THE T&R

BULLETIN

A JOURNAL FOR

RADIO EXPERIMENTERS

Vol. 16 No. 12 JUNE 1941 (Copyright) Price 1/6

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for the construction of PRECISION SHORT-WAVE EQUIPMENT ARE AGAIN AVAILABLE, although the types and quantities are strictly limited for private use.

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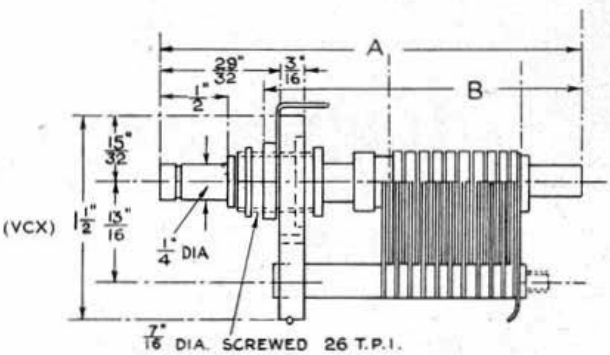

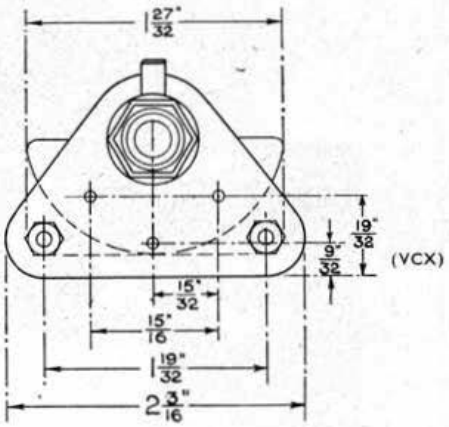

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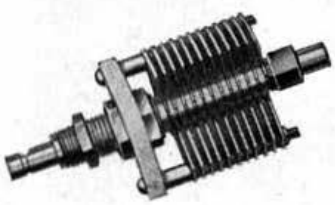

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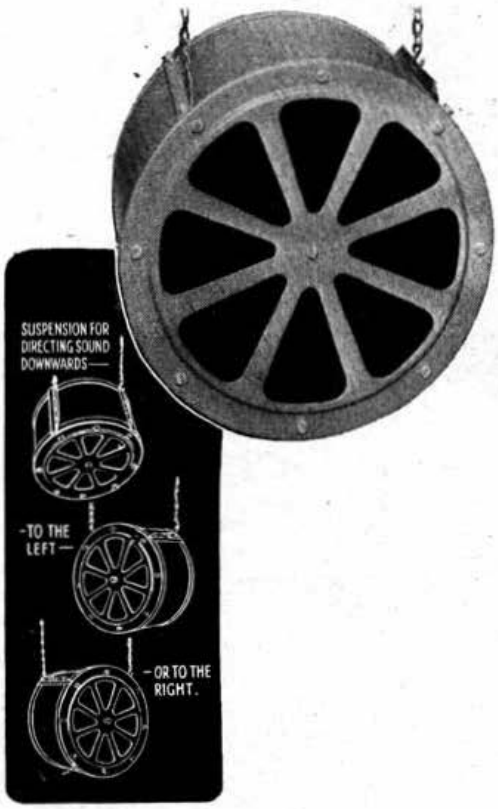

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Candler Code Courses have been advertised in the "T. & R. Bulletin" every month for the last two and a half years, and, if by chance you are not a New Member of the R.S.G.B., and have not previously applied for a copy of the "Book of Facts," do so now. All you have to do is to fill in the Coupon below and post it in an unsealed envelope (postage 1d. only) and a copy will be sent you by return.

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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

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Vol. XVI. No. 12 JUNE, 1941

CONTENTS

FRIENDS ACROSS THE OCEAN

RECENT correspondence in this and other journals, on the subject of the future of Amateur Radio has caused most of us to examine the various reasons put forward to justify the existence and continuance of our hobby. The reasons are many and we believe convincing, but for the moment we should like to draw attention to one very important way in which we think Amateur Radio has performed a great service to humanity and to the cause of freedom. We refer to the manner in which transatlantic amateur contacts have helped to pave the road towards the present close and friendly collaboration between this country and the United States. Who can doubt that these countless daily "meetings," spread over a period of many years, between several thousands of like-minded enthusiasts, speaking the same language, have helped considerably to promote friendship and understanding between the two nations.

Consider for a moment the position, say, twenty-five years ago. How many people in this country had ever seen an American, much less spoken to one? The average popular conception of America and its people was that engendered by the second-rate Music Hall and comic paper which pictured that great nation as a collection of loud-mouthed, boasting money worshippers. To the American citizen, the British were represented as jingoistic, overbearing snobs. How different is all that to-day! No longer do the letters U.S.A. conjure up that lean, billy-goat-bearded figment of the political cartoonist's imagination—the dollar-grabbing "Uncle Sam." On the contrary, for us personally they mean Hugo Bondy, Ray Fehr, Ralph Summers, Miles Weeks, and a host of other friends and acquaintances. For each one of you they stand for a different set of particular pals and pleasant memories. This is true for several thousands of us here, it is true of many thousands more in America.

Each one of these individuals must, in the very nature of things, have become an apostle of Anglo-American goodwill within his or her own circle of friends; ready with the well-informed answer to ignorant opinion and able to offer the facilities whereby the ignorant one could himself make direct contact with a *real person* on the other side of the ocean.

There is no doubt that the whole future well-being of mankind is bound up with the degree of goodwill and co-operation between the United States of America and the British Commonwealth of Nations. In our humble opinion there is also no doubt that in laying the foundation upon which this goodwill and co-operation are being built, Amateur Radio has played no small or unimportant part and we commend the thought to those who, in days to come, will have to decide the future destiny of our hobby in both this Empire and in America.

A. O. M.

THE "HETROFIL"

By R. L. VARNEY, Assoc. I.E.E. (G5RV)

THIS ingenious instrument, which was described by Raymond N. Woodward, W1EAO, in September, 1939, QST, is a modified Wien audio frequency bridge which may be applied conveniently to the output of any receiver and acts as a " phasing out " system for eliminating heterodyne interference.

The unit requires no extra valves or power supply and need cost only a small sum to construct.

Simply by rotation of a single knob, an interfering C.W. signal or a phone heterodyne may be tuned right out leaving the desired signal slightly reduced in volume but quite readable, where normally it would have been lost under the interference. The only case where an interfering signal may not be eliminated in this way is where it produces exactly the same audio frequency beat note in the telephones, as does the required signal. This will only happen in the fairly rare case where two stations are operating upon frequencies which produce a similar beat note in the telephones.

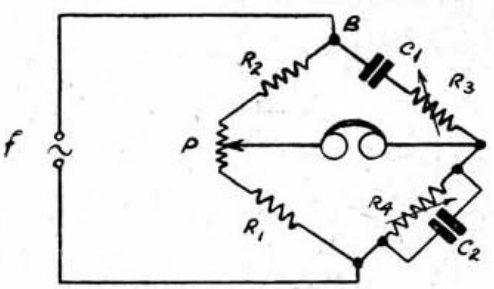


Fig. 1.
Fundamental Wien Bridge Circuit.

If there exists only a hundred or so *cycles* between their frequencies, two stations may easily be separated by the Hetrofil.

It is not necessary to use a superheterodyne receiver in order to obtain the benefit of the unit, in fact, a straight T.R.F. receiver fitted with the device is almost equivalent to a really good superheterodyne in selectivity.

The fundamental Wien bridge circuit, which is shown in Fig. 1, is often used for the measurement of audio frequencies in the laboratory. The unknown frequency is applied across A and B and the resistance arms R_3 and R_4 are varied until a null point is found.

Then the unknown frequency :—

$$f = \frac{1}{2\pi \sqrt{R_3 R_4 C_1 C_2}}$$

provided also,

$$\frac{C_1}{C_2} = \frac{R_2}{R_1} - \frac{R_3}{R_4}$$

Now if C_1 is made equal to C_2, and R_3 equal to R_4 as well as the ratio $\frac{R_2}{R_1} = 2$, then the expression for frequency reduces to :—

$$f = \frac{1}{2\pi R_3 C_1}$$

These conditions can readily be obtained and by arranging R_3 and R_4 on a common shaft and presetting the ratio arms R_1 and R_2, single knob control may be had.

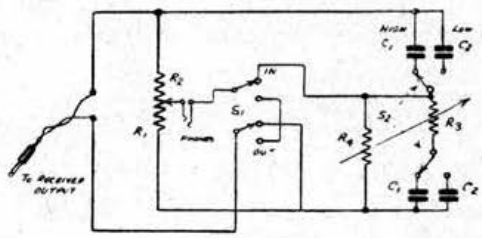


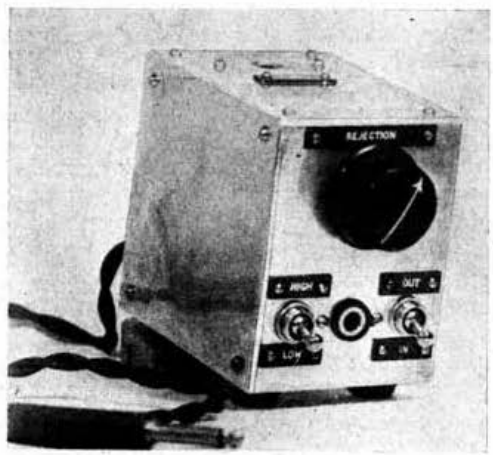
Fig. 2.

Modified Hetrofil Circuit.

S1, S2	D.P.D.T. switches (Toggle type).
R1, R2	Pre-set 5,000Ω potentiometer.
R3, R4	Two ganged 10,000Ω variable resistors.
C1	·05μF tubular paper.
C2	·25μF " "

Fig. 2 gives the modified circuit as used for communication purposes, including provision for switching the unit in or out of operation, and selection of two frequency ranges by switching in suitable condensers.

If possible, the ganged variable resistances R_3, R_4 should have a logarithmic taper but this is not essential and in the instrument constructed by the writer a pair of ganged 10,000 Ω " Elpro " potentiometers were used.



The Hetrofil unit described by the author. The pre-set ratio arm potentiometer (R1, R2) is mounted below the hole visible in top of box.

Actually, a pair of ganged 10,000 Ω potentiometers were not available but only a 25,000 Ω ganged to a 5,000 Ω were on hand. However, a pair of 10,000 Ω potentiometers were obtained and the inter-coupling spindle and accessories taken from the original pair and used to couple the two 10,000 Ω units together. The original spindle of one of the 10,000 Ω potentiometers was used again in the 5,000 Ω unit which took the place of the two separate resistors R_1 and R_2 with their compensating potentiometer P.

It may be mentioned here that the use of a pre-set potentiometer in place of the fixed ratio arms R_1 and R_2 in the original Hetrofil circuit (which also omitted the potentiometer P), is a distinct advantage, as it enables a perfect balance to be obtained, whereas with normally available fixed resistors for R_1 and R_2 a perfectly clean balance was not obtained in practice owing to small inaccuracies in the resistance values.

The complete instrument may be built into a box measuring 4 in. × 3¾ in. × 2¾ in. and a general idea of the layout may be obtained from a study of the photograph.

The original circuit in QST called for a triple-pole double throw switch to change over several connections in order to cut the Hetrofil in or out of circuit, but the present arrangement permits the use of a normal D.P.D.T. miniature toggle switch for this purpose. A similar switch is used for the range selection and provides a symmetrical appearance of the front panel.

The low range permits rejection of heterodynes or C.W. notes of frequencies between 65 and 350 cycles, while the high range covers 320 to 5,000 cycles.

The values of resistance and capacity chosen are those suitable for operation from a receiver telephone output circuit requiring a load impedance of approximately 2,000 Ω. For use with lower impedance output circuits, proportionately lower values of resistance and larger values of capacity must be chosen.

Fig. 3a and 3b show typical results obtained with the Hetrofil. It will be seen that the rejection is very effective and that the use of the lower capacity is preferable where possible as better rejection is thereby obtained.

It is hoped that many experimenters in this country will give this little gadget a trial as it will help greatly to reduce headaches from QRM—especially when peace returns, and brings with it the anticipated feverishly renewed activity on all the amateur bands!

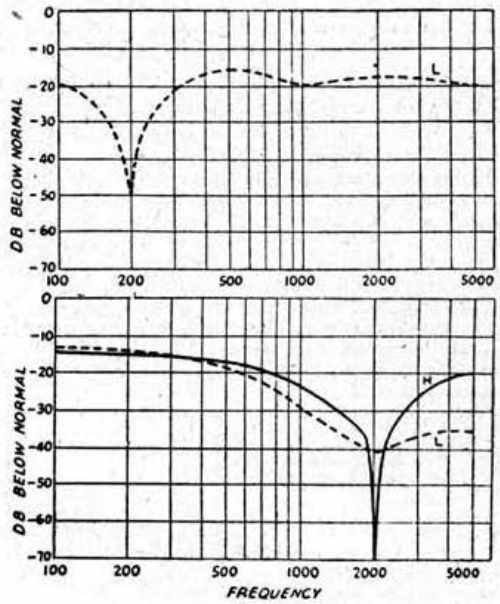


Fig. 3.

(*a*) Curve showing attenuation of unwanted frequency (200 c.p.s.) using range "L" (low). Unavoidable attenuation of wanted signal frequencies in the "pass" region is seen to be about 15 dB. This is not serious in practice and may be compensated for usually by increasing gain of the receiver. Interfering signal would be 30 dB below the wanted one.

(*b*) Curves showing attenuation of unwanted frequency (2,000 c.p.s.) and indicating choice of correct range "H" (High) selected by capacity switch on Hetrofil. Range "L" (Low) gives poor results at frequencies above 500 c.p.s.

B.B.C. Year Book

The 1941 edition of the B.B.C. Handbook, like its predecessors, brings to the public an interesting summary of broadcasting during 1940. Special features include articles on Propaganda, The Empire Service, The European Service, The Latin-American Service, and The Near Eastern Service. Major Gladstone Murray, well known to many Society members for his support for the amateur in the early days of the movement, gives his impressions of the B.B.C.'s audience in North America. Listening with the Forces provides Major Longland with an opportunity of recording a little about the work undertaken by the B.B.C. during the time the B.E.F. was in France. Much more will no doubt be written later. War Reporting and Mobile Recording complete the main section, but an extensive Reference Section provides data and information on many aspects of British Broadcasting.

As Sir Alan Powell says in his Foreword "The full story of the way in which the B.B.C. has met the call of war cannot be told until it is over"; but we radio amateurs know better than Mr. Everyman that they are doing a tough job—well.

The B.B.C. Handbook for 1941 is worth every penny of the 2s. you must pay to possess it. J. C.

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DISTANCE RANGES OF RADIO WAVES*

This informative Letter Circular (LC615), issued by the U.S.A. Bureau of Standards, is of special interest, because it predicts the distance ranges expected to hold good in temperate zones this summer. It also gives a clear description of many terms used when discussing propagation problems.

THE distances over which practical radio transmission is possible are very different at different times of day, seasons, etc., and for different frequencies of the radio waves.

Radio wave transmission takes place principally by the propagation of a " ground wave " along the ground and a " sky wave ' reflected from the ionosphere. The ionosphere is the electrically conducting (ionized) region in the upper atmosphere, more than 30 miles above the earth's surface. As the radio waves travel out along the ground or in the atmosphere, their energy is reduced below what it would be if no causes of energy absorption existed. The absorption is due to the electrical resistance of materials in the earth and to ionised particles in the atmosphere. The amount of the absorption determines the maximum distances at which waves of various frequencies can be received, for given reception conditions at the receiver.

The Ground Wave

The distance range of the ground wave is in general great at low frequencies (below about 500 kilocycles per second), and decreases as the frequency is increased, because the ground-wave absorption increases with frequency. The distance range of the ground wave is different for earth of different conductivities and dielectric constants, but is fairly constant with time over a given transmission path at a given frequency.

The Sky Wave

The distance range of the sky wave is not constant with time, frequency, or path. It is a minimum in approximately the broadcast band of frequencies (550 to 1,600 kc.), increasing with change of frequency in either direction. In the daytime the absorption of the sky-wave is so great that there is almost no sky-wave at frequencies from somewhat below to somewhat above the broadcast frequency band, particularly in the summer. Hence, sky-wave propagation in the daytime (particularly in the summer) is only appreciable in the lower and higher frequency ranges. During the night, however, sky-wave propagation takes place throughout the entire range of frequencies.

The large variations of sky-wave propagation result from conditions and changes in the ionisation of the ionosphere. Besides daily variation of daylight and darkness, factors such as latitude, season, magnetic storms, and solar disturbances, have been found to have effects upon this ionization. These changes in ionization result in variations in the distance range of radio waves from hour to hour, day to day, season to season, and year to year.

* *Published with the kind permission of the Director, Bureau of Standards, Washington, U.S.A.*

† *Published in the July, August and September, 1940, issues of* THE T. & R. BULLETIN.

Calculation of Ranges

While the distance ranges of ground waves are calculable, there are no generally applicable formulas for sky waves. Thus we cannot determine sky-wave distance ranges by any process of calculation but must use the accumulated results of experience. The attached graphs summarise experience and give average distance ranges as determined by numerous experimenters. There are considerable variations from the average for particular paths and times; the widths of the shaded boundaries on the graphs indicate roughly the variations found in common practice.

Detailed information about sky waves and the ionosphere was given in " Radio Transmission and the Ionosphere."†

Above a certain frequency (which last year was about 4,000 kc. at night and higher in the daytime), there is for each frequency a distance within which none of the regular sky wave is reflected back to the earth by the ionosphere. There is a zone, with an inner and outer boundary, in which there is no regular radio reception. This is called the skip zone and its outer boundary is called the skip distance.

Thus, in the right-hand portion of each of the graphs, for a specified frequency the waves are receivable at distances from 0 up to the ground-wave range (different for land and ocean), are not receivable from there up to the distance given by the line marked " skip distance," and are receivable from there up to the " distance range " line.

Sporadic " E " Reflection

In Figs. 1 and 2, part of the right-hand portion is cross-hatched and marked " Irregular Sporadic." This means that at the distances and frequencies indicated there is sporadic radio transmission at irregular times, even though in the skip zone. The times at which such transmission occurs are not predictable; it is most prevalent from May to August, and occurs particularly in the late afternoon, the evening, and the forenoon, but may occur at any time of day or night. It is due to reflection from peculiarly ionised patches in the E layer of the ionosphere, and not the regular reflection (from the extended layers of the ionosphere) which accounts for the regular transmission. Scattered reflections from the ionosphere, which are fluttering and blurred and usually weak, are frequently receivable in the skip zone.

Arrangement of Graphs

The scales of abscissas and ordinates on the graphs are cubical (*i.e.* numbers shown are proportional to cube of distance along scale, or, distance along scale is proportional to cube root of numbers). This was chosen because it spaces the data satisfactorily. A linear scale would crowd the low values too much and a logarithmic scale would crowd the high values too much.

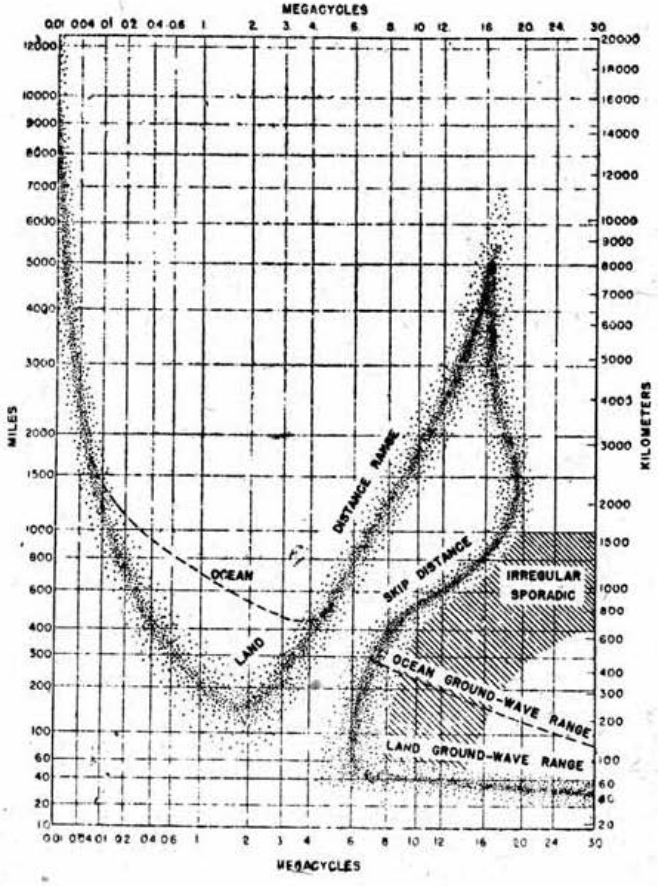


Fig. 1.
Predicted ranges—Day conditions. Summer, 1941.

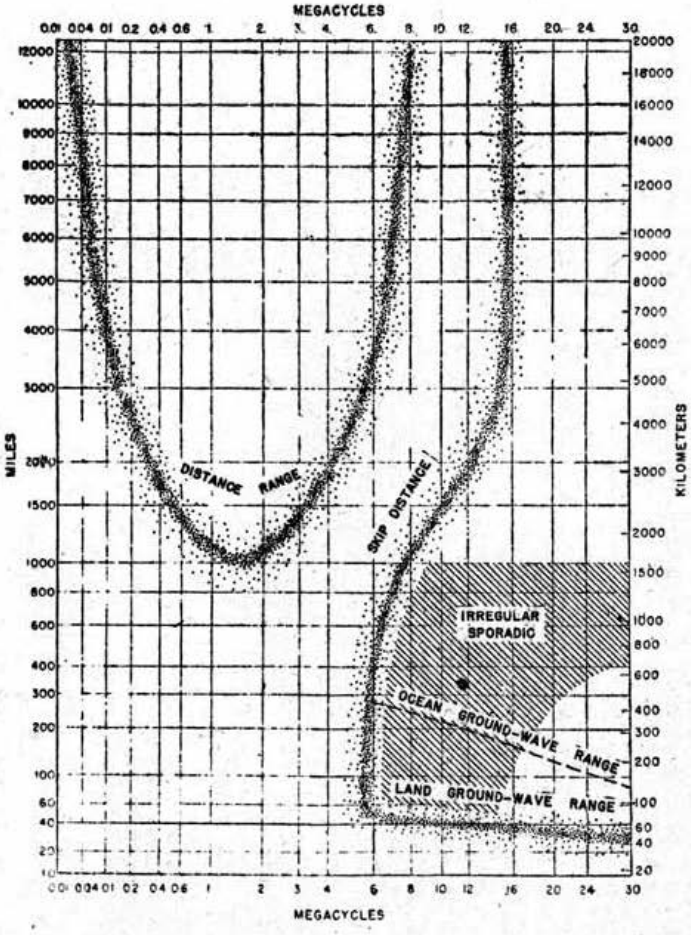


Fig. 2.
Predicted ranges—Night conditions. Summer, 1941.

The graphs show the limits of distance over which practical radio-telegraph communication is possible. They are based on the lowest field intensity which permits practical reception in the presence of average background interference or noise. For the broadcast frequencies this does not mean satisfactory programme reception. The limiting field intensity is different at different frequencies and times. The following table gives limiting field intensity values typical of those used in determining the distance ranges. This assumes the use of a good receiving set.

Table of Limiting Field Intensity Values.

Period	0·1 Mc.	1·0 Mc.	5·0 Mc.	10·0 Mc.
	kv/m.	kv/m.	kv/m.	kv/m.
Summer day	60	10	10	3
Summer night	100	50	15	1
Winter day*	25	1	2	1
Winter night*	35	5	1	1

Static Effects

When atmospherics (" static ") or other sources of interference are great, *e.g.*, in the tropics, larger received field intensities are required and the distance ranges are less. The graphs assume the use of one kilowatt radiated power, and non-directional aerials. For greater power the distance ranges will be somewhat greater. For transmission over a given path, received intensity is proportional to the square root of radiated power, but there is no simple relation between distance range and either radiated power or received field intensity.

General

The day graph is based on noon conditions and the night graph is based on midnight conditions. In a general way, there is progressive change from one to the other, but with some tendency for day conditions to persist through dusk, and night conditions to persist through dawn. The conditions of spring and autumn are intermediate between those of summer and winter, autumn resembling winter somewhat more than summer. Information is given for each month and for all times of day, in the summaries regularly published by the Bureau in the *Proceedings of the Institute of Radio Engineers* and *QST*.

The graphs are based principally upon data for the latitude of Washington, but serve as a guide for transmission anywhere in the temperate zones. They are not as accurate for polar or equatorial latitudes.

In general, the distance ranges for paths which ie partly in day and partly in night portions of the globe, are intermediate between those shown in the day and night graphs, for the range of frequencies which can be used both day and night. For paths which cross the sunset line in summer, the usable frequencies will be about the same as the usable summer day frequencies. For paths across the sunset line in winter, the usable frequencies will be a little higher than the night frequencies shown in graphs. For transmissions across the sunrise line, both summer and winter, the usable frequencies will be a little lower than the night frequencies shown in the graphs. Frequently the conditions of the ionosphere on the light and dark sides of sunrise are widely different. Under such conditions it is often so difficult to transmit across the sunrise line that it is almost a barrier to high-frequency radio communication.

The graphs give distance ranges for the current summer only. They change from year to year because of changes of ionisation in the ionosphere. These changes are caused by the changing ultra-violet radiation from the sun in an approximate eleven-year cycle. The graphs will therefore be revised each year.

The distance ranges given are the distances for good intelligible reception; they are not the limits of distance at which interference can be caused. A field intensity sufficient to cause troublesome interference may be produced at a much greater distance than the maximum distance of reliable reception.

Readers interested in examining graphs for winter 1940–1 day and night are requested to communicate with the Editor.

Dit, Dit, Dah, Dah, Dit, Dit

● ● — — ● ●

No. 2

Compiled by J. N. Roe, G2VV

(1) What is the common term used to denote a millionth part of an ohm ?
(2) What other term is sometimes used to denote the unit of flux ?
(3) How many millifarads are equal to one farad ?
(4) Upon what three factors does the capacity of a condenser depend ?
(5) Which has the higher specific resistance, platinum or mercury ?
(6) What term is used to denote the measure of the rate of flow of electricity ?
(7) What is the practical unit of electrical energy ?
(8) What are the three essentials for producing E.M.F. in a primary cell ?
(9) What is the unit of self inductance ?
(10) In what year did KDKA, E. Pittsburg, U.S.A., commence short wave transmissions, and on what wavelength ?

Radio Riddle-me-Rees

No. 6

Compiled by J. Irwin, G4FD.

My 1st is in Marconi who confounded the critics.
,, 2nd ,, ,, Condenser and also Electrolytics.
,, 3rd ,, ,, Capacity, Charge and Coulomb.
,, 4th ,, ,, Blitz but not in D —— bomb.
,, 5th ,, ,, Milli—a thousandth in brief.
,, 6th ,, ,, McElroy—morse reader-in-chief.
,, 7th ,, ,, Reaction which boosts up the sigs.
,, 8th ,, ,, TX but not found in Rigs.
,, 9th ,, ,, Electrode and H_2SO_4.
,, last ,, ,, Transformer and also in Core.

My whole will befound in your superhet.
Or maybe it's a Colpitts, Jones or Tritet.

(Solutions on page 424.)

Stray

Charles R. Newman, W8SCT, 5974, Woodland Avenue, Portsmouth, Ohio, would like to correspond with British Isles amateurs.

A FIELD OPERATOR'S 'VADE MECUM'

PART IV.

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

This month, the characteristic Question and Answer lay-out of the series is varied, to permit the description of a very simple means of adapting A.C. mains equipment for emergency operation.

WHEN war broke out the writer decided that his communication receiver would have to be immediately adapted for alternative operation off a car battery. For one thing, interruption of the A.C. mains was very probable through bomb damage, for another, if land-line communication broke down, the receiver might have to be set up in the open. The car battery purchased was of the 6-volt, 100 ampere-hour type, and would supply the heater current, as well as operating a vibrator from which, by means of a transformer and self-rectifying contacts, a D.C. supply of some 250 volts, 60 milliamps would be obtained.

It was especially desired to make the very minimum of wiring changes to the receiver, and to avoid having to cut holes in the chassis and steel cabinet. The easiest way of connecting up the emergency supply appeared to be by means of a plug inserted in place of the rectifier valve, and sketches were made of various connections to see whether this could be done. The plan was seen to be perfectly feasible, and also offered the following advantages :—

1. It is applicable to almost any receiver, small transmitter, or speech amplifier, operated off A.C. mains.
2. Scarcely any re-wiring of the circuit is involved.
3. No additional components have to be fitted—therefore no difficulty will be experienced with a crowded chassis.
4. No cutting, whatever, of the chassis or cabinet is required, for mounting connector panels, or switches ; therefore no workshop facilities are entailed.
5. The change-over is extremely rapid—in fact when the mains fail, the emergency supply can be plugged in almost before the heaters have lost their glow.
6. Connection being by means of a plug, avoids fumbling with screw terminal connections, etc., in the dark.
7. No damage can result if the receiver is accidentally connected to the restored mains supply while working off the emergency supply.

Circuit Wiring

As an example, assume that the receiver is fitted with, say, a 5Y4G rectifier. The rectifier socket of the chassis will be of the octal type (four-pin types will be dealt with later), and it will be seen that only four of the eight contacts are employed, namely contacts Nos. 3, 5, 7 and 8. Thus, we have four contacts left, which we can employ for our emergency supply connections. The wiring is as follows :—

(*a*) Break the lead from the non-earthed side of the heaters to the heater winding of the mains transformer.

(*b*) Connect the ends to contacts 1 and 2 of the rectifier socket.

(*c*) Connect contact 4 of the socket to earth (chassis).

(*d*) Join pins 1 and 2 *on the rectifier valve itself*, not on the socket.

This completes the alterations.

Operation

When the rectifier valve is inserted, the circuit is exactly as originally wired.

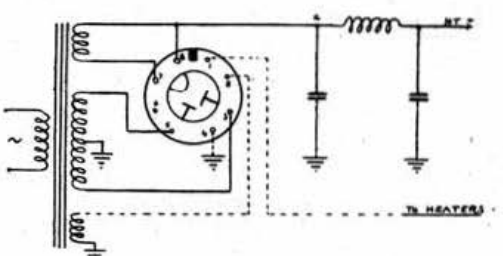
For emergency operation, the leads from the emergency supply are taken to an octal plug, LT + to pin 1 of the plug, LT − and HT − to pin 4, and HT + to pin 8. Insertion of this plug in place of the rectifier, automatically connects the supply to the appropriate points, and disconnects the heater winding of the mains transformer from the heaters. This winding would otherwise act as a virtual short circuit across the LT battery.

It will be seen that this system of connection can be used with any type of rectifier fitted with an octal base. Not all octal base rectifiers have the same connections as the 5Y4G (shown as an example), but the change in wiring can be sketched out in a few moments.

Difficulty arises with 4-pin sockets, as means cannot be provided for automatically disconnecting the heater winding from the heaters. It is, however, a simple matter to replace the 4-pin socket by an octal type, and either fit an octal base to the rectifier, or else to use a 4-pin-to-octal adaptor, which can readily be made from an octal base off a burnt-out valve.

As the system is applicable to a very wide range of equipment, a few additional comments may be of assistance.

Where an energised loudspeaker is employed, it may not be economical to operate this from the vibrator (or HT battery if this be used). In such cases, connect the HT + lead from the emergency supply to pin 6 of the plug, instead of to pin 8, and connect contact 6 of the socket *via* a 20 H. 250 ohm choke to the far end of the speaker field winding, at the point marked "b." The speaker field will no longer be energised, but reproduction will continue, due to residual magnetism, though at reduced volume. Alternatively, use a permanent magnet speaker when



Dotted lines indicate the only additional wiring required. The diagram is drawn for type 5X4G and 5Y4G rectifiers.

operating from the emergency supply, but it will still be necessary to cut out the field winding of the energised speaker to economise in the emergency HT supply.

In some receivers, bias is obtained by means of a resistor between HT − and LT − (chassis). In this case, it is not possible to use a common lead for these two connections, and pin 6 of the plug and contact 6 of the socket can be used for the HT − connection.

If contact 6 be not required for either of these purposes, rather than leave it idle, it is suggested that an extra lead be run from LT + to pin 6 of the plug, and contact 6 of the socket be joined to contact 1. There will thus be two leads in parallel for LT + and the drop of voltage between battery and heaters will consequently be minimised.

If it is found that the stand-by switch of the receiver is inoperative on the emergency supply, slight re-wiring and use of contact 6 will readily bring it into circuit again.

It will be seen that the change in wiring is so slight that there can be no possibility of impairing the performance of even the most advanced types of communication receiver. In addition, there is the great advantage that first-rate equipment can immediately be set up in the open should bomb damage to station or land-lines necessitate this. A car battery is a source of supply that will always be available, even in remote country districts, and the rugged construction allows them to be recharged at 20 amps or so in an emergency.

Apart from communication receivers and small transmitters, speech amplifiers can equally well be adapted for mobile use in directing traffic, evacuation and other needs.

The W3EDP Once Again

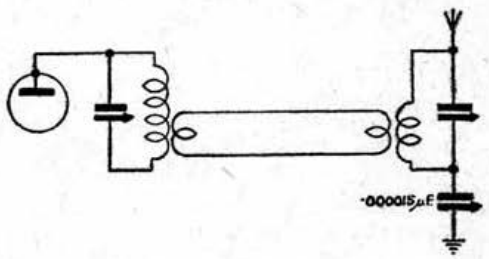
JUDGING by recent articles published in this Journal interest in that eternal enigma "Why does the W3EDP work?" has not relaxed. The writer offers a few notes on the subject gleaned during a twelve-months test on modifications of the aerial made by G6NA.

Preliminary tests were carried out (using the dimensions specified by W3EDP) with an aerial erected—thanks to the efforts of G6NK—in an E.–W. direction at a height of 40 ft. As such it performed quite well on all bands up to and including 56Mc.

The Counterpoise.—A disadvantage experienced in a small shack was the inconvenience in rapid band changing owing to the different counterpoise lengths. This problem was tackled by the simple expedient of cutting out the counterpoise altogether and substituting in its place a small capacity to earth. A value of 15 μμF. was found to be correct for 7 and 14 Mc. operation whilst the aerial coil and condenser were kept at their original values. Performance was comparable with that using the counterpoise.

Link Coupling.—Link coupling worked well in spite of heavy link losses. It appeared that a slight capacity coupling was needed to give the same characteristics as when the aerial was coupled directly to the plate tank. Using a single-ended P.A. this was effected by not earthing the link and winding it around the middle of the aerial coil and to one end of the plate tank coil, as shown in the sketch.

Summing up—the combination of link coupling, and the substitution of a small capacity to earth for the counterpoise, is a convenient method of keeping the radiating section of a W3EDP out in the clear. Incidentally it was found that the length of the "top" was not important, for almost any length of



A modified arrangement of W3EDP Aerial using link coupling not connected to earth.

wire could be induced to match-up and work in the same way as the W3EDP.

Having reduced this aerial from its "magic" dimensions to "any old length" it was decided that the subject had been pursued to a fitting conclusion and the records of the tests were ended with this observation: "As an aerial it is an atrocity, but as a ham proposition for a restricted space it is F.B."

G5WP.

"Electronic Engineering"

Commencing with the June issue, the title of the Hulton Press publication known as *Electronics & Television* " was changed to *Electronic Engineering.*" Of more personal interest is the fact that Mr. Geoffrey Parr, recently of *Ediswan Electric Co.*, has accepted the editorship. Mr. Parr has, on many occasions, rendered yeoman service to the R.S.G.B., especially as a lecturer at London and Provincial

Geoffrey Parr assumes the Editorship of "Electronic Engineering." He is also Lecture Secretary to the Television Society.

meetings, whilst his witty speeches at Convention dinners, will be remembered by many members.

Electronic Engineering is the only British journal to cover every application of thermionic valves. Additionally it gives details of all new technical developments in the field of Short Wave Communication. As from the June issue Technical Data Sheets are to be issued monthly for the use of designers of radio and allied apparatus.

In offering our congratulations to Mr. Parr we wish him and his new venture every success.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MATHEMATICS FOR THE RADIO AMATEUR

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

PART VIII.—FORMULÆ AND EQUATIONS.

Formulæ

A FORMULA is a general statement of an invariable rule or law. Being stated in algebraic symbols it is a rule in condensed form, and, being general, it is true for all values of the variable quantities.

One of the most common formulæ is " $A = \pi R^2$." In words, this reads " To find the area of a circle, multiply the radius of the circle by itself, and multiply this product by π (which equals $3\frac{1}{7}$, or 3·14, or 3·142, or 3·1416, in increasing order of accuracy). This formula then gives the area of a circle whatever the value of the radius R.

It should be noted that this formula can be transposed into $R^2 = \frac{A}{\pi}$ or $R = \sqrt{\frac{A}{\pi}}$, enabling one to find the radius corresponding to a given area of circle.

This is, of course a simple example, yet most formulæ which the reader will wish to use can be evaluated quite as easily by observing a few points in algebraic method. The following notes on notation, transposition, etc., are for those requiring to revise their algebra, or for those being introduced to the subject.

Notation and Evaluation.

The following should be noted :—

1. ab means " a × b "; LC means " L × C."
   E.g. If L = 5, C = 9,
   LC is not 59, but 5 × 9 = 45.

2. a + b means " To a add b, or vice-versa."
   3a + b means " To 3 times a, add b."
   3(a + b) means " Add a to b, and multiply the sum by 3."

   E.g. If a = 6, b = 4,
   (i) a + b = 6 + 4 = 10.
   (ii) 3a + b = (3 × 6) + 4 = 22.
   (iii) 3(a + b) = 3 × (6 + 4) = 3 × 10 = 30.

3. a + b^2 means " To a, add the square of b."
   $(a + b)^2$ means " Add a to b, and square the sum."
   ab^2 means " Multiply a by the square of b."
   $(ab)^2$ means " Multiply a and b together, and square the result."

   E.g. If a = 6, b = 4,
   (i) $a + b^2 = 6 + 4^2 = 6 + 16 = 22$.
   (ii) $(a + b)^2 = (6 + 4)^2 = 10^2 = 100$.
   (iii) $ab^2 = 6 \times 4^2 = 6 \times 16 = 96$.
   (iv) $(ab)^2 = (6 \times 4)^2 = 24^2 = 576$.

Thus, whatever the formula being evaluated, one substitutes the known values and performs the calculations according to the algebraic meaning of the symbols.

Examples :—

(1) $P = I^2R$ (wattage dissipation)
If I = ½A, R = 2000 Ω,
$P = (\frac{1}{2})^2 \times 2000 = \frac{1}{4} \times 2000 = 500$W.

(2) $Z = \sqrt{R^2 + (\omega L)^2}$ (impedance of inductance)
If R = 10 Ω, L = 0·01H, ω = 300 radians /sec.
$Z = \sqrt{10^2 + (300 \times 0{\cdot}01)^2} = \sqrt{100 + 3^2}$
$= \sqrt{109} = 10{\cdot}44\ \Omega$.

(3) $N = 10 \log \frac{P_2}{P_1}$ (decibel gain)
If P_2 = 4W, P_1 = 200mW,
$N = 10 \log \frac{4}{0{\cdot}2} = 10 \log 20 = 10 \times 1{\cdot}3010$
$= 13{\cdot}01$ dB.

(4) $R_s = \frac{E}{I_M} - R_M$ (mA-meter as voltmeter)
If E = 6V, I = 0·5 mA, R_M = 50 Ω,
$R_s = \frac{6}{0{\cdot}0005} - 50 = 12000 - 50$
$= 11950\ \Omega$.

Equations

When, in a formula, the values of all the symbols except one are known and substituted in the formula, an equation is obtained with one unknown quantity, which has then to be determined.

If the resulting equation is of the form x = a + b, the solution is obvious. Frequently such a simple state of affairs is not found. One may have to determine the value of the unknown x from equations such as $\frac{1}{x+2} = \frac{3}{x}$, $27 = \sqrt{10 + x}$, etc. Even then such simple (*i.e.* with only one unknown quantity) equations are solvable by following certain well-defined methods and rules.

The initial aim is to collect all terms containing the unknown together. This quantity, that which is to be found, is usually expressed in general examples by the symbol x; and the solver has to collect all terms containing x on one side of the equation, leaving all other values on the other side. By custom, and as a help in setting down, though not really essential, the terms containing the unknown are collected together on the left-hand side of the equation.

In the following analysis, LHS and RHS mean " left-hand side " and " right-hand side " respectively.

Negative Numbers

The consideration of negative numbers is inherent in algebraic work. The rules previously given should be revised, and it will be necessary to elaborate, in two points, previous notes.

The series of numbers

5, 4, 3, 2, 1, 0

is such that each number is 1 less than the preceding one. To continue the series beyond 0 we write down

−1, −2, −3, −4, etc.,

-1 being 0 -1, -2 being -1 -1, etc.

It will be seen from this definition of a negative number that $+4 + (-4) = 0$, $-3x + (+3x) = 0$, etc.

Transposition of Terms

Consider the obviously true statement

$$3 = \frac{12}{4}$$

It can be seen that the following statements are also as clearly true :—

$$3 + 5 = \frac{12}{4} + 5$$

$$3 - 2 = \frac{12}{4} - 2$$

$$3 \times 4 = \frac{12}{4} \times 4$$

$$3 \div 12 = \frac{12}{4} \div 12$$

In exactly the same way, if we have the equation $x = y$ (x and y in any form), then

(i) $x + a = y + a$

(ii) $x - b = y - b$

(iii) $nx = ny$ (remember $nx = n \times x$)

(iv) $\frac{x}{m} = \frac{y}{m}$

where a, b, n, m are any numbers whatever, except that in (iii) and (iv) n and m cannot $= 0$.

To put this into words :—*" In any equation, any quantity may be added to, or subtracted from either side if it is also added to, or subtracted from the other : and either side may be multiplied, or divided by any quantity except zero, provided that the other side is also multiplied, or divided by that quantity."*

From these basic rules we can obtain a more condensed rule for the treatment of equations.

Consider the equations :—

(*a*) $x + 4 = 6$; (*b*) $3x = 3 - x$.

To solve (*a*) it is necessary to remove the $+4$ from the LHS.

Now $+4 + (-4) = 0$.
Hence, by rule (ii), if $x + 4 = 6$
$x + 4 - 4 = 6 - 4$
i.e. $x = 6 - 4$.

In (*b*) it is necessary to remove the $-x$ from the RHS.

Now $-x + x = 0$.
Hence, by rule (i), if $3x = 3 - x$
$3x + x = 3 - x + x$
i.e. $3x + x = 3$.

What has been the net result of this operation of adding in (*b*) and subtracting in (*a*) equal quantities on each side of the equation ? It is seen that in (*a*), $+4$ on the LHS has vanished and given -4 on RHS. In (*b*), $-x$ on RHS vanished and gave $+x$ on LHS. That is, the quantities have been transposed from one side to the other and in doing so the signs have changed.

Hence : **Rule I.**—*A term in an equation may be transposed from one side to the other by changing its sign.*

Consider also the equations :—

(*c*) $\frac{x}{4} = 5$ $\left(x \times \frac{1}{4} = 5\right)$

(*d*) $3 = \frac{6}{x}$ $\left(3 = 6 \times \frac{1}{x}\right)$

Applying rule (iii) to (*c*),

$$\frac{x}{4} \times \frac{4}{1} = 5 \times \frac{4}{1}$$

and cancelling just as in arithmetic,

$$\therefore x = 5 \times \frac{4}{1}$$

Applying rule (iv) to (*d*),

i.e. $3 \times \frac{x}{1} = 6 \times \frac{1}{x} \times \frac{x}{1}$

$$3 \times \frac{x}{1} = 6$$

Here in (*c*), the *factor* $\frac{1}{4}$ on LHS becomes $\frac{4}{1}$ on RHS ; and in (*d*) $\frac{1}{x}$ on RHS becomes $\frac{x}{1}$ on LHS.

Hence : **Rule II.**—*A factor in an equation may be transposed from one side to the other by inverting it.*

These rules are equally applicable to the transposition of formulæ. Thus, by applying Rule II to the formula $E = IR$, one obtains $\frac{E}{R} = I$, or $\frac{E}{I} = R$.

Cross-multiplying

Clearly $\frac{6}{9} = \frac{2}{3}$; and also $6 \times 3 = 2 \times 9$.

This is a simple illustration of the general rule for cross-multiplying,

that if $\frac{a}{b} = \frac{c}{d}$

then $a \times d = b \times c$.

This is really a development of Rule II, but is a form which frequently is useful.

Eliminating Radicals

If $\sqrt{x} = 7$,

then $(\sqrt{x})^2 = 7^2$

i.e. $x = 49$.

And generally, if $\sqrt{x} = a + b$, the radical sign is eliminated by squaring each side of the equation.

Hence, $(\sqrt{x})^2 = (a + b)^2$

i.e. $x = (a + b)^2$, and this is a better form.

Fractions in Algebra

It is frequently necessary to simplify an expression which has some terms in fractional form. There are two points worthy of note in this connection. Firstly, one must remember that a term such as $\frac{1}{a + b}$ does not, as many making their acquaintance with algebra imagine, permit of immediate simplification. In the same way one cannot cancel in expressions such as $\frac{x}{x + y}$, because the denominator $(x + y)$ is an entity standing for one value—that obtained when x and y are added together.

Just as in arithmetic, fractions in algebra can be simplified by bringing to a common denominator.

The fractions $\frac{1}{2} + \frac{1}{4}$ can be compounded into $\frac{2+1}{4} = \frac{3}{4}$, and so in the same manner $\frac{1}{x} + \frac{1}{y} = \frac{y}{xy} + \frac{x}{xy} = \frac{y+x}{xy}$. The reasoning is :—The simplest common multiple of x and y is xy ; x divides into xy y times, and so $\frac{1}{x} = \frac{y \times 1}{y \times x} = \frac{y}{xy}$; similarly y divides into xy x times, and so $\frac{1}{y} = \frac{x}{xy}$; etc.

Hence, as given on p. 141 of this volume,

$$\frac{1}{R_1} + \frac{1}{R_2} = \frac{R_1 + R_2}{R_1 R_2}.$$

This is often a more convenient form giving simplified arithmetical work, for

$$\frac{1}{\frac{1}{R_1} + \frac{1}{R_2}} = \frac{1}{\frac{R_1 + R_2}{R_1 R_2}} = \frac{R_1 R_2}{R_1 + R_2}.$$

Similarly,

$$\omega L - \frac{1}{\omega C} = \frac{\omega L \times \omega C - 1}{\omega C} = \frac{\omega^2 LC - 1}{\omega C}.$$

Quadratic Equations

A quadratic equation is one which contains the second power of the unknown quantity. *E.g.* $7x^2 = 15$; $3x^2 + 5x = 8$.

The solution of the type such as $7x^2 = 15$, where there is the second power only, is straightforward.

Thus $7x^2 = 15 \quad \therefore x^2 = \frac{15}{7}$ (Rule II)

$$\therefore x = \pm\sqrt{\frac{15}{7}}$$

and is evaluated by tables or logs.

Note on sign for square root :—

We have seen that when multiplying, like signs give a + sign in the product.

Hence $(+3) \times (+3) = +9$; $(-3) \times (-3) = +9$ $\therefore \sqrt{+9}$ may be either +3, or −3, since each of these when squared = +9.

This is true for all square roots ; hence we have the sign ± 3, read as " Plus or minus 3," indicating these two different roots. In most cases the negative value of the root is not required, but it is correct to state it.

The second type of quadratic equation such as $3x^2 + 5x = 8$, is solved by comparison with the standard equation

$$ax^2 + bx + c = 0$$

the solution of which is

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Comparing $3x^2 + 5x - 8 = 0$ with $ax^2 + bx + c = 0$, it is seen that a in the general equation = 3 in the one to be solved, b = 5, c = −8.

Substituting these values in the general solution,

$$x = \frac{-5 \pm \sqrt{5^2 - 4(3)(-8)}}{2 \times 3} = \frac{-5 \pm \sqrt{25 + 96}}{6}$$

$$= \frac{-5 \pm \sqrt{121}}{6} = \frac{-5 \pm 11}{6}$$

$\therefore$ Taking the + sign, $x = \frac{-5 + 11}{6} = \frac{6}{6} = 1$

taking the − sign, $x = \frac{-5 - 11}{6} = \frac{-16}{6} = -2\frac{2}{3}$.

$\therefore$ in the equation $3x^2 + 5x = 8$, there are two solutions : $x = 1$, or $-2\frac{2}{3}$.

Example 2 :—

Find the values of x which satisfy the equation $4x^2 + 16x + 15 = 0$.

Comparing with the general form,

$$a = 4, \; b = 16, \; c = 15.$$

$\therefore$ roots are given by $\frac{-16 \pm \sqrt{16^2 - 4(4)(15)}}{2 \times 4}$

i.e. $x = \frac{-16 \pm \sqrt{256 - 240}}{8} = \frac{-16 \pm \sqrt{16}}{8}$

$$= \frac{\pm 16 + 4}{8} \text{ or } \frac{-16 - 4}{8}$$

$$= \frac{-12}{8} \text{ or } \frac{-20}{8}$$

$$= -1\tfrac{1}{2} \text{ or } -2\tfrac{1}{2}.$$

Examples :—

In the following examples of re-arrangement and solution of equations, units will not be given, although the reader will recognise familiar formulæ.

(1) $I^2R = P$

Given $P = 100$, $I = \frac{1}{10}$; required R.

$$\left(\frac{1}{10}\right)^2 R = 100$$

$$\therefore R = \frac{100}{\left(\frac{1}{10}\right)^2} \text{ (Rule II)}$$

$$= 10000.$$

(2) $I^2R = P$

Given $R = 2000$, $P = 125$; required I.

$$I^2 \times 2000 = 125$$

$$\therefore I^2 = \frac{125}{2000} = \frac{1}{16} \text{ (Rule II)}$$

$$\therefore I = \sqrt{\frac{1}{16}}$$

$$= \frac{1}{4}$$

(3) $\sqrt{R^2 + (\omega L)^2} = Z$

Given $Z = 12$, $\omega L = 5$; required R.

$$\sqrt{R^2 + 5^2} = 12$$

$$\therefore (\sqrt{R^2 + 25})^2 = 12^2$$

$$R^2 + 25 = 144$$

$$\therefore R^2 = 144 - 25 \text{ (Rule I)}$$

$$= 119$$

$$\therefore R = \sqrt{119} = 10{\cdot}9.$$

(4) $R_s = \frac{E}{I_M} - R_M$

Given $R_s = 20000$, $E = 10$, $R_M = 100$; required I_M.

$$20000 = \frac{10}{I_M} - 100$$

$$\therefore 20100 = \frac{10}{I_M} \text{ (Rule I)}$$

$$\therefore I_M \times 20100 = 10 \text{ (Cross-multiplying)}$$

$$\therefore I_M = \frac{10}{20100} \text{ (Rule II)}$$

$$= \frac{1}{2010} \text{ or } 0{\cdot}000498.$$

(5) $$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$$

Given R = 10, R_1 = 15; required R_2.

$$\frac{1}{10} = \frac{1}{15} + \frac{1}{R_2}$$

$$\therefore \frac{1}{10} - \frac{1}{15} = \frac{1}{R_2} \text{ (Rule I)}$$

$$i.e. \frac{1}{R_2} = \frac{3-2}{30} = \frac{1}{30}$$

$$\therefore R_2 = 30 \text{ (Cross-multiplying).}$$

(6) $$f = \frac{10^6}{2\pi\sqrt{LC}}$$

Required a formula giving L in terms of f, and C.

$$f = \frac{10^6}{2\pi\sqrt{LC}}$$

$$\therefore f \times 2\pi\sqrt{LC} = 10^6 \text{ (Cross-multiplying)}$$

$$\therefore \sqrt{LC} = 10^6 \times \frac{1}{2\pi f} \text{ (Rule II)}$$

$$\therefore (\sqrt{LC})^2 = \left(\frac{10^6}{2\pi f}\right)^2$$

$$i.e. LC = \frac{10^{12}}{4\pi^2 f^2}$$

$$\therefore L = \frac{10^{12}}{4\pi^2 f^2} \times \frac{1}{C} \text{ (Rule II)}$$

$$= \frac{10^{12}}{4\pi^2 f^2 C}.$$

Suggested Exercises

The reader is again reminded of the need for much practice. Many simple equations can be constructed, solved by the rules given for transposition, etc., and the solutions checked. *E.g.* Having made up equations such as (1) $3x + 8 = 17$; (2) $6x - 5 = 2x + 3$; (3) $\frac{7x-1}{4} = 5$; (4) $\frac{3}{2x+1} = \frac{1}{5}$ they should be solved. Solutions will be found to be, for these, (1) $x = 3$; (2) $x = 2$; (3) $x = 3$; (4) $x = 7$. To check these solutions substitute the value found for x in first the LHS and then the RHS. If the solution found is correct, this substitution will give LHS = RHS. Thus, in No. (2) substituting 2 for x, we have LHS $= 6 \times 2 - 5 = 7$. For RHS we have $2 \times 2 + 3 = 7$. Hence, as LHS does equal RHS, $x = 2$ is correct.

Problems

(34) If a = 4, b = 2, c = 3, find the value of:
(*a*) abc; (*b*) $(2a + b) \times c$; (*c*) $c^2 + ab^2c$;
(*d*) $(a + b)^2 + (b + c)^2$; (*e*) $\frac{\sqrt{a^2 + c^2}}{a - b + c}$

(35) (*a*) Express as a formula, "The work (W) done in joules in a circuit equals the square of the applied E.M.F. (E), multiplied by the time in seconds (t), and divided by the resistance (R) of the circuit."
(*b*) Transpose this formula so as to give an expression for E in terms of R, W and t.
(*c*) Evaluate this formula if E = 10 V, t = 1 minute, and R = 50 ohms.

(36) (*a*) Express as a formula, "The current (I) in an inductive circuit is equal to the voltage (E) divided by 2π times the product of the frequency (f) in cycles and the inductance (L) in henrys."
(*b*) Transpose this formula to give (i) E in terms of π, f, L and I; (ii) L in terms of E, I, π and f.

(37) $\lambda = 1{\cdot}885\sqrt{LC}$. Transpose this formula to one giving L in terms of λ and C.

(38) Z = impedance, R = resistance, X = reactance. State in words, "$Z = \sqrt{R^2 + X^2}$."

(39) Find the value of x which satisfies each of the following equations. Check your results by substitution.

(*a*) $5x - 7 = 2x + 14$ (*b*) $\frac{\sqrt{x}}{4} = 3$

(*c*) $\frac{x}{x+1} = \frac{2}{5}$ (*d*) $\frac{1}{x} + 3 = \frac{11}{3}$

(*e*) $3x^2 - 8 = x^2 + 42$ (*f*) $x^2 - 9x + 14 = 0$.

Solution to Problems

(30) (*a*) 92·96; (*b*) 2·847; (*c*) 40·93.
(31) 7403 kc.
(32) 164·6 m.
(33) 13710 kc.

Editorial Note.—In view of the very wide interest which has been shown in these articles, the author has agreed to continue the series in the new volume, which commences with the July issue.

Air Training Corps

G6CL will be pleased to hear from any member who is assisting the Air Training Corps, with a view to publishing a list of names next month. Already some 50 members have communicated with him on the subject. When forwarding details, members are asked to quote their Squadron number and rank, if holding a commission in the R.A.F.V.R. (Training Branch).

Thanks are extended to all who responded to the recent appeal for components. Several squadrons have benefited considerably as a result of generous offers. Any member with an overflowing junk box and who would like to help on the work of training cadets, should communicate with G6CL. Do not send gear until requested.

News from British West Africa

Complete fade-outs on all short-wave channels occurred on the 27th and 28th February. The interruption on the 28th which lasted two hours, effected both 7 and 14 Mc. Signals slowly improved and assumed normal strength at 11.30 G.M.T.

ZD2H, who spends a lot of time with a receiver on the ham bands was pleased to have a visit and a long personal rag-chew with ZD2G, in spite of the fact that he seemed to spend most of his time in sleeping on the shack roof! BERS442 is in Nigeria, but news of his activities is scarce. ZD2KM has left the country. ZD4AA is probably fully engaged with the newly instituted Gold Coast broadcast service and 4AB likewise is concerned with commercial radio. Too busy to drop a line OM? ZD2H.

RANDOM . REFLECTIONS

By COMMENTATOR

THERE used to be an old adage, proverb, motto —call it what you will—the purport of which was to the effect that "unity is strength". "United we stand, divided we fall" sort of thing. If ever an example of the truth of this were wanted, surely we have seen it in the history of the smaller European countries during the last year or so. Had unity been their watch-word instead of neutrality, they might not now be suffering under the heel of the tyrant. Had they presented a "common front," they might have got what they wanted.

Individuals and groups of individuals can learn a lot by observing the results of policies adopted by countries, great or small. Violation of the axiom "unity is strength" has the same results for individuals and groups of individuals as it has for nations.

At the time of writing, there is a great song and dance going on in the radio mags. about the" Future of Amateur Radio." The resulting airing of views has brought to light several interesting points. It appears that some regard the R.S.G.B. as a kind of dictatorship anxious to gain members for its self-aggrandisement; hurling threats at those who choose to remain non-members. Others agree that as the R.S.G.B. has had, shall we say, a little experience in the handling of amateur radio affairs, the future might well be left in their hands. It appears too, that of pre-war amateurs some 80 per cent. were members of the Society. This may be a good proportion, but it does mean that a fifth of the transmitting amateurs in this country were not attached to the country's official radio organisation. They may not have been members for a number of reasons. They may have been unable to afford the subscription. They may have thought that they didn't get a good enough return for their money from the Society. They may have kept aloof because they did not approve of R.S.G.B. policy. Whatever the reason, it remains a fact that one in five amateur transmitting enthusiasts in this country had no official channel through which to express their opinions. For that surely is the *raison d'être* for the existence of the R.S.G.B. at all. It is, when all is said, nothing more nor nothing less than a body of like-minded individuals joined together by a common interest into a body which has been given official recognition and which through its officers and officials can work for those things most desired by the majority. The R.S.G.B. was not started by the "powers that be" as a sort of police force to keep amateurs in order. It was started by those amateurs themselves to look after their interests and to give them an official status, through which they could have dealings with other official bodies. It is, in fact, the fold into which the sheep gather to afford themselves shelter against the storms outside. It offers help and the protection of a common interest to all who wish to avail themselves of it.

Now it is perfectly obvious to everyone, except the leaders of certain small European states and those amateurs who prefer to keep out of the Society, that the more there are in the fold the better able will they be to defend themselves against all assailants. Also it would appear obvious that it is better to have one official body representing the wishes of the majority than a number of semi-official spokesmen all clamouring for the interests of various small minorities. If one or other minority feels they have something they very much want done, then their line of action should be to make enough "converts" from amongst the majority so that they can get their point carried when things are put to the vote; not just split away from the rest, crawl into a corner and snarl.

When this war is over, amateur radio is going to have some pretty stiff problems to solve. As with most problems, more than one solution will no doubt suggest itself in many cases. There will be some who will favour one solution. There will be others who will favour another. It is going to be chaos if the champions of one side spend all their energies shouting down those of the other. It is obviously desirable that these problems should be handled by those best qualified by experience and sound judgment. The officials of the R.S.G.B. are all men who can lay claim to such qualities. They have had personal experience of amateur radio matters and they have all served the fraternity well. They have proved that their judgment can be relied upon. If you don't think so, you can always voice your disapproval in the correspondence columns of this Journal and you can make sure that when the next elections come along you do vote instead of just ignoring your privilege.

"Yes, that's all very well," I can hear you saying. "What's the use of you writing stuff like this in the Journal?" "We're all members of the R.S.G.B. Its the chaps who're not members who you ought to be writing at, not us."

Well, that's where you are wrong. It is you who are going to influence those potential members to join us and throw in their weight with the rest of organised amateur activity in this country. Just recently, whilst on my way back to the Midlands from London, I sat next to a Service "sparks" in the train. I happened to be reading the Handbook—having just purchased the latest edition—and I noticed him eyeing it inquisitively. So I passed it over. Learnt he'd been keen on transmitting before the war. Had in fact been a "pirate" on and off. Was certainly going to take up amateur transmitting as a hobby after this show is over. He'd heard of the R.S.G.B., but wasn't sure about it. Said he and his pal had been contemplating joining. Definitely decided he would join now after what I'd told him. Would get a copy of the Handbook at the same time.

This sort of chance to get new members will come your way sooner or later. And remember, the Society does not want new members just for the sake of their subscriptions nor for the thrill of having a big membership roll. They want to get all those interested in amateur radio together in one fraternity so that they can present a strong representative united front; strong enough and representative enough to take in all the views and interests of all those who wish to engage in this fascinating hobby of ours. Such a united front can easily overcome any of the difficulties amateur radio is likely to meet in the future years to come.

Unity is strength and there is safety in numbers!

EXPERIMENTAL SECTION

CONTINUING our earlier notes on the design of Signal Generators,* it is proposed now to discuss the advantages of using an aperiodic amplifier between the oscillator and the attenuator. The chief disadvantages of the circuits so far described are (1) frequency modulation; (2) variations in frequency, caused by the attenuator; and (3) lack of stability. All of these defects may be considerably reduced by introducing an aperiodic amplifier. The requirements of such an amplifier are, however, different from those of an amplifier used in transmitters and receivers. In the former case the amplifier is usually required to give the maximum output possible for a given input, a point which often leads to over-running the valve. In the case of receivers, we are mainly interested in obtaining maximum stage gain with a minimum increase in noise level. With signal generators we are not *primarily* interested in power output, stage gain, or noise level, because the amplifier is, in the first place, an isolating stage whose main duty it is to see that variations in load are not reflected back into the oscillator.

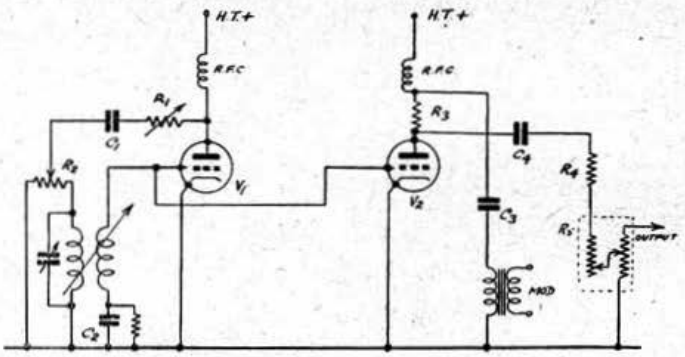


	Fig. 1.
C1, 2, 3, 4	·01 μF.
R1	50,000 ohms variable
R2, 3	100,000 ,, ,,
R4	1,000 ,,
R5	50,000 ,, per section.
V1, V2	76 or 6C5 Valves.

Fig. 1 shows a stabilised oscillator driving a triode amplifier. There are three main points about the circuit which call for some comment. Firstly, it is the anode coil, not the grid coil, which is tuned; theoretically, the circuit will give greater frequency stability with variations in power supply voltage than the conventional system. The other two points of interest are the resistances R_1 and R_2 which control harmonic distortion (and therefore stability), and the feedback voltage amplitude respectively. It will be noticed that the amplifier in Fig. 1 is driven at about three-quarters of its rated plate current to ensure that it is not overworked.

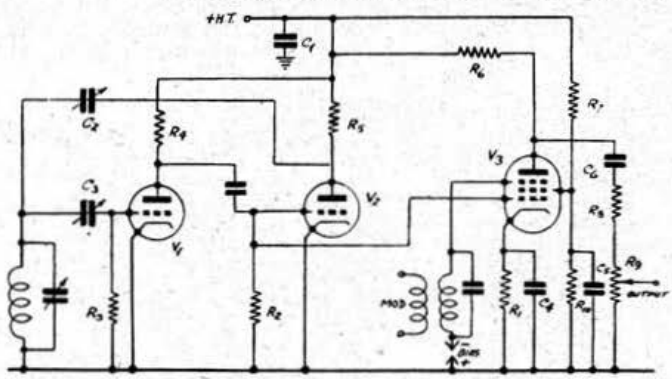


	Fig. 2.
C1, 5, 6	·01 μF.
C2, 3	0-6 μμF, variable.
C4	·0001 μF.
R1	1,000 ohms
R2, 4 5, 6, 9, 10	50,000 ,,
R3, 7	75,000 ,,
R8	5,000 ,,
V1, V2	6C5

Fig. 2 shows a Franklin oscillator† driving a pentode amplifier which is suppressor grid modulated. The resistance R_1 is used as potentiometer, so that the drive to the amplifier can be reduced to the absolute minimum necessary to give the required output. When finally adjusted this control should not be touched, the output being regulated from the grid circuit of the oscillator; consequently very little power is taken from the oscillator itself.

At first sight it would seem that a suitable amplifier could be built up from any old valve and pieces of apparatus from the junk box. But this is not the case. The fact that it is necessary to introduce an extra valve enables us to make use of a feature which is normally considered a nuisance: namely, that the stability of most oscillators is inversely proportional to the power taken from the circuit. Thus, by designing an efficient amplifier it is possible to reduce the load on the oscillator considerably and still obtain the same output. The problem resolves itself, then, into designing an amplifier with good stage gain and driving it from an oscillator which is so loosely coupled to the amplifier that the maximum output is just sufficient and no more. The amplifying valve should be run

* THE T. & R. BULLETIN, *Vol.* 16: *February, page* 255; *March, page* 291; *May, page* 368.

† *See "Franklin Master Oscillator in Amateur Transmission," by E. L. Gardiner:* THE T. & R. BULLETIN, *July*, 1939.

by the attenuator R_2. It is unwise to switch the suppressor grid lead when changing over from modulated to plain carrier, as is done in suppressor grid modulated transmitters, because this may cause variations in gain. The modulator should be left permanently connected and a switch inserted in the modulator H.T. supply.

Either of the two circuits referred to can form the basis of a useful and accurate instrument capable of a high standard of performance and certainly sufficient for nearly all amateur requirements. Care in construction and adjustment is necessary if the best results are to be obtained. It must also be realised that except when certain special devices are used, such as crystal control, circuits are not automatically stable but require adjusting. A badly operated Franklin or Dow oscillator can cause more trouble than a correctly adjusted T.N.T. circuit. The important point to remember is that these stabilised circuits are capable of greater stability, but unless their peculiarities are carefully studied and their operation correctly adjusted, no special advantage is to be had by using them. G5HF.

Cosmic Notes

Certain weekly data has not been received. The periods in question are indicated below.

Magnetic Conditions ; February 15 to 21, mild storm 15th, moderate storm 21st ; no data February 22 to March 7 ; March 8 to 14, moderate storm 14th ; no data March 15 to 21 ; March 22 to 28, moderate storms 22nd, 23rd and 28th ; March 29, 30 and 31 moderate storm ; no data April 5 to 11 ; April 12 to 18 fairly quiet.

Ionosphere Storms ; March 7, 8 and 9, moderate to severe storm ; March 29/30, mild storm ; March 30, 31, April 1, 2, 3, 4, 5, severe storm (lasting seven days) ; April 7/8, mild storm ; April 19, moderate storm. No data for February 26 to March 4, March 12 to 26, April 9 to 15.

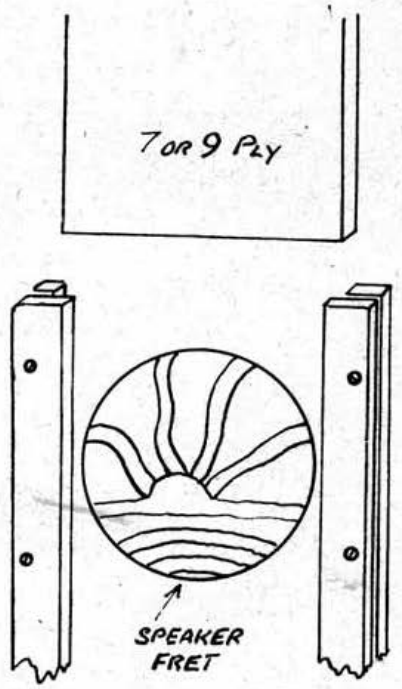
Critical Frequencies and virtual heights, at Washington, average for weeks ending, midnight F, midday E and F2 respectively (no data for weeks as indicated for ionosphere storms) :—February 26, 3·28 Mc. 297 km ; 3·18 Mc. 121 km. ; 9·16 Mc. 274 km. ; March 11, 3·33 Mc. 312 km. ; 3·25 Mc. 121 km. ; 7·17 Mc. 303 km. ; April 1, 3·83 Mc. 306 km. ; 3·3 Mc. 120 km. ; 6·53 Mc. 355 km. ; April 8, 3·21 Mc. 319 km. ; 3·39 Mc. 121 km. ; 6·24 Mc. 344 km. ; April 22, 4·36 Mc. 296 km ; 3·4 Mc. 120 km. ; 6·32 Mc. 412 km.

G6DH.

Protecting Loudspeakers from Blast

During recent air raids it has been found that loudspeakers are very sensitive to the effects of blast from bombs. In most cases they will stand the compression but the vacuum effect which follows immediately, is liable to pull the cone right out of position. In many instruments the speech coil has been pulled out with the cone and the spider torn off. The larger types of speaker with large baffles (such as are used in radiograms) are specially sensitive to this sucking effect, and even although windows in the house are not broken, the speaker may be damaged by blast coming through an open door or window.

One simple way to afford some protection is to fit a sliding panel of 7 or 9 ply wood in front of the fret. The sliding channels should also be made of 7 or 9 ply and the panel should fit up close against the cabinet and the channel so that there is very little "play."



The accompanying diagram shows a simple arrangement which will protect an instrument from all but exceptionally strong blast.

BRS3675.

G6UN's Home Bombed

The many friends of our Past President, Mr. Arthur Watts (G6UN), will learn with regret that his home suffered severe damage during an air raid on London last month. We are happy to record, however, that both he and Mrs. Watts escaped injury, and they ask that their thanks be conveyed to all members who have written or telephoned to make enquiries.

* * *

Mr. W. H. Windle, G8VG, has again been bombed out from his home in Plymouth. He is at present staying at Higher Compton, but letters should be sent *via* 3, Stephen Street, Taunton. Fortunately he escaped injury.

Ham Coincidence

G. V. Haylock, 2DHV (R.C. of S.), had a unique experience the other day. He espied an army No. 18 set on the promenade of a town somewhere in England, working in connection with War Weapons Week. After speaking on the set, he found at the other end of the line Sgt. G. L. Fish, 2BIP, of Hull. They enjoyed a pukka ham QSO before meeting later in person.

KHAKI AND BLUE

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

Writing from the Cadet College, Bangalore, India, Pat Frazer, G8ST, tells us he has settled down after a very interesting trip. On the ship he contacted G3TG (a joint operator of GI3ZX), a British operator who held the call HB9AY in Switzerland, as he was a journalist, and an A.A. holder. Additionally he met a relative of Dave Mitchell, GW6AA. Letters should be sent c/o his agents, Messrs. Grindlay & Co., Bombay, as he may soon be leaving Bangalore.

* * *

Congrats to 2nd/Lt. Joe Bryden, 2BOL, who has been granted a commission in the R.A.O.C. after serving in the R.A. Joe, who was recently married, is now living near Bury, Lancs. He sends special greetings to G2MI, 2UJ, 5FN and all old friends in the Medway area.

* * *

Cpl. Denis Furzey, BRS3783, wishes to record his thanks to Norman Davis, G6TV and other members of the R.A.F.A.R.S., for the kind hospitality they extended to him whilst on a recent visit to No. 1 Signals School. Denis who has been recommended for a commission, is at present serving at a Yorkshire station under F./Lt. W. Dunn, G2LR, until recently a prominent Society member and guiding light at Cranwell.

* * *

A.C.2 J. Payton, G2JB, who is serving on the south coast with the R.A.F., asks us to state that his new home address is 257, West Barnes Lane, Raynes Park, S.W.20.

* * *

Sig. G. Haylock, 2DHV, 28, Longlands Road, Sidcup, wishes to contact G3FC and 3OW both of Bexley. He also sends greetings to Sig. Morris, whose photograph appeared in the March BULLETIN. Apparently they were both in the same unit but did not recognise one another as amateurs. G8SW and 2DXP are at present serving with 2DHV.

* * *

Congrats to P./O.'s Howard Brabrook, G5ZD, Bill Pope, G3HT, Bill Wadsworth, VE5ZM, and all other members who " made the grade " in the final exam. held last month at No. 1 S.S. Brabrook is in N. Ireland, Pope is with his old pal Phil Thorogood, G4KD, in N.W. Scotland, whilst Wadsworth is now back at the station in Essex at which he won his M.C. last October.

* * *

F./Lt. Ham Whyte, G6WY, is now C.S.O. London Balloon Group, and can be reached most evenings *via* his parent's telephone, Beckenham 1934.

* * *

Under date of March 16, 2nd/Lt. T. P. Douglas, GM3BA, R. Signals, wrote to report his arrival in Malaya. He was looking forward to " raising " some DX by pumping out " CQ DX 20 " on the horn of a commandeered taxi ! We hope he succeeded.

* * *

Sig. C. Sharratt, G4CJ, of Blackburn, is still brass pounding with the R. Signals, and occasionally, " hooks up " with G4FJ. G4CJ is at a south coast resort and hopes to meet some of the locals during the summer. He writes : " the Bull is greatly looked forward to, and is the only remaining link between hams in this country, so keep it up !" We'll do our best OM !

* * *

A.C.2 J. H. Cant, G6FU, an enthusiastic pre-war 56 Mc experimenter is now a member of the famous " ZQ party." He is very keen to recommence his barometric studies and offers to reorganise the " Barometric Group " of E.S. Letters should be sent *via* his home address, 7, Elthruda Road, Lewisham, S.E.13.

* * *

2nd/Lt. Jim Kirk, G6ZO, is now living at 15,North Parade, Leeds, although much of his time is spent in London. He has several amateurs in his unit including G2YO, 4FP and 2AMG. 2BPW recently left to join an O.C.T.U. He has met GM2WL, 2JK, 3TJ, 4DD, 4XP and 8DP in his travels and would like to contact any SP ham in England. He reminds us that he had 120 QSO's with Poland in the last P.Z.K DX Contest. Happy Days !

* * *

From Gib. comes the news that Sgt. Adams, G5NM, Cpl. Viney, G5VD and Cpl. Pittock, 2CDB, are stationed there with the R.A.F. They hope to meet other hams during their stay. All three can be reached *via* R.A.F. Headquarters.

* * *

Lt. Jack Drudge-Coates, VU2FO ex-G2DC, is now living at 40, The Mall, Mhow, Central India, at which address he and Mrs. 2FO extend warm hospitality to any amateur located in that part of India. Jack reports meeting G4YN and 8VT and tells us that his neighbour is VU2KK. They have recently erected a pair of 45' sticks in KK's compound, and have been busy with the construction of frequency measuring instruments. VU2FO sends his greetings to all British Isles friends and especially to those from Districts 1 and 7 who are on active service.

* * *

Chas. Kirk, G4CL, ex ZB2A, is anxious to hear from Harry Waddington, operator of ZB2B. Letters to Gib remain unanswered.

* * *

L.A.C. J. G. Wardhaugh, G4LA, reports that an enjoyable meeting was held recently with VE1ER, 4OS, G2IK, 3YQ, 4HJ, 2FCJ, BRS4145 and himself present, under the lead of our Vice President, Capt. G. C. Price, GW2OP. Any member who finds himself in the District should write to 2OP at the National Provincial Bank, Pembroke Dock, with a view to participating in future meetings. VE4XM has just joined G3YQ, 4HJ and 2FCJ.

* * *

G6CL has been pleased to welcome to Headquarters L.A.C. Ted Fowler, VE5VO and L.A.C. P. D. Loosen, VE1KQ. The former had personal QSO's with G5FA (Ted gave him his first VE5 contact on 7 Mc. way back) and 8TY, whilst landline contacts were made with G6CJ and 2IM, both of whom had worked VE5VO. Ted, who was a broadcast engineer prior to volunteering for service in the R.C.A.F., has been a member of R.S.G.B.

for several years. He is, or was, at the time of writing, at No. 1 S.S. VE1KQ, although not a DX operator, had many interesting yarns to tell. He is a close friend of Fred Saxon, VE3SG, who has done so much to bring about a close liaison between the VE Operators' Association and R.S.G.B. We cannot help thinking that many other VEs now in England could follow the good example set by 1KQ and 5VO by "clocking in" at H.Q.

* * *

Friends of Lt. R. H. N. Johnston, G2ZN, will be glad to hear that, when he wrote from H.M.S. *Nubian* on March 17, he was fit and well. He sends greetings to those who remember him.

* * *

A. Squires, 2CDG, and R. T. Henley, 2CMH, who have just been promoted corporals in the R.A.F., report having met VE5AAG (Vancouver) and VP5AF (Jamaica). 2CDG sends 73 to G4HK.

* * *

Cpl. J. T. Parker, BRS3890, whose home address is 94 Grasmere Road, Handsworth, Birmingham, advises us *via* 2FDR that G3ZK (Halifax) and 5MY (Leicester) are serving with him as radio mechanics in the R.A.F. They are on the look-out for G3VN. Parker sends 73 to all old friends in Birmingham.

* * *

Friends of R. M. Bangay, G3DW, will be interested to hear of his promotion to Squadron Leader. He is at present in Saskatchewan, Canada, where he has met most of the local amateurs in and around Moose Jaw. Contact was established *via* the City B.C. station, whose chief operator is a VE ham. The Moose Jaw Club, about 25 strong, holds regular meetings, with VE4JU as the leading light. Very few Gs have been worked from that part of VE4, and little is known of R.S.G.B. or B.E.R.U., although, according to 3DW, the Handbook and BULL. were eagerly examined when he took copies along to a meeting. Those who wish to write to Sq./Ldr. Bangay should note that his address is c/o. H.Q., R.C.A.F., Ottawa.

* * *

Sig. H. J. Smith, BRS3044, of 150 Wanstead Park Avenue, Manor Park, E.12, wishes to express his appreciation of the hospitality afforded to him by the Prestatyn group whilst serving in that part of the country. Mr. Smith receives our congrats. on his recent marriage.

* * *

Sgt. G. Barrett, G8IP, who is on duty with the R.A.F. in GI, laments the fact that he is not able to take part in the activities at GI6YM due to his present station being remote from Belfast. He mentions meeting GI5XY, however, in very strange circumstances. Whilst travelling by train through Whitehead he spotted three masts, giving the house in question a very "ham" appearance. In his excitement he said to his fellow traveller, a complete stranger, "Do you know whether the wireless amateur GI5ZY lives there?" The "stranger" leant across the carriage, tapped him on the knee with a copy of the BULL., saying, "You're right, old man—and I'm GI5XY!"

It sounds a tall story, especially as it's an Irish one, but we are assured that "our Mr. Smith" can confirm it.

G8IP's new home address is 3 The Gardens, Raydon, Near Hadleigh, Suffolk.

Capt. John Swinnerton, G2YS, R.C. of S., who is now located near Hitchin, reports that G2MX, 8CK, VU2FJ and a VE5 are serving in his unit. He would be glad to hear from G2LU and 5GR *via* his home address, 35 Friars Road, Coventry.

* * *

F./O. Phil Thorogood, G4KD (not G4KT, as given in a recent issue), would like to hear from Sgt. Frank Bell, G4JU, one-time Secretary of the Edgware Society.

* * *

Frank Adams, G2YN, who by the way is now a F./O., sends his greetings to Alan Mears, G8SM, and congrats. to P./O. J. M. S. Watson, G6CT, on his recent "elevation." Frank attended the recent Salisbury meetings and was glad to meet many old friends.

* * *

A.C.1 Derek Wintle, G4GG, after leaving No. 3 S.S., was lucky enough to be posted to a station in Essex, where some extremely modern gear is being operated. G6PK is his O./C. He sends greetings to all who shared life with him at No. 3 S.S.

Ham Gathering

Friday, July 4th, 1941

7 p.m., at

STONEHAVEN, HORNCASTLE ROAD

BOSTON, LINCS.

(HOME OF DR. GEE, G2UK)

Service members in the area specially welcome. It is hoped to make plans at the meeting for a Lincolnshire Combined Services Conventionette during August.

A.C.2 Fred Sutton, G3BN, in a letter to G2MI writes enthusiastically of the hearty welcome which was extended to him by the Belfast amateurs on his arrival in GI. He expresses regret at having just missed GW3CR (Cock Robin as he dubbed him over the air) at No. 1 S.S. and later in Northern Ireland. Among recent personal contacts was one with G5GN who gave him his premier QSO. He has also met G4FN to whom he sends 73. Fred would like to hear from old friends who should write *via* his home QRA, 29, Rossall Road, Rochdale, Lancs.

* * *

Sgt. J. D. Cameron, GM8CN, after a spell of duty in Ulster, is now serving at an R.A.F. station in Suffolk. He would like to meet Ipswich and Stowmarket members. Letters should be sent c/o. 92 St. Albans Road, Edinburgh, 9.

* * *

Lt. J. M. George, 2DBO, after nearly two years' active service in the R.C. of S., has transferred to R.A.O.C. He is now in Northern Ireland.

73.

G2HV (R.N.V.(W.)R.), to G3YY, 6CY, 6RM, 8AC, 2DFL, 2CIA, and all old friends of the R.N.V.(W.)R. and Brighton Radio Society.

* * *

G2QY (16 Latimer Gardens, Pinner), to G2AI, IM, 3HT, LT, VW, 4KD, 5CW, FG, QF, 6OT, PM, ZO.

* * *

G2VD and **G5NM** (R.A.F., Gibraltar), to G2HK, 2QY, 3GX, 5CW, 5ND, 5PJ, 6ZO, 8GC.

* * *

G3BW (R.N.V.(W.)R.), to G3HJ, 6JZ, 6WR, 8RZ, 2AUM and all other Cumberland members.

* * *

G3PR (19 Corbyn Road, Bordesley Grn E., Birmingham 9), to G3IV, 3OZ, 3SS, 3UP, 4FJ, GI5HU, 5ZY.

* * *

G4BW (High Beech, Whyteleafe Road, Caterham), to G2RX, 3FT, 3NA, 3PW, 3TV, 3YK, 3ZI, 4HW, GW3XW, 2ATB, 2FQQ, BRS3003.

* * *

G4BY (112 Clare Road, Tankerton), to G3GW, 3OJ, 4FI, 5CI, 6AB, 8CK, 2AAN, 2BIB and BRS1295.

* * *

G4GG (R.A.F.), to G2FZ, 3NR, 3PV, 4BS, 4GQ, 6PK, GW2XZ, 2ARA, 2CMR, 2DFS, 2FTP, BRS3855 and all other No. 3 S.S. friends.

* * *

G4KT (Blackburn), to G2GA, 2PB, 3LR, 3TU, 3WA, 4CJ, 5ZT, 6BH, 8NL, 8TD, 2AKK, ZD2H and all Blackburn members on active service.

* * *

GM4NR (6 McVicars Lane, Dundee), to GM2NQ, 3LU, 3KC, 5SC, 8CF, and all members of "C" and "H" Districts.

* * *

G5RL (R.A.F.), to G2NJ, 2PL, 2UQ, 2XV, 4AZ, 5BQ, 5JO, 5OV, 5RI, 6BS, 6FL, 6WA.

G6AN (Bridge House, Shefford, Beds.), G2GZ, 2JK, 2UX, 3CI, 3CU, 3ST, 5OX, 5PY, 5SH, 6HM, 6WY, 8TN.

* * *

G6LR (307 Hood House, Dolphin Square, S.W.1), to G2DL, 2JB, 2LR, 3AD, 5KH, 6BY, 6DT, 6QN, 8KZ, 8QH, GI5TK, and all South London friends.

* * *

G6ZO (R.C. of S.), to G2AI, 3GX, 3HT, 3YU, 5CW, 8AY, 8DR, 8DV, 8JR, 8HA, 8QM, GM3CG.

* * *

G8IP (R.A.F.), to G2ZY, 3QR, 4BR, 4CI, 4JF, 5LC, 5VB, 6GB, 6RS, 8HN, 8IX, 8RG, 8SM and GI5XY.

* * *

G8IL (16 Canadian Avenue, Salisbury), to G3HG, 4DC, 5IU, 8SB, 8ZD, 8GP, VK3HG, 3BM, 4EL, VP1WB, W2IXY, 7FS.

* * *

G8ST (Bangalore, India), to G2PU, 3CY, 6GR, 8DG, 8DR, 8FA, 8NS, 8PD, 8SY, 8TV, BRS2320.

* * *

2BKC (R.A.F.), G4QA, 5DS, 5GH, 6CG, 8FV, GM5YX, J6JJ and 6RV.

* * *

2DBO (R.A.O.C.), to G2JL, 2XX, 3RW, 6FO, 6UN, 6ZO, VK6CA, 6FL, 6HW, 6MN, ZL2BO.

* * *

2FAO (25 Pound Lane, Gorleston), to G2MN, 2XS, 3RK, 3RW, 3UT, 4BC, 5QO, 5WW, 6IH, 6QB, 2BIC and 2BXJ.

* * *

BRS3788 (R.A.F.), to G3CI, 3GW, 3HB, 2CSN, BRS4088 and 4090.

* * *

BRS3821 to G3RW, 3UC, 2HFK, BRS2999, 3468, 3766.

* * *

BRS4187 (R.N.), to G2PF, 2ZV, 3SU, 3VB, 3TH, GW3CF, G5CM, 6LK and BRS3536.

Silent Keys

Pilot Officer David White, 2CDA, has been reported killed with his crew while on operations against the enemy. Although only 20 years of age, he was an enthusiastic amateur and will be remembered as a keen member at the Bromley and District meetings. We offer our sympathies to his parents and relatives in their sad loss. G2NK.

* * *

We have to record, with deep regret, the death on May 14 of Mr. J. W. Clennett, G3KR, of Darlington, following an operation. Although Mr. Clennett did not take up amateur radio until fairly late in life, he was one of the Society's keenest members and had a reputation among his many friends of always completing a job thoroughly. In his early youth he was a choir boy at York Minster; later he spent several years as a sea-going engineer, visiting many parts of the world. He was 64 at the time of his death, which will be mourned by a large circle of amateur friends.

Our condolences are extended to his relatives. G8SN.

* * *

We also regret to announce the death by enemy action of Radio Officer G. W. Sands, G3DC, late of Salford, Lancs. Mr. Sands lost his life when his ship was torpedoed off the coast of Ireland last April.

Mr. Sands, whose call was well known prior to the war, had been a member since 1936. Sympathies are extended to his widow and relatives.

* * *

The death is also announced of Phil Sherriff, G5CJ, of Kendal, Westmorland. At the time of his death, brought about through septic poisoning Mr. Sherriff was employed as a civilian mechanic at an R.A.F. station in Yorkshire.

Our sympathies are extended to his relatives and friends.

ON ACTIVE SERVICE

TWENTY-FIRST LIST

WE publish below our twenty-first 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 May 29, 1941.

Rank and Name	Regiment or Branch	Pre-war Call or B.R.S.
L./Cpl. W. P. Air ...	R.C. of S. ...	2FWX
Lt. E. J. Allen... ...	R.N.V.R. ...	4202
Pte. J. D. Baker ...	R.A.O.C. ...	3766
L.A.C. R. J. Baker ...	R.A.F. ...	1875
Cpl. A. Baracz... ...	,, ...	SP3FB
Cpl. E. L. Beamer ...	,, ...	4184
A.C.2 S. Blunk ...	,, ...	4201
L./Bdr. N. Booth ...	R.A. ...	2DSF
A.C.2 A. Bradley ...	R.A.F. ...	2BVK
F./Sgt. D. Cameron ...	,, ...	2BKC
A.C.2 C. Chalkley ...	,, ...	4180
Cpl. J. P. Davidson ...	,, ...	3326
Cpl. H. E. Drew ...	,, ...	4183
F./Lt. J. S. Dykes ...	,, ...	GM5DK
A.C.2 A. Ellis	,, ...	2HFR
Cpl. F. E. Garner ...	,, ...	3791
A.C.2 L. N. Gilburt ...	,, ...	4225
Sgt. C. H. Gould ...	,, ...	2FQH
O/Tel. J. H. Hagerty*	R.N. ...	2AFY
A./A. H. C. Halahan ...	R.A.F. ...	4204
A.C.2 S. Hayler ...	,, ...	4199
A.C.1 A. J. Hayward ...	,, ...	4222
L./Cpl. B. Healey ...	R.C. of S. ...	4216
A.C.2 D. Hoult ...	R.A.F. ...	G4OO
A.C.2 F. G. Jones ...	,, ...	GW3CF
Cpl. A. A. Lamb ...	,, ...	4206
A.C.2 J. W. Massey ...	,, ...	2FYB
A.C.1 T. J. Parry ...	,, ...	2FKT
Spr. A. C. Peachey ...	R.E. ...	3794
A.C.2 J. E. Rand ...	R.A.F. ...	2FOX
A.C.2 A. J. Reynolds ...	,, ...	4194
A./Cpl. F. A. Russell ...	,, ...	4207
Cpl. E. M. Smith ...	,, ...	4192
L.A.C. W. O. Sturmey	,, ...	G8KL
A.C. J. T. Svoboda ...	,, ...	OK2NB
L./Bdr. F. J. W. Trollope	R.A. ...	4190
A.C.1 D. W. Tucker ...	R.A.F. ...	4188
Sgt. W. Vinicombe ...	,, ...	4208
O./Tel. J. L. White ...	R.N. ...	4213
A.C.2 R. M. Woolfenden	R.A.F. ...	4217
O./Tel. F. H. Wright ...	R.N. ...	4187

* *Non-member.*

Book Review

ELEMENTARY HANDBOOK FOR WIRELESS OPERATORS. By W. T. Crook. Published by Pitman, April, 1941; 100 pp.; Price 4s.

All who have had occasion to impart elementary radio principles to the layman, will agree with the author of this new *Pitman* publication that "the trained engineer is inevitably struck dumb when asked to explain in a few words how it works."

This book, in commendable style, *does* explain how it works, without delving too deeply into abstract theory.

Electrical principles are described in language which is as non-technical as the subject permits, whilst the chapter entitled "The Basis of Radio Communication" is noteworthy for the neat analogies between a mechanical vibrator system, and an electrical oscillatory circuit.

Valve principles are treated rather briefly, perhaps a little *too* briefly in view of the fact that valves are the heart of every radio system, but the few pages devoted to their consideration are filled with essential facts.

The operation of transmitters is fairly well covered, although a little more space could, with advantage, have been assigned to the theory and operation of Crystal and Master Oscillator circuits.

An interesting feature of the chapter dealing with receivers, is the inclusion of a table explaining the function of each keyed component in a typical 3-valve circuit. A.T.C. instructors should find this information useful when considering Phase 18 of the Syllabus of Training for the Signals Trades.

Although Direction Finding is only touched upon briefly, it is of interest to note that the use of the C.R. tube is mentioned in connection with this important subject.

The author wisely devotes considerable space to a description of instruments, realising no doubt that every wireless operator should understand the theory of meters and their application to practical work. Power supplies too are well covered.

The illustrations are excellent throughout whilst the chapter on calculations should enable a reader to work out for himself any normal problem. The examples given to explain rules and formula are of a practical commonsense type.

Mr. Crook's new book receives full marks for having lived up to its title so fully. We predict large sales especially among those who now find themselves following a wireless trade in one of the three Services.

J. C.

Soft Valves

A valve is said to become "soft" when, instead of containing a negligible quantity of gas in a free state inside the bulb, some gas is freed. The term "soft" (now rather a misnomer) originated from the days of gas-filled valves, which commenced to pass current at a lower voltage when there was a considerable amount of gas in the valve. A radiograph at this lower voltage produced softer negatives on the film, and so the softness in vacuum devices is really a property of the photographic exposure.

G5HF.

THE MONTH "OFF" THE AIR—May, 1941

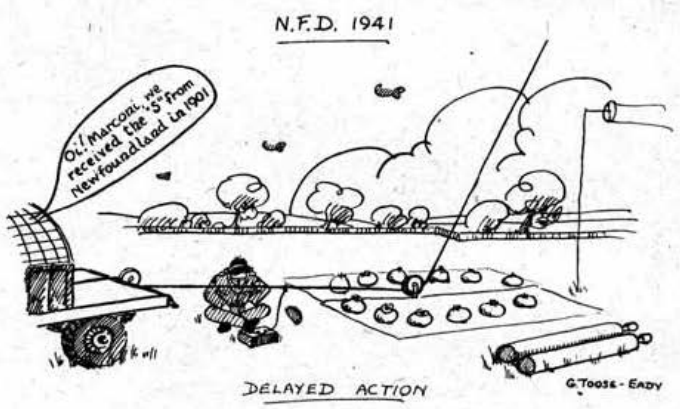
By A. O. MILNE (G2MI)

Notes and News

STAN. COOK, G5XB, who is engaged on civilian war work has, as his chief, one of Amateur Radio's best known pioneers, none other than Kenyon Secretan, the original G5LF, whom many old-timers will remember as "Sec seldom sleeps" of the famous BULLETIN advert. Sec. sends his 73 to all his old friends.

BRS3846 has been very industrious and produces a most comprehensive log. His observations are confined to 7 Mc., and here are some of the results. KA1AX, KA1LC (7220), K4DSE (7075), CM2AA, 8AL, 8AZ, PY1DY, 1UN, 1UR, 2KS, 2PW, 2UA, some sixty Russians, excepting U0 but including UK8IA (7186), U9ML, 9MR, 9QN, UK6AA and U6ST, W1–4 and W8, TF5C, YL1NR, 1FS, 2AP, and YU7AA.

Some of the really "choice ones" are HV1J, D2XX, ZC4BX, G1XX, G8P, TF5Y, LZ3AD, LZ5DM, PX1A, HB9R, LA5O, F3ZA, SM3AZ, SM7PC, XX9X and SX1AA. LY1J is apparently genuine. All this was done with an 0-V-1, 6SJ7-6C5 and an indoor aerial! He comments on the best times for DX. He gives his as: DX Russians, around 18.00 G.M.T.; West Indies and PY from 22.00 to midnight; and W's after midnight. Some of the good W's are 5DGB, 5JCR, 9CUO, VZO, KFT, MSQ, YXO. OK's, EA's and SM's are on the increase and OK3SL says he is near Prague. The KA's were heard one morning at 05.50 G.M.T.



With regard to the alleged LZ's and TF5Y, BRS3846 says they appear to be in a part of the world where A.C. is as abundant as filters are scarce. If they installed rectifiers, their signals might improve to a reasonable T1!

"GIXX" was heard to tell YU7AA, "I am under cover in G, Tx E.C.O., Rx Super." My own opinion, says 3846, is that he has found a way of coupling an aerial to a vacuum cleaner!—Under cover in G indeed!

Both U8IA and UK8IA have been heard and many Moscow stations are working UK0NG, but this station has not been heard yet.

ZC4BX evidently has a flair for originality, as he has been heard signing as TA4BX!

BRS4175, a new member in Bradford, is an invalid but is very keen. If any of our members in the locality could spare the time to drop in for a chat, he would be very pleased to see them. He is R. H. Alderson, 9 Hillside Villas, Otley Road, Bradford. He has a 0-V-2 receiver which consists of, what he calls, 4s. worth of junk, but which seems to work pretty well for all that.

G8UO reports one or two queer ones on 7 Mc. SM5CCX, LZ5DM, HB9F, LA5O, and OT8N. Others heard were CT1DC, EA1S, ES5L, HA6I, HA6O, SM5CF, OK3NR, YL2AB, U7EE and U6AE. EA1S gave his QRA as Madrid, and that of EA1AM as Bilbao.

BRS3607, who is still awaiting his call-up for the R.A.F., reports only a few W's on 14 Mc. but says Batavia still comes through very well at 14.00 B.S.T. on the 15 metre band. A new broadcaster is TGWB, heard at 23.00 B.S.T. on the 19 metre band, QRA unknown but, from the prefix, probably in Guatemala.

Ted Sutton, G3BN, now in Northern Ireland, sends his 73 to all his old pals, including the SWL's who sent him reports. He is very enthusiastic in his appreciation of the splendid hospitality extended to service members by the GI boys.

G8TL has met 6LB and his XYL recently, also 3OJ, all of whom are quite O.K. In answer to 3MD, he says that 8PC is still in Malta. 8SK called on him a few weeks ago and sends his 73 to 3MD. He is busy giving preliminary training to R.A.F. cadets. 2CKJ and 2CLH are both on war work. 2BRH is running low with his stock of junk but still carries on. 2XP is still in Bournemouth, although Ilford hams hope he won't settle there. He is far too useful, especially with his famous calibration service!

G4AB and a friend have been listening on 14 Mc. Some of the best are ZP1AA, 4AB, 5AC and 6AA, CP1AA, 2AC, 6XF, all on phone; also a station signing HUB de Sao Salvador, apparently an unlicensed YS phone. The best catch was KD4HHS, the successor to KD4GYM on Swan Island. 14,240, phone. HUB is on 14,140 kc. Beside the above, TG, TI, HH, HI, YV, OA, CE and HK have been heard on 14 Mc. Altogether, 83 countries have been logged since the beginning of the war. YV, CE, TI and TG have also been heard on 7 Mc.

2CGL has been doing a little listening on 14 Mc. and reports W5CSN and W5HSG. He says the Japanese broadcasters JZJ and JZK on 19 metres are coming over very well just now.

G3YY thinks that 7 Mc. is slowly deteriorating but he has managed to list the following rather motley collection: D2XX, EA1AM, HA1KM, I1TKM, OK3DT, NR, NZ, SL, HB9FC, 9F, LZ3UZ, SM5CF, and also these genuine amateurs, PY1KJ, 1DL, 2QO, W2KBH, 4VU, U9ML, MO, MP, MQ, UK8AI and U1AAI (note the three-letter

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IN THESE TIMES, in many directions needless to say, we are directing our main efforts and supplies towards the requirements of the Government Services.
However, some supplies of components are still available for Radio Servicing, but should delays occur we know our friends will appreciate the difficulties which at present arise from day to day.
We would point out that delays can be minimised and often avoided if alternatives are specified when ordering.
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call). He would very much like to know, "When does G4AB sleep?"

A new contributor, G3GX, gives a list of W's heard on 7 Mc., which is reproduced in full as it may be of interest to our friends in the United States: W1IDB, ECB, DVB, 2FMX, GZA, LKH, LQN, LRW, LSW, MPS, MWW, NQK, 3ADO, ALX, HPE, IPL, IXC, JAA, JBZ, JET, 4AKC, AKZ, CQR, EQQ, FP, FZN, RKZ, 5HEV, HKV, IGP, INV, 8DL, SRM, SSI, TEL, TVL, 9DWB, JNE, RDC, ROE, K4HSB, PY2QY, QZ, 4FI, and last but by no means least, a new one on all of us, HN6EN. This station was 347 on about 7060, trying to use a "bug."

G6QN comments on the amazing improvement in Russian notes and thinks someone must have opened up a crystal factory there. Best DX is U6AE, UX6AC, U9MP, LU8FB, PY4IO, K5AY, K4FEC, K4HCG, W4DIZ and W9EQJ all on 7 Mc.

14 Mc. has been pretty poor, the best signals being LU6AJ, W6RYV and W5FLA/K4. He will gladly QSL any of these stations if they would like a card.

War News

G8TL reckons he has the right call-sign, and says TL must stand for Tile Layer, as he has just had his roof lifted for the third time!

Word comes from Bill Windle, G8VG, now in the West Country, that he has just been bombed out for the second time.

G6WJ is another victim of the blitz, and is at present recovering in hospital. Get well soon, O.M.

The many friends of Arthur Webb, G6WQ, will be glad to know that he is alive and well after his ship had been long overdue; the relief, however, is spoilt by the fact that he is now a prisoner of war in Germany.

"Ham Chatter"

This is the title of the ZS6 monthly magazine, the first seven copies of which have just reached G6CL. The Jo'burg fellows are making a great effort to keep things going and are meeting with considerable success after some rather heavy going. An interesting and highly satisfactory feature of the new publication is the Active Service list. There is no doubt about the splendid way in which South African hams have answered the call to duty. We wish them all the best of luck.

Nigeria

ZD2H once again slips his report past old Nasty's U-boats and tells of the pleasure which the regular arrival of the "good old BULL." brings to at least one outpost of Empire. He remarks on the number of commercials encroaching on our bands and wonder how we are going to shift them out again. March, the month which he reviews, brings a change of season, and with it a change in conditions. Severe QRN causes a high noise level and makes listening for any length of time a most unpleasant pastime.

On 14 Mc., U2NE's 469 signal sounded almost like an interloper amongst all the commercial QRM. Both ends of a cross-town ragchew between PY1BC and 1HQ were heard at 20.00 on the 28th whilst at the same time the "old G man," W1WV, was laying down a solitary S8 signal as the sole representative of North America.

Art reckons that when things clear up and we are on the air again, it should be comparatively easy to work Nigeria on 3·5 Mc. from this country.

News from Down Under

Two letters are to hand from Eric Trebilcock, one having taken 15½ weeks to reach England, and the other only 7 weeks. He is still at Salamava but thinks there is hope of a transfer to the R.A.A.F. K6/W phone contacts occur daily and both CE2AS and CE2BX have been heard working XU. KF6JEG/KG6 on Jarvis Island works a regular sked with K6NVJ. Amongst the XU's, 6MJ, MK, 8LA, PL, YL and ZA are the most consistent. XU8YL is a YL op. named Amy. J8PJ logged earlier in the year was in Darien, Manchukuo. XU8PL, who speaks fluent Spanish and Chinese, as well as English, is often heard calling South Americans and also Japan.

Don Knocke, VK2NO, is busy as a radio instructor in the R.A.A.F. and has recently met G6HB. Don holds some strong views on the future of Amateur Radio. "Not only will its numbers be enormously increased after the war," he says, "but the technical standard will be much higher." He feels strongly that the right of the private individual to have direct contact with other countries, subject to adequate and reasonable safeguards, should be one of the articles in a new freedom charter and that more kilocycles not less, will have to be allocated for this purpose. When all the evil propaganda, at present poisoning men's minds, has been swept away for good by our resounding victory, there should be room and to spare for the real exponents of international friendship—the Radio Amateurs.

QSL Bureau

Cards are still held for many members who have no envelopes with the Bureau. A list from one G prefix will be published monthly and cards not claimed will be destroyed after a lapse of three months. There is some nice stuff here for some of you, so what about it? CO, CT3, CX, ES, KA, K7, LY, SV6, U4, VK, VO, and VK7 are some of the good ones!

Here are the G8's, some of whom have a pleasant surprise waiting for them. One envelope only per applicant please. G8**A**B, G, H, I, R, U, Z, **B**D, F, L, W, **C**A, C, H, L, S, W, **D**G, I, M, V, X, **F**A, G, K, P, Q, Y, Z, **G**L, T, Z, **H**B, C, H, K, L, N, P, R, V, **I**O, R, U, **J**A, B, D, H, I, K, L, N, O, T, U, V, X, **K**C, K, Q, R, S, U, X, **L**D, J, L, N, O, Q, S, V, X, Z, **M**D, J, Q, R, S, U, V, X, Y, **N**A, C, N, O, Q, R, S, Z, **O**D, K, M, O, U, V, **P**B, K, L, M, Q, U, V, Y, **Q**A, B, J, N, Q, W, X, **R**F, K, M, N, T, U, V, **S**F, K, N, **T**G, H, J, L, O, U, **U**I, P, W, Y, Z, **V**B, D, G, N, O, S, U, V, X, Y, **W**L, P, Q, V.

Ask Your YL or Sister

A number of situations are at present vacant in an important branch of civilian national service for qualified typists. If you know of anyone, not at present employed on essential work, who would like a pleasant and interesting job well outside the air-raid zone, please write to G2MI, 1 Kent Drive, Harrogate, giving qualifications. It should be added that the work is not connected with 2MI's own employment, nor will it be in Harrogate.

THE 28 Mc. BAND

ALTHOUGH not one amateur signal was reported on 28 Mc. during May, conditions showed an improvement on those of the previous month, and signals higher than 28 Mc. were heard on April 27, 28, May 1, 10, 12, 16–21 and 23. As is usual at this season of the year, short-skip (European) signals were audible on a good many days, due to the presence of "sporadic E" layer.

The best catch of the month was a harmonic of UK3AK, reported by BRS3893 at 21.35 G.M.T. on May 21—on 43 Mc.! A number of European commercial harmonics above 28 Mc. were reported, *viz.* IPL and IEU2 on 42 Mc., IRS on 39 Mc., IBT on 32 Mc. (on 5 days), and SDE/SDQ on 31 Mc. BRS3893 heard IPL as late as 22.18 G.M.T. on May 20, and IEU2 was logged on May 12, 17 and 23.

On May 20, the best day of the month, three unidentified broadcast harmonics were heard, at 12.10 G.M.T. on about 28·75 Mc., at 17.00 G.M.T. on 38 Mc., and at 21.00 G.M.T. on 30 Mc. The first of these, reported by G5BD, was sending news in English, and finished at 12.15 G.M.T. with: "The time is—" Can anyone identify this transmission?

The most consistent DX signal was LQB4/LSA2, 27·5 Mc., which was heard daily from April 27 to May 24, except May 1, 4–6, 11 and 14. Other commercial harmonics, heard above the band, were JMS on 28 Mc., LCJ on 30 Mc., LCP on 29 Mc., ODD on 31 Mc., and OIE on 30 Mc. A good many unidentified signals were logged, particularly between May 17 and 23, including weak carriers in the 28 Mc. band which may, or may not, have been W amateurs. G4MR reported WBH, 22·8 Mc. on seven days, but did not identify any W signals above this frequency.

BERS195, now in British New Guinea, has been doing some listening on 28 Mc. and has reported on summer conditions in that part of the world. During December and January he heard nothing except commercial harmonics, *e.g.* JNP, JMO2, JUM, KQF and XGP, usually between 04.00 and 05.00 G.M.T. The first ham signals heard were K6MVV and K6TOL, QSO on 'phone at 03.50 G.M.T. on February 11. A few days later W's started to come through for short periods around 21.00–22.30 G.M.T., but most were weak signals and the only calls logged were W2AMO, W4FGM (or N?) and W5DD.

By the beginning of March the band was usually open from 22.00 to 03.00 G.M.T., and Asiatic commercial harmonics were sometimes audible up to 11.00 G.M.T. On March 8 and 9 BERS195 logged K6ILW, K6MVV, K6TOL, K6CGK and K6QLR, the last two on c.w., and on March 9 W6RKI was R9 on 'phone.

Thanks are due to G4MR, G5BD, BERS195, BRS3003 and BRS3893 for their reports.

N. C.

THE ULTRA HIGH FREQUENCIES

ONCE again we have managed to squeeze past our eagle-eyed-paper-rationed Editor, just to show the world that the U.H.F.s are still much in our thoughts, especially in June, when we are dreaming of what might have been, and will be, when we can get going again!

American Commentary

From America comes news of an amateur 400 Mc. record, of 20 miles; and of a test, at five minute intervals over a 112-mile path, on 112, 224 and 400 Mc., using only 5 watts. No actual contact was made, but the 400 Mc. signal was the only one to get through!

The A.R.R.L. 1940 U.H.F. Marathon was won by a station using only 40 watts to a pair of 801's; 166 different stations were worked, in 25 States, including all nine-call areas. The operator seems to have relied on his thorough knowledge of the 56 Mc. band, as a result of observations recorded over several years, for he managed to be on the spot during "the openings" rather than by just chancing it.

"Sporadic E" on the Increase

While the effects of the approaching low period in the 11-year sunspot cycle are showing up very definitely in the early "closing down" of 28 Mc. and 14 Mc., for normal skip work (F2 layer) it appears that "sporadic E" (short skip) is on the increase. In 1935–36, at the height of long-range conditions on 28 Mc., short skip was very rare except for a short while during summer months.

Short skip has been showing up on 28 Mc. more frequently than during any previous winter-spring season, whilst 56 Mc. was open for short skip work more often than ever before in winter-time. It would appear that there is little relation between the occurrence of "sporadic E" DX and the 11-year cycle. If this surmise is correct, we may look forward to an increase in DX contacts during 1941. It seems probable that there is some definite periodicity to the occurrence of U.H.F. skip DX, in which case it may eventually be possible to predict the good dates for long-distance work. Already many feel that some relation exists between skip DX and certain solar cycles, the relation between weather and skip DX being too consistent to be passed over lightly. Although one does not produce the other, it may well be that they are the result of a common cause.

Thanks

W1HDQ is once again thanked for his air-mailed reports, as is also W9SLG/3 the XYL of N9BNX, who is continuing the U.H.F. news in *Radio* for him now that he has been called to Naval Service; her task is no easy one now that the U.H.F.s are so popular in the U.S.A. Thanks are also due to G3YY, 2AXP, 2DXS, BRS1151 and 2817, and "BUZ," for their continued interest in these notes.

C. H.

BRITISH ISLES NOTES AND NEWS

DISTRICT 1 (North Western)

Bolton.—As 2ABT is now stationed in the North again, after a spell of five months in London the members hope to see him more often than in the past. A letter, dated January 2, has just been received from 2FPI in the Near East. He says he is keeping well and is not being overworked. In his spare time, which seems unlimited, he is studying "an amazing subject known as radio"! He sends best wishes to all his friends.

A hearty welcome is extended to Mr. H. Sabini, BRS4177, Bolton's latest recruit to the Society's ranks. (*Via* 2DVQ).

Burnley.—A.C.2 Nicoll, G5ZN, who is in hut W69 Wing 4, No. 2, R.S., would like to contact other hams at the station. He reports meeting VE5EC and several W, VK and ZL amateurs. Evidently an opportunity for digging out of them some of those missing QSL cards. 3KT in a newsy letter mentions meeting 2IS, 3CJ and others down South, where he is doing civilian war work. (*Via* G8TD).

Manchester.—The D.R. has received a most welcome letter from Mr. Lucas, G2OI, who says there is little activity in the area at present since most of the members are on active service. The few who remain are devoting all their spare time to work of national importance of one kind or another. He has no doubt that the amateur spirit is still in being, however, and that it will manifest itself when the members are free once again.

He writes: "The future holds great promise for amateur radio and we look forward with real pleasure to the time when we shall be able to resume and develop the old 56 Mc week-end schedules between the Manchester and Liverpool members and those in other parts of the district." 2OI rightly says that Liverpool and Manchester will still be here when "that man" has run his course, and having shared the same trials and tribulations in the common cause the Manchester and Liverpool members will find a special interest in co-operating with one another when they are once more "on the air."

E. Holt, G5OZ, of Altrincham, asks us to record, for the information of his friends on active service, that the stork has called—a YL having joined his family. We offer our congrats.

Whitehaven.—Mr. H. Turner, G6ZT, recently transferred to Whitehaven from District 18, has made contact with some of the local members and in the absence of 8RZ has kindly promised to act as T.R. He reports that a meeting, held on May 3, was attended by ex-G2HT, 4PZ, 6WR, 2AYH and himself. A discussion took place about signal strength indicators. The meeting concluded with a "rag-chew" and the putting away of several "jars" of liquid refreshment! Meetings will be held every other Saturday, particulars of which can be obtained from 6ZT at "Braemar," Bransty Road, Whitehaven.

Congratulations to G8RZ on his recent marriage.

G6CX.

DISTRICT 2 (North Eastern)

Our despairing cry in last month's notes has roused quite a number of members and we are glad to see that there is still some activity in the District. First, the town news:—

Bradford.—A most interesting letter comes from G6KU who is busy on various forms of National Service, together with 6BX, 6HF, 6MC, 6XL and 2SU. 6BR, of Ilkley, is also helping along the war effort.

Dewsbury.—We must apologise to BRS1151 for using his regular reports in M.O.T.A., instead of in District Notes!

Keighley.—G8UO has had a visit from BERS474, home on leave from Gibraltar. If this should catch his eye will he please drop G2MI a line. Congratulations to G2QM on his promotion to Sub/Lt., R.N.V.W.R.

G3HA is still busy with the Home Guard and G8UO is trying out a new 9-valve superhet. 2DUX is welcomed as a new member.

Leeds.—BRS4065 keeps busy with A.F.S., A.T.C. and Scouts; in his "spare time" he does a bit of mountaineering with 2AHL! BRS3572 is still active.

CONVENTION ?

Assuming conditions permit, would *you* attend a Convention in London during August? If so please write at once to Headquarters.

SEE ANNOUNCEMENT ON PAGE 425

Sheffield and Rotherham.—BRS4157 reports active as do both 2LT and 4HT.

Wakefield.—Mrs. Parker, writing on behalf of 6WJ, who is in hospital, has kindly sent some news of local hams. They recently had a welcome visit from 8KP. 2BM is home awaiting final discharge papers after his short spell with the R.A.F. Hard luck O.M. 8NM was another recent visitor. 6WJ himself, is making a rapid recovery and wishes to be remembered to 8UJ and other friends.

Harrogate.—G2MI who has spent several weeks on the sick list had a welcome visit from 3QI of Wetherby and looks forward to meeting many other Yorkshire members in the near future.

District Meeting.—Sufficient replies have been received to my questions in last month's notes to justify an attempt to organise a meeting and every effort will be made to hold a meeting, if possible in Leeds, on Sunday, July 20th. Full details will appear in the July BULLETIN and in addition each member who has replied will be advised by post. G2MI.

DISTRICT 3 (West Midlands)

Birmingham.—Mr. B. George delivered the third of his series of lectures to an appreciative audience of 23 M.A.R.S. members on May 13. On this occasion he chose as his subject "Resonance."

Several new members to M.A.R.S. have been introduced through R.S.G.B. Further contacts of a like nature are looked forward to by the local Society. 2FDR.

Coventry.—Members of C.A.R.S. will be interested to hear that Mr. Wilkie, BRS (we've forgotten his number) who attended the 1936 N.F.D. has returned to England after a business trip to Nigeria. He wishes to be remembered to all old friends and especially to G2LU, to whom he sends a message which has something to do with fish and chips !

From a recent issue of the *P.O.E.J.*, we note an interesting article by H. D. Bickley on " Phase and Frequency Modulation." Mr. Bickley who is a member of C.A.R.S. delivered two important lectures to the Society some time ago on " Class B " and the " Crossley Volume Expander." We wish him continued success in a job which was once his hobby.

Congrats. to Jack Swinnerton, G2YS who has just collected his third pip. G5GR.

Forthcoming Events

June 21	District 15, 7 p.m., at G4IH, 31 Courthope Road, Greenford, Middlesex (see May issue for details).
,, 29	District 12, 3 p.m., Picnic at Cuffley. Meet at G6LL, " Woodlands," Tolmers Road, Cuffley.
,, 29	Scotland "A" District, at 2.45 p.m., in the Coffee Room, Y.M.C.A. Residential Club, 100 Bothwell Street, Glasgow. Visitors are cordially invited to attend.
July 4	District 17, Ham Gathering, 7 p.m., at G2UK, " Stonehaven," Horncastle Road, Boston.

DISTRICT 4 (East Midlands)

Nottingham.—Local meetings are to be resumed and the first of these will be held at G8DZ, 14 Epperstone Road, West Bridgford, on Friday, June 20. It is hoped that all available members will make an effort to attend.

G8DD has recently completed a morse recorder which, working directly off a " Sky Champion " will record up to 50 w.p.m. (and no QRM).

In a recent letter to 8DZ, 4AH reports that he is now posted to District 1 ; if GW4CK is in the Chester area he would like to contact him. He also reports that 4LY is with the R.A.F. in South Africa ; 2DRT with R.A.F. in Somerset and 2CIB with R.A.F. in London.

Mansfield.—G8MR recently had a visit from Capt. Vance, whilst on leave, 8SA was looking extremely well and reports having been posted from the East, to the West Coast. He sends 73 to all the " Robin Hoods." The few remaining amateurs in the town are doing very useful work training Air Cadets. (Details to G6CL please).

2APT having finished his course has now been posted to Yorks. G8MR would like to hear from 8OT, 3XA, 5KG and 2DTQ.

Northampton.—In a recent letter 3PZ reports that he is temporarily away from home, but hopes to be in a more permanent QRA shortly. 3RF who is now in the Navy was very fit and well when seen recently while on leave. 3MJ is spending quite a lot of spare time on the receiver.

Leicester.—2CFC, having finished his course at No. 1 S.S.R.A.F., has been posted to an address at present unknown. It seems strange that just as 2CFC left the school so 2RI was posted there : he would like to get in touch with other hams and gives his QRA as " Bristol Wood." 2IX is doing his best to satisfy the Minister of Food and has even sacrificed the shack by turning it into a " tomato factory," although we are not sure whether this is his own or Mrs. IX's idea. G6VD.

DISTRICT 5 (Western)

Only one T.R. has sent a report. Please let us have a few lines from the other areas next month.

Cheltenham.—Meetings here have been well attended. G4AB visited the town last month and travelled back to Stroud by push-bike after midnight. G8DA, when home on leave, made several visits. He is now a Corporal. 2HX is still on the sick list after receiving a 2,000-volt shock some months ago. 8AK hopes to meet local members, now that he is in the District. G6RB.

DISTRICT 6 (South Western)

News is still very scarce, no reports having been received from any area. This is very disappointing, as there must surely be some news available which would be of interest to members, particularly those in the Forces.

The D.R. has recently received welcome visits from members, including G6RF, who was home on leave. One evening was spent in the company of G3JD and BRS4029, the latter a new member from North Devon whom we welcome cordially.

G5SY has received a long and interesting letter from 2CWR, a member of the R.A.F. in Egypt. He is cheerful and well, but considers he has had enough travelling about for the time being. He says that in future his idea of a holiday away from home will be just a week-end on the moors ! G5SY.

DISTRICT 7 (Southern)

Bournemouth.—Welcome to 2HAG, 2HMX and Mr. Gifford, BRS4179, who have recently joined the Society. 2HAG is evacuated here whilst the others are already well known in the town. BRS3789 is reported to have built a preselector for his Ham-band Tobe. 4KV, who was recently home on leave, hopes to transfer to the Signals. We congratulate him on obtaining his second pip in the " Pick and Shovel Mob". Best of luck to 2CXP who has been posted to ZB1 after a short stay in GI. He is certainly seeing the world.

The T.R. has received letters from 3VY and 2FSL who left the town recently. 2XP has demonstrated his gear to the locals, who were pleased to meet 2CD when he paid a flying visit to 2XP recently.

(*via* 2HNO).

Coulsdon and Purley.—BRS3003 has been appointed T.R. for this area and will appreciate any news sent him. The QRA is 122 St. Andrew's Road, Coulsdon.

G2KU has made several attempts to join the

R.A.F., but much to his regret those in charge of his present job will not release him ; he has now been joined by 8JV. 6SM is in hospital after a motor accident ; here's wishing him a speedy recovery. 8IN who was bombed out several months ago has taken up model railway construction. He is desirous of meeting hams in the Forces who happen to be passing through, or who are stationed in his locality. (For QRA see last month's BULL. under " Ham Hospitality.") 2ANS has been home on a short spell of leave from the R.A.F., and is looking very fit. 2CRD, who has been to North Wales was accompanied on the trip by 6GS and 2HNN. For some time past, nothing has been heard of G2DN, 3TV and 2FJM. Please drop a line to the T.R.

(*via* BRS3003).

Croydon.—2FWA, 72 Kimberley Road, Croydon, has been appointed T.R. for Croydon and all news for District Notes should be sent to him. 2DP has made a very good job of his enlarger. (Prices on request ! !) BRS4150 has caught the local frequency meter building craze and is now busy with calibration. 2FWA is trying to get local meetings going. Dates and venues can be obtained from the T.R.

(*via* 2FWA).

Guildford.—A chance meeting on the road gave 6LK and 5WP the opportunity of a last rag-chew before the former sailed for points East. Best of luck, Ted. (Bet he has gone out to fix up a sked with AC4YN !). 3VB and 3UY came over to see the D.R. for the evening. 8IX looked in whilst on seven days leave.

Reading.—G8KJ and 2AFL both reported in person, the former is giving morse lessons. 2YB and 6GT are busy listening when time permits. 5HH has built a new T.R.F. receiver. 2DIO is a keen Home Guard.

(*via* G5HH).

G5WP.

DISTRICT 8 (Home Counties)

A farmer in these parts, disgusted with a litter of pigs that seemed loth to grow, swore that he would never feed them again until they *did* grow fat. If members in this District continue to adopt the same attitude toward District Notes the fate of the notes will be similar to that which befel the pigs ! It's only your continuous support which will keep them going.

Cambridge.—G5DQ writes from Yorkshire to say that he is fit, and happy. He has met VU2DB, and many other hams. If all goes well Peter will be joining an O.C.T.U. shortly. (Good luck, O.M.). 5DR was home recently, and visited 5OV.

Hunts.—G4AZ has moved from Beds. to Hemingford Abbots. There are no mains at the new QRA but he thinks that it will provide the ideal 14 Mc. site for N.F.D. 5RL has been on prolonged leave from the R.A.F., as he was taken ill as soon as he arrived home ; in a chat over the phone he indicated, however, that he is well on the road to recovery. 6DX and 6WA have also been on leave from the R.A.F., and both are well.

2DSL, now with the R.A.M.C., in the South of England, has recently lost his father, who was the Rector of Graveley. To 2DSL we offer our condolences in his loss. He sends his 73 to District members, particularly 5RL.

From March, Bedford and Luton, there is no news.

We would remind members in these areas that notes should now be in the hands of the D.R. not later than the 26th of the month. G5BQ.

DISTRICT 9 (East Anglia)

Norwich.—G2MN has been pleased to meet ex-VU2DK, who is now working in the town. 3QF, who before the war was in the Isle of Man, is now located at Shotesham. 2MN hopes to contact 4JJ who is stationed nearby.

Yarmouth.—BRS3821 tells us that 3766 has reported for Service with the R.A.O.C. as a Radio Mechanic. 3468 is progressing well in the R.A.F. We much regret to report that Mr. N. Meanwell, 2BIC has been reported as " missing " but hope that news of his safety will soon reach us.

Any member on service around Yarmouth is asked to call on Mr. E. E. Buck, BRS3821, 24 Priory Street, Gorleston-on-Sea.

Kings Lynn.—Those members left in the town are carrying on as usual but have nothing to report.

Ipswich.—The D.R. would like to hear from any local member who can supply news from the town. It is nearly a year since the last report came to hand. Due to petrol restrictions he regrets his inability to pay a visit. G2XS.

DISTRICT 10 (South Wales & Monmouthshire)

Swansea.—Wilf. Bowen, GW4CC, who sends special greetings to all old 7 Mc friends, reports that Bill Rees, GW3CR, is now stationed near the town, and that they frequently meet to talk of the old days.

DISTRICT 11 (North Wales)

A very successful meeting was held at Aunt Jane's Café, Prestatyn, on Sunday, May 25. Included in the attendance were : VE3AAA, 3AKX, 3AKY, 3IX, 4YG and Mr. J. Critchley (R.C.A.F.), BRS4176 (R.A.F.), G8TC and 2CZM (R.C. of S.), GW3KY, 4CX, 4CK, 2HCZ, 2HIY, BRS1060, 2731, 2866, 4027, and Messrs. Broadbent and Gill.

VE3IX gave a very interesting talk about Amateur Radio in VE, whilst GW4CX responded with a similar talk concerning conditions in G.

GW3KY, 2HCZ, GW4CX and BRS2866 travelled considerable distances to attend. As the latter is 78 years of age, we think it was a fine effort on his part to make the journey. Another meeting will be held at Aunt Jane's Café, Prestatyn, on June 22, at 6 p.m.

An informal but successful meeting was held at BRS4027 on May 6, when GW3CF, G5YP, G8CJ, G3TS, 8TC, 2CZM, BRS3044 (R.C. of S.), GW4CK, 2HIY, BRS1060 and 4027 were amongst those present.

Informal meetings are held at either 2HIY or BRS4027 every fortnight, with the open meeting on a Sunday late in the month. Details from BRS1066, " Woodside," Meliden Road, Prestatyn.

GW3CF, who was recently home on sick leave from the R.A.F., is now back on duty in the North. G3TS has left the District, having been transferred from R.C. of S. back into Army Pay Corps, from which he only recently joined R.C. of S.

GW2PH, writing from ZD4, wishes he was back in the District with the chance to meet the visitors at our meetings. He sends 73 to GW5FU, and all old friends. GW2PH has met G3CK. GW4CK recently contacted 2ATP at Chester L.M.S. Station.

G6US.

DISTRICT 12 (London North and Herts.)

Once again we are able to report a very successful meeting, held on this occasion at G4DC, Hertford. Thirteen members attended, in spite of the journey that most had to make. We were pleased to welcome our D.R. (G5QF), who came over from Ware Park; and also two old timers in G5VY and 8SK, both of whom are instructors in the A.T.C. It is of interest to record that seven of those present are similarly employed in their spare time. Good fun was had with a key and buzzer, upon which various members of the party took turns in testing the ability of the others to receive. Any failure to copy "solid" at over 20 words per minute was at once put down to the bad sending of the one on the key! Our thanks are due to Mr. and Mrs. Winsford for so kindly providing refreshments. To complete a very enjoyable evening a small party returned home *via* G6LL, where they admired the excellent workmanship which he is putting into a new super modulator at present under construction.

G6CL and 2CNM have been granted commissions in the R.A.F.V.R. (Training Branch) for voluntary service with the A.T.C. The latter is specialising in navigation instruction, whilst G6CL is Signals Officer to the Southgate squadron.

The following new members are welcomed:—G8SK, BRS4153, 4155, 4163 and 4173. We hope to see them all taking a part in future activities within the District.

Letters have been received from G4GT, 6QM, 2CNC, 2DTD, BRS3412 and 4073. G6QM reports that 8VM is once again on the high seas brass pounding, and sends 73. 5RR is returning to London from Birmingham. G5FA enjoyed a chat with Ted Fowler, VE5VO (who was his first VE5 contact on 7 Mc.) when he visited G6CL recently.

St. Albans.—A local meeting was held on May 7 at G2CY, when four members attended. We should like to see more local gatherings, particularly in the Welwyn area where interest seems to be flagging. We are sorry to hear from BRS3412 that he has had a minor set-back which will prolong his stay in the Isle of Wight for another three months; we wish him a speedy recovery. 2DTD, of Hitchin, reports seeing 3TX and 2DPQ frequently.

Special Notice.—The outing designed to keep up the spirit of N.F.D., which was announced last month, will take place from G6LL, "Woodlands," Tolmers Road, Cuffley (phone: Cuffley 2388), on Sunday, June 29, at 3 p.m. Train to Cuffley Station L.N.E.R., or by bus from Potters Bar. Weather permitting, it is hoped to have a picnic tea in the fields close to G6LL's QRA—but please bring your own food. Wives and lady friends are specially invited. G5FA.

DISTRICT 13 (London, South)

South Central and South-East Areas.—At the well-attended May meeting held at G3DF we were pleased to welcome 2JB, on short leave from the R.A.F., and BRS4150, a new member. 3ST is still busy with A.R.P. work. 2HHB has built a 6J7 regen-preselector which has improved his Sky-Buddy.

The next meeting will be held at G3ST, 62 Dumbarton Road, Brixton Hill, S.W.2, at 11 a.m., Sunday, June 22.

South-Western Area.—The "War-time Log" is proving quite a success and looks like being an historic document when the war is over. It seems that a month is hardly long enough for the Log to get round to everybody, so any member who does not figure in these notes must not think he is forgotten. It's just that District Notes *have* to be in to time! 3AD reports, and seems to meet hams everywhere he goes! BRS4018, who has been bitten by "oscillograph-fever," is looking for a 3 in. cathode ray tube. (Good luck at the City and Guilds exam., O.M.). 6DT, although very busy, has had time to discover a couple of acorns in his junk box (Acorn!). 2JK also takes an exam. in July (good luck, O.M.). He would like to hear from G2UJ. 3DF, who has built a new amplifier, seeks information on scratch filters. 6LR has 5GQ as a next-door neighbour. (Good thing there's a war on!—ED.) 4GD reported in person, and in R.A.F. blue, on leave from the West Country. BRS4111 is welcomed as a new member with a temporary address in the S.W. area. G8TN.

DISTRICT 14 (Eastern)

Chelmsford.—G2SA now has a "Sky Buddy" to which he intends to add a pre-selector stage and so obtain a really useful receiver ready for the re-opening festival! 5HF, aided by 6LB, is busy clearing "bugs" out of his somewhat ancient Hammarlund Super Pro. 5CA, BRS3650 and BRS 4122 do a little listening on occasions. 5RV is now an Associate I.E.E. and is working hard for A.M.I.E.E. 4GF is in the District on business and promises to attend the June meeting.

The May meeting was a great success with a record war-time attendance which included: Lt. Hill 2KG, 3SI, 4GV, 5CA, 5RV, 6LB, BRS3650 and BRS4122. Summer meetings at 5RV will be held on the first Sunday in each month at 7 p.m., until further notice. Visitors heartily welcome.

Ilford.—G2CD has been on a week's vacation and visited 2XP in Bournemouth. 6AB and BRS1295 are fit, and 8PC is still alive and kicking in Malta. 3OA and 3MD would like news of 3TS about whom they are worried. 4LV hopes to attend the Chelmsford meetings. Visitors are welcome at 3MD, who also wants more news for District Notes. 8JM in a letter to 5RV, sends greetings to all his friends and says he is now a radio mechanic in the R.A.F., and likes it very much.

Southend.—G2SO writes that P./O. J. M. S. Watson, 6CT, has just been married . . . congratulations, Jimmy, and here's wishing you and your lady a happy and long married life. BRS3085, of Thundersley, has been on leave recently. BRS 4023 (2SO's brother) has gone East to a DX country. Good luck, O.M. 6IF paid a visit to 2SO recently. G5RV.

DISTRICT 15 (London West, Middlesex and Buckinghamshire)

Although only six members managed to attend the May meeting held at G4IH, an enjoyable evening was spent. It had been hoped that a few Service members would be along, as the meeting was held on a Saturday, and at an easily reached QRA, but presumably none were on leave that week-end.

Letters were read from G8VM, 2QY, BRS3718, 2KI and 2DZD. G8VM related his experiences during a recent dive-bombing attack on his ship; 2QY, from his war-time QRA in the West Country, reported having met G2NJ, 2NL, 5IL, 8NA and

8UB; whilst BRS3718 mentioned that he is obtaining useful morse practice over the air. G2KI, after running around the country in the R.C. of S., has now settled down in the camp he left awhile back. 2DZD sent greetings to G3XC and other old friends. He is up north with the R.A.F.

The next meeting has been fixed for 7 p.m., June 21, at G4IH (see Forthcoming Events). Our warm thanks are extended to Mr. and Mrs. 4IH for their hospitality in connection with recent District meetings.

Old-timers in District 15 were grieved to learn from a recent issue of the BULLETIN that Mr. Turner, G2XO, had lost his life in an air raid. G2XO was a frequent visitor to pre-war District meetings, at which he enlivened the proceedings with talks about the early days of amateur radio. Our sympathies are extended to his widow and relatives. G6WN.

Northern Ireland

This month we welcome G5UD, 2FRY, and BRS3661, from England. 5UD, who is not new to this terrain (he was previously stationed in Belfast), hopes soon to visit the Y.M.C.A. Radio Club and is looking forward to meeting some old friends.

E. Davey, a Y.M.C.A. Club member who was recently ordained to Holy Orders, has been appointed to the curacy of Christ Church, Lisburn. His many GI friends wish him every happiness and a long career.

Our sympathy goes out to GM3TR, 2BNM, and BRS3883, who lost their homes in a recent "blitz." 6TK put out many fire bombs before being buried in a relative's shop. We are glad to know that he was extricated unhurt. 5HU recovered a receiver from a "blitzed" house, and found it functioning in its usual good style. 5SJ shows signs of returning interest in ham radio. He has just purchased the R.S.G.B. Handbook, an idea which many members might usefully copy. 6TK has become possessed of a portable generator set, and a fine tent, in readiness for next N.F.D. event! He has also received a long letter from VU2AN, who says he has been working with some radio gear the like of which he has never seen in amateur circles! He is very fit, but misses the old TX. very much.

GI6YM continues active, some twenty-one visitors being present on a recent Wednesday Club Night. Members learnt with sorrow that their "local" had been burnt out!

The D.R. had to "smell out" most of the above news, only GI6TK reporting. How about it? Will *you* help to keep GI on the map? GI5QX.

Scotland

"A" District.—Members will learn with regret that Mr. J. B. Duncan, GM6JD, the D.O., has been forced to resign for business reasons. He wishes to thank all members for their support and assistance during his term of office. Mr. David Niven, 2CHN, who has been appointed to fill the vacancy, is well known for his popular lectures and talks in the past.

At the May meeting there was a better attendance, when we welcomed as a visitor, GW5BI. We have had a letter from Ralph Bullock, who is on a special course; while Douglas Gillies is now at sea as a marine engineer.

"B" District.—Members will be glad to hear that Mr. D. J. Shaw, GM3RL, is now discharged from hospital and is back at home.

"H" District.—At the February meeting, held at GM4AN, 4AN, 4FK. 2NQ, 3LG, 3HY and 6SJ were present, the last two members being stationed at a nearby R.A.F. station. The home of BRS2757 was the venue of the March meeting, when 2NQ, 3LG, 4AN, 4FK, 8MQ, 2HBR, BRS2757 and BRS 2761 attended, 8MQ being on leave from the R.C. of S. The April meeting, which took place at GM2NQ, was attended by 3LO, 3LG, 4FK and 4GK in addition to the D.O. GM2NQ, 3LG, 3LO, 4FK and 6JJ were at the May meeting held at GM4FK, when there was discussion on recent BULLETIN articles and correspondence.

GM2UD and GM6NX visited the D.O. during May, but 2NQ was away from home at the time and regrets that he did not have the pleasure of a personal QSO. Our congratulations go to GM6JJ who has been promoted to the rank of Flight Lieutenant. (Ours too! G6CL).

The next meeting will be held at 2HBR, Windmill Road, Kirkcaldy, at 3 p.m., on Sunday, June 29.

GM6ZV.

Letters to the Editor

After the War

To the Editor of THE T. & R. BULLETIN

DEAR SIR,—Having followed the recent correspondence on post-war licensing with interest, perhaps I may be allowed to comment on the suggestions put forward in G5RV's letter in the May issue.

The principles outlined there will, I think, have general approval; personally, I like the idea of operators' certificates, which will encourage many keen youngsters who cannot afford to build a transmitter for the time being, but who should have acquired a thorough groundwork by the time they can own their own station. Would it not, however, be preferable to increase the morse requirements of the Grade B certificate to, say, 20 w.p.m., as a speed of 15 w.p.m. is not so very much faster than 12? I also think a maximum of 50 watts for a "B" licence sufficient; it has been proved that good, reliable DX can be achieved on considerably less power than this, if the operator is really interested in his hobby and is willing to take care over the design of his apparatus, including the *aerial*. If high power became general, "brute force" would become the order of the day.

I am also of the opinion that pre-war licensees should be required to prove their qualifications, otherwise we shall start with conditions almost as bad as they were before the war (I say "almost" as many will have learnt a lot in the Services).

Finally, the thorny question of message handling. Might not some compromise be arrived at to avoid treading on commercial corns? For instance, confine QTC handling to Britain only, and on frequencies of 56 Mc. and up; in this way VHF work would receive encouragement, and G.P.O. interests would hardly suffer any competition, as no "rapid delivery" could be assured.

I trust we shall have more views put forward on this subject.

Yours faithfully,
G. P. ANDERSON (G2QY).

Wood Wind Band for DX!

To the Editor, THE T. & R. BULLETIN

DEAR SIR,—Whilst idly glancing through the call book, I noticed one commercial station with a frequency of 15 kc. This started a train of thought: What is the lowest workable radio-frequency? Is it anywhere near the highest audio-frequency? If so would it not be possible to generate a radio-frequency by mechanical means? Need it be electrical? Would not a mechanical vibration at a high frequency travel through space to another potential or actual source of vibration of the same frequency, a sort of sympathetic vibration? If this be so, all we have todo is to modulate this with a speech frequency vibration to get communication without electricity! This may account for the feats of some native tribes in long distance communication. With the Tibetans, I understand, part of the "apparatus" consists of peculiar and very high pipes or horns. Are these the "carriers"? Can AC4YN verify this?

Yours faithfully,
W. R. BROOKS (2DRO).

18, Winston Gardens,
Headingley,
Leeds 6.

One of many!

To the Editor, THE T. & R. BULLETIN

DEAR SIR,—You may be interested to hear that I have just passed into the R.A.F. as a Radio Mechanic.

I should never have attained the standard required for this post had it not been for the technical knowledge acquired from your invaluable *Amateur Radio Handbook*. In order to illustrate how much I prize the handbook, let it be known that I have just spent more than the price of the copy in having it bound.

Yours faithfully,
C. W.
Radio Mech. A.C.2, R.A.F.V.R.
(BRS4008.)

Dit, Dit, Dah, Dah, Dit, Dit

● ● — — ● ●

No. 2

Answers

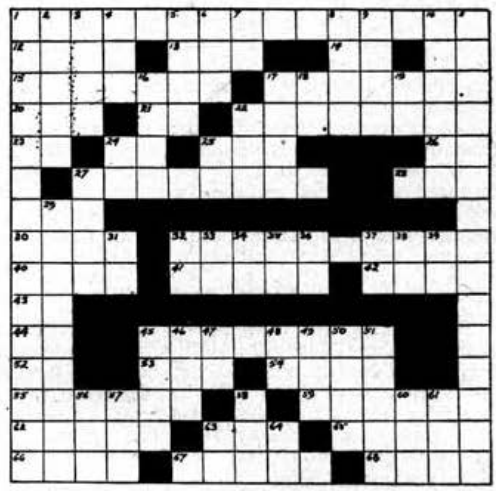
(1) Microhm.
(2) Maxwell.
(3) One thousand.
(4) Area of plates, spacing of plates and nature of dielectric.
(5) Mercury, 94 microhms per cm. cube. Platinum has 11 microhms per cm. cube.
(6) Current.
(7) The Joule.
(8) Positive plate, negative plate, electrolyte.
(9) Henry.
(10) 1925. 62·7 metres.

Radio Riddle-Me-Rees

No. 6. SOLUTION: OSCILLATOR.

"HAM-RADIO" CROSSWORD No. 10

Prepared by JAMES GOUCK (GM3NH)



CLUES

ACROSS.

1. Hardly straight.
12. Fools praise in verse but cannot make.
13. Practice.
14. Norway.
15. Insulator sounding like approach of dawn.
17. Obviously follows class "C."
20. Girl's name.
21. Bone is so backward.
22. DX worked by AA's.
23. Forward for Belgium.
24. Indefinite article.
25. We three control a tuned circuit.
26. Saint.
27. Potentially isolate.
28. Time please.
30. Torn.
32. A sailor starts a type of meter.
40. Otherwise.
41. A long time between the poles makes lamps.
42. Boy's name similar to Paddy, mixed.
43. Chile.
44. Not solid as it appears.
45. Being everywhere.
52. Not funny, in fact the reverse.
53. Mayday in C.W.
54. Request.
55. Whirlpool.
59. Mostly terrible but wholly legal.
62. Sounds like dah-dit had expired.
63. When day is done.
65. Associated with 63 across.
66. 'Phones of a kind.
67. This river sounds like what two vehicles might do.
68. Despatch is mostly dispatch.

DOWN.

1. Less straight (2 words).
2. Often follows a sub.
3. Peasant.
4. Even but not level.
5. Top gear.
6. Before.
7. A race, but not Scotch.
8. U Spy.
9. Mend.
10. Even 'phones can't be worn by this crank.
11. Popular oscillator.
16. Charged atoms.
17. Fool
18. And at this Waterloo.
19. Preposition.
22. Well known in U.S.A.
24. Indefinite article.
25. Relay league.
27. Hotels.
29. Means of communication.
31. French to thou.
32. Indefinite article.
33. Remain.
34. What often comes after.
35. Upon.
36. Always before GB.
37. Telephone exchange.
38. Inland revenue.
39. Cockney exclamation.
45. Employed.
46. Receptacle with nothing inside, although it contains ten.
47. Exists.
48. And up is on the level.
49. Unwell.
50. Often seen at wayside houses.
51. Facial contortions.
56. Sounds like an annual.
57. Boy's name.
58. This is the centre.
60. Enemy.
61. To cremate you must be this to fill this.
63. Broadcast listener.
64. F. W. rectifier.

HEADQUARTERS CALLING

A Projected Convention

We believe that many Service and civilian members, living in or near London, would welcome the opportunity to meet one Saturday afternoon whilst extra summer time is operating. War-time conditions would not permit the organising of social functions, but providing sufficient response is forthcoming, arrangements could probably be made to book the I.E.E. for informal discussions.

A further announcement will be made next month; meanwhile a *post-card* to Headquarters *now* if you think you can attend.

Projected dates, August 2 (Bank Holiday week-end), or August 9. State your preference.

B.B.C. Transmissions in the 7 Mc. Amateur Band

With reference to the paragraph published in our March issue, we wish to advise members that, as a result of correspondence between Council and the G.P.O., an assurance has been given that the use by the B.B.C. of frequencies at the L.F. end of the 7 Mc. amateur band is purely a war-time measure, and that the Post Office " will bear in mind the desirability of restoring the band to the exclusive use of amateurs after the war."

We understand that some attempt is being made by the A.R.R.L. to persuade the B.B.C. to reduce signal strength in the direction of North America, in view of the fact that the services are intended for the Eastern Hemisphere. Our information is that one of the transmissions causes considerable interference at certain times in the U.S.A.

Mr. E. A. Dedman, G2NH

It was with much regret that Council, at its May meeting, accepted Mr. Dedman's resignation as a member of the executive body of the Society. Mr. Dedman has served the Society for long both as D.R. and Council member, but, due to increasing business pressure (he is a Director of Quartz Crystal Company), he finds himself unable to continue in office.

In recording thanks to Mr. Dedman for his past invaluable services, the Council expressed their hope that the time may not be too far distant when he will again play an active part in Society affairs.

Mr. Dedman's seat on Council will be filled at an early date.

War-time Subscription Rates

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

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

Mails Lost

Information has been received that mail posted in North America during the period March 31–April 5 has been lost by enemy action. Mail to Northern Ireland posted during the week-end of May 3 was also lost.

The Atlantic sinkings may have resulted in the loss of American publications ordered by the Society for members.

Technical Books

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

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

Mathematics for the Radio Amateur

It is regretted that back issues of THE BULLETIN containing Parts 1 to 5 of the mathematics articles are now out of print. A limited supply of the April and May issues are available price 1/– each.

It is hoped, later in the year, to publish the series in book form, in the meantime, we offer our apologies to the many new members who have applied unsuccessfully to Headquarters for recent back issues.

QST and Radio

The April issue of *QST* reached Headquarters on May 25. The April and May issues of *Radio* arrived within a few days of one another towards the end of May.

73 Lists

Members who wish to send in calls for inclusion in our 73 feature, are asked to note that (1) Lists must be set out on a separate sheet of paper and arranged in the manner shown in this issue. (2) Not more than 12 calls may be included. (3) No foreign calls, other than U.S.A. are permitted.

Publicity Posters

Members are reminded that a new publicity poster is now available from Headquarters for display in technical colleges, libraries, Service institutes, etc.

Headquarters Office Hours

The following are the official office hours in force at Headquarters :—

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

It will be appreciated if Society business can be dealt with during the hours specified.

A New Volume commences Next Month

The current issue marks the end of Volume 16. The past 11 issues contain many important articles and topical features, but unfortunately several well known members who allowed their subscription to lapse are now bemoaning the fact that they have missed one or more issues. In peace time we could invariably supply back issues, but under present conditions our printing order is limited.

To avoid further disappointment, we would urge members to forward their subscriptions when due.

Changes of Address

It frequently happens that members notify us of a change of address after their BULLETIN wrapper has been prepared, and sent to our printers. In such cases we cannot do anything to stop the BULLETIN going to their previous address.

Changes of address must be notified to Headquarters by not later than the 28th of the month, if required to be effective from the next issue.

Members on Active Service

We again appeal to *all* members on active service in England, Scotland and Wales to allow us to send the BULLETIN to a permanent home address.

Naturally we should like to be able to oblige everyone by sending the BULLETIN to their service address, but the task would be too great.

Headquarters has been considerably embarrassed by personal friends of the Secretary-Editor who ask for special arrangements to be made. To do so would cause endless difficulties, and an even greater number of BULLETINS to be returned each month.

A permanent home address, please.

Greetings from Malta

Mr. Robert Galea, ZB1E, of 20 Colegiate Street, Birkirkara, Malta, sends greetings and best wishes to all old friends of the air, and expresses the hope that any member now located in Malta, will make an effort to get in touch.

Mr. Galea has been the B.E.R.U. representative in Malta for several years.

Greetings to the Czech Radio Society in Great Britain

The Council has been pleased to grant honorary affiliation for the duration of the war to the newly-formed Czech Radio Society in Great Britain. The President is Cpl. Horky, OK2HY, and the Hon. Secretary T. Svoboda, OK2NB.

The rules of the Society, which have been approved by the Czechoslovak Ministry of the Interior, in London, provide for members to join the R.S.G.B.

We understand that an endeavour is being made to bring Free Polish amateurs into the C.R.S.G.B., which will then change its title to cover the amalgamation of interests.

We are pleased to publish a Proclamation sent to us by the Hon. Secretary of the new Society. In future C.R.S.G.B. notes will appear monthly in this Journal.

CQ de CZECHO-SLOVAKIA

We Czechs, beeing temporary in Great Britain, fighting at your side—against our common enemie, founded this days the Czechoslovak Radio Society in Great Britain.

We greet you in the name of all Czechoslovaks radio-amateurs in Great Britain and all amateurs which are at home in our country. We should like to tell you close for this occasion a few words about our amateurs, of their todays relations at home and our aims in the future.

We were about 500 amateurs Xmitters. Our country is neither so large, nor so rich as yours, and we could be satisfied with a 500 Xmitters and 1000 listeners organised in one society. In the begin the radio-amateurism was hindered by dearth of components, and by diverse licencis. Czechoslovakia began her independence not untill the year 1918 and came very soon to years of prosperity, and own factories delivered radio-components, and as the prices of the valves and all other material fell nearly to the English index, the Czechoslovak Radio Society grow rapidly.

Unfortunately this didn't continue long. The Huns tumbled over our country and began to destroy everything connected with civilisation. It is clear, that one of the first things they did, was to liquidate the Radio Society and the radio-amateurs musted stop all their work and experiments.

The first idie for the Huns was to stop the most dangereous for them—relations between the Czechoslovak intellectuals and your and American free spirited intellectuals.

That is the mainly idea, why we have organised our society at the free soil of the friendly England. We won't only hold on, but expend our friendship relations with you, we will bring in our free country your free spirit and new knowledges.

We have also to work for the hundreds of people which are hindered by the Huns to learn something new and we hope, that with your help we will succed in it.

We are also in contact with the Poles. Our main effort will be in V.H.F. and Television. We want to elaborate a plan of a public Television, open to all classis of the people in our democratic country. In general we also want to take share in the modern progress and science.

We of the Czech Hams are looking forward to the day when we at home and amateurs in Britain will be in contact again.

So I will close now with these words. To the day which we hope may soon return to resume those old Chin Wags!

For the C.R.S.G.B.,
Y. T. Svoboda, OK2NB, Secretary.

Stray.

Apropos the paragraph published in our April issue (Khaki and Blue) Mr. S. R. Pountney, G3NM, asks us to point out that he is serving in a civilian capacity in Belfast.

New Members

HOME CORPORATES.

D. HOULT (G4OO), 19 Darcy Road, Norbury, S.W.16.
A. C. EDWARDS (G6XJ), "Goodrich," Norman Road, Birmingham, 31.
P. E. HUXTABLE (G6XP), 24 Bowness Drive, Hounslow, Middx.
W. O. STURMEY (G8KL), 400 Newhampton Road W., Wolverhampton, Staffs.
O. H. OWEN (2AUZ), Fernleigh, Llynclys, Nr. Oswestry, Salop.
A. ROWLAND (2AYV), 179 Wentworth Road, Doncaster, Yorks.
T. POLLARD (2AYY), 6 Rosehill Mount, Burnley, Lancs.
D. CAMERON (2BKC), The Gardens, The Cairnies, Glenalmond, Perthshire.
A. J. T. BRADLEY (2BVK), 16 East Gate Street, Chase Terrace, Walsall, Staffs.
S. F. KIRK (2DJK), 23 Trefoil Road, Wandsworth Common, S.W.18.
P. C. BUTSON (2DBM), 78 Kenmore Avenue, Kenton, Middlesex.
N. BOOTH (2DSF), 13 Station Road, Furness Vale, Nr. Stockport.
T. J. PARRY (2FKT), 20 Erskine Road, Colwyn Bay.
C. H. GOULD (2FQH), 6 Anroyd Street, Westboro, Dewsbury, Yorks.
S. W. SADDINGTON (2FXQ), 240 Stoney Lane, Yardley, Birmingham.
J. W. MASSEY (2FYB), 9 Ash Grove, Wembley, Middlesex.
W. P. AIR (2FWX), R.C. of S.
B. H. SMITH (2HDN), "Windy Ridge," Homestead Road, Medstead, Hants.
P. Zeid (2HAG), 78 Southbourne Road, Boscombe, Bournemouth.
A. ELLIS (2HFR), Rhydwenfa, Portmadoc, N. Wales.
W. SHORT (2HNP), 88 Lynn Road, Ley Street, Ilford, Essex.

WE extend a Cordial Welcome to the

75

NEW MEMBERS

whose names are listed

•

OUR THANKS ARE EXTENDED TO THEIR SPONSORS

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E. WORMAN (BRS.4185), 92 Kenwood Road, Bordesly Green E., Birmingham, 9.
T. J. PARRY (BRS.4186), 20 Erskine Road, Colwyn Bay.
F. H. WRIGHT (BRS.4187), Sheepdown Cottage, Petworth, Sussex.
D. W. TUCKER (BRS.4188), 49 Gordon Road, S. Woodford, E.18.
A. A. NICHOLLS (BRS.4189), 42 Oldfield Road, Bexleyheath, Kent.
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C. D. RUSSELL (BRS.4193), 3 Greenfield Close, Patcham.
A. J. REYNOLDS (BRS.4194), 65 White Horse Road, East Ham, E.6.
J. V. MCDONALD (BRS.4195), 83 Loopland Park, Castlereagh Road, Belfast.
S. J. MITCHELL (BRS.4196), 16 Prince Edward Park, Stranmillis, Belfast.
V. A. HOLLISTER (BRS.4197), "St. Kilda," Kinsale Road, Knowle, Bristol, 4.
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A. L. DRAKEFORD (BRS.4200), 122 Fowler Street, South Shields.
S. BLUNK (BRS.4201), 23 Manor Park Gardens, Edgware, Middx.
E. J. ALLEN (BRS.4202), 46 High Street, Fareham, Hants.
W. E. ELLERY ANDERSON (BRS.4203), 26 Queens Road, Cheltenham.
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W. VINICOMBE (BRS.4208), 6 O'Connell Street, Hawick, Roxburghshire.
R. BRADLEY, JNR. (BRS.4209), 111 The Quadrant, Cottingham Road, Hull.
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R. W. WHEELER (BRS.4220), 105 Burnside Road, Dagenham, Essex.
F. MEAD (BRS.4221), "Cainhoe," Stoke Road, Bletchley, Bucks.
A. J. HAYWARD (BRS.4222), 1 Bythesea Road, Trowbridge, Wilts.
J. E. CAVE (BRS.4223), 13 Gainsborough Avenue, Blackburn.
A. ARMSTRONG (BRS.4224), 3 Fir Street, Spring Bank, Ingrow, Keighley (transferred from Associate Grade).
L. N. GILBURT (BRS.4225), 21 Fletching Road, Clapton, E.5.
W. O. BROWN (BRS.4226), 91 Charlton Lane, S.E.7.
A. R. TRUMAN (BRS.4227), The Chestnuts, Woodend Green, Hayes, Middlesex.
R. H. MELVILL (A), The Cones, Oxshott Way, Cobham, Surrey.
V. GREEN (A), 3 South Lane, Holmfirth, Huddersfield.

DOMINION AND FOREIGN.

J. T. SVOBODA (OK2NB), R.A.F.
A. BARACZ (SP3FB), R.A.F.
J. G. BROWNELL (VE4BU), R.C.A.F.
D. SCHOLES (VE5DY), 1614 Pinewood Avenue, Victoria, B.C., Canada.

Dit Dit Dah Dah Dit Dit No. 1

The answer to the Question "Who was the Director General of the B.B.C. in 1928" should have read Mr. J. C. W. (now Lord) Reith. Lord Reith's elevation to the peerage occurred after Mr. Roe prepared his copy.

"HAM-RADIO" CROSSWORD No. 9

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WANTED.—A.C./D.C. Communication Receiver, NC8OX, NC44, or similar.—Full details to G3UK, 12 Terry Street, Dudley, Worcs.

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WANTED.—McClure All-Wave Silver-Super SX16, 17 or 18, or similar.—PARK, 45 Westholme Road, Manchester, 20.

WANTED.—National HRO or similar type Tuning Condenser Unit and Dial, preferably with stripped chassis.—Details and price to: GOUCK, 4 School Drive, Dundee.

WANTED.—National HRO or 100X or 101X or RME 69, with DB20 or Hammarlund HQ120X. Must be in good condition.—G3HZ, 57 Briarlands Avenue, Sale, Cheshire.

WANTED.—National standard HRO, complete with coils, speaker, power pack for 230 volts. Good cash price for guaranteed receiver. Write or call.—2 Church Street, Evesham.

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Ham Hospitality

The following additions and corrections should be made to the comprehensive list published last month:—

East Grinstead.—F. J. Forbes (2BFC), 78 West Hill. Phone: Day, East Grinstead 162; Evening, East Grinstead 941.

Gorleston-on-Sea.—E. F. Buck (BRS.3821), 24 Priory Street.

Ilford.—C. H. L. Edwards (G8TL), 10 Chepstow Crescent. Newbury Park. (Mondays to Wednesdays, inclusive.)

Sudbury, Suffolk.—C. H. L. Edwards (G8TL), "Speedway," Bartholomews Road. (Thursdays to Sundays, inclusive.)

Under **Boston.**—Dr. Gee's address should appear as "Stonehaven," Horncastle Road.

Under **St. Margarets-on-Thames.**—Mr. Roe's telephone number is Popesgrove 4871.

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C.40/500	40	20-34 H.	500Ω	6/-
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C.60/400	60	25-34 H.	400Ω	8 8
C.60/500	60	18-30 H.	500Ω	8 8
C.100/400	100	20-34 H.	400Ω	10/8
C.150/185	150	20-34 H.	185Ω	15/4
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All complete with transformer. Rola 6½ in., 15/-; 10 in. P.M.s, 22/6; Goodmans 8 in. P.M.s, 20/-.

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Plessy 8 in. 175 ohm field, 7/6; 10 in. B.T.H. 1,600 ohm field, less transformer 11/6.

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Premier 3-Band S.W. Coil, 11-25, 19-43, 38-86 metres. Suitable any type circuit, 2/11.

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S P.301—300-300 v. 150 m.a., 4 v. 2-3 a., 4 v. 2-3 a., 4 v. 1 a., 4 v. 1 a. ... 17/4

S P.350A—350-350 v. 100 m.a., 5 v. 2 a. (not C.T.), 6.3 v. 2-3 a. ... 16/-

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Complete Kit of Parts with drilled chassis, all components. Plug-in Coils covering 13-170 metres, 4 valves and full instructions and circuits, **£6-14-6.**

Battery Version also available—

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	Kit of Parts with Valves £ s. d.	Completely Wired and Tested £ s. d.
4-watt A.C. Amplifier	2 14 0	3 11 6
6-watt A.C. ,,	6 16 6	7 13 6
8-10 watt A.C./D.C.,,		7 9 0
15-watt A.C ,,	7 18 9	9 8 0

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25 m.mfd. ... 2/6 160 m.mfd. ... 3/7
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Will match any output valves to any speaker impedance.

11 ratios from 13 : 1 to 80 : 1, 5-7 watts, 16/10. 10-15 watts, 21/10. 20-30 watts, 36/10.

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A LANDMARK IN COMMUNICATION RECEIVER DESIGN

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SPECIFICATION of MODEL "358"

The receiver employs one stage of R.F. amplification frequency changer, two I.F. amplifiers, a separate beat frequency oscillator, octal base Mullard or Osram 6·3 volt valves. Frequency range is continuous from 22 Mc. to 1·25 Mc., using four fully-screened interchangeable coil units. Five additional coil units extend the range to 31 Mc. and 90 Kc. The large illuminated dial is accurately calibrated with the four standard coils and additional coils are supplied with separate graph. High and low impedance head-phone jacks are provided, and to simplify maintenance a meter and test switch is fitted to check emission of each valve. Main tuning control incorporates fly-wheel drive and spring-loaded Tufnol gearing (ratio 70-1).

To facilitate re-tuning to any given position, a logging scale is incorporated. This supersedes the old type band-spread control.

Separate power unit is provided to assure freedom from drift and overheating of the R.F. and I.F. stages.

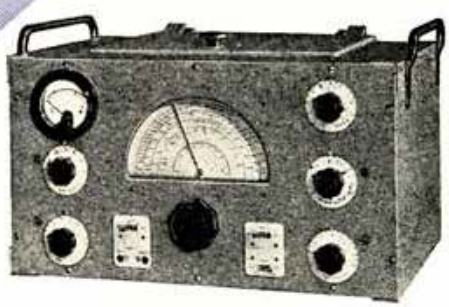
PRICES AND COMPLETE SPECIFICATIONS ON REQUEST

Medium Frequency Model "400"

Model "400" has been developed; in general design similar to the "358" but provided with four coils only covering frequency range from 130 Kc. to 2,200 Kc. The entire frequency range is accurately calibrated on the main illuminated dial and a separate logging scale, as in the "358," is provided.

Dual-Ratio Loud Speaker

A robust 7-inch cone unit permanent type speaker supplied with dual-ratio transformer input impedances, 600 ohms and 7,000 ohms, is designed to match the welded steel, grey crackle finish receiver cabinet.



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