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CONTENTS

OLD-TIMERS AND NEW-COMERS

JANUARY 22, 1938, will pass into British Amateur Radio history as the date when the first Reunion took place of those who, for the want of a better word, have been described as "Old-Timers." Never before have so many pioneers of our movement been gathered together in one place at one time.

Looking round the table that evening one was conscious of a different atmosphere from that which prevails at Society functions. Everyone spoke about it, none could define it. Maybe in that room we who were fortunate to be present were experiencing for the first time in our lives collective Ham Spirit —that elusive something that even our most euphonic contributor, Mr. Austin Forsyth, finds difficulty in defining.

To listen again to the Founders and Pioneers of British Amateur Radio was an experience which we of a later generation will not easily forget. In simple words, achievements of epoch-making significance were mentioned without self-praise or advertisement.

When Mr. Rene Klein, our original Secretary, told us of his decision to form a club for those interested in wireless experiments there was not a person present who did not wish that *he* had been one of the select half-dozen who responded to the call to meet at Hampstead in July, 1913. For Mr. Klein and no less for Mr. McMichael, the founders of the Society, the meeting of the "Old-Timers" must have meant a very great deal, for they have lived to witness their creation of pre-war years grow up from a mere handful of enthusiasts to a strong, virile organisation respected (as it has always been) by the G.P.O., the Services, the B.B.C. and even the commercial interests.

Let us for a brief space turn from the "Old-Timers" to the New. Since 1928 our membership has grown rapidly, thousands of new calls have come into operation and, sad to relate, many hundreds have lapsed. Oft-times we hear criticisms of the new-comers; we are told they have no ambitions in life, no urge to experiment, but we dare to challenge all who would so lightly belittle those to whom we must look for support and leadership in the future.

Frequently in our visits to the provinces we meet members who are apparently doing little real work, but as the years pass many of those same members will begin to concentrate on some aspect of "ham radio" which will bring with it greater enjoyment than mere key-punching without an aim.

We see it daily—the man who a few years ago was regarded as a prize "nit wit" has developed into a splendid T.R. or D.R.—the "gramophone maniac" of 1930 is now doing his share and more to safeguard the interests of the membership. And so it

[*Continued on page 462*

A 30-Watt Modulator

By J. N. WALKER (G5JU).

IN the December, 1937, issue of the BULLETIN there was described a 50-watt transmitter for the 28 and 56 Mc. bands. This transmitter is intended chiefly for long distance work, using pure C.W., but there may be occasions when it is desirable to use telephony, especially when carrying out tests on 56 Mc. with stations at moderate distances. A suitable modulator was therefore designed and built, and is described in the following article.

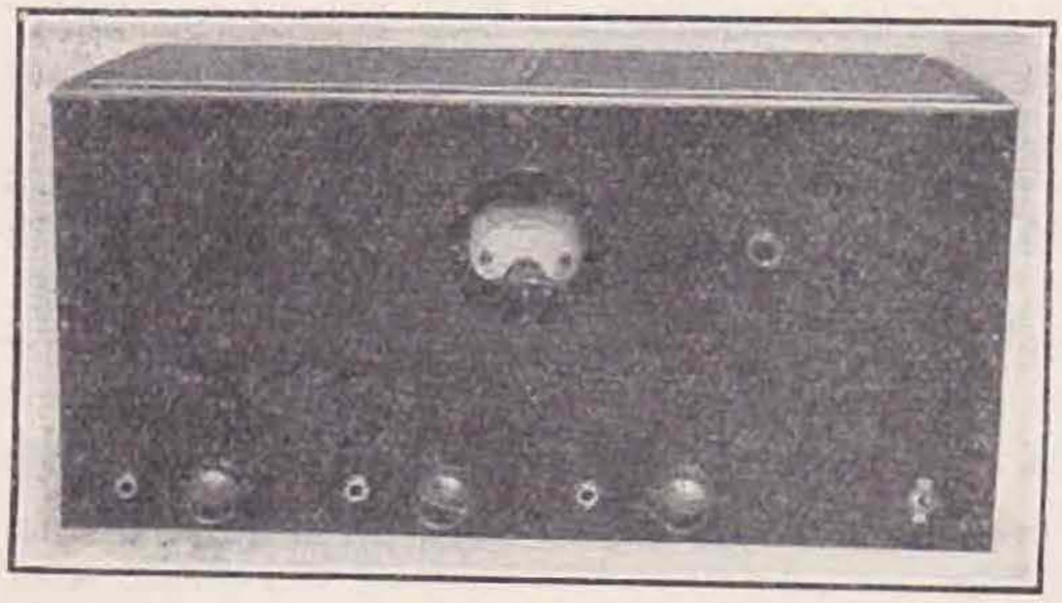
Major Points

The transmitter is very conservatively rated at 50 watts, and to fully modulate this input, 20 to 25 watts of audio power is required. At the same time it is well to have some reserve in hand and not work the modulator valves full out. The maximum output is in the region of 30 watts, and to economically obtain this figure, beam power tetrodes are used in a Class AB circuit. Under these conditions it is allowable to use fixed bias, as the anode current fluctuations are nothing like so great as under Class B. conditions. If fixed bias were used, the available output would rise to 50 watts, and, as at a later date, it may become desirable to take advantage of this fact, an output transformer designed to handle this aomunt of audio energy has been included.

A treble channel input precedes the driver stage. The first valve, a Type 75 triode, is intended for use with sensitive microphones, and the second, a Type 89 pentode, gives much greater gain, and can be used as an alternative with microphones giving only low outputs. The third valve, a Type 42, is connected to give a tone of approximately 800 C.P.S., and its obvious purpose is to enable the transmitter to be tone modulated (M.C.W.) in order that the signals may be read by users of super-regenerative receivers.

Microphone jacks are provided on the front panel, and also a jack for use with the key when M.C.W. is required. Each of the three-volume controls incorporates a switch, which is wired in the heater circuit, so that, when off, the valve remains cold, and no undesirable interaction can occur, neither are the valve impedances upset.

If metal valves are preferred, Types 6F5, 6J7, and 6F6 respectively can be substituted for those mentioned.



Front View of Modulator. Microphone jacks on right, keying jack on left.

Two metal 6C5 valves are used in the driver stage.

A push-pull circuit has been adopted, as this ensures both ample driving power and low distortion level, this latter point being very important with Class AB or B systems.

The final valves are 6L6's, and anti-parasitic resistance R19, 20 are included in the grid circuit. It was also found necessary to include similar resistances in the grid and anode circuits of the 6C5 valves, to prevent occasional oscillations at high frequencies.

The couplings throughout are by means of iron-cored transformers, these being of *Thordarson* manufacture, and properly matched to the various input and output impedances.

The Power Supply

Good regulation is very essential, partly to avoid distortion occurring through the anode voltage to the 6L6 modulator valves fluctuating under the varying current taken by them, and also because the early stages are fed from the common supply. As it is necessary to drop 150 to 200 volts to the anodes of the earlier valves, adequate decoupling is easy to arrange without any falling off in performance.

The mains transformer rating is 450-0-450 volts, at 150 200 mA., with three suitable L.T. windings. The 8 Henry swinging choke maintains good regulation, whilst the 20 Henry choke, in conjunction with condensers C11 and 12, ensures that the D.C. output (400 volts) is free from ripple.

The resistance R23 performs two functions, that of " bleeder " and also to provide a very steady voltage on the screens of the 6L6's. R23 is a *Bulgin* 20-watt resistance, provided with a variable tapping clip.

The rectifier valve is of the indirectly heated type, to prevent high voltage surges, and the type 83V is very suitable, as it possesses the additional advantage of low impedance and large current handling capacity.

The Output Transformer

The *Thordarson* Type 8470 transformer is designed to handle the 60 watts maximum audio power given by 6L6 valves when used in Class B. The load required under these circumstances is of the order of 3,800 ohms, but under Class AB conditions, the load necessary is higher, being of the order of 6,500 ohms.

It by no means follows that the transformer is unsuitable for both sets of conditions. What actually happens is that when a load of 7,500, 5,000 or 2,500 ohms is connected to the secondary tappings, the load reflected on the primary is 3,800 ohms. To reflect 6,500 ohms, it is necessary to connect loads of 7,800, 7,000, or 5,800 ohms to the respective secondary tappings. This point should be borne in mind, and the following table gives particulars of the power amplifier adjustments necessary to secure correct matching and best results, both from the point of view of depth of modulation and quality.

Required Impedance. Ohms.	Power Amplifier. Voltage.	Current. mA.
5,800	400	70
	500	86
7,000	400	57
	500	71
	600	85
7,800	400	52
	500	64
	600	77

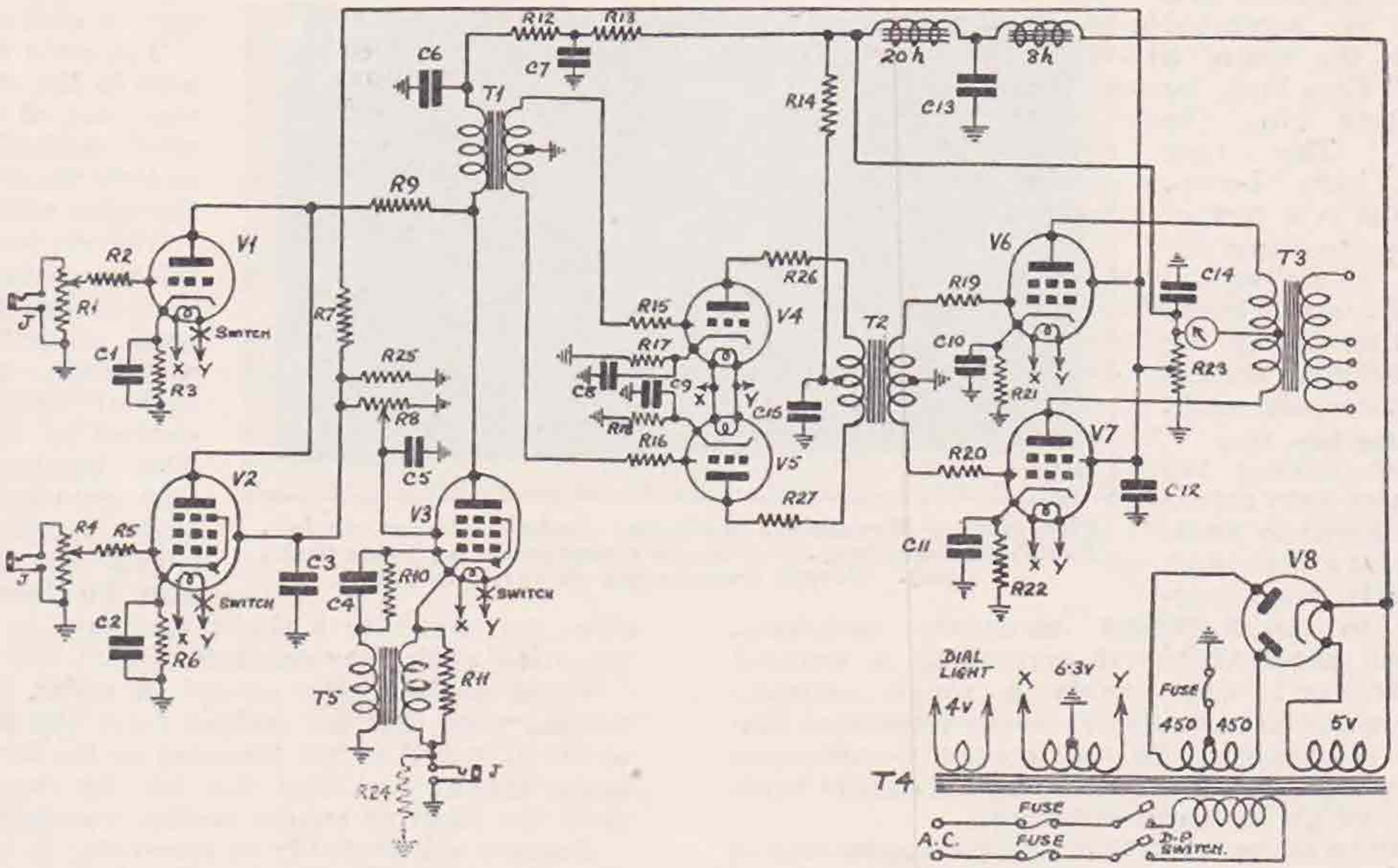
Construction

It is desirable to have the modulation equipment to match, in appearance, the transmitter itself, and the chassis on which it is built is housed in a black crackle finished steel case, measuring 20½ in. by 10½ in. by 10 in. A slot is left at the rear, through which connections are taken, and ventilation holes are provided.

On the front of the cabinet are mounted the three input jacks and volume controls, a 0/150 *Ferranti* milliammeter, which reads the combined plate current of the modulator valves, the double pole mains switch, and an indicating light.

All the other components are mounted on a mild steel chassis measuring 20 in. by 10 in. by 3 in. This should be made out of heavy gauge metal, preferable 16 s.w.g., as the weight it has to bear is considerable. The heaviest item is the modulation transformer, and whilst in the present case this has been included on the chassis, it would possibly be as well to mount it in a small case separately. A lighter gauge steel (18 s.w.g.) would then be permissible.

The photograph clearly illustrates the actual layout of the components, and, as suggested in the previous article, a full-size brown paper template should be prepared, and instructions given for the majority of the holes to be drilled by the manufacturer. The inter-valve transformers have sub-base connections, and although this necessitates more holes, a very clean "deck" appearance results.



R1, 4	*250,000 Variable, Type J Dubilier.*	*R24*	*See text. 1 watt Type F Dubilier.*
R.8	*100,000 Variable, Type J Dubilier.*	*R25*	*50,000 1 watt Type F Dubilier.*
R.2, 5, 15, 16	*5,000 ½ watt Type F Dubilier.*	*C1, 2, 8, 9*	*50 F. 12-volt Electro. Type FT T.C.C.*
R.3	*2,000 1 watt Type F Dubilier.*	*C3, 5, 6, 7, 12*	*4μF. 450-volt Electro. Type 502 T.C.C.*
R6, 17, 18, 26, 27	*1,000 1 watt Type F Dubilier.*	*C4*	*.02 μF. 400-volt Tubular Type 300. T.C.C.*
R7	*20,000 1 watt Type F Dubilier*	*C10, 11*	*25 μF. 25-volt Electro. Type F.T. T.C.C.*
R9	*10 000 1 watt Type F Dubilier.*	*C13, 14*	*8 μF. 450-volt Electro. Type 502. T.C.C.*
R10	*100,000 1 watt Type F Dubilier.*	*T1*	*Intervalve Trans. Type 8741. Thordarson (G5N1).*
R11	*See text. 1 watt Type F Dubilier.*	*T2*	*Driver. Trans. Type 84D59. Thordarson (G5NI).*
R12	*40,000 1 watt Type F Dubilier.*	*T3*	*Output Trans. Type 8470. Thordarson (G5NI).*
R13	*25,000 1 watt Type F Dubilier.*	*T4*	*Mains Trans. Outputs as shown in Fig. 2.*
R14	*15,000 2 watt Type F Dubilier.*	*T5*	*Any Intervalve Trans, Ratio 3-1.*
R19, 20	*500 ½ watt Type F Dubilier.*	*Ch.1*	*Input Swinging Choke. 200 mA. (G5NI).*
R21, 22	*200 2 watt Type F Dubilier.*	*Ch.2.*	*Smoothing Choke. 20 Hy. 150 mA. (G5NI).*
R23	*50,000 20 watt Type PR17 Bulgin.*		

OTHER COMPONENTS:

Valves: V1, Type 75; V2, Type 89; V3, Type 42; V4, 5, 6C5; V6, 7, 6C6; V8, 83V. (Raytheon, Webbs Radio).
Valve-Holders: 1 x 4 pins, 3 x 6 pin, 4 Octal American Types (Webbs Radio).
Switch: Double Pole, Type S126. Bulgin.
H.T. Fuse: Tubular 250 mA., Type 1034. Belling Lee.
Mains Fuse Plug: Clix. Metalwork. A.P.A., Ltd.
Indicating Light: Type D19. Bulgin.
Jacks: Type J6 (Closed Circuit). Bulgin.

The main smoothing condensers are of the aluminium can type, but the decoupling condensers are of the block type (Electrolytic), and are more conveniently mounted underneath the chassis.

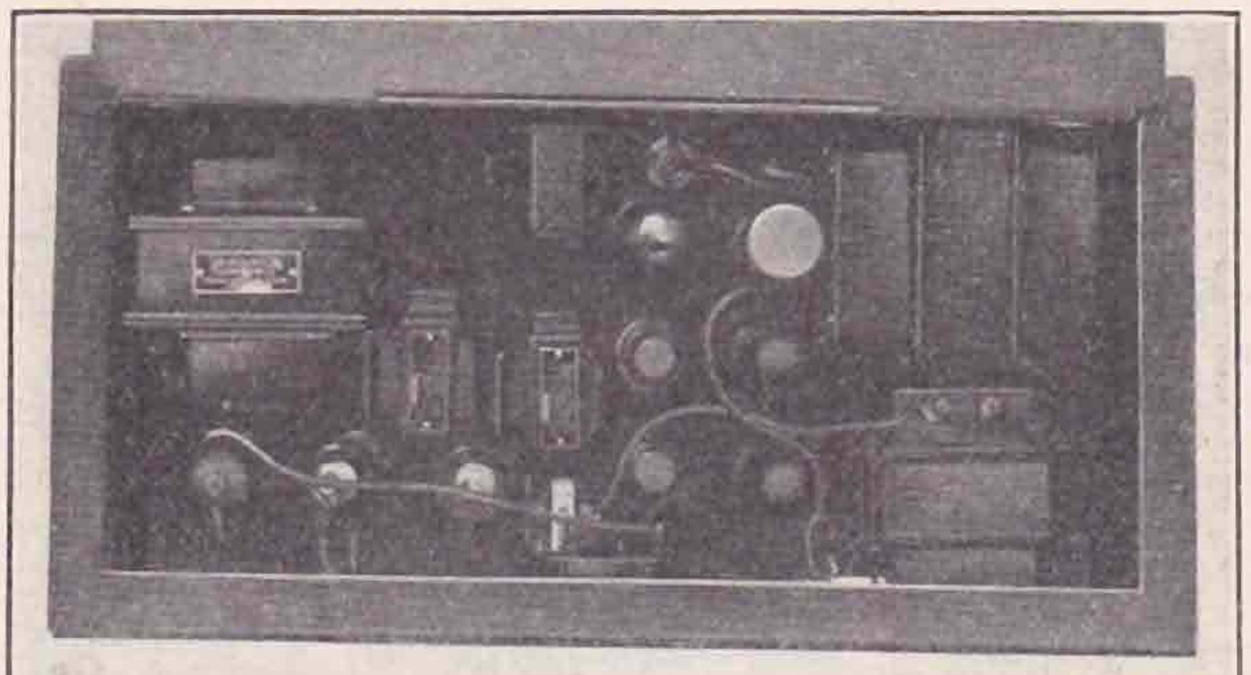
The resistance R23 develops a fair amount of heat, and it should be mounted clear of other components, and adequate ventilation allowed for.

The balance of the components are suspended in the wiring, which can be conveniently carried out with 20 s.w.g. tinned wire and systoflex sleeving. Particular attention should be paid to the high tension wiring, and especially to the insulation of the connections between the 6L6 anodes and the modulation transformer primary.

A small 3 amp. plug is fitted on the rear of the chassis, and is connected to the appropriate tappings on the secondary of the output transformer.

Holes are required in the front panel of the cabinet to correspond with the jacks, etc., on the front of the chassis. No insulating bushings are necessary, as one side of each jack connects to earth, whilst the volume control spindles are not electrically connected to the moving contacts.

The equipment as a whole is protected through the use of a "Clix" Fuse Plug, for connection to the mains. This plug should have 1-amp. fuses, and is is further desirable to fit on the chassis a *Belling-Lee* 250 mA. fuse between the centre tap of the H.T. winding on the transformer, and earth.



Plan view of Modulator. Swinging choke is at rear, on left. Rectifying valve is on left of mains transformer (extreme right, rear). Output transformer is extreme left

Putting into Use

Before putting the modulator into actual use, it is well to make preliminary tests with a 25-watt lamp connected to the 2,500ohm secondary terminals. This will show visibly if everything is working properly, and will enable a rough estimate of the output to be made. It is very important that a load is connected to the secondary—otherwise very high voltages will develop on the output valve anodes, which may cause damage.

It will be appreciated that high gain apparatus of this type requires earthing to a low resistance earth, and this should be carried out before the modulator is put into use, otherwise instability may occur.

A word or two is called for on the reading that may be expected on the milliammeter. The actual reading, and also the output, will depend upon the setting of the tapping clip, on R23. If only a moderate output, up to 20 watts, is required, the clip should be set so that a reading of about 75 mA. is obtained. If full output is desired, set the clip so that the combined anode current is between 90 and 100 milliamperes. The voltage on the screens in the latter case will be in the region of 250 volts. Under modulation, the meter needle will kick up to maximums of nearly 150 mA., and this is perfectly in order. Should the needle kick only slightly, or downwards, it is an indication that stray R.F. is reaching the grids of the valves. To prevent this, use screened leads for the connections to the grid top caps of the first two valves, and keep aerial leads, etc., well away from the microphone. Screened leads should, of course, be fitted to the latter.

The note given by the tone oscillator will depend on the transformer used. It will probably be too low, and the pitch can be raised by putting resistance R5 in parallel with the primary (cathode) winding. Various resistances should be tried until a pleasing, penetrating note is obtained.

The only snag met with in the modulator was that of finding a good method of controlling the intensity of the tone oscillations.

Various positions for R8 were tried, but all more or less altered the tone as well as the amplitude, and it is difficult to get a full control of the latter. The position shown was eventually found best. A high resistance across the key may also be found desirable to eliminate a slight variation in the tone occurring as the key contacts close.

When all has been proved in order, it is only necessary to link the output from the modulator to the plug and socket provided on the transmitter, using heavily insulated flex for the purpose, and open the shorting switch on the transmitter.

Readers will probably be interested to know that with the aid of this equipment, all U.S.A. districts have been worked on telephony many times over, and the reports indicate that both the strength and quality are consistently good.

Kingston and District Amateur Radio Society

Mr. Donald Biggs (G6BI), Hon. Secretary of the above Society, informs us that the membership has increased to 50, and that a highly successful year has just been completed.

At the January meeting, held at the Three Fishes Hotel, Kingston, a demonstration and lecture was given by *Premier Supply Stores*. Various amplifiers and transmitters were displayed, and a thoroughly enjoyable evening was spent by all.

The Group Managers reported progress, and gave information concerning future Group meetings. The 56 Mc. Group is controlled by 2CSK, the A.A. Group by G8IP, and the Propagation Group by G2ZY. The latter as Vice-Chairman announced that a new valve would be presented to the member submitting the best three or four-word slogan for use on the Society's note-heading.

R.S.G.B. members living in the Kingston area are invited to write to Mr. Biggs at 44, Pooley Green Road, Egham, Surrey, for further particulars.

Southend and District Radio Society

Mr. J. M. S. Watson (G6CT) informs us that he has been appointed Hon. Secretary of the above Society and he will be pleased to hear from R.S.G.B. members desiring information concerning his Society's activities.

Radio Frequency Power Amplifiers*

By F. Butler.

Introduction.

IN this article it is proposed to touch upon those points likely to interest a transmitting amateur whose aim is to extract from the smallest and cheapest components, the largest amount of radio frequency power, accompanied by reasonable stability of frequency and reliability of operation.

The knowledge that will be assumed is limited to valve static characteristics and a little A.C. theory, and the aim is to show how power supplies, circuits, and components may be chosen for the highest efficiency of operation.

Valve Characteristics.

The suitability of a valve for any purpose is always judged from the static characteristics:—

(1) Amplification factor $= \frac{dE_a}{dEg}$

(2) Slope resistance $= \frac{dE_a}{dI_a}$

(3) Mutual conductance $= \frac{dI_a}{dEg}$

For a good power amplifier, high mutual conductance and low slope resistance are desirable.

Dynamic Characteristics.

Suppose a valve is operated with a large resistance in the anode circuit. On making the grid more positive the anode current increases, and the volts drop across the resistance increases, whilst the anode voltage falls. Again, if the high tension voltage is increased, the anode current rises, and so does the volts drop in the anode load resistance. The voltage between anode rises, but not so much as it would have done with no anode circuit load. A curve showing how anode current changes with grid/cathode or anode/cathode voltage, when a load is connected in the anode circuit, is called a dynamic characteristic. It is always flatter than a static characteristic, and is often used in estimating the performance of audio as well as radio frequency amplifiers. The nature of the anode load will now be considered.

Anode Loads of R.F. Amplifiers.

These are almost always associated with tuned circuits. Often these circuits are heavily damped by:—

(a) Actual resistances—e.g., grid leaks.
(b) Losses due to bad dielectrics, insulators, or induced eddy currents.
(c) Input impedance of succeeding valve (loss may be very high if this valve runs into grid current).
(d) Output impedance of preceding valve (very noticeable if low resistance valves are used).
(e) Radiation resistance of an aerial.

The presence of the tuned circuit has one very pronounced effect. It offers a high resistance at the resonant frequency but a low resistance at frequencies removed from resonance, which means that it is selective. Distortion such as occurs with audio amplifiers dealing with a wide frequency band does not take place, for distortion as always the equivalent of the addition of spurious harmonic voltages or currents which are not amplified by the R.F. stage as a whole.

It has become customary to describe radio frequency amplifiers under three headings, types A, B and C.

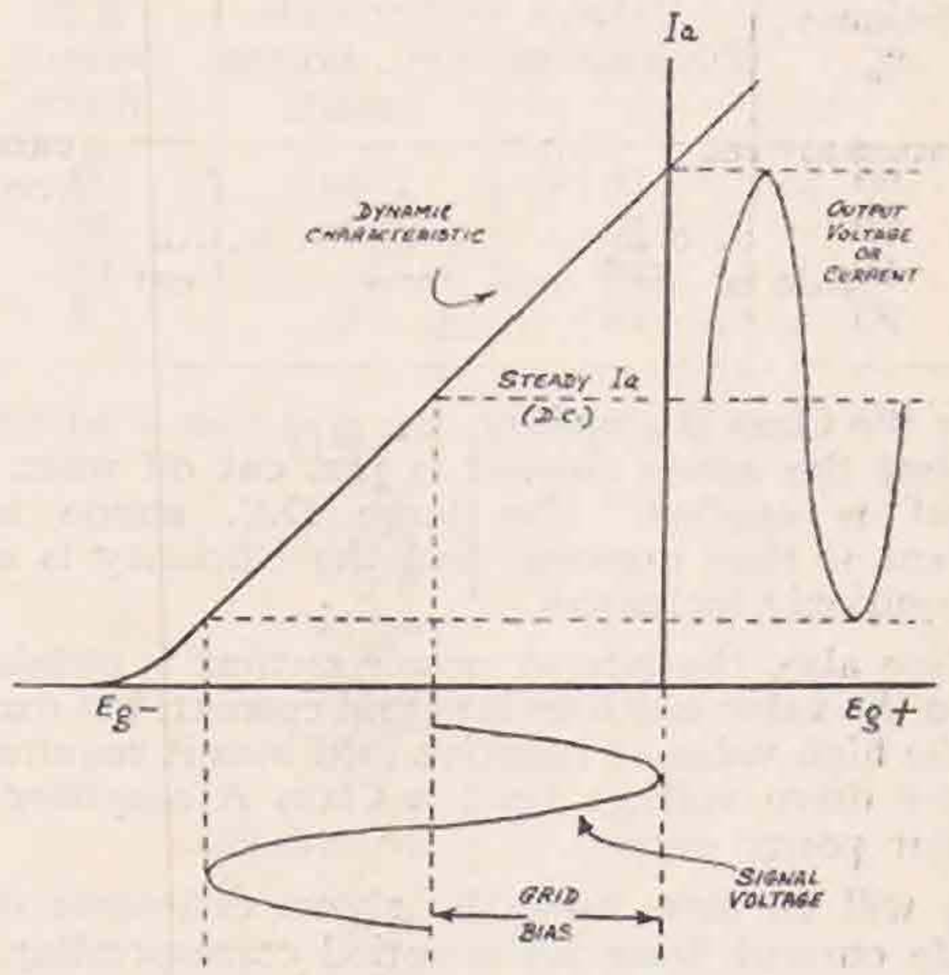


Fig. 1.
Showing a set of Conditions applicable to Class "A" Operation.

Class A Amplifier.

Here anode current flows during the whole cycle of input signal voltage. It is immaterial whether grid current is drawn or not. This affects the driving power but not the amplifier type. The detailed action requires a consideration of the diagram (Fig. 1) which shows a set of conditions applicable to Class A operation. It can be seen that:—

(a) As the grid/cathode voltage goes positive, the anode current increases.
(b) As the grid/cathode voltage goes negative, there is a similar decrease of anode current.
(c) With no signal voltage, there is quite a large standing anode current, *i.e.*, even in the quiescent condition there is a large energy dissipation in the valve which appears chiefly as heat at the anode; power loss W_a due to this cause being given by the product of the steady anode current and anode voltage ($W_a = E_a I_a$).
(d) The output wave shape closely resembles that of the input. It would do so exactly if the dynamic characteristic were a straight line. This indicates little or no distortion and so the circuit is much used for audio amplifiers where harmonics cannot be removed by a tuned anode circuit as in radio frequency work.

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Class B Amplifier.

The chief objections to Class A amplification are that much energy is dissipated even under no-signal conditions, because of the high mean value of anode current, and that consequently, the efficiency is low.

Now the efficiency and the maximum permissible anode dissipation decide the safe power output of a valve. This is illustrated by the following table which shows the maximum safe power inputs, and output obtained for a valve rated at 10 watts anode dissipation when operated at varying degrees of efficiency.

Efficiency, %	Valve Dissipation.	Max. Safe D.C. Power Input.	R.F. Output. Watts.
90	10	100	90
80	10	50	40
50	10	20	10
33	10	15	5

In the Class B amplifier, the grid bias is adjusted so that the anode current is just cut off when no signal is applied. The large D.C. anode feed current is thus removed and the efficiency is correspondingly increased.

Here also, the largest power output is obtained when the valve is driven into grid current, but owing to the high value of negative grid bias it requires a higher drive voltage than a Class A amplifier of similar power output.

It will be seen from the above definition that anode current flows for a period corresponding to exactly half of the input cycle, the anode current being a series of half sine waves as illustrated in Fig. 2.

Class C Amplifier.

To get still higher output and efficiency, the negative bias may be further increased. If it is arranged so that anode current flows for less than half of each cycle of input voltage we have Class C operation (with or without grid current). (Fig. 3.)

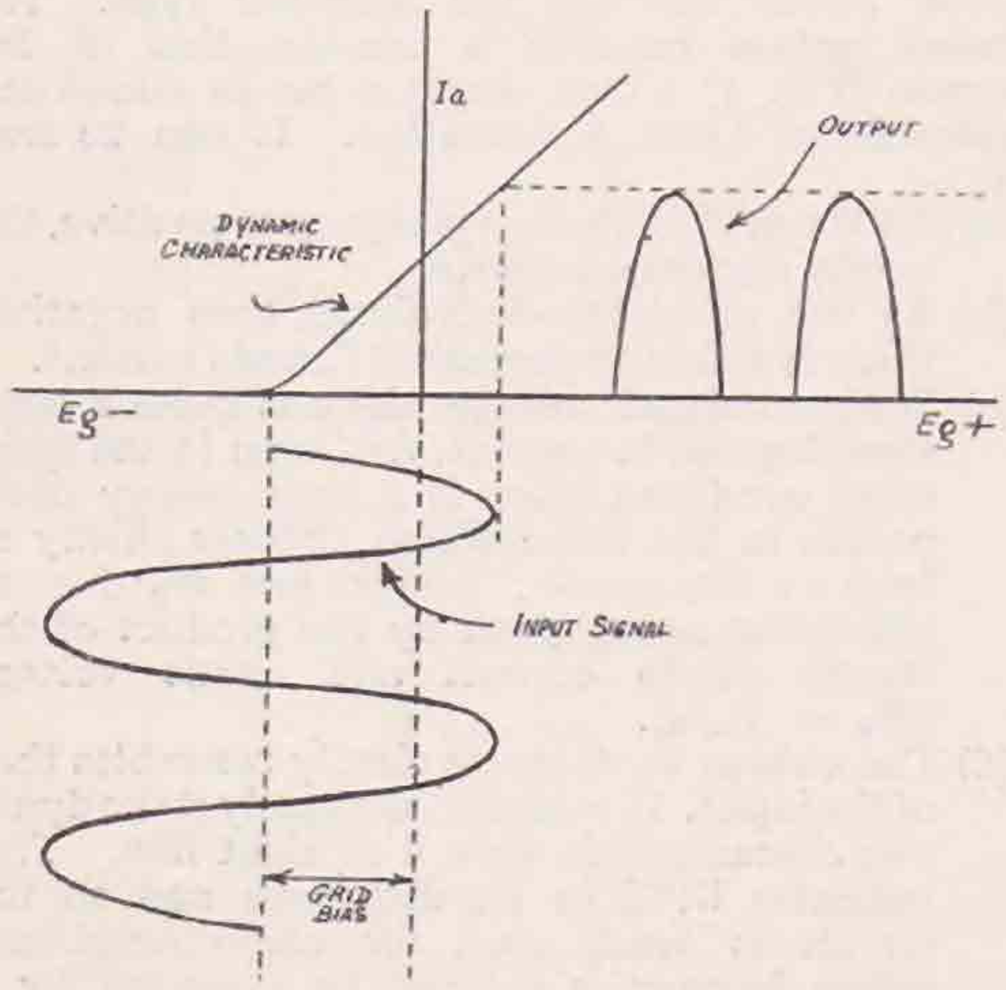


Fig. 2.
Conditions applicable to Class "B" Operation

Problems of Design of R.F. Amplifiers.

These may be discussed under the headings :—

(a) Power output.
(b) Efficiency.
(c) Stability.
(d) Sensitivity.
(e) Harmonic radiation.
(f) Interstage coupling.
(g) Parasitic oscillation.
(h) Grid blocking.
(j) Modulation capability (if used for radio telephony.)
(k) Suitability as an amplifier for dealing with modulated radio frequency.

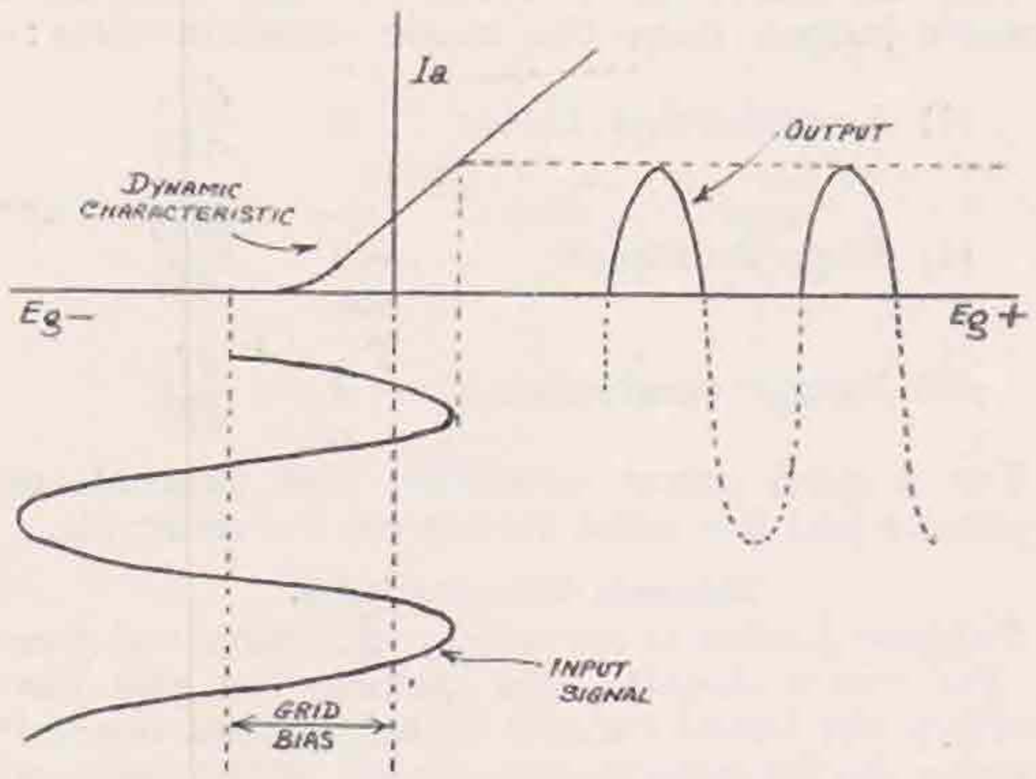


Fig. 3.
Class "C" Operation.

Power Output.

This is best considered by regarding a valve as an A.C. generator in series with a resistance equal to its own slope resistance R_a. The anode load is usually a resonant circuit shunted by a resistance which represents losses due to radiation from an aerial coupled to the circuit, or to the input impedance of an intermediate amplifier stage, *e.g.*, buffer or frequency doubler. At resonance the equivalent circuit can be represented by a resistance R in series with Ra as shown in Fig. 4.

It can be shown that for Class A operation, maximum power output is obtained when the load resistance R is equal to the slope resistance R_a and here the maximum efficiency is 50 per cent. For Class B operation the valve current is distorted and it can be shown that the load presents a lower resistance than its actual value.

It is well known that complicated wave-forms can be represented as the sum of sinusoidal waves, provided that the original is periodic in nature. For a series of half-sines, the amplitude of the fundamental is exactly 50 per cent. of the original amplitude. The fundamental component of current then develops only half the P.D. across the load that it would have done, had the wave-form of the original wave current been a complete sine curve. Thus the effective load resistance is only half its absolute value.

Now the efficiency depends on making the effective load resistance large compared with the valve resistance, and this is much more important and difficult with Class B than with Class A amplifiers. For Class C amplifiers conditions are still worse. In this case a very high anode load must be used, and in high frequency work it is often difficult to get a tuned circuit to offer sufficient dynamic resistance at resonance even when unloaded, so that when an aerial is connected the output and

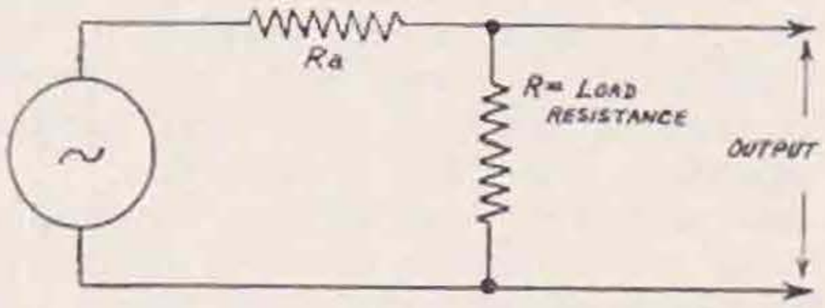


Fig. 4.
Equivalent Circuit illustrating condition when Valve and Anode Load are in resonance.

efficiency are very poor (Note the whole current flows in the valve and is responsible for anode dissipation loss, but only the fundamental component develops power in the load). The question of power output is bound up with efficiency as shown in the table under the heading "Class B Amplifiers," which assumes a constant valve loss.

Efficiency.

The instantaneous valve loss is E × I where the symbols represent the instantaneous values of anode voltage and current. Assuming a large load resistance and a fixed high tension voltage the anode voltage is lowest when the current is greatest, because there is then the greatest volts drop across the load. We shall get the highest efficiency if we pass all the anode current when the anode voltage is lowest. Here (1) The grid is most positive.
(2) The valve D.C. resistance is lowest.

To get high efficiency then implies :—

(a) The use of large negative bias to cut off anode current for most of the cycle.
(b) A very large input voltage, capable of swinging the grid positive during a small portion of the cycle, during which the anode current passes in the form of a sharp pulse, which in the limit is almost rectangular in shape.

This has the following consequences :—

(a) The power sensitivity is low, owing to the large signal required.
(b) The power amplification is comparatively low, due to the grid current losses when grid current flows.

The effective grid/filament load is half the grid leak resistance. The usual figure for the amplification ratio of output power to input grid driving power is about eight or ten.

The advantage of high plate efficiency is that with a given valve, possible output is limited only by the efficiency. The disadvantages are :—

(a) Rather large input power.
(b) Excessive instantaneous peak currents (sometimes ten times the D.C. feed current), which damage the filament.
(c) Excessive harmonic radiation, especially if damping is severe and circuits are poor.

Note that in all cases high efficiency needs high anode load resistances, for then the valve loss is only a small proportion of the total power. To get much power into such a load means excessive H.T. voltages and in practice it is usual to be satisfied with efficiencies of 60 per cent. to 70 per cent., particularly as the attainment of higher efficiency means employing excessive drive from the previous stage, which then requires more input and cancels any improvement in the output stage.

Stability.

Self-oscillation of amplifier stages due to feedback through the valve capacity can be cured or avoided by the use of screen-grid or pentode valves, or by neutralising. The first method is very convenient, but amplifiers of the largest size are generally neutralised triodes. The theory of the screen-grid action is well known, and will not be discussed. Instead, the merits of the Rice and Hazeltine neutralising balances will be compared. In the first case, both employ "centre tapped" inductances, which means that only one half of the voltage developed at resonance is available. In the Rice method, twice the drive voltage is necessary, which may lead to difficulties with the preceding stage. The dynamic resistance of the anode load of the Hazeltine amplifier is only one quarter of that which would be presented by an untapped tuned circuit. At high frequencies this difficulty becomes acute for the ratio $\omega L/r$ or L/Cr is always low at this end of the scale. It is interesting to note that in a push-pull amplifier both neutralising methods become the same, for both input and output coils are then centre-tapped.

Close examination of the circuits reveals that both are related to the Hartley oscillator, in fact—

(1) If the neutralising condenser is omitted, the stage behaves as a tuned plate tuned grid oscillator.
(2) If the neutralising condenser is very large, or much larger than the anode/grid capacity, both circuits behave like a Hartley oscillator, one of the tuned circuits merely acting in place of the high frequency choke or grid leak in the conventional circuits (shunt or series feed).

Sensitivity.

This is defined as the ratio $\frac{\text{Output power}}{\text{Square of input voltage}}$

It is always low for Class B and Class C amplifiers unless screen-grid or pentode valves are used. These, however, bring problems of their own due to their very high slope resistance. The ratio Power Output/Power Input, or Power Amplification is also very low (say 8 or 10 : 1) but this is not usually considered a serious disadvantage.

Design of Class B and C Neutralised Triode Power Amplifiers.

In amateur work the starting point is the maximum allowable anode loss of the valve. The power output then depends on the efficiency.

An exact analysis of Class C becomes very complicated and it is best to consider first the production of a Class B amplifier to fulfil most of the requirements and then consider modifications to the drive, the anode load, and power supplies, to make it suitable for Class C operation.

A properly adjusted Class B amplifier biassed so that with drive removed, anode current is just cut off, passes anode current in a succession of half sine pulses. Mathematical analysis shows that these contain

(a) 31.8% Direct current.
(b) 50% A.C. of fundamental frequency,
(c) 21.2% A.C. of 2nd harmonic frequency.
(d) 0% A.C. of 3rd harmonic frequency.
(e) 4% A.C. of 4th harmonic frequency.

and small quantities of higher harmonics. It will be noted that the combined amplitudes do not add up to 100 per cent. If, however, the R.M.S. values are considered, the correct total is obtained.

We are only interested in the fundamental component and the load resistance must be twice as large as for a corresponding Class A amplifier giving an output signal of the same amplitude as the Class B amplifier. For maximum output, a Class A amplifier requires a load equal to its own slope resistance so that a Class B amplifier requires twice this. This adjustment is never used in practice because the plate loss is excessive.

Instead we choose the highest safe anode voltage, remembering that a modulated voltage may be amplified, and set the bias to cut off. Start with a very high anode load impedance, such as might be obtained by using a well designed tuned circuit, very loosely coupled to the aerial or succeeding valve amplifier, and reduce it gradually, by tightening the coupling, until the maximum allowable plate loss is reached.

The excitation or drive should be such as to run into grid current at the crests of the positive half-cycles of input so as to make full use of the available valve characteristic. If the amplifier follows immediately after a master oscillator it may be desirable to increase the bias to prevent grid current, as a requirement of stability in master oscillators is that the power taken from the oscillator should be as small as possible. In this event, the power output of the amplifier will of course be reduced, and the operator must effect a compromise between the degree of stability and the amplifier power output required.

The manner in which the plate efficiency of a Class B amplifier varies with load resistance and valve resistance is given by the formula :—

$$\text{Efficiency} = \frac{\pi}{4} \frac{\frac{R}{r}}{\left(2 + \frac{R}{r}\right)}$$

where R is the load resistance and r is the valve D.C. resistance at zero grid bias, which should not be confused with the anode slope resistance. This applies only when the drive voltage is such that it swings the grid to the upper bend of the mutual characteristic. For smaller inputs, the efficiency is less in the ratio of actual drive to maximum drive voltage. Note that if modulated signals are being amplified, the formula only holds at peak modulation. If m is the degree of modulation, the efficiency when amplifying the unmodulated carrier is $\frac{1}{1+m}$ times the above figure. The maximum possible efficiency is seen to be $\pi/4$ or 78 per cent. when R is very much greater than r.

Having worked out a suitable design for a Class B amplifier, the correct operating conditions for Class C can be secured approximately by :—

(a) Doubling the negative grid bias.
(b) Increasing the drive to give the same grid current as before.
(c) Increasing the anode load resistance, because the amplitude of the fundamental component in the anode current pulse is less than for Class B operation.
(d) If the valve is not fully loaded, increasing the H.T. voltage until maximum allowable dissipation is used, with proportionate increases in negative bias and excitation to maintain true Class C operation.

Note that with very high efficiency operation—

(a) Grid driving power becomes excessive.
(b) The ratio of peak to mean anode current is large (say 10 : 1) and may damage filament.
(c) Very high load resistances must be used, and these are difficult to obtain at high frequencies.
(d) Unless very high H.T. voltages are used, high anode load resistances cause low minimum plate voltages, which with positive grid voltages cause high grid losses.

Grid Blocking.

The phenomenon here described is not to be confused with that known as "squegging," which is found in amplifiers or oscillators having unsuitable values of grid leak or condenser.

Sometimes the anode current of an oscillator or amplifier is found to rise to a high value. Examination shows that a reversal of grid current also occurs, and the valve is usually destroyed. If a valve is operated so that the maximum instantaneous grid potential and minimum plate voltages are both high, secondary emission from the grid is collected by the anode. This is effectively a reduction of grid current and consequently of negative bias, if a grid leak is used. This allows the grid to swing still more positive and the effect is cumulative. It may be avoided by :—

(a) Using a moderate value of grid leak (say less than 25,000 ohms).
(b) using a high load resistance.
(c) using moderate drive, in conjunction with steady bias as from a battery or separate supply rather than by the automatic leak and condenser method.

The effect is generally caused by over-running the valve, or keying the grid bias circuit of an amplifier only, the drive voltage being maintained continuously.

Factors Which Limit the Output of a Radio Frequency Amplifier

Assuming that the full anode dissipation is to be used, it has been shown that the available output is limited by the efficiency, and this in turn depends on

(1) Load resistance.
(2) Driving voltage (and power if grid current is permitted).
(3) H.T. voltage.
(4) Steady negative bias.

Grid blocking occurs if the output is forced by increasing the drive and reducing the anode load resistance. If a high anode load resistance is reached then the minimum anode voltage is very

low. If excessive drive is used, then a high positive grid voltage occurs when the anode voltage is lowest, and the grid draws a good deal of current which should reach the anode. This has two effects, namely,

(1) Reduced power output.
(2) Increased grid losses.

The static I_a/E_g characteristic shows a droop in the region of high positive grid voltage and low anode voltage. It is interesting to note that this same effect limits the excursion of operating point in an oscillator as well as in an amplifier. It is usual to state that the anode current of an oscillator swings between zero and saturation current, but it is more probable that the upper limitation is set by the peak positive grid voltage coinciding with the minimum anode voltage, resulting in the effect described. Knowing the characteristics of modern valves, which have a total filament emission of several amperes, it appears improbable that any upper limit could be set by saturation.

The effect of grid blocking is now most frequently encountered in five meter working, when efforts are made to increase the output of self-oscillators by reducing the load resistance. The existence of the second effect is best shown experimentally by noting the very great increase of driving power necessary to increase the output of an amplifier, once a certain level has been reached.

Measurement of Power Output of a Radio Frequency Amplifier

The direct measurement of power radiated from an aerial is extremely difficult, and not possible for the average amateur to make. The measurement of powe output from a transmitter to an artificial aerial is comparatively simple. Two easy methods are :—

(1) Use a lamp as an artificial load and couple it correctly—say by tapping across a suitable portion of the output tuned circuit. Connect a similar lamp across the mains and adjust the brilliancy to match that of the artificial aerial load. The two lamps will then be consuming approximately the same amount of power, the power supplied to the comparison lamp being readily measured.
(2) Dissipate the output of the amplifier in a load resistance placed under oil in a calorimeter, and calculate the output from the known weights, specific heats, and rises in temperature in a given time. This gives a good fundamental check on the operating conditions.

A method frequently put forward by amateurs is the following :—Disconnect the aerial and tune the final stage for minimum current (input). Measure this current and also the H.T. supply voltage. Calculate the power input. Now couple the aerial, re-tune, and note the new power input. It is then stated that the difference represents the power output. A simple analogy shows that this method is quite inadmissible.

Consider a battery of high internal resistance, supplying a small current to a load. The power loss in the battery will be small because the circuit current is very small. Now reduce the load resistance so that the current increases. This increases the *battery* loss to a larger figure than before. This applies exactly to the valve case. With the aerial disconnected the valve losses are small, but these immediately increase when the load is connected.

Pentodes as R.F. Amplifiers

Due to the presence of the positive screen, electrons from the cathode of a pentode are only weakly controlled by the anode voltage, *i.e.*, the ratio E_a/I_a or the slope resistance is very large. This effect is well shown on the plate characteristics. The mutual conductance is normal since the control grid functions exactly as in a triode, while the amplification factor is very high. If a suitable operating point is selected and an appropriate load line drawn, it can be seen that if a high resistance load is used, very large anode potential changes occur which can easily exceed the steady D.C. supply.

If Class B or C operation is attempted it is easily possible for the anode potential to be negative for a large portion of the cycle. The mean anode feed is low and the operator's first reaction is to increase the drive, which makes matters worse. The instantaneous peaks of anode current become very large compared with the mean current (10 : 1 with an anode load resistance of three times the correct value). The reduced anode current is accompanied by an increased screen current, and a further point is that the screening whilst adequate for moderate voltages across the anode load resistance, may not prevent instability when excessive anode voltage variations occur.

A pentode normally operates in the condition of an overbiassed Class A triode. To find whether the grid bias, anode load resistance or excitation are incorrect,

(1) Note if there is an excessive dip in anode current on tuning to resonance (not more than 30 per cent.).
(2) Note if screen current is excessive.
(3) Note if too high a drive power is required to obtain normal output.

If the anode load is correctly chosen, leak biassing is most suitable. Finally, if a pentode is operated with high drive and high bias, with an anode resonant circuit which is unloaded, the voltage may rise so high as to flash over to earth, or crack the glass pinch of the valve.

Another advantage possessed by pentode or screen-grid valves is that low excitation power is required, even when they are driven into the grid-current region. This is due to the presence of the screen at a high positive potential which prevents the electrons reaching the control grid at low anode voltages, this effect being very troublesome with triode valves. When a large output is being taken from a pentode amplifier, the anode voltage becomes very low for part of each cycle. Some care is necessary that during these intervals the rise in screen current which occurs is not great enough to exceed the permissible screen dissipation.

Modulation Capability of R.F. Amplifiers

This subject is wide enough in scope to merit a separate article, but the following statements may be made regarding operating conditions :—

(1) For distortionless output, anode modulation must be applied only to Class C amplifiers (pentode or triode). Fixed, automatic or leak and condenser bias may be used, or combinations of these methods.
(2) Class A or Class B amplifiers must be used for the amplification of modulated waves.

(*Continued on page* 462).

Contacts, Cigarette Smoke and Coffee!

(Being the impressions of a G during the 1.7 Mc. Contest, 1938.)

By "Positron."

TIME, 2350 G.M.T., January 8, 1938. Outside it is cold and dark—darker than it really should be since gloomy rain clouds obscure the young moon. Inside the shack, however, it is cosy, cheery and inviting. Over there is the rig, warmed up and ready to agitate the long-suffering ether. The filaments of the 47 and the 2A3 glow brightly—oscillator output has been checked—neutralising is O.K.—all the tuning has been lined up with meticulous care. Just a final test; a slight pressure on the key, and over swings the aerial ammeter needle. Yes, everything is absolutely A.1. Here, near the window, is the receiver—and now for a quick look round the band. More QRN than there was last night, but nothing to worry about really, unless it gets worse—dah di dah di, dah dah di dah, Europe—he signs, a Frenchman—here's some 'fone, a trawler, quality peaky (as usual), hope he doesn't make a nuisance of himself later on—down to the bottom of the band—a G signing off—wonder if I'll manage to raise him during the next few hours. 2359 G.M.T.—zero hour approaches.

These are some of *my* last-minute thoughts and reactions, but I know that they are not unique, for scores of hams all over the British Isles are at the same time experiencing the same sensations and emotions as myself, and here we are, from 2's to 8's, from hardened Old Timers to optimistic Young Squirts, a thoroughly mixed but really jolly and enthusiastic crowd, all waiting for the word "go" with keen anticipation and a sense of healthy rivalry!

0001 G.M.T., and we're off! I quickly tune the receiver to the neighbourhood of my transmitter frequency—Phew!—shoals of signals—gives me that 7 Mc.-on-Sunday-morning feeling—Ah! a nice loud T9X note—TEST TEST TEST DE G8—he repeats, until—AR K—he's gone—I call him—not for too long, time's valuable, then back to him, but, hard luck! he's already in QSO with somebody else. Never mind, here's another TEST call, a G5 this time—once again no luck. I try a TEST call—a look round the band, but nothing doing, and then once again, TEST.—Same result. I swear softly. What the deuce is the matter?—I got 579 from GM less than 24 hours ago, and my QRA can't have become a dead spot overnight! 0025 G.M.T.—Ye gods! Nearly half an hour gone, and not a single entry on the sheet. That G8 is calling test again—I offer up a silent prayer and call him once more. Thank goodness, he's replying—ur rst 589 ok?—well that's certainly a big improvement—can't be much wrong after all.—I reply—tnx ur rst 589 ok?—sk, and there's the first point. The evil spell is broken, and things go more smoothly. G2, G5 and another G8—4 points on the sheet. Progress rather slow again—0200 G.M.T.—chillier now as well—I light another cigarette. This chap's got a hefty spacer, sounds as if his neutralising has come unstuck—but he's QSA5—and another point. What's this 'phone?—sounds like a foreign broadcaster—but why in the band? S9+ and excellent quality—but too near my frequency for my liking—in goes the other crystal, GW5—I raise him—and so the points accumulate. 0300—don't feel so fresh now—a welcome cup of coffee. Rather foggy outside the shack. GM559 both ways—not bad! Here's G6WY—maybe he's trying to work that elusive umpteenth zone on 1.7 just to show 'em how it's done! However, if I snag a W, I'm satisfied!! 0400—a look at the meters—the crystal stage seems to have gone a bit off colour—0430, it's running OK again. Everything perfect now—6 QSO's in a straight line without a hitch. W's scheduled to begin their tests at 0430, but not a sign. 0600, things quieter now—a GW6 portable—wonder if he's camped out in the rain (it's raining fairly heavily here just now)—gives me 579—his RX can't have got wet, anyway! Still no sign of U.S.A. Now a G5, TPTG—wish he wouldn't drift so—but I get him OK and 100 per cent.—Coffee again. 0700, 'phone, "Wick Radio Calling"—doesn't bother me, but he may be blotting out the band for some less fortunate G. A G2 now—a well-known call. Quite a few famous men have given me points so far!

Nearly dawn—some signals go up from S6 to S9. Daylight—and many signals fade out entirely. I look out of the window, the rain has stopped, but trees and roofs are wet and glistening in the orange-grey morning light. A little breakfast while listening round—and now to work a few of the local lads just to round off the score. 0900, I yawn cavernously—only a few stations knocking about, and the score moves slowly, but it's over the forty mark now. 1100—only another hour left—a G6—a few more calls and it's all over bar shouting!—Yes, the clock indicates noon, and another year's contest is over.

I take off the 'phones with a sigh of relief—but yet with a feeling of regret, I know it sounds rather an impossible combination of sentiments, but I am sure that all of you who participated in this contest will know what I mean. Finally, you may not have done as well as you had expected, but I do hope that this short article has enabled you to recapture some of the thrills and the excitement of the 1938 1.7 Mc. Contest.

Well, here's to the 1.7 Mc. Contest, 1939; but until then, good hunting, everybody, and Au Revoir.

Reports Wanted

G3DB (Folkestone), on his 14022 kc. C.W. transmissions. All reports will be acknowledged, and should be sent to 37, Joyes Road, Folkestone.

G8ON (Worksop), on his 14320 kc. transmissions. All reports will be acknowledged, and should be sent via the R.S.G.B. QSL Bureau.

G5KN

Kettering Radio Society again report that their call-sign G5KN is being pirated. The Kettering Society call has not been used for three years.

VS1AA Malaya

SOME NEW CIRCUIT FEATURES

By J. MacIntosh.

SEVERAL unusual features have been embodied in the construction of station VS1AA and it is hoped that a description of the major ones may interest members.

The transmitter normally embodies an electron coupled oscillator, a frequency doubler and a push-pull power amplifier. The E.C.O. is capacity coupled to the F.D., while the F.D. is inductively coupled to the P.A. The E.C.O. and F.D. are on the bottom shelf, while the P.A. and aerial circuit apparatus occupies the top shelf. The diagram shows the circuit of the oscillator doubler.

Electron Coupled Oscillator

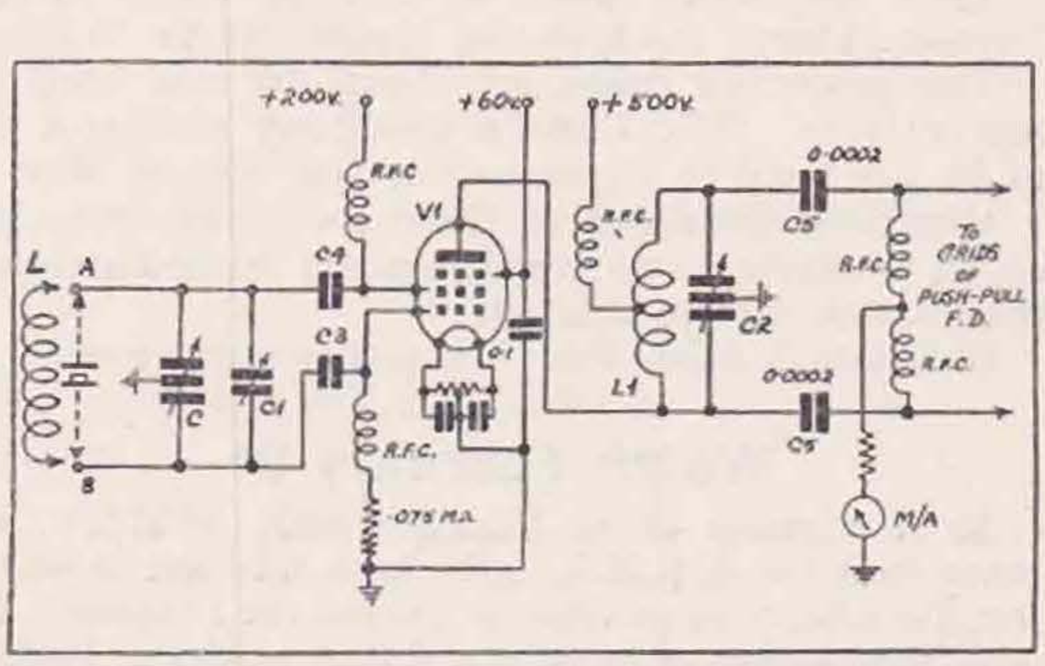
A good deal of experimental work has been carried out in connection with the E.C.O. The circuit, which is a Colpitts, is equally suitable with indirectly or directly heated valves. This circuit does not require a tapped coil and it has always puzzled the writer to know why most amateurs use the tapped cathode method, which is often troublesome to adjust. A fairly high capacity is necessary across the oscillator coil but if this is made too high the harmonic output falls off rather badly. Therefore, we must compromise. A value of .0003 μF was found to give good stability and good second harmonic output. The condenser C. should be a series gap with the rotor earthed. A value of .0003 μF is unusual, consequently the writer uses a .00015 μF *Cyldon* type C, with an ordinary .00015 (C1) in parallel with it. This arrangement works well and both condensers are used at their maximum capacity. All leads are of heavy gauge, copper tubing being used in certain places to ensure rigidity. Remember that a transmitter is no better than its oscillator and often much worse, due to amplified instability. The value of gridleak was found to be somewhat critical but a fairly high value should give a good pure d.c. note. C2 had to be tuned slightly to the *high* frequency side of harmonic resonance to avoid an impure note. The 362 R.F.P. 15 R.F. Pentode works satisfactorily as an E.C.O. with about 200 volts on the screen grid, 50 to 60 volts positive on the suppressor grid and up to 500 volts on the anode. Milliamps run about 10 to 12 on the screen grid and 25 to 30 on the anode. The gridleak should be 75,000 ohms and the grid condenser C3 kept low in value. High values increase output slightly but make it more difficult to obtain a good note. The blocking condenser C4 may be between .001 and .01 μF. R.F. chokes CH1 and CH2 should be above suspicion.

A New Crystal Oscillator Circuit

During the course of experiments it occurred to the writer that it would be advantageous to be able to revert to crystal control with the minimum of alteration. Accordingly, a crystal holder was mounted on a plug-in coil base similar to that used to hold coil L. The crystal is so wired that it replaces the coil L and is actually joined to sockets A and B, *i.e.*, between the screen grid and the control grid. The tuning condensers C and C1 are, of course, reduced to zero capacity. The crystal oscillates very readily in this position, while stability does not appear to be affected. It seems an easy solution to the E.C.O./crystal problem. A small amount of capacity across the crystal (*i.e.*, a few degrees of C) increases the harmonic output slightly, but this may not hold good for all crystals or all valves. The second harmonic drive to the next stage is very slightly better than when using E.C.O. The grid condenser C3 is not essential when using a crystal in place of L but, as it is necessary when using E.C.O., it has been left in position.

At the writer's station the high-tension supply to the oscillator is exceptionally well smoothed and by-pass condensers are fitted whenever necessary. A "push-push" doubler was decided upon after it was evident that a straight doubler would not adequately drive a pair of 838's to a full 100-watts input on 28 Mc. On this frequency the E.C.O. also had to be preceded by a crystal oscillator/doubler running on 3.5 Mc. to enable sufficient drive to be available. This C.O./F.D. is easily rigged up by plugging the output from the anode of the oscillator/doubler into the socket B; tuning of the anode circuit (series fed) being carried out by C. Additionally, C1 is reduced to zero and socket A earthed. Of course, the coil L is not then used; the anode circuit of the crystal oscillator being the grid circuit of the valve V1. The E.C.O., V1, is then used as a frequency doubler.

An attempt was made to run the E.C.O. on 7 Mc. as an E.C.O./F.D., with the output from the final on 28 Mc., but insufficient drive resulted and it was observed that the note was poor. The easiest rearrangement was therefore to add a crystal oscillator for 28 Mc. work. This has yet to be proved on the air because all experimental work has been carried out without radiation tests except for a brief spell when the final was tested for transfer of power to the aerial.



The electron coupled oscillator circuit described by the author. Component valves are mentioned in the text.

Frequency Doubler

This stage uses two R.F.P. 15 pentodes. Anode voltage runs up to 500 volts but suppressor and screen grid voltages are kept down to approximately 50 and 200 volts, respectively. The screen grid voltage is the trickiest of all; an increase of voltage over 200 volts gives little increase in output and results in erratic behaviour of the stage. The suppressor grid voltage is fed through a high-resistance potential divider, consisting of two fixed resistances. Anode current for the two valves is approximately 100 mA. The grid leak can be 30,000 to 50,000 ohms.

The Final Amplifier

This stage has two 838's in push-pull. Actually, 4211E valves have been used for some considerable time, but although they work well enough on 14 Mc., they are found to be very hard to drive on 28 Mc. Further, the base around the anode pin tends to blister. The 838's, which are easier to drive than the 4211E's, require a very small neutralising condenser. The writer uses two *National* 35 $\mu\mu$F transmitting condensers with the metal end-plates cut away as much as possible (why will manufacturers still give us large chunks of metal in an otherwise small condenser !) and one fixed with two moving plates; distance between plates being about $\frac{5}{32}$ of an inch. The large metal spacing washers have been removed and replaced by ebonite washers, while the straight edges of the plates were cut away to reduce the minimum capacity. Remember that with push-pull valves the valve capacities are in series and therefore if only one 838 is used the neutralising condenser must be larger. The neutralising condensers in this case were mounted with separate insulated rods to each driving spindle so that dual control was achieved with the additional facility of being able to adjust either condenser separately. In actual practice these condensers could be ganged.

Power Units

Separate power units are used for all valves. The E.C.O., F.D. (and crystal stage when used) are fed from two 83 rectifiers, while 866A's supply the needs of the final. Each power unit is well smoothed and each employs choke input. Choke modulation of the final has been allowed for but the modulator has still to be built.

Visits to the "Queen Mary and Rugby Radio

Steps are being taken to arrange visits to the "Queen Mary" and to the Rugby Radio Station. The projected dates are April 16 and May 28 respectively. The Cunard Company charge a fee of 5s. per head to all visitors to the "Queen Mary."

Members interested in these projected visits are urged to write in to Headquarters immediately as the parties will be limited.

Full details next issue, but please reserve *now*.

Watch February 21

In a message from Miss D. Hall, W2IXY, we learn that the A.R.R.L. have been advised to watch for the effects of magnetic storms on February 21. Any interesting phenomena noted in Great Britain around that date, should be passed on promptly to Headquarters.

A Low-Temperature Coefficient Frequency Standard

By R. G. Hammans (G2IG).

Accuracy in determining the limits of our amateur bands is becoming increasingly important, and a knowledge of the factors which contribute to inaccuracies is essential if off-frequency operation is to be eliminated.

There is a tendency amongst the amateurs of to-day, most of whom use crystal control exclusively, to assume without question that the figure quoted on the crystal "certificate" is correct, ignoring the possible error which is usually stated in the form of "plus or minus x %."

Further, if any consideration is given to the possible error, it is very often neglected as being too small to be of importance.

A true realisation of the magnitude of possible errors can be attained only if a little calculation be devoted to the subject.

An accuracy of $\pm$ .1% is usual for amateur band crystals, and interpreted into absolute values this means that for 28 Mc. operation, by frequency multiplication from any lower frequency crystal, the radiated frequency may lie anywhere in a band 56 kc. wide centred on the figure deduced from the crystal certificate.

Another factor now enters the case. It is rarely that a "good" crystal (this description is usually applied to a crystal which delivers large outputs) has a better temperature coefficient than five parts in a million per degree Centigrade; and since a temperature range under working conditions of 50° to 100° F. or 10° to 38° C. is not unknown, errors from this source are quite serious. To take the 28 Mc. example again: a temperature change during operation of the above order would produce a difference of at least 3 kc. which may be additive to the calibration error.

To sum up, the average crystal cannot, with certainty, be relied upon for greater accuracy than one kilocycle per megacycle irrespective of whether fundamental operation or frequency multiplication is employed.

Now this rule of thumb must of course apply equally to 100 kc. bars for frequency standards; and unless considerably better accuracies are specified, it is obvious that it is impossible to measure the error of, say, a 7 Mc. crystal, for such a combination might indicate anywhere between zero and 14 kc. of error.

Immediately accuracies of the order of .01% or better are desired, the design of power supplies, crystal holder and circuit constants becomes more exacting, and it is therefore intended to describe in an early issue a complete 100 kc. bar oscillator, frequency divider and stabilised power supply capable of determining the limits and intermediate points in our bands with an accuracy of $\pm$ .01% or $\pm$1.4 kc. at 14 Mc.

The power supply will provide sufficient reserve of output to operate numerous other measuring instruments which may be built and calibrated for the home laboratory; and it is proposed to include constructional articles at intervals giving details of apparatus invaluable to the amateur experimenter.

Faraday Shields and Harmonic Reduction

By E. L. Gardiner (G6GR).

THE references made in the November Bulletin to harmonic radiation have prompted the author to put forward a few notes dealing with experiences in connection with the emission and elimination of harmonics from his own transmitter when working on 1.75 Mc.

Shortly after the 1937 1.75 Mc. contest a complaint was received from the G.P.O. to the effect that signals from G6GR had been heard in the 3.5 Mc. band. There was no difficulty in proving that the signals were actually harmonics from 1.7 Mc., but as the writer was not licensed for 3.5 Mc. operation it became important that the matter should be cleared up in order to prevent a repetition of the complaint.

The first step was to investigate the strength of the harmonic radiation. Tests with G5RD, located 8 miles away, proved that with an input of only 6 watts, S7 signals were being received on 3.5 Mc. using a superhet. The aerial at the time was a 14 Mc. Windom about 50 feet long, including feeder, used as a Marconi against earth, and coupled to the transmitter by a matching network (Collins type).

The transmitter was very carefully adjusted for maximum radiation on 1.7 Mc., but no adjustment of the coupler could be found which eliminated the harmonic completely. Since no improvement seemed possible in the design of the P.A. (which consisted of a 6L6G working as a neutralised Class C amplifier) it was decided to try out a Faraday Shield.

A coupled aerial circuit was set up comprising a coil of suitable size to resonate to the 1.7 Mc. band, funed by a .0003 μF series condenser. This was fairly loosely coupled to the tank and a screen placed between them built up of parallel 16 S.W.G. T.C. wires spaced about ¼ in. apart. The wires were soldered at one end to a length of 16 S.W.G., and at the other were pushed into tight fitting holes in a block of wood to support them rigidly. The screen measured roughly 3 ins. × 3 ins. and did not overlap the coils very materially. These were solonoids wound on 2 in. diameter tube. The screen was earthed to the "earthy" end of the aerial coil; the transmitter chassis being joined by a separate lead to the same earth lead at the point where it entered the shack. This was done because it was thought at the time that the use of an independent earth for primary and secondary circuits would help to make the circuits independent thereby preventing possible coupling of the harmonic by a common earth impedance.

As a point of interest the aerial current was for all practical purposes identical with or without the screen proving that one need have no fear of lost output by its use, but unfortunately tests with G5RD showed that the radiated harmonics were just as strong. This report seemed to indicate that the screen was ineffective due to imperfect earthing.

After further experiments, it was found that when the screen, the transmitter chassis and the aerial circuit were *all* joined to the earth lead at a common point, the scheme worked. Its success was in fact almost startling, for so great was the reduction in harmonic radiation that the co-operating station doubted if the harmonic would have been detected at all had not its frequency been known. From the original S7 report the signal had dropped to a bare S1.

The writer cannot too strongly urge the use of the Faraday screen in all transmitters where harmonic radiation has been experienced.

Whilst discussing harmonics, attention is drawn to the serious harmonic radiation on 56 Mc. from amateur stations working on 14 or 28 Mc. Often the strongest 56 Mc. signals heard at G6GR are actually harmonics from one of the lower frequency bands, and when these harmonic signals are modulated the resultant transmission is frequently more "spitchey" than it sounds on the fundamental. The writer is of the opinion that more interference occurs on 56 Mc. from harmonics than from fundamental transmissions.

Those who have used Faraday shields on 7, 14 and 28 Mc. would be doing a service by passing on the results of their experiments to this Journal.

Listener Reports for U.S.A.

Although the R.S.G.B. QSL Bureau cannot undertake to handle listener reports for the U.S.A., we are pleased to announce that Mr. Ross Hansch (W9RBI), of Wisconsin Dells, Wisconsin, has agreed to accept for despatch batches of report cards addressed to North American stations.

Triode

By J. GOUCK (2CWG).

Once a man, Hertz by name,
Built two circuits, both the same.
Then through one, just for a lark,
He thought he would discharge a spark.
To his surprise a spark was seen
In the other circuit with no wires between.
So he called his wife and said to her "Honey,"
You can say what you like, but that's demned funny.
This experiment tickled a lad named Lodge,
Who thought he would try the very same dodge.
But across his circuit he slapped some capacity,
And by so doing showed great sagacity.
For the electrical circuits he then did find
Were tuned, or what's now called aligned.
This knowledge encouraged a lot more men
To try such experiments again and again.
So Edison, Lindsay, De Forest, Fleming,
Marconi and others, so far from condemning
Maxwell's theories, found they were true,
And built the foundation of radio for you.
Let us remember their services to us
And forgive our conceit of the credit due us.
For theirs is the power and the patent rights
That keeps us from getting to bed at nights.

Amateur Radio in Antigua, B.W.I.

By Arthur Tibbetts (VP2AT).

AN account of Amateur Radio in Antigua would be very incomplete without a short description of the place and its situation.

Antigua is a comparatively flat island of 108 square miles, situated in the West Indies, in the extreme North-Eastern Caribbean and belonging to the group of islands comprising the Colony of the Leeward Islands, of which it is the seat of Government. The other islands of this group are St. Kitts, Dominica, Montserrat and the British Virgin Islands. Antigua's position may be more accurately stated as being 17° North latitude and 62° West longitude. Its distance from England is thus about 4,000 miles.

Antigua's climate is most pleasant, the shade temperature ranging on an average from 70° F. to 83° F. in the cool months, and from 75° F. to 88° F. in the summer.

Antigua is well known for its beautiful bathing beaches, which abound along the Northern and Western shores. Its staple product, in common with many of the other islands of the West Indies, is sugar cane from which sugar is made, as well as the by-products, molasses and rum !

Readers who contemplate taking a holiday abroad are strongly recommended to give Antigua a try, for they are assured of a warm welcome.

Amateur History.

It is difficult to say exactly when Amateur Radio started in Antigua, but the writer knows that experiments of an amateur nature were being conducted some twenty years ago. These experiments were carried out with a spark transmitter, and communication was with ships in the harbour.

After this period nothing seems to have been done until 1931 when interest was renewed—this time from a different source. Experiments were then conducted with valve oscillators of the self-excited type working on 3.5 and 7 Mc.

Amateur Radio in the island continued on these lines for some time, the only reports received being from the neighbouring islands. This was due to the facts that the bands selected for these tests were unsuited for DX work ; also a proper understanding of the operation and tuning of aerials was lacking. It might be appropriate here to mention that all experience in the art of radio was gained either through our own experiments or by the help of radio handbooks.

However, it was the writer's good luck to make the acquaintance of a VP4 amateur, and it was through this contact that 14 Mc was given a trial by the writer and his brother. Also, as a result of the meeting, the prefix VP2 was chosen for the call of this station.

Not long after (February, 1934) station VP2RT, now VP2AT, had the pleasure of making the first Antigua QSO with another amateur station in some other part of the world. Unfortunately the exact date and station with which his QSO was made cannot be ascertained, as it was not until a short time after that a log was started. It is, however, known that the station was a W.

This was the turning point in Amateur Radio here, and from then on it has advanced rapidly. To-day there are five amateur stations in the island, most of whom are very active. WAC has been obtained by 2CD who is the first VP2 station to win this honour.

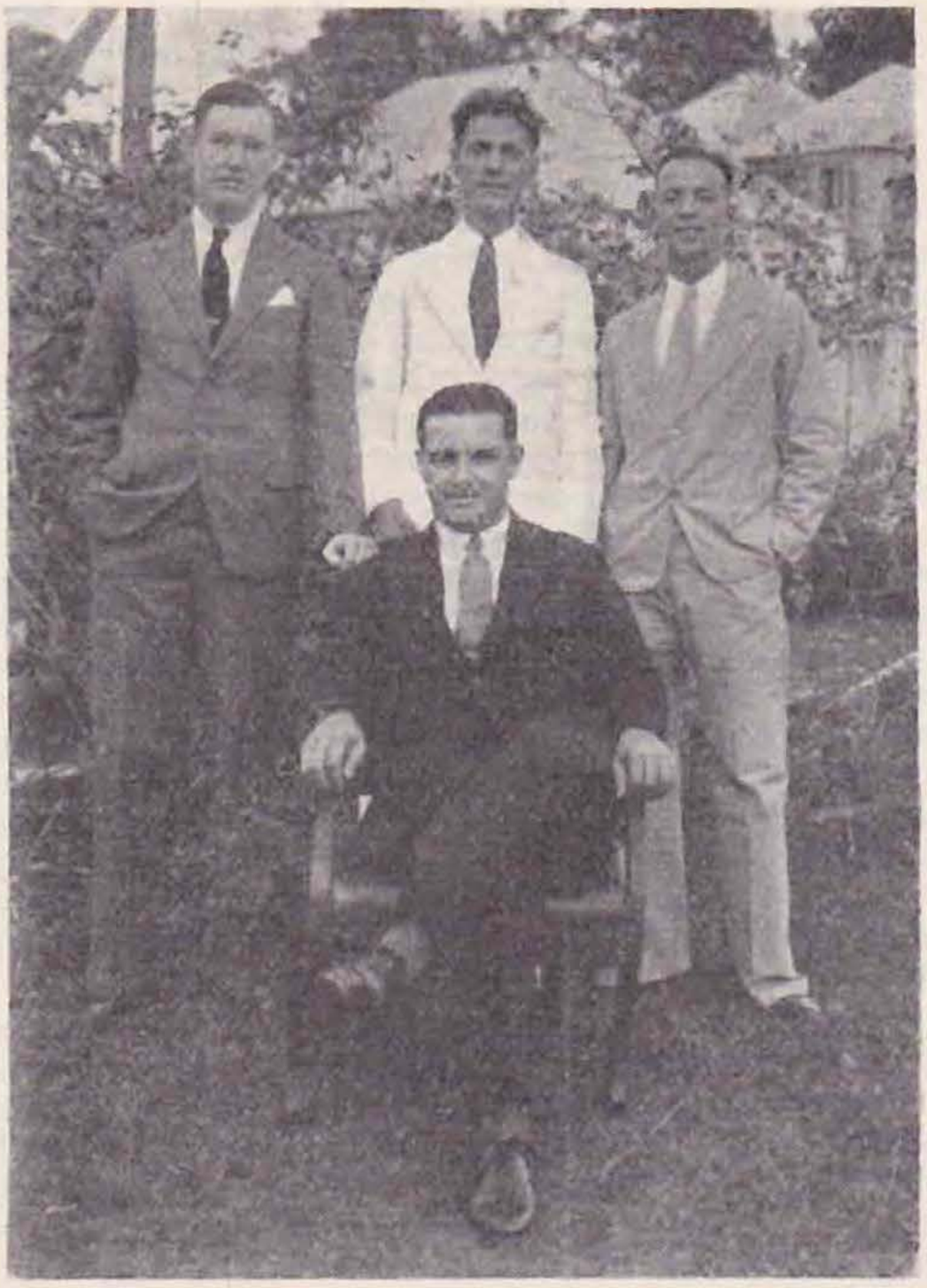
Activities.

DX Morse and inter-island phone communication are the chief interests. On certain occasions, such as Christmas and New Year, there are general "hook-ups" in which nearly all the amateurs in the Leeward and Windward Islands, Trinidad, Barbados and British Guiana, as well as some in the neighbouring foreign islands, join.

On special occasions one of the leading stations in a particular island broadcasts musical entertainment and talks as well as various inter-island sport tournaments. The latter are followed by private listeners with great interest.

Among the regular phone stations there are a few who are at present confined entirely to this form of communication, for want of a working knowledge of the Morse code.

DX contests also receive their due share of activity, and the more popular ones are always entered by one or more stations. There is also the usual amount of experimental work in connection with the improvement of transmitters and receivers as well as aerials.



Antigua's Amateurs
Standing : VP2AT. 2TG, 2BX. Seated : VP2CD.

The following is a short summary of activity in respect to the various frequency bands :—

7 *Mc.*—This band is used almost exclusively for inter-island communication, and by far the greater portion of this work is carried out on phone. However, during the Northern winter months DX makes its appearance, and VK has been worked on more than one occasion. QRM and QRN are very bad on this band thus making DX difficult at most times.

14 *Mc.*—Without doubt this is the most popular band—splendid DX being obtained during most of the year. On account of the skip, the band is unsuited for inter-island communication, except for the more distant islands. QRM is much less than on 7 Mc. and QRN is rarely present. Times when stations are more active here are 20.00-23.00 G.M.T. and to a lesser extent from 10.00-13.00 G.M.T.

28 *Mc.*—There is very little activity on this band —the writer being the only VP2 station working at present. Conditions were very poor when he first started up in May, 1936, but they improved considerably up to October, 1936, during which month several Europeans were heard and worked.

It is unfortunate that more time is not available for work on this band—the week-ends being the only periods possible.

1.7, 3.5 and 56 *Mc.*—There is no activity on any of these bands at present.

Here is a view of the operator and station at VP2CD. The transmitter is a Collins' 32F, and the receiver in the rack a Hammerlund Comet Pro. A pair of 841's are used in the final stage of the transmitter. Power is derived from a rotary convertor working from 220-v. D.C. mains.

Conditions.

DX conditions may be described as being very fair, due, no doubt, to the fact that, as Antigua is an island, signals have practically no land to traverse. It is, however, the writer's opinion that conditions are not as good in the Tropics as in more temperate climates.

At present European DX may be had without difficulty nearly all the year round, there being some falling off towards the end of the year, the best times being in Spring and Autumn from 10.00-13.00 G.M.T. ; and again from 20.00-22.00 G.M.T. ; and in Summer from 20.00-01.00 G.M.T. Conditions for working Australia are best during the Winter and Spring—the best time of the day being from 10.00-13.00 G.M.T. However, during the 1937 B.E.R.U. contest several VK—ZL stations were worked from 19.00-21.00 G.M.T.

Asia is the most elusive continent, followed next by Africa.

There are no local seasonal changes in the island which affect radio in any marked degree.

Apparatus.

Practically all apparatus for the amateur station has to be purchased from abroad. The only equipment obtainable locally is a limited selection of receiving tubes and BCL receivers as well as batteries.

In view of the vast variety of apparatus obtainable from, and the comparatively low prices prevailing in, the American market, as well as the time saved, all equipment which has to be obtained from abroad comes from this source.

It is with the self-excited oscillator that Amateur Radio first started in Antigua, and it is with this type of rig that most of the stations here to-day became acquainted with " Ham " radio. Although the multi-stage crystal-controlled transmitter has replaced the self-excited rig at some stations, the latter is still to be found in existence. Such a rig is very useful when only low power is required ; and especially so when one is compelled to change QRA to the country and has to rely on batteries for the entire power supply !

The local supply is 220 volts D.C. of a very poorly regulated character. While this is better than having no mains at all, it is by no means the ideal supply for the amateur station. In consequence of this, the cost of a modern transmitter of more than 25-30 watts input and also that of a modern commercially built amateur receiver is greatly increased ; as for the transmitter, a rotary converter becomes necessary, and for the receiver either this or batteries are required, thus adding considerably to the cost of fitting out the " shack."

As might be expected from the above remarks, the straight receiver is the rule rather than the exception. Quite good results are obtained with these receivers, the only trouble experienced being that of interference from the other local stations.

It is a pity that the amateur with D.C. mains is so completely forgotten by the manufacturers of amateur equipment ! How nice it would be to have a variety of amateur receivers and transmitters designed to work direct from the 220 volts D.C. mains from which to choose.

Regulations.

There are no Amateur Radio Regulations or licences in existence here, but the stations are operated within the full knowledge of the authorities, and the general principles for the proper operation of such stations are strictly observed.

As might be expected, however, there is much talk of regulations being enforced in the near future. How true this might be, one can only hope that they will be for the betterment rather than the detriment of amateur radio in the island.

Ham Movements

Mr. W. E. Rice (W1IKT), who has recently been on a flying visit to the British Isles, desires to thank all R.S.G.B. members who entertained him, and at the same time expresses his regret that it was not possible to personally contact all those who have given him many pleasurable QSO's. Mr. Rice is a native of Eire.

The Old Timers' Dinner

By O. T. (Vintage 1926).

IF we devoted a dozen pages to this event, it is quite possible that some feature would be omitted, so, to avoid any difficulties in that direction, we shall stick to a bare recital of facts, leaving Old Timers who were present to fill in the gaps when they talk about the dinner years hence, and the Old Timers who were *not* present, regretful of what they missed.

The suggestion to hold the dinner first arose in the summer of 1937, when a group of London members met together, as is their usual wont, to talk of all things bar ham radio! No one present that evening imagined for a moment that we should even approach the 50 mark, although it must be said in fairness to those who conceived the idea that they could see "on paper" that number of possibles.

The decision to go ahead was made in November, and, as is well known now, the announcement of the event met with instantaneous support from every part of the British Isles.

Coming now to the dinner itself, which was held at the Florence Restaurant, Rupert Street, London, on Saturday, January 22. The final roll call found no less than 80 Old Timers on parade under the chairmanship of Past-President Gerald Marcuse (G2NM), supported by four other Past-Presidents in the persons of Sir Ian Fraser, M.P., Mr. H. Bevan Swift (G2TI), Mr. E. Dawson Ostermeyer (G5AR), and Mr. Arthur E. Watts (G6UN).

In addition, the company were glad to welcome Vice-Presidents E. J. Simmonds (G2OD) and G. F. Gregory (ex-G2PZ), Capt. J. A. Echevarri (Secretary, Wireless Telegraphy Board), Hugh Pocock (Editor, *Wireless World*), Philip Coursey (Organiser Transatlantic Tests), Horace Freeman (Ad. Man), and last, but by no means least, the two founders of the old London Wireless Club, Leslie McMichael (G2FG) and Rene Klein (now G8NK).

The informal ragchew preceding the dinner will not easily be forgotten, as old friendships of a dozen or more years ago were renewed. Men whose call signs were famous in every part of the world a decade ago rubbed shoulders with those who still operate active stations. The days of spark and 1,000 metres were vividly recalled as pre-war call met pre-war call. What stories such call signs could tell? Maybe one of these days we shall find among us a J. B. Priestley to leave for posterity "A Radio Amateurs' Journey."

Prior to the commencement of the dinner, much interest was exhibited in a collection of historical photographs and other souvenirs brought along by Messrs. Marcuse, Bevan Swift and Simmonds.

The dinner menu was specially prepared and printed by O. T. Eric Martin (Vintage 1927), who is here and now thanked for "creating" that Grand Old Timer—"Father Hamusla" (an interesting suggestion in this connection appears from O. T. Knight (G2LP) in another page).

During the progress of the dinner numerous amusing and many interesting informal toasts were drunk, ranging from one to the Founders of the old L.W.C. (to which Messrs. McMichael, Klein and Elmer rose) to a toast dedicated to those who had been guilty in the distant past of a spot of piracy! We have no record of those who responded!

The first formal toast, that to the Society, was proposed by Mr. Rene Klein (first Secretary), who spoke with obvious pleasure of the way in which his creation of pre-war days had developed into a huge national organisation. Our present Secretary, in his reply, expressed his personal pleasure at meeting Mr. Klein for the first time, and went on to offer the suggestion that the occasion of the Society's Silver Jubilee on July 5, 1938, should be celebrated in some suitable manner.

Mr. H. A. M. Whyte (G6WY) had the honour of proposing the health of the Pre-War Amateurs, by virtue of being the youngest old timer present (Vintage December 24, 1927).

Mr. McMichael replied, and spoke of the intelligent anticipation shown by Mr. Whyte's parents in bestowing upon him the Christian names which, in his later years, have given him the distinction of always being a "Ham"! Mr. McMichael recalled that in pre-war days a wireless enthusiast was regarded as a "funny person" by his friends, and as a "crank" by those less kindly disposed towards him. He mentioned that his own experiments began in 1903, when a coherer was built and used for the reception of a self-created spark 30 yards away. It came as a surprise to most to hear that in 1914 there were 992 amateur stations operating in Great Britain.

Mr. McMichael spoke of the pioneer work of the old Derby Wireless Club, and the assistance that Club rendered to the amateur movement. He mentioned that in the years just before the war *The Wireless World*, *The English Electrician*, and *The Model Engineer* disseminated much useful information to wireless enthusiasts, chiefly as a result of the publication of letters and articles from such prominent experimenters as W. G. A. Shaw (now the renowned earthquake authority), B. S. T.

[Photo: F. G. S. Wise

Gerald Marcuse entertains our President and Past-President.

The First Reunion of Old Timers of the Amateur Radio Movement.

Florence Restaurant, London, January 22nd, 1938.

[*Photo: Haywood, Ltd.*

Top Table—Left to right: G. F. Gregory, J. Clarricoats, R. H. Klein, L. McMichael, H. B. Swift, Sir Ian Fraser, G. Marcuse, A. E. Watts, E. D. Ostermeyer, E. J. Simmonds, Capt. Echevarri.]

Wallace, Maurice Child, P. K. Turner and Dells Broughton.

Mr. McMichael paid tribute to the splendid organising ability of Messrs. Klein and Fogarty, Secretary and Treasurer respectively of the London Wireless Club. He mentioned how Mr. Campbell Swinton as first President, laid the foundation on behalf of the W.S.L., of many valuable friendships with men of science. He then recalled the epoch-making meeting at the I.E.E. on January 21, 1914, when Campbell Swinton delivered his Presidential Address, and a message of greeting from Colonel (later General) Ferrie was picked up in the I.E.E. building and relayed *via* a loud-speaker relay and the screen to the densely packed hall.

Mr. McMichael also referred to the work of Mr. Frank Hope-Jones, recalling how he and others had tackled the G.P.O. successfully with a view to obtaining a reduction of licence fees from £3 3s. to £1 1s.

B. M. Dunn (G6YL), Messrs. Sydenham (G5SY), Allen (GI6YW), Hayes (G2WK), Andrews (G5FS), Lewer (G6LJ), Nickless (G2KT), Walker (G5JU), and the Scottish H. District (themselves at a dinner in Kirkcaldy). A telegram was also received from a Mr. William Pope, of Notting Hill, recalling his association with many early Society members.

The toast to the Pioneers of International Short-Wave Radio was proposed by Sir Ian Fraser, who expressed his pleasure at again being in the company of many old friends, who, as he jocularly remarked, " were willing to come together to listen to each other's speeches " !

Sir Ian recalled the work of Messrs. Simmonds, Goyder, Marcuse, Partridge, Coursey and others, who had, with home-made gear, brought confusion into the professional ranks by doing things they were not expected to do. Sir Ian drew attention to the debt the B.B.C. and commercial concerns owe to the R.S.G.B. for having supplied them with

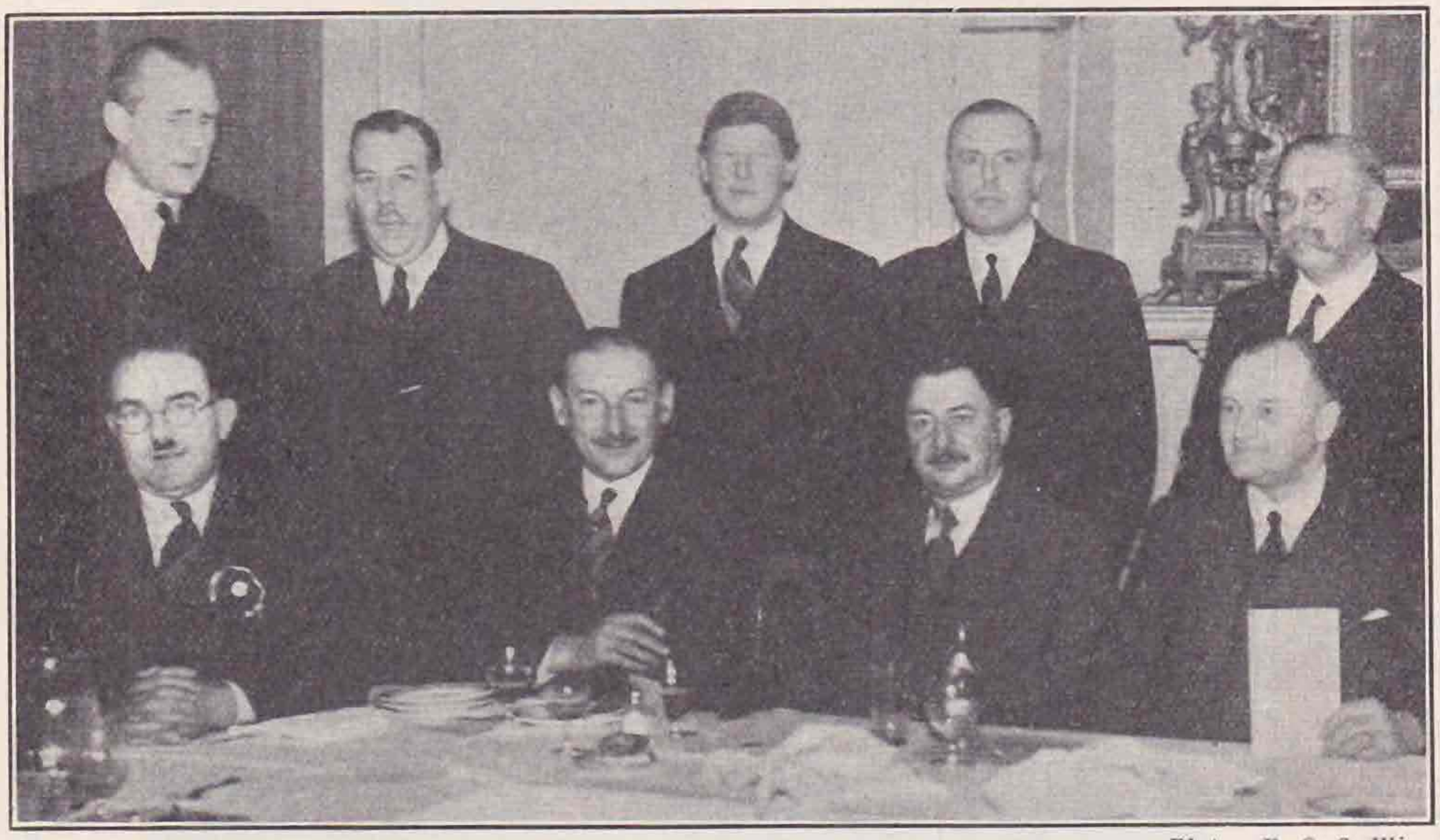


Photo: F. G. S. Wise

An interesting photograph taken at the Old Timers' Dinner.
Standing : Sir Ian Fraser (Past-President), Mr. L. McMichael (Founder and Vice-President), Mr. G. Marcuse (Past-President), Mr. A. E. Watts (President), Mr. P. R. Coursey (Organiser, Trans-Atlantic tests).
Seated : Mr. J. Clarricoats (Secretary), Mr. R. Klein (Founder Secretary), Mr. E. D. Ostermeyer (Past-President), Mr. H. Freeman (Advertising Manager).

He amused the company by mentioning that even in pre-war days QRM was a bugbear—so much so that licensees were allowed to transmit for only short periods each evening and at stated times. He also mentioned that frequently in pre-war days British amateurs chatted in the wee small hours with shipping in the Channel, distances up to 250 miles being frequently covered, using a 6-in. spark coil.

Mr. McMichael's speech received the ovation it deserved.

At this stage of the proceedings messages of greeting or apologies for absence were read from Sir Ambrose Fleming, Sir Noel Ashbridge, Dr. W. H. Eccles, Mr. P. P. Eckersley, Col. E. C. Jennings (G5OC), Capt. G. C. Price (G2OP), Miss

many of their most prominent radio engineers. He expressed the hope that the B.B.C. will continue to further the aims of the amateur radio movement, and gave a personal assurance that he himself would do everything possible to foster co-operation. (Sir Ian is a Governor of the B.B.C.)

He spoke of the radio amateurs' powerful influence on world peace, and expressed the view that " ham " language is something we should all be proud to understand and use.

Mr. Phillip Coursey and Mr. Bevan Swift responded, the former recalling with vivid detail the difficulties attendant to the Transatlantic Tests in 1923-24.

Mr. Swift, in thanking Sir Ian for attending, mentioned the many valuable services which he had

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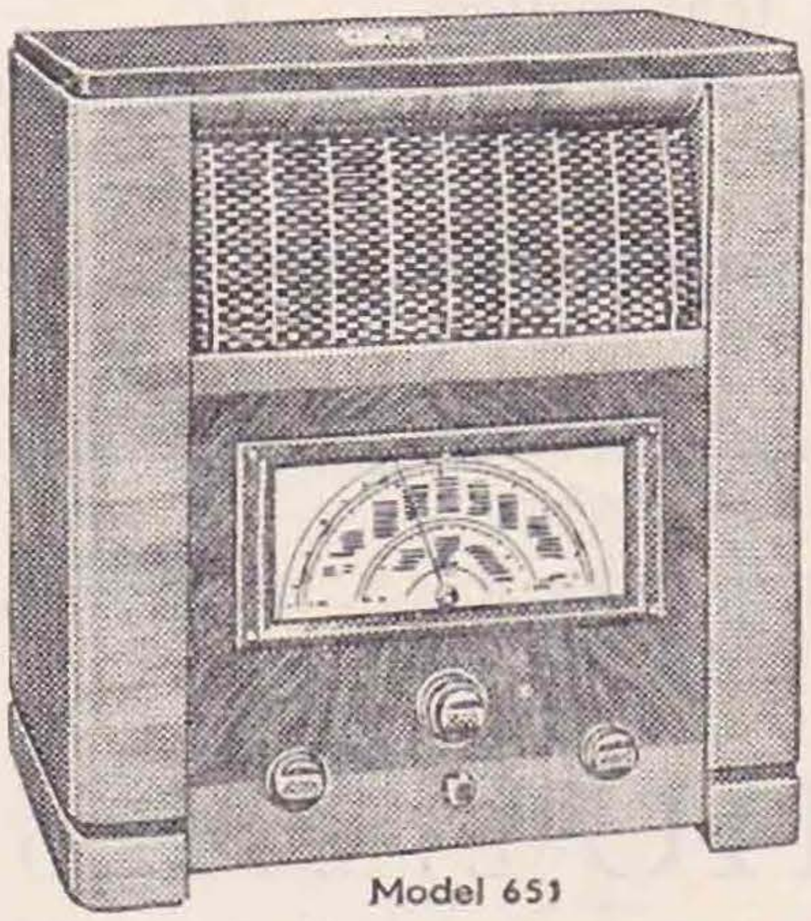

Model 651

Model 651 is a 6 valve All-wave superhet, covering wave ranges from 16·5 to 52, 195 to 580 and 725 to 2,000 metres.

"H.M.V."
Model 651 AC
12½ GNS.
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CONTROLS

The mains switch and volume control are combined. The latter is operative on radio and gramophone. The waveband switch is coupled to an indicator showing LW, MW, SW or GRAM.
The tone control is a variable capacity across the primary of the output transformer.
The tuner control consists of two concentric knobs providing ratios of 20–1 and 120–1.

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The scale is illuminated and clearly marked with the names and wavelengths of the principal European stations; the short-wave band is printed around the outside of the scale to obtain the greatest length of calibration and enables a very clear marking to be obtained. The principal short-wave bands are indicated.

LOUDSPEAKER

The wide angle type speaker developed by "His Master's Voice" is fitted above the chassis. The elliptical cone is of treated paper and measures 10" across its major axis; it is of graduated thickness.
The D.C. resistance of the speech coil is 4 ohms. and the impedance at 800 cycles 5 ohms.
Undistorted Speech Output is 3 watts approximately.

GRAMOPHONE PICK-UP

Fitted at the rear and suitable for the connection of No. 11 Pick-up or No. 119 Record Player.

CABINET

The cabinet is of neat design with a curved speaker grille at the top. It is finished throughout in walnut.

CABINET DIMENSIONS

Length 19½", width 17¾", depth 11".

VOLTAGE RANGE

A.C. supply from 195 to 255 volts, 50–100 cycles.

VALVE COMPLEMENT

Marconi valves are fitted throughout as follows :—
KTW 63—H.F. Amplifier.
X63—Frequency Changer.
KTW63—I.F. Amplifier.
DH63—L.F. Detector and A.V.C.
KT63—Output.
U50—Rectifier.

CIRCUIT

The H.F. Pentode amplifies incoming signals for conversion by the frequency changer valve. This is coupled by an iron-cored I.F. transformer to a further H.F. pentode functioning as an I.F. Amplifier. A second iron-cored transformer couples the pentode to a double-diode-triode, acting as detector, AVC and L.F. amplifier. It is resistance-capacity coupled to the pentode output valve. The H.T. rectifier feeds the energising current for the loudspeaker through the main negative lead.

UNIFORM RESPONSE

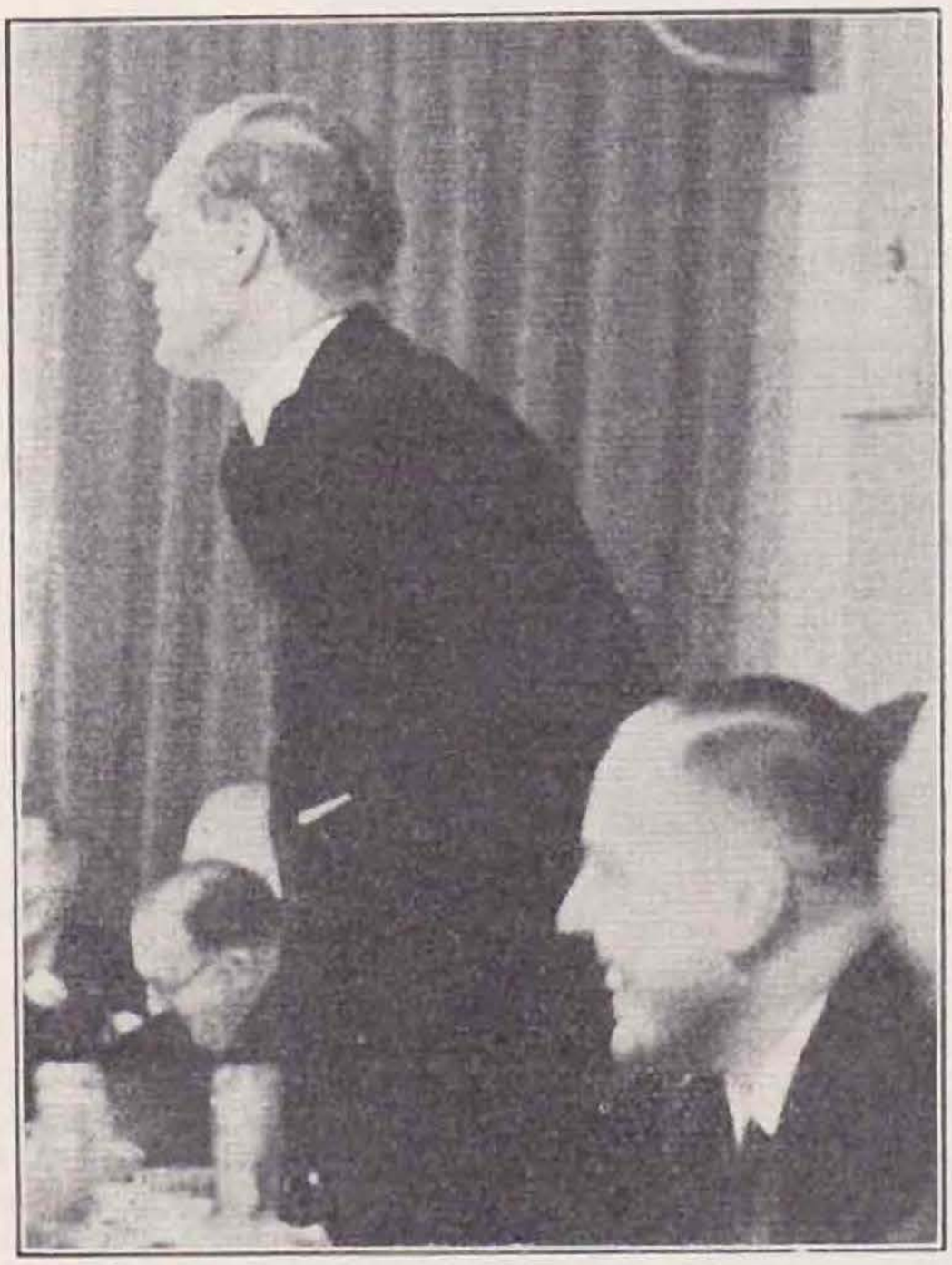
The iron-cored I.F. transformers contribute considerably to the good high note response of Model 651. Although selectivity is of a very high order there is no loss of quality and a uniform response is obtained over the whole frequency range.

If you would like to receive a copy of the "H.M.V." illustrated catalogue of RADIO *receivers and Radio-gramophones write to* "HIS MASTER'S VOICE", 108P Clerkenwell Road, E.C.1.

rendered to the Society and to broadcasting in particular. He spoke of his work on behalf of St. Dunstan's and of his interest in the progress of amateur radio under its present leaders. Mr. Swift made a suggestion that an Old Timers' Club be formed, with those present as founder members.

Mr. A. D. Gay (G6NF), in proposing the toast of Past-Presidents, recalled important work undertaken by each of the five Past-Presidents who were in attendance.

Mr. Arthur Watts, in replying, expressed the hope that everyone would go away with renewed interest in our work, and with a determination to keep alive the spirit of comradeship which was in evidence so prominently that evening. He gave a brief résumé of his plans for Cairo, and expressed his personal pleasure at meeting Capt. Echevarri, Secretary of the W.T. Board, and many of the early officers of the Society.



[Photo: F. G. S. Wise

Sir Ian Fraser, M.P., proposing the toast, "The Pioneers of International Short Wave Radio."

Mr. A. O. Milne proposed the toast of Absent Friends, and read a specially written poem from the pen of Mr. A. M. Houston Fergus (G2ZC), the last verse of which read :—

One toast I'd call—so fill your cup,
You who are here, and stand you up,
Before this merry evening ends,
I'd ask you drink "To Absent Friends."

The final toast to "Our Chairman and the Pioneers of Empire Broadcasting" was proposed by Mr. Hugh Pocock, who, as Editor of *The Wireless World* for many years, has watched the growth of Amateur Radio and Empire Broadcasting since the earliest days. He recalled how Mr. Marcuse had set up at his own expense a broadcast station at Caterham for the purpose of proving that Empire broadcasting was not only possible, but also badly needed. He mentioned some of the difficulties which had been raised by the "powers that be" when such a service was first projected, and went on to show that the impetus given by Mr. Marcuse and other pioneers finally produced the desired result.

Mr. Marcuse, in his reply, thanked Mr. Pocock for proposing the toast, and expressed his great pleasure at being present with so many of his old colleagues. He caused great amusement, when recalling some of his earlier DX work, by quoting from a Government letter in which it had been stated that if, in the process of transmitting his signals for the first time to Japan, he had contravened the terms of his licence, they (the G.P.O.) would be pleased to put matters right by suitably amending it !

Mr. Marcuse was given musical honours, after which the dinner party broke up to the strains of "Auld Lang Syne."

In concluding this brief record, the writer desires to thank Mr. Marcuse and all others who contributed to its success.

May it be the forerunner of many more similar enjoyable functions.

THE ROLL CALL.

The following were present :—

The G2's.

C. B. Cleland (G2CN), J. D. Chisholm (G2CD), S. R. Wright (G2DR), W. K. Alford (G2DZ), L. McMichael (G2FG), K. E. B. Jay (G2HJ), A. W. Fawcett (G2HQ), H. R. Goodall (G2IL), A. W. Knight (G2LP), A. O. Milne (G2MI), E. A. Dedman (G2NH), G. Marcuse (G2NM), H. R. Adams (G2NO), E. J. Simmons (G2OD), H. S. Walker (G2OM), R. W. Bailey (G2QB), S. Ward (G2QS), H. B. Swift (G2TI), R. H. Stevens (G2TU), H. Bailey (G2UF), W. E. Corsham (G2UV), G. McL. Wilford (G2WD), R. L. Royle (G2WJ), G. A. Jeapes (G2XV), A. M. Houston Fergus (G2ZC).

The G5's.

E. W. Butcher (G5AN), E. D. Ostermeyer (G5AR), G. F. Steven (G5BA), A. C. Simons (G5BD), H. N. Ryan (G5BV), D. N. Corfield (G5CD), A. M. J. Ley (G5DM), F. J. Jackson (G5FJ), B. Wardman (G5GQ), W. Grieve (G5GS), N. A. Richardson (G5HJ), L. W. Jones (G5JO), H. D. Cullen (G5KH)' N. H. R. Munday (G5MA), F. W. Miles (G5ML), J. V. Parsons (G5QP), J. B. Hum (G5UM).

The G6's.

G. H. Ramsden (G6BR), C. A. Jamblin (G6BT), J. H. Bateman (G6BX), F. Charman (G6CJ), J. Clarricoats (G6CL), D. G. Johns (G6GJ), E. L. Gardiner (G6GR), R. C. Neale (G6GZ), W. D. Kieller (G6HR), A. E. Livesey (G6LI), L. J. Fuller (G6LB), J. W. Mathews (G6LL), L. P. Elmer (G6LR), E. R. Martin (G6MN), A. D. Gay (G6NF), L. E. Newnham (G6NZ), I. D. Auchterlonie (G6OM), H. A. M. Clark (G6OT), L. H. Thomas (G6QB), R. A. Bartlett (G6RB), A. E. Watts (G6UN), T. A. St. Johnston (G6UT), H. V. and L. N. Wilkins (G6WN), H. A. M. Whyte (G6WY), F. W. Garnett (G6XL), G. A. Exeter (G6YK), and J. Hanson (G6YU). In addition, Sir Ian Fraser, Capt. J. A. Echevarri, Messrs. R. Klein, G. F. Gregory (ex-G2PZ), P. R. Coursey, H. Freeman, H. Pocock, G. G. Livesey (G6LI and ex-FO3SBR), Mr. F. G. S. Wise (ex-G5CF), H. W. Pope (ex-PZX), and S. Perrier (ex-PFX).

THE MONTH ON THE AIR

January, 1938

By H. A. M. Whyte (G6WY).*

CONGRATULATIONS this month go to G5ML, our champion 14 Mc. phone station, for working all continents on phone in 3 minutes 20 seconds. A round-the-world QSO party was arranged after many attempts, and success came to those who took part for a second time, only this time they broke their previous record to smithereens. G5ML, VK4JU, W4DLH, HK5AI, SU1KG, and VU2CQ all achieved this wonderful "hook-up." Incidentally G5ML claims first British phone contact with FR8VX, getting an S9 report with 500 watts input and a beam aerial. No dates are available.

Let us now deal with the new countries active. G6KP reports a 7 Mc. QSO with SV6SP on January 25 at 2323 G.M.T., and the address given as Canea, Crete. A QSL was promised, and we shall await its arrival with interest. It is curious that SV1SP has been very active recently with a similar note, he is quite genuine in Athens. G2CP, who worked FE3B on December 18 at 0745 G.M.T. on 14 Mc., obtained the following address: Radio FE3B, Buea, Fr. Cameroons, and asked for a QSL direct. CR6AF, in Angola, has been putting through a fair signal on 7180 Kc., and gave a new country to G6WY and G2ZQ. EA9AI is another new station on 7150 kc., and increased the country list of G5LP, G2ZQ, G6WY, and others. His QRA is: Dr. Mora, Canalejas 1, Mellila, National Spanish Morocco. (He used to work FR-EAR stations frequently in the old days!—G6CL.) His fist is rather "jumpy," and not too easy to read. PX2B is active on about 7150 kc., and was worked by GM8SQ. He asks for QSL's to be sent *via* REF, and claims to be in Andorra. I7EY worked by ZB1P is now claiming to be in Addis Ababa, so he must have set up his station pretty quickly after leaving Harrar. I7AA has also been heard being called.

Have you heard HAM? We don't mean G6OT or G6WY either! G5UC managed to raise him on 14 Mc., and he gave his QRA as "Budapest Airport." In a QSO with HA6A he requested details, and learnt that HAM was HA4H operating at (presumably) the Airport Transmitter. He has also been putting through a good signal on 7 Mc.

BRS2763, of Snodland, Kent, certainly keeps his ears wide open. He heard VK4HN in Papua, K7FNE 14050 and 14360. VQ4KTB 14100, ZS3F, and FR8VX, the last three being on phone. He has received a card from K6TE in Wake Is., who has now returned to Hawaii. He has now heard 134 countries. G8RH has worked some interesting stations on 14 Mc., U9AW, VE5ACN, VE5MH, VE5MZ, K7DNL, CN1CR, U6WD, U6ST, TF5C, TF3C, and ZS's. On 7 Mc., TF3C, CT3AB, T4TWO, the latter sent a home-made card postmarked Oldham, Lancs.! ZSM7QD worked on 7 Mc., gave his "TR" as S.S. *Simomack*, and was only using 1 watt. G2MI heard CN1CR asking a station with whom he was in contact to listen for CN1AA, and MI heard CN1AA with a T9 note at S7, so we have another Tangier station to work.

G6CJ received a card from VP4AA, who is on S.S. *Rosavra*, the operator, G8DF, has visited West Indies, British Honduras, and British Guiana, and met the amateurs in each port of call. G5FA continues the story by informing us that the call is being changed, ZD1Z being used when approaching the West African coast, and then ZD3Z when held up at Gambia with propeller trouble. G5FA worked HAM and CTO15, the latter just said he was in Portugal. On 7 Mc. he heard HK5JD 7100, EA8QA 7025, and PY2AD 7150.

GM2JF, right up in the North of Scotland, sends a very interesting report of 7 Mc. harmonics from European stations, heard *above* 14,400 kc. The nearest amateur is a day's train journey from him. Has that sunk in South London? 2JF uses 220 volts on his final from accumulators, and yet with this power he worked 16 VK/ZL's, 21 Africans, including VQ8AB, three ZE's, and ZS3F, one PY, and J5CC. G8MX again works his 14 Mc. phone DX. This month his bag includes ZT2G, ZS6AJ, VQ4KTB, ZT6N, FB8AF, and ZE1JA with 25 watts at 500 volts. G8RL, with 10 watts, worked W 1.2.3.8.9 on 7 Mc., and heard U9BM, ZL4AG, YI5KG, ZE1AA, VK2NY, ZL3GU, ZL2BD, ZL4FB, UONB, VK2ZF, ZS6EO, VK4CW, ZS1BG, PY1FD, LU5BL, HK5JO, YV1AC, YV1AK, and WXB (Alaska), working with amateurs. Now who said the Aurora Borealis upset 7 Mc. during January? Incidentally, UONB was also worked by G6CJ, G6WY, and G2ZQ, and is *not* in Zone 19, but in Irkutsk, Zone 18. SU1WM worked him and read his QRA at Yakutsk, which is in Zone 19, so we are sorry to disappoint him.

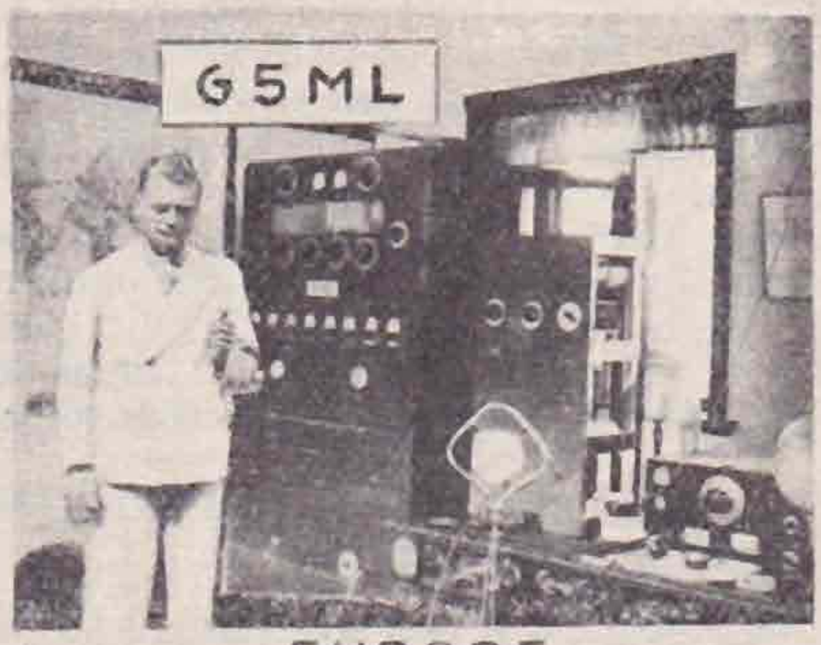
A new member to the Society is OXVC, so you can send your cards *via* R.S.G.B. in future. ZB2A is still puzzling Headquarters, as the cards are piling up, and no address is known. W2CYS raised him with 600 watts to an attic aerial. VU2JP worked the elusive I7EY, and confirms that the QRA was Addis Ababa, and that QSL's should be sent care I1IY. ON4XX confirms that XON4MY is genuine, but sees no good reason for the "X," as the station is being operated at Brussels Airport. ON4XX requests that G stations working on 1.7 Mc. should listen on 3.5 Mc. for him between 2130 and 2200 G.M.T. for replies. We hope he will run a regular listening schedule after these notes appear, so that the 1.7 Mc. stations can support the idea.

BRS 2722, of Grimsby, answers our appeal for information on ST1AB. He heard him several times in 1936, and sent a card. A letter was received from the Sudan Post Office stating that there was no call ST1AB operated in Sudan, and that he had been reported before, and details of his transmissions were requested. Answer: ST1AB is *not* in Sudan. 2722, who has heard some really good DX during the past few years, has reported, by QSL the good stuff only. He has sent about 50 cards, but has only received four in return, and has

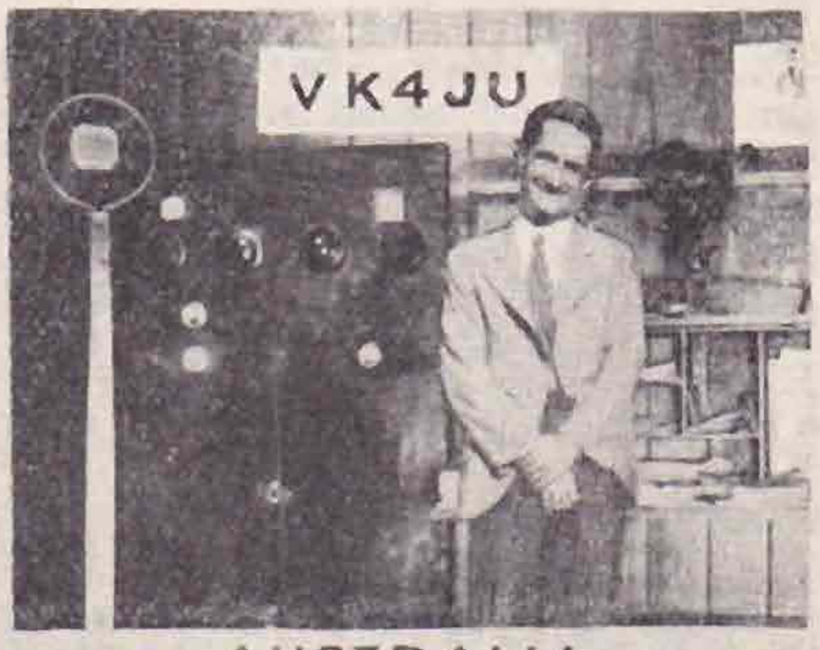
*9, The Mead, Beckenham, Kent.

given up all hope of obtaining his H.B.E. If this catches the eye of those who do not answer good reports received, let them remember that a card sent in return is a great kindness and pleasure to the recipient. We may enjoy our hobby, a little selfishly at times, but let us remember that there are others who rely on us to help them. Many write on their cards "A true ham always QSL's." For H.B.E. Certificate it is necessary to obtain cards from at least three Empire countries in each of the five continents, and 25 cards in all. North and South America count as one continent for H.B.E. purposes. BRS 2722 heard EA8AK on 7 Mc., and queries SSN9NX heard working G's on 7 Mc., and is another to report CR6AF.

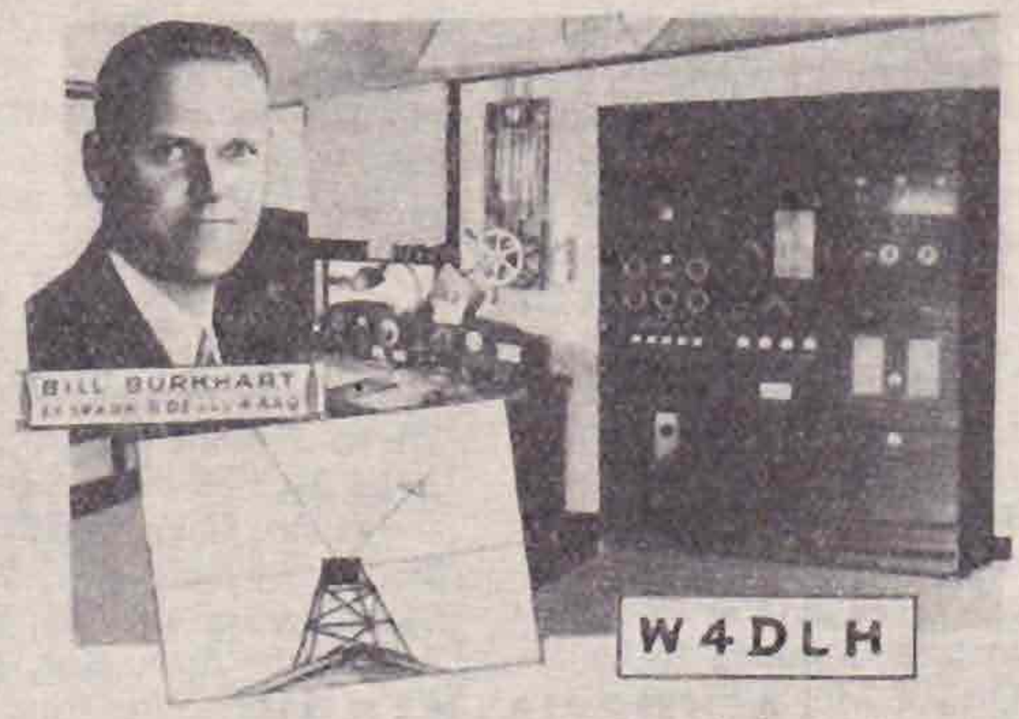
2ATI heard on 14 Mc. VP3THE, VO6J, HI8X, and on 7 Mc., ZL2UV, VO6C, ZL2QA, XE1AA.



EUROPE
Fred W. Miles, Kenilworth, England



AUSTRALIA
Frank W. Nolan, Brisbane, Australia



NORTH AMERICA
Wm. S. Burkhart, Goulds, Florida

AFRICA
"Bob" Green
Alexandria, Egypt.

SOUTH AMERICA
Antonio J. Restrepo
Colombia, S. America

ASIA
M. Mozoomder
Bombay, India

On January 4, the six amateur stations featured above took part in a unique All-Continent Round Table Relay covering 54,100 miles in 3 mins. 20 secs. Telephony was used by all stations. The originator was W4DLH, of Goulds, Florida, who acted as key station. On checking up the reports from the six participants it was found that all stations were hearing the other five with readable and satisfactory signal strength.

ZL2OD, K6PEJ, W7DXZ CM2CB, PY2DN, VP2GT and PX2B, and received a card from FI8AC. GI6YW informs us that he was the first G contact with VE5LD in 1935, and on the home-made QSL received the QRA was given as Gjöa-haven, King William Land, N.W.T. VE5LD cannot send cards until next summer when the ice has melted, and VE5ACS, in *Resolution I*, tells us that cards may be expected next August. Much patience must also be exercised in waiting for confirmation from VQ8AS in Chagos Archipelago, as boats only call three three times a year.

GM8SQ, with 10 watts, has worked CN1CR, PX2B on 7 Mc., and heard HAM, CTO15, and SU1RO. G6QS worked CR7AY, VE5KL, VE5HR, and many W6's and 7's and ZS. BRS 1330, of Misterton, Som., is asking for details of ZD4AA heard. There will be a known station starting up in Gold Coast in February, the operator being ex-G2TH ; we hope he is in time for BERU ! He hopes to build a 50-watt transmitter, as A.C. mains are available.

G5RI reports contacts with YN1AA 14400, YV5AK 14300, XU7CK, K7EWZ (HF 14), VP6LN 14300, and heard XU8JM, in the early morning. He thinks that 1.7 Mc. is the best band to-day for real rag chews on CW, away from the horrible QRM of other bands. We agree and think that more and more use is being made of the 1.7 Mc. for this very reason by CW stations. G2NJ reports that G5CQ is aboard S.S. *Kaluga* and QSL's *via* BRS 2178. He is bound for Vladivostock. G6YL states that XOH5NK made the same trip two years ago and signed the same call on the same boat.

BERS 195 still listens up in Darwin, even though the mosquitoes have bred more numerously this year. G8TI was logged on 7 Mc. phone, and many more carriers were heard, but could not be identified. Other Europeans heard were HA2N, ON4JC, ON4IW, PX2B, and D4ZMI, and no VK's were on 7 Mc. at all. Even the " G3's " have been heard ; GW3AX was logged. Trebilcock's record for 1937 is interesting. 116 different countries logged, 48 on phone, and H.A.C. 48 times. On 14 Mc. he logged VT3AB and requests details, and compliments ST6KR on the fine signal heard. Cards were received from the Swedish Film Expedition (SM5VQ) who were at Mentawei Islands, off the coast of Sumatra when heard, and from PK6WF, in the central jungle of Dutch North Borneo. A card from the YL operator of K7GLL stated that his was the only listener report ever received. She is now back in Arizona signing W6OPV.

GI5UR worked all continents except South America with his temporary aerial 10 ft. off the ground, with 24 watts input, using Goyder Lock. He queries the authenticity of KA1UP, whom he worked. We have stated before that we see no reason why he should not be genuine. If you want an outsize in cards, work KA1SL.

G2ZQ worked TA1FF, who gave the following QRA : Smyrna, Bankyir 8, Turkey. It is a plausable address, we hope that confirmation will be received. On 7 Mc. he worked VQ3TOM (ex GM2TM) at midnight G.M.T., and heard a station calling W6ITH and sign " 8UL," and then continue with Chinese War News on 7 Mc. G6WY worked WB3A (American ship off Boston), SU1AM on 7 Mc., and K7FNE, CX2AJ, on 14 Mc. Now that Channel Islands and Isle of Man count as separate countries for the A.R.R.L. DX Century Club, the G's in these islands will have to be very active to give the rest of the world a chance. Those known to be active at present on 7 or 14 Mc. are G6IA (I.O.M.) and G8MF, G5OU and G8DO in C.Is.).

G6FU has been concentrating on 7 Mc. with a maximum of 9 watts, and has worked 3 W9's and VO1D. G6FU is not in favour of high power phone on 7 Mc., especially when the discussion is about trivial matters. He has even heard two ladies discussing knitting. Yes, we agree, the telephone was made for that. There are too many amateurs playing at " Baby Broadcasters " to-day. It is a great pity that normally sane people cannot conduct their experiments with some degree of dignity at week-ends.

Finally, BRS 1151, of Dewsbury, sends an interesting newspaper cutting of the path taken by the ice-floe holding the crew of UPOL. On January 4 this expedition had drifted to below 80° N. in the Greenland Sea, and was expecting to be rescued soon.

Please send your reports to reach G6WY not later than the 25th of the month.

Late News

SV1RX confirms the authenticity of SV6SP, who is ex-SV1SP, operating at Canea, Crete, and he QSL's promptly.

IIIR gives us the information on amateur operation in Ethiopia. I7EY is in Addis Abbaba, and now signs I7AA (LF 14). His old Italian call was IIEY. It is now believed, from information received, that ST1AB is in Dessie, Ethiopia.

Empire Calls Heard

By G2TH at Accra, Gold Coast, from September 23 to November 23, 1937.

14 Mc. Phone : G6xr, vs2ak, zs3f, zs5m, zu6n.

14 Mc. C.W. : Ei2l, 6g, 7f, 7l, g2df, 2fo, 2hi, 2hx, 2im, 2jt, 2kh, 2lk, 2lu, 2ma, 2mi, 2nn, 2qb, 2xd, 2xn, 2zy, g5aq, 5bj, 5cg, 5ff, 5hz, 5ih, 5jx, 5lp, 5pp, 5rv, 5yh, 5yv, 5zg, g6cl, 6dl, 6dx, 6hb, 6hq, 6kp, 6nb, 6mk, 6qa, 6qs, 6td, 6ty, 6uj, 6vp, 6vg, 6vx, 6wy, 6xp, g8bd, 8dd, 8fz, 8gg, 8hn, 8ii, 8ik, 8il, 8ip, 8it, 8kp, 8nb, 8qt, 8to, gm2jf, 5sc, 6hz, 6jh, 6rv, 6xw, gi6tk, st2cm, 2lr, su1db, 1hb, 1wm, ve1ep, 1ex, 3ajx, vk2px, 5gr, 5ll, vq3far, 3hjp, vq4cri, vq8as, vs7gj, 7lt, 7mb, 7ra, vu2am, 2fh, 2fx, 2lj, xz2dy, zb1h, ze1jg, 1ji, 1jv, zl1jz, 1mq, zn1b, zs1ac, 1ag, 1ah, 1an, 1av, 1d, 1z, 2ac, 2p, 2x, 3f, 4d, 4h, 5ah, 6am, 6j, 6k, zt1z, 2z, 5p, 6ac, 6at, 6au, 6y, zu1d, 1t, 1v, 1x, 2d, 2g, 5aq, 5l, 5p, 5q, 6ac, 6ak, 6an, 6u.

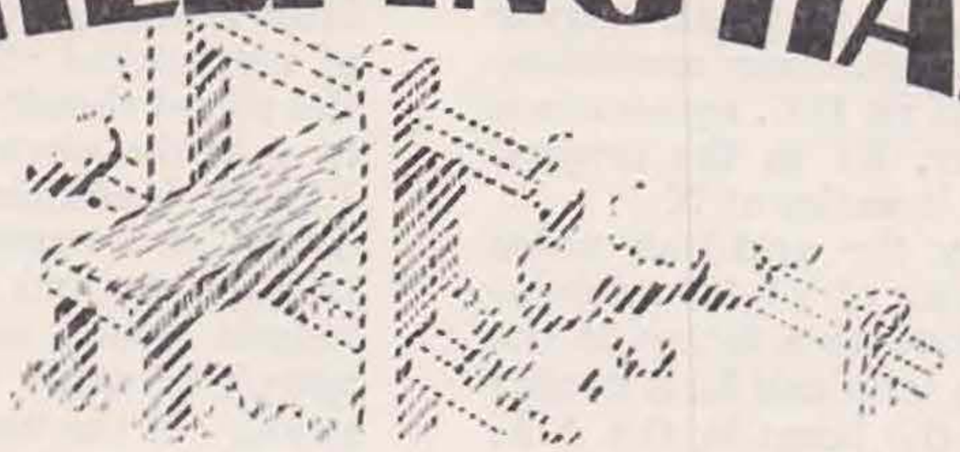
* * *

By G5BM, Cheltenham, between 0800 and 0900 G.M.T., Sunday, January 9, 1938, during 1.7 Mc. Contest :

G8bd (569), 8cs (599), 2nj (579), 2uj (579), 5ri (589), 5zx (589), 6gl (579), 2xp (569), 6bq (579), 2lc (579), 5jo (579), 8ml (599), 8ja (589), 5ww (589), 6yr (589), 2lk (579), 6hb (599), 6kp (559), 6vp (569), 8lo (569), 5tn (559), 8ct (569), 6lm (589), 6vc (559), 8md (579), 2cd (579), 2df (579), 8wf (569), 2zp (589), 6vd (579), 2hw (579), 6ct (579), 5to (579), 2du (579), 6ut (579), 5px (579), 6wy (569), 6lf (569), 6wf (569), 8nl (579), 6gm (579), 2cd (579), 6gr (569), 5od (599), 5il (579), 5ij (569), 2gg (569).

At the commencement of the contest, OZ1W (559) OZ5W (569) and F8AJ (589) were also heard.

THE HELPING HAND



By Austin Forsyth (G6FO).

PART XI.—SIMPLE MODULATION EXPERIMENTS.

HAVING dealt last month with a series of experiments on the adjustment and loading of a simple self-excited oscillator, we can with advantage follow this up with a similar treatment of some practical modulation systems and circuits for low-power working.

There are several methods of modulating a steady carrier-wave : choke control, grid modulation, series, screen or suppressor-grid control, and high-level or low-level modulation, to mention only a few. Whatever system is used, they all aim at one effect : *amplitude variation* of the carrier-wave in accordance with the audio-frequencies involved. To use a crude illustration, amplitude modulation can be likened to variation of the carrier " up and down " at a fixed frequency, and frequency modulation to " sideways " fluctuations of the carrier. The latter effect is nearly always most undesirable, since it is obvious that slight but rapid changes of *frequency* are involved which the receiver cannot follow, with the result that distortion is inevitable. Frequency modulation can be heard at any time on the 7 Mc. band.

We propose discussing here two main systems, and if their principles are grasped and applied to the little oscillator we described last month, it will be found that not only are the (apparently) more complicated telephony circuits easy to understand, but that no matter what names they may be called, technical or otherwise, they all boil down to some form of either choke or grid control. Much is heard nowadays of Class A, Class B, and Heising modulation. All these are simply different ways of applying the basic choke control system to either the output valve in a transmitter or, in the case of low-level modulation for instance, to one of the stages preceding the output, which then has to be operated in a particular way—as a linear R.F. amplifier—to put the modulated carrier-wave into the aerial.

If, therefore, the fundamental principles of the two main systems are understood, it becomes much easier to apply text-book material to some particular transmitter in which the P.A. stage is operated, say, Class B. We are at the moment concerned solely with low-power arrangements which will give results in connection with the Hartley oscillator described last month, but obviously the same methods can be applied to any type of transmitter which is suitable for telephony working.

Grid Modulation.

In this, the audio frequencies produced by the microphone—which may or may not have some amplification before they reach the modulated valve—are applied to the control grid in such a way as to vary the grid voltage, which in turn controls the plate current and therefore the plate voltage, so varying the amplitude of the carrier-wave to follow the original speech frequencies. The most elementary way of doing this is shown in Fig. 1, where T1 is a microphone transformer connected across C4 in our original Hartley circuit on p. 374 of the January Bulletin, to which diagram reference should be made all through this article, as we have used it as a suitable oscillator to which the different methods of modulation can be applied.

We have not the space here to deal with the audio-frequency end—questions of matching, choice of components, and so on—and as they are fully covered in the latest *Guide to Amateur Radio*, the A.R.R.L. *Handbook*, and similar publications, we are assuming that the reader understands this side of the question and can build a stable L.F. amplifier capable of giving a good output. In any case, there are many sources from which such information can be obtained readily enough.

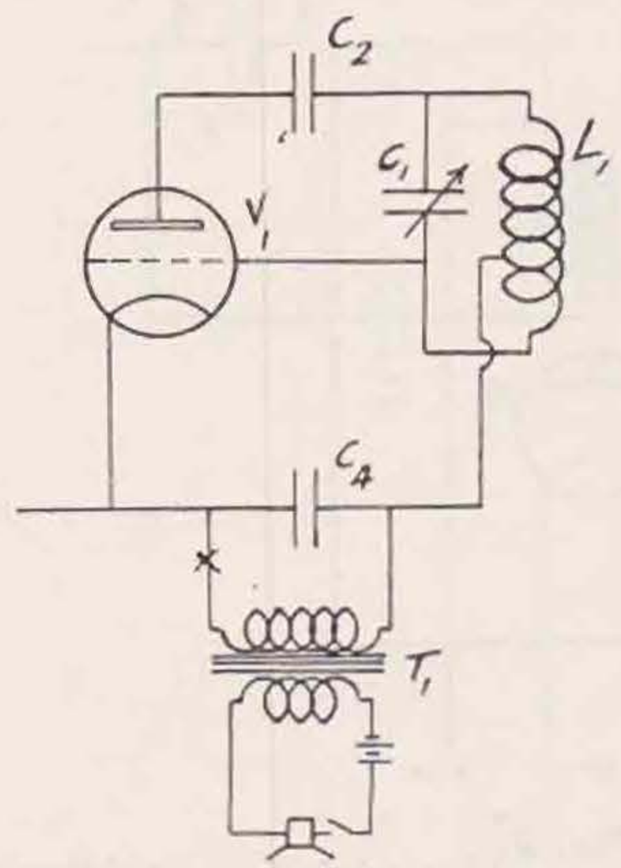


Fig. 1.
Simple grid modulation applied to the Hartley oscillator. T, 30:1 speech transformer; X, point of connection for variable grid-leak. All other values as given with Fig. 1 on p. 374, January " Bulletin."

In Fig. 1 here, it is obvious that the primary of T1 must match the microphone, while its secondary should have a fairly high impedance. In practice, a carbon-type microphone such as the G.P.O. solid-back, with its accompanying 30 : 1 transformer, will give results. In some cases, no grid-leak resistor would be required, as the transformer secondary takes the place of the leak. If its D.C. resistance is not sufficiently high, however, R1 in the original Hartley circuit can be joined in series at X.

The adjustment is to vary the grid-leak value and the plate input and loading of V1 till modulation is obtained. This will show as a flicker in the tuning loop if set up near the tank coil L, a similar effect being visible in either the lamp in the A.A. circuit or on its aerial ammeter. These variations in glow or on the meter should be upwards, i.e., a sustained whistle into the microphone should kick everything up. Ordinary speech will not give quite this effect, unless modulation is very deep, owing to sluggishness in the indicators. The speech can also be listened to on a harmonic of the receiver—never a very good method of checking quality—or in a monitor, consisting of a crystal detector and a pair of 'phones, the inductance of this monitor being coupled either to the A.A. coil or the tank of the oscillator, such that good pick-up is obtained. If the experiments are being carried out on 7 Mc.—which we do not advise, owing to difficulties with stability ; 1.7 Mc. as originally suggested is much better—it will be found difficult to get an ordinary crystal detector to work well, owing to the heavy damping introduced by this type of rectifier. A valve rectifier is the best thing to use on frequencies above the 3.5 Mc. band, all that is required being an ordinary three-electrode valve connected as a diode across a circuit tuning to the required frequency. Fig. 6 herewith illustrates these two types of 'phone monitor.

The first discovery which will be made is that to to get adequate modulation, the oscillator input will have to be kept much lower than the power it is possible to use on the CW adjustment. In other words, the audio output of the simple modulator circuit in Fig. 1 will be insufficient to control an input of more than about 3 watts—but the principles of adjustment and operation will be well illustrated.

There is still another effect to be looked for—frequency modulation. Assuming that the oscillator is set up so as to be immune from the effects of mechanical vibration, as mentioned last month, the signal should be tuned in on the CW monitor—or a fairly weak harmonic, say 14 Mc. from the 1.7 Mc. fundamental, on the receiver—and heterodyned at a comfortable strength. Speak into the microphone and listen to the *carrier*. This should remain steady and clean " at the edges," and the speech be easily readable at zero beat or the silent point. If the wave is broken or the speech sounds " fuzzy " and distorted, frequency modulation is taking place—always assuming that the vigour with which the mike is being handled is not shaking up the whole transmitter !

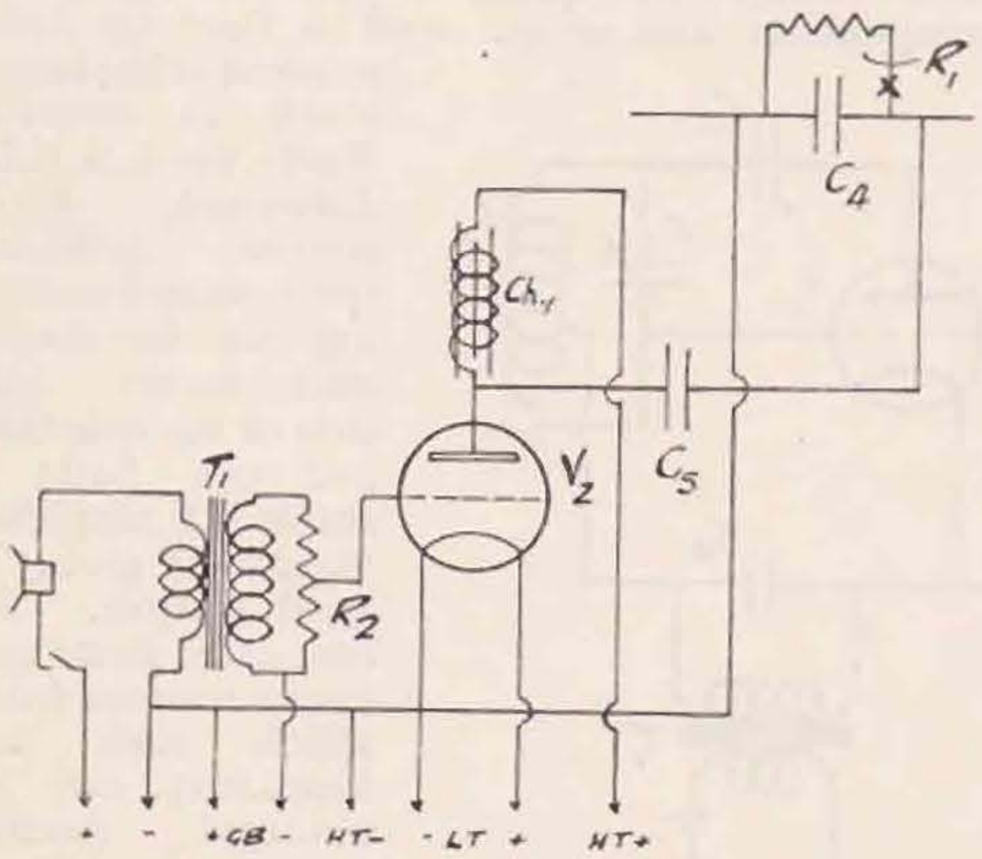


Fig. 2.
Amplifier for low-power grid modulation, enabling carrier inputs up to about 10 watts to be controlled. T1, as in Fig. 1 ; R2, volume-control ; Ch. 1, 20-henry 10 mA speech choke ; C5, 0.1 to 2 μf ; V2, triode output valve of P.220 type.
(C4 and R1 refer to the Hartley oscillator.)

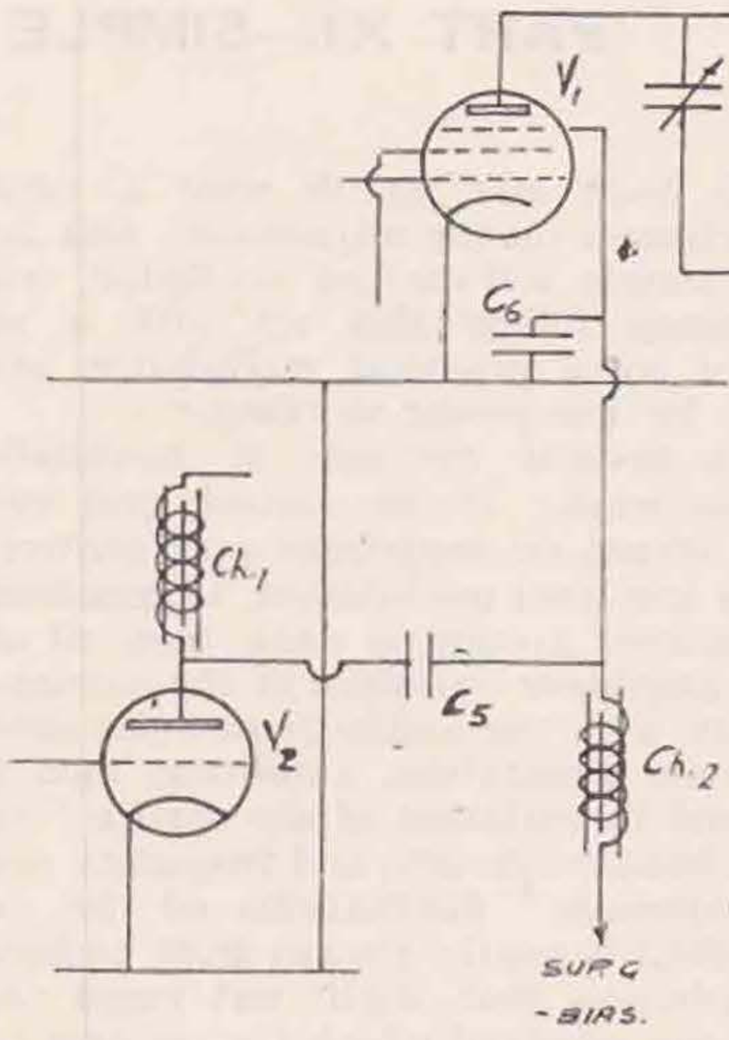


Fig. 3.
Suppressor-grid modulation using amplifier of Fig. 2. Ch. 2 is similar to Ch. 1 in Fig. 2. V2 is the modulator, and V1 the low-power modulated RF pentode in any type of transmitter. C6 should not exceed .001 μf for 'phone working.

The correct adjustment is when the settings of the different variables give good speech quality, slight upward flicks on the A.A. indicators, and a steady carrier.

Amplifier for Grid Control.

As we have seen, the circuit of Fig. 1 cannot give much control due to the limiting factor of the modulating power available. Fig. 2 shows a method by which the amplified output from the microphone can be applied to the Hartley oscillator, allowing a greater depth of modulation to be obtained with the transmitter running at a bigger input, say, from 5 to 7 watts. Any good output triode or pentode can be used at V2, either mains or battery type, the modulator circuit being suitably altered for whichever may be used. C5 and R1 become the critical values in this arrangement, and altering the size of C5 between .01 and 1 μF. with different values of R1 will give both " tone-control " and variation of the depth of modulation. In general, R1 should be kept as high as possible, and C5

changed to suit. It may be found advisable to put a small L.F. choke in series with R1 at the point X.

The adjustments and checking methods are exactly the same as previously described, and it will be found that the whole transmitter is much more " lively " and easier to modulate than when using the circuit of Fig. 1. As the depth of control and the amount of carrier power which can be modulated still depend upon audio output, it follows that V2 should, if possible, be a pentode, owing to its greater sensitivity and larger output.

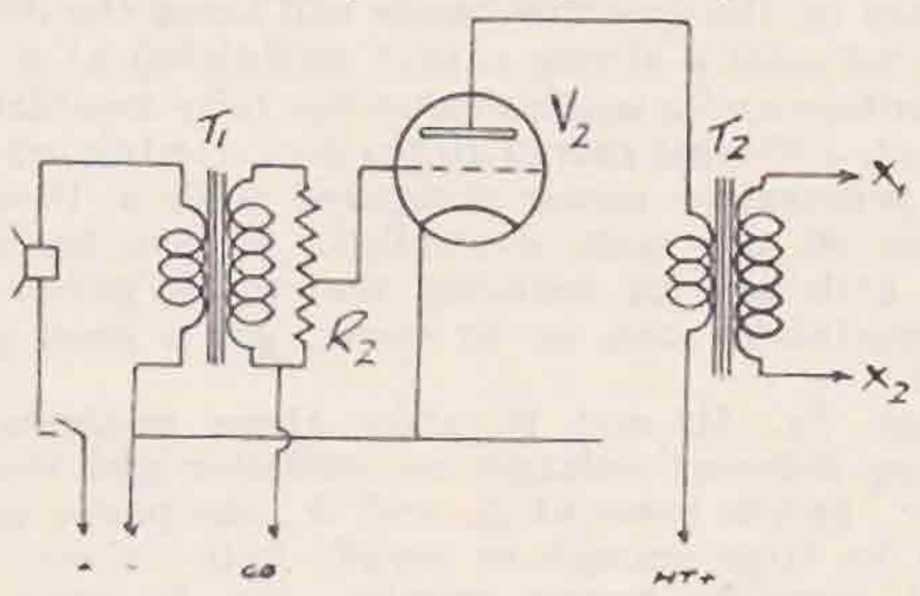


Fig. 4.
Improved grid-control modulator. T1, R2, V2, as in Fig. 2. T2 can be a matching transformer, and X1, X2 are joined across C4 in Figs. 1 and 2. In the case of Fig. 3, X1 goes to the suppressor-grid and X2 to the suppressor-grid bias, Ch. 2, not being required.

A variation on this amplifier is shown at Fig. 4, where T2 is an ordinary L.F. or a matching transformer. If the type of valve used at V2 requires a plate current of more than about 5 mA., the primary of T2 can be parallel-fed by the usual method, though this involves an extra component in the shape of a L.F. choke—or a resistor will usually do—together with a coupling condenser.

Either of these two amplifier arrangements can be used for suppressor-grid modulation of an R.F. pentode, such as the RFP-15, in any type of transmitter, controlled or otherwise. This is shown in Fig. 3. Modulation depends upon correct setting of the suppressor-grid bias and the amount of drive from the preceding stage, if the transmitter is controlled. In a self-excited circuit for experimental work of the kind we are now discussing, the excitation (or variation of the grid tap in the case of the Hartley), loading and plate input also have optimum settings.

The methods of checking are exactly the same as for the other circuits.

Choke Control.

" Straight " choke control is shown in Fig. 5, where V1 and its associated circuit is our familiar Hartley and V3 the modulator valve.

To understand how this system of modulation works, let us see what happens: V3 is biased to draw its normal plate current and V1 is in an oscillating condition, feeding R.F. power to the aerial or A.A. circuit. In the quiescent condition—carrier running but no speech input to the microphone—the voltage at the plates of V1 and V3 will be the same. When modulation is applied, the plate *current* in V3 is varied according to the audio-frequency fluctuations arriving at its grid. These plate-current changes in V3 cause corresponding *voltage* variations, which are held in the circuit V3, V1, due to the action of the speech choke Ch.3. In other words, the plate-voltage changes at V3 are transferred to V1, which in turn has its plate current varied, thus altering the amplitude of the carrier to correspond with the speech frequencies originally imposed on the grid of V3. The *voltage variation* is the connecting link between the two, though this can be thought of in terms of change of plate current varying the amplitude of the carrier to follow the audio frequencies.

R.F.C. plays no part in this, except in so far as it keeps R.F. out of the modulator side, as its impedance to audio frequencies is negligible; as regards modulation, it passes the voltage variations at audio frequency without let or hindrance, though it is very necessary for its own function of keeping the R.F. where it is wanted.

Thus simple choke control.

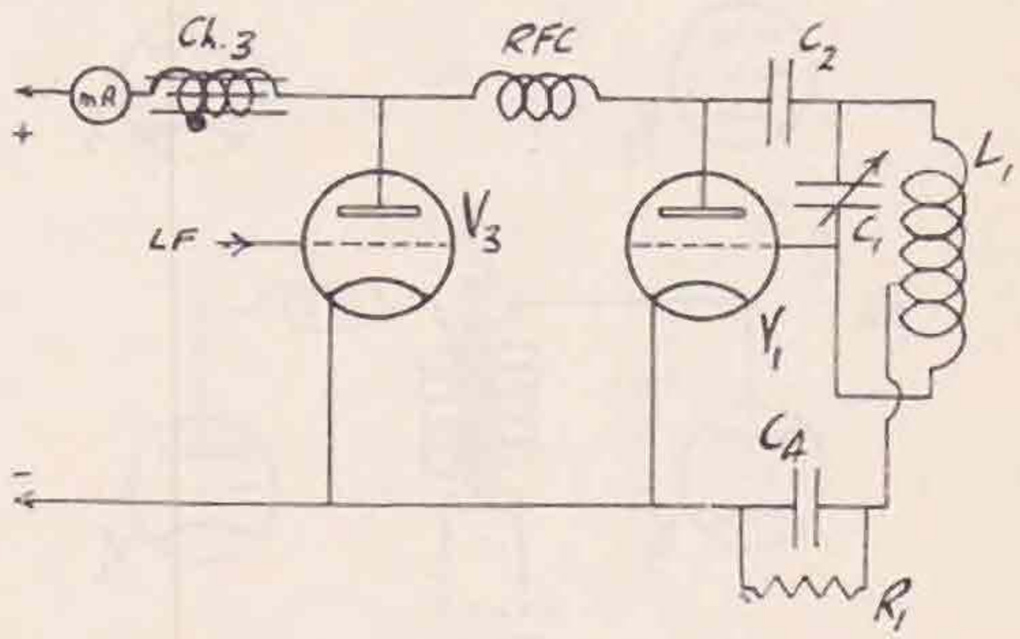


Fig. 5.
Simple circuit for choke control modulation. V1 and its associated circuit is the Hartley, V3 the modulator valve, Ch. 3 20-henry speech choke to carry the total plate current for both V1 and V3, read on the meter mA. Its needle should remain steady under modulation conditions. The fixed condenser C3 in Fig. 1, on p. 374, of the January " Bulletin " should be joined between the modulator side of the RF choke and the base-line.

Now, apart from all this, it is evident that there must be some sort of relation between V1 and V3 in terms of power-handling ability. Using any of the valves at V1 which were mentioned in the January article, V3 must be of a comparable type, but larger. With a *Mullard* AC044, " 362 " *Co.* ACPX4a or *Mazda* P.650 at V1, to mention only a few, a suitable valve for V3, the modulator, would be a *Mullard* DO.24, " 362 " *Co.* PX.25 or a *Mazda* PP.5/400, any of these modulators working quite well with any of the oscillators. Using battery valves and an output triode at V1, V3 could be any of the larger battery pentodes.

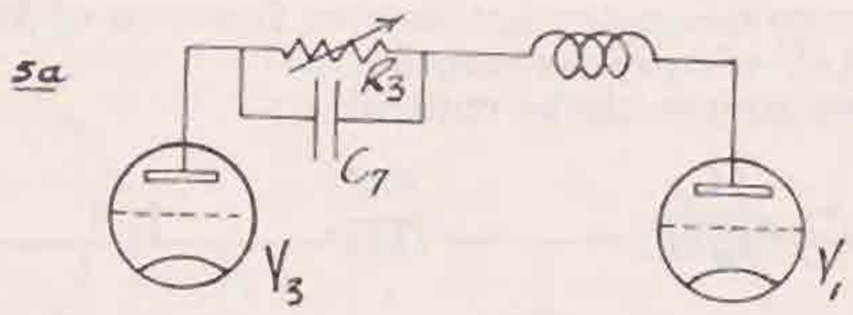
Furthermore, the oscillator and modulator should be balanced in order to get the greatest possible depth of control and proper matching. This is done by loading the oscillator such that its plate current equals the standing current in the modulator when in the quiescent condition. Also, the L.F. amplifier preceding the modulator should load V3 fully in order to get the greatest degree of plate-voltage variation within the limits of the valve's capabilities. Using any of the modulators named in the paragraph above and a transverse-current microphone, at least two stages of speech amplification are necessary.

It should now be evident that what we are aiming at in choke control is voltage variation at the plate of the modulated valve. With Fig. 5 as

it stands and everything working correctly, it would not be possible to get more than about 60 per cent. modulation at most—which, incidentally, is quite enough for a self-excited oscillator, as will be discussed later.

If it were possible, while working the modulator within its limits, to get the effect of increased plate-voltage swing at V1, the result would be increased depth of control, i.e., more modulation. To put this another way, suppose both V3 and V1 are working at 400 volts on the plate and the modulation is giving 100 volts swing on V3, which is transferred to V1 in the way we have seen, then this 100-volt variation will give a certain depth of control which cannot be increased without overloading the modulator. But if we so arrange matters that while V3 has 400 volts on its plate, V1 only has 200, then the *effect* of the 100-volt swing on the oscillator V1 is doubled, giving a greatly increased degree of modulation without having overloaded the modulator.

But as there is no such thing as ninepence for fourpence in this world, it must follow from the above that by reducing the oscillator plate voltage we also reduce carrier power, since in any event the two valves have to be balanced. However, any listener on the amateur bands will know the difference between a strong carrier modulated at a low percentage and a much weaker one fully modulated. In fact, a 50-watt carrier 10 per cent. modulated has low penetrative power compared with a 10-watt carrier 80 per cent. controlled. Hence, there is very little lost by reducing the carrier power till the modulator can, so to speak, get a good grip on it.



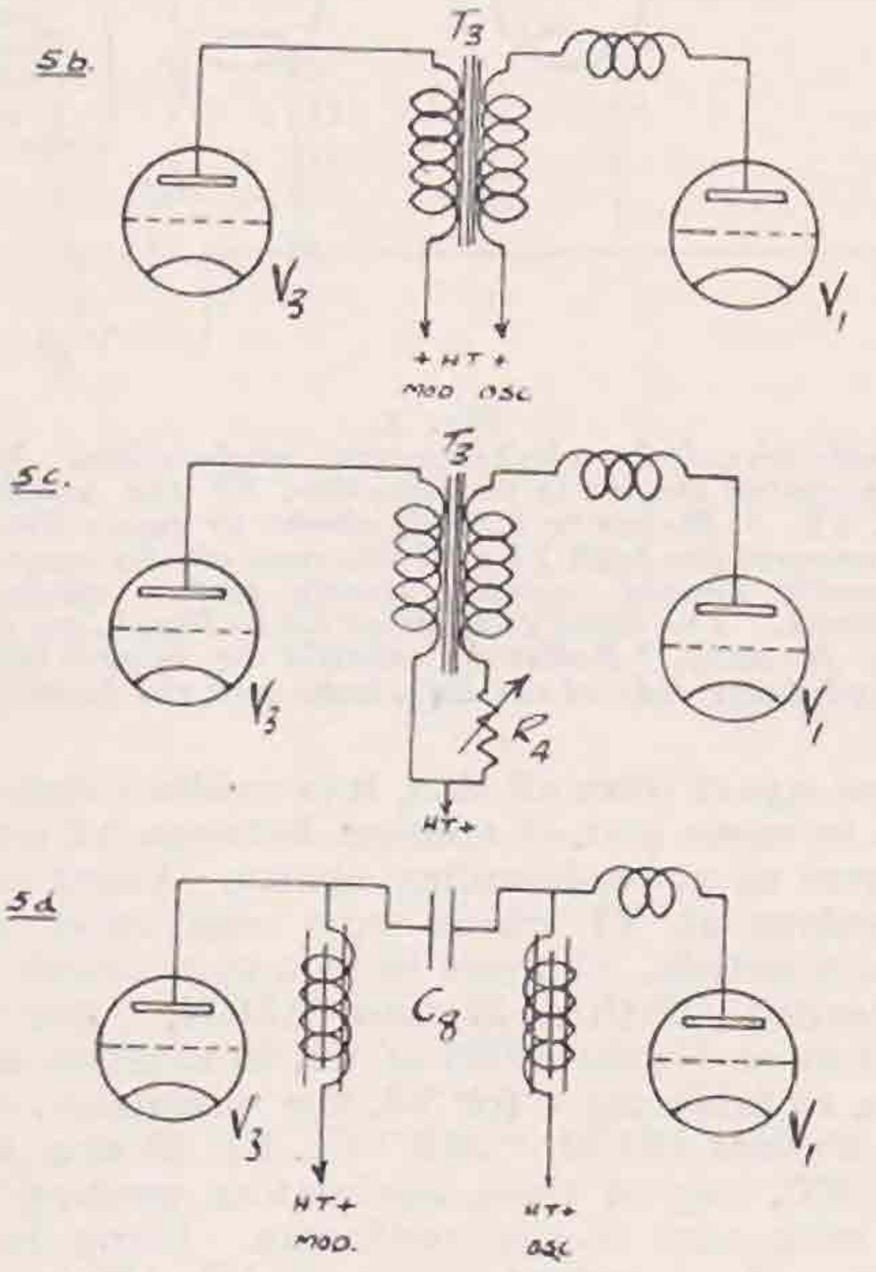


Fig. 5a.

Circuit for increasing depth of modulation with choke control. R3 is the voltage-dropping resistor and C7 the by-pass condenser discussed in the text.

Fig. 5b.

Choke control circuit for using separate power supplies on V1 and V3. T3 is a 1:1 power audio transformer having windings heavy enough to carry the required plate current.

Fig. 5c.

Using a 1:1 transformer for choke control where only one HT supply is available. R4 is the same as R3 in Fig. 5a.

Fig. 5d.

Choke control using two speech chokes and separate power supplies. Equivalent to 1:1 power audio transformer, and can be modified to Fig. 5c.if desired. C8 is 2µf, chosen for working at twice the modulator plate voltage.

Note.—In all the above diagrams, V3 is the modulator and V1 the modulated valve. In Fig. 5a the circuit to the left of V3 is the same as in Fig. 5.

Figs. 5a, 5b and 5c show three methods of getting different voltages on oscillator and modulator. In the cases of 5a and 5c, the power pack must be large enough to supply both valves, but in 5b separate power supplies can be used for modulator and modulated stages. In 5a, the method of adjustment is to increase the value of R3—which must be a power type resistor capable of carrying the oscillator plate current, such as the *Varley* 25-watt—till the required degree of control is obtained. Normally, if the oscillator plate voltage is set to about half to two-thirds that on the modulator, enough depth of modulation should result, but it is very definitely a matter for experiment, as is the loading on the oscillator under modulation. The function of C7 is to carry the audio-frequency variations across R3, since the latter will have a certain amount of impedance at audio frequencies which would otherwise affect quality. Also, R3 must be chosen with some regard to its duty—a value of about 6,000 ohms will give sufficient latitude for the necessary adjustments in the type of transmitter we have in mind.

In Figs. 5b and 5c, which do not differ in any way except that in 5b a separate power pack for either stage can be used if it is more convenient, a 1 : 1 power audio transformer effects the voltage transfer from modulator to modulated valve. In 5c, the resistor R4 is the same, and performs the same function, as R3 in Fig. 5a. By putting R4 on the low-potential side of the winding in the A.F. sense, there is no need to include a by-pass condenser.

Fig. 5d illustrates a useful circuit when it is desired to try the effect of a 1 : 1 transformer without having one actually available, and it is evident that the H.T. ends of the two chokes can also be used in the same way as 5b or 5c. The voltage transfer is by means of the condenser C8, and the chokes should be suitable for carrying the required current while maintaining their inductance values.

In fact, this raises an important point. In any modulator system, it is essential to use good audio-frequency components, and in this connection *Varley*, *Sound Sales* and *Radio Development Co.* (*Epoch*) products can be well recommended.

General Discussion on Modulation.

Having thus dealt with the two main systems in a manner which we hope is understandable by the reader who may be struggling to get his speech

out or is puzzled by just how to set about working 'phone, it remains for us to refer any choke control arrangement to any self-excited oscillator, since grid control of the Hartley and other self-oscillators or a driven stage has already been discussed.

When describing the oscillator experiments of last month, which were intended to cover CW working only, we suggested that readers with A.A. licences might profit not just by taking our word for the results that were to be expected, but actually trying to reproduce the effects themselves. In the same way, we now most strongly advise those more inexperienced readers who have got thus far to apply the circuits and methods of modulation discussed here to that same Hartley oscillator, for by doing so they will learn a great deal about telephony working, and will the more easily understand those systems which we have not the space to describe in detail.

We have already said that choke control by the means dealt with here can be applied to any valve or stage working under R.F. conditions, whether

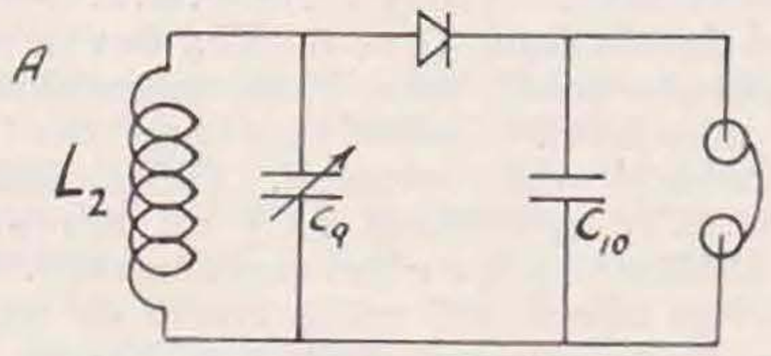


Fig. 6.

Two simple 'phone monitors. "A" uses either a crystal detector or Westinghouse rectifier, but is not advised for frequencies above 3.5 Mc. "B" is a similar circuit using for V4 any available triode as a diode rectifier. An 0-1 mA moving-coil meter in series with the 'phones would show a reading. In both cases, L2 and C9 are arranged to tune to the required fundamental frequency, being coupled either inductively to the tank coil of the modulated valve or used with a short length of wire for aerial. C10 is .001 μf.

self-oscillating or driven, though it may be necessary in some cases to modify the circuit a little. Our descriptions will cover most types of transmitter where the power used is up to 25 watts or so, and the principles apply whatever the input.

There is still, however, the question of frequency modulation to be considered. With a self-excited oscillator, this is always a matter requiring close attention, because it is an inherent failing of such oscillators that the frequency is altered, albeit slightly, by small changes in plate voltage; here it should be said that it is possible to design a self-oscillator which will remain constant as regards frequency over very large plate-voltage variations, but only at the expense of efficiency, which would be very low.

Now, we have already seen that the whole business of choke control is concerned with voltage variations at the plate of the modulated valve. It therefore follows that a self-excited oscillator will be very prone to frequency modulation when deeply modulated by choke control, and it is obviously necessary that under practical conditions—as when using this oscillator as an actual transmitter on 1.7 Mc., the only band on which it can be done with reasonable safety, because any tendency for frequency modulation would not be so noticeable as on, say, 7 Mc.—the depth of control be kept down. Fifty per cent. mean depth is about the limit, and even this is a bit high in view of the fact that it will go to 70 per cent. or more on peaks.

While modulation of self-excited oscillators is not really good practice, it is yet quite permissible on our lowest frequency band when proper precautions are taken as regards stability, both mechanical and electrical, and the depth of control is kept low.

Coming to driven transmitters with a modulated output stage, there should be no possibility of frequency modulation if everything is as it should be. But it is often very bad, which reveals a pretty desperate state of affairs from the point of view of efficiency and adjustment! If a transmitter is ECO-controlled, heavy modulation will affect the stability of the drive oscillator under certain conditions, even if there is a buffer amplifier or doubler in the way. It is even possible to have slight frequency modulation when the transmitter is crystal-controlled, again due to the output stage being pushed too hard and too tight a coupling all through the set.

Generally speaking, if there is no evidence of frequency modulation of the transmitter as revealed by a good CW monitor tuned near the edge of the signal, it can be taken that for practical purposes everything is all right—though there are hypersensitive critics who will always find a "slight" amount of frequency modulation on *any* signal, even if it can be read at zero-beat with the crystal-gate in, which is, we think, quite a good test of any 'phone transmission.

TECHNICAL ENQUIRY BUREAU

The service is free to members except that a nominal charge of 6d. per query is made to cover clerical and postage expenses.

The Rules governing the service are :—

1. Questions must be written legibly and concisely on one side of the paper.
2. A sixpenny postal order must accompany each question.
   The postal order must be made payable to the R.S.G.B., and the letter addressed to Technical Enquiry Bureau, R.S.G.B., 53, Victoria Street, London, S.W.1.
3. The service is only available to fully paid-up members of the Society.

D.R's and T.R's Please Note

D.R.'s and T.R.'s are asked to note that the membership figure was 3,353 and not 2,253, as mentioned in the January General Circular.

THE 28 Mc. BAND

By Nelly Corry (G2YL).

THE intense solar activity of last month was undoubtedly the main cause of the unsettled conditions which prevailed. North American and Oceanic signals were decidedly less consistent than those of last year, and on at least four days no W's were logged at all. From the other continents signals made rather spasmodic appearances, but activity was at a higher level than during January, 1937, and there were still over 40 countries to be heard.

From Oceania, VK2GU and VK3YP were heard at poor strength once or twice, and PK3BM was the only other signal reported. VU2CQ and VU2FV came through well on 'phone and c.w., and other Asiatic stations heard were VU2AN, VU2FX, and VS7RF. VS6AH also made a welcome re-appearance on the band on January 30. VU2FV reports that he is active every week-end, and with a rotary beam and 10 watts input he finds that European contacts are far easier than on any other band. He has recently worked VK3, VK5, VS1, ZE1, ZT6 and 39 Europeans, including only 9 G's. In lamenting the present scarcity of G stations, he asks: "Have they all donned their ultra-shorts and proceeded to the land of five metres?" X!

A total of 20 different African stations were reported during the month in CN, FA, FB, FR, ZE, ZS1, 2, and 6. BRS3179 logged FR8VX on approximately 28,800 kc. on January 30, but no G has yet claimed first contact with this station. ZS1AH sends a detailed log for 18 days in December, showing that he had about 80 North American and 27 European contacts, including 12 with Great Britain. He is usually active from 15.00-17.00 and 18.30-21.00 G.M.T., but rarely manages to get even a W QSO after 20.00 G.M.T.

From South America LU3DH and LU7AZ were worked, and YV5AN heard by G6YL. BRS3179 also heard HK1JB and LU5AN. Central American and West Indies stations reported were CO7CX, CM7AB, CM8AP, FM8AA, HI7G, HR4AF, K4EMG, K4ENY, K4ESH, K5AN, VP2AT and VP9R—a good selection of prefixes for those who are trying to increase their totals of countries worked. North American stations in VO, and all districts except VE5 and W7 were worked, but on the whole they were audible for a shorter period, at weaker strength, and with more fading than during the three previous months.

Finland, Greece and Roumania provided the most regular European signals, and a dozen other countries heard included CT2 and ZB. "W6BOY Mobile" worked G2XC on January 23 when off the Azores on a voyage from Antwerp to Florida, and told him he was using 20 watts input, was licensed for 28 Mc. only, and had been unable to work W for several days previously. While VU2FV's observation that British activity has declined is undoubtedly correct, nevertheless, BRS25 and the writer heard 76 different G's, working or being worked, during the month, and there must be well over 100 who are still occasionally active.

Interesting reports have been received from G2XC, G5BM and G6QZ about conditions on January 25, the date on which the Aurora Borealis was visible over a great part of Europe. In the morning, at 08.50, 10.50 G.M.T., and at mid-day, very little was audible above 22 Mc. The band has recently been going dead very early in the evenings, but on this date G5BM, of Cheltenham, found conditions excellent from 17.00 to 18.00 G.M.T., and worked W3RL, W4AZB and heard F8NS, F8RR, HK1JB, OH6TS, ON4JZ, VP2AT, VU2CQ, W8KYY and G2XC, of Portsmouth (QRB about 85 miles). At about 18.00 G.M.T., G5BM heard G6DH, of Clacton (QRB about 140 miles), at S7 with a watery note, and they had a QSO which lasted until 18.35 G.M.T. when the band went dead. About 19.15 G.M.T. G6QZ could hear no signals from 22 to 60 Mc., but in any case, most signals would have been unreadable due to the S7 noise level. BRS25 also heard the "Hissing Phenomenon" that evening. G2XC listened at 22.15 G.M.T. and heard LCJ on approximately 30 Mc. at S9, and a few other weak carriers. W6BOY Mobile was about 300 miles South of the Azores that evening, but even there the Aurora Borealis was visible, and he found conditions much improved. For several days previously the skip distance had been short, but that evening he worked VU2CQ when darkness covered almost the entire path. Conditions in England the next morning were exceptionally poor. The "Hiss" was also heard on January 3, 16, 17 and 26, and G6DH reports that one afternoon in December he and a W3 both heard it simultaneously.

DX conditions peaked in February and the beginning of March last year, so don't forget to give 28 Mc. a trial in the B.E.R.U. and A.R.R.L. Contests!

28 Mc. Dx from an Aeroplane

Details have been received from OE3WB and OE1FH of tests carried out from H.R.H. Archduke Anton's 6-seater aeroplane OEDEA, while on a flight from Vienna to Budapest and back on December 12. The crew consisted of OE3AH pilot and operator, OE1FH log-keeper, OE1EZ assistant operator, and another. The 'plane is fitted with a transmitter and receiver covering both amateur and aeroplane wavelengths, and on this occasion ten-metre gear was also included. The transmitter used an RK25 plate-modulated in the final stage, and a two-valve super-regenerative receiver was built into the same cabinet. Power supplies were from a generator, and two aerials, both 33 ft. long and outside the 'plane, completed the equipment.

The original plan was to test with a 70-watt 'phone station operating on 9.6 metres from the top of a church in Vienna. Contact was established at R9 both ways almost immediately after the 'plane left at 12.20 G.M.T., and was maintained consistently while flying east for 100 miles. As

was expected the 'plane had gradually to increase altitude, and was flying at 4,400 ft. at the most distant point. A 7 Mc. sked was also kept every fifteen minutes with OE3AH's home station where OE3WB was operating.

Bad weather conditions unfortunately forced them to turn back at 13.20 G.M.T., and twenty minutes later, while flying at 3300 ft., VU2CQ was heard on 28 Mc. calling " QC DX " on 'phone. OE3AH optimistically gave him a short call, and, in OE1FH's own words—" Well, what nobody expected happened. VU2CQ came back calling the Austrian aeroplane DEA. From this developed a solid fifteen minutes QSO with QSA5 R7 both ways. The microphone was passed around enabling also 1FH and 1EZ to talk to Bombay." Later W2BHY was called twice, but he was unable to get the full call OEDEA correctly. Contact was then established with OK3VA while circling over his QRA in Bratislava, and dusk finally compelled the party to return home " still thrilled for hours by the new experience." G2YL.

THE 56 Mc. BAND

By L. G. Blundell (G5LB)

A FAIRLY mixed bag this month, but as yet no scoring in the Contest to report.

A " flash " from VK2NO (unfortunately omitted from last issue) is as follows :—

" VK2NO logged in Wellington, N.Z., October 23 by SWL. Signals 459. Rx TRF three valves. Checks OK with log."

In view of this event, activity in ZL and VK is now increasing, and a trans-Tasman contact is anxiously awaited.

Now more recent events. G6VF has had two reports on his signals from listening stations in Austria. His CW was 549 average on December 4 at 15.25 and 15.35 G.M.T. One of the reports also mentions the reception of ZS1H in the Autumn of last year.

G2HG reports no DX heard, but mush level was noticed to fluctuate on January 2 at 12.45 G.M.T. However, this effect did not produce any signals, although the band was closely observed for some time after. HG kindly passes on the news (received from OK1AW) that OK1AA is active with 50 watts CC C.W. every Saturday and Sunday from 14.00 to 16.00 G.M.T.

G8OS heard OXI (or OHI) on January 8 at 13.50 G.M.T. Signals were 347 with slight fading, calling CQ on approximately 58 Mc. He also reports regular reception of some 15 different CW stations in various parts of London and the Home Counties, and when conditions are favourable, 6FL of Cambridge. As a point of interest 8OS is using Vee beam and Rhombic type aerial systems.

G6QZ in Norwich is active with 20-25 watts CW. and various beam systems. No DX to report, but mentions that his signals to 5QO in Lowestoft, while normally R4, were not received on the evening of January 25 when the Aurora display was in evidence.

No definite reports were received as to conditions generally noticed during the Aurora display that evening, but it is understood from various sources that while some parts of the country experienced " extended " groundwave effects, others (S. London, for instance) had the normal local ranges for that time of the day.

Now for more news regarding overseas activity. G2YL passes on the following :—W9SO and 9OUB active for transatlantic tests with 75 watts to beam array. W9SLF on 57.3 Mc. with 100 watts. 9ANA on 56.936 with 200 watts, and 9NY on 56.01 with similar power. Other active stations and frequencies are : W9PQU-QCX 57.31 Mc., also on 58.08, and 56.85. Included in G2YL's QSP is the same news concerning OK1AA as was received from G2HG, but with the addition of exact frequency. This is given as 56.00 dead (!) It is also learnt that one or more Newfoundland stations will be active during the DX tests.

A later report from 2YL brings the following :—" From VU2FV. We shall be active daily on 56 Mc. from 11.30 G.M.T. Transmitter will be CC with fairly high-power feeding a parabolic beam. Will probably operate from about 4,000 feet A.S.L., so signals should go somewhere." (!)

So it seems that activity is at last really world-wide and fairly intense. Those who were fortunate enough to get along to the last I.E.E. meeting in London and hear G6DH's remarks on the likely behaviour of 56 Mc. at this time of the year will need no prompting as to what to do about it, but for others let it be said that this month is the possible time for conditions such as are required for DX work.—'Nuff said.

Offer. 2AAN, of Tankerton, is ready and willing to co-operate with any transmitting station for scheduled activity. Please write direct.

Empire Calls Heard.

By G5SO between Port Sudan and Gulf of Oman from December 20-26, 1937.

7 Mc. C.W. : G2pz(56).

14 Mc. C.W.: G2zy (55), 5bd (56), 5iv (56), 5xy (44), 8it (58), 8kk (55) 8as (44), zs1bc (44), 1z (44), 2ac (45), 2q (59), 5aq (55), 5b (44), 5m (59), 5q (59), 6ak (58), 6eo (44), 6eq (58), 6u (55), 6uz (58), vk2ah (55), 2aha (44), 2dq (55), 2eo (55), 2gc (56), 2ok (55), 2qa (45), 2zl (56), 3hy (55), 4ul (47), 5hm (44), 5ml (54), 5ps (43), 6wz (59), 6zo (59), vq4cri (56), 4crt (56), vq8aa (55), 8ae (56), 8es (55), 8fc (57), 8yl (55), su1kg (57), 1sw (57), 1wm (57), st6kr (57), zl4br (44), 4dq (54), vs7rf (57), ze1ji (58), yi2ba (59), zb1j (59), ve1an (45), 1fg (54), 1hg (55), 1ro (56), vu2am (58) 2cq (58), 2dq (57), 2et (55), 2fv (55), 2fs (56).

14 Mc. Phone : Vu2cq (58), 2et (36), 2fh (57), g5dp (56), 5dt (57), 5ml (57), 5qn (44), 6fs (58), 6ml (56), 8nw (57), zt2q (59), 6af (58), 6aj (44), su1gt (59), 1kg (57), 1rk (58), st1mr (48), vk5je (59).

Note.—The first letter indicates the " R," the second " S."

Jones and A.R.R.L. Handbooks

Fresh supplies are due to arrive shortly. A new edition of the " Radio " Antenna Handbook is expected early in March.

Members are urged to place an early order for these publications.

"Twelve Years Back"

By Uncle Tom.

TWELVE years seems quite a lot, even now, to some of us youngsters, for even your Uncle can only claim fourteen years on the air (with a licence !) But a function like the Old Timers' Dinner, held on January 22, makes mere twelve-year merchants feel like Young Squirts. At that gathering there were some eighty members of R.S.G.B., whose aggregate radio experience must have totalled well over 1,000 years !

To a relative youngster like myself, it seemed that all the proverbial names of early radio days had suddenly been collected together. I suppose there are hundreds of members now to whom the mystic words McMichael, Klein, Marcuse, Simmonds, Alford, Corsham, Walker, and the like mean absolutely nothing. To me it seems that I can remember the time when those men sat behind the controls of the only amateur transmitters that were ever to be heard.

The first telephony I ever heard on my first set was a Galli-Curci record emanating from the altogether miraculous 2 O Emma of Brentford. At the Old Timers' Dinner I sat not far from Mr. H. S. Walker, operator of the said 2 O Emma, who assured me that he still possesses that record. That gave me a queer thrill that some of the young squirts who were brought up on the sounds of broadcast dance music can't understand, I suppose. It reminded me really forcibly of the days when every single thing connected with " wireless " was a thrill slightly bigger than the previous one.

But this is mere sentimental rambling, and the Old Timers' Dinner was an essentially practical, flesh-and-blood affair. It was nice to see how many of the old 'uns are still hale and hearty, and to see how many of the not-so-old 'uns—those who can claim more than ten years on the air—are still active and interested. Perhaps, they can get together and straighten out some of the mess into which amateur radio is in danger of falling. We shall see.

Among the speakers were Mr. Rene Klein, the first Secretary of the Society, and a founder member of the original London Wireless Club, and Mr. Leslie McMichael, a founder member and Vice-President. Both of them expressed amazement and gratification at what had grown from their own pioneer effort. Sir Ian Fraser recalled that the B.B.C. owed its existence to the radio amateur, and, in a way, to the R.S.G.B. Mr. H. S. Pocock, of *The Wireless World*, recalled that Empire Broadcasting was really brought into being by the pioneer work of Mr. Gerald Marcuse, G2NM, who first kept the Empire in touch with Great Britain by means of telephony transmissions.

The other speakers all recalled some phase of past activities, linked together with the present state of affairs. Such a success was the dinner that it was decided, then and there, to make a regular affair of it.

And now for " Twelve Years Back " in the stricter sense. The Bulletin for February, 1926, is more interesting than amusing. It contains the evidence submitted to the Broadcasting Committee, 1925, on behalf of the R.S.G.B., telling the said committee what the R.S.G.B. is, and, by the way, pointing out that the first experimental broadcast service in the country was inaugurated at the instigation of the Society. It went on to point out how unfortunate it was that the Society was not represented on one or more of the advisory committees of the B.B.C., and that the very people who had pressed for a broadcast service should, later, be severely hampered by its existence (this probably referred to the amateurs being pushed off the 440-metre wave-band !)

The Editorial was devoted to defending the amateur against an accusation, in *The Wireless World*, that he was " a useless person." As an example of his great value to the community, it pointed out : " It was but a few months ago that eminent scientists pooh-poohed the idea of a man working in London with a few watts and exchanging messages with America, but now this is done every night." I wonder if we can say that in 1938, bearing in mind that phrase, " a *few* watts " ?

An article on low-power work by G5SI would be of great value to many amateurs on the air to-day. G5SI, with a maximum of 14 watts, did DX work in 1926 that would put many a 1938 50-watter to shame. He worked U.S.A. with .4 watt—on 45 metres. His circuit was a split Colpitts—self-excited, of course.

A letter from G6JV raised a complaint about the QRM on 45 metres (with about 10 per cent. of the number of stations that are on 40 metres to-day), and seriously suggested that the solution was a scheme whereby certain districts had to close down at certain times of day. He also wanted an indiscriminate ban on 40-metre phone. (In my opinion, if he had had it, we should all be happier to-day, except those nuts who have forgotten their code and *have* to use phone.)

Poor G6JV complained of " a G station who was testing, pumping out rather poorly modulated phone on a rough carrier, and asking for reports. He remarked that he was using 97 watts. What on earth is the use of this sort of thing ? " I don't know whether JV ever listens to-day ; if he does, he must feel that he would like to get back to the " good old days."

Sidelight : A " stray " announcing that Mr. E. A. Dedman had been allotted the call G2NH, *with permits to work on* 2.5, 5, 8, *and* 23 *metres !* I remember Ernie and some of the gang on 8 metres in those days—1926, don't you forget !—but I wonder what they ever did on 2.5 ? Perhaps they did enough to confound some of the present lads who reckon they're doing real pioneering work on 5 metres.

Another coming event cast its shadow into the Bull. in February, 1926—a letter from Mr. C. A. Jamblin, G6BT, putting forward the brain-wave that QSL cards might be exchanged in bulk between the R.S.G.B. and the other European national societies instead of all being sent direct. It's incredible to think of to-day's QSL position without

(*Continued on page* 462.)

Trade Notes

G.E.C. Anti-Static Aerial.

The ingredients for a headache are a modern superhet, connected to the proverbial " bit of wire." Instal the set on the first floor of a suburban house facing a busy road and the resultant noise needs little imagination.

Substitute for the " bit of wire " one of the new *G.E.C.* Anti-Static All-Wave Aerial equipments (Type B.C.636) and the effect is most pronounced. Car interference is reduced very considerably, except of course when the owner of a particularly offensive ignition system chooses to park outside the house ! Vacuum sweeper QRM is probably the most difficult to clear but with the *G.E.C.* aerial in use this form of interference is definitely less.

The component parts comprise a 100 ft. length of 7/22 copper wire, 60 ft. of rubber-covered, weatherproof, noise-reducing, twisted transmission line, insulators, aerial and receiver matching transformers.

For amateur use it will be found satisfactory to use an aerial about 33 ft. long divided in the centre. The aerial matching transformer is connected into the aerial at this point and the transmission line runs off to the receiver matching transformer mounted close to the receiver.

The equipment is designed for use as a double V 49 ft. long but the erecton of such an aerial in addition to a transmitting aerial presents a problem to those amateurs who have restricted garden space. When used for broadcast reception the recommended arrangement would of course be highly desirable.

The aerial has been produced with the care and thoroughness with which the name *G.E.C.* is associated, and we have no hesitation in recommending it to all who suffer from the bugbear of short-wave reception—man-made static.

The price complete is £2 12s. 6d.

* * *

Universal Avo Minor.

The Universal Avo Minor is a multi-range moving-coil instrument having ranges of D.C. voltage and current, A.C. voltage and resistance, and is manufactured by *Messrs. Automatic Coil Winder & Electrical Equipment Co., Ltd.*

The instrument is housed in a black finished case, having a compartment at the back containing the test leads. The scale is very easily readable and has a useful length of about 3 inches. The ranges are set by plugging the test leads into appropriate sockets, but a switch is fitted to connect the rectifier for the A.C. ranges. There is a small knob for adjusting the zero on the resistance ranges.

The meter is equipped with the following ranges :—

D.C. volts : 0-.075, 5, 25, 100, 250 and 500.
D.C. amps. : 0-.0025, 005, 025, 0.1 and 0.5.
A.C. volts : 0-5, 25, 100, 250 and 400.
Ohms : 0-20,000, using an external battery, the ranges 0-100,000, 500,000, 2 megohms, 5 megohms and 10 megohms may be obtained.

The instrument was tested under the same conditions as those used for the Model 7 Universal Avometer (see BULLETIN, October, 1937). The D.C. ranges (voltage and current) showed no error greater than 1 per cent. minus of full-scale reading, most readings, in fact, were within 0.25 per cent. The A.C. ranges were also within 1 per cent. of full-scale reading. The resistance range, 0-20,000 ohms, was dead accurate at 1,000 ohms and 10,000 ohms, but at intermediate points there was an error up to minus 15 per cent. This type of error suggests that the scale marking could be made more accurate, as there is no inherent error in the MC instrument. The meter was found to be quite dead beat and no difficulty was found in setting the pointer to less than .25 per cent. The rectifier used for the A.C. ranges is suitable for audio-frequencies and the instrument is therefore useful as an output meter.

The price of the Universal Avo Minor is £5 10s. or with leather case £6, and, considering the 22 ranges available and the accuracy obtainable, is cheap, and should form a very useful piece of equipment for an amateur or for service purposes.

D. N. C.

Valve Reviews

Tungsram 6L6G.

The 6L6G valve manufactured by *Tungsram* in England is intended to be an exact equivalent of American manufactured 6L6G valves.

The 6L6G is an indirectly heated beam-tetrode, having a 6.3 volt heater and is fitted with an American octal base.

Characteristics.	*R.A.C. Rating.*	*Sample.*
Heater volts...	6.3	6.3
,, current (amps.) ...	0.9	0.8
Anode volts	250	250
Screen ,, ...	250	250
Grid ,, ...	–14	–14
Anode current (m.a.) ...	72 *	62 *
Screen ,, ,, ...	5.0 *	3.8 *
Amplification factor ...	135 *	165 *
Mutual conductance ...	6.0 *	5.72 *
Impedance (ohms)	22,500 *	27,400 *

* Taken at anode and screen 250 volts, grid volts – 14.

The sample was compared with R.C.A. rating at 250 volts, rather than at 400 volts (the maximum rating), purely for matter of convenience.

Characteristic Curves.

Curves were not taken as it was felt that measurement of harmonic content would be of more practical value. The figures for harmonics are similar to those for American-made valves, and are as follows, taken at anode volts 250, screen volts 250, auto-bias 170 ohms, and anode load 2,500 ohms :—

1 watt, 4 per cent. (0) ; 2 watts, 6 per cent. (0) ; 3 watts, 7.5 per cent. (.7) ; 4 watts, 9 per cent. (1.2) ; 5 watts, 10 per cent. (2.5) ; 6 watts. 11 per cent. (6) ; and 7 watts, 14 per cent. (11.5).

These figures show total harmonic content, those in brackets are 3rd harmonic only. At low outputs

the harmonic content is entirely 2nd harmonic, this effect is normal for a beam tetrode, and the 2nd, of course, cancels when push-pull is used.

As is seen from the results above, the screen current is lower than R.C.A. bogey, indicating that the grid and screen turns have been carefully aligned. The valve was tested as a doubler in a transmitter operated at an anode voltage of 400 and screen voltage of 300 doubling from 28 Mc. to 56 Mc., and the output on 56 Mc. was identical with that of an R.C.A. 6L6G.

The above tests indicated that the Tungsram 6L6G represents an exact equivalent or replacement for American 6L6G valves.

362 Type PX25a

The PX25a is a low impedance output triode designed for use as an L.F. amplifier or modulator. The valve is of the directly heated type, and is fitted with a 4-pin base. The price is 20s.

Characteristics	Makers	Sample
Filament watts	4.0	4.0
,, current	2.0	1.95
Anode volts max.	400	400
Anode dissipation (watts) ...	30 (max·)	25
Mutual conductance (mA/V)	3.5	3.3*
Amplification factor (μ) ...	5	5.5*
Impedance (ohms)	1,400	1,650*
Optimum load (ohms) ...	3,000	3,000
Anode current (MA) ...	60	67*
Grid bias (volts)	—50	—50*

* Taken at anode volts 400 grid volts—50.

A complete set of anode volts-anode current curves were taken of the sample and they were normal for the type of valve in every way. A load line drawn on the curve showed that under Class A conditions (*i.e.*, no grid current) the output would be 5 watts and using loaded grid (small grid current) the output would be 7.5 watts, two valves in push-pull would realise slightly over twice these values. The valve can be recommended as entirely satisfactory and equivalent to similar valves made by other valve manufacturers.

362 Type S.R.4.

The S.R.4 is a low impedance triode for use in super regenerative receivers manufactured by *The* 362 *Valve Co.*

The valve has a 4-watt indirectly heated cathode, and is fitted with a 5-pin ceramic base. The bulb is metallised and the price is 10s.

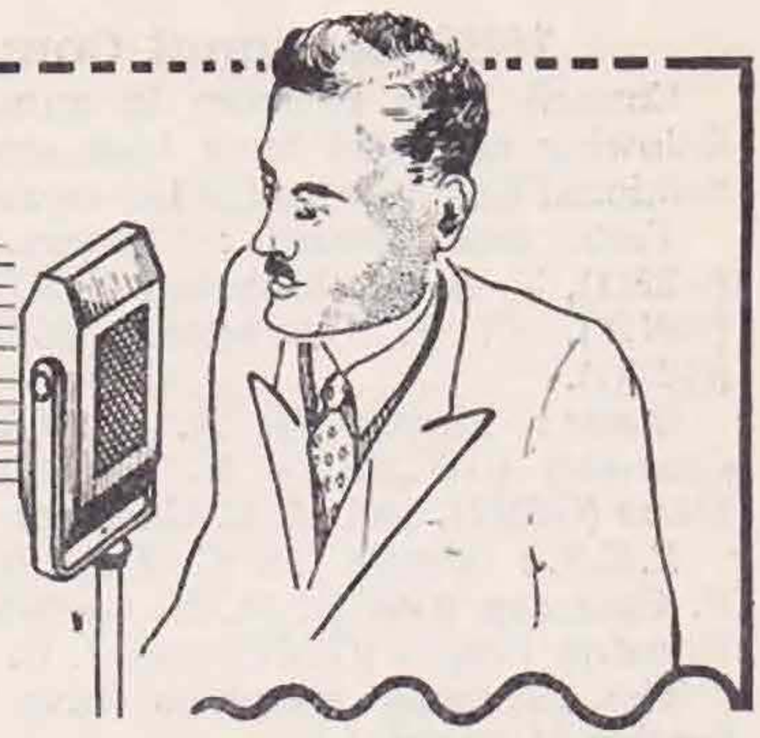
Characteristics.	*Makers.*	*Sample*
Heater volts	4.0	4.0
,, current (amps.) ...	1.0	1.02
Anode volts (max.)	300	—
,, current (max.) mA ...	30	—
Mutual conductance mA/v ...	not stated	3.2 *
Amplification Factor	,,	6.0 *
Impedance (ohms)	,,	1800 *

*Measured at anode volts 100, grid volts 0.

A characteristic curve was taken, and it was found that the valve has a very long grid base, the anode current being over 8 mA at —30 volts with the anode run at only 100 volts. The curve itself was quite reasonably linear and the long grid base not due to poor cut-off. It was not considered advisable to take curves at higher anode voltages than 100 as the maximum anode current was exceeded except with high values of grid bias. No

(*Continued on page* 462)

HEADQUARTERS CALLING



Presidential Address

At the January meeting, held at the I.E.E. on the 28th of that month, Mr. Arthur Watts was installed as President by Mr. E. Dawson Ostermeyer, the retiring President.

Mr. Watts, in taking office, thanked the Council and members for their expression of confidence, and in a brief address drew attention to several important matters concerning licence facilities. He expressed the hope that Provincial District meetings would again be well attended, in order that members in all parts of the country could glean first-hand information regarding the work of the Society.

He referred to his impending visit to Cairo as an I.A.R.U. representative, expressing confidence that the interests of the amateurs of the world would be safeguarded by the powerful delegations who had a full appreciation of the value of their work .

At the conclusion of his address, Mr. Watts, on behalf of the members who had subscribed, presented a handsome silver salver to Mr. Ostermeyer as a mark of esteem and appreciation for his past services. Mr. Watts spoke of the valuable work our Past President performed over a period of many years in office as Hon. Treasurer, reminding newer members of the time when he and Mr. Marcuse guaranteed a bank overdraft.

Mr. Watts also presented a silver bangle to Mrs. Ostermeyer as a small token of the regard with which she is held by the many members who are honoured with her acquaintance.

Mr. and Mrs. Ostermeyer returned thanks in brief speeches.

Mr. D. W. Heightman (G6DH) then delivered a most interesting and important address on Recent 56 Mc. Observations. It is hoped to publish the paper in an early issue of this journal.

At the conclusion of the meeting, Mr. H. A. M. Whyte (deputising for the Secretary, who was indisposed), extended greetings to Mr. and Mrs. Arthur Watts and, on behalf of the membership, wished them Bon Voyage and Good Luck.

I.E.E. Meeting

The February meeting to be held on the 25th will commence at 6.45 p.m.

The lecture that evening will be delivered by Dr. Brian Thompson, M.D., D.M.R., of the X-Ray Dept., King's College Hospital. Dr. Thompson, who was until recently a well-known New Zealand amateur, will lecture on " X-Radiations, their Production, and Application, with Special Reference to Medical Diagnoses and Treatment."

The subject should be of special interest to members, and it is hoped that a good attendance will be recorded.

The I.E.E. will be open from 5 p.m., and tea will be served free of charge from 6 p.m.

Our President Leaves for Cairo

In the presence of Mr. E. Dawson Ostermeyer, Mr. and Mrs. J. Clarricoats, Mr. A. O. Milne, Mr. L. Gregory and Miss A. M. Gadsden, our President and his wife left Victoria at 11 a.m. on February 3.

Heather for Luck

White heather was presented to them both by Headquarters staff who unite with all members in expressing the hope that our " Ambassador " and his lady will enjoy good health, good weather and good company during their six weeks absence from London.

Mr. and Mrs. Watts sailed from Toulon on the Orient liner *Orcades* and reached Cairo on Feb. 9th, where they were met by Mr. and Mrs. K. B. Warner and many prominent Egyptian amateurs.

Pirate Operation

We must again inform members that the Council do not consider any useful purpose is served by publishing (as separate notices) details concerning the illegal use of licensed calls.

All such information should be passed direct to the G.P.O. Radio Section, Armour House, London, E.C.

1938 Sectional Committees

Council have pleasure in announcing that the following members have been elected to serve on Sectional Committees for the current year :—

Tests and Awards : Messrs. A. O. Milne (G2MI), T. A. St. Johnston (G6UT), J. M. Watson (G6CT), C. J. Greenaway (G2LC), J. Hunter (G2ZQ).

Guide : Messrs. H. A. M. Clark (G6OT), F. Charman (G6CJ), D. N. Corfield (G5CD), A. O. Milne (G2MI), and E. L. Gardiner (G6GR).

R.E.S. : Messrs. H. C. Page (G6PA, Manager), F. Charman (G6CJ), D. N. Corfield (G5CD), A. M. Houston Fergus (G2ZC) and J. C. Elmer (G2GD).

The following members have been appointed Section Managers :—

Calibration : Mr. A. D. Gay (G6NF).
QRA : Mr. H. A. M. Whyte (G6WY).
Band Occupancy : Mr. L. Hill (G5WI).

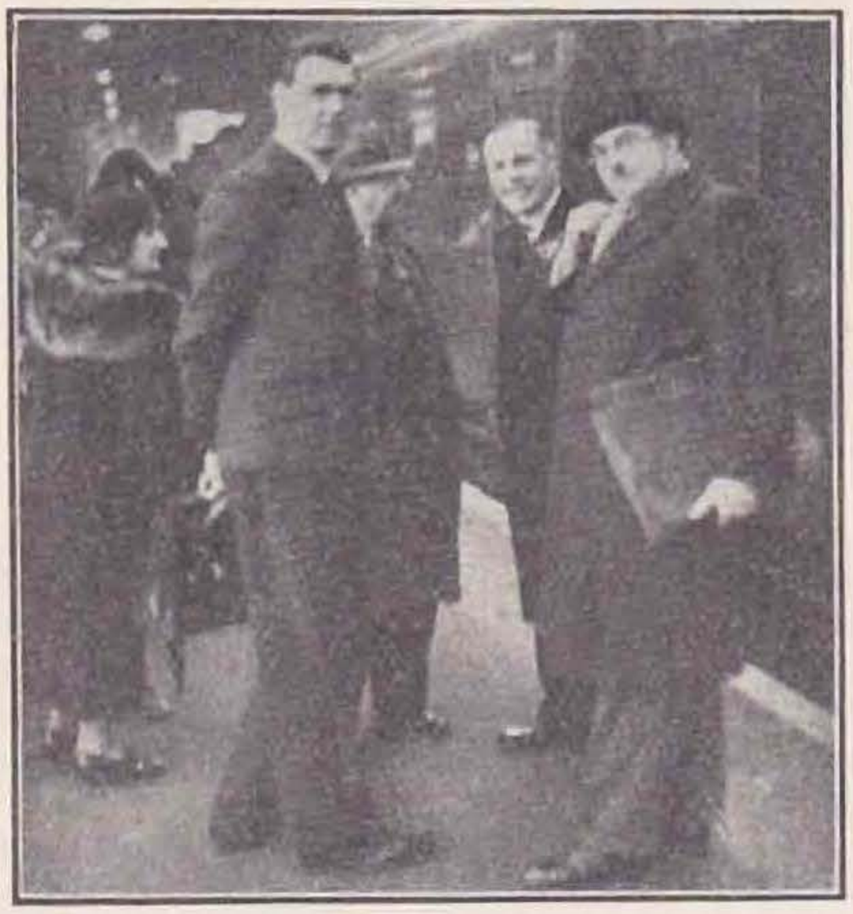
Mr. J. W. Mathews (G6LL) has been appointed to organise the production of the 1938 series of Documentary Films.

25-Watt Permits

As from February 20, 1938, members requiring permission to use an input of 25 watts must apply to Headquarters for a special form, sending a stamped addressed envelope for the purpose. The form, after completion, must be sent to the member's D.R. who will comment and pass it on to Council.

This step has become necessary due to the fact that several members have applied to the G.P.O. direct for this facility and having been rejected they have then written to Headquarters.

No member may apply for this facility until he has been licensed for a period of six months.



G2MI, 5AR, and 6CL see that G6UN catches the boat train.

Cover Design Wanted

Our Advertising Manager has very kindly offered to award the sum of £2 2s. to the member whose suggestion for a cover design for the Sixth Edition of " A Guide to Amateur Radio " is accepted.

Suggested designs should be forwarded to Headquarters not later than March 31, 1938.

Photographers, Please Note

The Guide Committee will be pleased to consider for inclusion in the Sixth Edition photographs of *modern* amateur stations or gear. Brief details should be appended with photographs showing close-up views of apparatus. The Committee are particularly anxious to obtain a photograph of the interior of an amateur station taken at night from *outside* the shack. To encourage keen photographers a copy of the 1938 A.R.R.L. Handbook will be presented to the member submitting the best photograph in this connection.

Original photographic ideas of amateur interest will also be welcomed, as these may be used in future issues of the BULLETIN.

All photographs should be sharply defined, and be not smaller than $3\frac{1}{2}'' \times 2\frac{1}{2}''$.

Replies to Advertisers

When writing to our Advertising Manager or to BULLETIN advertisers, members are requested to use their full name and address. Instances have occurred recently where only the call sign has been given, with the result that considerable inconvenience has been caused.

EMPIRE CALLS HEARD

Eric W. Trebilcock (*BERS*195), *Darwin, North Australia. December*, 1937 :—

7 *Mc.* (*Phone*).—G8ti (55).

7 *Mc.* (*C.W.*).—G5lp (45), 8bh (56), 8kb (55), 8lv (56), 8nh (58), 8om (54), 8wp (34), gw3ax (34), vr4ad (56), vt3ab (55), zs1be (55), 1cx (56), 5g (55), 5k (43), 5ak (55), 5as (44), 6d (44), 6m (55), 6ej (33), 6eq (43), zt2g (45), zu6g (55).

14 *Mc.* (*Phone*).—Vs2ar (56), 7gj (56), ze1jr (56), zu6af (55), 6n (56).

14 *Mc.* (*C.W.*).—G2yl (54), 8ap (44), st6kr (56), ve2ax (56), 3ahn (56), 3ajx (33), 3fb (55), 3qi (45), vp2tg (55), 6ln (54), vq3tom (56), 8ab (55), vs1aa (55), 2as (56), vu2lj (55), ze1jg (55), 1ji (55), 1jv (54), 1jz (55), zl1hy (58), 1ji (58), 1kr (56), 3aj (55), zs1ah (33), 1au (54), 1j (44), 1z (55), 5q (54), 6ad (55), 6eq (55), 6h (44), 6m (57), 6s (53), zt1z (55), 5f (54), 5y (55), zu2g (44), 5d (55), 5q (55), 6af (54), 6c (54), 6e (55), 6n (56), 6u (55).

CALIBRATION SERVICE

Crystals should be sent direct to the Calibration Manager enclosed in a small tin, and securely packed to avoid loss in transit. The Society cannot be responsible for any loss that might occur in sending crystals through the post.

Return postage must be enclosed as postage stamps, and not attached to the Postal Order.

Calibration fees : 1.7, 3.5 and 7 Mc. crystals, 1s. 6d. ; 100 kc. crystals, 2s. 6d.

All communications should be addressed to :—

Mr. A. D. Gay (G6NF),
" Oak Dene,"
156, Devonshire Way,
Shirley,
Croydon,
Surrey.

R.S.G.B. Slow Morse Practices

Details will be found below of the slow Morse practices organised by the Society for those members wishing to learn or improve their code. As usual, test matter will be taken from recent issues of THE T. & R. BULLETIN. The page number and month of issue will be given at the end of each test—by telephony. A telephony announcement will also be given at the commencement of each test to assist those interested in tuning to the sending station. It is emphasised that reports will be appreciated and are desired, in order to ascertain useful range and numbers utilising the service. If, however, a reply is desired, a stamp should be sent. Additional stations commencing as shown in the schedule below are :—

G8LL, Mr. W. A. Andrews, 167, Bishop Road, Bristol, 7.

G8AB, Mr. M. Railton, "Tree Tops," 35, Priory Road, Loughton, Essex.

GW6AA, Mr. D. Mitchell, The Flagstaff, Colwyn Bay, North Wales.

GW5OD, Mr. A. Ogden, "Rocklyn," Peulwys Road, Old Colwyn, North Wales.

As GW6AA's transmissions will be confined to telegraphy, the following will be sent slowly for three minutes: "M.P.T., M.P.T., M.P.T. de GW6AA" (M.P.T.=Morse Practice Transmission).

Will stations in areas not at present served offer their services to Mr. T. A. St. Johnston (G6UT), "Normandale," New Barn Lane, Little Hollingbury, Essex (telephone: Bishops Stortford 785).

Schedule of Slow Morse Transmissions

1938			G.M.T.	kc.	Stations
Feb. 22	Tuesday	...	1930	7137	GM8KR
,, 22	Tuesday	...	2030	1800	GW6AA
,, 22	Tuesday	...	2200	7184	G6UA
,, 23	Wednesday	...	2315	1741	GI6XS
,, 24	Thursday	...	1930	7096	GM8MQ
,, 24	Thursday	...	2000	1780	G8LL
,, 24	Thursday	...	2115	1930	GW5OD
,, 24	Thursday	...	2230	7184	G6UA
,, 25	Friday	...	2030	1800	GW6AA
,, 26	Saturday	...	Junior B.E.R.U. Contest		
,, 27	Sunday	...	,,	,,	,,
,, 28	Monday	...	2315	1741	GI6XS
Mar. 1	Tuesday	...	1930	7137	GM8KR
,, 1	Tuesday	...	2030	1800	GW6AA
,, 1	Tuesday	...	2200	7184	G6UA
,, 2	Wednesday	...	2315	1741	GI6XS
,, 3	Thursday	...	1930	7096	GM8MQ
,, 3	Thursday	...	2000	1780	G8LL
,, 3	Thursday	...	2115	1930	GW5OD
,, 3	Thursday	...	2230	7184	G6UA
,, 4	Friday	...	2030	1800	GW6AA
,, 5	Saturday	...	2300	7145	GI5QX
,, 6	Sunday	...	0915	1792	G8AB
,, 6	Sunday	...	0945	7155	GI5UR
,, 6	Sunday	...	1000	7260	G5JL
,, 6	Sunday	...	1015	1920	G6VC
,, 6	Sunday	...	2115	1930	GW5OD
,, 7	Monday	...	2315	1741	GI6XS
,, 8	Tuesday	...	1930	7137	GM8KR
,, 8	Tuesday	...	2030	1800	GW6AA
,, 8	Tuesday	...	2200	7184	G6UA
,, 9	Wednesday	...	2315	1741	GI6XS
,, 10	Thursday	...	1930	7096	GM8MQ
,, 10	Thursday	...	2000	1780	G8LL
,, 10	Thursday	...	2115	1930	GW5OD
,, 10	Thursday	...	2230	7184	G6UA
,, 11	Friday	...	2030	1800	GW6AA
,, 12	Saturday	...	2300	7145	GI5QX
,, 13	Sunday	...	0915	1792	G8AB
,, 13	Sunday	...	0945	7155	GI5UR
,, 13	Sunday	...	1000	7260	G5JL
,, 13	Sunday	...	1015	1920	G6VC
,, 13	Sunday	...	2115	1930	GW5OD
,, 14	Monday	...	2315	1741	GI6XS
,, 15	Tuesday	...	1930	7137	GM8KR
,, 15	Tuesday	...	2030	1800	GW6AA
,, 15	Tuesday	...	2200	7184	G6UA
,, 16	Wednesday	...	2315	1741	GI6XS
,, 17	Thursday	...	1930	7096	GM8MQ
,, 17	Thursday	...	2000	1780	G8LL
,, 17	Thursday	...	2115	1930	GW5OD
,, 17	Thursday	...	2230	7184	G6UA
,, 18	Friday	...	2030	1800	GW6AA
,, 19	Saturday	...	2300	7145	GI5QX
,, 20	Sunday	...	0915	1792	G8AB
,, 20	Sunday	...	0945	7155	GI5UR
,, 20	Sunday	...	1000	7260	G5JL
,, 20	Sunday	...	1015	1920	G6VC
,, 20	Sunday	...	2115	1930	GW5OD
,, 21	Monday	...	2315	1741	GI6XS

NEW MEMBERS

HOME CORPORATES.

W. H. ABRAHAM (GW3AJ), 9, Bridge Street, Abercarn, Monmouthshire.

J. O. JONES (G3AL), 331, Mortlake Road, Ilford, Essex.

G. H. URQUHART (G3AP), "Brockenhurst," Rockfield Road, Oxted, Surrey.

C. E. SUTTON (G3AQ), 178, North Street, Coventry, Warwicks.

R. L. SAVAGE (G3AV), 13, Park Farm Road, Kingston-on-Thames, Surrey.

N. M. BUTTON (G3BG), Richmond Avenue, Breaston, nr. Derby.

G. H. WILLIAMS (G3BI), 242, Ipswich Road, Colchester, Essex.

R. M. GARRETT (G3BP), 21, Woodside Avenue, Highgate, London, N.6.

R. CUMBERLIDGE (G3CK), "Lyndene," Burnley Road, Moreton, Wirral, Cheshire.

S. R. DEARDS (G5PA), 38, Marlborough Road, Queen's Park, Bedford, Beds.

H. J. WITHERS (G6XA), 90, Warwick Street, Leamington Spa, Warwicks.

W. E. BARTHOLOMEW (G8CK), 62, King George's Avenue, Watford, Herts.

C. A. J. PLANT (G8DU), 9, Hilton Road, Harpfields, Stoke-on-Trent.

E. HOYLE (G8GU), 16, Yew Tree Lane, Off Cowlersley, Huddersfield, Yorks.

L. C. CARDEN (G8HY), 106, Deacon Road, Kingston-on-Thames, Surrey.

A. DUNSIRE (GM8KQ), 21, College Street, Buckhaven, Scotland.

G. H. EVANS (G8MC), 30, Perrywood Road, Great Barr, Birmingham.

R. A. SIMPSON (G8SD), Styrrup Road, Oldcoates, nr. Worksop, Notts.

H. MALLINSON (G8TM), 27, Crimble Bank, Slaithwaite, Huddersfield, Yorks.

R. F. SHILTON (2AFR), 29, Clarendon Road, Salisbury, Wilts.

T. A. APPLEBY (2APF), 12, Montgomery Avenue, Sheffield, 7, Yorks.

W. G. DRAPER (2AWT), 51, Court Lane, London, S.E.21.

H. B. GROVES (2BGN), 12, Rushworth Road, Reigate, Surrey.

R. D. HOLLAND (2BTT), 233, Sherrard Road, Manor Park, London, E.12.

L. W. SKIPPER (2CAL), 148, Boston Manor Road, Brentford, Middx.

R. E. WOOD (2CBB), 2, King's Gardens, Holden Road, Leigh, Lancs.

C. R. CHICK (2CSX), 283, Bear Road, Brighton, 7, Sussex.

G. W. PRYOR (2CVP), The Lodge, Booth Hall, Knutsford, Cheshire.

T. ORR (2CXJ), 31, Grange Park Avenue, Sunderland, Co. Durham

D. SCOTT-JOB (2DBW), 96, Lyncroft Gardens, London, N.W.6.

H. C. BROXUP (2DCA), Fire Station, Long Lane, Croydon, Surrey.

G. B. ROUTLEDGE (2DDV), 91, The Drive, Feltham, Middx.

J. R. BRIERLEY (BRS3159), 39, Glen View Road, Burnley, Lancs.

S. A. ROSS (BRS3160), 13, Allan Street, Aberdeen, Scotland.

A. N. SMITH (BRS3161), 26, Waterloo Road, The Forest, Nottingham.

H. L. Overton (BRS3162), 1, South View, Chaddiford Lane, Barnstaple, Devon.
S. M. O'Neill (BRS3163), Norfolk Lodge, Shoreham Beach, Sussex.
G. W. Fish (BRS3164), Lancaster Cottages, Northwold, Brandon, Suffolk.
A. Miller (BRS3165), 21, Ceylon Street, Marfleet, Hull, E. Yorks.
J. Fulton (BRS3166), 19, Windsor Avenue, Belfast, N. Ireland.
W. Dickson (BRS3167), 49, Chanting Hall Road, Hamilton, Scotland.
E. A. Hughes (BRS3168), 41, Portland Street, Cheltenham, Glos.
T. C. Tyrrell-Lewis (BRS3169), Watermouth Cottage, Berrynarbor, Devon.
C. C. Newton-Wade (BRS3170), 61, Church Road, Whitchurch, Cardiff, Glam.
J. Baigent (BRS3171), Warren Hyde Bungalow, Torquay, Devon.
J. Higham (BRS3172), 13, Bath Street, Blackburn, Lancs.
R. F. G. Thurlow (BRS3173), 42, Regent Avenue, March, Cambs.
J. D. Morris (BRS3174), 17, Lynton Road, Heaton Moor, Stockport, Cheshire.
A. Simpson (BRS3175), 28, Hall Lane, Armley, Leeds, Yorks.
K. R. Peattie (BRS3176), Springfield, Laurence Drive, Bearsden, Scotland.
F. Field (BRS3177), 50, Bromley Gardens, Bromley, Kent.
L. T. Manton (BRS3178), 24, Fraser Road, Greenford, Middx.
H. F. Hamilton (BRS3179), Glenara, Shelvers Way, Tadworth, Surrey.
E. J. E. Davies (BRS3180), 122, Mount Park Avenue, S. Croydon, Surrey.
H. R. Perks (BRS3181), 66, Durnford Street, Plymouth, Devon.
A. J. R. Pegler (BRS3182), 53, Brecon Avenue, Cosham, Portsmouth, Hants.
N. Talbot (BRS3183), 952, Rochester Way, Sidcup, Kent.
E. B. Bennett (BRS3184), 23, Ellenbrook Road, Boothstown, Lancs.
A. R. Donald (BRS3185), 77, Ashgrove Avenue, West Hartlepool, Durham.
J. S. W. Nuttall (BRS3186), 24, Ballantrae Road, Allerton, Liverpool, 18, Lancs.
C. R. Perks (BRS3187), " Cross Keys " Hotel, Hednesford, Staffs.
G. M. Ward (BRS3188), 8a, Becket Buildings, West Worthing, Sussex.
J. L. Robinson (BRS3189), 12, Church Street, Helmington Row, nr. Crook, Durham.
H. F. Reynolds (BRS3190), 82, Cropthorne Road, Shirley, Warwicks.
D. Wright (BRS3191), 140, Spilsby Road, Boston, Lincs.
F. S. Morgan (BRS3192), Herbert's Lodge, Bishopston, Glamorgan.
W. H. Acock (BRS3193), " Northview," Newtown Road, Malvern.
E. J. Wilson (BRS3194), 32, Westbourne Road, Olton, Birmingham, 27.
R. H. Evans (BRS3195), 13. Danes Drive, Scotstoun, Glasgow, W. 4.
J. W. MacMullen (A), Faught's Cottage, Co. Sligo, Eire.

Dominion and Foreign.

K. S. J. Rancombe (ST6KR), Wireless Section, R.A.F., Khartoum, Sudan.
J. Ford (VS2AS), c/o Evatt & Co., Chartered Accountants, Kuala Lumpur, F.M.S.
M. E. Zwoster (W9GFG), 5552, Wentworth Avenue, Chicago, Ill., U.S.A.
J. L. van Zyl (ZS6AW), 15, DeBeers Terrace, Kimberley, Africa.
B. Maudsley (BERS421), Wireless Experimental Section, Cherat, N.W.F.P., India.
A. Nissen (BERS422), s/s Geir, c/o Smith, Imossi & Co., Gibraltar.
I. Higgins (BERS423), Garda Siochana, Tullamore, Co. Offaly, Eire.
L. S. Norman (BERS424), c/o Box 1, Cholo P.O., Nyassaland.
G. Osbal (FRS41), Montes g-ve 6, Klaipeda, Lithuania.

Golders Green and Hendon Radio Scientific Society

The following meetings have been arranged by the above Society. These are held at the Regal Cinema, Finchley Road, N.W.2, at 8.30 p.m. R.S.G.B. members cordially invited, but stamped and addressed envelopes must be sent if replies are required.

Thursday, February 24.—Some Accoustical aspects of Radio. Lecture and Demonstration by Mr. J. Spink, Grad.I.E.E., Assoc.I.R.E.

Thursday, March 10.—New Methods in Reception. Special reference to Short Waves. Lecture and Demonstration by Mr. E. L. Gardiner, B.Sc.

Monday, March 14.—Special visit with Demonstration at the Scophony Television Studios. Tickets must be applied for.

Thursday, March 24.—A welcome home to Mr. G. G. Blake, M.I.E.E., F.Inst.P., after his world tour. Mr. Blake will give one of his popular lectures and demonstrations to be called " Some Scientific Observations from my Notebook."

SILENT KEYS

G8VQ.

It is with great regret that we record the death of Sergeant David Middleton, of the R.A.F. Volunteer Reserve, aged 21, who died as the result of a flying accident at Hamble, near Southampton, on January 24, 1938.

At the time of the accident he was living at Hamble, although his home is at Barkingside. Born in West Ham, where his father is a teacher, he was a scholar at the West Ham Secondary School, where he passed the General Schools and Matriculation Exams. Later he was taken into the Civil Service, and served at the Land Registry in Lincoln's Inn Fields.

Keenly interested in Radio, he was a member of the R.S.G.B. and of the International Short Wave Club. He had been transmitting as G8VQ, the full licence for which he obtained only last year. His radio knowledge was made use of when in the Air Force, as for part of the time he became " teacher " instead of " pupil."

He was on a ten-weeks course of air training at Hamble, and had nearly finished the course. The machine he was flying, a Miles Magister, dived from 4,000 ft. into the sea off Southampton. The funeral took place on Friday, January 28, at Barkingside, and there were many floral tributes from his numerous wireless friends.

GM8LR.

We regret to announce the sudden death of Mr. William Reid, GM8LR, on January 12, 1938. His death was a great shock to all the members of " B " district, as it was understood that he was on the road to recovery. He will be missed by all who knew him, both personally and on the air, for his quiet, kindly and unassuming manner was more than ever evident in his courteous, unhurried style of operating. DX'ers especially will regret the passing of a real QRP DX man. All members wish to express their deepest sympathy to his widow, his parents and his brother, GM5YN.

Spacing Feeder Lines

A serviceable spreader for feeder lines can be made from old battery spacing tubes. The feeder wires are secured by means of 2-in. lengths of rubber tubing of the type used on acetylene lamps. The rubber tube is doubled round the wire and then both ends are forced into the end of the glass tube spreader. The rubber grips tightly and it will be found that the arrangement will stand up well, even in the worst weather.

2CVN.

NOTES and NEWS from the BRITISH ISLES

DISTRICT REPRESENTATIVES.

DISTRICT 1 (North-Western).
(Cumberland, Westmorland, Cheshire, Lancashire.)
Mr. J. NODEN (G6TW), Fern Villa, Coppice Road, Willaston, near Nantwich, Cheshire.

DISTRICT 2 (North-Eastern).
Yorkshire (West Riding, and part of North Riding).
Mr. L. W. PARRY (G6PY), 13, Huddersfield Road, Barnsley, Yorks.

DISTRICT 3 (West Midlands).
(Warwick, Worcester, Staffordshire, Shropshire.)
Mr. V. M. DESMOND (G5VM), 199, Russell Road, Moseley, Birmingham.

DISTRICT 4 (East Midlands).
(Derby, Leicester, Northants, Notts.)
Mr. G. W. SLACK (G5KG), "Inglenook," Racecourse Road, Mansfield, Notts.

DISTRICT 5 (Western).
(Hereford, Wiltshire, Gloucester.)
Mr. J. N. WALKER (G5JU), 4, Frenchay Road, Downend, Bristol.

DISTRICT 6 (South-Western).
(Cornwall, Devon, Dorset, Somerset.)
Mr. W. B. SYDENHAM (G5SY), "Sherrington," Cleveland Road, Torquay.

DISTRICT 7 (Southern).
(Oxfordshire, Berkshire, Hampshire, Surrey.)
Mr. E. A. DEDMAN (G2NH), 75, Woodlands Avenue, Coombe, New Malden, Surrey.

DISTRICT 8 (Home Counties).
(Beds., Cambs., Hunts and the towns of Peterborough and Newmarket.)
Mr. G. JEAPES (G2XV), 89, Perne Road, Cambridge.

DISTRICT 9 (East Anglia).
(Norfolk and Suffolk.)
MR. H. W. SADLER (G2XS), "The Warren Farm," South Wootton, King's Lynn, Norfolk.

DISTRICT 10 (South Wales and Monmouth).
Capt. G. C. PRICE (GW2OP), The Mount, Pembroke Dock.

DISTRICT 11 (North Wales).
(Anglesey, Carnarvon, Denbighshire, Flintshire, Merioneth, Montgomery, Radnorshire.)
MR. D. S. MITCHELL (GW6MX), "The Flagstaff," Colwyn Bay, Denbighshire.

DISTRICT 12 (London North and Hertford).
(North London Postal Districts and Hertford, together with the area known as North Middlesex.)
Mr. S. BUCKINGHAM (G5QF), 41, Brunswick Park Road, New Southgate, N.11.

DISTRICT 13 (London South).
MR. J. B. KERSHAW (G2WV), 13, Montpelier Row, Blackheath, S.E.3.

DISTRICT 14 (Eastern)
(East London and Essex.)
MR. T. A. ST. JOHNSTON (G6UT), "Normandale," New Barn Lane, Little Hallingbury, Bishops Stortford.

DISTRICT 15 (London West).
(West London Postal Districts, Bucks, and that part of Middlesex not included in District 12.)
MR. H. V. WILKINS (G6WN), 81, Studland Road, Hanwell, W.7.

DISTRICT 16 (South-Eastern).
(Kent and Sussex).
Mr. W. H. ALLEN (G2UJ), 32, Earls Road, Tunbridge Wells.

DISTRICT 17 (Mid East).
(Lincolnshire and Rutland.)
Mr. W. GRIEVE (G5GS), "Summerford," New Waltham, Lincs.

DISTRICT 18 (East Yorkshire).
(East Riding and part of North Riding.)
Mr. W. A. CLARK (G5FV), "Lynton," Hull Road, Keyingham, E. Yorks.

DISTRICT 19 (Northern).
(Northumberland, Durham, and North Yorks.)
Mr. H. C. D. HORNSBY (G5QY), "Newlands," 105, Kenton Lane, Newcastle-on-Tyne, 3.

SCOTLAND.
MR. JAMES HUNTER (GM6ZV), Records Office, 51, Camphill Avenue, Langside, Glasgow.

NORTHERN IRELAND.
Mr. T. P. ALLEN (GI6YW), 62, Balmoral Avenue, Belfast.

NEW MEMBERS ARE CORDIALLY INVITED TO WRITE TO THEIR LOCAL DISTRICT REPRESENTATIVE.

DISTRICT 1 (North-Western)

THE D.R. would like applications to be sent to him from those wishing to operate National Field Day Stations. For the information of those concerned he has already received applications from the Blackpool and Blackburn Areas.

Liverpool.—No individual reports have been received, but most of the members appear to be active, and the meetings continue to receive full support. It is hoped that one of the NFD stations will be established in this area, and suggestions are invited as to a suitable location.

Burnley.—G8FI, who is prepared to listen by arrangement for any other station on 56 Mc., is active on 7 Mc., and has applied for a 25-watt. licence. 8TD is working Europe on 14 Mc. telephony with a T20. 5ZN is busy with a push-pull 6L6 modulator; and 8UA is now using telephony. 2RB, 2CT, 2CVI and BRS2951 are also active, and a welcome is extended to BRS3159, who is a new member and the proud owner of an RME69.

Bury.—Local members are now holding monthly meetings at 64, Holcombe Avenue, Bury. All are invited to attend these meetings or to send in a report of their activities. Local interest is increasing, and it is hoped to make Bury a "live" area. Congratulations are extended to BRS770, who is now G3CJ.

G2GA is active on 7 Mc. with PX25 as P.A., and has been doing some interesting work on a 10-ft. indoor aerial with quite good results. Reports are wanted. 3CJ, who received his full ticket on Christmas Day, is quite pleased with his Christmas-box, and is hoping to be on the air as soon as constructional work will allow. 8NF was active during the 1.7 Mc. contest, and made an excellent score. He used a 6L6 C.O. and contacted OK, his second QSO of the contest. He would like 1.7 Mc. CW schedules from 19.00 G.M.T. 8NL also participated in the 1.7 Mc. contest, using a 6L6 C.O., which fully justified its special construction for the event. He reports the loss of a very good aerial during the recent gales. 2BGF has had trouble with his

receiver, and is now trying out the design in last month's BULLETIN.

Manchester.—An attendance of 17 was recorded at the last Manchester meeting. Activity is increasing in this area, and one or two G3s and G8s have taken the air. G5MO reports that his call is being consistently pirated on 7 Mc.

G5WR is active on 14 Mc.; 2RA is preparing again for 1.7, 14 and 56 Mc.; 8PW requires reports on his 7, 14 and 28 Mc. CW. signals. Other stations active include 2WQ, 2BCX, 2AXH, 2ARC, 2BDA, 2HW, 2OI, 3AH, 3BY, 2BC, 5YD, 5NV. 2LK, 8BI, 8PW, 8VU, 2BMG, 2CXP, 5OZ and 2CZW.

By kind permission of the *W.B. Speaker Co.*, their representative (Mr. Preston) will give a talk at the March meeting on Loud Speakers and their Construction. Please keep this date in mind, and let us have a good attendance. A lecture on Cathode Rays is planned for the April meeting. G3DH, who is now licensed for 14, 7 and 1.75 Mc., would welcome reports on his transmissions.

Will those in this section interested in 56 Mc. please get into touch with G2OI, so that arrangements for schedules on this frequency can be made during the summer months.

Blackpool and Fylde.—The members have held several discussions regarding N.F.D., and an application has been made for the 14 Mc. station. It is proposed to start assembling the apparatus immediately as instructional work for those holding A.A. permits, and it should therefore be possible to give the outfit a thorough trial. The power supply question has been quickly settled and a reserve arranged.

The change of address for the meetings has caused some disorganisation, but it is expected that usual activities will be resumed soon.

G5MS is off the air for a short time. 6MI is removing to what he hopes will be a better QRA for 56 Mc. 6VQ is rebuilding the transmitter in a steel rack. 8AK is very busy with R.N.W.A.R., and is trying to radiate on 1.7 Mc. without much success. 8GG is on 1.7 Mc. mostly, but sorting out 14 Mc. gear for the DX season. 8NU has not been heard for some time. 2CQQ is waiting for his Morse test. 2CKD has built a "Tobe" super. 2CWW has acquired a Super Skyrider. 2CMC is active; and 2CUI is busy with code practice with the aid of 6VQ, and hopes to apply for full ticket soon.

Birkenhead.—No individual reports have been received, but several local stations are known to be using six or seven times their licensed power.

DISTRICT 2 (Yorkshire).

Bradford.—A new type of meeting is to be tried out chiefly for the benefit of BRS and AA members. This will take place on the first Sunday in March, at 10.45 a.m. and small parties of three or four members will meet at the QRA's of many of the local transmitters. Here discussions and demonstrations of gear will take place and stations taking part will contact each other. The following, who tried out the scheme on January 30, are co-operating, G6KU, 6BX, 5TQ, 8CB, 8VS, 8WG, 8JD and 2SU. Members wishing to visit any of the above stations are asked to send a card to that effect.

The date for the Provincial Meeting at York (April 24) is getting nearer and it is hoped to have a record turn-up this time. The T.R. would welcome any suggestions for its improvement. Is a bus wanted for the transport of a large party or are private arrangements of small car parties preferred? It is suggested that in view of the fact that Bradford has had a station in N.F.D. for several years, another area should be given a turn. The 7 and 14 Mc. stations have been given to Burnley and Sheffield, respectively, so applications for the 3.5 and 1.7 Mc. stations only should be made to G6PY.

Sheffield.—We regret that only seven members attended the last meeting; if support is not maintained, it will be necessary to cancel them in order to cover the cost of N.F.D. Members in the area are asked to make a special effort to attend the N.F.D. meetings. The following report active, G2AS, 2JY, 2LT, 2JI, 5HK, 8KT, 8NN, 8JP, 8RX, 2BXA, 2CBQ, 8RX and 2282. G5TO and 6LF took part in the 1.7 Mc. contest and scored 39 and 34 points, respectively. Mr. Goffin, a new member, is now 2CDO. BRS2293 has passed the morse test and is building for 14 Mc.

Ilkley.—A small group of stations is active here, comprising G6SN, 6BR, 8BT, 8ID, 8UQ. What about a report for notes and some QSOs with Bradford on 1.7 Mc. on Sunday mornings?

Halifax.—The weekly meetings of the local radio society are well supported and two new members were recently enrolled. Reports show that there is much activity in building new gear. The following report active, G5QS, 8CB, 8GM, 8SJ, 2ABC, 2AKO, 2BHI, 2CKH, 2CMP and 2CYM.

Barnsley.—Will members who require frequency meters calibrated please bring them to the club lecture by G6PY, on "Freq-meter Calibration." The date is March 16. The following report active: G2BH, 5KM, 5IV, 5UA, 5DW, 6PY, 6LZ, 6AJ, 6XG, 8NM, 8TZ, 2CGD and BRS3068.

DISTRICT 3 (West Midlands).

Shrewsbury and District.—At a meeting held in Shrewsbury on January 15, preliminary arrangements were discussed concerning N.F.D. In this connection the general opinion is in favour of a motor generator for H.T. supply. Any offers? Local activities continue on the up grade. BRS2457 is busy on a super-superhet all-D.C. mains, and results are encouraging. The regular meetings are well supported and any interested local ham is asked to get in touch with the T.R.

DISTRICT 4 (East Midlands)

The D.R. wishes to apologise for being unable, owing to illness, to attend the last District meeting held at Ilkeston, and records his thanks to Mr. J. Lees (G2IO) for taking his place.

A very successful meeting took place and 30 members were in attendance. A discussion on 56-112 Mc. was opened by G2WS and supported by G6CW and G2SD. The date and details of the Provincial District Meeting were announced and a request made for a good attendance. Tickets for the P.D.M. were given to T.R.s for sale among their members. The former are asked to forward details and cash to Mr. Lees (G2IO) not later than March 10 so that final arrangements can be completed.

National Field Day was not discussed at the open meeting, but informal chats with the T.R.s produced the following tentative arrangements:—G2WS to take 1.7 Mc., G6VD to take 7 Mc., G2IO

to take 14 Mc., and the Worksop and Mansfield groups to pool their efforts on 3.5 Mc.

Nottingham.—No reports are to hand this month. Now, Nottingham! G2IO has started to build the 14 Mc. rig for N.F.D. and hopes to call a meeting shortly to fix all the other arrangements.

Northants.—2AFO has returned to Kettering from Brighton and makes a welcome addition to the Holmes, of Kettering, is now licensed under the call 2AXF. The Kettering Club has purchased a single signal super and installed it in their club room. They are now considering building the Society transmitter licensed under the call G5KN. 2CAX, of Northampton, has built a three-band exciter and is also listening on 56 Mc., but has had no luck to date. He would welcome schedules

FORTHCOMING EVENTS

Feb. 16.—Scotland "H" District, 7.30 p.m., in District Headquarters, Bank Street, Kirkcaldy.
" 16.—District 6 (Exeter Section), 8 p.m., at Y.M.C.A.
" 17.—District 6 (Torquay Section), 7.30 p.m., at G5SY, "Sherrington," Cleveland Road.
" 17.—Scotland "A" and "E" Districts, 7 p.m. in Room 119, Natural Philosophy Section, Royal Technical College, George Street, Glasgow.
" 17.—District 10, 7.45 p.m., at the Globe Hotel, Castle Street, Cardiff.
" 18.—District 12, 7.30 p.m., at The Orpheum Cinema, Temple Fortune, N.W.11. Discussion on N.F.D.
" 18.—District 6 (Plymouth Section), 7.30 p.m., at G8PN, 6, Savery Terrace, Lipson, Plymouth.
" 20.—District 11, 6.30 p.m., at 2APX, "Grenada," Cadnant, Conway, Caernarvonshire.
" 21.—District 12 (Watford Section), 8 p.m., at "The Nyth," Norwich Road, Northwood.
" 21.—District 13 (Blackheath Area), 8 p.m., at G8WO, 458, Green Lane, New Eltham, S.E.9.
" 22.—District 14 (East London Section), 8 p.m., at G8AB, 35, Priory Road, Loughton.
" 23.—District 14 (East Essex Section), 8 p.m., at 2CYC, 46, Woodfield Road, Leigh-on-Sea.
" 23.—Scotland "A" and "E" Districts, 7.30 p.m., in Room A, Institution of Engineers and Shipbuilders, 39, Elmbank Crescent, Glasgow.
" 23.— * District 15, 7.30 p.m., at G2GL, North End Road, W. Kensington, W.6.
" 24.—District 13 (Anerley, Balham, Kennington and New Cross Areas), 8 p.m., at Brotherhood Hall, West Norwood.
" 25.—London Meeting at I.E.E. Commence 6.45 p.m. Tea at 6 p.m. Lecture and Demonstration by Dr. B. G. Thompson (ZL1BG) on "X-Radiations, their Production and Application, with Special Reference to Medical Diagnosis and Treatment."
Mar. 2.—Scotland "H" District. Details as above.
" 2.—District 1 (Manchester Section), 7.30 p.m., at Brookes Café, 1, Hilton Street, off Oldham Street, Manchester. Talk by Mr. Preston (W.B. Speaker Co., Ltd.) on "Loud Speakers and Their Construction."
" 2.—S.L.D.R.T.S., 8 p.m., at Brotherhood Hall, West Norwood.
" 3.—District 14 (Colchester Section), 8 p.m, at G8PZ, 19-21, Artillery Street, Colchester.
" 4.—District 8 Meeting in Cambridge.
" 4.—District 12 (Welwyn Section), 7.30 p.m., at 13, Mandeville Rise, Welwyn Garden City.
6.—District 7, 2.30 p.m., at Royal Hotel, Stoughton, Guildford.
" 10.—District 6 (Taunton Section), at Bristol Arms, Bridgwater.
" 13.—Districts 3 and 4, Provincial District Meeting, at the Trent Bridge Hotel, Trent Bridge, Nottingham. Assemble 12 noon. Address by Mr. J. Clarricoats (see special notice).
" 13.—District 19, 6.30 p.m., at G2LD, 4, Priors Terrace, Tynemouth, Northumberland.
" 16.—Scotland "H" District. Details as above.
" 17.—Scotland "A" and "E" Districts, 7 p.m., in Room 119, Natural Philosophy Section, Royal Technical College, George Street, Glasgow.

* Sale of disused apparatus at this meeting.

strength. 2CSH and 2CTZ are still active and preparing for morse test. G5LP has completed the Jones "3-band exciter," but finds the output low on 28 Mc. He holds the opinion that the 6L6G is overrated and finds that the APP4C proves to be a better oscillator and doubler than the 6L6G. Some very interesting contacts have been made using this exciter on 7 and 14 Mc. Mr. I. L. from transmitting members using that frequency. (What about it, Notts and Derby?)

Worksop and Retford.—G8PO and 2CAJ are collaborating on suppressor grid modulation. We welcome a new member in G8SD, who is mentioned in *QST* for working W's on 7 Mc., using 1 watt from dry batteries! BRS2843, of Newark, is experimenting with 56 Mc. receivers. (Notts and

Derby again please note.) G8ON is building 28 and 56 Mc. equipment. All stations are active.

Mansfield.—The next local meeting will be held at the Swan Hotel, Mansfield, at 3 p.m. on March 6. At the last meeting members from Chesterfield, Huthwaite, Mansfield, Sutton, Warsop and Worksop attended, when a preliminary discussion took place on N.F.D. arrangements. G8OT has erected a 72-ohm feeder line for experimental purposes. 2BLV has built two 56 Mc. receivers, the first being a straight type o-v-1 and the other a super-regen. detector with one stage of audio amplification. (Again Notts and Derby please note.) G8MW took part in the 1.7 Mc. transmitting contest.

Ilkeston, Derby, Leicester and Buxton.—None of these towns has sent in reports. Surely this is not the way to start the new year! Do please try and get some reports each month to keep the District "live."—D.R.

MIDLAND PROVINCIAL DISTRICT MEETING

DISTRICTS 3, 4 and 17

AT

THE TRENT BRIDGE HOTEL, TRENT BRIDGE, NOTTINGHAM

On SUNDAY, March 13, 1938

Assemble	12 noon.
Lunch	1 p.m.
Business Meeting	2.30 p.m.
Tea	4.00 p.m.

Inclusive cost of lunch and tea, 5s.

Reservations must be sent to Mr. J. Lees (G2IO), 17, Trevose Gardens, Sherwood, Nottingham, not later than Thursday, March 10.

Tickets may be purchased from all T.R.s G5VM and G5GS.

District Meeting.—In view of the P.D.M. being held early in March, the D.R. has decided not to call a meeting in February, knowing that all the T.R.s, while wishing to be present at such a District Meeting, would also want to do their bit in the B.E.R.U. Contest. The B.R.S. and A.A. members would be well advised to take part in the receiving section of the Contest, because they are sure to find it interesting. Further, it will give them a chance to hear DX which they may not hear again during the coming year.

The Provincial District Meeting will be held on March 13 at the Trent Bridge Hotel, Trent Bridge, Nottingham. The meeting will commence at 12 noon and will conclude about 5 p.m. Mr. J. Clarricoats (G6CL), who will be present, will speak about Society affairs. All members are asked to make March 13 a "gala day" and attend whatever the cost or trouble; we can assure them a good time.

DISTRICT 5 (Western).

Bath members have found conditions generally erratic. G2IW has confined his activities to 7 Mc. 8JQ has been rebuilding and is now active again with an RK20, which is working well, after giving some trouble. G8DX has been unwell and has done little in consequence. 8HW has moved to Colchester.

G6LM, of Chippenham, is active on all bands and took part in the 1.7 Mc. Contest. He is provisionally in charge of the N.F.D. 1.7 Mc. station and wants all the assistance possible from members within reasonable distance. G2MS (Marlborough) reports that his call has been pirated on 7 Mc. telephony.

At the *Bristol* meeting in January, discussion took place on matters of general interest. It was decided to start slow morse practices from G8LL every Thursday evening, provided permission can be obtained. A special transmitter is being built for the purpose and full particulars will be announced later. Preliminary information regarding N.F.D. was given.

The 1.7 Mc. Contest was well supported locally, G5UH, 6GN, 5KT and 5JU taking part, with 6ZR also busy throughout. QRM was terrific!

At least six Bristol stations will be taking part in the B.E.R.U. contests, so that preparations, in the main, have consisted of increasing receiver selectivity!

G6VF has received two reports from OE on his 56 Mc. C.W. signals, and is heartily congratulated. A high wind brought down G8DP's 55-ft. mast, which has temporarily put paid to his activity.

G5WI's health is improving gradually. His new inverted V aerial performs satisfactorily, although DX is rare. G8WW, like the poor chap in the January BULLETIN, finds it very difficult to "get out"!

2AQO (Cheltenham) has been busy testing C.O. circuits and has evolved one which enables control to be effected at 7, 14 and 28 Mc. with a 7 Mc. crystal. His experiments with radio-controlled boats are proving successful and he hopes soon to proceed a step further.

G5ZK is only at home at Stroud during week-ends. His difficulty has been aerials, but this is now overcome, and he is doing well with his ML4/59/59 transmitter. A T205/20 "won" at Convention will be added soon.

Cheltenham members in general are very busy. A new member, BRS3168, is welcomed. G5BM is pleased with a new pre-selector he has built; 8ML has improved his results greatly by using link coupling; 5BK is building a new exciter for 28 and 56 Mc., using 6A6s in push-push; 8LB has moved to a new QRA and is installing new gear; 6IH was a welcome visitor last month and all appreciate the demonstration of his modern instruments.

G8DT is deserving of thanks for placing his QRA at members' disposal for meetings, and for the refreshments provided. BRS1947 is acquiring a name for "livening-up" meetings.

The D.R. thanks all those who have written to him recently. Personal replies will be sent sooner or later, and he is always glad to hear from any member in the District.

It is desired to arrange a District meeting on a Sunday in April, provided sufficient support is forthcoming. Suggestions as to a suitable day, time and rendezvous will be much appreciated by the D.R.

Please drop him a postcard, giving your views on this matter, whether you are in favour or otherwise.

DISTRICT 6 (South-Western).

Torquay.—The monthly meeting was held on Tuesday, January 18, when the following were present :—G5GD, 5IF, 5SY, 2AGQ, 2AUI, 2BXU, 2CMF, 2CRL, 2CWR, BRS2338, 2339, 2927, and 3171. BRS2339 was presented, by the D.R., with the "Wright" Shield in token of his good work with the receiver, particularly in last year's B.E.R.U. contest. The new T.R. was introduced to the meeting, and all were asked to support him during his year of office. Plans for this year's N.F.D. were discussed, and certain arrangements made.

Most members in the area report active ; 2CMF, 2BXU, 2CRL and 2CWR are building transmitting gear, and all are getting ready for a Morse test. G5SY, who has practically completed his rebuild, has separate P.A.'s and driving stages for 3.5, 14, 28 and 56 Mc. The input to the final on 56 Mc. is now in the neighbourhood of 60 watts. The modulator for all the P.A.'s is Class B, using 6L6's.

Taunton.—The following members, plus some friends, met at an informal meeting at Bridgwater on Thursday, January 13 :—G2JM, 5AK, 5GT, 6LQ, BRS2782, 3025 and 3096. After tea all enjoyed a very pleasant musical interlude. Will members please keep free the second Sunday in even months, and the second Thursday in odd months.

Exeter.—There was an attendance of ten at the meeting on January 5, when various matters were discussed. We should like all members in the Exeter area to know that meetings are held at the Y.W.C.A. on the *first* and *third* Wednesdays of each month.

G5QA is still doing good work on the DX bands, and occasionally puts in a little 'phone work. 2FP has now completed the building of his new shack, and will no doubt feel that he really has room to throw the key about.

North Devon.—At a special farewell meeting held at G3BO a presentation was made to G6FO (who, as announced last month, has left District 6 for his old QRA in Newport, Mon.) in recognition of his fine work as T.R. during the two years he has been resident in North Devon. Four active transmitters and many A.A. and BRS members owe their existence to his tireless efforts. Mr. Forsyth takes with him the sincere thanks of the membership in this area. 2CHY will very soon be taking her Morse test, and we wish her the best of luck. G8US, after valiant efforts with his diminutive aerial, is at last getting good reports from the U.S.A. G6GM, not content with his 1.7 Mc. contest score, worked VK, PY, and UK within the space of forty minutes a few mornings later. G3AM and 3BO are busy with constructional work, whilst G2ID, BRS2970 and 3081 report active.

Plymouth.—A meeting was held at G8HF on Friday, January 21. A new, and very welcome member, in the person of Owen Rogers, G2HX, was present. 2AHX was absent owing to illness, but there was a record attendance of nine. Well done, Plymouth ! There was a discussion on the relative merits of straight and superhet receivers. Strangely enough, the decision was that both had good points ! ! ! Having obtained a new RK20, 6RF has persuaded the old one to work again. 8HF is producing some good DX. 2CYJ has practically completed his Jones Super Gainer, and 8PN is working out the final details of an eight-valve super. BRS2020 is building a two RF stage receiver. The next meeting will be held at G8PN, 6, Savery Terrace, Lipson, on February 18 at 7.30 p.m.

DISTRICT 7 (Southern).

The January District meeting at Reading was well attended, and G6GR gave a demonstration of 56 Mc. reception using his superhetrodyne receiver, in conjunction with G2OD's transmitter from Ascot.

The March meeting will take place on March 6 at the Royal Hotel, Stoughton, Guildford, when we hope to hold our annual Junk Sale, so please bring your odd bits and pieces, together with a full pocket book !

Oxford.—G5HS sends an interesting description and snaps of his station, suggests a crystal register of local stations. 2CL and 2DU are rebuilding. 8PX reports activity on 7 Mc. with plenty of G contacts in the evenings. 5LO had his experimental wind-driven generator wrecked in the recent gale, but some interesting data has been obtained, the idea proving quite practical. 2CSV has left for Southampton, but hopes to be home for occasional week-ends. 2CZQ is busy with transmitter lay-out.

Guildford and Woking.—G2ZC spent an enjoyable time at the "Old Timers'" dinner. 6GS lost a mast in the January gale, but soon returned to 28 Mc. with FB signal. 6LK took advantage of poor conditions to complete contest preparations. 8IX is trying T20 final. 8LT returned to 6UW. 5WP made aerial directivity tests preparatory to contests.

Croydon.—Reports have come in better this month, but the B.R.S. members have not yet responded. G5XW is still very active and doing well on both 7 and 14 Mc., his phone has been heard in Bombay (shows what a difference it makes winding H.F. Chokes with copper wire instead of resistance wire, which he used until he wondered where his volts were going !).

G5XH is finishing a suppressor grid phone transmitter for 7 Mc. with a DET8, and now has his super working with maximum efficiency. Will also be on 1.7 Mc. shortly, after an absence of ten years. 5GQ is very active, and his phone is a credit to the district. 5HI is working in conjunction with him, and gets fair results with several tests they have carried out. 8LU has made his first W contact and is working many stations on 7 Mc. 5BT has completed the same super as used by 6WY and 5XH and finds it great for DX. We shall be hearing from this station soon.

G2TI, the oldest call in the district (pre-war) has turned his attention to cathode Ray Tubes, and finds no time for any other branch of radio, but has a great interest in the welfare of the Surrey Radio Contact Club. 2DN had just got going again when the gale blew down his new lattice mast, but that will be quickly repaired. 2KU is experimenting with doublers for 56 Mc. 2MV is still trying hard for DX on 56 Mc., and generally experimenting on this band. Signals are very rare, even local ones are falling off, but if members would like to arrange tests on 56 Mc. with him, he would be very pleased. He finds stacked dipoles still best after numerous tests.

G5AN has worked about 90 countries, but awaits

cards from a number, and would like to know if anyone has succeeded in being able to give CX2AJ his report, he has worked him a number of times and received good reports, only to hear him going straight on with CQ . . . 2CCZ has applied for his full ticket, and is visiting several locals (hams, of course) for morse practise; has several transmitters under test.

Reading.—At the January meeting of R.T. & R.S., some 20 members were present, and the N.F.D. and R.S.G.B. films were shown, followed by general discussion. G8MG has received QSL confirmation of reception of 56 Mc. signals from ON4AP, who stated that this was his greatest DX (220 miles approx.) on this band. 8MG is now building transmitter for 56 Mc. C.C. with horizontal aerialna, and hopes to be on the air by time these notes appear. He would also welcome reports of 56 Mc. signals. 8KJ lost his mast in the gale. 5VI hopes to be on the air again shortly. 5TP is using 7 and 14 Mc. doublets.

G2IT, 5AO, 5HH, 6GT and 6WO have been active on 7 Mc. phone. Most other members report active. B.R.S. activity in the district is increasing, and the total membership of Reading T. & R. Society is now some 30 members. The next local meeting will be on Wednesday, February 16, at Y.M.C.A., Reading.

Portsmouth.—The January lecture to the South Hants. R.T.S. was given by G5XC in the Civil Service Hut, Hilsea. He spoke on "Atmospheric Electricity," which proved a most interesting subject and of great importance in the study of wave propagation. Congratulations to G3CN (ex 2ACG), and BRS3182, a new member. 8WC is trying various modulation systems. 2AHA is rack building. 2537 awaits his A.A. call. 8BD, 8LO, 2XC, 6NZ, enjoyed the 1.7 Mc. test. 2AWC contemplates directional aerials. 2ZR hopes to solve the H.T. question. Locals report 28 Mc. very dull recently. 8JB, 5XY, 2BCM, 2AZX, 2CBL, 1319 all continue active.

Reigate, a town which can now boast of eight fully-licensed "Hams" is bristling with enthusiasm, and is shortly holding a discussion with a view to forming a local Short-Wave Club. G6JF, now equipped with an RME69, has managed some excellent DX, using four half-waves in phase, and is now thinking in terms of a Signal Squirter. 8HH is fast becoming known internationally, and has just completed a re-build. His experiments chiefly concern the difference of directional effects, employing "Doublet" and Zepp aerials for 14 and 28 Mc.

G8KI, who is only active in the evenings, is at present all C.W., but will shortly be equipped for phone; he is erecting a W8JK, flat-top beam aerial, and is hoping to do good work with this in the contest. 8MP who's QRA does not allow much aerial space, is at present experimenting with R.F.P.15's, and Collins coupled feeders. We are pleased to welcome 2JO back to the air, what about notes please OM? 5LK's chief experiments are plate modulation to an 801 with low audio input, and concentric feeders to half and full wave, Johnson J. aerials on 14 Mc. No notes have yet been received from 5XG and 6KD. We congratulate Mr. Groves on obtaining his A.A. call, and welcome him as 2BGH to Reigate Area.

DISTRICT 8 (Home Counties)

At a meeting held in Cambridge on January 7, 1938, which was attended by 18 members, several matters of district interest were discussed.

It was agreed to send a copy of agenda of meetings to the T.R.s only in future. It was also agreed to discontinue the annual compilation of a district frequency register owing to its being quite unreliable due to "Tissue paper," "Indian Ink" and "ECO."

Schemes for increased publicity in connection with the district PDM, which takes place on July 10, 1938, were also discussed.

G2PL has rebuilt his transmitter on somewhat commercial lines, and with improved results on all bands from 1.7 to 56 Mc. 5JO is active on most bands. 8SY is heard using 'phone on 14 and 7 Mc. with quite good quality. 5BQ is also operating 'phone on these frequencies. 5DR has a fine signal on 14 Mc. CW, but has modulation trouble. 6FL is still patient with 56 Mc., but needs co-operation. Will those also interested in this band please get in touch with him? 6WA has at last been heard active with a fine 'phone signal on 1.7 Mc. 2ABR now becomes G3CY, and within three days had several contacts on 7 Mc. He hopes to be on 14 Mc. by Easter, good luck, OM.

Bedford has now livened up under the representation of Mr. Jeakings (2AWH), and reports are coming through. 2MD is rebuilding. 5PA will probably be a member before these notes appear. 6HB has also rebuilt, and is doing fine work at week-ends. 2AWH has completed his transmitter, and now experimenting to eliminate key clicks. 2BFN is building a tri-tet transmitter, and has an HRO RX, also an RME69 and a Super Skyrider. Gee!! 2CAP is just finishing a new transmitter, and is delving into the mysteries of frequency doublers. BRS3125 has applied for his AA Ticket, and is building a new RX.

From *Peterborough* comes the news that 2NJ, who is active on 14, 7 and 1.7 Mc., has been testing several aerials, and eventually settled down to a 66-ft. top with a 66-ft. counterpoise for the 1.7 Mc. tests. 2UQ reports that his new modulation system is working very well. 2CCF has passed his Morse test, and will undoubtedly be on the air before these notes appear. Mr. Thurlow (BRS3173) is a new member living in March. He is learning the code, and has applied for an AA ticket, good luck, OM. 3BK is active on 14 Mc. 2075 has attained a very high speed with the code.

The next District Meeting will be held in Cambridge on March 4, and it is hoped that all members will make a determined effort to attend. Will any member who is willing to give a short lecture or talk on some subject of general radio interest please communicate with G2XV as early as possible?

DISTRICT 9 (East Anglia).

Reports have come in very well this month, and most stations appear to be active.

Ipswich.—The weekly rag-chews seem to be very popular, judging by attendances, and the T.R. hopes that more members will take this opportunity of meeting fel'ow hams. G6TI, 2JD and 8IS are on 14 Mc., and G8KB, 2AN and 8CU on 7 Mc. 'phone, the latter trying out a controlled carrier system. 2AGO has now applied for his full ticket. Others active are G5UC, 8AG and 8MU.

Norwich.—G6QZ has now completed a 56 Mc. "H"-type beam. With a T20 in the final stage

running at 25 watts, signals are R 4/5 at Lowestoft, 20 miles away. G5IX is active on 28 Mc. 'phone. No other Norwich stations have reported.

North Walsham.—G8FL has rebuilt his TX on the rack principle, and has acquired a S.S.S. receiver. He has been testing a variety of aerial and feeder systems, and has worked some good DX. G5UF is QRT owing to a burn-out in his final stage.

General.—G8WI, of Orford, is now testing on 7 Mc. CW, using QRP. Contacts and reports are very welcome. 2BND sends good news from Yarmouth. There will probably be several new members in that town shortly. At Lowestoft G8DD is active on 28 and 14 Mc. G5QO is rebuilding. Beccles and Bungay have not reported this month.

Once again the Scribe asks for reports of activities from all stations, either direct or *via* your respective T.R. The work of compiling these notes is gradually becoming easier, due to the fact that some of the members are reporting regularly. All reports to reach G5QO not later than 25th of each month.

DISTRICT 10 (South Wales and Monmouth).

District Representative : Capt. G. C. Price, T.D., The Mount, Pembroke Dock.

Town Representatives :—

Cardiff: H. H. Phillips, 2BQB, 132, Clare Road, Grangetown, Cardiff.

Newport: R. V. Allbright, G2JL, 2, Palmyra Place, Newport, Mon.

All the *Swansea* stations are known to be active except 5ZL and 5KJ, who is on vacation in HB. A new station, GW3AX, is on the air and doing well. 8HI is expending much time and wire on aerials. 2UL continues his SU sked *via* the postman at the moment! There is a possibility of several new stations shortly.

Cardiff and Newport.—There are no reports this month, but 6FO, who has now returned to Newport, has been heard on 1.7 Mc. 2OP is active on 1.7, 14 and 28 Mc.

DISTRICT 11 (North Wales).

How many members noticed the remarkable fade-out of practically all signals during the Aurora display on January 25? The writer was listening on 1.7 Mc. at the time, and observed a complete absence of signals from a distance of over 80 miles. With the exception of a few extremely weak signals in the region of 3 to 4 Mc., the whole spectrum from 1 to 80 Mc. was completely dead.

An article explaining the effect of Aurora displays on short-wave signals would provide some very interesting reading. Have any such articles been written?

Again, no individual reports have been received. Will those who worry the D.R. at meetings over the publication of more district notes kindly "hold their peace" until they are able to send him some information of general interest.

At the meeting on February 20 N.F.D. will be the main topic for discussion, so will all interested in this event please endeavour to be present.

DISTRICT 12 (London North and Hertford).

London North.—The January meeting was attended by 40 members. The lecture was given by Mr. Charman, G6CJ, who discussed different aerial systems and their directional properties, illustrating these on a Great Circle map. The next meeting, on the 18th, will be devoted to N.F.D. arrangements, and a large attendance is desirable so that station operators and sites may be tentatively arranged for Post Office information. The reports from the area representatives indicate that they are all busy contacting their members, but there is nothing of general interest to include in the notes.

Watford.—The T.R., Mr. H. Gibson, provided the QRA for the January meeting, seven members attending. Discussion was varied, and ranged from high fidelity modulation to 56 Mc. work.

Welwyn.—Following the appointment of G5UM as T.R., the first meeting was held on January 7 at the QRA of 6XN. In addition to the seven local amateurs we were pleased to welcome "Clarry," 6LL, 6OT and 2AI, together with three members from outlying districts, making a total of 14. As Welwyn Garden City and Welwyn Village are convenient centres for a large part of Hertfordshire, it is hoped that members in areas bounded by Letchworth, Bishop's Stortford and St. Albans, will attend future meetings on the first Friday of each month. These meetings are being held on alternate months at 5UM and 6XN.

5UM has obtained his W.A.C. on 14 Mc. with an input of 10 watts, and has reverted to his "old loves," 1.7 and 3.5 Mc.

DISTRICT 13 (London South)

An area meeting was held at the Brotherhood Hall on January 20 and was very well attended. Some interesting discussions took place and the D.R. was pleased to meet several new members. The T.R. meeting has, unfortunately, had to be postponed again but we hope that it will have taken place before these notes appear.

Wandsworth Area.—G6KM is a new member in the district and hopes to be on the air in February. 6GQ has been severely handicapped by difficulty in erecting an aerial. 2BNL is active but finds the lack of A.C. mains very distressing. G2RC is in the midst of a rebuild and hopes to be on for the B.E.R.U. Tests.

Balham and Tooting Area.—G5PY is now equipped with 7 Mc. 'phone and continues to work DX on the 14 Mc. band. 2JK is active on the 7 Mc. band and hopes to enter for the Junior B.E.R.U. tests. 2BKB is now fully licensed as G3CU and Mr. Bates has received the call sign G3DF. Congratulations and good luck to both. 2UX has been away during the last month and has therefore only been on spasmodically.

Blackheath Area.—We are glad to say that G8WO, of Eltham, is now on the air and we look forward to hearing of interesting results to his experiments in regard to the Magnetic North Pole. An interesting time was had one Sunday morning in January erecting a mast at the future home of G2ZQ. We are glad to say that the mast has since withstood the efforts of various gales to bring it down! 6FU has been active on the 7 Mc. band. He is applying for a 56 Mc. permit and, if successful intends to remain on this band exclusively. He would be glad to receive a card from anyone who would care to have details of regular transmissions on this frequency. 2WV has erected a new aerial

with the idea of improving communication with South Africa. Strangely enough the new aerial worked first time!

The annual dinner of the S.L.D.R.T.S. was held at the Half Moon Hotel, Herne Hill, on January 27 and was attended by 30 members. Mr. Bevan Swift was the guest of the evening and Mr. H. A. Maxwell Whyte, who proposed the toast to H.M. The King, took the chair. Mr. P. Johnson, in proposing the toast to the Society, spoke of the very satisfactory way in which the membership was being maintained and added that the attendances at meetings was very encouraging. In conclusion he mentioned that the Committee meetings still lasted until very late hours! Mr. Dedman, replying for the S.L.D.R.T.S., thanked those present for the warmth with which they honoured the toast and continued with some amusing stories. Mr. Chisholm then rose to propose the toast to the R.S.G.B. and quoted the present membership figures as proof of the Society's advancement. The activities of the Society were, he continued, more varied than ever before, and the B.E.R.U. Tests in February would furnish an excellent example of the enthusiasm in the Society. Loyalty to the R.S.G.B. was forthcoming everywhere and it must not be thought that criticism necessarily implied a lack of regard for the Society—rather should it be taken as a sign of healthy life. Mr. Swift, in replying, thanked the members for the toast but complained that owing to lack of time and the advancing years he was not in a position to know of the latest developments in the life of the Society. He related several entertaining incidents of the pre-War days in the inimitable style which is looked forward to each year. To conclude the evening, a paper of technical questions was set by Mr. Johnson and this resulted in a victory for Mr. Dedman. The party dispersed about 11 p.m.

The D.R. would like to thank those members who have forwarded reports this month and draw special attention to the meeting which has been fixed in the Blackheath Area for February. (See Forthcoming Events.). It is hoped that all those in the area will make an effort to be present. In conclusion, may we remind members of the South London Trophy which is awarded annually in the Junior B.E.R.U. Contest.

DISTRICT 14 (Eastern).

East Essex.—There were 16 present at the January meeting, held at G6IF; among other points, N.F.D. came up for discussion. It was decided unanimously that last year's site was most favourable, and the T.R. is again approaching the authority concerned for permission to use a part of Thundersley Glen. G2UK has had some success on 56 Mc., and has contacted several stations outside the local area, but he is disappointed with the lack of activity there. G6CT, 8RT, and 2LC entered for the 1.7 Mc. Contest. Congratulations to G6IF on obtaining the first W.B.E. 'phone certificate in this area, also to 2DDL (ex BRS 2708).

Colchester.—At the suggestion of G3BI and 2DDZ, a meeting was held at G8PZ on January 20. Those present were G8HW, 8PZ, 3BI, 2DDZ, BRS 2063, and three non-members (Messrs. Alberry, Hibbard and Lawson), who agreed to become members that evening. The business was "to discuss the possibility of forming a group of local members of the Society, to hold meetings for the advancement and sharing of knowledge in all matters of research and experimental short-wave transmission and reception." It was agreed to hold a meeting at 7.30 p.m. on the first Thursday of each month, also to hold a weekly slow morse class. G8HW, 8PZ, 3BI, and BRS 2063 signified they would assist in this project. It was also agreed to form a local group and to appoint Mr. S. D. Perry, G8PZ, as T.R. Will members and prospective members get in touch with him at 19-21, Artillery Street, Colchester.

East London.—At the January meeting held at 2CID, Chingford, the attendance was small. The D.R. was unable to be present, as moving to his new QRA was in progress. His station has now been re-erected at Little Hollingbury, Essex (near Bishop's Stortford). G8AB reported as being W.A.C. during Christmas using a new half-wave doublet. Congratulations to BRS 3104, now 2DBC, and to BRS 3082, who now awaits his A.A. permit. 2ANB is busy with modulation tests. BRS 3044 is rebuilding receiver. Details of morse classes to be held every Monday evening, details from 2CID, 25, Moreland Way, Chingford. Telephone: Silverthorn 1740. G8AB will shortly be sending slow morse for the benefit of local members on a frequency of 1792 kc. See "R.S.G.B. Slow Morse Practices" for schedule. BRS 3114 made his first attendance at the meeting. QRA's are required for future meetings.

DISTRICT 15 (London West, Middlesex and Buckinghamshire).

The district meeting at High Wycombe enabled the West London members to meet their associates in that part of the area. Sixteen were present in all.

A very successful meeting of T.R.'s and Social Committee was held on January 17. As a result of that meeting, and following the suggestion of the D.R., meetings will in future be held in various parts of the district according to the percentage of membership resident there at the beginning of each year. Meetings have therefore been provisionally fixed for the following dates:—*February* 23, West London; *March* 23, North Middlesex; *April* 20, South Middlesex; *May* 25, West Middlesex; *June* 22, West London; *September* 21, Bucks.; *October* 19, North Middlesex; *November* 23, South Middlesex; *December* (date to be fixed), West London. These dates will be confirmed each month in both the BULLETIN and District Magazine.

As T.R.'s will, in future, be responsible for arranging these meetings and fixing talks, will those with offers or suggestions please forward them to the T.R.'s?

Those who did not attend the dinner missed a treat, as will be readily ascertained from any of the fifty members and visitors who did go. It was with regret we learnt that G6CL was unwell and could not possibly be with us. G6CJ deputised for him.

Especial thanks are due to Mr. Werschker, who presented a cake-stand to be drawn for by members of R.S.G.B. G5JL was the lucky winner. Thanks also to Miss Wilkins for chocolates and G8WR for a pack of playing cards presented as prizes for the dance and whist drive respectively.

G5JL must not be forgotten for supplying the menu cards and G8KZ for the excellent P.A. equipment. We could mention others, but suffice it to say how much we appreciated everyone's efforts.

West London.—The T.R. is forging ahead with his scheme for local activities and has several fixtures for meetings. G6CO worked his first ZS and ZU's, 6WN is on 28 Mc., C.W. and 14 Mc. telephony, 8WR changed Sky-chief for Sky-challenger and built microphone amplifier, 2CMG busy with doublers. Congratulations to BRS3142, now 2DFJ, who has constructed wooden masts of "BBCish" appearance very economically, 2CZV building exciter and listening to DX, 2DDY sends first report, both BRS3074 and 3147 forward interesting logs.

North Middlesex.—G6LJ has super going but not hotted up yet. BRS3178 writes as a new member.

West Middlesex.—No reports. Why?

South Middlesex.—G6GB has built an electric torpedo-boat destroyer with radio controlled steering. It is 5 ft. in length, has a 7-inch beam, and carries a three-valve receiver which controls the electric motor operating the steering. The whole is remote controlled from a motor car in the vicinity. 2CZG busy with transmitter. G2KI, 2LA, 2NN, 2VV, 2ZY, 8IP and 8MK also active.

Bucks.—G6JK testing oscillators, 8JK on 7 Mc. telephony, 8VZ disgusted with super-gainer, while 2BAO finds it selective, 2AKZ reports 28 Mc. dull except for VU and HI, G2RL and 2BVX also active.

T.V.A.R.T.S. (Twickenham) had lectures on "Ideals of 56 Mc. by Mr. W. F. Holford (G5NG), and "The Design and Operation of Superheterodyne Receivers" by Mr. W. J. Jenkins, Grad., I.E.E.

Morse classes, under the supervision of G5LC, are now being taken by G2NN, 5LC, and 6GB; anyone interested should apply to G5LC.

S.R.S. (Southall) hold meetings weekly and a very fine programme has been arranged. R.S.G.B. members are always welcome on Tuesday evenings in the Library, Osterley Road, Southall.

DISTRICT 16 (South-Eastern)

It is understood that several town groups have elected, or are in the process of electing, a TR for 1938, and names and addresses of the new TRs will appear in THE BULLETIN as soon as H.Q. are advised.

Ashford.—G2JV, 2KJ and 6SY are on 1.7 Mc., although KJ's activities have been somewhat restricted by the collapse of his new mast. Hard luck, OM. 2QT is working 'phone and CW DX on 14 Mc. Congratulations to BRS2287, who is now 2DCL.

Bromley and District.—Fifteen members were present at the last meeting, at which G2NK's 224 Mc. Yagi array caused much interest and discussion. We are pleased to welcome G5TS and BRS3177, and hope to hear from them in the near future. 2BAV is awaiting his full ticket, G8WO is on 7 and 14 Mc, 2CDA built a super in three days (!) while 2NK is going on 224 Mc. with a 316A valve and the above-mentioned beam aerial. The next meeting will be on February 26, at A.C.S. Radio, at 8.15 p.m.

Chichester.—A demonstration of American communication receivers was given by G2ZV at the last meeting, held at 2BGH, where there was an attendance of 22 members. Thanks are due to Mr. and Mrs. Hansford for the accommodation and refreshments provided. G2ZV is on 28 Mc., and is erecting a rotary beam aerial, 2BGH's 11-valve television receiver is nearing completion, BRS2961 is now 2DDD, 2BBB is still trying to find the ideal 56 Mc. exciter, and 8RO has finished his rebuild and is on 14 Mc. G5PF, 2CDR, 2CIX and BRS3028 also report active.

Eastbourne.—The Eastbourne and District Radio Society met on January 7, and an interesting exhibition of pre-war and war-time radio gear was given by the Chairman, Mr. Thorpe. G2AO is on 7 and 28 Mc. 'phone, and testing on 56 Mc. with C.C. 2KV, 3AT, 5BW, 5IH, 2AVQ, 2BPB and 2CNO are also active. We congratulate 2BIU on obtaining his full call G3CX.

Gravesend.—The DR gave a talk on "A Transmitter for the Beginner" on December 20, but partly due to the fact that it was Christmas week, and partly to the weather, there was only a small attendance. G6AQ's talk on "Inter-Planetary Communication," on January 3, proved extremely interesting, and his somewhat revolutionary views on that much debated subject caused considerable argument among those present. The following week the lecturer was Mr. Nixon, of G.E.C., and his subject, "Osram Valve Design," was illustrated by two films. Mr. Nixon traced the development of valves from the early Fleming diode up to the modern multi-electrode types, and afterwards gave a demonstration of the use of gas-filled relays and photo-electric cells. The Society hope to be able to avail themselves of the invitation extended to them to visit the G.E.C. works at an early date.

The meeting on the 17th was billed as "Clarry's Evening," and our versatile Secretary dealt with many things of a technical and non-technical nature, ranging from the frequency drift of his new SS receiver to a warning to transmitting members to look to the out-of-band harmonics that they may radiate. The talk was much appreciated, and a very hearty vote of thanks was accorded to 6CL at the end.

At the annual general meeting the following officers were elected: Chairman, G5IL; Vice-Chairman, 6PG; Hon. Secretary, 2BDL, with 2IZ as assistant; Librarian, 5SI, assisted by 2TN. G6PG has kindly offered to approach the G.P.O. on behalf of the Society with regard to a portable call. All members are active.

Tunbridge Wells.—G5KV is on 1.7, 7 and 14 Mc., and has just got a Super Skyrider. 6OB is still rebuilding; as is 2UJ. The rest have nothing special to report.

Whitstable.—We have pleasure in welcoming to the District G5ZQ, and understand that he hopes to be active in a few weeks' time. G5CI is getting out well, using a 6L6G as plain CO; while all other stations seem to be active on one band or another. The next meeting of the WRA will be held on March 5, at G5CI, 13, Queen's Road, when the Society's NFD films will be shown.

DISTRICT 17 (Mid-East).

District Representative: W. Grieve (G5GS), "Summerford," Station Road, New Waltham, Grimsby.

District Scribe: T. S. Brister (G6AK), 22, Sherburn Street, Cleethorpes.

Town Representatives:

Boston: G. Hutson (G6GH), 11, Wide Bargate, Boston.

Cranwell: P. Halligay (G8PI), "M" Squadron, E. & W. School, Cranwell.

Mablethorpe and Sutton.—G5CY reports activity on 3.5 and 28 Mc. 56 Mc. enthusiasts will be glad to hear that 5CY is building a 50-watt transmitter especially for this band. G5BD is working DX on 14 and 28 Mc., also active on 3.5 Mc. 'phone. G2FT is experimenting with directional aerials.

Boston.—G6LH will be leaving Boston early in February, but as his new QRA will only be about 12 miles away he will be able to maintain contact with this group. Unfortunately no A.C. mains are available, but QRP 'phone work is contemplated on several bands. G6GH is still working DX and his latest is VR4AD in British Soloman Islands. We give a hearty welcome to a new member in Boston, BRS3154.

Horncastle.—2AAS is very busy rebuilding and awaits the arrival of new apparatus.

Brigg.—G8AP is active on 7, 14, and 28 Mc. and is now building 60 feet lattice towers for beam aerials, also constructing modulator equipment.

Cranwell.—We are sorry to have to report that one of our most active members, G8PF, is leaving us. PF has been posted to R.A.F., Mildenhall. At the same time we have to welcome 2AZR from Glasgow. G8PQ has at last succeeded in working Americans on 7 Mc. G8FC and 8PI report active.

Grimsby and District.—The following stations are known to be active: G2QA, 2VY, 5GS, 6AK, 8CI, 8JN, 8PV, 2AZH and 2BXG. Local and country members will be pleased to hear of the affiliation of the Grimsby and District Short-Wave Society to R.S.G.B., especially as a large number of District 17 stations are members of this Society.

The D.R. wishes to draw attention to the Sunday evening schedule at 18.00 on the 3.5 Mc. band. Members in the District holding permits for this band are asked to join in.

DISTRICT 18 (North Eastern)

Hull.—There is not a great deal of activity apparent this month, which is probably due to the after effects of the festive season and the absence of real DX, but we are hoping for better conditions for B.E.R.U., when we hope to see this district well placed in the list.

G5HA has made application for 28 Mc. permit, and is preparing for serious work on that band. 5MN is carrying out tests on 56 Mc. with A.A. 6OY is active again, and has added to his list of countries. 2QO is still busy with voice-controlled carrier, and he has now been successful in cutting off his complete carrier between sentences. 2AGK rebuilding TX in rack and panel. 2BRR testing out various types of C.O. and P.A. Others active are 6OS, 2XA, 5FV, 5JD, 5MN, 8IM, 2AAX, 2BWS and BRS2072.

During the evening of January 25 the D.R. (5FV) saw a splendid display of the "Northern Lights," and promptly noted radio conditions.

Scarborough.—On January 19 the N.F.D. films were shown at a special meeting of the Scarborough Short Wave Club, held at the St. Alma Hotel. Supper was provided after the meeting. The attendance included G2CP, 5GI, 5HZ, 5MV, 6CP, 6TG, 8BB, 8KU, 2CIW, 2DDA and 17 other members and friends. The evening was voted a huge success by all present, certain members being particularly impressed by the appearance of some of the fixed stations shown in the films. Considerable rebuilding is taking place locally as a result.

G5HZ (ex VU2JT) will shortly be leaving Scarborough to take up duties at Catterick and all will be sorry to lose him. 6SO is still being kept at home through illness, but has managed to contact North and South America on 'phone. Congratulations to Mr. Philpott, who has become 2DDA. 6TG is now licensed for 28 and 56 Mc. on artificial aerial, and is on 7 Mc. 'phone for a short time before rebuilding exciter panel for 4-band operation.

At the January 17 meeting, held in Gladstone Lane, the Q.S.T. official list of countries was discussed, and it was noticed with surprise that the Isle of Man is a separate country. According to the R.S.G.B. list received the following day, this is included with England. Several other differences occur, making the position rather misleading. As the R.S.G.B. compilers, G6WY and 2ZQ, are respectively first and third in the A.R.R.L. DX Century Club, it is hoped that the two lists can be brought into line with each other as soon as possible. (G6WY and 2ZQ had no idea that the A.R.R.L. were preparing a new list.—Ed.)

Bridlington.—G6OO reports active on 3.5 Mc., as he finds conditions bad on 7 Mc. He hopes to take part in the B.E.R.U. Contest.

A few more reports from Bridlington would be welcome.

DISTRICT 19 (Northern).

Stockton and Darlington.—N.F.D. preparations are being discussed and arrangements made for gear, etc.

G2FO is on 28 Mc. at last and getting ready for the B.E.R.U. contest. 6DR is active on 7 Mc. 'phone and contemplating a rebuild. 8OH is rebuilding to 53—RK23—and P/P 46s in the final. 8PS is having good U.S.A. DX with his 59 final. 2CZO is busy experimenting with different types of transmitters, while we are sorry to hear 2CBA is still in hospital complete with RX! Speedy recovery, OM!

G8HQ is chiefly on 14 Mc. and has worked PY. He is building a new RX—TRF with regenerative R.F. stage. 8SN has moved to his new QRA and is busy fixing up his mast and will be on 7 Mc. 'phone using 6L6G as modulator. Also active are 2CKN, 2CQJ and 2BNZ. The latter has applied for full ticket.

Joint Stockton and Darlington meetings are now being held weekly and are proving very successful.

Newcastle and District.—News from this quarter is very scarce at present. G8SG reports inactivity! 2YY is rebuilding, while 6UC is making a new TX—ECO/CO—BA PA and has been very active since he obtained his licence. G5RI is shortly moving to a new QRA and took part in the 1.7 Mc. contest. G5QY has been QRT and lost his mast in the gale and is QRT until a new one appears. 2BGG is busy with C.C. on 56 Mc. using a T20 PA. Also active are: G6IR, 6YL, 2PN, 5WZ, 8IF, 8VV, 8JO, 6TR, 2XT.

Scotland

The Wyllie Trophy has been awarded to Mr. Bryan Groom, GM6RG, for his noteworthy work

on 56 Mc. and on beam aerials. The presentation was made at the meeting of "A" and "E" districts on January 26, before a large attendance of members.

"A" and "E" Districts.—Activity continues brisk, although little individual information is available. GM5ZX took part in the 1.7 Mc. Contest. An improved attendance of members was present at the new mid-monthly meetings in the Royal Technical College, but it is hoped that the remaining two meetings this season will be even better supported. The topic discussed at the last meeting was that old and thorny question of the merits of Straight *versus* Superheterodyne receiver, and an interesting discussion resulted. The long-awaited display of the official R.S.G.B. Films took place on January 26, and was much appreciated by the members, despite an unfortunate hold-up which delayed the showing of the films for over an hour. Mr. Groom delivered a short lecture of intense interest dealing with his 56 Mc. gear and experiences. In the course of the lecture, Mr. Groom gave some details of a wonderful new 56 Mc. receiver which he is installing.

"B" District.—The members were greatly shocked by the sudden death of Mr. Wm. Reid (GM8LR), on January 12. Mrs. Reid, GM5YN, brother of GM8LR, and his parents wish to express their gratitude for the floral tribute and letters of sympathy received from members. GM5LF, who has been laid up for some time, is now off the sick list and expects to resume work shortly. Activity in the district is improving, although the same cannot be said about conditions, which are very poor. GM2OX and GM6IZ represented the district in the 1.7 Mc. Contest. GM2OX is rebuilding his 56 Mc. gear, but expects to recommence his transmissions during March. A big entry is expected for BERU and most stations are rebuilding in preparation. A beam aerial has been erected at GM8AT, who intends to erect a further two and thus secure full coverage of all continents. GM8SV struck quite a coincidence recently when he worked OK1SV, who surprised him with his knowledge of Deeside, until it transpired that OK1SV had attended Aberdeen University.

"C" District.—Activity continues brisk in the district. Congratulations to GM6RI on his appointment as headmaster at Logie Pert, and on his impending marriage. It has been agreed that the Crieff members shall run one of the N.F.D. stations this year.

"D" District.—There is still no news from the district.

"G" District.—Mr. B. Groom (GM6RG), the District Officer, has been forced by pressure of business to resign, and we thank him for his services during his period of office. We welcome Mr. David S. Bruce (2CXZ), 39, High Street, Galashiels, who has been elected to fill the vacancy and we wish him a successful term of office.

"H" District.—The District is in a flourishing state and it was indeed a pleasure for us to be able to meet in person such an enthusiastic body of members at the second Annual Dinner of the District, which was held on January 22, in Kirkcaldy. A fuller account of this function appears elsewhere in this issue, together with a photograph. By the time this appears in print, it is expected that several additional members will have received artificial aerial licences. Mr. A. L. Forge (BRS2815), is now 2DFA. Preliminary arrangements have commenced. for holding National Field Day. A display of the R.S.G.B. Films was given on January 30.

Northern Ireland

The older Gi's will be glad to hear news, after a long silence, of Mr. W. A. Hayes (Gi2WK, of Portadown). After leaving N. Ireland in 1930, he became G2WK of Reading, but is now living in Birmingham. A Foundation member of R.T.U., he is still keenly interested in amateur radio, and hopes to have his gear active again soon as he is now blessed with a "four-wave garden."

Gi8LF is reorganising the shack, and building separate TX's for 7-14 Mc. and 1.75 Mc. in rack and panel. He only requires one more QSL to confirm his WAC on 10 watts. He was recently asked by a G: "Do Gi stations ever QSL?" The writer, with 12 years' experience of Gi work, has never before known this complaint to be made against Gi's as a group, nor does he think there are the least grounds for it now.

Gi5AJ now has A.C. mains, and has rebuilt the rig. Gi8PA is erecting a Windom plus reflector to work W, has returned to a 2-V-1 RX because of quieter background, and builds a modulometer. His new crystal frequencies are 7160, 7180, 7275, and 7185 kc. Gi2SB is struggling with D.C. mains, but looks for a QRA in an A.C. district. Gi5SJ has yet another new RX, and another new TX; the latter comprises two 6L6's and an 809, and has been tuned up for B.E.R.U. Gi8WD (ex-EI7G) is welcomed as an addition to our ranks; he also finds D.C. mains a handicap. Gi6HI is active again. It is with great regret that Gi's hear that Gi5SQ is quitting the game, but those who know him and his enthusiasm hitherto wonder if he can keep such a decision. We hope not, for he has been a staunch supporter of all that is best in amateur radio, and his help—particularly at N.F.D.—will be greatly missed.

The N.F.D. films were recently shown to a very appreciative R.T.U. meeting. One Gi has already sent the D.R. an intimation that he wishes to take part in 1938 N.F.D.; any others with New Year resolutions?

Channel Islands

By G8DO.

Activity in the Channel Islands still seems to be at a low ebb. This month we greet a new member, 2ASO, who is building his first transmitter for QRP working, using dry batteries.

G8MF is active and is enjoying very excellent DX, using a full wave Zepp. He has now worked all continents and is awaiting cards for confirmation.

2BTP is busily engaged in wiring his new QRA for electricity, so that radio will have to be shelved for a little while.

G8DO has experienced converter trouble, but hopes to instal a new machine in the near future. 2AIX is experimenting with the Jones exciter unit and obtaining good results.

BRITISH EMPIRE NEWS AND NOTES

British West Indies (Eastern Group)

By VP2AT (*via* W9RCQ and G6WY).

Conditions have shown some improvement during recent weeks on both 7 and 14 Mc. The annual "hook-up" of West Indian amateurs took place on Christmas morning, with VP6YB, 6MR, 6NW, 4TH, 2CD, 2TG and 2AT participating.

VP2TG contacted ZL1HY on December 31 at 6.45 a.m. Antigua time (23.00 N.Z. Time), so they carried on until midnight so that 2TG could wish him a Happy New Year.

Ceylon

By VS7RP.

VS7RP reports that 14 Mc. conditions have not been too good, probably due to the abnormal weather conditions experienced of late. Signals from VK have come in fairly well between the hours of 12.00 and 13.00 G.M.T. Also during these hours the American continents have been occasionally heard, but generally speaking signals have been weak, except from the Canal Zone. Between the hours of 15.30 and 16.30, African signals have been heard, but on an average the strength has not been more than S4. It is to be hoped that conditions will improve shortly. Telephony signals, however, from KA, XZ, VU and VS6 have been coming over quite well.

The writer once again appeals to other amateurs in VS7 to send in reports so that he can keep these notes going.

Eire

By EI9D.

Answering a call from G5BM on 3.5 Mc. the other evening we found EI5M, Lieut. Stewart, Royal Corps of Signals, late of Spike Island, at the microphone. He is enjoying a short leave before embarking for India and a new appointment. Having obtained 5M's instructions for the delivery of various 73s, and, if we must admit it, 88s, around Cork and Glengarriff, he told us that the call EI5M is being transferred to his successor on Spike, Lieut. R. Webb. To ex-EI5M and to EI5M, therefore, we offer congratulations, and look forward to contacts with both stations in the near future.

Around Christmas EI6F collected a communications type receiver, since when he has been active again on 14 and 3.5 Mc. EI9D thinks there is a lot to be said for Santa Claus after all.

Kenya, Uganda, Tanganyika and Nyasaland

By VQ4CRC.

South Africans are now coming through very well indeed, but Australians and New Zealanders cannot be contacted, despite long vigils and the loss of patience. The annoyance becomes all the more aggravated when one can hear South Africans working them!

The whole of Europe is almost outside the pale of VQ3 4 and 5 at the moment, and it is almost a thrill to contact a G.

VQ4CRE has been giving slow Morse Code transmissions for local potential amateurs, which transmissions are greatly appreciated by them. These transmissions have been picked up outside East Africa, and, considering that the 7 Mc. band for DX is almost dead, CRE was greatly pleased to receive a report on his signals from VS7.

Since the last notes were despatched VQ4CRB has proceeded on leave, and within a month from now VQ4CRR will also be on his way to "Blighty."

Malaya and Borneo

By VS1AA.

Not a single report to hand this month. VS2AG, who has returned from leave, had a pleasant personal QSO in Penang with VS1AA. VS1AA has finished a new oscillator, ECO/FD cum crystal FD cum tritet FD using an 802. Results are most satisfactory.

Conditions on 28 Mc. are very poor indeed. G2YL kindly note.

Malta

By ZB1E.

Throughout the whole of January conditions on both the 7 and 14 Mc. bands have been very poor, with only an occasional brief DX period, the 28 Mc. band being practically dead. Complete fade-outs have been observed at irregular intervals, sometimes lasting as long as two hours, and mostly in the evenings. Unless a great improvement in conditions takes place in February, BERU contest entrants in ZB1 will be disappointed.

ZB1C finds that increasing the L/C ratio greatly improves his new P.A.'s efficiency on 28 Mc., but renders it very difficult to neutralise. ZB1E is building an entirely new transmitter to work on 7, 14 and 28 Mc., and 1H is testing out his new P.A., using a pair of Ediswans in push-pull. ZB1J has has added a buffer stage on 14 Mc., and he is now able to drive his pair of tens to 90 watts' input with high efficiency. ZB1L is mostly on phone on 14 Mc., and 1R is exclusively on 7 Mc. CW.

We have pleasure to welcome G5BO, who is staying with us for some time and expects to be on the air with a ZB1 call soon.

New Zealand.

By ZL3AZ

The New Zealand Association of Radio Transmitters (Inc.) have just finished a highly successful year. The Association accomplished very much

for the amateurs during the year, and ended up with a creditable bank balance. Mr. L. G. Petrie, ZL2OV, who has been hon. secretary for the past three years, has gained a well-merited honour in being elected President for 1938. Not many amateurs in this country have done as much for the cause of amateur radio in N.Z. as ZL2OV. Headquarters for the year have been shifted to Dunedin, and indications point to their making an excellent job.

While the writer has been doing his best to contact one or two South Africans, ZL2QA has been making a meal of them. His contacts for October and early November were as follows :— SU1KG, FA8DA, SU2TW, CN8MI, SU1DB, ZT6R, ZS5U, ST2CM, VQ8AF, VQ8AS, VQ8AB, ZU2G, ZS2F. Think this is where we South Islanders retire !

The annual convention was held during the Christmas period at Dunedin, and by all accounts it was a highly successful affair. Visitors turned up from all parts of New Zealand, and quite an amount of business was done at the meeting.

Rumours have trickled in to the effect that ZL1GX, our latest B.E.R.U. member in this part of the world, has reached a total of 100 countries. He has been aiming at this for some time past, and our congratulations go to him on his fine performance, as it is not easy to amass a high total of countries worked, in N.Z. owing to its distance from the highly populated areas.

Like most others, the writer is busy chasing the spiders and moths out of the rig, and polishing up the tubes for the B.E.R.U. contest in February.

South Africa

Division One. Conditions on 14 Mc. during the first week-end of the S.A.R.R.L. DX contest were very poor ; this appeared to be fairly general throughout the Union.

We recently had the pleasure of meeting W8IGQ, who is travelling round the world in the yacht " Yankee." He gave some interesting high lights of the voyage at our last meeting.

ZS1AX is the latest to use a T20 in the final. He has also rebuilt his modulation for Class B operation with excellent results. ZS1H and ZT1B have not been heard for months. ZU1C has relinquished his licence and given up the game for good. ZS1AN, one of our most active DX men, had very little sleep during the S.A.R.R.L. DX contest.

ZS1B, ZS1AN and ZS1AX had the thrill of a QSO with ZL4DQ. ZL contacts here are very rare. ZS1A is on the air again with a new rig ; the final stage consisting of an RK2O.

ZS1B has received four cards from the States for supposed QSO's on 7 Mc. ; all four cards bear the same date, times being within the same hour. As ZS1B has not operated on 7 Mc. for at least a year the conclusion drawn is that some one is pirating his call.

ZS1B.

Division Five. Apologies for non-appearance of these notes last month.

Conditions generally have been very erratic 7 Mc. at times has been a complete wipe-out, other times QRN has been very bad, in fact, most evenings the band has been too noisy for the majority of listeners. The 14 Mc. band has been much quieter. 28 Mc. according to reports has been pretty dead.

Congrats to ZS5AK, whose 56 Mc. transmissions were reported to have been heard at Dundee, a distance of well over a hundred miles. ZT5R having rebuilt and redesigned his transmitter is again keeping daily skeds with ZU5Q and CR7AK.

ZS5U is " stirring the ether " with a very powerful signal.

ZS5Z is still active on 14 Mc. ZU5L is putting out first-class phone, his DX contacts and reports are very encouraging.

The following have also been active ZU5AC, ZU5D, ZT5V.

ZU5Q.

Division Six.—Members in this Division and elsewhere extend their sympathies to Mr. R. Wood, ZU6V, and Mr. B. Wood, ZT6AD, on the death of Mr. Wood, senior.

South African amateurs are keenly looking forward to the B.E.R.U. contests, hoping for improved radio conditions.

During January VK signals were practically absent, but ZLs could be heard about 20.00 G.M.T., and VEs at 24.00 G.M.T. Gs were weak, but workable between 16.00 and 19.00 G.M.T. VU signals, usually strong at this time of the year, have also been weak at 17.00 G.M.T.

ZU6C.

Egyptian Notes

The most noteworthy event this month has been the return from Europe of our Patron, SU1AM. Accordingly we take this opportunity of extending to him a most hearty welcome. He resumed amateur activities almost immediately, and as a result regular Sunday 'phone schedules are being kept on 7 Mc. Those participating are SU1AM, SU1RO, SU1SG and SU1WM. In this way a valuable link is being maintained between Cairo and Alexandria.

Another item of great interest was the arrival from America of Mr. Warner (W1EH) on board the Exeter. SU1SG and the writer went to the docks to meet the ship, but by the time his baggage had been attended to, little time was left (before the departure of the special train for Cairo) in which to talk about the forthcoming Conference. It is expected, however, to resume acquaintances again before very long.

General conditions have been very patchy. On 14 Mc. signals have been most inconsistent and QSB very troublesome. DX, as a result, has not been as good as it might have been. In sudden bursts, however, some good contacts have been made by various stations.

The 7 Mc. band has suffered in much the same way, signals swinging from S8 down to S2/3 in a very short space of time. In the late afternoons on this band, VK, J, and XU stations have been heard, but no contacts made as yet.

SU2TW has received his speech amplifier equipment and has been active on 14 Mc. 'phone. He is rather QRL these days, however, and in consequence has not been on the air very often.

SU1RO has built a special PP PA for the 7 Mc. schedules and is using 807's plate and screen

modulated. Some slight trouble is being experienced with the modulator, but in general everything seems to be working fairly well. SU1RK appears to be active again in the evenings, but no information is to hand from this station.

In Alexandria, SU1SG has not had a contact, except as outlined in the first paragraph, for some months. His energies are now concentrated in another direction and he finds no time available at all for QSOs. As editor of the "ERSE Bulletin" he is doing an admirable piece of work which everybody interested therein fully appreciates.

SU1RD has his final 804 stage working quite well as a plate and screen-modulated amplifier. Modulation is being effected by means of a special transformer which results in quite good quality. He is, however, handicapped by his aerial, a vertical doublet, which is not very high and is badly screened in certain directions. Very little space is available for the erection of a more suitable aerial, but an attempt to overcome this is being made in the near future.

SU1WM has been fairly active and when conditions have allowed, DX has been worked, including VK, ZL, W6 and 7, FR8VX, U0, U9, XE, AC4YN, VQ3 and LU. A station signing HAM, and giving the QRA of Budapest Airport, has been heard on both 7 and 14 Mc. and a contact on the latter band was made some days ago. The operator seems to be more commercial than HAM! "QSL direct" was requested. (See Month on the Air.—Ed.)

SU1WM.

Contemporary Literature

Compiled by L. Fryer (GM2FR).

Simple 160-Metre 'Phone. Frank C. Jones (W6AJF). *Radio*, January, 1938.

A single-dial control circuit using a 6C5 as crystal oscillator in a modified Pierce circuit and a 807 amplifier, with a carrier output of at least 25 watts for an input of about 40 watts.

The speech amplifier and modulator uses a 6D6, 76 and paralleled 6L6G's, the whole outfit being fed from one power supply giving 500 volts at 200 mA.

* * *

Improving the Performance of High-Frequency Receivers. Grote Reber (W9GFZ) and E. H. Conklin. *Radio*, January, 1938.

A discussion and brief description of the use of concentric line couplers in H.F. and Ultra H.F. receivers.

* * *

A Five-Band Exciter with Front-of-Panel Band-Changing. Donald W. Exner (W8ZU). *Q.S.T.*, January, 1938.

The points studied in the author's own order of importance are:—1, Safety; 2, Frequency stability; 3, 100 per cent. front-of-panel control; 4, Ease of adjustment; 5, Flexibility of circuit; 6, Economy of circuit components.

The circuit for normal operation is a tri-tet, but by means of a simple switching scheme it is readily converted to an electron-coupled oscillator, or by shorting the cathode tank circuit it becomes a conventional "pentode" crystal oscillator.

* * *

The Compact Uni-Directional Array. Walter Van B. Roberts (W3CHO). *Radio*, January, 1938.

The author describes an aerial system which he claims to put out a signal equivalent to that from a simple dipole using 3.6 times as much power. The theory of the arrangement is based upon a portion of a paper by G. H. Brown in the Proceedings of the Institute of Radio Engineers for January, 1937. The main point of interest is that when a single parasitic aerial is used, either as a reflector or director, the best spacing between the two is, contrary to general belief, only a little greater than a tenth of a wave-length.

Constructional details are given, and the theory of adjustment is discussed.

* * *

Compact Crystal Control on the Ultra-High Frequencies. Faust R. Gonsett (W6VR. *Radio*, January, 1938.

Description of a 56 Mc. crystal controlled transmitter using a 6A6 crystal oscillator and multiplier with a 28 Mc. crystal, 6A6 final amplifier and 6L6 modulator. The transmitter is built on a 7-in. by 14-in. metal chassis, and powered by any good receiver type power supply capable of delivering 350 volts at about 125 mA.

56 Mc. Crystal Control with 28 Mc. Crystals. J. M. Wolfskill (W8QKT). *Q.S.T.*, January, 1938.

The author, after brief references to the subject in general, goes on to describe two crystal controlled transmitters.

The first is a 'phone transmitter with an 18-watt output, using an RK34 as crystal oscillator doubler, another RK34 as a push-pull amplifier and a 6C5 speech amplifier with 6L6 modulator.

The second transmitter is a three-stage 60-watt output transmitter with 28 Mc. crystal, 6J5G oscillator, 6L6 doubler and 35T final amplifier, which can be modulated 100 per cent. with 100 watts input.

* * *

Circuit Elements in Modern Television Reception. Marshall P. Wilder (W2KJL). *Q.S.T.*, January, 1938.

An outline of the basic circuit considerations in the vision receiver, with an examination of the values of resistance, capacity and inductance used in the circuit, and the influence which, in conjunction with the characteristics of the valves used, they have on the performance.

CORRESPONDENCE

THE "OLD-TIMERS" DINNER

To the Editor of The T. & R. Bulletin.

Dear Sir,—The electro which was used to symbolise "Old-Timers" on both the dinner tickets and menu cards could appropriately be used by "Old-Timers" to embellish their QSL cards.

I therefore suggest that copies of it be made available to holders of transmitting licences dated 1919, at, say, 2s. 6d. each.

An appropriate symbol for holders of licences for the past ten years would, of course, be something similar, minus the whiskers and the deaf aid!

What do readers of The Bulletin think?

Yours very truly,

A. W. Knight (G2LP).

EDITORIAL—(*Continued from page* 405.)

goes on—ham radio will never die so long as the ham spirit exists. That we shall grumble about decadence and the retrograde practices of the prevailing year goes without saying, but we wager that when the Old-Timers Dinner takes place in 1948, those who survive until then, will feel, as the present Old Timers feel, that they are mighty proud to *be* Old Timers.

R. F. POWER AMPLIFIERS—(*Continued from page* 413.)

Fixed bias is required and, preferably, the grids should not be driven positive. Such an amplifier shows a straight-line relation between the amplitude of the excitation voltage and the aerial current, while a plate-modulated amplifier gives a similar relation between anode voltage and aerial current, and a suppressor-modulated pentode between suppressor bias and aerial current.

J. C.

TWELVE YEARS BACK — (*Continued from page* 438.)

QSL Bureaux all over the world, but there *was* a time, you young squirts, when they all had to be sent direct. G6BT, of course, developed the idea, and handled the first QSL Section of the R.S.G.B., which went through various stages before it reached its present highly organised state.

Another item that might be taken to heart by some of to-day's members: a letter complaining about the use of childish "radiese" instead of plain English in letters. No complaints about abbreviations on the air, but a definite yell about "tnx," "es," "cum," "nite," and the like in written correspondence. And justifiably so, I think, for the amateur in those days was supposed to be a serious-minded experimenter. Nowadays so many all-wave set owners hear him that they are under no such delusions, but he still doesn't help things if he writes letters that look as if they suffer from an outbreak of first-form spelling.

VALVE REVIEWS—(*Continued from page* 442.)

point would be served in publishing the curve taken.

It is evident from the characteristics that the valve would function very well in a super-regenerative receiver, and would also be useful for any purpose as a low power oscillator; practical tests showed that such is the case.

QRA Section

Manager: H. A. M. Whyte (G6WY).

New QRA's

G2IK.—G. C. Manning, 42, Norton Road, Knowle, Bristol, 4.
G2JJ.—W. A. Skinner, 44, Harley Street, London, W.1.
G2JN.—J. G. Stonestreet, 71, Lower Hillmorton Road, Rugby, Warks.
G2RX.—R. P. Reed, 78, Lady Margaret Road, Tufnell Park, London, N.19.
GW2UH.—E. A. Hayward, "Wyoma," 44, Llanishen Street, Cathays, Cardiff.
G2XM.—R. H. Davies, 78, Manor Road, Rugby, Warks.
GW3AJ.—W. H. Abraham, 9, Bridge Street, Abercarn, Monmouthshire.
G3AN.—Talbot Cribb, 55, Knighton Drive, Leicester.
G3AQ.—C. E. Sutton, 178, North Street, Coventry, Warks.
G3AU.—L. Metcalfe, 114, Welford Road, Shirley, near Birmingham.
G3AV.—R. L. Savage, 13, Park Farm Road, Kingston-on-Thames, Surrey.
G3AZ.—J. Hunter, 155, Kentish Town Road, London, N.W.1.
G3BG.—N. M. Button, Richmond Avenue, Breaston, near Derby, Derbyshire.
G3BP.—R. M. Garrett, 21, Woodside Avenue, Highgate, London, N.6.
G3BY.—J. W. Cropper, 10, Manor Street, Audenshaw, Manchester.
G3CI.—J. F. Davis, 10, Treherne Road, Brixton, London, S.W.9.
G3CK.—R. Cumberlidge, "Lyndene," Burnley Road, Moreton, Wirral, Cheshire.
G3CP.—J. W. Turnpenny, 62, Grey Friars, Stafford.
G3CU.—H. F. Knott, 108, Church Lane, Tooting, London, S.W.17.
G3CX.—F. E. Wingfield, 14, Gore Park Road, Eastbourne, Sussex.
G3CY.—M. Ryle, 5, Herschel Road, Cambridge, Cambs.
G3DB.—E. A. Luckhurst, c/o 37, Joyes Road, Folkestone, Kent.
G3DC.—G. W. Sands, jun., 127, Eccles New Road, Salford, 5, Lancs.
G3DF.—R. J. Bates, 5. Childebert Road, Upper Tooting, London, S.W.17.
G5DY.—W. H. Derry, 1a, Chelmsford Road, Woodford, London, E.18.
G5PA.—S. R. Deards, 38, Marlborough Road, Bedford, Beds.
GW5PT.—V. Plascott, "Lyndhurst," Windsor Avenue, Radyr, Cardiff, S. Wales.
G5UY.—D. B. Fry, Rosewarne, 1, Downlands Avenue, Bexhill-on-Sea, Sussex.
G5XL.—H. P. Townhill, 4, Ashlin Grove, Lincoln, Lincs.
G6BY.—W. E. D. Parker, 6, Temple Court, East Sheen, London, S.W.14.
GW6ON.—C. H. Warrington, Flat "F," Marine Hotel, Penarth Dock, Cardiff.
G6UT.—T. A. St. Johnston, "Normandale," New Barn Lane, Little Hallingbury, Essex.
G6XA.—H. J. Withers, 90, Warwick Street, Leamington Spa, Warks.
GM8AT.—W. M. Beattie, 46, St. Swithen Street, Aberdeen.
G8AX.—T. C. R. Littlemore, c/o A. Grief, Mattishall, Dereham, Norfolk.
G8BG.—E. W. Thompson, 24, High Street, Chislehurst, Kent.
G8DT.—F. N. Bedwell, Hillthorpe, 22, Leckhampton Road, Cheltenham, Glos.
G8FQ.—D. H. Halliday, 33, Burton Manor Road, Stafford.
G8IH.—Noel T. J. Bevan, 51a, Manor Court Road, Hanwell, London, W.7.
G8LB.—N. E. Baker, "Langley," 72, Arle Road, Cheltenham, Glos.
G8RH.—J. A. Jagger, Send cards to R.S.G.B.
2AFO.—N. A. Owen, 19, Northampton Road, Broughton, Kettering, Northants.
2AIQ.—H. Barnett, 99, Auckland Road, Potters Bar, Middlesex.
2AMN.—E. Mallinson, 10, Brick Row, Siddal, Halifax, Yorks.
2AOI.—L. G. Spencer, 43, Rokeby Drive, Kenton Lane, Newcastle-upon-Tyne, 3.
2AJF.—W. J. Ridley, 27, Writtle Road, Chelmsford, Essex.
2AXH.—H. A. Woods, 92, Yewtree Drive, Blackbury, Lancs.
2BMV.—D. F. Waddington, 7, Court Drive, Sutton, Sy. (Reported incorrectly as 2BUV in January Bulletin.)
2BPX.—L. A. Reynolds, 6a, Queen's Place, Pulteney Road, Widcombe, Som.
2BTP.—F. S. le Pavoux, "Newlands," Rue Maze, St. Martin's, Guernsey, C.I.
2CIA.—E. F. Cranston, 39, Baden Road, Brighton, 7, Sussex.
2DBT.—G. Sanderson, 5, Saville Road, Chadwell Heath, Essex.
2DCK.—K. Thompson, 8, Holland Park, Knock, Belfast, N.I.
2DCT.—G. T. Sparkes, Lamerton, Swindon Road, Horsham, Sussex.
2DCU.—Leslie Turgill, 147, Cricklewood Lane, London, N.W.2.
2DDA.—R. C. Philpot, 54, Moorland Road, Scarborough, Yorks.
2DDH.—H. R. Durrant, 89, Longbrook Street, Exeter, Devon.
2DDI.—Ian G. Campbell, 106, Seacliffe Road, Bangor, Co. Down N.I.
2DDL.—T. W. Limmer 12, Tudor Gardens, Leigh-on-Sea, Essex.
2DFF.—A. D. Whitehead, 35, Higher Swan Lane, Bolton, Lancs.
2DFJ.—G. J. Carpenter, 259, Ladbroke Grove, London, W.10.
2DFK.—G. R. Cox, 35, Victoria Street, New Sawley, Long Eaton, Notts.

Cancelled: G2SX, G2WI, G5IR, G5IW, G5SZ, G6AW, G6HD, G6NT, G6OA, G6SB, G6SP, G6WF, GM8LR, 2ABR, 2ALL, 2ASI, 2ASN, 2ASU, 2AVY, 2AZO, 2BBG, 2BFD, 2BGZ, 2BHT, 2BIG, 2BIL, 2BIU, 2BJL, 2BKB, 2BMK, 2BSR, 2BVI, 2BVM, 2CBK, 2CCJ, 2CDI, 2CFO.

Scotland "H" District Annual Dinner

"H" District, one of the most recently created Scotish Districts, held its second Annual Dinner on January 22, 1938, in the Station Hotel, Kirkcaldy. A company of 25 were received by Mr. Andrew Lawson (2ANL), the District Officer. Following an excellent dinner, a brief Toast List was submitted. Mr. Lawson read, amid acclamation, the text of a telegram which he had dispatched in the name of the district to the "Old Timers' Dinner" which was being held concurrently in London. It was also announced that the District's application for transmitting facilities had been favourably received by the Post Office.

District H Dinner held at Kirkcaldy on January 22, 1938, GM6ZV, Scottish Records Officer, fourth from left.

The toast, "'H' District," was proposed by Mr. D. M. K. Harrower (GM6NX), who complimented the district on the big strides made during the past year. Mr. Lawson replied suitably. Mr. J. Millie (GM8MQ) gave the toast "Our Visitors," which was replied to by Mr. S. W. Rowden (GM6SR), who thanked the district for their hospitality. An impromptu toast, "Andrew Lawson, District Officer," was proposed by BRS209, Mr. L. Welsh, who pointed out how much of the success of the district was due to the efforts of Mr. Lawson in his capacity of District Officer. Mr. Lawson responded and thanked the members for their support of his efforts. When an official photograph had been taken, the members met in a social capacity, each member contributing to the programme. A very successful and happy evening concluded after two hours of song and story by singing of "Auld Lang Syne."

Ham Movements

Mr. A. R. Gilding, ex VS8AJ, VS1AJ, and BERS 311, is now licensed under the call VU2EO, and is operating on 14075 kc. from the R.A.F. Station, Ambala, Punjab.

Letters to the Editor

Owing to pressure on space several interesting letters have been unavoidably held over from this issue. We hope to publish them next month.

EXCHANGE AND MART

(Continued from Back Cover)

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