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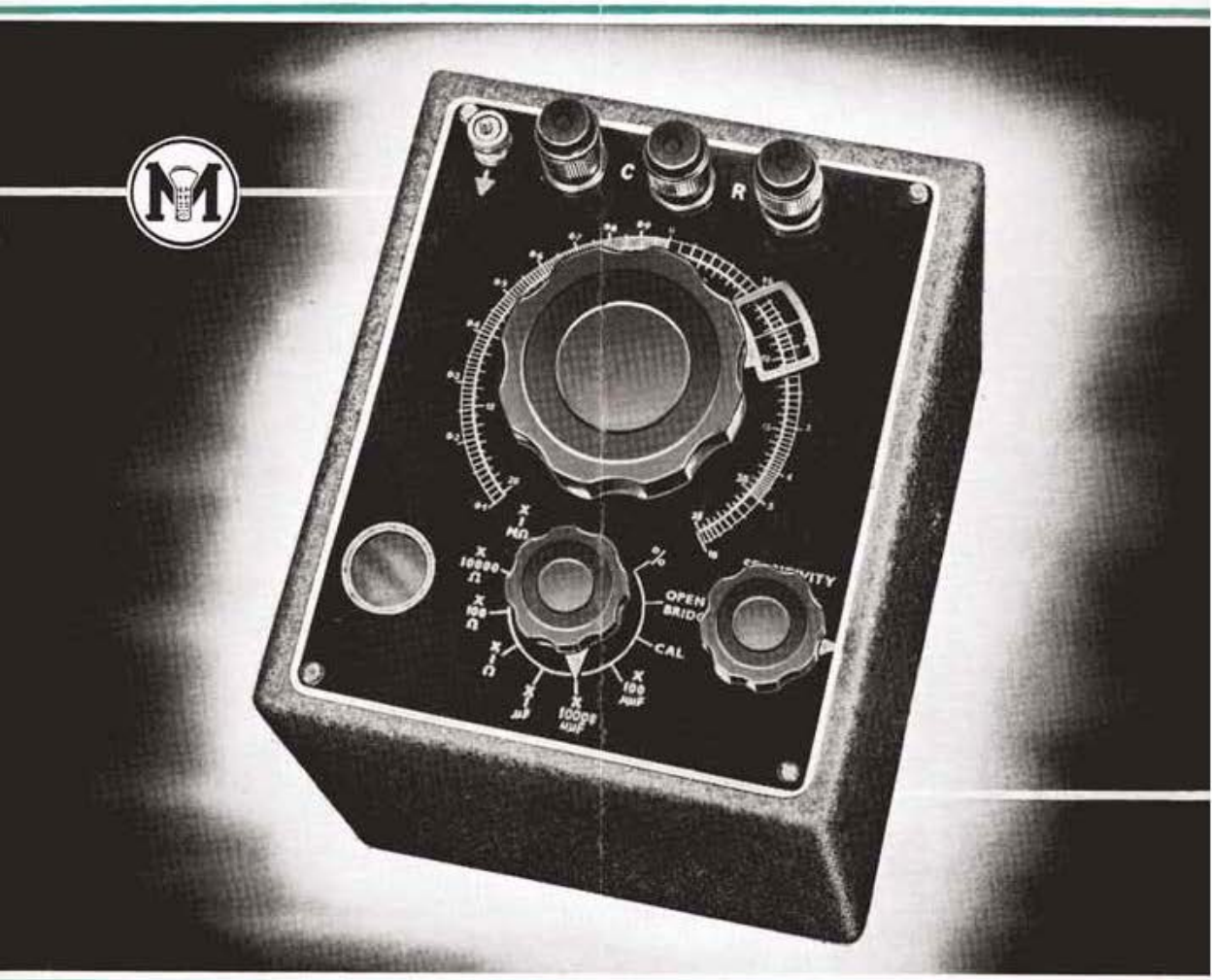
BULLETIN

JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN



- SERVICE RADIO TRADES
- THE PROPAGATION OF RADIO WAVES
- PHOTO-ELECTRIC TONE GENERATOR

R.S.G.B. BULLETIN

OFFICIAL JOURNAL OF THE INCORPORATED RADIO SOCIETY OF GREAT BRITAIN

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General Editor: JOHN CLARRICOATS.

Editorial Office:
NEW RUSKIN HOUSE,
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Telephone: Holborn 7373.

Advertisement Manager: HORACE FREEMAN

Advertising Office:
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SERVICE RADIO TRADES

FROM a study of the statement on Post-War Licence Policy published in the March, 1945 issue, members will have noted that the G.P.O. has agreed to the proposal, first put forward by the Society in July, 1941, and referred to again in March, 1943, that applicants for a post-war amateur experimental transmitting licence who have served in a radio trade in the Navy, Army or Air Force (which is recognised by the G.P.O.) and who can produce satisfactory evidence of proficiency, may cite this as technical and/or Morse qualifications for the granting of such licence.

Those who qualify for Morse only will be required to pass a simple technical examination, whilst those who only qualify technically will be required to pass a 12 words per minute Morse test. Those who have qualified by service in certain radio trades (*e.g.* R.A.F. Wireless Operator Mechanic) will be exempted from both the Morse and technical tests.

In order to assist members who are serving, or who have served, in a Service radio trade since September, 1939, a list of trades has been prepared, which it is anticipated will be recognised by the G.P.O.

It is understood that Services personnel will, upon discharge, receive a Discharge *Leave* Certificate which will state the trade or trades in which they have served. Pending the issue of the usual Discharge Certificate an applicant for a licence may submit his Discharge Leave Certificate as evidence of proficiency.

The lists which follow, show the trades which will carry exemption from Morse and/or technical examinations.

Royal Navy (including Reserves)

Exemption	*Trade or Branch*
Morse ..	Telegraphist Branch. Naval Airmen Air Gunners. Observer Officers, F.A.A.
Technical ..	Leading Radio Mechanics and above. Petty Officer Telegraphists and above. Petty Officers (R.D.F.) and above.
Morse and Technical.	R.N. (S.) Officers. R.N.V.R. Officers qualified in H.F. D.F.

Army (Royal Signals)

Morse ..	Operator, Wireless and Keyboard Operator, Wireless and Line.
Technical ..	Officers who have attended the Long Lines Course at School of Signals, Catterick.
Technical ..	Foreman of Signals. Electrician Signals. Instrument Mechanic. Linesman Mechanic.

Army (R.E.M.E.)

Technical ..	Officers of the following grades :— Electrical and Mechanical Engineer (Wireless and Radio). Wireless Maintenance Officer. Radio Maintenance Officer. Telecommunications Officer. Other ranks of the following grades :— Armament Artificer (Wireless). Armament Artificer (Radio). Radio Mechanic. Wireless Mechanic.

Royal Air Force (including Reserves)

Morse ..	Wireless Operator. Wireless Operator Air Gunner.
Technical ..	Wireless Mechanic. Radio Mechanic. Wireless Electrical Mechanic.
Morse and Technical.	Wireless Operator Mechanic. Air Observer W./T.

In the case of R.A.F. or R.A.F.V.R. Signals Officers their names appear in the Air Force List under Signals Branch. All officers serving in this Branch have passed through a Signals Officer's Course at Cranwell or elsewhere. The course covers Morse and Radio Theory to a standard comparable with that of Wireless Operator Mechanic. Such officers, therefore, will be exempted from Morse and technical examinations.

Signals Officers (R.) are specialists and their case will have to be considered separately, although it is known that many have graduated from the normal Signals Branch in which case they will have attained proficiency in Morse and Radio Theory.

Women's Services

Applications from members of the W.R.N.S., A.T.S. and W.A.A.F. who have similar qualifications will be dealt with on the same lines as those for the male Services.

Special Cases

It is possible that certain members may be serving in special Service radio trades not listed above. Such members are advised to communicate in the first instance with their Commanding Officer who will be

(*Continued on page* 176)

THE PROPAGATION OF RADIO WAVES

By B. H. Briggs (2FJD)*

PART V

The Earth's Magnetic Field. Short-Period Ionospheric Disturbances. Long-Period Disturbances. Effect of Thunderstorms. Luxemburg Effect.

IN the previous articles it has been shown how closely the propagation of radio waves is related to the sun, and consideration has been given to the regular variations which take place due to changes in the position of the sun, and to the sunspot cycle. In addition to these regular variations, there occur, from time to time, other quite irregular and more or less sudden changes. These are known as *ionospheric disturbances*. It is found that these are also due to the sun, and are associated either with particular sunspots on the sun's disc, or to the bright hydrogen eruptions which were mentioned in Part I.

Ionospheric disturbances are accompanied by irregular changes in the magnetic field of the Earth. It is proposed to consider, first, the theory of this field.

The Earth's Magnetic Field

The magnetic field of the Earth is roughly the same as that which would be produced by a bar magnet placed at its centre, with its axis along the line joining the Earth's magnetic poles. Superimposed on this main field, however, there are small daily and seasonal variations, and also a variation with the sunspot cycle. This makes us suspect at once, that part at least of the field, is controlled by the sun. The variable part is believed to be due to the magnetic field of electric currents flowing in the ionosphere, the currents varying in magnitude in accordance with the changes of ionization. The heavy ions as well as the electrons contribute to this current. The total current flow causing the daily variation in the Earth's field, may be as much as 200,000 amps., but the current *density* is of course quite low, owing to the fact that the current is distributed in a sheet over the whole surface of the Earth. In studying the magnetic field at any place on the Earth, it is normal to measure three quantities, the *horizontal component* of the field (H), the *vertical component* (Z) and the *declination* (D), which specifies the direction of the horizontal component. The regular variations mainly take the form of a change in the value of the horizontal component, and this is what we should expect, if they are produced by a horizontal sheet of current in the ionosphere.

Short-Period Radio Disturbances

(Also known as *Ionospheric Irruptions*, or *Dellinger Fade-outs*)

The effect of this type of disturbance on short wave transmission is very spectacular. Signals from about 7 Mc/s. to 20 Mc/s. may be heard at normal strength when they will suddenly fade, and in a few seconds become completely inaudible. Sometimes there is an increase in the noise level, or a hissing, just before the fade-out. The effect is often preceded by the reflection of waves of very high frequency, up to 40 Mc/s. and there is very short skip on the 14 and 28 Mc/s. amateur bands. There follows complete absorption of the sky waves of all but the very shortest waves. The effect only occurs on the sunlit side of the Earth, but is simultaneous over the whole of this region, being most intense at the equator. If the disturbance occurs at midday, all signals will be equally affected. If it occurs at sunrise, signals from the East will disappear, for these are travelling in the sunlit hemisphere. Similarly, if it occurs at sunset, signals from the West will disappear. Normally, the fade-out lasts for less than 15 minutes, but it may last as long as an hour in some cases. The disappearance of signals is very rapid, but the recovery to normal conditions takes place more slowly. During the disturbance there is a sudden change in the Earth's field, especially in the horizontal component, of a type which can be explained by a sudden increase of the electric currents normally flowing in the ionosphere. This also occurs only on the sunlit side of the Earth. These effects are shown for a typical short-period disturbance in Fig. 19.

It has been found that these short-period disturbances are simultaneous with the outburst of bright eruptions on the sun. An effect can be produced by an eruption anywhere on the sun's disc, but it is greatest when the point of the eruption is directly facing the Earth. The generally accepted explanation is that there is a sudden increase in the ultra-violet light reaching the Earth, this being of such a wavelength that it is able to penetrate the part of the

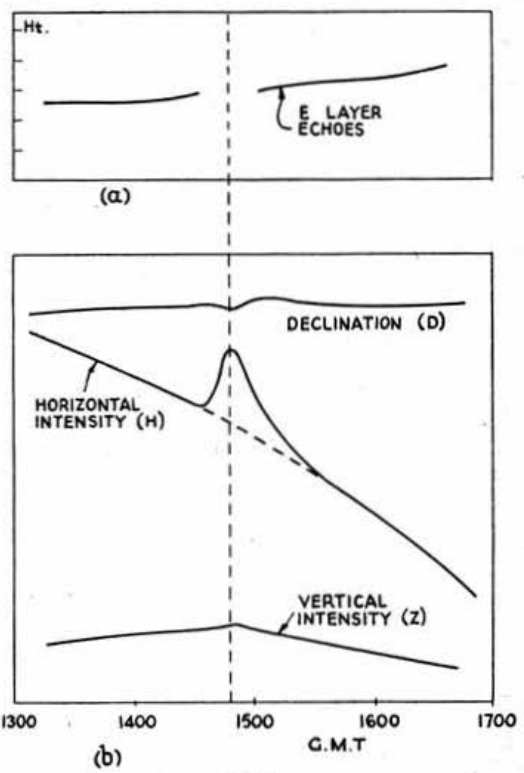


Fig. 19.

Typical short-period radio disturbance. The upper diagram shows the cessation of echoes from the E layer during the period of the disturbance, and the lower one the related changes in the Earth's field. There is a sudden increase of H during the disturbance, which is superimposed on a general downward trend due to the normal daily variation.

* 20 *Lindley Drive, Gt. Horton, Bradford, Yorks.*

atmosphere where the normal ionized layers are formed, and so is able to produce very heavy ionization low down, below the E-layer. The collision frequency in this region is so high that short radio waves are completely absorbed. On long waves, where the ionosphere is behaving as a conductor, there may actually be an improvement in transmission. The increased ionization causes an increase in the electric current system, and so accounts for the change in the horizontal component of the Earth's field. When the bright eruption on the sun dies down, the heavy ionization disappears quite quickly, for it is in a region where recombination will be very rapid.

The complete absorption of signals makes it impossible to observe the E and F layers by the usual echo methods during the fade-out, but observations made immediately afterwards show that they are very little affected. Since any increase in ionization of these layers could not disappear so rapidly, we can only conclude that the layers were unaffected during the disturbance.

Disturbances of this type occur at quite irregular intervals. In general they are more frequent at sunspot maximum than at sunspot minimum. During a disturbance the only thing one can do is to try raising the frequency of transmission. By this means the attenuation of the sky wave will be decreased, and if the fade-out is not too severe it may be possible to carry on communication.

Long-Period Disturbances (Magnetic Storms)

This type of disturbance differs from the short-period disturbance in that it occurs simultaneously all over the Earth, instead of being confined to the sunlit side. It also lasts much longer, several hours or days elapsing before conditions return to normal. Investigations made during the disturbance show that the whole ionosphere is in a disturbed condition, the upper part being particularly violently affected. The F region becomes expanded and diffused, presumably due to the existence of a very high temperature, and the ionization density drops much below normal. Weak and erratic echoes are obtained from very great heights, almost as if the F layer had exploded upwards in a series of fragments. If the disturbance is not too severe, the E layer may not be much affected, so that it may be possible to carry on communication by E layer reflections. In some cases there may be heavy ionization produced below the E layer, as in the case of the short period disturbances.

The effect on radio communication is most severe for transmission paths passing near to the Earth's magnetic poles, and is least at the Equator.

These disturbances are usually accompanied by very large fluctuations in the Earth's field. The magnetic effects, which were known long before the development of short wave communication, are known as *magnetic storms*. They are sufficiently violent to interfere with power lines, and line communications. The changes are greatest in the vertical component of the Earth's field, so that they cannot be explained by a mere increase in the normal current system in the ionosphere. Displays of aurora in the region of the Earth's magnetic poles usually take place during the magnetic storm.

It is found that the disturbances usually take place a short time after a sunspot has crossed the central meridian of the sun (*i.e.*, the position in which the spot is directly facing the Earth). The lag between the central meridian passage (C.M.P.) of the spot, and the occurrence of the disturbance, is between one and four days. In many cases the same sunspot can exist for several rotations of the sun, and each reappearance can cause a disturbance. The period of rotation of the sun is 27 days, and so the disturbance tends to recur after 27, 54, 81, etc., days. Strangely enough, the most violent disturbances seldom recur, but the milder ones may recur many times.

We are presented here with a different problem from any with which we have had to deal so far, for the disturbance cannot be due to any kind of electromagnetic radiation from the sun, owing to the large time-lag involved. We have to assume that it is due to particles of some kind being projected from the sun, and striking the Earth's atmosphere. It is believed that the solar prominences mentioned in Part I, which frequently occur over sunspots, are responsible. Particles projected from the sun with a velocity of 1,600 Km/sec. would reach the Earth in 26 hours, and prominences ejected from the sun have been observed to be moving with velocities of this order when leaving the surface. They are believed to consist of charged particles, which, when they reach the Earth, are deflected into the region of the Earth's magnetic poles by the Earth's field. Here they produce the aurora. It has also been shown that the changes in the field during a magnetic storm could be explained by the existence of two current belts flowing along and within the auroral zones, such as might be produced by these charged particles. Each of these two relatively small regions would carry a storm-current of more than half a million amperes. The whole storm current system over the remaining 90 per cent. of the Earth may add up to another half million amperes. The theory is able to explain the main effects of the long-period disturbances. It is also thought that the long delay echoes mentioned in Part IV may be explained by reflections from the ionized gases of the solar prominence which are still far out in space between the Earth and the sun.

Fig. 20 shows some observations made by Mr. E. J. Williams, G2XC, of signals on the 28 Mc/s. band, together with data on sunspot positions, and magnetic disturbances. The correlation between the three phenomena is clearly shown.

The disturbances are naturally more frequent at sunspot maximum than at sunspot minimum. In general *lower frequencies* should be tried for transmission during this type of disturbance, owing to the reduced ionization density of the layers.

Since bright eruptions tend to occur in disturbed regions of the sun's disc in the neighbourhood of sunspots, there is a certain correlation between long and short-period disturbances. Thus if a short-period disturbance is produced by an eruption on the central meridian of the sun it may be followed, after the usual period of a day or two, by a long-period disturbance. A short period disturbance which is due to an eruption in any other position on the sun's disc will not, however, be followed by a long-period disturbance, as the particles projected from the disturbed region will not strike the Earth.

Effect of Thunderstorms on the Ionosphere

A good deal of experimental evidence suggests that some, at least, of the sporadic patches of ionization in the E layer, may be due to the effect of thunder storms occurring in the lower atmosphere. Thus Table III shows some observations of Sporadic-E ionization made in India. It will be seen that abnormal ionization is much more likely when there is a thunderstorm, but unfortunately it also occurs at other times, so that this cannot be the complete explanation.

There are three possible ways in which a thunderstorm could affect the ionosphere. It may be that the high electric field associated with a thundercloud is

sufficiently intense to cause extra ionization, electrons being ejected from the molecules by the strong field. Or, electrons which always exist in small numbers low down in the atmosphere, may be accelerated upwards by the field and so add to the free electrons already present in the ionosphere. The most likely explanation, however, is that the electric field accelerates the electrons already present in the E layer to such high velocities that they are able to cause additional ionization when they collide with neutral gas molecules. (*Ionization by collision*). Detailed calculations of the field to be expected from the thunderstorm show that this process is theoretically possible. It will be noticed that this effect is an exception to the statement made in Part I, that the ionosphere is never affected by weather phenomena in the lower atmosphere.

TABLE III.

RELATION OF SPORADIC-E IONIZATION TO THUNDERSTORMS (BHAR AND SYAM. *Phil. Mag.* **23**, 1937).

	Cases of Normal Ionization	Cases of Abnormal Ionization	Tota
No thunderstorm ..	79	22	101
Thunderstorm ..	1	20	21
Total	80	42	122

The Luxemburg Effect

It is found that in some circumstances there is an interaction between two radio waves, which are being reflected simultaneously from the same region of the ionosphere. The effect was first observed between the transmitters at Beromünster and Luxemburg, and later with other medium wave stations. The modulation of the long wave high power station at Luxemburg could be heard on the carriers of these other stations. The effect only occurred at night, and for stations which were roughly in line with the receiving point, showing that it only occurred when reflection was taking place simultaneously from the same part of the ionosphere.

The effect can be explained as follows. A very high power long wave station will cause very large amplitudes of oscillation of the electrons in the E layer, and may appreciably increase the frequency of collision with gas molecules above its normal value. The collision frequency will, therefore, vary with the modulation of the high power station. Now, as we have seen many times previously, the collision frequency determines the attenuation of any wave passing through the region, and so the attenuation of the sky wave of the medium wave station will vary according to the modulation of the long wave station. In other words, the modulation of the long wave station will be impressed on the medium wave station.

Normally, a very high power station and a long wavelength is needed to show the effect. There is one exception to this, however. If the frequency of the transmitter is very near the resonance frequency of the electrons in the Earth's magnetic field (*i.e.*, around 200 metres), there may be very large amplitudes of electron oscillation even with low powers. In this way the effect has been observed with powers as low as 1 Kw.

The Importance of the Radio Amateur in the Study of Radiowave Propagation

We have now reached the end of our study of the propagation of radio waves. The amateur worker has contributed much to our knowledge of the subject in the past, and there is still good scope for research. There is no commercial or experimental organisation in the world which can have at its disposal such a widespread distribution of transmitters and receivers, as is provided by the amateur stations of the world, which are to be found in every corner of the globe. This gives the amateur a great advantage in the study

(*Continued on page* 174)

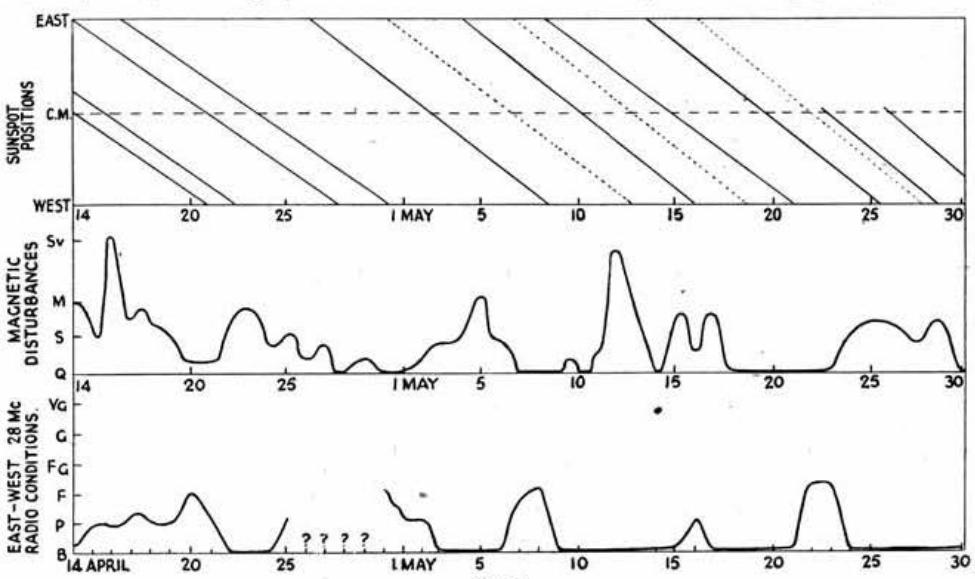


Fig. 20.

Graphs showing Radio Conditions, Magnetic Disturbances, and Sunspot Positions for the period from April 14 to May 30, 1938. The sloping lines are intended to show the position of various spots on the sun's face each day. Spots travel from the East limb of sun, across the central meridian (CM) to the West limb. Note the tendency for magnetic disturbances to occur one to two days after the central meridian passage of the spots. Also notice that a rise in the Magnetic graph usually corresponds to a fall in the Radio graph.

Notation: B, bad (no signals); P, poor; F, fair; FG, fairly good; VG, very good; Q, quiet; S, slight; M, moderate; Sv, severe; ? no observations. The dotted lines represent smaller spots.

A PHOTO-ELECTRIC TONE GENERATOR

By R. F. E. O'Connor (BRS4348).

IN testing the audio-frequency response of amplifiers and loudspeakers, some form of tone generator is necessary. It is very desirable that it should produce a good wave-form and uniform amplitude at all frequencies within its range. A valve oscillator possessing these characteristics is expensive and at present difficult to obtain.

With the photo-electric equipment to be described the accuracy is all that is desired for a commercial standard of sine wave, while continuous variability from 0–6000 c/s., with constant amplitude, is easily obtained.

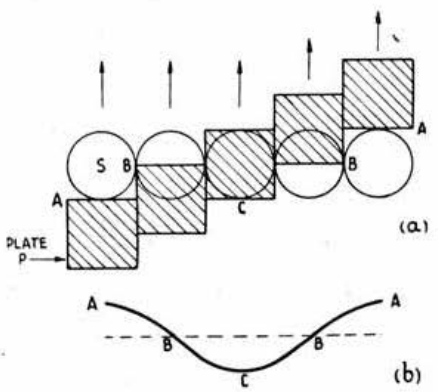


Fig. 1.

Illustrates the principle of operation of the photo-electric tone generator.

The Principle of Operation

If a circle is gradually covered, at a constant speed, by a plate having a straight edge, the rate of decrease in area will not be constant.

Consider Fig. 1a; if the plate *P* is moved over the circle *S* at a constant linear velocity from point *A*, it will be apparent that the rate of change of area will increase, while the area itself decreases, until the plate reaches point *B* on the circle, where the rate of change of area is a maximum. The greatest width is now covered. As the movement continues in the same direction the rate of change of area uncovered will decrease until point *C* is reached. The circle is now completely covered.

Thus the area is progressively decreased at an increasing rate to *B* and then at a decreasing rate to *C*.

If the vertical motion is continued—gradually uncovering the circle again—the opposite to the foregoing will be observed. The rate of change of area will again increase as far as point *B* (where it is a maximum), and then decrease to point *A*. As the circle is again uncovered, a complete cycle of closing and opening has obviously taken place.

The rates of change, which can be plotted out for each quarter-cycle, will be found to give almost a pure sine wave, as shown in Fig. 1b. Actually all values are positive, but an artificial zero occurs at *B*-*B* due to the reversal of area rate-of-change at these points.

Clearly then, if the sequences are repeated, a continuous sine wave will be produced, the frequency depending upon the number of complete sequences per second.

Application

By projecting a beam of light through a circular hole in opaque material on to a photo-electric cell (which is progressively covered as described above) a signal will be produced from the cell in the form of a sine wave, because the resistance change of the cell is proportional to the change in light admitted to it. If, for convenience, a series of holes is arranged round the circumference of a disc, a continuous signal will be produced by a revolving motion.

Construction of the Generator

To keep the disc light in weight, thin material, just sufficient to support itself, must be used.

A useful radius for the holes can be calculated from the formula:

$$\text{Radius} = \frac{L/2}{\sin \theta/2},$$

where L = length of chord, which is the distance between the centres of one pair of holes in the disc, and $\theta = \frac{360^\circ}{N}$, N being the number of holes required.

If this number is made a simple factor of 360°, it is an advantage for calculating the speed of the disc for a desired frequency.

Choosing 60 holes of 0·310 in. diameter, the distance between the holes must, of course, be 0·310 in., hence $\theta = \frac{360^\circ}{60} = 6^\circ$; $\sin\frac{\theta}{2} = 0{\cdot}0523$.

Therefore the radius is $\frac{0{\cdot}62/2}{0{\cdot}0523} = 5{\cdot}93$ in.

As shown in Fig. 2, a suitable overall diameter for the disc would be 13·5 in.

The frequency at any speed may be found from the formula: $f = \left(\frac{N_s \times \text{speed of disc in R.P.M.}}{60}\right)$ where f is in cycles per second. It will be noted that if N = 60, the frequency in c/s. is the same numerically as the speed of rotation in R.P.M. By cross-marking round the circumference of the 5·93 in. radius circle, with dividers set at 0·62 in., 60 points will be obtained.

The holes should be punched or drilled cleanly and accurately on the markings, great care being taken in the operation.

A motor of not less than 1/16 h.p. should be used,

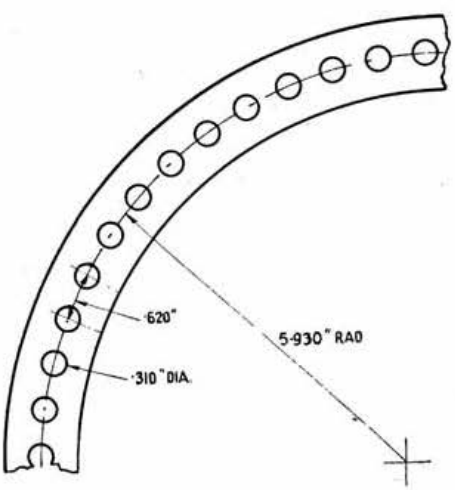


Fig. 2.

Disc dimensions

to facilitate a quick change from a low speed to the maximum desired. An electric cleaner motor is ideal for the purpose. To control the speed, and hence the frequency, a variable resistance should be inserted in series with the motor. The centre of the disc should be fitted with a suitable bush, bored to fit the motor spindle.

A form of friction-damping is an advantage in order to facilitate quick reduction of speed. The motor and disc should be mounted on a rigid frame as shown in Fig. 3.

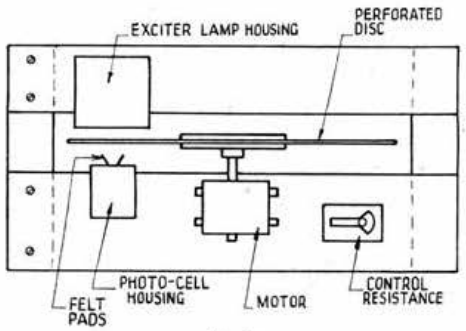


Fig. 3.
Method of mounting motor and disc.

It is preferable to use D.C. for the exciter lamp, which may be of low or high voltage. If A.C. is used, a lamp of the 80 watts sound-film exciter type should be employed, to reduce the A.C. 50 c/s. ripple to a minimum. With a low-voltage lamp it is desirable to concentrate the light with a lens on to a square aperture cut in the end of the lamp housing. The aperture should be 0·310 in. square and covered with a ground-glass diffuser. If a high-voltage lamp is used the power supply must be capable of delivering 50 to 60 watts owing to the loss of light concentration, due to the increased filament area, but such a lamp has the advantage that condensing is not required because of the greater amount of light available.

Care should be taken to exclude all light from the photo-electric cell housing aperture other than that from the exciter lamp. This can be done by fixing felt pads round the aperture close to the disc.

The photo-electric cell passes more current when more light falls upon the cathode. In Fig. 4, it will be seen that this current must also flow through *R*3 and an increase in current through *R*3 must, of course, be accompanied by an increase in voltage across it. Thus a change in light intensity on the cell gives rise to a change in voltage applied to the grid of value V. *C*2 is necessary to prevent any steady voltage across *R*3 reaching the grid of the valve. The signal thus amplified by the valve *V* (which should have an amplification factor of not less than 40) is fed to the input of a main amplifier, which should have a straight line characteristic and variable impedance output for matching purposes. The H.T. and heater supplies for the photo-electric cell and the valve *V* can be obtained from the main amplifier. The photo-electric cell should be of the gas-filled type similar to the Osram CMG8, requiring a maximum of 90 volts, while the valve may be a similar type to the Osram MH4.

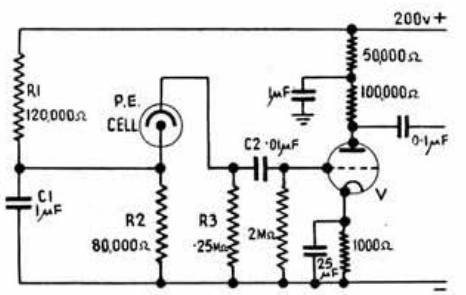


Fig. 4.
Circuit of photo-electric tone generator.

As the frequency is dependent upon disc speed, the control resistance can be calibrated by means of a tachometer.

No trouble should be experienced in producing a reliable and versatile tone generator if the above details are given careful attention.

Sir John Ambrose Fleming—1849-1945

THE name of Sir J. Ambrose Fleming, M.A., D.Sc., F.R.S., will long be remembered as one of the most outstanding in the history of radio and electrical engineering. Born in 1849, he was already a highly skilled mathematical engineer when the new electrical industry was making its first strides. The telephone and electric lighting owe much of their early development to him.

Fleming took an active interest in the original experiments conducted by Senator Marconi to communicate across the English Channel by means of wireless telegraphy. Writing of these experiments in *The Times* of April 3, 1899, Fleming said: "*The apparatus, moreover, is ridiculously simple and not costly. With the exception of the flagstaff and* 150 *feet of vertical wire at each end, he can place on a small kitchen table the appliances, costing not more than* £100 *in all, for communication across* 30 *or even* 100 *miles of channel.*"

The progress of the radio art through the coherer, the magnetic detector, the electrolytic detector, the frog's leg receiver and so on, was a matter of first-hand experience to Fleming. In 1890 he had already been investigating the conduction of electricity between electrodes at different temperatures in high vacua. His invention in 1904 of the diode detector, called by him an *oscillation valve*, marked the beginning of the radio valve industry and of radio communication as we now know it.

He assisted in the design of the first Transatlantic transmitting station at Poldhu, Cornwall, and for 30 years was Adviser to Marconi's Wireless Telegraph Co., Ltd.

The greater part of his long career, which is commemorated by nearly 100 scientific papers and some 20 books, was spent in academic circles. At University College, London, he occupied the Chair of Electrical Engineering for 42 years.

Sir Ambrose Fleming was a vice-president of the Society. S.K.L.

OUR FRONT COVER

OUR front cover illustration shows a Resistance and Capacity Measuring Bridge, one of the range of test instruments made by the Mullard Company.

The bridge is a robust A.C. driven unit which can be used for the measurement of resistances between 0.1 ohm and 10 megohms, or capacities between 10$\mu\mu$F and 10μF using internal standards. It is very simple to operate—balance is indicated by the opening of the sensitive tuning indicator, and the value of the unknown component can be read directly from the scale. Alternatively it can compare two similar impedances, or the internal balance indicator may be used to detect signals of 1 millivolt and upwards.

AN ECONOMICAL 10—80 METRES THREE VALVE BATTERY OPERATED RECEIVER

By A. SIMMONS (BRS5251).

THE receiver to be described has been in operation approximately twelve hours a day for the past eighteen months, giving excellent results on all the bands for which it was designed.

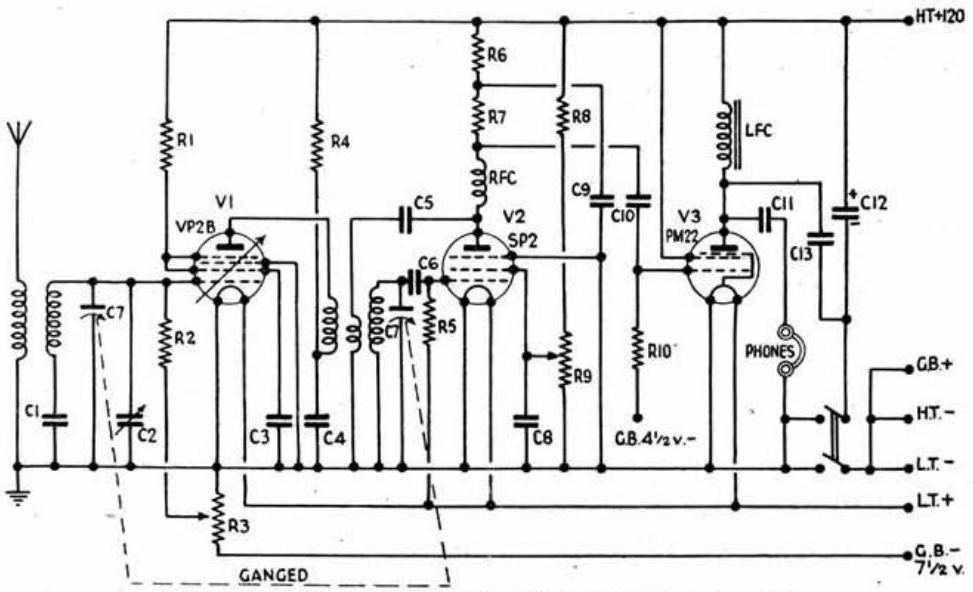
Circuit Description

Reference to the circuit drawing will show that three valves are employed, namely : a VP2B variable-mu RF pentode, a SP2 RF pentode, and a PM22 output pentode. Ganged RF and grid tuning condensers are used, with a 25 μμF variable across the RF section. The latter condenser will prove effective in improving the matching between coils, caused by slight discrepancies in the circuit wiring. A potentiometer is used as RF gain control to limit the input from the more powerful stations, and this will be found useful for improving signal-to-noise ratio.

The RF coils are standard four pin type, the reaction winding being used as aerial coupler. Grid coils are six-pin, with the primary winding in the anode of V1. This winding is decoupled by R4 and C4, as it was found that on the 28 Mc/s. range the receiver was slightly unstable. The reaction for V2 is obtained *via* C5 and the potentiometer R9. It may be necessary to experiment with the value of C5. Providing that all grid and anode leads are kept as short as possible very little trouble should be found in obtaining consistent reaction on all bands stated.

In the interests of economy and quality of reproduction, resistance-capacity coupling is used in the circuit of V2.

A 4 μF condenser (C12) of the dry electrolytic type was used across the H.T. in the original model, but this has since been replaced by a small 2μF, paper type ; no change was noticeable in circuit stability. When the H.T. battery begins to run low its internal resistance will increase and instability may occur if C12 is not present to bypass the RF to earth *via* the battery. The double-pole switch was used to prevent a slight current drain from the H.T. which occurred *via* C12, but this need not be used if a good quality paper type condenser is substituted.



CIRCUIT OF 10—80 METRES THREE-VALVE BATTERY OPERATED RECEIVER.

C1	·01 μF	C7	·00016 μF	R2, 5	1 megohm
C2	25 μμF	C9	2 μF	R3, 10	·5 megohm
C3, 8, 11	·1 μF	C10	·05 μF	R4	1,000 ohms
C4	·001 μF	C12	4 μF	R6	30,000 ohms
C5	·0004 μF	C13	·002 μF	R7	100,000 ohms
C6	·0001 μF	R1, 8	50,000 ohms	R9	100,000 ohms

Editorial Note

The receiver described above obtained first prize in the District 4 (Nottingham Section) Constructor's Contest.

Can you Help ?

Mr. J. K. McDowall, GM3AR, 15 Ruthven Avenue, Giffnock, Renfrewshire, recently purchased, second-hand, a Simpson turntable, rated 250 volts, 50 cycles. He finds it impossible, when using the turntable with a BTH crystal pick-up, to eradicate a vibratory condition which transfers itself *via* the needle to the amplifier, and causes a loud 50 cycle note in the speaker. His frequency record stops at 90 cycles, and when using same, the needle jumps right out of the 50 cycle section. As a result, whenever a note bearing an harmonic relationship to 50 cycles appears on the record being played, the reproduction becomes " wavy " ; organ recordings are quite impossible. With the turntable at rest, and plugged into the mains, the needle transfers the note with the same strength as when the turntable is revolving.

The issue of *Wireless World* dated March 26, 1930, which contained a reference to such a condition, stated the fault cannot be eradicated by any mechanical adjustment, and vaguely mentioned a Patent. As no further information can be found on the subject, Mr. McDowall asks " Can you help ? "

Letters to the Editor

More Views on "Netting"

DEAR SIR,—In the November, 1944, issue of THE BULLETIN I read with much interest a letter on "Post-War Licence Conditions," by Lt.-Colonel Postill (G8NO).

Regarding the first point of his letter I feel that compulsory adoption of a system of "netting" would be a mixed blessing. I am of the opinion that the success or failure of this idea would depend to a great extent on what particular branch of Amateur Radio appeals most to the enthusiast. Take the real-dyed-in-the-wool DX man. Real DX, in quite a number of cases, is just audible above "mush" level and would be completely drowned when answering a "Test" call, if on the same frequency as four or five stronger signals bent on the same purpose. Conversely, a low powered station replying to a "CQ" from a highly prized DX station would have little chance of raising him under these conditions. Shades of VR6AY! It is my opinion that this practice would lead to a rush for higher power with a corresponding increase in interference. However, for local or cross-country work the system has much to recommend it and would certainly help to relieve the congestion experienced on 7 Mc/s. during the summer evenings and the week-ends in pre-war days. Summing up I think that some system of "netting" should be instituted on 7 Mc/s. during the aforementioned periods and also be made a permanent feature of the 1·7 Mc/s. band. No attempt should be made to introduce it on 14 or 28 Mc/s.

With regard to G8NO's second point I most certainly agree that some system of amateur procedure should be laid down. In addition, before a licence is granted, I think that the would-be licencee should be required to prove that he has a detailed knowledge of such procedure.

The question of crystal control or master oscillator control I believe is best left to individual preference although, of course, the introduction of "netting" would preclude the use of crystal control.

Yours faithfully,
F. L. FIRTH (G8JD),
(Chief Radio Officer, M.N.)

Substitute Crackle Finish

DEAR SIR,—I was interested to read, in the March BULLETIN, Mr. A. J. Ward's remarks on substitute crackle finish, as for the past few years I have been using more or less the same method. However, I have developed a "modus operandi" which, I feel, has distinct advantages; one being that it is unnecessary to dab on the second coat of enamel; in fact it may be brushed as hard as you wish without in any way disturbing the coating of sand. A further advantage is that the whole operation can be completed in about eight hours. I pass on the method given below in the hope that it may be of use to some of your readers.

(1) The article to be "crackled" is first of all freed of grease oil, or other foreign matter.

(2) A fairly thick coat of *quick drying* black stove enamel is then applied.

(3) The wet enamelled surface is then coated with as much fine sand as it will take. Tip off the surplus and use it again next time.

(4) Allow to dry. (With the enamel I use this takes two hours at 65–70° F.)

(5) Spray over the sand a solution of resin in alcohol. For this I find a de Vilbiss No. 15 or 16 throat atomiser is excellent. (Do not on any account, forget to wash out the spray with alcohol or methylated spirit after use, or it will become permanently stopped up.)

(6) Allow to dry. In a current of air at 65° F. this will take about an hour.

(7) Brush in a second coat of the stove enamel in the normal way. There is no need to worry about disturbing the sand, because the undercoating of resin is practically insoluble in the quick drying enamel.

(8) Allow to dry for approximately three hours at 65° F. If it can be left longer so much the better, as it will give the enamel a better chance of becoming properly hard. Three hours is, however, a sufficient time if the job is urgent and has to be "off the line" in a hurry.

(9) If the article being treated is likely to be subjected to much sliding in and out of leather cases or canvas covers, etc., apply a third coat of enamel *not less* than twelve hours after the second. Allow a further twelve hours for drying.

N.B.—It is as well to sieve the sand before using it, as I have yet to find a commercial grade of silver sand that is completely free of grit, pieces of shell, etc. The formula for the resin solution is as follows:—

Resin	8 oz.
Industrial alcohol	20 oz.

The resin should preferably be powdered in order that solution may take place more quickly. Do not brush on the resin solution or the coating of sand will become very patchy, and the professional appearance of the finished article will be lost.

I shall be pleased to hear from any reader who tries out this method, and will do my best to help by answering any queries on the subject.

Yours faithfully
J. G. MCKENZIE DOWNES (BRS8436).
"Normanhurst," Kingswood, Bristol.

Examination Nerves

DEAR SIR,—Having been a radio amateur since I passed out of "The City School of Wireless Telegraphy" in 1919 and ex-principal of the late "Withington School of Morse," I believe I am in a position to pass comment on many letters that have appeared in THE BULLETIN recently on the question of the issue of transmitting licences after the war.

One mistake made is that of asking for a technical examination before a licence is issued. Nerves can play a great part in an examination, and good amateurs may fail due to this important fact.

One pupil of mine who could send at 25 w.p.m. and receive at 20 w.p.m. failed when he was put to the test at the G.P.O. just because his nerves failed him. If it is deemed necessary to hold a certificate of proficiency, then I insist that it must be the P.M.G. certificate; this would eliminate automatically the G.P.O. test.

I propose that all pre-war licence holders should be re-issued with a licence without question particularly those who have been in the Forces.

A.A. licences should be issued more freely. At the end of a year providing the holder passes a 12 w.p.m. morse test and also convinces the examiner that he is fully conversant with transmitting procedure, that is, the sending of an actual message—*many amateurs did not know this*—a full licence should be issued without the applicant having to answer question 4. This would eliminate to a great extent that disease called "piracy," which was so prevalent before the war.

I fear that several amateurs who have written to you on the subject of the issue of post-war transmitting licences have gone at it like a bull at a red rag without even considering the pros and cons.

Yours faithfully,
LESLIE E. BAXTER (G8HG).

Qualifications for a Licence

DEAR SIR,—In reply to Mr. Graham's (GM3TR) criticism in the December issue of THE BULLETIN relating to my suggestion that the qualification for a research licence should be a degree or equivalent educational standard, I would point out that the words "or an equivalent standard" were included in my original letter. I merely desired to suggest that an individual should not be granted a research licence unless he was qualified to undertake real research work—even as an amateur.

If other evidence that the applicant for the licence is capable of doing research can be produced, I assume this would be acceptable, but the possession of a degree or an equivalent diploma does indicate that a person has followed a course of scientific training and is therefore presumably capable of the analytical thought so vital to research work.

It might be argued that a person would, in effect, have to be a professional radio engineer before he could possess a research licence, thus making it inaccessible to the amateur. This, however, is not quite true in so far as a teacher, a professional engineer (other than radio), or any of the increasing number of professional people with scientific training would be eligible to take up radio research as amateurs.

On the subject of high power, 99 per cent. of experimental work can be conducted on low power and, as I see it, the only justification for the use of high power is on the 14 and 28 Mc/s. bands where American and other amateur stations use high power, and unless a reasonably high power is used one's signals will not be heard.

I should like to see the use of high power restricted to the 14 and 28 Mc/s. bands only whatever the ultimate outcome of the licence re-issue problem.

Yours faithfully,
H. TURNER (G8VN).

Appreciations

DEAR SIR,—I write to inform you of my safe return to England after long exile as a prisoner of war in Germany since June, 1940.

I must express my heartfelt appreciation of the fine work performed by the R.S.G.B. P.O.W. Fund, in supplying books and cigarettes, during the majority of that time.

Thanks to the generosity of members I, and my colleagues, were able to smoke at pre-war rates, and the brands were always excellent. Also the kit-bag supplied was indispensable in the evacuation and subsequent long march out from East Prussia.

As you may imagine, Bulletins stand in a pile almost to the ceiling, and I have much reading ahead of me.

I am, of course, sadly out of touch with everything and all Society news, but I rejoice to see that plans for post-war amateur activity seem well advanced.

Once again many thanks and my 73 to yourself and all fellow members.

Yours sincerely,
FRANK C. MARSHALL (G2XQ).

BRITISH ISLES NOTES AND NEWS

CLOSING DATE FOR JUNE ISSUE IS MAY 31st. - REPORTS SHOULD BE POSTED TO REACH D.R.'s AND SCRIBES BY MAY 26th.

DISTRICT 1 (North Western)

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

Ashton-under-Lyne.—Fourteen members attended the meeting of the local Society held on April 15. After business affairs had been disposed of there was a demonstration of amplifiers followed by a discussion. The meeting concluded with a sale of spare parts. Meetings will be held on May 20 and June 17 at 2.30 p.m. at the A.C.S. Educational Rooms, Stamford Street. G5PX.

Blackburn.—G8JA, who is with the B.B.C. at Moorside Edge, visited 4FD recently. Cliff Sharratt (G4CJ) in another air-letter from India reports having been through the Khyber Pass on the way to the frontier of Afghanistan. He has recently handled some high power American rigs with ¼ in. copper bars as aerial feeders, and remarks on the excellent quality of the gear. 4FD would appreciate news from G6WH and 2FLW. G4FD.

Bolton.—Congrats. to 2ABT and his wife upon the arrival of a junior op.—John Stuart Moorcroft—on April 6. Cliff Higham is at

Members of the Ashton-under-Lyne Radio Society at a recent meeting.

present breaking-in his army boots at a P.T.C. 5419 (of Blackley), a naval stoker, recently returned to this country after a spell of duty abroad and looked in at 2DVQ for a ragchew. 3549 and 5542 have reported by air-mail from C.M.F. and M.E.F. respectively.

Apart from those members with whom the T.R. is in almost daily contact, and our old stalwarts 2ABF and 5395, there has been no response to the appeal in the March notes for support for a revival of the Bolton Radio Society. Further progress in re-organising the club is impossible until we have some idea of the support we can expect from members residing in Bolton and the surrounding townships. The T.R.'s address is 32 Bromwich Street, Haulgh, and only the postal authorities will complain at the size of the mail, so rally round and do not let Bolton be behind the rest of Lancashire in starting up activity once more! 2DVQ.

Carlisle.—The Carlisle Amateur Radio Society, held its first meeting on April 14 in Tullie House Library Rooms. As the meeting was not advertised the attendance was poor. Those present included G3BW (Whitehaven), G3SY (Workington), 2ARW (Carlisle), 2DWG (Workington), and 2AYH (Carlisle). Pre-war and post-war difficulties were discussed.

It is proposed to continue meetings in the above rooms fortnightly and further information can be obtained from 2AYH, of Cammick House, Brisco, Carlisle, or from the local press. 2AYH.

Oldham.—Only four local members attended the March meeting held at G3PO, but four Ashton members were welcome guests. The P.D.M. was discussed and a short debate followed about grid stoppers. Next meeting will be held at G2MQ, 10 Moor Street, Shaw, Nr. Oldham, at 6.30 p.m. on May 27. G2MQ.

Darwen.—The first of a new series of meetings was attended by G8FI, 3VV, BRS9901, 9917, 9466 and 9903. Telegrams and air mail letters of good wishes were received from L.A.M. L. R. Holden (2CNQ) and L./Cpl. J. Simpson (4JS). The T.R. will be glad to hear from Service members and others who will support future meetings. G8FI.

General.—The D.R. would like to thank the T.R.'s for sending him their notes in such good time for editing and publication. They are, however, reminded that their notes should be confined to reports of meetings and news of Service members. It is regretted that owing to space limitations reports about experiments and constructional work undertaken by individual members must at present be omitted. It is hoped that the revival of interest which is taking place throughout the district will continue. G6CX.

DISTRICT 2 (North Eastern)

D.R.: C. A. Sharp (G6KU), 56, Moore Avenue, Wibsey, Bradford. Bdf. 10772. Scribe: H. Beadle (G8UO), 13, Chandos Street, Keighley.

We thank all members who supported the P.D.M. and helped to make it a huge success. A full report appears elsewhere in this issue.

Barnsley.—G5IV, now in Egypt hopes to attend Cairo meetings. He sends 73 to old friends.

Bradford.—We hope that 2BXS, now stationed in Oxon., has recovered from the attack of malaria. 4CL has built two power packs. 3HA is watching these notes for news of 4JB and 2DM.

Doncaster.—2AGH (R.E.M.E.) with the B.L.A., has visited ON4UU, where he was very interested in QSL cards and a two-valve short-wave receiver built for the Resistance Movement. 2AGH would welcome news of 3VG, 4OY, 5GJ and 8BA.

Halifax.—8SJ, who recently visited the Scribe has constructed a bug key. 4645 (R.A.F.) spends his spare time at the 'drome workshops. His double beam 'scope is now working well.

Harrogate.—2CDR, shortly to be married, is trying to arrange Sunday morning meetings.

Huddersfield.—4976 hopes the U.S.A. "Walkie Talkie" band does not happen over here. (Don't we all.) 2AND (R. Sigs.) now with East Africa Command, is post-war planning and sends 73 to all who knew him.

Ilkley.—All who were present at the P.D.M. were delighted to see Capt. E. S. Shackleton, G6SN, who has recently returned to this country after being in German prison camps since 1940.

Keighley.—5834 (R.A.F.) and his family have returned to District 13. 8BD is at the same station. 2VO has built a 1–v–1 (all pentodes) from parts of German civilian receivers. News of 8600 would be welcomed.

Leeds.—4MC is now in Tanganyika. The view makes him think of the South Sea Islands, but he wishes he was back home.

Sheffield.—Two very interesting talks were given at the March and April meetings by Mr. I. S. Christie, 7707, his subjects being "Cathode Ray Tube Circuits" and "Time Base Circuits." A further talk on these subjects is promised for the near future. The Society's post-war plan is to be discussed at the meeting on May 23.

General.—G3RY recently visited ON4VRB. 4LV (R.A.F.) is still waiting to start his B.I.E.T. course. T.R.'s are needed for Doncaster, Halifax and Harrogate. Offers to D.R. please. G8UO.

DISTRICT 3 (West Midlands)

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

Birmingham.—The attention of all members is directed to the announcement of the forthcoming P.D.M. to be held at the Imperial Hotel, Birmingham, on Saturday, May 26. Service members are assured of a warm welcome.

A meeting of M.A.R.S. was held on April 5 when a most interesting demonstration of high quality sound reproduction was given by Mr. G. Brown; 61 members and visitors were present.

Evesham.—Members in the Evesham area are asked to get in touch with Mr. H. Barnett, BRS4144, 14 Common Road, Evesham, who is anxious to try and organise local meetings. He informs us that he constantly hears from many local members several of whom are overseas. 2FDR.

WEST MIDLANDS VICTORY PROVINCIAL DISTRICT MEETING

to be held on

SATURDAY, MAY 26th, 1945

at the

Imperial Hotel, Temple St., Birmingham

PROGRAMME

ASSEMBLE	1 p.m.
LUNCH	1.30 p.m.
BUSINESS MEETING	3 p.m.
TEA	4.30 p.m.

INCLUSIVE CHARGE 8/6

Reservations to Mr. V. M. DESMOND, (G5VM), 90 Worcester Street, Birmingham, by not later than May 19th, 1945.

ALL MEMBERS CORDIALLY INVITED TO ATTEND

DISTRICT 4 (East Midlands)

Deputy D.R.: A. E. Clipstone (G8DZ), 32 Tettenbury Road, Perry Road, Basford, Nottingham.

Beeston and Stapleford.—Excellent progress is being made with the Morse classes and already the advanced members are doing 10 w.p.m. There is, however, still room for more members and the T.R. (Mr. B. E. Hentsch, BRS5514, Victory Road, Beeston) will be pleased to send details to those interested.

Two new members, BRS9977 and 9979, are welcomed.

BRS5514.

Derby.—Four new BRS members and one G2 are welcomed to membership. We hope to see them at future meetings. The T.R. (Mr. G. White, G2OU, 43 Kenilworth Avenue, Derby) will also be glad to meet them at his home together with others who have not yet made his acquaintance. At the April meeting, held at G3OZ, G6XM described his Signal Generator and B.F.O. Members were very impressed by its excellent performance and workmanship. The B.F.O. was demonstrated on the oscilloscope.

Next meeting, May 17, 7.30 p.m. at G3OZ. G2OU.

Nottingham.—The April meeting, held at 2AOO, opened with the first of a new series of talks on "Post-War Planning," which it is hoped will help members who are new to our field of experiments. The older members have offered to help them in the design and construction of apparatus. It was pointed out that the first essential is a good receiver and in view of the large amount of calibration equipment available in this area it was agreed that alignment and calibration should be carried out by members possessing the necessary equipment. It is hoped that many will take full advantage of this offer of assistance.

The attendance at the Morse classes held at G8DZ has not come up to expectations in view of the large local membership. It is hoped that more members will attend these classes which have been started for their benefit.

See separate announcement for details of the P.D.M. to be held in June.

Next meeting, May 27, 6.30 p.m. at G8DZ. G8DZ.

Forthcoming Events

May 17	District 4 (Derby), 7.30 p.m. at G3OZ, 2 Franklin Drive, Boulton Lane, Alvaston. Talk on Rotary Convertors by BRS6775.
„ 19	District 15 (Ashford), 6.30 p.m. at 5056, 9 St. Hilda's Avenue, Ashford, Mdx. (Southern Railway or buses 90, 117, 216) Discussion on Frequency Modulation.
„ 23	District 2 (Sheffield), 8 p.m. at the "Dog and Partridge," Trippett Lane. Discussion on Post-War Plans.
„ 23	Scotland "A" District, 7 p.m. in the Institute of Engineers and Shipbuilders, Room B, 39 Elmbank Crescent, Glasgow. Attention is drawn to new time and meeting place.
„ 26	District 1 (Liverpool), 3 p.m. at The Stork Hotel, Queen's Square.
„ 26	District 15, 3 p.m. at The Excelsior Hotel, 1 Ladbroke Gardens, Ladbroke Grove, Notting Hill, W.11. Discussion, "Pre-war Amateur Operations."
„ 26	District 7 (Reading), 6.30 p.m. at Palmer Hall, West Street.
„ 26	Provincial District Meeting, 1 p.m. at The Imperial Hotel, Birmingham.
„ 27	District 5, 3 p.m. at 17 Colston Avenue Centre, Bristol.
„ 27	District 12, 3 p.m. at 2DHF, 22 Bramford Court, High Street, Southgate, N.14.
„ 27	District 4 (Nottingham), 6.30 p.m. at G8DZ, 32 Tettenbury Road, Perry Road, Nottingham. Discussion, "Post-War Planning."
June 3	Districts 7 and 13. Combined Meeting, 3 p.m. at the Y.M.C.A., North End, West Croydon.
„ 3	District 12, 3 p.m. at BRS3412, 18 Sandfield Road, St. Albans (turning off main Hatfield Road, near Cemetery bus stop).
„ 9	District 7 (Reading), 7 p.m. at Palmer Hall, West Street. Morse Instruction.
„ 19	Midland Amateur Radio Society, 6.30 p.m. at the Chamber of Commerce, New Street, Birmingham.
„ 23	Provincial District Meeting, 2 p.m. at Marsden's Cafe, Milton Street, Nottingham.

A cordial invitation is extended to Society members to attend any of the above meetings.

DISTRICT 5 (Western)

D.R.: R. A. Bartlett (G6RB), 31 King's Drive, Bishopston, Bristol. Bristol 46960.

Bristol.—The April meeting produced an increase in the number of members, 20 being present. G3MA of Gloucester (who attended in hospital blue) as well as members from Bath, were welcomed. 6RB gave a talk on station planning and subsequent discussion ensued on the relative merits of T.R.F. and superhet receivers, types of aerials and various items appertaining to an amateur station. Much interest was shown in a receiver which G6VF had recently constructed. The T.R. was unable to be present as he was recovering from an operation. (Speedy return to full health O.M.—D.R.) In addition to those already mentioned the following were present: 5KT, 6UR, 8PH, 6OZ, 3YT, 2IK, 2CUI, 2HFG, 2BYU, 2FBV, 2104, 6550, 7383, 7961, 8452, 9777, and 9864. The next meeting will be held on May 27 when 5KT will talk on station planning. All new members are cordially invited.

There is no news from any other part of the District.

G6RB.

DISTRICT 6 (South Western)

D.R.: W. B. Sydenham, B.Sc. (G5SY), Sherrington, Cleveland Road, Torquay. Torquay 2097.

Torquay.—A welcome is extended to Messrs. L. Berry, S. Bowden, and G. Smerdon, all new members. It is hoped, when we have sufficient members, to resume meetings in Torquay. Congrats. to Mr. A. Jotcham (2FWB), who will be married by the time this is in print. His father is performing the marriage ceremony at Dawlish. G2GK has been busy on designs for a high fidelity speech amplifier. He hopes to meet many old friends at the Exeter P.D.M.

Taunton.—Members met at the Y.M.C.A., Taunton on April 12, when a very instructive talk on Cathode Ray Tubes was given by Mr. Evans. It was announced that if the necessary permission is forthcoming, a visit will be made to Mr. Taylor's wireless inspection department on June 14. Those present were G3SB, 4OM, 5AK, 6LY, 2DRW and friends.

Penzance.—A meeting was held recently in the London Inn, Penzance, when the two main topics for discussion were "Frequency Modulation," and post-war conditions. Members present were G3YH, 6LV, 6ZT, 8OH, 2BCL and 2FZZ. An endeavour is being made to get regular meetings going. (Many thanks 6ZT for your efforts, and good luck to you.—D.R.)

G5SY.

DISTRICT 7 (Southern)

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

Bournemouth.—Meetings continue to be held on the last Saturday of every month at 3 p.m. at 45 Parkwood Road, Bournemouth. The next will take place on May 26. At the April meeting G3BM described his new 80-foot masts in detail. Congratulations are extended to Mr. John Gifford on his recent marriage and to Sq./Ldr. Oram, 2ADT on winning the D.S.O.

2HNO.

Guildford:—Mr. H. C. Spencer, G6NA, will give a talk on "R.F. Amplifiers" at the meeting to be held on May 20th at 3 p.m. in the cafe, The Cinema, Woodbridge Road, Guildford. It will only be possible to provide tea for those who inform G5RS, 20 Hedgeway, Guildford (Phone 2286) of their intention of attending.

Coulsdon.—3179 looks forward to a spot of leave soon, having been over the other side since "D" day. Welcome and invitation to the local meetings to new members 9326 and 9514. BRS3003.

Croydon.—The attendance of 25 at the April meeting included G2DP, 2HP, 2UA, 3DA, 3DF, 3ST, 2FWA, 2HHD, 1545, 3003, 4458, 6894, 7943, 8000, 8417, 8429, 8796, 8955, 9004, 9110, 9780, FRS112, and Messrs. Ellison, Hyslop and Ulrich. G5BT was unable to lecture as arranged but he hopes to do so at a later date. A welcome is extended to all new members in the area. We were glad to see several of them at the meeting, also 3DF and 2HHD who had been absent for a time. 4314 and VE3ASJ both visited the

EAST MIDLANDS VICTORY
PROVINCIAL DISTRICT MEETING

to be held on

SATURDAY, JUNE 23rd, 1945

at

MARSDEN'S CAFE, MILTON STREET, NOTTINGHAM.

PROGRAMME

ASSEMBLE	2 p.m.
BUSINESS MEETING	3.0 p.m.
TEA	4.30 p.m.
INFORMAL DISCUSSION	5.0 p.m.

INCLUSIVE CHARGE 4/-

Reservations to Mr. A. E. CLIPSTONE (G8DZ), 32, Tettenbury Road, Perry Road, Nottingham, by not later than May 31st.

ALL MEMBERS CORDIALLY INVITED TO ATTEND

T.R. whilst home on leave. 2UA has moved into District 15 and hopes to get to the meeting there. On the way to the Leeds P.D.M. the T.R. ran into 5XW; he sends 73 to all at Croydon and looks forward to personal QSO's. See "Forthcoming Events" for date of next meeting. The P.O.W. Fund benefited to the extent of £1 12s. 6d. at the last meeting. G2DP.

Reading.—The March meeting was well attended in spite of being held during Easter week-end with travelling restrictions affecting Forces members. At this meeting VS7RP gave a most interesting talk on his activities in Ceylon. The action of the very humid atmosphere of Ceylon on components promoted an active discussion. The talk was brought to a close with the hope that in post-war days manufacturers will give due consideration to the problems of meeting the needs of overseas amateurs. See "Forthcoming Events" for dates of meetings. BRS4573.

General.—Hearty congrats to Ernie Dedman, G2NH, on the arrival of junior Op. No. 2. BRS4966, reports a meeting at a R.N. Signal School in District 7 when 2CP, 8TU, 3754, 4098, 5026, 8978, 9504, and BRS Sharkey were present. Many amateur problems were discussed and it is hoped to institute regular meetings. Sq./Ldr. Woollatt, G3ZI (Esher) recently back from India has been furiously rebuilding before an anticipated posting. 9358 (R.A.F.) reports from East Anglia where he hopes to take an active part in Society meetings. G4NU, tried to get to a Reading meeting by bus but before he got there it was time to start the return trip! After being surrounded by Radar equipment for so long, he longs for something simple—like "ham" gear—once more. 8341 enjoys life abroad but has met no members as yet. G2FI a regular client of pre-war District 7 meetings, is now in charge of valeting the transport of a Signals Cable Coy. in the C.M.F. G5WP.

DISTRICT 10 (South Wales & Monmouthshire)

Acting D.R.: H. H. Phillips (GW4KQ), 80 Cottrell Road, Roath Park, Cardiff. Cardiff 4512 during business hours.

Cardiff.—Monthly meetings continue and a lively discussion ensued at the meeting held on April 29th whilst post-war rebuilding remains a prominent feature of local activities. The next meeting will be held on May 27th at 2.30 p.m. and will take place at the home of GW8UH, 29 Ladysmith Road, Roath Park (off Penylan Hill) Cardiff.

Swansea.—As the inaugural meeting held at GW4CC on April 24th proved a success, it is intended to arrange further gatherings at a later date. Members interested in attending are requested to communicate with Mr. W. Bowen, GW4CC, Thistle Dhu, Upper Killay. We learn that GW3CR is back in the District, whilst it is rumoured that a certain member is now building lattice masts in preparation for a resumption of activities.

Pembrokeshire.—This reminder is given that G5FN is endeavouring to arrange a meeting at a convenient centre in the area. Will all those interested write to 5FN immediately at the address given in the April notes?

General:—Tentative proposals have been made to hold a P.D.M. in Cardiff during September subject to present catering and travelling difficulties being overcome. The writer would appreciate a card from those members who would support the venture. It has also been suggested that the P.D.M. be preceded by a District meeting to be held in Swansea during July or August and arrangements are going forward along these lines, further news of which will appear in later notes. To enable the District successfully to return to post-war activity it is essential that these meetings be given the fullest support. GW4KQ.

DISTRICT 11 (North Wales)

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

There is very little to report this month, but just sufficient to keep the District in the news. ZL2RI writes from the Pacific area to which he has been posted after a short spell at home. VE4YG is back in this country after service in India. BRS5770 (Coventry) still with the R.A.F. in India, reports fit and well. GW8WJ, writing from B.N.A.F. expects to be back shortly. All the above send 73 to members in the District. BRS1060.

DISTRICT 12 (London North and Herts)

D.R.: S. Buckingham (G5QF), 41 Brunswick Park Road, New Southgate, N.11. Enterprise 3112.

Arrangements for the District dinner and dance at the Salisbury Hotel, Barnet, on Saturday, June 30, have now been completed. As accommodation is limited to 100, and the management require to know the number to cater for by June 20, members are requested to make reservations as soon as possible—not forgetting the ladies.

The D.R. would like to remind members that when writing to him or to a T.R., a stamped addressed envelope must be included if a reply is required.

North London.—At the April meeting held at the home of Capt. Phillips, a most interesting talk, illustrated with slides, was given by Mr. Mervin Whithers, B.A., on the requirements for ascertaining accurate time. He explained the early types of master and slave clocks, various types of quartz oscillators, frequency dividing circuits and astronomical observations of time intervals with extreme accuracy.

P. Beresford, BRS8070, 109 Fortess Road, N.W.5, wishes to contact the old S.E. area 1·7 Mc/s. group. G. Kellarofsky BRS9664, 12 Sonia Gardens, N.W.10, would like to get in touch with other members residing in his area. L./Sgt. Halden is busy constructing a 10 watt audio amplifier. BRS8459 is planning aerials for post-war V.H.F. work.

The May meeting will be held at 2DHF. See "Forthcoming Events."

St. Albans.—"Can G6WN's 'Nine Points' be adapted for use in District 12 with special reference to St. Albans and the surrounding villages?" will be the subject of a discussion to be opened by 4477 and 3412 at the next meeting on Sunday, June 3. Tickets for the District 12 dinner and dance will be on sale. All local members are requested to make a special effort to attend or to let the T.R. know how many tickets they will require. Congrats to 2CNC on another promotion at work and very best wishes for his forthcoming marriage. 9265 has just completed a 9-valve superhet. G5QF.

DISTRICT 13 (London South)

Acting D.R.: S. E. Langley (G3ST), 19 Elm Gardens, Mitcham.

There was a record attendance of 26 members at the April combined meeting when an interesting discussion took place on post-war possibilities. It was decided that all future meetings will be preceded by a short Morse practice session for the benefit of those who may be a little rusty. It is also hoped to arrange for more frequent practice among members in the District. G3TG sends 73 to all South London members and states that he is now in Italy. G4KY, who has been unable to attend recent meetings, sends 10s. to the P.O.W. Fund. G3ST.

DISTRICT 14 (Eastern)

Scribe: L. J. Fuller (G6LB), 14 High Street, Walton-on-Naze, Telephone, Walton-on-Naze 202. Business Address—for all correspondence—85 High Street, Chelmsford, Essex. Telephone, Chelmsford 2079.

Chelmsford.—Interest seems at a low ebb, perhaps due to the fact that most of the old "brass-pounders" are now far afield. As G5RV and 5HF now have Junior Op's named Peter Varney and Peter Heap respectively, the District only wants a Peter G1Gi to complete the trio! Any offers? The Scribe has had welcome visits from G6LL, 5RV and 8PB.

Chingford.—A report from G2HR mentions his return to his war-damaged QRA, now almost repaired, where he hopes to revive meetings from June onwards. All members will join in congratulating G8DG on his marriage, and offer their gratitude for his untiring efforts to keep Chingford on the map during his temporary residence in that area.

BRS5726 is now in East Africa, and swotting Swahili in his spare time. BRS6599 is in Cambridge, on a P.O. Course. Local members welcome the return to the fold of G2XG. Will G8JM, now back in England, please phone G2HR (Larkswood 2933) and let him have his address as it has been mislaid.

Special Note.—G6LB tenders his apologies to all members of the District for the recent absence of Notes. This is due entirely to heavy pressure of work, in which he is "up to his ears." He is always glad to hear from members, but asks forgiveness should he fail to reply, due to the reason already mentioned. G6LB.

DISTRICT 15 (London West, Middlesex and Buckinghamshire)

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

G2TJ, 5LI, 5LN, 5ZA, 6WN, 8KZ, 2ADL, 3894, 4777, 4781, 5246, 6275, 6447, 6527, 7754, 8503, 8971, 9086, 9094, 9563, 9574 and

a prospective member were present at the April District Meeting, when Mr. Freeman (2ADL), Mr. Auzeas (2TJ), Mr. Freer (4781), Mr. Mace (6527), were elected members of the Post-War Plan Committee.

Many letters have reached the D.R. from members at home and abroad commenting on the District 15 post-war plan. The plan has received a warm welcome everywhere and one BRS member who is with the Guards Armoured Division, wrote his comments on March 24—only a few days after THE BULLETIN was published.

A letter-budget has been suggested and Mr. G. Hersee (6447), 8 Denison Road, Ealing, W.5, has agreed to act as organiser. Members wishing to participate should contact him.

West London.—Only G8DI attended the April meeting. Letters have been received from 7250, 9087 and 4AR, the latter is still with the M.E.F.

Hayes.—Two very good meetings have been held. The first took place in Hayes when 2PR, 3SU, 2CRU, 5246, 6527, 9244, 9422, 9575, 9574 and others heard a fine talk by Mr. Mace (6527) on his L.R.C. Bridge. A description of this well-made instrument would make a splendid BULLETIN article. (Glad to consider it.—ED.) The second meeting was held with the kind co-operation of Ft./Lt. Guy (2DN) and Ft./Lt. MacDermott (2689), at the Ham Shack, No. 1 S.D., R.A.F. 2DN, who opened the proceedings, welcomed the visitors after which 2689 described and demonstrated the SX28 and AR88 receivers. To add colour to his talk he used some recordings (kindly loaned by 8IG) of pre-war 7 Mc. conditions on Sunday mornings. Sgt. Drummond (2CRD) followed with a description and demonstration of his home-built cathode-ray oscillograph. 6WN concluded the meeting by thanking all concerned for their support and said how much he welcomed this idea of co-operation. Among those present were 2DN, 2PR, 3BR, 3RH, 5RF, 6WN, 2CRD, 2FTS, 2689, 4062, 4345, 4741, 5246, 5436, 6305, 6447, 7487, 8785, 9244, 9422, 9573, and 9574. The total attendance was 32. A welcome back is extended to 8FA, the T.R., who is now stationed in Oxfordshire. 6VP is looking forward to "The Day."

Ashford-Staines.—The first meeting saw 6RS, 6WN, 2CLL, 5056, 5169 and 6875 present to discuss Council's approach to the post-war licence problem. 3835 (R.A.F.) and 4726 (R.E.M.E.) hope their leave coincides with future meetings. The latter sends 73 to his friends.

Harrow.—2BMY writes again from India to express his thanks for the receiver sent to him by 8PD. He can now listen to London which he says comes in well. 9655 and 9705 report for the first time, as does Mr. Carson, of Wendover. 6WN while on a visit to 2FWA of Croydon had the pleasure of meeting 2FRM a Flight Lieutenant in the R.A.F., home once again after five years in Rhodesia.

Will all members please mention their call or BRS number when writing to the D.R. or T.R.

The sum of £3 10s. has been collected at the last two District meetings for the P.O.W. Fund. G6WN.

DISTRICT 16 (South Eastern)

D.D.R.: W. A. Scarr, M.A., (G2WS), 8 Beckenham Grove, Shortlands, Bromley, Kent. Scribe: E. H. Trowell (2HKU), 27 Unity Street, Sheerness, Isle of Sheppey, Kent.

A hearty welcome is extended to all new members in the District; news of their activities would be appreciated.

2FSC has built a two-valve receiver which works on 9 volts H.T., using standard valves. G6VC is dividing his time between a chicken run, garden and a small radio set. 2DHV has attended meetings at Catterick and Huddersfield. He is seeking contacts in the Scarborough area and sends 73 to G5MI. BRS9796, a new member in Gillingham forwards his first report.

Sheppey.—G2VA is building a wind-driven charging plant using a car dynamo and also giving 2HKU Morse practice. Both recently visited 6RQ of Tunstall. 3GW and 4HV (who has moved to Maidstone) have visited 2HKU. The latter has completed a bug-key and is building a superhet.

Whitstable.—G4BY has met 2BWP and 3OJ (Felixstowe) and records his thanks for the hospitality shown him by 5BD whilst in District 17.

Sussex.—From W./O. C. Barnard, G8AB, now living at 4 Gleton Avenue, Hove, 4, we learn that G3WR recently spent a day with him making post-war plans. F./Sgt. M. R. Campbell, VK3MR, has recently been recuperating in Brighton. Will local members who wish to meet VK3MR please contact 8AC? 3YY (Brighton) mentions that he is not a sergeant (as recorded under the heading of "Congrats." in the March BULLETIN) but a civilian. He reports that 2CMH is fit and well with the R.A.F. in Italy. 6581 (Bognor Regis) with the R.A.F. in the Middle East, noticed the Society mentioned in Ship's Daily Orders whilst at sea and met six members including 4692 (R.E.M.E.) and 6598 on board. He hopes to attend the Cairo meetings and is also arranging a meeting in his camp.

More news would be very welcome especially from those who have been in "retirement" since 1939. 2HKU.

DISTRICT 17 (Mid East)

D.R.: A. C. Simons (G5BD), Admiralty Road, Mablethorpe. Phone 69.

Gainsborough appears to be the live spot of the District where frequent informal meetings are held at the home of G3OS with G3WB, 4315, 2CGL, 9588 among the regular attenders. 8054, who recently returned from India, and 5933 have been on leave. G8BA has already been posted; 2CGL and 9588 are expecting the same fate. Old timer G6UO, now ZS6BT, has a junior op. 9318 is at a R.A.F. station in the District and is hoping for some contacts. 4390 has been to District 3 meetings. G2VY and 4GX report active from Grimsby; the latter is preparing for action with a single stage preselector. 4657, stationed in S. Wales, is completing his kitbag receiver. G5LL reports from Italy. G8SH has been having a busman's holiday at G5BD's shack. G2FT is still making occasional contacts in District 7. Nothing from the B.L.A. recently, the lads are obviously much too busy—good luck to them all. G5BD.

DISTRICT 18 (East Yorkshire)

District Scribe: S. Davidson (G6SO), 10 Sidney Street, Scarborough.

Hull.—G4LH is soon to be married. 7345 and 5GC were on leave recently, the latter from Burma. 8270 is building an oscilloscope. Others contacted include 5839 and 4530. A successful R.S.G.B. meeting was held at the Imperial Hotel during April; those present included 2XA, 3PL, 4LH, 8UL, 2BIP, 2BBR, 2FZX, 3271, 4209, 5120, 6895, 9492, 9712, 9730 and VE3RW/9EW. It was decided to hold meetings monthly and the date of the next has been fixed for Monday, May 28, 7.30 p.m. at The Imperial Hotel. G3PL.

Scarborough.—G6SO would like 2CP's present service address. 8470 (R.E.M.E.) writing from India Command, sends 73 to all in the District. He mentions the exorbitant prices asked out there for second-hand copies of radio textbooks. We welcome 8823 (R. Sigs.) of Derby and 2DHV (R. Sigs.) of Sidcup, Kent, at present known to be in the town. G6SO.

DISTRICT 19 (Northern)

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

Stockton-on-Tees.—2FXA is at present building a midget receiver. He met several G's and W's while on a recent visit to Cranwell. 3TG is designing aerials in anticipation of post-war activity, while 3YK is overhauling and repainting masts.

Catterick Camp.—The Catterick Radio Club now boasts 32 members including G8RF, 8PP, GM8MQ, 6GV, 6TZ, 5DQ, 3PY, 8U, DM, VU2EU and 15 BRS members. 8SN and 2HMK of Darlington are strong supporters. During the month G8RF, VU2EU, 8U1DM and G5DQ have given talks on their pre-war operating experiences. The following lectures have also been given: "Crystal Guiding" by G8PP; "High Power Broadcasting" by BRS5254; "Great Circle Bearings and Distances" by BRS8768.

A party of eleven including G8RF, 8SN, 5DQ, 2HMK, 8U1DM and BRS6943 attended the Leeds P.D.M. on April 22.

Cpl. W. Heath, BRS6943 has consented to act as T.R. for Catterick and the D.R. requests all members to give him their full support.

A Hamfest is to take place in Middlesbrough on June 23. As this will be the first effort of its kind in the District for some years, local members are urged to make every endeavour to be present. Full details will be published next month. G2FO.

Scotland

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

"A" District.—Members are asked to note that the Royal Technical College is *closed* for future meetings. New accommodation has been provided for the next meeting which will take place at 7 p.m. on May 23 in the Institute of Engineers and Shipbuilders, 39 Elmbank Crescent, Glasgow. This is the pre-war venue for meetings.

The newly formed District Committee met on April 8 and fully discussed future plans for conducting the District's business. The Financial Report was read by the Treasurer (Mr. Hunter). During the past twelve months the average attendance at meetings has been 17; it is hoped to increase this figure to 25. Due to the fact that these notes closed for press before the April meeting took place, no details of that event are available. BRS8254 recently came to the District and expects to be here for some months. GM6ZV has received a visit from VE4TJ (Winnipeg), a C.P.O. in the R.C.N.

"C" District.—At the monthly meeting held on April 15, Mr. J. Prince described two types of transmitter. As these were of commercial construction and certain features differed considerably from usual amateur practice, much was found to discuss. GM6ZV.

Northern Ireland

D.R.: J. N. Smith (GI5QX), 19 Hawthornden Drive, Belmont, Belfast, N.1. Phone 63323.

Ray Barnes (G6DS) receives our congratulations on his promotion to Sgt. Major, R. Sigs.

BRS9647 (R.O., M.N.) and his chief recently called on the D.R. and had much of interest to relate about their "life on the ocean wave." Another visitor was GI5SJ; the D.R. was glad to obtain his views on future plans for the district.

GI8TS, now at Farnborough on interesting radio work, has taken part in operations with the B.L.A. He is engaged to be married, and intends to make his home in England. He gets his news of GI affairs from District Notes, and through that medium sends 73 to GI3ML, 5SJ, 6YW and 6TK. (73 to you O.M.—D.R.)

BRS8388 reports that his C.O. is Sq./Ldr. M. Brookes, G5OI, the latter new to this district, is warmly welcomed. 2DHB is also in Belfast, having recently moved from Derry.

GI5QX.

LEEDS LEADS THE WAY

THE first P.D.M. of the year and the fourth to be held in District 2 under war-time conditions, took place at the Hotel Metropole, Leeds, on Sunday, April 22. Headquarters was represented by Mr. S. K. Lewer, G6LJ (Executive Vice-President), Mr. John Clarricoats, G6CL (General Secretary), Mr. Arthur Milne, G2MI (Honorary Editor), and Mr. F. G. Hoare, G2DP (Member of Council). Mr. C. A. Sharp, G6KU (District Representative), opened the meeting by introducing Mr. Lewer, who expressed his thanks to the assembly for their support and conveyed greetings from the President.

Secretary's Speech

The General Secretary began his speech by referring to the splendid contribution to the war effort made by members. He spoke of the Society's P.O.W. Fund and said that this was the first meeting in the history of the Society when the assembled Company had had an opportunity of welcoming back a returned Prisoner of War—Capt. E. S. Shackleton, G6SN, of Ilkley, having that week arrived in England after five years imprisonment in Germany. He then spoke of the Society's post-war plans as detailed in the March issue of THE BULLETIN. The statement by Council, he said, had been prepared with the utmost care and after long deliberations. It was factual, but when licences are re-issued minor modifications may have to be made and perhaps other "good things" added. Reference was made to the membership of the Society which had now reached a total of 9,000—a 300 per cent. increase in five years. The Secretary estimated that within three years from the date when licences are restored there will be 5,000 amateur stations in Great Britain. This big increase will call for everyone to re-double his or her efforts to keep the air as orderly and servicable as possible; to achieve this self-discipline and the exercise of conscience were an absolute necessity.

The meeting was then declared open for questions, following which Mr. Milne addressed the gathering on the subjects of QSL cards, post-war Convention problems, and H.Q. Staff difficulties.

"Shack" Pays Tribute to P.O.W. Fund

Tea and biscuits were then served after which "Shack" (G6SN) described his life in German prison camps and his journey home. He also gave news of members he had met and paid warm tribute to the R.S.G.B. P.O.W. Fund, which he said had been a godsend to him. He expressed his sincere thanks to the Society and its membership for the excellent work which was being done in this respect. A collection for the Fund realised £11 10s. Photographs were then taken after which the meeting broke up into informal groups. The fact that there was an attendance of 90 provides evidence of the interest which is being shown in the District.

Attendance.—The following signed the register: G2BM, DP, LT, MI, MQ, VC, 3FN, GN, HV, MK, MQ, PD, UV, WQ, 4CL, 5DQ, TO, US, VD, WQ, YV, 6 BX, CL, DV, KU, LJ, NP, PY, SN, UF, WJ, XL, 8BY, CK, RF, SN, TF, UO, 2ALL, BBJ, BSB, CGR, CNR, FIM, HCX, HMK, SU1DM, 1151, 4157, 4567, 4681, 4976, 6352, 6568, 6592, 6625, 6675, 6730, 6738, 6807, 6863, 6943, 7989, 8145, 8526, 8616, 8951, 9286, 9292, 9744, 9782, and 9833. Messrs. Beuden, Broxholme, Butcher, Child, Cratchley, Freeman, Germay, Gray, Hudson, Kelsall, Maucel (?) Prescud, Price, Rance, Smith, Turner, Venables and Whateley. (These members omitted to identify themselves by call sign or BRS.)

Group Photograph

Mr. P. B. Jackson, G3WQ, The Rose and Crown Hotel, New Street, Selby, Yorks, will be pleased to supply any member who attended the P.D.M. with a copy of the group photograph. Members who wish to take advantage of this offer should send a stamped addressed envelope and enclose 2d. in stamps to cover costs. G2LT.

LEEDS P.D.M., April 22, 1945.

Front row seated: G5VD (T.R., Huddersfield), G2LT (T.R., Sheffield), G2MI (Hon. Editor), G6KU (No. 2 D.R), G6LJ (Executive Vice-President), G6CL (General Secretary), G6SN (Ilkley), G8UO (Scribe), G8TF (T.R., Brighouse).

Referring to the B.R.S. membership, Mr. Clarricoats suggested they would come into their own in the field of V.H.F. work. They would also be in a position to render useful service by checking local transmissions and reporting on "lost" calls. Reference was made to the QSL card and the question asked "Should the QSL be abolished?" The speaker suggested that this would make a good topic for discussion at local meetings.

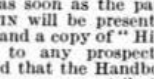
The Society had its own problems and Provincial representation on Council was one of them. A scheme had already been prepared and this would be put forward to the membership in due course. The chief problem at present was, however, THE BULLETIN. Members were told of the difficulties encountered in its production and distribution, and were assured that as soon as the paper position becomes easier, a larger BULLETIN will be presented. Technical contributions were still required and a copy of "Hints to Contributors" would be forwarded to any prospective contributor on request. It was appreciated that the Handbook required revision, and this would be done as soon as contributors were available and security regulations eased. In referring to the proposed H.Q. station, Mr. Clarricoats said that no definite details could be given at this date. The post-war amateur radio market has been well considered and a list of some 300 items, which it is thought will find a ready sale among amateurs, is being circulated to the trade.

Referring to the Experimental Section the speaker considered that real success will not be achieved until the Society is in a position to appoint a full-time Manager. He then described briefly the difficulties which were encountered at Headquarters during the V bomb attacks. The request to members not to write to H.Q. about trivial matters was again repeated, as was the suggestion that members should try to give prior notice of intended visits; these, if possible, to be arranged around lunch time. The post-war social activities of the Society were outlined and Mr. Clarricoats closed by extending thanks to the D.R., the Scribe Mr. H. Beadle, (G8UO) and the T.Rs.

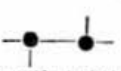
Inter-Services Standard Graphical Symbols for Use in Telecommunication Engineering.

The Inter-Services Radio Circuit Symbols Committee has recently issued a list of standard graphical symbols for use in telecommunication engineering. The publication of this list precedes the issue of revised British Standards Institution specification No. B.S.I. 530 (Radio Symbols). The symbols approved by the I.S.R.C.S.C. are intended solely for use by the Services and their presentation has been hastened in view of the urgent needs of combined operations.

It is of interest to note that in order to avoid confusion with wires which cross without connection, wires which are in contact should not appear thus:



but should be staggered thus:



The inclusion of symbols particular to wave-guide technique represent an important addition to previous lists.

The detached contact system is recommended for illustrating schematic circuit arrangements. Under this system a relay is designated by a fractional number, e.g. $\frac{\text{RL2.}}{3}$ The numerator identifies the relay and the denominator shows the total number of contact units.

Edgware Short Wave Society

The Committee of the above Society has decided to hold a revival General meeting at the Edgware Constitutional Club on Saturday, June 2nd. This decision was reached by the Committee when they met on April 28th at the home of G3HT for the first time officially since hostilities commenced.

Old, and prospective new, members are requested to communicate with the Hon. Secretary, Mr. E. R. Radford, G2IM, 1 Gibbs Green, Edgware, Middx.

"Shack" and "Snowy" Liberated

It is with considerable pleasure that we announce the safe return to England, after long years of captivity, of Captain Ernest Shackleton, R. Signals, **G6SN**, of Ilkley, Yorks, and Ft./Sgt. Mervyn "Snowy" Campbell, R.A.F., **VK3MR**, of Melbourne, Victoria.

"Snowy" escaped on April 12 after taking part in that, infamous forced march from Silesia to Western Germany, whilst

Capt. Ernest Shackleton, G6SN, of Ilkley, photographed at the Leeds P.D.M., with the General Secretary, G6CL

"Shack" was liberated by the U.S. 3rd Army a few days later. Both have stories to tell which, when the security ban is lifted, will show how invaluable has been their knowledge of amateur radio.

"Shack" and "Snowy" send greetings to their many friends and ask that their grateful thanks be extended to all who made it possible for them to receive parcels from the R.S.G.B. P.O.W. Fund.

More Good News

News has now been received that L./Cpl. Ken Smith, **G2RB**, Sig. J. B. Kay, **G3CO**, Capt. J. E. R. Wood, **BERS256**, and Sgm. A. Marshall, **G2XQ**, have arrived home. The former, in a letter to Mr. C. H. L. Edwards, G8TL, asks that his thanks be recorded to all who contributed towards the cost of sending parcels to him whilst a prisoner of war in Italy and Germany. He sends greetings to G8KP, 8WP, 3II, and seeks news of G6ZN.

A letter from G2XQ appears on another page.

* * * *

From *The Daily Mail*, dated May 1, we learn that Capt. Miles Peter King, **G4GY**, who was in Oflag 79, has volunteered to remain in Germany for the time being to assist in helping the hard pressed military government officers in their almost superhuman problem of controlling and caring for the displaced persons of Brunswick.

News from Europe

Lionel Le Breton, BRS5360, has contacted several Belgian amateurs and given them copies of THE BULLETIN. He spent an afternoon recently with ON4FT, who told him that his transmitter had been used by the "Underground," whilst his receiver (a National H.R.O.) had been safely hidden from the Germans during the occupation. The Gestapo confiscated his log books and demanded his QSL cards, but as this move had been anticipated, his best cards were safely tucked away before they came. It is understood that news of the Council's statement on post-war licence policy has spread fast in Belgium, and has greatly heartened our friends over there.

G6BP and G3UF recently visited ON4AM in Mons, who made them very welcome. He described how he had kept his radio business going during the occupation, helping his neighbours to hear the B.B.C. and bamboozling the Gestapo. He made up a tiny battery set to cover long periods when the mains were cut-off.

ATTENTION B.L.A.

It is understood that a meeting, convened by members of Reseau Belge, will be held at the Cafe De L'Horflage, Port de Namur, Brussels, on Saturday, 2nd June, at 1300 hours. Full details from M. Paul de Neck, 312 Rue Royale, Brussels.

KHAKI and BLUE

● Sgt. A. Squires, **2CDG**, serving with the R.A.F. in the Azores states that Ft./Lt. R. Harvey, 2DRP, is in charge of his section which also boasts two Canadian amateurs in Cpl. J. Bond, VE4LR and L.A.C. Giles, VE5AEE. Sgt. Squires sends greetings to all old friends.

● Capt. Jack Warner, R. Sigs., **G2WR**, after a long spell of duty in England, is now at S.T.C. (I) Bangalore, S. India, where he expects soon to meet a few kindred spirits. Jack hoped he might go to a field unit, but the "powers that be" saw the magic word "schoolmaster" on his papers and put him to teaching once more. He is at present learning Urdu, the "lingua franca" of the mystic East—or rather the Indian part of it!

● Major John Swinnerton, **G2YS**, writing from Italian Combat Force, C.M.F., reports meeting Lt. Beaumont, G6HB, Capt. Jack Lees, G2IO, Major Larry Richards, G3YO, Capt. Jim Kirk, G6ZO and Lt. Hunting, G3OC. Col. Eric Cole, ex-SU1EC watches over them all. G2YS offers his thanks to 2FJD for his propagation articles.

● Apropos the paragraph published in this section last month, referring to the present whereabouts of L./Tel. Victor Sims, G5VS, we are informed that his address is 4 (not 14) Bridge Street, Maidenhead, Berks.

Congrats

● To Capt. and Mrs. R. L. Varney, **G5RV**, on the birth of a son—Peter Louis.

● To Mr. and Mrs. Harry R. Heap, **G3HF**, on the birth of a son—Peter Nigel.

● To Mr. K. L. Howell, **G8DG**, on his recent marriage.

● To Mr. J. H. Gifford, BRS4179, of Upper Tooting, London, on his recent marriage.

● To Mr. Spick, **BRS6414**, and his wife on the arrival of a son—Richard John.

"C Q"

An announcement will appear in an early issue if it is found possible for the Society to accept subscriptions for the new American publication "CQ."

Stray

We learn from Mr. V. Scott, **G3UB**, that there are some 30 members of the Society living in the Cheadle (Staffs) area, Mr. Scott would be glad to arrange a meeting if sufficient interest is forthcoming. His address is 4 Harborne Road, Cheadle.

Correction

In the Resume of the Minutes of the February Council Meeting (published last month), it was stated that the call G2SO was held by Mr. Tom Geeson, a recently elected Life Member. L.A.C. Mal Geddes informs us that he was issued with that call sign in 1936, after it had been relinquished by Mr. Geeson.

THE PROPAGATION OF RADIO WAVES—(*contd. from page* 164).

of propagation conditions. The research worker in this field must keep in touch with developments in many related subjects. Our study has taken us through the physics of the sun and of the atmosphere, and we have had to consider such apparently unrelated things as the Earth's magnetic field, and the occurrence of the aurora. It is the way these many different subjects are interlinked which gives the study of radio wave propagation some of its fascination.

There is one part of the subject which has been omitted entirely. This is the propagation of U.H.F. waves. Sky waves are completely absent on these frequencies, but the range is found to be influenced by temperature and humidity effects in the lower atmosphere (*i.e.* in the troposphere), and it may in some circumstances be considerably greater than the normal ground wave coverage. The writer hopes to contribute a further article on this subject at a later date.

The reader who wishes to pursue the subject further, is advised to consult the references which have been given throughout the series. These are all non-mathematical and very readable.

References

1. E. J. Williams. "Sunspots, Magnetic Storms and Radio Conditions." *T. & R. Bulletin*, July, 1939.
2. H. W. Wells. "Solar Effect on Radio." *Proc. I.R.E.* April, 1943.

HEADQUARTERS CALLING

Victory in Europe

* * *

TO all members of the Society serving with the Armed Forces of the Crown in Europe or with the Merchant Navy, we send greetings and warm congratulations on the successful completion of their alloted task.

To those serving in the Far East we extend best wishes for their safe and speedy return, remembering especially all prisoners of war.

May Peace soon reign throughout the world.

March Council Meeting

Resume of the Minutes of a Meeting of the Council of the Inc. Radio Society of Great Britain, held at New Ruskin House, Little Russell Street, London, W.C.1, on Monday, March 19, 1945, at 6 p.m.

Present.—Messrs. E. L. Gardiner (President), S. K. Lewer, H. A. M. Clark, A. O. Milne, D. N. Clark, K. Morton Evans, F. G. Hoare, E. H. Laister, S. E. Langley, W. E. Russell and J. Clarricoats (General Secretary).

Apologies for absence were received from Messrs. A. E. Watts, A. J. H. Watson and F. Charman.

1. It was resolved to elect 214 Corporate Members (46 supported by references, 168 proposed by Corporate Members) 11 Associates, 7 Junior Associates and 2 Corporate Members from Junior Associate grade. An application for Life Membership received from F./O. R. C. White, D.F.C., BRS6116, of Torquay, was approved.

2. The Monthly Balance Sheet and Statement of Account were examined and adopted.

3. It was resolved to transfer a further £1,000 to the Post-War Development Fund and to invest this sum in 2½ per cent. National War Bonds.

4. Acting on the recommendation of Mr. C. H. L. Edwards it was agreed, in view of the prevailing war situation, to withhold the despatch of parcels for the time being to members held prisoner of war in Germany.

5. It was reported that Handbook and Supplement sales continued to be very satisfactory.

6. It was reported that the Censorship authorities had agreed that the R.S.G.B. BULLETIN may be sent under permit to civilian addresses in France.

7. A suggestion received from Mr. S. A. Brown, BRS5935, that the Society should print re-seal envelope labels embodying the badge of the Society, was rejected on the ground that at the present stage of the war, sales would probably not justify the expense involved. Mr. Brown had suggested that the profit on sales should be credited to the R.S.G.B. P.O.W. Fund.

8. Ft./Lt. P. Thorogood, G4KD, wrote to suggest that the Society should open a fund to establish a Freedom Memorial (Frequency Modulation) station. It was agreed to thank Mr. Thorogood for his suggestion and to point out that the project as visualised by him would contravene the terms and conditions of an amateur experimental station licence.

9. It was reported that a letter had been addressed to the G.P.O. outlining the F.C.C. recommendations for amateurs in the V.H.F. part of the spectrum. In acknowledging the Society's letter, which had also contained a request that the G.P.O. should assign similar channels to British amateurs, the G.P.O. stated that they were unable at the present time to confirm that exactly similar bands will be available for amateurs in this country, but they agreed with the desirability of lining up the various classes of frequency allocations throughout the world wherever possible.

10. It was reported that steps were being taken to prepare a series of articles for publication in the R.S.G.B. BULLETIN designed to assist the newcomer to amateur radio.

11. It was reported that numerous helpful suggestions had been received from members in reply to the circular dealing with the post-war amateur market. It was agreed to take steps to circulate the list as soon as possible to the radio industry, and to invite individual firms to send representatives to meet representatives of the Society to discuss their post-war plans insofar as they affect the amateur market.

The meeting closed at 9 p.m.

R.S.G.B. Prisoners of War Fund

DONATIONS.—The General Secretary acknowledges with thanks, on behalf of Council, receipt of donations from: District 17 (Gainsborough), £1 5s.; J. D. Gill, 7486, 5s.; District 4 (Nottingham), 14s. 7d.; District 5 (Bristol), £1 11s.; S. Allen, G8TR, 2s. 6d.; A. Swann, 7780, 2s. 6d.; A. E. Gautier, 7711, 5s.; F. H. Jackson, G2KZ, 5s.; F. H. G. Halfacre, 8130, 5s.; J. Mitchell, 6127, 5s.; Catterick Meetings per BRS5724, £1 10s.; District 11 per BRS1060, 12s.; J. Cairns, G3UC, 5s.; W. Hewitt, 4172, 5s.; Catterick Meeting per BRS5724, 10s.; A. Ward, 8273, 1s. 6d.; W. J. Thompson, G2MR, 12s. 6d.; District 7 (per G2DP), £1 12s. 6d.; A. T. Witts, £2 2s.; Capt. E. Shackleton, G6SN, "A Thank offering," £10 10s.; Catterick Meeting per BRS5724, 13s.; T. B. Cocking, G2CV, 5s.; G. Bellamy, 8131, 5s.; Leeds P.D.M., £12 17s. 6d.; E. G. Rowland, 6164, 10s.; F. F. Bowling, G8IC, £1.

Total receipts to date £1,550 17s. 1d. Total expenditure to date £921 0s. 9d.; Balance in hand as at 27th April, 1945: European fund £259 16s. 4d. Far East fund £370.

American Publications

The Society is in a position to accept orders for the following publications which are ordered individually from America:

"QST" (Official monthly publication of The American Radio Relay League). By subscription, per annum	17s. 6d.
"The Radio Amateur's Handbook" (A.R.R.L.) 1945 Edition	10s. 6d.
"The Radio Amateur's Handbook"—Special Defence Edition (A.R.R.L.)	8s. 6d.
"The Antenna Handbook" (A.R.R.L.)	4s. 0d.
"A Course in Radio Fundamentals" (A.R.R.L.)	3s. 6d.
"The Radio Handbook" (Editors and Engineers) 1943 Edition	12s. 0d.
"Radio" (Monthly publication of Radio Magazines Inc.). By subscription, per annum	21s. 0d.

Orders must be accompanied by a remittance made payable to the Society and rates and prices are subject to alteration without previous notice. Delivery can be expected in about 12 weeks from date of order. Service Addresses must not be used. Single copies of text books only may be ordered.

Members who change their address during the currency of a subscription to *QST* or *Radio* should advise the publishers *direct*.

B.B.C. Standard Frequency Transmissions

The B.B.C. announce that certain of its transmission frequencies are now controlled within $\pm$ 1 part in 1 million of the nominal frequency. Whenever these frequencies are used by B.B.C. transmitters, they can, therefore, be employed as a reference standard.

The frequencies in question are 200, 6180, 9510 and 17810 kc/s. and reception of one or other of them should generally be possible anywhere in the world for a period of each day. Transmission hours will change with alterations in B.B.C. services but the present schedule of transmissions is as follows (times in G.M.T.):

(*a*) 200 kc/s.	(European Service)	0400–1330	1430–0045
(*b*) 6180 kc/s.	(Home Service)	0500–1330	1430–2215
	(European Service)	0400–0500	2230–0045
(*c*) 9510 kc/s.	(Overseas Service)	0400–0800	1730–0215
(*d*) 17810 kc/s.	(Overseas Service)	0900–1515	

Record Cards

A considerable number of members still fail to return the record card, duly signed and completed, which is sent to them with their statement of account. It is essential for record purposes that every member shall complete and return the card without delay. In the case of members serving abroad parents and relatives are asked to forward the card to the member concerned.

As stated in the February issue the request for age *only applies to Junior Associates*.

Congratulations

All members will join the Council and Headquarters staff in offering warm congratulations to our President and Mrs. Gardiner, on the birth of a daughter, Mary Elizabeth, on Tuesday, April 17, 1945.

Hospitality Offered

Mr. C. W. Packe, **G3OJ**, will be pleased to extend hospitality to any member who may be in the neighbourhood of his new home, The Lilacs, Thurman's Lane, Frimley St. Mary, near Ipswich (Telephone: Felixstowe 93).

W.O. C. F. Barnard, **G8AC**, will also be pleased to extend a welcome to any member who cares to visit him at his new home address, 4 Gleton Avenue, Hove, 4.

EDITORIAL—(*continued from page* 161)

able to indicate whether the trade test requirements are comparable with those of the listed trades.

Civilians serving as instructors and who have passed a Radio Trade test will, it is anticipated, be permitted to obtain exemption on the lines indicated for the equivalent Service radio trade.

Service members who are serving in radio trades not listed and who have reason to believe the trade may carry exemption should communicate with the Society.

At an appropriate time the Society will announce the date from which members who wish to take advantage of the arrangements outlined above, may submit an application for a radiating licence.

EXCHANGE & MART—ADVERTISEMENT RATES

Advertisers and buyers are reminded that under Defence Regulations 1939, *Statutory Rules and Orders* 1940, *Number* 1689 *a permit (T 99 G) must be obtained before sale or purchase of certain electrical and wireless apparatus, particularly such valves and apparatus as are applicable to wireless transmission.*

ALL KINDS OF PRINT, especially QSL Cards.—Send your inquiries to G6MN, Castlemount, Worksop.

ABUNDANT supplies available for Hams:—0–1mA meters, all sizes from £2. Mullard universal bridges £16 16s. Oscilloscopes £70. Ex-A.M. meters 0–1.5, 0–15, 0–150 volts 1.5m A.F.S.D., £4 5s. Rothermel P/Us £3 18s. 6d. Speakers 2 in.–12 in. from £1 1s. Mains intervalve, O/P and filament transformers, condensers and resistors of all descriptions. 10,000 English and American tubes in stock. S.W. gear of all types, chassis, metal cabinets, etc. Hallicrafters SX27. FM/AM. "R" meter. B.F.O. Crystal, etc. "A dream to handle." Ditto SX17. Ditto SX11. Your rig taken in part exchange. View any time. More goods available, too numerous to list. All new. State your wants. S.A.E. please.—BRS7370, BERNARD'S RADIO COMPANY, 67 High Street, Chatham, Kent. Phone: Chatham 2927.

AMATEUR has for disposal the following radio components and apparatus. A rare opportunity to obtain a really good article which is otherwise unobtainable at a throw-away price. All brand new and guaranteed O.K. COMPONENTS. Pr. Browns "A" phones with Woden matching trans £2 12s. 6d. One 8 in. Stentorian Jnr. P.M.M/C Speaker with multi-match trans, £1. Thordarson trans T84D59, 35s. Velocity ribbon mike on crome case with trans, 50s. Canadian crystal mike with desk stand and screened cable, 60s. Ferranti M/C meters 0–1mA 4½in. 80s., 0–100mA., 0–150mA, 3½ in., 55s. ea. Two A.C./D.C. Midget radios, require slight attention, £4 10s. ea. A.C. power-pack 400–0–400v, 150mAs and 6.3v. 4a. with condensers, chokes, etc., on chassis, wired and tested, £6. Mallory VP553 vibrapack with spare vibrator on chassis with condensers, chokes, etc., wired and tested, output 125, 150, 175, 200v at 100mAs, £8 15s. 4-volt vibrapack as above but 200v at 30mAs, £3 5s. also numerous other components including relays, switches, coils, condensers, resistors, chokes, knobs, volume controls, transformers, pick-ups, cable, too numerous to detail. State wants. Stamped addressed envelope, please. I WANT Hammarlund Super Pro, Jensen bass speaker, "Bug" key, typewriter, or what have you?—BRS5689, 24 Rossie Island Road, Montrose, Angus.

FOR SALE.—1938 H.M.V. model 800 radiogram, as new, £100. Completely portable new public address amplifier, push pull 6F6's, two 10 in. speakers, crystal mike, size 10 in. × 12 in. × 17in., £30. H.M.V. portable gramophone, automatic stop, variable speed double spring motor, £7 10s. Wanted, good all-wave battery or mains superhet, working or not, Universal Avo wee megger; all-wave signal generator, valve tester, electric gramo motor.—BOX 558, PARRS, 121 Kingsway, London, W.C.2.

HALLICRAFTER or similar communication receiver wanted by allied ham. Also good ham gear.—Particulars, price, etc., to Box 578, PARRS, 121 Kingsway, London, W.C.2.

HALLICRAFTER Challenger 1938, £25. B.T.H.—R.K. Speaker, £5. Heavy chokes, Yaxley switches, 3-gang condensers, etc. Owner in Army.—G5DI, IRWIN, c/o Hillman, 25 Kingdom Road, West Hampstead, N.W.6.

H.R.O. Broadcast Band Coil Unit wanted.—State price to W. G. JOHNSON, Pinchbeck Hall, Spalding.

MEMBER of R.S.G.B. wanted for leading West End retailers specialising in high grade British and American components. Thorough technical knowledge and pleasing personality essential. Generous salary and unlimited possibilities for promotion. Excellent references required. (Ex-serviceman preferred.)—Write to BOX 579 PARRS ADVERTISING, 121 Kingsway, London, W.C.2.

MONOMARK service.—Permanent London address. Letters redirected. Confidential. 5s. p.a. Royal patronage. Key tag 9d.—Write BM/MONO7A, W.C.1.

NATIONAL H.R.O. Senior model, 7 coils, power pack, transformer and speaker; instruction manual. A.1 condition throughout. Offers invited.—Box 570, PARRS, 121 Kingsway, London, W.C.2.

NEW Valves.—VP4, Pen45, LW4/350, 10s. ea. MH4, 7s. 6d. Ferranti transformers: AF3, 6s. 6d. AF4, 8s. 6d. Several s.w. components, Eddystone, etc. S.A.E. for List.—RICHARDSON, 75 Westgate, Peterborough.

SALE.—R.C.A.9004 Acorn; U.H.F. detector, new. Best offer 7 days after publication obtains.—ANDERSON, 2FQO, c/o 28 Market Street, St. Andrews, Fifeshire.

SALE.—Browns' "F" type phones, various valves including rectifiers.—S.A.E. for details to 2HKU, 27 Unity Street, Sheerness.

SALE.—*QST*, September to December, 1939. 1940 complete less February, June, July. 1941 complete. 1942 complete less November, December, BULLETINS October, November, December 1939. July to October, 1938. 1940 complete. 1941 complete less December. 1942 complete less November, December. November, December copies 1943. 1944 complete. Offers for lot or part.—G4FN, 73 Glenwood Avenue, Westcliffe-on-Sea, Essex.

SALE.—Govt. Surplus; Mains transformers for C.R. tube 2,500v 2v 2-A, 4v 1.4-A. with rectifier valveholder (U22) 35s. each. Meters, M.C. 2½ in. movements 1st grade 10–0–10mA centre zero, 22s. 6d. each; 50–0–50mA 20s. each; 0–150mA 27s. 6d. each; 0–20 volts moving iron 18s. 6d. each. Condensers 2-gang x 43 pf ceramic insulation 7s. 6d. each, 4μf 1,500v wkg. 9s. 6d. each; 0.1μf 2,000v wkg. 4s. Yaxley switches 3-way 5-bank 7s. 6d. each. Valveholders Brit. Octal ceramic 10d. each. Eddystone flexible couplers 1s. 3d. each. Morganite volume controls med spindles, 1 meg., 2 meg., 2s. each.—HUSTON, 90 Bradfield Road, Stretford, Manchester.

TELE-RADIO (1943) LTD. for brand new good quality components at manufacturers list prices. Suppliers to British and Allied Services and Government departments, professional constructors and amateurs who want only the best. Weston meters 0–1 mA, £2 10s. 0–500 micro amps, £3. 0–100 micro amps, £3 15s. 0–50 micro amps, £4 10s. 1 mA instrument rectifiers, 12s. 6d. "Spot-on" wire wound precision resistors plus or minus ·05 per cent., 5s. 6d. each (up to 50,000 ohms only). Single pole 12 position switches, 3s. 6d. each; 4 pole 3 way, 3s. 6d. each. Cathode Ray Tubes, G.E.C. 1½ in., £2 15s. Cossor 23D, 2½ in., £3 6s. Cossor 26D, 4½ in., £6 10s. Cossor GDT4B gas filled triode, 24s. 4d. High voltage rectifiers and condensers. Potentiometers carbon, 4s. 6d.; with switch, 6s. 6d.; wire wound, 6s. 6d., all usual values. Crystals 100 Kc/s., 45s. (P.O. Permit). Rothermel crystal pick-ups, £3 13s. 6d. and £3 18s. 9d. (high fidelity Red Label, 10s. extra). Celestion, Goodman and Vitavox speakers. Wearite P. coils and I.F. transformers. Wave-change switches, variable condensers and trimmers, etc. Comprehensive stocks of British and American valves. Steel racks, chassis, panels and cabinets, any specification (callers only). Unlimited resources for technical information to callers. Postal inquiries acknowledged same day. Cash or C.O.D. orders, if in stock, 24 hours service. Postage and packing extra on all goods.—TELE-RADIO (1943) LTD. 177A Edgware Road, London, W.2. (Corner of Edgware Road and Sussex Gardens.) 'Phone: Pad 6116. Telegraphic address "Goahead" Padd, London.

URGENTLY required for work of National importance.—Any back numbers from 1936 to 1944 of any British or American radio magazines such as *Radiocraft*, *Radio News*, *Communications*, *R.C.A. Bulletin*, *Radio*, *Wireless Engineer*, *Electronics*, *Bell Telephone Journal*, *Proceedings of I.R.E.*, etc. Best prices will be paid. These are required to complete technical research library.—Reply to MR. BERNARD, Bernards (Publishers), Ltd., The Grampians, Western Gate, W.6. Telephone: Shepherds Bush 2581 (day and night).

VALVES.—2A5, 6A6, 51, AC/HL, 76, EF39, EF6, U14, 5Y4G, 6Q7G, 6J7G, 6K7G, 6C5G, 6J5, 6G5, D63, 84/6Z4, all at 8s. each.—Box 576, PARRS, 121 Kingsway, London, W.C.2.

WANTED.—RK62 gas filled triode, also *Practical Mechanics* December 1939. *Radio and Television* Jan. 1939. *Short Wave and Television* Jan. 1936, May 1938. *Radiocraft* August 1943, March 1944. *Radio News* March, April, June, 1944.—POTTER, 27 Kingsfield Drive, Didsbury, Manchester 20.

WANTED urgently.—Copies *Proc. I.R.E.*, April 1944; *Electronics*, Feb. 1943; *QST*, June 1944. State prices.—RESEARCH LIBRARY, E.M.I. Ltd., Hayes, Middx.

WANTED.—Webbs General Catalogue 1939; not receiver catalogue. Also required, minature receivers and Hallicrafter's speaker for SX24.—R. HATTON, 21 Lincoln Crescent, Enfield, Middx.

WANTED.—Avo all-wave Oscillator (battery model) or other similar make. Good price paid.—W. MACDONALD, Brae Gardens, Dingwall, Ross-shire.

WANTED.—Cossor DDT 16 or Marconi DHD. New or s.h.—H. HARGREAVES (G8FI) 15 Earnsdale Road, Darwen, Lancs.

WANTED.—July 1939 copy of *Television and Short Wave World*. One Thordardson T8470. Offers to G3LR.—269 Dill Hall Lane, Church, Accrington, Lancs.

WANTED urgently.—Faber slide-rule type 398 or 388 with 3 line cursor. Good condition essential.—BRYANT, 47 Belmont Hill, Lewisham, London, S.E.13.

WESTON Super Oscillator E692—perfect order but less SW.3 coil and charts (both obtainable), new batteries (H.T. external), original price 19gns., sell £15 10s., or (preferably) exchange for communications receiver. Hallicrafters Ultra commercial preferred—Multimeter, Condenser analyser. Cash adjustment either way.—BRS4630, 2 Meads Road, N.22. Bowes Park: 2140.

PATENTS AND TRADE MARKS

KING'S Patent Agency Ltd. (B. T. King, G5TA, Mem. R.S.G.B., Reg. Pat. Agent), 146a Queen Victoria Street, London, E.C.4. Handbook and Advice on Patents and Trade Marks free. Phone: City 6161. 50 years' refs.

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