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SERVICE TO MEMBERS

At the present time with members scattered far and wide, and with many overseas amateurs in our midst, Council desires to encourage District Representatives and other duly authorised members to arrange meetings in provincial towns and Service establishments.

Prior to the war, Provincial District Meetings were an integral part of the Society's activities, but for the past three years these meetings have, in general, given way to gatherings arranged by enthusiastic groups of Service members.

The Council feels that some D.R.'s have been discouraged from organising meetings of a representative nature for fear of incurring financial liabilities. In order therefore to overcome such difficulties, it has been decided to set aside a sum of money for the purpose of assisting duly authorised members to arrange meetings without incurring personal financial loss.

D.R.'s and others who are in a position to undertake the organisation of fully representative meetings, should notify the General Secretary in writing at least one month prior to the date fixed for the meeting, in order that publicity may be given through the Society's Journal.

They must state the approximate number of persons expected, and give details of all charges likely to be made for the hire of rooms and other facilities required.

The special fund will *not* be used for the purpose of paying for meals, although Council would be prepared to consider special cases where, due to war conditions, a charge higher than 2s. 6d. per head is made for one meal.

Council are of the opinion that these special arrangements will enable a number of members to take part in Society meetings during the coming summer. They also feel that if the meetings are conducted with their full approval better support will be obtained.

As far as circumstances permit, the General Secretary and members of Council will attend all officially sponsored meetings.

The organisation of the meetings will, in all cases, be undertaken by the D.R. or by the member duly authorised by Council to act on their behalf as Convener. The General Secretary will, when requested, offer suggestions in regard to items for inclusion in the Agenda, or Programme, of the meeting, but he will not make arrangements for lecturers or special features.

In general the Agenda or Programme should permit:

1. An opportunity for Council's representatives to address the meeting.
2. An opportunity for members to ask questions concerning the Society's activities.
3. A period to be devoted to technical discussion or lecture.
4. Photographs to be taken.
5. One meal to be served.

As many of those attending the meetings will be Service members, it is desirable to arrange for at least one hour to be set aside for informal "rag chewing."

Council trusts that members in a position to render service in the direction indicated, will communicate promptly with headquarters.

BRAINS TRUST MEETING AT THE I.E.E.

Those members who attend the I.E.E. meeting on Saturday, May 30, will witness a unique Society event, for on that occasion the Handbook Committee, comprising such well-known personalities as E. L. Gardiner, B.Sc. (G6GR), H. A. M. Clark, B.Sc. (G6OT), S. K. Lewer, B.Sc. (G6LJ), D. N. Corfield, D.L.C. (G5CD), and Dud Charman (G6CJ), will attempt to answer a series of technical questions submitted by the membership.

The Brains Trust will be under the direction of the President, supported by the General Editor and Mr. E. H. Simmonds, G8QH, a recently-appointed member of the Committee.

In order that the event shall go with a real swing, *members throughout the country* are invited to send in to Headquarters, not later than May 23, not more than two questions each. Questions must be typed, or written legibly, on a sheet of paper carrying the name, call-sign and address of the sender. Envelopes must be marked "Brains Trust" in the top left hand corner. If you do not wish your name to be mentioned please say so. Your wish will be respected. As it is expected that a very large number of questions will be received, a selection only will be prepared for the meeting, and these, together with the answers, will be published in future issues of THE BULLETIN. Questions which have a bearing on recent Service developments must not be submitted.

It is scarcely necessary to state that the "Brains Trust" will be given no previous intimation of the questions which they will be called upon to answer!

The meeting will commence at 2.30 p.m. sharp and will terminate at about 5 p.m. Members free for lunch should meet in Slater's Restaurant, 393 Strand (lower floor) from 12.30 p.m. onwards. The Institution of Electrical Engineers will be open from 2 p.m. for informal discussion.

Book the date—May 30—and send in your questions *now*.

J.C.

THE CATHODE FOLLOWER

By J. H. HARGREAVES (G5VO).

Recent experience has shown that the Cathode Follower furnishes an easy solution to many problems in the design of ultra-short wave transmitters, wide band amplifiers and high-power audio frequency amplifiers. In this article a description is given of the theory and method of determining the operating data.

Preliminary Considerations

CONSIDER first a simple resistance loaded amplifier employing cathode biassing in the usual way (Fig. 1A). The input can be taken to be a sine wave. The current flowing through the cathode resistance will have a D.C. and an A.C. component. The condenser will offer a low impedance path to the A.C. component and so the voltage developed across the resistance will be D.C. and will be equal to the product of anode current and bias resistance. This makes the cathode positive, and as the grid is assumed to be at earth potential, it is negative with respect to the cathode.

Consider next the effect of removing the condenser (Fig. 1B). The voltage developed across the resistance will now have a signal frequency component, and instead of the grid possessing a steady bias, it will be varied at signal frequency. This will reduce the effective signal input, for when the input is such that the grid is being driven towards positive, the anode current will increase, as will the bias, thus making the grid more negative. The effect of the signal will thereby be reduced and the circuit is now a negative feed back or degenerative amplifier.

If the anode load is removed (Fig. 1c) a cathode follower results.

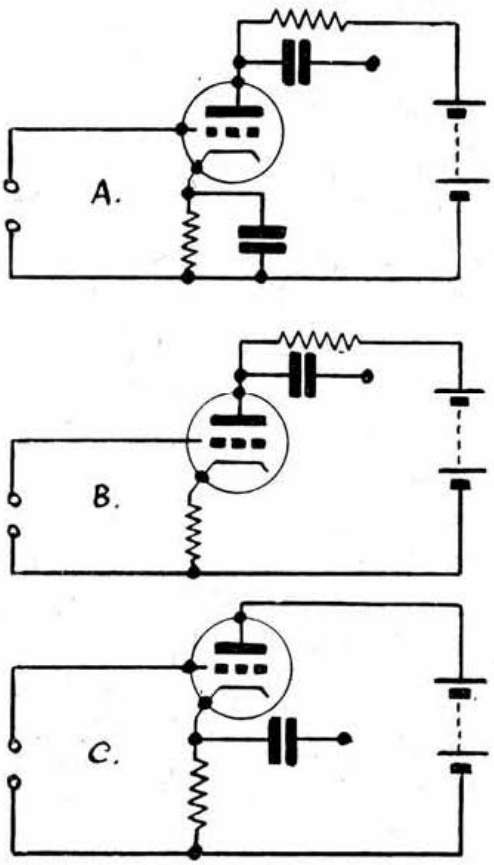


Fig. 1.
Building up the cathode follower: (A) resistance loaded amplifier ; (B) negative feed-back amplifier; (C) cathode follower.

Cathode Follower Circuits

A cathode follower circuit is one in which the load is common to both anode and grid circuits. The problem of the cathode follower is complicated by the fact that the change in grid volts is not caused by the signal alone but is due partly to the signal and

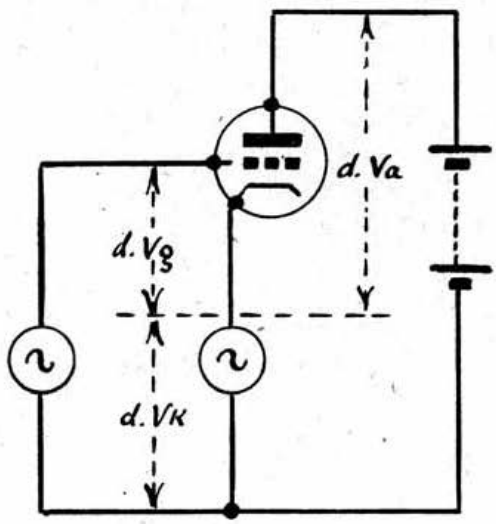


Fig. 2.
Input sources visualised as " generators."

partly to the signal frequency component developed across the bias resistance. If this resistance is selected to give the correct output voltage and is made to agree with other signal frequency requirements, a D.C. component will generally be developed across the bias resistance of a value different from that which is required for correct bias conditions. Hence a battery or other suitable system will be needed to correct this voltage. This additional bias may be either positive or negative.

From the above reasoning it can be seen we have effectively two signal frequency sources, one in the input circuit and the other in the voltage developed across the resistance. For convenience, these two sources can be regarded as generators. To envisage the operation of the " cathode generator," the other " generator " will be omitted for the time being, remembering that variation of the anode current can still be obtained by varying the H.T. potential. (See Fig. 2). Consider changes only in this simplified circuit. Let the anode current Ia change by dIa. This will result in the cathode generator producing a voltage of dVk. The cathode will, as a consequence, rise in potential and because the grid is at earth potential in so far as A.C. is concerned, the cathode will be moving away from the grid in potential and

the grid cathode potential difference will be increased by dVk, *i.e.* dVg = dVk.

The anode is also at earth potential to A.C. and so dVa = dVk. When the grid cathode potential changes by dVk, the resultant changes in Ia and Va are related to Vg as follows :—

$$dIa = gmdVg + gadVa = (gm + ga)\, dVk$$

where gm is the mutual conductance and ga the anode conductance or the reciprocal of the anode impedance.

Since dIa is the A.C. component of the current in the cathode load, the effective impedance of the " cathode generator " is

$$\frac{dVk}{dIa} = \frac{1}{gm + ga} \text{ or}$$

$$Zk = \frac{1}{\frac{\mu}{Ra} + \frac{1}{Ra}} = \frac{Ra}{\mu + 1}$$

where μ is the amplification factor and Ra the anode impedance.

Zk is generally small, but the actual output impedance of the cathode follower is Zk in parallel with the resistance. However, the resistance is usually so high compared with Zk that for most practical purposes Zk can be taken to be the output impedance.

The input impedance is very high and it can be shown that where Cga is the grid to anode capacity and Cge is the input capacity :—

$$Z \text{ input} = Cga + \frac{Cge}{\mu}.$$

To obtain mathematically the voltage amplification factor would entail delving into simple equivalent circuits and to avoid this it is proposed to give the equation :—

$$\text{Voltage Amplification Factor} = \frac{\mu R}{Ra + R(1 + \mu)}$$

This will obviously be less than unity and although the cathode follower cannot amplify, it is very useful having the following advantages :

(1) Low output impedance resulting in less susceptibility to changes in H.T. potential, self impedance and the effects of capacity shunted across the load.

(2) High input impedance—a great advantage at U.H.F.

(3) A reduction in distortion.

The output is in phase with the input and since the voltage amplification factor is nearly unity, the cathode and grid potentials are nearly the same, hence the name Cathode Follower.

Graphical Methods of Solving Cathode Follower Problems

Assume the following problem requires solution. Having been given the static characteristic curve of the valve by the makers and using a cathode load resistance of 2000 ohms and an H.T. supply of 300 volts, find :—

(1) The maximum permissible input signal amplitude, assuming the valve may swing from 0 volts bias to cut off.

(2) The value of additional bias required to give correct working.

(3) The output voltage.

(4) The voltage amplification factor.

(5) The distortion.

Referring to Fig. 3 Vg is the grid cathode potential, which consists of the input signal V, less the voltage produced by the " cathode generator " Vk. Therefore, Vg = V—Vk, but Vk = RkIa where Rk is the cathode load resistance.

Now let Ia increase to Ia + dIa and Vg increases to Vg + dVg.

$$\therefore Vg + dVg = V - Rk(Ia + dIa)$$

$$\text{subtract} \quad Vg = V - RkIa$$

$$\text{then} \quad dVg = -RkdIa$$

$$\text{or} \quad dIa = \frac{-dVa}{Rk}$$

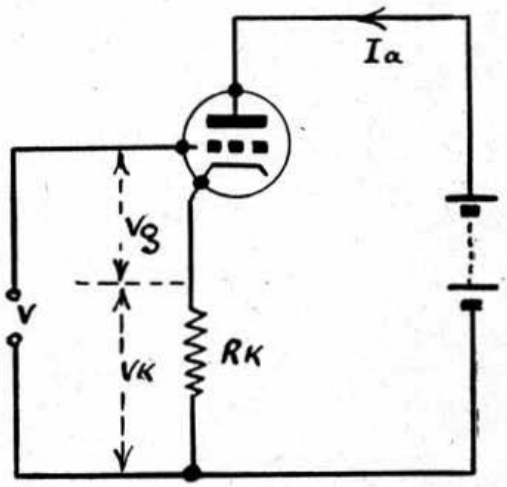


Fig. 3.

Circuit for the problem discussed in the text.

Consider now the typical Ia/Va curves shown in Fig. 4. Suppose V remains fixed and Rk is shorted. Changing Va would simply result in the valve working up and down the relevant static curve. That is to say, if the H.T. is increased, a point selected at A would move to B. With Rk in circuit any change in Ia would produce a change in the effective bias. Thus an increase in Ia, instead of moving the point from A to B, might move it to C on the adjacent static curve. A further similar increase in Ia will move the point to D. Line ACD now gives a working characteristic curve for the cathode follower.

Consider now the curves given by the makers of the valve as shown by the accompanying graph—Fig. 5. The load Rk is 2000 ohms, so first draw the load line for 2000 ohms in the usual way. The H.T. supply is 300 volts. As the Vg curves are given in steps of — 10 volts, it will be found convenient to use this figure for drawing working lines and each calculated point will fall on a Vg curve.

$$dIa = \frac{-dVg}{Rk}$$

So when

$$dVg = -10, \; Ia = \frac{-(-10)V\ 1000}{2000} = 5mA.$$

When

$$dVg = -20, \; Ia = 10mA.$$

These figures on the curve will give a working line for V = 0, the slope of this line being 0·5 mA/volts.

Since V = (Ia × Rk) + Vg, then when Ia = 8mA and Vg = 0, V = (0·080 × 2000) + 0 = 160 volts and when Ia = 90 mA and Vg = — 20, V = (0·090 × 2000) + (— 20) = 160 volts.

These figures give a working line for V = 160, the slope also being 0·5 mA/V. Where the static curves are straight, these working lines are parallel, but

where the static curves are very much bent, the working lines are slightly curved.

Thus the graph can be filled with working lines, but knowing the signal will only swing from Vg = 0 to cut off it is only necessary to draw lines to cover the intersect of the load line with the Vg = 0 line and the cut off point at Va = 300 volts. Also draw a few working lines about the physical centre of the load line for convenience in fixing later the electrical centre.

Having drawn these working lines, it can be seen that a signal swinging the grid from Vg = 0 to cut off can be accommodated between points A and B, or from V = + 171 to V = — 54, which gives a peak to peak value of 225 volts. Hence the maximum input amplitude is 112·5 volts. Now this signal swings about the electrical centre of the load line which is 171 — 112·5 = 58·5 volts (point C on graph—Fig. 5). This also indicates that for correct working of the valve a positive bias of 58·5 volts must be applied to the grid. Under "no signal" conditions the valve will have 58.5 volts positive bias, less the voltage developed across Rk which is 80·5 volts leaving — 22 volts bias. Thus whatever the input signal, the grid is always swung about the point C.

The output voltage is read off the Va axis and is 300 — 127 = 173 volts peak to peak, thus the output voltage is 86·5 peak or 60·5 volts R.M.S.

The voltage amplification factor is

$$\frac{\text{Output Voltage}}{\text{Input Voltage}} = \frac{86\cdot5}{112\cdot5} = 0\cdot76.$$

The length of line AB = 140 mm. so the length to its centre is 70 mm. (point D). The length of the line DC is 4 mm. The percentage of second harmonic distortion is

$$\frac{DC}{AB} \times 100 \quad \text{or} \quad \frac{400}{140} = 2\cdot8\%$$

The problem is now solved and the answers are :—

(1) Maximum permissible input signal = 112·5 volts peak or 78·75 volts R.M.S.

(2) Value of additional bias to give correct working = + 58 volts.

(3) Output voltage = 86·5 volts peak or 60·5 volts R.M.S.

(4) The voltage amplification factor = 0·76.

(5) Percentage of second harmonic distortion = 2·8%.

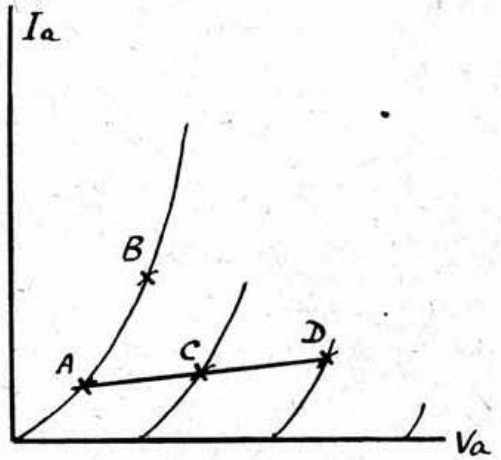


Fig. 4. Drawing working lines on typical Ia/Va curves.

Perhaps it is worth while noting that although this valve is not a particularly good one as a cathode follower—the voltage amplification factor should be nearly 0·9—as an ordinary amplifier it would only handle an input signal of 22 volts without giving more distortion.

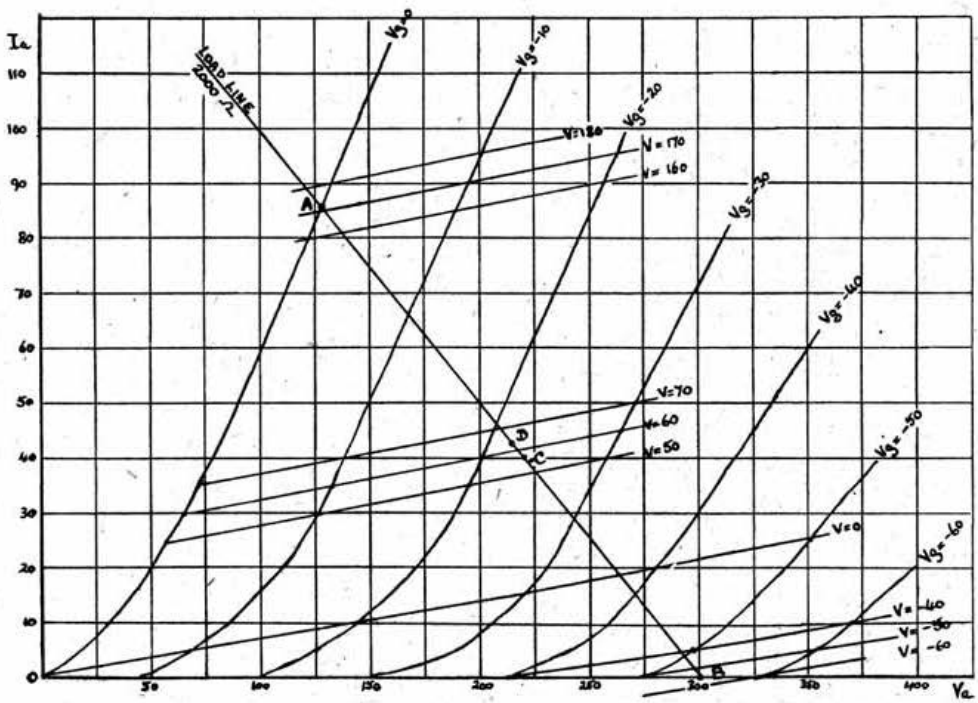


Fig. 5. Load line and necessary working lines on static curves of the valve used in the problem discussed. For the explanation of the points A, D, C, B, see text.

A 6L6 SUPER OSCILLATOR.

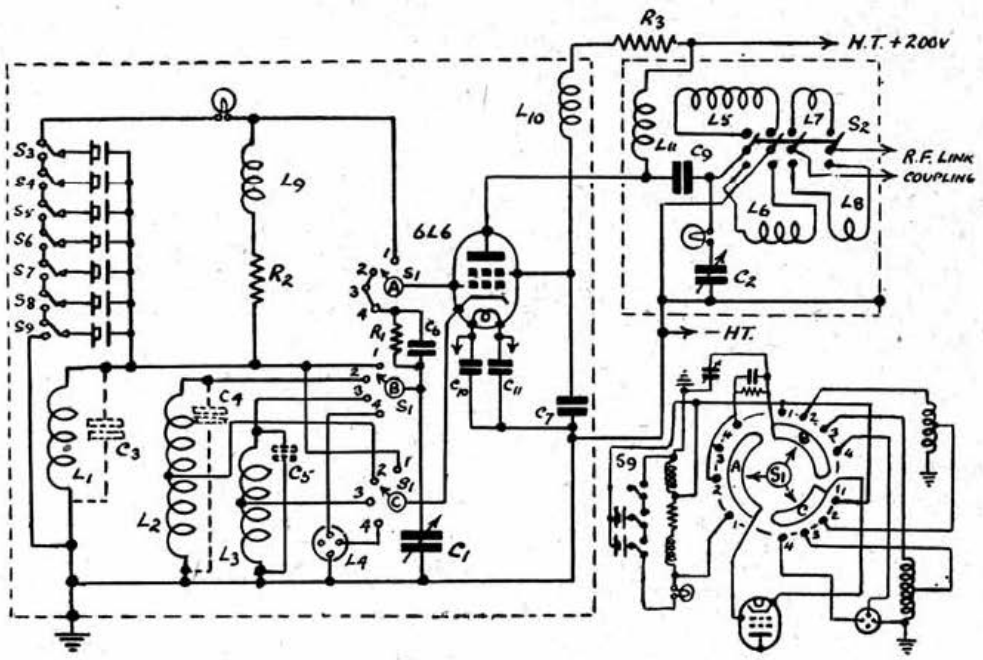
By T. R. NISBET (GM3SW).

THE following notes covering the design of a rather ambitious oscillator are put forward in the hope that some members may like to study them in conjunction with plans which they themselves have formulated for post-war operation.

The heart of the oscillator is the ubiquitous 6L6 valve which enjoyed universal popularity among amateurs before the war. It is conceivable that when the time comes to start transmitting experiments once again this valve may have been superseded by another, and more efficient, type, but the genesis of the design will, perhaps, provide a jumping-off place for those who, like the writer, appreciate the value of switching circuits.

On the E.C.O. side, position 2 of S1 puts the 3·5 Mc. grid coil into circuit, while position 3 places the grid on 7 Mc. To achieve stability the anode side should be set to take out the second harmonic in each case. The LC ratio of the Tritet and grid coils should be low, in order to give a high harmonic output, and, again, to achieve better stability. The condensers C4 and C5 should be in the region of ·002 μF, and experiments with various inductances and capacities will enable the condenser C1 to cover only the various amateur bands.

Position 4 of S1 switches into circuit the plug-in coil socket, marked L4. A similar device could be employed in the anode, although in the original



Switching arrangement for push-button crystal selection on straight or Tritet Crystal Oscillator and Electron-Coupled Oscillator on three ranges, using a 6L6 valve. A Yaxley single-bank switch may be used for S1 as shown on the right. S9 is the Tritet push-button. L9, L10 and L11 are R.F. chokes.

Circuit Details

An examination of the diagram shows the circuit to be that of a straight-forward Crystal-Electron Coupled Oscillator into which has been incorporated a series of push-button switches.

On the Crystal side, with switch S1 in Position 1 half-a-dozen 7 and 14 Mc. crystals can be selected at will. Advantage is taken of the fact that two of the buttons of the switch (which is of the usual pattern) can be " in " at the same time, thus permitting the Tritet coil (L1) to be switched into circuit.

If all of the crystals are in the 7 Mc. or 14 Mc. range then the Tritet coil may be made a fixture, but if different ranges of crystals are available an improvement can be effected by making L1 a plug-in coil. For Tritet operation one crystal button and the Tritet button (S9) are depressed together, so that both remain " in."

model, the switch S2 had a " neutral " position, so that a 4-pin coil socket could conveniently be mounted in parallel with the moving arms of the switch. Two anode inductances are shown, L5 for 7 Mc., and L6 for 14 Mc., tuned by the condenser C2. The bulb in series with C2 (a 5 or 10 watt low-voltage bulb will do) serves to flatten the tuning of the anode inductance (again in the interests of stability) and thus provides a useful indication of how much the tuning, or keying, of the rest of the transmitter affects the oscillator stage.

C1 tunes the grid coils on any of the E.C.O. ranges, and the Tritet coil when in the Crystal oscillator position. The only component value which is in any way critical is that of R1, which should be 100,000 ohms, *not* wire-wound. This resistor and C6 *must be of good quality*. C6 should be about ·0002 μF.

(*Continued on page* 363)

MORSE INSTRUCTION

PART II.

By B. W. F. MAINPRISE, B.Sc.(Eng.), Dip. Elect. Eng. (G5MP).

IN Part I we discussed the order in which the alphabet could be tackled ; a new type of practice card to assist beginners in converting sound combinations into letters, and a method of speeding-up the reverse process, namely, converting letters into morse sounds. Now we have to examine a few points arising in class-work.

An elementary class may receive beginners whose knowledge of morse is zero, and pass them out when they have attained a speed of 3 or 4 words a minute. All goes well if the beginners arrive together in one batch, but it may happen that newcomers enter the class week by week. The problem is how best to start off the newcomers without slowing down those who have almost reached the standard for promotion to the next higher class. The method adopted by the writer is as follows:

The newcomers are handed a typed morse alphabet when they arrive. This is a little larger than a post-card. On the front are the 26 letters, while on the back are the ten numerals and the various punctuation signs, such as the fraction bar, break, separation sign, question mark, etc. *There are no dots or dashes on the card ;* everything is given in dits and dahhs. Thus A is shown as *dit dahh* and 7 as *dahh dahh dit dit dit.**

The new arrivals are told to copy out on their writing pads the six shortest letters, namely, E T A I M N, in a short column so that these are readily visible. For the first period they watch out for these letters only, in the transmission which is proceeding at about 3 w.p.m. These short letters appear frequently in normal text, as half of them are vowels. The beginners therefore get useful practice, and by the end of the period should be getting down these letters without too much difficulty. A short sentence can be sent especially for their benefit ; thus " Ten men meet in a steamer" contains only two letters not in their short list.

When the class is over, they are kept behind for a few minutes. It is explained to them that they will be reading morse far more often by ear than by eye. Therefore the introduction of dots and dashes is an unnecessary complication—it will be much simpler for them to learn the letters from the start by sound, than having to convert mentally the sound into dots and dashes, visualising these, and converting them into letters. Accordingly they are advised not to worry about the alphabet in dots and dashes, as represented in the many booklets on the subject. They are told to make sure by the next period of instruction that they can immediately identify the sounds of the six short letters they have been practising on, and if they feel confident about this, to tackle the three unit letters (DGK OR SUW) as mentioned in Part I, but to leave the longer four-unit letters alone, till the new ones have been mastered. This is enough for them to remember on their first attendance, so the practice cards illustrated in Fig. 3 (Part I) are not brought out till their next class, when it is suggested that they make up a set for their own use.

In connection with morse alphabets handed out to beginners, one Air Training Corps squadron has photographed the alphabet and numerals, so that each beginner is handed an enlargement of post card type. These are excellent, as they are stiff enough to be carried about in the pocket without damage, while the high gloss of the surface does not show finger marks. The writer's one regret is that they give the alphabet in dots and dashes, and not in dits and dahhs.

From the very start the letters are formed fairly fast, equivalent to a speed of perhaps 12 w.p.m. but the intervals between each letter are long, permitting the beginner to consider what each letter is, with the result that the rate works out at about 3 or 4 w.p.m. This method is the usual one favoured in modern practice, as the beginner learns the letters by their characteristic sound. There is no change in the keying of the letters until he reaches a speed of about 12 w.p.m.—only the intervals between the letters are progressively shortened. This is very satisfactory as far as receiving practice is concerned, but is dangerous when the learner starts to send. For instance, if he is taught to think what the combination is to be keyed, and then to send it at a speed equivalent to 12 w.p.m. there is considerable risk that he will develop a " jitter-bug " or " glass arm" type of sending, which will be both unpleasant and difficult to read. The question of sending will, however, be dealt with later in this article.

Selection of Text

The choice of suitable text for practice transmissions requires consideration. Some instructors suggest that as for Service purposes the operator will be dealing mainly with groups, *e.g.* three letters and a numeral, groups of this type should form a large part of the practice transmissions. The writer cannot accept this view in the least, as it leads too easily to boredom. It has to be remembered that in the average elementary morse class only a proportion of those present are destined to be wireless operators. A great many are there solely because the training syllabus stipulates that all branches must attain a certain degree of proficiency in morse. Thus, in a typical Air Training Corps class, considerable numbers may aim at serving as fitters, riggers, flight mechanics, etc., and take more interest in timing the valve settings of an aero engine than in tuning the valve circuits of a radio transmitter. Therefore, the material chosen for practice transmissions should have an interest appeal, and the instructor should precede the opening transmission with a few minutes spent in working up " atmosphere." A series of transmissions consisting of groups of letters and numerals passing between two stations Q7J and S8B will not normally maintain the enthusiasm of the back rows for long. But there will be a great difference if the instructor, on entering the room, announces that a flight of Wellingtons using the call-sign Q7J have been hurriedly detailed to ferry certain secret personnel from Iceland, and are now about 100 miles away. They are in contact with a ground station S8B a few miles from where the class are sitting, and will be passing directly over S8B, making for a certain airfield. The individual members of the class will irresistibly start imagining themselves in those Wellingtons, flying in a dappled sky of moonlight and altocumulus, and even the somewhat dull subject of " procedure "

Note.—A better notation is to write these as di-dahh and dahh-dahh-di-di-dit. The sounds are then easier to read at a glance. The author is indebted to Col. C. W. Thomas (G6MW) for pointing out this improvement.

can be safely expounded without undue boredom.

In the same way, distress traffic has a great appeal. A few of the typical practice transmissions used by the writer are as follows: During dense fog a Norwegian steamer is in collision with a four-masted Yugo-slav training ship, south-east of Dungeness. The SOS is picked up by North Foreland who replies that assistance is being sent, and clears the air for distress traffic. The steamer follows with a slightly amended position, giving fuller details of the vessel she was in collision with, and which was partly dismasted. Announces that rockets are audible, and her own bows are seriously damaged. North Foreland asks all vessels in the vicinity to look and listen for men in the water. Later comes a message from a Dutch steamer; she has picked up some men, and subsequently her lifeboat locates the Yugo-slav vessel which has sunk. Further survivors are taken from the remnants of the standing rigging. The fog slowly clears: the nearby vessels proceed, leaving coast lifeboats and a couple of tugs on the scene of the wreck.

Another episode deals with a plane over the Channel. An oil pump fails, the machine sends out the XXX distress signal as she turns back for the French coast. Height is lost too rapidly, and the SOS follows as a descent is made in the sea. Lympne and Niton warn planes and shipping. Another cross-Channel plane locates the disabled machine in the water, with a fishing boat alongside. A liner has turned back. Boulogne reports in a general CQ that crew and passengers have been taken off by the fishing boat, and attempts to prevent the machine from sinking are in progress. A relief plane sets out, together with a newspaper plane seeking photographs of the event.

A third series covers a typical half-hour watch on the 11·3 Mc. band in the early days of the war. An American Clipper plane is approaching the Azores, and handling traffic with Horta. An Italian trans-Atlantic plane, up from South America has reached the west coast of Africa and is reporting. In this series, use of the Q code enables letters and numerals to be combined, *e.g.* QTI 024, QTJ 280 km., and so on. To avoid confusion, the writer changes such symbols as the starting sign CT and the "de" to their Service equivalents.

For very short periods of transmission, time will not allow working up a suitable "background." In such cases, there is no alternative to plain text, but the passage should be selected with foresight and not at random. For Air Training Corps work, text dealing with aircraft recognition will be suitable, and a well-chosen passage will not only maintain interest, but will also stick in the minds of the class and so fulfil a dual purpose. For sea cadets, a passage on the rigging of an emergency steering gear might be suitable, and for army cadets, some paragraphs on novel guerilla tactics. Maps or rough sketches on the blackboard all add to the interest. The preparation of such material certainly gives the instructor trouble, but he will be well repaid by the interest shown by the class, instead of their attitude of looking on the morse period as one of dullness, attended only because the syllabus makes it compulsory.

Plain Language Precaution

One objection often raised to plain language text is that some members of the class are inclined to guess the endings of the longer words, and to complete these almost ahead of the keying. There are good grounds for this objection, so from time to time the writer deliberately mis-spells the endings to cover with confusion those who are copying what they anticipate is coming, instead of what is actually transmitted.

Length of Practice Period

As regards the duration of each practice period, an hour is probably a satisfactory length. During the first 20 minutes or so, beginners are "warming up," and their rate of copy will have increased appreciably at the end of this time. The period is really dependent more on the instructor than on the class—an almost silent instructor forging ahead with only occasional remarks will clearly necessitate a shorter period than one who breaks the transmissions with short explanations on procedure, reminiscences, "background," etc. The writer's preference is for a period of an hour, or an hour and a quarter, with a break in the middle for a short talk, or better still, actual demonstration of signals on a receiver. For instance, an instructor can tune in a station, obtain the call-sign, explain the country it is situated in, and the type of traffic it is handling, *e.g.* press, commercial traffic, shipping, meteorological reports, etc. Unfortunately the war has put an end to many of the transmissions formerly available. Further, he can point out any idiosyncrasies of the operator's style, if hand-keyed, and comment on the type of signal, as regards stability, tone and similar features. A station sending strings of V's, with its call-sign interposed can then be selected, and the class can endeavour to take down its call, while the instructor moves round the tables, checking their copy. As the call-sign is frequently repeated, they will stand a good chance of success. The use of a receiver in this way adds a very realistic touch, and a novel break. For individual tuition, the writer invariably keys a small r.f. oscillator, such as that in a broadcast set, and picks up the signal on his own communications receiver, the pupil adjusting the tone and the gain controls to his own liking. Besides reproducing exact working conditions, the use of a receiver in this manner enables static and jamming to be mixed with the local signal to any extent required by advanced classes.

So far we have discussed the chief points arising in copying signals. Methods of sending, key design, and copying on a typewriter will be dealt with in the concluding instalment, where visual signalling will also be briefly covered.

(To be concluded.)

A 6L6 SUPER OSCILLATOR—

(Continued from page 361.)

Layout

Screen the grid side from the anode side, but remember that some capacity between them is essential for crystal operation. It is for this reason that a valve with both grid and anode connections in the base should be used—the inter-electrode capacity is just about right for the best results, if the coils are well shielded to prevent inter-action on E.C.O. Alternatively, a valve such as the RCA 807, with the anode taken to the top cap, could be used, with the crystals and push-button switch moved away from the grid screening-can and placed nearer the anode inductances. Provided that only a small amount of R.F. power is drawn from the stage (after the war the writer aims to feed this stage to a 6L6 buffer-amplifier before the final amplifier) a high degree of efficiency and stability can easily be obtained on both Crystal and Electron-Coupled Oscillator circuits.

MATHEMATICS FOR THE RADIO AMATEUR

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

SECOND SERIES—PART X. VECTORS—*continued*

The Magnitude of the Resultant.

IN Fig. 18a (page 347, April issue) $AD^2 = AB^2 + BD^2 = AB^2 + AC^2$
i.e. $R^2 = V_1^2 + V_2^2$

In Fig. 18b, where AB and AC are inclined at an angle θ

$$AD^2 = AB^2 + BD^2 - 2AB \times BD \cos \angle ABD$$
$$= AB^2 + AC^2 - 2AB \times AC \cos (180^\circ - \theta)$$
$$= AB^2 + AC^2 + 2AB \times AC \cos \theta$$
i.e. $R^2 = V_1^2 + V_2^2 + 2V_1V_2 \cos \theta$

The Direction of the Resultant.

In Fig. 18a,

$$\tan \theta = \frac{DB}{AB} = \frac{AC}{AB} = \frac{V_2}{V_1}$$
$$i.e.\ \theta = \tan^{-1} \frac{V_2}{V_1}$$

In Fig. 18b,

$$\theta = \tan^{-1} \frac{V_2 \sin \theta}{V_1 + V_2 \cos \theta}$$

Examples :—

(1) Suppose in Fig. 17a (page 347, April issue) the two vectors represented velocities given at the same time to a body, *e.g.* the case can be imagined in which a car has a velocity as represented by vector AB, and a shot is fired from it, at right angles to the path of the car, as represented by vector CD. What would be the path of the bullet, and in which direction would it travel?

The parallelogram of velocities (in this case a rectangle) would be drawn as in Fig. 18a, with $V_1 = 50$, $V_2 = 30$.

Then $R^2 = V_1^2 + V_2^2 = 30^2 + 50^2$
$= 3{,}400$
$R = \sqrt{3{,}400} = 58{\cdot}31$ f.p.s.
$\theta = \tan^{-1} \frac{V_2}{V_1} = \tan^{-1} \frac{30}{50}$
$= \tan^{-1} (0{\cdot}6)$
$= 30^\circ\ 58'$

i.e. the shot would travel at a velocity of 58·31 f.p.s. at an angle of 30° 58′ with the path of the car.

(2) Suppose in Fig. 17b LM represents a current of 1 ampere; NO is a current of 0·75 ampere in the same circuit, but out of phase with the former by 60°.

What would be the resultant current and its phase relationship to the current AB?

The parallelogram would be drawn as in Fig. 18b; with $V_1 = 1$ ampere; $V_2 = 0{\cdot}75$ ampere and $\theta = 60^\circ$.

R and θ are required.

$R^2 = V_1^2 + V_2^2 + 2\,V_1\,V_2 \cos \theta$
i.e. $R^2 = 1^2 + (\frac{3}{4})^2 + 2 \times 1 \times \frac{3}{4} \times \frac{1}{2}$
$= 1 + {\cdot}5625 + {\cdot}75 = 2{\cdot}3125$
$\therefore R = \sqrt{2{\cdot}3125} = 1{\cdot}52$ amperes

$$\theta = \tan^{-1} \frac{V_2 \sin \theta}{V_1 + V_2 \cos \theta} = \frac{\frac{3}{4} \times \frac{\sqrt{3}}{2}}{\frac{1}{2} + \frac{3}{4} \times \frac{1}{2}}$$
$$= \tan^{-1} \frac{3\sqrt{3}}{7} = \tan^{-1} 0{\cdot}7423$$
$\therefore \theta = 36^\circ\ 35'$

i.e. the resulting current is one of 1·52 amperes out of phase by 36° 35′ with the current of 1 ampere.

Resolution of Vectors.

It has been seen that two vector quantities can be compounded into their single equivalent vector by using the parallelogram law.

The reverse step is often required; *i.e.* it is necessary to find two vector quantities which are equivalent (in magnitude and direction) to one vector. Usually the two vectors required are desired to be at right angles; the original vector is then said to be resolved into two component vectors at right angles to each other. These two resolved parts are equivalent to the original vector quantity.

Thus in Fig. 18a, let AD be vector quantity to be resolved into two vector quantities mutually at right angles.

It is clear that V_1 and V_2 are the two required resolved parts for it has been proved that R is equivalent to $V_1 + V_2$.

What is the magnitude of these resolved parts, *i.e.* given the value of R, and the angle which V_1 makes with R, what are the values of V_1 and V_2?

In triangle ADB, $\frac{V_1}{R} = \cos \theta$
i.e. $V_1 = R \cos \theta$

In triangle ACD, $\frac{V_2}{R} = \cos \angle CAD = \sin \theta$
i.e. $V_2 = R \sin \theta$

Hence a vector quantity, R, can be resolved into two components; one R cos θ in a direction making an angle θ with R; and R sin θ in a direction making an angle $(90^\circ - \theta)$ with R.

[It is very easy to prove that these resolved components will give for their resultant, R.]

The rule for resolving vectors in a certain direction is :—

The resolved part of a vector quantity in a given direction is obtained by multiplying the given vector by the cosine of the angle between the given vector and the given direction.

Examples :—

(1) In Fig. 18a,

Let AD represent a velocity of 10 f.p.s.

Required the two velocities, in the directions AB and AC, which will give this; θ being 50°.

$AB = R \cos \theta = 10 \cos 50 = 6{\cdot}561$ f.p.s.

$AC = R \sin \theta = 10 \sin 50 = 7{\cdot}66$ f.p.s.

(2) A ship sailing north, is blown out of its course by a westerly wind, and actually makes a

(*Continued on page* 372.)

* *29 Hambro Avenue, Hayes, Kent.*

A HOLE IN TIME ?

A Ripley contribution from G8QH.

MIND you, I don't expect you to believe what I'm going to tell you. Nobody else did at the time it happened, and really I couldn't be surprised. They laughed so much and cracked so many jokes about my exceeding the rated input (in pints) that I got to thinking that perhaps. . . .

Anyway, it all came back to me when I was looking through the old station log-book the other evening and thinking, as the poet says, of " the days that are no more," and also of the QSL's that never were. I was pulled up by this entry: *July* 12—22.35—*G6DTQ*—14030 *kc/s fone*—*Him* 59, *me* 58.

Nothing to comment on there, unless perhaps you happen to know that 6DTQ is only a mile from my place, and you want to complain about my using the 14 Mc. band for cross-town talk. But don't worry; the band was dead as a doornail that night so far as DX was concerned.

There was nothing to comment on in the actual QSO either. I remember 6DTQ told me how well his new HK24 was perking; he gloated a bit over a contact he'd had with ZE1JA on a beam radiating east and west; and he signed after about 15 minutes. . . .

But I happened to run into 6DTQ in town the next day, and after the usual salutations he said suddenly:

" By the way—it never struck me till I'd signed with you last night—you were up pretty late, weren't you ? Don't often hear *you* at two in the morning."

I stared at him.

" What d'you mean, two in the morning ? " I asked.

Then he stared at *me* and said, " Well, brother, it *was* two in the morning, wasn't it ? Near enough, anyway."

" Half past ten, you mean," I said mildly, thinking there was some slight confusion in his mind. " Ten thirty-five to be precise, when we hooked up. I remember entering it in the log."

He roared with laughter.

" Better get that ticker of yours seen to," he said. " You and your half past ten ! Two in the morning it was, I tell you. I ought to know, because I kept a sked with old PJD at 02.20 just after I'd signed with you. You had something good for supper, I bet." And he roared with laughter again.

Well, you know, I felt a bit of a fool in the face of that hearty mirth, and I changed the subject with a mumbled something or other. But my mind was hammering away like a high-speed commercial on auto. Because, you see, it *was* 22.35 when we had hooked up. It was at my end anyway. I ought to know too, because my XYL goes to bed punctually at 23.00 hours when the old grandfather clock downstairs strikes; and that night I went with her. Besides which, I'd checked the station clock with the B.B.C. just before our QSO . . .

All the rest of that day, I couldn't fix my attention on anything I was doing. Whatever it was, I'd catch myself thinking: " Half past ten, half past two . . . it's crazy ! " And the more I thought of it, the crazier it seemed.

A few nights later, when some of the boys were round at the shack, I ventured to tell them. I affected a sort of half-laugh as I did so, in case they should think I'd gone off my rocker. Just as well I did, because they laughed too and, as I've told you, pulled my leg on the subject of " input."

Well, I gave it up. One can't insist seriously on a yarn like that in front of four sane and competent hams. And presently I began to think I must have dreamed the whole crazy thing; and I said no more to anyone.

But that wasn't the end . . .

A fortnight later I was in the shack around the same time of evening (*my* time) as the QSO with 6DTQ. It was a still, oppressive night—one of those nights when the band is quiet for a bit and then fires off an accumulated broadside of static that bulges the diaphragms of the 'phones. Although there was nothing doing in the way of DX, I pushed out a test call just on the off-chance.

(I ought to tell you that I use a pick-up and a record for test calls. Saves a lot of breath, I find. This particular record was cut by a friend of mine in a radio-advertising agency—a pretty good recording too, except that something got in my throat while I was making it, so that there's a fruity cough after the third " Calling test." We didn't remake; I thought the cough would add a touch of personality . . .)

Well, as I was saying, I pushed out this test call, stood by, and scoured the band. Nothing doing. As I told you, conditions were not exactly lively. So rather than waste time on more fruitless calls, I thought I'd do a job I had long had in mind—check the trimming of my IF's.

This took me a couple of hours. Mark that—two hours. It's a job I like to do carefully, using the oscillograph. And when it was done it was high time to turn in. But I thought I'd run over the dial once more to see if conditions had picked up at all.

No, they were still dead. But then—

As I tuned through 14030 (my own transmitter frequency, you will remember) I *did* hear a call. And it nearly jolted me out of my chair.

It was myself calling test. Clear as a bell, a good S9 signal, and very nice quality though I say it.

I tell you, I positively shivered there in the shack although it was a warm night. All that business with 6DTQ came rushing back, and I don't mind saying I felt a prickly sensation over my scalp as the call finished and I heard myself " standing by for any 20-metre station."

A pirate ? If so, he had my exact words, my very voice copied to a T—*and he remembered to cough after the third " calling test "* . . .

What do you think I did ?

I can't hear you laughing from here, so I'll tell you. When the call ended, I pushed the plate switch on the Tx, reached for the mike and—hoping to Heaven my voice wasn't shaking too badly, and that none of the local boys was listening—*I called myself.* And then I switched to receive and searched the band with a fine tooth comb for something like an hour. . . .

No, there was no answer. But eight days later (it's noted in the log) I got word from an SWL in Ithaca, New York State, reporting my test call, giving the usual SWL dope, hoping I'd got rid of " that cough," and of course finishing " Pse QSL, OM."

The time on the report ? 21.30 EDST, when I was in bed and—I hope—asleep.

. . . .

Well, there you are, Brains Trust. I told you I didn't expect you to believe me. Things like that just don't happen, do they ? But nevertheless. . . .

KHAKI AND BLUE

● News is to hand at last from Mervyn "Snowy" Campbell, **VK3MR,** who, it will be remembered, was taken prisoner in Italy last May. Writing under date of February 22, VK3MR stated that he had received no letters for twelve months, neither had he received comforts of any sort. Steps have been taken by G8TI, to send a liberal supply of cigarettes and such other items as are permitted. Members who have enjoyed contacts with 3MR may like to write. His full address is 9190, A.C.1 Mervyn Campbell, Concentramento Per P.G.52, P.M.5100, Italy.

● Mr. P. L. Garrett reports that his son, **G3BP,** is fit and well. He has met two other hams in his prison camp but gives no call signs. His new address is Sig. R. M. Garrett, 2590411, Campo Concentramento P.G.78, P.M. 3300, Italy. Letters from old friends in North London would be welcomed.

● Information has been received from Mrs. Phyllis Briscombe, BRS3484, that her husband, Tel. P. B. Briscombe, **G8KU,** is a prisoner of war. Details of his address are not yet available. Mr. Briscombe was in pre-war days the energetic Hon. Sec. of the Scarborough S.W. Club.

● After a lengthy spell of duty with the R.A.F. in Gambia, Cpl. B. A. Parsons, **GW4FW,** is now back in England and stationed at W.D. He sends greetings to all old friends.

● Dr. Arthur Gee, **G2UK,** District 17 Representative, has been granted a commission in the R.A.M.C., and is now in the Leeds area, receiving initial training. During his absence Mrs. Gee has kindly offered to deal with District reports.

● Congrats to J. D. Morris, **2DDR,** and A. J. Dolan, **2FUQ,** both of whom have been promoted to Pilot Officer after serving in the ranks of the R.A.F. The latter is in the M.E., whilst Jack Morris is now back in England from Iceland.

● 2nd-Lt. A. A. Jones, **G3RU,** having recently returned from a course at an A.A. Command Radio School, reports that the following U.S.A. amateurs are in England:—W1GKD, 2JAC, 3PDD, 5DQD, 6DOU, 6JUL, 8HVF (ex 3JII), 8MDS, 8NHZ, 8NIC, 8QA, 8SAN, 8UOJ, 8VVZ (ex 2JQS), 9SOA. All are 2nd-Lts. serving in the U.S. Signal Corps. Contact can be established *via* the American Embassy, London, and letters should be addressed to them with the words "Electronic Training Group" after the name. G3RU also mentions having met G8KM in a hairdresser's shop. He too is a Lieutenant, R.A.O.C.

● Ft. Lt. J. V. Newsom, **G3GY,** writing from the M.E. under date of March 17, seeks news of G3UQ and would welcome letters from all other old friends.

● We are informed by Mr. G. Joseph, of Auckland, New Zealand, that his son David, who held the call **GM2ZN** before the war, is now a Corporal attached to the Wireless Wing of the A.F.V. School in New Zealand. Ship operators and others will be welcomed at his home address, 5 Stack Street, Herne Bay, Auckland. David Joseph served on the Scottish "D" District Committee for some time.

● North London members will be sorry to hear that Frank Golding, **BRS3561,** of Cricklewood, has been discharged from the R.A.F. as the result of a spine injury received nine months ago. Frank is now awaiting admission to a local hospital where we hope a good recovery will be effected.

● Cpl. J. Harris, **2FPY,** of Tooting, now with an A.M.E.S. in the M.E., wishes to be remembered to all old friends in South London, and especially to G3AD, 6MU, 6QN and 8TN. His letter is being circulated by G8QH in the District 13 Log for May.

● Mr. P. Cooper, 61 Ringstead Crescent, Sheffield, 10, father of Geoffrey Cooper, R.A.F., **G3PP,** officially reported missing believed killed, in our last issue, would like to hear from any member (civilian or Service) who was in contact with him prior to the time when he disappeared on a flight over the Mediterranean last July. Mr. Cooper believes that his son met amateurs in Malta and Alexandria.

● P. H. Smith, **2FWV,** reports having met VE3CO, ZL3AI and W9VVW, at an R.A.F. station in Cornwall. The former is a Ft./Lt. in the R.C.A.F.

● Sgt. D. J. George, **G2UA,** writing whilst on embarkation leave asked that his 73 be conveyed to Capt. J. Bryden, 2BOI, and other old Medway and Croydon friends.

● Cpl. W. Bidie, a new member who has recently returned from TF sends greetings to G3CI, 3ZK and 3890, all of whom he met in that country.

● Cpl. H. W. A. Holloway, **2DGW,** of Waltham Cross, now serving as a Wireless Mechanic in the R.A.F., wishes to be remembered to his friends in District 12. He is now in Scotland.

● Before returning to the U.S., Ensign Roy Dunann, **W6KRM,** of California, wrote H.Q. to express his regrets that during his stay in G he was unable to attend Society meetings. He asked to be remembered to all old friends of the air who worked him from Piedmont. His final sally is worthy of record. "Well, I'm all earthed, valved, anode, and wirelessed up now, and to spoil it I'm going back to the land of grounds, tubes, plate and radio!"

● Sigmn. "Jazz" Ellett, **BRS3585,** now at the "Country Farmyard" would like to hear from G8KP and SP1HA. Letters via his home address, Meppershall, Shefford, Beds, please.

● L.A.C. T. G. Dickinson, **BRS3747,** asked in a letter written on the high seas that his 73 be conveyed to all old friends at Cranwell and in North London.

● L.A.C. Harry Willets, **2FPI,** and L.A.C. D. Barlow, **2HBG,** in recent letters report fit and well. The former wrote from Ismailia and the latter from Khartoum, but as Barlow's letter carried VU stamps we are wondering whether he is not somewhere else. Philatelists will have a busy time later on trying to "make sense" of the many interesting censor covers which they acquired during the war. Whilst 2FPI reported all BULLS to hand up to December, 2HBG had, up to mid-March, seen nothing later than June. Both wish to be remembered to old friends.

● From F./Sgt. G. F. Keen, **2BIL,** enthusiastic V.H.F. man pre-war, we learn with regret that Ernest Sprage, 2DQB, has been reported missing. 2BIL now on the permanent staff M.E. Pool, wishes to be remembered to all old friends at home and abroad.

● We understand that Pte. A. Francois, **BRS4556,** of 28 Kellett Road, Brixton has been discharged from the R.A.M.C., presumably due to ill health. We wish him every success now that he is again a "civvie."

● F./Sgt. D. Cameron, **2BKC,** writing from Perthshire wishes to be remembered to G8DI and all other "Second Earlies." He would like to hear from GM5YX and 6RV. G4KV is stationed with him and G15AJ was contacted recently.

● F./O. Ted Laker, **G6LK,** in an Air Mail letter dated March 28, reports fit from the M.E. Having completed a job of work in ZB1 Ted is now on a 12,000 miles journey which will take him through the Sudan, B. Congo, Kenya, French W.A. to the Gold Coast. Later he expects to visit Palestine and Syria. He has met Ken Jowers and G. M. R. Scott Farnie, as well as several U.S. amateurs. The only ham letter he had received since leaving G was from G8LY, to whom he sends 73. Greetings are also sent to "Rusty" and all other old friends.

● We are advised by Mrs. Emily Bolton that her son Sigmn. John Bolton, **BRS4304,** has been reported missing. John was serving with the 11th Indian Division Sigs., M Section, Malaya. Has any member news of his present whereabouts?

● From Mr. Shackleton, Snr., comes news that "Shack" **G6SN,** has met four hams in his prison camp. We are endeavouring to discover their calls. "Shack" has also met six men from his old school. He reports fit and well.

● Sub.-Lt. (A.) W. W. Taber, **G3GU,** an Observer in the F.A.A. travelled to the M.E. by air by way of Foynes, Lisbon, Bathurst, Lagos, Doula, Ligenga, Stanleyville, Juba, Khartoum, Wadi Halfa and Cairo, thereby visiting most of his African DX! He is now in Egypt where he has met G8LO and SU1AX among others.

● As the sowing season is now in full swing at the Farmyard, news is a bit thin. Our eminent correspondent (who seems to collect a stripe a month) reports however that 8OM is now a Lance Jack, 6CO now a Sarge, 2HT a new arrival and 8MQ a recent visitor from "the 'all."

● A.C.2 M. Hollinshead, **G5QG,** whose home is at 7 Regent Road, Birmingham, 17, and now at No. 1 S.S. (Hut 314, East Camp), wishes to be remembered to G8JI and all other old friends.

● Pte. R. M. Jeremy's call sign is **2CMJ** not 2CNJ as recorded in this column last month.

John Kyle, (G6WL—D.F.M.)

Heartiest congrats to F./Sgt. John Kyle, G6WL, who has been awarded the D.F.M. for outstanding work during operational duties. "Jock" who incidentally is 53 years of age, but as tough as they make 'em, has been in the R.A.F. since the early days of the war and has taken an active part in many interesting radio developments. Prior to the war he "dabbled" very successfully on the "long waves"—around 5 metres—and could always be depended upon for a sked at any hour of the night. Although living in London for some while up to 1939, his friends North of the Border will claim him as one of their ain folk because he began his ham career as GM6WL (Glasgow).

One day we *may* be allowed to tell the full story behind his award, suffice for the present to say that his D.F.M. was well and truly earned.

Safe

Eric Trebilcock, BERS195, writing from Townsville, Queensland, on February 20, reported fit after a very nerve wracking experience in Salamuna, New Guinea. He lost all his possessions but judging by the tone of his letter, the "Trebilcock spirit" remains unbroken.

MEMBERS ON ACTIVE SERVICE

Thirty-second List

WE publish below our thirty-second list of members on Active Service. Additional details and corrections should be advised to Headquarters as early as possible. The present list contains information received up to May 2, 1942.

Rank and Name	Regiment or Branch of Service	Pre-war Call or B.R.S.
Cpl. R. J. A. Arden	R.A.F.	4900
2nd Lt. W. J. Baird	R.A.O.C.	4956
L./Cpl. W. H. Baker	,,	G3JD
L./Cpl. R. C. Barnes	R. Sigs.	G6DS
A.C.2 K. G. Beauchamp	R.A.F.	4167
Sig. G. W. Belsey	R. Sigs.	G4PX
A.C.1 J. A. R. Blackman	R.A.F.	4975
Sgt. R. F. Blair	,,	4979
A.C.1 E. L. Blake	,,	4954
L./Cpl. K. R. Boot	R. Sigs.	2FZG
Cpl. K. Bowes	R.A.F.	4960
Sig. T. Boyce	Royal Sussex	4879
F./O. P. M. Carment	R.A.F.	G5WW
Capt. W. J. Chalk	R. Sigs.	G3IC
L.A.C. E. C. Cooper	R.A.F.	2HNW
Cpl. H. Collett	,,	G3KI
Pte. A. C. Couchman	R.A.O.C.	4978
Cpl. J. F. Davis	R.A.F.	G3CI
Ldg. W/Mech. D. Deacon	R.N.	4980
P.O./Tel. W. G. Dobbie	,,	4912
Cpl. L. S. Dunn	R.A.F.	4904
A.C.1 R. G. Ellett	,,	5014
Sgt. C. B. Ellwood	,,	2FSO
Cpl. T. S. Ferguson	R. Sigs.	4894
Pte. A. Francois	R.A.M.C.	4556
A.C.2. W. Fraser	R.A.F.	GM3BI,
Lt. A. C. Gee	R.A.M.C.	G2UK
Cpl. J. E. Gee	R.A.O.C.	4949
Sig. F. A. George	R. Sigs.	G5FG
Sgt. R. J. Gilbert	R.A.F.	2CQB
A./Capt. J. C. H. Gover	R.A.	4946
A.C.2 A. E. Grant	R.A.F.	4981
Cpl. L. Halstead	,,	4962
A.C.2 B. S. Hancock	,,	4897
A.C.2 P. W. Hand	,,	4286
A.C.1 H. R. Hanford	,,	4893
L./Cpl. B. Healey	R. Sigs.	4216
Cpl. J. Higham	,,	3172
A.C.2 J. C. Hislop	R.A.F.	3571
Sig. E. Ingleton	R. Sigs.	G5IL
L.A.C. F. Johnson	R.A.F.	4969
O./Tel. W. S. Johnston	R.N.	4895
A.C.2 F. D. Jones	R.A.F.	4942
Sgt. J. Kershaw	R.A.O.C.	4992
A.C.2 S. W. Ketley	R.A.F.	5010
Cpl. K. W. A. King	,,	5005
A.C.2 R. King	,,	4963
Sgt. H. Lacey	,,	4952
A.C.1 A. J. Linkins	,,	4965
L.A.C. D. R. Lovell	,,	4999
Sig. A. R. Luke	R. Sigs.	4957
Ldg. W./Mech. D. O. Macnamara	R.N.	4966
P.O./Tel. E. G. Martin	R.N.V.(W.)R.	G4BT
A.C.2 E. N. Maynerd	R.A.F.	4990
2nd Lt. J. W. Muntus	R.A.	5003
A.C.2 J. Oldham	R.A.F.	4955
Cpl. D. A. Parker	,,	4973
F./O. K. B. Pearse	,,	4961
A.C.2 R. C. Philpot	,,	2DDA
A.C.2 D. Pollard	,,	4138
A.C.1 D. Rabbage	,,	3607
F./O. C. B. Raithby	,,	G8GI
Capt. W. S. Robinson	Gloster	2BUL
L.A.C. T. Rutherford	R.A.F.	3611
Sig. L. Sanderson	R. Sigs.	G8TN
Sig. A. J. Scanes	,,	4948
Sig. L. Seal	,,	G2OC
L./Cpl. C. Sharratt	,,	G4CJ
Cpl. E. A. Siggers	R.A.O.C.	4989
Sig. J. Slater	R. Sigs.	4968
Sig. F. J. Strange	,,	5012
L./Bdr. S. V. Taylor	R.A.	4137
2nd Lt. J. H. Thorpe	R.A.O.C.	4998
A.C.1 B. J. Thrupp	R.A.F.	4899
Sig. A. G. J. Ward	R. Sigs.	G3WD
A.C.1 D. Warren	R.A.F.	5000
Cpl. A. Weaver	R.A.F.	5007
F./O. M. P. Whitmore, B.Sc.	,,	4959
Lt. P. Wolfendale	R. Sigs.	2FQT
Capt. J. E. R. Wood	,,	BERS296

HAVE YOU OBTAINED YOUR COPY OF THE AMATEUR RADIO HANDBOOK?

Prisoners of War Fund

PARCELS.—It had been planned to send a copy of "Maths for the Million" to all members who are held captive but the German Censor has refused to permit their entry into Germany. May parcels to an average value of £1 each have been despatched.

BOOKS.—Seven parcels have been despatched to date. Thanks are extended to all who have forwarded books. Further books should be sent to Mr. C. H. L. Edwards, G8TL, "Speedways," St. Bartholomews Lane, Sudbury, Suffolk.

DONATIONS.—The General Secretary acknowledges, with thanks, on behalf of Council, receipt of donations from:—R. Farmer, 3836, 3s. 3d.; A. J. Mathews, G6QM, 5s.; R. A. Mills, BRS4219, 5s.; D. W. Watson, BERS440, £4 7s. 6d.; W. Hopcroft, GM4AN, £1 1s.; District 7 (per G5WP), £1; J. E. Farnell, BRS3817, 2s. 3d.; G. W. Fraser, BRS4627, 17s. 6d.; D. Mitchell, GW6AA, 10s.; (2nd Donation), R. Broom, BRS3401, 15s.; "Three Hams on the Dover Front," 15s.; M. Brown, G3DL, 2s. 3d.; P. H. Smith, 2FWV, 4s. 6d.; E. Chick, G3JF, 7s. 3d.; R. Owen, G4KS, 4s. 6d.; R. W. Gittens, VP6MY, £1 18s. 6d.; P. L. Garrett (father of G3BP), £1; H. E. Hardy, 2DWM, 5s.; R.A.F. Bolton, per G2XU, £1 13s.; R. Cumberlidge, G3CK, 5s.; J. Paine, G6PR, £1; P. T. Atkinson, G4FJ, 5s.; J. W. K. Smith, 2BPW, £1; Derby Group per G2OU, £1 5s.; Capt. G. Noblett, EI9D, £1 1s.; F./Lt. G. V. Newsom, G3GY, £1 1s.; A. E. Ashfold, G5QB, 7s. 3d.; J. Casson, BRS3593, 3s. 6d.; Mrs. Quartermaine, £3 3s.; "Mac," £1 5s.; V. J. Flowers, G8QM, 3s.; H. Fairbanks, 2ACM, £1 1s.; R. Butterworth, G8BI, 10s. 6d.; J. Lees, G2IO, 9s.; S. W. Punnett, 2FMC, 10s.; E. G. Finch, BRS2755, 10s.; District 13 per G2GZ (5th Donation), £1; P. H. Smith, 2FWV (2nd Donation), 4s. 6d.; E. S. Elliott, BRS3341, 10s.; W. H. Hopcroft, GM4AN (2nd Donation), 2s.; C. G. Ellett, BRS3585, £1; R. Hamers, ON4FT; 3s. 6d.; N. Owen, G4KS, 10s.; District 12 per G5FA (2nd Donation), 10s.; W. F. Larbey, 2DWU, 12s.; Mrs. Denny, £2 10s.; S. Allen, G8TR, 10s.; E. Marshall, £1; J. Hudson, per G5BQ, 5s.; W. O. Wright, G6FQ, £5; District 7 (Croydon) per G2DP (6th Donation), £1 1s. Previously acknowledged, £245 10s. 8d. Total to date, £290 8s. 8d.

THANKS.—Are extended to Mr. W. O. Wright, G6FQ, whose bid of £5 was the highest received for the back issues of THE BULLETIN donated last month by Mr. Bramhill. The P.O.W. Fund has benefited from Mr. Wright's generosity.

ANOTHER GENEROUS OFFER.—Mr. P. W. Winsford, G4DC, has kindly donated six bound volumes of *The Wireless World* which will be sold to the member making the highest bid. The proceeds will, at the donor's request, be given to the P.O.W. Fund. The six volumes cover the periods from April 1920 to March 1923, and from April 1924 to February 1925, times when the "history of ham radio was in the making." All bids to the General Secretary by May 25 please.

73.

G2FZ (R.A.F.), to G4AS, GG, 6GL, GW2XZ, 6AA, VU2FO.
G3PZ, to G3JK, PI, RF, SK, GW3CR, QB.
G3RU (R.A.O.C.), to G3OU, YA, 5UA, 8KM, WF, GW3QB.
G4GQ (R.A.F.), to G3MI, NR, PV, 4BS, GG, 6NZ.
G5FG (R. Sigs.), to G2IM, QY, 3UQ, 5FA, 6OT, 8K .
G5OH (Birmingham), to G3GH, 6GM, and all old friends.
G6OQ (R.N.V.(W.)R.), to G2JB, NH, 5KH, LY, 6CX, WY.
G6QM (London, N.8), to G3CQ, JK, TR, WX, 5BB, WW.
G8AX (R.N.V.R.), to G2GU, RX, SO, UX, 3FT, WP.
2BKO (R.A.F.), to G2MN, 2OI, 4NO, HK, 2DRR.
2CFV (R.A.F.), to G4DC, 2DPQ, 2FFG, 3585.
BRS3593 (Barrow) to G3PL, XA, 4DS, GF, 8MR, NS.
BRS4795 (Leigh), to G6LC, 2BDA, 2DVQ, 2BTO.

Strays

Charles Bryant, G3SB, Beaconwood Hotel, Minehead. Som. would like to hear from GW4FW and from the person who operated GZYC during 1939.

• • •

Colin Coates, G5CS, 143 Hillcroft Crescent, Oxhey, Watford, seeks information on resistance tuned oscillators.

• • •

Friends of Dennis Hann, G3UY (Guildford) will join with us in offering him congrats on his engagement last month to Miss P. Clements.

Another Ham

Congrats to Mr. and Mrs. Alan Mears, G8SM, of East Molesey, Surrey, on the safe arrival of Howard Alan. It will be remembered that G8SM was discharged from the army some months ago as a result of war disability.

International DX'ers Alliance

Mr. J. Casson, BRS3593, advises us that a copy of *The Globe Circler*, official monthly publication of the above organisation, will be sent to any member of the Society who writes to C. A. Morrison, 730, Osage Street, Normal, Illinois. The annual subscription is 6/- which may be remitted to Mr. N. Burton, 14, Apollo Avenue, Whitefield, Manchester.

BRITISH ISLES NOTES AND NEWS

DISTRICT 1 (North Western)

D.R.: H. W. Stacey (G6CX), "Sandleas," Eddisbury Road, West Kirby, Cheshire. Hoylake 337.

The D.R has received only one report this month, but letters have come to hand from a number of members who are stationed in the District and who wish to get into touch with others. R. R. Waite (G3PZ) now at Millom, wishes to meet the Whitehaven Group. J. A. Hunt (2FSR), of "Dunham House," Charcoal Lane, Dunham Massey, Cheshire, asks for a list of members in the Altrincham area and J. Casson (BRS3593), of 2 Richmond Terrace, Barrow-in-Furness can find no R.S.G.B. members in that town. Will local members please make contact wherever possible? The address of 3PZ has been sent to the Whitehaven T.R.

G6ZT reports that various meetings have been held in Whitehaven during the month, at which 3SY, 4NS, 6WR, and 6ZT attended. 2HJ is still in M.E. 2AUM is in Kenya, Harry Tinnion has joined the R.C. of S. G6CX.

DISTRICT 3 (West Midlands)

D.R.: V. M. Desmond (G5VM), The Chestnuts, Hanley Castle, Worcs. Hanley Swan 41. Scribe: E. J. Wilson (2FDR), 48 Westbourne Road, Olton, Birmingham, 27.

Birmingham.—A meeting of M.A.R.S. was held on April 12, but owing to unforeseen circumstances the lecturer was not able to appear. The meeting was therefore thrown open to general discussion.

Shrewsbury.—There is very little activity around the Wrekin, the majority of members being engaged on radio duties with the Forces. 3PX continues his travels and is now west of Egypt. 2814 of Cressage is about to join the radio branch of R.A.F. and we wish him luck. 3XV is with the Navy somewhere in the South of England. When last heard of, 5YP was making good headway in R.C.S. but hoped to transfer to R.E. Messrs. Puddicombe, Millington, Casey and Westlake send 73 to their friends wherever they may be. (Please use call signs in future.—ED.) G6KR.

DISTRICT 4 (East Midlands)

Deputy D.R.: W. M. Vendy (G6VD), 9 Cecilia Road, Clarendon Park, Leicester.

Nottingham.—The meeting held at G8DZ was supported by 12 members, three of whom came from the Leicester area. 8DZ was unfortunately ill in bed. It was decided that meetings should continue throughout the summer. The next will be held at 2AOO, 78 Henry Road, West Bridgford, on May 17, at 6.30 p.m. Congrats to 4172 on the arrival of a junior op.

Leicester and Derby.—L.A.C. Barlow, 2BHG, writes again from M.E. He would like to hear from 2BI,R. 2RI who was on leave recently, is still near the East Coast. Congrats to 2XD and YF on their marriage—several hams were present to ensure that there were no technical hitches! We wish them the best of luck. A ragchew arranged recently by 2OU, was the first "get together" held in Derby for a long time. The sum of 25s. was collected for the P.O.W. Fund. G3PZ would like to contact 2nd/Lt. Fisher, who was in his area last summer. G6VD.

DISTRICT 5 (Western)

D.R.: R. A. Bartlett (G6RB), 31 Kings Drive, Bishopston, Bristol. Bristol 46960.

The April meeting held in Bristol was again very poorly attended. We were however, pleased to welcome G4JN and although the attendance was small an enjoyable rag-chew ensued.

Next meeting at G6RB, 31 Kings Drive, Bishopston, Bristol, at 3 p.m., May 31.

No news from any other part of the area. We hope all the Bath lads are O.K. G6RB.

DISTRICT 7 (Southern)

D.R.: W. E. Russell (G5WP), "Milestones," Westfield Road, Mayford, Woking, Surrey. Woking 1589.

Bournemouth.—Welcome to new members 2FSI, and 4826. The former sends his 73 to 4GI,, 5FN and other Cardiff friends. 5RS, of Guildford, was welcomed for a short stay. 4IJ, home on leave, thinks Army life grand. 2896, with the R.A.F. in VE, sends 73 to his pals and reports visits to W and experiments in HF and FM reception. (*via* 2HNO.)

Coulsdon.—2780 has joined the R.C. of S. The T.R. had the pleasure of meeting 6RF, who is now stationed in the vicinity. (*via* 3003.)

Croydon.—Twenty-three members attended the April meeting at 2DP's including 2FI, 2VB, 3NQ, 3ST, 4NI, 5AW, 5BT, 5GQ, 5HI, 5PY, 6OD, 6RF, 2FWA, 2HHD, 1545, 3003, 4150, 4324, 4584, 4812, 4814. We were pleased to see 5HI home for a few days from M.E.4. 2FWA brought along a few books which were sold for the P.O.W. Fund. 4AU walked into 2DP's works the other day to enquire if there were any hams there! See Forthcoming Events for next meeting. (*via* 2DP.)

Guildford.—Hams were to be seen everywhere in the undergrowth in 2ZC's garden following up the clues in the treasure-hunt at the most enjoyable April meeting.

All, who drop Nelly a card first, are invited to the next meeting at G2YL, Petersmead Meadow Walk, Walton-on-the-Hill, on Sunday, May 31, at 2.45 p.m. G5WP.

DISTRICT 8 (Home Counties)

D.R.: S. J. Granfield (G5BQ), 47 Warren Road, Cambridge. Cambridge 54644.

Cambridge.—Jim Hudson, formerly of Cambridge, and now a Sgt. in the Army, has sent a subscription to the P. of W. Fund. 5DQ is now stationed in Yorks and 8FF in Lincs. 5DR who is back in Cambridge reports "all well." 2PU is fully recovered from his accident. Stan O'Hagan, G2CR, is now Asst. M.O. at Papworth Colony.

BRS3585 (Bedford) reports again, after a break due to his joining the R.C. of S. 2DPQ has been on leave. The locals would like news of 8KP. N. V. Nichols, BRS3376, of Luton, is stationed near Glasgow, and his officer is GM3CG. From the S.W., 2NJ reports meeting GM2NQ, of Fife, DR for Dist. "H," also 2CPT, of Goole. G5BQ.

DISTRICT 11 (North Wales)

Deputy D.R.: C. Spilline (BRS1060), "Woodside," Meliden Road, Prestatyn.

Prestatyn.—Fourteen members took part in a Radio Quiz at the April meeting held at BRS4762, when GW3CF was the winner of a Handbook donated by H.Q. 4410 and 4040 were runners-up. The next meeting will take place on May 24, at 3 p.m., at "Vale View," Meliden Road.

Plans are afoot to hold a North Wales P.D.M. on June 21 at Prestatyn. It is anticipated that G6CI, and possibly members of Council will be in attendance so please book the date and watch the next issue for full details.

G8DI and his wife recently visited 1060 and 2HIY. 4CK still in London reports meeting 6NR, 8WA, 2DYK and 2FMJ, at his school. 3IR has been in hospital. 2HIY and 4CK are building superhets. BRS1060.

DISTRICT 12 (London North and Herts)

D.R.: S. Buckingham (G5QF), 41 Brunswick Park Road, New Southgate, N.11. Enterprise 3112. Scribe: P. R. Solder (G5FA), 35 Torrington Gardens, New Southgate, N.11. Enterprise 4347.

We are indebted to Mr. Deverell, 2FVX, for making the arrangements to place the hall attached to "The Nightingale" at our disposal, free of charge, at any time for local meetings. At the first meeting to be held there on April 26th, 16 members were present—the Watford, Welwyn and Hertford areas all being represented. Considerable interest was displayed in volumes of *The Wireless World* dating back many years. A collection made at the meeting produced 10s. for the Prisoners of War Fund.

F./O. J. R. Ford, BRS4376, has just completed a Chief Instructors Course at an R.A.F. Gliding School in connection with the A.T.C. and G5FA is due to go shortly.

The next North London Meeting will be held on Sunday, May 24, at The Nightingale, Green Lanes, Wood Green, N.22, at 3 p.m. Nearest station Wood Green Underground and then five minutes walk along Green Lanes. A special welcome is extended to all members in the Services who may be in town on that date. G5FA.

Forthcoming Events

May 17	District 13, 11 a.m., at G2VB, 35 Grangecliffe Gardens, South Norwood, S.E.25.
May 23	District 15, 6.30 p.m., at 2ADI,, 106 Cavendish Avenue, West Ealing, W.13.
May 24	District 12, 3 p.m., at The Nightingale, High Road, Wood Green (opposite Wood Green Town Hall).
May 30	London meeting, 2 p.m., at I.E.E., Savoy Place, Victoria Embankment, W.C.2. "Brains Trust" (see Editorial Announcement, page 357).
May 31	District 5, at G6RB, 31 Kings Drive, Bishopston, Bristol.
May 31	Scotland "A" District, at 2.45 p.m., in the Coffee Room, Y.M.C.A., 100, Bothwell Street, Glasgow.
June 7	District 7, 3 p.m., at BRS1545, 125 Hamsey Green Gardens, Upper Warlingham.
June 21	District 11, meeting in Prestatyn (provisional).
June 27	London meeting at I.E.E. (Details next month.

DISTRICT 13 (London South)

A.R.'s: L. H. Shersby (G2GZ), 41 Reverdy Road, S.E.1 (*South Eastern*); S. E. Langley (G3ST), 62 Dumbarton Road, S.W.2 (*Central*).

South Central and South-east Areas.—The April meeting attendance was a record, 24 members being present. G2VB has kindly offered a cup (known as the "Ann" cup) to B.R.S. members who support our meetings, including of course our good friends from the Croydon area. The cup will be presented to the member who produces the best piece of home-made radio apparatus. G2VB will furnish full particulars to those interested. G8TN sends 73 to all. The next meeting will be held at G2VB, 35 Grangecliffe Gardens, South Norwood, S.E.25, on Sunday, May 17, at 11 a.m. G2GZ and G3ST.

DISTRICT 14 (Eastern)

D.R.: R. L. Varney (G5RV), 184 Galleywood Road, Chelmsford, Essex. Chelmsford 3394.

Chelmsford.—The April meeting was attended by 2SO, 5RV, 6LB, 3650 and 4122. 3BS paid us a welcome visit recently and gave 5RV the usual licking at snooker! 5XI has been home again on short leave. 2CVV who was in Chelmsford recently is on interesting radio work in the R.A.F. Hearty congrats to 2SA on his promotion to 2nd/Lt. (H.G.). No news from Ilford, Romford or Southend. Come on, T.R.'s, but remember the paper restriction on the BULL. May we say that we think the way H.Q. has tackled this problem is admirable? (Thanks O.M.—ED.)

G5RV.

DISTRICT 15 (London West, Middlesex and Buckinghamshire)

D.R.: H. V. Wilkins (G6WN), 539 Oldfield Lane, Sudbury Hill, Greenford, Middlesex. Byron 3369.

G5KT was a welcome visitor at the April meeting. Others present were G3SU, 6WN, 2ADL, 3894 and 4684. Thanks are extended to 2ADI, for his continued hospitality. He again offers his QRA for the May meeting. We welcome all the new members who have joined the ranks during the past few months and would like to meet them at future meetings. Serving members home on leave, who have no time for visiting, but want "just that one word with the ham at home" should give the D.R. a ring. Any evening or week-end.

G3UQ sends a letter from G8VM who reports that he has been released from the Merchant Navy, he is now stationed in Cornwall with the R.A.F.

That's all for now, folks. G6WN.

DISTRICT 16 (South Eastern)

Deputy D.R.: W. A. Scarr, M.A. (G2WS), 8 Beckenham Grove, Shortlands, Bromley, Kent. Beckenham 1131.

G4BY who sends greetings from Orkney to the members of the Whitstable Radio Club, is anxious to have news of their individual activities. He would also like to hear from G5CI who, he believes, was recently granted a commission in the R.A.O.C. 3NQ is also in Orkney with the E.N.S.A. film unit. If any Whitstable members read these notes, perhaps they will make contact with 4BY through the medium of THE BULLETIN. 4720 of 12 Holly Road, Temple Farm, Strood, is anxious to contact members living in that area. 6CY, the acting T.R. for Brighton and Hove, sends the news that G3JF, serving with the West Africa Force, is apparently the only ham in that part of the world. 6CY has had visits from 3XV (who is now in hospital) and 2AO of Eastbourne. 8CP of Newhaven has had a visit from 6AQ.

G2WS.

DISTRICT 17 (Mid East)

D.R.: Dr. A. Gee (G2UK), "Stonehaven," Horncastle Road, Boston, Lincs.

Although the D.R. has now been called up for service with the R.A.M.C., he hopes to carry on with District Notes, if letters reach him well before the 25th.

Boston.—2BQC has been in hospital undergoing an operation, which we are pleased to learn has been successful. Speedy recovery, O.M.

Grimsby.—The D.R. was glad to receive a visit from F. Jackson (G5MT), a new member in the Grimsby area who would like to meet other local members. There seem to be quite enough Grimsby hams now to make a good "get-together" sometime. How about it, chaps?

Apologies for unanswered letters. Life has been rather hectic lately. G2UK.

DISTRICT 19 (Northern).

D.R.; R. J. Bradley (G2FO), 36 Raby Road, Stockton-on-Tees.

The members in this District seem to have taken the recent appeals to save paper very seriously and have reduced reports to an absolute minimum!

BRS4679, of Norham-on-Tweed, says that if any "hams" find themselves in that part of the country he would be pleased if they would call and promises them an egg for tea (if the hen lays!) 3844 is building a new audio amplifier while 5QU is winding a new mains transformer. 2FO is trying to obtain components for a Receiver. The stork has been busy in this district for 8CI, and 6CV have now 2nd junior ops. Congrats, O.M.'s. G2FO.

Northern Ireland

D.R.: J. N. Smith (GI5QX), 19 Hawthornden Drive, Belmont, Belfast.

VE5ZM writing from Derry expects to visit Belfast soon when he hopes to meet some of the GI's he worked whilst in Canada. VE3BI is also stationed in Derry. 2CII, went to England to be married, and has just returned with his wife. We wish them happy times during their sojourn in GI. 2DDI writing from Torquay sends 73 to old friends. GI6VG who has been home on leave after a long absence is very fit. The DR was pleased to receive a call from him, in company with 6TK. 3ZX has gone to India taking with him our best wishes. GI5OY who has been promoted to 2nd Lieut. H.G. receives our congrats, as does G6KS who is now Foreman of Signals. The latter sends 73 to his GI friends. Greetings to our recent visitors: G6QF, G8VK and BRS4852. GI5QX.

Scotland

Scottish Records Officer: J. Hunter (GM6ZV), 51 Camphill Avenue, Glasgow, S.1. Langside 237.

The monthly meeting of "A" District was again well supported and those members present appreciated an interesting talk on aerials by GM4JO. The next meeting will take place on May 31, at the usual place and time. GM6ZV.

Gibraltar Amateur Radio Society

Two very pleasant meetings were enjoyed recently by members of the G.A.R.S. Towards the end of February, GI5MZ, with the aid of a Hallicrafters S27 V.H.F. receiver demonstrated that a normal straight filament lamp appears to put out an oscillation around 66 Mc/s—at least on the local 76-cycle mains! Much discussion arose as a consequence of this demonstration; in fact, some members almost infringed the 11 p.m. curfew, so loquacious did the arguments become! At this meeting, incidentally, all present were pleased to see G5NM, our able and hard-working Secretary and Treasurer, in the uniform of a Pilot Officer.

It is with sincere regret that we have to record that, following the February Meeting, our President, Sqn/Ldr. MacDowell, GI5MZ, was posted away from the Rock. It was largely due to his efforts that the Gib. Society was so successfully resuscitated last winter, and his personality will be missed considerably in the future. Indeed, he *was* missed at the March meeting, which was held at G6ZY's QRA. At this meeting a photograph was taken which it is hoped may be published later in the BULL.

There is little local gossip to record except that G8IH recently won second prize in the Gibraltar Arts and Crafts exhibition, and Cpl. Dunlop has been having the same interesting QSO's GI5MZ was reported as having in some previous notes! Congrats to BRS4099 on the addition of a third stripe! G6ZY.

A Tribute to Col. R. P. G. Denman, G6HW.

Colonel Denman, whose death is reported elsewhere in this issue, was well known to several members of Council who, in pre-war days, enjoyed his companionship at official meetings convened to consider frequency allocations. As representative of the Aircraft Industry, Col. Denman was pledged at such meetings to press commercial aviation interests, but being at heart a true amateur, he always supported Council's representatives in their quest for permission for amateurs to operate on the V.H.F.'s. He will also be remembered in amateur circles for his association with the Science Museum receiver, whilst in more recent years he made valuable contributions to Radio Location and anti-D.F. Amongst many accomplishments in his persistent pursuit of high quality in audio reproduction was the construction and installation in his home of a 27-ft. logarithmic horn. He was also responsible for the first Lorenz Blind Approach Beacon to be installed in Great Britain—at Heston Airport.

Col. Denman lost his life during the opening stages of the last Libyan campaign whilst serving with the Royal Corps of Signals.

To his widow and two children we extend our deepest sympathies.

P/O. Norman Davis, G6TV—Benedick

All those who have served at No. 1 S.S. will be glad to hear that Norman Davis, G6TV, has been granted a commission in the Signals Branch, R.A.F.V.R. For many years he has been Hon. Secretary, R.A.F.A.R.S. and it has been largely due to his initiative that ham radio has been kept alive in the School. As a civilian instructor he has probably met more Service hams than any other member, many of whom owe much of their basic knowledge of Service equipment to his teaching. Coincidental with the granting of his commission, Norman entered the ranks of the Benedicks. We wish him and his wife every happiness.

HEADQUARTERS CALLING

THE attention of District Representatives and Scribes is directed to the Editorial announcement on page 341, April issue. In future, reports must be limited to 200 words and headed in accordance with the style adopted in this issue.

Closing date for copy is the 28th of each month. Notes received after that date cannot be used.

March Council Meeting

Résumé of the Minutes of a Council Meeting held at the Institution of Electrical Engineers, on Saturday, March 14th, 1942, at 2 p.m.

Present.—Messrs. A. D. Gay (President), E. L. Gardiner, J. W. Mathews, G. A. Jessup, S. K. Lewer, W. H. Matthews, W. A. Scarr, E. H. Simmonds, A. J. H. Watson and J. Clarricoats (General Secretary).

Apologies.—Messrs. A. E. Watts and H. A. M. Clark.

1. One hundred and fifty-nine applications for membership were accepted. One hundred and forty-two of the applications were sponsored by Corporate members and seventeen were supported by suitable references. One resignation was accepted.

2. It was agreed to hold afternoon meetings at the I.E.E. on Saturdays, May 2 and May 30.

3. It was reported that the Supplement was published on March 13. Pre-publication orders had been very satisfactory as had been revenue from advertising.

4. It was agreed to produce a small number of Supplements in a cloth binding similar in style to that adopted for the Handbook.

5. It was agreed to change the title of the Society's Journal as from July, 1942, to "The R.S.G.B. Bulletin—Official Journal of the Radio Society of Great Britain."

6. Various suggestions for improving service to members were discussed.

Call Sign Badges

Due to pressure of Government work the firm of T. A. Butler & Co., find themselves unable to continue the engraving of call sign badges and brooches. Members who have placed orders for engraving during the past few weeks have been advised. No new orders can be accepted at present.

Vibrator-Operated Power Supply Units

Nearly one hundred members and visitors, including several amateurs from the Dominions, were present at the I.E.E. on Saturday, May 2, to hear Mr. R. Pollock, G5KU, Chief Engineer, *Masteradio Company*, deliver his lecture on Vibrator-Operated Power Supply Units. A valuable contribution to the discussion was made by F./Lt. J. N. Walker, G5JU, who described how Service difficulties, when using vibrator units with V.H.F. equipment, have been overcome. Mr. Pollock's lecture will appear in serial form in future issues of THE BULLETIN.

"Time Bases"

The author of the article on "Time Bases" published in our last issue, states that two minor errors occurred in connection with Fig. 14. The lead from the top condenser on the L.H. side labelled "Lock" should read "C.R.T."

The caption reference to values as for Fig. 12 should be omitted.

Books Received

THE RADIO AMATEUR'S HANDBOOK. (Special Defence Edition.) Published by A.R.R.L.; 288 pp., 500 illustrations. Can be obtained through R.S.G.B.; price 8s. 6d. (10–12 weeks delivery.)

Designed to replace the League's standard Handbook for use in defence radio courses. Retains everything from regular edition that is useful to task in hand, and has new chapters on Maths, Measuring Equipment and Code Instruction. It omits such sections as construction of amateur equipment and operation of amateur stations. A most useful and timely publication which should prove as popular with the Services as the R.S.G.B. Handbook and Supplement.

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MATHEMATICS FOR THE RADIO AMATEUR—

(*Continued from page* 364)

track N.N.E. at a speed of 15 knots. What is the speed of the ship and of the wind?

In Fig. 18a,

Let AD represent the resultant velocity of ship.
Let AC represent actual velocity of ship.
Let AB represent the velocity of the wind.

Since AD is N.N.E., $\hat{DAB} = 67\frac{1}{2}°$

$$\therefore \text{Wind's velocity} = 15 \cos 67\tfrac{1}{2}° \text{ knots} = 15 \times 0{\cdot}3827 = 5{\cdot}741 \text{ knots}$$

$$\text{Ship's velocity} = 15 \sin 67\tfrac{1}{2} = 15 \times 0{\cdot}9239 = 13{\cdot}859 \text{ knots.}$$

Problems

(39) What is the resultant, in magnitude and direction, for each of the following pairs of superimposed voltages?

(*a*) 100 v. and 50 v., with phase difference of 45°.
(*b*) 30 v. and 40 v., with phase difference of 180°.
(*c*) 60 v. and 60 v., with phase difference of 120°.

Solution to Problems

(34) (*a*) 156¼′. (*b*) 3¼ secs. (*c*) 6¼ secs. (*d*) 150′.
(35) 56° 19′; 14° 29′; 60°.
(36) (*a*) $\tan^{-1} 2 = 63° 26'$.
(*b*) $\tan^{-1}(-\frac{1}{2}) = -26° 34'$.
(*c*) $\tan^{-1}\frac{4}{3} = 53° 8'$
(37) (*a*) $\tan^{-1} 1 = 45°$. (*b*) $\tan^{-1} 5 = 78°41'$.
(38) 72·1 f.p.s., at angle of 56° 19′ N. of E.

(*To be concluded next month.*)

Correction

In Part VIII, on page 316, referring to the slope of railway lines and roads, it was stated that this was measured by (vertical distance) ÷ (distance along slope). E. R. Westlake, G6KR, has kindly pointed out that this is not so for railway gradients which are are expressed as (vertical distance) ÷ (horizontal distanc—that is, the "mathematical" method.

Silent Keys

We record with regret the names of the following members who have made the supreme sacrifice.

To their parents, relatives and friends we extend our sincere sympathies.

Pilot Officer Basil E. P. Sadler, G2RC, of Wandsworth, London.
Sergeant Pilot W. C. Lees, GM4FT, of Edinburgh.
Col. R. E. P. Denman, G6HW, of London.
Sergeant R. Grimm, OK5GT.

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