THE T&R

BULLETIN

A JOURNAL FOR

RADIO EXPERIMENTERS

Vol. 14 No. 10 APRIL 1939 (Copyright) Price 1/6

G5NI ANNOUNCES—

a New Ultra H.F. Transmitter —the HX56

Note the Specification :—

OWING TO THE INCREASING INTEREST IN THE HIGH FREQUENCY BANDS, THIS TRANSMITTER HAS BEEN DESIGNED TO HAVE MAXIMUM EFFICIENCY FROM 14 Mc. UP TO AND INCLUDING 120 Mc. IT WILL OPERATE ON 7 Mc., BUT TUNING CAPACITIES ARE SUCH THAT ONLY SPOT FREQUENCY OPERATION CAN BE HAD ON THIS BAND.

Specification :—

The transmitter uses a total of 18 tubes, and is complete with all refinements for high frequency operation The latest type tantalum anode power amplifier tube is neutralised and operates Class C on all bands up to 60 Mc. with high efficiency. High fidelity modulator and speech amplifier with a total of seven tubes in phase-inversion circuits gives an extremely high gain, allowing any type of crystal microphone to be used with excellent fidelity. No less than six mains transformers are used, providing well-regulated power for the whole of the transmitter, and mains bias is used throughout. The whole transmitter is housed in a crackle-finished Cabinet, relay rack size, and has five first-grade moving coil instruments, so that operation can be checked at all times. Input wattage to 78 watts.

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Kit of 18 Tested Tubes for same.....**11 gns.**
Crystals and Coils for other Bands extra.

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THE T. & R. BULLETIN

OFFICIAL JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN

DEVOTED TO THE SCIENCE AND ADVANCEMENT OF AMATEUR RADIO

Hon. Editor: A. O. MILNE

Secretary-Editor: JOHN CLARRICOATS

Advertising Manager: HORACE FREEMAN

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CONTENTS

BRITISH THROUGHOUT

IT is doubtful whether the devotees of any scientific hobby have been so dependent upon foreign-made gear as have been the radio amateurs of Great Britain. This unfortunate state of affairs has been due almost entirely to the lack of appreciation, by certain manufacturers, of the amateur market.

Year after year such concerns have been content to allow thousands of pounds of good English money to find its way into the coffers of American and Continental factors (chiefly, let it be emphasised, through British agents), when by a vigorous attitude they could have produced and supplied goods at least on a par with, and probably better than, those being imported from abroad.

Since our Editorial comments on this subject a year ago, there have been increasing signs of that "Real Co-operation" we mentioned at the time, but we consider that even greater efforts should be made to bring back confidence in British products.

Our own rather lone voice cried for years in the wilderness whilst the mad rush to go "all foreign" continued. Is it yet too late for other British radio publications to join us in a united appeal to Buy British?

The Advertising Questionnaire enclosed with our last issue has confirmed, if confirmation was necessary, that during the past few months hundreds of foreign valves and dozens of foreign-made commercial superhets have been purchased by our members. The final analysis of the forms will undoubtedly show up still more clearly that the British amateur is more concerned in saving a few shillings on a foreign valve than on supporting the home trade. This attitude seems strange because British valves are made to last, as every old-timer will agree; further, from our own knowledge of the performance of such valves, we are confident that they are as efficient as the foreign counterparts, which they are intended to supersede. We agree, certain foreign valves *were* designed specifically for amateurs, but many others were not. By one of those queer twists of fate, a great many foreign valves have become generally accepted as "the last word," when a British valve, properly designed for amateurs, has been allowed to pass unheeded.

The receiver position, we admit frankly, is difficult. Not one of our manufacturers, judging by the replies to our Questionnaire, has been able even to scratch the surface of the market.

Yet that market exists, for 50 per cent. of those who returned the form intimated that they would be interested in a British-made superhet in the £25-£30 category. This, in spite of the fact that most of those who answered the question had purchased an American superhet within the past 14 months.

We appreciate that tool costs and development charges are the major difficulties in the way of the production of a receiver which would sell at around the price suggested, but with the knowledge that the demand exists, and that it is daily increasing, surely one of our larger radio firms could set about the task, even if it meant reduced profits for the first year.

As a point of some interest, a well-known British importer of American apparatus informed us recently that more than half of the receivers he handles, are sold to people who are not amateurs in the accepted sense of the word.

The component market, fortunately, is much brighter, and he must surely be a pernickety amateur who finds himself compelled to buy foreign coils, condensers and resistances, to mention a few of the items necessary for a modern transmitter.

Within the pages of this issue we present a description of a transmitter which is British Throughout. Not a single foreign-made component or valve has been included, yet we venture to say that its efficiency is at least comparable with any transmitter built-up around foreign material. The design is not fanciful, it was never intended that it should be, but it is one which we believe will appeal to many of our members who are looking, as we have been looking, for something that is not a slavish copy of those commercially produced instruments which have commenced to grace some British shacks.

We feel convinced that the average British amateur would be prepared to support home industries providing he could be assured that the radio trade would reciprocate.

Reciprocation must, we suggest, take two forms. First, manufacturers must be prepared to reduce prices to a level comparable with foreign-made material; second, they must be prepared to spend money in advertising their products.

Time after time we have given invaluable publicity to certain British valve and component manufacturers without receiving more than the merest semblance of advertising support. Whilst, in the interest of our members, we believe our actions have been justified, the time is fast approaching when *Quid pro quo* must be our motto.

How can certain British manufacturers—valve-makers in particular—hope to capture the amateur market in this country unless they are prepared to advertise *regularly*?

The undeniable success which has come to the manufacturers of foreign valves and receivers can be attributed primarily to intensive advertising, coupled with the fact that they have been able to instil such confidence into their customers that they have given them gratuitous publicity by enthusiastically recommending their purchases to other amateurs.

We wonder how many of our own manufacturers appreciate the subtle, yet quite legitimate, publicity which is given by transmitting amateurs during contacts, when they go to great pains to explain in minute detail the gear they are using?

Do our valve-makers realise that many thousands of a certain well-known brand of beam power valve have been sold as a result of this subtle selling medium? And what of the receivers? We believe that at least half of the American receivers in use by British amateurs have been sold through recommendations made over the air.

If our manufacturers would understand the value of both direct and indirect advertising, we are confident that before long the oft-asked question "What gear are you using?" would be answered in two words, "British Throughout."

OUR APPEAL ANSWERED

Just as we go to press the welcome news reaches us that two British-made amateur bands receivers are becoming available. We offer congratulations to the Companies concerned.

J. C.

An All-British Three-stage Transmitter

Covering 7, 14 and 28 Mc.—Telegraphy and Suppressor-grid Modulation

By S. BUCKINGHAM (G5QF) and J. CLARRICOATS (G6CL)

Foreword

THE intention of the designers has been to construct a transmitter made exclusively of British components and valves. With an increasing tendency to use foreign apparatus, it is hoped the description which follows will convince members that equally good results can be obtained by supporting Home Industries.

Transmitter Layout

Before offering a design embodying new valves and components many pros and cons had to be considered, the most important perhaps being that of layout. Fashion seemed to point to a rack and panel, but having examined many such arrangements it was thought that for the average amateur this method would be unsatisfactory, because of the dust problem. A further point considered was that however skilful the layout, some difficulty is invariably experienced in effecting adjustments or making alterations behind a rack.

The exposed bread-board method was excluded on the score that no protection against dust or accidental contact is given; furthermore, a design of this type could scarcely be described as "modern."

After careful consideration it was decided to employ an oblong aluminium cabinet for the transmitter proper, constructed in such a manner as to provide sufficient room for all components to be mounted in single chassis style, but which would be completely enclosed, except for vent holes in the back. Such a design enables coils and other components to be changed at will without difficulty; additionally, it allows all small components to be mounted on the under side of the chassis, thus leaving the top deck clear for the tuned circuits and associated wiring.

The aluminium cabinet was constructed to specification by *E. Paroussi* and its general dimensions are given in Fig. 1. The sloping front panel, besides improving the appearance, allows the meters to be read at a wide range of viewing angles.

The cabinet is divided into two sections, the left-hand portion containing the crystal oscillator and frequency multiplier circuits, whilst the right-hand portion houses the final amplifier plate circuit components.

A $1\frac{3}{8}$-in. hole is drilled through the partition for the power amplifier valve, the grid tuning circuit of which is included in the left-hand section.

The holes for the five meters will of course be made to suit the type used, but in the actual design described the holes were cut to accommodate *Ferranti* flush-type mounting, moving-coil instruments.

A protecting lid covers the top of the cabinet.

Power Supplies, Grid Bias and Modulator

The problem of housing the power supplies and grid bias batteries was considered from three main angles. First, and most important, safety; second, accessibility; and third, effective screening.

After a good deal of thought it was decided that the most suitable method would be to employ a steel cupboard fitted with one shelf and doors, the side panels and back being enclosed with steel mesh, to allow heat to be dissipated. This cabinet was also made by *E. Paroussi* and its general dimensions are given in Fig. 2.

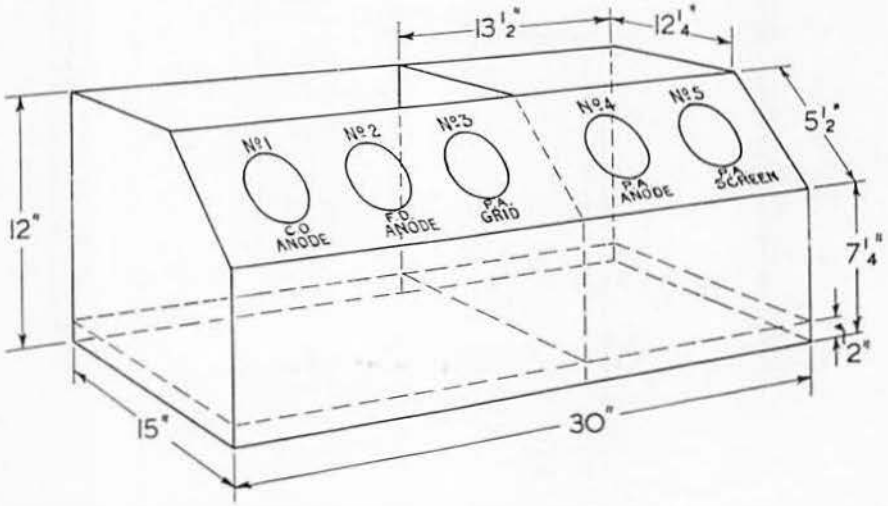


Fig. 1.—Sketch of the Transmitting Cabinet shown without protecting lid.

In addition to housing the power packs and bias supplies for the transmitter, the steel cupboard accommodates a three-stage resistance capacity-coupled amplifier (used for suppressor-grid modulation) and its associated power supply.

The height of the completed equipment measured from the floor to the top of the transmitter panel is 36 ins., the width is 15¼ ins., and the length 30 ins.

The photographs illustrate the assembly and layout of apparatus.

Valves for R.F. Stages

In considering a design which would embrace certain of the new British R.F. valves, care had to be exercised in the direction of substitution. For example, it would have been unwise to specify an equivalent to a popular American type, if the pin arrangements and filament voltages had been different. In point of fact the valves chosen are to all intents and purposes exact equivalents, and American substitutes can be used without any change of layout or design.

For the early stages *Tungsram* Beam Power valves have been used, whilst a *Standard Telephones* Type 4052A is employed as the final amplifier.

Although it had originally been planned to use 6L6G valves in the crystal oscillator and frequency multiplier positions, experiments have shown that the smaller counterpart, namely, the 6V6G, is entirely satisfactory, more than sufficient drive being available to excite the grid of the final valve on all amateur frequencies up to 30 Mc.

The 4052A is an R.F. Pentode and its inclusion was decided upon in order that the simplest method of modulation (suppressor grid) could be employed. This valve has excellent characteristics and is among the most efficient of modern valves for operation up to 30 Mc.

Rectifier Valves

For the pack delivering power to the first two stages an *Osram* MU14 Full-wave Rectifier has been used, while for the final amplifier power pack a pair of *Tungsram* RG250/3000 Mercury Vapour Rectifiers are employed.

Frequencies Covered

From the outset of the development it was intended that the transmitter should operate on the DX bands, 7, 14 and 28 Mc., but the 3.5 Mc. band can also be covered by introducing an air-spaced fixed condenser of about 100 $\mu\mu$F across the condenser (C4) shown in the wiring diagram Fig. 3, and by using an *Eddystone* coil former Type 1090 wound to full capacity.

The Crystal Oscillator

Until recently the popular Tritet circuit, which is used in this design for the Crystal Oscillator, required a pentode for its operation, but the new Beam valves now available have been found to be equally efficient, and in addition their use is made less complicated by virtue of the fact that one electrode is dispensed with.

The Tritet arrangement besides being simple in operation, and reasonably foolproof, is above all highly efficient. The theoretical aspects of this circuit are fully dealt with in *The Amateur Radio Handbook*.

The screen grid of the 6V6G, in conjunction with the crystal and control grid, acts as a triode crystal oscillator, and its plate circuit is tuned to either the fundamental or harmonic of the crystal. In the former case, it is essential that the cathode coil should be shorted out, as the screening between the plate circuit and crystal is poor, consequently self-oscillation becomes possible, which would then

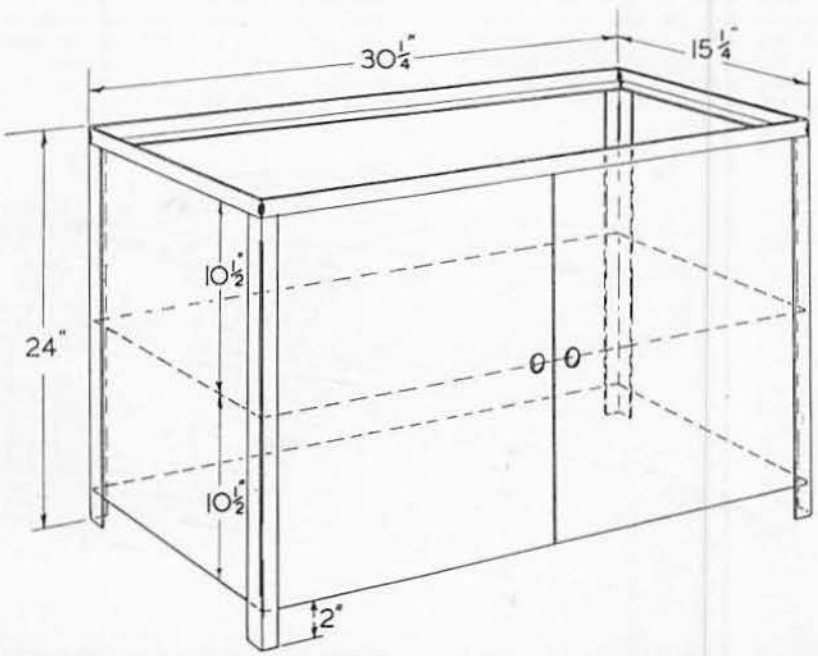


Fig. 2.—Sketch of Steel Cabinet for housing Modulator, Power Supplies, Grid Bias and Suppressor batteries.

result in the crystal becoming damaged due to excessive heating. The cathode coil (L1) consists of 10 turns of 20 S.W.G. enamelled wire close wound on a 1-in. diameter Paxolin former, tuned by an 85 μμF *Eddystone* Apex condenser. This has the edge of one of its fixed vanes slightly bent inwards to short-circuit the coil when the condenser is fully in mesh, thereby permitting safe operation of the crystal on its fundamental frequency.

The Frequency Multiplier

When it is desired to operate the power amplifier on either the fundamental or second harmonic of the crystal oscillator, it is unnecessary to use a frequency multiplier stage. In the first instance the crystal (provided the cathode coil is shorted) will deliver sufficient drive to the grid of the final stage for full rated operation, whilst in the second instance the Tritet feature of the C.O. circuit provides a strong second harmonic output.

For operation on frequencies higher than the second harmonic of the fundamental a frequency multiplier is essential, and in the circuit under discussion this takes the form of a *Tungsram* 6V6G which is capacitatively coupled to the crystal oscillator *via* C6. By biasing the F.M. stage to Class C the harmonic output is of a high order. Under this condition, it is possible to quadruple with ease from 3.5 Mc., the multiplier delivering sufficient power to drive fully the final amplifier on 14 Mc. For 28 Mc. operation a 7 Mc. crystal should be used in the Tritet arrangement and the frequency multiplier used as an ordinary doubler.

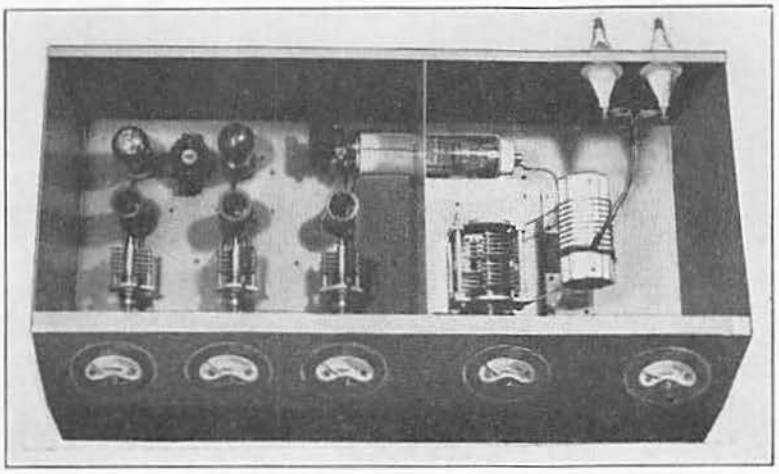
It is possible to quadruple from 7 Mc. to 28 Mc., but the method is not recommended as the ratio of input to output power is somewhat lower than under the conditions for 3.5 Mc. to 14 Mc. operation.

TABLE 1

C.O. stage		Frequency Multiplier on :—	Power Amplifier Frequency on :—
Fundamental of Crystal	Tritet		
3.5 Mc.	—	7 Mc.	7 Mc.
3.5 Mc.	—	14 Mc.	14 Mc.
7 Mc.	—	—	7 Mc.
7 Mc.	14 Mc.	—	14 Mc.
7 Mc.	—	14 Mc	14 Mc
7 Mc.	14 Mc.	28 Mc.	28 Mc.

Link Coupling

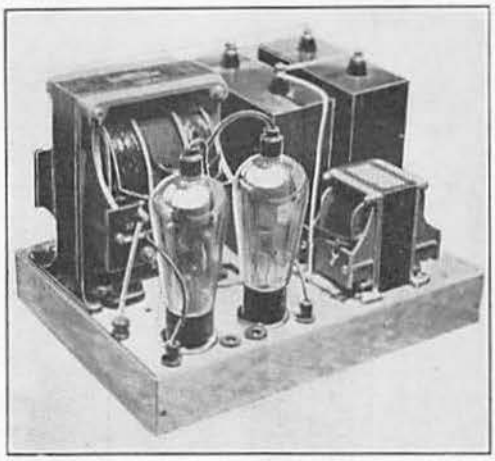
A special method of link coupling between the grid of the final amplifier back to the pre-stages has been devised, whereby the P.A. can be driven from either the frequency multiplier or crystal oscillator stage. The method is illustrated in Fig. 4.



Plan view of transmitter showing location of components.

Note Bulgin coil screen for 4052A valve.

This arrangement has the advantage that by using either 3.5 or 7 Mc. crystals the power amplifier can be operated on 7 or 14 Mc., giving a variety of operating frequencies in these two bands. The six different combinations made possible are set out in Table 1.



The P.A. Power Pack.

For telegraphy operation, especially when primary keying is used, it is advantageous to disconnect one of the 4 μF. condensers in order to avoid lag on the signals. Note the arrangement to enable the output voltage to be varied, by means of plugs, from 1250 to 750 volts.

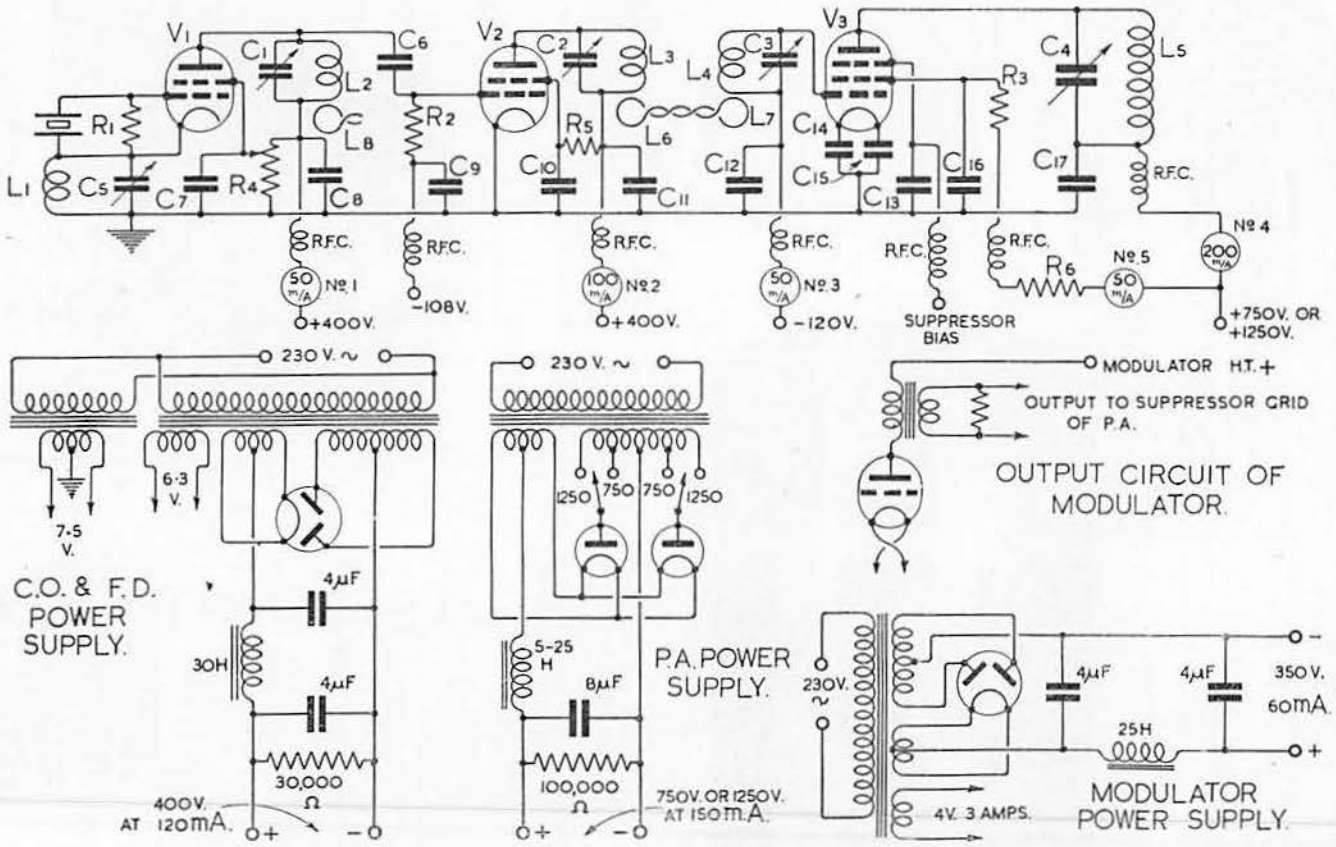


Fig. 3.—Circuit Diagram of Three-stage Transmitter, and Power Packs.

Keyed Components, for Transmitter.

C1,2, 3.	*40 μμF, Raymart, TC. 40.*
C4.	*50 × 50, μμF, split stator, Eddystone, 1081.*
C5.	*85 μμF Midget, Webb's Apex.*
C6.	*.0001 μF, Mica, T.C.C. 340.*
C7-15.	*.001 μF, Mica, T.C.C. 340.*
C16.	*.006 μF, Mica, T.C.C. 340.*
C17.	*.002 μF, Mica, T.C.C. 1,500-v. working.*
R1, 2.	*50,000 ohms, 1 watt, Dubilier.*
R3.	*50 ohms., 2-watt, carbon, Dubilier.*
R4, 5.	*25,000 ohms., 20-watt, variable, Bulgin, PR14.*
R6.	*2—15,000 ohms., 40-watt (in series), Bulgin, PR37.*
RFC.	*R.F. Chokes, Eddystone 1010.*
L1-8.	*See tables and text.*

Final Amplifier

The valve used for this stage, as previously mentioned, is a *Standard Telephones* 4052A Screened R.F. Pentode. Quoting from the maker's specification, we find that this is a filament type of valve for use as a suppressor-grid modulated oscillator or R.F. amplifier. Approximately 1 watt of R.F. power is required for excitation when operated as an R.F. amplifier and less than 1 watt of audio power is sufficient for 100 per cent. modulation using the suppressor-grid method.

The approximate direct inter-electrode capacities are :—

	μμF
Plate to control grid	.012
Input (control grid to filament and screen)	11
Output (plate to filament, screen and suppressor grid)	10

The makers recommend that battery bias should be used on the control grid, but a resistance in series with the battery can be used to develop additional bias voltage if desired. Filament centre-tap resistance should on no account be used.

In practice it has been found satisfactory to earth one side of the filament on the valve base, although the method shown in Fig. 3, which is the most conventional, will prove equally effective.

The input circuit should be adjusted for the lowest D.C. control grid current, with sufficient excitation to provide the rated output. Although the makers recommend that this should be in the order of 10 milliamps., it has been found for telegraphy operation that rather better outputs are obtained by increasing the drive very slightly in excess of this figure and by using positive suppressor bias.

It is essential that the valve shall be screened strictly in accordance with the maker's recommendation by the use of a shield which fully encases the base and extends up to the lowest internal electrode. Unfortunately no British component manufacturer has, as far as is known, marketed a suitable screen for valves of the 4052A type, consequently it became necessary to modify a *Bulgin* Type 958 X159 Coil Screen, as shown in Fig. 5. It is understood that the makers are prepared to supply a screen made to our specification.

For mechanical reasons it was found desirable to mount the valve in a horizontal plane. This method facilitates wiring and enables the leads from the tuned circuits to be kept short, which is essential for successful 28 Mc. operation.

After extensive bench tests it was found that a carbon resistance of 50 ohms (R3), placed in the screen lead as close to the valve pin as possible, effectively overcame any tendency for spurious oscillations when the valve was operated at 28 Mc.

Other Components for Transmitter.

Clix. *10 All in Terminals.*
1 4-pin chassis mounting valve holder, V1.
2 7-pin chassis mounting valve holders, V2.
2 Octal chassis mounting valve holders, V4 (American).

Eddystone. *4 Instrument Dials, 2¾ ins., 1097.*
4 Extension control outfits, 1008.
4 Frequentite coil formers, 1090.
3 Adjustable insulated brackets, 1007.

Ferranti. *3 Flush-mounting moving-coil meters, 0-50 mA. (Nos. 1, 3 and 5 in diagram).*
1 Flush-mounting moving-coil meter, 0-100 mA. (No. 2 in diagram).
1 Flush-mounting moving-coil meter, 0-200 mA. (No. 4 in diagram).

Raymart. *6 6-pin coil formers, threaded, CT6.*
3 4-pin coil formers, threaded, CT4.
5 Insulators, SS.
3 Kits of plugs and sockets, CPS.
2 Stand-off Insulators, SX.
2 Lead-in Insulators, SCL.
1 5-pin valve-holder, VA5 (American).

Standard Telephones. *1 4052A R.F. Pentode (V3).*

Tungsram. *2 6V6G (V1, V2).*

Cabinet work, E. Paroussi.
Crystals in enclosed holders, Brookes Measuring Tools.
Screen can, Bulgin, 958×159.

Components for Crystal Oscillator and Frequency Multiplier Power Pack.

All Power Transformer Co. *1 30-henry choke, 150 mA.*
1 H.T. transformer (Universal input).
400-0-400 v., 120 mA.
2-0-2 v., 2 amps.
6.3 v., 2 amps.
1 L.T. transformer (Universal input).
7.5 v., 3 amps. C.T.

Clix. *7 All-in terminals.*
1 4-pin valve-holder, V3.

Miscellaneous. *2 4μF, T.C.C., type 95.*
1 30,000-ohm., 40-watt, Bulgin, PR39.
1 MU14 Rectifier, Osram.

Chassis, E. Paroussi.

Components for Power Amplifier Power Pack.

All Power Transformer Co. *1 5-25-henry swinging choke.*
1 H.T. transformer (Universal input).
1250, 750-0-750, 1250-v., 150 mA.
1.25-0-1.25-v., 10 amps.

Clix. *7 All-in terminals.*
2 4-pin valve-holders (American).

Miscellaneous. *2 4μF, 1500-v. working, T.C.C.*
2 R.G. 250/3000 rectifiers, Tungsram.
1 100,000 ohms., 40-watt, Bulgin, PR44.

Chassis, E. Paroussi.

For details of the modulator see T. & R. Bulletin, March, 1938, or The Amateur Radio Handbook (1st Edition), pages 124-125.

The screen and suppressor by-pass condensers (C13 and C16) should be mounted as close to the valve pins as possible. Both of these condensers must be of the good quality mica type, and it is essential that all other fixed condensers should conform to the same standard.

The screen voltage supply is obtained through a pair of *Bulgin* 40-watt 15,000-ohm power resistances connected in series, and the taps adjusted to give a screen current within the limits specified by the valve manufacturers, *e.g.*, 37 mA. This method of applying screen voltage is to be recommended in preference to the potentiometer method for the reason that it prevents the screen voltage being applied before the anode voltage.

In considering the design of the power amplifier plate tank circuit it was realised that the type of variable condenser suitable for operation on 28 Mc. would require to possess a very low minimum capacity, in view of the somewhat high plate-earth capacity of the valve (which is in the order of 10 μμF). Experiments with various types of British-made transmitting condensers showed that their minimum capacity was in the region of 10-15 μμF, consequently if used in a single-ended circuit the minimum capacity across the inductance would be 20-25 μμF. As a result it was decided to employ an *Eddystone* Type 1081 split-stator condenser connected *in series* across the inductance, thereby reducing its minimum capacity to about 3 μμF. This permitted a reasonable amount of inductance to be used. Furthermore, such a condenser will facilitate push-pull operation if this arrangement is used at a later date.

TABLE 2.

Crystal	L2	L3	L4	L5	Output
3.5 Mc.	34	18	18	17	7 Mc.
7 Mc.	18	9 *	9 *	9 *	14 Mc.
7 Mc.	9 *	4 *	3 *	3 *	28 Mc.

* Double-spaced.

All coils except L1 and L5 (the P.A. plate tank) are wound 14 threads per inch and link windings (L6, 7, 8, 9) are 1½ turns. All coils are wound with 20 S.W.G. enamelled wire, except the P.A. tank coils, which are wound with 14 S.W.G. bare copper.

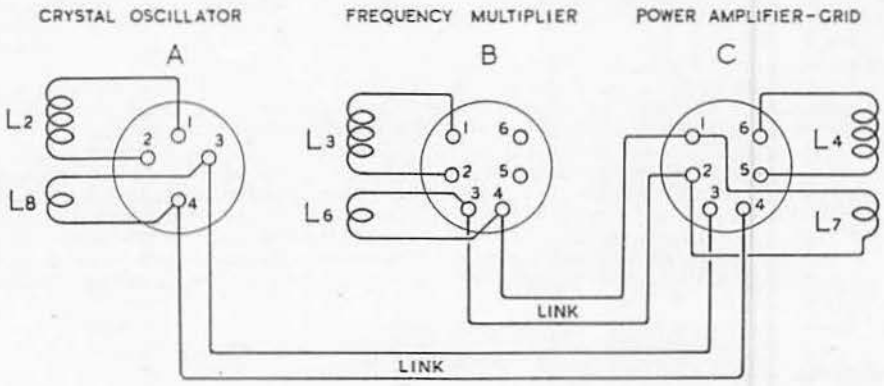


Fig. 4.—Method of Link Coupling when Frequency Multiplier is in use.

When the transmitter is operated direct from the C.O. stage a coil (L9) is used in position C, which has the link winding connected to Pins 3 and 4 instead of 1 and 2, as shown above.

Coil Data

The coils for the crystal oscillator (L2), frequency multiplier (L3) and grid circuit of the PA (L4) are wound on *Raymart* formers in accordance with the winding specification given in Table 2. The plate tank coils (L5) are wound on *Eddystone* Frequentite Formers, Type 1090.

Aerial Coupling

A pair of *Raymart* Lead-in Insulators, Type SCL, have been mounted at the rear of the P.A. compartment to enable a feeder line to be terminated. It is not proposed to discuss aerial coupling methods in detail, but it can be stated that a one or two-turn link has proved an effective method of coupling the transformer to a voltage-fed Zeppelin aerial system.

Keying Methods

Several effective keying methods are possible with this type of transmitter. These can be enumerated as (*a*) Screen keying, (*b*) Cathode keying, (*c*) Primary keying. Keying Methods are fully covered in *The Amateur Radio Handbook*, to which publication the reader is referred.

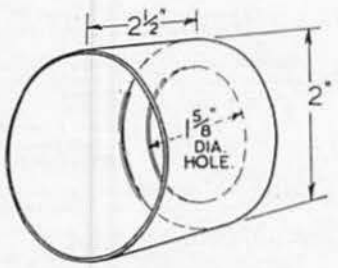


Fig. 5.—Method of modifying Bulgin Coil Screen.

Metering

The five *Ferranti* flush-type mounting meters included in the layout are connected in the following circuits :—

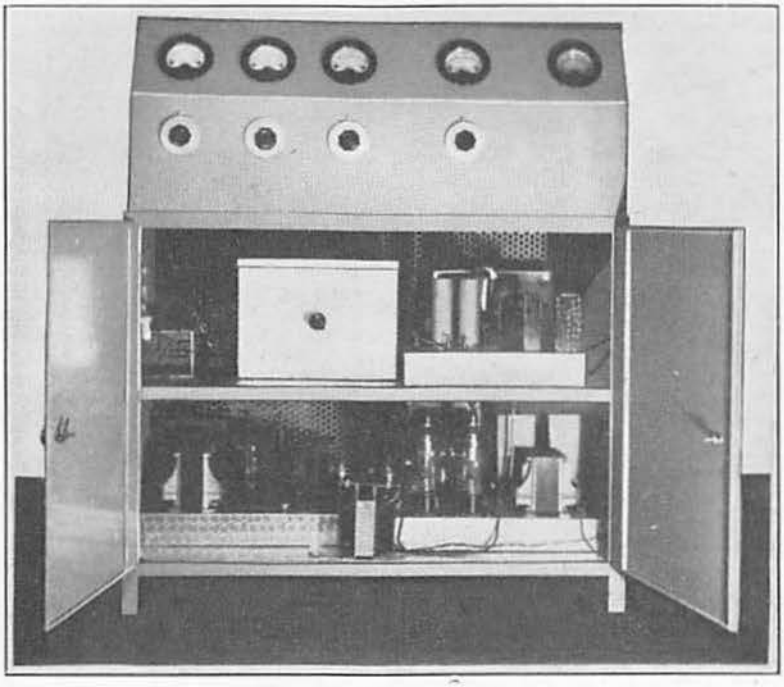
No. 1. Plate of crystal oscillator (0-50 mA.).
No. 2. Plate of frequency multiplier (0-100 mA.).
No. 3. Grid of power amplifier (0-50 mA.).
No. 4. Plate of power amplifier (0-200 mA.).
No. 5. Screen of power amplifier (0-50 mA.).

Meters in the P.A. circuit are essential, but for the previous stages a plug-in method could be used.

crystal is operated on its fundamental frequency, the cathode coil must be shorted.

For 14 Mc. operation three alternative methods are available, as shown in Table 1, whilst for 28 Mc. operation it is desirable to use a 7 Mc. crystal worked in a Tritet arrangement the output of which is then doubled to 28 Mc.

It is imperative that a good absorption wavemeter should be available when adjusting the Tritet and multiplier circuits, as it is surprisingly easy, with modern multi-electrode valves, to " take



Front View of Complete Equipment.
Transmitter proper at top, modulator on first shelf with associated power supply. Bottom shelf houses C.O. F.M. power pack on the left and PA pack on right. Centre transformer at bottom supplies filament volts for RG 250/3,000 rectifiers to permit primary keying.

C.W. Operation

It will be seen from the general wiring diagram (Fig. 3) that the two main power packs are arranged to deliver 400 volts for the C.O. and F.M. stages, and alternatively 1,250 or 750 volts for the P.A. stage. For initial tests the final amplifier should be operated at 750 volts, or lower, if facilities are available.

Preliminary radiating tests should be carried out on 7 Mc. as this is the most suitable band from which to obtain local reports concerning tone and keying.

Assuming it is decided to employ a 3.5 Mc. crystal for 7 Mc. operation, the C.O. is then used as a straight oscillator and its output is taken direct to the F.M. stage. In this case the cathode coil must be shorted out.

When a 7 Mc. crystal is used for fundamental operation its output is taken direct to the grid of the P.A. and the power supply to the F.M. valve is disconnected.

It should again be emphasised that when a

out " the wrong harmonic. If it is found that grid drive is excessive this should be reduced by slackening off the link coupling.

In Table 3, given overleaf, current values obtained in practice have been set out for the guidance of those who build the transmitter and adhere closely to the component specification.

Telephony Operation

By using suppressor-grid modulation a comparatively simple modulator may be employed. Readers interested in adopting this transmitter for telephony operation are referred to the article published in the March, 1938, T. & R. BULLETIN entitled " A Speech Amplifier for Suppressor Grid Modulation." This amplifier, which is of the resistance-capacity coupled type, will be found entirely satisfactory, but attention must be paid to screening. All leads from and to the speech amplifier must be screened and bonded together to a direct earth.

A transverse current microphone is suitable, and in this connection the reader who wishes to dispense

with the annoyance of maintaining a polarising battery should study the method, described in the article referred to above, of obtaining energising current for the microphone by means of a potentiometer connected across the main power supply.

This particular amplifier is also described in some detail in *The Amateur Radio Handbook*, pages 124-125, to which publication the reader is referred.

For satisfactory telephony operation the suppressor-grid voltage must be carefully selected. In general, the amount of negative bias required should be such as to reduce the aerial current to one-half the value obtained for optimum telegraphy operation. The grid current for telephony operation should not exceed 7 mA.

TABLE 3.

Operating Current Data for 7, 14 *and* 28 *Mc.*

	C.O.	F.M.	P.A.		
Condition of Operation	Meter No. 1	Meter No. 2	Meter No. 3	Meter No. 4	Meter No. 5
3.5 Mc. C.O. Doubling to 7 Mc.	24	14	10	90	37
3.5 Mc. C.O. Quadrupling to 14 Mc.	20	40	10	90	34
7 Mc. C.O. to 7 Mc.	40	—	12	90	36
7 Mc. Tritet to 14 Mc.	45	—	11	90	36
7 Mc. C.O. Doubling to 14 Mc.	28	18	10	90	35
7 Mc. Tritet Doubling to 28 Mc.	38	36	10	90	34

These figures were taken under the following conditions with a suppressor bias of 60 *volts positive:—*

Valve	Grid Bias	Anode Volts
C.O.	Resistance	400
F.M.	108v.	400
P.A.	120v.	1,150

In order to change over the suppressor-grid voltage from positive to negative some form of two-way double-contact switch is required. A suitable method of achieving this result was illustrated on page 407, April, 1938, T. & R. BULLETIN.

An excellent rotary double-pole double-throw miniature switch is marketed by *A. F. Bulgin* under the List No. S98. Another similar type of switch, made by the same firm, is designed for use with a flexible coupling, and is listed as S114. Either of these switches can be mounted on the side of the steel cabinet adjacent to the suppressor battery.

The power pack for the speech amplifier consists of a 350-volt 60 mA. transformer with associated smoothing apparatus, the whole being mounted on a separate chassis which can be accommodated in the steel cabinet. Care must be taken to avoid inductive pick-up from the power transformer into the speech amplifier and microphone transformer. A slight rearrangement of the position of all three power packs will frequently overcome trouble in this direction.

In the event of feed-back occurring after the wiring has been effectively screened it may be found necessary to insert a small R.F. choke in the direct lead to earth.

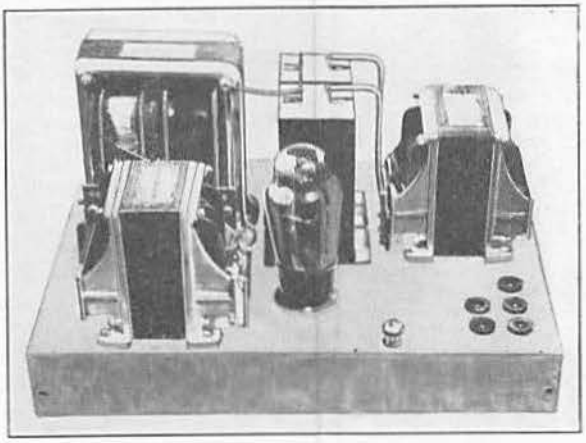
When the modulator is operating correctly the aerial current increment should not exceed 20 per cent. on peaks. It should be remembered that although the available output of the modulator under discussion is only of the order of 2 to 2½ watts, the recommended audio input power to the suppressor of a 4052A valve is less than 1 watt. Care should therefore be taken to avoid over-modulating the carrier.

Switching

Each man to his own ideas, is a truism which applies in particular to the question of switching radio circuits. Providing attention is given to the following major points, the actual method of switching can be left to individual taste.

1. Remember that high-voltage power packs can deliver dangerous and sometimes fatal shocks. Don't allow familiarity to breed contempt.
2. Insert double-pole switches in the mains supply leads to all power packs.
3. Insert switches in the anode feeds to the CO, FD and PA stages.
4. Use heavy gauge power cable for all circuits carrying high voltages or currents.
5. Don't make adjustments until you are sure that there is no danger of a direct or discharge shock.
6. Use good quality switches and cable.

The transmitter under discussion has been operated by means of 5-amp. lighting switches obtainable from *Messrs. George Becker, Ltd.*



The Power Pack for the C.O. and F.M. Stages The Clix All-in terminals at the right enable neat and safe connections to be made to the appropriate terminals at the rear of the transmitter.

Conclusion

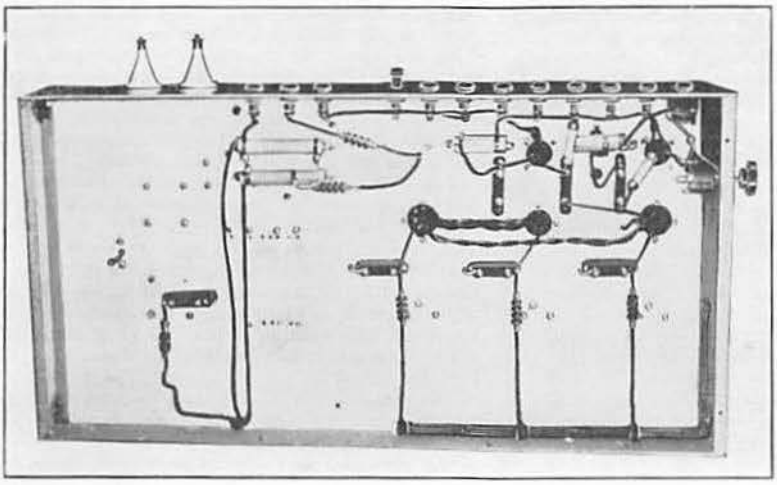
No attempt has been made in this article to give point to point information or detailed data regarding construction. The various photographs give a clear idea of the layout of all components, and where any special difficulty in construction has been encountered it has been mentioned in the text.

The equipment described is intended to be an answer to those who complain that a 100 per cent. British transmitter is not practicable in these days of cheap foreign valves and components. It is the considered opinion of the writers that the slightly extra cost involved initially is more than compensated for by the knowledge that British apparatus is built *up* to a standard to last and not down to a price which may give satisfaction for a few months only to bring disappointment later.

Readers who construct this transmitter will be doing the Society a good service by specifically referring to this Journal when placing orders for components, valves or metalwork.

Results

The transmitter has been operated with considerable success on 7, 14 and 28 Mc. With an input of 50 watts, telephony stations in over 30 countries and in all continents have been worked at good signal strengths. Using telegraphy, all continents were worked within a few hours of the transmitter being installed. Results on 28 Mc. have proved to be very satisfactory, an input power of 95 watts being available for telegraphy work.



Under side view of Transmitter Chassis.

Note position of Tri-tet cathode condenser on left. The Bulgin screen resistors appear to the left of the Raymart lead-in insulators.

Thanks

The writers wish to record their thanks to Messrs. J. N. Walker (G5JU), H. A. M. Clark (G6OT), J. W. Mathews (G6LL) and S. Howard (G8TY), who have either contributed helpful suggestions or assisted in tests, whilst Mr. Percy Murden (BRS3379) is thanked for producing the very excellent photographs used to illustrate this article. The photographs were taken with a new form of polarising screen, details of which will gladly be given by the photographer.

FORTHCOMING SOCIETY MEETINGS AND CONTESTS

APRIL

18. Council Meeting.
28. I.E.E. Meeting. Lecture by Dr. C. G. Lemon (G2GL). Subject : "Communication Receivers."

MAY

7. Provincial District Meeting in Weston-super-Mare.
9. Council Meeting.
21. Provincial District Meeting in Chester.

JUNE

3-4. Seventh Annual National Field Day
13. Council Meeting.
18. Provincial District Meeting in Southsea.

JULY

2. Conventionette in Cambridge.
9. Third Annual 56 Mc. Field Day.
11. Council Meeting.

A Modern Selective Receiver Featuring Mullard Red E Valves

Part II.—Construction and Operation

By J. N. Walker (G5JU)

THE circuit employed in the receiver is given in full detail in Fig. 1, a close study of which will show that two alterations have been made to the original specification outlined last month. Before proceeding to describe the details of construction, the reasons for these alterations will be given.

The first change is the removal of an output point for use with telephones from the anode circuit of the detector valve. It was originally intended to use a multi-contact jack to effect automatic switching upon withdrawal of the telephone plug, but such jacks are to-day difficult to obtain. Rather than employ as a substitute a somewhat complicated switching arrangement, it was decided to operate the telephones, through an isolating transformer, in the anode circuit of the output valve. A further reason for this change was the difficulty of matching the comparatively low impedance presented by a pair of telephones, into the high anode impedance of the screen-grid detector valve. Satisfactory operation can be secured by the employment of a specially wound transformer, and this will be desirable when, for instance, the receiver is used with batteries, but otherwise it is more convenient to cut-out matching difficulties, the output from the EL3 being such that a large degree of mismatch will cause no serious reduction of signal strength. Of course, when a speaker is employed, the usual care in matching is necessary if the best results are to be secured. The output impedance of the EF6 detector forms a very good match into the grid input impedance of the EL3 output valve.

Other advantages obtained are simplification of the wiring through the elimination of additional switches and jacks, whilst one has the benefit of the L.F. gain of the output valve for boosting up very weak signals.

The second alteration concerns the frequency meter. Its output, instead of being taken to a separate jack, is fed into the output valve, the reasons for the change being similar to those given above. The valve in the frequency meter is operated with low potentials on its electrodes, and in consequence of this, and because the valve does not operate under conditions of maximum efficiency as a detector, the output obtained when a harmonic of the transmitter was heterodyned was too low to give satisfactory results, even with telephones. Further, it was found inconvenient to change over the telephone plug each time it was desired to monitor an outgoing signal. It was realised that if the output of the frequency meter was fed into the L.F. stage, a multiple beat would be audible when using the F.M. as a beat oscillator, since the heterodyne output of both the detector and the F.M. would be amplified and heard simultaneously in the telephones. A trial was therefore made to discover if this effect resulted in any disadvantages, but it proved that matters were quite satisfactory, and the connections were permanently made as shown in Fig. 1. Placing C20, R28, etc., in parallel with the grid of the output valve cuts down the high-frequency response slightly, but this is no disadvantage and permits the omission of the impedance limiting resistance-condenser combination often placed across the output circuit of a pentode valve.

The switch for cutting in and out the frequency meter as required, and independently of the receiving valves proper, is retained.

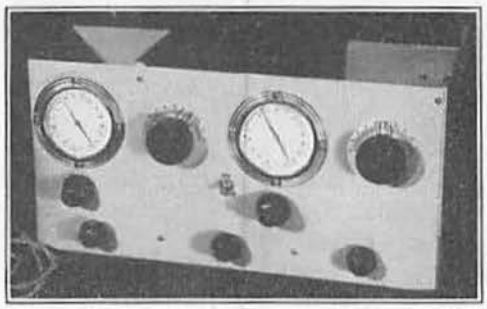
The Chassis

Due to the number of stages incorporated in the receiver, and to the fact that the power supply is self-contained, a rather large chassis is necessary, for, although each separate stage is compact in itself, it is not desirable to place them very close to each other.

The chassis is made of steel, finished mid-grey, and measures 18″×10″×2½″. The sketches of the chassis and panel shown in Figs. 2a and 2b give details of the positions and sizes of the major holes, some being required to mount components and others to carry through wires to the underside of the chassis. The sides and back form separate pieces and are bolted on when the wiring-up has been completed. They are essential to provide complete screening of the separate stages from each other and from external influences.

Where holes appear in the side of the chassis, it is, of course, necessary to ensure that the holes in the panel (or other piece) exactly correspond. An instance is the holes which accommodate the variable resistances.

Three screens are mounted on the chassis, each being 6½″ deep to correspond with the height of the panel above the chassis. The measurements are



Front view of the receiver.

The controls from right to left are:—Top: R.F. stage tuning; Band Set tuning; Band Spread tuning; Frequency Meter tuning. Bottom: R.F. regeneration; Reaction; R.F. Gain. On the left-hand side are the aerial and earth sockets and input condenser control. On the right-hand side are the main On/off Switch and the Frequency Meter Switch. The front middle switch is the Transmit/Receive control.

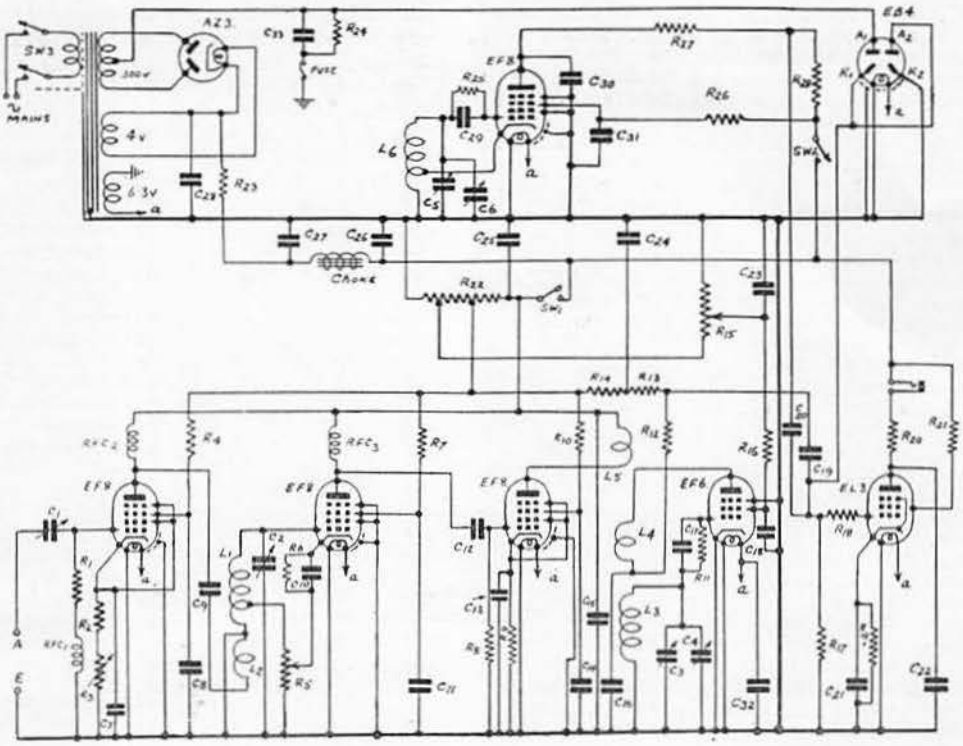


Fig. 1.
The complete circuit diagram of the new Selective Receiver, incorporating Mullard Red E Valves.

Keyed Components

C1 (see text).	*40 μμf Microdenser, Cat. No. 1129 (Eddystone) or 4-50 μμF Trimmer Condenser (Clix).*
C2, C3.	*100 μμF Microdensers, Cat. No. 1130 (Eddystone).*
C4.	*25 μμF "Midget" Variable Condenser (J.B.).*
C5.	*18 μμF Microdenser, Cat. No. 1094 (Eddystone).*
C6.	*65 μμF Air Dielectric Trimmer Condenser, Cat. No. 978 (Eddystone).*
C7, 8, 10, 11, 13, 14, 15, 18, 28, 31, 32.	*.002 μF Fixed Mica, Type "M" (T.C.C.).*
C9, 16, 22, 30.	*.0003 μF Fixed Mica, Type "M" (T.C.C.).*
C12.	*.0003 μF Fixed Ceramic, Type CTS925 (Dubilier).*
C17, 29.	*50 μμF Fixed Ceramic, Type 6171-88 (T.C.C.).*
C19.	*.02 μF Fixed Paper Tubular (Polar-N.S.F.).*
C20.	*.01 μF Fixed Paper Tubular (Polar-N.S.F.).*
C21, 33.	*50 μF Fixed Electrolytic 12-v., Type 3016 (Dubilier).*
C23.	*4 μF Fixed Electrolytic ,500 v., Type 0284 (Dubilier).*
C24, 25.	*8-8 μF Fixed Electrolytic, 500 v., Type 3105 (Dubilier).*
C26, 27.	*8-8 μF Fixed Electrolytic, 500 v., Type 9203E (Dubilier).*
R1, 21.	*5,000 ohms, 1 watt, Type F (Dubilier).*
R2, 6, 9.	*300 ohms, 1 watt, Type F (Dubilier).*
R3 5.	*5,000 ohm Variable Type, V-1 (Polar-N.S.F.).*
R4, 7, 10, 13, 14, 28.	*100,000 ohm, 1 watt, Type F (Dubilier).*
R8.	*500,000 ohm, ½-watt, Type F (Dubilier).*
R11.	*4 megohm, ½-watt, Type F (Dubilier).*
R12, 27.	*10,000 ohm, 1-watt, Type F (Dubilier).*
R15.	*50,000 ohm, Variable, Type CP159 (Varley).*
R16, 17, 26.	*250,000 ohm, ½-watt, Type F (Dubilier).*
R18.	*25,000 ohm, ½-watt, Type F (Dubilier).*
R19, 24.	*150 ohm, 1 watt, Type F (Dubilier).*
R20.	*50 ohm, 1 watt, Type F (Dubilier).*
R22.	*20,000 ohm, Tapped Power Resistance, Type P.D.6 (Bulgin).*
R23.	*1,000 ohm, Power Resistance, Type "Spirohm" (Dubilier).*
R25.	*750,000 ohm, ½-watt, Type F (Dubilier).*
RFC1, 3, 4.	*Short-wave Chokes, Type "A" (Q.C.C.).*
RFC2.	*Screened Short-wave Choke (Eddystone).*
Mains Transformer.	*Outputs: 350-0-350 volts, 100 mA. (Radiographic). 6.3 volts, 1 amps. 4 volts, 2 amps.*
Smoothing Choke.	*40 Henry, 100 mA. (Radiographic).*
Sw1.	*Single-pole Mains Switch, Type S80 (Bulgin).*
Sw2.	*Single-pole Mains Switch, Type S91 (Bulgin).*
Sw3.	*Double-pole Mains Switch, Type S126 (Bulgin).*

(*a*) 4", (*b*) 10", and (*c*) 5" long, not taking into account the necessary fixing flanges. Screens (*a*) and (*b*) form, with the left-hand side piece, separate compartments in which are set the first two R.F. stages. The cabinet, as a whole, forms a very firm foundation in which to build the receiver. It is available from a Bristol firm at the price of 20s. (postage extra), which also includes two valve-mounting brackets, details of which are given later.

Constructional Details

The First Radio-Frequency Stage

The construction of the first R.F. stage is the simplest of all, with the possible exception of the rectifier. The valve-holder is sunk in the chassis and is thus easily reached after mounting for the purpose of wiring up the few condensers and resistances associated with it. As it is important that the suppressor and auxiliary grids should be correctly connected if the full benefit of the low noise properties of the type EF8 valve is to be obtained, note should be taken that the numbers on the valve-holder correspond to (1) metallising, (2) and (3) heaters, (4) cathode, (5) suppressor grid, (6) special auxiliary grid, (7) screen grid proper, and (8) anode. The control grid is connected to the top cap, this feature enabling better screening to be secured between the input and output sides of the valve.

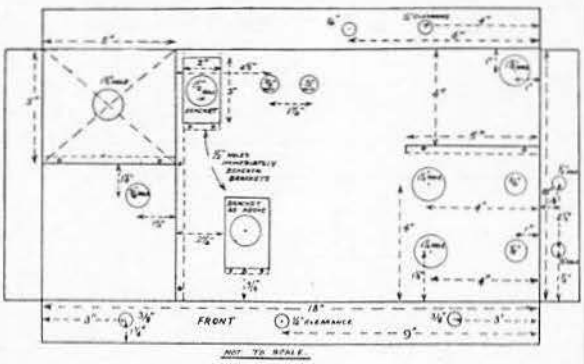


Fig. 2a.
Sketch of Chassis used for receiver.

The metallising will be connected to the chassis, but tags (5) and (6) will be soldered to the cathode, one very short piece of wire serving to make the connection. All the wires going to the chassis should be soldered to a tag placed under one of the bolts holding the valve-holder in place. The chassis connections in the upper compartment are similarly taken to a tag placed under the *same* bolt, thus securing one-point chassis connections for the stage as a whole. The same principle should be followed throughout the R.F. and detector stages, as it prevents circulating currents upsetting the stability.

The radio-frequency choke in the anode circuit of the EF8 valve is of the screened short-wave type previously listed by *Eddystone*, and still obtainable without difficulty. Alternatively, an unscreened choke may be employed. If any trouble is experienced from parasitic low-frequency oscillation, a resistance of about 5,000 ohms connected in series with the choke on the H.T. side of it will effect a cure.

In the upper compartment appear only the valve and the components comprising the input network. The reasons for the inclusion of the resistance will be given later—its value is not critical, and any value from 5,000 to 20,000 ohms is suitable. In the original model, an *Eddystone* 40 μμF. variable condenser is used to allow the degree of aerial coupling to be controlled, but this refinement is not essential, and a small mica-dielectric trimmer type may be substituted, or even a fixed condenser of 50 μμF. As shown, the aerial is completely isolated and is likely to collect and hold a static charge. To allow this to leak away to earth it is suggested that a 500,000 ohms resistance, which may be of the ½ watt type, should be soldered directly across the aerial and earth input sockets.

The Second R.F. Stage

The second R.F. stage being tuned, is naturally placed at the front of the chassis. As indicated in the photograph, the valve is mounted in one corner and the coil-holder in another, the variable condenser coming between them, the wiring carrying radio-frequency currents is thus kept reasonably short.

Special metal brackets are used in the later stages to hold the valve-holders, but, in this case, there is not sufficient room available to permit of one being employed. The valve-holder is therefore mounted above the chassis on two *Eddystone* 1½" pillars. It will be obvious that wiring up the valve-holder when in position will be extremely difficult, if not impossible, but, fortunately, practically all of the wiring can be accomplished beforehand. Six-inch lengths of wire, which may be either of the "push-back" variety or of 20 S.W.G. tinned wire (latter to be covered with systoflex), will be soldered to the heater, cathode and anode tags. The suppressor and auxiliary grids (noted in the valve data sheet as grids 2 and 4) and the metallising will all be joined together and a length of wire left for connection to the chassis. In passing, it is well to point out that these two grids are not connected to the cathode, as would normally be the case, because the cathode, by reason of the regenerative action, acquires a radio-frequency potential which must not be applied to any of the screening grids, otherwise instability would probably result. The gain is slightly reduced, due to the negative bias applied to the suppressor and auxiliary

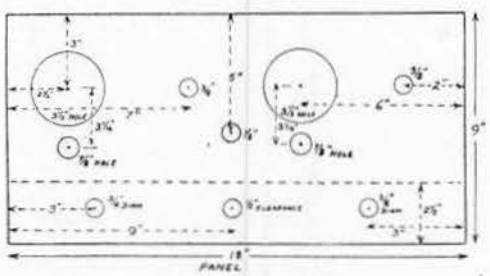


Fig. 2b.
Sketch of panel.

grids, *via* the cathode resistance R6, but the regeneration more than makes up for this reduction.

The screen by-pass condenser C11 will be soldered directly to the appropriate tags and a length of wire attached to tag (7). This wire and the heater wire pass through a common hole in the chassis beneath the valve-holder. It is advisable to provide separate holes for the cathode and anode leads, to enable them to be made as short as possible and to keep them away from other wires. Separate holes should also be provided around the coil-holder for the cathode tap and coupling coil leads (to C9). The lead from the anode to the grid of the third valve is taken through the middle of the side screen.

The choke in the anode circuit of the second valve is mounted in the wiring beneath the chassis. It is unnecessary to employ a screened choke, as the resonant frequency is well removed from the frequency of the tuned circuit.

The circuit employed for the control of regeneration is somewhat unusual, and will therefore be discussed at length later. For the moment it can be said that it is very effective and gives a very smooth control.

The Third R.F. Stage

A metal bracket which is employed for the mounting of the valve-holder in the third R.F. stage is formed from a strip of metal measuring $6\frac{1}{2}'' \times 2''$, a size which allows for fixing flanges. In the centre of the top of the bracket, which, as shown in the sketch, measures $3'' \times 2''$, is cut a hole $1\frac{1}{2}''$ in diameter to accommodate the valve-holder. Such a bracket is preferable, where possible, as it is more rigid than pillars, and, moreover, confers a measure of additional screening between the input and output ends of the valve.

The wiring of up the valve-holder is completed before the bracket is fixed to the chassis, otherwise it calls for little comment. The resistance R8 is not, of course, a grid leak, but is there to ensure that the grid of the valve receives, as bias, the voltage developed across the cathode resistance R9. R8 is anchored to a bolt holding two screens together, and serves to hold in position the ceramic coupling condenser C12.

The Detector Stage

The lay-out of the detector stage, shown clearly in the photograph, has been made as compact as possible, and the only leads of any length are those to the band-spread condenser C4, these being unavoidable.

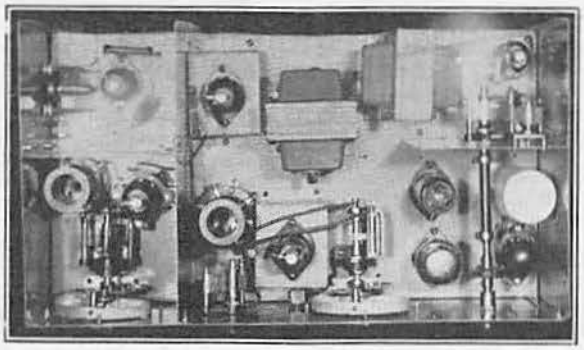
A metal bracket, identical with the one used in the third R.F. stage, is employed to mount the valve-holder. As shown in the sketch, it must be fixed half an inch or more from the edge of the chassis, otherwise it is liable to foul a moving part of the slow-motion dial.

The type EF6 valve has somewhat different characteristics to the EF8, making it more suitable for the detector position. It does not possess an auxiliary grid, and, since both the suppressor grid and cathode are directly earthed, the wiring of the valve-holder is simplified. No point is served through the use of a metallised valve, and it is better, in this particular case, to employ one with clear glass.

To avoid losses from the proximity of the metal chassis, the coil-holder is raised on three *Eddystone* midget stand-off insulators, this also enabling the leads to be made a little shorter. The grid condenser and leak are wired in parallel and anchored between the grid cap of the valve and the fixed vanes of condenser C3.

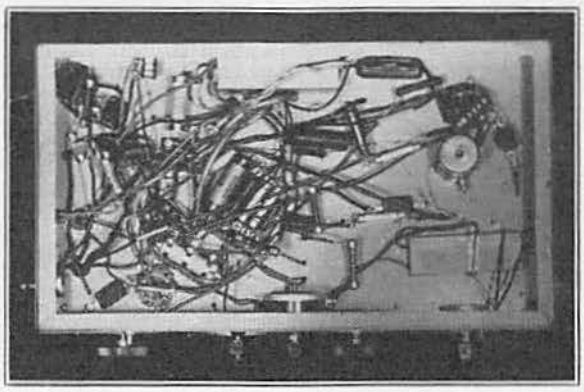
It will be noticed that the decoupling included in the anode circuit is of a very thorough character. This is most essential if the output is to be free from hum, especially when the detector stage is followed by a sensitive valve such as the EL3.

Between the "earthy" end of the reaction winding and the chassis is placed a fixed condenser C16, the value chosen, .0003 μF., being suitable for the whole range of frequencies covered by the receiver. This capacity is considerably larger than



Plan view of the chassis.

At the rear can be seen from left to right: 1st R.F. valve; 3rd R.F. valve; power transformer and choke; Frequency Meter. Towards the front are the 2nd (regenerative) R.F. stage, the detector stage, the output and rectifier valves, and, on the extreme right, the noise silencer valve.



An under-chassis view of the receiver.

The components are not so tightly packed together as would appear, this effect being due to the apparent lack of depth in the photograph.

the actual value usually in circuit when a variable condenser is used for reaction control, one result of which is that it is much more effective in by-passing to earth the R.F. appearing at the anode of the detector valve. Little trouble is therefore to be expected from R.F. reaching the audio stage, and this has been found to be the case in practice. A resistance having a value of 10,000 ohms is employed instead of a choke.

The reaction winding must be of a smaller size than usual, as oscillation is obtained with great ease. If the number of turns is too great, the screen potential has to be cut down to so low a value that inefficient operation of the valve results. A large capacity condenser (C23) is connected between the chassis and the slider of the *Varley* potentiometer (R15), making operation of the latter absolutely silent.

The Output Stage

Little need be said about the output stage, which follows normal practice. The valve-holder is sunk in the chassis and the majority of the associated components are mounted on a group board placed near it. The exceptions are the stopper resistances R18 and R20 (which prevent parasitic oscillation, as well as eliminating any residual R.F. from the detector stage) and condenser C22, which should be soldered directly to the appropriate tags on the valve-holder. The anode current is cut down by the insertion of a series resistance (R21) in the lead to the auxiliary grid. If the full output of four watts is required, this resistance should be omitted, but if, on the other hand, a watt or two of audio output is sufficient, the value of R21 may be increased to 10,000 ohms or more.

The Power Supply

A mains transformer and choke have been specially designed for this receiver by *Radiographic*, and are to be highly recommended for inclusion therein. They are substantially built, fully shrouded and well finished components and are offered at very reasonable prices. Loose leads are provided, and these are taken through holes in the chassis (indicated in the sketch), giving a very neat appearance. The transformer, which is fitted integrally with a place for adjustment of the input voltage, remains cool after several hours' continuous running. The fact that each component weighs approximately 7 lbs. is an indication of the generous design.

The rectifier valve, a *Mullard* type AZ3, is indirectly heated, thus preventing any possibility of trouble from excessive surges being applied to the condensers throughout the receiver.

It has been mentioned before that it is desirable, in order to obtain good regulation, to employ choke input filters in receiver power packs, as well as in those feeding transmitters. Actually, where a receiver is concerned, it is not essential to use a choke, since a resistance can be made to serve a similar purpose. The voltage drop across it will be rather more, but the hum level will be less. The strain on the smoothing condensers will be reduced, and, owing to the absence of excessive peak currents, the life of the rectifier valve will be increased. The inclusion of the *Dubilier* " Spirohm " resistance R23, of 1,000 ohms, results in a steady potential of 240 volts being developed on the anodes of the valves. Since this resistance carries, in effect, both A.C. and D.C., a wire-wound type of substantial rating is necessary. It is mounted on a midget stand-off insulator, and is placed well clear of other components.

Smoothing is effected by means of the 40-henry choke, the inductance of which is fully maintained under load, in conjunction with condensers C26 and C27, each of 8 μF. These are enclosed in a single cylindrical container, seen in the photograph on the extreme right.

In view of the fact that the mains transformer is fitted with a screened primary, very minor precautions are required against modulation hum. These take the form of condensers C28 and C32, both of the mica tag type.

A *Belling-Lee* enclosed fuse, rated at 150 mA., and mounted beneath the chassis, protects the rectifier valve, whilst a *Clix* fused mains plug protects the equipment as a whole.

The Frequency Meter

The variable condensers employed for tuning the frequency meter are mounted on a screen measuring 5" × 6½", placed 4" from the rear of the chassis on the extreme right. In the interests of stability an electron-coupled circuit is employed, and both the tuning and padding condensers are of the air dielectric type. The valve-holder is sunk in the chassis, whilst the paxolin former on which the coil is wound is mounted mid-way between it and the screen. The coil itself is wound to cover the 3.5 Mc. band with 32 turns of 30 D.S.S. wire, the cathode tap being made at the third turn up. Some slight adjustment of the number of turns may be necessary, the aim being to strike the band with the padding condenser C6 set near maximum. Finally, the turns should be cemented in place with thin cellulose lacquer.

The F.M. tuning condenser is controlled from the front panel by means of an *Eddystone* extension control outfit (which must be reduced in length by about an inch) and flexible coupler. The position of nearby components and valves has been arranged to give ample clearance to the control.

The Noise Silencer

It would be interesting to discuss the manner in which the noise silencer operates, but this will be deferred until later, so, for the present, only relevant details will be given.

The valve-holder is mounted on two pillars, chiefly because it might be difficult to insert the valve (which is of small dimensions) if the holder were sunk in the chassis. One cathode, the metallising and the internal screen are all connected to the chassis. The other connections are arranged so that a negative bias is applied to each diode anode, the value of the bias really being dependent upon the degree of interference from noise experienced at any particular situation. In the present instance, the bias is of the order of 4 volts. When the incoming signal (which, of course, includes peaks of noise) exceeds this value, the diodes conduct and act as short circuits to each alternate cycle.

Underneath the Chassis

Many of the components beneath the chassis have already been mentioned, and it only remains to say a word or two about the others.

The block condensers C24 and C25 (forming one) and C23 are fixed to the chassis by means of metal strips. The single output jack must be insulated from the chassis by means of bushes, and this also applies to the potentiometer R15, the spindle of which is " alive." The holes specified allow for

the bushes. This precaution is not necessary with the other variable resistances.

The voltage dropping resistance R22 is of the *Bulgin* power type, two resistance spools being mounted on one frame, which is bolted direct to the chassis. The anodes of the valves (except the detector) go to its extreme H.T. positive end ; the screen-grids and detector anode to a tapping placed half-way along the top spool (to this point also is connected the decoupling condenser C25) ; and to the mid-point of the two spools, *i.e.*, where the two ends are joined together, is connected the screen-grid of the detector valve. The tapping point fitted by the makers to the lower spool is not required and should be removed.

All the other components, chiefly small resistances and condensers, are mounted in the wiring. Most of them come near the detector and output side of the chassis, and it might appear that they are unduly crowded together. This is not actually the case, as the depth of the chassis allows plenty of space for them.

Wires coming through the chassis should be well insulated therefrom either by means of good quality systoflex or with rubber grommets.

Wiring Up

The main points of wiring up have been dealt with, and it is only necessary to mention that the metal chassis must not be relied upon to make earth returns. All the upper earth connections are brought to bolts which pass through the chassis, and these, in turn, are all connected together with 18 S.W.G. tinned wire. This may be laid flat along the chassis and left uninsulated, for convenience of making other connections to it. Similarly, the tags on the moving vanes of the variable condensers are connected to the coils by as short a length of wire as possible, notwithstanding the fact that they are mounted direct on the metal-work.

The grid top-caps should be wired up with thin flexible wire to prevent any mechanical strain being placed on the valves.

Coils

Four pin coils are employed in the regenerative R.F. stage and six-pin coils in the detector stage. It is immaterial which system is used for wiring up the pins, although it is well to utilise the two well-spaced pins on the six-pin coils for the coupling winding. The coil-holder is mounted with the appropriate terminals facing the third R.F. stage, thus enabling the wiring to be kept short.

The accompanying table shows the number of turns in each winding for each band, threaded formers being used for 28 and 14 Mc. and plain formers for the others. The reaction winding should be placed *very* close to the main winding, whilst the coupling winding should be situated away from the main winding, say $\frac{1}{4}$" for the highest frequency, increasing to $\frac{1}{2}$" for the lowest. The looser the coupling the greater the selectivity, and some experiment may be necessary to suit individual requirements. Once the windings have been completed they should be fixed in place, where the ribs touch, with cellulose cement.

Operation

Whilst the tuning of a receiver of the type described is straightforward, it is only natural that the best results can only be expected after one has become familiar with the use of the various controls.

Coil Table.

Band. Mc.	R.F. Stage.			Detector Stage.			Wire Gauge. S.W.G.
	Grid.	Cathode Tap.	Coupling.	Grid.	Reaction.	Coupling.	
1.7	60	2	17	56	3	16	26
3.5	28	1½	10	26	2	10	26
7.0	12	1	5	11	1	5	24
14.0	6	¾	3	6	1	3	18
28.0	3	½	2	3	1	2	18

The *J.B.* airplane dials fitted to the R.F. and band-spread tuning condensers are very fine models of their type, the dual ratios of 8/1 and 100/1 being particularly useful. In the first instance, one can rapidly cover the sweep of the R.F. condenser to find resonance and then bring the very slow-motion drive into play to effect fine adjustment. The capacity of the band-spread condenser in the detector stage is somewhat on the large side, and, if it is proposed to devote major activities to the higher frequency bands, it would be as well to remove one of the fixed vanes. At the same time, with the aid of the particular dial fitted, no difficulty has been experienced in tuning-in weak signals on the higher frequencies ; whilst, on the lower frequencies, the capacity of C4 is just right for convenient tuning.

The dials illustrated in the photograph have small knobs, but it is understood that large knobs can be fitted at a slight increase in cost. There is no doubt that these would make for greater convenience in handling and would form a distinct improvement.

Care must be exercised in the control of regeneration to the second valve. As the slider of the potentiometer R5 is moved towards the "hot" end, it will be found that tuning becomes sharper and signals increase in strength. A point will be reached at which the proper signals will probably disappear and loud whistles will take their place. The stage is then actually in a state of self-oscillation, and the control must be backed off again.

It will seldom be necessary to have the R.F.

(*Continued on page* 628)

The 56 Mc. International Contest

By J. M. R. Sutton (GW2NG).

Although only four final entries were received for this Contest, the data obtained is of considerable importance.

The Council has been pleased to award a small silver trophy to Mr. H. F. Wareing (W9NY), who alone of the entrants was successful in effecting scoring contacts.

In the account which follows our contributor has recorded the most important information put forward by the entrants.—Ed.

THE 28 Mc. International Contests sponsored by the R.S.G.B. during 1935 and 1936 aroused world-wide interest in the higher frequencies, and it is no exaggeration to say that the present great interest in this band has been brought about in no small measure through these contests. With the laudable aim of extending amateur interest in 56 Mc. work, the Society announced an International Contest in the November 1937 issue of The T. & R. Bulletin.

An examination of the Contest rules shows that they were formulated with certain definite and worth-while aims. Firstly, it was hoped that distances in excess of local would be covered, consequently the first scoring point was awarded for a contact with a station at a distance in excess of 200 miles. This rule encouraged the use of more efficient transmitting and receiving apparatus and aerial systems. Secondly, a monthly report was to be submitted, as it was felt that this would enable valuable data to be collected, thereby avoiding the possibility of the contest turning itself into a mere scramble for points.

Thirdly, all forms of transmission, other than plain continuous wave, were excluded. This again was a worthy condition, and, as has been recorded many times elsewhere, is the greatest aid to long-distance transmission. The fourth important condition required operation to be from a fixed station address. This was intended to preclude freak results from elevated locations, thereby enabling information of greater scientific value to be recorded.

All 56 Mc. experimenters will readily appreciate that these rules were formulated with an aim at the greatest return in the shape of extended knowledge of 56 Mc. propagation. A 56 Mc. Contest based only on points scored would be unworthy of the Society, and would not enhance the scientific prestige of the amateur U.H.F. worker.

Keeping clearly in front of us these avowed aims, it is pertinent to enquire how far they have been realised. It cannot be denied that, since the inception of the Contest, interest in 56 Mc. has grown apace, both in this country and in the U.S.A. It is also true that distances considerably in excess of 200 miles have been covered and that these successes have been due to more efficient apparatus and aerial systems.

The monthly reports submitted by entrants have sustained the lively interest in the band and the drive for plain C.W. has strengthened, although there is still much to be desired in this respect. Operation from fixed station addresses has now become the rule rather than the exception, and this has led to the construction of more ambitious and advanced apparatus.

It can, therefore, be asserted that, although the final entries are few, the aims of the contest have been to a great extent realised. It must be remembered that many of those who did not submit official entries have been stimulated to greater activity and to the construction of better apparatus. The success of the Contest must therefore not be judged on entries alone, but on greater activity, an increase in stabilised transmitters, better receivers, and a distinct advance in our general knowledge of 56 Mc. propagation. Judged by these tenets it has been eminently successful.

The Transmitting Entries

Mr. H. F. Wareing, W9NY (Milwaukee, Wisconsin), devoted every available minute during the year to 56 Mc. operation, and his total of 40 points was due to this unremitting work. In describing his activities, brief abstracts from each monthly report will be given, thus presenting a picture of 56 Mc. work at his station during the year.

The equipment used in January, 1938, consisted of a 59 Tri-tet with a 14,003 kc. crystal, followed by an 807 FD driving push-pull 801's in the final to 225 watts. Plate supply was from 866A rectifiers and the CO cathode was keyed, to minimise the somewhat rapid frequency-drift of the crystal. The note was slightly chirpy, but quite readable. The receiver was a 56 Mc. converter using a 954 acorn pentode first detector with suppressor grid injection from a 955 acorn triode oscillator. This was placed ahead of a *National HRO* receiver tuned to 20.5 Mc. On January 16 a 954 acorn pentode R.F. stage was added to the converter, which increased the sensitivity considerably and completely eliminated three commercial station images which were present before its installation. The receiver was completely stable on CC harmonics from lower-frequency stations, and also on local 56 Mc. CC C.W. and 'phone. Almost all other local 56 Mc. 'phones were unreadable, being received as broad smears across the band. The aerial system was two 56 Mc. vertical half-wave elements stacked vertically and excited by a quarter-wave tuned feeder connected between the adjacent ends. The transmission line was a 440-ohm two-wire open line, the station end being inductively coupled to the final tank coil, while the aerial end was clipped on to the tuned feeder section 13 ins. from the shorted end. During January no points were recorded and no DX stations heard, although many hours were spent in operation.

During February no change was made to the

equipment, and the results as regards points and DX heard were still nil. In fact, there were many hours and days when the band was reported dead. W9NY hoped that it would open up in March, but this hope was not realised, as he did not hear or work any DX that month. Up to the end of March he had not missed a day of operation.

This record of continuous operation was maintained throughout April, but some changes were made in the equipment. His signals were reported as very chirpy, so he reduced the voltage on the oscillator to minimise frequency-drift and began to key the final amplifier. The drift, although still present, was not so bad, but the voltage on the final amplifier had to be raised to 1,250 to compensate for the reduced excitation from the oscillator. At this time he reported that the efficiency of the final amplifier was very low. Several local stations were getting ready for the "domestic" DX expected in May, and there were now three C.W. receivers and four CC transmitters in his town. He was disappointed not to get European QSO's during January, February or March, and his report for April was still devoid of points or DX.

May saw a more cheerful state of affairs. Three DX stations were worked—W9CLH, W1BJE and W5EHM—and one point was claimed for W5EHM. W5CSU was heard at 9NY and 9NY was heard at W1COS. At this stage some bad luck was experienced with the equipment, for the 801's burnt out when 9NY was on the roof trying to improve the match of his aerial feeders. He had forgotten to reduce their voltage! The 801's were replaced with T 40's, but considerable trouble was experienced with instability and regeneration. This produced a very bad AC note at the crystal frequency and lost him a point for a contact with W1BJE, as the QSO was made on I.C.W. instead of straight C.W. The input was now 300 watts, but the tuning of the final amplifier was very critical and showed a tendency to burst into self-oscillation. During May the band was open four times to W5, but 9NY was not at home on two of these occasions and had visitors on the third. Fortunately he was able to contact 5EHM during the fourth period. Activity on CC 'phone was high, but this was unlucky for 9NY, as he was limited to C.W.

What a change in his June report! The number of DX stations worked increased to 16 and a corresponding number of points was claimed, bringing his score to 17. Besides these contacts, 31 DX stations were heard in W1, 2, 3 and 5, whilst 9NY was heard by 17 DX stations in W1, 2, 3 and 8. Up to the end of this month not one single day of operation had been missed.

July was another month worthily rewarding such intense activity, and 21 more points were claimed from contacts with stations in W1, 2, 3, 5, 8 and 9. Details of these contacts were given in the October issue of THE T. & R. BULLETIN. The total points claimed had now reached 39.

August was a blank one. Besides being on holiday, conditions were very poor, therefore 9NY did not miss much when he was not operating. Optimistically he was still looking forward to European contacts, now that the "domestic" DX was over, but unluckily for this hope September was another blank month, for even the CC locals seemed to be deserting the band. October proved no better, and his hope for a contact with Europe before the end of the contest was gradually fading. So deserted was the band in November that he was getting lonely for a contact! He had only worked a couple of locals since July!

In the final month of the contest the band relented, and he was able to claim one more point for a contact with W3EZM. He had the bad luck to miss a W4 contact, as he heard and was heard in that State.

His operating days during the year totalled 338, and stations were contacted in W1 (9), W2 (2), W3 (15), W5 (4), W8 (1), W9 (18). Some of these were worked more than once, but not all counted for points because of the distance regulation. Actually, 42 contacts were made over distances exceeding 200 miles, but one was disallowed because of the self-oscillation trouble in the final amplifier and the other because seven days had not elapsed between the contacts. The total contacts made up to 200 miles were 73. The receiver in use only covered the frequency range of 56 to 58 Mc., and, furthermore, was so selective that only first-class frequency-stabilised signals could be received. Incidentally, W9NY reported that a number of stations (even well-known CC operators) were heard out of the band on either side! A paucity of receivers capable of receiving straight C.W. also reduced the number of reports of W9NY's signals. All keying was carried out by hand and with a definite view to contacts.

In our opinion W9NY's record is a remarkable one. It shows tenacity of purpose, consistent experimental work and operating, and a constant fight against conditions, poor receivers (in other stations), and spasmodic activity on the band. We are glad that such devotion to an ideal has been rewarded with success, and feel that W9NY has added yet one more leaf to the book recording our knowledge of the higher frequencies.

* * *

Throughout 1938 we received monthly reports from Miss Constance Hall, G8LY (Winchester, Hants), and this consistent activity has been maintained under most adverse conditions. Unfortunately, no contacts over the critical distance of 200 miles rewarded her with a point to keep interest alive. Activity in her locality was not high and there were other difficulties, such as power supplies, to contend with. Yet the monthly reports were maintained, and, at the end of the contest, a most interesting and comprehensive log was submitted. It is with this log that we will concern ourselves, as adequate mention of her monthly reports has been made in this Journal from month to month.

The equipment consisted of 6L6G Tri-tet with 7 Mc. crystal exciting a 6L6G FD to 28 Mc., followed by a 6A6 regenerative doubler to 56 Mc. or an RK 39 doubler to 56 Mc. Inputs ranged up to 21 watts at a frequency of 56,272 kc. Power supplies were 300 volts of H.T. accumulators. The receiver was either an 0-v-1 with S.G. detector and pentode output, or an 0-v-2 (both straight receivers).

Nine aerial systems were tried in the course of the year. The most successful, both from the point of QSO's and reports of reception, was an 8-ft. 4-in. horizontal with a 5 half-wave semi-vertical downlead, attached by 6-in. spreaders to a 5 half-wave semi-vertical downlead of an 8 half-wave horizontal aerial, both aerials being in line

at 10 degrees N. of E., 10 degrees S. of W., with a very slight slope to the west end, the approximate height being 50 ft. Whether this aerial gave partly horizontal and partly vertical polarisation is not known, but most receiving stations use horizontal aerials.

Contacts were made with G8MG, 2MV, 2XC, 5MAP, 5NF, 6XM, 2OD, 8DF, and 2GG. 8LY received reception reports from 2AQW, BRS3179, 2CIL, G5LB, 5MA, 8DM, 8OS, 2DUT, BRS2601, 2DFG, 2AAH, 2CZQ, 2DGR; the maximum distance being 50 miles. G6FO (85 miles), 5RD (55 miles), 5BY (50 miles) and 6IH (80 miles) were also heard at 8LY. The contours between her station and various others worked are very interesting and well drawn. Unfortunately the location of the station is just out of the "local London area," besides being the most south-westerly 56 Mc. station at present in operation. This resulted in few stations swinging their beam in 8LY's direction. Practically every direction from her station is overlooked by a hill, thereby scattering the already low-power signals.

Some general remarks from her log include the observation that cold weather followed by mild weather appears to increase signal strength, while she found that signals increased slightly at the eclipse of the moon. G8DF, at a distance of 9 miles and 70 ft. lower in altitude, found that signals from 8LY increased in strength as darkness approached.

Miss Hall's log shows the same admirable qualities evident in the reports from W9NY. Tenacity of purpose (with no encouragement in the shape of DX or points), genuine experimental work under difficulties (no convenient A.C. supply for low or high voltage), consistent watch on the band and a fight against poor conditions and location. We cannot but again record our complete admiration of a whole year's work carried out in so fine an amateur spirit. May better luck attend the portable survey planned for the near future.

An Interesting Discovery

Immediately following the log proper was given an account of an investigation which appears almost incredible, but one which nevertheless supports the contention that the study of wireless vibrations is still in its infancy. Water divining, or "dowsing," is now an accepted scientific fact, and is even a commercial proposition. Metals can also be detected by the use of a divining rod in the hands of an adept. 8LY, together with a water-diviner, has found that his powers can be extended to colour detection and the detection of metals by using a *coloured* divining rod. The rod used is the usual vee-shaped one, but, when coloured, it will rotate in the hand a given number of times according to the nature of the substance to be detected. Now comes the amazing fact. *When a red rod is used it rotates 21 times whenever it comes near a wireless transmitter!* This is independent of frequency; in fact, any receiver in a state of oscillation can produce the effect. Other colours have been tried, but it has been found that the rotation is only produced when a *red* rod is used.

Experiments proving that the phenomenon is not of a random nature have been carried out and details are given to show that the discovery cannot be explained under any known natural laws. Transmissions from the vertical aerial at 8LY were detected at a distance of one mile, and when transmissions were made from the half-wave horizontal beam the width of the beam was given accurately up to 150 ft. from the aerial. The various "lobes" of radiation were "detected" with surprising accuracy and verified from the theoretical diagram. Let it be said that the diviner in question knows nothing about wireless transmission, and merely observes the rotation of the divining rod. When experiments were carried out at a distance of 20 miles it was found that, as the effect is independent of frequency, transmissions from many sources and on many frequencies were detected, producing a mixed effect. It is hoped to find an hour during the twenty-four when no transmitters are in action, thus permitting a test to be made at a distance, but, judging from present activity, this is likely to be a vain hope! We dare not offer any explanation of this newly discovered effect, but hope, with 8LY, that it will make someone "furiously to think"!

Receiving Logs

Mr. H. W. Parker, BRS2601 (Ewell, Surrey), recorded his log of stations heard in one book and gave details of apparatus, results and conclusions in another. His receiver used an *Osram* HL2K as detector and a *Hivac* Y220 as pentode output. The circuit was a modified Reinartz, and special attention was paid to lay-out in order to obtain high efficiency. Five different types of aerials were tested. In the case of the end-on type, one being 8 half-wave and the other one half-wave, it was found best to couple the aerials to the receiver by means of a small variable condenser and also use an earth or counterpoise. Capacity coupling proved to be more efficient, although resonance spots were troublesome. For all-round 56 Mc. reception, but not necessarily maximum signal strengths, the half-wave dipole or capacity impedance matched aerials were found best. A discussion on planes of polarisation and the directivity of aerials is very well set out, but is too detailed to be given here. However, when conditions are good for semi-DX (shown by reception of harmonic of 1BE), signals are received quite independently of the direction of the aerial.

During the months of February, March and April signals seemed stronger than at any other time, probably due to the presence of a low ionised layer whose ionisation remains relatively high and constant during these months. Large variations of background noise, almost amounting to flutter, were heard on April 18. These continued until April 21, later becoming smoother. No DX was heard during this period, and local signals were not affected. It is recorded that when conditions are good the background noise does not appear to be any different.

Fading is more common on semi-DX signals than on those of a local nature. On distant signals it is slow and sometimes very deep, amounting to a complete fade-out at times. Echoes have not been observed, neither has static, unless a local storm is in progress. Before proceeding to an account of a new theory propounded by BRS2601 a list of stations received during the year will be given. These were:—G2HG, OD, MV, MR, KI, MC, LW, AW, UX, JH, KV, NMP, NHP, QY, YL, JKP, LCP, JK, ZV, AR, RD, NW, DN, DP, VW, NH, UJP, ZVP; G3CU, GP, OO, VK, WN; G5MA, LB, CD, RD, NF, NG, OJ, MD, OI, ZJ, OX, KH, AU, AV, GF, CM, MAP, RF, BY, MQ, TIP, AA; G6GR, VA, XM, DH, SM, PK, WL, OT, FL, FU,

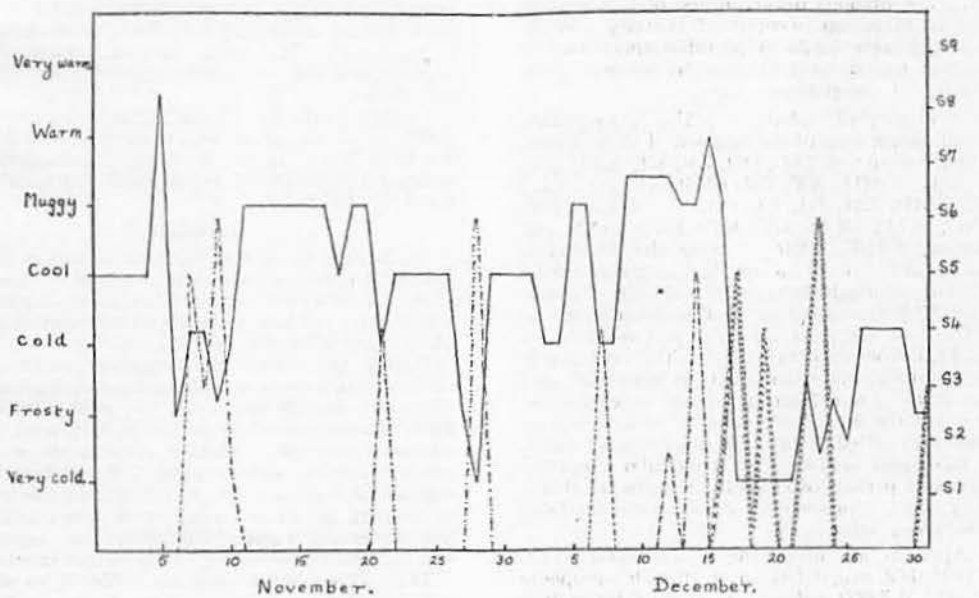
VX, LK, SC, FO, NL, KFP, NF, BUP; G8TX, CV, GD, MG, KZ, IX, OS, LY, OQP, NV, SK, JV, FV; F3BE, H?I?. This list shows an efficient receiver and unbounded enthusiasm!

Towards the end of 1938 mention was first made in this Journal of a theory, which, for want of a better name, was called the *Theory of Contrasting Weather Conditions*. This theory was originated by BRS2601, and can be stated very briefly thus: when there is a large climatic change, mainly shown by a large rise or fall in temperature, it is followed by reception of semi-DX signals on 56 Mc. The term *semi-DX* is taken to mean signals which are not normally received at the station, but are only heard under good conditions.

It was found that when a day which was warm for the time of the year was followed by a very cold day, then, fairly soon afterwards, semi-DX signals were received. BRS2601 gives a table of results tabulating the weather tendency (warm to cool or cool to warm) which commences as from February 25, 1938, and ending on December 31. The table gives the incidence of these semi-DX signals. It should be clearly understood that there must be a *sharp* variation in climatic conditions and that the sharper the change the greater is the distance covered by these signals. As an example, November 5 was very warm (70° F.), while November 6 was very cold, with sharp frost. On November 7 signals were received from G6DH, 2XC, 5XY and 8LY—all semi-DX. The change from warm weather to cold has a much greater effect than the change from cold weather to warm.

Without elaborating further, the writer has taken three graphs drawn by BRS2601 and combined them to produce the graph illustrating this article. It is admitted that the calibration of the weather is qualitative rather than quantitative. If temperatures (Fahrenheit) had been given, the writer would have attempted to calculate the correlation coefficient between the two sets of data. This would have given the possible connection between signals and temperature, together with the probable error of the correlation coefficient. It would also have established the degree of relationship between climatic changes and the incidence of such signals. Nevertheless, it is apparent from the curves that semi-DX signals are heard following large changes in temperature. The "troughs" in the weather curve coincide with or immediately precede the "peaks" of the signal strength curves. Notice that the "flat" portions of the weather curve (denoting little temperature variation) are free from peaks of the signal curve. The distance between station G6DH and BRS2601 is 72 miles, whilst 6FO is distant 118 miles.

Space forbids a more detailed analysis of the curves, but there is evidently a strong connection between the two sets of data. We recommend that this theory should be investigated thoroughly by all experimenters interested in 56 Mc. propagation We suggest that incidence of semi-DX signals on the high frequencies be recorded, together with temperatures at as many intervals as possible. An average temperature for a period can be ascertained, and then the temperature difference between this average and the next equal period correlated against signal strength. The writer will be very pleased to assist in statistical evaluation of the necessary coefficients and would like to hear from



Curves Showing Climatic Changes and 56 Mc. Semi-DX Reception at BRS2601
Reception of G6DH — · — · — ·
Reception of G6FO × × × × × × × ×

all members interested in such an investigation. Will E.S. members of the Propagation Group please note ?

In concluding this rather rough summary of the logs submitted by BRS2601 we feel that bare justice has been done, but space is a matter to be considered. We compliment him on his enthusiasm, and wish him the same success under his new call-sign, 2ADZ.

Finally, we come to the logs of Mr. W. F. Miller, 2AAH (Chichester, Sussex). These are in two complete books and illustrated with very neat diagrams and effective photographs. His equipment consisted of a battery TRF-v-1 receiver with *Hivac* SG220SW, *Cossor* 215 SG and *Cossor* 220 HPT, and was built on a steel chassis with masonite front panel. The detector stage was enclosed in a screening box. Couplings between aerial and RF stage and RF stage and detector were made as tight as possible. From January 1 to November 12 the fixed aerial in use was a 33-ft. top, fed in Zepp fashion. From November 12 to the end of the year a 4-section *W8JK* beam was erected. Both aerials were slung between two 38-ft. masts, though these only brought them about 8 ft. above the neighbouring houses. For portable work a horizontal half-wave dipole with reflector was used. This was rotatable and mounted on a 12-ft. mast. The feeder was of flex about 14 ft. long which led-in through the car window.

A very interesting system known as the *RD System* was used for plotting conditions. In this scale the S-strength of the observed signal is multiplied by the direct distance between transmitter and receiver. If more than one signal is heard, then the maximum RD figure for the listening period is used as a measure of conditions for that period. The obvious disadvantage of this system is that it takes no account of activity. When observations were made in portable operation the RD figures was divided by two, to preserve some uniformity of comparison.

The summary of signals logged is accompanied by a well-drawn map of the location of the stations. Calls heard were :—G2XC, OD, ZV, KI, NMP, QY, ZVP, XIP ; G5OJ, XY, CM, CMP, NF, BY, RD ; G6LK, XMP, XM, IH, LI, FO, VF ; G8CV, DM, OS, RO, KZP, OQP, DF, LY, KZ ; F8AA and harmonics of IBE, FYR. During the months of January and February no signals of any description were heard, although the receiver was quite efficient, as proved by the reception of Television sound at S8. The first signal of the year was received on March 27, but was not identified. The first identifiable signal was one from G2XC on March 30, and he was 589 ! From then on signals were received fairly regularly and every month, as activity on the band permitted, a curve of days against maximum RD figure was drawn. Particular attention was given to periods of the full moon, to see if this had any effect. An account of these investigations will be given later.

On April 27 an interesting transmission which very probably originated in a French aeroplane at a height of 3,000 metres, was received by switching in the quench. Some interesting tests with 2XC were arranged every Sunday from June 19 to determine the hourly variation of signals. Signals appeared to peak from 1500 to 1600 G.M.T. F8AA was heard at 565 on June 25 at 2210, the distance being 120 miles and the input 100 watts.

With regard to the Second Annual 56 Mc. N.F.D., 2AAH considers that if it had been held a week later much greater distances would have been covered, as conditions were much better. The GW Cup Contest was held under very good conditions.

General remarks on 56 Mc. propagation appear at the end of his report, and may be summarised as follows :—Certain conditions favour propagation by means of low altitude refraction or reflection. These seem to be, firstly and most important, a temperature difference between the two stations. This causes warm air to rise over cold and gives temperature inversion which the A.R.R.L. has already proved to be favourable to transmission beyond visual limits. Secondly, from the observations referred to in a previous paragraph, the signals peak at the full moon. This may be due to the sun or the moon, because good periods occur at intervals of about 28 days. As the revolution of the sun and the circuit of the moon take about this time, the effect may be attributable to either. Low altitude ionisation may be caused by either effect which requires long-term observations to arrive at any definite conclusion. As a matter of interest, this 28-day cycle of good conditions has been observed in the early days of 1939 by both 2AAH and G8OS.

In conclusion 2AAH remarks that transmission by the E and F layers seems to occur so infrequently as to be useless from a communication point of view, but he thinks that the future of 56 Mc. is bound up with low altitude propagation over distances up to 200 miles. He predicts the regular coverage of such distances with an improvement in transmitters and receivers. In connection with propagation of this nature a beam aerial is a drawback and an aerial which radiates in all directions is necessary. The weak link at present is the receiver, but the new valves appearing will remedy this defect.

Coming to the end of this admirable report of a year's work we again feel that only bare justice has been done. However, enough has been said to indicate the wealth of detail which has been tabulated by 2AAH.

Conclusions

At the end of an account such as this it is very difficult to view all the detail in true perspective. There are, however, certain outstanding suggestions which point the way to better understanding of the mechanism of 56 Mc. propagation.

Firstly, the theory of contrasting weather conditions, which deserves thorough investigation, and secondly, the 28-day cycle of good conditions. Both of these should be proved or disproved in the course of the year. Thirdly, there is the need for greater activity with straight C.W. and receivers capable of receiving it. Lastly comes the matter of keeping accurate records with every available fact concerning weather, conditions, etc., registered, as well as matters relating to the signals themselves.

The radio amateur has been forced to occupy higher and higher frequencies. At every step he has proved his right to these frequencies by discoveries of proved scientific worth. He is now uncovering the truths of the very high frequencies. Are *you* helping ?

A Simple 56 Mc Detector Circuit

By R. V. A. ALLBRIGHT (G2JL). *

DURING the last year or two it has become increasingly evident that many of the newer recruits to the listening side of amateur radio prefer to probe the mysteries of 56 Mc. rather than employ their time in listening to local telephony on the 7 Mc. band.

The chief concern of this type of listener is his receiver. For he is likely to become disheartened for a time by the thought that ultra-high frequency receivers are necessarily complex and difficult to build. It is the purpose of this brief article to describe a simple detector circuit which can be used as the basis of a really good straight receiver, but which in itself does not claim to be the last word or even original. It is, however, capable of a high performance and has the merit of being both simple and cheap to build.

Circuit

Before this receiver was constructed tests had been carried out with several types of oscillator for detection purposes, and it was finally found that the Schnell circuit would prove the most satisfactory when certain small modifications had been effected.

One of the special *Hivac* short-wave valves, D210SW, was finally chosen after tests with many others, and it is believed that this valve is definitely the most suitable for the circuit with the possible exception of the Acorn and other special types, which were too expensive to receive much attention at the time.

The most important object to be attained in any straight receiver is quiet and smooth reaction with as much freedom as possible from the tuning of signals by the reaction control. This was achieved by controlling the plate voltage of the detector with a potentiometer, in preference to varying the coupling between the plate and grid circuits with a variable condenser.

Constructional Details

The writer has built this receiver on a solid wooden baseboard with thick ebonite front panel, but the chief reason for employing this form of construction was the necessity for a really solid effect to withstand the few thousand miles it has been carried by car on listening tests. It is thought that the losses with this type of construction are small, but there is nothing against building the circuit into a metal cabinet, as no doubt many will prefer to do.

The chief point to bear in mind is that all wiring carrying R.F. currents should be as short as possible and that, as in transmitter design, bypass condensers and other wiring to a point of zero potential, should be brought to one point, and there firmly soldered. This is most important and attention thereto and to other matters of good design will ensure a receiver that is reasonably free from "snags."

A grid tuning condenser of 22$\mu\mu$f is rather large for serious 56 Mc. work and the value might be reduced to about 15$\mu\mu$f, although the better method would be to use a still smaller bandspread condenser in parallel with the main one. Even with the somewhat high value of 22$\mu\mu$f it is possible to tune and hold the weakest crystal controlled carrier and even to read telephony.

It is suggested that the valve be mounted vertically, its holder being supported by small standoff insulators; it should be possible to find a place close to the coils which will allow of very short connections. The grid coil is home-made, being four turns of 12-gauge copper wire, $\frac{3}{4}$ in. diameter, and this is mounted directly on to the *Eddystone* tuning condenser. The plate coil also uses four turns and the *Eddystone* four-turn coil, with its convenient holder, will fulfil this function admirably. The coils should be about $\frac{1}{4}$ in. apart, that is, between their low potential ends. The actual distance is fairly critical and individual tests to find the best position will repay the trouble taken with an improvement in reaction.

The detector stage is followed, in the writer's receiver, by two audio frequency stages, the first being resistance capacity coupled and the output stage transformer coupled, thus providing fairly high gain. The design of these stages follows standard practice and it is therefore considered unnecessary to describe them in detail. It should, however, be pointed out that the whole performance of a receiver can be spoilt by faulty low-frequency stages and in an ultra-high frequency receiver it is especially important to provide adequate decoupling between each stage and, in addition, insert 10,000 ohms grid stoppers in the grid leads to the AF valves. It is often an improvement to bypass the

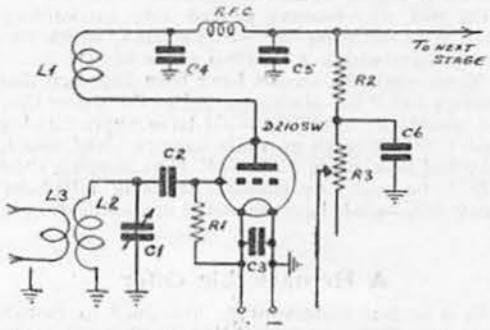


Diagram of Simple Detector Circuit.

C.1—22$\mu\mu$F. Eddystone Type, 900/20.
C.2—50$\mu\mu$F Dubilier Type 670, Mica.
C.3 C.5—100$\mu\mu$F ditto.
C.4—300$\mu\mu$F ditto.
C.6—2μF Paper.
R.1—3 Megohms, $\frac{1}{2}$ watt.
R.2—50,000 ohms ditto.
R.3—50,000 ohms Graded Potentiometer, Reliance.
L.1—4 turns with base, Eddystone, Type 1050.
L.2, L.3—See Text.
R.F.C.—Eddystone, USW, Type 1011.

Other Components

1 Valveholder, 4 pin, Raymart.
2 Extension handles, Eddystone, Type 1008.
2 Flexible couplers, Eddystone, Type 1009.
1 Slow motion dial. JB.
2 Adjustable Brackets, Eddystone type, 1007.
2 Type SS Standoff Insulators, Raymart.
1 Terminal Saddle for Feeders, Eddystone, Type 1046.
1 Toggle Switch, On-Off, Premier.
1 Knob, Bulgin.

* *Experimental Section Member.*

anode of the final valve with a condenser of about .001 μF. Any trace of threshold howl now remaining can be removed by connecting a ½ megohm resistance across the secondary winding of the AF transformer. Suitable valves for the two L.F. stages are the HL2 and LP2 respectively.

Operation

Oscillation should be quite smooth with upwards of 40 volts anode supply and as it is possible to couple the aerial tightly with an improvement in signal strength, the voltage necessary will, in practice, be about 100. Sometimes a larger grid leak effects an improvement but the writer found little difference with either 3 or 5 megohms, although the smaller value is favoured.

Aerials

The receiver can be used with any type of aerial, and coupling is provided for either a doublet or single-wire feeder. This coupling consists of one turn of heavy-gauge copper wire wound over the grid coil, the actual diameter of which will depend upon the degree of coupling required and is a matter for experiment. When a single-wire aerial is used the free end of the coupling coil is earthed.

Conclusions

It is hoped to carry out further tests with a view to improving this receiver by the addition of at least one tuned high-frequency stage, as this would undoubtedly improve the handling of the set. It may be of interest to note that many types of valves have been tested as detectors but the *Hivac* D210SW is by far the best yet tried. The next most suitable is the *Osram* HL2K and then the HL2. Several other valves of very ancient vintage worked quite well, thus demonstrating their efficiency under difficult conditions.

On test, the receiver proved very satisfactory when removed from the writer's QRA, which has five garages within a hundred yards of it!

Many weak DX signals have been heard on this receiver and it has often occurred to the writer that the operators concerned would have appreciated a report. Most of them would have received one if they had been using plain C.W. thus allowing their calls to be read. By persistently using telephony many DX signals have remained unidentified.

A Remarkable Offer

In a serious endeavour to introduce to British amateurs their new E.C.R. superhet receiver, *Messrs. Stratton & Co., Ltd.*, announce that very liberal allowances will be made on old receivers.

We have assured ourselves of the genuineness of this offer which is of a type never before introduced to radio amateurs in Great Britain.

The E.C.R. receiver is an outstanding advance in receiver design, and it is hoped to give a full-length review of its performance at an early date.

The unique offer made in this issue is exclusive to R.S.G.B. members, a number of whom will have the opportunity of installing at their station an All-British receiver backed by the strength of the Eddystone guarantee.

Interested members are urged to write at once to the Stratton Company, Balmoral Works, Bromsgrove Street, Birmingham.

Duplex Telephony

By J. B. Parke, D.Sc. (GI8PA)

THERE is little doubt that the intelligent use of duplex working, together with some form of simple carrier control, preferably automatic, would do much to eliminate the interference which is so obvious on the amateur bands to-day. On the other hand, the careless use of duplex telephony by a large number of high-power stations, without due regard to either licence regulations or the rights of others, could do much to make our bands useless from the point of view of serious experiments.

In order to work duplex it is necessary to listen on the receiver while the transmitter is actually radiating, and the advantages of being able to do so are well worth the trouble involved. In replying to a test call it is possible to invite the station to break-in, and also in the event of a reply to someone else, transmission can cease at once.

The fact that both stations are listening on each others' frequencies would almost completely eliminate the report which most of us have received at one time or another—"Sorry—I missed all that transmission due to QRM." Immediately QRM becomes heavy the second station in the QSO can break-in and inform the transmitting operator of the fact. It is hardly necessary to point out that repetition would be virtually unnecessary, operating time for the transmission of a given amount of intelligence would be much reduced, and, most important of all, given a little shrewd co-operation, QRM would cease to be the trouble which it is at the present time. It is perhaps worth mentioning that the writer has found this type of break-in very useful on 14 Mc., where advantage has been taken of slight breaks in QRM to pass and receive reports from weak DX stations.

It will be appreciated that one cannot listen on their own frequency, but it is quite possible to listen up to within 25 kc. of it provided due precautions have been taken, and a suitable receiver is used. (Tests with several types will be described later.)

The main problem is to prevent R.F. from the nearby transmitter entering the receiver, and this can occur in several ways:—

(1) General pick-up by the receiver due to poor screening.
(2) From the mains.
(3) From telephone or loud-speaker leads.
(4) From the earth lead.
(5) From the aerial.

It is proposed to consider each of these separately and see how the problem can be overcome.

The Receiver

Taking first the receiver. This should be completely screened by a suitable metal cabinet. If a separate power pack is used, this also should be dealt with in the same way and earthed. Screened leads must be used for the connections to the receiver. Battery operated equipment should be treated on similar lines, all batteries being placed in an earthed metal container—a large biscuit-box is efficient.

Mains Supply

Passing on to point No. 2, it is surprising how much energy can make its way from the transmitter

to the receiver through the mains. The obvious remedy is a high-frequency choke in each lead to the mains, and these chokes must of course be sufficiently large to pass the current taken by the receiver. At the writer's station chokes consisting of a 6-in. long winding of 22 gauge wire (enamelled) on a former 2-in. diameter were found to be completely satisfactory with even a large receiver.

The chokes should be screened if possible, and screened wire should be used for the connections between them and the receiver. Bye-pass condensers having a capacity of .001 μF should be connected from the mains end of each choke to earth.

Output Leads

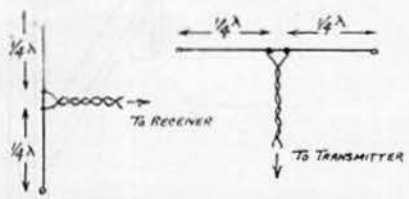
The amount of unwanted energy which can make its way into a well-screened receiver through the output leads to an external speaker or telephones would appear to be negligible, but, nevertheless, a definite improvement was obtained by fitting an R.F. filter close to the receiver.

Earth Lead

A great deal of unwanted signal may be picked up on a long earth lead, accordingly a short direct earth connection is very desirable. Some operators do not trouble to earth their receivers directly, but rely on the capacity of the mains to earth for this essential connection. It should be remembered that when high-frequency chokes are installed in the mains leads, this type of earth will not even be as effective as is normally the case. If an earth must be used, and it is impossible to keep it short, then a simple screened wave-trap tuned to the transmitter frequency and installed in the earth lead close to the receiver will eliminate most of its disadvantages.

The Aerial

Lastly, the aerial, and this is where so many attempts to work duplex go astray. Instead of using only a few feet of wire, as is very frequently done, an attempt should be made with a full length



Suggested aerial system for duplex work. The distance between the aerials should be as great as possible.

aerial to discriminate against one's own transmission. This, of course, requires that a second aerial be erected for receiving only. At the writer's station the most satisfactory aerial arrangements were found to be as follows :—

Transmitting : Half-wave doublet fed with 75 Ohm line. This aerial has the advantage that most of the energy from the transmitter is removed from the neighbourhood of the receiver to the aerial.

Receiving : Half-wave doublet at right angles to the transmitting aerial and as far from it as possible. The actual disposition of the aerials is shown in the sketch. The doublet receiving aerial was used because it could be erected reasonably far away from the transmitting aerial, and also, of course, the receiver could be worked without an earth connection.

Experiments have indicated that two end-on aerials are reasonably satisfactory for duplex working provided that they are at *right angles* and that a wave-trap, tuned to the transmitter frequency, is placed in the aerial lead close to the receiver. If possible, however, the pair of doublet aerials should be used, as really remarkable results may be obtained.

Practical Tests

Three receivers were tested from the point of view of duplex working :—

(1) A T.R.F. four-valve battery receiver employing a high-frequency pentode (with regeneration), buffer screen grid, triode leaky grid detector (with regeneration) and an output pentode. A wave trap was inserted in the connection between the buffer H.F. amplifier and the leaky grid detector. The receiver and all associated equipment were completely screened.

It was found that stations working about 150 kc. from the transmitter frequency could be read with a fair degree of ease while the transmitter was radiating. The pair of doublet aerials was used in these experiments, and with a pair of end-on aerials it was impossible to listen within about 400 kc. of the transmitter frequency. As a general rule, the use of a T.R.F. receiver is not to be recommended for duplex working.

(2) A small four-valve Commercial " All-wave " receiver of popular make, using a super-heterodyne circuit, but with screening not complete. The chassis was removed from the cabinet and a piece of zinc, cut to size, was used as a temporary cabinet. The receiver was already wired for a doublet aerial connection. With doublet receiving and transmitting aerials it was found that duplex working to within 50 kc. of the transmitter frequency was easily possible. The receiver was fitted with a system of automatic volume control, and this was later rendered in-operative as slight blocking of the receiver by the strong local signal was thus eliminated. When the doublet aerials were replaced by a pair of end-on type, duplex could still be worked to within 100 kc. of the transmitter frequency.

(3) A large communication type 10 valve receiver having one stage of R.F. preselection but no crystal filter. This receiver was completely screened in a metal case, and was fitted with optional A.V.C. action. Using the doublet aerials already described and with no A.V.C., it was possible to listen to within 25 kc. of the transmitter frequency without trouble of any kind. With a large receiver, such as that used in these experiments, the difference between the pairs of doublet and end-fed aerials was not so marked as in the case of less ambitious receivers. The doublet aerials, however, were still obviously more satisfactory.

Conclusion

In conclusion, it is perhaps worth mentioning that if duplex telephony is to be successful, modulation must be kept within reasonable bounds. While listening close to the transmitter frequency any over-modulation gives rise to very unpleasant rasping noises in the receiver.

The writer is experimenting with several systems for controlled carrier operation, and it is hoped that at a future date a further article covering this aspect of duplex working may be possible.

The Console Station

A Suggestion for Cramped Quarters

By J. G. Halley (GM8CF).

In amateur circles, discussion frequently rages around the best method of station assembly. As rack-and-panel, box, breadboard, and chassis layouts all have their good and bad points, the following suggestion for combining the desirable features of each may be of interest.

A sketch of the idea (not to scale) is given, from which it will be seen that, while there is nothing very new about it, no great skill in carpentry is required in the assembly.

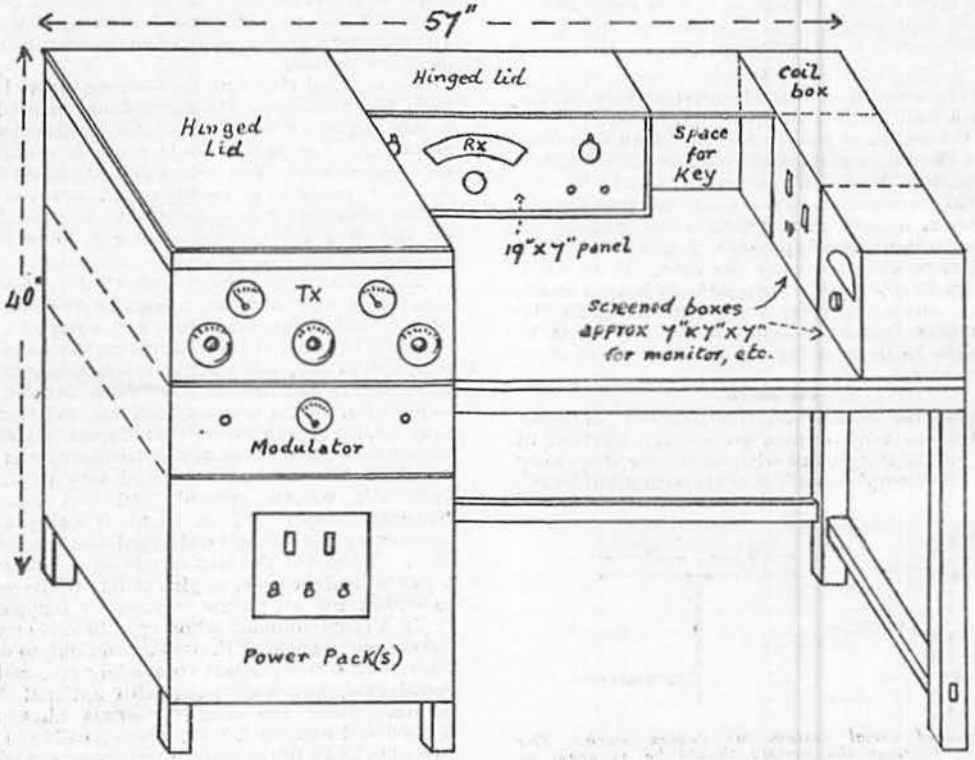
Briefly, the framework consists of an upright type of radiogram cabinet, obtainable "in the white" from any radio or handicrafts store, with a table built on to one side. A cabinet approximately 21" square should be chosen, as the front will accommodate standard 19" rack panels. It should be as high as possible, up to a maximum of about 40". This latter height is quite standard, and permits of the entire assembly being of uniform height throughout.

It is suggested that the whole of the transmitter R.F. section be mounted on one standard rack panel 19"×10", with chassis to suit, and the modulator (if any), immediately below, on a similar or narrower panel. The power pack could be housed in the bottom of the cabinet, the speaker fret being camouflaged by a panel carrying the power control switches.

"Laming-board," a form of plywood about ¾" thick, is suggested for the table, the length being about 36", and the back-to-front dimension the same as that of the cabinet. Along the back and the outside end are box-housings lined with perforated zinc, having hinged lids. A convenient height would be such as to accommodate 7" rack panels.

From details gleaned "on the air," it seems that this form of assembly would provide ample space for a large proportion of the rigs at present in use, and with a degree of accessibility which it would be hard to better.

There is no reason, of course, why the framework should not be built in two units, as the basic idea is simply to use a radiogram cabinet for the transmitter. The single unit, however, has the important domestic advantage that no wiring at all need show except the aerial and main leads. The "ex-YL" will probably appreciate this!



British Isles Calls Heard

VP4TO.—D. G. Bagg, ex G6BD, Pointe à Pierre, Trinidad. C.W., January 1 to February 12, 1939, inclusive.

G2: fi, ig, it, kg, lb. G3: fm, iq, ot, zv. G5: dw, ha, rv, gm5sc, gi5sj. G6: gl, gm, gm6iz, lc, gm6rv, sy, gi6tk, xp. G8: ac, fl, fv, gb, gm8mq, tx, uk, vv.

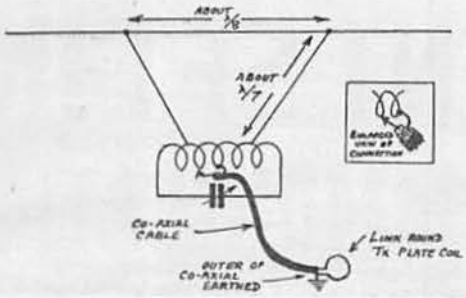
The above stations have not yet been worked. Full reports will be supplied on request.

Feeding a Rotary Beam Aerial

By Bryan Groom (GM6RG)

Those who are using, or contemplate using, rotary beam aerials, will be interested in the method successfully adopted by the writer for feeding such an aerial.

In effect, two feeder systems are employed, one, of low impedance, between the transmitter (some distance away) and the aerial tank circuit; and one of medium impedance between the latter and the aerial. The advantages claimed for this method, which is only applicable to aerials specifically designed for use on one particular wavelength, are better matching and lower losses.



The aerial tank circuit, of high L/C ratio, is contained in a weatherproof box (fitted with feed-through insulators) mounted on the rotating part of the beam, the driven element of which is connected to the coil by means of a "delta match." Since the whole rotates with the aerial, there is no fear of the matching altering or of the wires becoming twisted. The variable condenser, of 25 to 50 μμF., is mounted completely within the box (not on one side of it) and adjusted by means of an insulated extension spindle, since both sides are at high R.F. potential.

Telcon air-spaced, flexible co-axial cable is used to transfer the R.F. energy from the transmitter to the distant tuned circuit. The inner conductor is tapped on to the coil at a point, near the centre, at which standing waves on the feeder are eliminated: the outer conductor is connected to the electrical centre of the coil.

The cable should be taken away at right angles to the aerial for at least a quarter of a wave-length and preferably half a wave-length, before being led away to the transmitter. The proximity of stay wires, mechanism control wires and other metallic objects will not affect the line, providing the outer conductor is earthed, as it should be in any case.

Tuning Up

Standing waves on feeders mean that radiation is taking place, and, in this condition, the power reaching the far end is less than it should be. The tapping point on the coil at which standing waves are eliminated can therefore be found quite simply by noting when maximum power is developed in the aerial tank circuit for a given input to the transmitter, using any of the usual indicators for the purpose.

If the distant tuned circuit is adjusted without any load being applied to it, trouble is likely to occur from interaction between it and the transmitter tank circuit. It will be found possible to tune the far circuit to resonance, the anode current rising to a comparatively high value but, on retuning the transmitter tank, another point will be discovered at which the meter needle again dips down to a low reading. This process can be continued indefinitely and, to avoid the difficulty, it is suggested that an ordinary house lamp, of from 25 to 40 watts rating, be tapped across a few turns of the tuned circuit whilst preliminary adjustments are being made. The lamp will act as a resonance indicator in itself if the power employed is sufficient to light the filament.

A certain amount of judgment will be necessary to locate the correct points for the delta matching wires, these being tapped on equally each side of the coil centre. If the points are too close, indicated by unduly sharp tuning of the variable condenser, the aerial will not draw much power; if too wide, the tuned circuit will be heavily damped, with very flat tuning. It will not be difficult to strike the happy medium, at which points maximum power will be transferred to the aerial.

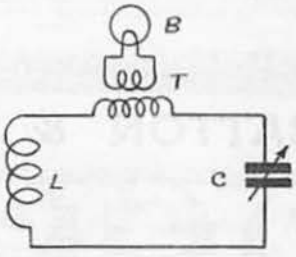
Another method of adjusting the delta match, and also of checking the adjustment of the cable match to the coil, is by using a reasonably remote field-strength meter, and adjusting for maximum reading, which will be obtained at optimum setting of the taps.

An Improved Absorption Wavemeter

By H. S. Chadwick (G8ON)

THE absorption wavemeter, as used by most amateurs, suffers from two notable defects, namely, lack of selectivity and sensitivity. Various circuits used by the writer indicated that these faults were due partly to the use of a lamp as an indicator, owing to the fact that currents of less than about 100 mA. gave little or no indication of their presence. Hence close coupling, with resultant lack of selectivity, was necessary to obtain a glow in the bulb.

In the instrument now used by the writer, the R.F. indicator is still no more elaborate than a twopenny 60 mA. fuse bulb, though both sensitivity and selectivity are greatly improved. It is possible to distinguish between frequencies less than 30 kc. apart in the 7 Mc. band and to provide an R.F. indicator for neutralising purposes which is quite as



Circuit of Absorption Meter

L 6 turns 3 in. dia.
C 160 μμF. Eddystone.
T Transformer (see Text).
B 60 mA Fuse Bulb.

A wooden baseboard or box is preferred to a metal cabinet.

sensitive as a milliammeter in the P.A. grid circuit.

Reference to the sketch shows that the place of the lamp in the conventional circuit is taken by a small step-down H.F. transformer the secondary of which feeds the lamp. Owing to its low consumption, this lamp is quite a sensitive indicator which, in turn, allows of very loose coupling to the transmitter stage in question, thus a considerable increase in selectivity results.

The H.F. transformer consists of a small former (a short length of heavy rubber-covered cable will do admirably, as a loop of wire at each end of the rubber-covered portion makes mounting a simple matter) on which the primary winding of eight turns of fine wire (36 or 40 S.W.G.) is wound. This is covered by a layer of adhesive paper or tape, and then the secondary, consisting of three turns of the same fine wire, is wound over this, and another layer of paper completes the transformer.

If the leads are kept short, it is possible, with the circuit values given, to cover the 7, 14 and 28 Mc. bands with a single coil. A greater step-down ratio in the H.F. transformer will increase selectivity, while the reverse will increase sensitivity. However, the number of primary turns must not be greatly increased or unwanted inductance will be introduced. If a slow-motion dial is used the instrument can be calibrated to a fair degree of accuracy.

This idea may not be original and the excuse for recording it is that it works out very well in practice. It must be noted, however, that selectivity is still far below that of a heterodyne valve frequency meter, and so cannot be used as an absolute frequency check. The improvement on the more conventional circuit, however, makes this small alteration definitely worth while.

One final point: since using this circuit, the writer has not burnt out any bulbs, even using very close coupling, whereas with the conventional circuit a regular supply of bulbs was required!

Telephony and Telegraphy Break-in Working

By R. W. H. Benson (G8NF) and E. H. Jones (G3CJ).

IN view of the undoubted advantages, particularly on congested wavebands, of being able to use "break-in" or (in the case of T.R.F. receivers) "rapid change-over" working, the following details may be of interest.

The method used is that of breaking the receiver H.T. line each time the key (or push-button control, in the case of telephony) is operated. The first scheme tested utilised the magnetic field through a solenoid-type choke in the key-click filter to actuate an armature with contacts, which opened the receiver H.T. circuit when the transmitter was keyed. The key being in the cathode circuit of a simple 6L6 crystal oscillator, as in Fig. 1. The method is, of course, only applicable to a circuit in which the current flowing is sufficient to actuate a relay, and the scheme was accordingly modified to provide for relay keying of the C.O. either in H.T. negative, cathode, or screen circuits.

Relay Keying of C.O. stage

The keying relay, a 200 ohm D.P.D.T. type, operating at about 25 mA., was arranged to key the transmitter and receiver simultaneously, the connections being so arranged that when the transmitter contacts were closed, the receiver contacts opened, and *vice versa* (Fig. 2). The relay power supply consisted of a *Ferranti* AF3 L.F. transformer

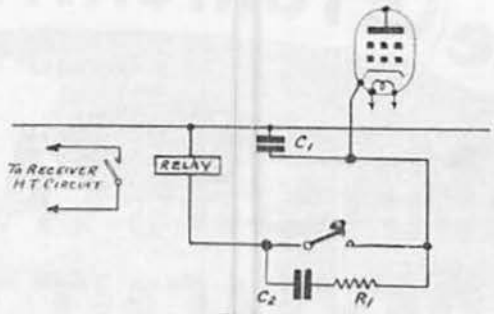


Fig. 1.
An easily installed rapid "change over" system especially suitable for telephony operation.
C1 .0002 μF R1 1000 ohms.
C2 1μF Relay 30 ohms. 40 mA type

with one half of the primary across the mains, the secondary being rewound with five layers of No. 26 S.W.G. D.C.C. The output from the transformer was rectified by a small metal rectifier (96 mA. maximum) and a 25 μF. 25-volt electrolytic condenser connected across the output; which was

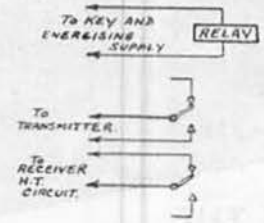


Fig. 2.
Basic Relay switching circuit for break-in operation.

approximately 5 volts under load. A filter, consisting of a 1 μF. condenser and 1,000 ohm resistor was connected across the relay receiver contacts,

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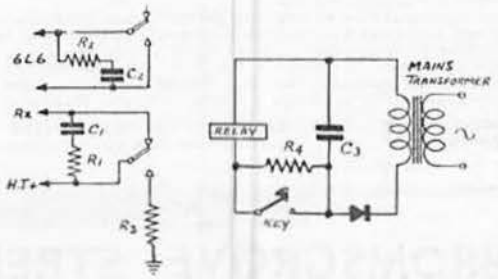


Fig. 3.
The complete Break-in Circuit with filters.
C1, 1μF R1, R2, R3, 1000 ohms, ½ watt
C2, 0.1μF R4 1500 ,, 20 watts
C3, 25μF Relay 200 ,, 25 mA
Transformer can be Ferranti AF3 modified as per text.

Experimental Section

MANAGER, A. M. H. FERGUS (G2ZC).

WITH increasing interest being shown in Cosmic matters an effort is to be made to publish more up-to-date information in this Journal. Already Mr. E. J. Williams (G2XC) gives us each month a summary of Cosmic conditions, but it is felt that some effort should be made to correlate Solar Observations with Radio Conditions.

The suggestion is that we should form a small group of interested members who will exchange data on radio conditions with Mr. Percy Murden (BRS3379), of 320, Bowes Road, New Southgate, London, N.11 (Enterprise 3087), who has offered to observe and photograph the sun daily (weather permitting).

For this important work to be carried out effectively it is essential that the co-operating stations should be within economical telephonic distance of London and, further, that they should be prepared to carry out regular transmitting and/or receiving schedules. The exact details will be worked out by Mr. Murden and those who offer their help.

From the data collected a monthly report correlating Solar Conditions and Radio Conditions should become possible.

The scheme is open to all members of the Society, who are invited to communicate with Mr. Murden direct.

The ultimate aim is to extend the scheme to such other parts of the country where members are in a position to obtain daily Solar or Cosmic data.

Questionnaires

The E.S.M. wishes to again point out that those who have not returned the questionnaires sent to them by the G.M.s or the E.S.M. are causing unnecessary delay in the formation of Groups, etc. Early attention to this matter will be of assistance to all concerned.

G2ZC.

Aerial Group

Experimental work continues in all Groups. A decision has been reached that a half-wave dipole, fed with 80 ohm feeder, shall be used as a standard on which all experiments are based. The height of the aerial shall be 33 feet. Vacancies exist for interested members.

G2IM.

Propagation Group

The Journal of the British Astronomical Association for February contains a graph of the daily frequency of spots on the sun which shows a gradual upward trend for the last five years, save for a decided fall in November, 1937, coming to a maximum in 1938 (July ot October), since when there appears to have been a fall. It is to be noted that mean daily spotted area differs from spot frequency, and the former may be taken as the criterion for maximum, which in the present case would have happened in 1937. Conditions on 28 Mc. and measurements of critical frequency confirm that the sunspot maximum has passed, probably in late 1937.

Following the Aurora and Magnetic Storm of February 24, the F2 layer rose to a great height and the critical frequency at noon on the 25th was very low, and half that of the previous day. All signals on an East-West path were affected on the higher frequency bands, but signals from Africa and the East Indies were still heard at good strength. The fact that stations in the U.S.A. working on 56 Mc. contacted up to 1,200 miles seems to indicate that the radiation from the sun causes not only a magnetic storm but also intense ionisation of the upper layers with subsequent absorption of the higher frequency waves. This is confirmed by short skip on 28 Mc. preceding the storm.

The new Conditions Group under G8AA urgently needs keen A.A. and B.R.S. members, with a sufficient knowledge of morse to read calls, who will take regular observations.

I1ER and VU2AN are providing useful reports for the active 28 Mc. groups.

Mr. L. F. Coursey (2FHA) has been appointed Assistant to the Group Manager and Mr. W. F. Holford (G5NG), Group Centre of the 56 Mc. A group.

G8DA.

Receiver Group

Three interesting points have come to hand this month :—

(1) The first concerns a method which aims at overcoming the main difficulties in super-regenerative receivers for U.H.F. communication. At present the disadvantages of this type of receiver are :—

(*a*) High noise level.
(*b*) Poor selectivity.
(*c*) Masking effect when receiving strong signals.

It is claimed that all these difficulties may be overcome by a method of anti-phase qeunching. The detector consists of two oscillators on nearly the same frequency and the quenching voltage is applied 180 degrees out of phase to each.

(2) Many amateurs have difficulty with measuring apparatus of various kinds, due to mains fluctuations and to valves ageing. In order to eliminate mains fluctuations, batteries are often resorted to, but this is not always convenient. By introducing feedback, the amplification of any given amplifier can be rendered independent of the circuit. Referring to the diagram a fraction (β) of the output of an amplifier is fed back in series with the input. If m is the gain with feedback and m_1 the gain without feedback, E_2 the output voltage, E the input voltage without feedback and E_1 the input with feedback to give the same output, then :—

$$m_1 = \frac{E_2}{E} \text{ *}$$

$$\text{and } m = \frac{E_2}{E_1} = \frac{E_2}{E+\beta E_2} = \frac{m_1}{1+m_1\beta}$$

i.e., the gain of the amplifier is reduced in the ratio of 1 to $(1+m_1\beta)$.

* "Instruments Incorporating Thermionic Valves." I.E.E. Dec. 1938. By James, Polgreen and Warren.

Any variations in valve characteristics or mains voltages will give rise to a change in amplification. If δm_1 be the change in amplification without feedback, and δm the change with feedback, then

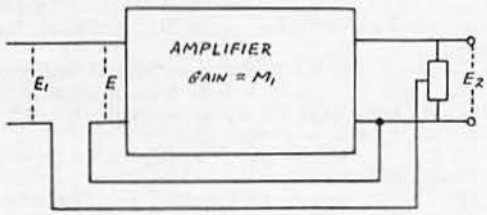
$$\frac{\delta m}{m} = \frac{\delta m_1 / m_1}{1 + m_1 \beta}$$

Therefore the percentage change in amplification is reduced by an amount corresponding to the reduction in amplification.

If $\frac{1}{m_1} \ll \beta$, the gain $m \simeq \frac{1}{\beta}$

The feedback may conveniently be applied by inserting an impedance in the cathode circuit of the valve.

(3) The following method of obtaining constant detection characteristics in a straight receiver may be of interest. This can only be applied when



feedback is applied by a "tickler coil." If a resistance of 2,000 to 3,000 ohms is placed in series with the "tickler" coil and a condenser placed across it, it is possible to obtain a circuit whose oscillation threshold remains practically constant for a given setting of the reaction condenser over a wide band of frequencies. The exact values of components used vary with circuit conditions, and so some experimenting may be required, but the idea is useful for "taming down" a detector which is too lively.

G5HF.

Transmitter Group

The activities of the Transmitter Design Sub-Group controlled by J. M. R. Sutton (GW2NG) are of a nature which would undoubtedly prove of much interest to the many 56 Mc. enthusiasts who read this Journal.

This particular group is concerned almost entirely with problems concerning 56 Mc. operation, the main line of experiment being the design of a compact 56 Mc. crystal-controlled transmitter, incorporating a minimum number of stages. To this end, the earlier valve or valves must necessarily be of the pentode type, and, further, frequency quadrupling is desirable, in order that use may be made of a 7-Mc. crystal, thus keeping the cost reasonably low. It has been found that a good deal of experiment is necessary with each different type of pentode valve to discover the operating conditions which give maximum efficiency and output when quadrupling.

It is intended that the final valve shall be a Power Amplifier and not a Doubler, since the comparatively poor efficiency of the latter means that the final R.F. output obtained, especially when low input power is employed, will be detrimental to results on the air.

A further line of experiment being carried out simultaneously is in connection with the production of stable E.C.O. circuits, the object being to achieve a final stable 56 Mc. output, again with the minimum number of stages.

There are still a few Group vacancies for those interested in experiments of this nature.

G5JU.

Cosmic Notes

Sunspots

An average group of sunspots were observed to cross the sun's central meridian on March 17, and other smaller centres of activity on March 14, 19, and 23.

Tokio reported a high prominence on the north-east limb of the sun on February 26.

Magnetic Elements

Several disturbances of moderate severity occurred during March. The first of these began on March 1, and continued with varying intensity until March 5. Then followed a comparatively quiet period, which was interrupted by a moderate disturbance on March 9. Another disturbance began early on March 15, and lasted for two days. A short disturbance lasting about one hour was recorded at 0228 G.M.T. on March 20, and was followed by moderately disturbed conditions on the following days. This condition continued until midday on March 23, when its intensity had become slight only. Conditions were still somewhat disturbed on March 24.

The Ionosphere

Critical frequency measurements at Washington, U.S.A., at noon local time for the F2 layer were as follows: February 22, 11,700 kc.; March 1, 12,100 kc.; March 15, 8,400 kc.; March 22, 11,300 kc. Mild ionosphere storms were recorded on March 16, 21 and 22, and Dellinger fade-outs on March 20 and 21.

The sunspot data in these notes is obtained by personal observations, the magnetic data from the U.S. Coast and Geodetic Survey at Cheltenham, U.S.A., *via* Science Service, and W1XAL, etc., and the ionosphere data from the National Bureau of Standards at Washington, U.S.A.

G2XC.

February Aurora

By S. W. Allcorn (2FIH).

THE very large sunspot which made its appearance on the surface of the sun on February 11, 1939, was no doubt responsible for the Aurora, Magnetic Storm and Radio Fadeout of February 24. This spot had an area of 800 millionths of the sun's surface; a spot of 500 millionths or more is considered large.

The sunspot crossed the Central Meridian on February 17 and passed over the west limb on the 24th: this would send out from the sun a stream of ions of sufficient velocity to carry them clear of its atmosphere. The stream would reach the earth's atmosphere in 20 to 60 hours, depending upon the solar longitude of the eruption on the sun's surface.

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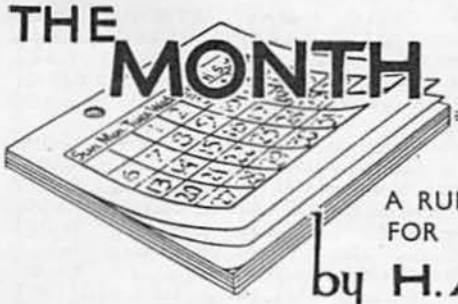
THE MONTH ON THE AIR



A RUNNING COMMENTARY OF RADIO CONDITIONS FOR THE MONTH OF . . . . . MARCH, 1939

by H. A. M. WHYTE (G6WY.)

THE game of "Numbers" and the "Great Dog Fight" are over. The last week in March saw the bands in a sombre state following 20 days of trying to push several thousand stations into bands which would only accommodate a few hundreds with any degree of comfort. Conditions during A.R.R.L. Contests may be said to have been "down" compared with the corresponding period last year; especially was this so so during the first week-end of the CW event. This continued deterioration of conditions during the winter brings forth the depressing thought that we are on the decline, and low-powered stations will in future have to fight even harder for their new countries. Ere long, we may see the 14 Mc. band behave as it did in 1931-32, *i.e.*, be of no use as a DX communication channel, with the bulk of the long distance contacts taking place on 7 Mc. We ask for no forgiveness in saying that the 14 Mc. "local telephony" enthusiasts will undoubtedly have the time of their lives!

We feel also, that the DX telephony contest has outlived its original novel purpose, unless it be confined solely to 28 Mc. There are too many stations using telephony in the restricted 14 Mc. band to enable a world wide telephony contest to be of *any interest* to the amateur world at large, unless the individual uses a kilowatt and an efficient beam. We recommend *strongly* that this event be dropped. Apart from any other consideration, the temptation to increase modulation well beyond the 100 per cent. mark appears too strong to those who have the necessary audio equipment. It was particularly noticed that the stations using very heavy over-modulation were the ones making the most contacts.

The "mystery" of the VP-ZA series is now cleared up, thanks to a card from A. E. Mitchell, who normally operates G8DF. He is running 20 watts to a 66-ft. aerial on board the M/Y "Rosaura," which acts as the base for the Royal Commission in the British West Indies. All contacts have been made when the yacht has been in harbour at the different territories indicated by the prefix, but these contacts do *not* count for the DX Century Club as they have been made from a ship.

G2DH continues to work new ones, his latest being LZ1ID, VS2AL, CR4HT, FQ8BS and VR4AM, but the last two are a little doubtful to our mind, especially FQ8BS. Other interesting stations worked include VP4TP, HH4AS, VP2AC, U8IB and CR7AD. A card received by G2DH from YS2LR now requests QSL's to be sent *via* W5FIW, and in answer to 2DH's query, both PJ1BV and LZ1ID QSL! G3BS has raised VQ8AI, KA1FG, PK1TM, 1WA and XZ2AB, who states that cards should be sent to A. B. Raye, 78, Frazer Street, Rangoon. Further news from AC4YN indicates that he will mostly be heard (we hope) on a new frequency of 14292, although his others, 14106 and 14157 will also be used—another to succumb to the H.F. end temptation! Incidently, we heard a station signing AC4YN on 28 Mc. on March 11 at 1330 G.M.T., but his note was not crystal and drifted about 30 kc.

G6ZO added KB4AAN (Virgin Islands) on 7300, VK7LZ 14030, and VS6AE 14280 to his list, while YI2BA 7100, XU4XA, VQ4CRE, 2PL, 2MI, helped to make an interesting month on the air. G6ZO can usually be counted on to hear everything that's worth hearing, and the following will bear this out: SM5RY, "Crown Princess Margareta," bound for Rio de Janeiro, TI6RR very active during the DX contest on 7 Mc., HR9Z also on 7 Mc. CW., ZD4AB, VP2LC 14120 (St. Lucia), I7AA 14390, XE1NN 7015, J8CA 14395, OA4R 14395, PK4KS 14320, HR4AF 7040, HI6Q 14310 and VP5PZ active again on 14320. G8IW furnishes us with the QRA of VS6BE—Box 651, Hong Kong, and CR4HT signalled Box 61, Praia, Cape Verde Islands. Incidentally, the latter's address appears in the new edition of the Call Book, so he must be genuine! G8IW worked VQ8AI (who always QSLs), KA7TT, whose address is not yet known, and our old friend TA2BS, who wishes to create further mystery by rivalling TA1AA. The prefix EK is now officially allotted for Tangier I.Z., thereby replacing CN1, which was unofficial. (We cannot understand the authority for this prefix as EK is assigned to Japan according to Cairo regulations.—ED.) It may have been noticed that both CN1AA and CN1AF were off the air for a time pending licences, after being requested to cease operation until the matter of regularising amateur radio in the zone had been settled.

G3AH contributes VP4TO 14320 2250, KA1FG 14360 1455, CR4HT 14440(!) 1915, and K7GFY 14370 0825. He has now worked 66 in 28 Zones and informs us that XU4XA has obliged with a card. G6YR added three—VP5PZ 14300 1145, J8CD 14400 1900, CR4HT 14430 2200. G6XL has fallen—we should explain ourselves better by saying (unless you've already heard it!)—he's on 'phone. He at once noticed that there were many new countries to be worked that had rarely

been heard on CW, especially the VP's. New countries for 6XL were: VS7RA, VP3AA, YV1AQ, and in four days he had WACP. (W.A.C.P. is an editorial brainwave! G6WY.) The best heard on 'phone included VS2AK 14065 1600, VP9R 14130, VP9L 14050, VP9G 14031, VP6FO 14092, W5GGX (New Mex.), HK5EE 14288, HH5PA 14146, PK4KS 14308 and PK4JD (worked).

A card received from BSWL 877 at Ipoh, Perak, Malaya, states that he will listen for G phones on 14 Mc. from 1440 G.M.T. every Saturday, and reports will be sent to any G who wants one—so call BSWL 877. He reports G4CY as an amazing signal on 7 Mc. G3JR raised his country total to 87 with VU7BR 14350 1530, VS1AL 14340 1600, CR7AF 14285 1830, VP2AB 14410 2030, VP5PZ 14305 1150, VQ4CRI 14310 1950, CR4HT 14430 2145, and K6PLZ 14350 0800. VE5LD in Zone 2 was added to the Zone list; he is in Cambridge Bay, N.W.T., which is believed to be in King William I. His most interesting contact was with XU1AG, who gave his QRA as Suiyum, Box 56. Now the only place with a name resembling Suiyum is a province of Inner Mongolia described as Suiyuan on British Maps, which is in Zone 23, *i.e., the same Zone as AC4YN!* Input was 600 watts on 13985 kc. at 1800, but unfortunately, Inner Mongolia is not considered to be a separate country by any recognised country list, as it is gazetted as a province of China. On 28 Mc. he worked HI7GW on CW—is this any relation of HI7G? 2DZZ of Taunton heard 'phone from ZL3KX at 1500 and from VS6AL at 1530.

G5BD was the first G to work VK9, as he contacted VK9VG on November 7, 1938, whereas G6GH raised the same station three days later. G5BD is also on phone and has been rewarded by TG9BA and HI3N on 14 Mc. and VP3AA on 28 Mc. The key brought forth such DX as J8CA, J8CD and ZD4AB, bringing his total to 125 with only 103 confirmed, while YV4AX was worked on 7230 giving him 7 Mc. WAC. Additional DX heard by G5BD includes VP7NT 14405 1100, VP1AA 14290 1030, VP1BA ('phone), I7AA 7180 0001, OX7XL 14390 2200, KF6KHW 14370 1830, OY7AN 13995 1900, VP2SC 7090 0030 (St. Vincent), and YN1IP 14030 2330. G3BK thinks he had the first G3/W contact, as he worked W8RJM on December 13, 1937, thereby depriving that old G-man, W1WV, of the privilege. KA1RP, ZC6RL were worked, and KA1FG 14360 1600, XU4XA, 3LK, 2AW heard about 14350 between 1500-1600 G.M.T. by G3BK.

BRS1066, of Burton-on-Trent, who has been doing some interesting listening on 1.7 Mc., reports reception of FA, HB, F, HA OZ and ON, which only goes to show that "160" is beginning to regain some of its former glory. This is not to be wondered at considering recent conditions on 7 Mc. VP2SC, HR4AF, FM8AD and VP6MY were also unusual countries heard on 7 Mc. Incidentally, BRS1066 is a budding rival to BERS195 and 2AOU, as he has heard 138 countries with 102 verified. BERS195 was marooned by the recent floods in Northern and Central Australia, but managed to chalk up 1465 points in the B.E.R.U. Contest representing 115 stations in 27 zones. 28 Mc. conditions grew rapidly worse in VK, but VS2AS and VS6AO were heard in early February. Besides hearing ZE2JB, who is genuine in Salisbury, BERS195 reports ZE2JC as well as such tit-bits as CR6AF, CT3AB, KG6NVJ, KD6OPJ, VP2LC, VP4TO, VQ4LMA, YI2BA, YV1AK, ZC6RL, on 7 Mc., while 14 Mc. produced CR4HT, OA4Q, VP1AA, VR1AP, VS4AD. Apparently, K6PMP is still very active in Guam, but should be signing KB6PMP.

VU2FO, who comes into the B.E.R.T.A. seekers list this month, worked VU7BR, VS6BE (Capt. Whatman, Command H.Q., Hong Kong), VU2CZ (c/o Hyderabad Regt., Peshawar), CR7AG, VK9BW, PK4FS (Riouw Is., Singkep), XZ2AB, VQ2EF (Broken Hill) and last, but by no means least—AC4YN on 14292. VU2AN completed his 3.5. Mc. tests by working G2PL, 2ZQ, 5BD, 6RB, 6CJ, 6WY, GI6TK, GI5SJ, HB9CE, D4KSD and HA6K, and has also entered the B.E.R.T.A. "stakes." He is willing to arrange a schedule with any station requiring a QSO with Baluchistan and makes some interesting remarks about QRP with 220 v. D.C. mains which caused a spot of argument a few months ago. He writes: "Some people are happy running up to 25 watts, and I understand theoretically that one is supposed to get an extra S point by increasing from 10 to 25 watts, but when that involves running a PA with a tank impedance of 1950 ohms and its low L/c ratios, I think most of the gain goes up in smoke or hot air." VU2AN uses 220 v. D.C. mains.

G8CV contributes K4EZR, HI7G, VP3AA, PK1VM, PK2WL, VE5GQ, and PY8BC as having been worked on 28 Mc. 'phone, while VU2AN and FB8AA obliged on CW. On 14 Mc. 'phone, PK5EC was a most unusual contact with PK1RI proving his signals really reached the D.E.I. PK5EC is not listed in the call book, but he should be in Dutch Guinea if genuine. On CW CR7AY 14070, K7ETS 14380, VS7MB 14320 were raised on 14 Mc. His input still stays at 25 watts. Once again we have the old question from 2CNC in Jersey—Is TA1AA genuine? We wish we knew as we've worked him! U1AD in Murmansk was heard on 7, while XU4XA represented his best for 14 Mc. G3BI has concentrated on Asians with the result that ZC6EC, J2JJ (0830), PK1MF, J2NF, XU8HM, VS2AL answered his calls. G5FA, ever active on 7 Mc., registered some new countries in ZC6RL, VP6MR and YI2BA, and heard ZL4AO, TI2RR, EA5JA and TA1AA!

G6CL remarked last month that SU1JM and 1RH were putting through amazing 'phone signals on a "dud" band during the Aurora period. G3GH tells us that the same applied last year in May during the Aurora display when she worked SU1RK six times between 21.30 and 01.00 G.M.T. on an otherwise "dead" band. Here is something for our Propagation Group to work on.

BRS3319 of Thurnby, Leics., listens every morning, and was rewarded by his first K6—6NYD. He remarks on the fact that the VK 'phones are with us again in the mornings, especially VK3HG. Other 'phone DX includes CE3AT, HI3N, ZS6DY, VP3AA, ZS6AJ, YV's, VP9's, and K4's on 14 Mc. Finally, G2DH would like some information on AR8AO heard outside the H.F. end of 14 Mc. sending V's and "pse QSL."

Reports Wanted

W9DRZ (Saint Louis, Mo.) on his 28 Mc. C.W. and telephony transmissions. All reports will be acknowledged.

THE 28 Mc. BAND

By NELLY CORRY (G2YL)

CONDITIONS during March were very disappointing, and there were many days when it might have been mid-summer for all that could be heard on the band. BRS25, whose activity is mainly confined to week-ends and week-day evenings, found it the worst March since 1935, and there is no doubt that conditions were, at any rate, much inferior to those of 1937 and 1938. Thanks, however, to the A.R.R.L. DX Contests activity was at a very high level, particularly in the Southern Hemisphere, and reports indicate that more than 120 DX stations (exclusive of W's, VE's and Europeans), in 56 countries were logged. BRS3179 is to be congratulated on having heard 101 countries on 28 Mc. since December, 1936 ; it would be interesting to know if anyone has exceeded this total.

There was a surprising absence of Oceanic signals, and apart from PK1VM and 2WL, the only stations reported were K6MVV, heard by BRS3179, and VK4SA and W6QGL/Hawaii portable, heard by 2AOU. PA0FB had 23 PK QSO's during the month, and G2XC reports PK1VM as an outstanding signal, with strength sometimes up to S8 from 1200 to 1430 G.M.T. BERS195 reports that conditions in Northern Australia were very poor in February, and he heard no signals from Europe, Africa or South America, though on February 5, 15, 16 and 19 he logged stations in K6, KA, VE, VS2, VS6, W and ZL.

Asiatic signals are not very numerous these days, but VU2AN is as active as ever, and VU2FO and 2FS were occasionally audible at week-ends. VU2AN had 10 QSO's with G6DH, but their daily schedule is getting more and more difficult as conditions deteriorate. He reports hearing W1BBX on February 13, and W1ME and W2TP on February 22, but despairs of working the U.S.A. himself without the assistance of a kilowatt and a beam, or very freak conditions ! VU7BR was often a strong signal around mid-day, and during the month gave many G's their first contact with Bahrein Island.

African signals were heard on 17 or more days, and included over 50 different stations. Of these, 29 were in ZS, the majority taking part in the A.R.R.L. Contests, and apparently enjoying better conditions than were European competitors. Other African stations active were CR7AG, CR7AK, FB8AA, VQ2FJ, VQ3TOM, ZE1JR, ZE1JZ, ZE2EA and seven SU's.

South Americans were louder and more numerous than for some months, and 29 stations were logged. These included 13 LU's, 6 PY's, CE2BX, CE3BA, CX1AA, CX1FB, CX1GB, HC1FG, HK1BM, VP3AA, VP3LF and YV1AQ. The DX Contests were also, as usual, well supported by stations in Central America and the West Indies, of whom nearly 40, in 17 countries, were heard in G. The more unusual calls included FM8AD, HI1M, HR4AF, TI2FG, TI2RC, TG9BA, VP1BA, VP1DM, VP4ZA, VP9L, VP9R, YS2LR and six XE's.

North American signals were inaudible on several days, poor on most days, and at no time really consistent, as they frequently were in March, 1937 and 1938. Signals from W6, 7 and VE5 were only heard on a few days, and G8JQ reports a scarcity of W1 and 2 stations during the DX Phone Contest ! The Fourth District was heard more often than most, and on some days W4's and Central Americans were coming through when the more northern W's were inaudible. BRS3003 heard W3FPI Mobile on the Atlantic on March 11, and 2AOU reports K7AK (?).

Signals were heard from about a dozen European countries, but apart from a few stations in Eastern Europe they were rarely heard, and usually very weak. OH2NB reports that the band in Finland has been practically dead for the last two months ! On March 26 he listened for some time and only heard OA4U on C.W. and a few W 'phones. In G this was one of the best days of the month, as all continents were heard, including signals from PK, VU2, VU7, SU, ZS, HC, HK, LU, VP3 and W.

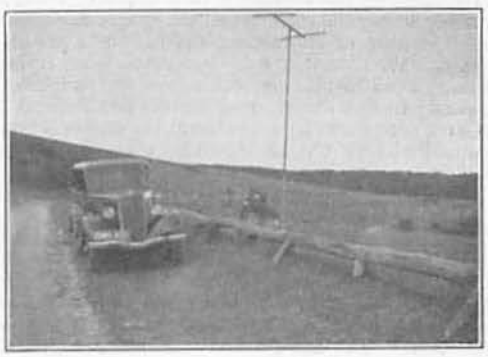
Many thanks to the following for their reports :— G2CR, 2XC, 6DH, 6QZ, 8JQ, 2AOU, BRS25, 3003, 3179, BERS195, PA0FB and VU2AN.

The 56 Mc. BAND

By J. M. R. SUTTON (GW2NG)

WHEN not actually reporting British and American activity we always seem to be issuing appeals ! This month is no exception, and we sincerely hope that this one will be answered. Every year since 56 Mc. activity became general the band has produced what is known as " Summer DX." This has become such a regular feature of U.H.F. conditions that the latest news from America gives details of stations preparing for this period of activity which usually occurs in May, June, July and sometimes August.

G6DH advances his skilled knowledge of propagation conditions on 56 Mc. to voice a plea that there be considerable *European* activity in the months of April to August. During these months it is possible to obtain conditions favourable to propagation between 500 and 1,000 miles, but to take advantage of these distances activity on the Continent is needed. May, June and July are the important months, so we urge everyone to become active during this period, particularly European stations. Although the high-frequency limit up to the present time (late March) is 10 Mc. down on 1937-38, the



2AAH portable at Goodwood located 500 ft. above sea-level.

short-skip summer conditions may prove favourable. Make your good resolutions effective *now, in April*, so that you will be operating on the band when May arrives.

British Notes

G6DH has been active, but finds little time to report. Although it does not help to write this page, our personal opinion is that regular and frequent activity is worth many reports! However, please do not stop reporting after reading this! G6DH, who is keeping regular schedules with 2OD, tells us there was a very good patch of conditions between January 30 and February 6. Two-way 'phone QSO's were made with 2OD (85 miles). A schedule is being kept with ON4DJ (90 miles), but with no success so far. Stations worked in February were G6QZ, 5MA, 5BY, 2OD, 6VX, 2AO, 2MC, while 8OS was heard at a distance of 100 miles. A very welcome surprise recently arrived from H.Q. in the shape of a confirmed report from DE3229F (Berlin), who heard 6DH calling "Test 56" on May 24, 1938, at 12.45. The report was RST359, and it will be remembered this was just prior to the departure of 6DH to America when conditions were definitely good, and at the time when 6DH had heard SM5SN.

BRS2601, now 2ADZ, when rebuilding his receiver in January, found that a 0.0003 μF grid condenser and the incorporation of an *Eddystone* 5 to 100-metre H.F. choke in place of the usual 2.5 to 10-metre type improved its performance very considerably. G6DH was heard on February 1 to 5, with very consistent signal strength, averaging S5, with QSB to S3. The best day was February 15, when 6DH was S8, with no trace of QSB. G2UJ, 8OS, 2ZV and many other stations up to 20 miles were also heard that day. 8OS (30 miles) had a real "DX flutter," and signal strengths were all around S6 to S8.

2ADZ is still intent on his contrasting weather conditions theory, and found that the weather was getting warmer up to February 14, when a sharp frost occurred.

Weather conditions during March were very even, consequently DX conditions were poor. 6DH was only heard on March 10 at RST229 with QSB to zero. G2ZV was heard fairly regularly, due to ground-wave reception at 40 miles, but 2UJ was only heard on March 14. Activity is very sporadic, and 2OD is the only dependable station to be heard.

He suggests the formation of a chain of reliable stations across the country, so that any one station could be sure of contacting another on a specific evening. We note that American stations are trying to build up a 56-Mc. network across the continent. So surely we can do the same on this small island!

G8CV intends to be active from the end of March onwards with CC CW on 56,035 kc. with a beam and 25 watts.

Continental Activity

News of Continental activity comes from J. Ramond (F8VC), 224 Bould. Voltaire, Paris XI, who intends to be active on CC 'phone (and, we hope CW) with 50 watts input on a frequency of 56,576 kc. His transmitter is 6L6-6L6-6L6-T20, and the modulator consists of push-pull 6L6's in Class AB1. The microphone is a new Brush HL, while the receiver is a home-constructed 9-valve super-het with acorn valves 954, 955, 956. The dates and times of transmissions will be announced later, but we are sure F8VC will be happy to supply them direct to interested stations. Here is the chance for a continental contact under summer DX conditions! F8VC and his brother CN8BA are both members of the R.S.G.B.

American News

Some very queer effects on 56 Mc. were noticed in the U.S.A. on February 24, 25, 26, March 3, 4 and 6. These effects were associated with severe ionosphere storms and displays of the Aurora Borealis. 56 Mc. DX on the above dates was both unusual and varied. Unfortunately it is not possible to give details here this month, but the data is being circulated to all groups interested in U.H.F. propagation. Details have also been received of an ultra-sensitive 56 Mc. receiver, employing the concentric line method of tuning, with acorn valves, as mentioned in these notes last month. It is hoped to make the receiver description available soon.

Finally, get that transmitter and receiver on the band by May!

Third Annual 56 Mc. Field Day*

As announced in last month's issue the Third Annual 56 Mc. Field Day will take place on July 9.

The rules which are given below follow closely those in vogue last year. As the previously specified times of operation, viz., 10 a.m. to 8 p.m. (10.00 to 20.00 B.S.T.) have met with general approval, no change has been made in this respect.

Rules

1.—Stations must be installed in the open air and at a *fixed* point inside the radius covered by the station portable licence.

2.—The input to the valve or valves delivering power to the aerial must not exceed 10 watts.

3.—Contacts may be made with home and portable stations operating in the band 56-60 Mc.

4.—Stations must be equipped with frequency-measuring apparatus or the transmissions must be frequency stabilised by means of a crystal.

5.—The station call must be suffixed by the letter P.

6.—The event is only open to fully paid-up members of the R.S.G.B. and a declaration must be signed by the entrant stating that the terms of his or her licence have been strictly adhered to.

7.—Entrants must apply to Headquarters not later than June 19 for an official log sheet.

8.—The Mitchell-Milling Trophy will be awarded to the entrant submitting the best log and technical description of the equipment used, together with observations recorded. In judging the entries the adjudicators will also take into account other 56 Mc. work accomplished during the present year. Certificates of merit may also be awarded.

9.—Council reserves the right to amend or alter these rules at any time prior to the commencement of the event and their decision will be final in all matters connected with its operation.

10.—All entries must reach Headquarters by Monday, July 24, 1939.

*NOTE:—*This event is confined to those already holding 56 Mc Portable permits.*

To encourage observations by B.R.S. and non-transmitting members, certificates of merit will be issued to the operators of portable receiving stations submitting the best entries judged on the basis of Rule 8 above.

* * *

It should be clearly understood that this event is not a competition and points will not be scored for contacts. Awards will be made entirely on the basis of Rule 8. Furthermore, it is emphasised that whilst no restrictions are made regarding the system of transmission employed, it is very desirable from all points of view that competitors should be equipped for both C.W. transmission and reception. C.W. should be employed during the major portion of the event. It is anticipated that many fixed stations using C.C. transmitters will also co-operate, as was the case last year.

Members taking part in the Field Day should in their own interests advise Headquarters not later than May 28, so that a list of call signs and venues can be published in the June issue of THE T. & R. BULLETIN.

F.O.C. Notes

By R. WEBSTER (G5BW)

AS things are at present, the remarkably rapid increase in Amateur licences in this country seems likely to prove a mixed blessing for the Amateurs themselves, and it needs little imagination to envisage, in the quite near future, an intolerable situation, particularly on 7 Mc. Even now, under normal conditions, serious experimental work on that band is often extremely difficult, chiefly owing to telephony interference. A very unpopular remedy would be to forbid British telephony stations to operate on the band at all, but a more reasonable solution would be the establishment of a British 'phone band from 7,200-7,295 kc. Under the prevailing conditions the full and correct use of an appropriate system of operating signals and information codes is more essential than ever for successful working, and pending a solution to the interference problem it is up to both telephony and CW stations to co-operate in ameliorating the position by careful and correct operating.

It is obvious that to facilitate the rapid and precise exchange of technical information and scientific data we must have codes specially compiled by ourselves for our own particular needs. One of the preliminary requirements is to reduce the amount of superfluous signalling caused by the inadequacy of the Q codes, the continued use of which in their present form is often of little or no advantage. Three courses are open to us: (1) Modify the present Q codes; (2) produce an entirely new code (or codes); or (3) supplement the present Q codes with additional signals or codes covering subjects not dealt with or ineffectively dealt with.

Various correspondents have asked us if we have any intention of attempting to introduce reforms on the lines suggested above, but we feel that such a task could only be undertaken successfully in co-operation with R.E.S. We are quite willing to deal with any points concerning operating alone, but obviously the Society's official Experimental Section should contribute the chief suggestions on the scientific aspect. It is our opinion that this long-neglected matter should be tackled without delay, and we should be pleased to co-operate wholeheartedly with R.E.S. or other responsible bodies.

We recently received a very sensible suggestion from GM3UM concerning Test calls, which we consider will be of general interest. In a normally active Amateur band a station at either end has little chance of raising a "Test" or "CQ" station who is searching from the opposite end. Unfortunately the listening station has to listen often as long as 5 minutes before he is aware of the calling station's intentions, as practically every station making use of QLH or QHL only mentions it immediately prior to changing over. It is an even chance that the listening station finds he has wasted several minutes which could otherwise have been profitably employed looking round the band. GM3UM's suggestion is that stations should interpose QLH at frequent intervals during their "Test" or "CQ" calls, and it seems an excellent idea.

Members elected during the month are GM3RL, G8NS and GI5NJ, and the total is now 61.

Please address correspondence to Radio G5BW, Willingdon, Eastbourne.

Loyalist City Amateur Radio Club

Mr. George Wells (BERS169), of St. John, New Brunswick, who, until his departure for Canada, was resident in North London, sends us latest news regarding the above Club.

At the A.G.M. held in January at the Club's new Headquarters, Mr. A. S. Ruthen was re-elected President. Mr. H. C. Fowlie was appointed Secretary, and Mr. W. G. Andrews, the Treasurer.

Last month members of the Club were guests of No. 7 District Signals of the Royal Canadian Corps of Signals. Films illustrating the activities of the Signal Corps were displayed, following which Club members were given the opportunity of witnessing the operation of various military transmitters. The value of amateur radio co-operation with the Signal Corps was stressed by the officers in attendance.

AC4YN

VU2FO informs us, *via* G5AN, that AC4YN will work his station at 1600 G.M.T. on Wednesdays and Saturdays. The frequency in use at AC4YN will be 14,292 kc. After the schedules AC4YN will remain on the band for contacts with other stations.

Calls Heard

Eric W. Trebilcock (*BERS*195), *Powell Creek, North Australia. February* 1-*March* 5, 1939.

7 *Mc. CW:* Ei6g, g2nj, 2yj, 2zq, 3ad, 3dh, 3yy, 4fb, 5ci, 5jm, 6cw, 8ab, 8az, 8fd, 8wp, gm3yn, 5yg, 8kq.

14 *Mc. CW:* Ei4j, g2dh, 2ft, 2hw, 2hx, 2ig, 2qt, 3bk, 3cw, 3pg, 3tb, 4ai, 5bd, 5cv, 5dr, 5jz, 5lp, 5my, 5wp, 5wr, 6bq, 6cw, 6nj, 6py, 6rh, 6sy, 6td, 6uc, 6wy, 6xl, 8ip, 8rq, gm6nx, 6rv.

J. Haw (*BERS*454), 10 *Mess, H.M.S. "Egret," at Aden, on* 14 *Mc.*

February 19: g4au, 6gm.

February 26: g2lb, 3bu, 5lp, 6os, 6td, 8lu, 8pc.

Contemporary Literature

By L. FRYER (GM2FR)

A T-20 100 WATT PHONE. Frank C. Jones (W6AJF). *Radio*, January, 1939.

The 100-watt phone transmitter described has several interesting circuit combinations. The audio system has adjustable automatic volume control, inverse feed-back in the Class-B driver stage provides an efficient and simple Class-B driver having more gain than the usual push-pull 45 valve driver. Excessive audio input voltage to the modulator automatically reduces the gain of the amplifier stage.

The set is built into a small relay rack 26 ins. by 18½ ins., the layout used being 6C5 Pierce crystal oscillator, 807, and push-pull T20 final, the speech section being 6C6, 76, 6V6 driving a pair of push-pull T20s, and a 6H6 as automatic volume control.

* * *

A SIMPLE 56 MC. TRANSMITTER-EXCITER. Jack Rothman (W6KFQ). *Radio*, January, 1939.

The author describes a compact 56 Mc. crystal controlled unit delivering 15 to 20 watts. The layout is straightforward, a 42 crystal oscillator on 7 Mc. driving a 6L6g quadrupler which in turn drives a T21 doubler on 56 Mc., the 6L6g is connected as a triode and all stages are capacity coupled. The unit can be modulated for phone or keyed for C.W.

* * *

INEXPENSIVE DX. Emile Milles. *Radio*, January, 1939.

The writer describes an A.C.-D.C. super-heterodyne receiver built for a total cost of $15 (American), many of the components being obtained from old broadcast receiver chassis.

The valves used are 6L7 as regenerative detector-mixer, 6J5 or 6C5 as radio frequency oscillator, 6K7 I.F. amplifier, and a 6C8g in which the first section is used as a bias detector and the second portion as the B.F. oscillator, followed by a type 43 as output valve.

* * *

MORE ON THE 3-ELEMENT ROTARY. E. H. Conklin. *Radio*, January, 1939.

The author gives further data and results of tests with a three-element rotary both for transmitting and reception, and states that the three element aerial was a far greater improvement over the two element aerial than the latter was over a simple doublet.

* * *

AN INEXPENSIVE FREQUENCY STANDARD. Curtis C. Springer (W9EMR). *Radio News*. January, 1939.

In this, the winning article in a recent competition organised by the magazine, the writer describes a neat and reliable frequency meter covering the amateur bands. Briefly, the frequency meter functions as follows :—

One oscillator operates on exactly 100 kc., the accuracy being maintained by checking for zero beat between its harmonics and any frequency standard station whose wavelength is a multiple of 100 kc. A second oscillator operates in the neighbourhood of 7,000 kc., the output from each oscillator being fed into the grid of a pentode output valve connteced as a grid leak detector. The external signal whose frequency is to be checked is fed into the same point.

The 100 kc. oscillator is only used as a check on the H.F. oscillator, the transmitter being checked against the H.F. oscillator only.

The valves used are two 6D6's, a 41 and an 84 in the power supply.

* * *

PUSH-BUTTON CONTROL FOR TRANSMITTERS. A. G. Sheffield (VE4SS). *Radio*. February, 1939.

A description of an inexpensive and easily constructed transmitter control system which gives positive time delay, push-button control, adjustable protection and automatic reset of overload circuit. A schematic diagram of the complete circuit is included in the article.

* * *

EXTRACT FROM "CQ N.V.I.R. (HOLLAND). December, 1938. Submitted by Ing. W. Weijers (PA0DO).

In an article by PA0RG entitled "Something about the reproduction of Records" the author remarks that the voltage generated by a pick-up is dependent on the "velocity" of the needle-point. If the frequency of the sound to be reproduced decreases, the amplitude of the groove must increase, but, if the amplitude of the groove gets too high the grooves may run into each other. Almost all recording companies have therefore decided to make the amplitude of the groove constant at frequencies below 250 Hz.

PA0XL describes a small and cheap direction finding receiver, PA0AH tells how he constructs his own neutrodyne condensers, and the E.A. (Experimental Division) proposes a new way of indicating (in a telegraphy QSO) the type of superhet used. For instance, I-V-S-2-V-2, means one preselector stage first detector with separate oscillator, two I.F. stages, second detector and two audio-frequency stages (the amplifier part of a duo-diode-triode included), and suggest that an indication of this kind would be much clearer than "9 valve super." The Secretary of the N.V.I.R., PA0NP, describes conditions from the radio amateur's point of view in the Dutch West Indies where transmitting licences are unobtainable and says that the N.V.I.R. is doing its utmost to change this situation.

* * *

CHARACTERISTICS OF ANTENNAS WITH CLOSELY-SPACED ELEMENTS. John D. Kraus (W8JK). *Radio*. February, 1939.

Some pertinent facts pertaining to close-spaced aerial arrays are discussed, such as effect of resistance losses on gain, effect of tilting the array, and best height above ground for various frequencies. The data apply particularly to the author's "Flat-Top Beam," but part of it also applies to other end-fire arrays having low radiation resistance, such as those of the close-spaced director-reflector type. The article is well illustrated by diagrams and curves.

(*Continued on page* 628)

HEADQUARTERS CALLING

I.E.E. Meeting

At the next I.E.E. meeting, which will be the last of the season, Dr. C. G. Lemon (G2GL) will deliver a lecture on "Communication Receivers."

We would urge all London members to make a special point of attending. The meeting will commence at 6.45 p.m., April 28.

Tea will be served free of charge from 6 p.m., and the I.E.E. will be open for informal discussions from 5 p.m.

Radiolympia and Convention

It will be recalled that last year the Society, in company with many other concerns who had in past years hired gallery stands at Radiolympia, were called upon to erect a stand in the Main Hall. The charge for the stand space and for erecting the stand itself amounted to £77, which with other expenses brought up the cost of exhibiting to well over £100.

Bearing these facts in mind, and with a knowledge that interest in radio exhibitions appears to be decreasing, the Council has decided not to apply for a stand at the forthcoming Exhibition.

In view of this it has been agreed to organise the Society's 14th Annual Convention later in the year. An outline of the programme, together with the dates selected, will appear in an early issue of this Journal.

Channel Isles Representation

Council has been pleased to approve of the appointment of Mr. Martin Bourke (2AOU), "Crediton," Samares, Jersey, as Channel Islands Representative. News from the Isles will appear under our British Empire Notes.

Districts 4 and 7

The Council has accepted with regret the resignations of Mr. W. A. Scarr (G2WS) and Mr. E. A. Dedman (G2NH) from their position as Representative of Districts 4 and 7 respectively.

Mr. Scarr has recently been appointed Chief Education Officer at Beckenham, Kent, whilst Mr. Dedman finds that increasing pressure of private business makes it imperative for him to relinquish an office he has held for a period of eight years.

The Council records its thanks to both members for their past support and for their wholehearted interest in the welfare of the membership in the Districts they have recently represented.

Berwick-on-Tweed

At the request of members living in the Border town of Berwick-on-Tweed, Council has approved of their transfer from District 19 to Scottish G District.

I.E.E. Lectures

Provincial and London members who were unable to attend the February and March meetings held in the I.E.E., London, will be glad to learn that both lectures are to appear in this Journal.

Dr. Bloomfield's important treatise on "Insulating Materials for the Ultra-High Frequencies" will appear next month, whilst Mr. E. L. Gardiner, B.Sc., is preparing a series of articles, based on the subject of his lecture on "Crystal Band-Pass Filters."

These lectures were among the finest delivered to the Society, and this opportunity is taken of recording our thanks to Dr. Bloomfield and Mr. Gardiner.

Suggestions for, or offers of, lectures during the season 1939-1940 will be welcomed by the Secretary-Editor.

Punctuation Signals and Operating Procedure

In accordance with decisions reached at theCairo Telecommunications Conference, new Morse Code groups for the full stop (.) and the comma (,) are to be introduced.

The full stop will be sent as - — - — - — instead of - - - - - - whilst the correct symbol for the comma is — — - - — — in place of - — - — - —

Apparently the exclamation mark has been placed in the background as a new symbol is not included in the official list.

New Representative for District 7

The Council has been pleased to appoint Mr. W. E. Russell, G5WP, "Milestones," Westford Road, Mayford, Woking, Surrey, to the position of Representative for Southern England, in succession to Mr. Dedman, whose resignation is recorded above.

Mr. Russell takes office with a wealth of experience, having been closely associated with the work of his District for a period of many years.

Under his able leadership we feel confident that No. 7 will continue, as in the past, to hold its own among the leading Districts in the country.

The 56 Mc. International Contest

The Council record their grateful thanks and appreciation of monthly logs and reports sent in during the initial months of the contest by Messrs. H. A. M. Clark (G6OT), G. Henderson (G8JV), E. H. Swain (G2HG), J. N. Walker (G5JU), Miss B. Dunn (G6YL), A. G. Parker (G6QZ) and D. W. Heightman (G6DH). These contributed materially to the maintenance of interest in the band, and also added to the existing knowledge of 56 Mc. propagation. It is only regretted that these members were not rewarded with a DX contact, but activity on the Continent was, and still is, very low.

Bulletin Features Competition

Three out of 3,600 members took the trouble to send in an entry for the above competition, which was aimed at providing the Editorial staff with ideas for the forthcoming new volume.

Owing to the poor response it is impossible to make an award, but a copy of the Kilocycle-Meter Conversion Tables has been sent to Messrs. P. H. Smith, 2FMV; A. G. Boon, 2BAG; and F. J. Lucas, 2DZZ, the sole entrants, and all A.A. licence holders.

The Helping Hand

Part XX in the above series, dealing with new methods of eliminating broadcast interference, will appear next month. Due to pressure on space the article has been held over from this issue.

The 1939 GW 56 Mc. Trophy Contest

We understand that preliminary discussions have taken place regarding the rules governing this year's contest for the "GW 56 Mc. Trophy," which will take place during the week-end July 29-30.

The rules, together with all other relevant details, will be published next month.

W.B.E., H.B.E. and B.E.R.T.A. Certificates

The following W.B.E., H.B.E. and B.E.R.T.A. certificates have been issued :—

Name	W.B.E. *Call Sign*	*Date* 1939
G. Harrower ...	GM8HM	Mar. 1
W. H. Metcalfe	VU2EU	,, 2
O. M. Derrick ...	GM3OM	,, 21
C. Parsons ...	GW8NP	,, 21
J. Schefer ...	G3JX	,, 24
L. leKashman*	W2IOP	,, 30
A. E. Ward ...	G3IH	,, 30
R. Postill ...	G8NO	,, 31

*Non-member R.S.G.B.

Telephony

J. Ramond ...	F8VC	,, 7
G. D. Belling ...	W6CTG	,, 10
P. Ramond ...	CN8BA	,, 14
G. Gray ...	VK4JP	,, 16
W. H. Christie	VQ2HC	,, 16
H. H. Brokate	W8AAJ	Jan. 31

(This call was given incorrectly as W8AJJ in the February BULLETIN.)

	H.B.E.		
P. R. Selder ...	2AOZ / G5FA	... ...	Mar. 1
	B.E.R.T.A.		
C. G. Allen ...	G8IG	... .	10

R.S.G.B. Slow Morse Practices

Details appear 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-in 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. Will stations in areas not at present served offer their services to Mr. T. A. St. Johnston (G6UT), "Normandale," Little Hallingbury, Essex. (Telephone: Bishop's Stortford 785.)

	G.M.T.	kc.	Station	Location
Sundays ...	0900	1755	G8NF	Manchester.
	0900	1865	G3LP	Cheltenham.
	0930	1792	G8AB	Loughton.
	1000	1800	G8PR	Staffordshire.
	1015	1920	G6VC	Northfleet.
	1230	1758	G6VD	Leicester.
Mondays ...	2230	1925	G2CF	S. Devon
Tuesdays ...	2200	1934	G3GH	N. Devon.
Wednesdays	2215	1865	G3LP	Cheltenham.
	2230	1813	G4AU	Charlton.
Thursdays...	2200	1934	G3GH	N. Devon.
Fridays ...	2230	1925	G2CF	S. Devon.

NEW MEMBERS

HOME CORPORATES.

H. HARDING (GW2HH), Treve Cottage, Beulah Place, Ebbw Vale, Mon.
M. C. ELLISON (G2JP), Tenter Lodge, Knaresborough, Yorks.
A. G. DAVIES (G2PC), "Rose Field, Hullen Road, Elland, Yorks.
R. G. KITCHENN (G3SK), 13, Norton Road, Letchworth, Herts.
L. HOSKINS (G3VN), 6, Dagnall Park, South Norwood, S.E.25.
MAJOR R. B. TURBOTT (G4AF), Ogston Hall, Higham, Derbyshire.
A. MACFARLANE (G4CF), 132, Liverpool Road, South, Burscough Town, Ormskirk, Lancs.
A. E. HYDE (G4DU), 1, Prune Street, Ingrow, Keighley, Yorks.
P. F. ATKINSON (G4FJ), 102, Prenton Road East, Birkenhead, Ches.
G. E. COCKROFT (G4FO), 18, Harborough Road, Oadby, near Leicester.
M. F. J. SAMUEL (G4FX) (ex G5HS), 9, Norfolk Road, London, N.W.8.
F. L. POSTLETHWAITE (G5KA), 41, Kinfauns Road, Goodmayes, Essex.
K. E. WALTERS (G8FW), 39, Durham Avenue, Thorne, Doncaster, Yorks.
G. W. A. ILLINGWORTH (G8QG), 77, Clifton Road, Southport, Lancs.
D. W. LINSLEY (2AIY), 168, Springfield Road, Sheffield 7, Yorks.
F. B. WILFORD (2BFK), 40, Church Lane, Eston, Middlesborough, Yorks.
H. T. WALKER (2BTV), Eastburn, Stewarton, Ayrshire, Scotland.
A. J. CRYER (2BXL), 113, Abercrombie Road, Fleetwood, Lancs.
A. J. C. THRELFALL (2CGY), "Winsted," Burton Joyce, Notts.
R. D. COX (2FFG), 5, Elm Road, Shefford, Beds.
L. HARDIE (2FHH), 530, Holburn Street, Aberdeen, Scotland.
J. M. MILLER (2FHL), 91, Balshagray Avenue, Broomhill, Glasgow, W.1, Scotland.
A. LUCIE (2FJW), "Kilmory," North Iverton Park Road, Johnstone, Renfrewshire.
W. R. JOSS (2FOJ), 22, Beaufort Gardens, Hendon, London, N.W.4.
L. S. EGGLETON (2FUG), 4, Lewisham Park, Lewisham, London, S.E.13.
C. R. DAVIS (2FVG), 12, Maes Knoll Road, Knowle, Bristol, 4 Glos.

H. KEMP (2FWR), Greenmore Hill, Woodcote, Oxon.
A. ROWNEY (BRS3560), Dewhurst, Brynhill, Barry, Glam.
F. W. GOLDING (BRS3561), 22, Sandingham Road, Willesden Green, London, N.W.2.
W. A. PARK (BRS3562), 45, Westholme Road, Withington, Manchester 20, Lancs.
A. S. LOMAX (BRS3563), 12, Canowie Road, Redland, Bristol 6.
A. TAYLOR (BRS3564), 67, Sylvia Avenue, Knowle, Bristol, 4.
D. H. AUSTIN (BRS3565), 17, George Street, Ramsgate, Kent.
D. C. AMBLER (BRS3566), 17, Ovenden Road Terrace, Halifax, Yorks.
D. N. HIGGINBOTTOM (BRS3567), The Doroldes, Boundary Road, West Kirby, Ches.
MAJOR C. A. CARKEET-JAMES (BRS3568), Littleshaw, Woldingham, Surrey.
J. A. TYRRELL (BRS3569), 1, Beresford Road, Lowestoft, Suffolk.
I. PARRY-EDWARDS (BRS3570), Devon Constabulary, Axminster, Devon.
J. C. HISLOP (BRS3571), "Linkfield," Lamlash, Brodick, Isle of Arran.
A. KUHNEL (BRS3572) 53, Dalton Avenue, Beeston, Leeds, 11, Yorks.
A. T. THORNTON (BRS3573), 134, Belvedere Road, Ipswich, Suffolk.
V. G. PRINS (BRS3574), 48, Hyde Park Gate, London, S.W.7.
N. ROBINSON (BRS3575), Suttons Lane, Halewood, near Liverpool, Lancs.
A. R. GLOVER (BRS3576), Hilyard Row, Catterick Camp, Yorks.
J. E. WILBY (BRS3577), 54, Dukeries Crescent, Manton, Worksop.
H. G. TOOTHILL (BRS3578), 23, Whirlowdale Crescent, Millhouses, Sheffield, 7, Yorks.
J. W. LYMER (BRS3579), 68, Anglesey Road, Burton-on-Trent, Staffs.
I. M. GAYE (BRS3580), 507, Binley Road, Binley, Coventry, Warcs.
J. P. C. P. RABAN (BRS3581), Hadzor Rectory, Droitwich, Worcs.
J. R. SENIOR (BRS3582), 37, Meadow Bank Avenue, Nether Edge, Sheffield, 7, Yorks.
J. C. WARREN (BRS3583), 57, Gallows Hill, Kings Langley, Herts.
MISS D. BULLOUGH (BRS3584), 35, Hays Walk, Cheam, Surrey.
C. J. ELLETT (BRS3585), Meppershall, Shefford, Beds.
WM. J. ALLEN (BRS3586), 22, Woodford Road, Watford, Herts.
J. L. C. ROBERTSON (BRS3587), 325, Strathmartine Road, Dundee, Angus.
H. L. COUPLAND (BRS3588), 113, Nansen Road, Leicester.
A. W. WALKER (BRS3589), 51, Greencourt Road, Petts Wood, Kent.

DOMINION AND FOREIGN.

F. C. BAEYENS (ON4EG), Boulevard Lambermont, 99B, Brussels, Belgium.
T. ULLMAN (SM7MU), Helgo, Rappe, Sweden.
R. CHRISTIANSSON (SM7VA), Doktorsgatan 6, Vaxjo, Sweden.
R. H. LAWRENZ (VQ4RHL), Box 103, Nairobi, Kenya Colony, B.E.A.
R. J. DOLMAN (BERS365), c/o Imperial Airways, Calcutta, India.
N. D. MEADS (BERS466), Force Headquarters, Jerusalem, Palestine.
J. GABRIEL (FRS44), Box 747, Elisabethville, Belgian Congo.

Trade Notices

The sixth edition of their Catalogue of low and medium power transmitting valves has recently been issued by the Transmitting Division of *The Mullard Wireless Service Co., Ltd.* There is now available a wide range of both triode and pentode valves, the dissipation of which varies from 5 to 300 watts. Particulars of complementary modulator and rectifier valves are also included in the catalogue, whilst data regarding the operating conditions normally applicable to the various types is given in a series of charts. An additional chart gives the prices and operating details of *Mullard* Cathode Ray Tubes.

The catalogue has been extended to include "Mitcham" measuring and testing instruments. Comprehensive particulars are given of a complete Cathode Ray Oscillograph Unit, a Signal Generator and other equipment of a like nature.

A copy of the catalogue will be sent to any interested reader applying to *The Mullard Wireless Service Company*, 225, Tottenham Court Road, London, W.1, and making mention of this Journal.

* * *

We are advised by Messrs. *Tungsram* that an improved version of their popular low power transmitting triode valve, type 0-15/400, is now in production. The static characteristics remain as before but improved methods of construction allow the maximum permissible anode voltage to be raised to 600 volts. The inter-electrode capacities have been reduced, making the valve suitable for ultra-high frequency operation, and the performance at any frequency will be found to be superior to that given by the older type.

The valve, which is listed as type OQ15/600, is fitted with a ceramic British 4-pin base, and represents excellent value at the price of 12s. 6d.

* * *

The Edison Swan Electric Co., Ltd., have recently published a comprehensive Valve Data Manual covering in eight sections the following types of valves :—

Section I. Screened H.F. Pentodes.
Section II. Frequency Changers.
Section III. Triodes.
Section IV. Diodes and double Diode Triodes.
Section V. Output Pentodes.
Section VI. Rectifiers.
Section VII. Special types.
Section VIII. Transmitters.

The book is of the loose leaf type—well bound and clearly printed. The individual sheets give complete operating data for each valve described. In addition a base diagram and characteristic curves are included.

The book is priced at 3s. 6d., which price also covers the cost of replacement sheets.

* * *

We recently tested a series of Morse Practice Records prepared by *C. L. Masters*, Orchard House, Finchampstead Road, Wokingham.

Series 1 gives speeds from 4 to 11 words per minute; Series 2 ranges from 12 to 20 w.p.m.; and Series 3 from 20 to 30 w.p.m. Records 1A and 1B contain examples of code, numerals and plain language. 1C gives further examples of code and numerals only. Record 3, which is similar to 1A, introduces interference.

The tone used, which, in amateur parlance, is "best c.c.," is a delight to listen to.

Single records are priced at 2s. 6d. each, including postage, whilst a series of three are available at 7s.

The manufacturer is preparing records to enable candidates to train for the Services, whilst correspondence courses are also being arranged.

A book, giving helpful advice to beginners, is in preparation.

Stray

Mr. Ray Carter (VK2HC), who also owns the portable call VK2AI, informs us that he continues to receive QSL cards addressed to the latter call sign when it is clear that they are intended for three-letter VK2 stations in the series VK2AIB-VK2AIZ.

Members working or reporting VK2 stations should check carefully the call sign.

Mr. F. Adams

Mr. Frank S. Adams (G2YN) has now left the Service Department of Murphy Radio, Ltd., and will be glad to see his many friends at *Webbs Radio*, 14, Soho Street, London, W.1. To avoid confusion with Mr. H. R. Adams (G2NO), of the same company, he will be known as Mr. Frank.

NOTES and NEWS from the BRITISH ISLES

DISTRICT REPRESENTATIVES.

DISTRICT 1 (North-Western).
(Cheshire, Cumberland, Lancashire, Westmorland.)
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).
(Shropshire, Staffordshire, Warwick, Worcester.)
Mr. V. M. DESMOND (G5VM), 199, Russell Road, Moseley, Birmingham.

DISTRICT 4 (East Midlands).
(Derby, Leicester, Northants, Notts.)
To Be Appointed.

DISTRICT 5 (Western).
(Wiltshire, Gloucester, Hereford.)
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).
(Berkshire, Hampshire, Oxfordshire, Surrey.)
Mr. W. E. RUSSELL (G5WP), "Milestones," Westfield Road, Mayford, Woking, Surrey.

DISTRICT 8 (Home Counties).
(Beds., Cambs., Hunts and the towns of Peterborough and Newmarket.)
Mr. S. J. GRANFIELD (G5BQ), 47, Warren Road, Milton 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).
MR. A. J. FORSYTH (G6FO), 29, Stow Park Avenue, Newport, Mon.

DISTRICT 11 (North Wales).
(Anglesey, Carnarvon, Denbighshire, Flintshire, Merioneth, Montgomery, Radnorshire.)
MR. D. S. MITCHELL (GW6AA), "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), 539, Oldfield Lane, Sudbury Hill, Greenford, Middlesex.

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. E. MITCHELL (G5MV), 40, North Marine Road, Scarborough.

DISTRICT 19 (Northern).
(Northumberland, Durham, and North Yorks.)
MR. R. J. BRADLEY (G2FO), "High Crest," Yarm Road, Eaglescliffe, Co. Durham.

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

NORTHERN IRELAND.
Mr. J. A. SANG (GI6TB), 22, Stranmillis Gardens, Belfast.

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

DISTRICT 1 (North-Western)

District Representative : J. Noden (G6TW), "Fern Villa," Coppice Road, Willaston, Nantwich, Cheshire.

District Scribe : H. W. Stacey (G6CX), "Sandleas," Eddisbury Road, West Kirby, Cheshire.

Town Representatives :
Birkenhead : G. Russell Lee (G6GL), 25, Boundary Road, West Kirby, Cheshire.
Blackburn : Jim Bolton (2CRM), 6, Ash Street.
Blackpool : H. Fenton (G8GG), 25, Abbey Road, Blackpool, S.S.
Burnley : P. Nicoll (G5ZN), 35, Reedley Road.
Bury : T. G. Platt (G2GA), 64, Holcombe Avenue.
Crewe : L. H. Webber (2CPW), 18, Jesmond Crescent.
Liverpool : H. Caunce (G6KS), 24, Vanbrugh Road, Anfield, Liverpool, 4.
Manchester : W. Lucas (G2OI), 25, Boothfields, Winton, near Manchester.
Oldham : F. Sutton (2DJV), 194, Shaw Road, Royton.
Southport : R. W. Rogers (G6YR), 21, Chester Avenue.
Warrington : F. A. Vost (G2IF), 26, Pinewood Avenue.

THE District Representative wishes to remind members that the North Western P.D.M. will be held at Chester on May 21, and it is hoped that all Town Representatives will attend and bring with them as many members as possible. Please do your utmost to make this meeting a complete success. Further particulars of the programme will be found in an announcement published elsewhere in this issue of THE BULLETIN.

Burnley.—G8TD has had nearly 1,000 telephony contacts on 28 Mc. during the past six months. He

is now back on 14 Mc. working VK on telephony, using a T20 in the final with an input of 20 watts. The following members are also active: 2RB, 5ZN, 8TD, 8UA, 3HK, 3IY, 3KT, 3SJ, 3WU, 3VO, 2BFB, and 2FBI.

Liverpool.—The N.F.D. transmitter especially designed and constructed by G5MQ was on show at the meeting held in March, and members are eager to have it in operation. The station will be located at Linkstor Road, Woolton Hill, Woolton, Liverpool, and final arrangements will be settled at the April meeting.

Manchester.—An attendance of 34 was recorded at the last meeting, when a very valuable address on the subject of 56 Mc. developments and progress was given by G6OM, who mentioned various interesting aerial tests made on this frequency, and compared the old self-excited transmitters with the latest controlled types.

Activity on 56 Mc. is increasing, and the following are taking part in tests every Friday between 2200 and 2330: G3BY, 3SP, 3HF, 5CH, 6TL, 6LC, 6OM, 2OI, and 2RA. Listening stations are 2ARC, 2FPI, and 3228.

A protest was made at this meeting regarding the exclusion of active station calls from these notes, and we would welcome the views of other groups on this matter. (Active station calls are *not* excluded from District Notes, only lists of members who attend meetings.—ED.)

Please note the district calendar for May 3, and do your best to attend this meeting.

Oldham.—To those interested, the 58 Mc. arrangements are progressing favourably.

Aerial design and application appear to be the main attention in this area. What is the shortest length to give the maximum radiation?

Stations active: G2BK, 3JB, 3JT, 3PO, 5XF, 5XJ, 2DJV.

NORTH-WESTERN PROVINCIAL DISTRICT MEETING

SUNDAY MAY 21st 1939

AT

THE BARS HOTEL, FOREGATE STREET, CHESTER.

Assemble	12 noon
Lunch	1 p.m.
Meeting	2.30 p.m.
Tea	4.30 p.m.

5/6 inclusive

Reservations to Mr. J. Noden, G6TW, Coppice Road, Willaston, Nantwich, not later than May 15th.

DISTRICT 2 (North-Eastern)

District Representative: L. W. Parry (G6PY), 13, Huddersfield Road, Barnsley.

District Scribe: C. A. Sharp (G6KU), 316, Poplar Grove, Great Horton, Bradford.

Town Representatives:

Barnsley: T. Malkin (G5IV), 5, White Hill Terrace, Dodsworth Road.

Bradford: As above.

Doncaster: A. Dickinson (2FJO), 11, Sprotboro' Road.

Halifax: R. P. Pohlmann (G3ZK), 138, Skircoat Moor Road.

Harrogate: J. Pullan (2BPI), 1, Roseville Avenue.

Huddersfield: J. Dale (G5VD), 12, Langley Terrace, Crosland Road, Oakes.

Sheffield: A. H. B. Cross (G3FN), 19, Stradbroke Road, Sheffield, 9.

The Provincial District Meeting is to be held at the Windmill Hotel, Blossom Street, York, on Sunday, April 16 (this week-end). We should like to see members present from every part of Districts 2 and 18, to ensure an even better meeting than in past years.

Barnsley.—Thanks are sent to the Huddersfield Club for a very enjoyable evening spent with them. Stations visited were G6RO, 8OF and G5VD. BRS3207 is now 2BFJ. Members active include G2BH, 2WX, 3PG, 3YA, 5KM, 5IV, 5DW, 5UA, 6PY, 6LZ, 6XG, 8TZ, 8NM, 8WF, 8IJ, 2BFJ and BRS3068.

Bradford.—The 1.7 Mc. N.F.D. station will be operated by Bradford Area members. The site will be near Ilkley and the station will be in the charge of G6SN. Those who would like to spend the week-end are cordially invited to write to G6PY or G6SN. Details will be given later, probably on 1.7 Mc., so keep an ear open between 11.00 and 13.00 on Sundays for latest news. 2FFH, who is now G4GJ, is on 1.7 Mc. He started well by working all round the British Isles and France during the first week. 2ACT, now G4FU, is on 7 and 14 Mc., and will soon be on 1.7 Mc. Both stations will appreciate contacts and reports. G6XL is almost QRT for a time, due to collapse of mast, but he managed to WAC on 'phone before his twin W8JK beams caused the aforementioned calamity. G6QS worked 30 W/VE districts in the A.R.R.L. contest, with a score of 22,000 points.

Keighley.—There are four fully licensed local stations, but only G8UO appears to be very active. 2VO is at Guy's Hospital, London, but is active on vacation. G4DU (ex-2DXG) is on 7 Mc. with CW, using a battery-operated CO-PA.

Sheffield.—More monthly reports are wanted by the T.R. There are over 40 members in the town, but very few trouble to send in a report of activity. Just a card to the T.R. regularly, please, OM. Stations active include G3FN (who is getting gear going at his new QRA), 2AS, 4AI, 5HK, 5TO, 6LF, 8IW and 8JP.

DISTRICT 3 (West Midlands).

The first P.D.M. of the season took place on April 2, in Birmingham, when 92 members sat down to lunch under the chairmanship of Mr. G. Brown, G5BJ (Birmingham T.R.), deputising for the D.R., who was prevented by illness from attending.

Messrs. Scarr, Walker and Forsyth (Representatives of Districts 4, 5 and 10), together with Mr. J. W. Mathews (G6LL) and the Secretary-Editor, were among the many visitors.

At the business meeting attended by about 110 members, G6CL gave a résumé of Society activities, and at the conclusion of his talk answered various questions.

The D.R. regrets that the accommodation was sorely tried, but he would point out that up to three days prior to the meeting less than 60 members had notified him of their intention to be present.

N.F.D. plans are now complete, and all stations are under way. Offers to help during the event should be made without delay to the D.R.

DISTRICT 4 (East Midlands).

It is with much regret that the D.R. has to inform members of his resignation, consequent upon his having accepted an appointment in Kent. He hopes to meet many members at the April meeting before taking his departure.

Thirty-one members and friends attended the meeting held in Leicester on March 19. After tea G6AY gave a very comprehensive account of the best way to erect a 50-ft. aerial pole, illustrating his talk with specially prepared models. G5VU then described his transmitting aerial in detail and by means of world maps, on which were marked all DX contacts made over a long period with the same aerial, was able to show that the actual radiation was largely in accordance with theory.

NORTH-EASTERN PROVINCIAL DISTRICT MEETING

SUNDAY, APRIL 16, 1939

AT

THE WINDMILL HOTEL,
Blossom Street, YORK.

Assemble	1 p.m.
Lunch	1.30 p.m.
Meeting	2.30 p.m.
Tea	5 p.m.

Inclusive charge 5s.

G2WS also gave details of his W8JK beam aerial used on 28 Mc.

Final field-day details were then settled, 5VU kindly promising to take over the 3.5 Mc. station at Crich Stand, which was to have been run by the D.R.

The April district meeting will take place at the Swan Hotel, Mansfield, on Sunday, April 23, at 3.30 p.m. A talk is being arranged and a junk sale will take place afterwards. The T.R., G8SA, is making the arrangements.

Mansfield.—The local meeting held on February 26 was attended by 13 members and activity in the area is much as usual.

DISTRICT 5 (Western)

District Representative : J. N. Walker (G5JU), 4, Frenchay Road, Downend, Bristol.

Town Representatives :—

Bristol : H. Gratton (G6GN), Richmond House, Sydenham Road.

Bath : G. R. Marsh (G2IW), Oriel Lodge, Lower Swainswick.

Cheltenham : P. Malvern (G8DA), 10, Selkirk Street.

Gloucester : J. Hamilton (G5JH), Brook Cottage, Bristol Road, Hardwicke.

The matter of greatest importance this month is not one of the past, but one of the future. The Western Provincial District Meeting has been fixed to take place at Weston-super-Mare on Sunday, May 7, full particulars appearing elsewhere. In view of the fact that this function is the major social event on the R.S.G.B. Calendar, as far as the West of England is concerned, it is hoped to see present a record number of members. We would appeal particularly to those residing in outlying parts of the District, and who do not, in the ordinary way, get much opportunity of meeting fellow-members, to make an effort to be present.

Next, National Field Day is near at hand. The District will, as usual, operate four separate stations, these being situated at Hardwicke (1.7 Mc.), Pensford, near Bristol (3.5 Mc.), Cheltenham (7 Mc.) and Hawkesbury Upton (14 Mc.). It appears that ample personnel is available for all stations except the one at Hardwicke, for which volunteers are required. Will those in this area who have not yet done so please get into touch with the T.R. (G5JH) ? Otherwise, arrangements for all four stations are well in hand.

The *Bristol* monthly meeting took the form of a " rag-chew," the main topic of conversation being the sites for the two N.F.D. stations. This matter was settled to everyone's satisfaction, the sites selected affording ample accommodation for all those taking part.

Regarding the Crystal Register proposed by the Bristol T.R., requests have been received from other parts of the District asking to be included, and it will therefore form a District Register. To allow of its rapid completion, all members who wish to have their frequencies included are asked to communicate with G6GN. A copy will be available, at a small nominal charge, to all making application.

Station activity during the month has been high, but, due to fluctuating conditions on 14 Mc., stations regularly using this frequency have not been heard so much as usual. G6RB did fairly well in the American DX Contest. 6BW experienced some little difficulty with a new beam aerial, but managed to overcome it in time to take part in the telephony section.

The T.R. makes a special appeal to Bristol members to support the P.D.M. Final arrangements regarding the transportation of parties will be made at the meeting on May 4.

Activity in *Cheltenham* is normal, 1.7 and 28 Mc. being the two most popular bands at the moment. A party will be attending the P.D.M., and those wishing to join it are requested to get into touch with G8DA.

In *Bath*, G2IW is following G8JQ's example, and is building a rotary beam aerial, but is finding difficulty in obtaining long, rigid bamboo poles.

An Amateur Radio Club has been formed in *Stroud*, and is making good progress. It is probable that a T.R. for this town will be appointed shortly.

Owing to the membership being scattered, G4CL has found difficulty in arranging regular meetings in the *Salisbury* area. A Short Wave Club is being formed in that town, and members in this area are invited to make up a party to attend

the P.D.M., unless the distance renders this prohibitive.

Westbury (Wilts.) now has an active transmitter, 2FAG having received his full card G4HD.

DISTRICT 6 (South Western)

Arrangements for N.F.D. are now complete and station calls, frequencies and approximate locations are as follows: G5AK in the Quantock Hills 1.7 Mc., G6GM at Holsworthy 3.5 Mc., G5SY near Exeter 7 Mc., and G3TX at Wembury, near Plymouth, 14 Mc. We hope that all those who are prepared to offer assistance at any of the stations will inform the D.R. or the T.R. of the particular area concerned as early as possible. It is also essential that the exact capabilities of the apparatus be known; therefore all those who can possibly do so should practice with the gear in order to become thoroughly familiar with it.

A P.D.M. organised by District No. 10 is arranged for Sunday, May 7, at Weston-super-Mare. An announcement appears elsewhere in this issue, but as Weston is in our District there should be quite a good attendance from No. 6. The D.R. will be there and he hopes that a large number of members will support him and help to make the event a success. G5SY would like to know the number of those attending before the end of April.

It has been decided to abandon the idea of a Conventionette in the Dorset area in view of the P.D.M. at Weston in May and N.F.D. in June. Instead, it is hoped that members of the Taunton area will be able to hold a Conventionette some time in October. Details will appear later.

Torquay.—At the monthly meeting there was an attendance of twelve. Interest mainly centred round N.F.D. and arrangements were finally completed. The next meeting on Thursday, April 20, will consist of a visit to the Torquay Corporation Power Station at Newton Abbott.

North Devon.—Although there is little to report this month it is known that all stations are active. Congratulations to G6GM on the attainment or a high place in the recent 1.7 Mc. contest.

A good attendance at the next R.S.G.B. meeting is expected when arrangements for N.F.D. will be discussed. BRS2442 is starting to build his station and hopes, before long, to apply for his A.A. licence. G4CW is putting out a fine signal, 'phone and C.W. on 1.7 Mc. He is also congratulated on working his first W station on 7 Mc.

Plymouth.—Eleven members attended the March meeting at 2DLJ, where superhet troubles and beam aerials were under discussion. Suggestions and arrangements for N.F.D. occupied most of the evening. Active members include G2HX, 3TX, 8HF, 8PN, 2AHX, 2CBJ, 2DLJ, 2FKO, BRS2997, 3464, 3549. We extend a welcome to G4DT (ex 2DUD) and 2FRX.

Exeter.—The usual two meetings were held last month and both were well attended. At the second meeting G2FP demonstrated and described his resistance capacity measuring device.

FORTHCOMING EVENTS

April	14	District 12 (Central Herts), 7.30 p.m., at 152, Longcroft Lane, Welwyn Garden City.
,,	17	District 6 (Plymouth section), 8 p.m., at G8HF, 2, Staddon Park, Plymstock.
,,	19	District 14 (East Essex Section), 8 p.m., at G6IF, The Chalet, Woodside, Leigh-on-Sea.
,,	19	District 1 (Liverpool Section), 8 p.m., at 56, Whitechapel, Liverpool. Discussion on N.F.D.
,,	20	District 6 (Torquay Section), 7.30 p.m., outside Newton Abbot Power Station.
,,	21	District 12, Dinner and Social Evening, Salisbury Hotel, Barnet, 7 p.m. for 7.30 p.m. Ladies welcomed. Tickets: 4s. 6d. single, 8s. 6d. double.
,,	23	District 4, 3.30 p.m., at The Swan Hotel, Mansfield.
,,	25 *	District 14 (East London Section), 7.30 p.m., at G4BZ, 45, The Avenue, Highams Park.
,,	26	Scotland "A" District, 7.30 p.m., in Room "A," Institution of Engineers and Shipbuilders, 39, Elmbank Crescent, Glasgow.
,,	26 *	District 15, 8 p.m., at The Albany, Twickenham (in conjunction with The Thames Valley Radio Transmitting Society).
April	26	
,,	27	District 6 (Exeter Section), 8 p.m., at Y.W.C.A.
,,	28	District 14 (Brentwood Section), 8.15 p.m., at 27, Mount Crescent, Brentwood.
,,	28	London Meeting at the I.E.E. Commence 6.45 p.m. Tea from 6 p.m. Lecture by Dr. C. G. Lemon (G2GL). Subject: "Communication Receivers."
May	1	District 14 (Chelmsford Section), 8 p.m., at G5RV, "Arvika," Galleywood Road, Chelmsford.
,,	3 *	District 1 (Manchester Section), 8 p.m., at Brookes' Café, 1, Hilton Street, off Oldham Street, Manchester. Talk by Mr. G. J. Scoles, B.Sc. (Eng.), on "The Application of Continuous Evacuation to Electronic Apparatus." By kind permission of the Research Dept., Metro-Vickers, Ltd.
,,	4	District 14 (Colchester Section), 7.30 p.m., at G8PZ, 19-21, Artillery Street, Colchester.
,,	10	District 18 (Hull Section), 8 p.m., at Broadway Hotel.

* Sale of disused apparatus at these meetings.

At the end of March local members joined forces with the Exeter Radio Society and visited the hospital to attend a very interesting lecture given by Mr. Wroth, the Senior Radiologist.

DISTRICT 7 (Southern).

As announced last month, the P.D.M. for the South of England will be held on Sunday, June 18, 1939, at Southsea. Due to the uncertainty of the numbers likely to be present, it has not yet been possible to fix the exact venue. In this connection it is essential that everyone who is likely to attend should advise G2NH *as soon as possible*. The charge for dinner and tea will be 6s. 6d. per head for all tickets booked in advance and 7s. 6d. for tickets taken after June 10. Payment need not be made in advance, but please book your place *now*. Ladies will, of course, be welcome.

The next meeting of the Surrey section will be held at the Royal Hotel, Stoughton, Guildford, on Sunday, May 7, at 2.30 p.m.

* * *

Kingston.—The New Malden Society met on March 6 and the Thames Valley Society on the 22nd. Plans for the N.F.D. station to be operated by T.V.A.R.T.S. have been arranged.

No individual reports have been received but the following are known to be active: G2GK, 2NH, 3OR, 3VK, 5MA, 8SM, 8TX, 2DLX, 2DOK.

Guildford.—G4AP, 5RS, 5YA, 6GS, 6LK, 6NA, 6YZ, 8CV, 8IX, 8LT, 8UG and 5WP are all active. 8CV is concentrating on 28 Mc. and doing well with 25 watts.

Bournemouth.—Activity in the town is now considerable. G2RX is putting out good-quality 'phone on 7 and 14 Mc. 8BW is using a small portable rig with a 6L6 on 7 Mc. 3BM continues to work DX after replacing his three-section 8JK beam with two sections. He is erecting a vertical beam array directed on South Africa. 5OH has a poor aerial on 14 Mc. but is obtaining good results on 7 Mc. with a W3EDP aerial. G2IH, 2NS, 5PB, 5SO, 2DNF, 2DTR, 2FSL and BRS2947 report, most of whom are active.

Croydon.—The Surrey Radio Contact Club, which is strongly represented in the town, is staging at least two field days during the coming summer. They are now comfortably installed in new headquarters at 79, George Street, Croydon, where meetings are held on the first Tuesday of each month at 8 p.m. A morse practice class is now in hand.

G2MV is doing well with a vertical 28 Mc. beam. 2DN, 8BX, 8TB and 2BTH are busy with C.W.R. duties. 5AN is occupied with work in connection with the Auxiliary Fire Brigade Wireless. 2KU has built a 15-in. televisor which has given very satisfactory results. 3IG has finished an exceedingly good single-signal superhet, whilst 6VA leaves the district for Birmingham. 5XH is trying telephony after 12 years on key. 2FH has just completed one of the neatest transmitters seen in the area for some years. BRS3003 has been logging some excellent DX.

Congratulations to BRS3179 and his wife on the arrival of a junior op. 3NQ, 4BW and 6SM report active.

* * *

I very much regret that I have found it necessary to resign from my position as D.R. for No. 7. After some seven years in this office I feel that it will be for the good of the District to have a new man and I take this opportunity of thanking all the T.R.'s and others who have been such a great help to me.

Council have appointed Mr. W. E. Russell, G5WP, "Milestones," Mayford, Woking, Surrey, as the new D.R. G5WP is well known to most of you and I am sure you will give him your fullest support.

E. A. DEDMAN (G2NH).

DISTRICT 8 (Home Counties).

District Representative: S. J. Granfield (G5BQ), 47, Warren Road, Cambridge. ('Phone: 54644.)

Town Representatives:

Bedford: H. R. Jeakings (G5FO), c/o Jeakings and Son, Ltd., Mill Street.

Cambridge: L. W. Jones (G5JO), "Mella Loona," 16, Leys Road. ('Phone: 3406.)

Luton: A. G. Tearle (G3KG), 32, Waller Avenue.

St. Ives: C. D. Whaley (G6WA), "Danum," Ramsey Road.

Peterborough: W. Carter (G2NJ), 52, Park Road. ('Phone: 3587.)

A very successful District meeting was held at the Waffle Café, Petty Cury, Cambridge, on the afternoon of Sunday, March 5, when there was a record attendance of 34 members. G6CL, 6OT, 6LL and 5QF were spending the day in Cambridge, and took the opportunity of renewing acquaintance with their many friends in District 8.

G5FO, 5JO, 3BK and 5DR, who are in charge of N.F.D. stations, reported satisfactory progress with their arrangements. The list of actual operators is now complete and has been forwarded to Headquarters, but A.A. and B.R.S. members should bear in mind that they can be of real assistance, and are asked to offer their services.

Results of the District DX Contests are announced as follows:—7 Mc., G5JO (195 points); 14 Mc., G2XV (163 points); winner of Granfield Trophy for best aggregate, G5JO (300 points).

Cambridge.—G5DR has completed his receiver, using "E Series" valves, and has it going on all bands. Recalling that he was prostrate for several hours after a N.F.D. breakfast, he has this year enlisted two chefs (complete with tall white hats?) from Trinity College for the 14 Mc. station. 5JO expects to be off the air for some time while he carries out a complete rebuild. 2XV reports that conditions were just to his liking during the "W" 'phone contest. 2PL has deserted 1.7 Mc. for a holiday at Eastbourne. 8FF has a post as civilian operator at the Mildenhall Aerodrome. 5DQ, who lives next door to 2PL, had the loan of a mast and found the new direction fine for ZS working. 5OV reports patchy conditions. 4AZ is disappointed that he cannot get a contact outside Europe yet. He is using a "*Mc. Murdo Silver*" receiver. 8SY is active, while 5BQ has been QRT through illness.

Peterborough.—When not on 7 Mc., 2NJ listens to press matter from commercial short-wave stations. 2NJ, a pressman himself, recommends other members who aspire to 25 w.p.m. to try out this idea. 3BK, who will have charge of the 7 Mc. N.F.D. station, is building the transmitter. 2FHC has kindly offered a site at Manea, Cambs. 3BK is active on 14 Mc., using C.W., and is getting out extremely well. 3WW is on 7 Mc., using 'phone, and 3DY is active on 14 Mc.

Luton.—3 KG has moved QRA and incidentally changed from D.C. to A.C. in the process. 3QG is welcomed to the town from Stourbridge, and comes from A.C. to D.C. BRS3518 has applied for his A.A. licence.

Bedford.—Congratulations to 3JU, who contacted W1BB on 1.7 Mc., using an input of 3 watts—good work, O.M.! 5FO has offered a call-book as prize for a listeners' contest—details in the monthly circular. He has been experimenting with aerial feeders. 5PA is concentrating on modulation and recordings of his own transmissions. 2CAP has applied for his full licence. 2BFN reports active.

Other Districts.—6FL is with Murphy Radio at Welwyn—his activity is confined to his week-ends at Longstanton. Both he and 2FZQ, whose work takes him away to the North of England each week, managed to get to the District meeting.

The next meeting is on Sunday, April 16, at 2.30 p.m., when Mr. J. F. Lucas (G2HK), of Letchworth, will demonstrate and describe a new British communications receiver.

DISTRICT 9 (East Anglia)

District Representative : H. W. Sadler (G2XS), Warren Farm, South Wootton, King's Lynn.
District Scribe : H. A. Spashett (G3RK), Smallgate, Beccles, Suffolk.
Town Representatives :
Great Yarmouth : D. Davy (G3RW), 59, East Road, Maygrove.
Ipswich : S. G. Keeble (G2AN), 139, Sidegate Lane.
Lowestoft : F. L. C. Firmin (G5QO), 2, Hall Park Villas, Oulton Road.
Norwich : C. White (G8VW), Heathfield House, Ipswich Road.

Ipswich.—A well-attended meeting was held on Saturday, March 18 to discuss N.F.D. Operators for each station were appointed, catering arrangements settled, and power supplies for both stations decided upon ; but discussions on transmitters and receivers had to be left to a later meeting.

All local members wish to record their sympathy with G3OJ in his recent bereavement.

Reports are again scarce, but there is a fair amount of activity ; G8MU is on 1.7 Mc. with his Meisner Signal Shifter, and reports that his trouble with parasitic oscillation has now been cured by using grid stoppers. 2JD has been operating on 14 Mc. phone with a new modulator, but is not satisfied with the hum level ; 8AN is on 14 Mc. phone with his old rig ; 8IS is anxious to get going again, but is still waiting for a new mains transformer ; 3OJ reports trouble with his new modulator ; 2AN is testing his RK34 final ; and BRS3573 s making good use of his new Sky Champion.

Great Yarmouth.—Yarmouth members have been busy preparing local gear for display in the Hobbies Exhibition shortly to be held in this town.

G3RW has received permission to operate on 1.7 Mc., and has also applied for a 25 watt permit ; 2BXS is constructing power supplies for his transmitter ; 2BIC is testing his 6L6 C.O. on 1.7 Mc. ; 2FAO is building a C.O. stage and carrying out experiments with doublers ; BRS3366 is obtaining good results with his new receiver ; and BRS3468 has moved to an outdoor shack.

Norwich.—Only one report has been received from Norwich, although the majority of stations are active.

G2MN has constructed a new four-band exciter, also a P.A. stage for 3.5 and 1.7 Mc. 2MN would welcome schedules on this latter band with local stations, he is available every Thursday between 2030 and 2130.

Lowestoft and District.—A very successful supper organised by Lowestoft members was held at the Wherry Hotel, Oulton Broad, on March 9. Parties attended from Yarmouth, Beccles and Bungay, and some interesting and informal discussions took place over the supper table. Later in the evening a varied display of films was presented by 2CWO, and thanks were offered to him for making this such an enjoyable function.

G5QO is active on 3.5 Mc., and is constructing a three-stage crystal controlled transmitter for 56 Mc. We welcome another new member in Lowestoft, Mr. J. A. Tyrrell, now BRS3569 ; G3RK is building a QRP battery transmitter ; 2APD has just installed a 6L6 T20 transmitter, and the following are known to be active : 3UT, 8AX, 3IN, 3XT, 8WI, 2CWO, 2AFC, and 2FFT.

WESTERN COUNTIES PROVINCIAL DISTRICT MEETING

WESTON-SUPER-MARE

SUNDAY, May 7th, 1939

at

GRAND CENTRAL HOTEL.

(Opposite Grand Pier)

Lunch, Tea & Meeting. Assembly, 12.15 p.m.

Inclusive Charge 5s. 6d.

This is the biggest thing of the year for members of Districts 5, 6 & 10. Reservations early, please, and not later than May 2nd, to : Austin Forsyth (G6FO), 29, Stow Park Avenue, Newport, Mon.

DISTRICT 10 (South Wales and Monmouth)

Your D.R. is this year responsible for the P.D.M. arrangements and an announcement appears elsewhere. As this is the joint annual meeting for all the western counties, covering also Districts 5 and 6, it is anticipated that there will be a large attendance from No. 10 at the Grand Central Hotel, Weston-super-Mare, on Sunday, May 7. Boats will be running and there are cheap and convenient air services (or special machines can be chartered by a party) from *Cardiff* and *Swansea*.

We are glad to have the first note from *Tonyrefail* this month, where they are having a dinner at the Red Gate Hotel on April 27 (tickets 2s. 6d.), at which the D.R. hopes to be present. GW3QB reports that mid-Glamorgan and Rhondda Valley members are very active on the H.F. bands, though, unfortunately, we do not, as he says, often hear from them.

N.F.D. calls and locations have been fixed as follows : *Newport*, GW3AJP 1.7 Mc. and G2JLP 3.5 Mc. ; *Cardiff*, GW8NPP 7 Mc. ; *Blackwood*, G8PUP 14 Mc. It is most regrettable that *Swansea* members found themselves unable to participate officially this year for the reason that they could not be allotted 14 Mc.! Owing to licensing diffi-

culties in other areas, they were offered 7 Mc., but declined to accept this band. It is fully realised that the allocation of N.F.D. frequencies is rather a difficult matter but—as was said in this column last year—the event is essentially a *co-operative affair* and the first consideration in allotting frequencies must be the interests of the District as a whole, which includes arranging for as wide a participation as possible on bands with which the majority of members in a given area are familiar. This time *Newport*, running two stations, will be somewhat short of operating personnel, so that anyone within reasonable distance who can come along for a few hours will be welcome.

Cardiff in Merry Mood.

The first annual supper and social evening organised by the Cardiff and District Short-Wave Club was held on March 23. Seated centre row are GW8AM (Chairman), 2BQB (Secretary), G5JU (D.R. for No. 5 District), G6FO (President and D.R. for No. 10 District), GW5WU, GW5FI, and GW3VL.

Arising from all this, it has been decided to institute an N.F.D. rota forthwith, the arrangement for the next two years being: 1940, Cardiff 1.7 Mc., Blackwood 3.5 Mc., Newport 7 Mc. and Swansea 14 Mc. For 1941: Newport 1.7 Mc., Swansea 3.5 Mc., Blackwood 7 Mc. and Cardiff 14 Mc. The members in all areas now know what licences they have to obtain and the experience they must get before June next year.

Finally, some personal notes. GW2UL is leaving *Swansea* to take up a new appointment, GW3UO has been appointed treasurer there and GW5BI is now at *Llanidloes*. GW5FI expects a change of QRA any time now and GW5TJ (the mystery man) gave a very good programme of magic at the *Cardiff* Hamfest on March 23, which drew a total of 42—we cannot say members, as this year the event became a social evening and a number of ladies were present. Dancing followed after the dinner and the rafters of the Philharmonic Hotel in St. Mary Street shook to the bass notes of 2BQB's PA unit till close on midnight. G5JU was among those present and a 56 Mc. schedule he arranged with G5WU for the following Sunday gave the first Penarth-Bristol 5-metre reception.

Please let the D.R. know you are coming to Weston on May 7. Write that card *now!*

DISTRICT 11 (North Wales)

Seventeen members attended the last of the winter meetings, which was held in Rhyl on March 26. On behalf of all members in the district, the D.R. would like to thank Mr. J. Starkey (GW6KY), Mr. E. G. Foulkes (GW5FU) and Mr. Bevan Evans (GW3GL) for having permitted the meetings to be held at their homes, and for so kindly supplying refreshments free of charge on each occasion.

No individual reports have been received this month. If these notes are to appear throughout the summer the D.R. must receive regular reports of *general interest*.

DISTRICT 12 (London North and Hertford)

District Representative: S. Buckingham (G5QF), 41, Brunswick Park Road, London, N.11.

Town Representatives:

Welwyn: J. Hum (G5UM), "Byeways," The Drive, Welwyn, Herts.

Watford: P. Spencer (G8MH), 11, Nightingale Road, Bushey, Herts.

Area Representatives:

A. J. Mathews (G6QM), 74, Hawthorn Road, Hornsey, N.8.

P. R. Solder (G5FA), 35, Torrington Gardens, New Southgate, N.11.

There will be no District meeting in April but it is hoped that all members will support the District Dinner and Social to be held at the Salisbury Hotel, Barnet, on April 21. Full details appear in this page.

North London.—The usual large attendance was recorded at the meeting held on March 17 at the Orpheum Cinema, Temple Fortune, when a debate took place on the merits of E.C.O. as opposed to Crystal control. Mr. J. Kirk (G6ZO), who opened in support of the Quartz Crystal set out the advantages and disadvantages of this method of control. He was of the opinion that two or three crystals judiciously selected give an amateur station sufficient flexibility for normal requirements. Mr. W. E. Brigden (G6WU), took up the cudgels on behalf of E.C.O. users, and it was clear from his remarks that he has carried out a considerable amount of exerimental work with this system. He referred to an E.C.O. cum crystal arrangement he uses, which produces a T9 note with the advantages of the E.C.O. circuit. Several other members spoke of their experiences and the systems in use at their own stations, but the discussion had to be curtailed to some extent owing to the lateness of the hour.

A sale of usable apparatus was held which produced further revenue for the District fund.

Watford.—Activity in this area is on the increase. Eleven members were present at the last meeting and four new members enrolled. A Watford Radio and Television Society has been formed and arrange-

ments are in hand for a permanent meeting-place, thereby relieving various members of the necessity of providing a QRA for their meetings. G8MH is trying the W3EDP aerial and the first call produced a report from Quetta. The following are active : G3KP, 3NR, 6GR, 6QL, 8CK.

Central Herts.—There was an excellent attendance at the March meeting, which took place at G2CN. The T.R. announced the winners in the local QRP Contest held in January. First prize (an 802 valve) went to G6XN, who scored 77 points, or twice as many as G2KQ, who finished second. Third place was occupied by G8PM. All three are situated in Welwyn Garden City. A very unusual low power transmitting rig was used for the contest by G6XN, who employed a string of Class B battery valves, all working off one lone 120 volt H.T. battery !

AN INVITATION

DISTRICT 12 (North London and Herts)

Cordially invite members in South, East and West London to attend their

SECOND

ANNUAL DINNER & SOCIAL

to be held on

FRIDAY, APRIL 21, 1939

at the

SALISBURY HOTEL, BARNET

7 p.m. for 7.30 p.m. LADIES WELCOMED

Tickets 4/6 single, 8/6 double. All reservations to Mr. S. Howard, G8TY, 92, Arlington Road, London, N.14, by April 17, latest.

DISTRICT 13 (London South)

Due to illness the D.R. has been unable to furnish notes for this issue.

The next Wimbledon area meeting is fixed for April 24. The Woolwich area meeting will take place on the same day.

DISTRICT 14 (Eastern)

Brentwood.—The March meeting held at G3MV, Brentwood, was well attended when 2DRI lectured on his latest high fidelity amplifier. G3LA and 2DRI recently visited the " A.P. " transmitter. The former has applied for a 56 Mc. portable permit for the summer months. 2AUK is now G4AK, not 2AWK as reported last month.

Chelmsford.—G5RV has at last fallen to temptation—and purchased a communication receiver—an SX16, his first contact using it was CE2BX on 14 Mc. phone, when he was reported Q5 R9 plus ! 6LB has worked VU7BR. 2KG put up a splendid show in the A.R.R.L. phone DX contest. 5RW is on 3.5 Mc. C.W. at week-ends. 8PB is still testing his new receiver. 3BS contemplates a rotary beam. 2SA bought a new car and did not have to sell his transmitter ! 3OX and 4AC are active, but do not report.

The recent local Hamfest was very successful ; 24 were present. N.F.D. developments are well in hand, and great things are expected. G5RVP, the 14 Mc. station, will be situated on Danbury Common.

East Essex.—The March meeting was held at G3SO and 16 members were present. G4GT, the first local " 4," was welcomed, and is joining the Society. N.F.D. arrangements formed the chief topic of discussion, and a sub-committee was formed to assist the T.R. with the work entailed. BRS2625 has offered to attend to the receiving side of the contest.

G5UK has had a " pylon " erected in his back garden to take his 56 Mc. beam aerial ; this has become a local landmark.

The Southend Radio Society had two meetings during the month. At one a C.W. *versus* phone debate took place, phone winning by one vote. The other meeting took the form of an exhibition of apparatus for the " Pocock " Cup. This was won by 2BNR and BRS1647 for an excellent television receiver built by them. The contest was judged by G5RV. The S.R.S. held their annual dinner and dance on March 25.

East London.—The March meeting was held at G3XS, Chingford, when the attendance was small. 2HR (ex G2ZN) attended to make contact again. 4BZ has started up on the top band, and has an enormous wooden fabricated mast. 3KZ will be inactive until after his examination. BRS3430, of Coggeshall, recently visited the D.R. and intends to apply for an A.A. permit.

A junk sale will be held at the next meeting, the commission to be appropriated for N.F.D. expenses. G8ABP will be the call of the 3.5 Mc. station at Tye Green, near Potter Street. 2CD and 2XP will assist as operators.

Romford.—Visitors are welcome at meetings held every Tuesday by the Romford and District A.R. Society. 8 p.m., Red Triangle Club, North Street, Romford.

DISTRICT 15 (London West, Middlesex and Buckinghamshire).

District Representative.—H. V. Wilkins (G6WN), 539, Oldfield Lane, Sudbury Hill, Greenford, Middlesex.

Town Representatives—

West London—H. B. Crowe (G6CO), 22, Chipstead Gardens, Cricklewood, N.W.2.

Wembley—S. Riesen (G5SR), 44, Wood End Road, Sudbury Hill.

Hayes—E. J. Napier (G8FA), 44, Cranmer Road.

Edgware—H. W. Pope (G3HT), 4, Gainsborough Gardens.

Slough—J. Paine (G6PR), 38, Alpha Street.

High Wycombe—J. Redrup (G8VZ), " Lyndale," Longwick Road, Princes Risboro, Bucks.

Twenty-seven members entered into a discussion at the March meeting as to what constituted a Communications Receiver. A message was received from an old friend in VK5NR who is looking out for district members now that he has returned to VK. We send him 73.

So far no further T.R. appointments have been made but if anyone in the two sections concerned would offer to take over, the D.R. will be grateful.

We are very sorry to hear of G6CJ's prolonged illness and in sending our greetings we wish him a speedy recovery.

Congratulations to G2LA on his recent marriage, and to all those who have graduated to full or A.A. calls during the month.

G8FA suggests that a local contest be organised. The D.R. would like to hear from others with ideas on the subject.

Wembley.—G5SR has now worked 120 countries and 6WN added two more to list. 2TJ and 8PI are active.

Hayes.—G8FA is testing aerials. 2FYF is experimenting with Television aerials.

High Wycombe.—G3MI is on 1.7 Mc. and 6JK on 28 Mc. telephony using a W8JK beam. 8JK, 8VZ, 2AKS, 2BOA and BRS3292 are active.

Slough.—G6IR using a long wire aerial, is raising DX on 7 Mc. He has recently contacted HH, VK5, ZS5, W1, 2, U5 and 6.

DISTRICT 16 (South Eastern)

District Representative : W. H. Allen (G2UJ), 32, Earls Road, Tunbridge Wells, Kent.

Town Representatives

Ashford : R. G. Dennett (G8RK), 81, Beaver Road.
Bognor and District : C. J. Rockall (G2ZV), "Aubretia," Seafield Road, Rustington, Sussex.
Brighton and Hove : H. Lunson (G3WR), 80a, Beaconsfield Road, Brighton, 6, Sussex.
Eastbourne : F. Wingfield (G3CX), 48, Willingdon Road.
Heathfield : R. J. Lee (BRS1173), 9, Theobalds Green.
Gravesend : R. S. Martin (G2IZ), 41, Mayfield Road.
Maidstone : L. J. Cleggett (BRS2834), "White Cottage," Detling Hill.
Medway Area : J. E. Bryden (2BOL), 24, City Way, Rochester, Kent.
Whitstable : W. Crossland (G5CI), 13, Queens Road.

Members are reminded that reports should be sent to their T.R. before the 25th of the month.

Ashford.—The monthly meeting was held at G2QT's, who gave an interesting talk on his 14 Mc. gear, afterwards working VK on 'phone. All members report active.

Brighton and Hove.—On March 2, Mr. Wilkins, of the *Avo Company*, gave a very interesting talk on meters, etc. Activity: G2RU, 3HP, 3JF, 3WR, 3YY, 6CY and 8AC, also all AA and BRS members. We offer our congratulations to 6RM and his wife on the birth of a daughter. Mr. Dickins (BRS2134) is welcomed to the district from abroad.

Bognor.—The D.R. regrets that the notes sent by G2ZV have been mislaid.

Eastbourne.—G3AT gave a much appreciated talk on 56 Mc. work at the E. & D.R.S. meeting in March. 2AVQ is now G4FV. G2AO, 3AT, 3CX, 5BW and 5IH are active.

Gravesend.—On February 27, Mr. J. Clarricoats (G6CL) gave a talk entitled "Up and Down the Ham Bands," and in his usual manner completely held the interest of the members. Later in the evening G6PA assisted by 6NS, introduced Mr. Hosburn, C.W.R. Chief Technical Instructor, who described the aims of the C.W.R., and followed with an account of his own experiences in the R.A.F. in Egypt. On March 13 N.F.D. was discussed. All stations in the area are active and Mr. Butler (BRS3530) is welcomed to the Society.

Heathfield.—G5JZ is putting good 'phone over to VK on 14 Mc. 2CJZ is now G4GW, and most of the other stations report activity.

Maidstone.—During the month talks were given by Mr. O. P. Lowther, who demonstrated quality reproduction, using a Lowther radio chassis and a Voigt speaker, and G2UJ, who spoke on 56 Mc. work generally and brought over his transmitter and receiver. The R.S.G.B. films were shown during another meeting. Active: G5FJ, 5XB, 8UC, 2BXW, 2763, 2834 and 3552.

Tunbridge Wells.—G6OB is busy testing a new modulator. 6ML is trying to keep his beam arrays in the air without poles, the latter having caused trouble with his neighbours! 2UJ is active on 1.7 and 56 Mc. and is using a T40 on the latter band with some success. 5KV has constructed a very satisfactory preselector for his super and has much improved the signal/noise ratio. G4AY, 4DM, 8NO, 2AKQ and 2CUX are also active.

Whitstable.—2CMI is now G4FI. Activity is confined to G4BY and 5CI.

DISTRICT 17 (Mid-East).

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

Town Representatives :—

Grimsby and District.—T. S. Brister (G6AK), 22, Sherburn Street, Cleethorpes.
Mablethorpe and Sutton.—A. Simons (G5BD), "Windy Ridge," Admiralty Road, Mablethorpe.
Boston.—G. Hutson (G6GH), 11, Wide Bargate, Boston.
Lincoln.—H. Townhill (G5XL), 4, Ashlin Grove, Lincoln.
Cranwell.—R. Wilson (G3OI), A5 Flight, No. 2 Wing, E & W School, R.A.F., Cranwell.

Reports from all areas are very scarce this month, although most stations are known to be active. A District Meeting was held at The Mason's Arms Hotel, Louth, on Sunday, March 19, to discuss N.F.D. arrangements. Twenty-five members attended and all details regarding sites, station crews and accommodation were settled satisfactorily. It was decided to hold a further meeting at Lincoln a fortnight before the contest.

Mablethorpe and Sutton.—G5BD is on 3.5 Mc. most evenings about 22.30 and those looking for district schedules should make a note of this fact. The Grimsby and District Short-Wave Society have a schedule on this band with G8AP every Tuesday evening at 19.45 and other stations in the District are asked to co-operate.

DISTRICT 18 (North and East Yorkshire)

District Representative : E. Mitchell (G5MV), 40, North Marine Road, Scarborough.

Town Representatives :

Bridlington : T. Woodstock (G6OO), 24, Roundhay Road.
Hull : J. W. Gill (G6OS), 95, Parkfield Drive, Anlaby Road.
Scarborough : L. Tranmer (G6TG), "Wandsworth," Scalby Road, Burniston.

As this issue should be in the hands of all members before the York Provincial District Meeting fixed

for April 16, the D.R. takes this opportunity of drawing attention to details which were unfortunately missed from THE BULLETIN last month. The charge, which includes two meals, will be 5s. Assembling time is 1 p.m., with lunch at 1.30 p.m. Tea will be at 5 p.m. The meeting is open to members and interested friends of Districts 2 and 18, a special invitation being extended to members having no Town Representative.

Arrangements have now been completed for N.F.D. The 3.5 Mc. station which will be operated at Garton-on-the-Wolds will use the call G2KOP.

Hull.—The chief item of interest this month relates to the policy of future meetings. Guided by information which the T.R., G6OS, has gathered from Wireless Societies in other parts of the country, members who were present at the March meeting decided to allow non-members of the R.S.G.B. to attend the monthly meetings. If the response to this invitation is successful, then the question of a properly constituted club will be reconsidered. Members are requested to make this change of policy known to all interested.

In the absence of reports, a *résumé* of the activity in this part of the District cannot be recorded.

The visit to the Hull Technical College referred to in last month's notes has now been fixed for the second Wednesday in July.

Scarborough.—Activity is rather low at the time of writing, judging by the lack of reports. G3KS has now worked all districts of VE and W on 14 Mc., using 10 watts. 6SO has been off the air for a few weeks owing to illness, but has now been heard again. 2TK has been busy erecting a three-element beam aerial, which on test gave S8 to S4 readings at G6TG, four miles away, when rotated through 180 degrees.

At the Scarborough Short Wave Society, G6TG gave a talk describing various types of valves. Several obsolete specimens were on view, including the LS1 (the first power valve—1922), AR, Dutch "Soft" Detector, V24 low capacity, and several early dull-emitting types.

A 22 ft. self-supporting mast is being built in the club-room by G6TG for use with his 56 Mc. and 28 Mc. beam aerials. Assistance is being given by various members at each weekly meeting.

It is regretted that no response has been received to the appeal for reports from other parts of District 18. Will all members who are not yet served by a T.R., please let the D.R. have a card reporting activity at least every three months? It is impossible to write to everyone individually, and these notes are supposed to include news of the whole District, not merely the two centres, Hull and Scarborough.

DISTRICT 19 (North-Eastern)

District Representative—

R. J. Bradley (G2FO), "High Crest," Yarm Road, Eaglescliffe, Stockton-on-Tees, Co. Durham.

Town Representatives—

Newcastle-on-Tyne—S. A. O'Hagan (G2CR), 293, Rothbury Terrace, Heaton, Newcastle-on-Tyne 6,.

South Shields—W. Smith (G5WZ), 60, Sunderland Road.

Stockton-on-Tees and Middlesbrough.—F. Robinson (G5XT), 4, Cranford Gardens, Acklam, Middlesbrough.

The members in Berwick-on-Tweed have, at their own request, been transferred to Scottish "G" District. The 1.7 Mc. N.F.D. station will now be operated from Hexham instead of Berwick under the call of G5RI.

Newcastle-on-Tyne.—Reports have been very scarce during the past few months. Will members please make every effort to send a report of their activities to the T.R. by the 20th of each month? 2CR and 5RI are greatly in need of assistance for N.F.D. Members willing to help should please get in touch with 2CR as soon as possible.

South Shields.—All stations are active with the exception of 5TG who is preparing to move to a new address. Fortnightly meetings have recommenced at 5WZ who is now active on 3.5, 7, 14 and 28 Mc. 8JO and 8VV are active on 14 Mc., the latter on phone using a crystal microphone. 5WZ hopes to arrange for a meeting of the South Shields and Stockton members one Sunday during the coming month.

Stockton-on-Tees and Middlesbrough.—G2FO is busy constructing the N.F.D. transmitter, 6L6 CO. RK11PA. 3YK is building a 50 ft. mast from ARRL design to support a new beam aerial. 8OH and 8PS are getting consistent DX reports using doublet aerials, 5XT, 8CL, 2CZO, 2DMY are also active.

Northern Ireland

An increasing number of members are maintaining activity.

The second quarterly district meeting was held in Belfast on March 30, when there was a large attendance. After tea and a short business meeting the evening was taken up by the showing of the 1938 N.F.D. films and the latest "Scrap Book" films. Those responsible are to be congratulated on the excellence of the photography and the make up, which could hardly be bettered. There is a considerable improvement on the films of previous years, good as these were. The show was enlivened by running comments from those present, and was voted one of the most successful of these meetings. The last film was re-wound through the projector, when the personalities and vehicles in reverse caused much amusement.

Teams to man four stations in the 1939 N.F.D. were finally fixed. At the close of the meeting a vote of thanks was passed enthusiastically to Mr. W. J. White—a friend to Amateur Radio, though a non-participant—who very kindly projected the films, and took a lot of trouble to ensure there being no "technical hitches."

The next meeting is provisonally fixed for June 30, but any alteration will be duly notified.

Scotland

Most districts are now busy making final plans for taking part in N.F.D. and we should like to point out to members who have not attended at recent meetings, that if they are interested their D.O. will be glad to hear from them. Vacancies exist for both assistant operators and helpers at most stations.

"A" District.—Sites for N.F.D. have been finally fixed. Despite the appeal last month for more volunteers, no further names have been received. At the monthly meeting a "bug" key, donated by the D.O., was raffled and resulted in a welcome addition to district funds. Mr. Niven and Mr. Ferguson have been elected District Auditors. The question as to whether lectures should be given at future meetings was discussed and it was decided to continue them. An earnest appeal is made in this connection for volunteers.

GM6MS reports very encouraging results on 28 Mc. using a vertical aerial with special co-axial feeder system as described in the January issue of QST. He will be glad to hear from others who are testing this aerial. 6WD had a remarkable spell of DX on 14 Mc. during the A.R.R.L. 'phone contest. In the early hours of March 25 he worked all W districts and VE1, 3, 4, 5, a total of 38 contacts in 3½ hours. He has now completed his 56 Mc. transmitter and will welcome co-operation from members. 8FR, who has been testing the double doublet aerial described in the Handbook, reports excellent results. No less than 16 new countries have been worked and WAC WBE made on the aerial. 6SJ reports receiving listeners' reports from Quetta on his 7 Mc. signals. 6IW has erected a 278 ft. Zepp aerial. 2CHN, 2FHZ report.

"B" District.—Two meetings were held during March. At the first, discussion centred around N.F.D. arrangements. Station sites and chief operators have now been selected, but assistant operators are required for all the stations. At the meeting on March 17 a discussion took place on T. & R. BULLETIN articles, etc. Many interesting points came to light, and it is hoped that the result of the discussion will be published in the near future.

Several members took part in the A.R.R.L. contest, but little information of a definite character has come to hand concerning results. Members who have items of interest for these notes should inform the D.O. before the 20th of each month, or at the meeting previous to that date. Should the D.O. not be present notes should be given to Chairman for that evening.

Mr. Fowler (GM8SV) has left the district to take up an appointment as a marine engineer.

"C" District.—There is little news to hand, but N.F.D. arrangements have been made and four stations will be in operation.

"D" District.—GM5GK put up a good show in the DX contest, while GM6RZ is rebuilding for A.C. Preparations for N.F.D. are going ahead. 2BIQ is now GM4HB. The following are active: GM3UM, 3YN, 4CV, 5YX, 6NO, 6SR and 6XI.

"F" District.—In the A.R.R.L. Contest GM3OM had no difficulty in working W6 and 7 with his W8JK beam. In the same contest 6NX worked 28 districts. The H.T. supply at both stations was 230 volts from D.C. mains. 2DWO is now GM5IR and 2DWY awaits his call. Nearly all stations are conducting aerial experiments.

"G" District.—Members paid a visit to G2YY on Sunday, February 26. A meeting was held afterwards in Berwick, when the subject of discussion was "The C.W.R. and the Amateur." This was followed by a request from G2YY, G6UC and G8SG, that they be transferred to this district from No. 19. The matter was referred to H.Q. and the transfer has been approved by Council. "G" District welcomes these very active amateurs. At a meeting in Galashiels on March 12 N.F.D. plans were discussed. All stations are active and GM8RV's brother now joins the ranks of amateur radio in Bristol. Mr. Peacock has left the district for Barnsley and we wish him luck in his new appointment.

"H" District.—In view of the growing membership in the Dunfermline, Cowdenbeath and Kelty area and the difficulties and high cost of attending District meetings, it has been agreed to form a town group in the area. Mr. C. A. M. Clackson (GM8KR) has been elected T.R. It is hoped that the new arrangement will prove of great value and result in an increased membershp. Regular meetings will be held. GM8MQ has been elected Deputy D.O. The N.F.D. transmitters have been built and tested and all matters with regard to this event are finally arranged.

The 1.7 Mc. band is being well used by members in "H" District. Mr. Fraser (2DIT) is now GM4FK and Mr. Imrie (2AHD) is GM4GK. The following are active: GM2NQ, 3LO, ND, NH, SW, UU, 4AN, 6JJ, 8KR, MQ and SQ. A.A. members are also active and several new full calls are expected shortly.

A "Ham Evening" in Maidstone

By "VISITOR"

THE evening of Wednesday, March 29, saw a most successful revival of the old time "Hamfest" in Maidstone, at the M.A.R.S. clubroom.

This event, admirably organised and carried out, attracted 75 hams from all parts of Kent to a "get-together" on a scale probably never before realised in the district.

In this part of the county where cross-country communication is somewhat difficult and the amateur population scattered over a large area, it has been considered good work in the past when 30 people attended a conventionette or P.D.M. which had been advertised perhaps for months beforehand, and yet here was more than twice that number; indeed a tribute to the preliminary work put in by members of the Maidstone Group.

The chief event of the evening was an address by "Clarry," who, complete with little black book, talked as only he can of the aims, the difficulties and the work both past and present of the R.S.G.B., the problem of the high-power licence, and the future of the amateur movement.

There were facts and figures, plenty of them. Not just a dull recital, but information of interest to all amateurs. For instance the results of the band occupancy checks organised by the Society. Who would have thought, even considering the over-crowded state of the 7 Mc. band, that in those 300 kc. 1,300 odd British amateur stations were heard operating during the four Sundays of last November?

G6CL was given a great ovation when he at last resumed his seat, and it is felt that before long the

M.A.R.S. will have an almost 100 per cent. R.S.G.B. membership.

Question time over, refreshments were announced. This was certainly a pleasant surprise for the visitors, as piles of "eats" and gallons of various sorts of drinks, provided free by the members, were distributed amongst the assembly; a generous gesture which was highly appreciated.

The loyal toast was followed by that of "The R.S.G.B." to which Mr. Clarricoats briefly replied, and then came "The Visitors," proposed by the Hon. Secretary, Mr. P. M. S. Hedgeland, the D.R., G2UJ, responding. This concluded the programme except for that most important feature of ham gatherings, rag-chewing, which continued for some time.

It would be impossible to mention all by name who contributed to the success of the evening, so we will just say "Well done, Maidstone," and assure them of the support of Kentish amateurs for any similar occasion in the future.

BOOK REVIEWS

ELECTRON OPTICS: THEORETICAL AND PRACTICAL. By L. M. Myers. 618 pages and 379 illustrations. Published by Chapman & Hall, Ltd., London. Price 42s. net.

A few books on television and cathode-ray work have already touched on this subject in as far as it was applicable to their purpose. But this book is a specialized text dealing much more comprehensively with the behaviour of electrons in electric and magnetic fields, and is the first of its kind in English. The subject is not exactly a new one, but the recent rapid developments in high-vacuum engineering have expanded the scope so much that it may now be considered as a new and highly important branch of physics.

The first few chapters build up from first principles the fundamental theory of electron behaviour and establish the properties of "lenses" of electrostatic, electro-magnetic and space charge types.

Chapter 4 is devoted to the electron multiplier, and a surprising number of different multiplying devices are described and analysed. The potentialities of these devices in many fields of application is a fascinating prospect.

The author then deals with the proper choice of materials and constructional technique, and has some most encouraging words of advice for the student who is about to tackle the practical side.

In the electron microscope section the author treats many types and shows a number of extremely interesting microphotographs of which perhaps the most interesting is one of staphylococcus aureus magnified 20,400 times. The physicist is here evolving a mighty instrument for his brother scientists.

Other applications are described and include the electron telescope, iconoscope, cathode-ray ray tubes of the more usual types and those employing temperature radiating screens; there is also a critical survey of the present position regarding large screen television.

The book concludes with a very extensive bibliography. Special mention must be made of the excellent illustrations which are very numerous, and only a few typographical errors were noticed.

The subject is, of course, considerably mathematical in its analytical sections, but the balance of theoretical and practical treatment is very satisfactory.

A specialized book such as this must have a limited appeal, but physicists and students of high-vacuum engineering will, one feels sure, enthusiastically welcome this as an outstanding work of timely appearance.

T. P. A.

THEORY AND APPLICATIONS OF ELECTRON TUBES. By Herbert J. Reich, Ph.D., Associate Professor of Electrical Engineering (University of Illinois). 670 pages and 512 illustrations. Published by McGraw-Hill Publishing Co., Ltd., London. Price 30s.

The rapidly increasing number of electronic devices and their many applications have made treatment of their operation almost uselessly brief in the general engineering type of textbook. It would be hardly too much to say that valves and their characteristics overshadow all other branches of radio engineering in importance and complexity. A special book, such as this, devoted to the functional theory of electronic devices, is one that the engineer and physicist will find very useful.

The scope of the book includes high-vacuum thermionic valves, glow and arc-discharge valves, and photoelectric cells.

The author begins with a brief explanation of the physical principles regarding electrons, ionization, space charge, deionization, and emission, and then analyses the construction and operation of the high-vacuum diode. Cathodes are fully treated in this section.

Grid-controlled high-vacuum valves, from the simple triode to the beam-power pentode, are firstly considered individually as devices and their characteristics studied, then in association with circuits, where performance demands a rigorous analysis.

Modulation and detection are, very logically, treated together in the same chapter; the theoretical treatment here is comprehensive. Amplifier arrangements are classified, and various types treated from the design view-point, including such matters as A.V.C., compression and expansion circuits, and inverse feedback.

Class A and AB1 amplifiers are covered in one chapter, and Class B and AB2 in the following one. The treatment is practical and thorough, but it is a disappointment that Class C amplifiers are "beyond the scope of this book." Again, when considering the power output of oscillators in the next section of the book, only Class A operation is mentioned, except for the remark: "Occasionally other considerations such as plate-circuit efficiency and harmonic content may be of more importance than maximum power output."

Many types of oscillator are dealt with in this section, but one feels that the magnetron deserves more than three sentences.

The next section of the book will be considered to be of great value and importance to electrical as well as to radio engineers. It deals, firstly, with electrical conduction in gases, and then with glow and arc-discharge valves and circuits. This section includes such devices as neon stabilisers, rectifiers, and thyratrons. The electrical engineer will find much of interest in the inverter operation of thyratrons and in water-cooled ignatrons.

A section on photo-electric cells precedes a consideration of power supplies with analyses of condenser and choke input filters. The book concludes with an interesting and useful chapter on valve instruments and measurements.

Many references are given throughout the text, and each chapter concludes with problems and a bibliography. Problem solutions are not supplied.

The presentation of the subject matter is extremely methodical, and the book will find a handy niche in many an engineer's bookshelf.

T. P. A.

LETTERS TO THE EDITOR

The Editor does not hold himself responsible for opinions expressed by correspondents

COUNCIL BALLOT

To the Editor T. & R. BULLETIN.

DEAR SIR,—The announcement in the February issue of THE T. & R. BULLETIN that 492 ballot papers had been received must have called for considerable attention from those who returned them.

Out of some 3,000 home members only about 16 per cent. considered it worth while to find time to use their power of recording a vote. The R.S.G.B. as an organisation has in the past upheld the interests of the British amateur. I would go so far as to say that our position without such representation would indeed have become precarious. Yet no organisation can further its best interests when the great majority of its members show an unreasonable apathy toward electing officers.

With every member behind it the Society can maintain and consolidate its position, but while a great number use only the privileges of membership without assuming its minor responsibilities, how can any Council serve us with confidence ?

I respectfully look forward, sir, to a little editorial comment on the duty of members.

Yours faithfully,
FRED J. LUCAS (2DZZ).

[We shall be pleased to make an editorial comment on the duties of members prior to the next election.—ED.]

C.W. ON 56 MC.

To the Editor, T. & R. BULLETIN

DEAR SIR,—I thank you for publishing my 56Mc. schedule in the March issue of THE BULLETIN, and I hope soon to give you good news of activities between Sheffield and the South.

I cheerfully accept the admonishment of Mr. Sutton and would inform him that I will carry out his suggestion to open and close test transmissions on C.W. I cannot give a good reason for avoiding C.W., but my amateur interests have always been on 'phone and I suppose one gets used to it. It is not a case of being unfamiliar with the code, as one of my friends has provokingly suggested, because I have the usual certificates for fast morse. Quite recently I finished a self-imposed task of teaching a certain body of men the morse code from alphabet to passing out at twenty words per minute. Perhaps that is why my keys are lying dormant in the shack, but available for emergency work.

So while still assisting 56 Mc. activities by sending C.W. I shall not feel satisfied with any DX QSO's until they are solid on 'phone.

Yours faithfully,
G. W. BAGSHAW (G8KD).

AN OMNI-DIRECTIONAL LOW ANGLE AERIAL

To the Editor, T. & R. BULLETIN.

DEAR SIR,—With reference to Mr. Heathcote's article in the March issue, I have recently tested a modification of his " T " aerial on 14 Mc., using a single wire matched impedance, or " Windom," feeder. The dimensions in my case were as follows : Length of top : 68 ft. Length of vertical wire : 33 ft. Feeder tapping point : 20 ft. 9 in. from top of vertical wire. No. 14 gauge wire was used throughout. This appeared to balance perfectly for a crystal frequency of 14,380 kc.

Results were quite up to expectations, and it is readily understandable how Mr. Heathcote has obtained his fine performance. WAC was made within three days with S6 reports from all continents. The input to the final stage was 20 watts.

These results may be of interest to readers who wish to try this type of aerial, but have not the necessary 80 ohm cable on hand.

Yours sincerely,
G. C. PROCTER (G5PR).

MORE ABOUT THE F.O.C.

To the Editor, T. & R. BULLETIN.

DEAR SIR,—Although not a member of that select body, I read with interest the F.O.C. Notes. In the February issue G5BW delivers a sermon on operating procedure, and I would therefore like to draw his attention to some errors.

Firstly, the signals " AR. K." are not correct. The AR signal means " End of transmission " and therefore should, *ipso facto*, end the transmission. Anything sent after this is technically offside. The correct signals to be used should therefore be " . . . K. AR."

Allowing for this slight difference, we next come to the statement " . . . procedure might well take the following form : ' QRZ ? de G1AA QRU ? Then QRT AR K.' " A study of the G.P.O. Handbook shows that QRT means " Stop transmitting," and it is only used, to my knowledge, in order to stop a station interfering with another. (In fact, I have only heard it in connection with distress calls.) But even allowing for this hazy idea of *when* it is used, I still doubt the logic of telling a station to stop sending (QRT) and follow

it up with the "AR. K." signal. This, surely, is contradictory? Perhaps G5BW would clear up this point, as operating procedure, to my mind, is very important in that a correct knowledge thereof will save precious minutes in a time of emergency.

Coming away from technical matters, it is nice to see that, after 10 years as a Ham, I am given "permission" to have long QSO's. Surely the matter of how long a QSO lasts rests with the stations concerned, and, if it is overdone, then the note of warning should come from an official source, and not from a club, which, I observe, boasted a membership of 58 in February?—Yours sincerely,

C. R. EMARY (G5GH).

F.O.C. CORRESPONDENCE

To the Editor, T. &. R BULLETIN.

DEAR SIR,—In the March issue of the BULLETIN there are two very long letters regarding the F.O.C.

I personally have no interest in the club in question, because it seems to have no bearing on *Amateur Radio* in its true sense. I do, however, feel that the space taken up by these letters could be put to far greater use.

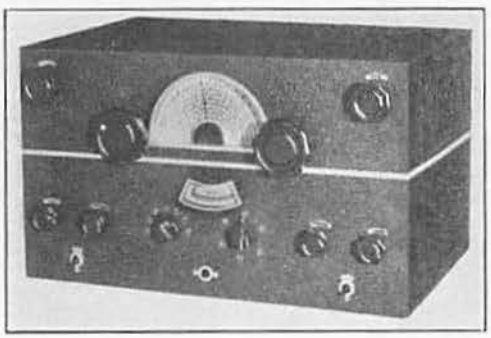
To my mind it is immaterial whether a man can send at commercial speeds or not, and neither does his standard of operating interest me so long as real experimental work is being carried out, but I do object to a large amount of space being given up to airing of views which, in my humble opinion, do not advance our movement the tiniest bit.

Space is valuable, so we are told, and I therefore say it should be devoted to something of a constructive nature.—Yours faithfully,

HERBERT BARTLETT (G5QA).

The Hamrad L39 Receiver

Scarcely had our present Editorial been set up at the printers before details reached us of the new *Hamrad L39* Receiver. Time and space limitations will not permit more than a brief reference to this answer to our repeated appeals for an All-British receiver selling at a reasonable price. We hope, however, to publish a detailed test report at an early date.



A brief specification follows:

Crackle finished, cadmium-plated steel cabinet, 17 ins. by 11 ins. by 10 ins. high. Cadmium-plated steel chassis with heavy copper bonding. Twelve valves. R.F. stage on all bands, entirely new mixer circuit, separate oscillator valve, two I.F. stages with crystal gate, Dicde second detector, A.V.C. amplifier, B.F. oscillator. "S" Meter amplifier, two audio stages giving 4 watts output.

Twelve wave-bands from 0.6 to 33 Mc. are covered in seven stages, and five amateur bands 1.7, 3.5, 7, 14, and 28 Mc. are pre-selected by means of a switch. A built-in "S" Meter is incorporated. Di-pole, matched impedance, and ordinary aerials are catered for.

Crystal gate is of new design and permits a continuous variation of selectivity from normal to crystal sharpness.

One tuning dial only is employed.

The 18 coils employed in the R.F. Mixer and Oscillator sections are mounted on a rotating turret and only the coils in actual use are in circuit.

The price of this receiver is £25 available through Hamrad Agent-Dealers. Full details can be obtained from *Hamrad Wholesale*, 32, St. Lawrence Terrace, W.10. J.C.

Reorganisation of T.V.A.R.T.S.

The Thames Valley Amateur Radio and Television Society, whose headquarters are at the Albany Hotel, Twickenham, Middlesex, have found it necessary to effect a change in policy. By approaching newly licensed amateurs, a new club has been formed with a limited membership, comprising persons holding A.A. or full licences and B.R.S. members.

The new Society will be known as The Thames Valley Amateur Radio Transmitting Society, in order to retain the familiar initials, T.V.A.R.T.S., and its main function will be to cater for those interested in short-wave transmitting.

A series of interesting meetings, visits and field days has been arranged. The chief feature of the summer will be the running of the District 15, 3.5 Mc. N.F.D. station for the third year in succession.

The officers for 1939 are: President, G. H. Billison, G6GB; Hon. Secretary, D. R. Spearing, G3JG; Hon. Treasurer, A. Mears, G8SM; Committee: Messrs. Crocker, G2NN, Cooper, G5LC, Wadman, G2GK, and Bowdidge, G3GQ.

Those interested should write to the Secretary at "York House," Queen's Road, Teddington, Middlesex.

Mullard Red E Valve Receiver

It is regretted that an error occurred in the wording of the caption which appears beneath the diagram illustrating a section of the electrode system of the EF8 valve, shown on page 501 of last month's issue. Electrode (2) is the auxiliary grid, and Electrode (3) the screen grid.

Station Descriptions

We shall be pleased to consider for publication photographs and brief descriptions of British Isles amateur stations. Photographs should show a general view of the station.

The Society would be prepared to pay for the cost of professionally photographing suitable stations, providing a description and an *amateur* photograph is *first submitted*.

BRITISH EMPIRE NEWS AND NOTES

Australia (Western)

By VK6WZ

FEBRUARY-MARCH conditions here have shown what many consider a final spurt of summer characteristics before settling down to winter. 14 Mc. revived and many DX contacts were made, and it is rumoured that two stations at least worked South America. At present VK6SA is our only W.A.C. and that honour can scarcely be coveted more in any part of the globe. 6MW reported an unexpected break in 28 Mc. during early March when he contacted SU1MW. Otherwise this band has been quite dead. 6RU, a newcomer, has been doing very well on 7 and 14 Mc. with his T55. 6JS and 6MY, two "OT's," have staged comebacks, the former working 14 Mc. 'phone with an 800 final and NC81X receiver. VK6LJ is inactive owing to studies. 6FL, of Geraldton, visited Perth during February and met many VK6's.

VK6BW, who is arranging schedules with 56 Mc. stations, hopes to put a 50-watt c.c. signal on the band. The Field Day Committee of the W.I.A. has decided to encourage the use of better 56 Mc. gear by awarding bonus points in five-metre contests for stations using stabilised transmitters, etc.

A sad blow to his parents and a shock to amateurs was the death in hospital of Fred J. Kemble (VK6FJ) on February 21. Prior to his illness he had been working away from his home (Katanning).

British West Indies (Eastern Group)

By VP2AT.

Although it is a long hark back to Christmas, the writer would like to record that for the fourth year in succession local amateurs gathered together on Christmas morning for a Round Table QSO on 7 Mc. The success of the party was largely due to the efficient way in which VP2LC acted as M.C. The following participated in the order given: 3AA, 2AT, 2AD, 2AB, 2GD, 2SB, 6FO (with 6TR), FG8AB, VP6RB (with 6NW), 6MR, 4TO, 4TN, 4TI, 2LC (with 2LB).

VP6MY recently broadcast a running commentary on the Inter-Colonial Cricket Tournament between British Guiana, Barbados and Trinidad.

The following are active in Antigua: 2AD, 2AB, 2AT, 2AL. The last three-mentioned have worked Lord Moyne's yacht "Rosaura" which is cruising the Caribbean with members of a Royal Commission investigating labour conditions in the West Indies.

VP2SA and 2SC are working on C.W. from St. Vincent.

Ceylon

By VS7RP

The chief item of interest here during February was the B.E.R.U. Contests, and as far as the writer is aware, the following took part: VS7RA, 7MB, and 7RP. A noticeable feature was the severe QRM from telephony stations, especially at the L.F. end of the 14 Mc. band. While it is not possible to expect foreign telephony stations to keep off the air during contest hours, it was nevertheless somewhat surprising to hear Empire stations in Asia, operating on telephony during the peak periods. Year after year an appeal is made by Headquarters to restrict telephony to a minimum, but it is very regrettable that this appeal is treated with such scant respect by amateurs who should know better. VS7RA was a particular victim of this trouble, due to the fact that his crystal frequencies were at the low end of 14 Mc., with the result that he was swamped out in the Senior event. In the Junior contest he was able to obtain a crystal which took him away from the L.F. end, thus allowing him to make many more contacts.

Best reception periods during the Contests appeared to be from 11.00 G.M.T. to 16.00 G.M.T. when signals from VK2 and 4 (and to a lesser degree ZL) were coming in fairly well with little or no QRN. Signals from Empire stations in Europe and Africa started to arrive at about 13.30 G.M.T. reaching their peak at 18.00 G.M.T., then gradually fading out at around 19.30 G.M.T. QRN became prominent from about 15.00 G.M.T.

After the Contests finished conditions at VS7RP gradually went from bad to worse, although VS7RA reports that he had some very fine contacts with Great Britain between 18.00 and 19.30 G.M.T.

It is hoped to have two new VS7 stations on the air shortly. They will be very welcome, because at present VS7JW and VS7EB are on leave and VS7RF and 7GJ are also, it is believed, going shortly, thus leaving only VS7RA, 7JB and 7RP active.

Channel Islands

By 2AOU

Alderney.—G3XN, who operates on D.C., recently had the misfortune to burn out his rotary convertor. 2BMU is applying for his full licence.

Jersey.—G3GS continues his aerial tests and is observing skip on 7 Mc. He expects to be on 28 and 56 Mc. shortly. 2FDJ and 2CNC are in the C.W.R.; the former has applied, and the latter will apply shortly, for a radiating permit. 2AOU has been concentrating on 28 Mc. reception and hopes to H.B.E. on that band before long. 2BUP has constructed a very efficient receiver.

Members in Jersey extend their thanks to G8DO for his past services as C.I. Representative. There are no reports from Guernsey.

Eire

By EI9D.

Arrangements for N.F.D. are now well in hand. EI6F, EI6J, EI3L, EI9N operating on 1.7, 3.5, 7 and 14 Mc. respectively, will take the air. Exact locations have not yet been fixed, but all will be convenient to Dublin city. This new arrangement is to avoid a shortage of operators, a handicap which was very noticeable last year when stations were located in Cork and Sligo. It is hoped that as many provincial members as possible will visit Dublin and take part in the event.

Our friends in GI should take notice of these happenings because it certainly looks as though EI intend to do something about that trophy this year. The fact that arrangements have been made at the present early date certainly looks like business. Nothing of the kind has ever happened before in EI and it seems to indicate determination to do things this time. We want to know if there will be

any duty on the trophy crossing the Border. Perhaps "Clarry" will refer to his "little black book" and let us know!

We are very sorry to hear that Mr. H. Hodgens, E15F, has been ill in hospital, but we understand he is now making satisfactory progress. We wish him a very speedy and complete recovery.

Malaya and Borneo

By VS1AA

Amateurs in other countries are asked to please note that VS1AF, 1AH, 1AI and 1AJ closed down some time ago. It is useless therefore to send cards to Malaya in respect of these stations.

Further pirate calls are VS1AU, 2AI and 3AL. Stations believed to be active are 2AE, 2AG, 2AK, 2AL, 2AR and 2AS.

Mr. Foster (BERS444) recently visited VS1AA, who enjoyed his company very much.

Malta

By ZB1E

Stormy weather with a continuous thundery atmosphere prevailed for practically the whole of the month of March, rendering all bands very noisy. Especially bad were conditions for the W-VE CW contest, during which period all Europeans were coming in at S9 plus, but only rarely was a W to be heard; VE's were conspicuous by their absence. Lately, in the Phone section of the contest, the stronger W phones came in rather well, but contact proved practically impossible.

We have to record a further depletion of the ZB1 group ZB1P, 1U, 1V have left us for England and it appears that 1J will also be leaving soon. We wish them all the very best of luck and hope to meet them on the air again soon. This leaves ZB1E, 1L, 1S and 1X active, while 1H is expected to be on the air shortly with an entirely new rig.

ZB1E is trying out a new PA using the 35T which is proving to be very efficient even at low anode voltages and inputs.

CALIBRATION SECTION

Crystals and frequency meters of the heterodyne type can be accepted for calibration and these should be sent *direct* to the Calibration Manager:

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

Crystals should be enclosed in a small tin and securely packed to avoid loss in transit, whilst frequency meters should be packed in a *wooden box or substantial cardboard container.*

Return postage for crystals and frequency meters must be enclosed as stamps and not attached to the postal order. The Society cannot accept responsibility for any loss or breakage that might occur in sending apparatus for calibration through the post.

Calibration Fees.

Crystals, 1.7, 3.5 and 7 Mc. types...1s. 6d. each
Crystals, 100 kc. type ... ...2s. 6d. ,,
Heterodyne frequency meters 5 points within the amateur bands ...5s.
For each extra point at any desired interval 6d.

A.R.R.L. Staff Changes

The March issue of *QST* announced several staff changes at A.R.R.L. Headquarters. The most important is that made necessary by the retirement, due to illness, of Mr. James Lamb from the post of Technical Editor. Mr. George Grammar (W1DF), who succeeds to the office is well known to the "ham world" as the author of many valuable *QST* contributions. In wishing him success we also record our regret that illness has, for the time, deprived our sister society of the services of the man who created the Lamb noise silencer, and a host of other original circuits.

Mr. Don Mix (W1TW) becomes an assistant technical editor, a position shared with Mr. Byron Goodman (ex-W6CAL), who for some years has been one of the Assistant Secretaries of the League.

Mr. John Huntoon (ex-W9KJY), of Chicago, has joined the Secretarial Department after completing a term as secretary of the Chicago Area Radio Club Council.

Aldershot and District Radio Society

Mr. H. Atthill, G8CV, informs us that an inaugural meeting of the above Society was held on March 17. Lectures and morse instruction are to be arranged, and during the summer it is hoped to hold outdoor events, such as direction-finding field days. Meetings are held at 41, Grosvenor Road, Aldershot, and the Secretary, whose address is "Ardvarney," College Road, Heath End, Farnham, Surrey (Telephone Aldershot 905) will be pleased to furnish further details regarding the Society's future programme.

Mr. S. Ward, G5NF, and Mr. W. James, G6XM, have been appointed Honorary Treasurer and Technical Adviser respectively.

Stroud and District Amateur Radio Club

A club has been formed in Stroud, Glos. and meetings have been arranged for every other Tuesday. Morse practices are taking place under the direction of G5HC, who has consented to coach members. Interested amateurs are asked to get in touch with the Secretary, Mr. K. D. Ayers, 2FRG, 8, Hamwell Leaze, Cashes Green, Stroud, Glos.

W.C.I.!

2AOU tells us that G8GM recently worked Alderney (G3XN), Jersey (G3GS) and Guernsey (G8OK) in one day. As there is no active station in Sark, we presume this constitutes W.C.I.!

Golders Green and Hendon Radio Scientific Society

Lt.-Col. H. Ashley Scarlett informs us that an open 7 Mc. Direction Finding Competition will be held on May 21. The area of operations will be around St. Albans, Berkhamsted, Dunstable and Stevenage. During the first part of the competition all groups will be confined to a central area of country, the transmitter operating in the country surrounding this area.

A cordial invitation is extended to R.S.G.B. members to attend this event. Communications should be addressed to Lieut.-Col. H. Ashley Scarlett, 60, Pattison Road, Hampstead, N.W.2.

SELECTIVE RECEIVER—

(*Continued from page* 583)

gain full on, as signals are then usually of quite overwhelming strength, at least on telephones, and it becomes practically impossible to distinguish between a signal emanating from a small battery-operated transmitter and one from a much more powerful mains operated transmitter, as a recently carried out practical test clearly showed. One feature is noticeable, and that is the way in which signals stand out against a comparatively silent background.

The reader will have noticed references in the preceding paragraphs to points " which will be discussed later." It is proposed next month to write at greater length on these particular subjects than is possible in the present article, and to go further into the *finesse* of operating the receiver, this including the intelligent use of the frequency meter. So there for the moment we will leave matters.

(*To be concluded.*)

Other Components for Receiver.

8 Valveholders, Side Contact, VH24 (Bulgin).
5 Grid-top Caps, Standard, P41 (Bulgin).
1 Mounting Strip and 1 Group Board, T21 and C31 (Bulgin).
5 Formers, 4-pin (two threaded, three plain), 935-6 (Eddystone).
5 Formers, 6-pin (two threaded, three plain), 1002-3 (Eddystone).
2 Knob Dials and Cursors, 1026 (Eddystone).
1 Slow-motion Head, 1012 (Eddystone).
1 Flexible Coupler, 1009 (Eddystone).
1 Extension Control Outfit, 1008 (Eddystone).
2 Insulated Brackets, 1116 (Eddystone).
4 Midget Stand-off Insulators, 1019 (Eddystone).
4 Insulating Pillars, 1½-in., 1029 (Eddystone).
2 Slow-motion Dials, Dual-ratio Airplane (0-180), (J.B.).
1 Socket Strip, A-E, Type (A), (Clix).
2 Solid Plugs, A-E, Type (7), (Clix).
1 Fused Mains Plug (with 1-amp. fuses) (Clix).
1 Jack and 1 Plug, J7 and P38 (Bulgin).
1 Single Safety Holder and Fuse (150 mA), 1045 (Belling-Lee).
1 4-pin Coil-holder, 949 (Eddystone).
1 6-pin Coil Holder, 969 (Eddystone).

TELEPHONY AND TELEGRAPHY BREAK-IN OPERATION—

(*Continued from page* 598)

the transmitter contacts being shunted by a 0.1 μF. condenser and 1,000 ohm resistor. A choke was unnecessary in this case, as the current keyed (to the screen of a 6L6) was only a few milliamps. A further 1,000 ohm resistor was connected across the key (or push-button control) in the energising circuit of the relay.

When used for telephony work, the receiver relay contacts may be connected in the transformer centre-tap or the plate circuit of a half-wave rectifier, in place of the usual send-receive switch. When used for C.W. break-in working, the time-lag with these connections was too long and the switch had to be fitted in the H.T. line from the smoothing equipment, otherwise the charged condensers tended to keep the receiver operative during transmission. In order to prevent surge voltages, the relay back-contact was used to shunt the receiver H.T. through a resistor R_2 taking a current equal to that of the receiver (Fig. 3).

FEBRUARY AURORA—

(*Continued from page* 600)

Reports from the magnetic stations at Abinger and Eskdalemuir show that the magnetic storm started at about 17.00 G.M.T., reaching a maximum at about 20.00 G.M.T. The disturbance continued throughout the night and the next day, until about 23.00 G.M.T., but the radio fade-out did not make itself felt until about 18.00 G.M.T. when practically all short-wave bands became affected with flutter-fading and echo. Shortly afterwards most signals weakened and eventually disappeared or became quite unintelligible. It is assumed that this was due to the sudden reduction in the degree of ionisation of the F2 layer brought about through the influence of the ions (this has been dealt with in an NPL report). Under these conditions the layer would become insufficiently ionised to refract the radio waves which penetrate it and escape into space.

The Aurora was first seen at Lenchars at 18.30 G.M.T., extending from about 24.00 G.M.T. to 40° with an elevation of 10° to 9° and forming a large arc from which rose a reddish curtain at 70° to 90° elevation. The height of the Aurora was at least 60 miles above the earth.

Two interesting features noted were the almost entire absence of atmospherics just before February 23 and severe echo on the Northern Ireland and Cologne medium-wave broadcast transmissions. Atmospherics increased after the storm commenced.

It is pertinent to query whether there will be a recurrence of these conditions after 27.3 days or will there be a skip of a month as last year, returning after 54 days, i.e., about the middle of April?

CONTEMPORARY LITERATURE—

(*Continued from page* 606)

REVIVING 80 AND 160 METER DX. E. H. Conklin. *Radio*. February, 1939.

The author in a well-written article presents some reasons why fairly low angle radiation is desirable for DX work regardless of frequency.

* * *

PULSING AMATEUR TRANSMITTERS FOR IONOSPHERE SOUNDING. Albert Wiley Friend (W8DSJ). *Radio*. February, 1939.

In this article which may be regarded as a continuation of the author's article in the January issue of *Radio*, he describes how an ordinary amateur transmitter may be used to make Ionosphere soundings which experimentally minded amateurs should find an interesting and fertile field for research.

Constructional notes on various pulsing devices are given and the article is fully illustrated by diagrams and photographs.

QRA Section

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

When sending in a new, or changed address members are requested to print their names and addresses in block letters, as frequently signatures and names of streets are illegible. This necessitates reprinting the corrected address in the next ssue of the BULLETIN.

New QRA's

G2BM.—G. R. FOSTER, 22, Belle Isle Avenue, Wakefield, Yorks.
G2CT.—R. W. PEEL, 110A, Abbey Street, Accrington, Lancs.
GM2DI.—JAS. W. JEFFREY, Craigmara, Coronation Street, Wishaw, Lanarkshire (address in Call Book incorrect).
G2KK (ex-ZC8AQ, ex SU1AQ).—K. J. COOK, 7, Southfields, Rochester, Kent.
G2LA.—S. E. SMITH, 50, Cypress Avenue, Whitton, Twickenham, Mddx.
G2LW.—F. H. LAWRENCE, 78, Venner Road, Sydenham, London, S.E.26.
G2PU.—S. R. R. KHARBANDA, "Trudacot," 23, Windsor Road, Cambridge, Cambs.
G2QV.—T. SHANKS, Four Hedges, Hurst Green, Sx.
G2RI.—L. RIDGWAY, Southview, 90, Romway Road, Leicester.
G2UK.—DR. A. C. GEE, "Nethergate," Rayleigh Road, Hutton, Essex.
G3AG. (ex-G6IN).—F. INCHLEY, 34, Silver Birch Road, Erdington, Birmingham.
G3CL.—WM. HERRING, 223, Newark Road, Lincoln.
G3KG.—A. G. TEARLE, 32, Waller Avenue, Luton, Beds.
GM3KU.—ED. J. RITCHIE, Carbetlea, 5, Camphill Road, Broughty Ferry, Angus.
G3NW.—L. G. SHAW, 20, High Street, Alton, Hants.
G3OI.—R. WILSON, A5 Flight, A. Sqdn., No. 2 Wing, E. & W. School, R.A.F., Cranwell, Lincs.
G3XK.—W. KERSHAW, 22, Kirkgate, Burnley, Lancs.
G3XM.—L. T. MULLINS, 9, Picton Street, Lincoln.
G3ZN.—F. B. HOLT, 40, Britain Street, Bury, Lancs.
G3ZU.—F. E. ATKINS, Mont Altier, 50, Victoria Road, Guernsey, C.I.
G4AZ.—G. W. NEVILLE, The Rookery, Fenstanton, Hunts.
G4BR.—R. F. LAWRENCE, Grove Lodge, Dorney Grove, Weybridge, Surrey.
G4BU.—R. H. DRAPER, 4, Cliff Cottages, Bracebridge Heath, Lincoln.
G4CA.—P. A. WODEHOUSE, "Ravenscote," High Street, Cheltenham, Glos.
G4CF.—A. MACFARLANE, 132, Liverpool Road South, Burscough Town, Lancs.
G4CG.—H. E. HUGHES, 57, Kingswood Road, Wimbledon, London, S.W.19.
G4CJ.—C. SHARRATT, 22, Devon Road, Blackburn, Lancs.
G4CY.—F. W. R. ROBBINS, 41, St. Mark's Road, Henley-on-Thames, Oxon.
G4DM.—E. G. W. SCRACE, 33, High Brooms Road, High Brooms, Tunbridge Wells, Kent.
G4DP.—A. DICKINSON, 111, Sprotboro Road, Doncaster, Yorks.
G4DR.—D. P. M. URQUHART, "Kyle," 7, Padwell Lane, Bushby, Thurnby, Leics.
G4DS.—T. S. WHITE, 16, Eland Street, Langwith Junct., Mansfield, Notts.
G4DT.—F. L. WOOD, 14, Fore Street, Kingsbridge, Devon.
G4DY.—L. BERRYMAN, The Engineer's Cottage, The Spa, Scarborough, Yorks.
G4DZ.—A. E. R. BUCKLE, 56, Mereworth Dr., Shooters Hill, London, S.E.18.
GM4FK.—K. M. FRASER, 6, McDuff Crescent, Kinghorn, Fife.
G4FL.—I. C. FLETCHER, 4, Cyril Road, Bexleyheath, Kent.
G4FM.—R. H. KELSALL, Cragg Cottage, Troutbeck, Windermere, Westmorland.
G4FN.—C. T. WAKEMAN, 44, River View, Chadwell-St.-Mary, near Grays, Essex.
G4FR (ex-VU2KK).—CAPT. G. TWISS, Firfield, Farnham, Surrey.
G4FS.—R. TOLE, 7, Testerton Street, N. Kensington, London, W.10.
G4FU.—F. S. CLOSE, 44, Sunderland Road, Heaton, Bradford, Yorks.
G4FV.—G. CATT, 47, Church Street, Old Town, Eastbourne, Sussex.
GW4FW.—B. A. PARSONS, 13, Howell Road, Ely, Cardiff, South Wales.
G4FX (ex-G5HS).—M. F. J. SAMUEL, 9, Norfolk Road, London, N.W.8.
G4GJ.—J. H. MACDONALD, Westwood House, Cooper Lane, Bradford, Yorks.
G4HA.—T. J. PARKER, 24A, Victoria Crescent, Upper Norwood London, S.E.19.
GW5BI.—V. J. BARTLETT, c/o Bank House, Llanidloes, Mont., Wales.
GM5IR.—TH. P. RAE, 52, Upper Bridge Street, Stirling, Scotland.
G6FY.—R. A. FEREDAY, 4, Country Life House, Datchet, Bucks.
G6PZ.—R. F. WESTON, 12, Somerset Road, Swindon, Wilts.
G6XB.—G. E. JONES, "Saunton," Worlebury Hill Road, Weston-super-Mare.
G8AN.—D. H. BARBROOK, 24, Vernon Street, Ipswich, Suffolk.
G8DL.—S. T. PHILLIPS, 43, Woolwich Common, London, S.E.18.
G8FJ.—H. S. NORRIS, 47, Winfield Street, Rugby, Warwickshire.
G8GS.—C. W. FARRELL, The Holt, 35, Queen's Road, Knaphill, Woking, Surrey.
GM8LK.—A. D. BEAGIN, "Brewhead Cottage," Birkhill, Angus.
G8NT.—R. F. STANBRIDGE, 185, Church Street, Woking, Surrey.
G8PM.—J. D. MACKAY, c/o Lennon, 147, Welwyn Garden City, Herts.
G8SC.—C. COLLINS, R.A.O.C., Att. M.C. of S., Woolwich, London, S.E.18.
G8TZ.—A. TAYLOR, 9, Derby Street, Barnsley, Yorks.
G8VD.—C. PLUMMER, 171A, Highbury New Park, London.
G8WM.—B. WICKHAM, I, The Spinney, Tattenham Grove, Epsom, Surrey.
2AHR.—D. G. RUMARY, Pineholme, Upper Station Road, Heathfield, Sussex.
2ARA.—A. R. DRAKE, "Cranmere," Maple Avenue, Braintree, Essex.
2AZU.—H. VINCENT-UPTON, 9, Belle Vue Terrace, West Cliff, Whitby, Yorks.
2BFA.—G. E. FELTON, 18, Russell Avenue, Bedford, Beds.
2BIC.—N. R. MEANWELL, 7, Palgrave Road, Great Yarmouth, Norfolk.
2BLR.—MRS. M. RIDGWAY, Southview, 90, Romway Road, Leicester.
2BPD.—H. BEDFORD, 21A, Vincent Gardens, Dollis Hill, London, N.W.2.
2BRJ.—R. JONES, 118, North Road, Clowne, near Chesterfield, Derbyshire.
2BTO.—G. OPENSHAW, 287, Wigan Road, Deane, Bolton, Lancs.
2BUD.—D. TANNOCK, 11, Brown Terrace, Manchline.
2CDT.—F. H. MARTIN, 22, Walders Avenue, Wadsley, Sheffield 6.
2CFI.—E. M. AGNEW, 14, Chislehurst Avenue, Finchley, London, N.12.
2CJB.—M. C. BLAKE, 4, Blanchard Place, Colebrook, Plympton, South Devon.
2COP.—J. M. FOGGO, 9, Cherry Orchard, Lichfield, Staffs.
2CSH.—S. C. HEDGES, 57, East Street, Sittingbourne, Kent.
2CWH.—W. C. HODSON, 1, Bryan's Lane, Rugeley, Staffs.
2DTD.—L. W. LIMB, Oban Villa, Clifton Road, Henlow, Beds.
2DVH.—J. STEWART, 57, Bridge Street, Lisburn, Co. Antrim, N.I.
2DZA.—J. E. SWIFT, 14, Glanselsig Street, Blaenycwm, near Treherbert, Glam.
2FKC.—D. L. WOOD, 72, Addington Road, West Wickham, Kent.
2HAD.—L. W. WILSON, 29, Birklands Drive, James Reckitt Avenue, Hull, Yorks.

Cancelledr—G2AJ, G2SF, G2WW, G3IF, G5KS, G5YK, G6AO, G6JS, G6UP, G8HU, G8NI, 2ACT, 2AHN, 2AIX, 2AMK, 2AVQ, 2AZH, 2BAA, 2BJN, 2BMR, 2BOK, 2BQT, 2BSD, 2CCJ, 2CFT, 2CTF, 2CUS, 2CUW, 2CXI, 2CZK, 2CZT, 2DDK, 2DCN, 2DFU, 2DHD, 2DIF, 2DIT, 2DMC, 2DMZ, 2DPX, 2DQS, 2DSD, 2DUI, 2DWL, 2DWO, 2DZS, 2DZV, 2FFH, 2FFS, 2FIN, 2FJO.

In Search of B.E.R.T.A

Call	*Dominion Districts*	*Colonies*	*Total*
G2HX ...	25	13	38
G5OJ ...	25	13	38
GM8HA ...	25	11	36
G2UX ...	22	14	36
G6ZO ...	21	15	36
G3BS ...	25	11	36
G5ND ...	24	10	34
G3BI ...	24	10	34
VU2AN ...	20	14	34
VU2FO ...	23	11	34
ZS6DM ...	21	13	34
ZS6BT ...	18	15	33
G2GK ...	25	8	33
G8KP ...	23	9	32
G3JR ...	20	10	30
W1IKT ...	21		30

Please send to G6WY your total of *confirmed* contacts for listing in the above table.

EXCHANGE AND MART

(*Continued from Back Cover*)

G6DS.—Known the world over for quality. QSL Cards and Log Books. Send for samples. —QRA, 14, Lambley Avenue, Mapperley, Nottingham.

HALLICRAFTERS, Sky-chief, new. Collaro AC37, gramophone unit, new in cabinet, 6L6. Phone TX, etc. Offers must be cleared.—H. M. BLABER, 9, Stanton Road, S.W.20.

JANETTE ROTARY CONVERTER, 500 watt. Input 220/230 D.C. output 110/60 cycles. Silent running, suppressed, with starter. Cost new over £20. Also Class B modulator 56-46, pair 46s. Metal case, rugged construction. All power packs to suit. Sell separate if desired. What offers? Must sell, owner hard up.—GM3RL, 46, St. Swithin Street, Aberdeen.

MODULATION TRANSFORMER. STANCORE. 100 watts audio to RF load. As new, 35/-. Two RCA 849 with sockets, used but O.K. Bargain £4. each. RK20, 20 hours use, O.K. £2. 10. 0. Aerial Wire. G6US "DX Antenna Wire." Semi hard drawn, enamelled, 14 gauge, 34 ft. 1/9d., 68 ft. 3/-, 134 ft. 6/-. 12 gauge, 34 ft. 2/3d., 68 ft. 4/-, 132 ft. 8/-. Feeder Spacers, 6 inch glazed, 4d. each. Pyrex Insulators. The perfect wet weather insulator, 9d. — G6US, 24, Church Street, Oswestry.

NATIONAL AGSX COMMUNICATION RECEIVER, complete band spread 20, 40, 80, 160m., nearest £15. 72 ohm feeder, 3d. per yard.—GW2OP, Pembroke Dock.

OLDTIMER G6MN for 1st grade QSL's and Log Books. Send for Samples.—G, AA, BRS, G6MN, Worksop.

R.M.E.69, and R.M.E. Speaker, little used, £30, or nearest. Wayfarer Major Portable, £5 10s. Both as new. Valves, full emission PP3/250, 7s. AC/P, 4s. X41, 7s. 6d. VMP4G, 6s. Wanted, "Peak" Preselector.—2, Cliff Road Gardens, Leeds, 6.

QSL's.—250, 4s. 6d. 1,000, 9s. Post free. Samples gratis. State whether BRS, AA.—G. ATKINSON BROS., Printers, Elland.

REQUIRED A.C. COMMUNICATIONS R.X. All bands Ham, a commercial manufacture. Price and details, G8TL, 10, Chepstow Crescent, Ilford.

SURPLUS USEFUL COMPONENTS at bargain prices. Example: Insulated Plugs and Jacks, 1s. 6d. complete. Stamped addressed envelope for full list.—EDWARDS, 14a, Louisville Road, S.W.17.

ULTRA SKYRIDER SIOX: Xtal Gate, Noise Silencer, perfect condition. With Quality Speaker, £18. Transformers, 350-0-350 150 mils., 5V3A, 6.3V3A, 10s. Ferranti OPMI-C, new, 10s. Valves, 5Z3 RCA, 4s. 6L6, 4s. 6L6G, 2s. 6d. 6A6, 3s. 6d. 42, 2s. 6d. All new, unboxed. Bug Key, new, 15s. Meters, Hoyt Hot Wire 0-1½A, new, 15s. 0-100MA, MC, 15s. Weston 301-0-20MA, 15s. D.C. Avominor, 12s.—Apply, G4BL/VU2AU.5, Wimborne Avenue, Earlswood, Redhill, Surrey.

WANTED, National NC80 or NC8IX Receiver. Good condition essential.—Write, G. F. WAKEFIELD, 67, Southwark Park Road, London, S.E.16.

25-WATT C.W. TRANSMITTER for sale. very compact, steel chassis, own power supply. Complete with 7 Mc. Coil and Xtal, Raytheon 80 and 6L6, and Meter, condition perfect, £3. Send stamped envelope for details, also bargains in transmitting gear.—2FTR, 603, Finchley Road, N.W.3.

50-WATT CW., Grid Modulated Transmitter, 3.5 to 28 Mc., 6L6-6L6-PPT20's. Complete Unit, two power packs and modulator on Eddystone rack (4 moving coil meters), £22.—Full details from, G8HH, 65, Chart Lane, Reigate.

Patent and Trade Mark Agents

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