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BULLETIN

JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN

- FREQUENCY MODULATION
- MULLARD GM3152 CATHODE RAY OSCILLOSCOPE
- FREQUENCY DIVISION

R.S.G.B. BULLETIN

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FROM ACORN TO YOUNG OAK

IT is quite certain that if we were not engulfed in the turmoil of war we should, during the coming month, be celebrating an important anniversary in the history of the Society—namely, its thirtieth Birthday. To our distinguished Vice-President, Mr. Rene Klein, belongs the honour of founding the Society, or rather, the organisation from which has grown up our present nation-wide association of radio experimenters. In a letter which he sent to the Press during the summer of 1913 Mr. Klein deplored the fact that there was no association in London whereby amateurs interested in radio problems could meet and discuss their hobby. To fill this obvious want he invited such persons to communicate with him. A meeting at his home in Hampstead followed on July 5, 1913, and the London Wireless Club was born.

The first General Meeting of the Club was held on September 23, 1913, at Westminster City School, when the objects of the Association were discussed, and a Committee appointed to draw up the Rules. It was also agreed at that meeting to alter the name of the Club to the Wireless Society of London, a title which remained unchanged until November 22, 1922.

The Great War, and its aftermath, brought about a considerable increase in interest in radio communication, with the result that demands for technical information and greater experimental facilities became the primary concern of the Society. How well those demands were met is known only to those who can justly claim to be *real* "old timers." Suffice it is to say that within four years of the signing of the Armistice, the Society had assumed national responsibility for the furtherance of the amateur radio movement in Great Britain and many hundreds of experimental transmitting licences had been issued. It was not surprising therefore that the title of the Society should again be changed, this time to symbolise its wider scope and extended sphere of activity.

Was it coincidence that the change of title to Radio Society of Great Britain occurred almost at the moment that radio amateurs begun to pave the way for international communication on the short waves? Certain it is that the two events heralded a period in our history that has no parallel unless perhaps future historians will regard the part played by radio amateurs in the present struggle as the most important of all time.

To those members who helped to plant the acorn in 1913, we extend our greetings and our thanks for their foresight. To that greater majority who are to-day the vigorous branches of the young oak, we offer cordial salutations. May the Society enjoy many happy birthdays in the years to come. J. C.

AGAIN—"THE BULLETIN"

We make no apology for returning to the subject of THE BULLETIN, for in these days of restricted social activity, THE BULLETIN is the very core of the Society. It is *your* journal, *your* source of information, *your* forum for discussion—and we confess our surprise in receiving no more than a dozen letters when we invited correspondence on the subject in a recent editorial.

In July we begin a new volume, and Council have been considering whether, and how, THE BULLETIN may be improved. Paper restrictions have weighed heavily on those responsible for THE BULLETIN'S production, every month presenting afresh the problem of getting "a quart into a pint pot". Since only a pint will go, we are anxious to learn from members which particular kind of pint they want. Put quite bluntly, there isn't room for everything. We wonder whether there is a feeling that more room should be found for technical articles. This cannot be done unless some other feature or features are sacrificed. The question is: Which?

Since few members have time to-day to set out long written opinions, we have prepared the following questionnaire, and every member is urged to take this opportunity of planning THE BULLETIN he wants to see.

The questions are numbered, and all that is necessary is to copy the numbers on to a postcard and put against each either *Yes* or *No*.

If you wish to send a more developed opinion, Council will welcome it, but in any case *answer the questionnaire*! Without the opinions of members, Council and the Editor must work in the dark. The membership of the Society is now 5,000. How many postcards are we going to get?

Of course, if you like THE BULLETIN exactly as it is, you can write across all the numbers *Leave as now*!

HERE ARE THE QUESTIONS:

(1) Shall we eliminate District Notes to make room for more technical articles?

(2) Shall we eliminate the monthly list of new members for the same purpose?

(3) Do you wish to read more constructional articles?

(4) Do you think "73" is worth retaining?

(5) Do you find the Active Service List useful?

Address your postcard "BULL. Questionnaire," R.S.G.B., 16 Ashridge Gardens, London, N.13, and post it to-day.

FREQUENCY MODULATION*

By A. J. Bayliss,† B.Sc. (G8PD)

In Part I the advantages and disadvantages of Frequency Modulation were discussed. In this article the author described F.M. systems of transmission, F.M. Receivers, and Limiters.

PART II

Reactance Valve Modulators

THE reactance valve (or reactor) was adapted for frequency modulation by Murray Crosby in America. In essentials it is merely a valve connected across an oscillator-tuned circuit in such a way that it behaves as a variable capacity or inductance—the change in reactance being controlled by the grid voltage of the valve.

The fundamental point about a reactor is that its control grid is fed with a voltage 90° out of phase with the voltage across its anode. A typical reactor circuit is shown in Fig. 5, the resistance R and the condenser C forming the phase change circuit. The condition that the phase shift should be 90° is that the reactance of C should be large compared with the resistance R. Fig. 6 shows a typical reactor characteristic, grid bias voltage being plotted against oscillator frequency.

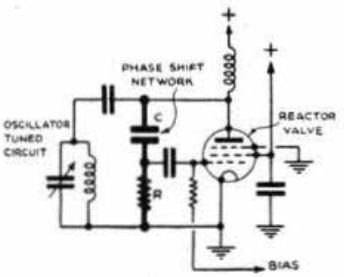


Fig. 5.
A typical Reactance Valve Modulator, showing the phase shift network in heavy lines.

In practice the reactor is biased at A in the centre of the linear portion of the characteristic, and the modulating voltage is superimposed on this voltage. As the grid voltage varies between C and D, the frequency of the oscillator is caused to vary between E and F, the deviation being proportional to the amplitude of the audio voltage and the rate of frequency swing being equal to the modulating frequency. Thus pure frequency modulation is produced so long as the grid voltage excursion keeps to the straight part of the characteristic.

The single reactor type of F.M. transmitter is not altogether satisfactory if a high degree of carrier stability is required, although for amateur purposes, with careful construction and adjustment, such a simple transmitter offers great possibilities. Crosby has developed a push-pull reactor circuit in which the effect on frequency brought about by changes of supply voltages is arranged to cancel out.

Even so the push-pull circuit does not compensate for slow frequency drift caused by warming up of the transmitter, valves, etc. The American *General Electric Company* has developed a circuit in which automatic control of the mean carrier frequency is obtained by comparison with a stable quartz crystal oscillator. The basic circuit is shown in Fig. 7. The M.O.—F.D.—P.A. part of the transmitter is quite conventional and is such as might be used in a 10-watt 60 Mc/s. amateur transmitter. The reactor is of the type already mentioned, whilst the rest of the circuit provides the automatic frequency control.

Some portion of the output from the P.A. is fed into a mixer valve where it is combined with a stable reference frequency obtained from a crystal oscillator.

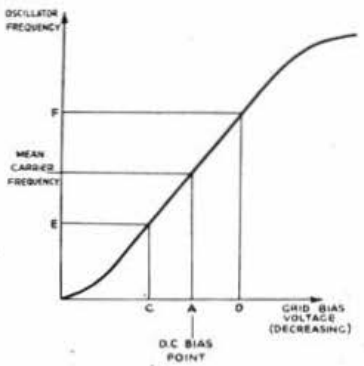


Fig. 6.
A typical Reactor characteristic for the circuit of Fig. 5.

The I.F. from the mixer is selected by a tuned circuit and fed into an amplifier valve. The output from the amplifier is in turn fed into a discriminator or frequency detector, about which more will be said later. It is sufficient here to know that a discriminator is a device which gives an output depending on the frequency of the voltage which is fed to it. The circuit is arranged so that when in tune no output is obtained, but when the frequency of the voltage being fed into the device varies, a positive or negative voltage is obtained depending on whether the frequency is above or below the " in tune " frequency. A discriminator characteristic is shown in Fig. 13. As the stability of the transmitter is to a large extent decided by the stability of the discriminator a low I.F. of the order of 500 kc/s. is used where high stability can be achieved. The D.C. output from the discriminator is smoothed to remove the frequency modulation and is then fed back into the reactor grid circuit.

The complete action of the A.F.C. circuit is as follows. Suppose the transmitter frequency drifts

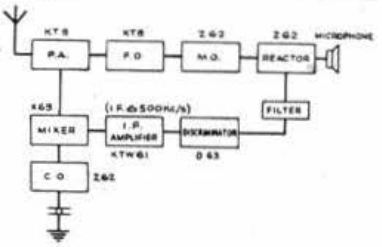


Fig. 7.
Typical Reactance Modulator type F.M. transmitter with automatic frequency control.

* *A Lecture delivered to the Society at the Institution of Electrical Engineers, London, on December 19, 1942.*

† 90 Thurlby Road, Wembley, Middlesex.

higher, then this causes the I.F. to increase by the same amount and gives rise to a D.C. output from the discriminator. If this output is of correct polarity to produce a decrease in the oscillator frequency, the transmitter frequency will be corrected until there is no output from the discriminator again. A similar line of reasoning applies to the case of the transmitter frequency drifting to the low side.

In practice a very high degree of stability, approaching that of the best crystal controlled transmitters, can be achieved with such a system.

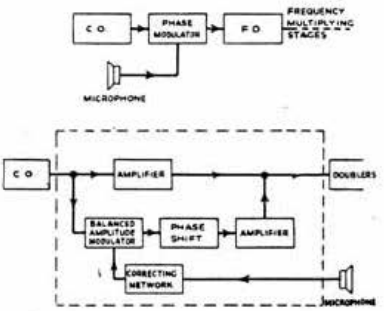


Fig. 8.

(i) The Armstrong system of frequency modulation. (ii) Details of Phase Modulator stage.

The Armstrong Phase Modulation System

The Armstrong phase modulator system of producing frequency modulation is designed to achieve a high degree of carrier stability. The system is crystal controlled and produces a phase modulated wave which is turned into frequency modulation by means of a simple network in the L.F. stages of the transmitter. A transmitter using this system has been in operation at Alpine N.J. (W2XMN) with a power of 40 kW on a carrier frequency of 42·8 Mc/s. The system was flat within 1 db. from 30 to 15,000 cycles per second, and the deviation used was ± 75 kc/s.

The elements of the system are shown in Fig. 8. The output from a crystal oscillator is fed into a linear amplifier and also into a balanced amplitude modulator. The latter is a device from which the side-bands only are taken, the carrier being balanced out. The side-bands are then amplified and recombined with the carrier which has undergone simple amplification. The phase of the side-bands is arranged so that when they are in phase with each other they are 90° out of phase with the carrier. The balanced modulator circuit as used by Armstrong in his original experiments is shown in Fig. 9. The condensers C1 and C2

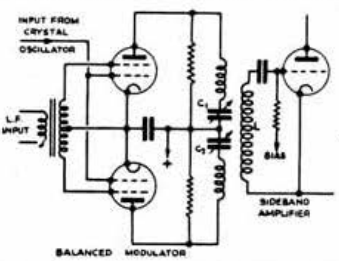


Fig. 9.

Armstrong's Balanced Modulator circuit.

are adjusted to cancel out the carrier frequency. The secondary winding L has a high resonant frequency compared with the crystal oscillator frequency and this provides the requisite phase relationship already mentioned. A vector diagram of the voltages concerned is shown in Fig. 10. The carrier is represented by OA and the side-bands by AC and AD. In the position where the side-bands are in phase with each other and are 90° out of phase with the carrier, it can be seen that a phase shift ø is obtained. During modulation the side-band vectors rotate about the point A in opposite directions and cause a phase deviation of $\pm$ø. It will be seen that some amplitude modulation is also produced, but this is of no consequence as it gets removed in the frequency multiplying stages of the transmitter which follow. If the phase deviation is kept below $\pm$ 30° it is found to be substantially linear.

The equivalent frequency deviation for a given phase deviation is proportional to the modulating frequency, therefore to obtain pure frequency modulation a network must be inserted in the L.F. stages of the transmitter, whose output is inversely proportional to the frequency of the modulating voltage. A network such as that shown in Fig. 11 can be used for this purpose. R is a high resistance and C is a capacity whose reactance is small compared with R at the lowest modulating frequency.

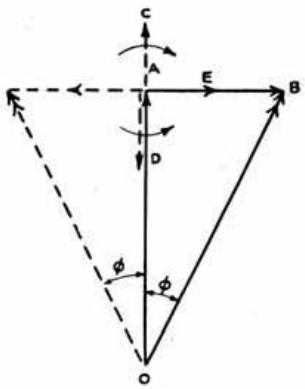


Fig. 10.

Vector diagram of the voltages in the Armstrong Phase Modulator.

The phase deviation at the lowest modulating frequency is limited to $\pm$ 30° for reasons of linearity, and the lowest modulating frequency may be as low as 30 cycles in a high-fidelity broadcasting system. The equivalent frequency deviation in this case is only $\pm$ 15 cycles. If a final deviation of $\pm$ 75 kc/s. is required it is clear that a frequency multiplication of some 5,000 times is required ! It is this need for a large number of frequency multiplications that is the chief disadvantage of the Armstrong system. In practice a fundamental crystal frequency of about 50 kc/s. is used and the frequency is multiplied up. After this first set of multiplication stages, the frequency so obtained is fed into a mixer (which does not alter the deviation) and is changed down to about 50 kc/s. again. More stages of multiplication follow and the process is repeated until the necessary number of multiplications have been achieved to give the correct deviation at the final carrier frequency.

In the case of an amateur type of transmitter the total number of multiplications can be reduced appreciably. Consider a transmitter designed to operate around 112 Mc/s. The audio frequency band which needs to be transmitted for good speech quality is from 300 to 3,000 cycles per second. Assume, too, that a final deviation of some $\pm$ 15 kc/s. will be used. The equivalent frequency modulation deviation at the lowest audio frequency can be calculated to be $\pm$ 150 cycles, calling for a frequency multiplication of only 100 times to give the desired deviation at the carrier frequency. Thus starting off with a 1·12 Mc/s. crystal a simple 112 Mc/s. transmitter could be

constructed, the number of valves required being quite small as with modern types it is possible to multiply by as much as four times in one stage.

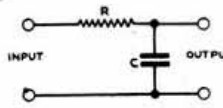


Fig. 11.
Correcting network used to produce Frequency Modulation from a Phase Modulator.

Frequency Modulation Receiver Considerations

An F.M. receiver differs from an A.M. receiver in two important ways, namely, in the type of detector used, and in the insertion of an amplitude limiting stage or stages. First let us consider the detector, which is a device which must produce an output proportional to the deviation of the applied signal.

The earliest type of frequency detector used a detuned parallel tuned circuit, followed by some sort of amplitude detector. Fig. 12 will help to make the method of operation of this type of detector clear. ABC in the diagram represents the passband of the receiver I.F. amplifier, and DEF represents the response curve of the detuned circuit which follows

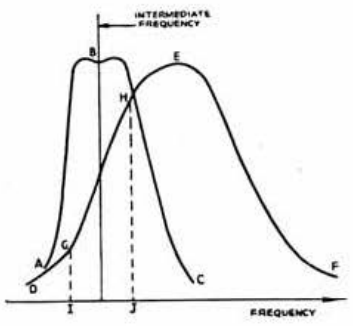


Fig. 12.
An early type of Frequency Detector.

the amplifier. The tuning of the circuit is arranged so that the straight portion GH is centred on the intermediate frequency of the receiver. Now consider what happens when a signal is applied. As the signal is deviated during modulation the frequency sweeps from I to J, the output from the detuned circuit being proportional to the deviation so long as the deviation is kept within the bounds of the straight part of the curve. The resulting output which is now amplitude modulated can be detected in a conventional A.M. detector stage. It is this type of detection which takes place when an F.M. signal is received on an A.M. receiver by detuning slightly.

The type of frequency detector or discriminator which is most widely used to-day is of the balanced type and was developed by Seeley in America. It has certain noise-reducing properties in itself as when it is exactly in tune it is insensitive to amplitude modulation. The circuit is shown in Fig. 13, together with a typical discriminator characteristic. The circuits L1, C1 and L2, C2 are both tuned to the receiver intermediate-frequency and are magnetically coupled as in an ordinary I.F. transformer. The 'hot' end of the primary is connected to the centre tap of the secondary circuit *via* a condenser. The secondary centre tap is also connected to the centre of the load resistances R1 and R2. The ends of the secondary winding are connected to two diode rectifiers. It will be seen that the primary voltage is applied to both diodes, and each half of the secondary voltage is applied to one diode.

The phases and magnitudes of the voltages are such that when exactly in tune the rectified output developed across each half of the load resistance R1, R2 are equal and opposite in sign; thus the sum output across the two diode cathodes is zero. When the signal is deviated, the voltage across one load resistance increases and the other decreases, producing a sum output across the two diode cathodes which is proportional to the deviation of the signal. The discriminator can be designed to be linear over the range of the deviation of the signal. There are other types of frequency detector circuit but they are in general more difficult to design and adjust and so do not lend themselves to amateur practice.

The discriminator may be tuned by setting an amplitude modulated signal to the middle of the receiver I.F. passband and tuning for minimum output of the modulating signal from the loudspeaker. Another method is to measure the voltage across the primary of the discriminator transformer, tune the primary for a maximum with the secondary shorted, unshort the secondary, and then tune the secondary until the primary voltage falls to a minimum.

Limiters

The objects of the limiter stage in a F.M. receiver are (1) to remove amplitude modulation from incoming signals, and (2) to remove noise (which takes the form of pulses of great amplitude). The conventional limiter, which precedes the discriminator, takes the form of one or two stages consisting of pentode valves operating with low screen and anode voltages and arranged with grid leak bias. The screen and anode voltages used are between 5 and 50 volts, depending

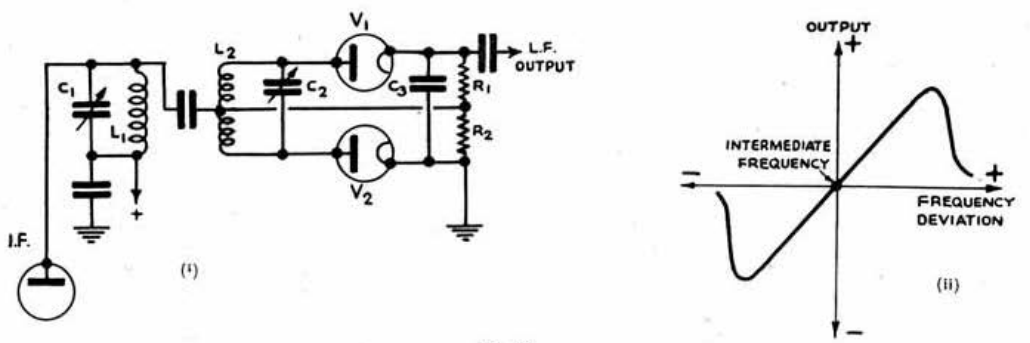


Fig. 13.
(i) The Seeley Discriminator. (ii) Typical Discriminator characteristic.

on the level at which the stage is required to limit, and the time constant of the grid leak and condenser is kept short so that the limiter can handle very quick pulses such as are generated by motor car ignition systems. Time constants of the order of ten micro-seconds are common in practice. The single pentode limiter stage has a characteristic as shown in Fig. 14 which falls off in output as the input is increased past a certain point. This is undesirable and two limiters in cascade are often used, the second limiter being called upon to handle the relatively small amplitude variations which exist in the output of the first stage. In practice, two such limiters give a nearly ideal limiter characteristic as shown in dotted lines in Fig. 14.

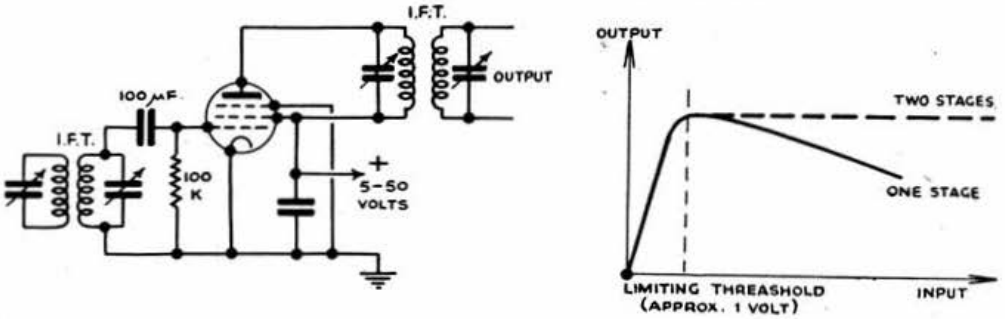


Fig. 14.
A typical limiter circuit and characteristic.

Receiver Design—General

The only other way in which the F.M. receiver differs from an A.M. set is in the extra gain which is required to give the best results. The design should be such that the limiters are in operation on the weakest of signals. As many signals used in amateur communication are only just above the receiver noise level it follows that sets should be designed so that the valve and circuit noise originating from the H.F. stage of the receiver should fully load the limiter valve. As the equivalent noise level at the grid of the H.F. amplifier of a good set is of the order of $\frac{1}{4}$ microvolt and a limiter requires an input of one volt to cause saturation, it is clear that a gain of some 4,000,000 times is required up to the grid of the first limiter! Using a high carrier frequency not much gain can be obtained in the R.F. stages of a receiver, leaving all the gain to be obtained in the I.F. stages. As a high intermediate frequency is necessary on the grounds of image suppression, the achievement of this gain with stability is a difficult problem. It is desirable to go to the double superhet principle for a solution, splitting up the gain between the R.F., 1st I.F., and 2nd I.F. stages in order to avoid instability. Such a double superhet receiver is shown in Fig. 15 together with a block diagram of all the stages. The receiver is suitable for the reception of either F.M. or A.M. signals in the 112 Mc/s. amateur band. The set will cope with signals using a deviation of ± 15 kc/s. and the signal noise ratio with an input of one microvolt is 20 db. A. M. detection takes place in the 1st limiter grid circuit.

Noise Reduction in Frequency Modulation Systems

It is the limiter stage in a F.M. receiver which accounts to a large extent for the reduction of noise in F.M. systems. All amplitude variations are removed by the limiter. This, however, does not mean that the background of an F.M. receiver is absolutely silent, for the random-noise components are in effect phase modulated, and so are detected at the discriminator, producing a noise output at the loudspeaker.

Fig. 16 is a diagram showing the relative noise in an A.M. and a F.M. system of the same I.F. band-width. OC represents half the I.F. band-width, and in the A.M. case the noise output would be represented by the rectangle ABCO. On an F.M. system with a limiter, however, the noise output is represented by the triangle OBC. The reason for this "triangular noise spectrum" is that, the noise being phase modulated, the equivalent deviation is proportional to the audio frequency. If the audio passband is restricted to OF in the diagram it will be seen that the ratio of A.M. to F.M. noise will be as area ADFO is to area EFO. It should be noted that the improvement using F.M. increases as the deviation (and consequently the I.F. band-width) is increased.

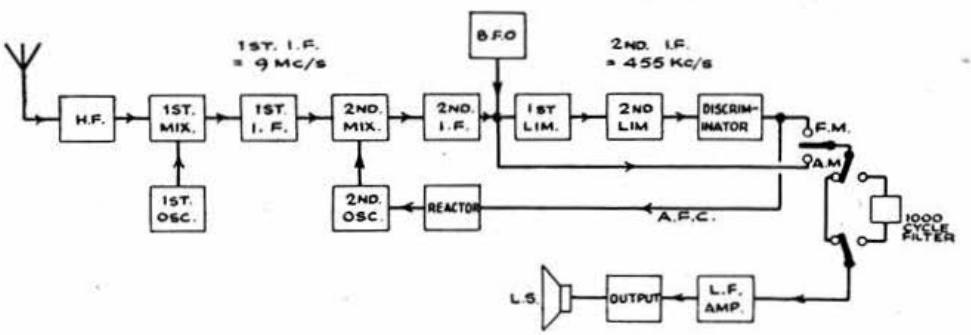
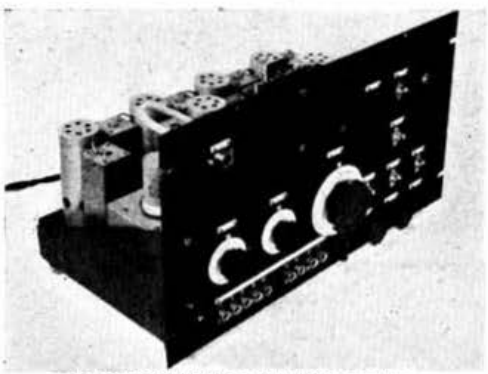


Fig. 15.
Block diagram of the stages involved in an advanced 112 Mc/s. F.M./A.M. receiver.

In practice there seem to be different optimum deviations for different purposes. For broadcasting where very good signal-to-noise ratios are required and high audio frequencies have to be transmitted a large deviation of some ± 75 kc/s. is preferable. Wider deviations could perhaps be used with advantage but a compromise must be struck with the limited number of channels available even in the U.H.F. region.



An advanced 112 Mc/s. F.M./A.M. receiver.

For amateur communication purposes where set noise usually sets the limit of the service area, and many stations have to be accommodated in narrow wavebands, a narrower deviation will have to be used, and the writer hopes that the R.S.G.B. will lead the way in standardising on suitable deviations for amateur use. A deviation of some ± 15 kc/s. seems to be most promising on the grounds of carrier stability, channel width and signal-to-noise ratio.

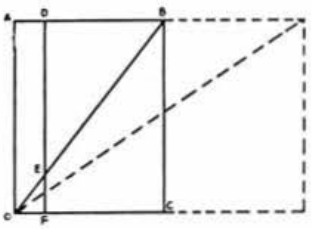


Fig. 16.
The triangular F.M. noise spectrum.

Conclusion

It is difficult to say how popular F.M. will become in amateur circles. Before the war in this country few amateurs had given the subject much thought, and even in America amateurs were only just beginning to take an interest, as evidenced by the articles in the contemporary publications *QST* and *Radio*, before that country was drawn into the conflict. No doubt British amateurs will live up to their reputation of "having a go at everything" and in so doing will reap the benefits which F.M. has to offer.

Ham Hospitality

Mr. I. H. Pearsall, **2ARB**, 30 Mancot Way, Mancot Royal, Queensferry, Cheshire, invites Service members stationed in the area to visit him. Prior notification is requested.

Chemical Reactions with H.F. Fields.

Most readers probably know the old story about it being possible to cook an egg in the tank coil of a transmitter, and perhaps many of them have considered it to be just another old wife's tale. It is however a well known scientific fact that high frequency fields, of the order of 700,000 cycles per second, have an effect on certain chemical reactions.

With inorganic substances it is found that solutions of potassium permanganate are discoloured, iodine can be liberated from a solution of potassium iodide, and sulphur from hydrogen sulphide. Organic substances such as dextrine, gelatine and gum arabic are decomposed into simpler compounds. Albumin is, as can be seen from the egg story, coagulated. Sugars behave differently; for example cane sugar when treated to a H.F. Field of 723,000 cycles per second is changed into other varieties of the sugar series.

The most useful field that has yet been found for this rather abnormal technique is in the production of emulsions. Certain substances that do not normally mix with water, such as paraffin, mercury and coal form emulsions in water when exposed to high frequency currents. A paraffin candle thus treated, melts in the water, forming a milk-like emulsion. Mercury on the other hand forms an emulsion which looks like ink of a dark black colour. This effect of producing emulsions is, it is believed, used commercially in the manufacture of Halogen emulsions for photography as a very fine grain can be produced.

2BIB.

Mutual Conductance

Would it not simplify mathematical calculations if Mutual Conductance were expressed as a straightforward function of current and voltage, and labelled, for instance, Control Resistance (CR), instead of in mA per volt or in micromhos ?

Thus CR would be expressed as $\frac{dEg}{dIp}$

Anode Impedance (Za) as $\frac{dEp}{dIp}$ and

Amplification Factor (Mu) as $\frac{dEp}{dEg}$

From which it would follow that $Za = CR \times Mu$

By transposition $CR = \frac{ZA}{Mu}$ and $Mu = \frac{ZA}{CR}$

Mutual conductances of 1,000, 2,000 and 5,000 micromhos respectively would thus become control resistances of 1,000, 500 and 200 ohms. Being in units no conversions from milliamperes to amperes, or from micromhos to mhos would be required in making the calculations. The approximate pentode stage gain would then be $\frac{R\ load}{CR}$.

As some manufacturers express the slope of a valve in micromhos whilst others obtain the value from mA/V, the method recommended would produce standardisation. Expressed simply, the lower the control resistance of a valve the higher will be its efficiency.

GM3NH.

The Call of Youth

Apropos the editorial published last month, Mr. J. Skidmore, B.C.C., 2AUL, states that the Derbyshire Education Committee has appointed him instructor in Radio and Morse to the L.R.O.B. Radio Technical School, Belper, near Derby. This appointment follows his two years of work for local youth organisations as a radio instructor.

G6LB

THE MULLARD GM. 3152 CATHODE RAY OSCILLOGRAPH*

THE following general requirements were laid down before work was commenced on the design of this instrument which is intended to meet the need for a general purpose oscillograph capable of giving good results under ordinary every-day conditions :—

(1) It must be self-contained and capable of operation direct from a 50 cycle mains supply.
(2) It must be robust and reliable.
(3) It must be as versatile as possible.
(4) It must be capable of giving good results in the hands of those not specially trained in electronics.

It will be readily appreciated that the last two requirements tend to work against each other. In the laboratory it is an easy matter to obtain excellent results and extreme versatility by using complicated circuit switching and " juggling " with a number of variables. Such a policy, however, has two important drawbacks : In the first place it makes the instrument very difficult to manufacture and in the second, the multiplicity of controls confuses the average user who requires to use an oscillograph in the same way that he uses a meter, *i.e.* he wants to see on the tube screen a picture which can be easily translated into his own terms without the use of an " electronic interpreter." It is also important that the limitations of the instrument shall be easily understood. To take a simple example, suppose that the vertical amplifier overloaded before fully sweeping the screen, then a large sinusoidal input would give rise to a square-topped wave. An engineer using such an instrument in conjunction with a suitable pick-up element to study pressure variations in a pipe line might easily overlook very high peak pressures which would simply produce a square-topped wave, such as he might expect to see if the system included a " blow off " valve.

It may be felt that the above remarks have very little connection with a technical description of the GM.3152, but this background is necessary for a proper appreciation of the instrument. The average radio amateur can probably think of several " dodges " by which the oscillograph could be improved in one or two particulars and it is to explain these omissions that this explanation has been prepared.

Design Features

The 4 in. high-vacuum cathode ray tube is operated from a 1,000 volt supply rectified by an HVR2A. Due to the low current drain, adequate smoothing is provided by three condensers connected in series to give an effective capacity of approximately 5 μF. H.T. for the time base and amplifier is provided by a full wave rectifier which furnishes a smoothed output of about 375 volts at 40 mA.

The vertical deflection amplifier uses three high slope H.F. pentodes the last two being connected in a paraphase circuit, drive for the third valve being taken from a tapping on the anode load of the previous valve. A tapped anode load is employed in order that the impedance of the potentiometer network may be kept low to avoid high frequency attenuation caused by stray capacity in the input circuit of the third valve. The anode supply for the first valve is stabilised by a neon lamp.

The inevitable shunt capacities across the anode loads cause a drop in amplification at high frequencies and this may be partially offset in two ways. The common method is to include a small inductance in series with the anode load. The reactance of this inductance will increase with frequency and by correct design can be made to cancel out the reduction in gain due to shunt capacity. This method has the advantage that the full gain of the amplifier may be utilised, but unfortunately another complication arises. The inductance has a self capacity of its own, and the resonant frequency of the combination occurs at the high frequency end of the response curve and actually sets the upper frequency limit of the amplifier. Moreover, when a very steep wave front is applied to the amplifier, the inductance tends to oscillate on its own self-capacity, and the resulting picture on the cathode ray tube bears little relation to the wave-form of the input voltage. Such a phenomenon is quite easily understandable to the radio engineer and it is quite possible to allow for it, but it is most confusing to the ordinary user, and for this reason the method has not been used. Instead, a feedback method has been employed, each cathode resistor being by-passed by a small capacity of the order of 1,000 μμF. At low frequencies, therefore, feedback occurs across the cathode resistor and the gain of the amplifier is accordingly reduced. As the frequency increases, the reactance of the condenser becomes comparable with the cathode resistor and the gain is increased. By a proper choice of condenser, this may be made to compensate for the normal fall in response up to a limit set by the factor by which the gain is reduced when the cathode resistor is not by-passed.

A combination switch controls the vertical deflection of the amplifier. In position (1) the input is applied to the input attenuator and the amplifier is operated at full gain. In position (2) the gain is reduced by the inclusion of an extra feedback resistance in the cathode circuit of the first valve, while in position (3) the input is applied straight on to the deflector plates of the C.R. Tube. To avoid frequency discrimination the resistance of the input attenuator has to be kept low (10,000 ohms) and as this may not always be convenient, a switch disconnects the attenuator and applies the input direct to the grid condenser when the input impedance is approximately 1 megohm.

The time base is a conventional three-valve circuit comprising charging valve (H.F. pentode), discharge valve (L.F. pentode), and control valve (another H.F. pentode). A switch selects one of a bank of condensers to provide a stepped control of sweep frequency, while a continuously variable control is provided on each range by a potentiometer which controls the screen potential of the charging valve. The amplitude of the sweep is controlled by the screen potential of the last H.F. valve which is fed from a potentiometer. The time base is synchronised with the work voltage by means of a voltage injected into the control grid of the later valve *via* a potentiometer. A combination switch controls both the time base and the synchronising source (internal, external or 50-cycle). Provision is also made for single-stroke operation.

(Readers interested in this new instrument should write to the Mullard Wireless Service Company (Measuring Apparatus Section), Century House, Shaftesbury Avenue, London, W.C.2, for leaflet.)

* Contributed by the Mullard Wireless Service Company Ltd.

A REVIEW OF FREQUENCY DIVISION

By I. B. WHITSTABLE.

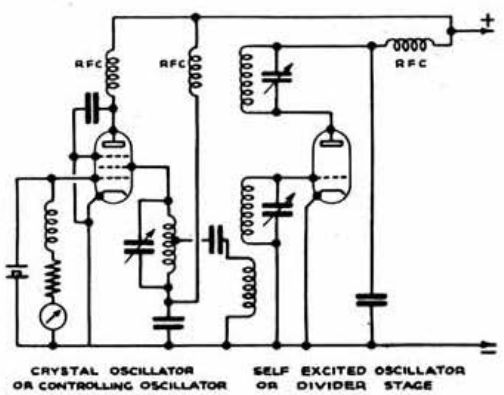
BY means of the normal method of frequency doubling it is possible to produce harmonics *higher* in frequency than the fundamental frequency of a crystal or self excited oscillator. The system by which it is possible to control frequencies *lower* than the fundamental, is known as frequency division.

It is well known that the output wave form of a self-excited oscillator (as shown on an oscilloscope), contains a large proportion of higher frequency harmonics, due to the more or less rectangular shape of the *current* wave. Now if the grid of a self-excited oscillator is receiving additional energy at a frequency close to any harmonic of its fundamental, the whole system is forced to follow the additional excitation frequency.

A self-excited oscillator cannot oscillate on the controlling frequency because of the values employed in the tuning circuit. On the other hand it will, provided certain conditions are fulfilled, oscillate on a frequency that is a sub-division of the controlling or exciting frequency. The governing conditions are :—

(1). The controlling or exciting frequency (*i.e.* a harmonic of the self-excited oscillator) must possess sufficient energy to pull the divider stage into synchronism.

(2). The controlling frequency must not be too high if good synchronism is to be obtained.



Basic circuit of Frequency-Divided Exciter.

For normal use the ratio between the divider frequency and the controller frequency should never exceed five to one, although it must be remembered that this ratio depends to a large extent on the energy fed into, or taken out of, the divider stage.

An examination of the basic circuit illustrated will show that the output of a crystal controlled oscillator is fed into the grid circuit of a self-excited oscillator working on the required divided frequency. The resultant output then becomes crystal controlled and no fluctuations of frequency can take place.

Although there are several drawbacks to the use of frequency division, none are so great as to make its application impracticable for amateurs. The first is the necessity of using at least one extra stage (*i.e.* the controlling frequency oscillator) and perhaps an extra power amplifier stage after the frequency has been divided. This additional stage is usually necessary, because for design reasons (such as stability), the output from a self-excited oscillator is invariably low. Furthermore, the greater the output from the self-excited stage, the greater must be the input energy from the controlling oscillator. Thus when more than a few watts output are required from the divider stage, the system becomes too cumbersome for general use, consequently it is easier to amplify the divided frequency output than the controlling frequency energy. Additionally, the greater the power output of the divided frequency, the greater is the danger of fracturing the controlling crystal. This snag never arises in respect of frequency doubling because none of the output harmonics can be of the same frequency as the controlling crystal. With frequency division, however, one of the harmonics of the output frequency will be the same as the frequency of the controlling crystal. Hence, if the field energy of the transmitter is too great, the crystal will fracture.

This later drawback is removed by limiting the power output of the self-excited oscillator, and by careful layout and screening of components. A check is provided by means of a grid current meter in the crystal oscillator.

Operation

The controlling oscillator is switched on first and the grid current read off from the meter. The dividing stage and power amplifiers are next switched on and adjusted, an operation which should cause the grid current in the crystal oscillator to drop slightly in value. If this is not the case then it proves that the field energy from some part of the transmitter, containing the divided frequency, is too great and the crystal will probably fracture.

Applications

Frequency division presents an easy method of stabilising a multi-band transmitter because only one crystal oscillator is required, the output from which can either be divided or doubled to the appropriate band required. Another application which presents itself is in the design of frequency meters, utilising a single 100 kc/s. crystal, whilst it is even possible that frequency division applied to super-het receiver convertors will solve some of the " Workshop Man's " D.S.H. problems !

Letters to The Editor

A Flashback

DEAR SIR,—Whilst on leave recently I came across a note in my transmitting log regarding an effect which occurred during the afternoon of July 2, 1939, on the 14 Mc/s band whilst I was making tests with the P.A. and aerial coupling, with the aid of G3XA located about three miles away.

The initial stages of the contact were quite normal—we were both using under 10 watts and our signals were strength 8 each way.

During one transmission 3XA (who had his shack window open) commented on the fact that a Whitley aircraft was passing directly across our line of transmission and asked me to check as to whether I could hear its engines. At this moment 3XA's signals went down to strength 3 in a slow fade, then returned to normal, only to fade again, this time rather quicker. Further fading occurred, which became much more rapid, and then the reverse occurred—the fades became slower but still as deep. About 10 seconds from the first indication of fading the signals became normal once more.

I should like to have an explanation of this effect for we were well within ground wave distance, and normal skip could not have entered into the question at all.

The only explanation I can give is that 3XA was putting out some very high angle radiation, which gave a short skip, and the aircraft provided a screen during the time that it was between our stations.

Has anyone else had experience of this effect ?

Yours faithfully,
F. BEWLEY (G8HX).

KHAKI AND BLUE

● Sgt. Owen, **G4KS,** after a trip to North and South America is now living at Stranraer, where he can be located in the Sergeant's Mess near the harbour station. Norman was a member of a Coastal Command squadron which was sent out to Trinidad last summer to offer opposition to U-boats operating in that neighbourhood. On the outward journey he visited Iceland, Labrador, Montreal, New York, Miami, Cuba and Puerto Rica and as wireless operator worked much DX including St. Lucia, British Guinea and Surinam, but no QSL's were collected! Whilst in America he visited one of the U.S.S. sea-plane carriers where he discovered that practically all the radio section staff were hams. He managed to get in a little ski-ing in Labrador on the return trip. Incidentally the run in from Iceland to Scotland was made in four hours dead—not bad going! He is at present instructing in the use of special radio apparatus and operating procedure.

G4KS mentions that his friend Fred Jupp, 2FAD, has received a Red Cross letter from Dr. M. Hellingman, PI1J, who operated from the Technical College at Dordrecht. The doctor and his family are quite well.

● S./Ldr. Stan Henton, **G5VU,** who was reported recently to be at a Staff School in the M.E., is now at H.Q's Mediterranean Air Command, R.A.F. His first ham contact there was with Lt.-Col. Fred Elser, **W6GVU,** whose desk was adorned with recent issues of THE BULLETIN!

● Sgt. Ernie Dolman, **2DCG,** now with 87 W.U., R.A.F. B.N.A.F., has met W5FKW and fellow early bird V. F. West, 2DYW.

● P./O. A. M. Boyce, **2CMR,** whose home address is 34 Carr Avenue, Butterstile Lane, Prestwich, Lancs., would like to hear from Stanley Eyre, Bryan Bowkes, Harold Morris, Bert Collard, John Knowles, and all old C.W.R. friends. 2CMR is now an electrical engineering officer at an R.A.F. station in Bedfordshire.

● Bristol friends of Reg Griffin, **G5UH,** will be glad to hear that he is quite happy at Combined Training Centre, M.E.F., where he has as companion G6FK of Wolverhampton. Reg, now a sergeant, offers his congrats to the Society on the remarkable progress made during the past two years.

● L./Radio Mech. W. H. Hodgson, **G3BW,** who is at the R.N.W.T. station at Kilindi, East Africa, invites members passing through that town to look him up. He has met VQ4SNA and has regular phone QSO's with 2AUM at Nairobi.

● P./O. P. G. Spary, **2FVU,** who was at Cranwell last summer, sends greetings from the M.E. to G5RF, 8PB and others who were on his course and with him earlier on W/T. E.F.P.'s. He was married whilst on embarkation leave.

● After a long spell of duty in India, P./O. Derry, **G8PQ,** is now back in England. He would like to hear from old friends who should write c/o Hallcroft Cottages, Highgate Avenue, Fulwood, Preston, Lancs. Whilst in VU Doug met many hams, including G5OX and 6CD. If any member is going to India and would like information about what to take or not to take, he should get in touch with 8PQ.

● From Sgt. Les Coupland, **2BYC** we learn that the following members are with him at Park Royal: Sgts. Rayner, G6FZ, Wynn 8TB, Ripley 4AD, Hensford 2BHS, and Muddell, 2AOY. Cpls. Hammond 4NL, Mayner 2HLK and Stuttard, 2MB, remain at W.D. Several of the above are "Early Birds."

● Cpl. Dennis Hoult, **G4OO** who is on an R.A.F. station near York in company with G8HS report that until recently Ft./Sgt. "Jack" Cowden, 8U1AS, was with them. Dennis says that "although the BULL. has been cut down in size it is still the most interesting magazine to-day. It's funny, but with THE BULL. one does not seem to be so lonely."

● Listeners to "Cairo Calling" on Sunday, May 30 heard Sgt. Rowland Shears, **G8KW,** of New Barnet, and F./Lt. Runeckles, Ex-SU8RS, of Ipswich, broadcast greetings to their families.

● S./Ldr. Max Buckwell, **G5UK,** met the following members during a trip to North Africa:—G2VD, 5UV, 5VU, 6SM and 8KS, all of whom wish to be remembered to old friends.

R.A.F. (T) Officers

Members holding commissions in the Training Branch and serving with the A.T.C. who propose spending a week at Cranwell on a Signals Officer's course are asked to note that G6CL and others expect to be at the School from August 14th. It is hoped to arrange a series of R.S.G.B. meetings during the week. G6CL will be pleased to hear from those who can join his party.

ARE YOU AT

No. 1 R.S. OR No. 8 R.S. ?

★ If so, you are invited to attend Meetings in Hut 165 (No. 1 R.S.). Details from Cpl. Chadwick (G8ON), Cpls.' Club, East Camp.

Another Fine Meeting at No. 1 Radio School

The Radio Block was the venue for the meeting on May 19 as Hut 165 was unable to cope with the audience, which totalled just over one hundred. Among those present to hear Squadron Leader Newnham, G6NZ, give a talk on the Ionosphere were OK1MPT, SP1WS, G3YC, 6NZ, 8ON, 8RW, 8WM, 2ARY, 2AZI, 2DBM, BRS626, 4169, 4830, 4852, 5004, 5243, 5467, 5578, 5620.

There were many "layers" of gen and quite a few of laughter, as 6NZ has such an admirable way of putting things across! When Cpl. Gough proposed a vote of thanks, his remarks were ably seconded by enthusiastic applause.

We were pleased to welcome SP1WS and OK1MPT. It was also very gratifying to see the Officers Mess so well represented. The collection for the P.O.W. fund raised 35s.

Cpl. Gough is to repeat his now famous "Aerials" lecture in three parts (revised and re-edited), on June 7, July 5 and August 2—in each case at 7 p.m. The venue will be arranged when the size of the audience can more nearly be estimated, but either Hut 165 or the Radio Block (both in East Camp) form a safe guess.

G8ON.

New R.A.F. Radio Society Formed

At the inaugural meeting of the newly formed R.A.F. (North West Kent) Radio Society held on May 10, the guest speaker was F./O. John Clarricoats, G6CL, (General Secretary), who outlined the aims and objects of the R.S.G.B. The chair was taken by P./O. C. S. Bradley, G5BS, who had the support of several other R.S.G.B. members.

Regular meetings of the Society will be held during the summer when it is hoped that non-Service members of R.S.G.B. will attend. All communications regarding the new Society may be addressed to P./O. Bradley, Rogers Wood, Fawkham, Kent.

Cairo Meeting

By Air Mail A.C.1 Arthur Goode, **2DTQ,** sends news of the second war-time Conventionette held in Cairo on May 6. The meeting which took place in the Britannia Restaurant opened in the morning with a "get together," after which members were free to do as they wished, providing they returned in time for the dinner at 9 p.m.! 2DTQ in company with SU1AX appears to have spent part of the time testing out the potent powers of Whiteway's Cider, as stronger drink was hard to get! The evening meeting was a great success with 44 persons present. A collection was again taken for the P.O.W. Fund.

Credit for the meeting goes to Bill Marsh, SU1WM, who went to great pains in order to ensure its success. The gathering broke up at 11.30 p.m. after a vote of thanks to SU1WM had been proposed by Sq./Ldr. Maurice Brookes, G5OI.

The following signed 2DTQ's menu card: G2LK, 3KB, NZ, TA, 4AH, JY, 5BR, OI, UH, UX, WZ, 6IX, PQ, 8DA, HW, QQ, VI, GM3LG, 2BXS, CIB, CIX, CLD, DOS, DYK, FDT, FFM, FPI, FXZ, BRS3766, 4905, VE3AKX, SU1AX, GT, MW, SP, WM, ZL2IO, 2TZ, W2CMY, VU2EO/VS1RJ, SV1RX.

73.

G2JB (R.A.F.), to G2GB, YL, VV, 5OX, 6OQ, 8TN, 2CIL, GM6MD, SU1SG, BERS195 and all old friends.

G3BW (R.N.), to G3HJ, 4CB, PZ, 6JZ, WR, ZT, 8RZ.

G3OU (Sheffield), to G3FN, RU, TC, 4PI, 8IO and UO.

G3RY (R.E.), to G3IR, JB, YB, 4LQ, 5PX, 6GX, 8HG, UO, and 2AAM.

G3TU (R.A.F., M.E.), to G2PB, 3LR, 4GM, GM4HX, 2HIW and the Blackburn and Burnley Group.

G4FD (Blackburn), to G2HW, 3HI, 4CJ, 4DR, 4FJ, 4JS, 6WH, 8JA, 2AKK and 2FLW.

G4OO (R.A.F.), to G3FT, 4AD, 6ZY, 8PL, and all old friends of the R.A.T.S. and in Gibraltar.

G5QG (R.A.F.), to G5GN, 8JI, KL, SO, TI and 2FHF.

GI5DX (R. Signals, PAI Force), to GI3KV, 5HU, JJ, QX, ZY, 6TK, 8MI, G8NO.

GM3LG (R.A.F., M.E.F.), to GM3BA, CG, LO, ND, NH, SW, 6IW, JJ, LS, SR, 8MQ and G8FA.

2DRR (R.A.F., Gibraltar), to G4HK, 2BKO and BRS4960.

BRS4512 (R.A.F.), to G3CD and 4513.

● **CHANGES OF PERMANENT ADDRESS SHOULD BE NOTIFIED TO HEADQUARTERS IMMEDIATELY**

MEMBERS ON ACTIVE SERVICE

Forty-fifth List

WE publish below our forty-fifth list of members on Active Service. The present list contains information received up to May 31, 1943.

Rank and Name	Regiment or Branch of Service	Pre-war Call or B.R.S.
A.C.2 G. A. Ayers	R.A.F.	6375
L.A.C. J. Bagby	,,	6314
Ft./Sgt. G. Baldock	,,	3645
F./O. W. H. Barton	,,	6374
Cpl. F. Baxter	,,	5097
Cpl. K. G. Bayliss	,,	6376
Cadet J. A. Bennet	R. Sigs.	6313
Cpl. G. Browne	R.E.M.E.	6337
L.A.C. J. J. Burke	R.A.F.	6392
Cfn. F. D. Chapman	R.E.M.E.	6330
Cpl. H. E. Chissell	R.A.F.	6396
Sig. J. A. Clark	R. Sigs.	2HIK
Cpl. A. De Costa	R.A.F.	5059
Sgt. L. H. Cox	,,	6327
Sgt. I. C. Dalrymple	,,	6380
Cpl. R. C. Darney	R.E.M.E.	6320
L.A.C. E. Davis	R.A.F.	6354
A.S./Sgt. W. R. Davis	R.E.M.E.	5108
Cpl. F. E. Day	R.A.F.	BERS521
L.A.C. D. T. Dinsey	,,	6355
L./Cpl. R. Dore	R. Sigs.	2FPD
S./Ldr. J. Facer	R.A.F.	6309
L.A.C. W. J. Fisher	,,	6315
A.C.2 G. Fordyce	,,	5096
A.C.1 J. Frampton	,,	2APF
Ft./Sgt. J. C. Fry	,,	6334
A.C.1 G. A. Garbutt	,,	6391
Cpl. R. F. J. Gilbert	,,	6308
Cpl. J. T. Goss	,,	6366
Sig. B. A. Gould	R. Sigs.	6347
P./O. J. Gratwick	R.A.F.	6322
P./O. A. L. Gray	,,	6318
A.C.1 W. W. Griffiths	,,	6372
P.O. Tel. L. E. Hall	R.N.	6331
Sig. E. M. Handcocks	R. Sigs.	G5HN
A.C.2 R. A. Harding	R.A.F.	6343
Cpl. G. A. Harvey	,,	6394
Elec. Mid. N. C. Heathcock	R.N.V.R.	6319
P./O. J. D. Herring	R.A.F.	6360
A.M.II C. Hider	F.A.A.	5156
P./O. S. G. Hinton, B.Sc.	R.A.F.	6383
A.C.2 R. A. Holdstock	,,	6346
L.A.C. W. H. Howard	,,	6305
Lieut. G. Hyde	R.C.C.S.	BERS519
L./Cpl. J. C. Imrie	R. Sigs.	GM4GK
Pte. W. G. Irwin	R.A.S.C.	G4DI
Sgt. J. Percival	R. Sigs.	6333
P./O. D. B. Kennedy	R.A.F.	5208
Cfm. J. Kirkpatrick	R.E.M.E.	2BIK
A.C.1 H. A. Lamb	R.A.F.	6379
L./Tel. H. D. Langford	R.N.V.(W.)R.	G8OA
A.C.1 D. L. Lewis	R.A.F.	6363
Sgt. J. G. Login	R.A.	6369
Ldg. Radio Mech. J. D. Loveridge	R.N.	6393
Sgt. H. Mellor	R.A.F.	4924
Cpl. K. Metcalfe	,,	6350
Cpl. C. R. S. Moon	,,	G5MN
P./O. T. G. Morriss	,,	4234
Cpl. D. B. MacDonald	,,	6361
Sig. F. Macfarlane	R. Sigs.	GW3YR
Pte. B. A. Nichols	R.E.M.E.	6335
Gnr. W. O'Donnell	R.A.	5076
A.C.1 G. W. Peacock	R.A.F.	6368
Lt. J. Preston	R. Sigs.	6377
Ldg. Sea. J. E. Purkis	R.N.	G5UI
Ldg. Radio Mech. F. A. Raynor	F.A.A.	6329
Cpl. D. Reed	R.E.M.E.	5068
A.C.1 D. G. Robbins	R.A.F.	6349
L.A.C. R. F. Russell	,,	6365
Cpl. J. Sanders	,,	6293
A.C.1 F. Saunders	,,	2CHS
Cpl. C. Shackleford	,,	2HJG
L.A.C. N. J. Singleton	,,	6317
Gnr. B. H. Smith	R.A.	2HDN
A.C.2 G. F. Springate	R.A.F.	6345
W./Bdr. P. J. Stratton	R.A.	6338
Sgt. R. H. Sumner	R.A.F.	6324
Gnr. H. Tomlinson	R.A.	6339
Cpl. L. S. Townson	R. Sigs.	5079
P./O. C. Tudor	R.A.F.	6384
A.C.1 A. Walker	,,	5050
Ldg. Radio Mech. R.A. Walker	R.N.	5105
P.O. F. Ward	F.A.A.	6296
A.C.2 R. V. Watson	R.A.F.	5727
Cfm. L. R. Webb	R.E.M.E.	6342
Cpl. G. E. White	R.A.F.	5037
Cfn. H. G. White	R.E.M.E.	5027
Cfn. W. E. Young	,,	5016
L.A.C. P. Zeid	R.A.F.	2HAG

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

DONATIONS.—The General Secretary acknowledges with thanks, on behalf of Council, receipt of donations from :—Scottish H District, *via* A. H. Lawson, GM2NQ, 18s. 6d. ; W. Dyer, 4120, 2s. 6d. ; W. Guild, 5088, 8s. 6d. ; L. Armstrong, 6086, 10s. ; 2CNC and Office Friends, £2 ; M. F. Long, G2CL, 10s. ; F. E. Herzog, G2UM, 5s. ; J. E. Farnell, 3817, 5s. ; J. D. Chisholm, G2CX, £1 1s. ; A. M. Boyce, 2CMR, 5s. ; H. E. Hunter, BERS395, 7s. 6d. ; J. Cairns, G3UC, 5s. ; S. Rowden, GM6SR, 10s. ; I. Pearsall, 2ARB, 1s. 6d. ; A. H. Bruce, G5BB, 15s. 6d. ; Anon, 11s. 8d. ; No. 1 R. S. per G8ON, £1 15s. ; District 2 P.D.M., £6 6s. 2d. ; Anon, 5s. ; District 13 per G3ST, 15s. ; J. K. McDowall, GM3AR, 1s. 6d. ; District 15 per G6WN, 17s. 6d. ; J. S. Whitehead, 5138, £1 ; F. Druce (father of N. F. Druce, 2600), £2 2s. ; Anon, 8s. 2d. **Receipts to date, £822 15s. 10d. Expenditure to date, £343 16s. 9d. Balance in hand as at May 31st, £478 19s. 1d.**

MARCH AND APRIL PARCELS.—During March parcels were sent to 23 members and 5 non-members. The April despatches were made to 24 members and 5 non-members.

KIT BAGS AND SUIT CASES.—As announced last month, kit bags and suit cases have now been despatched *via* next of kin. These gifts have been sent in lieu of cigarettes, tobacco and books and represent our May and June despatches. Numerous letters of thanks have been received from the next of kin who have expressed their gratitude for the gifts which will undoubtedly prove of the greatest value when the time comes for our colleagues to " pack their bags."

BOOKS.—Mr. Edwards, G8TL, acknowledges the receipt of books from Mr. J. G. Macvie, G3IB. Other donations of books will be gratefully received and acknowledged.

News From the Kriegies

Information is to hand that Sigm. John Bolton, **BRS4034** of Blackburn is a prisoner of war in Japanese hands. He had been missing since the fall of Malaya.

Naval P.O. Cunningham, ex G5CI, who was taken prisoner in air operations over Norway sends greetings to his friends and reports the safe arrival of nine P.O.W. Fund parcels.

The parents of **2CXT** advise us that he has recently changed camp. Members who wish to write should note his new address : L.A.C. A. R. Richardson, R.A.F., B. P. of W., 24437, Stalag Luft III.

From several sources we learn that 2nd/Lt. J. P. Douglas, **GM3BA,** who has been missing since the fall of Singapore, is now a prisoner of war in Japanese hands.

Congrats

● To Cpl. J. W. Russell, **G2ZR,** of Newchurch, Isle of Wight, who was married at Alexandra Park, London, on May 8, to Miss Wadey. Thus was another page written in his "Teleprinter" romance !

● To Sergeant and Mrs. Charles Miller, **VK2ADE,** who are now the proud parents of a daughter Heather. VK2ADE who was serving in England until last year with the R.A.A.F. is now back in N.S.W. (162 North Street, Casino). He was married at Hornsey Church in April, 1942.

● To Royce Wilkinson, O.B.E., D.F.M. and Bar, **G4HW,** on his promotion to Wing Commander. He is now Station Commander at a Typhoon station in S.E. Kent from which station a squadron in which he served earlier in the war now operates. Royce destroyed nine enemy aircraft while he was with the B.E.F. in France and Belgium in May, 1940.

● To Dr. Harold Walls, **G2DH,** of Prestwick, Manchester, whose wife recently presented him with a daughter.

● To Cpl. Massingham, **5743,** of Liverpool, who was married whilst on leave from the Faroe Islands, where he is serving with the R.A.F.

● To W./O. G. Barrett, **G8IP,** whose wife presented him with a daughter—Elizabeth—on February 16.

● To C. Farley, **5161** R.E.M.E., of Bermondsey, on the birth of a daughter, and on his promotion to Lance Sergeant.

● To Kenneth Jowers, **G5ZJ** on his promotion to Wing Commander. He is now at R.A.F. Indian Command, Delhi.

● To Sgt. D. Peek (R. Sigs.) **G2ZZ,** whose wife presented him with a junior op—Heath William—on May 15, 1943.

BRITISH ISLES NOTES AND NEWS

District and Town Meetings

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

Details of forthcoming meetings should be sent to reach Headquarters not later than the 28th of each month. The details should be set out on a separate slip of paper or on a post-card, and should be arranged exactly as shown in the panel published on page 188.

DISTRICT 1 (North Western)

Bolton.—Attendance at the monthly meetings continues to improve, seven members and two prospectives being present at 2DVQ on May 2. Amongst those present was Cpl. Walmsley (6202), the town's newest member. 2BTO reports the recent acquisition of a Sky Champion but is waiting for his next leave before trying it out on the air. Congrats to Frank Clements (one of the founder members of the Bolton Radio Society) on the safe arrival of a junior op. on May 17. 2HGJ of Thornton Heath, is the latest Service member to record his presence in the district.

The next meeting is fixed for July 11, at 2.30 p.m., but as the venue has not yet been settled, interested members are asked to contact the T.R., G. Shackle, 32 Bromwich Street, Bolton, for further information. *via* 2DVQ.

8SJ is writing for the Press. 2317 is highly satisfied with the results obtained from his crystal pick-up. 5YV who is now removing the snags from his 9v. receiver says that "Clarry's" P.D.M. speeches get better and better. (Thanks Harry—G6CL.) 8GU is teaching at Rotherham. 3UR and 8CD are still in the District.

Sheffield area members still refuse to come out of their shell! G8UO.

DISTRICT 4 (East Midlands)

Deputy D.R.: A. E. Clipstone (G8DZ). Phone c/o 2AOO, Nottingham 84105.

Nottingham.—At the May meeting which was well supported, great interest was shown in 2AOO's oscilloscope; the hard valve time base of special design being the centre of interest. This will work up to speeds of about 1 Mc/s. 5639 later demonstrated a midget two valve short wave receiver.

The next meeting is to be held at University College, Highfields, on June 20, when we are to be the guests of the College Radio Society. Thanks are due to 5639 for arranging this meeting.

Derby.—G8SI in a letter to 6VD says he enjoys the District Notes and reads them first. 8BN called on 2OU to show off his three stripes and a crown, 4071 is building a new "super" and 2OU a signal generator. G8DZ.

DISTRICT 5 (Western)

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

Bristol.—The May meeting was again poorly attended, only seven members putting in an appearance. We were, however,

Leeds P.D.M. May 23, 1943.
Seated centrally, G6CL (Gen. Secretary), G6NF (President) G6KU (D.R.), G8UO (Scribe). Extreme left, G5BD (D.R. No. 17 District)

DISTRICT 2 (North Eastern)

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

The P.D.M. held last month furnished proof beyond doubt of the radio interest in the District; a full report is published elsewhere in this issue.

Will Huddersfield area members please note that a meeting will be held at 12 Langley Terrace, Crosland Road, Oakes, on Sunday, June 27, at 7 p.m. 5VD hopes for a good turn up.

The Scribe solicits letters for incorporation in a Letter Budget for Service members of the District. G2LT (Sheffield) would like to hear from those who would support a local meeting; he still awaits letters for his Letter Budget.

G4MC (N.W.A.A.F.) has just finished his third year with the R.A.F. 3593 has moved into District 18 and wishes to contact York members. QRA from the Scribe. We extend our sympathies to 4412 who recently lost his stepfather. 4377 (Sgt. R. Sigs.) hopes to be with O.C.T.U. soon. Best wishes to 2DUX and Miss M. D. Schooling on their recent marriage, 'DUX is at present with the Admiralty. We hope that 2BM will soon recover from his illness. 6WJ is now straightening up his new QRA. 8KP (R.A.F.) has been home occasionally. 8RF (Corp. R. Sigs.) has acquired an XYL and junior op. since we saw him two years ago. Congrats, O.M. 5939 is a Radio Technical Officer now located in District 1 after 24 years at sea as a radio op. He spent 12 months in a prison camp in Tunisia. 4304 (Corp. R.A.F.) sends 73 to 2UK. 5687 is in N. Rhodesia and is awaiting delivery of his BULLS. (Congrats. on your City and Guilds Final result O.M.) 3UI and a G4, whose call has not yet been ascertained, are P.O.W's in Jap hands.

very pleased to welcome 3LP of Cheltenham, who is now stationed in the locality.

In a letter to the D.R. 5UH reports that he is still meeting amateurs in the M.E. He is now at Combined Training Centre with G6FR, and has also contacted 4BB and 6GA. G6RB.

DISTRICT 6 (South Western)

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

It is with profound sorrow that we record the death, early this year in a flying accident, of John Merriman, only son of Harold Merriman, G6GM. Local members as well as many others who have made his acquaintance over the air, will wish to join us in conveying to Mr. Merriman and his family our sympathy in his tragic bereavement. G5SY.

DISTRICT 7 (Southern)

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

Croydon.—BRS4314, when on leave, paid a visit to G2DP which started at 8 p.m.; it was nearly midnight before the party broke up! 4584 was pleased to see some of his old friends when home recently. 8ID has not gone down to Somerset after all. 2DP will be in Bournemouth towards the end of July and hopes to meet the locals. See "Forthcoming Events" for the date and time of the next meeting. *via* 2DP.

Coulsdon.—2ANR, writing from G.C. Island, says he and other amateurs have been trying to start a local club, but they find it difficult owing to constant moves. 1545 has taken up

philately again. The T.R. would welcome news of 8TB whose copies of THE BULL are being returned to H.Q. (now located at Park Royal—see K. & B.—ED.) *via* 3003.

Bournemouth.—G8BW, who returned recently on a short visit is now working at Aylesbury. He sends 73 to old friends. 4IJ and 4KV have been on leave. 3BM is constructing two new 85 feet lattice masts. *via* 2HNO.

Kingston.—3MF, reporting by airgraph from VU, takes a poor view about the paucity of notes from Kingston and the Thames Valley generally. 3JG went down with pleurisy soon after reaching VU.

General.—G3HG, of Christchurch, now in the Middle East, writes to say that he is receiving THE BULL safely, but about 18 months after publication. He has Cpl. Chittenden, 2CJT, of Kent, in his unit and they both send congrats on the way THE BULL is keeping its end up. 4268, in North Africa, seems to have done quite a bit of listening in his job as official news-getter to the unit until the need to conserve juice kept the switch in the "off" position. 3RN, of Camberley, has company at his R.A.F. station in the shape of W5IQG and 3FJ. He would like to hear from 6BP should this meet his eye. 4822, in the F.A.A., having passed his examination as telegraphist/air gunner, is due to begin his flying. G5WP.

Forthcoming Events

June 19	District 15, 3 p.m., at The Excelsior Hotel, 1 Ladbroke Gardens, Notting Hill, W.11. (Ladbroke Grove Met. Station or 7, 15 and 52 buses.)
June 20	District 4, 3 p.m., at University College, Highfields, Nottingham.
June 20	District 14 (Chingford section), 3 p.m., at 73 Broad Walk, Ilford.
June 20	District 15 (High Wycombe section), 2.30 p.m., at BRS4781, 37 Melbourne Road, Micklefield Estate, High Wycombe. (Bus 326 from Castle Street. A postcard if attending.)
June 25	District 12, 7.30 p.m., Informal Dinner Party, The Cock, Cockfosters. (See District 12 notes.)
June 26	District 8, 3 p.m., at the "Bizzie Bee" Cafe, Bury Park Road, Luton. Lecture "Cathode Followers" by C. Heys, Esq., Grad.I.E.E.
June 27	District 5, 3 p.m., at 17 Colston Avenue, Centre, Bristol.
June 27	District 15, 6.30 p.m., in "The Cabin" at "The Bull's Head," Aylesbury.
June 27	Scotland "A" District, at 3 p.m., in the Royal Technical College, George Street, Glasgow. (Enter by Montrose Street.)
June 27	Scotland "C" District, at 2.30 p.m., in Dundee Wireless College, 7 Airlie Place, Dundee.
July 3	District 8, 3.45 p.m., at Milton Arms Hotel, Cambridge.
July 4	District 7 (Croydon area) and District 13 (South London Central and Eastern areas). 3 p.m., at Croydon Y.M.C.A., North End, West Croydon.

DISTRICT 8 (Home Counties)

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

There is little to report this month, except that the D.D.R. has received most interesting letters from G5PA at Malta, who is keeping in touch with amateur matters generally, and 2UK, who is busy preparing a history of amateur radio for the society.

The April meeting at Luton went off very well, but was not quite so well attended. The May meeting was up to standard when an interesting talk was given by Mr. S. J. Buckley on A.F. Oscillators. He included a description of an R.C. oscillator, which has a constant output sine wave over a long range—demonstrations followed. The next meeting has been arranged for June 26 at the "Bizzie Bee" Cafe, Bury Park Road, Luton, at 3 p.m., when a talk will be given by Mr. C. Heys, Grad.I.E.E. on "Cathode Followers"; a discussion will follow.

The next Cambridge meeting will be held on Saturday, July 3, at the Milton Arms Hotel, at 3.45 for 4 o'clock, when tea will be served. The Hotel lounge will be available for the evening. It is hoped to arrange a talk on items of current interest, and post-war activity. Please reserve this date. G5JO.

DISTRICT 9 (East Anglia)

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

From Norwich, G2MN reports visits from 5UF and 5IX. 5KG is believed to be in the District. If correct we shall be glad if he will make himself known. J. T. W. Blyth, who is still stationed in the West, would appreciate receiving letters from his friends in these parts. G2XS.

DISTRICT 10 (South Wales & Monmouthshire)

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

Very few reports of activity in the District have been received since these notes last appeared but a cordial welcome is extended to 6109, 6129, 6144, 6148, 6158, 6120, 6227, 6262 and 6271 who have recently joined.

Cardiff.—Meetings are still being held on Sunday afternoons at monthly intervals and amongst those who have attended since the last report appeared have been GW2UH, 4KQ, 6HR, 8AM, 8NP, 5753, 5958 and Mr. Morgan. Although the dates and times of future meetings have not been arranged at the time of going to press, 4KQ will be pleased to give any information required.

Pembrokeshire.—From 5369, now serving in District 2 where he has met several members, comes a report that GM8MQ is stationed in the Pembrokeshire area. 6240, to whom a cordial welcome is extended, would appreciate a meeting with other members in Neyland.

Newport.—5958, a L./Tel. R.N., looks forward to making the acquaintance of local members when next on leave. GW4KQ.

DISTRICT 11 (North Wales)

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

As no news is to hand re the May meeting, members should contact BRS2731 or 4762 for details of forthcoming events in the Prestatyn area.

Ft./Lt. J. Starkey, known to many of us as GW6KY, is mentioned in an article entitled "The Men who Stopped Mussolini" published recently in a well-known weekly paper. (Nice work Jimmy! N.F.D. will be a busman's holiday to you after this.) 2HIY, having finished his W./Op's course, has been posted to Herts. pending a W./O.M's course. 4444, who has spent many months in hospital is now to be discharged from the Service on medical grounds. 4761 and 4762 have volunteered for the R.A.F. The latter expects to leave home in July. 4023, in an airgraph from the M.E. reports contacting G4HI through seeing a copy of THE BULL. on his desk. BRS1060.

DISTRICT 12 (London North and Herts)

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

The experiment announced last month worked, for no less than 20 members and their ladies "took wine" at The Cock, Cockfosters, on Friday, May 28, and thereby set a new fashion for District 12 war-time meetings. Among the visitors present were Major Joe Andrew, W4EFG, Major Higson, GW2PH, Major Warner, G2WR, C.Q.M.S. Cecil Bradbury, 1066, "Early Birds," Les Coupland, 2BQC and Hammond, G4NL. After an enjoyable meal the party indulged in various feats of strength under the expert tutorship of Mrs. 4DC, following which a move was made to that place which holds so much interest for Sir Kingsley Wood.

Having found yet another way of keeping alive the "ham spirit" the "locals," headed by G4DC, 5FA, 5QF, 6CL, 6QM and 8TY, announce their intention of repeating the experiment on Friday evening, June 25. Those who wish to partake in what promises to be another quite interesting evening should "make their number" to the D.R. by not later than June 20. Accommodation is tight, so please send off your p.c. to-day. If you wish to take the set evening meal remember the price is 5s.

We are happy to announce that Bill Hartley, G3MS, survived a visitation from Goering's minions, although his house has lost some of its pristine newness. North Londoners were pleased to catch a fleeting glance of Andrew Boa, SU5BO, ex-G5BO, at a recent I.E.E. meeting. "BO" looked very fit after a long spell abroad. Congrats are offered to Mr. and Mrs. Purvis, 2DVU, on the safe arrival of a junior op. G5WW sends 73 to old friends. G5QF.

DISTRICT 13 (London South)

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

South Eastern and Central.—Our May meeting at the Y.M.C.A., Croydon, was most successful, the following being present:—G2DP, 2JK, 2VB, 3DF, 3ST, 4NI, 2FWA, 2HHD, BRS1545, 3003, 4111, 4585, 5317, 5545, 6064 as well as Service visitors. The first business was to debate on what, in future, should be included in THE BULLETIN: the various items were displayed on the blackboard and after lengthy discussion on each subject a representative vote was taken and forwarded to the Editor. An idea suggested by 2DP and 3ST was well received. Those present

were asked if they had any snags worrying them in the matter of radio; after stating their difficulties, all members were asked to co-operate in providing explanations and solutions. Several queries came up relating to aerials and amplifiers which were very ably dealt with. We were favoured by the presence of Lt. Ilott, G2JK, who always reminds us of "round the town hook-up's" in the days when all good boys should have been asleep! A collection for the P.O.W. Fund realised 15s.

G3ST recently had the pleasure of a visit from 3CI (R.A.F.) who returned from Iceland about eight months ago. He is in fine fettle and sends 73 to all friends. All will sympathise with him in the loss of both parents. An airgraph has been received from Sgm. S. Kirk, 2DJK, who is in North Africa. He gets THE BULL. regularly and looks forward to news from District 13. Says he likes being in the mountains. 5317, having left to join the R.A.F. as Radio Mechanic, we wish him good luck. 5341, also R.A.F., dropped in to enquire how things are going; he hopes to attend our next meeting which will be held on July 4, at the Y.M.C.A., Croydon, at 3 p.m.

A hearty welcome awaits any member who is willing to give a lecture in "Ham" fashion on Radio or any allied subject.

G3ST.

DISTRICT 14 (Eastern)

Scribe: L. J. Fuller, G6LB, 167 *Galleywood Road, Chelmsford. Tel.: Chelmsford* 3929.

Chelmsford.—Meetings will be held as usual on the first Sunday in the month at 7 p.m. at G6LB unless notified locally to the contrary.

Due to the absence of the local "Brains Trust"—G5HF, 5RV, and 6ZC—the May meeting at 6LB was rather quiet. Just before leaving us, 5RV completed his nine-valve superhet—and a lovely job it is. Congrats Louis. All members join in wishing him the best of luck in his new vocation. 3SI (Thaxted) has recently undergone an operation.

If any members are still in the Brentwood area, the Scribe would like to hear from them, with a view to arranging a "get-together" during the summer. Romford might also care to support such a venture. What about it? G6LB.

Chingford.—G8DG demonstrated his new amplifier and crystal pick-up to the eight members who attended the meeting at 8 Bosgrove on May 23. Included in the party were G2HR, 2ABC, 2DXL, 4215, 5648, 5726 and 5892. The meeting decided, apropos the recent discussion, that the crystal type of pick-up is superior to the magnetic type provided it is used correctly. It is, however, more susceptible to "snags." "The Workshop Man" may be interested to hear that 5726 is experimenting with a D.S.H. G8DG.

DISTRICT 15 (London West, Middlesex and Buckinghamshire)

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

This month's news relates chiefly to meetings held within the District.

The West London meeting saw an attendance of ten which included G2TJ, 6WN, 8BW (from Aylesbury), 8PD, 2ADL, 2ARR, 2BQC and his wife (from Boston, Lincs), ex-VE3DG and BRS5883 (Merseyside). 2BQC requested news of G4DS and the D.R. was able to convey his regards in person the following day when they met at Aylesbury. 2ADL suggested that each district should attempt a discussion on Post-War Planning. He would like to see the recent I.E.E. discussion papers published in THE BULLETIN. (It is hoped to publish Mr. Winsford's paper shortly, ED.) The sum of 17s. 6d. was collected for the P.O.W. Fund.

The High Wycombe meeting was attended by G2RL, 6JK, 2HFY, 4514 (home on leave from the R.A.F.), 4780, 4781 and 6079, a new member whom we were pleased to meet. Discussion here centred around the April Editorial and even went further and suggested more drastic alterations. Thanks are recorded to Mr. and Mrs. 6JK for their hospitality.

Aylesbury held its first meeting with seven present. SP1AH, a Ft./Sgt. in the R.A.F. and stationed locally came along as did G4DS and 8NS, who made the journey from North Bucks. 6014 and 6020 were also there. 8BW is to be congratulated for organising these meetings. The D.R. and Mrs. 6WN attended and would like to thank Mr. and Mrs. 6014 for their invitation to tea. The April editorial also received attention here. All members residing or stationed locally will be welcome at future meetings.

G6WN.

DISTRICT 17 (Mid East)

D.R.: A. Simons, G5BD, Admiralty Road, Mablethorpe, Lincs. Phone: Mablethorpe 69.

The writer, upon taking office as D.R., extends greetings to all District 17 members wherever they may be, and expresses the hope that as many as possible will send in regular notes. He will particularly appreciate letters from members serving abroad, as well as offers from members resident in Lincoln, Grantham Sleaford and Gainsborough, who are willing to act as T.R.'s. Mr. Jackson, G5MT, 21 Cragston Avenue, Grimsby, and the D.R. are anxious to arrange a meeting in Grimsby. G2UK and 5BD (old and new D.R.) met and had an enjoyable time at the Leeds P.D.M. 2UK is expecting shortly to seek DX personally. 5LL now a F./Sgt., is already on his way overseas, 2FT is in District 7 with the B.B.C. G5BD.

DISTRICT 18 (East Yorkshire)

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

Beverley.—Mr. D. Armstrong, 3271, is anxious to revive local meetings. He has had the Marble Arch Café offered on Sundays for this purpose. He also offers ham hospitality on Sundays at his home, 24 York Road.

Hull.—G3PL has left for Wolverhampton and Nottingham and expects to be away for some weeks. A. Beautement, 2CNX, has gone overseas. F. W. Ellis, 4043, now back in the District, visited G8UL recently. G5MN gives news of G5HA (R.A.F.), who is now a F./Lt. stationed in the Far East. He has just completed a new communications receiver and is very pleased with its performance. *via* G8UL.

Scarborough.—2DDA (R.A.F.) still stationed in N.E. Scotland, spent a short leave in the town recently and visited G6SO. The latter was also pleased to receive a visit from Tom Brackenbury, G8BB (R.N. Civilian Radio Op.) whom we welcome to the town after an absence of three years, during which time he saw service in East Africa, Aden and Ceylon, being in Ceylon at the time of the Jap air blitz. After a short leave he expects to be stationed locally. He sends 73 to all old friends. 8BB also gives the news that Jim Wetherill, G2TK (R.N. Civilian Radio Op.) and wife are in Bermuda. Sep. Stephenson, G3KS, is doing war work in Grantham, but managed a few days break recently, visiting York and Scarborough. Les. Berryman, G4DY, who is doing electrical work on R.A.F. sites is still living in the town although his work takes him away a good deal.

We welcome the following new members:—W. Greatorex, 6008 (York), M. J. Toole, 6202 (Redcar), C. F. O'Reilly, 6074 (Hull) and H. Christopher, 6256 (Hull). G6SO.

DISTRICT 19 (Northern)

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

South Shields.—In an airgraph from the Middle East, 5WZ says he has already met 5QY and 6MK and hopes to meet 6PB and 6VG soon. He also sends 73 to his South Shields friends and would be pleased to hear from them. *via* 5257.

Newcastle.—G8SG, 4679, 5306, 3844 report active and hope to see regular meetings arranged in the town.

BRS2977, home after three years at sea, reports having met several amateurs in his travels including ZS1K.

The Sunderland area seems very silent these days. What about it chaps? G2FO.

Scotland

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

"A" District.—At the May meeting a most interesting lecture was given by Mr. J. S. Tait, B.Sc., A.R.T.C., A.M.I.E.E., on Quality Sound Reproduction. The lecture was fully illustrated by practical demonstrations. Congratulations to 2HHX on his recent marriage and to Ian McDermid on his promotion to F./O. The next meeting will be held on June 27 in the Royal Technical College Glasgow.

"H" District.—At a meeting held at 2NQ's home on April 25 there was a fair attendance of Home Front members despite transport difficulties, but owing to illness 2NQ himself was unable to be present, and his place was very suitably filled by 6JJ. A BULL Quiz was held and the findings duly sent to H.Q. It was agreed to elect an Executive Committee to deal with all District matters in an entirely different manner than in the past, and the ideas outlined show signs of stability that augur well for "H." It was suggested that a list (with full details) of all District Members serving in the Forces and on work of National importance be drawn up by the D.O., but it was learned later that such a list was already practically completed by the D.O. The meeting voluntarily subscribed 18s. 6d. to the P.O.W. Fund. We all congratulate 6JJ on attaining the rank of Wing Commander. 8MQ has now recovered from a bout of diphtheria. The next meeting will be held at 2HBR, Kirkcaldy, and members will be advised in due course.

Far North.—G6NM, 3NM, 4046 and 5347 have now gone "tae ither pairts" and we wish them good luck and 73. We have pleasure in welcoming G3SJ and 8AU to our small band, and by the time this is in print we hope that 5598 will again be in harness. Our sympathies are extended to 5668 in his recent bereavement. GM6ZV.

Northern Ireland

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

Mr. R. Holden (GI5HU) has offered to take over as Belfast T.R. in succession to Mr. S. Johnson who has been too busy to deal with Society matters. In future, items of news interest for

(*Continued on page* 191.)

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: 2/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.

April Council Meeting

Resume of the Minutes of a Council Meeting held at the Institution of Electrical Engineers, London, on Monday, April 19, 1943, at 6 p.m.

Present.—Mr. A. D. Gay (President), Messrs. Charman, Gardner, Hunter, Lewer, W. H. Matthews, Russell, Scarr, Watson and Clarricoats (General Secretary).

Apologies.—Were received from Messrs. Clark, Farnie, Jessup and J. W. Mathews.

1. One hundred and fifty-three applications for membership (including three Associates) were accepted (44 were accompanied by references and 109 were sponsored by Corporate members). An application from Mr. D. A. G. Edwards, G3DO, for Life Membership was accepted.

2. In regard to Sir Stafford Cripps' recent speech in which he had praised the work of students and others engaged in radio research and development, it was reported that a letter had been sent to Sir Stafford Cripps and to the editor of *The Times*, drawing attention to the work done by radio amateurs.

3. Capt. Arthur Gee, G2UK, tendered his resignation from the position of District 17 Representative consequent upon his leaving the District. A vote of thanks was recorded to Capt. Gee for his past services.

4. It was agreed to support a Services meeting in Salisbury on June 6.

5. It was agreed to establish new headquarters in Central London.

6. Wing Commander Hunter was warmly congratulated on his recent promotion.

I.E.E. Wireless Section Meetings

The Council records, with considerable pleasure, that the Committee of the Wireless Section, Institution of Electrical Engineers, has extended an invitation to R.S.G.B. members to attend future meetings of that Section. The 1943–44 programme will be published in a later issue of this Journal.

Members availing themselves of the invitation to attend meetings will sign the Visitors side of the Attendance Book and indicate that they are R.S.G.B. members.

District Representatives

The Council announces the following changes in District Representation :—

District 4 (*East Midlands*).—Mr. A. Clipstone, G8DZ, 14 Epperstone Road, West Bridgford, becomes Deputy D.R. in succession to Mr. W. M. Vendy, G6VD, who has relinquished that office for personal reasons.

District 14 (*Eastern*).—Mr. L. Fuller, G6LB, 167 Galleywood Road, Chelmsford, becomes Scribe until such time as Mr. Varney, G5RV, is free to resume his duties as D.R.

District 17 (*Mid East*).—Mr. A. Simons, G5BD, "Windyridge," Admiralty Road, Mablethorpe, becomes D.R. in place of Capt. A. C. Gee, G2UK, who, as announced last month, has left the District.

The Council extends its thanks to Messrs. Vendy and Varney for their past services and offers its best wishes to their successors and to Mr. Simons. Mr. Fuller and Mr. Simons have had previous experience as D.R.'s whilst Mr. Clipstone has been Town Representative for Nottingham for some time.

London Meetings, Session 1943–4

In connection with the programme for the 1943–4 Session, the Council invites offers from members who are willing to read a paper to the London membership. Offers should be made in writing to the General Secretary giving a synopsis of the ground to be covered. The invitation is not confined to members resident in the London area.

Meetings will be held monthly at the Institution of Electrical Engineers, London, commencing Saturday, September 25, 1943.

London Meeting

Nearly 100 members attended a meeting of the Society held at the I.E.E. on Saturday, May 29, 1943, to hear Mr. Rex Heatley, G5OH (Technical Sales Manager, Stratton & Co., Ltd., Birmingham) lecture on the Eddystone 358X receiver.

Mr. Heatley referred to the many design and manufacturing problems which had been successfully overcome by his company in the production of the 358X and at the conclusion of his lecture he demonstrated a model loaned for the occasion by Messrs. Webbs Radio, Soho Street, London.

Mr. S. K. Lewer voiced the thanks of the meeting to Mr. Heatley and congratulated Messrs. Stratton & Co., Ltd., on producing such an excellent instrument. Mr. H. A. M. Clark (Hon. Secretary) deputising for the President (Mr. A. D. Gay) associated himself with the vote of thanks and on behalf of Council extended a warm welcome to the many Service members present. It is hoped to publish Mr. Heatley's paper in a future issue of this Journal.

Subscriptions to *QST*—An Important Statement

The A.R.R.L. informs us that the following notice is now sent to all overseas subscribers to *QST*.

"If your *QST* subscription entry is a new one, we have not been able to enter it with the issue specified because under present conditions, and also because of export control, we can only enter it with the issue current at the time the entry is made. If your subscription entry is a renewal, the foregoing also applies. After the war we shall be glad to supply upon request the missing issue or issues if they are available, at the rate of 25c. per copy, U.S. funds.

"Also under present conditions each monthly copy of *QST* mailed overseas is sent at the subscriber's risk, and we cannot duplicate copies."

In view of this new ruling members who subscribe to *QST* should forward a remittance to Headquarters at least four months before their subscription is due for renewal.

In certain instances individual overseas members send their renewal remittance direct to A.R.R.L. but this practice leads to further delays as the A.R.R.L. are required to submit the draft for collection through U.S. banks. In their own interest Society members who wish to subscribe to *QST* should place their order through Headquarters. The annual subscription rate remains at 17s. 6d.

NEW MEMBERS

Home Corporates

* W. Scott Hay (G2FV), 2 River View, Heath End, Flackwell Heath, Bucks.
* W. T. Rees (GW3CR), 82 Oak Street, Gilfachgoch, Tonyrefail.
K. N. Hollands (G3LL), 14 Highfield Cottages, Wilmington, Dartford.
W. G. Hodges (G4MY), 1 Lincoln Avenue, Bournemouth.
* J. J. Maling (G5JL), James Hse, Albert Road, Hayes, Middx.
A. Gwinn (G5LZ), 27 Consfield Avenue, New Malden.
R. Mitchell (G5LH), Croft House, Horbury, Nr. Wakefield.
* J. E. Perkis (G5UI), 67 Arthur Street, Ryde, I.O.W.
W. E. Sykes (G5XK), 54 Kennedy Avenue, Fixby, Huddersfield.
* H. D. H. Smith (G6YN), 64 Columbia Road, Grimsby.
J. Frampton (2APF), 48 Stanbury Road, Birmingham, 14.
F. Saunders (2CHS), 17 Ash Grove Terrace, Brighouse, Yorks.
S. A. Fisher (2FOC), 93 Lecale Street, Donegall Road, Belfast.
R. Dore (2FPD), 10 William Street, Reading.
J. H. Whent (2HGY), 46 Bramley Road, London, W.5.
C. Shackleford (2HJG), 72 Hales Road, Cheltenham.

Home Corporates (B.R.S.)

J. L. Sanders (6293), 69 Bradstock Rd., Kings Norton, Birm., 30.
T. G. Clark (6294), 27 Pemberton Road, E. Molesey, Surrey.
W. F. Wright (6295), 31 Woodfield Rd., Panteg, Pontypool, Mon.
F. Ward (6296), 51 St. Peters Street, Syston, near Leicester.
A. G. Symmonds (6297), Pen-Hill, Llantwit-Major, Glam.
L. A. Slann (6298), 12 Priestley Gardens, Romford, Essex.
A. W. Roach (6299), 92 Carlton Crescent, Luton, Beds.
R. J. Ramsay (6300), 20 Glenburn Avenue, Cambuslang, Glasgow.
Miss J. E. Paine (6301), 38 Alpha Street, Slough, Bucks.
W. McCall (6302), 10 Fruin Rd., Drumchapel, Glasgow.
D. J. Humphreys (6303), 34 Alloa Road, Goodmayes, Essex.
J. Howat (6304), 4 Rigg Street, Stewarton, Ayrshire.
W. H. Howard (6305), 59 Jennings Road, London, S.E.22.
A. Hopkins (6306), 23 Station Road, Ampthill, Beds.
G. Holliday (6307), 198 Chatsworth Avenue, Cosham, Hants.

R. F. J. GILBERT (6308), c/o Mrs. Hickman, Endon Lodge, near Pershore.
J. FACER (6309), 37 West Gate Road, Barrow-in-Furness.
K. DUCKWORTH (6310), Gravel Hill, Wombourne, Staffs.
J. BROWN (6311), 606 Rutherglen Road, Glasgow, C.5.
I. BENTLEY (6312), 55 Brentbridge Rd., Fallowfield, Man.14.
J. A. BENNET (6313), Buckstane, Braid Road, Edinburgh.
J. BAGBY (6314), 68 Victoria Road, Sutton Coldfield, Warwicks.
W. J. FISHER (6315), 12 Herbert Street, Newport, Mon.
N. J. SINGLETON (6316), c/o Little Summerleaze, Coppits Hill, Yeovil.
J. F. GOLDING (6317), 43 Camp Road, St. Albans.
A. L. GRAY (6318), 26 Eaglesfield Road, London, S.E.18.
N. C. HEATHCOCK (6319), Camelot, Chawn Hill, Stourbridge, Worcs.

A CORDIAL WELCOME IS EXTENDED TO THE

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NEW MEMBERS WHOSE NAMES ARE LISTED

R. C. DARNEY (6320), Burntisland, Ashford Road, Faversham.
J. MERRIFIELD (6321), 30 Armitage Avenue, Brighouse, Yorks.
J. GRATWICK (6322), 19 Hastings Road, London, W.13.
G. SMITH (6323), 3 Hungerford Avenue, Slough.
R. H. SUMNER (6324), 8 Brookfield Crescent, Headington, Oxford.
W. O. WILLIAMS (6325), 2 Kirkway, Greasby, Cheshire.
E. A. PORRITT (6326), 41 Algiers Rd., Ladywell, London, S.E.13.
L. H. COX (6327), Pebsham Bungalow, Pebsham Lane, Bexhill-on-Sea.
A. A. CAMPBELL (6328), South Lodge, Baxter Park, Dundee.
F. A. RAYNOR (6329), 24 St. Pauls Road, Colchester.
F. D. CHAPMAN (6330), 68 St. Mary Street, London, S.E.18.
L. E. HALL (6331), 38 Hawthorne Tce., Main Rd., Dovercourt.
K. WOOD (6332), c/o 153 Lee Street, Oldham, Lancs. (Prisoner of War).
P. JONES (6333), Kingsheath Av., Knotty Ash, Liverpool, 14.
J. C. FRY (6334), 3 Grosvenor Court, Shelley Road, Parkstone.
B. A. NICHOLS (6335), 32 Danbury Street, London, N.1.
W. G. S. HINCHCLIFFE (6336), 70 Huddersfield Rd., Brighouse, Yorks.
G. J. L. BROWNE (6337), 23 Plashet Road, London, E.13.
P. J. STRATTON (6338), 22 Oakleigh Road, London, N.11.
H. TOMLINSON (6339), 100 Ray Street, Heanor, Notts.
S. H. WADE, B.Sc., PH.D. (6340), 49 Kennedy Avenue, Fixby, Huddersfield.
G. R. LEWIS (6341), Oakley, Oldfield Road, Altrincham.
L. R. WEBB (6342), 82 Hollingbury Park Avenue, Brighton, 6.
R. A. HARDING (6343), Deloraine, Tenterleas Rd., St. Ives, Hunts.
J. G. V. MORRISS (6344), 131 Shadwell Road, North End, Portsmouth.
G. F. SPRINGATE (6345), 39 Kings Road, Tonbridge.
R. A. HOLDSTOCK (6346), 37 Kingsland Road, London, E.13.
B. A. GOULD (6347), 152 Staines Road, Ilford.
S. C. DUNN (6348), 75 Crags Avenue, Paisley, Renfrews.
D. E. ROBBINS (6349), 11 The Linkway, Barnet.
K. M. METCALFE (6350), 13 Palace Gardens, Weybridge.
C. R. MIDDLEWOOD (6351), 12 Mount Joy, Durham City.
J. JACKSON (6352), 26 Carlyle Street, Mexborough, Yorks.
R. E. CHURCH (6353), Avondale, Marley Lane, Haslemere, Sy.
E. DAVIS (6354), 72 Blythswood Street, Liverpool, 17.
D. T. DINSEY (6355), 56 Russell Road, London, N.15.
R. DURBER (6356), 4 Stonehaven Road, Aylesbury.
S. W. HONEYBALL (6357), 20 Chiltern Street, Aylesbury.
E. GRIFFIN (6358), 63 Lee Road, Southcourt, Aylesbury.
G. F. J. SIRETT (6359), 36 Christopher Way, Broadgreen, Liverpool.
J. D. HERRING (6360), 97 Brown Street, Salisbury.
D. B. MACDONALD (6361), 24 Marshall Street, Lochee, Dundee.
R. COOPER (6362), 138 Harborne Road, Birmingham 32.
D. L. LEWIS (6363), Penybont, Llanybyther, Carms.
L. J. RIPPON (6364), 43 Chelmerton Avenue, Chelmsford.
R. F. RUSSELL (6365), 45 Woodland Road, London, E.4.
J. T. GOSS (6366), Rose Cottage, Cricket Hill, Yateley, Camberley.
W. DEAN (6367), 133 Green Lane, Leamore, Walsall.
G. W. PEACOCK (6368), Crossvale, Idole, near Carmarthen.
J. G. C. LOGIN (6369), 5 Rosemont Road, Richmond, Sy.
D. CHIPPERFIELD (6370), 3 Victoria Tce., Calne.
L. CRITCHLEY (6371), 83 Bradford Road, Huddersfield.
W. W. GRIFFITH (6372), Angorfa, Abersoch, Pwllheli, Caerns.
K. C. E. FORD (6373), 29 Hill Crescent, Kenton, Middlesex.
W. H. BARTON (6374), 37 Lowe Bank Rd., Ashton-in-Makerfield, Lancs.
G. A. AYERS (6375), Wayside Cottage, Coldharbour Lane, Hildenborough, Kent.
K. G. BAYLISS (6376), 93 Penn House Av., Penn, Wolverhampton.
J. PRESTON (6377), 106 Deanston Drive, Shawlands, Glasgow.
R. B. EDWARDS (6378), 17 Drylaw Cres., Blackhall, Edinburgh.
H. A. LAMB (6379) 1 Council Houses, Kirk Hammerton, Nr. York.
I. C. DALRYMPLE (6380), 63 Salisbury Road, Cressington Park, Liverpool, 19.
G. B. L. WOODBURN (6381), 223 Quinton Lane, Birmingham, 32.
A. WOODS (6382), 32 Feltham Hill Road, Ashford, Middlesex.
S. G. HINTON (6383), Greenways, Rainsford Lane, Chelmsford.
C. TUDOR (6384), 8 Ella Street, Hull, Yorks.
G. CHADWICK (6385), 41 Woodville Avenue, Liverpool, 23.
R. G. COLLIER (6386), 8 Cherhill, Calne.
W. H. COLE (6387), 6 Market Street, Guildford.
J. H. WILLIAMS (6388), 51 Towncroft Avenue, Middleton, Manchester.
C. KITCHING (6389), 1 Porlock Close, Woodbank, Stockport.
R. E. G. DANIELL (6390), 63 Elmgrove Road, Harrow, Middlesex.
G. A. GARBUTT (6391), 92 Scruton Av., Humbledon, Sunderland.
J. T. BURKE (6392), 7 Welton Place, Hyde Park, Leeds, 6.
J. D. LOVERIDGE (6393), 290 Coleshill Road, Castle Bromwich.
G. A. HARVEY (6394), 7 Cobourg Street, Plymouth.
J. J. GRANT (6395), 23 Holbrook Avenue, Rugby.
H. E. CHISSELL (6396), 27 Northumberland Gardens, London, N.9.
* E. R. MARTIN (3990), 42 Exmouth Street, Swindon.

Dominion & Foreign

G. B. MOLENAAR (PAOFL), P.O.Box 237, London, E.C.1.
P. D. DOERSAM (W2BZB), 7 Buckingham Road, Palisade, New Jersey, U.S.A.
J. A. GRUTZIUS (W6FZ), 4928 Ledge Avenue, N. Hollywood, Calif.
LT. D. R. DOXSIE (W8EVV), U.S. Army.
2ND/LT. J. C. BOLTZ (W9BQK), U.S. Army.
H. O. WRIGHT (W9UYA), c/o 11 Carlos Place, London, W.1.
P./O. M. W. C. RIDDLE (ZL2UG), R.N.Z.A.F.
R. DAVIDSON F.F.C.S. (BERS518), c/o The United Africa Co. Ltd. Lagos, Nigeria.
LT. G. HYDE (BERS519), Canadian Army.
B. V. DORE (BERS520), R.C.A.F.
F. E. J. DAY (BERS521), 96 Beach Boulevarde, Hamilton, Ont.
CPL. N. BEETS (FRS69), Royal Dutch Brigade.

Associates

A. W. BOWMAN, 118 Ann Street, Dundee.
W. BENNETT (Junior), 5 Victoria Tce., Dawson Rd., Birm., 21.
W. E. DUGGAN (Junior), 229 N. Church Street, County of Orange, New York.

* *Denotes Re-Elected to Membership.*

BRITISH ISLES NOTES AND NEWS—(*Continued from page* 189)

these columns should be sent to Mr. Holden at 260 Grosvenor Road, Belfast. G6DS, and G3IR are welcomed to the district. G3NM is with us again—since his last visit he has "tied the knot." (Congrats to you both.) Airgraphs from VU2AN and G8PR bring 73 to all their GI friends. 8PR receives our congrats on his promotion to Flight Sergeant. 2DZG (Walter Caughey), P.O.W. in Poland, is now in receipt of R.S.G.B. parcels. He recently sent a photograph, and an account of St. Patrick's Day celebrations to one of the local papers. He is very well. Suitable components are required at the Y.M.C.A. club for the P.O.W. Ballot. What about it, you GI Hams? If you have anything to spare please send it along. New members will be very welcome at the Club at any time.

GI5QX records a visit from A. V. Dyer who was co-operator at VS6AQ. Incidentally 5QX had the pleasure of working VS6AQ on March 1, 1936. Seeing Mr. Dyer in person was as great a thrill as the original contact. Congrats to 2DDI who is engaged to a Toronto girl. He hopes to be a VE3 after the war.

GI5QX.

Leeds P.D.M. Photograph

Mr. P. B. Jackson, G3WQ, whose address is The Rose and Crown, New Street, Selby, Yorks, will be pleased to supply prints of the Leeds P.D.M. group (reproduced on page 187) to those who send him 2d. in stamps and a stamped addressed envelope.

Silent Keys

We record, with deep regret, the passing of Ft./Lt. Gilbert Alan Houghton, R.A.F.V.R., **G3AG,** of Tadworth, Surrey, who lost his life as the result of a road accident in North Africa in April, 1943. He was 21 years of age.

* * *

Scotland "D" District members, as well as many others at home and abroad, will be sorry to learn of the death on active service at the early age of 29, of Flight Sergeant James Huschman, R.A.F.V.R., GM6HZ. James who had been a member since 1932 possessed outstanding technical abilities and had the happy knack of being able to impart information to his colleagues in an easy style.

On behalf of fellow amateurs and friends who knew him we extend our deepest sympathies to his wife, mother and brother.

GM5HL.

Book Review

THE TECHNIQUE OF RADIO DESIGN. By E. E. Zepler. Chapman and Hall; 21s.

This is a type of book which we are glad to welcome among the many recent publications on radio engineering. To quote from the preface, "It deals mainly with those problems which are closely linked with the daily routine of an engineer, both in the development and testing of radio receiving apparatus of all types. Intimate details of many aspects of receiver work are given rather than a comprehensive treatment, general principles being adequately dealt with in the excellent existing textbooks."

The book opens with an introductory chapter upon fundamental theoretical facts such as tuned and coupled circuits, equivalent circuits of transformers, matching problems, etc. The value of that useful adjunct to Ohm's Law known as Thévenin's Theorem, in simplifying circuit calculations is very justifiably stressed. The more commonly used capacitance and inductance formulæ and expressions for impedances of transmission lines, etc., are collected together in front of this chapter. Chapter two deals with aerial coupling circuits, aerial feeders, and direction finding aerials. Chapter three covers the general theory of amplifiers with useful data on negative feedback, wide band and D.C. amplifiers. Power amplifiers are discussed including class B, B_2 and AB push-pull stages.

The fourth chapter is devoted to problems of detection and frequency changing. Following the general theory of straight detectors, frequency changers are fully discussed and some useful notes are given on some of the reasons for unsatisfactory operation of such circuits. The design of the oscillator and its ganging is next considered and it is pleasant to notice the attention given to such points as stability and the curing of squegging. Automatic frequency control and beat frequency oscillators are also described in this chapter.

Selectivity forms the subject of the next chapter, under the headings of adjacent channel selectivity, spurious responses, cross-modulation and reception in the vicinity of strong transmitters. Useful information is given on crystal gate circuits, the use of regeneration to control selectivity, stagger-tuned circuits, image suppression, etc.

Chapter six is devoted to the very important subject of the generation of noise in receiving circuits and the design of receivers to combat the various sources of noise. The useful convention of referring the shot noise of a valve to an equivalent grid resistance whose thermal agitation noise would have the same effect seems to have been omitted, however.

Chapter seven covers many aspects of gain control both manual and auto. Many of the practical snags frequently encountered when applying these are related.

A very complete chapter on the screening of receivers, valves and coils, etc., then follows. The next four chapters are concerned with some of the less desirable phenomena which are so regrettably often found in receivers. The most important of these is that dealing with undesired feedback. The failure of many new designs to behave as forecast on paper can be attributed to unexpected stray capacitances, magnetic couplings, common earth impedances, the presence of R.F. currents in A.F. circuits, acoustic feedback and "threshold howl." It is refreshing to find all these and other similar points described with means for overcoming them. The other three chapters in this category cover hum, distortion and parasitic resonances.

The book concludes with two chapters on routine measurements and fault-finding respectively. No chapter of practical dimensions could itemise all the faults likely to be met in receiving circuits but it nevertheless lays down, by giving examples, the logical way in which such fault-finding should be undertaken.

The whole book is illustrated by many examples of design and practical methods of test. For the advanced amateur who constructs his own receivers this book can be recommended as the best combination of the theory and the practice of the subject we have yet seen. H. A. M. C.

A Leeds Occasion

Headquarters were represented by Mr. A. D. Gay, G6NF (President) and Mr. J. Clarricoats, G6CL (General Secretary) at the second war-time P.D.M. held in District 2 at the Hotel Metropole, Leeds, on Sunday, May 23. Mr. C. A. Sharp, G6KU (District Representative) introduced the President, who opened with references to the Society's increased membership and to the proposed new H.Q. in the centre of London. Mr. Gay also referred to the term "Ham" as applied to the radio amateur; he considered this term derogatory and felt that now was the time for it to be replaced by some other and better term. In concluding he thanked G6KU, on behalf of Council, for his services as D.R. and gave a special welcome to Service members.

The General Secretary then addressed the meeting and after expressing his appreciation of the warm welcome extended by the "County of broad acres" went on to review the rapid growth of the Society's membership and to point out the difficulties met with in producing THE BULL. He spoke of District Notes and the future policy of THE BULL making reference to the questionnaire published in this issue. An appeal was made to members, particularly those in the Services, to join the Society's Experimental Section. In regard to post-war plans Mr. Clarricoats stated that the Council of the Society would, as reported in a recent issue of THE BULLETIN, press for the early restoration of licences, but he warned members not to expect restoration immediately on the cessation of hostilities. At this stage tea was served, after which the General Secretary continued his talk with a reference to the possibilities of producing new Society technical publications after the war. He spoke of the present day difficulties of T.R.'s and expressed thanks for the services of those officially listed in THE BULL and appealed for volunteers for towns not yet represented. He stressed the advantages of local meetings and asked that publicity be given them. Special thanks were extended to G8UO, the District Scribe.

Reference was made to the good work being done by the Prisoners of War Fund and an appeal for support resulted in the sum of £6 6s. 2d. being donated later.

Mr. Gay then declared the meeting open for questions following which a vote of thanks to the President and General Secretary was carried.

The meeting concluded with the usual rag-chews and photographs and "a good time was had by all."

Those present included G2LT, UK, VC, 3PM, WQ, 4CL, FU, 5BD, DI, TQ, YV, 6BX, CL, DV, KU, NF, NP, XL, 8RF, UO. 2DUX, HAP, HDU, HDY, HNQ, BRS1151, 4095, 4377, 4408, 4819, 4976, 5560, 6105, many of whom were in uniform.

G2LT.

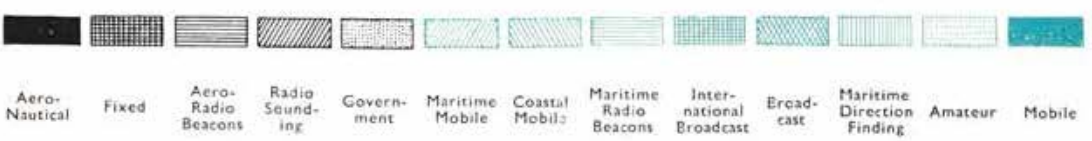
Side Slips

The caption printed beneath the circuit diagram of the one valve preselector published last month (Page 167), was incorrect in two respects. The range 7.2–1.8 Mc/s. should have read 7.2–18 Mc/s., whilst the coil data references L1 and L4, L2 and L3 were transposed.

QSL Bureau

After a final clear out of the QSL Bureau, G2MI advises us that he holds cards of more than ordinary interest for the following calls. These cards will be retained indefinitely, but anyone able to claim them now can do so by sending a stamped, addressed envelope to A. O. Milne, 29 Kechill Gardens, Hayes, Bromley, Kent.

G3BI, JQ, JS, MC, MJ, OF, QD, QH, WM, 4DQ, FF, 5DQ OB, OR, QM, 6CI, FB, KM, MK, PC, PU, QY, RO, 8FQ and JX.



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