THE T&R

BULLETIN

A JOURNAL FOR

RADIO EXPERIMENTERS

Vol. 17 No. 2 AUGUST 1941 (Copyright) Price 1/6

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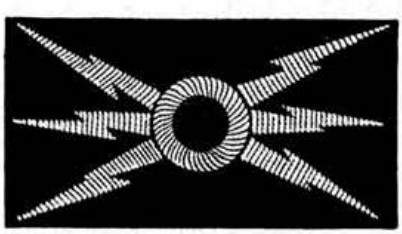

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AO4/8/41

The Incorporated

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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. XVII. No. 2 AUGUST, 1941

CONTENTS

THE P.M.G. AND IMPOUNDED AMATEUR APPARATUS

SOME months ago reference was made, in this Journal, to the fact that the Society, through its representatives, had been in communication with the G.P.O. in regard to loss or damage to amateur transmitting equipment impounded by the Postmaster General at the outbreak of hostilities.

We are now in a position to publish a letter from the Telecommunications Department of the G.P.O. which sets out the legal position.

The obligation to insure against war damage rests with the owner of the impounded equipment. In this connection we have been assured by the Telecommunications Department that the conditions outlined in Paragraph 3 apply also to the future, so long as hostilities continue, and provided the War Damage Act is not changed.

The full text of the letter reads as follows :—

COPY OF LETTER RECEIVED FROM TELECOMMUNICATIONS DEPARTMENT, GENERAL POST OFFICE.

P.O. Reference 1227/40. *Dated 7th July*, 1941.

Dear Sir,

With reference to your letter of the 10th of June and previous correspondence regarding the loss or damage to radio apparatus belonging to ex-licensees and now in the hands of the General Post Office, I am directed by the Postmaster General to say that he is advised that he is under no liability for damage to that apparatus caused by enemy action or other causes beyond his control ; he is merely a bailee of the property.

He is informed by the Insurance and Companies Department of the Board of Trade, whose address is Romney House East, Tufton Street, London, S.W.1. that the apparatus falls within Part 2 of the War Damage Act 1941 and would be insurable either under the Business or the Private Chattels scheme. The apparatus is insurable under the Business scheme in relation to its owner if it is part of his business equipment ; otherwise, it will be insurable under the Private Chattels scheme. Two explanatory memoranda, setting out the details of these schemes known as B.S. 4 and P.C.S.5, can be obtained from most Fire Insurance Companies or from the Board of Trade at the above address.

There has been unavoidable delay in replying to your enquiry due to circumstances beyond the control of the Postmaster General, and he is assured by the Board of Trade that if any apparatus has been damaged or destroyed by enemy action, the Owner's failure to make a claim within the prescribed period of 30 days, will not prejudice the claim provided that the delay is not due to causes within the claimant's control.

Owners of the apparatus will be notified by the Post Office in the near future of its present whereabouts so that those who desire may inform their insurance company and the owners will also be informed, if, and when, it should be destroyed or damaged.

Yours faithfully,

(signed) F. J. Pearce.

Attention is specially directed to the following points :—

1. All questions regarding insurance must be raised with a member's insurance company or the Board of Trade and not with the G.P.O. or with the Society.

2. Members serving overseas will clearly be in some difficulty in dealing with matters of insurance. The Council is therefore approaching the Board of Trade with a view to receiving an assurance from them that the failure or delay on the part of such members to insure, shall not prejudice any claim, so long as it is not due to causes within the claimant's control. It is hoped to publish a further statement later.

CHANGES OF ADDRESS

FURTHER to the letter published above we have been asked by the G.P.O. to give publicity to the following communication dealing with changes of address.

COPY OF LETTER RECEIVED FROM ENGINEER-IN-CHIEF'S OFFICE, G.P.O. RADIO BRANCH.

P.O. Reference W2/GB. *Dated 30th July, 1941.*

Dear Sir,

I shall be glad if you will advise your members through the medium of " The T. and R. Bulletin " that the Postmaster General is advised he is under no liability for damage to impounded apparatus caused by enemy action or other causes beyond his control ; he is merely a bailee of the property. It is therefore, in the owners own interest to insure against fire or any other risk normally covered by insurance, and to consider whether he should take out insurance under the War Damage Act.

All owners of impounded apparatus are being communicated with individually on the matter, and to facilitate this, it will be appreciated if you will request your members to advise the Post Office promptly of any changes in their addresses. This will also facilitate matters if it becomes necessary to advise the owners of the occurrence of any loss or damage.

The address to which correspondence should be addressed is :— The Engineer-in-Chief, G.P.O. Radio Branch (W2/1), Harrogate, Yorkshire.

Yours faithfully,

(signed) G. A. Struthers.

In view of the very large number of changes of address which have taken place since September 1939, it will be appreciated that unless members co-operate along the lines indicated, it will be impossible for the G.P.O. to forward the information needed for the insurance of impounded apparatus.

Negative Feed-Back and its Application to Audio-Frequency Amplifiers

By R. W. Addie, B.A. (Eng.) G8LT.

ALTHOUGH Amateur Radio as such is in the throes of a temporary eclipse, there must be many whose attention has moved from radio in the strict sense to kindred fields in what little time can be spared for such pursuits. The design and construction of audio frequency amplifiers offers much scope for ingenuity and experiment, and it is to such amplifiers that the principle of negative feed-back can be applied. It is hoped to show just in what way negative feed-back can be put to advantageous use and what are its limitations.

Fundamental Principles.

Negative feed-back is the principle whereby a small fraction of the output voltage of an audio-frequency amplifier is fed back to the input of the amplifier in addition to, and in opposite phase to, the input voltage. This may best be explained by the use of the simplified diagram (Fig. 1).

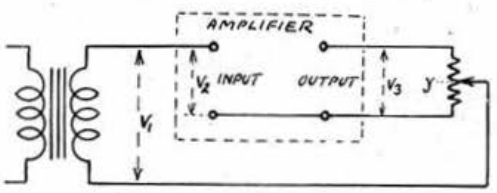

Fig. 1.

Simplified diagram to illustrate principle of negative feed-back.

Let us first consider the various voltages shown on the figure by symbols. The voltage V_2 applied to the input of the amplifier consists of the original input voltage V_1, plus a fraction y of the output voltage V_3 of the amplifier. Adding vectorially, we get :—

$$V_2 = V_1 + yV_3 \quad . \quad . \quad . \quad . \quad (a)$$

Suppose now that yV_3 be 180° out of phase with V_2, we then get

$$V_2 = V_1 - yV_3 \quad . \quad . \quad . \quad . \quad (b)$$

Thus we see that, without feed-back, we had an input voltage V_1, and with it an input voltage V_2 which, as we have shown in (b), is less than V_1.

In practice the output of any amplifier will consist of three A.C. voltages :—

(1) The undistorted or fundamental output.
(2) The distortion and harmonic output generated by the amplifier.
(3) The residual hum and noise voltage.

Let us now consider the effect of negative feed-back on each of these in turn. Let the gain of the amplifier be n. Let the distortion component of the output voltage be hV_3. Let the residual hum and noise, which will be constant for given gain, be x.

Thus (1) becomes nV_2; therefore the output voltage may be written :—

$$V_3 = nV_2 + hV_3 + x.$$

From (b) above we have $V_2 = V_1 - yV_3$

$$\therefore V_3 = n(V_1 - yV_3) + hV_3 + x$$
$$\therefore V_3 = nV_1 - nyV_3 + hV_3 + x$$
$$\therefore V_3 + nyV_3 = nV_1 + hV_3 + x$$
$$\therefore V_3(1 + ny) = nV_1 + hV_3 + x$$
$$\therefore V_3 = \frac{n}{1 + ny} V_1 + \frac{h}{1 + ny} V_3 + \frac{1}{1 + ny} x.$$

Thus it can be seen that the gain of the amplifier has altered from n, without feed-back, to $\frac{n}{1 + ny}$ when negative feed-back is applied. As $\frac{n}{1 + ny}$ will be less than n for all positive values of y, the overall gain is thus reduced. With suitable changes of sign it will be obvious how the equation works should the feed-back voltage be in phase with the input voltage. It can also be seen that, as well as reducing the gain of the amplifier, the distortion, hum and thermal noise are all reduced by a similar amount.

At first sight, negative feed-back does not seem to offer any advantage at all, since it would appear that, in order to reduce distortion, one has to reduce gain as well. It must, however, be remembered that it is the harmonics, etc., at the *output* which are reduced, and, while it is a simple matter to provide that extra amount of distortionless voltage, amplification in the early stages of the amplifier if this, in conjunction with negative feed-back, will reduce distortion in the output.

The last term in the equation cannot be overcome by this method as it is generated throughout the amplifier in valves, resistors, etc. All that negative feed-back does in this case is to reduce it by the

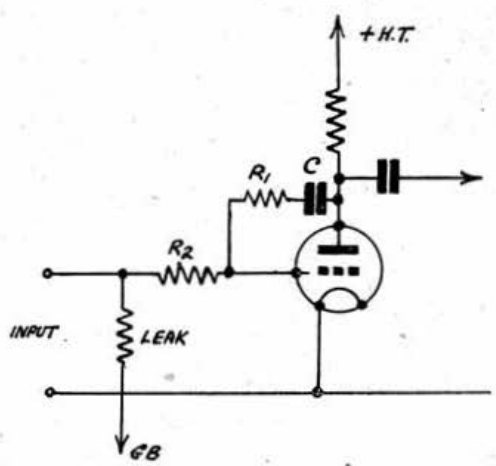

Fig. 2.

Circuit of single-valve amplifier with negative feed-back applied.

same amount as the overall gain and thus, when more amplification is added, to offset this, noise returns to its original level. There are two limitations of the system. First, it is not the be all and end all of distortion, however great. It is only effective where a small amount of distortion is present and cannot correct severe grid current distortion. Second, its effect on any amplifier is to alter both the input and output impedances of the arrangement. As a general rule, in the case of voltage feed-back, its application is to increase the input impedance and to decrease the output impedance.

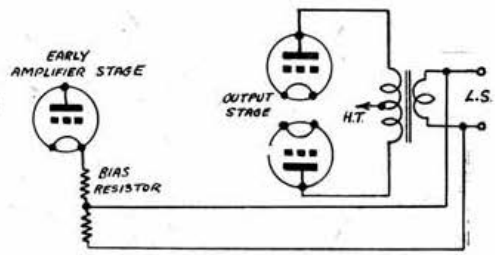

Fig. 3.
Practical negative feed-back arrangement used by the author.

Typical Circuits.

Fig. 2 shows a simple single-valve amplifier with negative feed-back applied. The phase reversal occurs in the valve, the " out of phase " component being fed back via C, R_1, etc. Values may be R_2 = 100,000 ohms and R_1 = 2 megohms approximately. This latter can be varied to suit the feed-back required.

Fig. 3 shows an arrangement which the author has used with success. One side of the secondary winding on the output transformer is earthed and the other led back to an early amplifier stage whose valve has the bias resistor split. The bottom resistor being of sufficient value to give the feed-back required, a low value should suffice. If, after switching on, the amplifier howls, reverse the transformer connections to make the voltage feed-back out of phase.

Some amateurs have expressed disappointment with the results obtained with the above circuit, and are at a loss to understand the reason. In general, it can be said that great care must be taken if negative feed-back is to be applied over several stages. This is because there is invariably a phase shift occurring in the amplifier, due to the use of more than one interstage transformer, etc. Further, this shift may not be the same for all audio frequencies. Thus, instead of feeding back a voltage which is exactly 180° out of phase with the input volts, there may exist an appreciable phase angle between the two. An infallible check can be obtained with the aid of an oscilloscope. The input volts of the amplifier are applied to the X plates of the tube and equal output volts are applied to the Y plates. In the event of an audio frequency sine wave passing through the arrangement, a line will be seen on the screen inclined at 45° to the horizontal when the two voltages are out of phase by 180°. (*N.B.*—Zero phase will also produce this effect, but the method of dealing with it has been mentioned above.) If any phase angle exists between the two voltages, an ellipse will be seen which would become a circle at 90°. The author has tried an arrangement of air-cored chokes to correct for the above fault, thereby introducing an artificial delay into the circuit to phase up.

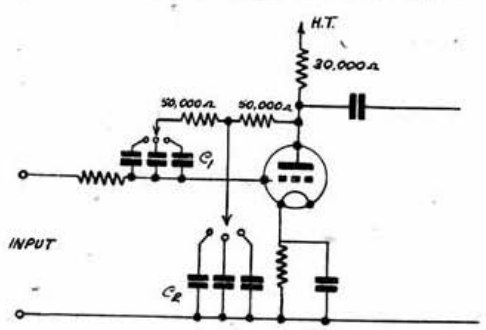

Fig. 4.
A tone control circuit to which the principle of negative feed-back has been applied.

One rather interesting application of negative feed-back is in a tone control circuit illustrated in Fig. 4. Although not claimed as an original idea, it is a very good method of reinforcing the ends of the audio scale covered by any amplifier. The circuit is of the feed-back type but is ineffective at either end of the audio scale, thus bringing about a greater amplification of these frequencies.

In conclusion it can be said that, given a little time for experiment, and if trouble be taken to check the points that have come under review, very good results can be obtained.

SWAMP RESISTANCES—(*Contd. from page* 45).

Special Property of Manganin

There is a peculiarity about manganin which does not exist in other types of resistance wire, namely, its temperature co-efficient is very, very low and positive until a certain temperature is reached, at which point it changes to negative; the critical temperature at which this change takes place depends upon the percentage of iron content. As an item of interest, one grade of manganin has the following composition: copper 84 per cent., manganese 12 per cent., nickel 3·5 per cent., and iron ·5 per cent.

Conclusion

It can be stated in conclusion that a shunted moving coil instrument should have a strong magnetic field, which will enable a low resistance moving coil and a large enough " swamp " to be used, at the same time keeping down the milli-volt drop across the shunt; the greater the drop with a given current, the greater will be the amount of power dissipated as heat.

An Offer.

Mr. E. Gant, G4DV, The Rookery, Leasingham, Sleaford, Lincs., has a collection of back issues of *"Television & Short Wave World "* which he will be pleased to donate to any service member or service club.

"Swamp" Resistances in Moving Coil Instruments

By R. C. HARRIS (2BAB).

IT is not generally appreciated that moving coil instruments are designed for *two* specific purposes, namely, the measurement of *current* and *pressure*. Fundamentally both instruments are the same, except for the winding of the moving coil, which is wound with different sizes and turns of wire, depending upon the use to which the meter is to be put. When an instrument is used for the dual purpose of measuring current and pressure, some modification of the moving coil windings is necessary and, although a compromise, it is not a difficult job. Actually the operation is usually carried out at the time the meter is designed and manufactured. As this type of instrument has a very small limited current-carrying capacity, it is usual to shunt a portion of the current in the case of an ammeter; and use a high resistance in series with it when it functions as a voltmeter. It will be clear, therefore, that for the instrument to read accurately, a constant ratio of $\frac{\text{Instrument Current}}{\text{Total Current}}$ should be maintained. To achieve this condition the temperature co-efficient of the instrument must be small, which means that its reading must remain substantially the same over large temperature changes. These latter are, chiefly, the internal heating of the instrument and the changes in the ambient temperature of the air.

The Use of "Swamp" Resistances

In order to minimise the alteration of resistance which occurs with temperature rise, a manganin "swamping" resistance is permanently connected in series with the moving coil winding of an ammeter. Manganin has practically a zero temperature co-efficient. The value of this "swamp," which is fixed inside the instrument, is normally made to have an ohmic resistance of about four times that of the moving coil. In the case of voltmeters the "swamp" is not necessary, as the series resistance serves the same purpose, but it is retained when the instrument is used for both purposes.

When an ammeter is employed for measuring currents of greater magnitude than it can safely carry, it is used as a milli-voltmeter, reading the fall of potential across a shunt, which is calibrated to have a pre-determined voltage drop, with a known current.

Practical Examples

In order to make evident the outstanding benefit of the "swamp" resistance, some practical examples will be worked out, using a modern milli-ammeter as the basis. The one chosen gave a full-scale deflection with 1 milli-amp. and had a total resistance of 100 ohms—from which it follows, by Ohm's Law, that it gave a full-scale deflection with 100 milli-volts (·1V.).

It should be noted that the value of 100 ohms is the total resistance of the "swamp," and of the moving coil. The resistance of the latter was measured and found to be 20 ohms.

For the purpose of comparing the accuracy of the instrument under different conditions, it will be assumed that:—

In Case (*a*) the whole of the 100 ohms is made up of copper wire, and that in Case (*b*) a "swamp" resistance is used.

Case (a)

Instrument current ·001 amp. (1 milli-amp.).

Value of current to be measured, ·1 amp. (100 milli-amps.).

Scale reading to be multiplied by 100.

$$\text{Shunt resistance} = \frac{100}{(100-1)} = \frac{100}{99} = 1{\cdot}01 \text{ ohms.}$$

Shunt current = ·1 — ·001 = ·099 amp. (99 milli-amps.) and the drop of pressure across the shunt will be ·1V. (100 milli-volts).

Temperature co-efficient of copper, ·43 per cent. per degree Centigrade rise; for a temperature rise of 15° C., the copper would increase in resistance by 15 × ·43 = 6·45 per cent.

The new value of the instrument resistance would be 106·45 ohms.

The instrument current corresponding to ·1 amp. (100 milli-amps.) in the main circuit will be

$$\frac{1{\cdot}01}{106{\cdot}45} \times {\cdot}1 = {\cdot}000948 \text{ amp. } ({\cdot}948 \text{ milli-amp.}).$$

Multiplying the scale reading by 100 the instrument would indicate 94·8 milli-amps., from which it can be seen that the error due to temperature rise is 5·2 per cent.; therefore the instrument will read low by this amount.

Case (b)

We now use a "swamp" of manganin, the resistance of which is 80 ohms. With the same temperature rise, the copper in the moving coil increases by 15 × ·43 = 6·45 per cent; and the moving coil resistance will now be 21·29 ohms. As the "swamp" has a negligible temperature co-efficient, the new value of the instrument resistance will be 21·29 + 80 = 101·29 ohms.

The instrument current corresponding to ·1 amp. (100 milli-amps.) in the main circuit will be

$$\frac{1{\cdot}01}{101{\cdot}29} \times {\cdot}1 = {\cdot}000997 \text{ amp. } ({\cdot}997 \text{ milli-amp.}).$$

Multiplying the scale reading by 100, the instrument would indicate 99·7 milli-amps.; the error due to temperature rise is now only ·3 per cent.

These examples clearly show that the addition of the manganin "swamp" allows the resistance of the moving coil to vary an appreciable amount, whilst the variation in the total resistance will be small. It also follows that, in the case of voltmeters, the high series resistance makes this effect more marked.

Types of Meters

Commercially-made moving coil shunted ammeters are designed to give a full-scale deflection with 75 mV., although this figure is often varied to meet special circumstances. For instance, it is possible to obtain instruments that give a full-scale deflection with 60 mV., 75 mV., 100 mV., and 125 mV., rising to 250 mV. in the case of recording instruments. These latter require more power for their operation than those used for indicating purposes.

(*Continued on page* 44).

A FIELD OPERATOR'S 'VADE MECUM'

SECOND SERIES—PART I.

By B. W. F. MAINPRISE, B.Sc.(Eng.), Diploma Electrical Engineering (G5MP).

In this article, the first of a further short series designed to provide helpful advice to those on active service, the author deals with dial lights and methods of ascertaining information in regard to enemy equipment.

1. *The dial light of your receiver is missing. Would you attach any importance to replacing it as soon as possible?*

Considered merely as a means of illuminating the scale, the dial light is of little importance. It has, however, a far greater use than this, as it acts as an excellent indicator, and in the case of field equipment which is liable to develop faults through rough transit, and which often has to be connected up hurriedly and in difficult positions, I would certainly replace it at the earliest.

2. *How can the dial light act as indicator?*

In three ways. It will indicate excessive voltage, lack of voltage, and it can be used as an emergency fuse in the H.T. supply where a fault is suspected.

3. *Give examples of a dial light acting as excess voltage indicator.*

Suppose equipment where the mains transformer is set to the 110 volt tapping is accidentally connected to 230-volt mains. The flash of the dial light as it immediately burns out will enable the operator to switch off before the valve heaters break down, and before the excess H.T. voltage builds up across the filter condensers. In the case of battery receivers, the burning out of the dial light on switching on would indicate wrong accumulator voltage, *e.g.* a 12-volt instead of a 6-volt accumulator, or else a short circuit of the H.T. across the L.T. circuit.

4. *And as a "no volt" indicator?*

Suppose there was a serious short circuit on the mains transformer, due to breakdown of winding insulation, or due to damaged insulation on a heater lead where it passes through a screen; then the failure of the dial lamp to light, or its lighting at very reduced brilliance, should enable the operator to switch off again immediately and so prevent further damage, such as the burning out of the transformer primary winding. A short on the rectified D.C. portion of the equipment will probably not extinguish the dial light, though appreciable dimming of this may give warning. Similarly, with battery receivers, failure of the dial light to illuminate may enable a short circuit on the accumulator to be noticed before the accumulator is totally run down. In fact a careful operator will sub-consciously notice that the dial light comes on whenever the equipment is put into operation, and will immediately switch off if the lamp fails to indicate. The possibility of the dial light failing through old age, however, should not be overlooked before checking the circuit for a fault.

5. *A captured enemy receiver is brought in to you. How would you decide on the correct L.T. voltage to apply, assuming that this information is not given on the valves or on the battery leads?*

If the receiver happens to be fitted with a dial light, the working L.T. voltage is readily found by applying a low voltage and raising it until the lamp is at its estimated normal brilliance. The dial light can be removed from the receiver for this test, thereby avoiding any risk of damaging the valve filaments. If no light is fitted, the only procedure is to apply a low voltage to the filaments (preferably withdrawing all but the last valve), and slowly raising the voltage until valve noise and "ringing" when the valve is lightly tapped would seem at a reasonable level. Then replace the remaining valves and check that the reaction or the frequency changing oscillation is satisfactory.

6. *In what other ways would you employ a dial light or a flash lamp bulb as an indicator?*

It is very easy for a milliammeter needle to drop to a low value, or to be driven off the scale without the operator noticing the change. If, however, a flash lamp can be arranged so that when the equipment is operating normally, the flash lamp glows at medium brilliance, any change in brilliance will at once draw the operator's attention. For instance, suppose a valve or component in a transmitter is damaged, and has to be replaced by one of slightly different type in order to continue operation. As a result of the change, the transmitter may not be entirely stable; parasitic oscillation may develop at intervals, or the oscillator fail to start immediately. If the transmitter is mounted to one side of, or behind the operating position, there may be difficulty in keeping an eye on the milliammeter reading, but if a flash lamp can be set to glow under correct working conditions, any such change will at once be noted, and the transmitter switched off before damage through over-load occurs.

7. *In what points of the circuit could the flash lamp be placed?*

It could be (*a*) placed in the aerial feeders (in which case, several in parallel might be necessary), (*b*) connected to the usual loop of wire and placed near the tank coil or aerial coupling coil, (*c*) connected in the H.T. lead if the current is suitable. One favoured position is in the HT— lead, close to the transformer.

In the case of a power supply giving 400 to 500 volts, and with average values of input filter condenser, it will be found that the usual 0·3 amp flash light bulb will light brightly when the transmitter is loaded to some 100 milliamps, due to the condenser charging current and the load current. In this position it thus serves two uses—first as an indicator that the correct current is being maintained, and second as a fuse, should excess current be drawn. If the lamp cannot be seen directly from the operating position, a small mirror can generally be mounted at a suitable angle; in an emergency, a shaving mirror can be used.

8. *Could the flash lamp be used as a rough indicator for modulation?*

Yes. When operating a new transmitter, or when operating for several hours on end, it is often difficult to maintain correct voice level, with the result that the degree of modulation suffers. Instead of endeavouring to watch a milliammeter, it is much easier to couple a flash-lamp and loop of wire to the output tank coil, or the aerial coil, and note what increase in brilliance is obtained when the average modulation depth is correct. It is then fairly easy to maintain correct voice level by noting the flickering of the light, even if it is only visible from the corner of one's eye. The only difficulty occurs when daylight is changing, *e.g.* in the evening, for then the change in brilliance of the flash lamp may be deceptive; during this period it is wiser to check with meter readings at intervals.

9. *When operating in an advanced position, your receiver breaks down. You suspect a fault in the coil-box. As you have no testing instruments available, could you use the dial lamp for a continuity test?*

Certainly, provided the normal resistance of the circuit under test is not too high compared with the lamp resistance. Thus, if the lamp be of the 6·3 volt, 0·2 amp type, the working resistance will be approximately 30 ohms; if the circuit resistance is not more than about 15 or 20 ohms, there will probably be still sufficient voltage across the lamp to make it glow.

With battery receivers, all battery connections should be first broken, and the lamp can then be connected to the circuit under test by means of a couple of strands of wire pulled out of a flex lead. With mains receivers, the lamp can still be supplied off the heater winding provided the rectifier valve is removed, thereby rendering all H.T. circuits "dead" except the leads between the mains transformer and the rectifier valve-holder. These leads should be protected against accidental contact (and possibly also the primary and mains switch tags) by a sheet of paper, or message pad. As one side of the heater winding is usually permanently connected to the chassis, care must be taken against short circuits. When testing coils and switches for continuity, it must be remembered that there are often several alternative paths which may mask a break, and it may be necessary to disconnect leads because of this.

10. *You are given a valve taken from some enemy equipment, and you wish to trace out the base connections. How would you proceed, using only the simplest of apparatus, such as a milliammeter, voltmeter, and some batteries? Assume that the valve has eight pins in the base, and a top connection.*

The first step would be to locate the heater pins. A simple continuity test with the voltmeter and a battery in series would indicate these two. If the valve is of the metal envelope type, a similar continuity test between the metal and each of the other pins in the base would show which was connected to this metal screen. If the valve were of the glass envelope type, I would bear in mind that one of the pins in the base may have no connection, to permit the interchanging of glass and metal types.

11. *Having traced these three pins, how would you then proceed?*

In the case of a glass valve, it will generally be possible to see whether the top connection is taken to a grid or anode, unless the glass is heavily "gettered." The next step is to locate the cathode pin. Apply voltage to the heater pins, starting at a low value, and raising it till the heater glows red where the ends protrude just above and below the cathode. Connect the negative terminal of the milliammeter to one of the unknown pins (Fig. 1); the positive terminal to the positive end of an H.T. battery (quite a low voltage sufficing), and touch a lead from the negative end of the H.T. battery to the other pins in turn. One pin will be found where a reading on the milliammeter is obtained; the *negative* end of the battery is now in contact with the cathode pin, unless one happened to have connected the milliammeter to the cathode pin by mischance at the beginning. In this event, the test will fail till the connection is moved to another pin.

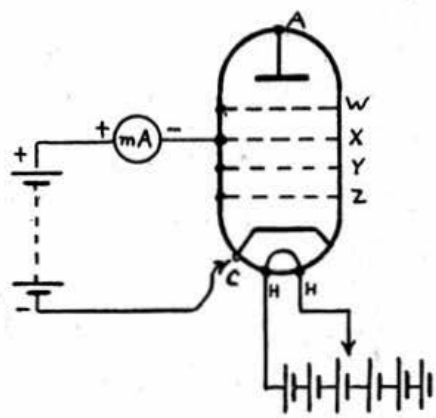

Fig. 1.

Tracing the cathode pin. An appreciable reading on the milliammeter is obtained only when the flexible lead is touched on the pin connected to the cathode.

12. *Having located the cathode, how would you now determine the sequence of the grids between cathode and anode?*

So far, we are using the valve connected as a diode. Suppose we are using the grid marked X in Fig. 1. To determine whether or not the remaining electrodes A, W, Y and Z lie between X and the cathode, the best way is to apply a negative bias voltage to each in turn, and note whether this controls the reading of the milliammeter connected to electrode X. Then if any of these electrodes do lie between X and the cathode, they will control the electron flow; if, on the other hand, they lie on the remote side of X from the cathode, they will have very little effect on the electron flow, unless biased positively with respect to X.

Thus, if the connections are as shown in the figure, it will be found by test that electrodes W and A are remote from the cathode, while electrodes Y and Z are between X and the cathode. A similar test will show which of Y and Z is nearer to the cathode.

13. *Would it be possible to damage the grids if excessive current were flowing?*

Yes, grids can easily overheat on account of their fine wire structure, but there is no need to pass a current of more than 2 or 3 mA for a test of this nature.

14. *What types of valve would you expect to provide difficulty in tracing the electrode arrangement?*

Multi-section types, such as duo-diode-triodes, and some frequency changers. For instance, with a duo-diode-triode, the grid and anode of the triode portion can be identified by the test, but if each anode of the diode portion is equidistant from the cathode, this might be confusing, unless the valve happened to be of the glass envelope type, in which one could see to some extent the electrode disposition. Similarly, one should be on the look-out for power rectifiers, with their anodes equidistant from the cathode, but with a little guesswork, confirmed by systematic testing, a good degree of success is possible.

15. *The top connection of a valve in your equipment has been torn off, leaving the lead-out wire broken flush with the glass pip. How would you maintain the valve in operation in the field, pending the arrival of a replacement?*

Attempts to melt down the glass pip slightly, in order to expose a little more of the lead-out wire, are very risky, as the glass cracks, or is suddenly pushed inwards by the external pressure of the atmosphere. A safer method is to obtain a piece of " silver " paper, such as sweets or cigarettes used to be wrapped in, place a pellet of this inside the top cap, and press firmly into position, so that it is forced into contact with the end of the lead-out wire. The cap should then be secured in place by binding with insulating tape, as shown in Fig. 2. As an alternative to binding with insulating tape, the rubber sealing band from the lids of glass jars can be slipped under the base of the valve, and passed over the top, thereby providing very firm pressure. It should be well cleaned before use. In some cases, it may be possible to obtain mercury (quick-silver) by breaking up a disused thermometer or barometer, instead of using the " silver " paper, to make a better contact, first ensuring that the cap and the glass top of the valve are free from any greasy film.

" Silver " paper is often very handy for temporary connections or short circuits where material in the form of a flexible sheet, or a pellet is more convenient than a wire.

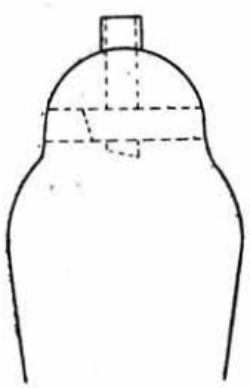

Fig. 2.

A pellet of silver paper is pressed into the valve cap before binding in position.

(*Series to be concluded.*)

AUTHOR'S NOTE.—In Series I, Part III, the writer suggested that resin was not the same as rosin. Letters from Mr. W. H. Matthews (G2CD) and Dr. Brian Christian (5XD) show that resin is a naturally-occurring substance, obtained from certain trees, such as the turpentine tree. To facilitate the flow, slits are often made in the bark. Rosin (Colophony-rosin) is the residue from the distillation of crude turpentine and is useful as a constituent of soap. Mr. Leslie McMichael remembers noticing many years ago, that the resin he used to obtain from the chemist always became rosin when it reached the workshop. The V.H.F. insulating material, polystyrene is, as G2CD points out, one of the many varieties of synthetic resins.

B.S.W.L.

We understand from Mr. A. C. Cheffins, Honorary Editor of the B.S.W.L. Review, that new members will be welcomed. Communications and enquiries should be directed to Mr. E. H. Trowell, 2HKU, 27 Unity Street, Sheerness, the present Hon. Secretary.

The British Short-wave League, was founded some years ago to encourage short-wave listening, and in recent months several of its members have joined the R.S.G.B. as the result of much appreciated publicity given by Executive members.

W.F.S.R.A. Good Cause.

Mr. A. H. Bird, G6AQ, 35 Bellwood Road, Nunhead, London, S.E.15, Hon. Secretary, British Section, World Friendship Society of Radio Amateurs (U.S.A.) appeals on behalf of the Queens' Hospital for Children, Hackney Road, London, E.2, for used British and Foreign postage stamps. Perforations must be intact, as the stamps are exported and sold, the funds going to Hospital funds. Packets should be sent to the Secretary of the Hospital marked " The World Friendship Society of Radio Amateurs Stamp Collection Good Turn, No. 6A."

Hams that Pass by Day.

W./O. A. E. Lambourne, G5AO, had occasion recently to visit a certain motor works in company with R.A.F. officers. While leaving the factory he noticed another W./O. in front, but could not make contact. Shortly afterwards, on the way home, he spotted the other W./O. approaching in another car from the opposite direction. Observing an R.S.G.B. sticker on the windscreen G5AO leaned out of the window and yelled " what's your call, old man ?" Back came the reply, as the cars passed, " VU2EK, what's yours." Once again the old sticker had proved its worth !

Here's to a G5AO-VU2EK QSO soon.

MATHEMATICS FOR THE RADIO AMATEUR

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

SECOND SERIES—PART II. TRIGONOMETRY (continued)

IN the previous article, for the preliminary definitions of the trig. ratios and for the accompanying figures, it was tacitly assumed that the angles under consideration were $> 0°$ and $< 90°$. Angles are not so limited, however, for it is clear that the revolving radius OP of Fig. 1a may stop anywhere. Its position may be such that the $\angle$ through which it has turned $= 173°$, $242°$, or $573°$, etc. Thus it is necessary to consider the meaning of the ratios $\sin\theta$, $\cos\theta$ etc., when $\theta > 90°$; and further to consider how these ratios may be found in view of the fact that Tables do not go beyond 90°.

Angles of any Size

Consider any point P moving counter-clockwise (and hence in the +ve. direction) from its initial position along OX, and taking up successively the four positions P_1, P_2, P_3 and P_4. (Fig. 2).

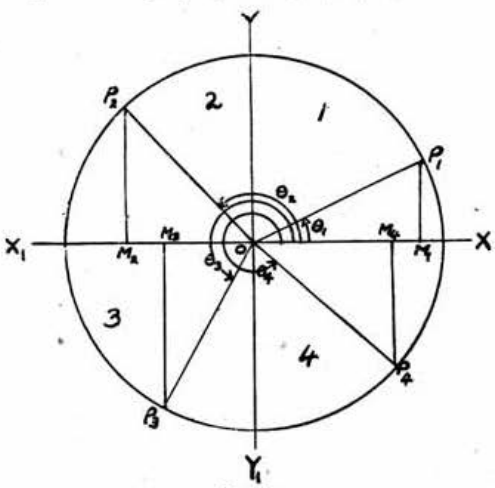

Fig. 2.

Angles of any magnitude, and their trigonometrical ratios.

Definitions.

A quadrant = a quarter-circle, and has an $\angle$ of 90°. There are thus 4 quadrants. They are numbered 1, 2, 3, 4 in Fig. 2 and will be referred to as the 1st quadrant, or 3rd quadrant, etc.

Axes (ackseez) are the lines XOX_1, YOY_1, mutually at right angles, which divide the figure into the quadrants.

In Fig. 2, therefore,

P_1OX, in 1st quadrant $= > 0°$ and $< 90°$.
P_2OX, in 2nd quadrant $= > 90°$ and $180°$.
P_3OX, in 3rd quadrant $= > 180°$ and $270°$.
P_4OX, in 4th quadrant $= > 270°$ and $360°$.

These angles, for the sake of brevity, will be referred to as θ_1, θ_2, θ_3, θ_4 respectively.

An angle $> 360°$, *e.g.* 573°, is merely one complete revolution $= 360° +$ a further $\angle$ of 213°.

* "*Westwood*," *Heslington Lane, Fulford, York.*

The Meaning of Trigonometrical Ratios of Angles $> 90°$

With regard to θ, in the 1st quadrant, the definitions previously given for sin, cos, etc. apply.

For θ_2, θ_3, and θ_4 the conditions are different, for it is manifestly impossible to construct a right-angled $\triangle$ including one of these angles. (The sum of the angles in a $\triangle = 180°$. If one is 90°, one of the other two cannot be $> 90°$.)

In this case, from the points P_2, P_3 and P_4 on the revolving arm, the lines P_2M_2, P_3M_3, and P_4M_4 respectively are drawn $\perp$ to OX, or to XO produced (*i.e.* XO extended backwards) *i.e.* $\perp$ OX_1. The trig. ratios are then obtained from the right-angled $\triangle$ so formed. Thus for the ratios of $\theta_2 = \widehat{XOP_2}$, the $\triangle$ OP_2M_2 is used, the angle being that at O. Hence, $\sin \widehat{XOP_2}$, using $\widehat{P_2OM_2}$ in $\triangle$ P_2OM_2,

$$= \frac{\text{side opposite } \widehat{P_2OM_2}}{\text{hypotenuse}} = \frac{P_2M_2}{P_2O}$$

$$\cos \widehat{XOP_3} = \frac{M_3O}{P_3O} \quad \text{from } \triangle\ P_3M_3O$$

$$\tan \widehat{XOP_4} = \frac{P_4M_4}{OM_4} \quad \text{from } \triangle\ P_4M_4O$$

One point must be borne clearly in mind here. There are 2 angles which can be named, for example, XOP_4. One is $> 270°$; the other is the acute $\widehat{XOP_4} < 90°$. We are considering positive angles, which by the convention stated, are formed by an anti-clockwise movement of OP. Hence we are considering the positive $\widehat{XOP_4}$, which is $> 270°$ and in the 4th quadrant; not the negative $\widehat{XOP_4} < 90°$.

Sign convention for lines.

The matter is not as simple as this, for there is an additional convention to be known.

It is clear that we can represent a journey from a point A, to a point B 4 miles due North by a straight line of say 4" in length. Also the same length and position of line will represent a journey of 4 miles due South from B to A. How is one to distinguish which is meant? It is, in such representational diagrams, by having a sign convention, agreeing to call the line showing one direction as +ve., and the reverse one −ve. Thus +4 miles means 4 miles N., and −4 miles means 4 miles S. In exactly the same way a sign convention is applied to the lines in Fig. 2. This is :—

(*a*) All lines drawn $\perp$ XOX_1 are positive if above XOX_1, and negative if below.

(*b*) All lines drawn $\perp$ YOY_1 are positive if to the right of YOY_1, and negative if to the left.

(*c*) The radius OP is always positive.

This means that in Fig. 2, OP_1, OP_2, OP_3, OP_4 are all positive; OM_1, OM_4 to the right of YOY

are positive, but OM_2, OM_3 to the left are negative; P_1M_1, P_2M_2 above XOX_1 are positive, but P_3M_3, P_4M_4 below XOX_1 are negative.

The Algebraic Sign of the Ratios.

Using the correct sign for the different lines, and remembering that when multiplying or dividing, like signs give + and unlike signs give − (see p. 284, Vol. 16 of this Journal) it will appear that the trig. ratios of angles > 90° will vary in algebraic sign.

E.g. Using $\triangle P_2OM_2$ in the 2nd quadrant,

$$\cos \widehat{XOP_2} = \frac{OM_2}{OP_2} = \frac{\text{−ve quantity}}{\text{+ve. quantity}}$$
$$= \text{a −ve. quantity}$$

Using $\triangle P_3OM_3$ in the 3rd quadrant,

$$\tan \widehat{XOP_3} = \frac{M_3P_3}{M_3O} = \frac{\text{−ve. quantity}}{\text{−ve. quantity}}$$
$$= \text{a +ve. quantity}$$

Using $\triangle P_4OM_4$ in the 4th quadrant,

$$\sin \widehat{XOP_4} = \frac{P_4M_4}{P_4O} = \frac{\text{−ve. quantity}}{\text{+ve. quantity}}$$
$$= \text{a −ve. quantity}$$

The signs of the ratios can be summarised in the following table which represents the 4 quadrants in which the angle under consideration may be.

sin +	sin +
cos −	cos +
tan −	tan +
sin −	sin −
cos −	cos +
tan +	tan −

Table III.
The signs of the Ratios in the different Quadrants

Ratios of Angles > 90°

The above summary in conjunction with Fig. 2 will now enable us to find the ratios of any angle.

In Fig. 2, for θ_2, $\widehat{P_2OM_2} = 180° - \theta_2$ was used
for θ_3, $\widehat{P_3OM_3} = \theta_3 - 180°$ was used.
for θ_4, $\widehat{P_4OM_4} = 360° - \theta_4$ was used.

Examples.

(*a*) Sin 120° (in 2nd quadrant).
$180° - 120° = 60°$.
From Tables, sin 60° = 0·8660.
In 2nd quadrant sine is +ve.
∴ Sin 120° = 0·8660.

(*b*) Cos 253° (in 3rd quadrant).
$253° - 180° = 73°$.
From Tables, cos 73° = 0·2924.
In 3rd quadrant cosine is −ve.
∴ Cos 253° = −0·2924.

(*c*) Tan 310° 30′ (in 4th quadrant).
$360° - 310° 30' = 49° 30'$
From Tables, Tan 49° 30′ = 1·1709.
In 4th quadrant tangent is −ve.
∴ Tan 310° 30′ = −1·1709.

Two special cases; ratios of (180 − θ) *and of* (−θ).

Angles of these types are encountered so frequently that in addition to the general treatment given above, it is advisable to consider them separately and to memorise the rules.

In connection with the word "memorise" it should be stated here that such a step is not really essential. With use one becomes familiar with the rules. More important, however, is the fact that if the method used here is understood, it is then only a matter of seconds to determine the rule required, from first principles, using a rough sketch.

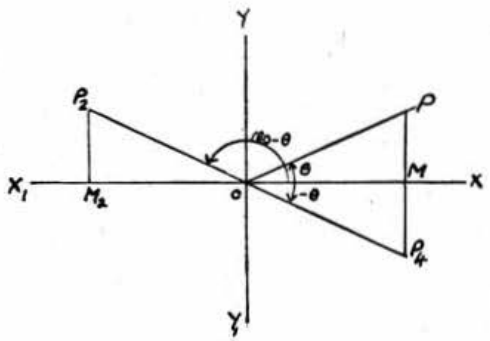

Fig. 3.
The trigonometrical ratios of an angle (180°−θ), and of an angle (−θ).

Ratios of (180 − θ).

Two angles whose sum = 180° are said to be *Supplementary*.

In Fig. 3, if $\widehat{POM} = \theta$, and P_2 is in such a position that $\widehat{P_2OM_2} = \theta$, then $\widehat{P_2OM} = 180° - \theta$. From $\triangle P_2OM_2$ we obtain the ratios for $(180 - \theta)^\circ$. Due regard being given to the sign of the lines, it is clear that:

$$P_2M_2 = PM;\ OP_2 = OP;\ M_2O = -OM.$$

Hence, $\sin(180 - \theta) = \frac{P_2M_2}{P_2O} = \frac{PM}{PO} = \sin\theta$

$$\cos(180 - \theta) = \frac{M_2O}{P_2O} = \frac{-OM}{OP} = -\frac{OM}{OP} = -\cos\theta$$

$$\tan(180 - \theta) = \frac{P_2M_2}{M_2O} = \frac{PM}{-OM} = -\frac{PM}{OM} = -\tan\theta$$

Ratios of (−θ).

Let OP have revolved in a −ve. direction (clockwise) to P_4 so that, numerically, $\widehat{P_4OM} = \widehat{POM}$.

Hence $\widehat{MOP_4} = -\theta$.

Here $OP_4 = OP$; $OM = OM$; $MP_4 = -PM$; and it is shown that:

$$\sin(-\theta) = -\sin\theta$$
$$\cos(-\theta) = \cos\theta.$$
$$\tan(-\theta) = -\tan\theta.$$

Thus we have discovered that, in addition to their numerical magnitude, the trig. functions require a + or − sign prefixing to them. (Where no sign is given, the +ve. one is understood to be meant, just

as in algebraic work generally.) Therefore in the manipulation of these functions due regard must be given to the algebraic signs, according to the rules previously given.

Examples.

(1) $\text{Sin}\ (-60)^\circ \times \cos 150^\circ$
$= -\sin 60^\circ \times \cos (180 - 30)^\circ$
$= -\sin 60^\circ \times -\cos 30^\circ$
$= -0{\cdot}866 \times -0{\cdot}866$
$= +0{\cdot}75.$

(2) $\sin (-60)^\circ - \cos 150^\circ$
$= -0{\cdot}866 - (-0{\cdot}866)$
$= -0{\cdot}866 + 0{\cdot}866$
$= 0.$

(3) $\text{Sin}\ (-60)^\circ + \cos 150^\circ$
$= -0{\cdot}866 + (-0{\cdot}866)$
$= -0{\cdot}866 - 0{\cdot}866$
$= -1{\cdot}732.$

Pythagoras' Theorem

Before proceeding further it will be as well to revise this extremely useful theorem. This states :

"In a right-angled $\triangle$ the square on the hypotenuse is equal to the sum of the squares on the other two sides of the $\triangle$."

Or in Fig. 3, in $\triangle$ OPM, $OP^2 = OM^2 + PM^2$.
in $\triangle\ O_2PM_2$, $(OP_2)^2 = (P_2M_2)^2 + (M_2O)^2$.

As an illustration of this, if a $\triangle$ with sides of 3, 4, and 5 units is drawn, it will be found to have a right angle between the sides which are 3 and 4 units.

Now $3^2 = 9$; $4^2 = 16$; $5^2 = 25$; $25 = 16 + 9$.

i.e. $5^2 = 4^2 + 3^2$.

or (hypotenuse)^2 = (one side)^2 + (other side)^2.

Example of use of theorem.

What length is required for the guy wire which is to be fastened to a pole 30′ above ground, and which will be pegged 20′ from the base of the pole ?

Let length required = L′. Then L is the hypotenuse of a right-angled $\triangle$ with sides 30′ and 20′.

Hence $L^2 = 30^2 + 20^2$
$= 900 + 400 = 1300$
$\therefore \quad L = \sqrt{1300} = 36{\cdot}056'$
$= 36'\ 1''$ approx.

Relations between Ratios

Each of the trig. ratios can be expressed in terms of any one of the others. We shall deal here with only two of these ; the others can, if necessary, be obtained from these two, or by using Pythagoras' Theorem.

1. In Fig. 3, in $\triangle$ OPM,

$$\sin\theta = \frac{PM}{OP} ; \cos\theta = \frac{OM}{OP}$$

$$\therefore \frac{\sin\theta}{\cos\theta} = \frac{PM}{OP} \div \frac{OM}{OP} = \frac{PM}{OP} \times \frac{OP}{OM}$$

$$= \frac{PM}{OM}, \text{ which equals } \tan\theta$$

$$\therefore \mathbf{\tan\theta = \frac{\sin\theta}{\cos\theta}}$$

2. In the same $\triangle$,

$OP^2 = OM^2 + MP^2$ (Pythagoras)

and dividing each term by OP^2, we have

$$\frac{OP^2}{OP^2} = \frac{OM^2}{OP^2} + \frac{MP^2}{OP^2}$$

$$i.e.\ 1 = \left(\frac{OM}{OP}\right)^2 + \left(\frac{MP}{OP}\right)^2$$

$$\text{or } 1 = (\sin\theta)^2 + (\cos\theta)^2$$

(in the usual notation, $(\sin\theta)^2 = \sin\theta \times \sin\theta$, is written as $\sin^2\theta$; $(\cos\theta)^2$ is written as $\cos^2\theta$).

$$i.e.\ \mathbf{\sin^2\theta + \cos^2\theta = 1.}$$

These are the two basic relationships from which others are obtained. The other identities are not required as a rule, however, for a good guide when manipulating ratios is the schoolboys' tag, "When in doubt, change to sines and cosines." Knowing that $\tan\theta = \frac{\sin\theta}{\cos\theta}$, and therefore $\cot\theta = \frac{\cos\theta}{\sin\theta}$; as well as remembering that $\sec\theta = \frac{1}{\cos\theta}$ and $\text{cosec}\ \theta = \frac{1}{\sin\theta}$, it will be seen that one can always change any of the ratios to sines and cosines.

Example.

If $\cos\theta = 0{\cdot}7$, what is the value of $\sin\theta$ and $\cot\theta$?

$\sin^2\theta + \cos^2\theta = 1$
$\therefore \quad \sin^2\theta = 1 - \cos^2\theta$
$= 1 - (0{\cdot}7)^2 = 1 - 0{\cdot}49$
$\therefore \sin\theta = \sqrt{0{\cdot}51}$
$= \pm\ 0{\cdot}714$

(*b*) $\cot\theta = \frac{\cos\theta}{\sin\theta}$
$= \frac{0{\cdot}7}{\pm\ 0{\cdot}714}$
$= \pm\ 0{\cdot}9804.$

Suggested Exercises

1. This seems a convenient point at which to halt before proceeding to the solution of triangles, and general applications. Before that stage is reached it is essential that the meanings of Figs. 2 and 3 should be grasped firmly so that determining the ratios for angles greater than 90° presents no more difficulty than for angles less than 90°. A good way of becoming familiar with the underlying principle (which is far more important than the mere memorising of formulæ) would be to verify the signs, in Table III, attached to the ratios in the different quadrants. The sign values given for the ratios of $(-\theta)$ could also be verified fully.

2. For interest and practice, two other identities, $\sec^2\theta = 1 + \tan^2\theta$ and $\text{cosec}^2\theta = 1 + \cot^2\theta$ could be proved ; first by using Pythagoras' Theorem, and then by using the two identities already established.

Problems

(7) What is the value of sin 140° ; tan 207° ; cos 310° cos 180° ; sin (−50)° ; tan (−100)° ?

(*Continued on page* 76).

RANDOM REFLECTIONS

By COMMENTATOR

It was the radio amateur who, two decades ago, popularised broadcasting. Our contributor is convinced that Television, already well received by the general public just before the war, will, as the result of amateur experiment and development, become universally popular once conditions return to normal.

AS was to be expected during the recent discussions on the "Future of Amateur Radio," that old bone of contention "experimental work" very soon came up for its periodical chew. Just prior to the war, it was the favourite subject upon which critics of amateur radio sharpened their claws. These critics were not only outsiders. Many in the ranks have been heard to pooh-pooh the idea that useful experimental work can be done by the amateur and the "cut out that experimental licence bunkum" gang were gathering many lusty followers.

When amateur radio began, one *had* to be an experimenter to get any results at all. But with the march of progress things have become easier and easier. As with the motor car, so with radio. Given a long enough pocket, one could buy a bag of tricks with which one could "go places" for years without even so much as a peep beneath the bonnet. So into the ranks of ham radio came those whose interest lay not so much in what the gadgets in the box *did*, as in what they themselves could do with those boxes of gadgets. Organised ham radio gained a lot from their affiliation. There was a place for them in the fraternity and they were made welcome. On the whole they behaved creditably—with one or two exceptions. But in any crowd of people one or two always will make fools of themselves and get the rest into trouble. On the whole most amateurs take up radio as a hobby because they really are interested in wireless and its kindred sciences, and the majority of them willingly engage in tests and experimental work when shown how to go about it.

Now one would not be far wrong in saying that there are two phases in the making of a new discovery. There is the discovery proper—the occasion when one realises one has discovered something new, some fact or phenomenon which has never been reported before, the answer to some baffling problem or whatever it may be—and then there is what one may call the "spade work" of the discovery; proving if the reported facts are really true, repeating the original experiments, and seeing if they come off in the hands of other workers, making quite sure that the inventor is not "kidding" his audience, seeing if it will fit in with other established facts and does not cut across well-proven theories. The original discovery may be made as the result of some sudden inspiration or chance observation, but much more likely, it results from a series of well-planned and thought out experiments, designed with a view to proving a theory, or carried out to see what happens, the theories to account for the results to be evolved later. Once the original discovery is reported, written up and published, then the "spade work" begins. Other workers who happen to be interested in the question under consideration read up the published material, try out the experiments themselves and before long it becomes pretty evident whether the discovery is a genuine one or whether it is just another of those "flashes in the pan" with nothing of real value in it.

How does all this affect us as amateur radio experimenters? To begin with very few of us are ever likely to find ourselves in the first category. Modern research is such a well-organised business that the discoveries of the future are more likely to be made by specialists who devote the whole of their energies to studying one particular problem, than by lone workers getting sudden inspirations.

But on the other hand there is great scope for the amateur experimenter in the second class of worker. Every now and again new theories are advanced and new statements made regarding radio phenomena. All these have to be verified, and much of this work can be done by the amateur. It is often said that with the limited gear at his disposal, the amateur experimenter cannot hope to do anything useful, when commercial concerns with their wealth of talent and capital are engaged in so much research work. Certainly if he tackles the problems they are tackling he would be wasting his time, but there are many useful jobs the amateur can do which no commercial concern would ever dream of doing for the sole reason that it is not worth their time and money.

When broadcasting first began great encouragement was given to the home constructor, the fellow who was keen enough to assemble his own equipment, experiment with it until it worked satisfactorily, got the neighbours in to hear this new thing called "wireless," got them interested, got them "broadcast-minded," got them finally buying commercial receivers of their own. The same thing was happening over again with television before war started. Most of the long distance television reception reports in this country were coming from amateurs and others keen enough to install receiving gear at their own cost, experiment with it and with various aerial systems until they got good results. It was such persons who were making television popular. When this war is over it is they who are going to help put this newest of sciences, this latest of the fruits of culture and progress, on to its feet again. Among the amateur fraternity there will always be found many who are experimentally-minded. The more of them the better. They are the leaven which leaveneth the whole. They keep us out of the ruts. Experimental work is one of the foundation stones of amateur radio. In the new order for which we are planning lets keep it in.

You see amateur radio is a many-faceted jewel. Experimentation is but one of these facets, and after all, we are supposed to be a scientifically-minded society.

Ham Hospitality

Mrs. H. W. Phillips, wife of BRS.1615, who is on active service, advises us that she and her mother will be pleased to entertain any amateur who finds himself in the Plymouth area. Her address is 33 Dale Gardens, Mutley.

EXPERIMENTAL SECTION

ONE of the most important stages of a signal generator is the attenuator, for this must be designed to give adequate control of the output voltage down to absolute zero without affecting the frequency of the oscillator. The voltage range of a laboratory instrument is usually about 1 microvolt to 1 volt, and in this connection it is advisable to arrange that not more than 1 volt is available at maximum otherwise there may be difficulty in reducing the output to zero. It is also important that the " earth " point of the electrical circuit be connected to the metal screening box at one point only in order to avoid, as far as possible, the presence of R.F. currents in the screening box itself as these can cause large external fields.

Attenuator Circuits.

The simple variable resistor control shown in the previous diagrams included in these notes (Fig. 1a) is limited in its application and is rarely satisfactory for a first class piece of apparatus. The self capacitance of the resistor introduces errors in the calculated resistance and very often absolute zero is not possible due to residual capacity. The two most satisfactory arrangements are the Constant Impedance and the Resistance Step attenuators, which are shown in Figs. 1b and 1c respectively. The former arrangement presents a constant impedance to the valve generator (or amplifier) and the output, whilst the latter has the advantage that the steps can be arranged in regular degrees—usually multiples of ten. A stepped R.F. attenuator requires great care in construction if it is to function with less than 20 per cent. error, because non-reactive resistances when operated at frequencies of 10 to 30 Mc/s present a serious problem. A common type of winding which is used to reduce the self-capacitance and inductance of the winding is the Ayrton-Perry. This consists of two constant-temperature coefficient resistance wires wound on thin mica sheet in such a way that the wires are electrically in parallel but wound in opposite directions around the mica so that the two windings create opposing magnetic forces.

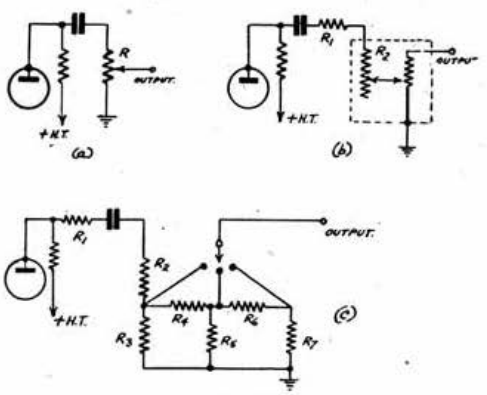

FIG. 1a.

Simple variable Resistor Control for use in Attenuators, R 5,000 ohms.

FIG. 1b.

Constant Impedance Attenuator, R 1, 1,000 ohms. R 2, 50,000 ohms per section.

FIG. 1c.

Resistance Step Attenuator, R 1, R 2, 10,000 ohms. R 3, R 4, R 5, R 6, R 7, 20,000 ohms.

Checking Accuracy.

Checking the accuracy of attenuators presents a difficult problem for the amateur, but it can be carried out approximately with the help of a good receiver, an " R " meter and an auxiliary oscillator with some form of transmitting loop in which is connected a milliameter. Assuming the voltage output of the attenuator at maximum can be measured on a valve voltmeter then the other steps can be checked by obtaining their ratio to the maximum position. This is done by comparing the current in the transmitting loop with that position of the attenuator which gives the same reading on the " R " meter. If the current in the loop is " x " to give the same " R " reading as the attenuator at maximum, and one tenth of " x " to give the same reading as the attenuator on the second step, then the second step is one tenth of maximum.

Use of Dummy Aerial.

When a signal generator is used in conjunction with a receiver, a dummy aerial is usually inserted between them. On frequencies below 1500 kc/s it is usual to employ for this purpose a resistor of 25 ohms, an inductance of 2 microhenrys and a capacity of 200 micro-microfarad all in series. The network is connected between the output terminal of the signal generator and the aerial terminal of the receiver. Above 1500 kc/s a non-reactive resistor of 400 ohms is standard.

Attenuators for V.H.F.

Attenuators for use at very high frequencies are difficult to construct and calibrate and are beyond the scope of these notes but readers who are interested should consult the various publications by authors who have specialised in this type of work.

For most amateur work it will not be necessary to know the constants of the attenuator with any great accuracy, and as long as it enables the R.F. output of the signal generator to be cut down to zero it will probably be satisfactory. Complete screening is desirable and in this connection it can be mentioned that some commercial attenuators are fitted with solid brass covers which are ideal for the purpose.

Aperiodic Amplifiers.

In connection with our notes in the June issue, the following suggestions have been put forward by Mr. S. K. Lewer (G6LJ) :—

" In Fig. 2 (page 408) a separate battery is shown for biasing the suppressor grid for modulation purposes. It would be more convenient to increase the value of the cathode bias resistance to give enough bias for the suppressor grid. In this case the suppressor grid would be returned to earth and the grid bias return lead through R_2 common to V_2 and V_3 would be returned to a point higher up towards the cathode on the high resistance cathode bias for

V_3. Two suitable resistances in series would be used to give the correct bias values.

In Fig. 1 (page 408) a screen grid valve would be better for V_2 in order to reduce the effect on the oscillator frequency, of changes in the output circuit. The buffer action of V_2 is very important and a screen grid valve would do the job better than a triode. G5HF.

Transmitter Group.

Members, or prospective members, of the Transmitter Group, who would be interested in contributing to, and receiving, a monthly Letter Budget are requested to write to the Experimental Section Manager, D. Heightman, G6DH, 234 Burrs Road, Great Clacton, Essex. It will be appreciated that, for the time being, only theoretical considerations can be discussed in the Letter Budget.

Cosmic Notes

Magnetic Conditions from April 19 to May 30 inclusive (no data received for May 17 to 24).—Mild storm April 19; moderate storm April 24/25; mild storm May 24, otherwise quiet conditions.

Ionosphere Storms from April 23 to June 3 inclusive (no data May 21 to 27).—Moderate and prolonged storm April 24 to 29; mild storm April 29 to May 5; mild storm May 9/10; moderate May 10/11; moderate May 17/18/19; mild May 28/29.

Critical Frequencies and *Layer Heights*, at Washington, average for weeks ending, midnight F, midday E and F2 respectively.—April 29, 3·03 Mc. 347 km.; 3·37 Mc. 116 km.; 5·6 Mc. 372 km.; May 6, 3·05 Mc. 353 km.; 3·4 Mc. 120 km.; 5·34 Mc 382 km.; May 13, 3·87 Mc. 315 km.; 3·4 Mc. 121 km.; 5·46 Mc. 411 km.; May 20, 3·5 Mc. 326 km.; 3·5 Mc. 125 km.; 5·57 Mc. 405 km.; June 3, 4·26 Mc. 297 km.; 3·5 Mc. 122 km.; 5·6 Mc. 396 km. G6DH.

Book Review

RADIO LABORATORY HANDBOOK. By M. G. Scroggie, B.Sc., A.M.I.E.E. Published by Iliffe & Sons, Ltd.; Price 10s. 6d.

The second edition of this already popular book will be welcomed by the ever-growing body of amateur and professional workers alike who find themselves engaged in laboratory measurements upon communication apparatus. In producing the new edition the author is keeping abreast of the times by the inclusion of new material on crystal-controlled frequency measuring circuits, Q-meters, transmission line technique and double beam oscilloscopes.

For those who have not already seen the first edition it may be said that the book discusses every aspect of radio laboratory work, including such questions as layout of the laboratory, and the most economical way of equipping it. Although adequate description is given of orthodox measuring equipment as produced by the well-known instrument manufacturers, he lays great stress upon the use of laboratory constructed and improvised apparatus wherever possible.

Included are chapters on oscillators of all kinds, signal generators, valve voltmeters, oscillographs, indicating instruments, bridge measurements and electrical standards. A chapter on V.H.F. work is also included.

Not the least valuable chapter is that which deals with the choice of experimental method, the assessment of errors and the working-up of experimental results.

A few features in the author's treatment of the subject which appear to be original are the very extensive use of dynation oscillators of all classes and the general adoption of the excellent automatic output control system (similar to A.V.C.) which he applies to all oscillators. The use of "level-diagrams" when explaining gain and alternative measurements is helpful while the choice of bridge oscillator frequencies, which are equivalent to a round number in radians per second is to be heartily recommended.

A very pleasing feature is the inclusion of a comprehensive wire table in *centimetre* units.

The book is very free from errors, but it is to be regretted that having specified the use of B.S.I. recommendations, for symbols the author uses "mmfds." for micro-microfarads in several places. H. A. M. C.

The 28 Mc. Band

DURING the period June 27 to July 27 conditions were normal for the time of year, and short-skip signals came through regularly. European commercial harmonics above 30 Mc. were heard on at least 18 days, and there were usually a few signals above 27 Mc. on the remaining days.

BRS3003 sent the only report of an amateur signal on the band, *viz.*, an unidentified phone station at the rather late hour of 20.50 G.M.T., on July 13. He was calling CQ Ten with a foreign accent, but signals were S4/0 and the call sign was not heard.

From South America LSA2 was only reported four times in the first two weeks of July, but after July 14 was heard every day except the 20th. We apologise for labelling LCP a South American last month. He is, of course, a Norwegian commercial station.

European commercial harmonics heard included most of those mentioned last month and a few others. French and Italian signals predominated, and BRS3003 reported the 30 Mc. Rome broadcast harmonic on several days, and IBT, 32·7 Mc., as the loudest signal of the month.

The Hissing Phenomenon was again heard on several occasions, *i.e.*, on June 28 at 14.18 G.M.T., on July 3 at 16.01 for three minutes and again at 16.09, on July 19 at 16.18 for two minutes, and on July 31 at 12.05 G.M.T.

Reports received after going to press last month show that signals higher than 35 Mc. were heard on 12 days in June. BRS3893 heard a solitary W4 'phone on June 17, and the 42·8 Mc. harmonic of JNP on June 10 and 14. Italian commercial harmonics were logged on 43, 42·8, 39·9 and 36 Mc., and B.B.C. harmonics as high as 47 and 53 Mc.

Future reports should reach the writer (G2YL) at "Petersmead," Walton-on-the-hill, Tadworth, Surrey, by the 25th of each month. In the meantime thanks are due to G4MR, BRS3003, 3893 and 4144 for providing material for this contribution. N. C.

KHAKI AND BLUE

Those who remember the interesting monthly commentaries dealing with 56 Mc. work published in this Journal just prior to the War, will be pleased to hear that one of the contributors, F./O. L. G. Blundell, G5LB, is engaged on work after his own heart at an R.A.F. station in the N.W. He hopes to meet other amateurs during his spell of duty in the Island.

* * *

L.A.C. R. F. C. Brake, G8QR, now living at 115 Goddard Avenue, Swindon, will be glad to contact amateurs who arrive at No. 2 R.S. He can be located by asking for him at Hut No. 42. G8QR is anxious to arrange a Conventionette before the summer ends. Those who are interested should communicate with him immediately, so that an announcement can appear in our next issue. Incidentally, G8QR must consider himself fortunate, for according to a report he recently managed to get across about 20,000 perfectly good volts. As one of his pals said " as a ' bleeder ' he should make a fine dead short ! "

* * *

News has reached us that 2/Lt. David G. Blair, G8VU, of Manchester, and Sig. J. B. Kay, G3CO, of Blackpool (late of Plumstead) are prisoners of war in Italy. Details are given on page 74.

* * *

L.A.C. B. A. Parsons, GW4FW, who is still located in Gambia, sends his special greetings to all old friends in South Wales. He expresses his regret that no notes appear from District 10, and urges someone in that area to get busy.

GW4FW has already commenced to introduce the Society into ZD4, and hopes to form a club there before he leaves.

* * *

Sgt. C. H. Gould, 2FQH, a Cadogan Arms-ite, would like to hear from BRS1151 *via* H.Q. G8BQ, 2DBM and 3825 who are with 2FQH join him in extending a welcome to any member serving in the Bury St. Edmunds or Thetford areas, We understand the name of the famous hostelry at which they are billeted is shortly to be changed to the " Sign of the Black Diamond ! "

* * *

From an R.A.F. station in Iceland, comes news from A.C.1, J. H. Cant, G6FU. He reports having experienced a comfortable trip by air. The difference between actual conditions in TF, and what he expected to find, apparently amazed him.

* * *

Writing from a Signals Unit near London, F. H. Chambers, 2FYT, who is now a Lt. (having progressed from the ranks), reports that K. C. Morton Evans, GW5KJ, has been promoted to Captain, and that Cecil Bradbury (1066 and all that) is now a Sergeant. Cecil incidentally has just announced his engagement. Serving in the same unit are G5PF, 5SR, 6JF, 6RW and 6TQ, some of whom are civilians.

All members serving at No. 1 S.S., and at stations in and around Lincoln, are reminded that a Conventionette will be held in that town on August 24. It is hoped that every one will make a special effort to attend. The meeting will be addressed by the Secretary-Editor, G6CL.

* * *

The first Airgraph letter received at Headquarters, came from F./Lt. J. V. Newson, G3GV, who is now with the R.A.F. in the Middle East. J. V. N. sends greetings to all old friends in the London area and looks forward to hearing from those who have the time to write. His address can be obtained from G6CL.

* * *

A.C.1 A. E. Sutton, G3BN, wishes to record his thanks to all GI members who extended hospitality to him whilst in that country. He also sends greetings to " Pop " of the " Belfast Saturday Night " and to his friends in Bury, Ashton and Manchester.

* * *

G6CL and G5SY together with other members who have been commissioned to the R.A.F.V.R. (Training Branch) will be attending a Signals Officers course at No. 1 S.S. from August 16 to 24. During that time it is hoped to arrange one or two informal Ham gatherings in camp during evenings.

* * *

L.A.C. F. H. Lane, whose home address is " St. Austell," Barton's Hill, Minster-on-Sea, Isle of Sheppey, Kent, is anxious to get in touch with E. Vaughan, G2VA, and L. Mottershead, BRS4090, both of whom are on active service. G3GW, wishes to be remembered to all old friends who contacted his station on 1·7 Mc. At the present time he is serving with the R.A.F. in Caithness, Scotland.

* * *

Tel. R. C. E. Beardow, G3FT, having returned to England from Gibraltar, asks that all letters should be addressed to his home at 3 Geneva Gardens, Chadwell Heath, Essex. He has just completed a month's leave and is now undergoing a course for wireless mechanic. He would like to get in touch with amateurs in the Portsmouth area.

* * *

Cpl. H. M. Fenton, G8GG, now a wireless operator mechanic (1) at No. 1 S.S., would like to hear from members of the Blackpool and Fylde R.T.S., who are on active service. Letters should be sent *via* his home address, 25 Abbey Road, Blackpool.

* * *

Ft./Lt. Peter Mortimore, G8KI, now living at The Lodge, Barnock, Nr. Peterborough, would like to hear from G5LK, 8HH, 8MP and other old friends. He recently had the pleasure of meeting F./O. Barclay Dowden, VE1HK. Land line QSO's with GM8HA and occasional chats with G8VS provide his chief ham contacts.

Writing from the Gold Coast, Capt. Stanley Higson, GW2PH, reports an unexpected meeting with Sig. R. Cumberlidge, G3CK, who is attached to his section. They are hoping to recruit some new members during their stay in ZD4. Stan sends his special greetings to all old friends in Districts 1 and 11.

* * *

On his first day in the R.A.F., A.C.1 A. G. Bennett, 2AUM, met GW3CP. Later in the evening he contacted 2DPH and GM6HZ as a result of reading his copy of the Handbook in the canteen. He is a Wireless Mech. at an O.T.U. in Cumberland.

* * *

A. Schofield, G3TS, of Laindon, records his thanks to Prestatyn members who extended hospitality to him, whilst stationed in the neighbourhood of that town.

* * *

We learn that Naval Airman H. G. Cunningham, G5CI (H.M.S. *Ark Royal*) was last summer awarded the D.S.M., and twice mentioned in despatches. Shortly afterwards he was shot down off Norway and taken prisoner thus bringing to an end, for the time being, 14 years of active service in the Royal Navy.

* * *

We understand from Tel. Beardow that the following are, or were until recently, serving in Gibraltar :—G2KQ, 3BD, 4OO, 5NM, 5VD, 6ZY, GM3TD, BRS3355, 2CDB, BERS481.

* * *

A.C.2 F. A. Beane, 2CUB, now in training as a W.O./A.G. at No. 2 S.S., was glad to find that his first two instructors were "hams." 2CUB, who founded the B.S.W.L., sends his best wishes to all old members of the League, also to VU2EU, G3MI, 8QJ and others who know him.

That there are still a few hams at No. 1 S.S. is confirmed by J. Lomax, G3TU, who tells us that G2NU, 5XY, GM4HX, are in his class. Why not arrange regular meetings lads ?

* * *

Patience Rewarded ! E. J. Williams, G2XC, until recently head of our Propagation Group, has just been granted a commission in the R.A.F.V.R., with the rank of Pilot Officer. Ted joined up last year as an A.C.2 and rapidly rose to corporal. He carries with him into his new sphere of activity the best wishes of many friends in and out of the Services.

* * *

Patience Doubly Rewarded ! Some few days after writing the previous paragraph, news reached us that Sgt. W. H. Allen (G2UJ), had also been "elevated to the peerage." Bert Allen, an original member of the C.W.R., went to France in September 1939 with the "Early Birds," returning nine months later to take up important work at an R.A.F. station in Kent. P./O. Allen is one of our best known D.R.'s, having visited most parts of the country at different times. We hope that in his new job he will continue to have the same opportunities as of yore, of meeting fellow amateurs. Good luck Bert !

* * *

Congratulations also to Basil Sadler, G2RC, who has recently been granted a commission in the R.A.F.V.R. with the rank of Pilot Officer after serving in the ranks. He will be glad to hear from old friends and in particular from G2JK and 3TA *via* his home address 40 Loxley Road, London, S.W.18.

* * *

Ham Meeting at Sea

Believing in the theory that one cannot walk 100 yards without bumping into a ham in this war, P./O. Ken Walker, GW2WO, and F./Lt. Sam Pollard, G2GB, decided to test that theory in extreme conditions. Finding themselves "somewhere at sea," they persuaded the ship's adjutant to insert in "Orders" a notice of a forthcoming R.S.G.B. meeting on board. A blackboard inscribed with the cryptic message "Radio Society of Great Britain" and emblazoned with a copy of the Society's badge in chalk, drew men from all corners of the boat thirsting for a Hamfest.

No fewer than 35 hams and would-be hams turned up, of whom 16 possessed calls. These included L.A.C. Willmott, G3IO; A.C.2 Fox, G3MB; Signalman Green, G3QZ; A.C.2 Davy, G3RW; L.A.C. Flintoff, G3UG; L.A.C. Moore, G3ZM; L.A.C. Abraham, GW3AJ; L.A.C. Hardie, GM6JH; A.C.1 Price, G8OQ; A.C.2 Marsden, ex-2AUI; A.C.2 Wood, 2DBW; L.A.C. Huppler, 2HCT; L.A.C. Kerbey, 2HCW; and A.C.2 Wilkes, BRS4011.

Newcomers to the game were given details of the Society's objects and its work in support of the amateur movement. The meeting then developed along traditionally ham lines, passing through the usual phases of tall stories, other stories, and the final reluctance to break up. In fact the only detail lacking was the familiar stream of cars, whose hooted morse is the accepted ending to a successful gathering.

Electronics Battalion

From the A.R.R.L. comes the news that an Electronics Battalion of the U.S. Army Signal Corps has been inaugurated. Experience gained by Great Britain has established the urgent need for men who have specialised in electrical engineering, radio communication and electronics. Special arrangements have been made for the appointment of qualified specialists to the rank of 2nd Lieut. for immediate duty. They are desired for the specific purpose of studying and operating devices which employ high-frequency apparatus of an extremely complex nature.

The publicity work in connection with this latest drive to put amateur experience to the crucial test is being undertaken by Mr. George Bailey, W1KH (President of the A.R.R.L.) who is Chairman of the Radio Section, Office of Scientific Personnel, National Research Council, Washington.

Appointments to the Electronics Battalion not only defer a call under the Selective Service Act but offer complete exemption.

The type of expert most eagerly sought after is those who have had some experience of microwave and cathode-ray technique. Pay and allowances range from about £45 to £90 per month, depending upon duration and place of service.

Congratulations

To Major and Mrs. E. Y. Nepean on the arrival of a daughter on June 23. Major Nepean, the original holder of that elusive call AC4YN, and more recently G5DN, is serving with the Royal Corps of Signals, and prior to the outbreak of hostilities was a member of the W./T. Board.

Ham Coincidence

David Niven, 2CHN, our Scottish "A" District Representative, was making his daily train journey to a town prominent in the news lately. Soon after the train started he noticed that two of his fellow travellers were talking in language which only hams understand. Presently one remarked "There was something about that in the BULL. last month, but I've left my copy at home."

It requires little imagination to picture the surprise of the speaker when Dave's copy of the BULL. fell into his lap. The speaker was Lyn Jones, GW3XY, up from Wales on a radio job for the Government. An animated ragchew followed and their destination was reached in record time.

Need we reiterate—always carry a copy of the BULL. when travelling.

Was it that Rotary ?

W./O. Joe Rockall, G2ZV, a keen pre-war V.H.F. experimenter, tells us that as a result of a Nazi machine gunning exploit several of his rare 56 Mc. DX cards have been "shot up" including one from G6CW of Nottingham, which confirmed what was, at the time, the best two-way contact between fixed G stations. The "bits of lead" came through the walls of Joe's shack, across the operating table and made a mess of the electrolytics in his power pack. After boring holes through the QSL's they finally went to "earth" outside the building. The four which have been found are to be presented to the first four W's to work Joe on 224 Mc. after the war ! Mrs. 2ZV who was at home when the "incident" occurred, escaped unharmed.

An Unusual Battery Set Fault.

A battery set would function satisfactorily for a short period and then fade out. The H.T. and L.T. were tested and replaced without affecting a cure. A filament voltage test was made at the valve holders and the reading was found to be less than 2 volts. On investigation it was found that within the rubber covering about 3 in. along the L.T. lead, the wire had corroded. There was nothing to indicate the fault from the outside and it was only discovered by sharply tugging the lead.

B.R.S. 4270.

Silent Keys

It is our sad duty to record the death on active service of two of our youngest and keenest members—Lt. Hugh du Sautoy Atthill, G8CV, of the Royal Corps of Signals, and L.A.C. Leonard Charles Nash, G4DA, of the R.A.F.V.R.

* * *

Hugh Atthill known to a wide circle of amateurs, was drowned on June 19 while bathing in the Middle East. From an early age he had been interested in radio, constructing his first receiver when only 12 years old. Four years later he obtained his transmitting licence. He was organiser of the Aldershot and District Amateur Radio Club in 1938, and acted as its Hon. Secretary. In May of that year he was commissioned as 2nd Lieutenant in the Royal Corps of Signals (Supplementary Reserve) and went to France with First Corps Signals immediately war was declared. He was promoted 1st Lieutenant last January, and left for the Middle East two months later. On arrival he met his brother, Major A. J. M. Atthill, M.B.E., another radio enthusiast who has since been wounded in action. During his all too brief stay in Egypt he found time to look up other amateurs whom he had talked to over the air in peace-time.

Hugh Atthill, at the time of his death, was 21 years of age.

* * *

Leonard Nash reported missing, believed killed, in the evacuation of Crete was only twenty. Educated at St. Johns and Weymouth Grammar Schools, he became interested in radio when only eleven years of age. He was among the first to join the Weymouth Short-wave Club in 1938. He was granted a full call when seventeen and at the time was one of the youngest licensed amateurs in the country.

Leonard enlisted in the R.A.F. in March of last year, and after passing through No. 2 S.S., was posted abroad for duty at a Radio Location station.

* * *

To the parents and relatives of these two young men whose lives and interests had so much in common, and whose future seemed so bright, we extend our heartfelt sympathies and condolences.

J. C.

ON ACTIVE SERVICE

TWENTY-THIRD LIST

WE publish below our twenty-third 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 July 26, 1941.

Rank and Name	Regiment or Branch	Pre-war Call or B.R.S.
F./O. F. E. Atkins ...	R.A.F. ...	G3ZU
A.C.2 C. R. Beaven ...	,, ...	2BVD
A.C.1 A. G. Beckett ...	,, ...	2AUM
A.C.2 H. Billing ...	,, ...	4336
Cpl. J. Blacklaw ...	,, ...	GM4HN
Gnr. T. R. Brooke ...	R.A. ...	4315
Sig. T. Brown	R.C. of S. ...	2FVH
Ft./Lt. P. J. Bulow ...	R.A.F. ...	4331
L.A.C. P. C. Butson ...	,, ...	2DBM
A.C.1 E. T. Carter ...	,, ...	G4IV
Lt. H. J. Clements ...	War Office Photographer	G2QL
Cpl. J. A. Cook ...	R.A.F. ...	G3WC
A.C.1 E. F. Dilnot ...	,, ...	4326
2nd Lt. D. W. H. Ffennell.	R.A. ...	3595
Cpl. R. E. Friend ...	R.A.F. ...	G4NV
L./Bdr. R. W. Gilbert...	R.A. ...	4322
Capt. W. R. Hamilton...	New Zealand Dental Corps	ZL4DQ
A.C.2 A. H. Hennis ...	R.A.F. ...	4305
Tpr. H. F. Henshaw ...	R.A. ...	4246
A.C.2 A. Kuhnel ...	R.A.F. ...	3572
A.C.H. u/t Pilot H. T. Lunson.	,, ...	G3WR
L.A.C. W. J. Markwick	,, ...	4306
A.C.2 A. P. Morris ...	,, ...	4301
A.C.2 R. H. M. Peach...	,, ...	4321
L.A.C. S. Richard ...	,, ...	4328
F./Lt. D. W. Sawyer ...	,, ...	3505
Gnr. S. P. Shackleford...	R.A. ...	2HAX
A.C.1 E. G. Smith ...	R.A.F. ...	4304
A.C.2 R. J. Stellig ...	,, ...	GW4CK
Pte. D. F. Strong ...	East Lancs. Regt.	4323
A.C. W. A. Sweatman...	R.A.F. ...	2CSZ
Tel. A. Walker... ...	R.N. ...	4339
P./O. W. K. Walker ...	R.A.F. ...	GW2WO
Capt. E. D. Watterson	R.A. ...	4312
P./O. J. M. Wheeler ...	R.A.F. ...	3352
A.C.2 E. H. Williams ...	,, ...	4317
A.C.1 F. T. Williams ...	,, ...	4337

73.

GM2JF (Highfield, Knutsford Road, Holmes Chapel), to G2RX, GM2UD, G2YY, 5SC, 6HZ, 6JJ, GM6MD, 6NX, 6RV, 6ZI, 2DVQ.

* * *

G2SH (Condora, Gyllyngvase, Falmouth) to G2AT, 2FP, 3BI, 5QA, 5SY, 8QL.

* * *

G2YI (51 Blackwell Avenue, Norwich), G2SA, 2SO, 2WG, 3GW, 3LD, 3MV, 5RV, 6AB, 6LB, 6LL, 6UT, 8BR.

* * *

G3DN (Rathlin, Mobberley, Cheshire), to G3NZ 3YX, 5CP, 5US, 5WI, GI8PA, 2FIZ, BRS1066.

* * *

GM3LO (75 Woodside Avenue, Rosyth), " Awe The Best Tae Auld Pals."

* * *

G4FN to G2IZ, 2YH, 3GF, 3GW, 3BN, 4AK, 5IL, 6VC, 8VG, W1BLO, 1FSI, VK4JB, and all the " Eagles."

* * *

GW4FW (R.A.F., Gambia), to G2BG, 3GH, 3SB, 4KQ, 8CT, 8NP, 8UH, and 8WU.

* * *

G5PY (18 Parkthorne Road, S.W.12), to G2GZ, 2JB, 2 JK, 2UJ, 2UX, 3CI, 3CU, 3HG, 5CI, 6AN 6HM, BERS195 and all members of District 13.

* * *

G5LB (R.A.F.), to G2GB, 2HG, 2NK, 2YL, 3CY, 5OX, 5OJ, 6NF, 6QB, 6WY, 6YL, 8DN.

* * *

G8GG (R.A.F.), to G3IC, 3IM, 4KG, 5MS, 6MI, 6VQ, 6YR, 8AK, 8NU, 2COR, 2CWW and all Blackpool and District 1 members.

G8HX to G3FR, 3WK, 3XA, 4DR, 4DS, 8GO, 8MR, 8NS, 8OM, 8OT, 8SA, 8UZ and all the " Robin Hood " gang.

* * *

GM8QD (2 Trossachs Road, The Hill, Johannesburg), to G3SL, GM5YG, 6JD, 6JJ, 6MD, 6WD, 8RJ, 8RM, EI9M and all Scottish "A" District members. GM6IW is especially requested to write.

* * *

G8PL (R.C. of S.), G2CD, 3SV, 3CQ, 4OO, 5KA, 5RV, 8TV, 8PP, 8PC, GM8MQ, 2AWK, 2DVA.

* * *

2AKK (29 Harborne Road, Cheadle, Staffs), to G2HW, 2PB, 4JS, 4KT, 8JA and all members of the Blackburn group.

* * *

2CIB (R.A.F.), to G2NN, 3DG, 4AH, 4LY, 5QZ VU2EB, VE3AMP, 2BSR, 2DRT, and all Nottinghams.

* * *

2DRT (R.A.F.), to 2BSR, 2CIB, G4AH, 4LY, 5TN, 4MS, and all Notting-hams.

* * *

2FQH (R.A.F.), to G2WI, 3AN, 3BR, 4OG, 6GH, 8KL, 8PR, 2ADJ, 2CLS.

* * *

2HBG (R.A.F., Sudan), to G2RI, 2IX, 3BU, 4FO, 5MY, 5ZP, 6VD, 6IM, 8LD, 8CZ, 2BLR, 2CFC.

* * *

BRS3593 (Lynton, Kirby Road, Sutton in Ashfield, Notts.), to G2YL, 3XA, 4DS, 4GF, 6DH, 8DI, 8HX, 8MR, 8NS, 8SA, BRS2777.

THE MONTH "OFF" THE AIR—July, 1941

By A. O. MILNE (G2MI)

Notes and News

AS might be expected, since Russia's entry into the war, there is even less activity on the amateur bands, or rather perhaps it would be more correct to say that there are fewer active amateur stations on the bands!

BRS3825, a new contributor to these columns, is using a Ham bands 2 receiver and reports 14 Mc. rather poor except for South Americans, who now speak only Spanish when on the air. W6RKI (getting well down the alphabet in W6!) has been coming over well on 'phone, S8 at 17.00 G.M.T. Other good signals are W5HGC, K6SRZ, KA6FB and KF6SJJ.

G2QY, writing from Cornwall, heard a QSO between W4BED and W3IBE at S2 on 7093 kc. at 15.49 G.M.T. on April 10. He has copied W1AW on 1·7, 3·5, 7 and 14 Mc. simultaneously and mentions that he has been strong enough on 3·5 Mc. to copy at 35 w.p.m.

G6QN heard D3DSR calling CQ—ARHL; so evidently they are still about! He supposes he tuned from high to low but like the famous dog of nursery rhyme, the poor little daschund got none.

'QN quotes from an official broadcast made by W1AW which, in a "message to all amateurs" stated that the F.C.C. has given its ruling to open all but the first 100 kc/s. of the 28 Mc. band for telephony and has allocated the band 29,250–30,000 kc/s. for F.M. experiments. The message also called attention to the necessity for every station to sign both, the call-sign of the station being worked and his own, after each transmission. (See Headquarters Calling.—ED.)

The best of the month on 14 Mc. are K5AG, K4HEB, HHT and HDY, on c.w. and PY4AP, W5HZI, 1NJ and 4EVI on 'phone. The following W9's may like to know that their signals are coming in well over here; 9IIV, MYW, PZM and RSI.

2HOG reports an interesting effect on the short-wave bands at a few minutes before midday G.M.T. on June 26. Conditions on 15 Mc. went quite hay-wire with mid-continental stations subject to intense fading. The most marked being DJL which was radiating a trans-atlantic link to the N.B.C. and C.B.S. networks. For more than two hours the band was very noisy. It is interesting to note that the time coincided with earth tremors in the Middle East, reported the following day in the B.B.C. news bulletin. He also comments by way of interest on the excellent strength of some of the American broadcasting stations in the early hours of the morning.

Talking of conditions, did anyone else notice the loud hiss, like a prolonged escape of steam, which began building up at 14.33 G.M.T. around 7 Mc. on July 8 and gradually died away to inaudibility at 14.36?

G3GX has heard American amateurs discussing a new regulation which will apparently allow certain of them to work 'phone between 7,100 and 7,200 kcs. By the time we get back on the air, it will be completely over-run by W 'phones! 'GX does a good deal of his listening in the early morning on 14 Mc.

W6RDV, RKI and SPJ are three 'phones which have been coming over well, also a station signing W6TSW/9 who says he is "fixed portable." W6LJD and PY4IR have been heard on 7 Mc. c.w. Outstanding 'phones on 14 Mc. have been W5EB, BGQ, HSG, FCD, 6IVB, BOZ and MBG. Of the 7 Mc. c.w. signals, the following is a fair selection: W1, MKR, NLM, OR, WAS, 2IXZ, JEJ (598), NNO, NOL, NCF, 3JBB, 8VX, SSK and 9DLA.

G3XV who is in the Navy pay office would be pleased to see anyone who happens to be Pompey way. The address is 325 Lake Road, Portsmouth. There is a R.S.G.B. plaque in the doorway!

BRS191 has no DX for us this month as he has been trying out a new receiver on the "ultra highs."

Overseas News

Eric Trebilcock, reports the death of Frank Rostier, VR2FR of Labana, Fiji, pioneer operator for the British Government on Canton Is. (now KF6), at the time when its ownership was in dispute between this country and the United States. Best DX down Salamaua way, during April was XU8MA, KF6JEJ/KG6, K6PAH on c.w. and LU6AJ, CE3CG, J8CI, J5CW, KB6OCL, XU8YL, KA9AA and KA6FB on 'phone. W4DSY was heard to say that the Byrd Expedition has just left Antarctica for U.S.A. via Argentina, so bang goes all hope of our contact with KC4USA!

Doc Haussman, W8DST, in a letter to G6CL, says 28 Mc. is practically dead over there, except for some sporadic E layer stuff. 14 Mc. is also pretty dud and appears to behave very much as 28 Mc. did about two years ago.

"With all the DX a minus quantity" he says "there isn't much of a good reason for not polishing up the rig, so we have gone in for extensive rebuilding."

Ham Coincidence

Charlie Kirk, G4CL, ex-ZB2A, has recently moved to 20 Branksome Drive, Nabs Wood, Shipley, Yorkshire, where he will be very pleased to see any ham in the district. Not until he had moved in did he discover that he now lives opposite our worthy past President G5AR.

Medium Wave DX

G5HH remembers that a pal of his with the British-India Steamship Co. who used to be on the Durban to Bombay run once said that it was a regular thing to receive good signals from London Regional on 342 metres. 5HH also enclosed a letter from a New Zealand listener dated 1938 saying that he had received 850 medium wave broadcasting stations, excluding those in N.Z. and that he could produce verifications from all of them. (PHEW! ED.)

BRS1151 also mentions that a letter, published some years ago in *Popular Wireless* gave a long list of European stations heard in Australia.

Tailpiece

Will Mr. Ivan Hilton, an Ex-BRS of Leeds, please write to G8RF, c/o of his home QRA?

BRITISH ISLES NOTES AND NEWS

District Representatives and Deputies.

DISTRICT 1 (North-Western). (*Cheshire, Cumberland, Lancashire, Westmorland.*) MR. H. W. STACEY (G6CX), "Sandleas," Edisbury Road, West Kirby, Wirral, Cheshire.

DISTRICT 2 (North-Eastern). *Yorkshire (West Riding, and part of North Riding.) Acting:* MR. A. O. MILNE (G2MI), 1 Kent Drive, Harrogate, Yorks.

DISTRICT 3 (West Midlands). (*Shropshire, Staffordshire, Warwick, Worcester.*) MR. V. M. DESMOND (G5VM), 90 Worcester Street, Birmingham.

DISTRICT 4 (East Midlands). (*Derby, Leicester, Northants, Notts.*) *Deputy:* MR. W. M. VENDY, (G6VD), 9 Cecilia Road, Leicester.

DISTRICT 5 (Western). (*Gloucester, Hereford, Wiltshire.*) MR. R. A. BARTLETT (G6RB), 31 King's Drive, Bishopston, Bristol.

DISTRICT 6 (South-Western). (*Cornwall, Devon, Dorset, Somerset.*) MR. W. B. SYDENHAM (G5SY), "Sherrington," Cleveland Road, Torquay.

DISTRICT 7 (Southern). (*Berkshire, Hampshire, Oxfordshire, Surrey.*) MR. W. E. RUSSELL (G5WP), "Milestones," Westfield Road, Mayford, Woking, Surrey.

DISTRICT 8 (Home Counties). (*Beds., Cambs., Hunts., and the towns of Peterborough and Newmarket.*) MR. S. J. GRANFIELD (G5BQ), 47 Warren Road, Milton Road, Cambridge.

DISTRICT 9 (East Anglia). (*Norfolk and Suffolk.*) MR. H. W. SADLER (G2XS), "The Warren Farm," South Wootton, King's Lynn, Norfolk.

DISTRICT 10 (South Wales and Monmouth). *Scribe:* MR. S. HOWELL (G5FN), 90 Coleridge Avenue, Penarth, Glam.

DISTRICT 11 (North Wales). (*Anglesey, Carnarvon, Denbighshire, Flintshire, Merioneth, Montgomery, Radnorshire, and parts of Shropshire not in District 3.*) *Deputy:* MR. N. E. READ (G6US), 24 Church Street, Oswestry, Salop.

DISTRICT 12 (London North and Herts.). (*North London Postal Districts and Herts., together with the area known as North Middlesex.*) *Deputy:* MR. P. SOLDER (G5FA), 35 Torrington Gardens, New Southgate, N.11.

DISTRICT 13 (London South). To be appointed.

DISTRICT 14 (Eastern). (*East London and Essex.*) MR. R. L. VARNEY (G5RV), "Arvika," 184 Galleywood Road, Chelmsford, Essex.

DISTRICT 15 (London West). (*West London Postal Districts, Bucks., and that part of Middlesex not included in District 12.*) MR. H. V. WILKINS (G6WN), 539 Oldfield Lane, Sudbury Hill, Greenford, Middlesex.

DISTRICT 16 (South Eastern). (*Kent and Sussex.*) *Deputy:* MR. W. A. SCARR, M.A. (G2WS), 8 Beckenham Grove, Shortlands, Kent.

DISTRICT 17 (Mid-East). (*Lincolnshire and Rutland.*) MR. W. GRIEVE (G5GS), "Summerford," New Waltham, Lincs.

DISTRICT 18 (North and East Yorkshire). (*East Riding and part of North Riding.*) MR. E. MITCHELL (G5MV), 40 North Marine Road, Scarborough.

DISTRICT 19 (Northern). (*Northumberland, Durham, and North Yorks.*) MR. R. J. BRADLEY (G2FO), 36 Raby Road, Stockton-on-Tees.

SCOTLAND. MR. JAMES HUNTER (GM6ZV), *Scottish Records Officer:* 51 Camphill Avenue, Langside, Glasgow.

NORTHERN IRELAND. MR. J. N. SMITH (GI5QX), 19 Hawthornden Drive, Belfast.

New Members are cordially invited to write to their local Representative, enclosing a stamp if a reply is required.

DISTRICT 1 (North Western)

THE D.R. would like to remind those Town Representatives who send him notes for publication that unless these are in his hands by the 25th of the month they cannot be included in the following month's issue.

GM2JF (Mr. J. C. Foster) writes that he is now stationed at a local R.A.F. station. His private address is "Highfield," Knutsford Road, Holmes Chapel.

Unfortunately no District 1 members were able to attend the last Prestatyn meeting but Mr. Spillane informs the D.R. that a special effort is to be made in regard to the August meeting, particulars of which will be found in the notes for District 11. The D.R. hopes to be able to attend and if any District 1 members can make it they will be most welcome.

The following reports have been received to date:

Liverpool.—Although there is little to report in the way of "activity," membership is steadily increasing and a welcome is extended to those who have joined the Society during the past few months. A further batch of applications is in hand. Will members please keep the acting T.R. posted with news so that he can prepare a monthly report which will be of interest to those who are away on active service?

News from the T.R. and other members who are with H.M. Forces would be very welcome. Those who remain, send them their best wishes and look forward to seeing them (and hearing them on the air) at a not too distant date. May they all have a safe and speedy return. (*Via* G5RY.)

Bolton.—BRS4114 (R.A.F.), one of our newer members, recently sailed for the Middle East. The local members did not have the pleasure of meeting him before he left so take this opportunity of extending to him their heartiest good wishes. 2BDA is now officiating as a Civilian Instructor to

the Bolton Squadron of the Air Training Corps. G3CJ was over for a few days at Whitsun and says that on his new job in District 7 he is meeting hams right and left although he did not mention any specifically by call-sign. (*Via* 2DVG.)

Blackpool.—At a recent ragchew at Beth's Cafe, G4MH, 6MI, 2DZN, 2FPA and Messrs. Fairbanks and Nuckley were present, the latter a prospective member. 2BVV and 2CUB have now left town but 5MD is believed to be still in the locality. A welcome is extended to 2ZN, 3TA and 8SA. The latter who was T.R. for Mansfield, hopes to make contact with local members. G5TH is anxious to contact SP1HI, who spoke at the North West Conventionette, or would appreciate his QRA if anyone can supply it.

(*Via* 2FPA.) G6CX.

DISTRICT 2 (North Eastern)

The big event of the past month was, of course, the District meeting on July 20. No less than 54 turned up at the Metropole Hotel and we feel confident that every one of them thoroughly enjoyed himself. Stocks of the Handbook disappeared like bars of chocolate, with kc./metre booklets a good second!

Apart from a few short remarks by the D.R. and a most interesting talk by "Clarry," the meeting was informal and rag chewing the order of the day. Just as a spur to those who did not attend, but might make the effort next time, here is a list of those present: G2BM, GW2GV, LT, MI, SU, VC, WR, 3BS, GM3CV, KB, QI, SJ, 4CL, JB, 5AR, WZ, YV, 6BR, BX, CL, KU, MN, OS, WH, WJ, 8LS, RF, TD, UO, WF, VE3AHV, VE3AHX, 2AMJ, 2BPJ, 2CGL, 2CNR, 2DBK, 2FJD, 2HCZ, 2HDU, BRS1151, 2317, 2939, 4065 and 4224. In addition we welcomed six visitors, five of whom signed up their membership forms before they left.

Well done District 2! Perhaps now we shall hear a little less from the dismal "Jimmies" who said we couldn't hold a meeting in Yorkshire during war-time as no one would support it!

Apart from the meeting there is little local news, but we welcome Mr. G. F. Larson, BRS4253 and Mr. G. C. Waddington, BRS4272 as members. 4272 is brother of Harry Waddington, ZB2B.

G2MI.

DISTRICT 3 (West Midlands)

Birmingham.—A meeting of M.A.R.S. was held on July 15, when the President, Mr. C. Naylor Strong, gave a very interesting lecture entitled "Some Observations on Frequency Calibration." The lecturer went into minute details regarding the factors which tend to cause frequency variation. He also pointed out that even the very short wiring used on some frequency meters would account for as much as 7 kilocycles difference. Sixteen members were present. 2FDR.

Coventry.—Congratulations to 2AFS (holder of one of the city's first A.A. Transmitting Licences) on his recent marriage and also to Captain J. Swinnerton, 2YS, on his engagement.

We learn that Mr. Gaye is leaving Coventry for London—we wish him the best of luck. G2LU has been promoted to Leading Telegraphist and receives our congrats! G2AV is enquiring about G6YU now believed to be in Bradford. Enquiries are also being made for 5PP and 6TD. BRS3404 reports building some very interesting test gear. G5GR.

DISTRICT 4 (East Midlands)

Mansfield.—Writing from a west of England R.A.F. station, 8MR says that he is settling down to R.A.F. life very well. He is billetted with 3YA. During 8MR's absence BRS3593 has kindly consented to act as scribe, so it is hoped that those members still remaining in the area will make every effort to keep in touch with him. He would like to hear from any amateur stationed in the district and particularly from 8DI. His QRA is "Lynton," Kirkby Road, Sutton-in-Ashfield.

Nottingham.—At a recent meeting held at 8DD, members had a chance of checking their sending abilities by means of his home constructed recorder, and "bug" key.

After waiting a very long time for material, 8DZ has at last been able to complete his new superhet. During a recent visit 8CZ and 6VD saw the receiver in its final stages, when it was working exceptionally well and had a particularly workmanlike finish about it.

The next meeting will be held on August 29, at G8DZ, 14 Epperstone Road, Nottingham, at 8 p.m.

Leicester.—G2RI who was home recently on a very welcome seven days leave, is still at No. 1 S.S. School R.A.F. He remarks on the number of handbooks to be found there, and says that it has to be seen to be believed.

News is to hand of 2HBG, via G2RI who is still in ST; he reports fit and well. It is now known that 4DR is with the B.B.C. and that BRS3319 is with the Ministry of Aircraft Production.

2FMX reports a strange meeting recently. Whilst in the train he spotted a "Bull" lying on the seat; on making enquiries he found the owner to be 4NU, who until then was a complete stranger to him.

G6VD.

Forthcoming Events

Aug.	24	Mid-East Conventionette in Lincoln. (See separate announcement on page 71.)
,,	31	Scotland "A" District at 2.45 p.m. in the Coffee Room, Y.M.C.A. Residential Club, 100 Bothwell Street, Glasgow. All visitors welcome.

DISTRICT 5 (Western)

ONE report this month!—We cannot carry on like this. Many members, especially those on active service, expect to see some reference each month to their own District. The DR cannot invent material for inclusion, so it is up to you. *Once more, please let us have some dope.*

Cheltenham.—The TR received a visit from G3LZ of Sedgeberrow, 8DA is reported to have left for overseas with his unit, 3YZ of the Tank Corps has been home on leave. Local meetings are held regularly every week.

Bristol.—The June meeting did not take place because the advertised venue was closed. Apparently a case of no beer, no meeting! Apologies to those who were turned away. It is hoped to fix another shortly. G6RB.

DISTRICT 6 (South Western)

The radio life of Torquay has recently been brightened with an unexpected visit by G6LL. This was much appreciated by the D.R., and other amateurs who met him. It will be of interest to those members from the South West, now scattered in various parts of the world, and who are in the know, to learn that it rained !

During the period of G6LL's visit, it was learned that one or two local members were home on leave, and also that G2DP was in Torquay on holiday, so an informal gathering was arranged. The result was that on July 12th, there was a great swapping of tales and ideas. In short, it was like old times. Those present were G2DP, 5SY, 6LL, 2BMZ, and BRS3171.

During the month G5SY also received a very welcome visit from G6OT. As it was three years since their last meeting, again there was a great interchange of news and notions.

We have no reports to record from other areas, so evidently the Services have claimed most of those who were active. G5SY.

DISTRICT 7 (Southern)

Thanks to the enthusiam of the T.R.'s we are again able to provide a maximum of news from most parts of the District but the scribes have had a tough time collecting together the "bits and pieces". District notes are eagerly looked forward to by our pals on active service. If you are still at home won't you do your bit by sending along some news to your T.R. ?

Bournemouth.—We are very sorry to announce that L.A.C. J. C. Croome, 2CXP, has been officially posted as missing. John is well-known in the town, and it is sincerely hoped that news of his safety may soon reach us.

G4MY was pleased to receive through the QSL bureau a "heard" card from 3PC of Sittingbourne relating to 14 Mc. reception in the "Good Old Days." 4MY thought his sigs. never left the town until he got this card ! 3169 has joined the R.A.F. Good luck, O.M. ! 3789 reports a personal QSO with a ZL2 in the local post office.

G2NS went up into his attic to inspect his indoor aerial and found there a wasps' nest nearly 2 ft. 6 in. in diameter. It is reported that he came down quicker than he went up ! We have occasional news of 4KV to whom we send 73. 3VY down in South Wales is swotting hard at the maths articles. The T.R. would appreciate further news for inclusion in these columns. (*Via* 2HNO.)

Here are 2FWA, 2DP, 3ST, 2HHD, 4198, 2GZ, 2ZZ, 2VB, 1545, 6CS, 4150, 8NB, 2DJK, and 8TN at a recent District 13 meeting, held at Brixton, South-West London.

Croydon.—Another successful meeting was held at the T.R.'s QRA on Sunday, July 27. Those present were : G2DP, 2KU, 2VB, 4AA, 4NI, 2BLA, 2FWA, 2HHD, BRS1545, 3003, 3724, 4150 and 4324. The party were pleased to welcome 4AA home on leave from the R.A.F. He has met 5XH and 5XW (who are working together) and has 3CC and a "W" in the same squadron.

The next meeting will be held at G2DP, "Radiohm," 6 Dunheved Close, Thornton Heath ('phone, Tho. 2849), on Sunday, August 17, at 3 p.m. This QRA is near Thornton Heath Pond.

Coulsdon and Purley.—G2DN who sends a very welcome letter says he finds very little opportunity for constructing amateur gear, as practically all of his time is spent in travelling up and down the countryside. He is now stationed just north of London. 2FI who is now a P./O. is busily engaged in training A.T.C. cadets. 2KU has just completed a "super" which tunes up to 60 Mc. 2ANS (R.A.F.), has left for an overseas destination.

2CRD who was married recently has left the District for a town in No. 8. 3003 has been attempting to copy press from several stations to keep his code up to scratch. The T.R. would like to receive more news, particularly from newer members. (*Via* BRS3003.)

Oxford.—A welcome reappearance of news from Oxford this month is due to the efforts of 8PX (1 Lovelace Road, Oxford), who has agreed to look after the "Notes" side of ham activity in this corner of the District.

A meeting was held on July 6 when 2CL, 8PX, GM8CN, 2ALG, 2BHS, 2CVD, and 2FQR were present. Post-war transmitting conditions were the chief topic of discussion. It is hoped to hold a meeting on the second Sunday in each month at which all will be welcome. 2QT having left the District we send him 73. 8PX is building a time base for his C.R. tube. 2ALG is building yet another gramophone amplifier while 2CVD is finishing off a frequency meter.

Guildford.—After a few weeks stay in this neighbourhood 5YA has been posted to a remote health resort near the East End of London which he finds very pretty and strange ! 8LT has found a little time in which to polish the lavish chromium-plated embellishments on his new amplifier. 8IX, home on leave, was cheered up since his C.O. (a VE4) is not after all to leave the station. 3VB is off for a course at Cambridge. 5WP had a few days leave in Bournemouth and was pleased to meet 2HNO and 6GZ. The latter, looking very fit, was able to pass along good news of Spenny, 6NA, and the rest of the gang in those parts. G5WP.

DISTRICT 8 (Home Counties)

A number of reports have come to hand this month, and the D.R. hopes that the members concerned will accept this acknowledgment, and expression of appreciation, in lieu of individual letters.

Cambridge.—G2DT just missed the mail last time —sorry O.M. He speaks of the enthusiasm of hams, when his duties take him to B.B.C. and service stations, where his R.S.G.B. badge is soon spotted. 2DT's treasured junk-box received a D4 transmission, some time ago, when an incendiary came to rest therein. He sends his 73's to 3NQ, if this should catch his eye. 5PU has been on leave

from the R.A.F., reports "All well," and has travelled the world a good deal since he was last home. 5DQ is on leave as this goes to press. 2XV tells us that 2JS (Kings Lynn), well known to some Cambridge members, is in very poor health. We should like 2JS to know that his friends in Cambridge are thinking of him, and wish him a speedy recovery. 8SY is well, but is very busy on war work.

Bedford.—BRS3585 has been trying, with the aid of three men, to erect a "land-mark," 63 ft. tall, and has now enrolled a squad of ten, for the attempt. He should have rung the "Wizard Pole Erector, Cambridge 87156" who would have done the job single-handed.

2FFG is expected on leave during August, while 8KP and his XYL have spent a weekend with 2DPQ. BRS3430 is still in this district. 3KG (Luton) visited Cambridge recently and phoned his 73 to all locals.

St. Ives.—G5RL (R.A.F.) thinks he may be moving shortly to take the W.O.M. course. As 6WA is doing similarly from another station, they hope to meet at the new depot. 4AZ is still at Hemingford, while 8ST (India) was well when his mother last heard from him. Peter Shenton (R.A.M.C.), stationed in Yorkshire, has met 8RF, 2BAG, and 2AMY. He tells how they placed a QSL card on the Y.M.C.A. notice-board, and were suspected as "Fifth Columnists" by the uninitiated.

Peterborough.—G2NJ has been on leave from his wartime QRA in S.W. England. 5NP has also been on leave, but 2NJ had the ill-luck to miss seeing him by a few hours. Both are engaged on Government radio work.

2UQ who called on 5BQ recently is now stationed in Cambs. He left word that 6DX had been decorated for gallantry. We are sorry that no details are available, as District 8 would like to offer its congratulations to Pat, who is a Sergeant Air-Gunner. (We hear indirectly via G6LB that Pat has won the D.F.M. See District 14 Notes—ED.)

3DY (R.A.F.) is in the Oxford area, and is quite well.

Finally, there are still a few from District 8 who belong to the "Long Lost Legion." Please report your whereabouts. G5BQ.

DISTRICT 9 (East Anglia)

King's Lynn.—We regret to report that Mr. C. J. Bayes, G2JS, lies seriously ill in the local hospital. We all wish him a speedy recovery.

2HBZ appears to be having an interesting time in Gambia. He says that there is not much in the way of amusements, but bathing in the Atlantic is good fun, except for the sharks! Both 2CFO and 3SZ are stationed within a reasonable distance from home so are able to come over on leave at times. 3IP is still around and at the moment is busy rebuilding his receiver.

A speedy recovery to 2DCQ, who is in hospital in the Middle East.

Norwich.—G2MN informs us that he recently met 3BW of Whitehaven, and that 2YI is also in Norwich. 2MN gets around the country-side a little more these days and hopes to contact more "war resident" hams if they will let him know where they are.

Yarmouth.—Mr. D. E. Postle (2FAO) calls attention to the fact that we made an error in our last Notes when we mentioned that 2FAO had been married. It would appear that Mr. Hoult, whom we congratulated, is 2FOH ex-BRS3373. We regret any domestic QRM caused to Mr. Postle, who has been enjoying a few days' leave. G2XS.

DISTRICT 10 (South Wales and Monmouthshire)

Swansea.—The sympathies of all local members are extended to Mr. Phillips, GW5PH, on the loss of his wife who went through a very trying experience during the Swansea "blitz." GW5PH and his family moved out to the country, but Mrs. Phillips never regained her health. Many members will remember her for the hearty welcome she extended when they visited 5PH.

Reports are few and far between. 3UO and 3CR have visited 8HI. 5TW and 5LV called on 3AX and had a ragchew about old times. 3AX also received a visit from 4CC. 2HDX is active on work of national importance. GW3AX.

DISTRICT 11 (North Wales)

Prestatyn.—Attention is directed to a meeting which has been arranged to take place, through the courtesy of Mr. R. Gill, at Vale View, Meliden Road, at 6 p.m. Sunday, August 24. It is hoped that all District and service members living within easy reach of the town will make a special effort to attend. A cordial invitation is also extended to District 1 members to support this gathering.

At the July meeting those present enjoyed a "question box" evening, many interesting posers being asked and answered by the company. The services were represented by G4AH, 6HQ, BRS3044, and VE4YG, whilst BRS4298 was welcomed as a new member. Another visitor was ex-BRS1156 recently home from ZD1.

BRS4298, a native of Hove, but at present residing in Bangor, hopes to meet other local members. G6HQ (R. Navy) is stationed in the District and expects to attend town meetings. 4CK writing from Weston-Super-Mare, reports having met BRS3607 in S. Wales. He would like to meet Weston members. GW3KY has met G2JR, 3WP, 5OX and 8TM in the locality of his present station. VE3AKY and 3AKX have left No. 11 and are now in the London area. BRS1060.

DISTRICT 12 (London North and Hertford)

The picnic meeting that was to have been held near Arkley on July 27 unfortunately did not go quite according to plan owing to the WX, but after various phone calls and a trip to the Arkley Hotel to redirect those that were already there, a successful meeting took place at G5FA. All duly arrived with the exception of G2IJ who was only able to break duty for an hour, and BRS4073 from Watford who had the bad luck to have an accident with his cycle, fortunately without hurting himself. The twelve members present were pleased to welcome VK3UH who is serving in the Australian Navy. Since joining up he has had the good fortune to meet hams in many parts of the world and it was only natural that the chief topic was about pre-war QSO's when some very amusing stories were told. With the aid of a pint of milk, which Mrs. 2BB had with her, and some juggling with tea leaves and sandwiches the majority had tea!

News is as scarce as it was in summer-time before the war, letters being received only from 2DGW and BRS3825. However we have to welcome an un-

usually large number of new members to the district this month in G6TQ, 8SK, 2DWV, BRS4231, 4229, 4249, 4265, 4266, 4270, 4276, and 4296 and hope to see them taking part in our activities in the near future.

G5FA had a visit from BRS4116 and 4219 of Tring during the month and also had a phone chat with 2AK of Birmingham while he was at 6CL. He sent 73 to all in North London who he used to work regularly on 7 Mc. phone. BRS4219 has been doing some constructional work with mains-operated amplifiers.

2DGW is now serving in the R.A.F. as a wireless mechanic after having had a course at No. 1 S.S. He likes his job in the transmitting room but complains that there is a lack of hams in his part of the country. G4BC is now helping with morse instruction at Southgate (No. 85) Squadron A.T.C., probably making the largest number of full call instructors in any one Squadron in the country.

It is not proposed to hold a local meeting during August. Details of the September meeting will be announced next month. G5FA.

DISTRICT 13 (London South)

South Western Area.—G8QH would like some hints on making bricks without straw. . . . News of our scattered S.W. community for these notes should be compiled from the circulating log book, *which ought to be returned to8QH on the 18th of each month.* At the moment of going to press, there is no sign of it. No straw, no bricks, no log, no notes!

G4GD reported personally at 8QH and brought news that he is now "instructing" and has been recommended for a commission. (Good work!) 3AD reported by telephone during a short leave and announced another step-up in rank. (Congratulations O.M.!) 8IL wrote from Salisbury and has had things to say about B.B.C. quality in those parts. But he has some aerial ideas in pickle which look interesting!

That's all this month. *Where is that log book?* G8QH.

South Central and South East Areas.—The July meeting held at 2HHD was well supported, the subjects discussed varying from radio, to the merits of a certain brand of gargle! We were pleased to hear that 2FRM is doing well with the R.A.F. in Southern Rhodesia. (Good luck O.M.)

The next meeting will be held at G2VB, 35 Grangecliffe Gardens, South Norwood, S.E.25, at 11 a.m. on Sunday, August 24. The T.R. would be pleased to hear of members' activities so as to make these notes more comprehensive. G8TN.

DISTRICT 14 (Eastern)

Chelmsford.—The District Conventionette held on July 27 was a great success, very largely due to the splendid efforts of many members in the Services who in most cases made long journeys to attend. Thirty-one call signs were entered in the meeting record.

G6CL, the indefatigable, made the journey from London after a strenuous morning on duty and gave us a most instructive résumé of the Society's wartime programme and affairs. Great satisfaction was felt at the news that the membership is still growing rapidly. G6LL (Hon. Editor), also gave us some interesting information whilst 6LB, the D.R.'s right-handman, very efficiently ran the Morse competition for which he offered a prize. This was won at 22 w.p.m. by Mr. L. H. Manning, G4BG, of Chelmsford. Telegraphist Beardow, G3FT, kindly undertook the job of pounding the brass for the event.

We were delighted to see P/O. Jimmy Watson and XYL, while W/O. "Tiny" Tremaine, 8PB, kept us all in order.

To Mrs. Cheyne, the good landlady of the "Spotted Dog Hotel" we express our sincere thanks for her kindness and hospitality.

The following were present: G2RD, 2SA, 2ZJ, 3FT, 3OX, 4BG, 4GT, 5CA, 5GJ, 5HF, 5RV, 6CT, 6DH, 6CL, 6LB, 6LL, 8AB, 8CK, 8JI, GM8MQ, 8PB, 8PP, 2BQC, 2CQI, 2DBL, 2DUJ, 2DXI, 2FXM, 2HGU, BRS3650 and 4122. (It is hoped to publish a group photograph in our next issue.—Ed.)

G5RV and 6LB recently had the great pleasure of entertaining Sgt. Pat Crisp, D.F.M., G6DX (ex-VU2AB, ex-YI6PC), during a short visit to the town. 6DX has 75 operational flights over Germany to his credit, and in addition to being a 100 per cent. ham is undoubtedly a most efficient W./Operator Air Gunner.

G3JW recently of Brentwood writes to say he has left the District and is somewhere in Devon.

Romford.—2DXI is holding meetings each Sunday morning at 5 Butts Green Road, Hornchurch, and extends a hearty welcome. 2GHU is still trying hard to get his services accepted in some capacity to help the war effort. 2FXM assists 2DXI, and 2DUJ puts in an appearance when work permits. Geofrey Cousins has been accepted by the R.A.F. for training as a pilot. (Good luck O.M.) 6NG, 3CQ, 2CWF, 2HLY, 2DXL, 2AWK. Harold Drury and Mr. Pye are all reported busy. 4MP is believed to be in Canada, and a word from him is requested.

G5KA and 8PC are still in Malta according to latest reports. 2DBT has been bombed out and can now be found at 52 Ashton Gardens, Chadwell Heath. 2BVN is thought to be in the R.C.O.S. 3FT is home on 27 days leave, after which he is due for a W./T. course. 4OO is where 3FT just came from.

Southend and Leigh.—G5XI, pre-war T.R., has again been transferred to some unspecified spot in the Red Sea area. 3NP of Pitsea has been on leave after a triple dose of torpedoing whilst serving as a Radio Officer.

2GU (R.A.F.) and 2LC (R.E.) have been visitors to 2SO. 2CMF (London) is now Captain and Adjutant to the Home Guards. (*via* G2SO). G5RV.

DISTRICT 15 (London West, Middlesex and Buckinghamshire)

There seems to be little point in holding District meetings when they are only supported by about five members, as was the case last month. 2DZD, again home on leave, was with us. As things are a little uncertain no District meeting has been arranged for August.

G3GY, a F./Lt. in the R.A.F. sends the D.R. an Airgraph, from the Middle East, and asks us to convey his 73 to the District and to kick G8KZ for not having replied to letters sent him! We are waiting to hand it to KZ! GY still gets his "Bull" and is pleased with the way the Society and District 15 are carrying on in spite of raids. BRS3754, is now aboard ship and serving in the tropics—he suggests that stations sending press on about 10 Mc. at 18 to 22 w.p.m. provide good practice. He sends 73 to all, as does 2FUX who has joined the R.A.F.

as a radio mechanic and seems to be passing all his exams with flying colours. Word has been whispered that G8WR is "somewhere in England," ; we should like to hear from him sometimes. We should also like to hear from the 20 odd members who are serving with the R.A.F. at a certain local R.A.F. station. Please telephone BYRon 3369.

Suggestions, and offers of accommodation, for future meetings are solicited by the D.R.—what about trying Sunday afternoons this winter for a change ? Again is it preferable to have them each month in a different part of the district ? Will members please give their views ? G6WN.

DISTRICT 16 (South Eastern)

All the news this month comes from Brighton, from which town both G3WR and 2KU send reports.

Mr. Lunson (G3WR), T.R. for Brighton and District has volunteered for flying duties with the R.A.F. and will have been called-up by the time these notes appear. Good luck, O.M. Mr. S. Clacy (G6CY), 8 Hangleton Road, Hove, having kindly consented to take over the work of T.R. for the time being we shall look forward to hearing from him.

G2KU, describing himself as exile from District 7, tells of enthusiastic and informal meetings in a certain canteen where members attached to an Admiralty establishment nearby may be found daily. During the tea interval G2MU, 2KU, GM3QH, G4BW, 4HO, 4HS, 8JF, BRS4193 and BRS4283 are usually in evidence and recent visitors have included G2QH, 4GL, 5UB, 8JV (73, Jock, G2WS), 8MO and 2CGS. Evening meetings are also being arranged and visitors to Brighton should contact 6CY or 2KU for details. G2WS.

District 17 (Mid East)

CONVENTIONETTE

Service members and civilians will be heartily welcomed at

THE SARACEN'S HEAD
HIGH STREET, LINCOLN

on

Sunday, August 24th, 1941

Programme

3 p.m. Informal Ragchew.

3.30 p.m. Talk by John Clarricoats, G6CL, Secretary-Editor, R.S.G.B.

4.15 p.m. Tea.

5 p.m. Five Minute Talks on Topical and Technical Subjects.

INCLUSIVE CHARGE, 2/-.

Reservations if possible to DR. A. GEE, G2UK, "Stonehaven," Horncastle Road, Boston, by August 20.

DISTRICT 17 (Mid East)

In the continued absence of news from other parts of the District we are pleased to publish the following Notes from Dr. A. Gee, "Stonehaven," Horncastle Road, Boston.—ED.

There is little ham activity to report, the " Dig for Victory " campaign being in full swing. G6LH advises that the scything in the churchyard is now complete and he is looking forward to harvesting the hay ! 6GH suggests a tomato growing contest in place of the old DX ones !

2FNU informs us that there are some VE's on the 'drome with him. G5UK flashed through the District recently in a red M.G. Stop longer, next time, O.M.

Don't forget the Conventionette on August 24th, 3 p.m., " Saracen's Head," Lincoln—and some dope for District Notes next month please ! G2UK.

DISTRICT 18 (North Eastern)

The following brief notes have reached us from G8UL via G3PL :—

Hull.—BRS4209 is welcomed as a new member although we believe he has now moved to Bridlington G4LH, 5MN, 6OY, 2BRY, 2CNX, 2HJZ, and BRS1948 have been on leave but none has any special news to pass on, except the latter (an R.A. Staff Sergeant) who receives our congratulations on his recent marriage. G3PL contacted BRS4147 as the result of a paragraph in the BULLETIN.

In view of the obvious interest shown in District notes, the D.R. once again appeals for support for these columns. He feels it is unfortunate that with so many service members located in Yorkshire, no effort appears to have been made to arrange regular meetings in the chief centres. G5MV.

Northern Ireland

G4RX, 2CWW and BRS3661, this month's newcomers, are warmly welcomed, as are G3NW, 8VI, 8PR and BRS1874, who, strange to relate, have been here for some time, but have only recently been discovered. The " sticker " caught 1874, who reports that he is working with 8VI and 8PR. 3NW and the D.R. met at a local junk-store where the former was seeking parts for the completion of a 9-valve Jones super. He is hoping for some good DX when it takes the air.

G8PI has married an Ulster lady, and has taken up residence in Northern Ireland. We offer them our hearty congratulations and wish them long life and prosperity.

G3PA is on leave in G. 3BN has left for Norfolk, and takes with him our good wishes. 8PW asks that his 73 be conveyed to all GI friends.

F. Robb, GI6TK, and W. Boston (an operator of GI6YM), have joined the A.T.C., as radio and morse instructors respectively.

BRS3243, it is learned, had a narrow escape during the last " blitz " while on A.R.P. duty. He was blown along the ground by the blast of an H.E., but suffered only the loss of his coat buttons ! We are thankful that he got off so lightly. 2AMW was

(*continued on page* 76)

Ham Coincidence.

Some time prior to the war, F. Bewley, G8HX, of Mansfield (now a Corporal in the R.A.F.), hooked up with J. Ward, G4JJ, of Barnsley, who, when he learnt of 8HX's QRA, asked for further details, as his wife came from that town. A few weeks later Bewley was asked to service a local broadcast receiver. Having fixed the set, conversation turned to short wave reception during which the owner of the receiver mentioned that his son-in-law was a radio amateur—yes, it was G4JJ!

Coincidence No. 2 occurred long afterwards. Nine radio mechanics including G4DR and 4JJ reported to the guardroom of an R.A.F. station somewhere in the north-east. Presently an airman, wearing an armband bearing the magic letters "F.P." strolled up and asked whether they were R.M.'s. G4DR answered the question in the affirmative, after which the stranger asked if there were any amateurs in the party. G4DR introduced himself and said that G8HX was present. The "stranger" was, of course, G4JJ. Thus after long years, as call signs, our "heroes" established personal contact.

G8HX got a further surprise recently when after reporting to a south of England station he found G4DS and 8NS, his "next door neighbours" in Mansfield, sitting at the breakfast table.

Service!

The July "BULL" arrived at G6QN on a Wednesday. At Thursday noon he posted an order to G5NI as a result of his advertisement. On Saturday the goods arrived. What price this for service in wartime?

INDEX TO DISPLAYED ADVERTISEMENTS

HEADQUARTERS CALLING

June Council Meeting

Résumè of Council Meeting held at the Institution of Electrical Engineers, Savoy Place, London, W.C.2, at 6 p.m., on Monday, June 23, 1941.

Present.—Messrs, A. D. Gay, A. E. Watts, H.A.M. Clark, J. W. Mathews, W. H. Matthews, A. J. Watson, H. V. Wilkins, and J. Clarricoats (Secretary-Editor).

Apologies.—Messrs. D. N. Corfield, S. K. Lewer and W. A. Scarr.

Excused by Council.—Mr. E. L. Gardiner.

1. One hundred and five new members were elected, 82 of whom had been proposed by Corporate Members. Seven applications were held over for further information. Three resignations were accepted.

2. The monthly statement of account was presented by the Hon. Treasurer, and approved.

3. An order was placed with Bradbury, Wilkinson, for 2,000 new membership certificates.

4. It was announced that a member had bequeathed a legacy to the Society.

5. It was decided to give careful consideration to the question of again reprinting the Handbook, or alternatively to consider producing a supplement to the present edition.

*6. Sq./Ldr. G. M. R. Scott Farnie, GW5FI, District 10 Representative was co-opted to serve on Council.

* 7. It was reported that the question of compensation for loss or damage to impounded amateur apparatus, was receiving the close attention of the G.P.O.

Jewel of Office

To commemorate his six years in the Presidential Chair, Mr. Arthur E. Watts, G6UN, has intimated his desire to present to the Society, a Jewel of Office, to be worn by the President at official functions.

Council, in accepting the offer on behalf of the membership, decided to ask Mr. Watts to defer the actual purchase of the gift until a more opportune moment.

Correspondence with Northern Ireland

Members who have occasion to write to friends in Northern Ireland (a censorable country) are reminded that previously used envelopes may not be employed.

Prisoners of War Parcels Fund

It has been suggested that a special P. of W. Fund be inaugurated for the purpose of sending parcels at regular intervals to members who are held as prisoners of war.

Donations up to any amount may be forwarded to the Secretary-Editor who will be glad to hear from any member in the London area, willing to take over the arrangements connected with the despatch of parcels. Donations will be acknowledged in THE BULLETIN monthly.

* These items were referred to in the July issue.

Important Amateur Changes Coming in the U.S.A.

As the result of listening to telephony contacts between various U.S.A. amateur stations, including W1KBB, 1KQC, 1KSK, 3GSV and 4DSY, Mr. D. Watkin, BRS4271, gathers that in the near future frequencies between 3650 and 3950 kc/s which are at present used exclusively by U.S.A. amateurs, will be taken over by the U.S. Army for defence purposes. To compensate those who have consistently worked on this band it is understood that the channel between 7250 and 7300 kc/s will be opened up for amateur telephony operation.

Our correspondent states that considerable excitement has apparently been caused in American amateur circles by the news that there will soon be no difference between a Class A and a Class B licence. If this proves to be correct it would seem that Class B licence holders will receive all the privileges of Class A and *vice versa*. Amateurs at present operating phone stations on 14 Mc. seem to be concerned at the prospect of many Class B licence holders, who previously worked on 1·7 and 3·5 Mc., migrating to 14 Mc. That band, already crowded, will, they think, become useless for low-power operation.

We understand some modifications are to be made in regard to the 28 Mc. and higher frequency allocations, but no details are yet available. The changes referred to are expected to take effect from September 1st next, and the whole "new order" will be in force by March 15th, 1942.

Our correspondent reports that all American phone operators now give not only their own call sign when signing off, but also the call of the station being worked. This presumably is in accordance with a recent F.C.C. ruling, which makes it compulsory for amateurs to state their own call sign every ten minutes, and to give the call of the station they are working.

* * *

Stop Press

We have now received further details of the forthcoming changes referred to above. These can be summarised as follows :—

3650 kc/s—3950 kc/s to be taken over for Military use (3800 kc/s—3900 kc/s will be released to the services around September 1, remainder 8–9 months later).

1800 kc/s—1900 kc/s Exclusively C.W.
1750 kc/s—1900 kc/s } Will become available
3500 kc/s—3650 kc/s } for organised C.W.
1900 kc/s—2050 kc/s } Will remain available
3950 kc/s—4000 kc/s } for phone.

To compensate phone operators for the loss of 1800 kc/s—1900 kc/s and 3900 kc/s—3950 kc/s, the channel **7250 kc/s—7300 kc/s** will be made a phone assignment.

The special privileges held by Class A operators will be temporarily abandoned and all amateur phone frequencies will be available to all amateur licencees.

An Official Statement Regarding QSL Cards

For the information of those members who are interested in sending reception reports abroad we publish below a notice issued last month by the Postal and Telegraph Censorship Department of the Ministry of Information.

* * *

It has been found necessary in the interests of National Security to prevent certain information concerning the reception of broadcasts and wireless signals from leaving this country. The public, and in particular radio amateurs and short-wave listeners, are therefore asked not to send to addresses outside Great Britain :—

(1) Any correspondence containing references to the reception of wireless signals or speech (other than correspondence addressed to recognised broadcasting stations in friendly countries referring to reception of their broadcasts).

(2) Any QSL or S.W.L. cards (whether the spaces are filled in or left blank) or any letters or cards of a similar kind, or

(3) Any reports prepared by radio correspondents or reporting clubs or societies or the like, containing lists of stations received by their members.

Any correspondence of the kind described above is liable to be stopped by the Censorship Authorities.

It is to be noted that radio trade correspondence, letters between amateurs about set construction or other technical problems, or any other correspondence on radio topics which does not fall within the above description is not affected. At the same time it is realised and regretted that the application of these rules will interfere with what is, in the case of most correspondents, a harmless and fascinating hobby, but unfortunately it is possible for information which would be of use to the enemy to be sent out of the country by these means, and this must be prevented. It is suggested, however, that wireless amateurs who wish to keep in contact with overseas friends might adopt a suitable form of war-time radio greeting card, which would state the name and address of the sender, and would not contain any code groups or reports of reception.

Prisoners of War

Following up the suggestion made in our last ssue we list below details of members who are held as prisoners of war.

2ND LT. M. L. QUARTERMAINE (R.C. of S.), G3FZ. B.P. of W.1238, OFLAG VB, Germany. (Taken prisoner at St. Valerie, June 12, 1940.)

LT. DENNIS FLOWER (R.C. of S.), G8TO. B.P. of W.1453, OFLAG VB, Germany. (Taken prisoner at St. Valerie, June 12, 1940.)

CAPT. E. SHACKLETON (R.C. of S.), G6SN. B.P. of W.15591 OFLAG VIID, Germany. (Taken prisoner at St. Valerie, June 12, 1940.)

2ND LT. E. M. FROST (R.A.), BRS2692. B.P. of W.1607, OFLAG VIID, Germany. (Lt. Frost is stage electrician at his camp and is interested in photography. He appeals for books.)

2ND LT. DAVID G. BLAIR (R.A.C.), G8VU. B.P. of W. Campo Concentramento Di, Prigionieri di Guerra, Agazzano Rezzaneleo, Piacenza, Italy. (Taken prisoner in Lybia.)

SIG. J. B. KAY (Middlesex Yeomanry), G3CO. (Held captive at Capua, Italy, but no exact details yet available.)

LT. A. W. LISTER (R.A.), G5LG. Present address wanted. (Captured in May 1940.)

P.O. NAVAL AIRMAN H. G. CUNNINGHAM (F.A.A.), G5CI. No. FX76292. B.P. of W. 63, STALAG LUFT II, Germany. (Captured off Norway, June 13, 1940.)

Further information concerning members who have been taken prisoner should be sent to Headquarters.

NOTICES AND NEWS FROM ADVERTISERS

WE think it may prove helpful to members if we publish from time to time notes and news from advertisers concerning their temporary addresses and telephone numbers, and details regarding deliveries.

The following Companies have forwarded information in connection with this new feature :—

Company.	Present Address.	Telephone Number.	Remarks.
Sir Isaac Pitman & Sons, Ltd.	39 Parker St., London, W.C.2.	Holborn 9791.	Deliveries more or less normal ; occasional delays, due to paper and printing difficulties. Growing list of books on radio, particularly in regard to its application to the Services.
A.C.S. Radio.	44 Widmore Rd., Bromley, Kent.	Ravensbourne 0156.	Due to the difficult position in regard to deliveries, a Roneo-d price list of components available for sale is issued free to all enquirers.
Radiomart (G5NI Birmingham Ltd.).	44 & 48 Holloway Head, Birmingham.	Midland 3254. Emergency No. Priory 2634.	Good delivery can be given on most transformers and odd types of valves, condensers and precision dials. Some delay due to Government commitments, on all other types of condensers and dials. At times Ceramic valve-holders are difficult to supply but at present all types are in stock. Communication receivers can still be supplied when required for work of National importance. By dispersing stock over four different addresses delays in delivery will be avoided.
E. H. Robins Trading Co., Ltd.	32 City Rd., Cardiff.	—	Postal business as usual. Good stocks of many types of British and American valves, components, speakers, and headphones.
Automatic Coil Winder & Electrical Equipment Co., Ltd.	Winder House, Douglas St., London, S.W.1.	Victoria 3404	Very busy on work of National importance, but every effort being made to supply trade customers.
Electradix Radios and Leslie Dixon & Co.	19 Broughton St., Queenstown Rd., Battersea, S.W.8. (Nearest Station, Queens Rd., Battersea, Bus route No. 137.)	Macaulay 2159.	As a result of wise disposition of stocks, Still in a position to supply bargains in electrical instruments, testing equipment, radio equipment, radio apparatus, and components.

NEW MEMBERS

Home Corporates.

G. C. GEDDES (G3RI), 421 Portswood Road, Southampton.
Cpl. J. A. COOK (G3WC), R.A.F.
F./O. F. E. ATKINS (G3ZU), R.A.F.
R. W. H. JENNINGS (G4BY), 116 Clare Road, Tankerton, Kent.
J. BLACKLAW (GM4HN), 4 Nairne Place, 58 Seafield Road, Dundee.
R. E. FRIEND (G4NV), 91 Northfield Road, Waltham Cross, Herts.
K. J. FREEMAN (2ADL), 106 Cavendish Avenue, West Ealing, W.
W. H. SWEATMAN (2CSZ), 22 Templars Firs, Wootton Bassett. Wilts.
J. W. WHITE (2FCH), 20 Carlisle Street, Felling-on-Tyne, Gateshead, 10.
H. F. BLAIR (2FJZ), 52 Doagh Road, Ballyclare, Co. Antrim, N.I.
S. P. SHACKLEFORD (2HAX), 20 Coniston Drive, Tilehurst, Reading.

WE extend a Cordial Welcome to the

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NEW MEMBERS

whose names are listed

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OUR THANKS ARE EXTENDED TO THEIR SPONSORS

T. BROWN (2FVH), 17 Apsley Street, Partick, Glasgow, W.1.
W. GIRVAN (2FVV), 20 Murray Place, Stirling.
P. O. HUBBART (2FXT), 78 Kynaston Avenue, Thornton Heath, Surrey.
A. J. DAVIES (2HFZ), West Bradford Bowling Club, Duckworth Lane, Bradford.
T. F. A. URBEN (BRS4299), Clive Cottage, Clive, Shrewsbury, Salop.
G. P. THWAITES, B.Sc. (BRS4300), 81 Edgebury, Chislehurst, Kent.
A. P. MORRIS (BRS4301), 176 Court Road, Orpington, Kent.
L. R. DENNE (BRS4302), 113 Longlands Road, Sidcup, Kent.
D. V. COX (BRS4303), 25 Carnarvon Road, West Bridgford Nottingham.
E. G. SMITH (BRS4304), 7 Fraser Road, Broom, Rotherham, Yorks.
A. H. GENNIS (BRS4305), 100 Canonsleigh Road, Dagenham, Essex.
W. J. MARKWICK (BRS4306), 153 Arthur Road, Windsor, Berks.
J. HAWKINS (BRS4307), 551 Jovil, Linthwaite, Nr. Huddersfield.
R. ELLIS (BRS4308), 160 Alder Road, West Derby, Liverpool, 12.
T. W. POLLARD (BRS4309), 12 Rose Grove, Wellington, Salop.
F. H. GILBERT (BRS4310), 17 Sybil Road, Leicester.
R. WHITAKER (BRS4311), 58 Rakes House Road, Nelson, Lancs.
Capt. E. D. WATTERSON (BRS4312), R.A.
J. GREENWELL (BRS4313), 7 Sondes Place Drive, Dorking, Surrey.
D. O. MORRIS (BRS4314), 15 Parson's Mead, West Croydon, Surrey.
T. R. BROOKE (BRS4315), 19 Westgate, Sleaford, Lincs.
GUY L. BOWMAN (BRS4316), Dorchester Hotel, Park Lane, W.1
R. H. WILLIAMS (BRS4317), 19 Dinmore Road, Wallasey, Ches.
M. O. FELIX (BRS4318), 2 Bedwardine Road, Upper Norwood, S.E.19.
R. COPELAND (BRS4319), 15 Castle Street, Portadown, N.I.
W. M. LONG (BRS4320), Austin Motor Co., Bickinhill Lane, Marston Green, Nr. Birmingham.
R. H. M. PEACH (BRS4321), 38 Cascade Avenue, Muswell Hill, London, N.10.
R. W. GILBERT (BRS4322), 17 Sybil Road, Leicester.
D. F. STRONG (BRS4323), 69 Pendennis Street, Anfield, Liverpool, 6.
F. W. BENNISTER (BRS4324), 3 Englewood Road, Balham, London, S.W.12.
H. HASLAM (BRS4325), 84 Harpers Lane, Bolton, Lancs.
E. F. DILNOT (BRS4326), 17 Montpelier Road, Peckham, S.E.15.
W. L. MADDOX (BRS4327), 77 Russell Road, Palmers Green, N.13.
S. RICHARD (BRS4328), 30 Glentrees Road, Liverpool, 12.
J. C. KERR (BRS4329), 62 Wilworth Crescent, Blackburn, Lancs.
W. H. VARNEY (BRS4330), Passenham Lane, Nr. Stony Stratford, Bucks.
P. J. BULOW (BRS4331), 61 Broughton Avenue, Aylesbury, Bucks.
A. H. WALKER (BRS4332), Newhiggle Buildings, Errol Road, Invergowrie, Scotland.
T. JACK (BRS4333), Loanhead, Greengairs, Airdrie, Lanarkshire.
W. S. HASTINGS (BRS4334), Chatterton Road, Stubbins, Ramsbottom, Nr. Manchester.
G. ROONEY (BRS4335), 10 Chetwynd Street, St. Michaels, Liverpool, 17.
H. BILLING (BRS4336), 50 Bowood Road, Sheffield, 11.
F. T. WILLIAMS (BRS4337), 76 Blackshots Lane, Little Thurrock, Grays, Essex.
J. F. BUSH (BRS4338), 95 Milton Road, Chesterton, Cambridge.
A. WALKER (BRS4339), 7 Balmoral Grange, Heaton Park, Prestwich.

Dominion and Foreign.

M. MIKA (OK1RG), R.A.F.
P./O. J. MURON (OK2LR), R.A.F.
P. TOFEL (OK5PT), R.A.F.
S. B. TRAINER, Jnr. (VE3GT), 46 Dunvegan Road, Toronto, Ontario, Canada.
Capt. W. R. HAMILTON (ZL4DQ), c/o New Zealand House, 415 Strand, W.C.2.
Capt. P. JAROSLAV (FRS51).

Ham Hospitality

Further to the lists published in our May and June issues the following members extend hospitality to any amateur who finds himself in their locality. Members wishing to avail themselves of hospitality should, when possible, write or telephone in advance.

Birmingham.—E. F. Watson (2AGS), 11 Vicarage Lane, Water Orton.
Dovercourt.—P. Whittle (2AOW), "Kaercolin," Highfield Avenue. Phone: Harwich 358.
Leicester.—J. Fairley (G2IX), 19 Francis Avenue, Narborough Road.
Mablethorpe.—A. C. Simons (G5BD), "Windyridge," Admiralty Road. Phone 69.
Norwich.—R. B. Hoult (2FOH), 26 Elm Grove Lane.
Ripon.—Cpl. A. R. Yates (G3LB), 25 Clotherholme Road.
Rotherham.—D. D. Marshall (G2MA), "Moorlands," Hall Road.
Woodbridge.—A. Richardson (BRS4214), The Watering, Parham.

Silent Key

It is with regret we have to record that Mr. W. H. Derry, G5DY, of Woodford Green, a member of the Society for seven years, passed away after an operation on July 15.

G5DY had many friends both in the amateur movement and in the C.W.R. of which later organisation he was a member up to the outbreak of war. Owing to a tubercular hip he was not accepted for active service, so he took up other voluntary work which he carried out faithfully until he was taken to hospital. He was in his early thirties.

No amateur could leave behind happier memories than Bill Derry, and our sympathies are extended to his wife and little son. G2CD.

MATHEMATICS FOR RADIO AMATEURS—

(*Continued from page* 53)

(8) Evaluate (*a*) sin 150° × cos 120°.
(*b*) cos 225° × sin 225°
(*c*) tan (—30)° — sin 60°.

(9) Without using Tables, but by using the identities, evaluate cos θ and tan θ if sin $\theta = \frac{1}{2}$.

(10) Without drawing, determine if a △ with sides of 17, 15 and 8 inches is right-angled.

(11) A point B is 100 miles due North of A and 150 miles due West of C. How far is C from A, and what is the bearing of C from A? (*i.e.* how many degrees East of North is the line AC?)

(12) A right-angled △ ABC has $\hat{A} = 90°$ and AB = 12 cm. If tan C = 2·4 what is (*a*) length of AC; (*b*) length of BC; (*c*) size of B?

Solution to Problems

(1) (*a*) $\frac{3}{5}; \frac{4}{5}; \frac{3}{4}; \frac{4}{3}; \frac{5}{4}; \frac{5}{3}$

(*b*) $\frac{4}{5}; \frac{3}{5}; \frac{4}{3}; \frac{3}{4}; \frac{5}{3}; \frac{5}{4}$

(2) 0·8480; 2·9619; 0·2588; 1·0028; 1·7591; 1·2527.
(3) 1·0472 radians; 71·6198°, or 71° 37′ 11″.
(4) (*a*) 31° 18′; (*b*) 49° 13′; (*c*) 36° 38′.
(5) (*a*) 3·214″; (*b*) 3·830″.
(6) 34·64′ or 34′ 8″ approx.

(*To be continued next month.*)

District Notes—

(*Continued from page* 71)

another "bombed out" local, but is now settled in a new home, none the worse for his adventure.

Two new members in T. V. McDonald, BRS4195, and S. J. Mitchell, BRS4196, are welcomed to the District. Let's hear from you O.M.'s. GI5QX.

Scotland

"A" District.—At the July meeting those present were pleased to welcome Jim Shankland, GM8FM, and Ralph Bullock, 2HHX, as visitors. 2HHX has completed his course with distinction. We have had a letter from Gordon Kerr, GM8QD, who is in South Africa and wishes to be remembered to all his friends.

"B" District.—After almost a complete lack of news from this District, we have recently received letters from two sources—GM5LF, who writes from the South, and GM3RL; these letters are very welcome and we hope are the forerunners of many more. Congratulations to 5YN and 6ZP on their recent marriages and to 5LF who will be married by the time these notes appear in print, 5YN is in the R.N., while 6ZP is a civilian instructor with the R.A.F. 5UT is doing radio servicing, his brother, 8SV, has obtained his 2nd Engineer's ticket and is back at sea. 5TA is a radio officer but is on the sick list at the moment—speedy recovery O.M. 4DG and 4MG are also radio officers, 8AT is a corporal in the R.A.F., 3SF is in the R.N.V.(W)R. out East. 3QH after a single trip to sea, lasting eight months, is now on work of national importance down Southampton way. 6LG, 6VO and 6IZ are all very busy. 3RL continues to make good progress to complete recovery. GM6ZV.

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