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BULLETIN

JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN

- COMMUNICATION ON CENTIMETRE WAVES
- VALVE VADE MECUM
- HOME MADE PUNCHING JIG
- A.C. SHORT WAVE RECEIVER

R.S.G.B. BULLETIN

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TAKING STOCK

THOSE who were licenced to operate an amateur station in the days before the war may be surprised to learn that nearly 50 per cent. of our present membership has had no *practical* experience of Amateur Radio.

When peace returns we who have been accustomed to think in terms of Contests and Field Days, will find little difficulty in reverting to a life controlled largely by a clock reading G.M.T. We shall experience no hardship in again pulling ourselves out of bed in the still small hours of a winter's morning, or in rushing home from our office, to keep a schedule with a colleague at home or abroad. Conventions and Provincial District Meetings will find us ready once again to enjoy the pleasures of personal contacts. These things and many more were an integral part of our pre-war existence, but the 2,500 new members who have not enjoyed the hunt for DX or scrambled for points in a contest, what of them? How can we, the old timers of Amateur Radio, help them to find their feet and take an active part in a movement that is destined to become ever more important as time goes on?

Whilst the war continues, local meetings provide the only obvious means for communal gatherings. For that reason we would again urge all who are willing and able to arrange meetings to communicate with their District Representative. Much good work has already been done in this direction, sometimes by members with little or no pre-war amateur experience, but much more can, and must, be done if we are to provide newcomers to our ranks with a fuller understanding of Amateur Radio.

Several of our new members who replied to THE BULLETIN questionnaire, appealed for articles dealing with the development of amateur radio from the earliest days. Others asked for contributions designed to teach the basic principles of radio. To both groups we would say that the calls upon our restricted space prevent us from carrying into effect these admirable suggestions at the present time. We hope, however, to announce next month that a lecture dealing with the Development of Amateur Radio will be delivered to the London membership at an I.E.E. meeting during the next session. Whilst appreciating that many new members would welcome articles of an elementary nature, we feel that their requirements are admirably, if not fully met, by the Society's Handbook and Supplement, and by the many other excellent publications now on the market.

Incidentally the publication this month of a ninth printing of the *Amateur Radio Handbook* brings our total printing orders up to a figure well in excess of 100,000 copies. When we recollect that the first edition of 5,000 copies was published as recently as December, 1938, and that the second edition did not appear until the war had been in progress for nearly 12 months, the Society can feel justly proud of the success achieved by this "all amateur" publication.

The Supplement, produced only last year, has already been reprinted and nearly 60,000 copies are in the hands of members and interested sections of the general public.

How far our present satisfactory membership position can be attributed to the Handbook and Supplement, none can judge with certainty, but undoubtedly many of those who are now proud to sign themselves "M.R.S.G.B." first became aware of our activities as the result of perusing one or both of these publications.

The importance of our own Journal must not be overlooked when taking stock for the future. It has stood the test of time for over 18 years and has, we believe, lived up to the aspirations of those who, with some trepidation, launched it on to the amateur fraternity in 1925. THE R.S.G.B. BULLETIN bears witness to our activities, and reflects our technical outlook, as evidenced by the series of articles on Micro-wave Technique which are now appearing, and by the many other important contributions we have presented to members during recent months. In the days ahead it will be to THE BULLETIN that members will turn for the latest circuits and technical information. To-day with the component market practically closed to "the man in the street," it is not wise to publish articles dealing with receivers or other instruments which require unobtainable parts, but when the good times return, we guarantee to provide as good a fare each month as ingenuity and brains will permit. Until that time comes we would urge the old timers of the Society to leave no stone unturned in their efforts to establish in the minds of new members a sound knowledge of the traditions upon which the Amateur Radio movement is founded. Tell them about your first DX contact, dig out your QSL cards and your field day photographs and show them how to design and lay out a modern amateur station.

J. C.

How was it done?

Many observant members have enquired how we managed to obtain Holborn 7373 as the telephone number for our new Headquarters. The answer is quite a simple one—we asked for it!

COMMUNICATION ON CENTIMETRE WAVES

PART II

By J. H. SHANKLAND, B.Sc., Grad. I.E.E. (GM8FM)

Velocity Modulation

CONSIDER a beam of high velocity electrons passing through two grid electrodes AB, which may consist simply of two plates with circular holes, across which a high radio-frequency voltage is impressed (Fig. 5). It is assumed that the electron velocity is so high and the grids spaced so closely, that the time for an electron to cross the space between the two grids is only a small fraction of the time taken for one radio-frequency cycle. This transit time is usually expressed in degrees or radians and is known as the "transit angle," *i.e.* the angle described by the radio frequency voltage vector during a space of time equal to the transit time. As there is a high radio frequency voltage across the two grids, A and B, there will be an alternating electric field between them which will be more or less parallel to the direction of motion of the electron beam. Suppose that when an electron is entering the inter-grid space the electric field is in the direction A to B. This electron will be

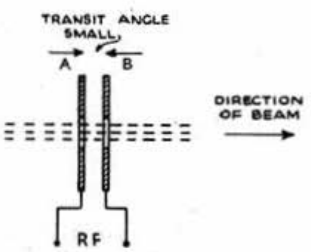


Fig. 5.
Velocity modulating grid.

accelerated and will leave the grid B with a velocity greater than the mean velocity of the electrons in the beam. Similarly, an electron entering the space when the direction of the field is from B to A, will be decelerated and will leave B at diminished velocity. Thus after leaving B the electrons in the beam will travel onwards with differing velocities, *i.e.* the beam has been modulated in velocity due to its passage between the grids. Note that the electron density of the beam on leaving B is the same as the density of the beam entering the gap; only the velocity of the electrons has been changed.

There is also a type of grid developed by Hahn and Metcalf which is suitable for velocity modulating a beam. This consists of two hollow tubes (Fig. 6) through which the electron beam passes. Suppose a radio frequency voltage to be impressed on the two tubes as shown. The transit angle between A and B, and between C and D is small. An electron entering the gap AB when the electric field across the gap is in the direction A to B will be accelerated during its passage. At this instant the field across CD will be in the reverse direction, D to C. After passing B, at increased velocity, the electron enters the centre of the inner tube, which is field-free and so it will proceed from B to C without further change of velocity. Now if the transit angle of the space BC is 180° (π radians), when the electron reaches C (half a cycle later) the field across CD will have reversed and will now be in the direction C to D which will again accelerate the electron. Similarly an electron which is decelerated at the gap AB will be decelerated at the gap CD and an electron entering the gap AB at an instant of zero field will pass through the grid and leave D with unchanged velocity. It will be seen that this double-acting type of grid is similar in action to the simpler type previously described, the electrons leaving D with differing velocities.

It now remains to be seen how the velocity modulation may be changed to amplitude modulation and the energy in the beam transferred to an output circuit. This may be done by three different methods (1) deflecting the beam, (2) allowing the beam to drift in field-free space, (3) applying a retarding field to the beam.

Deflection Conversion

If an electron beam is allowed to pass through a magnetic field at right angles to its direction of motion, it will be deflected through an angle which is proportional to the strength of the field and inversely proportional to the velocity of the electrons in the beam. Hence if a beam containing electrons having different velocities is allowed to enter a steady transverse magnetic field, the slower-moving electrons will be deflected through a larger angle than the faster-moving ones. The main stream will be split up into two subsidiary streams, one containing the fast-moving electrons and the other containing the slow-moving electrons. Thus the main velocity modulated beam has been converted into two smaller charge-density modulated beams from which power may be drawn.

A steady transverse electric field would also split a velocity modulated beam into two amplitude modulated beams. However, tubes using this method of conversion to amplitude modulation have proved rather difficult to adjust due to critical electrode potentials, and tubes using the two other methods of conversion have been found to be more satisfactory.

Drift Tube Conversion

If a velocity modulated beam is allowed to pass through a field-free space (known as a "drift space"), the faster-moving electrons will now begin to overtake the slower ones, so that at some point along the beam, the beam will consist of alternate regions of high and low electron density, *i.e.* the beam has become

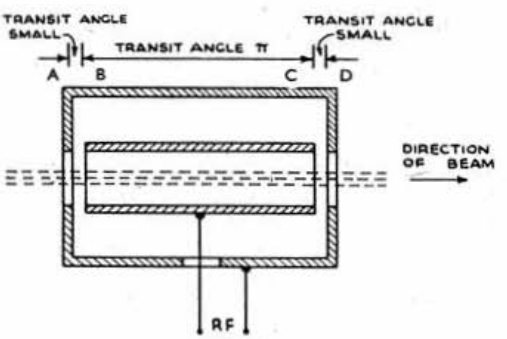


Fig. 6.
Hahn and Metcalf grid.

bunched and is now charge-density modulated at this point. The length of the drift space to produce bunching will depend on the magnitude of the radio frequency voltage existing across the electrode structure used to produce the velocity modulation. Only a very small voltage is necessary to produce deep amplitude modulation, provided that the drift space is long enough, since the electrons will in time sort themselves out into bunches even if there is only slight velocity modulation when the beam leaves the modulating electrodes. However, very long drift spaces are not a practical proposition since space charges may be set up in them which have a deleterious effect on the bunching action.

It was seen that at some point in the drift space the beam was charge-density modulated, but the electrons in the bunches have different velocities and if the beam were allowed to continue to drift in field-free space they would un-sort themselves after a certain time and again bunch themselves. Thus in a long velocity modulated beam passing through field-free space there will be several equally-spaced regions of charge density modulation along the beam, the maxima being spaced by a transit angle of 2π radians.

To abstract the energy from the beam it is only necessary to arrange for the output circuit to be placed at a point of maximum charge-density modulation. This output circuit may take the form of a concentric line circuit such as was used for the Inductive Output Tube, in which case the mechanism for the abstraction of energy will be as previously described, or it may take the form of the Hahn and Metcalf grid (Fig. 6) coupled to a concentric circuit. Consider a charge-density modulated beam entering the grid-structure shown in Fig. 6. It will be assumed that the grid is connected to a resonant circuit which is being excited. The cluster of electrons enters the gap when the field across AB is in the direction B to A. The field across the gap CD will be in the direction C to D at this instant. The bunch of electrons will be retarded as it passes through the gap AB and will give up energy to the oscillating circuit connected to the grid assembly. Half a cycle later it will reach the gap CD where the field has now reversed and is now in the direction D to C, so the bunch of electrons will undergo a further retardation and transfer more energy to the output circuit. When the fields are in such a direction as to accelerate (and hence abstract energy from the tank) there will be a region of minimum electron density entering the gap, so that there is more energy transferred to the output circuit than is abstracted from it. The electrons emerging from the grid structure may now be collected by means of a collector electrode, as is done in the Inductive Output Tube.

Retarding Field Conversion

If a beam of electrons is allowed to approach a low potential electrode, the electrons will be retarded and brought to rest by the negative potential gradient, and will return along the beam. The point at which they are turned back depends on the velocity of the electron. If a velocity modulated beam approaches a reflecting electrode at the potential of the cathode, the faster-moving electrons will have sufficient kinetic energy to reach the electrode and be collected. The slower-moving electrons however, will be brought to rest before they reach the reflector and will return along the beam. This reflected electron stream is charge-density modulated, and may therefore supply radio frequency power to an electrode system placed in its path.

The Positive-Grid Triode or Barkhausen Oscillator

The positive-grid triode oscillator is one of the oldest devices for the generation of power at centimetre wavelengths and was accidentally discovered in 1919 by Barkhausen and Kurz when they were investigating the degree of vacuum in transmitting valves. In this oscillator a positive voltage is placed on the grid and a small negative voltage on the anode. There are several ways of connecting the resonant circuit to the valve, the most common being to connect it between the grid and anode.

Suppose the valve to be in oscillation and a radio frequency voltage to be impressed on the D.C. potential. All the electrons emitted by the cathode will be accelerated towards the grid and some will pass between the wires of the grid mesh. The impressed alternating potential on the grid will produce velocity modulation of the electron stream, which passes through the grid towards the anode, and as this is operated at zero or a small negative potential, the part of the electron stream which has the greatest velocity will reach the anode and be collected—thus an anode current will flow, this being the usual sign of oscillation in a oscillator of this type. Part of the stream is turned back before it reaches the anode and returns towards the grid. As this stream is intermittent it is charge-density modulated and in passing through the grid it induces an alternating current in the grid structure as was described when considering the operation of the normal triode at very high frequencies. It now approaches the cathode and as its velocity has been reduced in its passage through the grid it will be again reflected by the cathode. It continues to pass to and fro through the grid until its velocity has been so reduced that it is collected by the grid. Thus if the external circuit is adjusted so that the time taken for one radio frequency cycle is equal to the electron transit time between anode and cathode the oscillation will be maintained. This type of oscillator is very inefficient as the electron stream is not focused and hence a large number of electrons will strike the grid without doing any useful work on the high frequency circuit. A development of this type of oscillator was used in the 17 cms. cross-Channel telephone link. In this case the valve used had a special helical grid with no supports running along it. The grid helix was designed to resonate at the working frequency and the Lecher wire output circuit was connected between the two ends of the grid.

Magnetron Oscillators

The Magnetron valve first made its appearance in 1920 being designed for use on long waves. It consisted of a diode having a cylindrical anode and cathode, round which was wound a solenoid so as to produce a magnetic field co-axial with the cathode. A variation in the magnetic field would then control the electron stream flowing from cathode to anode. As the large inductance of the solenoid limits the use of this tube to very low frequencies it proved inferior to the normal triode and was ultimately abandoned.

However, around 1924 it was found that the Magnetron could be made to produce oscillations of very high frequency by using a constant axial magnetic field and connecting a resonant circuit

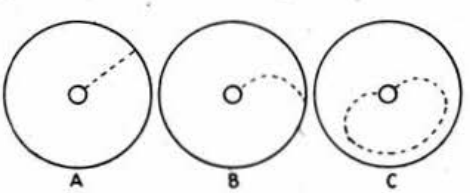


Fig. 7.
Electron paths in a Magnetron. (A) Zero magnetic field. (B) Small magnetic field. (C) Magnetic field at cut-off.

between the anode and cathode, or between the segments of a divided anode, this latter being the most usual method for the production of centimetre waves.

Consider a diode valve having a cylindrical anode and cathode, placed in a homogeneous magnetic field parallel to the cathode, and a D.C. potential applied between anode and cathode. When the field is zero the electron paths will be radial (Fig. 7A) and when the field is increased from zero the paths will tend to become curved (Fig. 7B) since the force acting on an electron moving in a magnetic field is always at right angles to its direction of motion. If the field is still further increased, a point will be found where the anode current falls to zero, the electrons

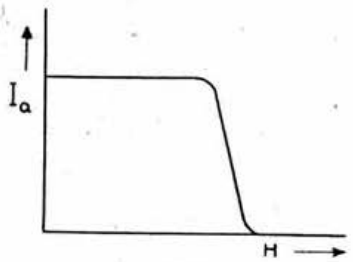


Fig. 8.
Magnetron characteristic.

now describing a circular path and returning to the cathode (Fig. 7C) after grazing the anode. Fig. 8 shows a Magnetron characteristic.

In the case of the two-segment Magnetron, which is perhaps the most important type for the production of micro waves, the anode is divided into segments by means of two longitudinal slots and an oscillatory circuit is connected between the two segments. The magnetic field is adjusted to the cut-off value. When the valve is in the non-oscillating state, both halves of the anode will be at the same potential and the electric field will be radial as in Fig. 9A. The dotted curve shows the probable path of an electron under these conditions, and *p* gives the direction of the force acting on the electron due to the electric field, and *f* the direction of the force due to the axial magnetic field. Note that this is always at right angles to the direction of motion of the electron. Let us now assume that the tube is oscillating and there is a small alternating potential between the two segments. The uniform radial electric field of Fig. 9A is now distorted by the application of an alternating tangential field, the distortion being strongest in the vicinity of the gaps (Fig. 9B). The electrons which pass in front of the gaps with the field will be accelerated, hence the radius of their orbits will be increased, and the electrons will strike the segment with the higher potential (Fig. 10A) where their energy is dissipated as heat. Those electrons which pass the gaps, with an adverse tangential field, will be retarded and give up energy to the field and will continue on an orbit of smaller radius than the grazing orbit (Fig. 10B) towards the cathode. By the time the electron has returned to the vicinity of the cathode the field has reversed and the electron is again accelerated by the D.C. potential. It may repeat the same process during several consecutive cycles until its kinetic energy is exhausted and it can contribute no longer to the maintenance of oscillation. The frequency of oscillation of the tube is determined by the time taken for the electrons to complete their circular path from the cathode back to the vicinity of the cathode. It should be noted that the electrons which do not contribute to the oscillating energy are automatically removed from the anode-cathode space. It has been found that an increased efficiency may be obtained if those electrons which have completed several cycles are removed. This may be accomplished by tilting the magnetic field a few degrees, so that the electrons describe a spiral path along the anode axis, or by fitting two end plates and applying an electric field in the same direction as the magnetic field. This will also give a spiral motion to the electrons, and when exhausted they will be collected on one of the end plates.

Very high frequencies may be attained by this mode of oscillation. Richter has obtained a measurable output at 0·49 cms. (61,000 Mc /s.) using a tube of this type, although the efficiency was very low.

The Klystron Oscillator

The Klystron, one of the most successful of the newer types of velocity-modulated oscillators, was developed mainly in the U.S.A. by R. H. and S. F. Varian. Fig. 11 shows the circuit. The tube contains an electron gun similar to that in a cathode-ray tube, from which a narrow beam of electrons is projected along the axis of the tube and focused so that it will pass through the small apertures 1, 2 and 3, 4, across which the oscillating circuits are connected.

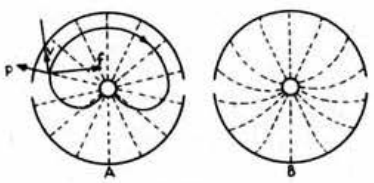


Fig. 9.
(A) Electron path in a Split Anode Magnetron with critical field and no R.F. voltage on the segments. (B) Field configuration in an oscillating Split Anode Magnetron.

The transit angle of the two gaps 1, 2 and 3, 4, is assumed to be small. The resonant circuits are of the cavity type (of which more will be said later in this article) and consist of hollow toroidal chambers, known as "rhumbatrons". The oscillating currents in this type of circuit flow on the inner surface of the chamber and there will be a high radio-frequency voltage across the neck 1, 2.

Suppose that the tube is oscillating, and ignore for the moment the length of concentric line connecting the two rhumbatrons. The electron beam from the cathode, accelerated by a D.C. potential of several thousand volts applied to the body of the tube, will pass through the aperture 1, 2, across which there is an R.F. potential. This will cause velocity-modulation of the beam in the manner already described. The velocity-modulated beam then enters the field-free space between the two rhumbatrons, known as the "drift space," where the faster electrons will begin to

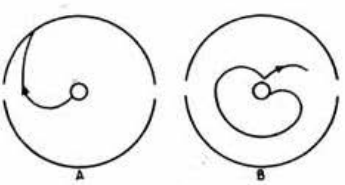


Fig. 10.
Oscillating Split Anode Magnetron. Paths of electrons emitted when the upper plate is going positive. (A) Electron absorbing energy from the output circuit. (B) Electron delivering energy to the output circuit.

overtake the slower ones and the beam will become bunched. It should be noted that bunching in a drift tube really amounts to electron focussing in space and time. The distance between grid 2 and grid 3 is so arranged that the beam is bunched when it arrives at the latter, although it may, of course, be bunched and de-bunched several times prior to reaching this grid. If now we assume that when the bunches of electrons arrive at the second rhumbatron (the catcher) the electric field across the neck 3, 4, is adverse, the electrons will be decelerated in their passage and their lost energy is imparted to the field, and hence to the catcher rhumbatron. The electrons are retarded almost to zero velocity in their passage through the gap 3, 4, and are removed by a collector electrode which may be at the same potential as the body of the tube.

If oscillation is to be maintained it is thus seen that the beam must be bunched when it enters the catcher rhumbatron and that the phase of the R.F. voltage across the neck of the catcher must be such as to retard the bunches of electrons entering the aperture. This latter is easily arranged by feeding energy from the catcher to the buncher rhumbatron by means of a short length of concentric line, the length of which is varied so as to establish the correct phase relationship between the voltages across the two rhumbatron necks. Output is taken from the catcher rhumbatron by means of a short length of concentric line connected to a coupling loop inserted in the rhumbatron.

The Klystron is capable of giving very high R.F. outputs with good efficiency, typical figures being 1 kW. at 20 cms. (1,500 Mc/s.) with an efficiency of the order of 50 per cent., and 300 watts at 10 cms. (3,000 Mc/s.) and thus is very useful as a communications transmitter. Modulation is usually effected by applying speech voltages to one of the focussing grids and thus varying the intensity of the electron beam passing through the necks of the rhumbatrons.

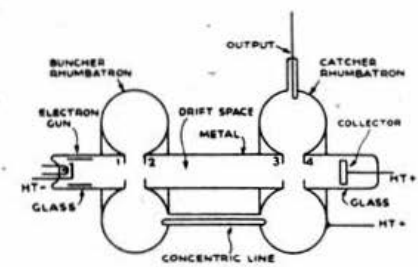


Fig. 11.
The Klystron Oscillator.

The Reflection Type Oscillator

This type of oscillator is rather similar in principle to the Klystron but employs only one resonant circuit or rhumbatron and is intended mainly for use in U.H.F. receivers where only a small amount of power is required. Figs. 12A and 12B show the circuits of two typical tubes, one employing a Hahn and Metcalf grid and a concentric line output circuit and the other using a rhumbatron. The action of both these tubes is the same, depending on retarding field conversion. The electron beam is focussed as in the Klystron so as to pass through the aperture in the Hahn and Metcalf grid (or rhumbatron) and is thus velocity-modulated on leaving the grid system or rhumbatron. It then approaches a reflector electrode which is at a potential near that of the cathode, and may be either slightly positive or negative to the cathode. If it is at the cathode potential or slightly more positive, the velocity-modulated beam after leaving the modulating grid, enters a negative potential gradient and the part of the stream which possesses average, or more than average, kinetic energy will reach the electrode and give rise to a reflector current. Part of the stream with kinetic energy below average will be retarded and turned back towards the cathode. This part of the stream is intermittent and is charge-density modulated.

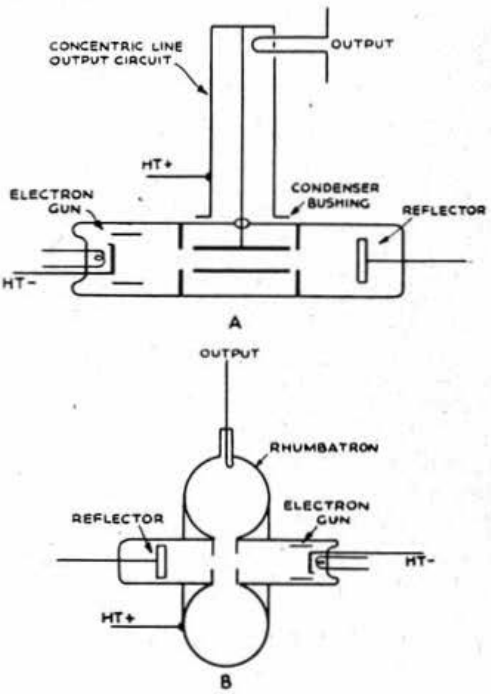


Fig. 12.
Reflection Type Oscillators. (A) Hahn and Metcalf Tube. (B) Tube using Rhumbatron tank circuit.

Thus for oscillation to be maintained it is only necessary to arrange that the returning bunches of electrons are retarded during their second passage through the modulating grid or rhumbatron. If the reflector is operated with a potential negative to the cathode, no reflector current will flow and the entire beam will be reflected. In this case the returning beam is velocity modulated and becomes bunched when it enters the modulating grid for the second time.

Hahn and Metcalf have produced tubes of this type which will oscillate at 5 cms. (6,000 Mc/s.).

(To be continued.)

A VALVE VADE MECUM

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

PART II—RECTIFICATION

19. *A valve permits current to pass in one direction only—how is this achieved ?*

When the plate is made more positive than the filament it attracts electrons to it and accordingly there is a passage of current through the valve. On the other hand, when the plate is more negative than the filament it repels any electrons that approach so there is no current flow. The action is much the same as that of **a mechanical valve** but with certain advantages. Thus the radio engineer has provided himself with a device affording him unidirectional flow of current, with almost instantaneous opening and closing, but free from those difficulties of inertia, bouncing and leakage which test the ingenuity of his counterpart, the mechanical engineer.

20. *The simplest action that a valve can perform is rectification, i.e. the conversion of an alternating supply to one which is unidirectional, though possibly fluctuating or intermittent. How is rectification obtained ?*

First consider an alternating wave form such as is represented in Fig. 1 (*a*). During certain intervals OAB, DEF, etc., the wave form is above the datum line and can be considered as positive. During the following intervals, BCD, FGH, etc., the wave form is below the datum line and must, therefore, be considered negative.

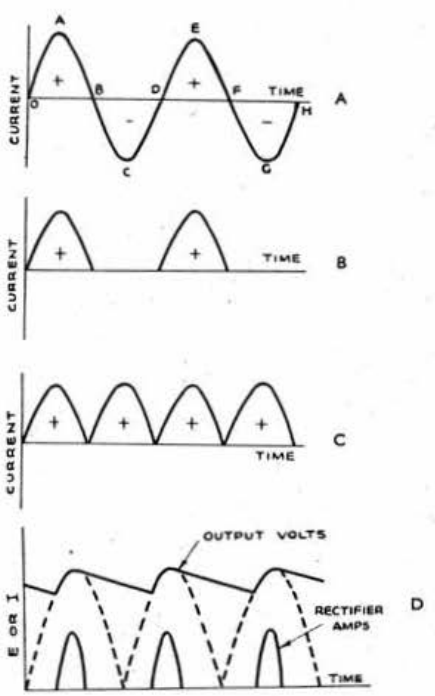


Fig. 1.

(*a*) An alternating wave-form. (*b*) Suppression of the negative half-cycles, giving half-wave rectification. (*c*) Inversion of the negative half-waves, giving full-wave rectification. (*d*) Effect of a condenser across the rectifier output.

Alternating voltage and current is of great convenience in transmitting power over cables from the generating station to the consumer, but once the latter has had the supply made available he must convert it to a unidirectional form before he can use it for applications such as electro-plating, accumulator charging, or running transmitters and receivers. To take the case of a receiver, the minute alternating voltages forming the signal are amplified stage by stage by the valves and associated components. The operation of the valves is dependant on their electrodes being maintained at certain steady voltages, on to which the signal voltage may be superimposed.

The simplest way to obtain a unidirectional current, or voltage from an alternating one, is to suppress one half of each cycle, as shown in Fig. 1 (*b*) where the negative halves are shown suppressed. This is called half-wave rectification. Another method is to invert the negative halves so that they are brought above the datum line, in which case we have achieved full-wave rectification (Fig. 1 (*c*)).

21. *What types of equipment may be used for rectification ?*

In all cases, the equipment functions merely as a switch—mechanical in some instances and electronic in others. The commutator on a D.C. generator is one example of a neat mechanical rectifier. All generators fundamentally produce A.C. and it is only by rapidly changing the connections to the appropriate conductors at the instant when they pass from the influence of one pole to the next that a unidirectional supply can be obtained. The changing of the connections is accomplished by fitting the machine with a commutator; in fact the advertising department of a firm of D.C. generator manufacturers could fairly describe their products as " Self-Rectifying Alternators " in an attempt to impress a *blasé* public.

Another example of a mechanical rectifier is provided by a vibrator, such as is often used in mobile equipment powered entirely by a low voltage accumulator. It should perhaps be stressed that the main function of a vibrator is to interrupt an otherwise steady current, but it is clearly a simple step forward to fit additional contacts varying the connections to the secondary winding of the vibrator transformer so as to obtain current of correct polarity at the appropriate instants of time.

Both examples quoted above are mechanical switches; an electronic switch is readily obtained by means of a valve.

22. *How is a valve employed merely as a switch to provide rectification ?*

Fig. 2 (*a*) shows a transformer T across whose secondary a resistor R can be connected by closing the switch S. The resistor can be considered as the load represented by the valve currents of a receiver or transmitter.

Suppose we consider the instant O in Fig. 1 (*a*) when the voltage is just becoming positive. During the ensuing quarter cycle the voltage will increase to its maximum value, shown by the point A. For this interval we can mark the top end of the secondary winding in Fig. 2 (*a*) as positive and the bottom end negative, so that the current may be shown as circulating clockwise. During the next quarter-cycle

the voltage, while still acting clockwise, will be decreasing in amplitude.

At the end of the complete half-cycle considered so far, the voltage will begin to reverse, and we must, therefore, open the switch S because we need a unidirectional voltage only. We can now mark the top of the secondary winding as negative and the voltage would be acting anti-clockwise had we not opened the switch to stop all current flow. We must hold the switch open for the whole of the interval during which the current is negative, and this will last for a half-cycle till the point D in Fig. 1 (*a*) is reached, when we can again close the switch to allow the load to receive another half-cycle pulse of positive voltage. The shape of the curve will now be as shown in Fig. 1 (*b*)

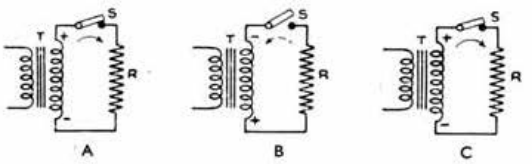


Fig. 2.

A rectifier acts merely as a switch, allowing an alternating current to flow in one direction, but opening as soon as the current tends to reverse.

Clearly a mechanical switch would have to be very rapid in action, for assuming the usual 50-cycle per second supply, a full positive or negative pulse will last for only 1/100th of a second. A valve, however, is practically instantaneous in operation and so provides a useful alternative device. We need merely connect the anode-filament gap in series with the load and arrange to heat the filament in order to obtain the electron stream. Instead of using an accumulator for filament heating, it is usually more convenient to draw the necessary heating current from a winding on the transformer, Fig. 3 (*a*). The reversals of the heating current will have little effect on the operation of the circuit for electrons will be emitted regardless of the direction in which the heating current flows through the filament. The filament current will fluctuate in accordance with the amount of current passing through it, but its natural property of losing heat only comparatively slowly will maintain its temperature sufficiently to continue the emission of electrons while the current is passing through zero.

23. *How is full-wave rectification obtained ?*

In order to rectify the negative half-cycles which are suppressed in the arrangement so far discussed, two half-wave rectifiers must be employed. It will be necessary to add an additional secondary winding and switch to the circuit of Fig. 2, or, to go a step further, an additional secondary winding and rectifier to the circuit of Fig. 3 (*a*), thereby giving us the full-wave circuit of Fig. 3 (*b*). The common junction of the two secondary windings is equivalent to a centre-tapped winding of twice the original number of turns. Thus, a transformer giving, say, 350 volts on either side of the centre tapping will often be found referred to as a 350–0–350 volt transformer.

The switches are arranged so that one opens when the other closes. During the positive half-cycle, the upper switch is closed and the upper half of the secondary winding supplies the current, the other half being idle, for its switch prevents the passage of current. During the subsequent half-cycle the lower switch takes its turn to close, and the lower half of the secondary winding now supplies current to the load. A pulse will, therefore, be supplied to the load twice per cycle, instead of only once per cycle as in the half-wave form of rectification.

24. *Are two valves essential for full-wave rectification ?*

No, it is necessary to have two anodes, but these can surround different portions of the same filament, and thus be contained in one glass envelope. This is the type found in receiver and similar light duty applications, but for higher power work two separate envelopes are preferable, to facilitate insulation and cooling.

25. *In practice a large condenser is placed across the output of the rectifier. What purpose does this serve ?*

The voltage and current pulses so far hold good only for the case of a resistance as the output circuit of the rectifier. It will have been noted that the voltage falls to zero each time the input wave is about to change from positive to negative polarity. These voltage fluctuations occur at audible frequency, and will therefore impose a hum on the output of the receiver or transmitter, though for applications such as accumulator charging they are unimportant, merely reducing to some extent the possible voltage from the rectifier. If a large condenser be added across the output of the rectifier it will act as a reservoir—in fact it is often called the "reservoir condenser." It will receive a charge during that portion of the conducting half-cycle when the voltage from the rectifier exceeds that across its terminals. When the rectified voltage begins to fall below the condenser terminal voltage, the condenser will supply current, which must pass to the load, as it cannot pass back through the rectifier. A large condenser takes an appreciable time to discharge, and before it has discharged to any great extent, it will receive another pulse from the rectifier to build up its voltage

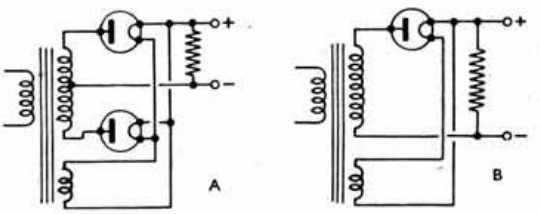


Fig. 3.

(*a*) A half-wave rectifier. The switch of Fig. 2 is replaced by the anode-filament gap of the valve, and a filament heating winding added. (*b*) Full-wave rectification by means of another valve. The two may be in one envelope.

once more. As a result the voltage is kept from falling back to zero ; in other words the voltage fluctuations are partly "smoothed out." Remembering that a rectifier can be compared with a pump, the condenser can be compared with the air reservoir often fitted to the pump to maintain a more constant flow. Fig. 1 (*d*) shows the effect on the output pulses of connecting a condenser across the rectifier output. It will be seen that the current pulse lasts for only a portion of the conducting half-cycle instead of for the duration of the half-cycle, which occurred in the case of a pure resistance output.

26. *How is a half-wave rectifier employed for detection on radio frequencies ?*

In radio frequency operation, the designer arranges for an alternating voltage to be developed across a tuned circuit. This voltage is applied across the anode-filament gap of the diode, with the load resistor in series, as shown in Fig. 4 (*a*). The electrons emitted from the heated filament of the valve can

reach the anode only when this is more positive than the filament, so that alternate half-cycles are suppressed. The electrons return to the filament through the external load resistor, and this current flow develops a voltage across the resistor.

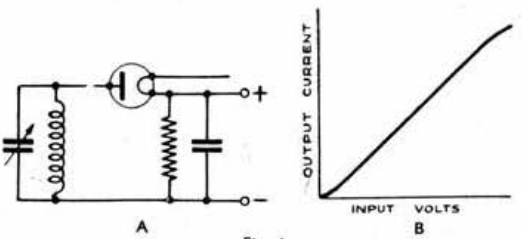


Fig. 4.
(*a*) Half-wave rectifier, or detector, on radio frequencies. (*b*) Over a wide range the output current of the diode follows a linear law.

The voltage can be shown to consist of three components, which can be separated. These components are :—

(1) A steady voltage, proportional to, but somewhat less than the amplitude of the carrier input. This is often used for biassing earlier stages.

(2) A component of carrier frequency, which is unwanted, and is by-passed to the filament by the condenser across the diode load resistor.

(3) A component of modulation frequency, which is applied to the grid of the following L.F. stage.

27. *What are the chief advantages and disadvantages of diode rectifiers ?*

Their main advantage lies in the fact that over a wide range of input voltage, the output follows a straight line law. This is illustrated in Fig. 4 (*b*) and makes them especially suitable as detectors in receivers for high quality reproduction, and for valve voltmeters used on audio and radio frequencies. The disadvantage is that the output is less than the input voltage, in other words, they cannot act as amplifiers, nor can feed-back be obtained for reaction in receivers or oscillation in transmitters.

(*To be continued*)

A Home Made Punching Jig

By Jas Gouck (GM3NH).

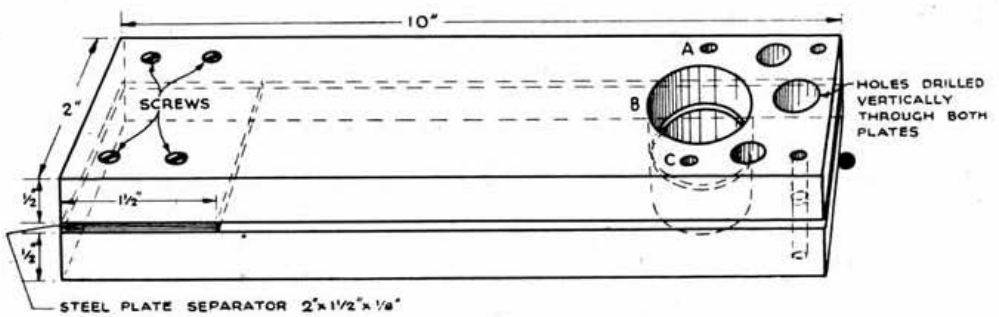
THE accompanying sketch of an easily made punching jig may be of interest to amateurs doing constructional work.

Two steel plates, ¼ in. thick and about 10 in. by 2 in. are screwed together at one end with a 2 in. by 1½ in. by ⅛ in. steel separator between them, care being taken to keep the edges parallel. Another separator of similar thickness is fitted temporarily at the other end until two of the smaller size holes are drilled. Still keeping this separator in position, two bolts are inserted in the holes and nuts run on to lock the assembly, thus ensuring perfect alignment while drilling the remaining holes. After the drilling is completed, the temporary separator, having served its purpose, is removed. The thickness of the permanent separator may be varied according to the thickness of the job material.

Punches are made from hard steel rod, ground to a good sliding fit, and the cutting ends ground flat, except in the case of that for hole B (1⅛ in.) which is slightly concave. The striking end should be slightly rounded to ensure a vertical blow.

A sharp blow with a hammer will drive a punch through aluminium up to ¼ in. or steel up to about 3/32 in. thick, leaving a very much cleaner hole than is normally obtained by drilling. Punches can be from 2 in. to 4 in. long, the shorter sizes enabling holes in small articles to be pressed out by using a bench vice instead of a hammer. When punching for valve-holders, the position on the chassis should be marked and the jig allowed to slide along to centre the mark in B, the jig should then be placed on a solid support and the punches A and C driven in. With these left in position, punch B may be driven through. Incidentally, the holes marked A, B, and C, form a jig for the Celestion Amphenol type octal holder which saves much time in drilling and measuring.

The smaller punches may require to be pulled out with pliers, but the larger sizes can be removed by hand, leaving a perfect cut-out for the valve-holder and fixing bolts, providing the jig has been drilled correctly.



Your Support is Solicited

Mr. F. G. Hoare, G2DP (T.R. for Croydon and Thornton Heath) has arranged to hold a meeting on Sunday, August 22, at the home of Mrs. Norman, 10 Glossop Road, Sanderstead, when the radio gear of the late F./O. Ron Norman, ex-G6DP, will be offered for sale. It is hoped that all members residing or stationed in the area will make a special point of attending at 3 p.m. The proceeds of the sale will be handed to Mrs. Norman.

AN A.C. S.W. RECEIVER

By A. H. Bruce (G5BB)

IN anticipation of quite a considerable increase in amateur activity after the war, most readers will already have decided that a single signal superhet must be employed to meet the inevitable interference, but a stand-by receiver will also be needed on many occasions. This article describes a suitable receiver for the latter purpose.

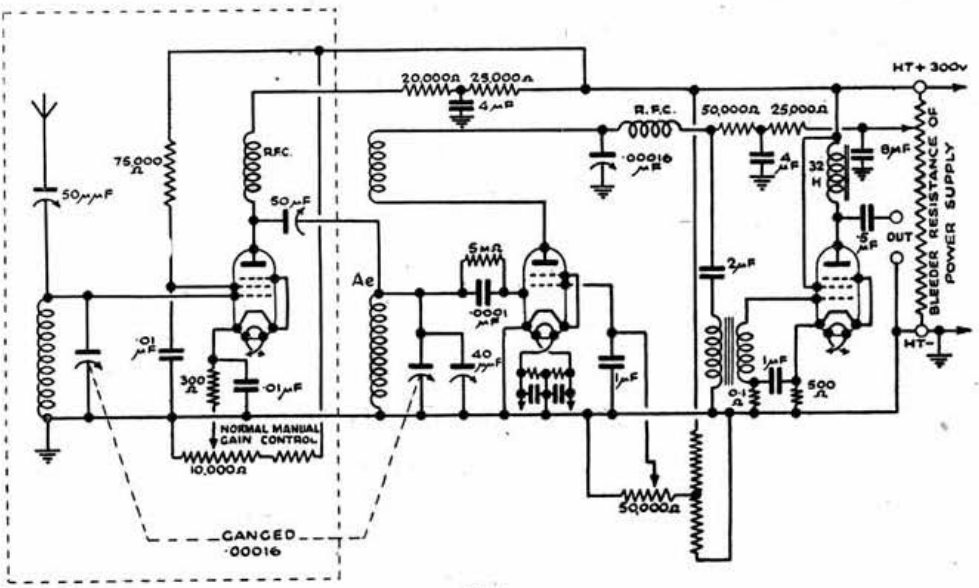


Fig. 1.

The circuit diagram. The H.F. stage is built into a biscuit tin and all components shown in dotted line are in this tin. Valves: H.F. Tungsram Variable Mu., Detector Ferranti S.P.4, Output Mullard Pen A4.

The Circuit

The circuit given in Fig. 1 illustrates a 3-valve combination, which is more or less conventional, with the exception that regeneration is obtained either capacitively or by varying the screen voltage on the detector valve. The correct method of operating the controls is to keep the screen voltage as high as is reasonably possible and then to use the reaction condenser in the ordinary way. This means that the detector valve can always be operated at maximum efficiency, at the same time making the regeneration control very flexible indeed.

From experiments carried out so far this method of regeneration control has produced a most stable set, although the writer would appreciate it if readers would point out any disadvantages that there may be attendant upon its use.

Constructional Details

It was decided that the receiver should be a pentode job with a detachable H.F. unit which could be added in a few minutes and at the same time have the advantage of being ganged. The pentode, detector, and L.F. stages were built upon an existing aluminium chassis measuring 12 in. × 7 in. × 2½ in. deep. The H.F. stage is assembled inside a standard 4lb. biscuit tin (no other metal being available) and is secured to the chassis by means of four 4 BA bolts. All controls are brought out to the front panel (which is cut to the height of the tin) with the exception of the manual gain control. This latter is, of course, incidental to the H.F. stage and therefore mounted on the side of the tin.

Details of the set can be better followed by studying Fig. 2 which shows an "end on" view of the constructional features, some of which may be mentioned here. Midget variable condensers of ·0001 μF capacity (Raymart) are used for the "main gang" and these

(*Continued on page* 32)

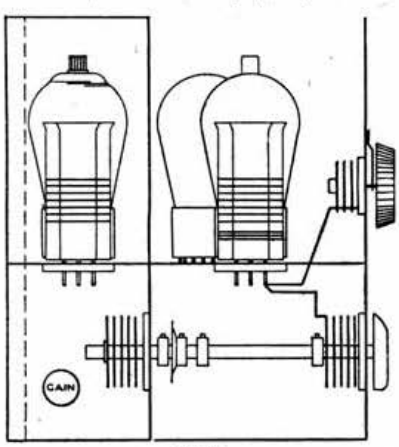


Fig. 2.

Showing layout as viewed from detector end. On the left is the H.F. unit with coil and valve mounted on a small metal shelf. To the right are the detector and output stages.

KHAKI AND BLUE

● Capt. John Swinnerton, **G2YS,** who has been in North Africa for the past eight months spent some time in the early days of the campaign as liaison officer at a French H.Qs. "Believe me," he writes, "those chaps have lost neither the will nor the power to fight and their signals personnel did wonders with little equipment and no transport. It often struck a reminiscent chord to hear them say 'dah dit dah' over the radio."

● Capt. Larry Richards, **G3YM,** is now working in B.N.A. with numerous American amateurs, including representatives from W3, 6, 7 and 8. . He has his tent pitched in an olive grove.

● North London friends of L. F. Viney, **G2VD,** will be pleased to hear that after nearly four years' service in the R.A.F. he has now been granted a commission as Pilot Officer. 2VD has been stationed in Gibraltar for the last two years. During a recent trip to Southern Tunisia he met W5GDM (S. Carolina) who holds a high technical post in the A.A.F.

● Mr. I. N. Davies, **BERS468,** of the Gambia Marine Service (P.O. Box 65, Bathurst), seeks news of Corporal B. A. Parsons, GW4FW.

● L.A.C. Halahan, **4204,** discovered just before being posted to a new N.W.A.A.F. unit that his C.O. had been S./Ldr. Cecil Page, G6PA. He sends greetings to old friends.

● Cpl. Spetch, **4649.** now attached to A.M.E.S. Reserve Pool, M.E.F., wishes to be remembered to 2HKQ and others who know him. He has met 2HJX.

● L.A.C. E. Brown, **4235,** whose address is R.A.F. Ferry Command, c/o Cable and Wireless Station, St. George, Bermuda, would appreciate letters from G3LR, 2HJN and 5391. He has met no other members to date. Daventry keeps him in touch with home news.

● Cpl. J. Harris, **2FPY,** serving with the R.A.F. at an A.M.E.S. in the M.E. makes some interesting comments in a letter to G8QH regarding the projected post-war headquarters station. He believes that such a station would be able to maintain a more precise record of data on layer heights, angle of radiation, etc. than the average amateur, and suggests that this information could be issued from time to time in the form of Technical Bulletins. He also advocates regularised "point to point" working between amateur stations with a view to improving operating ability.

● Since leaving England a couple of years ago F./Lt. Ted Laker, **G6LK,** has visited no less than 25 countries. Last June he was present at a two-day meeting of amateurs in Pretoria—the first war-time "Sigs-fest" held in the Union. We hope to reproduce in our next issue a photograph taken on that occasion.

● L.A.C. Desmond Alimundo, **G4HK,** now in India, reports meeting G2UQ, 8HW, VE3AQK and ZL2AG. He sends greetings to all old friends.

● Boltonians will be glad to learn that Stanley Garnett, **G4AW,** has been promoted to the rank of P.O. Radio Mechanic (Shore) after serving three years as Telegraphist. He is now at "Lascaris" W./T. Station, Malta.

● "After a day of toil and sweat somewhere down Burma way, a meal of corned beef and a swim what more could one want to soothe an old key basher? It came a few minutes later by someone announcing the arrival of mail. Two copies of the good old BULL, the first since leaving G-land." So wrote Sgt. W. H. Graham, **G4BJ,** on June 7.

● After performing yeoman service in the Western Desert for nearly 12 months, the Advanced Air Headquarters Amateur Radio Society has ceased to function, due to the fact that most of its members have been posted to new theatres of war. Those responsible for the enterprise, which incidentally had official R.A.F. backing, have the satisfaction of knowing that the Society provided a means of giving many of its members their first glimpse of Amateur Radio. When the war is over no doubt those concerned will see to it that the associations formed in the Western Desert are not forgotten.

● From Teheran comes news of F./Lt. R. L. Markham, **G6MK,** who reports having visited Trevor Brown, VU7BR (B.A.P. Co. Bahrein). The latter has recently married an R.A.F. nursing sister, but we gather he is staunch enough "key puncher" to keep off phone when peace breaks out! Visitors will be cordially welcomed at VU7BR. G6MK maintains contact by correspondence with G8AY (N. Africa) 5QY (Ismalia) and 5ZM (Nairobi) and uses various "Kites" for personal QSO's along the route from Karachi to Cairo. He sends greetings to old friends in Newcastle and Stockton.

● Cpl. G. D. Bolam, **BRS3833,** serving with an R.A.F. Squadron "out in the blue" appeals for technical magazines. "I can assure you," he writes, "they will be well read even if years out of date." He and his colleagues would also be grateful for any surplus wireless gear as they have no receiver for entertainment purposes. All gifts should be addressed to him c/o 7 The Crescent, Tanfield Lea, Newcastle-on-Tyne.

● Cpl. H. Dawes, 761325, **BRS3896,** R.A.F. India, sends greetings to all who were members of No. 1 and 2 instructors' classes and passed out from Cranwell with him. He would like to hear from 2CMR to whom he sends congrats on his elevation to "the peerage."

● Will the R.A.F. F./Sgt. who wrote to P./O. C. S. Bradley, **G5BS,** "Rogers Wood," Fawkham, Kent, from the Gravesend area regarding the R.A.F. (N.W. Kent) Radio Society, be good enough to send a card with his address, as his original letter has been mislaid?

● W. H. Nuttall, **2AGP** (Leigh), reports fit and well from Tripoli. He is still waiting to hear from Ron Wood, G3TK.

● **GM3TD,** who is still enjoying life in Gibraltar, reports that most of his colleagues are now members of the Society. He recently toured Algeciras, Cueta, Tetuan and Tangiers, returning to "Gib" on a Spanish boat. 2KQ is with him.

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

DONATIONS.—The General Secretary acknowledges with thanks, on behalf of Council, receipt of donations from :—District 4 Meeting, £1 4s.; District 5 Meeting, £1 18s.; W. E. Russell, G5WP, £1 10s. 10d.; B. W. Stainton, 6588, 1s. 6d.; "2CNC and office friends," £2 14s.; Mrs. Hughes (mother of G4CG), 10s. 0d.; Cairo Meeting, £6; R. E. Disteche, SU1RD, £1 5s.; F. H. Pettitt, SU1SG, 15s.; Mrs. Frost, £1; Masteradio (per S. L. Robinson, £1 10s.; District 8 (Cambridge), £3 14s.; J. G. McIntosh, VU2LJ, 7s.; R. T. F. Coote, 6714, 5s.; G. C. Eyre, G8OJ, 5s.; T. R. Brooke, 4315, 5s.; C. J. Pemberthy, G6BC, 5s.; J. V. Davis, 4625, 16s. 6d.; M. O. Felix, 4318, 10s.; G. W. D. Spurrell, 5205, 5s.; D. McInnes, 96, 5s.; I. N. Davies, BERS468, £1; District 13 (per G3ST), 15s.; C. E. Jefferies, G5JF, 5s.; G. S. Wood, 2DNZ, 5s.; Scotland "H" District (per GM2NQ), 10s.; District 15 (Aylesbury) (per G8BW), 10s.; J. Higham, 3172, 10s.; District 4 (per G8DZ), 5s. **Receipts to date, £870 10s. 0d. Expenditure to date £385 10s. 3d. Balance in hand as at July 30th, £484 19s. 9d.**

A THANK OFFERING.—Sgt. H. G. Hughes, **G4CG,** commemorated the first anniversary of his escape from being taken prisoner when Tobruk fell (June 20, 1942) by forwarding a donation of 10s. to the Fund.

News from the Kriegies

Information is to hand *via* Mr. James Hunter, Scottish Records Officer, that F./Lt. A. C. Brown, ex **GM6ZX,** is a P.O.W. in Java. After serving as D.O. for Scotland "A" District for several years, Archie left for Singapore in 1937, to take up an Air Ministry engineering appointment.

In spite of being shackled for the past 10 months Lt. Heath recently sat for an Advertising examination. Both he and F./Lt. Babcock, **G8LI,** return thanks to all who have made it possible for them to receive R.S.G.B. fund parcels.

After being missing for 18 months Sgm. S. H. G. Weeden, **BRS3812,** has reported fit and well from a Japanese prison camp. In a letter to his parents, who live in Brixton, London, he asks to be remembered to all old friends.

"Snowy" Campbell, **VK3MR,** who is in P.G. 52 Italy, continues to instruct in advanced radio theory. Classes begin at 9 a.m. and continue throughout the day, with breaks for meals, until 10 p.m., each lecture lasting for one hour. A wide field is covered by five grades of instruction. "Snowy" who is on the camp executive committee states that the camp strength has dropped from 3,200 to 2,700 due to demands elsewhere for working parties.

Cpl. Denis Carr, **G8UC,** acknowledges receipt of numerous parcels and asks to be remembered to his friends.

Letters have been received by G8TL from Messrs. Briscombe and Richardson, both of whom report safe arrival of R.S.G.B. parcels. They ask to be remembered to old friends at home and overseas.

Hospitality Offered

Mr. W. J. Barker, **G3NQ,** "Darjeeling," Albion Lane, Herne Bay, Kent, and Mr. A. H. Mason, **GM6MS,** 17 Redford Avenue Wallington, Surrey, will be glad to extend a welcome to visiting, amateurs.

Mr. J. V. Davis, **BRS4625,** Castle Road, Wootton, Woodstock, Oxon, will be pleased to entertain Service members stationed near his home.

Mr. Dave Price-Jones, **G5SA,** late of Welwyn, is now living at Manoravon, Llandilo, S. Wales, at which address he will be glad to receive visitors and letters from old friends.

CRANWELL MEETING

SUNDAY, SEPT. 12th, 1943

For details, watch notice boards and cinema screen

ALL OFFICERS AND AIRMEN CORDIALLY INVITED

Silent Keys

We record with regret the deaths, due to flying accidents, of Sergeant John Smith Whitehead, BRS5138 and Corporal Francis Neville Sloss, BRS6168. Their home towns were respectively Abertillery and Bangor, Co. Down. Sympathies are extended to their relatives and friends.

BRITISH ISLES NOTES AND NEWS

District and Town Meetings

D.R.'s, T.R.'s and others are asked to arrange meetings at least seven days after BULLETIN publication date—nominally the 15th of the month. Due to distribution difficulties, coupled with the fact that a very large number of members living away from home have the BULLETIN redirected to a temporary address, some days may elapse before the current issue is received. If a meeting is fixed between the 15th and 22nd of a particular month a notice should appear in the *previous* month's issue.

Details of forthcoming meetings should be sent to reach Headquarters not later than the 27th of each month. The details should be set out on a separate slip of paper or on a post-card, and should be arranged exactly as shown in the panel published on page 28.

DISTRICT 1 (North Western)

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

Ashton-under-Lyne.—At the June meeting of the local Radio Society, the election of officials for the coming year took place. G3BY, home on leave, attended, and was given a hearty welcome by all present. A general discussion took place on various topics of interest, after which 5043 gave a demonstration of a well constructed amplifier. At the July meeting a welcome was extended to visitors from Bolton. (*via* G5PX).

Bolton.—G3JD, a Service member stationed in a nearby town made a special journey to attend the July meeting but found that 4618 and 2DVQ were the only other members present. However, a very enjoyable time was spent. 2HGJ put in a late appearance. Local members still appear to be hibernating, since there is no other news. (*via* 2DVQ).

The D.R. apologises for the unavoidable delay in answering correspondence recently. This is due to pressure of private business but an early attempt will be made shortly to dispose of the arrears. G6CX.

DISTRICT 2 (North Eastern)

D.R.: C. A. Sharp (G6KU), 316, Poplar Grove, Gt. Horton, Bradford. Bfd. 10772. *Scribe: H. Beadle (G8UO), 13, Chandos St., Keighley.*

Members in the Brighouse area are asked to note the appointment of G8TF, 119 Rastrick Common, Brighouse, as T.R. 5834 has moved to London. 6XT (Cpl. R.A.F.) is stationed in Wilts. 3XQ has rejoined the Society after a lapse of several years. 4FU, 56 Mannheim Road, Toller Lane, Bradford, requires the present addresses of 3KB, 3VR, 4MC and 8FP. 6KU has been to Cranwell for a week; he saw 2QM in town recently. 2DUX had a pleasant time at the recent Huddersfield meeting, others present included 2HM, 3CD, 5MI, 5XK, 8GU, 8RF, 2HDY, 4377, 6190, 6215, 6225 and 6340. The next meeting will be held on Saturday evening, August 28, at G5VD, 12 Langley Terrace, Crosland Road, Oakes, Huddersfield. A meeting will also be held at G4CL, 20 Branksome Drive, Nab Wood, Shipley, on September 1, at 7 p.m. The projected letter budget for Sheffield and District has been dropped owing to lack of support.

A meeting of the Morley-Batley-Dewsbury members will be held on Sunday, August 29 at 2.30 p.m. at the home of 5YV, 8 Ashfield Avenue, Morley. Other members living near will be welcome. G8UO.

DISTRICT 3 (West Midlands)

D.R.: V. Desmond (G5VM), The Chestnuts, Gilbert's End, Worcester. Scribe: E. J. Wilson (2FDR) 48 Westbourne Road, Olton, Birmingham.

Birmingham.—A meeting of M.A.R.S. was held on July 13 at the "Hope and Anchor" Hotel when Mr. George Brown, G5BJ, gave an interesting talk on the repair of broadcast receivers. The Annual General Meeting will be held on Sunday, September 12, at 11 a.m. 2FDR.

DISTRICT 4 (East Midlands)

Deputy D.R.: A. E. Clipstone (G8DZ), 14 Epperstone Road, West Bridgford, Notts. 'Phone: c/o 2AOO, Nottingham 84105.

Derby.—BRS4071 would like to hear from members willing to support a local meeting. 8DZ will attend.

Nottingham.—Twelve members attended the July meeting held at 8DZ when Mr. E. Norman, a new member, displayed his very efficient home-constructed combined signal generator and B.F.O. We hope he will submit an article for THE BULLETIN. The sale of photographs taken at the June meeting by 5406 brought in the sum of 5s. for the P.O.W. Fund. A welcome is extended to Mr. E. C. Le Sueur, late of the Channel Isles.

A Radio Brains Trust is to be staged at the next meeting when 8DZ will act as question master. Please send in your problems now. The meeting will be held at the home of Mr. P. Collins, 24 Quernaby Road, Mapperly, on August 22, at 6.30 p.m. 8DZ would like to hear from members who are interested in visiting places of interest around the District. G8DZ.

DISTRICT 7 (Southern)

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

Bournemouth.—Congratulations and best wishes to Norman Vaus, 2FSL, who was married to Miss Nye on August 8. 2DP, of Croydon, has been here on holiday. 3789 was on leave recently. (*via* 2HNO).

Coulsdon.—2ANR, writing from Malta, says that very few of the amateur fraternity are left there since the general movement in a northerly direction. He would like to hear from 8TB. The T.R. was pleased to see 5XH at the last Y.M.C.A. meeting. "Hooky" wishes to be remembered to all old friends. 2DN returned some time ago after a spell in Iceland. (*via* 3003.)

Croydon.—There will be a special meeting this month, see Forthcoming Events. If you are interested in junk sales—turn up. 4150 is still in the best of health out in North Africa according to a letter received from him recently. He sends 73 to all old friends. We were pleased to read that 6RF has safely arrived in the M.E. 2DP enjoyed himself at Bournemouth. (*via* 2DP.)

General.—The D.R. was happy to receive a letter budget with contributions from 2YL, 2ZC, 5RS, 5OJ, 5CM, 6NA and 8LY. All seem to be in excellent spirits and to have given the gastronomic topic of nuts and ham (generously provided by ZC) a lot of thought. G5WP.

DISTRICT 4 KEEPS UP ITS END.

The feature of the June meeting held in Nottingham was a display of amateur built apparatus. G8DZ, Deputy D.R., is sixth from the left.

DISTRICT 8 (Home Counties)

Deputy D.R.: L. W. Jones (G5JO), 16 Leys Road, Cambridge. Telephone: Cambridge 3406.

A successful meeting was held in Cambridge on Saturday, July 3rd, when 23 persons were present. During the afternoon a most interesting talk on the R.S.G.B. Prisoners of War Fund was given by Mr. C. H. L. Edwards, G8TL. Many letters were read from members who are in prison camps and it was clear that the efforts being made by the Society, and particularly by 8TL, are more than appreciated. After the talk a collection was made which resulted in the sum of £3 14s. being raised for the Fund.

Unfortunately due to official duties F./Lt. Walker was unable to give his promised lecture, but the gap was well filled by Mr. D. Jackson, who delivered a much appreciated talk on the subject of Hum, during which he covered the design of power packs. He also gave a detailed explanation of smoothing circuits and mains transformer fields with their relationship to cathode ray tubes and other equipment. A lengthy discussion followed on the position of the amateur after the war.

SALISBURY MEETING

A few of those who attended the Services Meeting held recently in Salisbury.

The next meeting will be held on Saturday, September 25, at the Milton Arms Hotel, Milton Road, Cambridge, at 3.45; ladies will be welcomed. Local members are asked to make a note of this date as no individual notices will be sent out. Will those who expect to attend, please advise G5JO by September 22, in order that arrangements can be made for catering? G5JO.

DISTRICT 10 (South Wales & Monmouthshire)

Deputy D.R.: H. H. Phillips (GW4KQ), 82 Cottrell Road, Roath Park, Cardiff. Cardiff 2697 during business hours.

A cordial welcome is extended to all new District members who have joined since these notes last appeared.

Cardiff.—The next meeting is to be held at the home of GW8UH, 29 Ladysmith Road, off Penylan Hill, Roath Park, Cardiff, on August 22. Service members will be welcomed.

Newport.—Mr. Ron Owen (BRS5643), 40 Walmer Road, is endeavouring to arrange a local meeting and would welcome a letter or call from those who would support the venture. He has been appointed T.R. for Newport in succession to Mr. Allbright, 2JL, who has left the district. GW4KQ.

Forthcoming Events

Aug. 21	District 15 (West London Section), 3 p.m. at The Excelsior Hotel, 1 Ladbroke Gardens, Ladbroke Grove, Notting Hill. (Buses 7, 15 and 52, or Met. Station.)
,, 22	District 7, Special Meeting 3 p.m. at 10 Glossop Road, Sanderstead, when the radio gear of the late F./O. Ron Norman, ex G6DP, will be offered for sale. Organiser, Mr. F. G. Hoare, G2DP.
,, 22	District 15 (High Wycombe Section) 2.30 p.m. at G6IF, 1 Squirrel Lane, Booker, H.W. (Bus 38 from Station. A p.c. if attending.)
,, 22	District 14 (Chingford Section), 3 p.m. at BRS5726, 73 Broad Walk, South Woodford, E.18. (Bus 581 or 38A to Rising Sun.)
,, 29	Scotland "A" District, 3 p.m. in the Royal Technical College, George Street, Glasgow. Enter by Montrose Street.
,, 29	Scotland "C" District, 2.30 p.m. at 7 Airlie Place, Dundee. Lecturette by J. Gouck on Amplifiers.
,, 29	District 12 Annual Picnic, 3 p.m., at G6LL, "Woodlands" 90 Tolmers Road, Cuffley.
Sept. 5	District 7 (Croydon section) and District 13 (South London Central and Eastern area) 3 p.m. at Croydon Y.M.C.A., North End, West Croydon.
,, 5	District 14, 7 p.m. at G6LB, 167 Galleywood Road, Chelmsford.
,, 25	London Meeting at I.E.E., 2 p.m. Subject to be announced next month.
,, 26	District 15, Dinner and Social. (See separate announcement.)

DISTRICT 11 (North Wales)

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

We would ask local members and visitors to the District to make every effort to attend the meeting to be held on August 22, at BRS4762, "Vale View," Meliden Road, Prestatyn, at 3 p.m., BRS2731, will auction items of gear and later demonstrate a new receiver he has built. Future arrangements for meetings will also be discussed.

G5PX, on holiday in Prestatyn, discovered that he was staying at GW4CK's home. 1060 had the pleasure of meeting him whilst on leave. 4761 has left the District having been accepted for air crew duties with the R.A.F. He is now in District 12. Congratulations to G8DI and G6WL on their recent awards. BRS1060.

DISTRICT 12 (London North and Herts)

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

The next meeting will be held at the home of G6LL, "Woodlands" Tolmers Road, Cuffley, on August 29 at 3 p.m. Ladies are invited and we hope to stage the usual cricket match. Those who intend to be present should advise G5QF by the 22nd. Please bring your own food. G5QF.

DISTRICT 13 (London South)

A.R.'s: (South Eastern and Central), S. E. Langley (G3ST), 62 Dumbarton Road, S.W.2. (Western), E. H. Simmonds (G8QH), 17 Roedean Crescent, Roehampton, S.W.15. Prospect 1990.

South Eastern and Central.—The July meeting was attended by G5PY, 5XH, 2DP, 2JB, 2JK, 2VB, 3DF, 3FP, 3ST, 4NI, 2DRT, FWA, HHD, BRS404, 1545, 3003, 3868, 4324, 5802, 5859, 6064. After informal discussions Lt. Ilott (2JK) proceeded to give his talk on Aerials. The way in which he explained the formation of Polar diagrams and the direction of maximum radiation of various arrays showed what a complete knowledge he has of the subject. By the unusual silence of his audience one could sense how well they enjoyed the talk. A hearty vote of thanks to the lecturer was proposed by 3ST and carried with acclamation.

Good news! Sigm. S. G. Weeden, BRS3812, has advised his parents that he is alive and well as a prisoner of war in the Far East. "Scottie" (3TG), late of Redpost Hill, reports by air mail and says he has visited India, Persia, Iraq, Palestine, and Egypt. He sends 73 to all who know him. G3ST.

DISTRICT 14 (Eastern)

Scribe: L. J. Fuller (G6LB), 167 Galleywood Road, Chelmsford, Essex. Telephone Chelmsford 3929.

Chelmsford.—G3JO (Swindon) and G5BO–SU5BO (London) have been in the town. The latter will soon be back in a warm clime when he hopes to be on the air again with an Empire prefix. Hearty congrats to G5HF on his engagement to Miss Hardie. At the time of writing, the "Top Wop" has just come "unstuck," consequently G6LB has shifted that large cobweb from the old transmitter framework—just in case! The D.R. was recently on leave, looking very fit.

Brentwood.—G3VD (now a P./O. in the R.A.F.) reports that nearly all the locals are away from home in the various Services.

G3SI, Thaxted, is now fully recovered after losing a pair of "block-buster" tonsils.

Chingford.—G8DG, 2DXL, 2DWV, 4215, 5684, 5726 and 6599 attended the July meeting held at G2HR. G8DG has received letters from 2AIP and 6303, both of whom will be welcomed at the meeting to be held on August 22 at 73 Broad Walk, South Woodford, E.18, the home of BRS5726. (38a or 581 to Rising Sun). G6LB.

DISTRICT 15 (London West, Middlesex and Buckinghamshire)

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

As announced below, arrangements are being made to hold a dinner and social on Sunday, September 26. It is hoped that the gathering will be fully representative of Council and the Services.

Aylesbury.—The July meeting, although postponed, produced an attendance of 11 including G4DS, 8BW, 6014, 6015, 6019, 6356, 6367 and 6358. Ten new members have been enrolled including 6CD. The group offer congratulations to Sgt. John Kyle, D.F.M. (GM6WL) who was recently awarded the A.F.M. At the next meeting Mr. Oakham, M.P.S. Research Chemist, will lecture on "Plastics." Please contact 8BW, 165 Park Street, Aylesbury, for details.

West London.—A cordial welcome was extended to G5DW, of Barnsley, when he attended the last meeting. Present also were G5IJ, 5LN, 8KZ, 2ADL, 2842, 4781 and 5056. Mr. and Mrs. 5LN are again thanked for the catering arrangements.

General.—G8VM, in an airgraph to 3UQ, states that he expects to be home shortly. 2DZN would like to receive letters. The D.R. has his address. Congrats are offered to C. L. S. Cooper, G4IH, of Greenford, upon being granted a commission in the R.E.M.E. G6WN.

DISTRICT 17 (Mid East)

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

News seems to be "on points" this month. 2BUV, writing from Iceland, will have an article on that country for the "BULL"

one day. With him are G3WP, 2CMW and G2NT, and, of course, TF5C is around. 5LL, reports fit from B.N.A.F. 5BD had welcome visits from 5MT and 5601. The district extends welcome to new members, 6404 and 6457, also to four W-Op. A.G.'s who were entertained and signed up by the D.R. Owing to transport difficulties, the usual Lincoln meeting will have to be abandoned for this year; an all-Service meeting will, however, take place on September 12th at Cranwell. The D.R. is waiting for more response from Grimsby before fixing a meeting there. If this catches the eye of any Service member stationed in the area, please drop a line. G5BD.

Scotland

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

"*A*" *District.*—An unexpected hitch led to the June meeting falling through and apologies are extended to members who turned up to find nothing doing. The next meeting will be held on August 29, at 3 p.m.

"*C*" *District.*—At the June Meeting the D.O. gave a lecturette on Electrical Measuring Instruments. At the July meeting which was the A.G.M. the D.O. and the district committee were re-elected with the addition of A. Campbell. Membership of the district has exactly doubled since the war. Members please note that from September, meetings will be held on the second Sunday of each month.

"*H*" *District.*—GM2NQ has again met ZL2GF. 2HBR reports meeting SP1LL. 4AN had an unofficial meeting when visited by 3NH and 8MQ. Congrats to 8MQ on attaining the rank of sergeant. 2929 still at sea retains his interest in U.H.F. The D.O. will be glad to hear from "H" members who have not yet sent in reports.

Far North.—G3PQ and 8RI have recently been indisposed, but are fit again. 5598 has not yet fully recovered from his long illness and is now recuperating somewhere down south. G3PJ has at last broken his silence and announces that his plans for his post-war rig are almost complete. 3SJ would like to know the whereabouts of 8AR and 6HV, and will welcome any information sent to his QRA in Burnley, Lancs. GM6ZV.

Letters to The Editor

Was it Reflection?

DEAR SIR,—I can confirm Mr. Hallett's observations on this phenomenon. There is no doubt that it is due to phase displacement between the direct signal and the reflection from the surface of the 'plane. The effect was a constant source of annoyance on the television service in this locality, which is on the direct air route from Croydon.

I have not made any tests to ascertain the low frequency limit of the effect but can confirm that it is definitely noticeable on 14 Mc/s. as the result of pre-war tests on that band between my own station and G6WY.

I believe it is a fact that when the first pre-war tests were made of the London balloon barrage, some queer "ghost" effects were observed on the television service and that, if for no other reason, a television service would be impracticable in war-time when the balloon barrage is in position.

The "aeroplane effect" is in fact a simple demonstration of flutter fade with the plane acting as the variable reflecting layer.

Yours faithfully,

Hayes, Bromley, Kent. A. O. MILNE (G2MI).

Mr. T. Warburton, BRS6111, of Helmshore, Manchester, has noted the effect recorded by G8HX and others and suggests that it is due to the presence overhead of heavy cloud formations. He states that the presence of ice-formations can be checked by observing the "halo" effect. The fading effect he suggests can be used to provide definite information on "skip," providing the heights of planes and clouds can be accurately ascertained.

Electrostatic Repulsion ?

DEAR SIR,—I wonder if any reader can throw light on a phenomenon which has caused some speculation ? The following are the conditions under which the effect is observed :—

A 200-volt 8 c.p. carbon lamp, used as a series resistance in a 200-volt D.C. mains circuit, supplying energising current to a 100-ohm electromagnet (circuit identical with that of a trembler-bell), lights at about 80 per cent. of its full brilliancy. The carbon filament is shaped in the form of a single loop.

If a hand is now held grasping the glass envelope of the lamp, the outer legs of the filament are repelled towards the centre by a distance of approximately half-an-inch. Upon the hand being removed, the filament moves back so violently as to stick on the glass envelope, a fairly sharp knock being needed to free it therefrom.

My own theory is that the effect is due to some form of electrostatic repulsion, noticeable particularly in this type of lamp on account of the free suspension of the filament thread.

I should much appreciate any alternative solution to this interesting effect.

Yours faithfully,
RONALD M. OWEN (G5RB).

To beat the Sneak Raiders

The "tip and run" technique of German raiders on the south and south-east coast towns, though difficult to combat is, nevertheless, being vigorously tackled by both the government and local authorities. The destruction of the raiding craft is, of course, the government's responsibility, but the safety of the townspeople is, to a large extent, the responsibility of the local government.

An air raid warning system has been developed by the local authorities at Hove to meet the sneak raider menace. It is an electronic system, by which impulses transmitted on a special P.O. danger signal network are amplified and passed on to loud-speakers situated in various parts of the town, thus giving local warning of imminent danger. The system is entirely automatic and is supplementary to the normal siren alert. Some idea of the speed of operation (and speed is vital) may be gauged from the fact that there is a time lag of only half a second between the receipt of the control impulse and the broadcast of the warning signal from the loudspeakers!

This electronic equipment consists of a signal generator, control and switchgear mounted in panel form on a 6 ft. rack frame and bolted to this is a similar rack carrying an 800-watt amplifier.

A check on the efficiency of the 16 valves employed can be immediately carried out by means of a bank of meters on the amplifier panel whilst constant visual and aural checks on the signals being radiated are effected by neon output indicator and monitor loudspeaker panels. On the main control panel a test key is mounted which, when operated, disconnects the loud-speaker network and substitutes an artificial load of equivalent impedance. Coloured lamps on the main control panel indicate the situation as directed by the post office impulses at any given time. The equipment was supplied and installed by Broadcast Amplifiers, Ltd., Brighton, in co-operation with the makers, The General Electric Co., Ltd. It is kept at the "ready" 24 hours a day, seven days a week.

The main amplifier performs three main functions automatically, and in order of priority: (*a*) the broadcast of an "Imminent Danger" warning signal and the corresponding Imminent Danger release; (*b*) the normal Home Office "Alert" and "All Clear" siren tones; (*c*) police announcements by microphone.

The Imminent Danger warning signal is a series of short piercing "beeps" at the rate of 48 per minute for 30 seconds whilst the I.D. release is a continuous note of a similar pitch for a like period. The normal siren "Alert" and "All Clear" signals are simulated electronically and are broadcast throughout the speaker network simultaneously with the sirens, thus adding considerably to their effectiveness. The police announcements are made through a moving coil microphone installed in the amplifier room.

Although in an emergency the apparatus can be controlled from the amplifier rack or from one or more spotters' posts the entire system is normally operated from a remote control centre by means of impulses transmitted to a tuned relay and thence to the signal control equipment.

The Imminent Danger signal is first, the siren signals second, and the microphone announcements third in priority. This means that if a warning is received during the course of a microphone announcement, either of the two air raid signals automatically takes control and if the Imminent Danger signal is received, even during the time the siren tone is being radiated, the latter will be superseded by the short piercing tones of the "beeps" which indicate raiders overhead.

In addition to the check meters, neon indicator and monitor speaker, other aids to quick location of faults and servicing are embodied in the design and although protective covers are provided at the rear of each panel they can be quickly and easily removed thus leaving the components and wiring readily accessible.

This equipment, unique in many ways, has proved completely satisfactory over a period of time and has on more than one occasion been instrumental in preventing many serious casualties.

Congrats.

● To Dennis Hann, **G3UY,** of Guildford, who was married on July 17 to Miss Phyllis Clements. The bride was given away by Denis Ball, G3FU, and the photographer was Derek Babbage, G4CI.

● To Mr. and Mrs. Mal Geddes, **G2S0,** of Leigh-on-Sea, Essex, who are proud parents of another junior operator—Guy Russell, born July 1.

● To Mr. and Mrs. S. K. Lewer, **G6LJ,** on the birth of a daughter, Pamela Joan.

● To Mr. and Mrs. S. Archer, **2DWZ,** on the safe arrival of a daughter, Christine Winifred.

● To Sgt. J. J. Williamson, **BRS5529,** and to Cpl. S. Richards, **BRS3723,** both of whom announce the safe arrival of a daughter.

● To Mr. R. H. Hammans, **G2IG,** whose wife presented him with a daughter on July 27, 1943.

HEADQUARTERS CALLING

June Council Meeting

Resume of the Minutes of a Council Meeting held at the Institution of Electrical Engineers, on Monday, June 21, 1943, at 6 p.m.

Present.—Messrs. A. D. Gay (President), A. E. Watts, A. J. H. Watson, H. A. M. Clark, D. N. Corfield, G. R. Scott Farnie, G. A. Jessup, S. K. Lewer, W. H. Matthews, W. E. Russell, and J. Clarricoats (General Secretary).

Apologies were received from Messrs. Charman, Hunter, Scarr and Simmonds.

1. W/Commander G. R. Scott Farnie was warmly welcomed by the President and Council on his return from the Middle East, and congratulated on his recovery from his recent serious accident.

2. It was unanimously resolved to accept 178 applications for Corporate membership and 2 applications for Associate membership. It was recorded that 37 applications had been supported by references and that the remainder had been sponsored by Corporate members. Two resignations were accepted.

3. The monthly financial report was approved. It was unanimously resolved to place £500 to the credit of the Post-War Development Fund and to invest that amount in 2½ per cent. National War Bonds, 1951–3.

4. Mr. R. T. Reed, G2RX, in a letter, outlined his views regarding the basis upon which post-war licences should be issued. It was agreed to place the letter in the special dossier relating to Post-War Licence matters.

5. Mr. Banks, 2CNC (whose home was in the Channel Isles prior to the war) enquired whether parcels from the R.S.G.B. Prisoners of War Fund, could be sent to a civilian member living in Guernsey. Council decided that the P.O.W. Fund can only be applied to persons who are, in the military sense, prisoners of war. It was agreed to suggest to the District 12 Representative that he invites local members to contribute towards the cost of sending a parcel to the member referred to by Mr. Banks.

6. The President stated that during the course of his talk at the Leeds P.D.M. he had drawn the attention of members to the fact that certain terms used by amateurs were liable to misconstruction by the professional radio engineer and the general public. For example he mentioned the words "ham" and "shack" both of which he considered were misleading when used outside amateur circles. After a discussion it was agreed that the use of such terms should be discouraged in print and in public.

7. It was agreed to arrange lectures at the I.E.E. on the following Saturday afternoons:—September 25, October 30, November 27 and December 18. The A.G.M. was fixed to take place on the last mentioned date.

8. The President reported that following upon the publication in the June issue of *The Wireless World* of an editorial dealing with offences against the Defence Regulations by persons who had illegally operated transmitting stations, undesirable publicity to the Amateur Radio movement had been given in a recent issue of the *Daily Express*. Mr. Gay stated that he had, in consultation with Mr. Watts, instructed the Secretary to write to the Editor of the *Daily Express*, pointing out that the use of the word "amateur" in the press story was liable to cast a reflection on the achievements of real radio amateurs. Copies of the letter had been sent to *The Wireless World* and to the Home Office. The Editor of the *Daily Express* had replied stating that "the word 'amateur' was used in its usual sense of meaning 'non-professional.'" He further stated: "I am sure the use of the word in this story does not cast any reflection upon members of the Society, whose work in the national interest, and in the development of radio is widely known."

Mr. Pocock (Managing Editor of *The Wireless World*) agreed it was unfortunate that the word "amateur" was used, as he had been particularly careful to avoid its use in *The Wireless World* in connection with this matter. Mr. Pocock further stated that when press representatives got in touch with him subsequently, he took the opportunity to impress upon them that the organised amateurs of pre-war and war-time fame would not be likely to be the culprits. No acknowledgment had been received from the Home Office.

9. The engrossed counterpart of lease for the Society's new offices at New Ruskin House was signed and sealed.

10. It was reported that up to date 187 replies to THE BULLETIN questionnaire published in the June BULLETIN had been received, representing a very small percentage of the membership. The analysis showed that:

(*a*) 92 per cent. favoured more constructional articles.

(*b*) 82 per cent. favoured the elimination of Active Service Lists and the "73" feature.

(*c*) 70 per cent. favoured the deletion of New Members' Lists.

(*d*) 59 per cent. favoured the deletion of District Notes.

It was agreed (i) to appeal to the membership for more constructional articles; (ii) to eliminate the Active Service lists and "73" feature; (iii) to maintain the publication of lists of New Members as these are undoubtedly used by D.R.'s, T.R.'s and others; (iv) to continue District Notes because it was considered that they are of interest to a large number of members overseas who were unable to vote.

11. Mr. S. K. Lewer, G6LJ, was appointed Deputy Hon. Editor. Messrs. Lewer and Simmonds were appointed to serve with the General Editor, on THE BULLETIN Committee. The Committee were given power to co-opt.

The meeting closed at 8.45 p.m.

Back Issues of the Bulletin

Headquarters has for disposal, at 1s. per copy, post free, a number of back issues of THE T. & R. BULLETIN including a few war-time issues. Wants lists should be addressed to the General Secretary and accompanied with a remittance to cover the cost of the issues required. A refund will be made if Headquarters cannot supply.

American Publications

The following American publications may be ordered through the Society:—

QST	17	6	p.a.
Radio Amateur Handbook (A.R.R.L.)	10	6	
Antenna Handbook (A.R.R.L.)	4	0	
"*Radio*" *Handbook* (E. & E. Ltd.)	12	0	

Delivery can be expected in about 3 months from date of order, Service addresses must not be used and cash must accompany each order.

Subscriptions to "Radio"

Subscriptions to "Radio" (published by Radio Magazines Inc., 132 West 43rd Street, New York) can now be accepted at the rate of 21s. per annum. Remittances should be made payable to the Society and a permanent home address given with the order. Subscribers who change their address during the currency of a subscription, should notify the publishers direct.

Returned Bulletins

A considerable number of BULLETINS continue to be returned to Headquarters each month due to members failing to advise a change of address. Immediately a copy of THE BULLETIN is returned the appropriate stencil plate is removed and no further issues are sent until the member concerned forwards his new address. Due to paper rationing it is now impossible to maintain stocks of back issues, therefore, in their own interest members are urged to assist Headquarters by forwarding a change of permanent address *promptly*.

NEW HEADQUARTERS

The address of the Society is now

NEW RUSKIN HOUSE,
28/30 LITTLE RUSSELL STREET,
LONDON W.C.1

Telephone: Holborn 7373

NEW MEMBERS

Home Corporates

G6JL *J. C. LEE, 22 Common Road, Pontypridd, Glam.
G8WP A. G. SMITH, 17 Browns Terrace, Purlwell Lane, Batley, Yorks.
2AGN *G. H. MEARA, 44 Kenilworth Avenue, Hull.
2HNG G. M. WARBURTON, 11 Mervyn Road, Bishopston, Bristol, 7.

Home Corporates (B.R.S.)

6533 A. MACKENSIE, 93 Church Street, Inverness.
6534 A. MARSDEN, 25 St. Barnabas Street, Blackburn.
6535 K. G. STEVENS, Audley Hse., Station Rd., Earley, Berks.
6536 E. F. C. OWEN, 33 Burleigh Road, Sutton, Surrey.
6537 B. G. ULPH, 24 Burns Street, Nottingham.
6538 S. H. STEPHENSON, c/o Durley Dene, St. Albans Road, Sandridge, Herts.
6539 G. T. FRANCIS, 46 Junction Road, Andover, Hants.
6540 N. D. REYNOLDS, 1 Talbot Rd., Bearwood, Smethwick, 41.
6541 M. D. LIPSCOMBE, 83 Stafford Road, Seaford, Sussex.
6542 J. LEVICK, 80 Pitcroft Road, North End, Portsmouth.
6543 G. H. MOSS, Basford, Marldon Rd., Shiphay, Torquay.
6544 N. MYERS, 17 Rockcliffe Rd., Rawmarsh, Rotherham.
6545 D. G. BUCHANAN, 77 Colinton Mains Rd., Edinburgh, 13.
6546 T. J. TIFFNEY, 42 Breadalbane St., Glasgow, C.3.
6547 K. J. TWEEDLEY, 20 Carnarvon Road, Liverpool, 9.
6548 T. G. APPLETON-FITT, 72 Silchester Rd., London, W.10.
6549 G. R. GRAVES, Hillcrest, Chalvington Rd., Chandlers Ford, Hants.
6550 G. I. TURNER, 9 Merryhills Drive, Enfield West, Mddx.
6551 W. J. VANDERSTEEN, P.O.Box 60, Reading, Berks.
6552 G. W. L. DAVIS, 65 Spring Grove, Loughton, Essex.
6553 J. F. MARSHALL, 9 Cove Road, Gourock, Renfrewshire.
6554 D. R. SAUNDERS, Trealaw, Portsmouth Road, Milford, Sy.
6555 T. S. JACKSON, 34 Churchdown Road, Knotty Ash, Liverpool, 14.
6556 D. H. HOPE, 29 Wykeham Road, Kenton, Middlesex.

A CORDIAL WELCOME IS EXTENDED TO THE

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NEW MEMBERS WHOSE NAMES ARE LISTED

6557 D. J. GRANGE, 3 Prospect Villas, Chalford, Stroud, Glos.
6558 J. TATHAM, 13 Oxford Road, Harrow, Middlesex.
6559 F. CAWKILL, Woodend Sessay, Thirsk, Yorks.
6560 R. N. LEUTWYLER, 174 Kingshall Road, Beckenham, Kent.
6561 J. W. EMMOTT, 5 Balderstone Road, Preston, Lancs.
6562 E. H. GALE, Baguley Sanatorium, Altrincham, Cheshire.
6563 E. J. GLOVER, 38 Boydfield Avenue, Prestwick, Ayrshire.
6564 H. J. HEWITT, 8 Armscroft Way, Gloucester.
6565 G. B. COLLIS, Stourton Caundle, Sturminster Newton, Dorset.
6566 C. E. REEVES, 10 Gloucester Avenue, Sideup, Kent.
6567 A. DEAN, 3 Hillside Ctges., Tower Hill, Cove, Farnborough.
6568 J. V. MOORHOUSE, 9 Brassey Terrace, Paley Rd., Bradford.
6569 D. F. FILCHER, 147 Mayfield Gardens, London, W.7.
6570 D. MCKINLAY, 49 Crossgates Lane, Crossgates, Leeds.
6571 P. ANDREWS, 25 Manor Farm Road, Bitterne Park, Southampton.
6572 G. G. SUGGARS, 27 Red House Rd., Hebburn-on-Tyne, Co. Durham.
6573 G. D. WYNN, 49 Warham Street, London, S.E.5.
6574 D. M. TAUB, 11 Cedar Avenue, Beeston, Notts.
6575 H. FISH, 110 Bloomfield Road, S. Shore, Blackpool.
6576 G. W. WILLIAMSON, 3 Council Hses., Woodlands, Bishop Auckland.
6577 J. HUNT, Cress Hill, Welford-on-Avon, Warwicks.
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6625 M. F. EVERITT, 54 Dallow Road, Luton, Beds. (Transferred from Associate).
966 *E. W. MORRIS, 80 Northwood Avenue, Saltdean, Sussex.

Dominion & Foreign

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LA1GA B. A. RORHOLT, D.S.O., F.O., Kingston House S., 70 Ennismore Gardens, London, S.W.7.

Associates

A. J. RAMSAY (Junior), 14 Bathurst Road, Ilford, Essex.
J. DRUMMOND (Junior), 75 Rosebery Street, Oatlands, Glasgow.

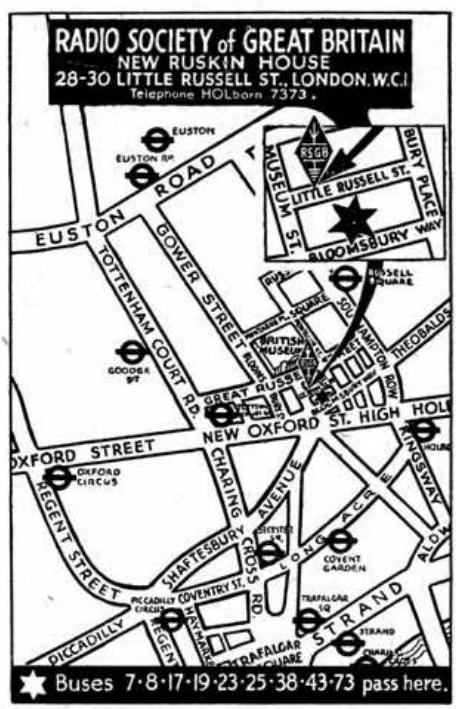
**Denotes Re-elected to Membership.*

Correction

MR. J. C. FORD, Cloch View, Alexander Street, Dundoon, recorded last month as BRS6424 held the call 2DWW at the outbreak of war.

NEW HEADQUARTERS

The accompanying sketch map will enable Members to locate the new Headquarters of the Society



AN A.C. S.W. RECEIVER—(*continued from page* 25)

are ganged by an extension rod. A flexible coupling is also a great advantage as it assists in smoothing out any lining-up difficulties that may be experienced. A midget 40 μμF slow-motion Eddystone variable condenser placed in parallel with the detector grid coil can be used as a " band spread " or to line up the two circuits. It is assembled on the front panel, immediately above the main gang which, it will be seen, is mounted " sub chassis." Coils are wound on Eddystone formers and are plugged into sub-mounting holders.

Power Supply

This is quite normal except that care must be taken to obtain adequate smoothing. A 300-0-300 volts transformer is used which delivers an output of 120 mA and although this is rather on the large side it enables the use of heavily decoupled circuits in the receiver, with consequently a very quiet background.

Note.—Later experiments have shown that if the H.T. positive of the detector is tapped down from the bleeder resistance of the power pack, as shown in the circuit (thus still further decoupling the detector circuit) and smoothed with an 8 μF electrolytic condenser which can be mounted on the receiving chassis, hum is reduced to an absolute minimum, in fact, there is a vast all-round improvement of the operation of the Pentode detector. The inclusion of this refinement is well worth the trouble.

Book Reviews

TIME BASES (Scanning Generators). By O. S. Puckle, A.M.I.E.E. Chapman and Hall ; 16s.

This new work is arranged on a chronological basis, which seems a convenient method of dealing with the subject. Circuits are divided into basic types, and their various modes of operation are well described, reasons being given for possible " snags," and useful pointers made to cures. We are pleased to see that the circular time base has been given the same attention as the more popular types. Trigger circuits are treated in the same manner, although perhaps rather undue prominence has been given to the Transitron, in view of the screen limitations of most present day valves.

A chapter is devoted to linearizing traces possessing various forms of non-linearity. Push-pull is given good attention as befits its importance, as also are the problems of synchronisation. There is also mention of counting and frequency dividing circuits derived from time base technique. The appendices are a most useful addition, that relating to the development and use of the cathode ray tube being very concise. Others include differentiating and integrating circuits, the effect of large shunt capacitances in the anode circuit, square wave generation, etc. For the amateur or engineer who has need of such circuits, this book will help considerably in their design and adjustment, whereas those who will be operating and maintaining such equipment will find it a veritable friend in need.

There is but one criticism to offer, and that is in the unfortunate choice of the term " rail " volts as applied to the H.T. supply. Such a term may be quite common in the laboratory, but surely there is no need for it in an otherwise perfectly written work of this nature.

H. C. S.

Stray

Mr. C. A. Simmons, **G3SV,** North Lodge, Pyrgo Park, Havering-atte-Bower, Romford, has a small quantity of 43 S.W.G. Oxide Nichrome wire which he requires enamelled. Can any member put him in touch with a firm free to undertake this work ?

● Mr. G. Hersee, **BRS6447,** 90, Arundel Road, Littlehampton, would like to hear from any member who has constructed a ribbon or moving coil microphone. He also seeks information on carrier current.

EXCHANGE & MART—ADVERTISEMENT RATES

MEMBERS' private advertisements 2d. per word, minimum 3s. TRADE advertisements 4d. per word, minimum 6s. Box Numbers: 6 words, plus 1s. TERMS: Cash with order. All copy and payments to be sent direct to Advertisement Managers, Parrs Advertising Ltd., 121 Kingsway, London, W.C.2, by the 30th of the month for following month's issue.

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FOR SALE.—465 kc/s Crystal and pair Meissner trans. for same, 40s. Massive multi-ratio output trans, 15s. D104 Crystal mike, 50s. National P.W.O. dial and drive, 50s. UTC Mod. trans. V.M.I., 20s. Woden trans. 350v., 150mA and 2 × 6, 3v., 30s. Two R.I. 250ohm 140mA Chokes, 15s. each. Eddystone S/M drive and dial, 4s. Valves : 6A6 (3), 6E6, 6J7 (3), 6K7 (3), 58, 56, 84, 6H6 (3), 76, 6D6, 5s. each. 24A, 45, 43, 3s. each. Pair 6A5G new, 10s. each. Stamp inquiries.—G4MN, 47 Weymoor Road, Harborne, Birmingham, 17.

GOOD PRICE offered for National P.W.O. dial and drive. — SHERWOOD, Queen's Promenade, Douglas, Isle-of-Man.

MORSE Code Training. See Candler System Co. advertisement on Cover iii, July issue.

NATIONAL Velvet Vernier Variable Ratio Dial, 15s. Want Acorn 954 and holder.—5CP, 33 Manley Road, Sale, Cheshire.

PICK-UP wanted.—State make, condition, price.—Box 210, PARRS, 121 Kingsway, London, W.C.2.

S.O.S.—Ex-Ham (R.A.F.) requires furnished house or bungalow for family in district where sirens QRT. Preferably 60 mile radius N./London.—Box 205, PARRS, 121 Kingsway, London, W.C.2.

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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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