T = current for total shunt in circuit, I_N = current for tapping point:—

$$\text{then } I_T : I_N = 1 : \frac{I_N}{I_T} = 1 : \text{“K”}$$

$$\therefore \text{ Value of resistance at correct tapping point} = \frac{\text{Total shunt resistance}}{K}$$

When the universal type of shunt is tapped it must not be forgotten that the higher the current range the less will be the resistance across the input terminals and the more resistance will be in series with the meter.

The calculation of the voltage dropping resistances is again a matter of simple proportion. If we assume that the universal shunt has been adopted and that the lowest range is 1 mA., then from Ohm's Law it can be seen that this is equivalent to a resistance of 1,000 ohms for every volt to be measured. Thus if the lowest range is 1 volt D.C. the extra series resistance required will be 1,000 ohms, *less* the total resistance of the meter and meter shunt, which are in parallel. For every range above this, the series resistance required will be a multiple of 1,000 for every extra volt that it is required to measure. This circuit can be seen in Fig. 1 (*b*), for which sample values are given. A further advantage of this type of circuit can be seen from the fact that, having calculated the values of the voltage resistances on the basis that the meter is taking 1 mA.; if the current taken by the meter and its shunt circuit is altered by means of the range switch, for example to 2 mA., instead of the voltage being on the basis of 1,000 ohms per volt, it will be on the basis of 1,000 ohms per 2 volts and the voltage ranges may be multiplied accordingly. This applies to all the tappings on the universal shunt, though a limit is set by the fact that the circuit being measured suffers from a corresponding current drain.

If the separate shunt method has been used then this last circuit adaption is impossible since the total series resistance will vary according to the shunt

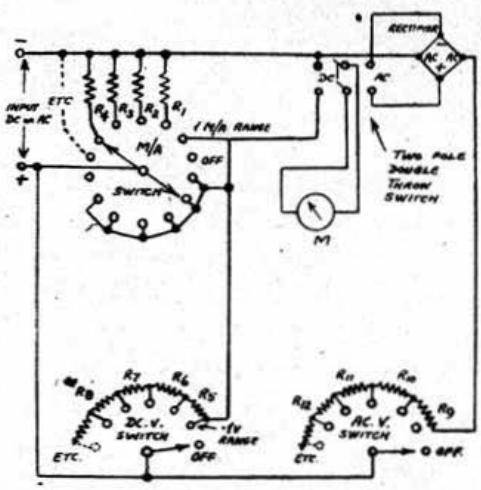


Fig. 3.

A suggested A.C./D.C. voltage and D.C. current (mA.) circuit using separate current shunts.

Circuit values when M has a resistance of 100Ω *for* 1 *mA. full scale deflection.*

Resistance.	Range.	Value.	Resistance	Range.	Value.
				Volts.	
R_1	10 mA.	11·11 Ω	R_7	100	90,000 Ω
R_2	100 mA.	1·11 Ω	R_8	500	400,000 Ω
R_3	500 mA.	0·20 Ω	R_9	1	810·8 Ω
R_4	1,000 mA.	0·11 Ω	R_{10}	10	8,108·1 Ω
R_5	1 volt	900 Ω	R_{11}	100	81,081·0 Ω
R_6	10 volts	9,000 Ω	R_{12}	500	360,360 Ω

that is across the meter. In this case therefore it is necessary to calculate the value of the series dropping resistance of the measuring meter. The higher voltage ranges are only simple multiples of this value as before. This type of circuit is shown in Fig. 1 (*a*).

Checking Resistance Values

It is essential that some means of checking the value of either commercial or home constructed resistances should be available, since the grading of commercial resistances is seldom better than ± 5 per cent. and unless these are regraded by the manufacturer, they are hardly of sufficient accuracy to be used as a measuring device.

Fig. 2 shows a suitable circuit for checking the values of resistances to an accuracy of 1 per cent.,

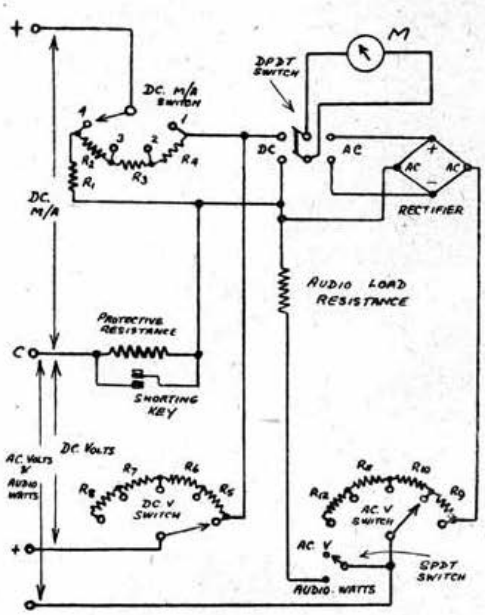


Fig. 4.

Test Set circuit for A.C. and D.C. volts, D.C. milliamps and audio watts, showing protective resistance in the common lead and a " universal " current shunt.

Circuit values when M has a resistance of 100 Ω *for* 0·5 *mA. full scale deflection.*

Resistance.	Range.	Switch point.	Value.	Note.
$R_1+R_2+R_3+R_4$	1 mA.	1	100 Ω	Hence $R_4 = 90\Omega$
$R_1+R_2+R_3$	10 mA.	2	10 Ω	Hence $R_3 = 9\Omega$
R_1+R_2	100 mA.	3	1·0 Ω	Hence $R_2 = 0·9\Omega$
R1	1,000 mA.	4	0·1 Ω	—

$R_5 = 950\ \Omega$, $R_9 = 845·5\ \Omega$.

R_6, R_7, R_8, R_{10}, R_{11}, R_{12}. See Fig. 3.

Protective resistance and audio load resistance. See text.

but depending, naturally, upon the accuracy of the measuring instruments used in the checking device. The average amateur will however find it a great deal easier to borrow an accurate high resistance voltmeter and an ammeter for a few days than to borrow a Wheatstone Bridge.

It will be seen that the circuit comprises a voltage supply that is fairly steady (such as a car accumulator) a voltmeter and an ammeter, the resistance to be measured, and an artificial load, which is adjusted so that a reading is obtained on the ammeter; the voltage drop across the resistance under test is then measured at a given current, and from these figures its value can be calculated. It is as well to prepare beforehand a table showing the volts and amps that will be indicated when the resistance is of the correct value.

An alternative method, available to the amateur, is to adjust, or check, these resistances on a borrowed commercial test-set which has several resistance ranges.

A.C. Voltage Measurements

For A.C. voltage measurements, the metal oxide rectifier is shunted across the movement, which then becomes an A.C. milli-ammeter. This is treated in the same way as previously described for D.C., except for the fact that the rectifier will only give the R.M.S. value on the instrument side, but has to carry the peak voltage on the resistance side. This difference must of course be allowed for. The rectifier should be switched out for D.C. measurements.

Measuring Audio Power

The measurement of audio power in watts is equivalent to the measurement of A.C. volts drop across a resistance. This resistance which is shunted across the voltage input terminals should have the same value as the output load of the valve whose output is being measured. In other words, if the output load is 5,000 ohms, a resistance of this value is used. The watts dissipated are then calculated from the formula:

$$\text{Watts} = \frac{(\text{Voltage drop across resistor})^2}{\text{Output load resistance}}$$

Thus if the instrument is switched to take 100 volts A.C. for full scale deflection and the output load is 5,000 ohms, the full scale reading will be 2 watts. It should not be forgotten that the measuring instrument must, in this case, be isolated from the H.T. voltage supply of the output valve, either by means of a large condenser or by an output transformer. The load resistances should be capable of dissipating the maximum amount of power to be measured.

Practical Designs

Figs. 3 and 4 show two circuits which suggest themselves from the above short consideration of materials and their uses. The former illustrates an A.C./D.C. voltage and D.C. milliamp circuit, whilst the other shows an A.C./D.C. voltage, D.C. milliamp and audio watts circuit. These are not intended to be final or the best possible examples of their type, but they illustrate however the general theoretical design and the way that the various ranges are fitted together. The circuit used by any particular

constructor may be developed to suit his own requirements.

The photographs depict one of the author's experimental designs and illustrate most of the salient points of actual construction. The whole design is compact, but not so compact as to prevent all component parts being easily accessible.

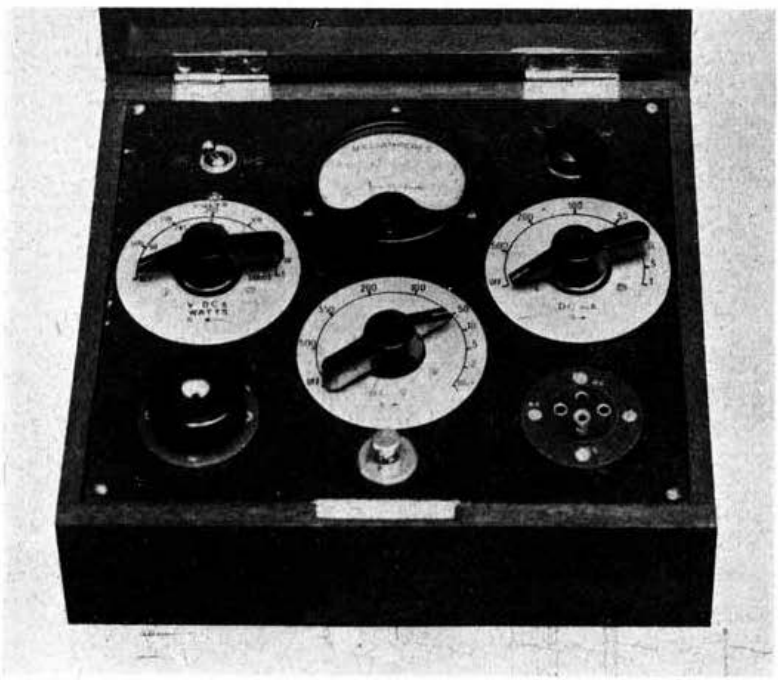


Fig. 5.
Test set panel showing range switches and markings. The left-hand switch plate should be marked "V. AC" and not "V.DC."

The switch indicators are clearly marked, and the panel layout is such that there can be no mistake as to exactly which range is in use.

It can be seen from the photographs that the movement is scaled 0 to 1 mA., which is the current taken by the meter at 0·1 volt D.C., so that all other ranges are read off with a simple scale multiple, dependent upon the range in use.

The measuring system is protected by means of a press key (centre front Fig. 5) which shorts out a protective resistance of 1 megohm, see Fig. 4. This prevents the movement from being overloaded, for it can be seen that if the meter had any large degree of deflection before the key is pressed, it would be seriously overloaded if the protective resistance were shorted out.

The device in the front left-hand corner of Fig. 5 is a shorting plug fitted into a normal 5-pin valve socket, which may be removed and replaced by a valve in order to test heater continuity. As this valve socket is permanently wired into the 5-volt range of the voltage measuring network, it is only necessary to set the voltage range switch to the voltage nearest to the available supply (even if this is 500 volts) and the continuity of the heaters may then be ascertained without any further trouble.

The right-hand front valve socket serves for the input terminals. The back left and right switches are

(*Continued on page* 347)

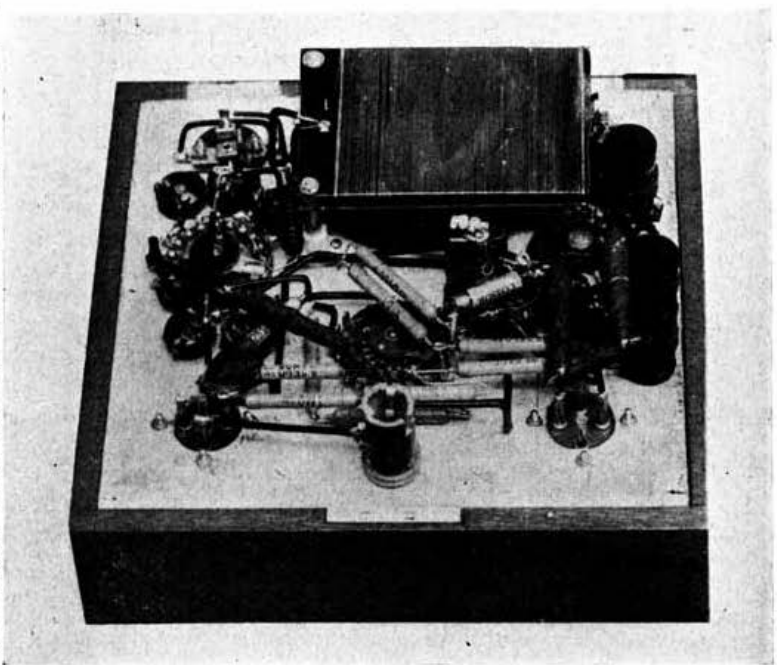


Fig. 6.
Underside view of the test set illustrated in Fig. 5, showing lay-out of resistances.

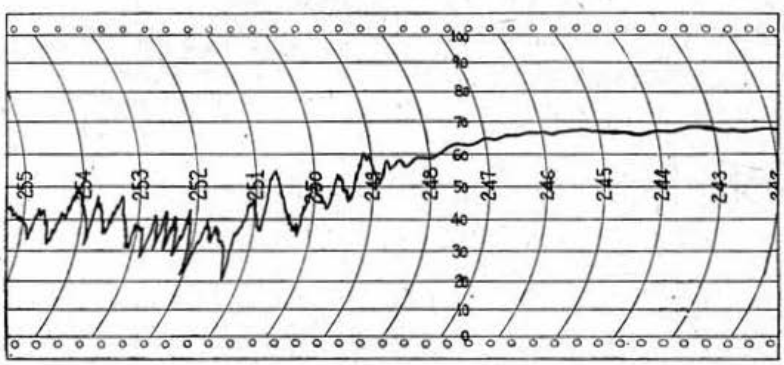
MOBILE FIELD STRENGTH RECORDINGS ON V.H.F.*

THE efficient use of the ultra-high frequency spectrum requires the consideration of the frequency and polarisation which will produce the strongest signal over a given area. The choice is better made as a result of experience than of theoretical considerations, due to the many irregularities in transmission paths.

A field strength survey, by means of a continuous mobile recorder, was made of the transmissions on 49·5, 83·5 and 142 Mc. from the Empire State Building in New York. Measurements were made for both horizontally and vertically polarised waves.

Field Work

A log was kept to correlate numbers on the chart with locations on the route. A chart speed of 20 inches per mile was used within three or four miles of the transmitter, while at all other times a speed of five inches per mile was employed. On horizontal polarisation measurements a frequent check had to be made to ensure that the receiving doublet was kept broadside to the transmitter, since directivity was noticeable. (The views of readers in this connection would be of interest.—Ed.)



Sample of Mobile Recording.

Receiving Equipment

The receiver, with power supply and aerial, was installed in a passenger car, precautions being taken to prevent mechanical vibration of the apparatus when in motion. The aerial (a short doublet of $\frac{3}{8}$ inch diameter duralumin tubing) was supported ten feet above ground and arranged horizontally, so that rotation about a vertical axis was possible by means of a steering wheel inside the car. The receiver was a triple detector superheterodyne with automatic volume control to compress the wide range of field strengths obtained, and the output was applied to a recording milliammeter, in which a continuous ink record was obtained on a paper chart drawn under the pen at a known rate. This chart was driven from the car drive shaft, through suitable gearing so that the records could be easily compared with geographical location.

Transmitting Equipment

On 49·5 Mc the vision transmitter of the N.B.C. television was used, the aerial being a half-wave doublet, 1,000 feet high and the radiated power about 5 kW. The higher frequency transmitters were at 1,200 feet above ground and employed half-wave doublets. The radiated power was 750 watts on 83·5 Mc and 68 watts on 142 Mc.

Results

The sample chart shows two extreme types of recording. The smooth portion, obtained in open country and wide streets, indicates few indirect paths, while the irregular trace is caused by indirect rays produced by buildings, overhead wires, etc., combining the direct ray in random phase relation. When the direct ray is very weak compared with the indirect, wide local variations are obtained, such being found in the city where the transmitter was shielded by buildings.

The records were summarised by noting maximum, minimum and average field strengths in each section of the chart. The smaller variations in field strength in the country with vertical polarisation was immediately apparent. A comparison of the average field strength on horizontal and vertical polarisation showed the former to be consistently stronger. The average ratio was 4·3 db.

The performance of the three frequencies was compared by correcting the average field strength curves to an output power of 1 kW. On horizontal polarisation it was found that the lowest frequency was strongest in the city and the highest frequency was consistently strongest in the country. Using vertical polarisation the highest frequency produced the highest average field strength in both city and country.

The magnitude of field strength variations on both polarisations was no doubt influenced by the low receiving aerial and had the height been increased to 30 or 40 feet many obstructions to an

* *A precis of an article entitled "Mobile Field Strength Recordings of 49·5, 83·5 and 142 Mc. from Empire State Building, New York Horizontal and Vertical Polarization" by G. S. Wickizer. Published in the April 1940 issue of R.C.A. Review, 75 Varick Street, N.Y. to which publication we make due acknowledgment.*

optical path would have been removed and the effect of topographical irregularities on reflections from the ground would have been less.

The maximum field strengths on the two polarisations were compared. It was found that the maximum field strengths were in all cases greater on horizontal polarisation, but a similar comparison for minimum field strength values showed no consistent result. This was probably due to the shielding effect of horizontal open wires on horizontally polarised waves on some of the roads.

The results, summarised, show that for the area covered, horizontal polarisation (1) varies over a wider range, (2) has higher maximum values, and (3) produces a higher average field strength than vertical, other things being equal. It should be remembered that a comparison over a sea path or over high-conductivity ground might show different results.

E. J. W.

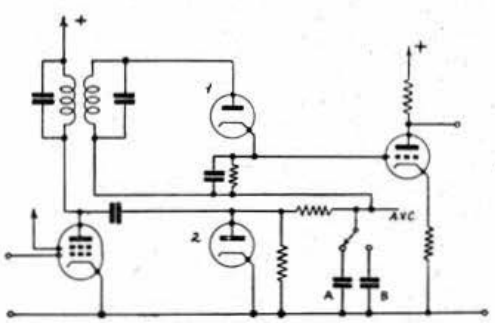
A Diode Detector Circuit

By I. J. P. James (G5IJ).

WHEN using an ordinary diode detector in a receiver, the problem arises of choosing the best value of A.C./D.C. load for the diode.

For efficiency of linear peak rectification it is necessary to employ a large value of load resistance, but for distortionless reception the A.C. load on the diode must be large compared with the D.C. load. The usual design is a compromise in order to avoid using a volume control of very high resistance.

One way of overcoming the difficulty is to connect the diode detector directly to the grid of the L.F. valve. This scheme has the disadvantage that the bias on the L.F. valve varies with the strength of the carrier. This can be avoided by the circuit shown in the diagram.



A novel Diode Detector Circuit in which the detector diode is connected to the grid of the L.F. valve.

In this arrangement the detector diode No. 1 is directly connected to the grid of the L.F. valve, and the low potential end of the diode load resistance is connected to the A.V.C. line. Assuming that the D.C. components from the two rectifiers are equal, then the bias on the L.F. valve remains constant with varying carrier levels. On the broadcast band, the condenser A may be large for maximum bass response. On short waves a small condenser, B, may be switched in for the purpose of producing a bass loss and a quicker A.V.C. action. Precautions have to be taken to avoid overloading the first L.F. stage. In the circuit shown, the first L.F. valve is provided with cathode degeneration to reduce distortion in this stage. Alternatively, a "cathode follower" stage could be employed with advantage.

Volume control can be carried out in a subsequent stage or in one of the radio frequency or I.F. stages. The detector load resistance should not have too high a value otherwise hum is likely to arise.

Although the two diodes are shown supplied with high frequency energy from different tuned circuits, this is not necessary in practice. It will be seen from the figure that the A.V.C. circuit is less selective than the detector circuit and thus when the receiver is detuned the bias developed by the A.V.C. diode is greater than that of the detector diode. The net result is that a large negative bias is applied to the L.F. valve. By a suitable choice of valve characteristic this bias may be used to reduce the L.F. gain when the receiver is detuned, thus providing a muting or "Q" effect.

Light Efficiencies

Whilst investigating the published literature on the production of light by fireflies, some interesting facts were discovered concerning the efficiency of various sources of light. The following table gives a few examples which may be of interest to readers.

Subject	Lumens per Watt
Glow-worm	0·000005
Neon glow discharge	0·8
Fireflies	2 to 10
Carbon filament lamp	6
Tungsten (vacuum) lamp	9
ditto (gas-filled)	10 to 20
Carbon arc D.C. (enclosed) ...	10
Carbon arc D.C. (open)	15
Neon arc	25
Mercury arc	40 to 50
Modern gas discharge tubes ...	40 to 80

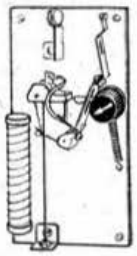
G5HF.

A Sticker Story

A few days after G2VV attached an R.S.G.B. "Sticker" to the windscreen of his car, and another to the back window, a motor lorry charged into the back of the car and did £100 worth of damage. Luckily he escaped serious injury, but it just goes to show how that little old diamond attracts people!

ELECTRADIX RADIOS

AUTOMATIC CIRCUIT BREAKERS



2-AMP. THERMO TIME-LAG CIRCUIT BREAKERS

A SPECIAL DESIGN IN AUTO-SWITCHES with time-lag tripping on 2 to 3 amps. Safety thermo switch with long-break auto overload trip. For back of panel with front indicating knob, compact, 4 in. × 2 in. × ½ in. deep. Any voltage up to 1,000 v. (as illus.). **Worth a Guinea.** Ideal for your experimental panel, and only **5/6.** Post 4d.

Magnetically tripped Switches that operate instantaneously.

We offer, at a reduced price, Circuit Breakers of first-class make, in place of fuses on power circuits. Operate instantly on an overload. Fireproof construction and bakelite or metal cover. Made in single, double, and triple pole. Prices are very low, and **type marked with a star have thermal trip delay.**

SINGLE POLE, HEAVY IRON CASE 250/400 Volt

Illustration shows S.P. with cover removed.

Rating	Type	Price
6 amps.	S 11/1G	11/6
6 ,,	S 11/1Z*	13/6
10 ,,	S 11/1G	16/-
15 ,,	S 11/1G	18/-

4 in. × 5½ in. DOUBLE POLE, IRON CASED

Rating	Type	Price	Rating	Type	Price
1 amp.	S 11/2Z*	18/6	5 amps.	S 11/2Z*	25/6
1½ ,,	S 11/2Z*	19/-	6 ,,	S 11/2Z*	26/-
2 ,,	S 11/2Z*	20/-	6 ,,	S 11/2	23/-
2½ ,,	S 11/2Z*	21/-	10 ,,	S 11/2Z*	32/-
3 ,,	S 11/2Z*	22/-	10 ,,	S 11/2	30/-
4 ,,	S 11/2	22/-	12 ,,	S 11/2Z*	36/-
4 ,,	S 11/2Z*	25/-	15 ,,	S 11/2Z	34/-

TRIPLE POLE, 3 TRIPS Light Iron Case 300/500 Volt

Rating	Type	Price
800 m/a.	S 11/3Z*	25/-
3 amps	S 11/3	21/-
3 ,,	S 11/3Z*	24/-
4 ,,	S 11/3	21/-
6 ,,	S 11/3	32/-
10 ,,	S 11/3	38/-
15 ,,	S 11/3Z*	45/-

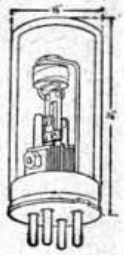
TRIPLE POLE, 3 TRIPS Heavy Iron Case 300/500 Volt

Rating	Type	Price
500 m/a.	S 11/3Z*	26/-
800 ,,	S 11/3Z*	27/-
1 ,,	S 11/3Z*	24/-
2 ,,	S 11/3Z	22/-
2 ,,	S 11/3Z*	26/-
3 ,,	S 11/3Z*	28/-
4 ,,	S 11/3	23/-
4 ,,	S 11/3Z*	30/-
6 ,,	S 11/3	36/-

MICRO-MOTORS

A.C. split phase synchronous motors, squirrel cage rotor, ¾ in. dia. Dog clutch drive to reduction gear from 2,000 revs. to 58 r.p.m. Voltage 15 to 20 volt, 50 cycles reversible double shaft, enclosed laminated new. Suit model drive, remote control switching, tuning drive, etc., **8/6.**

L.T. Battery-operated Home-made VIBRATOR KITS



To obtain H.T. successfully. Supersede H.T. Batteries. The Vibrator converts D.C. to A.C. by vibrating uniformly. Any voltage up to 100 watts obtained by transformers and rectified for radio H.T.

WE OFFER

American Vibrators totally enclosed, slightly dented covers. 4-pin non-sync. at the low price of **10/-**

METERS, ETC.

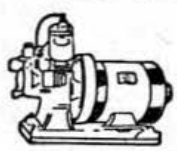
Genuine **Weston** model 354. Central zero 1 to 15 amps., pol. mag. dead beat. Flush panel, 2½ in. dial, nickel or black. Sale price, **7/6.** Mounted in solid mahog., 3 in. sq., **9/-.** Varied ranges of Switchboard Meters.

HOT WIRE METERS for Radio or Low-Frequency. ½ amp., 2½ in. dial, front panel, 100 m/a. to ½ amp., **10/-.** 200 m/a. to 1½ amp., **7/6.** 500 m/a. to 2 amps., **7/6.** To 2½ amps., **15/-.** High voltage model in square ebonite case, 1½ amps., **10/-.** Special Sullivan Meters with cut-out switch, **15/-.** High grade magnet damped H.W. Meters. 100 to 500 m/a., 4 in. dial, Marconi type, **25/-.** 200 m/a. to 1½ amps., J. & P., brass case, **27/6.** 2 amp. and 3 amp. ditto, **32/6.** 6 in. and 8 in. H.W. meters to 10 amps., 20 amps. and 50 amps., **40/-.**

LAB. GALVANOMETERS. Vertical Ballistic with mirror on coil, quite new, by Tinsley, **60/-.** Mirror Galvos. in brass case, **90/-.** Galvos. by Gambrell Paul and Nalder, **£3/10/-** and **£4** each. Universal Multiplying Galvo. Shunts, **35/-.** Silvertown, Siemens and Fuller horizontal 3½ in. Galvos., **7/6.** Vertical Telegraph type Central Zero Scale, **4/6.** Multiplex Vibrators, **45/-.** Wheatstone Bridges.

PELAPONE 500-watt, single-cyl. 2-stroke water-cooled, self oiling Engine, mag. ignition ; coupled to 50/70 volts, 10 amps. shunt Dynamo. 1,000 r.p.m., **£17/10/-.**

Horizontal Twin Petrol A.B.C. Engine, fan-cooled, coupled 1¾-KW. D.C. Dynamo, 50/70 volts 25 amps., Mag. Ignition. Cost £190, Sale **£25.**



2¾ kW. **AUSTIN.** 2-cyl. water-cooled Engine, Mag. Ignition and 110 volts 25 amps. Dynamo, **£28.** **Austin** 3½ kW., 110 volts, **£48.** Switchboards, **£5.**

ASTER Single-cyl. W.C. Engine, Bosch Mag., 2½ kW., Set 220 volts. Claudel H. Carb. Coupled 12 amps. compound Dynamo, **£20.**

2½d. stamped envelope must be enclosed for post replies.

ELECTRADIX RADIOS

218, UPPER THAMES STREET, LONDON, E.C.4
Telephone : Central 4611

MATHEMATICS FOR THE RADIO AMATEUR

By T. R. THEAKSTON, B.Sc. (2DBK).

PART VI.—LOGARITHMS—INTRODUCTION

FOR saving labour in arithmetical calculations, logarithms are invaluable. By devoting some effort to practising the reading of log tables, and to the fundamental manipulations with logs, their use can become automatic and rapid. All this can be done without any knowledge of what the log really is or of how it is obtained. As the author's argument, however, is that one should know the "Why," a brief explanation will be given. This section could, however, be omitted at the first reading without great detriment.

The reader has undoubtedly studied the excellent article on "Logs" published in the February, 1941, issue of this Journal. Another perusal is strongly recommended before making a detailed study of this more formal article.

Definition of a Logarithm

In Part V we saw how any number can be expressed, in index form, as a power of another number.

Thus 49 can be expressed as 7^2, 1000 as 10^3, etc.

A Logarithm is an Index.—In logarithms all numbers are given as powers of some arbitrary number which is called the *base*. So in the examples above

2 is the log of 49 to base 7
3 ,, ,, 1000 ,, 10.

and these facts would be stated :

$$\text{Log}_{\ 7}49 = 2\ ;\ \log_{10} 1000 = 3\ ;$$

and generally, if

$$a^x = N, \text{ then } \log_{\ a}N = x$$

The general definition, which can be understood by referring to the examples, is "*The logarithm of a number to a given base is the index of the power to which the base must be raised to equal the number.*"

For common use the base 10 is used, in which case the subscript is omitted ; and hence *the Common Logarithms are indices of powers of* 10.

Therefore, if we say that log 41·73 = 1·6204
we really mean that $10^{1.6204} = 41{\cdot}73$.

A log consists of two parts, the whole number part called the *characteristic*, and a fractional part (in decimal form) called the *mantissa*.

The characteristic, which may be positive or negative, is found by inspection according to a simple rule ; the mantissa, which is always positive, is obtained from log tables.

The Characteristic

As $1000 = 10^4$, log 10000 = 4
$1000 = 10^3$, log 1000 = 3
$100 = 10^2$, log 100 = 2
$10 = 10^1$, log 10 = 1
$1 = 10^0$, log 1 = 0
$\cdot1 = \frac{1}{10} = 10^{-1}$, log .1 = − 1
$\cdot01 = \frac{1}{100} = 10^{-2}$, log ·01 = − 2
$\cdot001 = \frac{1}{1000} = 10^{-3}$, log ·001 = − 3

Studying the above it will be seen that the log of a number between 100 and 1000 must be between 3 and 4 ; the log of a number between 1 and 10 must be between 0 and 1 ; the log of a number between ·01 and ·1 is between — 1 and — 2, etc.

Thus $2 = 10^{\cdot3010}$, $\therefore \log 2 = \cdot3010$

$200 = 2 \times 10^2 = 10^{\cdot3010} \times 10^2 = 10^{2\cdot3010}$,
$\therefore \log 200 = 2{\cdot}3010$

$\cdot2 = \frac{2}{10} = 2 \times 10^{-1} = 10^{\cdot3010} \times 10^{-1} = 10^{-1+\cdot3010}$
$\therefore \log \cdot2 = \bar{1} + \cdot3010$

Remembering that the characteristic is the whole number part of the log, the rule for determining it by inspection can be seen. It is clear that the characteristic depends on the number of digits only, and not on their value. For any number greater than 1 the characteristic is positive and one less than the number of digits in that part of the number before the decimal point : *e.g.*, the characteristic of the log of 785 is 2, because there are three digits before the decimal point ; of 7·85 it is 0, as there is one digit in the integral part ; of 7850 it is 3, etc.

For any number less than 1 the characteristic is negative and is 1 more than the number of ciphers immediately after the decimal point : *e.g.*, the characteristic of the log of ·0785 is — 2, written $\bar{2}$ and read "bar 2," because there is one cipher ; of ·785 is $\bar{1}$, because of no ciphers ; of ·00785 it is $\bar{3}$, as there are two ciphers, etc.

The Mantissa

This decimal, and always positive, part of the log is found from tables, and depends only upon the significant figures in the number. That is, the mantissa is unaffected by ciphers at the beginning or end of the number, and by the position of the decimal point. Hence the mantissæ of the logs of 20·79, 20790, ·02079 are identical (the characteristics of the logs only varying), as each number has the same significant figures, 2079.

Logs for all numbers from 1 to 100,000 have been evaluated with seven decimal places in the mantissa. Ordinarily, for approximate calculations (that is, calculations correct to four significant figures) four-figure logs are used. A specimen of the four-figure table is appended.

To Find the Log of a Number

The first two significant figures are found in the first column. On that horizontal row (in the vertical column below the third sig. fig.) is the log of the first three sig. figs. For the fourth sig. fig. look in the column of mean differences, still keeping on the same horizontal row, and add this to the number previously obtained. This is the mantissa of the log ; the characteristic will have been written down by inspection.

Example.—Find the log of 2674.

The characteristic, which depends only on the number of digits before the decimal point, or the number of ciphers after it, is written down as 3 (for there are four digits in the whole number).

The log table is now referred to.

(1) Opposite 26 in the first column and below 0 in the top horizontal row we find ·4150. This tells us that the mantissa for log 26 (or 260, or ·26, etc.) is ·4150.

(2) On this row, and below 7 in the top row, we have ·4265. This tells us that the mantissa of log 267 (or 2670, or ·267, etc.) is ·4265.

(3) In the mean differences below 4, and keeping on the same row as before, there is 7. 4265 + 7 = 4272, hence mantissa of log 2674 (or 2·674, or ·2674, etc.) is ·4272. Prefixing the appropriate characteristic: **log 2674 = 3·4272.**

The same reading of the table also gives: log 2·674 = 0·4272; log 26740 = 4·4272; log 0·002674 = $\bar{3}$·4272, etc.

log ·0028 = $\bar{3}$·4472 log 25·09 = 1·3994
log 273 = 2·4362 log ·02994 = $\bar{2}$·4763

Antilogarithms

In addition to being able to find the logs of numbers it is necessary to be able to find a number for which we know the logarithm. This can be done by reversing the process in the log table, but a better way is to use the table of antilogarithms. This table gives in first column, and top row, and mean differences, the mantissa, *i.e.* decimal part of the logarithm, and in the columns the figures (without place value) of the corresponding number. It should be noticed that the decimal point is prefixed to the numbers in the first column.

1st Two Sig. Figs.	Third Significant Figure.										Fourth Sig. Figure. Mean Differences.								
	0	1	2	4	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
25	3979	3997	4014	4031	4048	4065	4082	4099	4116	4133	2	3	5	7	9	10	12	14	15
26	4150	4166	4183	4200	4216	4232	4249	4265	4281	4298	2	3	5	7	8	10	11	13	15
27	4314	4330	4346	4362	4378	4393	4409	4425	4440	4456	2	3	5	6	8	9	11	13	14
28	4472	4487	4502	4518	4533	4548	4564	4579	4594	4609	2	3	5	6	8	9	11	12	14
29	4624	4639	4654	4669	4683	4698	4713	4728	4742	4757	1	3	4	6	7	9	10	12	13

Table I. Extract from Table of 4-Figure Logarithms.

Summary.

When finding logs of numbers:

(*a*) Write down the characteristic. It is a whole number. It is positive and one less than the number of digits before the decimal point, or negative and one more than the number of ciphers after the point.

(*b*) Find the mantissa from the table, taking the four significant figures of the number. If there are more than four sig. figs. use the number corrected to 4: *i.e.*: for 32736, which has five sig. figs., use 3274; for 987123, which has six sig. figs., use 987100. If there are less than four sig. figs., *i.e.*, for 17,893,5, etc., regard these as 1700, 8930, 5000, etc.

The value given in the table is always positive, and is a decimal.

Exercise

Before proceeding further, the following should be verified. The logs could be covered up with a slip of paper, and the reader could find them from the table, writing them down and verifying later.

log 2500 = 3·3979 log ·2753 = $\bar{1}$·4398
log 27 = 1·4314 log 286·8 = 2·4576
log ·29 = $\bar{1}$·4624 log 2·69 = 0·4298

The process of reading the antilog table is just as for the log table. The first two figures of the log are in the first column, the third in the top row, and the fourth in the mean differences. Having obtained the significant figures, the characteristic tells us where the decimal point is placed. A characteristic of 3 indicates that there are four figures before the decimal point; one of $\bar{2}$ shows that the number (the log of which we have), has one cipher immediately following the decimal point.

Example.—Find the number the log of which is 2·6947, *i.e.* find antilog 2·6947.

The antilog table (q.v.) gives the significant figures for ·6947.

(1) Opposite ·69 and below the 4 is 4943.

(2) Under the 7 in the differences column, and on the same row, is 8. 4943 + 8 = 4951.

Hence the figures in the required number are 4951.

(3) The characteristic 2 indicates three digits before the decimal point. Place the point so this is so. This gives 495·1.

i.e. **antilog 2·6947 is 495·1**

Antilog 1·6947 = 49·51; antilog $\bar{1}$·6947 = 0·4951, etc.

1st Two Decimal Places.	Third Decimal Place.										Fourth Decimal Place. Mean Differences.								
	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
·66	4571	4581	4592	4603	4613	4624	4634	4645	4656	4667	1	2	3	4	5	6	7	9	10
·67	4677	4688	4699	4710	4721	4732	4742	4753	4764	4775	1	2	3	4	5	7	8	9	10
·68	4786	4797	4808	4819	4831	4842	4853	4864	4875	4887	1	2	3	4	6	7	8	9	10
·69	4898	4909	4920	4932	4943	4955	4966	4977	4989	5000	1	2	3	5	6	7	8	9	10
·70	5012	5023	5035	5047	5058	5070	5082	5093	5105	5117	1	2	3	5	6	7	8	9	11

Table II. Extract from Table of 4-Figure Antilogarithms.

Similarly antilog $\bar{2}\cdot7$ is 0·05012, because opposite ·7 in the table is the number 5012, and the characteristic $\bar{2}$ means that the number is less than 1, and has one cipher immediately after the decimal point.

Summary

When finding antilogs, *i.e.* numbers corresponding to given logs :

(*a*) The decimal portion only is looked up in the antilog table. To remind one of this the decimal point is there in the first column, and should be looked for always to ensure that the correct table is being used.

Correct the number to four places (if using four-figure tables) : *i.e.* ·42763 becomes ·4276, and ·42768 becomes ·4277. Look up in table. This gives the significant figures required. Write them down.

(*b*) The whole number of the characteristic states the position of the decimal point. If it is positive, there is one more digit than its value before the decimal point in the required antilog. If it is negative there is one less cipher than its value after the decimal point.

Exercise

Verify the following :

antilog 0·66	= 4·571	antilog 2·6648	= 462·2
antilog 0·681	= 4·797	antilog $\bar{1}\cdot7049$	= 0·5069
antilog 0·706	= 5·082	antilog $\bar{2}\cdot6709$	= 0·04687
antilog 0·6956	= 4·962	antilog $3\cdot67939$	= 4779·0
antilog 1·68	= 47·86	antilog $\bar{1}\cdot68213$	= 0·4809

Negative Quantities.

Before dealing with the application of logs it will be as well to revise the manipulation of negative numbers, for this alone, in some cases, causes difficulty when using logs.

We must remember primarily that a log such as $\bar{2}\cdot6714$ means $-2+\cdot6714$. If it is visualised as such when adding or subtracting with other logs, or when multiplying or dividing it, errors will be very infrequent.

The rules for addition, etc., of positive and/or negative numbers were given in Part V, and should be re-read. Illustrative examples, with notes, will be given for those cases where a log with a bar number, *i.e.*, a number partly positive and partly negative, is used. One figure only after the decimal point will be given so as to economise with space. The principle is just the same with the usual four places in the mantissa.

Addition

(*a*)
$$\begin{array}{r} 3\cdot7 \\ 2\cdot6 \\ \hline 2\cdot3 \end{array}$$
$(3+\cdot7)+(-2+\cdot6)=2\cdot3.$
Working is : $6+7=13$. Write down 3 and carry + 1. Then $3+1-2=4-2=2$.

(*b*)
$$\begin{array}{r} \bar{3}\cdot7 \\ 2\cdot6 \\ \hline 0\cdot3 \end{array}$$
$(-3+\cdot7)+(+2+\cdot6)=0\cdot3.$
Working is : $7+6=13$. Write down 3 and carry 1. Then $-3+1+2=-3+3=0$.

Subtraction

Remember that to subtract negative numbers, change the sign and add :

(*a*)
$$\begin{array}{r} 2\cdot3 \\ \bar{1}\cdot2 \\ \hline 3\cdot1 \end{array}$$
$2\cdot3-\bar{1}\cdot2=(+2+\cdot3)-(-1+\cdot2)=3\cdot1.$
Working : $3-2=1$.
$2-(-1)=2+1=3$.

(*b*)
$$\begin{array}{r} \bar{3}\cdot6 \\ 1\cdot4 \\ \hline \bar{4}\cdot2 \end{array}$$
$\bar{3}\cdot6-1\cdot4=(-3+\cdot6)-(+1+\cdot4)=\bar{4}\cdot2.$
Working : $\bar{3}-1=-3-1=-4$.

(*c*)
$$\begin{array}{r} \bar{3}\cdot6 \\ -\bar{1}\cdot4 \\ \hline \bar{2}\cdot2 \end{array}$$
$\bar{3}\cdot6-\bar{1}\cdot4=(-3+\cdot6)-(-1+\cdot4)=\bar{2}\cdot2.$
Working : $\bar{3}-\bar{1}=-3-(-1)=-3+1=-2$.

(*d*) The type which presents most difficulty is that in which the mantissa being subtracted is the greater.

Ex. I : $\bar{2}\cdot4-\bar{1}\cdot9=\bar{2}\cdot5$.

It is remembered that the mantissa must be positive always. To ensure this, one unit is " borrowed " to make the ·4 into 1·4. From this ·9 can be subtracted and give a positive answer. The 1 we have used in this way has been taken from the $\bar{2}$, thus making it $\bar{3}$. Hence the sum is regarded, mentally, as being

$$\begin{array}{r} \bar{3}+1\cdot4 \\ -\bar{1}+\cdot9 \\ \hline \bar{2}+\cdot5 \end{array}$$

Ex. II: $\begin{array}{r}\bar{3}\cdot5\\-1\cdot7\\\hline\end{array}$ is regarded as $\begin{array}{r}\bar{4}+1\cdot5\\-1+\cdot7\\\hline\end{array}$, and the solution is then $\bar{5}\cdot8$. The 1 attached to the ·5 was taken from $\bar{3}$, making it $\bar{4}$. Then $\bar{4}-1=\bar{5}$.

Multiplication

As ordinarily, taking care with the sign, *i.e.* remembering that $\bar{1}\cdot6=(-1+\cdot6)$, and should be treated as such when it is being multiplied.

$$\begin{array}{r} \bar{1}\cdot6 \\ \times 3 \\ \hline \bar{2}\cdot8 \end{array}$$
Working : $3\times(+\cdot6)=+1\cdot8$. Write down ·8 and carry the + 1.
$3\times(-1)=-3$. $-3+$ the 1 carried $=-2$.

Similarly (and verify this) $\bar{2}\cdot8\times4=\bar{5}\cdot2$.

Division

Again it is emphasised that the mantissa is always positive, and so in dividing a log such as $\bar{2}\cdot6$ by, for example, 4, it must be arranged so that no negative remainder is carried into the decimal portion. This is done very simply as follows :

The $\bar{2}$ is made exactly divisible by 4 by adding 2 to it ; and to balance this -2 added, $+2$ is added to the mantissa, making it $2\cdot6$.

Hence $\dfrac{\bar{2}\cdot6}{4}=\dfrac{\bar{4}+2\cdot6}{4}=\bar{1}+\cdot65=\bar{1}\cdot65.$

$\dfrac{\bar{5}\cdot8}{3}=\dfrac{\bar{6}+1\cdot8}{3}=\bar{2}+\cdot6=\bar{2}\cdot6.$

$\dfrac{\bar{1}\cdot7}{5}=\dfrac{\bar{5}+4\cdot7}{5}=\bar{1}+\cdot94=\bar{1}\cdot94$, etc.

If this preparatory work is done carefully the reader will be able to follow immediately and easily the methods of using logs to be given in the next article.

For speed in using logs, practice as in the problems below is essential.

Problems

(22) What are the characteristics of the logs of: 379; ·48; 97·12; 18450; ·007.

(23) Antilog ·3817 = 2·408. Write down the antilogs of: 2·3817; $\bar{1}$·3817; 1·3817; 3·3817; $\bar{2}$·3817.

(24) From tables find the logs of: 397·9; 8·31; 0·67; 14·322; ·007684.

(25) From tables find the antilogs of: 1·6713; $\bar{1}$·2988; 3·57631; 0·06779; $\bar{2}$·3980.

(26) Evaluate:

(*a*) 1·4 + 3·7; $\bar{1}$·4 + 3·7; $\bar{1}$·4 + $\bar{3}$·7; 1·4 + $\bar{3}$·7.

(*b*) 3·9 — 2·4; $\bar{3}$·9 — 2·4; $\bar{3}$·9 — $\bar{2}$·4; 3·9 — $\bar{2}$·4.

(*c*) 1·7 × 4; $\bar{1}$·7 × 4; $\bar{2}$·5 × 3; $\bar{1}$·6 × 1·5; $\bar{1}$·4 × 2·5.

(*d*) 5·2 ÷ 5; $\bar{5}$·2 ÷ 5; $\bar{1}$·7 ÷ 2; $\bar{3}$·8 ÷ 5; 7·4 ÷ 3.

(27) Subtract log 0·4837 from log 2·8634.

(28) Multiply log 0·0952 by 3.

(29) Divide log 0·0078 by 5.

Solution to Problems

(17) (*a*) 256; 512; 1; $\frac{1}{1000}$ or 0·001.

(*b*) 3; 10; $\frac{1}{2}$ or 0·5; 100.

(18) (*a*) 10^{10}; 10^{6}; 10^{1} or 10; 10^{3}.

(*b*) 10^{-3}; 10^{3} or $\frac{1}{10^{3}}$; 10^{1}; 10^{0} or 1.

(*c*) 10^{6}; 10^{9}; 10^{2}; 10^{1} or 10.

(19) 10^{3} or 1000.

(20) 1·3; 130; 0·13.

(21) 721; 12·2; 2·93.

(To be continued next month)

Correction. Part V

Page 283, col. 1, 3 lines from bottom:—

" then $\sqrt{0·573} = \sqrt{\frac{573}{100}}$ "

should read

" then $\sqrt{0·573} = \sqrt{\frac{57.3}{100}}$ "

Mathematics for the Radio Amateur.

Headquarters can supply the February issue of THE T. & R. BULLETIN, containing Mr. D. G. Baggs' article on Logs., referred to by Mr. Theakston. Price 1/–.

Letters to the Editor

Looking Further Ahead

SIR,—Having read the very interesting letter by G8HA, published last month, I feel that he has touched on a very important subject, namely, " Message Handling." I do not think that the Post Office would allow traffic handling on the scale that it is practised in America, neither do I think that it would serve such a useful purpose in this country where the distances covered are so much smaller. However, some form of message handling should, in my opinion, be permitted, particularly messages relating to Amateur work. Such messages would be of great assistance to those engaged in real experimental work.

With regard to Traffic Handling within the Empire and the U.S.A., this too should be possible, although it would probably be necessary to limit the arrangement to messages connected with amateur radio. This would not be a hardship, as there would be plenty of available material for traffic and, as G8HA has said, the standard of operating would improve considerably.

Yours faithfully,
T. CHAS. BRYANT (G3SB).

SIR,—I was very interested to read Mr. Emmerson's letter in the March BULLETIN, and agree with him that we should press for permission to handle third-party traffic after the war. Several other amateurs of my acquaintance have expressed similar views.

It seems to be generally believed that the reluctance of the G.P.O. to allow third-party traffic is due to a fear of " competition " from amateurs. I hardly think that the volume of traffic we should handle would be such as to reduce appreciably the revenue which the G.P.O. obtain from telegrams. The licence fees paid by amateurs would probably amount to a considerably greater sum. Also, many of the messages would probably not be sent at all if the regular G.P.O. service were the only one available.

To ensure a standard of operating high enough to warrant such permission being granted, it would seem advisable to raise the code-speed minimum to, say, 15 w.p.m., and to institute a procedure test. An examination on elementary radio theory would also help to clear up the amateur bands. In my opinion, some tests on these lines should be passed by all who wish to use the ether, including those who held transmitting licences before the war.

As Mr. Emmerson says, considerable practice is required before messages, as opposed to Ham QSO's, can be efficiently handled. However, after a year or two under the proposed new regulations, I believe that the overall quality of British amateur signals would be second to none.

Yours faithfully,
K. B. WILSON (G8OW).

Editorial Note.—It is regretted that space restrictions prevent us from publishing further letters in connection with the above topic. The majority of correspondents, however, appear to think that Traffic Handling would be welcomed by amateurs.

RANDOM REFLECTIONS

By COMMENTATOR

SOON after the outbreak of war our contemporary *The Model Engineer*—it is a contemporary as its ideals are the same as ours though it covers a different sphere—published in an Editorial some remarks from a reader's letter in which he had described his workshop as his " sanity room." The present writer could not help thinking how appropriate that term was for describing our own " shacks." We had our worries and troubles even during those far-off days of peace, and after a busy spell in shop or office, when everything seemed to have gone wrong with the world, what better way of recuperating was there than to hurry home, don the old slippers and hide oneself away up in the shack for a quiet evening amidst the things we cherished ? A few local QSO's perhaps, a bit of DX, a little addition to the new receiver or the filling up of those QSL's which should have been dispatched weeks ago. Whatever it was, the evening passed quickly and happily, the cares of the world were forgotten, and once again we were restored to sanity. When war broke upon us and our transmitters were carted off " lock, stock and barrel," most of us felt that event represented the end of ham radio. The shack door was slammed, the key turned in its lock and we turned our backs on all it had meant. We had more important work on hand. The fight was on. We had a war to win. We hadn't time for hobbies. We must get down to the job.

But things have not turned out quite as we had expected. Some of us who thought we would be at grips with the enemy find ourselves still in the old job. Others in the Services find themselves with time to spare in strange towns where—if our memory doesn't fail us—there should be a ham shack or two. We find we cannot work all the time. We've *got* to get a change occasionally. More than ever now we feel the cares of this mortal life. Gradually, one by one, we've been slinking back to our old shacks. The key has been turned once again, the cobwebs cleared, the rusty tools reconditioned, the fallen QSL cards replaced in their rightful places on the wall and—well, already we feel better. Spurred on by our rising spirits, we decide that as the shack has been shut up for so long we might as well give it a thorough spring clean. This produces several good results. It gets rid of that pile of old papers under the bench which we've always meant to clear out but have never had time to do, and at the same time provides a bit more waste paper for the National Effort. If we're going to have the salvage chap round, we might as well give him something worth while taking, so we decide to take the final plunge and get rid, once and for all, of all those junk components we've had stowed away " just in case they come in handy." That having been done, we sigh a sigh of relief, " Won't be tempted to use that rubbish any more ! " During the course of our spring cleaning we come across that frequency meter we once started. We had put some good work into that frequency meter. We had begun with big ideas, but somehow it had never been finished. DX had opened up a bit, and it had been put aside. It looked pretty good still, in spite of having been underneath the junk box. How about finishing it ? So the next few nights we get on with it, and at the week-end, when we receive an unexpected visit from " Sergeant Ham " of the local searchlights, oh ! boy, do we feel keen to be caught in the act of still being a real active amateur !

All this little story, dear reader, is just to remind you that a hobby is good for a man, war or no war, and that it is the easiest way of keeping sane in a mad world. There's plenty to be done, and if you do it now you'll be encouraging those firms who still help to keep our Society and its BULLETIN on a sound financial footing. And, as J. C. asked us in the December issue, you won't forget, will you, to mention where you saw their advert. when you write for those new components required to finish off that frequency meter ?

Talking of sound finances, I wonder what you thought when you saw recorded that fine balance of £340 in the balance sheet sent you a month or so back ? Did you, I wonder, think as the Scribe for District 9 thought when he wrote his notes for the December issue ? " Lest we forget—congrats. to our Secretary-Editor and all those who have managed to present such a good balance sheet at the end of a very difficult year." In the preparation of these articles I've come to learn quite a lot about what goes on behind the scenes, to make sure that the Society keeps going, and that we receive our BULL. regularly month by month. I'm afraid we're rather inclined to take all these things for granted. I wonder if our good friend " Clarry " will forgive me if I quote from a recent letter I received from him ? I hope he won't mind, because it illustrates so well the point I wish to make. He says : " It may seem perhaps strange to you that with our home filled with Society paraphernalia that anyone besides myself would be even remotely concerned in the more abstract aspects of our work, but the whole family show great interest in everything—especially the BULL. My eldest daughter has already contributed several sketches and is working up something for our next issue, whilst they all help in general office duties. Your BULL. wrapper was probably prepared by my youngest daughter after a day at school, and your renewal reminder may come to you through Mrs. CL's hands." There is more I could quote, but I will stop there, as it serves well, I think, to demonstrate that the Ham Spirit is very much alive in those who conduct our Society affairs. May I say, too, on behalf of all of us " Thanks a lot to you all at 6CL ? "

Oh, ! Henry !

The following is an exact copy of an order received by one of our advertisers from the Technical Department of a Government Station :—

Please supply :

Item 1 ... Chokes, Low Frequency, Quantity 8.

Item 2 ... Henries, Quantity 6.

Our advertisers asked for further details of Item 2, suggesting that it be deleted. They received this gem in reply :—" We confirm the remarks contained in the second paragraph of your letter, namely—that " Henries, Quantity 6 are to be deleted from the order."

Jones, bring me the elbow grease !

A NEW CRYSTAL CALIBRATOR

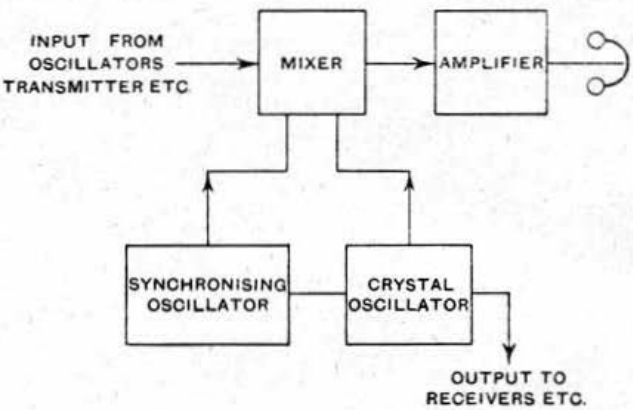
The General Electric Co. Ltd., have introduced a new instrument in the form of a crystal calibrator, which should be of great interest to all amateurs who wish to have available a quick, easy and accurate means of calibrating their receivers and transmitters.

The instrument comprises a crystal oscillator, followed by a mixer stage and amplifier-detector. The principle of operation is shown below. If the apparatus to be tested or calibrated is some form of oscillator (such as a signal generator or transmitter) its output is passed to the mixer stage of the calibrator. The crystal oscillator, whose harmonics are accentuated by a special circuit, is also fed into the mixer and the two signals produce an audible beat note, which is amplified and detected in the normal way. For precise frequency measurement the frequency of the unknown source can be varied so that zero beat is obtained.

The crystals employed are cut from the finest quality quartz and are of extremely low temperature coefficient. There are three in all, ground to frequencies of 100 kc., 1 Mc. and 5 Mc., the required frequency being selected by means of a switch on the panel.

A unique feature of the instrument is the addition of a synchronising oscillator (using an acorn valve) which is capable of being switched to 25 Mc. or 50 Mc. This oscillator can be brought into tune with the corresponding harmonic of the 5 Mc. crystal, thereby avoiding the confusion which arises when trying to differentiate between various harmonics grouped close together at high frequencies.

G5HF.



Schematic diagram of principle.

The Morse Code on Columbia Records

At a most appropriate moment *The Gramophone Co. Ltd.*, Hayes, Middlesex, through its associated Company—Columbia—introduces a set of four double-sided Morse Instruction records, which are assured of considerable popularity.

On the principle that oral instruction is necessary in the early stages as an aid to understanding, a morse expert has been engaged to make the records, carefully explaining how the code is constructed.

The importance of learning the alphabet as dits and dahs is stressed; thus the student is able instantly to recognise the correct sound formations, a method repeatedly stressed by the Society in its publications. The introduction of the human voice is a matter of psychological importance.

The method of presentation is based on the latest practice used by the three fighting services.

Part 1 explains how the Morse Code is built up from the elementary dot and dash, each letter being repeated twice. Part 2 deals with figures, common punctuation and procedure signs.

Part 3 provides an introduction to simple plain language messages and simple letter groups. Part 4 contains short plain language, code and figure group messages. Part 5 is a similar record but the speed is now increased, whilst some weak jamming is introduced. Part 6 contains longer messages sent at a faster rate and with medium jamming.

Parts 7 and 8 contain mixed and plain language messages, transmitted at 18 words per minute and with more severe jamming.

The instructional value of these records lies in the perfect sending employed, coupled with the fact that a most pleasant tone of signal is used. The jamming is very natural and is made to vary in strength in a manner experienced in actual practice.

The records should prove especially useful to those called upon to give morse instruction to Service recruits, Cadets, Scouts and others interested in learning the code quickly and accurately.

The full set (Numbers DB1995–1998) costs 12/-, plus 2/8 purchase tax.

J. C.

Bombed Out

G5VO. New address: 1 Belgrave Mansions, Marine Drive, Bridlington, Yorks.

NOT "A SOLE EXCLUSIVE HEAVEN"

IN our February issue we expressed regret that a contemporary should display ignorance of the work of our Society. That contemporary, *The Wireless World*, in its current issue takes exception to the fact that we have published a record of the work we have done for the improvement of amateur radio. *The Wireless World* has not recognised this position; a fact which forces us to the conclusion that they are only interested in the matter from a journalistic viewpoint.

The article in their April issue distorts our outlook and intentions, for example, it expresses *fears* that the author of the article published in our February issue holds a certain view, then, without definitely saying so, by clever phrases insinuates that he *does* hold that view.

Let us say quite plainly in reply:

(1) Neither the Council nor, we are sure, does any member of R.S.G.B. hold the view that, "unless you are a member of that body you are not an amateur wireless transmitter."

(2) No attempt will ever be made to make membership of R.S.G.B. a necessary qualification for an amateur transmitting licence. The Post Office is fully aware of our views on this point, and *The Wireless World* could easily have found this out if they had wished.

(3) The R.S.G.B. has never claimed "a sole exclusive heaven." The Society has co-operated with, and has done work for, non-members in the past, and will do so in the future. It should be remembered that any concessions obtained by the R.S.G.B. from the Post Office have automatically been conferred on non-members. The R.S.G.B. is sufficiently broadminded to recognise that there are excellent amateurs outside the Society who are not interested in its work. The Society can, however, claim to represent at least 80 per cent. of the pre-war licensed amateurs of Great Britain. The Council believes that the majority of members are in the Society for the purpose of doing what they can to help amateur radio in all its aspects, and not for what they are able to get out of it.

Regarding "Navigator's" letter in the April issue of *The Wireless World*, we are unable to trace any suggestion that he should refrain from putting forward views as to the future, or that the R.S.G.B. expects any eulogy from him. Further, we are unable to discover in our article any attempt to discredit his ideas; neither is it true to say that there is any petty egoism in the Society. Was it not reasonable, however, to expect some mention of R.S.G.B. to be made in his original article, bearing in mind that the improvements effected in amateur radio conditions during past years have been obtained by the R.S.G.B., through negotiations with the G.P.O.?

The R.S.G.B. is fully appreciative of the help which it has received in the past from *The Wireless World*. It was for that reason the phrase "so valued and so long established a contemporary" was used when referring to "Navigator's" article.

We trust *The Wireless World* will agree with us that the immediate duty of all who have an interest in the future of British amateur radio is to pool ideas and work for a common cause.

H.A.M.S.

The response to the notice published in our last issue, inviting members to send to Headquarters the name or names of non-members who would like to receive details of Society activities has been very gratifying. A large number of specimen copies of the BULLETIN have been distributed and already several applications for membership have been received as a result of the co-operation given by members.

Attention is drawn to the form which is again reproduced on page 348. Those who do not wish to cut their copy of the BULLETIN may forward a postcard to Headquarters, requesting particulars to be sent to their friends.

Receiver Designs

From time to time it has been suggested by members that up-to-date articles dealing with V.H.F. superhet design would be welcome. A design which we believe would prove popular would be one employing English Acorns (such as the Mullard 4671 and 4672) covering frequencies from 30 Mc. up to 300 Mc. Such a receiver could be employed ahead of a good standard communications model, making the whole a very sensitive double super-het.

The Secretary-Editor will be glad to hear from any member who is in a position to undertake the construction of such a receiver or any similar design.

British Standard Specification 415

B.S.S. No. 415, "Electric Mains-operated Radio and other Apparatus for Radio, Acoustic and Visual Reproduction," has recently been revised. The R.S.G.B. were directly represented on the committee, entrusted with the preparation of this important specification, which is obtainable from the British Standards Institution, 28 Victoria Street, London, S.W.1; Price 2/3 post free.

CRYSTAL CLEAR

Yes, on Sunday mornings he used to call me on it.

SOME SUGGESTIONS REGARDING THE W3EDP AERIAL SYSTEM

By W. GRIMBALDESTON, B.Sc. Tech. (G6WH)

IN view of the articles which have appeared in recent issues concerning the W3EDP aerial system, and having regard to the absence of any generally accepted theory concerning the operation of this aerial, the following notes may perhaps be of some interest. They seek to provide some explanation of the results achieved with an aerial which was developed purely on an experimental basis, as the original article by Messrs. Beers and Wilford pointed out.

If one considers the 84-ft. top, used in conjunction with the appropriate counterpoise, it will be seen to consist of a length of wire carrying standing waves, and having one, two, three or five electrical half-waves (according to the band in use) disposed along its length. Of course, the length of aerial plus counterpoise is not sufficient to accommodate these numbers of half-waves unless sufficient " artificial wire length " is inserted by means of a parallel-tuned circuit to bring the system to resonance. In this respect, it is interesting to compare the aerial with the parallel-tuned zepp or with the compressed dipoles which have been described at various times. The tuned circuit, then, serves to resonate the whole system (except on 28 Mc.) and to provide a convenient means of feeding the aerial.

If a mid-band frequency on 7 Mc., corresponding to a half-wave aerial of length 67 ft., be taken as an example, corresponding half-wavelengths on 3·5, 14 and 28 Mc. would approximate to 134 ft., 33 ft. 6 in. and 16 ft. 9 in. respectively. The following approximate relationships would then hold :—

(*a*) On 28 Mc., 84 ft. represents 5 half-waves almost exactly, and the aerial can be tapped on to the end of the aerial tuning coil and used as an ordinary voltage-fed end-on aerial. No counterpoise is needed.

(*b*) On 14 Mc., the 84-ft. top represents two half-wavelengths plus 17 feet. The use of a 17-ft. counterpoise would bring the whole system very near to a length of three half-wavelengths, but there would then be no need to use the tuned circuit, so that an alternative method of feed would have to be adopted. A shorter counterpoise is therefore used, together with sufficient inductance and capacity to resonate the system. Apparently, 6 ft. 6 in. provides an effective compromise between counterpoise length and size of tuned circuit.

(*c*) On 7 Mc., the top will accommodate one half-wave plus 17 ft. The use of the 17-ft. counterpoise would then provide a symmetrical system, the middle of the tuned circuit corresponding with a current antinode. It is of interest to observe that the tuned circuit is supplying the equivalent of a quarter-wavelength of wire. The symmetry of the arrangement on this band, the band for which it was primarily developed, is particularly striking.

(*d*) On 3·5 Mc. the top contains less than a half-wave, being a quarter-wavelength plus 17 ft. The 17-ft. counterpoise and tuned circuit are used to bring the whole to an electrical half-wavelength. The inner end of the tuned circuit is located only one sixteenth of a wavelength from the current antinode, so that the feed is again substantially at " high current."

(*e*) Although not usually recommended for use on 1·7 Mc., the top can be tuned to work as a Marconi aerial against earth by means of a parallel-tuned circuit. The aerial is considerably less than a quarter-wave in length, but the writer has used such an aerial on this frequency with quite fair results, although a longer aerial would, no doubt, have been superior.

One of the great advantages of this aerial is that it provides a solution to the problem of multi-band operation in cramped locations. Moreover, such aerials often contain one or more sharp bends (the writer's had four !) which tend to render them more or less omni-directional. The counterpoise also radiates to quite an appreciable extent, and, since the latter is usually arranged at right-angles to the aerial, this radiation helps in achieving the omni-directional effect.

It would appear that Mr. Tomlin's experiment of raising the counterpoise above the aerial may have rendered the radiation from the former more effective.

At 7 Mc., 17 ft. represents only an eighth of a wavelength, along which the voltage distribution in the standing wave varies from a maximum to 0·7 of that maximum—that is a variation of only 30 per cent. It seems therefore that, as Mr. Tomlin points out, a neon might glow with nearly uniform brilliance along the length of the counterpoise. But it seems difficult to account for the observed voltage maximum at a distance of 30 ft. from the free end of the top wire.

In Marconi aerials, a counterpoise near the ground is often used as a substitute for a high-conductivity earth, but in the W3EDP aerial the counterpoise is a part of the radiator, the tuned circuit being situated between the two parts of the radiating system.

The aerial was apparently designed primarily for 7 Mc., and the symmetry of the arrangement on this frequency is most striking.

It would be interesting to hear of any results achieved by varying the counterpoise lengths used on 14 and 3·5 Mc., although a symmetrical arrangement on these frequencies seems hardly possible if the top-length is to remain constant, as is necessary in a multiband aerial.

With regard to B.C.L. interference, the Handbook points out that there is usually considerable capacity coupling between the transmitter and the counterpoise, and it would be interesting to hear the results of any tests which may have been made with a view to alleviating the interference problem by using a Faraday screen between the two coupled circuits.

Information Wanted

Mr. E. W. Fair, BRS4095, 50 Ashlands Road, Harpfields, Hartshill, Stoke-on-Trent, is anxious to obtain a circuit diagram of the Pye P/AC portable. He also wishes to know the value used for the I.F.

KHAKI AND BLUE

Items for inclusion in this exclusive feature should reach the Secretary-Editor not later than the first day of the month preceding date of publication.

Warm congratulations to Capt. Alvin Pryor, 2FTR, of the Army Dental Corps, who was recently married to Miss Platt, sister of Mr. T. C. Platt, G2GA, recently our Bury T.R. Incidentally, this marriage was brought about through 2FTR requesting H.Q.'s to put him in touch with local amateurs when he was posted to Bury last year. "One more bit of R.S.G.B. service," to quote Capt. Pryor's words. 2FTR (who can be reached c/o. P. O. Snaith, West Yorks.) would like to meet local amateurs. Mrs. Pryor, beware!

* * *

A.C.2 A. H. Bruce, G5BB, who has recently rejoined the Society, wishes to contact G5DY *via* Headquarters. He has had a spell at that North Western School familiar to many R.A.F. recruits.

* * *

Old friends of Tom Maitland, GI5SQ, whose photograph appears below, will be interested to hear that he is now a Lt. in the R. C. of Signals somewhere in his native land. He finds the maths. articles especially useful in his present job.

Lt. Tom Maitland, GI5SQ.

* * *

2FWA reports meeting a bunch of R.A.F. hams whilst visiting a well-known Sussex seaside "resort." Among those known to be there are G2JB, 3GX, 3KI, 4NO and 8KS.

* * *

Monty Campbell, G8MK, who is now on an O.C.T.U. course in Yorkshire, would like to meet members in the camp. His course is No. 32, and he is in No. 4 Cadet Coy., 152nd O.C.T.U., Marne Lines. Fred Saxon, jnr., son of VE3SG, is at the same camp on Course 28.

* * *

S. R. Pountney, G3NM, at one time PF3 R.N.V. (W.)R., and now serving in Northern Ireland, sends greetings to old friends in Birmingham. Letters can be addressed *via* 78 Earlswood Road, Belmount, Belfast.

* * *

"Early Birds" will be interested to hear that S. L. Hill, G8KS, is now a F./O. stationed somewhere on the S.E. coast. He sends special greetings to G2LK and 5US and records his thanks to 2DBK for the maths. articles.

* * *

Apropos the paragraph published in our February issue, we now learn from Sgt. D. Bridges, BRS935, that after he requested us to give publicity to a meeting to be held at No. 2 S.S. on November 10, he found that the Committee of semi-permanent-staff airmen were, for various reasons, unable to proceed with their arrangements. Sgt. Bridges states that he wrote to an officer member on the administrative staff at the School, and asked him to carry through the arrangements among the officers. He comments, "it was indeed a shock to learn that no meeting was held at all, and I feel extremely sorry for all who trekked up from No. 3 S.S."

In giving publicity to this rather belated explanation, we feel it desirable to again emphasise that gatherings arranged in R.A.F. or Army camps must not be regarded as official R.S.G.B. meetings, unless that fact is made clear in the published announcement.

* * *

Cpl. L. J. Cleggett, BRS2834, ex T.R. for Maidstone and now an Instructor at No. 1 S.S., R.A.F., would like to hear from G8UC and other members from his home town. Letters should be addressed c/o. "Foley Cottage," Stockbury Valley, near Sittingbourne.

* * *

L.A.C. F. H. Lane, G3GW, who can be found in Hut W7, No. 2 S.S., would like to meet other members at the School. He also asks G4FN to write to him *via* his home address: "St. Austell," Barton's Hill, Minster-on-Sea, Sheerness, as recent letters have been returned marked "gone away." Prior to going to "Tumuli," Frank Lane spent an enjoyable nine months in GM.

P./O. W. D. Wadsworth, M.C.

"Bill" Wadsworth, VE5ZM, now a Pilot Officer in the R.A.F., has been awarded the Military Cross in recognition of gallantry and devotion to duty during an attack by enemy aircraft. The official citation also states that he is further commended for unselfish devotion to duty in the removal of enemy bombs.

We learn from G2QY that his brother, Sgt. Anderson, BRS4074, read his first copy of the BULL. after joining the Society, whilst seated in the rear seat of a machine engaged in dive-bombing exercises! The old BULL. rises higher each month!!

* * *

"Prime DX" is how we should describe the present location of L.A.C. B. A. Parsons, GW4FW, whose photograph we reproduce herewith. Parsons, a well-known South Wales amateur, is now near Bathurst, Gambia, from which spot he sends greetings to all old friends wherever they may be. He tells us he has vivid recollections of the last pre-war P.D.M. at Weston-super-Mare. So have we! Good luck, 4FW, and here's to a ham contact before you leave ZD3!

* * *

A.C.1 A. C. Kenny, BRS3825, who seems to have taken up permanent residence at the "Cadogan Arms," tells us of his first war-time meeting with G3MI during a pay-parade and of another meeting, this time with 2HGQ, who was easily identified from his "battle bowler" which is adorned with a copy of the R.S.G.B. badge and his call sign! Kenny mentions that, since the war, most of the ex-members of the Enfield Society, including 2FPC, 2CUB, 2HGQ and himself, have joined R.S.G.B. He sends greetings to G2ZR and 2HGQ (now at No. 1 S.S.) and asked 2CUB to write *via* his home address.

* * *

Cpls. Boyce, 2CMR, and Edwards, BRS3855, writing from No. 3 S.S., R.A.F., inform us that official permission has been granted to form a Radio Club at the School. Plans are progressing well and it is hoped shortly to arrange a representative meeting to which Headquarters representatives can be invited. Boyce and Edwards are located at S.H.Q., No. 4, Wing, X2. Newcomers to the school during March were G2ZU, 3ON, 3ZF, 5PG and 5RL. The ZL contingent referred to in our last issue are now at No. 2. SS.

L.A.C. B. A. Parsons, GW4FW, now serving with the R.A.F. in Gambia.

2CMR sends greetings and congrats to H. P. Daynes, G5YD, of Manchester, who is on a P./O.'s course in the Midlands. He also asks, "what about some news from Society members in Manchester?"

* * *

L.A.C. J. C. Warren, BRS3583, well-known to the Watford group as Hon. Treasurer of the local Society, tells us he joined the R.A.F. nearly 12 months ago. Since enlisting he has been at several R.A.F. Signals Schools, and is now serving at a station on the Suffolk coast in the capacity of Radio mechanic. The gear he is handling, to quote his own words, "would turn every ham (and many pro's) green with envy!" We believe it!

* * *

From the Sudan comes news of A.C.2 D. Barlow, 2HBG, of Leicester. He sends special greetings to all old friends who were his comrades in arms at No. 2 S.S. last year, and asks G3AN and 5MY to write via H.Q. Censorship restrictions forbid him from sending a list of calls for inclusion in our 73 feature. This difficulty can be overcome in the case of members serving abroad, by sending short lists of names which H.Q. will "convert" to call signs.

A.C.2. A. Blackburn, 2CCB, of Hull, is now serving abroad with the R.A.F.

Recent service visitors to G6CL have included Lt. W. E. Brigden, G6WU, R.N.V.R., who anticipates a DX journey shortly; F./Lt. H. A. M Whyte, G6WY, now C.S.O. at a balloon station; F./Lt. H. C. Page, G6PA, attached to a near-London R.A.F. station; F./O. W. Craig, GM6JJ, A.S.O. at an East Scotland station; F./O. Barclay Dowden, VE1HK, in training with the R.C.A.F.; P./O. A. Simmons, G3AD, located in Kent; and P./O. Phil Thorogood, G4KT, assistant to F./Lt. Chapman, G2IC, at a west of Scotland station.

Another

Ham Gathering

will be held at

THE COUNTY HOTEL SALISBURY

on

Saturday, April 19th, 1941

At 3 *p.m.*

All intending to be present are asked to advise F/Lt. J. N. Walker, G5JU, South Lodge, Churchfields Road, Salisbury, by April 16th.

INCLUSIVE CHARGE 2/-

ON ACTIVE SERVICE

NINETEENTH LIST

WE publish below our nineteenth list of radio amateurs on active service. Additional details and corrections should be advised to Headquarters as early as possible. The present list contains information received up to April 1, 1941.

Rank and Name	Regiment or Branch	Pre-war Call or B.R.S.
A.C.2 K. Abbott ...	R.A.F. ...	4103
Sgt. A. I. P. Anderson...	,, ...	4074
P./O. G. T. Armstone...	,, ...	4119
Cpl. H. Barnett ...	,, ...	2AIQ
A.C.2 R. Barr	,, ...	4104
A.C.2 C. Bowtell ...	,, ...	G5GN
A.C.1 S. Brierley ...	,, ...	4114
A.C.2 H. E. Brown ...	,, ...	2DZD
A.C.2 A. H. Bruce ...	,, ...	G5BB
A.C.1 H. J. Caldwell ...	,, ...	G8US
A.C.2 H. S. Chadwick...	,, ...	G8ON
A.C.1 J. Clarke* ...	,, ...	2AAN
Sig. A. Cole	R.C. of S. ...	4119
L.A.C. J. Collins ...	R.A.F. ...	4088
P./O. A. Dalziel, B.Sc.	,, ...	2670
A.C.2 W. L. Danes ...	,, ...	2DGP
O.C. P. D. G. Frazer ...	Indian Army	G8ST
P./O. R. G. Frisby ...	R.A.F. ...	2CFC
Cpl. R. H. Gatland ...	,, ...	2FTP
A.C.2 S. J. Geary ...	,, ...	G3MO
A./Cpl. A. E. C. George	,, ...	4115
L./Bdr. J. H. Hargreaves	R.A. ...	G5VO
L.A.C. F. Hudson ...	R.A.F. ...	2BHA
L.A.C. R. Jennings ...	,, ...	G4BY
Sub. Lt. H. Jones ...	R.N.V.R. ...	G5ZT
L.A.C. L. W. Kerbey ...	R.A.F. ...	2HCW
A.C.1 C. Lister... ...	,, ...	4108
A.C.2 L. Melville ...	,, ...	3843
L.A.C. L. Mottershead	,, ...	4090
A.C.2 P. Nichol ...	,, ...	G5ZN
L./Cpl. R. Needham ...	R.C. of S. ...	4099
Tel. J. A. F. Newman...	R.N. ...	4098
Gnr. A. H. Othen ...	R.A. ...	4081
Sig. A. G. Pruden ...	R.C. of S. ...	2CZM
A.C.2 M. A. Pyle ...	R.A.F. ...	2BLA
P./O. L. Ridgway ...	,, ...	G2RI
L.A.C. M. N. Shipp ...	,, ...	2HBZ
A.C.2 W. B. Smith ...	,, ...	G6IM
L.A.C. A. Squires ...	,, ...	2CDG
Gnr. B. Stewart ...	R.A. ...	4070
A.C.2 A. Taylor ...	R.A.F. ...	3564
A.C.2 J. J. Thomson ...	,, ...	2DRD
A.C.2 J. S. Tomkins ...	,, ...	4091
A.C.1 J. Troy	,, ...	GM8RJ
A.C.2 P. A. Turner ...	,, ...	4111
A.C.2 G. Vale	,, ...	4123
L.A.C. J. G. Wardhaugh	,, ...	G4LA
L.A.C. J. C. Warren ...	,, ...	3583
Sig. A. M. Wilding ...	R.C. of S. ...	4124
A.C.2 E. K. Williams ...	R.A.F. ...	G8VY
A./Cpl. C. D. S. Wintle	,, ...	G4GG
A.C.2 E. Woodhouse ...	,, ...	3842

* Non member.

C. J. Pollard, G3IY, wins the M.M.

It will be remembered that when recording, in our June, 1940, issue, the fine work done by " The Early Birds " during the withdrawal from France, we stated that, " A Manchester amateur performed such splendid work under fire that his exploits have been brought to the notice of the powers that be."

It is now our happy duty to record that the young man concerned was Cpl. James Pollard, G3IY, of Manchester Road, Burnley, who has been awarded the Military Medal. When war was declared, Pollard, then barely 18, reported for duty as an R.A.F. Civilian Wireless Reservist and his name appeared in the original list of " Early Birds " who went to France on September 4. When the B.E.F. moved into Belgium, G3IY was operator of a ground station. For a time he was between the German and Allied lines, but by a fine show of spirit managed to return to his unit. He was invested recently at Buckingham Palace.

Well done, Jim !

G6ZO de G2QY

G. P. Anderson, G2QY, seeks news of 2/Lt. Jim Kirk, G6ZO. Letters to his old QRA remain unanswered.

The " Conventionette " Marched !

From P./O. H. W. Pope, G3HT, comes news of a highly successful conventionette held recently at a well-known hostelry at Kirby La Thorpe, Lincs. A party of 32 left No. 1 S.S. by special bus to Sleaford. Faced with a two miles walk to the rendezvous, some bright lad hit on the idea of " forming threes " to give the girls a treat ! Thus, for the first time in ham history, a " Conventionette " marched itself to its meeting place ! What a chance for a film.

The proceedings opened with a lively " ragchew," after which a ham and egg tea was served. Speech making and yarn swopping became general until, at 5.30 p.m., the 1938 N.F.D. films taken by the R.A.F.A.R.S. were shown. Then followed a talk given by OK2HY, who described conditions before and after the Sudetenland crisis. Later a New Zealand amateur gave an account of ham life in New Zealand.

The whole company (except two civilian instructors) were in Air Force blue, although services other than the R.A.F. were represented. Among overseas visitors present were amateurs from Canada, South Africa and New Zealand.

The meeting finished at 8 p.m.

73.

G2UM to G2TJ, 4AR, 5LT, 5SR 6HB, 6WN, 8KZ, 8LY, VU2FO and all old and new friends.

* * *

G3KG (26 Farley Avenue, Luton), to G2AO, 2HK, 5BQ, 5FO, GW5JK, G5PA, GW5PH, G5ZJ, 6GO, 8KP, GI8PA and G8TO.

* * *

G3GW to G2LZ, 3OA, 3OJ, 3WP, 4BY, 4FI, 4FN, 4HG, 6AB, 6NU and BRS1295.

* * *

G3HT (R.A.F.), to G2AI, 3AB, 3LT, 4KD, 5UM, 6LL, 6OT, 6WN, 6WY, 6ZO and all members of the Edgware S.W. Society.

* * *

G3LS (8 East View Terrace, Seaton Carew, W. Hartlepool), to G3IV, 3UG, 5QU, 5GJ, 8LV, 8CL, 8RW, GI8JP, GM3NG, 3LO and SU1AF.

* * *

G3OA to G2KH, 2GU, 3GW, 3MD, 3WP, 4GT, 4LV, 6CT, 8UO, 2CLD, 2FTN and BRS3085.

* * *

G3TS (R. C. of S.), to G2SO, 3MD, 3OA, 8RT, 2CYF and other Southend-on-Sea members.

* * *

G3UY to G2LR, 3AD, 3GH, 3WN, 3ZI, 4BH, 5LK, GW5KJ, G6GO, 6KJ, GI8PA, and G8TO.

* * *

G5BB (R.A.F.), to G2AT, 5DY, 5HS, 5RR, 5WW, 6LH, 8CY, 8JM, and W1HOU.

GI5ZY (" Bel-Air," York Avenue, Whitehead N. Ireland), to G2PU, 3BR, 3HZ, 3PR, 5FO, 5ZN, 6VQ, 8DI, 8FP, GW3AX, 5TJ and EI2N.

* * * *

G6IM (R.A.F.), to G3KH, 3TW, 3WN, 4AZ, 4FO, 4JJ, 8SY and all old Leicester friends.

* * *

G6UR (ZB1R) (" Langness," Groudle Road, Onchan, Isle of Man), to G2LB, 3KM, 5BJ, 5TZ, 5UI, 6WY, W8OQF, VE5AAD, 5ZM, ZB1E, 1U, 1X.

* * *

G6VD to G2XD, 3KH, 3AN, 4BJ, 5MY, 5GN, 6IM, 2HBG, 2BAP, 2CFC, 2FNW and BRS3588.

* * *

2ABC (R.A.F.), to 2ACN, 2BRR, 2FSR, 2FTH, and all members of Woodford and District Radio Society.

* * *

2DHV (28 Longlands Road, Sidcup, Kent), to G2DS, 2IZ, 2TN, 3FC, 3OW, 5IL, 5OQ, 6PG, and 2DOH. G2YZ is especially requested to write.

* * *

2FUX (75 Uxbridge Road, Ealing, W.5), to G2JK, 2NH, 2TJ, 3CU, 3GT, 6FX, 6UB, 6WL and 6WY.

* * *

BRS3766 (56 Elsie Road, Southtown, Great Yarmouth), to G3RK, 3RW, 3UC, 5QO, 2BIC, 2CPL, 2CWO, 2FFT, BRS2999, 3468, VE5ZM.

* * *

BRS3583 (R.A.F.), to G3NR, 5RD, 6GR, 8CK, 8SB, 2HAR and all other Watford area members.

Silent Keys

With very deep regret we have to announce the death, by enemy action at sea, of Roy L. Coombes, G5QI, Faraway, Otterton, Devon. His ship, the s.s. *British Premier*, was sunk in December in Southern waters.

Those of us who were privileged to know 5QI will remember him chiefly for his lively, cheerful and friendly disposition. He was also a staunch supporter of Society work in the area, and one could always count on his help in whatever was being done.

He worked hard at all kinds of Field Day work and was especially interested in V.H.F. radiation. In this connection he gave unstinted assistance to all others engaged in the same study, and contributed in no small measure to the progress made in this branch of the Science.

His many friends and co-workers will join us in extending deepest condolences to his relatives. He will be greatly missed by all.

G5SY.

* * *

It is also with regret we have to record the death at an early age of Sgt. J. McAdam, 2CKO, of Whitehead, Northern Ireland. He obtained considerable flying experience prior to the war as a member of the R.A.F.V.R., and had been on active service since the German air raids commenced last year.

A very keen amateur, who had looked forward to obtaining his full call, he will long be remembered by the members of the City of Belfast Y.M.C.A. Radio Club, of which he was a member. Prior to the war he was an engineering student at Queen's University, Belfast.

His many friends in Northern Ireland received the news of his sudden death with much sorrow, and on their behalf the writer offers sincerest sympathies to his parents and relatives.

GI6TK.

* * *

Our deep sympathies are extended to Mrs. E. Thompson, mother of Sgt. Thompson, BERS459, whose death on active service last September has recently been confirmed. Sgt. Thompson had been a member for two years, and had served in Egypt with the R.A.F. for some time prior to the outbreak of war. His home was at Hucknall, Notts.

* * *

It is also our sad duty to record the death, on active service last December, of Sergeant J. C. Spurgin, 2AKS, whilst serving with the R.A.F. Mr. Spurgin, whose home was at Little Brickhill, near Bletchley, Bucks., had been a member since 1937. Our sympathies are extended to his relatives and friends.

G6CL.

KHAKI AND BLUE MEET BENEATH THE TOWER

HELD under the auspices of the newly-formed Olympian Amateur Radio Society, the North-Western Provincial District Meeting took place this year at Booth's Café, Blackpool, on Sunday, March 23.

In presenting this account of a memorable occasion, the writer desires at the outset to thank, on behalf of the President, Committee and members of the O.A.R.S., all those from outside the town who attended to make the meeting an unqualified success.

The renewal of old acquaintances was the order of the day, especial pleasure being shown in the presence of six Polish amateurs who were in attendance. All three fighting services were represented, with the R.A.F. well to the fore. After a ragchew, reminiscent of London Convention days, the President of the local Club—F./Lt. R. Turner, BRS3841—called the meeting to order.

He expressed his personal pleasure at being able to welcome such a fine gathering, and after formally welcoming visiting amateurs, he introduced Mr. John Clarricoats, G6CL (Secretary-Editor) and Mr. H. W. Stacey, G6CX (District 1 representative).

For the next 70 minutes G6CL addressed the company with the aid of that famous little black book, which we believe has accompanied him to every R.S.G.B. function for the past 12 years. Mr. Clarricoats voiced his appreciations at being given the opportunity of meeting the officers and members of the O.A.R.S. He then gave a résumé of the work which has been done by the R.S.G.B. since the outbreak of war, explaining some of the difficulties which have been overcome. Mention was made of the recent rapid increase in membership, and to the fact that up to date nearly 1,500 members had entered the Services. He paid a warm tribute to the local Club for its initiative in forming an organisation which, to quote his words, " brings a breath of home to all who find themselves in the area served by the Club." He spoke of the valuable assistance given by Messrs. Platt (G2GA), Marlow (G2FT) and Musk (2FPA), civilian members of the O.A.R.S. The news that a similar Club was in the process of being formed at No. 3 S.S. was greeted with applause.

G6CL then gave details of the work being done by the Society for and on behalf of its members on active service. The need for maintaining contact was stressed and a broad hint given about " square pegs in round holes."

Referring to the BULLETIN, G6CL explained how the " Khaki and Blue " feature had grown from " an odd corner " to one of the most appreciated features of war-time issues. Its value, he said, was inestimable, for it served as a connecting link between service members everywhere.

Dealing with present-day matters of policy, Mr. Clarricoats reminded the meeting that the Council is pledged to press for the early restoration of licence facilities. He gave his opinion of the way in which he thought things might go, mentioning in particular the A.A. licence, amateur status, grades of licence, the morse test, technical examinations and message handling. He stated that already a meeting had taken place with the G.P.O. to discuss matters connected with post-war licence facilities. He expressed the view that the frequencies allotted to British amateurs after the war would probably be varied from those previously in force, although he felt confident that the broad principle of harmonic relationship would be preserved. He believed that permission to use the V.H.F. would be granted. He made it clear, however, that the Council did not intend to rush into print with " bright ideas." Their job, he explained, was to obtain the maximum facilities with the minimum amount of delay, and to work in the closest co-operation with the G.P.O. and the fighting services. He spoke of the excellent liaison already existing between the Society and the Army and Air Force, and mentioned that many of the " key pins " in Signals Branches were fully appreciative of the work which is being done by members in the services.

The announcement that a further reprint of 10,000 copies of the Society's Handbook had been put in hand, was greeted with applause. The continued demand had, said the Secretary, been most gratifying.

Dealing with Society finances, G6CL mentioned for the benefit of newer members that, as a result of careful expenditure and economical methods of operation, the Society achieved a record year during 1939–40—the first year under war conditions. He explained that the decision to reduce the subscription for Service members to 10s., was made in order to assist those whose financial position has been affected by the war. The numerical strength of the Society was at present only about 350 below the peak pre-war level. In this connection, he mentioned that some 300 overseas members (mostly Europeans) had lapsed, but the gap was rapidly closing, due to the splendid support being given by new members.

At the conclusion of Mr. Clarricoats, speech, which was very cordially received, Mr. Stacey spoke of District 1 activities. He expressed pleasure at findhimself able to participate in a war-time P.D.M., a state of affairs made possible by the fine work done by the O.A.R.S. He hoped that the civilian members would co-operate in the sending of notes, and suggested that in towns where the T.R. had joined up, some enthusiastic member should offer his services as scribe.

Mr. Platt then proposed and Mr. Musk seconded, a vote of thanks to G6CL and G6CX, which was carried with acclamation.

At this point in the proceedings Mr. Young, BRS1357, suggested that each member present should rise and announce his call and home town. The roll call showed that the following were " on parade " :—

G2FP, 2GA, 2HW, 2JT, 3IM, 3LL, 3MO, 3SJ, 4OS, 4IC, 4KT, 5MN, 5RY, 5ZN, 6CL, 6CX, 6DP, 8TD, 8DK, 8LT, 8NU, 8AK, 8VY, 2FWV, 2CCJ, 2BDA, 2DVQ, 2BTO, 2CUB, 2COR, 2FPA, 2HCP, 2CMD, BRS2013, 3841, SP1LR, SP1HA, SP1HI, SP2AC, SP3DF, together with Messrs. Littlestone,

(*Continued on page* 347)

THE MONTH "OFF" THE AIR—March, 1941

By A. O. Milne (G2MI)

Foreword

G2MI tenders his apologies to anyone who has been kind enough to forward notes for this month, which appear to have been ignored. This is due to his being away from home on "official business" in the more remote parts of the country.

Notes and News

G8PP was on guard at 00·15 one morning when a party of men arrived by lorry. They were destined for another place some distance away, but had lost themselves. They were given beds and some food and duly turned in for the night. Judge of PP's surprise when next morning he found himself face to face with G8PL, one of the wandering boys. These two had lived as neighbours for four years, and neither knew what had become of the other! 8PP has also run across G3OV, who is an instrument mechanic. Commenting on the ham bands, he says U9MT was logged recently on 7,035 kc., and that W1, 2, 3 and 8 have also been heard on 7 Mc.

G6QN, who comes up once more with a fine report, has heard D4ARR working CX1BO. OA4X at S7, closely followed by PY1CT, PY5CE, PY7BF and K4GTH (phone) have been the best signals on 14 Mc., but very little has been heard from the U.S.A. recently.

On 7 Mc. YU7DT, YL2AP, OK3PR, PX1A (!) and F3ZA have been heard. In a recent QSO between F3ZA and HA1Z, the former gave his QRA as Bordeaux. The HA came back with "Sri for QRA but is not in HA hi!" To F3ZA's "Hope cu agn," he said, "Yes but after the war, to-day my transmitter is destructed!" 6QN sends his 73 to VK2ADE, and would like a card for their QSO at 08·30 B.S.T. on 27·8·39.

2DVA has acquired a "shack" in the form of a vast packing case 12 ft. × 8 ft. × 8 ft., and has been given a site and a mains supply by his firm. This packing-case shack is worthy of some notice, as it provides an excellent example of what can be done by compromise, and also proves that necessity is the mother of invention! He had the notion of rendering it weatherproof with roofing felt; discovered, however, that there is a war on and that said felt is unobtainable. Someone had a bright idea; why not use tarred paper. At first the shack and 2DVA shared the tar about 50:50, but gradually he mastered the art of transferring about 75 per cent. of the tar to the paper and promises us a photo of the result. The aerial is slung to an 80-ft. water tower, so that should be O.K.

G2MI recently visited the Scilly Isles, and had the pleasure of looking up G6RB in Bristol on the way. Incidentally, MI did his first bit of flying, and liked it. Staying in an Anglesey hotel a few weeks ago, 2MI got into conversation with a R.A.F. chap who turned out to be GM2SB's brother.

BRS3766, the artist responsible for our cartoon, reports improving conditions on 14 Mc. KA1BH (phone) and KA7FS have peaked to S9. Another good signal came from KA9AA. KA7FS was heard to remark that a new station had just come on, and that his call was KA9AA. A few minutes later CQ de KA9AA was picked up by '3766, putting in a first-rate signal. Other calls heard include KA1AF, PY7AN, K4HGF and K4FAK 14380, phone. He expects to be called up soon, so this may be his last report for the time being.

G4AB says 7 Mc. is still good for DX, but does not open up much before midnight, and usually fades out by 06·30. W5HMU, in Arkansas, gave him his forty-sixth State heard on this band. On 3·5 Mc. W1, 8 and 9 have been heard, but the band is very noisy.

G3YY sends along a comprehensive list of stations heard, including CT1JU, CM2LE, EA2D, F3ZA, G1XX, HA9YD, HB3RM, I1ZY, OK3DT, PY1UJ, U2NF, YL2AP, YU8T, YU7AA, two separate HA5J's besides numerous U's and W's, all on 7 Mc., and, contrary to G4AB's observations, all before 23·00 B.S.T. His best on 14 Mc. is KA7FM

(phone). He notes OK4LUV (see 2DVA last month), and wonders if it is a YL!

G8TL has nothing much to report; only one incendiary bomb in the garden since last month, which is pretty quiet for his neighbourhood! He recently had a welcome visit from G3OJ and G8CK, reports that 2CKJ is married, and that G4AT announces his engagement. What a war!

G3MD is still going strong, and "Junko" (otherwise 2BRH) still carries on despite the lack of supplies. He has had a letter from John Preston, BRS1295, of 1·7 Mc. report fame, who is still at his observer post.

Can anyone loan a 100 kc. bar to G3MD for a short time?

G3GH, the "little old lady" of Devon, sends her 73 to all her old friends, and looks forward to hearing them again before very long.

YLRL

This flourishing Society recently staged a Radio Party which proved highly successful. The winner of the trophy awarded was W1FTJ, who contacted 26 YL stations in 17 States.

Slogan culled from the pages of *YL Harmonics* W7GQK (girl quits kitchen), and her O.M. W7GKJ (gets kitchen job)!

Luftsbangsgenoten

G8IG says our remarks about him in last month's notes flashed across his mind one night recently. He was fire-watching at his factory and heard some bombs on their way down. " I felt they were mine for sure," he says. " Fortunately, however, they landed about 300 yds. away up the road. I was on my own, as my colleague decided to wait until things had quietened down locally before venturing out. The snag was he had the keys, and I was locked out. The only cover was, of all things, a petrol pump, not ideal in the circumstances, but any port in a storm ! "

Bert records a visit from Ham Whyte and his wife during a recent leave in the old home town. Ham and his family are still going strong somewhere in the Midlands.

G5XB reports considerable damage to his home from a nearby land mine, but we are glad to say that his family, although badly shaken, are safe and well. 'XB has left Birmingham and is now in the Home Counties on special civilian duties. Letters are forwarded from his home address at 2 Queen's Avenue, Snodland, Kent.

Historical DX

G4AB has been delving into back numbers of the BULLETIN and *QST* with a view to compiling a list of all countries which have definitely been on the air in the past 10 years. Checking against the A.R.R.L. list the total number of genuine countries active at one time or another is 231. According to the R.S.G.B. listing, however, no fewer than 245 can be vouched for. Here are a few of the rare ones : XFB8AB, St. Paul and New Amsterdam Is. ; FKXL, Clipperton Is. ; VR2FR, Phœnix Is. ; TM8AA, Seychelles ; VU3DV, Andaman Is. ; VU1AA, Maldive Is. ; SN1AA, Ascension ; VQ9AA, Seychelles (article by the operator in *QST*) ; and ZU9AC, Tristan da Cunha, also verified in *QST*.

He asks anyone interested in his researches from the historical viewpoint to drop him a line. Looks like a job for G6WY or G2ZQ !

Keep your peckers up ; they won't beat us now ! 73 till next month.

The 28 Mc. Band

By NELLY CORRY (G2YL)

FROM reports kindly sent by G4MR and BRS3003 it is obvious that the approach of summer conditions and of the Sunspot Minimum are having an increasingly bad effect on the band.

The only amateur signal reported was a W2 'phone, heard by BRS3003 at 15.25 G.M.T. on March 28. G4MR heard LSA2, 27·5 Mc., on March 18, 19 and 26, and a 26 Mc. U.S.A. Broadcast station on February 27, 28 and March 18. At 16.14 G.M.T. on March 17 BRS3003 logged a French-speaking telephony station on 27 Mc. He also heard the " Hissing " phenomenon for the first time for several months when it came up strongly for a quarter of a minute at 15.56 G.M.T. on February 28.

Will anyone who hears anything on or around 28 Mc. in future kindly inform the writer by the 28th of the month, so that some sort of record can be kept of the decline and fall of the band.

News from Denmark

We read with pleasure a paragraph in March *QST* to the effect that the Danish amateur society, E.D.R., is going strong. This is grand news indeed. May we ask the A.R.R.L. to convey our fraternal greetings to E.D.R. through the medium of *QST* ?

It will probably come as a surprise to G's to hear that last September (several months *after* the invasion) the E.D.R. delegates to their annual meeting were privileged to take part in a hidden transmitter hunt. By special permission of the Government (which one is not stated) two officers manned the " secret " station while members tracked it down.

The E.D.R. has not yet been able to contact its sister societies in Norway and Sweden.

For Britain

From *YL Harmonics*, official monthly journal of the Young Ladies' Relay League of America, we learn that Dorothy Hall, W2IXY, recently donated a pint of her blood to the British Red Cross Society.

We can think of no finer gesture, on the part of one who devotes her whole life to the fostering of friendships between the radio amateurs of the United States of America and the British Commonwealth of Nations, than the giving of life blood to the cause of freedom.

An Urgent Appeal

Now that the Air Training Corps is under way, the need arises for wireless equipment. The Air Ministry are anxious that every cadet shall receive instruction in morse (buzzer and visual) but they are unable to supply all of the necessary material.

Already many Society members are acting as instructors, but lack of equipment presents difficulties.

The following items are urgently required :—

Morse keys and Buzzers.
Single valve oscillators and headphones.
Obsolete low current consumption 2-volt or 4-volt battery valves.
A.F. transformers, 3 : 1—5 : 1 ratio.
Semaphore flags and signalling lamps.

In addition, components such as fixed and variable condensers, resistances, valve holders, meters, terminals, valves and transformers are required for practical work on the bench.

Members with overflowing junk boxes will be doing a good turn by donating their spare gear to the A.T.C. If you have anything to offer, please send a list to G6CL, 16 Ashridge Gardens, London, N.13. Do not forward apparatus until requested to do so. Members serving as signals officers in the A.T.C. or as civilian instructor are asked to advise G6CL.

POSTAGE DUE

For EVERY BULLETIN RETURNED TO HEADQUARTERS THE G.P.O. DEMANDS A SURCHARGE OF 1½D.

Please co-operate by notifying change of address immediately

Book Reviews

UNDERSTANDING RADIO. By Watson, Welch and Eby. Published by McGraw-Hill Co. Ltd. Price 20s. 603 pp., 400 drawings and photographs.

Under this somewhat unusual title the authors have made available in book form the methods which they have been using in their classes at the Stockton Junior College, California, for the past few years.

The importance of basic principles is stressed, as is the need for the learning of these principles in a logical order. This is achieved by combining set construction, and practice in operating circuits with a thorough study of fundamentals.

The subject matter is arranged in such a way that each circuit is studied as a single lesson.

The book, which contains over 600 pages, is divided into 14 chapters covering a wide range of subjects. It is pleasing to observe that some 70 pages are devoted to an examination of Valve Principles, for unless these are fully grasped, the task of Understanding Radio becomes impossible. Yet another vital aspect—Tuning—receives comprehensive treatment. Since the outbreak of the war, one of the most difficult problems met with by R.A.F. instructors has been that of instilling the principles of tuning into the minds of those who have had little or no previous experience. The appropriate chapter in this book would undoubtedly prove useful to those Service instructors who desire to explain tuning principles in a fresh and entertaining manner.

Oscillators and Transmitters are discussed in a lengthy chapter and most of the fundamental circuits, familiar, to amateurs receive careful attention.

The line drawings, illustrating the methods to be employed in connecting up test gear, are well executed, as are the full page drawings illustrating the new symbols introduced in each chapter.

It is interesting to note that although the authors deal with the construction of ultra-short wave receivers, they do not proceed beyond super-regenerative types. Coming from a country where V.H.F. developments are taking place very rapidly, we should have expected some reference to be made to the use of Acorn Valves, Concentric Line Tuned Circuits, and Crystal Control at V.H.F. However, these omissions in no way reflect against the publication, which, in spite of its American presentation, lives up to its title of providing a comprehensive Understanding of Radio over a wide field.

J. C.

* * *

ELEMENTS OF ACOUSTICAL ENGINEERING. By Harry Olson. Published by Chapman and Hall; 30s.

As the Acoustic Research Director of the Radio Corporation of America, Dr. Olson is one of the best known authorities on acoustical engineering in the U.S.A. From his pen comes a most comprehensive work on the subject.

In addition to the basic theory of acoustical engineering he presents in this book the design principles of every commonly used acoustic instrument. Among the theoretical chapters, the most interesting are those devoted to the electrical analogies of mechanical and acoustic systems. The author sets out clearly the means by which electrical circuit theory can be applied to the mechanical design of such devices as microphones and pick-ups.

The mathematical design of all types of loud-speakers is given, together with a large number of useful graphs of frequency response and directional characteristics. All the more modern developments, such as multiple horns and multiple cones, and the use of combination horn and direct radiators, are described.

The section dealing with microphones includes a number of the more specialised directional types including the so-called "line" microphones. The remainder of the book is concerned with acoustical measurements, architectural acoustics, and a section on speech and hearing.

Although the book will interest only the more advanced of our readers it can be recommended to all those whose activities lie in the direction of high quality acoustical equipment of any type. The feeling that the book appears to be somewhat "compressed," in spite of containing nearly 350 pages, goes to illustrate the rapid growth of the subject during the course of the past few years.

H. A. M. C.

* * *

TELEVISION BROADCASTING. By Lenox R. Lohr. Published by McGraw-Hill, 21s.

"To those scientists, engineers, and laboratory workers who have created a new social force that fulfils man's age-old desire to see beyond his horizon, this book is dedicated."

These words, with which this work is dedicated, suggest the idea which the author has continually in his mind in presenting an account of *Television Broadcasting* as it has progressed so far. In his treatment of the subject Mr. Lohr gives a happy mixture of the technical, economic, and programme production aspects of television. After a very convincing justification of the new art of television (which, incidentally, is hardly necessary in this country) the general principles of the television system and its operation are discussed, with particular reference to the R.C.A. system which is in use by the *National Broadcasting Company* in New York.

The chapters which follow are concerned mainly with the technical problems connected with the provision of the programme variety which is necessary to satisfy the wants of a critical audience whose interests cover an infinite field. The questions of studio "live-talent" programmes, film transmissions, and outdoor "relayed" broadcasts are all dealt with.

Some considerable space is allotted to the economic, legal, and sponsoring aspects of television as they appear in the U.S.A. to-day. Although not entirely applicable to conditions in this country it is interesting to see how American engineers have overcome, and propose to tackle the remainder of, the problems confronting them.

The penultimate chapter contains a technical description of the *R.C.A.* equipment and the component parts of a typical receiver for home use. A very interesting appendix presents the complete production script for a short television play in which the method of setting out the camera cues and lighting directions, etc., are given in full. A large number of photographs, taken in the studio during the course of production of the play, show very clearly the

(*continued on page* 347)

BRITISH ISLES NOTES AND NEWS

District Notes

Due to prevailing circumstances we would urge all D.R.'s and Scribes to post their notes in time to reach Headquarters by not later than *April* 28.

DISTRICT 1 (North Western)

FOR the information of members we publish below a list of those who are acting as Town Representatives :

Blackburn : Mr. J. Bolton (G4KT), 6 Ash Street, Blackburn.

Bolton : Mr. G. E. Shackle (2DVQ), 32 Bromwich Street, Bolton.

Bury : Mr. C. Turner (G8NL), 4 Moreton Avenue, Whitefield, Manchester.

Liverpool : Mr. R. W. Wright (G5RY), 112 Melling Road, Aintree, Liverpool.

The high spot of the month was the North-Western P.D.M., held at Blackpool under the auspices of the Olympian Radio Club. As an account of this meeting is published on another page, it is not proposed to say anything further here except that the success of the meeting exceeded all expectations, and it was most gratifying to find so many civilian members present from all parts of the country. Those who were unable to attend, missed a most enjoyable experience.

It was a great pleasure to meet the six SP amateurs and to hear the address so ably delivered by SP1HI. The suggestion that our Polish friends should write a few notes for publication each month originated at this meeting, and it is hoped that this feature will appear regularly in future issues.

Mr. J. L. Whittaker (BRS1933) writes to say that he is now in the Navy. He was associated with the Nelson S.W. Society some years before the war, and would be glad to hear from some of his friends. His home address is 20 Holly Street, Nelson.

Mr. J. Davies (G2OA) is now in the R.A.F., and hopes to renew acquaintance with a key in the near future !

Best wishes are extended to Phillip Nichol, G5ZN, who is now an A.C.2 in the R.A.F. Until recently 5ZN was our Burnley T.R.

The D.R. will be glad to have the names and addresses of those T.R.'s and acting T.R.'s who are not mentioned in the list above. It is proposed to publish these once every three months, so please write *now*.

Several reports have been received, but there is still no news from Manchester.

Bolton.—2BDA, 2BTO and 2DVQ attended the P.D.M. at Blackpool, and, besides having the honour to represent the town, had also the pleasure of renewing many old friendships and making new ones. Incidentally, an apology to 2BDA would be in order. In the March notes, due to inadequate information on the subject, he was described as being in R.A.F. blue, but actually he is serving with the R.A.F. in a civilian capacity.

A welcome is extended to BRS4077, of Westhoughton. Local members hope to have the pleasure of meeting him shortly. (*Via* 2DVQ).

Bury.—G8NL had pleasure in entertaining 2BUD of Mauchline, Ayrshire, Scotland, during his recent short period of duty at a local R.A.F. station before being drafted to the South. One of his visits was of particular interest, since he brought along the brother of GI8MI, with whom he was stationed. 8MI in person was unable to make the journey from a nearby locality as had been arranged, otherwise there would have been a happy reunion.

Many members have become civilian instructors in the newly formed Air Training Corps, and are now busy instructing the local youths in the mysteries of code.

Greetings are extended to BRS4101, who has just joined the Society. (*Via* G8NL). G6CX.

Forthcoming Events

April 19	Ham Gathering at the County Hotel, Salisbury, from 3 p.m.
,, 22	District 5, 7.15 p.m., at The Antelope, Broadmead, Bristol.
,, 27	District 12, 3 p.m., at G5FA, 35 Torrington Gardens, New Southgate, N.11.
,, 27	Scotland " A " District, 2.45 p.m., in the Coffee Room, Y.M.C.A. Residential Club, 100 Bothwell Street, Glasgow, C.2.

DISTRICT 2 (North Eastern)

BRS2317 writes that " Leeds seems to be dead " from the amateur point of view. This would also appear to be the case of the remainder of the " broad acres." Surely there are enough members left in Yorkshire to keep these notes going ! Come on, you chaps, just as a personal favour to the D.R. to show how good you can be if you try ! To return to BRS2317: he offers to collect reports from the Leeds area, and his address is Mr. W. F. Wilson, 4 Stratford Street, Leeds 11. His only item of news is to welcome a new member, Mr. F. Pygram, BRS4065. He would also like to hear from G8ID if this should catch his eye.

G2LT, who also bemoans lack of support, says G8IO is now in Derbyshire and is building a multivibrator. From Barnsley comes the news that G4JJ has been promoted to sergeant. G4CL has left York, having been invalided out of the Army, and is temporarily residing in Bradford.

Do something about it for next month, chaps !

G2MI.

DISTRICT 3 (West Midlands)

Birmingham.—A meeting of M.A.R.S. was held on Sunday, March 16, at which Mr. B. George gave a very interesting lecture on A.C. Circuits. Twenty members were present. At the meeting it was pro-

posed by Mr. G. Brown and seconded by Mr. B. Matthews that a vote of support be passed to R.S.G.B. Any R.S.G.B. member will be welcome at M.A.R.S. meetings.

We send greetings to all our colleagues in blitzed areas.

The secretary of M.A.R.S. will be pleased to hear from any member on active service. 2FDR.

Coventry.—There is nothing of importance to report, and now that local meetings of C.A.R.S. have been suspended, 5GR would be glad to hear from the "gang" in order that we can at least keep in touch with one another *via* the District Notes. So what about it? G5GR.

DISTRICT 4 (East Midlands)

Mansfield.—It appears that G4DS and 8NS were incorrectly reported in a recent issue as Air Gunners; we apologise and trust they will permit us to put the blame on Dame Rumour. The fact has emerged, however, that they have lots of stripes and are doing important work. G8HX, who writes from a new station, says he is still finding new interest in his job as Radio Mechanic. 8SA reports from an East Coast QRA that he has met two hams in the R.A.F. (G2VD and 5NM). He passes on 73 to all in the District. 3XA has passed his medical and is looking forward to meeting some amateurs when he joins his R.A.F. unit. BRS3593 continues his receiver development work and regularly listens on 28 Mc. 2APT sends best wishes to the Robin Hood Gang. 2DTQ has not written for some time; he was expecting to be posted abroad. Anybody know? The Sutton group have tendered their services to the local squadron of the A.T.C. and await instructions.

Derby.—BRS4071 (H. C. Murfitt), who writes from 47 Kirkleys Avenue, Spondon, having moved up from London, is rebuilding a super-het. and later hopes to experiment with a double I.F. model. He would like to contact other local members. Give him a call.

Leicester.—The postman staggered up 2RI's front garden recently with a bewildered expression on his face. Well he might, seeing that his load included a letter from G5GN! After all this time he has the effrontery to say he has been "in Blue" for eight months on very interesting work without saying a word to his old 1·7 Mc. friends (perhaps it is because he was artful enough to get posted quite close to home!). He is in good spirits, doing well, and sends 73 to all. BRS2793 reports that his son, VS2AR, left G in November and is safely back in VS.

By the time these notes are printed the D.R. will himself have changed his "civies" for the blue of a P./O. in R.A.F. Technical Branch. Bill Vendy (G6VD), the Leicester T.R. for years past, has consented to take over the duties of Deputy D.R. for the duration. His address is 9 Cecilia Road, Leicester. We know that the interests of the Society will be safe in his hands. Cheerio, chaps, and all the best; the Junk-Sales-Chief-Op. will be back full o' beans after the QRM has died down, *and don't forget* District 4 is Cock o' the Walk—we hold the N.F.D. Trophy. Keep smiling! G2RI.

Editorial Note.—On behalf of his many friends in the Society, we extend best wishes to Laurie Ridgeway and wish him every success during his period of service in the R.A.F.—G6CL.

DISTRICT 5 (Western)

Reports are not quite so numerous this month, but the D.R. thanks all those who have sent in items of news. A very enjoyable time was had by all those who were able to attend the Salisbury Ham Gathering, and the D.R. hopes that many more will come to the next on April 19, details of which were announced in the March *Bulletin*. It is a real tonic in these times to attend one of these gatherings, just to talk about old times and get away from the war atmosphere for a few hours.

As announced elsewhere in this issue, a Bristol meeting is being held on April 22, so roll up all members in that locality.

Cheltenham.—Mr. F. N. Bedwell, G8DT, 22 Leckhampton Road, who has been appointed T.R. for the duration, reports good attendances at meetings, and everybody alive and well. G8ML, 5BM, 5BK, 8DT, and 2FMT are as active as war-time restrictions allow. 8LB has nearly completed his entirely home constructed superhet. 3LP now has an oscilloscope working.

Stroud.—G4AB asks any who would like local contacts to ring Brimscombe 109. 2DWH is taking his finals at Bristol University. 5HC and 4AB have occasional phone QSO's, and the latter reports a pleasant visit from G4FH of Cheltenham.

Swindon.—G6XT is welcomed to the district. The T.R. also received a brief visit from 3JO on 48 hours' leave. 8IY, 8QR and 3NQ recently spent an enjoyable afternoon talking about old times. G6RB.

DISTRICT 6 (South Western)

The only item of news from North Devon concerns G3AM, now safely on dry land "out East," and 8US, who has gone to join his unit. We wish them well in their new positions.

Somerset members left at home are still doing what they can to keep things going. 2ACU is still designing his valve testing apparatus, but has not yet commenced construction.

A large number of members in the South-West who knew him personally will greatly regret the death at sea of Roy Coombes, G5QI, of Otterton, Devon. We are sure the sympathies of all will go out to his relatives. In very sad circumstances we have lost a very valuable member. G5SY.

DISTRICT 7 (Southern)

On behalf of the many members from this and adjoining Districts who have been to the numerous meetings at "Redholm" we wish to offer Miss Corry, G2YL, and her family our sincere condolences on the death of her father.

Bournemouth.—Congratulations to 2HMX on being appointed to a Government post and returning to the fold after nearly a year's stay in Southampton. Good luck to BRS3789, who has embarked on his chosen career of banking. 2ACA, who is studying at a Radio College in London, dropped in to see the T.R. recently. 2NS has completed his new battery 1—V—1, which takes two men to carry it! We were amused to learn that 2RX has grown a beard. 2CXP was recently posted to Scotland, and thinks the R.A.F. is sending him to the North Pole by easy stages (*via* 2HNO).

Croydon.—Congratulations to G6KD, who was married at Redhill on March 22. 2KU, who recently met 3YY, has been busy constructing some

VHF gear. 6VA is reported to have returned from Birmingham. 5XH has taken up a job with the Air Ministry. 3IG and 2FH continue to meet over the coffee cup. 2MV still finds time to do a little listening on the VHF's. 3179 passed his exams. and has had seven days' leave. 3003 has been digging for victory, and says he's got some onions! 4BW, 2BFL, 2ANS, 2BTF, and 2HDC have joined the Admiralty. 4NI still rolls out the barrel. 4AA has bought a new car and is expected home on leave shortly. 2780 is giving morse lessons. 2FWA was able to unearth some hams when he was at Eastbourne; he and 2DP are doing photography together (*via* BRS3003 and 2FWA).

Guildford.—G2ZC, recovering from a chill, has been doing a lot of listening. He recently had visits from GM3OM and 8LY. 8IX has been moved up north again, but this time is not so lucky as there are no hams at the new post. 6GS, home on seven days' leave, dropped in with 3VB for an evening with the D.R., and a pleasant time was spent talking ham radio. 6LK put in a fleeting appearance whilst passing through the town. 6NA returned for a few days whilst on premature Easter leave. 4AP is back in this area after having a grandstand view of a blitz.

Kingston.—By request, some news of T.V.A.R.T.S. members. 5LC is still hard at work. 8SM is home after a period of illness (we wish him a speedy recovery). 2VV and 2LA are carrying on the good work. 2KI, R.C. of S., is now in the west of England. 2NN is back with the "old firm." 6GB is residing in Sussex, and 5VB at Ewell. 3VK is at Q.C.C., and also busy with the signals section of the H.G. 2921 is still active. P./O. W. Pyke, 6PK, is in Eastern England.

We send best wishes to all serving members, and the T.R. (G2GK) would be pleased to hear of the whereabouts of other members.

G4CI listens on 14 and 28 Mc., as does 2921 when time permits. 2AJD, recently on leave, sends 73 to members of the New Malden Society. Congratulations to 3ZI, who has been promoted to F./O. 2GK was sorry to have missed 8HA when he was on leave, but now sends 73 (*via* G2GK).

Oxford.—G4AB, 4FH, 8SF and various members of the O.U.R.C. meet occasionally, and send greetings to 3CY, 4AJ, 4DI and 2BCQ. An enjoyable evening was spent by the O.U.R.C. at 8PX's home. The latter seems to be a promising crooner judging by home recordings. It was regretted that 4002 was unable to be present. Will members passing through Oxford make their presence known to 4AB at St. Edmund Hall (*via* G4AB). G5WP.

DISTRICT 8 (Home Counties)

There is little to report this month. Even our regular contributors have failed us, for once, so here's hoping that this reminder will bring a better result next month.

Cambridge.—Our rather belated but none the less sincere sympathy to G8SY, whose brother, F./O. Donald Custerson, recently lost his life in a flying accident. 5JO and 5BQ spent a Saturday afternoon knob-twiddling on the H.R.O. just for old times' sake, but they sadly missed the old familiar calls. 2XV still retains his enthusiasm for radio, although he first had a ticket way back in '13. 5DR, having paid a visit home from the "county of broad acres," reports "All well." 5DQ is in that part of the world too, but there is a shortage of ink and paper in his locality, isn't there, Peter?

St. Ives.—A ring to Swavesey 26 will contact 5OV. He is anxious to hear from VU2DR, who wrote, about a year ago, that he was returning to England. Since then there have been no tidings. Will anyone with news please write to him at Station Road, Over, Cambs.

March.—G3WW, who hopes to enrol a number of new members shortly, writes most enthusiastically of the new *Handbook*, which he procured on a recent visit to H.Q. 3DY is in the Home Guard, but is, we understand, contemplating joining the R.A.F. shortly.

Luton.—G3KG is still in Luton, and recently reported to Headquarters, but of other members in Bedfordshire we have no news this month.

G5BQ.

DISTRICT 9 (East Anglia)

Gt. Yarmouth.—Local members are looking forward to meeting G6WU, who, according to "Khaki and Blue," is in the district. 3UC, of Lancaster, and 5UB have been "discovered," the latter through his habit of purchasing *QST* at a bookstall!

BRS3821 is busy with superhet designs, whilst 3766 is looking forward to 1942 B.E.R.U. Contests! 2BIC and 3468 have been on leave and are both looking fit. The latter has recently been in GM and GW, and reports contact with VP4ZA and others.

King's Lynn.—Many of us wish we could have been with Lieut. E. W. Burgess, G6FB, on board the *Valiant* during its recent very successful operations. We wish him the best of luck. G2XS.

DISTRICT 11 (North Wales)

Activity in Prestatyn continues. The last meeting was arranged for Sunday, March 23rd, and although these notes were prepared before it took place, it is hoped that a good attendance was recorded. G3TS of Laindon is a recent arrival, whilst other members are known to be close at hand. It is hoped that every member stationed in the area will get in touch with BRS1060 at Woodside, Meliden Road

G6US.

DISTRICT 12 (London North and Hertford)

More than a dozen members met at G8TY on Sunday, March 30, to welcome Lt. W. E. Brigden, G6WU, R.N.V.R., who was home on leave from an East Coast town. During the afternoon the company were greatly amused to hear a series of gramophone recordings prepared prior to the war, of telephony contacts between G6CL, 6WU and 8TY. A two-way between G6WU and W2DH was, however, the high spot of this surprise item. At the conclusion of the meeting G6CL presented G6WU with a copy of the *Handbook* which had been autographed by all present.

Our thanks are extended to Mr. and Mrs. Howard for their hospitality, and to Mrs. 6LL and Mrs. 6WU, who helped to officiate with the teapot!

G5QF wishes to thank all who joined in the gift of cigarettes. He remains very cheerful despite minor setbacks. We wish him a speedy complete recovery.

The following new members are welcomed: 2BAB, 2FPC, BRS4073 and 4074; we hope to see them at future meetings.

Letters have been received from G3NR, 2AIQ, 2CNC, 2DTD, BRS3583 and 4073. BRS3760 was on leave recently and visited 5FA.

Watford.—G3NR is working on a battery operated oscillator covering 500 kc. to 15 Mc. Not much success is reported so far with the V.H.F. convertor, but from tests made he has come to the conclusion that " acorns " seem the only suitable valves for V.H.F. straight or superhet receivers, and ordinary valves when used as super-regenerators. He has heard that 2CNV is now in the Fleet Air Arm, while G3GY is a Ft./Lt., R.A.F., serving in the Middle East. G3GY would like to hear from old friends; his present address may be had from 5FA. BRS4073 is devoting his time to the construction of a radio controlled model motor-boat with a receiver of the convertor type and an old car magneto. BRS3583 is a radio mechanic in the R.A.F., and has met several amateurs in his travels. He sends 73 to the district and the Watford and District Radio Society.

St. Albans.—2CNC followed 3NR's example of last month in sending a card to members in that area, but only received one reply—two cards were returned " gone away." He attended a meeting of the Channel Islanders last month, and met G3GS, who was looking well and is now a member of the H.G. 2DTD (Hitchin) is proposing to carry out tests with special receiving aerials after his spell of " digging for victory " is finished! He reports seeing 2DPQ, of Shefford, from time to time. 2AIQ (Potters Bar) is now serving in the R.A.F. as a radio mechanic, and sends 73. He likes the job but has not yet met any amateurs at his station.

The next North London meeting will be held at G5FA (phone ENT4347), 35 Torrington Gardens, New Southgate, N.11, at 3 p.m. on Sunday, April 27. All members in H.M. Forces who happen to be in London will be welcome. G5FA.

DISTRICT 13 (London, South)

The newly appointed Area Representatives have decided upon the following plan for the splitting up of the South London District.

South-Eastern Area.—Mr. L. H. Shersby, G2GZ, 41 Reverdy Road, Bermondsey, S.E.1, will cover Postal Districts S.E.1, 4, 5, 8, 10, 11, 14, 15, 16 and 17. As there are insufficient members in this area to hold regular monthly meetings, G2GZ is arranging to combine with the South Central Area.

South Central Area.—Mr. L. Sanderson, G8TN, 104 Croxted Road, West Dulwich, S.E.21, will cover Postal Districts S.E.19 to S.E.27, S.W.2, 4, 8, 9, 12 and 16. At least one meeting will be held each month in this area.

South-Western Area.—Mr. E. H. Simmonds, G8QH, 17 Roedean Crescent, Roehampton, S.W.15, will cover Postal Districts S.W.11, 13 to 20. As G8QH is not acquainted with many of the members in his area, he has circulated a book in order to obtain news of local activities. He hopes to arrange a meeting shortly.

Members living in South London will notice that the following postal districts are not covered in the above plan: S.E.2, 3, 6, 7, 9, 12, 13 and 18. The explanation is that these postal districts are too far from the centre of Mr. Shersby's area.

Headquarters will be glad to hear from any member in the centre of this area who would be willing to act as representative.

* * * *

South Central and South-East Areas.—Eleven members attended a meeting at G2VB on March 23, when a frequency meter constructed by 2FWA attracted much attention. The next meeting will take place at 2HHD, 85 Bedford Hill, Balham, S.W.12, at 11 a.m. Sunday, April 20 (this address is two minutes from Balham Station).

G2JB has been on leave, but missed the March meeting by one day. He sends 73 to all old friends. Congrats to 5WG, who has been promoted to Corporal-instructor. Can any member provide news of 6AN, who is known to be in the R.A.F.?

South-Western Area.—The A.R. will be glad to hear from all members resident in the new S.W. area of South London. He also hopes that service members who normally live in the area will communicate with him.

DISTRICT 14 (Eastern)

Chelmsford.—At the local meeting held on March 2 we were glad to welcome G5HF, who gave some sidelights on U.H.F. work in his home area before the war. 5RV is busy with A.T.C. instruction and finds it most interesting. 6LB continues listening and must be our most consistent member in this respect—" If you want to know what's on, ask LB " is becoming a local byword. 2SA recently had the pleasure of a visit from F./O. T. White, G8TX, a good rag-chew resulted! 8PB writes from N.E. Scotland to say he would like to contact other hams up there—he may be written to *via* his home QRA, Rose Cottage, Rivenhall End, Witham, Essex. 5CA has recovered from two bouts of 'flu and has 5RV's sympathy—he's had some too! 6LL ran over from Cuffley recently, causing consternation and dismay to the local residents but joy to the local hams! BRS3650 and Mr. Goodchild have done some listening but have not much to report. Still no news of 2KG, 3BS, or VK2XC.

Brentwood.—No report this month. How about it, G3JW?

Ilford.—In a cheery letter from G3MD which arrived too late for inclusion in last month's notes (through being sent to one of the D.R.'s old QRAs, vacated four years ago!), he tells us that he meets many ship ops. in his job at " Albert Dock Hoists," and would be glad of a ragchew with fellow hams who may be in the vicinity. Just ask for the " Radio Guy "! 3MD would like news of 8PC, 5KA and 3TS.

Southend.—Congrats. to Jimmy Watson, G6CT, who has been granted a commission as P./O. in the R.A.F. 2MY, whilst on leave from the same service, visited 2SO, who is a Signals instructor to the local A.T.C. Squadron. 2LC and 6IF maintain contact with their old friends. 2SO is in need of an Eddystone S.W. Two for cash. Any offers?

The D.R. requests all T.R.'s and Scribes to forward notes to reach him by the 25th of each month. G5RV.

INDEX TO DISPLAYED ADVERTISEMENTS

DISTRICT 15 (London West, Middlesex and Buckinghamshire)

The March meeting was not too well supported, but many members are finding it increasingly difficult, owing to private business, to get along. Among those present was our long lost friend G6CO. We should like to thank G3UQ for his hospitality during the past few months. It is understood that he will be unable to accommodate us again for a while. If there are any other offers, please inform the D.R.

Letters reaching G6WN during the month included one from Lt.-Col. Carpenter of the R.E., whom we congratulate on his further promotion. He sends 73 to the District. BRS3894 and 4112 write as new members, and we give them a welcome.

After spending some time tracing 2FCJ we obtained his address from BRS1060 (Prestatyn) and G6RW, but unfortunately, although the cigarettes were dispatched, they never reached the recipient. We are sorry about this, O.M. 2DZN recently called on the D.R. As many will know, his work entails spending the night in town, so he can relate many interesting experiences.

Once again an appeal is made for news. G6WN.

DISTRICT 16 (South Eastern)

Two letters have arrived from the Brighton area this month, the notes sent in by the T.R. (G3WR) being supplemented by items from 3YY. 2RU and 4HS are listening on amateur bands, whilst 6CY is busy building gear. 3YY is fitting a 1851 into the R.F. stage of a new 56 Mc. receiver and is listening regularly. He has been visited by 2CMH and G2KU, and believes that G4BW is in the district. He would like to see local meetings recommenced (please contact 3WR, OM—G2WS). 3YY seeks news of 4JH and 8OQ.

It is with regret that we announce the death of Mr. E. Thomas, G8IT, of Worthing, who died on May 7. " Tommy," who was blind, will be missed by the many amateurs in this country who remember his cheery voice and perfect keying.

Frank Marchant, 2ACU, of Hove, has moved to Devon. Most members in the area put in a good deal of time at their receivers. G2WS.

DISTRICT 18 (North Eastern)

The D.R. wishes to thank all who sent reports last month, but unfortunately they all arrived too late to be included in the March issue. All notes should reach the T.R. not later than the 20th of the month, and the D.R. not later than the 25th.

We are now without T.R.'s in Newcastle, Sunderland and South Shields. Are there any volunteers ?

G5RI writes to say that he intends to start a letter budget among his own circle of friends in order that those separated by the war may keep in touch with each other. This seems to be a good idea which might be copied by other groups. (Splendid.—ED.)

Sunderland.—At last some news has arrived in a letter from G3IV, who reports that 6CV spends most of his time repairing 3IV's car ! He intends to build a new receiver. 5GI has now settled down in the town. 8AR is reported to have obtained a position of trust with a local firm. Congrats., O.M. 6UD has been discharged from the Navy owing to ill-health. He is now back in town, and was last seen " neutralising a bottle " ! 6TR is working day and night, and very little is seen of him. 6HV has moved to Newcastle. 3IV has built a TRF as standby receiver, and is contemplating building a really good frequency meter and C.W. monitor for " later on " !

Stockton-on-Tees and Middlesbrough.—G6ZT arrived home during the month for a brief holiday, and visited most of the locals. 3YK is recovering from the effects of 'flu and sends 73 to all. 8SN is also on the " sick list " with a septic finger, and reports that he is building a 6-valve super. of QST fame. 8CL has added a crystal filter to his receiver, and finds this a great improvement. 2FO hopes to build a pre-selector unit in the near future, but is too busy at present sowing onion seeds ! BRS3779 laments that there are no members left in his area. Owing to pressure of work he had to more or less put the receiver on the shelf, but occasionally finds time for a look round the ham bands on the BCL set.

Scotland

" A " District.—The change of date for meetings to the last Sunday of the month seems to be a success, judged by the good attendance at the first meeting held on this day—the best for some time. G5CF—one time GM5CF—was a welcome visitor together with GM2IA. After the meeting the party went to *The Daily Record* offices to see the apparatus used for the transmission of pictures by wire. A most enjoyable two hours was spent examining the gear and having its function explained and demonstrated. Our thanks are due to Mr. Scarle, who showed us round, and to GM6WD, who arranged the visit.

We have had a long and interesting letter from 2HHX, who has been posted for a special course ; he wishes to be remembered to his friends in the district. 2CHN and GM6ZV have visited GM3RL, who is making a good recovery from the serious injuries sustained in an air attack on his ship. In response to our appeal in the February *Bulletin*, we have received a contribution of 5s. from GM5ZX, whilst 3AR gave 1s. These contributions are gratefully acknowledged with thanks. 8RJ, who visited the district recently while on leave, wishes to be remembered to his friends, as do GM5ZX and BRS2671.

During the Clydeside Blitz 6WD was bombed out, but we are glad to say that he and all members of his family are safe. 8RM also suffered considerable damage to his home. The next meeting will be held on April 27, at 2.45 p.m., in the Coffee Room, Y.M.C.A. residential club, 100 Bothwell Street, Glasgow.

" B " District.—A letter from GM4DG brings news of some members of this District. 8SV is at sea as marine engineer, 5YN is in the Navy, 2OX in the R.A.O.C. somewhere in the South, while 4MG and 4DG are both radio officers.

"C" District.—Our sympathies go to GM5NW, who is in hospital suffering from a fractured skull. We hope that he will have a speedy recovery. GM6ZV.

Northern Ireland

G3NM, 3PA, BRS2671, G6KS, 8PR and 2AMW are welcomed back after a visit to G. GI8HS has now settled down in his new QRA and is doing a little listening. BRS3833, who is busy on war work, spends most days with GI5SJ, G3BN, GM8CN, GM3TR and GI6TK.

(*Continued on page* 347).

HEADQUARTERS CALLING

New Honorary Member

The Council has pleasure in announcing that Mr. Arthur Egerton Watts, G6UN, past President, has been unanimously elected an Honorary Member of the Society.

Mr. T. A. St. Johnston a new Vice-President

The Council has been pleased to elect Mr. Thomas Annandale St. Johnston, G6UT, a Vice President of the Society in recognition of his very long and valued services as District 14 representative.

War-time Subscription Rates

For the benefit of newer members, the Council wishes to explain that the decision to reduce to 10/–, the subscription for those serving in H.M. Forces, was made because it was felt, in the early stages of the war, that many younger members would be adversely affected financially.

The Council desires to record its thanks to those members serving with H.M. Forces who have not taken advantage of the reduced rate. In many cases such members have specifically stated that, as their financial position has not been adversely affected, they desire to pay the full subscription.

Northern Ireland Representation

The Council has accepted with regret the resignation of Mr. J. A. Sang, GI6TB, from his office as Northern Ireland representative. Mr. Sang has for some time been in ill health, and this fact coupled with pressure of private business made his resignation inevitable.

The Council records its sincere thanks to Mr. Sang for his past most-valued services, and acting on his suggestion, they have been pleased to appoint Mr. J. N. Smith, GI5QX, "Ben Venuto," Hawthornden Drive, Belmont, Belfast, as his successor.

Mr. Smith has had a long amateur career and is one of the Society's best known members in Northern Ireland. The Council has full confidence in his ability to continue the good work done by Mr. Sang in linking together the membership in Northern Ireland.

Advice to intending Purchasers of Communication Type Receivers and Kits

Due to prevailing conditions, the Council recommends that members who wish to purchase communication type receivers, or kits of parts, should, prior to sending money to an advertiser, inquire when delivery can be made. This arrangement will, it is believed, overcome many present difficulties, besides avoiding disappointment.

Reprinted Again

As announced in our advertisement pages *The Amateur Radio Handbook* has again been reprinted. The new order, which is for 10,000 copies, is 100 per cent. greater than any previous printing, but, judging by the demand, it is doubtful whether it will "hold the fort" until the third edition can be prepared.

Members in factories, signals schools, etc., are reminded that special prices will be quoted for bulk orders.

We Hate to Mention It!

The Secretary-Editor would greatly appreciate it if matters concerning Society *business* could be dealt with during office hours.

For 18 months certain members have taken advantage of the telephone facilities provided by the Society, by making calls late at night and at week-ends. It is appreciated that occasionally a matter is sufficiently urgent for a call to be made outside business hours, but the great majority are of a trivial nature.

In addition to unnecessary telephone calls, a number of members call at Temporary Headquarters after hours and at week-ends to pay subscriptions or purchase Handbooks.

Please co-operate by noting carefully the office hours in force at Headquarters :—

Weekdays : 9.30 a.m.—1 p.m.
2 p.m. —5.30 p.m.
Saturdays : 9.30 a.m.—Noon.

Members who desire to meet G6CL in person would be advised to telephone in advance.

Technical Books

Headquarters will be pleased to obtain technical books for members. The "Selected References" Chapter in the reprinted 2nd Edition of the Handbook has been completely revised to include up-to-date prices. Please add postage when ordering single books.

It is hoped that this arrangement will prove helpful to Service members in need of technical literature.

For the information of those who wish to obtain comprehensive current price lists, we give below the names and addresses of leading publishers :

Chapman & Hall, 11 Henrietta Street, Covent Garden, W.C.2.
Iliffe & Sons, Dorset House, Stamford Street, S.E.1.
George Newnes, Ltd., Tower House, Southampton Street, W.C.2.
McGraw-Hill Publishing Co., Ltd., Aldwych House, Aldwych, W.C.2.
Sir Isaac Pitman & Sons, Ltd., 39 Parker Street, W.C.2.

Q.S.T. September and December, 1940

The A.R.R.L. has sent to Headquarters 10 copies of the September and December, 1940, issues of *QST* for distribution to members who lost their copies by enemy action. Those in need of one or both issues should write to Headquarters, enclosing stamps. If the demand exceeds the number of copies available, we feel sure members will excuse us if we do not return their stamps.

The March issue of *QST* and *Radio* arrived at Headquarters on March 25.

Kilocycle-Metres Conversion Tables

Fresh supplies of this popular vest-pocket book are now available, price 1/6 each, post free.

New Members

C. E. HOBDEN (G2YH), 11 The Pines, Stifford Clays, Grays, Essex.
W. C. BARNES (G3JO), 7 Surrey Road, Swindon, Wilts.
G. L. A. JONES (GW3XY), 8 Tyn-yr-Heol Avenue, Tonna, Neath, Glam.
J. G. WARDHAUGH (G4LA), 20 Hallgates, Hexham, Northumberland.
D. L. DAVIES (G8QW), Vectis, Bereweek Avenue, Winchester, Hants.
E. K. WILLIAMS (G8VY), 1 De Villiers Avenue, Crosby, Liverpool 23.
H. G. M. COLEMAN (2AVU), 228 Victoria Road, N.22.
T. HUDSON (2BHA), 343 Eastwood Road, Rayleigh, Essex.
A. H. SQUIRES (2CDG), 12 Brookside Road, Upper Holloway, N.19.
J. F. MOSELEY (2CIW), 54 Clarence Road, Grays, Essex.
G. A. SOWERBY (2DMY), 6 Ravenscroft Avenue, Middlesbrough.
C. W. PETTIFAR (2DPQ), 84 Clifton Road, Shefford, Beds.
S. J. KENNEDY (2DTZ), 43 Taswell Road, Southsea, Hants.
H. E. BROWN (2DZD), 32 Elton Avenue, North Greenford, Middx.
H. E. HARDY (2DWM), 204 The Broadway, Burnt Oak, Middx.
R. H. GATLAND (2FTP), 5 Highfields, Forest Row, Sussex.
C. B. ELLWOOD (2FSO), 44 Benefield Road, Oundle, Peterborough.
L. W. KERBEY (2HCW), 1 Hillfield Avenue, Wembley, Middx.
A. H. BARTLETT (BRS4079), 42 Kimberley Road, Southbourne, Bournemouth.
W. W. POLLARD (BRS4080), Devonia, London Road, Datchet, Bucks.
A. H. OTHEN (BRS4081), 81 Elizabeth Road, Farncombe, Nr. Godalming.

WE extend a Cordial Welcome to the

65

NEW MEMBERS

whose names are listed

•

OUR THANKS ARE EXTENDED TO THEIR SPONSORS

G. W. MASON (BRS4082), Royd's House, Wakefield Road, Drighlington, Nr. Bradford.
D. W. BREWSTER (BRS4083), 111 Ewhurst Road, Crofton Park, S.E.4.
G. E. WHEELER (BRS4084), 30 Cambridge Road, Carshalton, Surrey.
A. GREEN (BRS4085), 94 Rutland Street, Hulme, Manchester 15.
M. F. HARGANS (BRS4086), 70 Hillcroft Crescent, Oxhey, Watford, Herts.
M. L. ELLIOTT (BRS4087), 49 Lincoln Road, Fratton, Portsmouth, Hants.
J. COLLINS (BRS4088), 244 All Saints Road, Wolverhampton.
R. W. PERRIN (BRS4089), 7 Puller Road, Barnet, Herts.
L. MOTTERSHEAD (BRS4090), c/o. 55 Lorne Road, Clarendon Park, Leicester.
J. S. TOMKINS (BRS4091), Seedalls Farm, Waddington, via Clitheroe, Lancs.
R. L. MOXON (BRS4092), 51 Myrtle Street, Liverpool 7.
H. ELIE-LEFEBURE (BRS4093), 8 Berwood Road, Erdington, Birmingham 24.
J. H. T. COLE (BRS4094), 45 Lytton Road, Chadwell St. Mary, Grays, Essex.
E. W. FAIR (BRS4095), 50 Ashlands Road, Harpfields, Hartshill, Stoke-on-Trent.
R. W. EDWARDS (BRS4096), 1 Princes Avenue, Kingsbury, N.W.9.
R. GARDNER (BRS4097), Coniston, Park Side Avenue, Millbrook, Southampton.
J. A. F. NEWMAN (BRS4098), 53 Ravensbourne Road, Bromley, Kent.
R. NEEDHAM (BRS4099), St. Augustine's School House, Hanson Lane, Halifax.
E. BOWLING (BRS4100), 64 Moore Avenue, Wibsey, Bradford.
R. TAYLOR (BRS4101), 291 Bury New Road, Heywood, Lancs.
J. PETHERBRIDGE (BRS4102), 54 Kimberley Road, Cambridge.
K. A. ABBOTT (BRS4103), 91 Harland Way, Cottingham, E.Yorks.
R. E. S. BARR (BRS4104), 22 St. Ursula Road, Southall, Middx.
E. G. LAWRENCE (BRS4105), 92 Langton Court Road, St. Annes Park, Bristol 4.
C. N. CLEMENS (BRS4106), 133 High Street, Pershore, Worcs.
R. J. HUGHES (BRS4107), 81 Kingshurst Road, Northfield, Birmingham 31.
C. LISTER (BRS4108), 3 Elm Street, Burnley, Lancs.
G. S. CLARKE (BRS4109), 48 Lonsdale Road, West Smethwick, Staffs.
E. D. BUGG (BRS4110), 101 Willingham Street, Grimsby, Lincs.
P. A. TURNER (BRS4111), 51 Tybenham Road, Merton Park, S.W.19.
C. J. STANFORD (BRS4112), Stoke Road, Bletchley, Bucks.
F. R. NICHOLSON (BRS4113), 16 Lincoln Road, Dorking, Surrey.
S. BRIERLEY (BRS4114), 14 Gaythorne Street, Bolton, Lancs.
A. E. C. GEORGE (BRS4115), 46 Woollards Lane, Gt. Shelford, Cambridge.
B. G. COLLINS (BRS4116), Winchmore, Ashurst Road, Cockfosters, Herts.
V. T. RUSSELL (BRS4117), 1 Denny Road, Lower Edmonton, N.9
A. C. COLE (BRS4118), Milton, St. Johns Avenue, Harlow, Essex.
G. T. ARMSTONE (BRS4119), 7 Keswick Gardens, Wembley, Middx.
W. DYER (BRS4120), 22 Hale Court, Hale Lane, Edgware, Middx.
G. W. FYNN (BRS4121), 208 Victoria Road, Cambridge.
J. R. GOODCHILD (BRS4122), 89 Moulsham Street, Chelmsford, Essex.
G. VALE (BRS4123), Cartref, Belgrave Road, Loughor, Nr. Swansea.
A. M. WILDING (BRS4124), 2 Wallacre Road, Wallasey, Ches.
H. V. GILPIN (VE4MO), c/o. Mrs. D. Ward, Bridgehouse, Burgh, Nr. Skegness.

Correspondence Invited

Melvin H. Dunbrack, W1BHD, 148 Glendale Street, Everett Mass, U.S.A., invites correspondence from British Isles amateurs. He is in the test laboratory of the James Millen Co., Malden, Mass.

Silent Keys

Old timers will regret to hear that Mr. A. Turner, G2XO, of Maida Vale, London, was killed last November during an enemy air attack. Although not a member at the time of his death, G2XO had in past years been a keen supporter of the Society. His call was heard regularly on 1·7 Mc. and other frequencies.

We extend our sympathies to his relatives.

* * * *

Many amateurs will learn with regret of the passing of Mr. E. G. Thomas, affectionately known as " Tommy " to all his friends. He served as a lieutenant in the 5th City of London Rifle Brigade during the Great War, and in 1916 on the Western Front, lost his sight. This handicap did not prevent him becoming a first-class Masseur and Osteopath. In addition, he spent a great deal of his spare time carrying out experiments in amateur radio.

He was a typical " ham," and those who had the privilege of sharing his home and the amazing hospitality offered by his family will feel his loss very greatly.

His excellent telephony on the 7 and 14 Mc. bands will long be remembered by those of us who worked regularly with him.

To Mrs. Thomas, Pat and Doreen, we send our deepest sympathy in their sad bereavement.

C. R. P.

AN INTRODUCTION TO THE DESIGN OF AMATEUR CONSTRUCTED MEASURING APPARATUS—(*Continued from page* 318)

respectively for changing over from A.C. to D.C. measurement (its position being indicated either by the letters on the panel or by the arrows on the range plates) and for the change over from A.C. volts to audio watts measurement.

Fig. 6, illustrating the underneath of the test-set shows on the left-hand side the ampere and milli-ampere shunts, in the centre front, the D.C. voltage network, and on the right-hand side the A.C. voltage network. In the rear can be seen a large resistance wound on a piece of bakelite sheet to dissipate the considerable amount of energy occasioned by the measurement of audio watts. This method of construction was adopted because it gives a large surface area for cooling, whilst at the same time keeping the inductance of the resistance at a low value.

The 1 mA. metal oxide rectifier cannot be seen because it is mounted beneath the right-hand corner of this large resistance.

All the component parts are mounted on one panel, which facilitates alteration and adjustments; the panel itself fitting into the top of a shallow teak instrument case.

Conclusion

In a short article such as this it is plain that only the edge of the subject has been touched on. It is hoped however, that its publication will encourage the development of testing apparatus amongst others. Should any reader wish for further explanation of any point, or should anyone get into difficulties in developing their own apparatus, the author will be very glad to assist.

Bibliography

(1) *The Amateur Radio Handbook*. (Chapter 15. Published by R.S.G.B.

(2) *Instrument Rectifiers*. Published by Westinghouse Brake and Signal Co. Ltd.

(3) *Industrial Electrical Measuring Instruments*. By Edgcumbe and Ockenden. Published by Pitman.

BOOK REVIEWS—(*Continued from page* 338)

layout in the studio and the results as seen on the receiver screen at various points in the script.

This book, with its numerous illustrations and clear non-mathematical accounts of the technical equipment, forms a very fitting companion to Fink's "Television Engineering" from the same publisher, which was reviewed in our October 1940 issue. H. A. M. C.

KHAKI AND BLUE MEET BENEATH THE TOWER—(*Continued from page* 335)

R. M. Jones, Instone, Whitlam and Dyer. A very special greeting was extended to the six SP hams as they rose to introduce themselves.

The company were then treated to a most informative talk by SP1HI who, in excellent English, spoke of amateur conditions in his home country before the war. SP1HI, on behalf of his colleagues, thanked the British amateurs he had met for their hospitality. G6CL, responding "in the name of the radio amateurs of all free countries," expressed the hope that "our colleagues from Poland will find ham radio a guiding beacon in a world racked with war." He spoke of the Society's badge and an amateur call sign as providing "the open sesame to sanity and good fellowship."

Mr. E. K. Williams, G8VY, of Liverpool, in a brief talk outlined his pre-war experimental work on 56 Mc.; after which F./Lt. Turner declared the meeting open for questions, to which G6CL replied. Informal tea followed. The company then broke up, having enjoyed one of the finest ham gatherings of all time.

The writer wishes personally to thank all those who attended and hopes that further meetings of the O.A.R.S. will be fully supported by those who can conveniently attend at Collinson's Café, Blackpool, on Wednesday evenings at 7.30 p.m.

H. G. N.

DISTRICT NOTES—(*Continued from page* 344)

It is hoped that those GI members who have allowed their subscription to R.S.G.B. to lapse, will renew as soon as possible, and also do their bit to make the Society stronger by introducing at least one new member.

All GI members are sorry to hear that Mr. John Sang, GI6TB, has had to give up his duties as D.R.

The City of Belfast Y.M.C.A. Radio Club has now commenced morse instruction for interested non-members of the Club. Classes are run at a very small fee per head, and already a number of Boy Scouts and others have availed themselves of the opportunity of learning the code. The Club is still well patronised and all Service members anywhere near Belfast are cordially invited to attend.

Members in Belfast who require the R.S.G.B. Handbook or window stickers are asked to write to GI6TK, who has a supply. *Via* GI6TK.

Editorial Note.—Mr. J. N. Smith, GI5QX, will take office as Northern Ireland D.R. as from April 15 *and, in accordance with usual practice, we would ask all members to send their notes direct to him.*

EXCHANGE AND MART.

Advertisement Rates

MEMBERS' private advertisements 1d. per word, minimum 1s. 6d.
TRADE advertisements. 2d. per word, minimum 3/-
TERMS: Cash with Order.
All copy and payments to be sent direct to Advertisement Managers, Parrs Advertising Ltd., 121 Kingsway, London, W.C.2, by the 30th of the month for following month's issue.

ALL KINDS OF PRINT.—Send your enquiries to G6MN, Worksop.

AUDIO Output at Radio Frequency. Double-detector circuits. Revolutionary Detection theory; system; circuits; practical experiments, 2/- post free.—D'Arcy Ford, Gandy Street, Exeter.

COMMUNICATION Receiver, late model Hallicrafter SX16, complete with speaker, in good condition. What offers?—Mortimer, "Dore," Sheffield.

EDDYSTONE All-World (Battery) Two, with specified valves, and coils for 20, 40, 80 metres, 65s. Wanted, Thordarson 11M77 Modulation Transformer.—G2XV, 89 Perne Road, Cambridge.

FOR SALE.—Complete American Course Code instruction, £1. Wanted or exchange, 2" 0-1, 5 or 10 milliammeter, 0-5 A.C. voltmeter Brown's "A" 1,000 Ω phones.—Price, 35 Earl's Court Square, London, S.W.5.

MAINS Transformers, Chokes, Speakers, Fields, etc. Rewound, competitive prices.—G8TF, Radio Engineer, 119, Rastrick Common, Brighouse. Phone: 97.

NATIONAL NC80X Communication Receiver, 30 Mc.–550 kc, 10 valves, Xtal Gate, AC/DC, 2½ watts output. Recently re-aligned and calibrated, super performance, unused since war. Complete with National Speaker and Auto-Transformer. £20 or near.—G8RY, "Windyridge," Highfield Road, Oakley, Beds.

SALE.—McElroy Junior Bug, 12/6. 50-watt "Matchmaker" Modulation Transformer, 12/6. Tungsram 0015/600, 9/6.—Abbott, "Y-Worry," Banbury Road, Bicester, Oxon.

WANTED.—1853, 5Z4, two 6C5 Tubes; also 1,600 Kc. I.F. Transformers and 2,000 Kc. Crystal. Price to Wilkinson, c/o "Parrs," 121 Kingsway, London, W.C.2.

WANTED.—Amateur Call-Book, late 1939 Edition. State price.—Richardson (BRS3558), Buxton Road, Aylsham, Norwich, Norfolk.

WANTED.—Loan of copies of "Radio," 1939–40. Postage refunded. Great care taken.—G4AB, Weavers House, Burleigh, Stroud, Glos.

WANTED.—"National One-Ten" Receiver, complete valves, power supply and instruction manual. State if receiver requires any minor servicing Quote cash price.—Box T.R., 121, Kingsway, London, W.C.2.

HELP ALL YOU CAN TO MAKE YOUR SOCIETY STRONG

AT the present time it is the duty of every member who has ambitions for the future to help create a strong organisation which will be in a position to press for the early restoration of licence facilities after the war. Many hundreds of new members have been elected recently, but many more are needed. Members on active service, no less than those following civilian occupations, can help to make the Society strong by introducing its work to their colleagues.

Please fill in the form below and send it without delay to Headquarters.

To R.S.G.B. Headquarters,
16 Ashridge Gardens, London, N.13.

Please send details of membership and specimen copy of THE T. & R. BULLETIN to

.....

.....

.....

..... (*Signature*)

Printed in Great Britain for the Inc. Radio Society of Great Britain, 115 High Holborn, London, W.C.1, by Sir Joseph Causton & Sons, Ltd., Brettenham House, Lancaster Place, London, W.C.2.