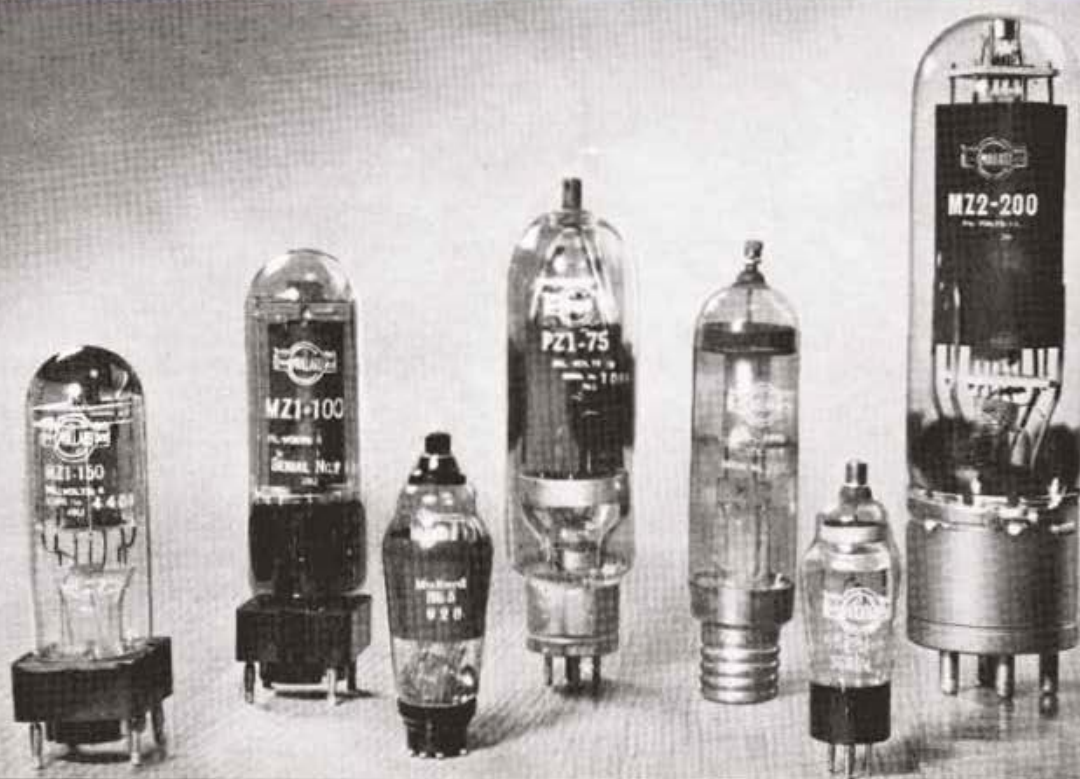


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BULLETIN

JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN



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No. 5

BREAK-IN

THE progress of amateur radio technique in times of peace has always been dependent, in no small degree, upon the amateur's own initiative and enterprise. The art as he knows it is largely what he and his forbears have made it. It is the moral obligation of the amateur to do the best with whatever legislation and technical progress may leave open to him.

In war-time, the trend of progress is obscured by the necessary secrecy in which all technical developments of possible military value are securely hidden. There can be no doubt of the wisdom of such a policy, but it is not necessary, and even not possible, to hide every advancement in the field of radio communication. One of the most outstanding characteristics in that field during the war, which will be apparent to the observant amateur, is the widespread use of break-in, or "listening-through" as it is known in other quarters, where communication is liable to interruption or interference from various sources, yet must be maintained and the intelligence conveyed with as little delay as possible.

The term "break-in" relates, of course, to telegraphy. The counterpart in telephony is known as "duplex" operation, and while it is to be regarded as a more difficult technique than C.W. break-in, the advantages are much the same, and it would be illogical to encourage one and ignore the other. By reason of mere numbers, however, and the slower rate of transmission in telegraphy, the question of break-in is, without doubt, the more important.

The experienced amateur cannot fail to recognise the similarity between the practice of Service communication and his own pre-war activities. But a strict comparison will bring to light a certain negligence amongst amateurs in the past to get to grips with the problem of uncontrolled mutual interference. On the pre-war DX bands it was only rarely possible for the amateur to maintain uninterrupted contact with a distant station for as long as perhaps ten or fifteen minutes. It must have happened in many such instances of interference, that the interfering station was engaged at that moment in repeating a previous transmission on account of interference from yet another interfering station—a vicious circle of cumulative interference. How much quieter the bands would have been, how much more room there would have been, if every transmission had been received without interference and if no repetitions had been necessary! It would not have been true to say that it all worked out satisfactorily in the long run, for unhappily the amateur was frequently

obliged to abandon his attempt to "get through" and many of his contacts had to be left unfinished.

The problem of interference will, no doubt, return with the re-opening of the amateur bands after the war, and it may reasonably be supposed that it will become even more serious as the numbers of active stations are swelled by the newcomers whose interest in amateur communication has been growing apace during the war years. It may well happen that with a vastly increased amount of activity on the popular amateur bands, the effectiveness of any attempted communication will dwindle to such a degree as to destroy all genuine interest by reason of the intolerable interference.

A real step forward in reducing interference can be achieved by avoiding all unnecessary transmissions. Above all, the transmission which is, in itself, a repetition made on account of previous interference, is the transmission which should be considered unnecessary. As soon as a transmission becomes unintelligible through interference, the transmission should cease. The vicious circle must be broken. The practical technique of break-in can be relied upon to eliminate the unnecessary transmission by enabling the operator at the transmitter to know when his signals are not getting through. He then stops transmitting and awaits the clearing of his channel or changes frequency to some other clear channel. In either case further interference has been avoided. Being human, the operator himself is far less likely to suffer from any sense of irritation or frustration if he is saved from making useless repetitions.

For a break-in system to be effective in a major degree, its use should be the rule rather than the exception. In pre-war years the practice of break-in was rarely encountered in the amateur bands. One of the chief reasons for its rarity was probably the extra initiative and effort required in the design and layout of the average amateur station in order for it to become a practicable possibility. In its most elementary form, the problem is one of ensuring that the receiver is not rendered completely inoperative while the transmitter is being used. Secondly, provision must be made for convenient and efficient operation of the receiver and transmitter simultaneously, involving such considerations as key-clicks, absorption of transmitter power in the receiver input circuit and the physical layout of the equipment.

The usefulness and value of break-in have been proved. Its general adoption by amateurs as a post-war development may be looked to with confidence as one of the most effective measures against an overwhelming annihilating wave of mass interference.

S. K. L.

in the vicinity of 100 cms. (300 Mc/s.) then a pentode type Acorn can be used as a mixer and normal U.H.F. superhet practice followed. Below this wavelength, diodes or crystals (rectifying) are used. Any non-linear device which has oscillations at two frequencies impressed upon it will produce beat notes, hence any diode (or triode) may be used as a frequency converter. In Fig. 21A is shown the radio frequency section of a 40 cm. (750 Mc/s.) superhet used by the Massachusetts Institute of Technology in an aeroplane blind-landing project. The third harmonic from an Acorn-type oscillator is injected into the diode mixer circuit where it beats with a signal from the aerial, to form an I.F. signal which is applied to a high-gain amplifier. In the simplified schematic diagram in Fig. 21B, the input circuit A is tuned to the signal frequency, and B to the oscillator fundamental. Circuit A is effectively a length of capacity-loaded concentric line while B is a one-turn coil consisting of a length of copper tube resonated by a small variable condenser and tuned to approximately three times the signal wavelength. The signal from the input circuit A is applied to the anode of the diode by means of a small condenser (built into the central conductor of the input circuit in Fig. 21A). As the coil of circuit B has appreciable inductance at the signal frequency, its tuning condenser acts as a bypass condenser for signal frequencies. The oscillator voltage (at 120 cms.) is introduced into circuit B by means of a small coupling loop tapped onto the coil. The diode anode coupling condenser is large enough to act as a bypass condenser to the oscillator voltages and the signal frequency circuit A offers but little impedance at three times the resonant wavelength, so that for all practical purposes the diode is connected across the tuned circuit B. Since the diode is a non-linear device, harmonics will be generated in the diode, and the third harmonic of the oscillator will mix with the signal from the input circuit to produce a beat at the intermediate frequency (in this case 10 Mc/s.). The anode condenser of the diode presents a high impedance to the I.F. voltages generated and hence the I.F. input circuit is connected across it.

The diode mixer is obviously incapable of providing any gain and has also the disadvantage that the I.F. oscillations are present in the same circuit as the signal and local oscillator voltages, and hence the I.F. may beat with the local oscillator to produce unwanted frequencies. Also, as the diode introduces considerable damping into the input circuit, the Q of the signal circuit will be very much reduced, resulting in a low image-rejection ratio, and as oscillator and oscillator harmonic voltages are present in the input circuit there will be a fair amount of radiation from the aerial. This is not so serious as in the case of the super-regenerative receiver, because the radiated signal is pure C.W.

In a recently published article conversion "gains" of 0.6 to 0.8 are quoted for small "television" type diodes which have been used as mixers down to 50 cms. (600 Mc/s.).

The intermediate frequency amplifiers used in microwave superhets resemble those used in television receivers. The frequency must be high enough to obtain a fairly wide band-width so that oscillator drift does not become objectionable, and to allow unintentional frequency modulated transmissions to be received. The intermediate frequency transformers may be loaded with resistors in order to achieve a wide band-pass (of the order of 0.25 to 0.5 Mc/s.). Such a wide-band I.F. amplifier should make the tuning of the receiver equal to that of a broadcast receiver. Three or four stages of I.F. amplification are usual as the damping resistors connected across the coils reduces the stage gain.

As the wavelength of the signal circuit is decreased the frequency of the intermediate frequency amplifier must be increased as a greater bandwidth is required for stability reasons. The following empirical formula has been quoted by Dudley for determining the value of the intermediate frequency to be used in terms of the band-width and image ratio.

$$f = \frac{1}{2} \Delta f E_s / E_i$$

where Δf is the band width of the receiver,

E_s is the signal frequency voltage,

E_i is the image frequency voltage.

There is another type of I.F. amplifier which may prove to be useful in the microwave spectrum—the resistance-coupled or video amplifier. Such an amplifier will provide a good overall gain from the high audio frequencies up to 120 kc/s. or higher. With a set of this type the construction is very much simplified. The oscillator can be used as a combined oscillator-mixer as the signal and local oscillator are so close in frequency and the I.F. amplifier requires no lining-up. If desired, the I.F. response may be peaked by including a choke in the anode circuit of the first I.F. stage.

Using a set of this type the signal and image occur very close together on the tuning dial. Radiation may become rather excessive since the aerial is coupled directly to the local oscillator.

Aerial Systems

The small dimensions of dipoles in the centimetre wave-band makes the construction of highly directive radiating systems a practical proposition. Full use is made of reflecting surfaces and aerial arrays begin to resemble light projectors.

For the longer waves (100 to 50 cms.) aerials may be similar to those used at wavelengths around 5 metres, employing reflector and director waves. In Fig. 22 several types of directive arrays using reflecting surfaces are shown. The "Bill-board" array (Fig. 22A) consists of a number of stacked dipoles erected at either $\frac{1}{4}\lambda$ or $\frac{3}{4}\lambda$ from a reflecting metal sheet. This

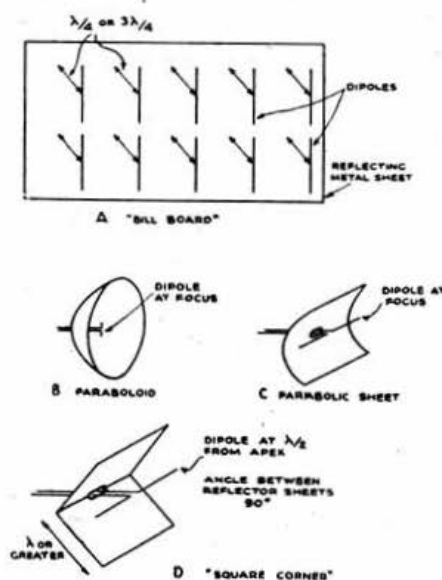


Fig. 22.

Directive aerial systems for use on centimetre wavelengths.

reflector sheet may consist of fine-mesh wire netting in order to reduce the wind resistance. Simpler types of highly directive aeriols using only one dipole are shown in Fig. 22B, C, and D. Paraboloidal and parabolic reflecting surfaces with a dipole at the focus give the sharpest beams, in fact a beam like a searchlight can be obtained with a paraboloid provided that the aperture is of the order of 10 or 20 wavelengths. This rather limits the use of the paraboloid to the very short centimetre waves if the size of the array is a limiting factor. In the 17 cm. cross-Channel telephone link paraboloids were used, having a dipole at the focus, and a hemispherical reflector in front of the dipole, so that all the radiation was thrown back into the paraboloid and an extremely sharp beam obtained. A gain of 33 dB was realised with this set-up. Perhaps the simplest type of directive array for use on centimetre waves is the "square-corner" beam (Fig. 22D). This consists of two metal reflecting sheets arranged at an angle and the dipole situated on the bisector of the angle. For amateur purposes the reflector sheets may be replaced by a number of wires, one half-wave long, arranged in two intersecting planes, thus making the system very light and reducing the wind resistance. The beam obtained will not be so sharp as that given by the parabola or paraboloid, but the array has the very great advantage that it requires no adjustment when once set up.

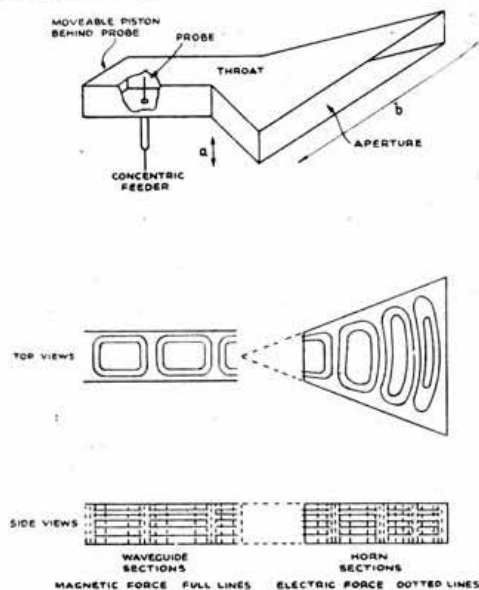


Fig. 23.

Electromagnetic Horn radiator.

One of the most interesting types of radiator is the electro-magnetic horn which consists of a wave guide flared out at one end. This type of radiator can be used only at wavelengths where wave guiding systems are of practical dimensions. If waves are set up in a wave guide they travel along it, and if the remote end is left open they are radiated into free space. The radiation pattern depends on the cross-section of the wave guide, a large cross-section (compared with the wavelength) giving a more directive beam. This is due to the fact that the waves undergo diffraction when passing from the guide into free space. The amount of diffraction depends on the size and shape of the aperture through which the waves pass. This phenomena is analogous to the passage of a beam of light through a narrow slit of

width comparable to the wavelength of light. A sharp beam can be obtained from a simple open-ended wave guide but the dimensions must be several times the wavelength employed. That means that the guide must be operated well below its critical wavelength where the wave impedance is approachable the value $\left(\frac{\mu}{\epsilon}\right)^{\frac{1}{2}}$. This value is that obtained for waves in an unbounded medium and is termed the intrinsic impedance of the medium or in the case under consideration, the intrinsic impedance of free space.

In order to make the wave guide of economical dimensions it must be operated near its critical wavelength and if a sharp beam is desired the wave impedance must be matched to that of free-space. This matching is done by flaring the open end of the tube in one or more directions so that the aperture through which the waves pass into free space is of the order of 10 or 12 wavelengths. In Fig. 23 is shown a short length of wave guide with the end flared out in one direction giving a beam which is sharp in the plane of the parallel sides. The wave guide portion of the horn, which may be of any length, has H-waves set up in it. As the waves pass into the horn section their velocity varies along the length of the horn. It will be remembered that the velocity of propagation in a guide operating near its critical wavelength is greater than the free space value. Thus the wavelength of the waves will change along the length of the horn. Fig. 23 shows the field distribution in the horn section.

The horn radiator offers several advantages over other types. It requires no insulators and owing to the fact that the feed is remote, spurious lobes are absent in the radiation pattern. It is easy to adjust, the only adjustment being the piston behind the exciting probe in the wave guide section, and it may be operated over a wide range of wavelengths of the order of two to one.

When considering cavity resonators, wave guides, and horn radiators it will be seen that there is a certain amount of similarity to acoustic resonators and radiators. This similarity will be observed in any system where the length of the waves used is of the same order as the cross-section of the boundary walls.

Propagation of Centimetre Waves

In general the range of any centimetre wave communication system will be only a little more than the optical range. There will be a certain amount of diffraction over the optical horizon. When considering very short wavelengths the field strength at a distant point is the resultant of at least two waves. There is the space wave travelling directly from the transmitter to the receiving aerial, and there is also a ground reflected wave reaching the receiver by a longer path (Fig. 24). If the aerials are very low there is also a wave which is more or less guided along the surface of the ground and if there are any obstructions, such as buildings, in the immediate vicinity there will be reflected waves from the walls of the obstructions. Now as all these paths will be of different lengths the phases of the different received waves will be different and so a series of "standing waves" will be set up, i.e. by moving the receiving aerial through several wavelengths, several maxima and minima of reception will be observed depending on whether the reflected

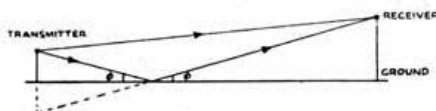


Fig. 24.

Direct and reflected wave paths between transmitter and receiver.

waves arrive in or out of phase with the space wave. When a wave is reflected by a surface there is a phase change of 180° . Now, if we consider reception over flat ground with no lateral obstructions, the received signal is the resultant of the space and reflected waves, so that the reflected wave will arrive nearly 180° out of phase with the space wave and cause destructive interference. As the path lengths differ however, the two will not entirely cancel out. Thus, the range over flat ground may be expected to be small if the aerials are low. If the aerials can be raised high enough to

minimise the adverse effect of the reflected wave the range is very much increased.

Atmospheric conditions such as rain and fog have an effect on propagation and may cause bad fading if the range is great.

Under the present conditions, little more can be mentioned about the behaviour of centimetre waves. A new technique is rapidly developing and discoveries are continually being made and a wide new frequency spectrum should become available for post-war commercial activity.

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PART II

The H.T. Circuit

THE reference made in Part I to a rectifier may have surprised some readers in view of the fact that D.C. only is being dealt with in these articles. In the course of testing receivers and amplifiers on mercury-arc rectified mains, it was found that a very annoying and persistent hum prevailed which no amount of smoothing would overcome. This occurred when the H.T. positive was applied to the circuit direct from the mains *via* a choke filter; special rejector filters were considered but for many reasons they were not used. It was found by experiment, however that by using a rectifier 75 per cent. of the hum could be eliminated.

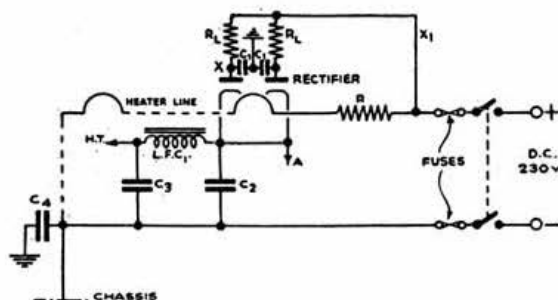


Fig. 6. Orthodox H.T. circuit employing twin anode/cathode rectifier, and limiting resistances in the anode leads.

Fig. 6 illustrates an H.T. circuit for 230 volts operation employing a rectifier which may be either a single anode/cathode or a twin assembly type. R_L is a 5-watts limiting resistor not exceeding a value of 100 ohms. This resistor prevents heavy surges on the rectifier, at the same time allowing a valve of the 25Z5 110 volts type to be used. A pilot lamp may be inserted at X or when twin types are used at X_1 . This lamp provides an indication that the circuit is alive as well as acting as a fuse. Some experiment may be required in order to obtain the right type of bulb but one rated at 60–100 mA. will generally function satisfactorily.

Although a single resistor R_L may be used in the common lead to both anodes, it is better with a twin assembly type to insert one in each anode lead as this will give better regulation.

In Fig. 7 the anodes are shown connected direct to the 110 volts mains. If, however, it becomes necessary

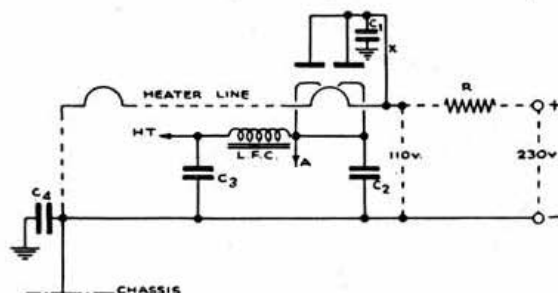


Fig. 7. A circuit for 110 volts operation similar to Fig. 6, but with the mains connected direct to anodes of rectifier; the resistor R is added when the supply is 230 volts.

to operate from a 230 volts supply a resistance R must be added as indicated by the dotted lines. The value of this resistor can be obtained from the equation $R = E/I$, where E is 230v–110v, and I is the total current supplied to the set at 110 volts, i.e., the heater current plus the rectifier anode current. As the wattage developed will be considerable it is important to use the correct type of resistor. Other component values are:— C_1 , 0.01 to 0.1 μ F; C_2 , 8 μ F; C_3 , 24 μ F; C_4 , 0.1 μ F. The value of the choke L.F.C. is not critical, but it should be around 500 ohms, as there are not too many volts to be spared. The output valves can be fed from the point A as this provides maximum voltage, at the same time reducing the general voltage drop which would occur if the anode current were obtained *via* L.F.C. Double pole fuses are advisable, as is a double pole switch in the input from the mains. The condenser C_1 reduces modulation hum.

When a larger H.T. current is required two rectifiers can be arranged in parallel as shown in Fig. 8.

Safety Precautions

Much has been written in amateur radio textbooks on the subject of safety precautions. When using D.C. receivers these warnings cannot be repeated too frequently. A brief consideration of the 230v. D.C. supply arrangements in a street of houses where only one side has been completed, will serve to illustrate some of the danger points. The cable itself is usually of the three-core type, i.e., two "outers" and a neutral, which means that the voltage across the

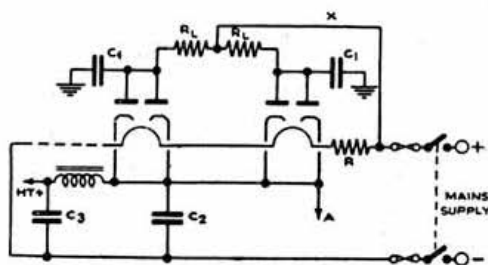


Fig. 8. Two rectifiers connected in parallel will provide a higher current thereby maintaining H.T. voltage at a maximum.

"outers" is 460 volts, whilst that across one "outer" (either positive or negative) and the neutral is 230 volts (see Fig. 9). In the case of a person living in house A, the negative mains will be approximately at earth potential. As in each of the receivers previously discussed the negative side has been taken direct to chassis, it follows that if such a receiver is used in house A then the chassis, control spindles, metal cabinet, etc., will all be at earth potential. Clearly, then, if a direct earth connection is made, the operator of the set will be quite safe. In the case of house B, however, the negative is 230 volts above earth potential and the positive is "dead." In this case the earth connection must be made *via* a 0.1 μ F condenser and not be taken direct to chassis. The chassis, control spindles, etc., must be insulated from the panel and cabinet which are themselves connected to true earth. If the grub screw holes in the condenser knobs are filled with hard wax, a safe job will result and the operator will be in no danger.

Twin pole fuses and switchgear should be used at the mains input, whilst if three pin plugs are fitted to the mains lead, an earth is obtained automatically and the polarity will always be correct. It is always advisable, however, to pull out the plug when a major adjustment is being made. Never trust a switch to cut off the supply when handling high voltages as it is liable to stick in the "on" position. Incidentally, some wall switches are of the single pole variety which, sad to relate, are often wired in the "dead" side of a pair.

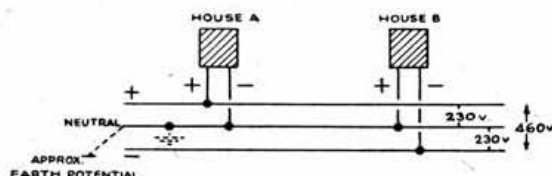


Fig. 9.
Illustrates a common arrangement used to provide D.C. to houses on one side of a street.

To ascertain to which side of the mains a house is

wired, first check the polarity of the sockets of the switchplug and note which is positive and which is negative. Next connect one side of a 230 volts lamp to the conduit or lead sheathing of the plug supply (or true earth); touch the other end of the lamp against each socket of the switchplug in turn. The position that causes the lamp to light is obviously the "live" socket.

Hum

If the negative side is "live," then more work is needed to insulate the chassis from the panel, etc., if this is made of metal. It has been found from experience that hum is harder to cure on the negative side. With both sides, however, it is best to start with a minimum amount of screening (except R.F.), increasing gradually by experiment. An excess of screening can increase the hum level, particularly when the negative side is "live," as can also a true earth connection. When the receiver is finished the hum level should be completely lost in the hiss of even a small superhet; it will not be quite so silent on a T.R.F. receiver, but certainly not enough to cause annoyance even when using headphones.

(To be continued)

LIGHT BEAM COMMUNICATION

A PROPOS the article published in the September issue, Lt. John Brynildsen, LA9N, writes as follows:—

"The article made me recollect some tests that took place in Norway long before the war. I was only an onlooker, but I think I can give an answer to the question of the possibility of transmitting speech on a light receiver.

"A gramophone, with pick-up, was located in a house, and in the window of the house, a lamp was placed in the focus of a parabolic mirror. This was connected to a powerful A.F. amplifier instead of to a loudspeaker. This was the 'transmitter.' In a field outside the house was a 'receiving' station consisting of a plain mirror that reflected the light beam down into a photo-electric cell, this being connected to an A.F. amplifier instead of to a microphone. When a record, or speech from a microphone, was fed to the 'transmitting' amplifier, the light beam was modulated accordingly, and of course no sound was heard in the room. Out in the field however the record or speech was heard perfectly.

"The lamp was of the ordinary incandescent type capable of standing the power delivered from the 'transmitting' amplifier. The variations in the glow of the lamp were hardly visible to the human eye.

"As the writer of the article suggests I think it would be possible to transmit plain language over distances with the highest degree of secrecy without using wireless."

* *

FROM time to time various circuits have been evolved for the purpose of sending and receiving speech over a light ray, and the neon lamp has been tried with varying degrees of success. The greatest drawback with neon, or other gas discharge devices, is the low intensity of illumination, hence only a very restricted range is obtained. The size of the light source is also considerable, whilst focusing difficulties arise. The ideal source of light would appear to be the low voltage incandescent lamp using a tungsten filament, the chief drawback being, of course, the slow cooling of the filament and consequent

inability to follow the rapid fluctuations of the speech frequencies.

To overcome these difficulties the following arrangement was devised in America some years ago.

A low voltage lamp is supplied from the tank circuit of an oscillator operating at about 56 Mc/s. and this oscillator is modulated in the conventional manner from an A.F. speech amplifier. The modulator-oscillator-lamp assembly forms the transmitting end, and at the receiving end a photo-electric cell, with reflector, picks up the light beam. Its output is used to feed an L.F. amplifier in the usual fashion.

The apparatus depends for its success upon the H.F. phenomena known as "Skin Effect" which is mentioned in the article on Centimetre Waves in the September issue of THE BULLETIN. It has been found that the ratio of H.F. resistance to D.C. resistance is proportional to the thickness of the conductor and also to a quantity $\sqrt{\mu f / \rho}$

Where μ is the permeability of the material, ρ is the specific resistance and f is the frequency.

When the frequency is very high the skin effect is considerable and the H.F. current crowds to the skin of the conductor. From the formula quoted it is evident that the higher the permeability of the material of the filament the more pronounced will be the effect; the tungsten filament of the average incandescent lamp suits the case quite well. When the filament is supplied by H.F. current, quicker cooling results, and as most of the heat generated is in the skin of the filament, much more rapid dissipation of this heat is achieved, thus allowing the light beam to follow the fluctuations.

If it is desired to send rapid Morse over the beam all that is necessary is a "squegging" oscillator operating at, say, 56 Mc/s. and employing a "squegging" frequency of about 800. This arrangement only involves the use of one valve in the "transmitter."

BRS5349.



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THE WORK OF THE RADIO AMATEUR

I.E.E. Wireless Section—New Chairman's Address

MR. T. E. GOLDUP, M.I.E.E., the newly elected Chairman of the I.E.E. Wireless Section, in the course of his inaugural address on October 13, 1943, said: "The contribution of the thousands of wireless amateurs in creating interest in the general advances of radio has not been inconsiderable."

His address, which took the form of an historical survey, dealt with (1) Thermionic Valve Manufacturing Progress; (2) Broadcasting; (3) Television; (4) Commercial Radio Communication; (5) Industrial Applications of Thermionic Devices; (6) The Radio Industry; (7) The Work of the Radio Amateur; (8) The I.E.E. Wireless Section.

Of the work of the radio amateur Mr. Goldup said: "In this historical survey of the progress of radio, reference must be made to the contribution of the radio amateurs of Great Britain and to the part they have played and are playing during the present war."

The co-ordination of amateur activities within the British Isles has, for the past 30 years, been in the hands of the Incorporated Radio Society of Great Britain, which on its formation was known as the London Wireless Club. Telephone transmissions by amateurs on 440 metres during the years 1920-1922 focused attention on possible future developments, and their further experiments on short wavelengths demonstrated the possibilities of providing world-wide communications using relatively low power and small aerial systems.

The work of Mr. Gerald Marcuse, G2NM, who set up with official authority at his home in Caterham, a short-wave Empire broadcasting station is well known, and his success influenced the decision made by the Government to establish an Empire broadcasting service.

The encouragement given by the R.S.G.B. to the transatlantic tests of 1922-23 and to the British Empire tests of more recent years, brought about a rapid growth of interest in short-wave technique and led to the establishment of a considerable number of low-power short-wave amateur stations throughout the British Isles. The resulting educational value of this hobby has proved of immense value, for it is generally recognised that the keen experimenter who has constructed and operated his own station carries with him into industry enthusiasm, and practical experience.

Of especial importance was the pioneer work carried out by British amateurs on the ultra-short wavelengths. Organised tests on the 28 Mc/s. and 56 Mc/s. bands found a ready response from hundreds of enthusiasts, and undoubtedly their experience has proved of immense value to the country during the past four years.

Prior to the war the R.S.G.B. was largely responsible for launching successfully the Royal Air Force Civilian Wireless Reserve, and the Royal Naval (Wireless) Volunteer Reserve. The purpose of these reserves was to train radio amateurs for service in the event of hostilities. The fact that the first batch of R.A.F. Civilian Wireless Reservists were on the way to France on the morning of September 3, 1939, to take up front-line duties, provides evidence of the confidence shown in their operating abilities by the R.A.F. Signals Directorate; and since that date nearly 4,000 members of the Society have joined the Services, some of them holding senior executive rank.

I should like to refer to two publications produced by the Society, namely the *Amateur Radio Handbook*

and the *Radio Handbook Supplement*. The former made its appearance prior to the war, and its purpose was to keep members of the Society in touch with modern developments. Official recognition as an instructional manual has been accorded this publication. The *Supplement* which appeared last year is enjoying a similar response and is undoubtedly meeting a very definite need. The R.S.G.B. BULLETIN (official journal of the Society) continues to present valuable technical contributions, many of which reflect the trend of thought for the future.

It is my hope that the Society will continue to work in close harmony with this Institution, and in this connection it is pleasing to note that the General Secretary of the Society has accepted, on behalf of its members, the invitation of the President and Council of the Institution to attend future meetings of the Wireless Section."

Mr. Goldup made some pertinent and helpful remarks regarding "the young engineer who is on the threshold of his career, and who has yet to accumulate that technological experience so necessary to his future progress. His study of Wireless Section papers will, in many cases, merely impress upon him the fact that his knowledge is limited, and he may even go so far as to draw incorrect conclusions especially on those points, where there is a difference of technical opinion. We are often apt to forget, in connection with the work of our young engineers that the rapid progress of technical development in radio engineering or telecommunication, results in text-book and other information lagging behind current work, and that the complete understanding of highly specialised papers creates difficulties." To overcome these difficulties Mr. Goldup suggested that "it may be advantageous to consider the publication by the Institution of simplified technical summaries of Section papers, written in an explanatory form with the object of enlightening the less advanced readers."

In connection with education and training the speaker said: "The war has directed our attention to the problems of education and training, and those of us in industry and elsewhere having the responsibility of controlling technical staffs are well aware of the present deficiencies. The war years have proved to be very difficult for engineering students, for they have continued their studies in circumstances that are not altogether conducive to good results, and this has aggravated an already unsatisfactory position. In the immediate post-war period we shall therefore be faced with the problem of completing the training of these engineers and deciding their future sphere of engineering work. In addition, an overhaul of present methods of education and training will be necessary, and industry will have to share in the responsibility of providing technological training. What can the Wireless Section do in this connection? In my opinion we can contribute considerably towards the solution of this problem. We could promote a series of informal discussions on specific aspects of training, and lead them towards the preparation of some definite recommendations for the guidance of educational bodies and industry."

(EDITORIAL NOTE.—Acknowledgement is made to the Institution of Electrical Engineers for permission to publish extracts from Mr. Goldup's address. The address will appear in full in the next issue of the proceedings of the I.E.E. Wireless Section.)

A VALVE VADE MECUM

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

PART III—THE GRID—VALVE CURVES

28. *Early valves contained only a filament and an anode. Why was the grid introduced?*

The electron flow in early valves could be controlled only by varying filament or anode voltages. This was inconvenient, for it wasted power, and also amplification could not be obtained. Accordingly an extra electrode—called the grid—was placed in the valve between filament and anode, so that electrons travelling between these two had to come under the influence of the grid. As a result two advantages were achieved:—

(a) Control was possible with negligible expenditure of power.

(b) Amplification became possible, instead of only rectification which had hitherto been the case.

29. *What does the grid of a valve consist of?*

It consists of a spiral of nickel wire enclosing, but not touching, the filament. Electrons emitted from the filament and drawn towards the positive anode must therefore pass between the turns of the spiral on their journey.

30. *What is the action of the grid?*

The action of the grid is to repel or to attract electrons. By this means the number and velocity of electrons reaching the anode is easily varied as required. Consider three conditions.

(a) *The grid very negative.*

Since electrons are themselves negative charges they will be driven away from the grid when they try to approach. They will even be driven back if they try to pass between the spaces of the grid spiral, Fig. 5 (a), so none will reach the anode. The non-arrival of electrons means no anode current and under these conditions the anode current is said to be "cut off."

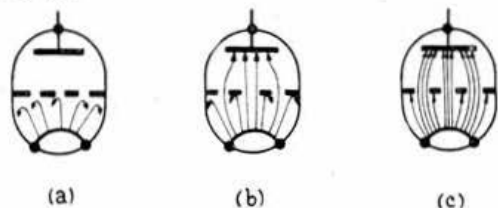


Fig. 5.

(a) The grid is very negative, repelling all electrons, and preventing anode current. (b) The grid is less negative, permitting anode current to flow. (c) The grid is positive, resulting in grid current as well as high anode current.

(b) *The grid slightly negative.*

It will still repel electrons and prevent any from landing on it, but the repulsion will not be sufficient to drive back those aiming for the spaces between the turns of the grid spiral, Fig. 5 (b). These will slip through, and coming under the strong influence of the positive anode will be accelerated towards, and land on this electrode. Anode current will therefore flow; its magnitude depending on how many electrons slip through the grid spacing.

(c) *The grid positive.*

With the grid positive it no longer repels the electrons; in fact it attracts them and some land on it, Fig. 5 (c), returning to the filament via the D.C. conducting path (such as grid leak or transformer winding), which must always be provided between the grid and filament of a valve. On the other hand, many of the electrons are travelling towards the spaces between the grid turns with such high velocity that

they get carried through, and before they can reverse and move back towards the grid, to land on it, they become attracted to the anode which is more positive than the grid. The combined action of both grid and anode in drawing away electrons from the region of the filament may be intense enough to damage the emissive surface, in which case the filament is said to have "lost its emission." Further, the electrons may be impinging on grid and anode with such heavy impact that they may overheat and damage these two component parts.

31. *What chiefly decides the controlling action of the grid, apart from the voltage supplied to it?*

(a) The closeness of the turns in the spiral which comprises it.

(b) Its proximity or otherwise to the filament.

32. *Fig. 6 shows typical curves usually supplied by the manufacturer in the box of a newly purchased valve. What information do the curves provide?*

The curves show what anode current the valve will pass for different values of grid bias, when the anode voltage is maintained at the figure stated. In the example shown the highest anode voltage is 120. If the grid bias is set to -3 volts, then by projecting from this point on the grid-volts line up vertically to meet the curve, and then horizontally to meet the anode current line we can read off the anode current as 5 mA. Similarly, if the grid bias were increased to -5 volts, the anode current would be reduced to 1 mA. Thus the purchaser can calculate the desirable grid voltage and anode current for operation of the valve.

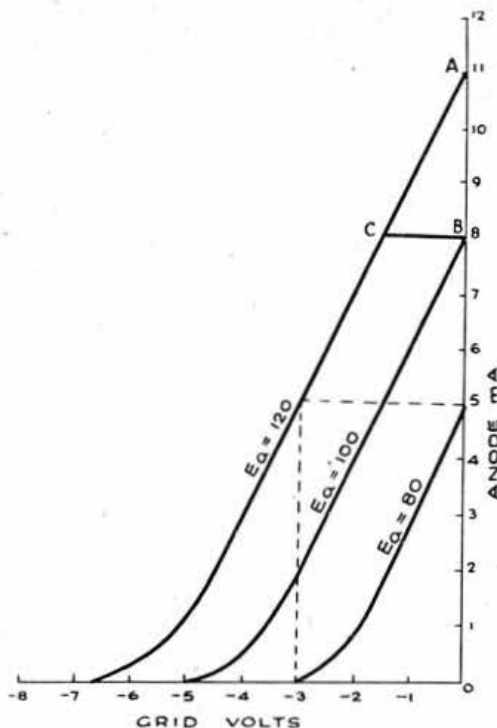


Fig. 6.

A typical set of curves for a medium impedance triode, enabling the purchaser to determine the operating conditions.

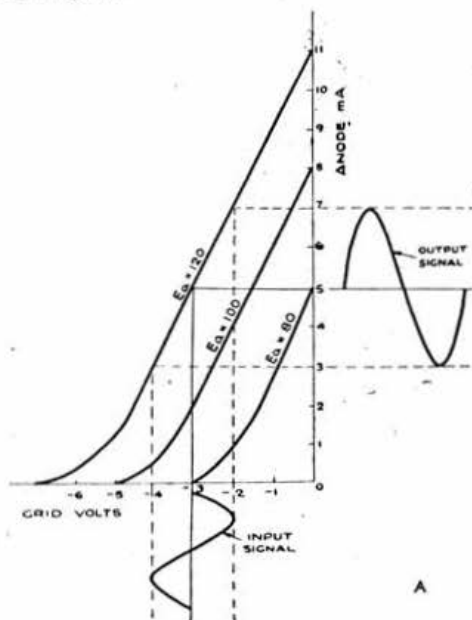
33. What is the other main purpose of the curves?

They enable us to estimate the strength of signal which can be handled without distortion by the valve. The condition for freedom from distortion is that the positive and negative half-cycles of the signal shall be equally amplified. To ensure this, the valve operating point should be chosen approximately mid-way along the straight portion of the curve, and the signal must not be so strong that it will make the grid positive during the positive half-cycle, or take it into the curved portion during the negative half-cycle.

Suppose the valve is working with a bias of -3 volts, and an anode voltage of 120. Then the anode current under these steady conditions will be 5 mA. Now apply a signal whose peak amplitude is 1 volt. This is superimposed on the grid bias, so that during the positive half-cycle the effective grid voltage is $(-3 + 1)$ or -2 volts. The grid is still negative, so all is in order, and the anode current is read off from the curve as 7 mA. On the negative half-cycle the grid voltage becomes $(-3 - 1)$ or -4 volts, which is still on the straight portion of the curve—but only just. The anode current is now 3 mA. As the decrease in anode current is equal to the previous increase, we get distortionless reception.

Suppose however that a stronger signal is applied having a peak amplitude of 3 volts, then the effective grid voltage will vary between the limits of 0 and -6 volts. At 0 volts the anode current will be 11 mA., making an increase of 6 mA., and we shall probably just escape the flow of grid current. When the grid voltage is -6 volts however, we are working right down on the bend of the curve; the anode current is about 0.25 mA., giving a change of 4.75 mA. instead of 6 mA. and under these conditions we shall get distortion.

Figs. 7 (a) and 7 (b) show the two signals plotted below the curves, and the resulting anode current variations are projected across to the right of the diagrams. Note the lop-sided amplification of the stronger signal.



34. What is the name given to the valve curve of Fig. 6?

The slope of any curve is given by the ratio of the vertical increase divided by the horizontal increase. In the curve under consideration this ratio represents $\frac{\text{current}}{\text{voltage}}$ which gives a *conductance*. (Had the ratio

been the other way up, that is to say $\frac{\text{voltage}}{\text{current}}$, it would have given a resistance, in accordance with Ohm's Law.) Consequently the curve is called the "Conductance curve," or more generally, to distinguish it from others, the "mutual conductance curve" for the valve.

35. In Fig. 6 a small right-angled triangle ABC has been drawn between two of the curves. What is the importance of this triangle?

The ratios of the sides of the triangle enable us to measure the three important factors of a valve, namely the mutual conductance, the a.c. resistance, and the amplification factor.

As already explained, the slope of the curve gives the mutual conductance of the valve:—

$$\therefore g_m = \frac{AB}{BC} = \frac{3}{1.5} = 2 \text{ mA. per volt.}$$

36. What ratio of the sides gives the a.c. resistance of the valve?

The a.c. resistance is defined as the ratio:—

$$\frac{\text{Change in anode voltage}}{\text{Change in anode current resulting therefrom}}$$

$$\therefore R_A = \frac{E_{A1} - E_{A2}}{AB} = \frac{120 - 100}{\frac{11 - 8}{1000}} = 6,600 \text{ ohms.}$$

Note the factor 1,000 converts milliamps to amps.

37. What ratio gives the amplification factor of the valve?

The amplification factor is defined as the ratio:—

$$\frac{\text{Change of anode voltage for a given anode current change}}{\text{Change of grid voltage to produce the same current change}}$$

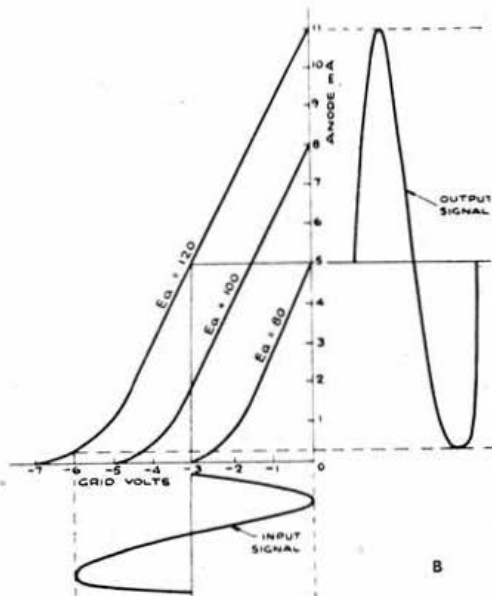


Fig. 7.

(a) Distortionless amplification, the projections of the input voltage all falling along the straight portion of the graph.
(b) Excessive input, entailing operation along the bend of the graph, and consequent unequal amplification of positive and negative half-cycles.

$$\therefore \mu = \frac{E_{A1} - E_{A2}}{BC} = \frac{120 - 100}{1.5} = 13.3$$

Note that the amplification factor is simply a number, without units, in contrast to the mutual conductance and the a.c. resistance of a valve, both of which have units which must be stated.

38. Knowing two of the above factors, how can the third be calculated?

The three factors are related by the expression

$$\mu = R_A \times g_m$$

so that the missing factor, where only two are supplied, can be found by simple proportion.

39. What point must be remembered when drawing valve curves?

The straight portions must be almost parallel, and equally spaced for equal intervals of anode voltage. This is because the conditions affecting the flow of anode current are the same under all conditions of the anode voltage, and it is only when the limits of operation are approached—such as the filament being unable to cope with the full demand for electrons, to give one example—that the lines bend appreciably and tend to merge into one another.

(To be continued.)

CHASSIS AND PANEL CONSTRUCTION IN WAR-TIME

By A. JOTCHAM (2FWB)

AT the present time few experimenters are able to obtain sheet metal suitable for the construction of chassis and panels. The few chassis that are on the market are usually quite unsuitable for amateur requirements.

Chassis

To take the place of metal, a rigid chassis, of the inverted box type, can be constructed from 5 ply wood. Details are given in Fig. 1. The top of the chassis is covered with perforated zinc, cut to overlap $\frac{1}{2}$ in. at the two sides, and back, bent down and tacked. This operation should be completed before any other part of the chassis is constructed. The perforated zinc covering provides for efficient earthing. The chassis should be given a coat of battleship or slate grey paint.

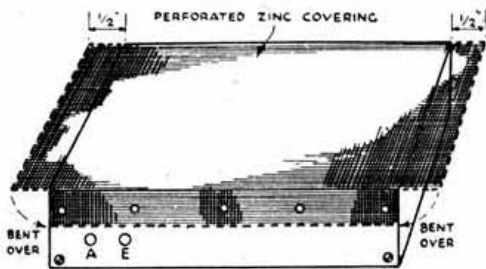


Fig. 1.

Panels

Panels can be made from $\frac{1}{4}$ in.- $\frac{1}{2}$ in. ply wood, provided one side is free from joins. First rub down well with glass paper, then apply a coat of light, or dark varnish. When dry remove the shine of the varnish with fine glass paper, and then rub in well a little salad oil. The coat of varnish produces not only a good finish, but also makes the panel more rigid. If a dark finished panel is required, a dark varnish

should be used, because the oil when rubbed in, tends to make the panel lighter. The panel is fitted to the chassis by means of small angle brackets as shown in Fig. 2.

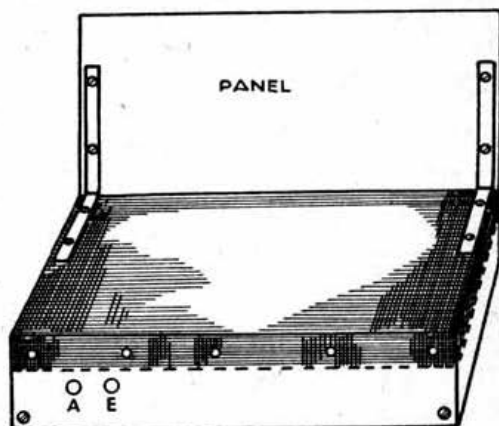


Fig. 2.

Standard Frequency Transmissions

Mr. O. C. Doley, BRS4679, Orkney House, Norham on Tweed, states that standard frequency transmissions are again being radiated by WWV, the station of the U.S. Bureau of Standards.

Continuous day and night transmissions are made on 5 and 10 Mc./s, the carrier being modulated 50 per cent. at 440 c.p.s. (the standard of musical frequency, corresponding to A above Middle C). Transmissions are also made on 15 Mc./s during the hours of daylight in the U.S.A. In addition a pulse is impressed on the carrier once per second, thus assisting in station identification. Transmissions are interrupted once every five minutes and recommence again after an interval of one minute. During the interval the station call (WWV) is radiated in Morse. The station call is also announced once every half hour, precisely, in telephony, when particulars of the frequencies used are given—again the interval is one minute. A frequency of 4000 c.p.s. is employed on occasions as the modulating frequency.

Pre-war members will remember that details of transmissions radiated by WWV were published frequently in this Journal. Our last detailed reference appeared in the December 1939 issue.

Letter to The Editor

The Future of Civilian Wireless Reserves

DEAR SIR.—The other radio mechanics with whom I work (all ex R.N.V.(W.)R. telegraphists) have discussed the points mentioned in your editorial, many times, and feel that if there is a "Reserve for Radio Mechanics" after the war, considerable numbers now serving as such will join.

The reason I use the expression "ex R.N.V.(W.)R." is that upon transfer being effected, into the radio mechanic branch, the original R.N.V.(W.)R. agreement was formally terminated, and a new one made for the duration of the present emergency.

Prior to the war there was no facility in the R.N.V.(W.)R. for amateurs with a technical knowledge; the importance of which has only come to light during the present conflict.

A good proportion of those who changed to this branch at its inception were either R.N.V.(W.)R., amateurs or radio service men.

The R.N.V.(W.)R. is, I think still, in being because up to 1941 I was classified as telegraphist R.N.V.(W.)R., having signed on, like others, until 55 years of age. I have not seen any statement that serving members of the reserve have been released from their obligations, should there be another emergency after the present conflict.

I suggest that after the war radio mechanics should attend short refresher courses at factories which are manufacturing service equipment and further short courses at operational stations under active service conditions. They should also be encouraged to operate and maintain their own amateur experimental station.

Yours faithfully,
REACTOR.

Hospitality Offered

Mr. K. W. Harbridge, G2KH, will be pleased to welcome members at his new home, 40 Tyrone Road, Thorpe Bay, Essex (Telephone Thorpe Bay 8109).

A similar invitation is extended to members stationed in the vicinity of Blackpool by Mr. P. Roberts, 2COR. His full address is 65 Mossam Lane, Norbreck (Telephone Cleverleys 2197).

BRITISH ISLES NOTES AND NEWS

DISTRICT 1 (North Western)

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

Ashton-U-Lyne.—G6DV has been on an A.T.C. Instructor's Course at No. 1 R.S. where he met 2MA and several B.R.S. members. 5PX attended a similar course at No. 2 R.S. but made no amateur contacts. via G5PX.

Bolton.—2BTO broke a silence of several months when he called on the T.R. recently. Since his previous leave he has been getting round the country and has collected a couple of stripes during his wanderings. 5542 (R.N.) has now passed his badge test. BRS6591, of Notts., has successfully completed his course.

The next meeting will be on December 5, at 2DVQ, 32 Bromwich Street, at 2.30 p.m. Service members welcome, as always. via 2DVQ.

G6CX has received airgraphs from Messrs. Walker, 2DCF (M.E.F.), P. Nicoll (R.A.F., India) and W. H. Hodgson, G3BW (British East Africa). All wish to be remembered to their colleagues. G5UM has recently taken up duties in Liverpool and it is hoped that a meeting of those local members who are available will be arranged in the near future.

The D.R. receives many requests from Service Members who come into the District for names of members with whom they can make contact but owing to the fact that so many members are away, no up-to-date list of resident members is available. If each member who has a permanent location in the District will kindly send the D.R. a postcard with his name, address and call sign, it will be possible to prepare a list and give the information required.

Mr. W. Lucas (G20I) in the course of a newsy letter sends kind regards to his fellow members, particularly those in the Manchester area. G6CX.

DISTRICT 2 (North Eastern)

D.R.: C. A. Sharp (G6KU), 326 Poplar Grove, Gt. Horton, Bradford. Bfd. 10772. Scribe: H. Beadle (G8UO), 13 Chandos St. Keighley.

The D.R. would like all new members to let him know whether or not they are in the Forces; he would also welcome suggestions regarding arrangements for meetings which would enable them to meet old members.

G5YV reports that his first meeting held on August 29 was poorly attended but this was no doubt due to the bad weather. Those present were G6O, 2HHV, 5893 and 6441. SWP is in the signal office at Catterick Camp. 2FQH is a F./Sgt., R.A.F. 5774 is now a Cpl., R.A.F. 5ZB is in GL 3RB is a P.O.W. in Italy and 5HB a C.Q.M.S. in the M.E. 2317 is moving to a new QRA; we are sorry to hear of the illness of his wife and father and wish them a speedy recovery. 6854 is welcomed to membership. 6KU is trying to finish his 10 valve super, but is short of time. 6592 is a civilian instructor with the A.T.C. and in his spare time is building an amplifier with PP 6L6's for use in conjunction with a home-made ribbon microphone. He would like to hear from 2IK, 6WI, 6DL and 4IP, also any W's who may be in the District. 2DM expects to be home shortly. 6733 was sorry to miss the Morley meeting but his leave ended a few days too soon. He says that any member will be welcomed at the Park Hall Radio and Television Club, Oswestry, Salop. 3WP, 41 Queen St., Brightlingsea, nr. Colchester, would like to hear from 2DQL. 4JB states that our impounded apparatus is being well cared for by the P.O. Morley and District Radio and Television Society was recently inaugurated. 6PL is Treasurer and 5YV Secretary. Fourteen R.S.G.B. members have already joined. We wish the new venture every success. G8UO.

DISTRICT 3 (West Midlands)

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

Birmingham.—At the meeting of M.A.R.S. held on Sunday, October 10, Messrs. Brown and Vincent opened a most interesting discussion on high fidelity gramophone reproduction. Twenty-five members were present.

The Scribe would be pleased to hear from members on active service. 2FDR.

DISTRICT 4 (East Midlands)

Deputy D.R.: A. E. Clipstone (G8DZ), 14 Epperstone Road, West Bridgford, Notts.

Derby.—Interest here is at last increasing and there is every prospect of meetings recommencing soon. 2OU has had visits from 3OZ (after an absence of four years), 8SI and 2CVV. The latter is now a sergeant. G2OU.

Leicester.—We welcome the new T.R. (BRS5605) and wish him every success. His first report is as follows:—There was a good attendance at the October meeting, those present included 2IX, 2XD, 4FO, 6VD, 2FNW, 2793, 5142 and 5329. A junk sale induced members to buy gear they did not require; as a result the P.O.W. Fund became the richer by 22s. See "Forthcoming Events" for details of future meetings. Local members please note particularly December 12 as the date for the meeting at Wigston when 4FO will demonstrate high quality cinema

amplifiers and 2XD will outline his ideas regarding frequency measurement. BRS5605.

Mansfield.—2DTQ, now in the M.E., reports fit and well. He asks what has happened to all the locals especially 3XA, 4DS, 8NS and 8OT. His only contact with amateur radio is 8MR. We welcome 7171 of Sutton who is anxious to get meetings started again. Those interested should write to 18 Farnedale Road, Sutton-in-Ashfield.

Nottingham.—The October meeting held at 8DZ was a great success, the biggest attendance since early 1940 being recorded. The Radio Quiz turned into a riot and a good time was had by all. Mrs. 8DZ came up to scratch with tea and cakes. A social evening is to be held at St. Saviour's Rooms, Arkwright Street, Nottingham, at 6 p.m. on December 18. A meal will be provided but early reservation is necessary. Entertainment will be provided by a well-known concert party. Ladies are especially invited.

Forthcoming Events

- | | |
|---------|---|
| Nov. 21 | District 4 (Leicester section), 2.30 p.m., at G2IX, 19 Francis Avenue, Narborough Road. |
| Nov. 21 | District 4 (Nottingham section), 6.30 p.m., at 2A0O, 78 Henry Road, West Bridgford. ('Bus No. 11 from Market Square.) |
| Nov. 21 | District 12 (North London section), 3 p.m., at 2DHF, 22 Bramford Court, Southgate, N. 14 (opposite Minchenden School, High Street. (No. 29 or 244 'bus passes door. Two minutes Southgate Tube Station.) |
| Nov. 21 | District 14, 3 p.m., at G3FT, 3 Geneva Gardens, Whalebone Lane North, Chadwell Heath, Essex. ('Buses 66 and 86a to Whalebone Lane North, then three minutes walk.) |
| Nov. 21 | District 15, 3 p.m., at BRS5533, 31 Wellington Road, Northfields, Ealing, W.5. (Northfields station, or 'buses 55 and 97. A p.c. or telephone call to Ealing 4950 if attending.) |
| Nov. 27 | London Meeting at I.E.E., 2.30 p.m. Discussion on "Valve Voltmeters" to be opened by Mr. E. L. Gardiner, B.Sc. (G6GR). |
| Nov. 27 | District 12 (St. Albans section), 3 p.m., at BRS4659, 21 Marshals Drive. ('Buses 304, 314, 355, 365, or 391 to Lancaster Road, turn right off main Sandridge Road at railway bridge; or Circular Route (354) to Gurney Court Road.) |
| Nov. 28 | District 2, 7 p.m., at G5VD, 12 Langley Terrace, Crosland Road, Oakes, Huddersfield. |
| Nov. 28 | Scottish "A" District, 3 p.m., in Royal Technical College, George Street, Glasgow. Enter by Montrose Street. |
| Dec. 5 | Districts 7 and 13. Combined Meeting, 3 p.m., at the Y.M.C.A., North End, Croydon. |
| Dec. 12 | District 4 (Leicester section), 2.30 p.m., at the Magna Cinema, Wigston. Demonstration of high quality cinema amplifiers. |
| Dec. 18 | District 4 (Nottingham section), 6 p.m., Social Evening at St. Saviour's Rooms, Arkwright Street. Refreshments will be provided. Entertainment by a well known Concert Party. Reservations must be made early. Ladies invited. |
| Dec. 18 | Annual General Meeting, 2 p.m., at I.E.E. (See special announcement published elsewhere.) |

Further details in December BULL. The November meeting is to be held at 2A0O, 78 Henry Road, West Bridgford, on the 21st inst. at 6.30 p.m. when Radio Quiz No. 4 will be held. G4LY reports a visit to SU18G where he was made very welcome and shown around; he expects to return home in the near future.

Peterborough.—2FVQ who attended the Nottingham meeting expressed the view that he would like to start up meetings in the town again. Interested members please write him at 32 Lime Tree Avenue, Peterborough. G8DZ.

DISTRICT 6 (South Western)

D.R.: W. B. Sydenham, B.Sc. (G58Y), Sherrington, Cleveland Road, Torquay. Torquay 2097.

The T.R. for Torquay (Mr. F. Wadman, G2GK, 106 Warbro Road) would be glad to hear from any member willing to support a local meeting. Suggestions are invited.

Mr. Aldous, BRS1006, advises that his book on recording is now in print. Visits or reports have been received from 1939, 5384, 6028 and 6750. The latter would like to meet members living in or near to Tintagel. 2FWB (Dawlish) is welcomed from

District 7. He wrote to a "local" member and received his reply from Gib!

News from Exeter and North Devon would be appreciated. Speedy recovery to G5YR who, as reported last month, is ill in London.

The D.R. being away on an A.T.C. Course at the time these notes were due to be written the duty was undertaken by G2GK.

DISTRICT 7 (Southern)

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

Croydon.—At the October meeting held at Croydon Y.M.C.A. there was an attendance of 18 which included 2HP, 2IG, 2MI, 3CI, 3DF, 3ST, 5BT, 2DRT, 2HHD, 1545, 3003, 4324, 4584, 4814, 6064, and 2DP. The main item was a very interesting talk by 2IG on his Synthescope (it will be published in the BULLETIN shortly). 2IG will be booked for another talk in the near future. G2DP met 2KU and 8DL in Bournemouth recently. Letters have been received from 6666, 6756, and 6782 who hope to be able to attend meetings. Welcome to 4063 and Mr. Welch, a new member. £2 6s. was collected for the P.O.W. Fund.

via G2DP.
Cousdon.—G5AN, finding little to do in radio, has turned to photography. 4458 on holiday in Cornwall was unable to contact any of the locals. via 3003.

Bournemouth.—The following have been in town on leave: 6YD, 4IJ, 4KV, and 4449. Welcome to new residents 8DL and 2KU. via G2NS.

Reading.—Last month's note produced replies from 3BN, 8KJ, and Mr. Nash of 9 Holybrook Road, Reading. The latter has very kindly offered to provide a place for meetings and make the other arrangements. Reading and District members are earnestly requested to support him in his efforts to get Society activity under way again. Drop him a postcard indicating your support.

General.—6756 reports from the wilds of Kent that an R.S.G.B. badge on his workbench and another over his bed have failed to raise any contacts; 6931, laid up after a kick received on the football field, suggests an article in the BULL explaining Amateur Radio jargon to the new member. 3VB has 2CIW of Grays, Essex, in his unit on Gibraltar. He finds that talking about the "good old days" only opens up an old wound! G5WP.

DISTRICT 8 (Home Counties)

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

There is no news to report from the district this month, only one visitor having made contact with the Deputy D.R.

G5JO will be pleased to hear from any member who is interested in the suggestion to hold a social function between now and Christmas. If sufficient members offer their support before the end of November, steps will be taken to try and arrange something. G5JO.

DISTRICT 9 (East Anglia)

D.R.: H. W. Sadler (G2XS), The Warren Farm, South Wootton, Kings Lynn, Norfolk. Castle Rising 233.

A welcome letter is to hand from Ft./Lt. Paul M. Carment, G5WW, who states that he has for some time been a resident of Felixstowe although he is at present serving elsewhere in the R.A.F. Apparently he had only just settled in the district when hostilities arose. May he soon be back to his favourite aerials! Paul also mentions meeting 5QO in the Orkneys (perhaps that's where he has dug himself in 8DD). G2XS.

DISTRICT 10 (South Wales & Monmouthshire)

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

GW4CC reports that EI7M has been in hospital for a considerable time following a serious motor accident. 7M would like to hear from G3YK and other old friends. A recent letter from B.N.A. brings news of 2DHM (Chepstow) who has been "living on wheels" for the past nine months.

Cardiff.—A welcome is extended to 2BBO upon his re-election. He is now a F./Sgt. in the Home Counties. Meetings continue to be held on Sunday afternoons at monthly intervals, full details of which can be obtained from the D.D.R.

Swansea.—Congrats to Mr. and Mrs. Bowen (GW4CC) upon the safe arrival of another Junior Op (Pearl Diane).

New members are cordially invited to communicate with the D.D.R. who will be pleased to give any information on local activities. GW4KQ.

DISTRICT 11 (North Wales)

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

As only GW4CX, GW3CF and 2731 arrived for the September meeting, future meetings will only be held when sufficient members write in to say they can attend. Please advise BRS2731 if you can attend a meeting during the period 17th to 24th of any month.

2DAH reports from hospital after an operation. (Quick recovery O.M.) BRS5520 writes from Dakar F.W.A. and sends 73 to 3CF and others who know him. 5543, who is still with R.A.F. in the District contacted the writer during a recent leave. GW4CK

and 1060 recently did the rounds together but found very few members at home. 4444 has built a two valve battery amplifier, a two valve servicing oscillator and is now building a low resistance ohmmeter. He wishes to conduct photo cell experiments if he can obtain a cell.

The deepest sympathy of all members is extended to Mr. and Mrs. Stellig and Rowland, GW4CK, on their tragic bereavement by the death on active service of Sgt. Pilot Max Stellig, brother of GW4CK. BRS1060

DISTRICT 12 (London North and Herts)

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

North London.—Nine members spent an enjoyable and interesting afternoon at the home of Capt. Phillips on Sunday, October 24. Thanks are due to our hostess, Miss Phillips, for providing a splendid tea. The next meeting has been arranged for November 21 at the home of Mr. C. Stevens, 2DHF.

St. Albans.—The October meeting was attended by 3NR, 4GT, 5QF, BRS4425, 4502, 6317 and 4127, the latter a welcome visitor from Cumberland, who is stationed locally. A general discussion took place on such subjects as crystal grinding for various purposes; likely frequency allocations after the war; resuscitation of dying cats and curing diseased milk in cows by high frequency means to which 4GT contributed some amusing details. Tea (for which thanks are due to the parents of 3412 and his YL) more darts and a game of billiards completed a very pleasant afternoon and evening.

The next meeting will be held at BRS4659 on Saturday, November 27, when Service visitors can be sure of a warm welcome. 3412 has been pleased to receive visits from G4IJ and 2DOW. G5QF.

★ LONDON MEETING ★

E. L. GARDINER, B.Sc. (G6GR)

will open a discussion on

"VALVE VOLTMETERS"

at a Meeting to be held on
SATURDAY, NOV. 27th, 1943

at

The Institution of Electrical Engineers
SAVOY PLACE, Victoria Embankment, W.C.2
COMMENCING AT 2.30 P.M.

(Members are invited to contribute to the discussion and to bring for display examples of home constructed Valve Voltmeters).

DISTRICT 14 (Eastern)

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

Chelmsford.—The October meeting was very well attended, a welcome visitor being the D.R., who was home on leave looking extremely fit. We were also pleased to see Mr. Butcher (Royal Signals) who made the journey specially from Surrey.

G3FT is trying to put Chadwell Heath on the map again—not easy for anyone serving away from home—and to that end he is holding a revival meeting at his home on 21st November. See "Forthcoming Events."

The efforts to secure a venue for the proposed Romford Meeting in December have not been successful. Chelmsford members, however, propose to support G3FT's meeting. G6LB.

DISTRICT 15 (London West, Middlesex and Buckinghamshire)

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

Ft./Lt. W. H. Allen, G2UJ, was a welcome visitor to our October meeting, it was the first he had attended for eighteen months. Others present included 5LN, 6WN, 8KZ, 2ADL and Mr. Peckham, together with 3789 (R.A.F.) of Bournemouth, and 3894 and 5301 (R.E.M.E.).

F./O. Thomson, 3425, has left the District, 3HS an R.A.F. corporal is in India, 4994 is with the R.A.F. in Lincoln, whilst 8VM is now in Lancashire undergoing a refresher course.

From Twickenham comes news of 8MK who is in the Middle East. 2LA is away from the district. G2NN, 2VV and 6GB are still around and wish to be remembered to everyone. No news is to hand from either High Wycombe or Aylesbury. G6WN.

DISTRICT 17 (Mid East)

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

The past month brought a welcome Airgraph from Geoff Hutson, G6GH, who is somewhere in the M.E. He reports very

fit, is playing tennis and hockey, and has acquired a couple of amateur type receivers which he finds time to use. He only needs S. America for W.A.C. in person. Geoff sends best wishes to all old pals with a special hello for Clarry. (Thanks O.M.—G6CL.) Alf Lunn, G5LL, still fit and well in Sicily keeps in the news with a picture post card. Arthur Oughton, G8BQ, reported by phone whilst on leave; a rag chew was missed owing to the D.R. being away on A.T.C. duty. Sgt. Wright, 7716, had an extended leave, he hopes to meet a few ZS amateurs shortly. The D.R. has received visits from 5675 (a keen war-time member) and G6YO, who is at No. 1 A.A.S. To all overseas members, "A Happy Xmas and may you all be back on the air in 1944." G5BD.

DISTRICT 18 (East Yorkshire)

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

Apologies are offered for the non-appearance of Notes last month due to pressure of business.

Hull.—G8UL visited 5GC when he was on leave. He sends 73 to all old friends. 60S had a visit from Dr. Smith, 5KD. 4043 was seen in town recently. Congrats to 5MN on being granted a commission with the rank of P./O., also to P./O. C. Tudor, 6384, on his promotion to P./O. Via G8UL.

Beccles.—Mr. D. Armstrong, 3271, still awaits members' support to start local meetings again. A few lines from those interested to 24 York Road, would be appreciated. Via 3271.

Scarborough.—G6SO had the pleasure of a visit from F./O. Robb, G16TK, during his short stay in the town. 73. Frank! He has also received a letter from Cpl. W. Johnson, 5636, serving as a radio mechanic, with the R.A.F. in North Africa. He says life is not too bad out there but he could do with a little less dust, insects and smells around. He sends 73 to 6TG and all old friends. 6SO had his head forced through the glass windscreen in a recent car accident, but luckily, apart from minor cuts and scratches plus a thick head, was little the worse for this experience.

York.—We are pleased to learn from the President (Mr. R. Wallwork) of the existence of a radio club at Archbishop Holgate's Grammar School. This club has been affiliated to the R.S.G.B. for more than 12 months and we send our best wishes for its continued success. G6SO.

DISTRICT 19 (Northern)

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

Newcastle members held their second monthly meeting on October 20 when the following were present:—BR34470, 4546, 5236, 6572 and 6698. A discussion took place concerning how best to attract more members to these meetings which are still poorly attended in spite of wide publicity and the number of members known to be in the district. The meeting ended with a swap and sale of components. The D.R. would like to point out that these meetings are held on the last Wednesday of every month and he urges all who can to give their full support. Full particulars can be obtained from the T.R., Mr. Haley, BR55236. G2FO.

Scotland

Scottish Records Officer: J. Hunter (GM6ZF), 51 Camphill Avenue, Glasgow, S.1. Langside 237.

"A" District.—A welcome visitor to the October meeting was GMSHJ, who now holds the rank of Sq./Ldr., R.A.F. GM6MD gave a short talk on transmitter construction.

"B" District.—Letters are to hand from GM2JF and GM3RL. The first named wishes to be remembered to his numerous friends in GM; if any amateur wishes help in Inverness on his way north or south, a call to Inverness 1533 will find 2JF ready to do all he can. In his letter 3RL gives news of 5YN, who is now at sea after two years at a naval shore station. RL would like to hear from 3QH who is still at an Admiralty research station. 5UT is carrying on radio business and brother 8SV is still out East in M.N. Located at home are 6IZ, 6LG and 6VO, who are all engaged on work of national importance, they wish to be remembered to all members of "B." 4MG is still at sea as R.O. 3SF is L./Tel. R.N. In the Near East is 8AT, who is an R.A.F. Sergeant. 6ZP is an instructor with A.M.

"H" District.—The last meeting held at 2DBX was well attended. Mr. H. L. Anderson, BR56641 is welcomed to membership. Sympathy is extended to the widow and family of Mr. W. Anderson, ex BR52757, who has died after a long illness. Future communications to the D.O. should be addressed to his home address, "Makora," Kinghorn, Fife.

The Far North.—Members are asked to note that it is no longer possible to continue the Far North Notes. Good Luck and 73 to all from GM2NQ. GM6ZV.

Northern Ireland

D.R.: J. N. Smith (G15QX), 19 Hawthornden Drive, Belmont, Belfast. Telephone: Belfast 63323. T.R.: R. Holden (G15HU), 260 Grosvenor Road, Belfast.

A cordial welcome is extended to J. Hargan, 2DHB, of 'Derry, who we understand is doing some recruiting in his area, and to L. J. Smith, W9EEZ, of the U.S. Air Corps. G15HU and 6TK are fit again after illness. 8GK is constructing an amplifier in readiness for "the great day." The Y.M.C.A. Radio Club A.G.M. was postponed owing to small attendance. G15QX.

KHAKI and BLUE

● "Globe Trotter" Ted Laker, G6LK, in an air mail letter from Sicily dated September 22, reports meeting S./Ldr. John Curnow, G6CW, shortly after his arrival. He wrote, "Etna is just outside the back door, and we are trying to organise a trip up the slopes if work permits. We had lots of German beer at first, but now we are down to drinking the local wine which is rather heavy."

● Sgt. Ken Peattie, 2FQG, now at Debert, N.S., reports meeting W2BUY in New York during a recent visit to the States. Ken wishes to be remembered to all old friends.

● F./Lt. Frank Adams, G2YN, has arrived safely in India—his address, "R.A.F. India," is just about as vague as "High Street China"! He is fit and well and sends 73 to all who know him.

● Friends of Vincent Richardson, G4NG, will be glad to learn that, after serving a lengthy apprenticeship in the ranks of the R.A.F., he has been granted a commission with the rank of Pilot Officer. He is now with 16 S.O.R., R.A.F., but hopes to be on his way home before very long.

● Cpl. B. L. Mapley, 5569, Hyde Terrace, Pimlico, Hemel Hempstead, Herts, would like to hear from P./O. A. A. Lamb.

● C.Q.M.S. Harry Counce, G6KS, who is still with the Falkland Islands Force, says that "one VP8 is a certainty after the war. He has at least 100 watts for use on 3.5, 7 and 14 Mc/s. and was given the call SAJ just before war broke out. S4C is rebuilding and should be ready for 14 and 28 Mc/s. S4C operated a low power rig on 3.5 Mc/s. in pre-war days, but has now been supplied with circuits for 14 Mc/s." G6KS states that "Most of the receivers used in this 'paradise for DX' employ vibrator units and results are very good. Transmissions from the B.B.C. and KWID pound in every night, in fact we do not know what it is for the 'news' to be missed through conditions." Harry has taken to poultry farming but not all of his hens QSL!

● From B.N.A. Lt. Stan O'Hagen, G2CR, reports meeting VU2DB, his first amateur contact since leaving G. At the time of writing he was "a thousand miles from the war but we enjoy the bathing and fishing for octopus with respirator 'diving helmet' and spear!" G2CR appears to possess a "very fine DX grape vine which brings in the most far-reaching rumours at RST569." He is trying to fit it with a "crystal-farm-yard-gate to separate the sheep from the goats among the rumours." Greetings are sent to G2UK, YL, 5QY, 6DH, IR and YL.

● Chief Radio Officer F. L. Firth, G8JD, 2A Burnett Avenue, West Bowling, Bradford, Yorks, seeks news of G3FX and 3HA. G8JD has recently returned to G. after four years service in the Middle and Far East during which time he contacted amateurs of many nations.

● L.A.C. R. Swaby, 5687, recently made a flying trip over the Belgian Congo. At one stop he came across a Belgian studying a 1936 edition of the A.R.R.L. Handbook. He could not understand a word of English but pored over the diagrams obtaining what knowledge he could from them. Enthusiasm!

● From G2JK, we learn that F./O. R. J. Traill, VK2XQ is safe and well in Melbourne after escaping from Malaya at the time of the Japanese invasion. He met F./O. T. R. White, G8TX, prior to the fall of Singapore, and was unaware that he was taken prisoner later.

● Members serving in Southern India are assured of a warm welcome at the home of Mr. J. S. Nicholson, VU2JP Kadalapari Estate, c/o Mudis P.O., Via Pollachi.

● F./O. H. Barnett, 2AIO, of Potters Bar, sends greetings to all in District 12 who know him. He took part in the N. African campaign and during August was in Sicily. He receives our congrats on the arrival of his second daughter, Olwen Elizabeth, born last July.

● F./Lt. G. F. Keech, BR52714, whose home address is 10 Blinkbonny Grove, Edinburgh, 4, is now serving with the U.S.A.A.F. as a Liaison Officer in the Intelligence Section. He hopes to contact U.S. amateurs in his travels.

Silent Keys

We record with deep regret the names of the following members who have been killed, or have died, on Active Service:—

Major John Holding, G4AS, Royal Corps of Signals (died abroad as the result of an accident).

First Radio Officer G. Hargreaves, G2FR, Merchant Navy (missing since last March).

A.C.2 R. E. Eales, BR55867, Royal Air Force (drowned whilst on leave).

Flight Sergeant R. J. Rider, G8IX, Royal Air Force (died abroad as the result of an accident).

"Reg" Rider was known to a wide circle of members in West Surrey who will mourn the passing of a friend and many of the newer members will not forget the welcome and encouragement they received from him in their early days. SIX was accorded a military funeral and was buried at Bizerta. W. E. R.

HEADQUARTERS CALLING

COUNCIL 1943

President:

ALFRED DUNCAN GAY, G6NF.

Executive Vice-President: E. L. Gardiner, B.Sc., G6GR.

Honorary Secretary: H. A. M. Clark, B.Sc., G6OT.

Hon. Treas.: A. J. H. Watson, A.S.A.A., G2YD.

Honorary Editor: Lt. James W. Mathews, G6LL.

Immediate Past President: Arthur E. Watts, G6UN.

Members: F. Charman, G6CJ, D. N. Corfield,

D.L.C.(Hons.), G5CD, G. A. Jessup, G4HG,

W. A. Scarr, M.A., G2WS, E. H. Simmonds, G8QH,

Wing-Com. J. Hunter, G2ZQ, Wing-Com. G. M. R.

Scott Farnie, GW5FI.

Co-Opted Members: S. K. Lewer, B.Sc., G6LJ,

W. H. Matthews, G2CD, W. E. Russell, G5WP.

General Secretary: John Clarricoats, G6CL.

September Council Meeting

Resume of the Minutes of a Council Meeting held at New Ruskin House, Little Russell Street, W.C.1, at 6 p.m., on September 20, 1943.

Present.—Messrs. A. D. Gay, A. E. Watts, A. J. H. Watson, F. Charman, D. N. Corfield, G. A. Jessup, S. K. Lewer, J. Hunter, W. H. Matthews, W. E. Russell, E. H. Simmonds, W. A. Scarr and J. Clarricoats (General Secretary).

Apologies were received from Messrs. E. L. Gardiner and H. A. M. Clark.

1. Mr. A. D. Gay, on behalf of the Council, made a presentation to Mr. G. A. Jessup, to mark the occasion of his recent marriage. Mr. Jessup thanked his colleagues for their gift.

2. It was unanimously resolved to elect 157 Corporate Members and 7 Associates. It was recorded that 32 applications for Corporate Membership had been accompanied by references, and that the remainder had been sponsored by Corporate Members.

3. The monthly balance sheet and statement of account was examined and approved.

4. The following members were nominated to serve on the 1944 Council:

| | |
|----------------------------------|---------------------------|
| President | Mr. E. L. Gardiner, G6GR |
| Executive Vice President | Mr. S. K. Lewer, G6LJ |
| Hon. Secretary | Mr. H. A. M. Clark, G6OT |
| Hon. Treasurer | Mr. A. J. H. Watson, G2YD |
| Hon. Editor | Mr. E. H. Simmonds, G8QH |

Retiring Members eligible for re-election:—Messrs. Charman, G6CJ, Corfield, G5CD, Farnie, GW5FI, Hunter, G2ZQ and Jessup, G4HJ.

New Names.—Messrs. W. E. Russell, G5WP and H. W. Stacey, G6CX.

5. The principle of broadening provincial representation on Council was discussed, and it was resolved to record that this principle was unanimously approved. A Committee comprising Messrs. Gay (President), Watts (Immediate Past President), Scarr (Deputy D.R. for District 16), Russell (D.R. for District 7) and Scott Farnie (D.R. for District 10) was appointed to investigate and report upon the suggestions which have been made.

The meeting closed at 8.15 p.m.

Headquarters Address

During the past month more than 500 letters relating to Society affairs have been delivered at the General Secretary's private address. Members are asked to note that the address of the Society is now:—

New Ruskin House,
28/30 Little Russell Street,
London, W.C.1.

Members who act as sponsors to applicants for membership are kindly requested to record the above address on the application form, if the latter bears the temporary war-time address of the Society viz. 16 Ashridge Gardens, Palmers Green, London, N.13.

Changes of Address

Members who change their address are reminded that at least four weeks must elapse before the change can become effective for BULLETIN despatch purposes.

It may surprise readers to learn that upwards of 300 changes are recorded each month. As every change calls for a new stencil members are asked to assist Headquarters by reducing to a minimum requests for a change. In some cases members have asked for their address to be changed a dozen or more times in a few months. Under present conditions it is impossible to "keep time" with such rapid changes. If you are on the move please co-operate by giving Headquarters a permanent address. BULLETINS lost after despatch cannot now be replaced.

Lists of New Members

Lists of new members will, in future, be published in the form of 4-page leaflets and inserted in THE BULLETIN. The first insert will be included in the January or February, 1944 issue.

London Meetings

Thirty-five members were present to hear Mr. W. A. Scarr, M.A., G2WS, discuss "Radio and its Relationship to Kindred Sciences" at the London meeting held on Saturday, October 30, 1943, at the Institution of Electrical Engineers. Messrs. Clark, G6OT, Bloomfield, Stamford, 2ALY, Wilkins, G6WN, Cullen, G5KH, and Reed, G2RX, contributed to the subsequent discussion.

The Chair was taken by Mr. A. D. Gay, G6NF (President) and Mr. E. L. Gardiner, G6GR (President Elect) moved a vote of thanks to the speakers, which was carried with acclamation.

Mr. Scarr's paper will be published in a future issue of this Journal.

Mr. E. L. Gardiner, G6GR (President Elect) will open a discussion on Valve Voltmeters at the London meeting to be held on Saturday, November 27, at the Institution of Electrical Engineers, Savoy Place, London, W.C.2. The meeting will commence at 2.30 p.m. and tea will be served at 4 p.m.

I.E.E. Wireless Section

Electrical Hearing Aids will be discussed by Dr. T. S. Littler, and Mr. C. M. R. Balbie, at the I.E.E. Wireless Section meeting to be held on December 1 at 5.30 p.m. Tea will be served from 5 p.m. By courtesy of the I.E.E., Society members are invited to attend this meeting.

Technical Publications

Members are again reminded that no facilities exist at Headquarters for obtaining technical publications other than the A.R.R.L. and Radio Handbooks listed in the August issue of this Journal. Considerable inconvenience is caused by members who send cheques and postal orders for other publishers books when forwarding either their subscription or an order for American handbooks.

Christmas Presents

Members, or relatives of members, who wish to purchase Cloth Bound copies of *The Amateur Radio Handbook* and *Radio Handbook Supplement* for Christmas presents, are urged to forward their orders early in December. The price for the pair, when ordered together, is 10s. 6d.

Cash Sales Department

The following items are now in stock:—
 Members' Notepaper (new style), 100 sheets 3s. 6d.
 Car Plaque of Emblem 3s. 6d.
 Rubber Stamp of Emblem 3s. 0d.
 Kilocycles to Meters Conversion Booklet 1s. 6d.
 All the above items will be sent post free to any address in Great Britain on receipt of remittance. Orders for Eire are despatched via the Censorship authorities.

Majestic Receivers

International Majestic Radio Corporation Ltd., 6 Angel House, Pentonville Road, London, N.1, have recently prepared a very comprehensive booklet which contains schematic diagrams, and details of the most popular Majestic models manufactured between 1930 and 1940. This booklet, produced at considerable cost, is supplied exclusively to Radio Service Engineers who will find it of great value in servicing Majestic instruments.

The Council has pleasure in announcing that

R. L. SMITH ROSE

D.Sc., Ph.D., M.I.E.E., D.I.C., A.R.C.S.,
(Honorary Member)

will deliver a Lecture entitled

"MEASUREMENTS IN RADIO
EXPERIMENTAL WORK"

at the

INSTITUTION OF ELECTRICAL ENGINEERS
Savoy Place, Victoria Embankment
London

On SATURDAY, DECEMBER 18th, 1943

FOLLOWING THE ANNUAL GENERAL MEETING
CONVENED FOR 2 P.M.

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

DONATIONS.—The General Secretary acknowledges with thanks, on behalf of Council, receipt of donations from:—Swindon Mtg per GSKC, £1; E. G. Finch, BR82755, 10s.; W. N. Craig, GM6JJ, £1 7s. 6d.; G. Spence, GM6RZ, 5s.; J. Harris, 2FPY, 10s.; P. H. B. Trasler, G3DV, 5s.; E. F. Gadsden, 4690, 10s.; 2CNC and office friends, £2; H. A. M. Clark, G6OT, 5s.; T. E. Rowley, G6TC, 5s.; Mrs. A. Collins, £2; W. D. Gilmour, 2VB, 5s.; F. J. Merriman, 2FPR, 10s.; H. Bostock, 5246, 5s.; E. J. Scudder, BR8981, 4s.; C. B. Seaman, 2603, 5s.; G. T. Sparkes, 2DCT, 5s.; R. A. Bent, 5562, 5s.; D. T. Blunden, G8IN, 5s.; W. Larbey, 2DWV, £1; J. Witty, G6WQ, 12s. 3d.; District 7 (Croydon) per G2DP, £2 6s.; District 4 (Leicester) per 5605, £1 2s.; H. Arnfield, G3LX, 10s.; S. O'Hagen, G2CR, 9s. 6d. **Receipts to date, £938 17s. 3d. Expenditure to date, £467 17s. 9d. Balance in hand as at Oct. 31st, £470 19s. 6d.**

BOOKS.—Mr. C. H. L. Edwards, G8TL, acknowledges, with thanks, parcels of books from Messrs. P. H. Smith, 2FWV, H. Tee, G8UA, and T. G. Macvie, G3IB. He will be glad to receive further gifts of books which should be addressed to him at "Speedways," St. Bartholomews Lane, Sudbury, Suffolk.

What Offers

Mr. M. L. Elliott, BR84087, has donated to the Society a bound copy of Volume II of *The Wireless World* covering the period from April, 1914 to March, 1915. Best offer received up to November 30, 1943, secures. Proceeds of sale to R.S.G.B. P.O.W. Fund.

New Book

WIRELESS FOR EVERYMAN (HISTORY AND PRACTICE). By F. W. Killaway, B.Sc. (Hons). John Crowther; 2s. 6d.

This 48-page booklet provides an introduction to more comprehensive discussions on the history and practice of radio. The story of the growth of broadcasting and the theory necessary for its understanding are presented together. Some useful hints are given on keeping a receiver in good order.

It seems a pity that no steps were taken to produce finished line diagrams. The blocks were obviously made from the author's rough sketches. J.C.

Strays

Friends of Svend Aagi, OZII, will be glad to hear that he and his family are fit and well according to a message received by Mr. J. S. Gingell, 2AAM.

Mr. H. G. Holt has relinquished his position as Hon. Secretary of the Romford and District Radio Society due to the possibility of an immediate call-up for Active Service. All communications should, until further notice, be sent to Mr. R. Beardow, G3FT, 3 Geneva Gardens, Chadwell Heath.

Mr. T. A. St. Johnston, G6UT, "Normandale," New Barn Lane, Little Hallingbury, Essex, seeks news of Mr. Golkovitch who was a member of the Society some years ago. Can any member provide G6UT with his present address?

R. H. Broadbent, 2AND, in a letter to 4976, reports reaching Kenya after an exciting journey. He has also visited Cape Town, Northern Rhodesia, Belgian Congo, Lake Tanganyika and Nairobi. He sends 73 to all who knew him.

Thanks

F.O. Frank A. Robb, G16TK, wishes to thank GM2UU, G6SO, G5MV, G6CL, G6NF, G8SM, G8ON and all at No. 1 R.S. who extended hospitality to him whilst in England recently.

Hospitality Offered

Mr. W. L. Jones, 30B Kimmel Street, Rhyl, will be glad to receive visitors at his shop up to 6 p.m. any weekday.

Congrats

To Sergeant and Mrs. Frank J. Scales, 2FNS, on the safe arrival of Beryl Ann.

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ALL KINDS OF PRINT.—Send your enquiries to G6MN, Castlemount, Workson.

BUG Key wanted "urgent" by VE4AKJ.—Price etc. to GW5TJ, "Radio House," Merthyr, Glam.

EXCHANGE £25 Leitz microscope, complete in case, for a 35 mm. Camera.—GW5TJ, "Radio House," Merthyr, Glam.

FOR SALE.—Four aluminium boxes $6\frac{1}{2} \times 6 \times 4\frac{1}{2}$ in. with lids, slightly drilled, 4s. each. Avodapter (5-pin) boxed, 25s. Gam-Brell Novotone type "J" 20s. Ferranti 2½ in. flash 0-2 mills, 55s. Another (no name) moving coil 0-100 mills, 20s. Westector type WX, boxed, 8s. Four pairs phones 2,000 ohms, 7s. 6d. each. Five Ferranti intervalve transformers, one lot, 25s. Haynes duophase choke, new, 10s. One double spring gram. motor (wants cleaning) complete, 10s. 60 ft. Belling 80 ohm. feeder cable, 10s. 6d. Dubilier condenser .027 Mfd., 2500 v test, 10s. Mains trans. all 200/230v primaries, 4v 4a C.T. 110v, 10s. each. 200v C.T. 180 mills, 10s. 4v 4a C.T. 5s. 4v 3a 200v C.T., 12s. 6d.—55 Derbyshire Road, South, Sale, Cheshire.

FOR SALE.—456 Kcs crystal, airtight holder. Wanted: 6BS metal tube, National NPW-O or NPW-3 dial and drive.—W./CMDR. WILKINSON, Cobham Hall, Cobham, Kent.

G6CL invites members serving abroad to send him examples of Provisional and Overprinted war stamps (mint, or used on cover). All expenses guaranteed.—16 Ashridge Gardens, London, N.13.

PETO-SCOTT Preselector £6. Lot of valves, components, books, all as new. Get these bargains for Xmas. No junk.—Box 246, PARRIS ADVERTISING, 121 Kingsway, London, W.C.2.

SALE.—Condensers, resistors, mains transformers, valves battery and mains, rectifiers, F.C.s, output pens, I.F.T.s, coils, also large variety of radio and torch batteries.—Enquiries to Radio Service Depot, Sunny Cottage, Donnington Wood, Wellington, Shropshire.

SALE.—DB20 Preselector, complete.—Offers MCANISH, Kinnara, Crief.

SALE.—Two WX6 Westectors, suitable noise limiter, 5s. each. One instrument pattern F.W. rectifier, 10s. Valves: U30, Pen 3520, KT30, SP13, 12SK7GT, 6Y6, Pen A4, 10s. each. 955 Acorn 308.—Box 241, PARRIS ADVERTISING, 121 Kingsway, London, W.C.2.

WANTED.—Back numbers OST and Radio, any 1937-43. Bulletins 1937-43. SX16 or similar. Coilpack or tuner. Meissner or similar.—GREAVER, "Windmill Cottage," Windmill Lane, Marlton, nr. Paignton, Devon.

WANTED.—Bug Key.—Price to G8OJ, 46 Warbeck Road, New Moston, Manchester, 10.

WANTED.—Cathode Ray Oscilloscope and signal generator.—Replies to B. K. GEORGE (2BKZ), 22 Studland Road, Hall Green, Birmingham, 28.

WANTED.—Communication receiver; Sky Champion, Sky Buddy or similar type. State price and condition.—R66461, CPL. PETTIGREW, T.431 Squadron, R.C.A.F., England.

WANTED.—Eddystone 4-pin plug-in coils. Valves: 1851, 1852, VR 150, VR 105, RCA 913. C.R. Tube. Mallory 1½v bias cell. Bandswitch coil turret complete.—G4HU, 16 Keswick Gardens, Ruislip, Middx.

WANTED.—Preselector, Peto-Scott preferred. State price and condition. 3-stage A.C. Amplifier. 41MH, 41MH, PX4, output, U12, partly wired. First offer £5.—CAMERON, 1487, Dumbarton Road, Glasgow, W.4.

WANTED.—Skyrider Marine or similar receiver tuning range of which covers 500 Kc. Also H.R.O. coils, types F and H.—Box 252, PARRIS ADVERTISING, 121 Kingsway, London, W.C.2.

WANTED.—SX24 communications receiver. Would collect.—CLARK, 2 Cliff Gardens, Leeds, 6. Phone: 55011.

WANTED.—Zeiss Ikonta camera or similar.—Price, condition and details to BAYLISS, GSPD, 90 Thurlby Road, Wembley, Middx.

£3 B.T.H. RK Speaker 6 inch cone, 6 volt field; ditto 1,000 ohm field; Marconi model 90, 2,500 ohms field; several Ferranti intervalve and output transformers 15s. each. Tuning packs etc., S.A.E. List.—HARDWICKE, 29 Warwick Avenue, Crosby, Lancs.

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.

OUR FRONT COVER

ON the front cover of the May issue we were able to illustrate a comprehensive range of Mullard Valves, from the very large Transmitting types down to the smallest Receiving types. This month the front cover illustration shows a representative range of Mullard Medium Power Transmitting and Rectifying Valves.



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TYPE B 100

A longitudinal mode 100 kcs. crystal, ground to within 25 cycles of the nominal frequency and supplied mounted in a fixed air gap mount, of the plug-in type. Temperature co-efficient 5 parts in 10⁶ per degree Centigrade change.

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A Candler student in the **ARMY** says:—"I am still getting on all right with the course, and I find my receiving speed has increased to 15 w.p.m., and my sending to 18 w.p.m." Ref. 8032, R. E. G.

A Candler student in the **NAVY** says:—"Thanks to your Course I passed my Morse exam. in the Navy with 97 per cent., and at a speed varying from 18 to 20 w.p.m. I am certain I would not have done so had it not been for your Course." Ref. 4214, R. L.

A Candler student in the **MERCHANT SERVICE** says:—"A few weeks ago I obtained my P.M.G. Special Certificate, and I am going to sea very shortly as a 2nd Radio Officer in the '...' Co." Ref. 7925, A. H. M.

A Candler student in the **A.T.C.** says:—"Am making fine progress, being fastest operator in my Squadron (A.T.C.). Have also been accepted as W/T Operator in Royal Navy." Ref. 8768, T. D.

NOTE:—When in London call and inspect the originals of these and numerous similar letters.

In the "BOOK OF FACTS," which will be sent FREE on request, full information is given concerning the subjects covered by all Candler Courses.

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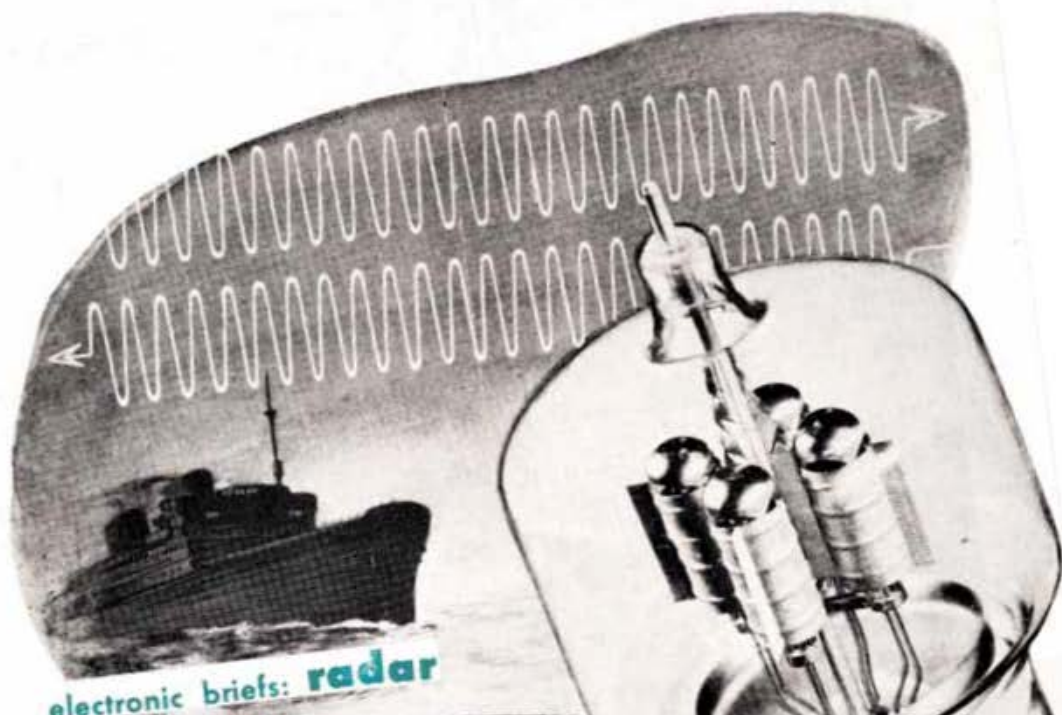
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For other bargains see previous advertisements.

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electronic briefs: radar

Radar is a method of transmitting ultra-high-frequency radio waves to an object which reflects the wave back to its source. The time required for the round trip from the transmitter to the object and back to the receiver is the measure of the distance to the object. The direction is established through the use of directional wave transmission.

High transmitter power is essential in radar for the amount of energy which is reflected is extremely small. Plate voltages are in the order of tens of thousands of volts and plate currents are measured in tens of amperes. The vacuum valves used in such equipment must be capable of operating efficiently and dependably over long periods under extremely heavy loads.

High voltage, high frequency, operation at absolute peak emission...ability to stand momentary overloads of as much as 400%...unconditional guarantee against emission failure due to gas released internally...are the features which marked Eimac valves as ideal for this important application. These are some of the reasons why Eimac has been "Standard" in Radar transmitters for the past number of years. Just one more proof that Eimac valves are first in the important new developments in electronics.

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