THE T&R

BULLETIN

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RADIO EXPERIMENTERS

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THE INCORPORATED
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THE T. & R. BULLETIN.

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THE Secretary-Editor will be pleased to consider for publication, articles of technical or general interest. Intending contributors are requested to indicate in advance the scope to be covered by the article under consideration.

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THE T. & R. BULLETIN

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DEVOTED TO THE SCIENCE AND ADVANCEMENT OF AMATEUR RADIO

Hon. Editor: ARTHUR O. MILNE

Secretary-Editor: JOHN CLARRICOATS

Advertisement Manager: HORACE FREEMAN

Vol. XV. No. 7. JANUARY, 1940

CONTENTS

THE EARS OF THE NAVY

WHEN the history of the Second Great War is written the naval epics of the first few months will stand out in bold relief against a background of strange and somewhat mystifying situations. To-day, however, the necessary censorship restrictions deprive us of a full knowledge of all that is taking place, but we as radio amateurs, need no telling that many hundreds of our comrades have become the ears of the Royal Navy.

The extent of their present duties is beyond our ken but it is certain that those who enlisted in the Royal Naval Wireless Auxiliary Reserve, now the Royal Naval (Wireless) Volunteer Reserve, have been able to put to the supreme test, the knowledge they acquired first as ordinary radio amateurs, and later, as naval reserve telegraphists.

It is now some eight years since the Admiralty invited the R.S.G.B. to co-operate with the Admiral Commanding Reserves in launching the R.N.W.A.R., and although at the time there were some who felt we were " selling " the amateur movement to the war machine, others, and we believe the vast majority, were fully alive to the possibilities which were offered.

It may perhaps be news to some of our present members that the R.S.G.B. through its representatives on the R.N.W.A.R. Committee was chiefly responsible for deciding upon the frequencies to be used in peace-time for the highly important reserve exercises. It was also the R.S.G.B. who pressed hard for the establishment of local training centres and for the granting of monetary allowances to offset the cost of installing transmitters and receivers suitable for the exercises. It was also the R.S.G.B. who advocated that meetings should be arranged around the country at which Society representatives and Naval officers could speak on matters concerning the Reserve. At these meetings frank, informal discussions took place and as a result the Admiralty was quickly in a position to put into operation a regional training scheme pivoted around prominent amateurs and their stations.

Most of the original District Controllers were men who had been recommended by the Society, whilst right up to the time of the commencement of the present war the Society was given advice regarding new Reserve appointments.

The manner in which our members responded to the call for naval volunteers acted, without doubt, as an incentive for the Air Ministry to approach the Society when the Civilian Wireless Reserve was first mooted.

To-day it is safe to assume, and history will reveal, that very few ships in His Majesty's Navy are without the services of one or more radio amateurs. It will probably be long years before

the world is allowed to know how well they took over the onerous duties of Naval Telegraphist, but it is quite certain that each man has already given ample proof of his capabilities.

To the men of the Signals Branch of the Royal Navy and to all members who are serving at sea, we at home raise our hand in salute.

The ears of the Navy will never fail.

J. C.

NEW DEFENCE REGULATIONS

In addition to the new Order referred to in our last issue, two further Orders of special interest to our members have been issued.

The text of these Orders appears below :—

STATUTORY RULES AND ORDERS

1939 No. 1687

EMERGENCY POWERS (DEFENCE)

Post Office—Wireless

ORDER, DATED NOVEMBER 24, 1939, MADE BY THE POSTMASTER GENERAL AS TO POSSESSION OF WIRELESS TRANSMITTERS.

The Postmaster General in the exercise of the powers conferred on him by Regulation 8 of the Defence Regulations, 1939(*), hereby orders that on and after the 15th day of December, 1939, no person shall, except under the authority of a written permit granted by the Postmaster General for the purpose, have in his possession or under his control (1) any wireless transmitter which is designed to be used for communicating by wireless telegraphy, wireless telephony or wireless television ; or as a navigational beacon or landing beacon or otherwise for the purpose of indicating position or direction ; or for the purpose of the remote control of machinery, or (2) wireless apparatus components capable of being assembled to form such a wireless transmitter, or (3) any wireless receiving apparatus which is designed to be used also as a wireless transmitter or which can be adapted for the purpose of being used as a wireless transmitter by the operation of a switch or by the changing of screwed or plug connections.

This order shall not apply in relation to any apparatus in respect of which there is in force a licence under the Wireless Telegraphy Acts, 1904 to 1926, authorising the use of the apparatus for transmission.

Applications for permits should be made to the Engineer-in-Chief of the Post Office, stating full particulars of the apparatus or article concerned, the purpose for which it is required, and the name, address and occupation of the person or company in whose possession or under whose control the apparatus or article is to be retained.

Dated this 24th day of November, 1939.

G. C. Tryon.

STATUTORY RULES AND ORDERS

1939 No. 1688

EMERGENCY POWERS (DEFENCE)

Post Office—Wireless

ORDER, DATED NOVEMBER 24, 1939, MADE BY THE POSTMASTER GENERAL AS TO REGULATION OF USE OF WIRELESS TRANSMITTERS

The Postmaster General in the exercise of the powers conferred on him by Regulation 8 of the Defence Regulations 1939(*), hereby orders that on and after the 25th day of November, 1939, no person shall except under a licence or permit granted by the Postmaster General use a wireless transmitter for communicating by wireless telegraphy, wireless telephony or wireless television ; or as a navigational beacon or landing beacon or otherwise for the purpose of indicating position or direction ; or for the purpose of the remote control of machinery.

This order shall not apply in relation to any apparatus used in accordance with the terms of a licence in force under the Wireless Telegraphy Acts, 1904 to 1926, authorising the use of the apparatus for transmission.

Applications for licences or permits should be made to the Engineer-in-Chief of the Post Office, stating full particulars of the apparatus concerned, the purpose for which it is to be used and the name, address and occupation of the person or company who wishes to use it.

Dated this 24th day of November, 1939.

G. C. Tryon.

(*) S.R. & O. 1939 No. 927.

It is hoped in our next issue to publish an official statement regarding these Orders. In the meantime we have been authorised by the G.P.O. to advise all members to do nothing until the statement is published.

THE YEAR IN REVIEW*

By JOHN CLARRICOATS (Secretary-Editor)

IN presenting their Annual Report for 1939, the Council feels that on this occasion it will be desirable to consider Society activities during the year as having fallen into three separate periods. The first, or normal, period ended in early August, the second period ended with the issue of Council's special war-time circular on September 15, whilst the third period, that of working under war-time conditions is with us still.

The Period of Normality

The year commenced under a clearing sky with war dangers receding into the background. Membership continued to show a satisfactory increase, meetings in all parts of the country were registering excellent attendances, the first of the G4 calls had been issued, and except for a possible threat to our jealously guarded allocations, 1939 appeared to hold promise of being one of the most successful in our history.

Contests

The Annual B.E.R.U. Contests were again well supported as was the 1·7 Mc. transmitting contest held in January. The greatest credit is due to the Tests Committee who arranged these events, checked all entries and prepared reports for publication. Especial thanks are recorded to the Hon. Secretary to the Committee, Mr. W. H. Allen, G2UJ, and to Mr. T. A. St. Johnston, G6UT, the Chairman.

A MESSAGE FROM THE PRESIDENT TO ALL MEMBERS

May the New Year be Brighter for You All.
May it bring what we wish for, above everything else—
A Just and Lasting Peace, and the Opportunity to
Meet our Friends again over the Air and in Person.

ARTHUR E. WATTS (G6UN).

"Be patient, for the World is broad and wide." Shakespeare.

Negotiations with the G.P.O.

During the winter and early spring several important meetings took place between representatives of the Society and the G.P.O., at which the projected changes expected to occur in September, as a result of the Cairo Telecommunications Conference, were fully discussed. Recommendations were put forward in regard to the anticipated reallocation of the 3·5 Mc. band, and efforts made to obtain the agreement of the G.P.O. to the retention of the full amateur allocations between 7 and 7·3 Mc., and between 56 and 60 Mc. As the months passed it became increasingly apparent, however, that difficulty would be experienced in holding the low frequency section of the latter band, whilst Service needs appeared to be making amateur occupancy on the ultra-high frequencies also more difficult.

Prolonged negotiations took place with the G.P.O. with a view to obtaining an improvement in the position regarding the use of power in excess of 25 watts. Unfortunately no entirely satisfactory agreement had been reached up to the time British licences were determined.

During the early summer the Council devoted several special meetings to the consideration of the licence regulations, and after discussion with the G.P.O. presented detailed recommendations for their modification. The recommendations were receiving the careful attention of the G.P.O. and it is believed that many would have been accepted if the war had not intervened. These recommendations would undoubtedly have proved of value to both the G.P.O. and to our members.

District Activities

Approximately 400 members attended Provincial District Meetings held in Birmingham, York, Weston-super-Mare, Chester and Southsea. Conventionettes were held in several parts of the country. An interesting innovation took place in the South Eastern District where evening meetings of a fully representative character received unusually wide support. The Maidstone and Medway Societies are thanked for arranging these meetings.

Throughout the British Isles town meetings took place at regular intervals, and in this connection the Council desires to record its thanks to all Town Representatives, and others who have been responsible for organising local activities, often at considerable personal inconvenience.

At the Weston-super-Mare meeting, recommendations were put forward regarding Provincial Representation on Council. The retiring Council gave careful consideration to the proposals and had intended to bring the matter forward for discussion at the Convention D.R.'s meeting. In preparation for that meeting all D.R.'s had been invited to give their views on the general question of representation. With the outbreak of hostilities the Council considered it unwise to pursue the suggestions further for the time being.

It had been hoped to present distinctive badges to

* *Being the Annual Report of the Council read at the Annual General Meeting held in London on December 30th, 1939.*

all D.R.'s attending Convention, but as the event had to be cancelled the badges were distributed by post.

During the year several changes in District Representation took place.

Mr. L. Ridgway, G2RI, replaced Mr. W. A. Scarr, G2WS, as District 4 Representative when the latter took up a business appointment in London, Mr. W. E. Russell, G5WP, succeeded Mr. E. A. Dedman, G2NH, who was compelled to relinquish his office as Southern D.R. due to pressure of private business. In District 10, Mr. Scott Farnie, GW5FI, took over from Mr. Austin Forsyth, G6FO, who resigned owing to increasing personal business ties. Owing to illness Mr. S. Buckingham, G5QF, appointed Mr. P. Solder, G5FA, to act as Deputy D.R. for North London and Herts, whilst Mr. W. A. Scarr, G2WS, is acting as Deputy D.R. for Southern England during Mr. Allen's absence on active service. The Council records its grateful thanks to all who served as D.R.'s during the year.

Certificates

After careful consideration of all circumstances the Council decided in March to allow non-members to claim Society certificates on payment of a small fee. The concession has proved popular, particularly in the U.S.A.

Convention

Due to subsequent events the arrangements made for the Society's 14th Convention were cancelled with regret. It will be remembered that for the first time it had been planned to organise an exhibition under the auspices of the Society which would have taken place during the period set aside for Convention. It had also been arranged to hold all Convention meetings in a London hotel, a plan which appeared to have the approval of the entire membership.

The Council in recording its regret that it became necessary to cancel the plans made for what would undoubtedly have been a record Convention desires to record its sincere thanks to Mr. H. Freeman, the Society's Advertising Manager who had made all arrangements for the Exhibition. Thanks are also recorded to the many Radio Companies who had promised their support.

"The T. & R. Bulletin"

The Society's Journal continued to increase in size until August. Issues from January to August averaged 64 pages, a satisfactory condition brought about by the continued support given by advertisers on the one hand, and generous contributors on the other. Thanks are again due to Mr. Freeman for his unceasing efforts in connection with advertising whilst the Council, speaking also for the membership, cannot speak too highly of the voluntary labours undertaken by those who offered contributions.

Especial mention must be made of those who prepared regular monthly articles. These contributors included two of our most prominent lady members Miss Nelly Corry, G2YL, and Miss Constance Hall, G8LY, and in addition Messrs. H. A. M. Whyte, G6WY, A. O. Milne, G2MI, J. M. Sutton, GW2NG, E. J. Williams, G2XC, and L. Fryer, GM2FR. The membership are also indebted to Messrs. T. P. Allen, G16YW, and D. N. Corfield, G5CD, Book and Valve Reviewers, respectively.

Band Monitoring

Excellent work was again carried out by the Band Monitoring Group who industriously recorded instances of off frequency operation. The value of this service was greatly appreciated by the Council and also by those members who received friendly advice concerning their transmissions which had been heard out of the specified bands.

Band Occupancy

The Council again records its thanks to Mr. L. Hill, G5WI, and his colleagues who undertook the April Band Occupancy Check. This was the 15th bi-annual check since 1932.

Calibration Service

Numerous crystals and frequency meters were calibrated during the first eight months of the year by Mr. A. D. Gay, G6NF, the Society's Calibration Manager. This service was especially appreciated by many newer members.

QRA Section

The Council records its thanks to Mr. H. A. M. Whyte, G6WY, who conducted the Society's QRA Section until June and maintained a close liaison with the publishers of *The Radio Amateur Call Book*.

Experimental Section

The Council has been particularly pleased to witness the strengthening of the Experimental Section under the conscientious and skilful direction of Capt. A. M. Houston Fergus, G2ZC, ably supported by his Group Managers, Messrs. Radford, G2IM, Walker, G5JU, Heap, G5HF, and Malvern, G8DA. The increase in the number of technical articles submitted by Section members has been much appreciated.

The Amateur Radio Handbook

As forecast in our previous report, the first edition of 5,000 copies of *The Amateur Radio Handbook* was sold within a few months of publication in December 1938. To meet the increasing demands the Council authorised a reprint of 3,000 copies, but unfortunately within a week of fresh supplies becoming available war had been declared. The Council is hopeful that the balance on hand, amounting at the end of December to approximately 1,250 copies, will be sold during the coming year. In this connection they urge that every member should use his or her best endeavours to dispose of the present stock. It is gratifying to record that within recent weeks large orders have been received from members in the Services who recognise the value of such a text book at the present time.

The Second Period

This period dates from about August 15 to September 15. The first sign of a change was noticed when subscriptions fell off rather sharply, the full total for the month amounting to some £50 less than in August last year.

From the Society's standpoint, August was the worst month in the year for a crisis because with Convention planned for late September, all arrangements were by then in full swing. The August

BULLETIN had been printed, but with the world in such a state of tension, it was difficult to make a decision regarding Convention or the September issue (which would have been the largest issue ever published). At this time many members in Service reserves were being called up and general uncertainty as to the future prevailed at Headquarters.

British Amateur Licences Determined

The worst was foreshadowed when, in the 9 p.m. News Bulletin on the evening of August 31, it was announced that all full and artificial aerial licences had been withdrawn. The events of the next three days are history, but it should be recorded that from early in the morning of September 1 until a date well into September, the G.P.O. were impounding amateur equipment. Due to urgency, G.P.O. officials without radio knowledge were frequently required to visit stations, and as a consequence some confusion arose in certain instances. The chief difficulty centred around the neglect on the part of G.P.O. officials to give a receipt for material collected. A further difficulty concerned the collecting of apparatus not even remotely connected with the generation of high frequency signals. To regularise matters members have been advised to communicate with the G.P.O., and ask for a receipt and/or for the return of certain non-transmitting equipment.

War-time Plans

Within one week of the outbreak of the war an emergency Council meeting was held at the private address of the President. At this meeting decisions of vital importance were taken.

(1) It was agreed that the work of the Society should continue and that

(2) The Society's business should be conducted from the private address of the Secretary-Editor.

(3) THE T. & R. BULLETIN should continue to be published in reduced form.

(4) The services of the Junior staff should be terminated.

(5) The London area subscription should be reduced to 15s. per year. The subscription for home members serving in H.M. Forces should be reduced as from September 1 to 10s. per annum.

The Council in making these decisions considered that for the future well-being of amateur radio, it was essential to carry on in spite of the obvious difficulties. In accepting the offer of the Secretary-Editor to conduct the Society's work from his private address the Council appreciated that this would effect an economy of approximately £120 per year. The reduction of staff would still further effect an economy of approximately £220 per year.

The decision to reduce the London area subscription was made after it had been agreed to cancel the monthly meetings at the Institution of Electrical Engineers.

In agreeing to reduce the subscription for Service members the Council had in mind the fact that the financial position of a very large number of such members would be affected adversely by the war.

The decision to continue publication of THE T. & R. BULLETIN was made after very careful consideration and the Council is pleased to place on record that several prominent radio concerns promised their continued support.

Having made its decisions the Council authorised the publication on September 15 of a special circular entitled " The R.S.G.B. in War-Time." The circular made known the decisions which had been reached.

The Third Period

Immediately after the publication of the special circular evidence reached Headquarters that Council's decision was warmly welcomed. It is no exaggeration to state that from the middle of September until the end of the year, many hundreds of letters were received from members congratulating the Council on its foresight in carrying on.

With the passage of time it became more and more clear that the decision to continue publication of THE T. & R. BULLETIN was especially welcomed. The first four war-time issues have contained important technical contributions whilst every effort has been made to present topical news. The lists of service members have attracted considerable attention, providing as they do concrete proof of the amazing manner in which the British radio amateur has answered the call to service.

It is worthy of record that subscriptions received during October reached the very satisfactory figure of £230 compared with £302 in October, 1938. It should also be recorded that in this one month alone 61 London members paid the reduced fee, whilst 32 Provincial and 9 London members paid at the reduced service rate, representing a total of £31 10s. which when added to the £230 received brought the October total on war reckoning to within £40 of the October, 1938, figure.

During November and December, revenue from subscriptions exceeded 70 per cent. of last year's figures, whilst a number of new applications for membership were received during the same period.

Members on Service

The Council is proud to publish lists of amateurs serving in H.M. Forces and appeals to members to help to make the record complete. It is particularly gratifying to record that many prominent members who enlisted in the Civilian Wireless Reserve have been granted commissions. In the majority of such cases those concerned were originally recommended by the Society for positions of responsibility in the Reserve.

(*Continued on page* 320.)

A NEW DESIGN OF FREQUENCY METER, MONITOR and 10 kc. SIGNAL GENERATOR

By T. B. WIMBUSH (G6HP)

PART I.

THE following details of a precision instrument for amateur construction are given in the hope that more experimental stations will equip themselves with accurate frequency measuring apparatus. The instrument is unique, in that, to the best of the writer's knowledge, a similar combination has not previously been described.

Fig. 1 shows the basic arrangement of the meter, which consists of (*a*) an electron coupled frequency meter with band switching followed by (*b*) a detector for the monitoring of telephony or C.W. (*c*) a 100 kc. pentode crystal oscillator stage, (*d*) a multi-vibrator stage using two triodes, and (*e*) an electron coupled harmonic amplifier using a pentagrid converter tube, with the output from the multi-vibrator fed into the injection grid, thus modulating the output.

The last three stages form a signal generator giving 10 kc. intervals throughout the H.F. spectrum, thereby providing a continuous check (at the throw of a switch), on the stability and calibration of the frequency meter. The uses to which such an instrument can be put are obvious; frequency measurements can be carried out to a high degree of accuracy without reference to graphs, whilst monitoring facilities for CW and telephony are available. Before proceeding with constructional details it will be desirable to consider separately each stage of the completed instrument.

The Frequency Meter

For accurate measurement of frequency and high stability the following points are of vital importance in the design, construction and use of a frequency meter:—

(1) A low-loss L-C circuit of high stability is essential.
(2) The space current (screen and anode) of the oscillator valve must be kept as low as possible consistent with satisfactory oscillation, and must be maintained at a set figure.
(3) Rigidity of construction and wiring is essential.
(4) The meter must be allowed to warm up before use.
(5) An efficient dial is essential; slipping and back-lash are fatal to accurate frequency measurement.
(6) A true S.L.F. condenser is necessary if frequencies are to be read direct from the dial.
(7) Efficient screening must be employed.
(8) A stable form of oscillator is necessary.

The instrument described herein meets all the above points.

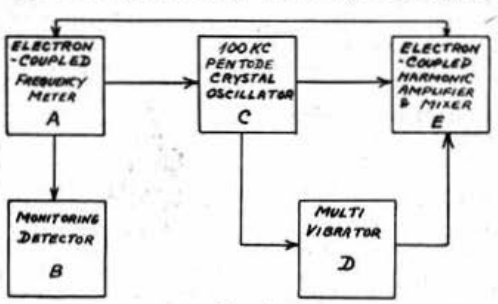


Fig. 1.
Basic arrangement of meter.

A variable voltage control to the screen and anode of the oscillator valve is provided, whilst a sensitive meter registers any change in anode current, due to fluctuating mains or other causes, additionally it enables the correct reading to be maintained. The dial used, an *Eddystone* type 1085, is ideal for this class of instrument, and the vernier attachment enables readings, to one twentieth of a degree, to be made easily. Provided the band is spread across the whole of the dial this represents 200 cycles around 14 Mc.

Electron coupling was chosen because of the high inherent stability possessed by this type of circuit. It is unaffected by minor changes in cathode and anode voltage and if mechanically rigid it provides an oscillator with a high degree of permanence. Further, it is capable of supplying R.F. energy from the anode circuit without affecting its stability, thus it can be followed by a detector for monitoring purposes.

A unique feature of this meter is that instead of calibrating it on the 1·7 Mc. band and working on harmonics for other amateur bands as is usually the case, a band switching arrangement is employed with each band spread across the whole dial. The much greater degree of accuracy obtained using this method is ample recompense for the time and trouble expended in winding and adjusting the various coils.

Consider the comparative degrees of accuracy using the two methods: the table which follows gives the frequency variation in cycles represented by 1/10th of a degree dial movement on the two bands using first the harmonic method and second the band-spread system.

Band.	Harmonic Method.	Band-spread Method.
7 Mc.	600 cycles	300 cycles
14 Mc.	1,200 cycles	400 cycles

Provided the band is spread across the whole dial, 1/10th of a degree represents 300 cycles on 1·7 Mc., 400 cycles on 3·5 Mc., 300 cycles on 7 Mc., 400 cycles on 14 Mc., and 2 kc., on 28 Mc. On 56 Mc. the coverage would be 4 kc. using the 28 Mc. harmonic. The variable condenser used must, of course, be of the straight-line frequency type, if graphs are not used.

In this connection it should be pointed out

that the makers of the S.L.F. condenser used admit that the condenser does not follow a true straight-line frequency curve towards the minimum position, due to stray circuit capacities.

It will be found that sufficient coupling exists between the frequency meter and the other stages due to proximity, and to the fact that a common power supply is used. However, to give a stronger signal when using the frequency meter and detector on the higher frequency bands, a very small capacity coupling can be arranged from the output valve anode circuit to the detector grid. A value of about 5 μμF (C27) will be found sufficient. This condenser can be taken direct from the anode of the harmonic amplifier. If too tight a coupling is used here all types of spurious oscillations will result, whilst beats with various harmonics will be heard in the detector circuit, which, to say the least, are very misleading.

Monitor

The frequency meter is followed by a triode detector for monitoring purposes. For telephony purposes, a switch in the screen of the oscillator valve is provided to stop oscillation, consequently a

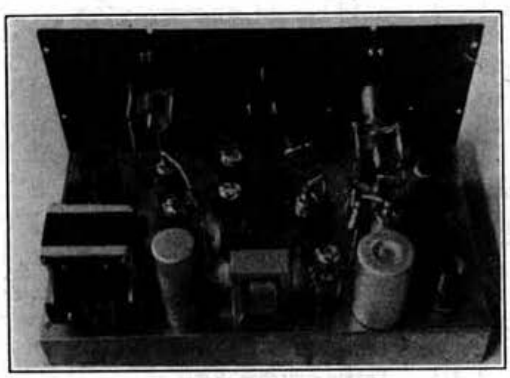


Fig. 2.

General view showing lay-out of components on top of the chassis.

beat note with the C.W. carrier is not produced. A well filtered supply reduces the tendency for hum to appear. Unless this precaution is taken a false idea of the quality of a C.W. carrier is liable to be formed. An output transformer is included in the detector anode circuit to maintain the current drain at a constant figure whether or not headphones are in circuit. Thus the oscillator voltage is not varied by the monitoring function, and the frequency meter calibration does not vary.

100 kc. Oscillator Stage

This stage consists of a pentode oscillator of conventional design, using a *Q.C.C.* type B100 crystal. The crystal is calibrated to an accuracy of 0·025 per cent. and has a temperature co-efficient of better than six parts per million. Under the normal conditions liable to be experienced in this country, the crystal fundamental is unlikely to change by more than 6 to 8 cycles due to temperature variations. With the circuit used, harmonics can be picked out to above 56 Mc. Since the crystal frequency is usually slightly higher than 100 kc., a small variable condenser (C26), can be used to tune the crystal to 100 kc. dead. A switch is provided to cut this stage out when not required.

It is unnecessary here to dwell on the uses of the 100 kc. crystal oscillator and the check points produced 100 kc. apart throughout the high frequency spectrum. Reference should be made to the various publications listed at the end of Part II for further information on this subject.

Multi-vibrator Stage

This stage consists of two triodes with grids and anodes cross-connected to form a resistance-capacity oscillator. The frequency of oscillation depends mainly on the values of resistance and capacity used and in this case is approximately 10 kc. The multi-vibrator is easily locked in frequency by the injection of voltage from another oscillator operating at a higher frequency, and may be regarded as a " frequency divider."

The frequency control resistance in one grid circuit produces a " band-spread " control effect by using a second resistance in series, instead of one large variable resistance. The stage is locked on its eighth to twelfth harmonic, by varying the frequency control resistance, that is the particular harmonic synchronises with the 100 kc. oscillator, and holds the stage in lock.

The common cathode resistance is used to provide some bias so that the anode current of the two valves is not excessive. It also provides control voltage from the 100 kc. oscillator through a small condenser. This condenser will be found to have a marked effect on the operation of the stage, for varying the capacity slightly will alter the locking effects. For instance, instead of locking on the eighth to twelfth harmonic, it is possible, by altering the condenser to work on the second to the sixth, or on any other harmonic. By using the multi-vibrator locked on its tenth harmonic, a series of check points 10 kc. apart and of high accuracy are available throughout the high-frequency spectrum. A switch is provided to cut out this stage when only 100 kc. points are required and this is so arranged that the anode current passing through the two valves is the same whether operating or not. The switch must be connected direct to cathode and not to earth.

Harmonic Amplifier

This stage uses a pentagrid converter valve in an electron coupled circuit and is a useful addition to a 100 kc. oscillator, since harmonics on the 28 Mc. band direct from the oscillator are rather weak.

The output from the multi-vibrator stage is fed into the injection grid, thereby modulating the output at the frequency on which the multi-vibrator stage is operated, normally 10 kc. The output of the harmonic amplifier therefore consists of a series of frequencies 10 kc. apart and amplified at that part of the spectrum to which the anode circuit is tuned.

A link coupling to the receiver input is provided *via* an *Eddystone* terminal saddle. Sufficient coupling is normally obtained by running a single wire from one side of the link to the aerial connection of the receiver. Band-switching of the output coil is not provided since one coil covers two amateur bands. It is considered that at this point dead-end and other losses which would automatically be introduced,

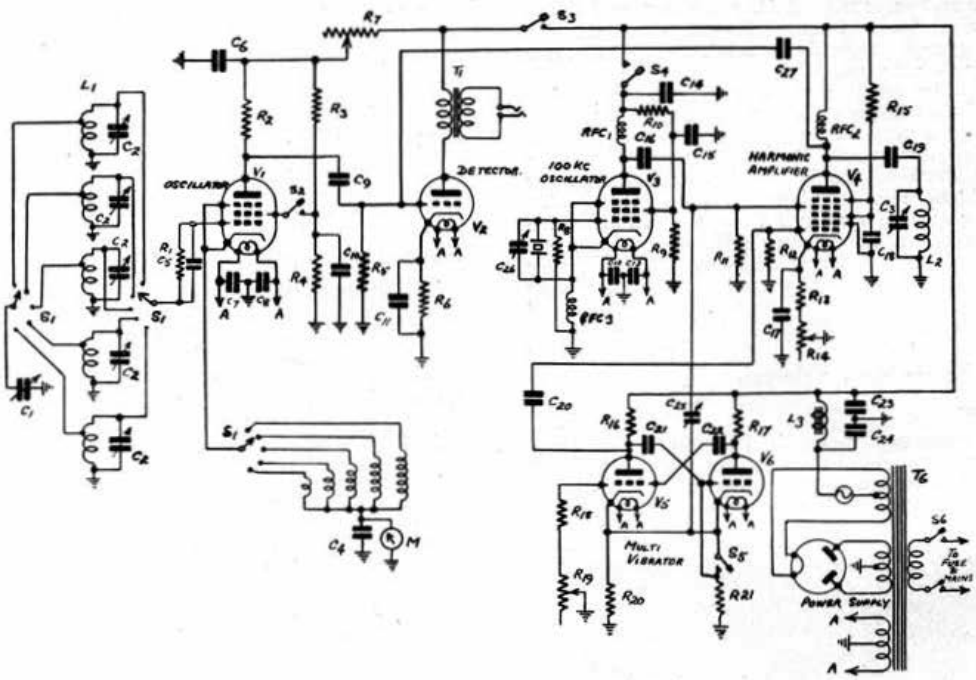


Fig. 3
Circuit diagram of the Frequency Meter Monitor and 10 kc. Signal Generator.

Keyed Components

C1	·000075μF S.L.F. Cyldon.
C2	Air trimmer, Eddystone, No. 978.
C3	·00016μF, Eddystone, No. 1131.
C4, 19, 21, 22	·001μF tubular, Bulgin PC.201.
C5, 9, 16, 20	·0001μF tubular, Bulgin PC.310.
C6, 7, 8, 10,12,13, 14, 15, 17	·01μF tubular, Bulgin PC.101.
C11	·25μF tubular, Bulgin PC.25.
C18	·1μF tubular, Bulgin PC.P1.
C23, 24	8 + 8μF electrolytic, Bulgin EC.8.
C25	Mica trimmer, Eddystone, No. 1023.
C26	3–18μμF, Eddystone, No. 1094.
C27	5μμF, see text.
R1, 2, 6, 11	100,000 ohms., 1 watt.
R3, 4, 9, 18	10,000 ohms., 1 watt.
R5	1 megohm, 1 watt.
R7	10,000 ohms. potentiometer, VC.7.
R8	500,000 ohms., 1 watt.
R10	25,000 ohms., 1 watt.
R12, 15, 20	50,000 ohms., 1 watt.
R13	500 ohms., 1 watt.
R14, 19	25,000 ohms., potentiometer, VC.9.
R16, 17	8,000 ohms., 1 watt.
R21	40,000 ohms., 1 watt. (All resistances are Bulgin.)
RFC1	Eddystone, No. 1066.
RFC 2, 3	Eddystone, No. 1010.
L1, L2	See text.
L3	L.F. choke, Bulgin, LF.15.
T1	L.F. transformer, Bulgin, LF.37.
T2	Mains transformer, 250-0-250 v., 5v. 2 A.C.T., 6·3v. 2 A.C.T. All Power Transformers Ltd.
M	Meter, Bulgin, MC.3.
S1	Switch unit, S.153.
S2, 3, 4, 5	Toggle switches, S.80T.
S6	Double-pole switch, S.123. (All switches are Bulgin.)

Other Components

100 kc. mounted crystal unit and base, Q.C.C. type, B.100.

16 s.w.g. chassis, size 16 × 9 × 20 ins. deep, front flange, 20 ins. deep. E. Parroussi.

Eddystone:—
- Welded steel cabinet, No. 1034.
- Precision vernier dial, No. 1085.
- Precision direct drive, No. 1077.
- 3 Instrument knobs, No. 1089.
- 3 Plain 4-pin coil formers, No. 935.
- 7 Frequentite octal valve holders, No. 1120.
- 5 4-Pin frequentite valve holders, No. 1073.
- 1 Adjustable insulating bracket, No. 1007.
- 1 Two-way terminal saddle, No. 1046.

Bulgin:—
- 1 Open circuit jack and plug, J2, P38.
- 1 Main's fuseholder and fuses, F.18.
- 1 6-in. shaft driver locator switch unit, S.150.

Valves :—V1 6J7G V3 6K7G V5V6 6C5G
V2 6C5G V4 6A8G V7 5Y3G

International range, octal bases.

outweigh any advantage of band-switching. Furthermore, a variable coupling arrangement would have to be used if this scheme were incorporated.

A variable resistance in the cathode circuit is used as a volume control. This is not essential and the same effect could be obtained by detuning the output circuit.

Construction

As the chassis is made a snug fit in the cabinet it is necessary to file the front flange off each side of the latter in order to allow the chassis to slide in. Effective screening of the complete instrument is provided by the cabinet and chassis assembly. British components are used throughout, whilst the *Tungsram* valves were found to operate as satisfactorily as their American equivalents.

The layout is quite simple as will be seen by reference to the photograph (Fig. 2) which shows the frequency meter portion at the left viewed from the panel with the detector behind it. The 100 kc. oscillator comes next followed by the multi-vibrator and harmonic amplifier with the output coil and link coupling at the right. The power supply is mounted along the rear of the chassis. Spacing of the individual components is not critical and with the photographs as a guide arrangements can be left to the individual constructor.

Care should be taken to ensure that vibration of components is minimised and that all wiring is rigid. The 5-way band switch is mounted under the chassis. It is advisable to wind and adjust the 1·7 Mc. coil before dealing in like manner with the other coils.

The Frequency Meter Coils

In the original design of the frequency meter it was intended to employ a coil tuning across the 1·7 Mc. band and to use harmonics for the other bands. Band-switching with separate coils, tuned by *Eddystone* air dielectric trimmers, is a modification included after the meter was built. In the photograph the 1·7 Mc. coil is shown wound on an old *Bulgin* screened broadcast coil former and tuned with a 65 $\mu\mu$F Microdenser. The other four coils are shown wound on valve base formers with their respective air dielectric trimmers mounted under the chassis. In the list of components five *Eddystone* air dielectric trimmers are specified, whereas only four and a Microdenser are used in the meter described. Intending constructors are advised to use an air dielectric trimmer for each coil. The trimmers are adjusted through a hole drilled in the side of chassis and cabinet, a method which permits corrections for temperature variation to be easily made without removing the meter from the cabinet.

With coils as specified in the table (using 24 s.w.g. enamelled wire) each band should be spread across the whole dial, but the band-spread tap may need slight adjustment either way. Fine adjustments can more easily be made by slight alteration of the spacing between turns. First locate the band by using a receiver and adjusting the trimmer, then accurately spread the band with the aid of the signal generator, or by means of the 100 kc. points only. A separate trimmer is really necessary for each coil, since very accurate matching in coil construction would be necessary in order simply to switch from one band to another without varying a band-set condenser. Furthermore, the use of separate trimmers permits optimum L-C ratios to be employed for each band.

The output coils are wound on *Eddystone* 4-pin plain formers using 24 s.w.g. enamelled wire and each coil covers two bands. A link coupling is wound at the earth end and details of these coils appear in the table. Satisfactory fundamental electron-coupled operation of the frequency meter was found to be impossible above about 22 Mc. For the 28 Mc. band, therefore, the second harmonic is used and the coil is similar to the 14 Mc. coil.

Frequency Meter Coils

Band Mc.	Turns.	Bandspread Tap.	Cathode Tap.
1·7	90	78	30
3·5	38	22	12
7	16	5	4
14	9	3½	2½
28	9	3	2½

Output Coils

Band Mc.	Turns.	Link.
1·7 & 3·5	40	1½
7 & 14	8	1½
28	2½	2

The output for headphones is *via* a transformer to isolate them completely, and the jack should be of the open circuit type.

The controls along the front panel from left to right are ; S2 (the telephony or C.W. switch in the screen of the frequency meter valve), S3 (the high tension switch for the frequency meter and detector valves), S1 (the band changing switch assembly), the headphone jack, S4 (the switch controlling high tension to the 100 kc. oscillator stage), R7 (the potentiometer varying the voltage to the frequency meter), R19 (the multi-vibrator frequency control resistance), R14 (the output volume control resistance), S5 (the multi-vibrator on-off switch), and S6 (the main power supply switch). A green panel light is wired across the heaters and a red panel indicating light is used as a fuse.

The two large dials are the precision vernier dial of the frequency meter and the direct drive of the output circuit.

(*To be continued.*)

MODERN 56 Mc. RECEIVER DESIGNS

By J. N. WALKER (G5JU)

UNQUESTIONABLY, it is desirable that research on the evolution of ultra-high frequency receivers should continue at an even faster pace than heretofore and, since both possess merits not always common, such research should apply to both superhet and straight receivers.

As mentioned in previous articles, there is no doubt that the sensitivity of many 56 Mc. receivers of comparatively recent construction is much lower than it should be. It is hoped therefore that the following notes, which briefly describe the outstanding points of receivers proved successful in recent 56 Mc. events, will enable many 56 Mc. enthusiasts to effect major improvements to their equipment.

Superhet Receivers

It would appear that superheterodyne receivers are at last coming into their own on the ultra-high frequencies and several interesting designs are given in the entry forms of the 56 Mc. N.F.D. and the GW Contest.

G2ZV and 2DDD have constructed practically identical receivers, of a type calculated to give good results without being unduly complicated. The first valve (the frequency-changer) is an Acorn R.F. Pentode (*R.C.A.* 954) used with a separate oscillator (955 Acorn triode). The latter is separately tuned, this arrangement avoiding the necessity of critical ganging and enabling the two tuned circuits to be brought into very exact resonance. Two I.F. stages follow, the first employing the recently introduced high gain R.F. pentode type 1851 and the second a type 6K7. The second detector consists of a 6C5 triode, regeneration being introduced to allow of the reception of C.W. signals. When energised from A.C. mains, a 6L6 valve is employed in the output position but, when used under portable conditions, this valve is replaced by another 6C5 for the sake of current economy, both H.T. and L.T. The total H.T. current consumption is then about 20 mA. from two standard dry batteries in series giving 240 volts. It has been found that adequate output for reception with telephones is secured by placing a telephone jack across the secondary of the L.F. transformer, the primary winding of which is in the anode circuit of the 6C5 second detector. This method results in a very low level of background noise and still further economises current consumption. The value of the intermediate frequency is not given but presumably it is high in order to avoid second channel interference, since no R.F. stage is employed. This receiver has been found to be more sensitive than a straight T.R.F. type utilising a 954 Acorn R.F. stage, 6K7 detector and 6C5 output, as well, of course, as giving much greater stability.

The superhet constructed by G6QZ who, it will be remembered, secured some outstanding contacts in the GW Contest, is very similar—in fact, the only differences in line-up are the use of two 6K7 valves in the I.F. stages, the frequency of which is 3 Mc., and a 6F6 output stage. 6QZ states that whilst not so sensitive as it might be, this receiver is absolutely stable in operation and is devoid of all trace of the troublesome hand capacity often associated with 56 Mc. straight receivers.

In passing, another benefit arising from the use of a superhet may be mentioned. Users of oscillating straight receivers will know only too well that any two pieces of metal lightly touching each other give rise to noise in the telephones and alterations in aerial or other connections external to the 56 Mc. receiver result in frequency changes in the latter, making it necessary to re-tune. In the case of a superhet, the frequency of the oscillator alone governs the signal holding qualities. Providing this stage is well screened (as, of course, it should be) both from other parts of the receiver and from external influences, none of the foregoing disadvantages will be present.

Another interesting, if somewhat ambitious, line-up is the one employed in G5CD's receiver. This consists of a 954 Acorn R.F. stage, X65 frequency changer (incorporating its own triode oscillator), two I.F. stages employing 6D6 valves, 75 (double-diode triode) second detector, 78 B.F.O., 6H6 noise limiter, and 6C5 output. Despite the number of valves, the H.T. consumption is reasonably low and the receiver performs well when operated from batteries.

With the exercise of a certain amount of ingenuity, a communication superhet can be readily adapted for 56 Mc. reception. G2NH's method with his *National* HRO is to replace the normal first detector coil with a separate circuit tuned to 56 Mc., this being preceded by a tuned R.F. stage employing one of the new EF12 footless valves. The two R.F. stages which form an integral part of the HRO are not used.

G5MA, also with an HRO, utilises a similar method but with the omission of the R.F. stage. In both cases, the second harmonic of the normal 28 Mc. HRO band spread oscillator stage is used and it is stated that operation is as certain and positive as on the lower amateur frequencies. When used under portable conditions, with the output pentode and the two R.F. valves removed, good results are obtainable from battery supplies, the consumption being approximately 2 amps at 6 volts and 16 mA at 120 volts.

Finally, G6DH has developed a very sensitive superhet 56 Mc. receiver. It employs Acorn valves in the earlier stages, whilst losses have been reduced to extremely small proportions through the use of Trolitul insulation at all important points. This particular model (and others) are available under the trade name of *Denco*.

Straight Receivers

More than ever in a straight receiver does the performance depend on the efficiency of the valves incorporated in it. It is not surprising therefore to find that the most successful receivers used by competitors incorporated Acorn valves either in the R.F. or detector stages or, in many cases, in both.

Everyone knows of the extremely consistent results recently achieved by G6CW on 56 Mc. The line-up of his receiver consists of 954—954—6C5; that is to say, Acorn R.F. pentodes in both R.F. amplifier and detector positions, followed by a small triode L.F. amplifier. This combination is a good

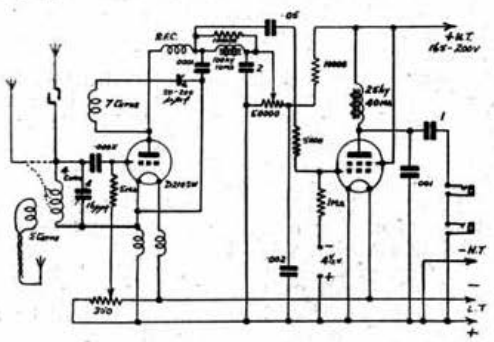
one for use with telephones and possesses the merits of low background noise and low current consumption.

GW6AA's receiver is similar but employs an Acorn triode (955) as detector and has two L.F. stages, both having 6C5 valves. It will be noted that the latter valve is in very common use, the reasons being its general suitability and the fact that its heater voltage tallies with the 954 and 955 Acorn valves, whilst its small physical size is an aid towards compactness.

The 6K7 valve—an R.F. tetrode with top grid cap—is favoured for the detector position by several, including G8JV, the winner of the GW Contest. In his case, it is preceded by a 954 R.F. stage and followed by a 6C5 L.F. stage.

An interesting line-up, devoid of Acorns, is the 1851—6K7—6C5 combination employed by G2WS. The first valve undoubtedly gives good gain and is considerably cheaper than an Acorn pentode.

The final receiver to be mentioned is the one built by 2BIL which always succeeds in bringing in numerous signals. It will be observed from the accompanying circuit that battery valves are employed in a more or less conventional circuit.



The interesting portable receiver used by 2BIL for 56 Mc. Field Days.

There are included, however, a number of useful refinements, such as variable grid bias to the detector valve, double control of reaction (semi-variable condenser and potentiometer) and alternative couplings. Unusual features are the high capacity grid condenser (·0005 μF) and the coil sizes—four turns in the grid winding and *seven* turns reaction. Presumably the large number of turns in the reaction winding are necessary because the grid circuit is heavily loaded through the use of comparatively tight aerial coupling. The reaction potentiometer is fitted with a 9/1 reduction slow motion dial to facilitate control. The general construction of the receiver can be judged from the accompanying photograph.

* * *

Originally, it was the intention to proceed with the description of the many interesting transmitter designs but since the information, if published, could not, under present circumstances, be put to practical use, it has been decided to withhold publication indefinitely.

Many ingenious aerial systems were also to be described but almost all of them had regard to portable systems rather than permanent structures and the remark above again applies.

Charging Accumulators from D.C. Mains

By R. M. Hall (XZ2EM)

IT may not be generally known that in localities served by D.C. mains, it is possible to evolve a very simple and economical method of charging any type of wet battery. The information which follows is submitted for the benefit of those who wish to cut down current (pardon the pun!) expenditure on this account.

By means of the system under discussion, accumulators and batteries can be charged for what really amounts to nothing at all because the charging current is used in any case for lighting or power purposes in the house. The drop in voltage caused by the battery being in circuit is negligible and can be ignored even with a mains supply of only 110 volts.

The method does away entirely with the charging board and its expensive and power consuming carbon lamps. The entire outlay, apart from the possible cost of labour, consists merely of two wall plugs, one socket and a few yards of flex. *It is important however, to remember that this particular system cannot be used with A.C. mains;* it is only suitable for D.C.

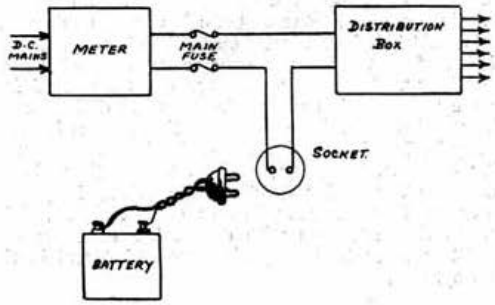
Practical Details

One side of the mains—it is immaterial which—between the main fuses and the distribution box must be cut and the ends connected to a wall socket. Next, the prongs of a wall plug should be shorted internally so that, when no batteries are being charged, it can be inserted into the socket, thus enabling the household supply to continue uninterrupted.

When it is desired to put on charge an accumulator or battery, another plug, to which has been attached a suitable length of flex, is substituted for the shorted one. The free ends of the flex are joined to the terminals of the battery, taking care that the positive lead is connected to the positive terminal. The positive side of the flex can easily be found, either by testing with a D.C. voltmeter, or by holding the free ends apart in a glass of water—the end which gives off bubbles is the *negative* pole.

No current passes through the battery until lights or fans in the house are switched on. The rate of

(*Continued on page* 320).



A novel method of charging accumulators from D.C. mains without the use of charging board and carbon lamps.

THE NEW SYSTEM OF FREQUENCY MODULATION

MAJOR E. H. ARMSTRONG, already familiar to the majority of readers on account of his pioneer work in connection with receivers of the super-regenerative and superheterodyne types, has, during the past few years, been working on a new system of modulation which is now developed to a stage which warrants it being placed on a commercial basis and employed for regular broadcasting.

Amplitude modulation has been universally employed in the past. In this method the amplitude of the carrier itself has been caused to vary in sympathy with the audio frequencies generated by the microphone, but in the new system the carrier amplitude remains practically constant, the fundamental frequency being varied.

It will be evident that to receive frequency modulated transmissions, a receiver having a wide band acceptance will be essential, and therefore the normal selective receiver will be totally unsuitable, in addition to which it is necessary to employ a different method of demodulation to that which applies to amplitude modulated carriers. A broadcasting system using frequency modulation cannot be operated on the medium waves whilst the wide frequency band required would, in any case, prohibit such operation, except possibly in very isolated areas and then only with low power. It therefore becomes necessary to use the ultra-high frequencies, the same principles applying as in the case of television transmission.

Benefits of the New System

Two major advantages are claimed for the new system. One is the very high quality of musical reproduction—it is stated that reception is quite startling in its realism. The other advantage is the great reduction in the effects of static, either natural or man-made. As is well-known, such interference is brought about by electrical discharges which give rise to shock oscillation over a wide range of frequencies. This effect is equivalent to a very heavily modulated signal and naturally it has a great effect on a normal type of receiver. But the power radiated over the whole band of radio frequencies around which the interference centres is more or less equal and the overall effect on a receiver designed for the reception of a frequency modulated signal will be practically nil. Natural static is a rare occurrence on the U.H.F., but it is difficult to avoid some degree of interference from motor cars and electrical machinery. To many listeners the advent of frequency modulation will make no great difference in their radio entertainment, but to thousands of people living in farming or remote districts, as well as to city dwellers in noisy sections where there is no adequate signal for daytime reception, frequency modulated broadcasts will be a distinct boon. Discriminating listeners who desire the best possible quality will undoubtedly show great interest in the new system.

Established Stations

It is interesting to learn that several stations utilising frequency modulation are now in regular service in the United States, and it is expected that many more will be active early in the New Year. Since height above sea level is an important factor influencing the range of a station operating on the U.H.F., it is to be expected that these special broadcasting stations are situated at high elevations.

Major Armstrong operates his own station at Alpine, N.J., and it is proposed to erect a new station using an aerial mast 300 feet high and having a power output of 50 kW. on top of the Palisade Hills, near the same town. Another station of 5 kW. is being built on Mount Washington, 6,512 feet above sea level (note that the comparatively low power is compensated for by the great height of the station), and it is calculated that, with each station covering a radius of between 75 and 100 miles, all the major cities lying between New York and Portland will receive a reliable service.

The Yankee broadcasting network possesses a station on Mount Asnebumpskit, near Worcester, which has been in regular operation for some time. *The General Electric Company* are incorporating a frequency modulated transmitter with the new television station which is being erected on the Helderberg Hills, west of Albany. This station will also serve New York and adjacent cities. Permission has been requested to erect stations in Detroit, Milwaukee and Los Angeles.

At present, *The General Electric Co.* is the major set manufacturing company producing frequency modulation receivers, two types of which are available. One, of the so-called " transition " type, is capable of receiving both methods of broadcasting, whereas the other and less expensive model will receive only frequency modulated signals.

J.N.W.

Useful Suggestions

Mr. W. H. Baker, G3JD, makes the suggestion that transmitting members with spare time available should prepare graphs based on past experiments.

He suggests the following data be tabulated in graph form :—

(*a*) Distance, or number of contacts made, against input power.

(*b*) Results (distance or number of contacts) obtained through the use of different types of aerial systems.

(*c*) Performance obtained from American transmitting valves compared with British counterparts.

Graphs of this nature would, he feels, prove of great value later when applying for extra facilities.

On the practical side, Mr. Baker suggests that time be devoted to overhauling and renewing where necessary, mains connections, and installing an efficient earthing system if this has not already been done.

Work of this nature, as Mr. Baker states, would help to demonstrate to the authorities at a later date that Amateur Radio did not die out during the war but was only slightly restricted in its scope.

Experimental Section

Manager: A. M. H. FERGUS, (G2ZC).

WE are carrying on to the best of our ability but adjustments have to be made in Groups where members have fallen out, consequently we cannot hope to get down to settled work until we know who can be counted upon. Although this fact should be obvious to all, it appears to have escaped the notice of the majority of members who are unable to continue their support, hence the matter being stressed for the second time.

As three changes have taken place since the war started we print the names of the Group managers for the benefit of members desiring to co-operate with any particular Group.

Aerial Group.—O. M. Derrick (GM3OM), " Gowanhill," Drip Road, Stirling.

Propagation Group.—E. J. Williams (G2XC), 34 London Road, Widley, Portsmouth.

Receiver Group.—H. R. Heap (G5HF), 404 Victoria Avenue East, New Moston, Manchester, 10.

Transmitter Group.—H. H. Phillips (GW4KQ), 132 Clare Road, Grange, Cardiff.

The E.S.M. takes this opportunity of thanking all Section members for their past co-operation, and at the beginning of a New Year, expresses the hope that the Section will receive the same support as in the past. His personal good wishes go out to every member.

G2ZC.

Aerial Group

The Aerial Group in common with all others, has faced many changes and difficulties since the war commenced, but by the time these notes appear in print, it is expected that it will again be a flourishing part of the Section. A circular has been sent to all Group members and immediately sufficient replies have been received the appointment of G.C.'s will be considered.

Although work with transmitting aerials has ceased, much can be done by studying data collected in peace-time, and by giving consideration to aerial problems in general.

The Group will also endeavour to keep abreast of the times by recording new designs which may be published in contemporary Journals such as *QST* and *Radio*. It is certain that so long as the U.S.A. remains neutral amateur aerial development will continue, therefore, we must not miss the opportunity of tabulating information which may prove useful at a later date.

Receiving aerial experiments can be continued and in this connection we should like to hear from any member who has experimented with the Stationary Beam described recently by G2IG.

GM3OM.

Propagation Group

The new G.M. wishes to thank his G.C's. and others for their prompt co-operation in getting the Group re-started. Thanks are also due to the late G.M. (G8DA) and his assistant (G4JZ) who have been to considerable trouble to supply valuable information about the sub-groups.

Two sub-groups are re-starting this month. The first has been formed from the " 28 Mc. A and B " sub-groups and with G2YL as G.C. will consist of G2XC, 6DH, 8MH, BRS25, 3003, 3179. A letter budget will be circulated early in the New Year. The second contains members of the old " Aurora " sub-group and will continue under that name with 2FIH as G.C. Members are G3PM, 3TR, 4IT, and 8CP. It is hoped to produce the magazine *Aurora* again in the near future.

Several members of the 56 Mc. sub-groups are understood to be willing to join in a letter budget scheme and it is anticipated that these groups will be working again soon. The G.M. will appreciate it if all those who are still in a position to continue active will send him a postcard to confirm the fact.

A new amplifier having recently been installed, the *General Electric Co.*, of U.S.A. will shortly be requiring information on the signal strength of their 9,530 kc. transmissions. As G6CL has offered the services of the Society in this matter, it is proposed to form a sub-group for the purpose. Membership will not be restricted to E.S. therefore the G.M. will be glad to hear from any Society member willing to co-operate.

G2XC.

Receiver Group

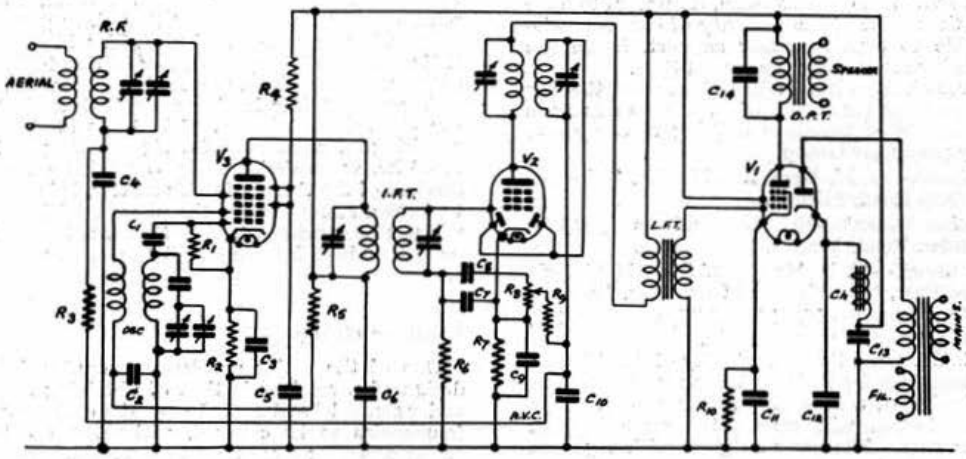
One of the major problems encountered in the design of a receiver is that of obtaining sufficient and practical band-spread over the entire range of frequencies to be covered, without resort to the use of several gangs of condensers. The difficulties are made all the more acute when the 56 Mc. band is to be included, and although it is not recommended, many amateurs appear to wish to include this range on their normal short-wave receivers.

It is not possible to design a system which provides good band-spreading on the higher, and adequate range on the lower frequencies using a single gang therefore a compromise has to be adopted. If more than one condenser can be used then a variety of arrangements present themselves, but in order to ensure good frequency calibration all condensers, other than the main tuning condenser, must be arranged so that their capacity can be varied in definite known steps, such as by using a dividing plate. Alternatively an efficient system has been devised whereby five variable air condensers can be adjusted to definite values and selected by a low-capacity low-loss switch of modern design. In this type of circuit an extra switch is provided to isolate the entire tuning circuit (except the main tuning condenser and coil) when used on 56 Mc., thus the high capacity obtained by introducing several condensers and a switch is avoided.

In past years a condenser was manufactured in which the moving vanes moved one at a time, each complete half revolution of the spindle bringing out another vane. With this arrangement a large capacity was made continuously variable at a very slow speed. It might be possible to construct a condenser on these lines with the necessary modifications to suit modern conditions for U.H.F. working, and it is suggested that amateurs with mechanical ability should try and work out a design which can either be home-built or offered to a manufacturing concern.

In the receiver circuit which is appended it will be seen that full use is made of the ability of certain

valves to fulfil two or three functions at the same time. The first valve is a conventional pentagrid convertor with oscillator and mixer in one envelope. The second is arranged as an I.F. amplifier, detector and L.F. amplifier by reflex action. The I.F. from the mixer is applied to the control grid, amplified and applied to the diodes through the I.F. transformer, A.V.C. being taken off in the usual manner, and applied to the mixer. The L.F. output is then re-applied to the control grid of the valve, through



Circuit diagram of a superhet receiver using only three valves.

R1	50,000 ohms.	R7	600 ,,	C1	·0005 μF.	C8	·02 ,,
R2	300 ,,	R8	175,000 (Variable).	C2	·01 ,,	C9, 12, 13	8 (Electrolytic).
R3	250,000 ,,	R9	400,000 ,,	C3, 5, 6	·1 ,,	C10	·001 ,,
R4	5,000 ,,	R10	1,000 ,,	C4	·05 ,,	C14	·0001 ,,
R5	20,000 ,,	V1, 12A7. V2, 6B7. V3, 6A8.		C7	·0003 ,,	CH	Smoothing Choke.
R6	500,000 ,,						

C8, and amplified before reaching the output valve through the intervalve transformer, which is in series with the I.F. transformer. The output valve is combined with a half-wave rectifier. This circuit is quite suitable for broadcast listening although it is doubtful whether it could be stabilised for short-wave operation. In order to gain maximum amplification the leads connecting R9, R8 and C8 should be shielded and the shielding earthed. It makes an interesting freak circuit and with care is quite suitable as a mains portable.

G5HF.

Cosmic Notes

By E. J. Williams, B.Sc. (G2XC)

Sunspots

DATA for the period October 28 to November 17 has been received from Science Service. No large sunspot groups were reported during this period and spots were not particularly numerous. A large solar prominence was observed at Tokio Observatory on November 12. This prominence on the sun's west limb had a height of 73,000 km., and breadth 200,000 km.

Magnetic Elements

A disturbance of moderate intensity occurred on November 13 beginning at 01.46 G.M.T. and finishing at 22.00 G.M.T. the same day. With this exception conditions were quiet from October 28 to November 18.

Radio Conditions

The F2 layer vertical incidence critical frequencies at Washington (local noon) for Wednesdays beginning November 1 were as follows:—12,800 kc., 12,600 kc., 13,400 kc.

It is noted that the 28 Mc. band was extremely poor on November 13 (see last month's " The 28 Mc. Band "). As stated above, this day was marked by a magnetic disturbance. During November and December night-time propagation conditions were extremely bad although daylight conditions do not appear to have been at all abnormal. It has been impossible to receive the Cosmic Data broadcasts from NAA on 9,250 kc. (transmitted nightly at 22.30) during recent weeks.

Rede Dos Emissores Portugueses

We have been informed by the President of the above Society (CT1BY) that although amateur transmitting has been suspended in his country, the R.E.P. are carrying on their work. The new address of the organisation is Rua de S. Julião 41-3°, Lisbon.

Contemporary Literature

By L. FRYER (G2FR)

DIODE OPERATING CONDITIONS. W. P. N. Court B.Sc. (Eng.), A.C.G.I. *The Wireless Engineer*, November, 1939.

The author analyses the operation of the diode rectifier under various conditions. The first part of the paper treats the diode rectifier alone, and deals with conditions obtaining with (1) Resistive load—Unmodulated input, (2) Resistive load—Modulated input, (3) Resistive load—Modulated input—Indirect Coupling, (4) Reactive load—Modulated input. In the second part the rectifier and tuned circuit are considered.

The article also deals very fully with the mathematical aspect of the subject, and includes all necessary circuit diagrams and curves.

* * *

SIGNAL HANDLING CAPACITY OF H.F. VALVES. R. W. Sloane, M.A., Ph.D. *The Wireless Engineer*, November, 1939.

The author describes the work undertaken to develop a method of measuring signal handling capacity which would be simple and speedy and would require comparatively little special apparatus. As a result the task has been rendered almost as easy as the plotting of a static characteristic.

The apparatus, except for the test stage, is available for other purposes when required.

* * *

SOME APPLICATIONS OF NEGATIVE FEEDBACK WITH PARTICULAR REFERENCE TO LABORATORY EQUIPMENT. F. E. Terman, F.I.R.E., R. R. Buss, Student, I.R.E., W. R. Hewlett, A.M.I.R.E., and F. C. Cahill, Student, I.R.E. Proceedings of the I.R.E., October, 1939.

The application of feedback to an entire amplifier rather than to the final stage alone makes it possible to realise the characteristics of a perfect amplifier over wide frequency ranges. The use of such amplifiers to give direct-reading audio-frequency voltmeters with permanent calibration and any desired sensitivity is described.

Negative feedback can be used to reduce the distortion in the output of laboratory oscillators for all loads from open circuit to short circuit by the expedient of dissipating a part of the output power in a resistive network.

Methods are given for applying feedback to tuned radio-frequency amplifiers so that the amplification depends only upon the constants of the tuned circuit and is independent of the values and supply voltages.

The use of negative feedback to develop a stabilised negative resistance substantially independent of tubes and supply voltages is considered, and various applications described.

High selectivity can be obtained by deriving the feedback voltage from the neutral arm of a bridge, one leg of which involves a parallel resonant circuit. It is possible by this means to obtain an effective circuit Q of several thousand, using ordinary tuned circuits, and the selectivity can be varied without affecting the amplification at resonance. The use of these highly selective circuits in wave analysers is considered.

Feedback can be used to give improved laboratory oscillators. These include resistance-stabilised oscillators, in which the amplitude-limiting action is also separated from the amplifier action, and oscillators in which the frequency is controlled by a resistance-capacitance network. Such resistance-capacitance oscillators represent a simple and inexpensive substitute for beat-frequency oscillators, and have comparative performance.

* * *

CRITICAL INDUCTANCE AND CONTROL RECTIFIERS. W. P. Overbeck, A.M.I.R.E. Proceedings of the I.R.E., October, 1939.

This paper explains the effect of a choke-input filter when used in connection with controllable rectifier valves. Many of the difficulties experienced with instability and discontinuities of control of such rectifiers are due to an improper choice of input-choke inductance. A mathematical derivation of the proper value of inductance is given and a simple method of applying it to actual problems is illustrated.

* * *

NON-EXISTENCE OF CONTINUOUS INTENSE IONIZATION IN THE TROPOSPHERE AND LOWER STRATOSPHERE. O. H. Gish, Non-member I.R.E., and H. G. Booker, Non-member I.R.E. Proceedings of the I.R.E. February, 1939.

Evidence that radio waves are returned from the troposphere and lower stratosphere has been interpreted by Watson Watt and co-workers as pointing "to continuous ionization in sharply bounded thin strata, over long periods of 5×10^{12} ions/cc or more in regions around 6 to 10 km. . . . at all times of day, in summer and in winter." Direct observations of the electrical state of the troposphere and lower stratosphere prove that the electrical conductivity of these regions is something like nine orders of magnitude less than that suggested by Watson Watt and co-workers. Continuous recording of electrical conductivity during the flight of the Explorer II up to an altitude of nearly 22 kilometres shows a maximum ionic density of only 5,300 ions/cm³ (at 14·8 kilometres). Balloon observations throughout the troposphere show no trace of ionic densities far in excess of 4,000 ions/cm³. This evidence is further supported by many years of continuous recording of the electrical state of the troposphere at the Huancayo Magnetic Observatory, 3·3 kilometres above sea level. Moreover, the power required to maintain the electrification postulated by Watson Watt is startling when compared with that available from the sun and thunderstorms. The strength of radio echoes from the troposphere would seem to have been greatly over-estimated.

* * *

5–10 METRE SPECIAL TRANSMITTER. Eugene O. Gleeson. *Radio News*, June, 1939.

The writer describes a neat and efficient 5 and 10 meter transmitter. The unit uses one or two 10 metre crystals and the choice of two frequencies in either band may be had by reversing the crystals.

The oscillator uses a type 6J5g valve as a straight fundamental generator providing ample excitation to the HY60 beam valves for telephony or C.W.

Two HY60 valves are used, one as a straight amplifier on 10 metres, the other as a doubler on 5 metres. The modulator is a 6L6 operated class A, which provides up to 6·5 watts audio from a single button carbon type microphone. The transmitter has been used with vertical rod aerials on both 5 and 10 metres, the output being about 12 watts on 10, and about 10 watts on 5 metres with a 300-volt anode supply.

THE TRANSITRON OSCILLATOR. Cledo Brunetti. A.M.I.R.E. Proceedings of the I.R.E. February, 1939.

The negative-resistance oscillator possesses many advantages over the ordinary triode feed-back types. The most common of negative-resistance oscillators, the Dynatron, has not been generally adopted owing to its dependence on secondary emission, an unsteady property. The retarding-field negative-transconductance oscillator possesses the advantages of the dynatron without its disadvantages.

This type of oscillator is discussed from the practical standpoint, the theoretical treatise having been given in a previous article. The oscillator will generate sinusoidal oscillations of any frequency from the lowest audio to 60 megacycles by simply changing the tuned circuit constants. It will function with direct plate and anode voltages of 2 and 4 volts, respectively, or 50 and 200 volts, respectively, or any intermediate values. An alternating-current output of a fraction of a volt to over 20 volts effective value is obtainable across the tuned circuit.

The simplicity of construction and operation and the assurance of constant performance make this type of oscillator a valuable addition to the laboratory.

* * *

EXTRACT FROM "CQ-NVIR" (Netherlands) May, 1939. Ing. W. Weijers (PA0DO).

The Experimental Division of N.V.I.R. gives a lot of data on the construction of "Bandmikes." The principles of this type of microphone are treated first. A thin metal band is mounted in a strong magnetic field so that it can move in directions perpendicular to the direction of the lines of magnetic force. The band when moved by speech waves cuts the lines of force at rates which vary according to the amplitude of the speech, and therefore has a varying E.M.F. induced in it. The magnetic field must be homogeneous, otherwise distortion will occur.

Mechanical features are then discussed. The most difficult problem is the adaptation of the microphone to the amplifier, due to the very low internal resistance (0·1–0·2 ohms) of this type of microphone. The voltages supplied by this microphone are very low and therefore must be transformed, the supply leads and transformer primary being of very low resistance in order to avoid loss.

The transformer is connected to the microphone direct, the secondary being joined to the amplifier by means of screened cable in order to avoid static-hum. The screening results in a rather high capacity, causing attenuation of the high tones, and in order to correct this a second transformer is used for the input to the amplifier.

Details of the transformers used are as follows: Core size $2\frac{1}{2}$ in. × $2\frac{1}{2}$ in. × $\frac{1}{2}$ in. square section. The microphone to line transformer has a primary of 2 × 2 turns copper strip, secondary 2 × 120 turns wire (size 2/150 in.). The line to amplifier grid transformer has a primary of 2 × 120 turns of 2/150 in. wire. Secondary 5,000 turns of wire (1/500 in.). The centre-tap of the primary winding of the second transformer is connected to earth.

In the first transformer half of each winding is wound on one leg of the core the other halves being wound on the other leg.

Both transformers are fitted with iron shrouds to prevent magnetic hum. Several means of compensation for the frequency characteristics are treated in the article.

In this issue also PA0OO describes his four stage C.W. transmitter working on 10, 20, 40 and 80 metres, with a special beam for the U.S.A. and a non-directional aerial for all-round working.

PA0KT is active again with a television transmitter (30 line Baird system) working every Sunday morning from 6.40 to 8.10 a.m. G.M.T., on 76 metres vision and 85 metres sound.

* * *

TRANSMISSION LINES WITH EXPONENTIAL TAPER. Harold A. Wheeler, Fellow I.R.E. Proceedings of the I.R.E., January, 1939.

Exponential lines, like exponential horns, are useful as impedance-matching devices. They are best inserted in a high-pass filter having the same cut-off frequency determined by the rate of taper. Unusual rules are derived for inserting the line in the filter with exact matching of iterative and image impedances. Design formulas are derived for the construction of exporential lines.

"Polar" S.W. Condensers

FURTHER to the review published in the December issue we have now had the opportunity of examining three more examples of new "Polar" condensers manufactured by *Messrs. Wingrove and Rogers.*

C.1801 (20 μμF.)

The C.1801 which is a compact and efficient condenser for general short-wave work is mounted in a very solid frame. The rotor revolves in a plain bearing at the spindle end and a single ball-bearing at the extremity. The stators are mounted on two $\frac{3}{16}$ in. diameter round rods of ceramic material and to all intents and purposes the condenser is air-insulated. The frame is rather too massive for many U.H.F. applications but for general short-wave work the condenser is very efficient. At 7s. 6d. it is cheap for a really first-class component.

C.1804 (20 μμF.)

This is an exceptionally robust condenser of small dimensions similar in design to type C.1801 but with two important improvements:—first the spindle is extended at both ends to permit easy ganging and second the rotors run on multi-ball bearings through both ends of the frame. The bearings are electrically shorted by a silver-plated phosphor-bronze contact. Mechanically beyond reproach it is eminently suitable for stable oscillators such as B.F.O's. Frequency Meters, etc. where mechanical stability is of prime importance. For a condenser of its type the price of 9s. 6d. is not high as it is worthy to be included in any laboratory instrument.

C.604 (100 μμF.)

A single section transmitting condenser at 15s. for plate voltages up to 1,500 volts. Solidly built on a ceramic base it is a first-class job available in capacities of 50, 75 and 100 μμF.

G5HF.

International Short-wave Broadcast Stations

PERUSAL of lists of international short-wave broadcast stations invariably shows that the information given in one list fails to agree with that published in another.

In an attempt to produce an authentic list, which can also be used for calibrating frequency meters, we have been in communication with the B.B.C. and the Directors of the best known U.S.A. short-wave stations.

We would remind readers that programmes and times of the transmissions in the B.B.C. Overseas Service appear weekly in *London Calling*, a new publication issued by the B.B.C. and available by an annual subscription of 10s. Details of the U.S.A. programmes appear weekly in *The Radio Times*.

B.B.C. Overseas Service Stations

Call	Frequency in Kilocycles	Wavelength in Metres
GST ...	21550	13·92
GSJ ...	21530	13·93
GSH ...	21470	13·97
GSV ...	17810	16·84
GSG ...	17790	16·86
GSP ...	15310	19·60
GSI ...	15260	19·66
GSF ...	15140	19·82
GSE ...	11860	25·30
GSD ...	11750	25·53
GSC ...	9580	31·32
GSB ...	9510	31·55
GSL ...	6110	49·10

VP5PZ Becomes a Government Broadcast Station

Mr. John Grinan, VP5PZ, doyen of Amateur Radio in the British West Indies, receives our congratulations upon being invited by the Government of Jamaica to operate his station, during the war period, for broadcasting purposes.

The station commenced operations on November 17, 1939, when the Governor (Sir Arthur Richards) broadcast an inaugural speech. Mr. Grinan's amateur call is being used and the frequency employed is 4·8 Mc. (62·5 metres).

In the course of his speech Sir Arthur Richards paid a warm tribute to Mr. Grinan who he said had some months previously offered to present a private broadcasting station to the Jamaica Government. In accepting the offer, which he regarded as generous and patriotic, the Government were now in a position to disseminate news and announcements of food prices at regular periods each week.

Mr. Grinan's gesture is yet another example of the spirit of loyal co-operation which exists throughout the amateur movement. That radio amateurs in all parts of the British Commonwealth would gladly devote their time, money and ability to the provision of similar services goes without saying. Maybe the Governments of Empire will follow the lead of the Jamaica authorities should opportunities present themselves.

Care should be exercised in logging B.B.C. short-wave broadcasts as frequently the same programme is radiated on frequencies lying close together in the spectrum. The same remark applies to a lesser extent to certain U.S.A. transmissions.

The B.B.C. and U.S.A. lists have been tabulated separately in order to facilitate ease in use.

U.S.A. Short-wave Broadcast Stations

Call	Frequency in Kilocycles	Wavelength in Metres
WRCA ...	21630	13·87
WCBX ...	21570	13·90
WPIT ...	21540	13·93
WCAB ...	21520	13·94
WGEA ...	21500	13·95
WNBI ...	17780	16·87
WGEA ...	15330	19·57
WCAB ...	15270	19·64
WCBX ...	15270	19·64
WRUL ...	15250	19·67
WPIT ...	15210	19·72
WPIT ...	11870	25·27
WCBX ...	11830	25·36
WRUL ...	11790	25·45
WRCA ...	9670	31·02
WCBX ...	9650	31·09
WCAB ...	9590	31·28
WGEA ...	9550	31·41
WGEO ...	9530	31·48
WCBX ...	6170	48·62
WCBX ...	6120	49·02
WNBI ...	6100	49·10
WCAB ...	6060	49·50
WRUL ...	6040	49·67

Australia Calling

Radio history was made last month when an Australian short-wave international broadcasting service, the first to be operated by a British Dominion, commenced transmissions. Just prior to the inauguration Headquarters was invited, at short notice, to report on a series of experimental transmissions, and it is understood that the information provided was appreciated, as was the suggestion that "Australia Calling" should be announced in addition to the station call signs.

For the past month VLQ on 31.32 metres (9580 kc) and VLQ2 on 25.26 metres (11875 kc) have been heard at good signal strength, between 0700 and 0900 GMT. An English News Bulletin is given at 0815 GMT.

Members interested in propagation are invited to study the transmissions from these two stations and to forward a summary of their observations to Mr. E. J. Williams (G2XC), Propagation Group Manager.

KHAKI AND BLUE

A new feature in which we publish information concerning our members serving in H.M. Forces. Items for inclusion in future issues should reach the Secretary-Editor not later than the first day of the month preceding date of publication.

H. Fenton, G8GG, who is in France with the R.A.F., writes: " Radio books and papers are in great demand, and the number of BULLETINS and copies of QST arriving here would delight, the printers, no less than the respective Treasurers ! "

* * *

Friends of Q.M.S. C. W. Kirk, R.A.S.C., G4CL, will be sorry to hear that after a spell of duty in France, he has been invalided to England with gastric trouble. Letters may be addressed to him via Headquarters. Mr. Kirk, who it will be remembered, held the first amateur call issued in Gibraltar—ZB2A, was welcomed at the A.G.M.

* * *

H. G. Newland, G5ND, now an L.A.C. in the R.A.F. abroad, sends greetings to G6OQ. He reports that several amateurs are in his unit including G3GX.

* * *

We understand that Arthur Simmons, G3AD, has been promoted to the rank of L.A.C. Advancement has also come to many of those whose names have appeared in earlier Active Service Lists.

* * *

Lt. D. E. Herbert, G6RF, who is serving with the Royal Corps of Signals in the West Country sends greetings to his many friends in District 6. On arriving recently at a North of England camp for a radio course, the first piece of gear which met his eye was a " ham built " 200 watter (complete with LS5B's) and a Hammurlund Receiver !

* * *

" The Three Musketeers," G8UR, 8RA and 8KL are together in the R.A.F. somewhere in the East of England. They send greetings to old friends and will be glad to receive letters via Headquarters.

* * *

Gunner R. A. Simpson (G8SD), who is serving in the Signals Section of a Heavy Artillery Battery, will be pleased to hear from friends. Letters should be sent via his home address " Esses Don," Harworth Road, Blyth, near Worksop, Notts.

* * *

Douglas Walters (G5CV), after a short spell of duty at a Signal School has been granted a commission in the R.A.F.V.R. His present rank is Pilot Officer, but we understand promotion is on the way. In his last letter to Headquarters he mentioned that Ian Campbell Brice (G5IB), and Douglas Johnson (G6DW), were with him at an East Coast Training School. Douglas Walters sends greetings to his many friends at home and abroad. Letters can be sent to him via Headquarters.

* * *

It is with particular pleasure that we record the safe arrival in this country of one of our best-known Canadian members in the person of Mr. W. D. Wadsworth, VE5ZM, of Trail, British Columbia.

" Bill " as he is known the ham world over, has probably worked more British Isles stations than any other VE5 and during his stay in England he hopes to make many personal QSO's. He enlisted shortly after the war commenced in the Royal Canadian Artillery, and is now in training somewhere in England. Correspondence may be sent to him via G6CL who had the pleasure of extending a warm welcome to him and to his eldest brother when they visited Headquarters on December 27. VE5ZM was welcomed at the A.G.M. on December 30.

VE5AAD operated by another of the Wadsworth brothers, is now in the Royal Canadian Air Force, and it is expected that he too will shortly arrive in England.

* * *

AC.2 N. F. O'Brien, G3LP, tells us that he has just completed a radio course in the company of GM3NI, G5KV, 5NA, 8AD, 8IJ and 8NS. Unfortunately 8AB contracted measles just before the examination and was taken to hospital. We hope he has now made a good recovery.

* * *

2nd-Lt. John Swinnerton (G2YS) who is serving with the Royal Corps of Signals sends us news regarding the activities of several well-known Coventry members. In his own unit Dennis Flower, G8TO, indulges in many arguments with him about aerial systems, which they find is an admirable way of whiling away the time during route marches ! G2LU, as reported elsewhere, is qualifying, as an R.N. telegraphist, for the new S.A.C. (seen all continents) certificate ! G2ZT and 3AQ are helping to train local cadets for the R.C. of S.; 6DC is an R.A.F. officer in training for radio duties. 3YO and 8UX are in France with the R.C. of S.

G2YS asks to be remembered to all old friends wherever they may be at this time. Referring to the BULLETIN he says " not only do I look forward to it merely for news of friends, but also because it keeps alive the spirit and jargon of ham radio which serves us well in these troublesome times."

May we soon hear the Coventry Gang on the air, once again.

Bert Simpson, G8DI, of Old Swan, Liverpool, who is now serving as an AC.2 with the R.A.F. in France.

Friends of Fred Ingleton, G6FI, will be interested to hear that he is now serving in France as a Corporal in the R.A.F. Fred was probably better known in North London than anywhere else, and the operators of the N.F.D. stations in that District cherish happy memories of his many nocturnal visits !

* * *

Recent letters from " the early birds " as we have christened the first R.A.F. drafts to France, indicate that many of them will be on leave during January and February.

* * *

R. G. Shears, G8KW, who is serving as a Signalman in the R. C. of S., wishes to be remembered to old friends. Letters can be sent via his home address 52 Lytton Road, New Barnet, Herts.

* * *

L./Cpl. W. H. G. Medcalfe, VU2EU (R.C. of S.) tells us that all VU licences were withdrawn on September 4, since when prices for radio parts have risen considerably. VU2EU thanks all British Isles amateurs who co-operated with him in his low power experiments.

* * *

News is also to hand from another well-known VU service member, Tom Arnold, 2AN, who is serving with the Signals in Baluchistan. Appreciating that on the outbreak of war the Government would impound all amateur gear, Tom converted his rig to E.C.O. and disposed of it to the Army !

He wishes to be remembered to all old G friends, and in particular to Cecil Symonds, G5OV, who, we believe, is in the R.N.V.(W.)R.

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Service Members

Due to the fact that their service address may frequently change, members in H.M. Forces are kindly requested to allow Headquarters to send THE T. & R. BULLETIN and other Society correspondence to their home address. Providing redirection is made without delay no extra stamp is required on the wrapper or envelope.

The R.A.F. Amateur Radio Society

The latest issue of *QRV*, official journal of the above Society, contains the following statement : " Owing to sudden postings many addresses are now unknown to us. Members are requested to acquaint their friends with the fact that copies (of *QRV*) are now available and will be forwarded by the Secretary immediately on receipt of addresses. In forwarding addresses due regard should be paid to official requirements regarding secrecy, and in doubtful cases, magazines could be obtained by indirect means. " Members are further requested to read radio society notices in radio periodicals, which may for a time prove to be the only possible vehicle of communication between the officers of the Society and its members."

In view of the very large number of R.A.F. men who are members of the R.S.G.B. and the R.A.F. A.R.S., we have advised the latter organisation that they may use the columns of this Journal for making announcements.

Air Defence Cadet Corps

Throughout the British Isles Air Defence Cadet Corps Squadrons have been inaugurated for the purpose of training the youth of the Nation to become air-minded. Admission is granted to young men between 14 and 18 years of age who are required to purchase their own uniform and pass a medical inspection.

In several squadrons specialised training in radio communication is given by ex-service personnel or by qualified radio amateurs and others.

Squadrons where radio instruction has not yet commenced will undoubtedly welcome co-operation from Society members who are in a position to devote time to this important and interesting work.

The Secretary-Editor who is Signals Officer to the 85th (Southgate) Squadron, will be pleased to give information to any junior member who wishes to join a Squadron, and advice to senior members willing to give assistance as radio instructors. He will also be glad to hear from any member in North London with a sound knowledge of meteorology who would be willing to give occasional lectures to the Southgate Squadron.

The work of the A.D.C.C. is centralised through the Air League of the British Empire, Kinnaird House, 1a Pall Mall East, London, S.W.1, who have recently received the highest praise from the Secretary of State for Air and other prominent Government personages for the remarkable progress made since the organisation commenced its activities in 1938.

True Ham Spirit

The following quotation from a letter received from one of our members serving with the R.A.F. in France speaks for itself.

" As an example of real ham spirit can this be excelled ? Five or six weeks ago I received a letter from G8—— of —— Suffolk, forwarded from R.S.G.B. I wrote to him and gave my address. Since then he has written me nearly every week and he has sent me parcels of books (new ones), magazines, a French Grammar, a mouth organ, petrol lighter and other useful things. This, mark you, from a chap I have only met once—at a Suffolk meeting last year."

THE MONTH "OFF" THE AIR—December, 1939

By ARTHUR O. MILNE (G2MI)

ALTHOUGH a little late in the month, may I take this opportunity to wish everyone good luck during 1940, and a speedy return to the full amateur life. In addition, I should like to thank all those who so kindly sent Christmas and New Year greetings, especially my friends in the Services.

* * *

G3OA contributes a list which, although too long to publish, indicates that our bands are by no means dead. Both 7 and 14 Mc. yielded plenty of DX during December. 28 Mc., on the other hand, was poor, much more so than at the same time last year.

G3JR, who made the first G contact with HB1CE and has just received his card, now requires only four more cards for D.X.C.C., a remarkable performance!

As forecast in these notes some time ago, cards from GX7AX (a really beautiful production) have now been distributed.

Several reports are to hand regarding VR6AY heard on 14270 kc. Assuming he is the "genuine article," this must be the last Empire station left on the air. Reports in the Press mention that Admiral Byrd recently called in at Pitcairn and repaired their receiver, so perhaps they now know there is a war on! Talking of Byrd, you lads in the Services must get this war won in time to work KC6USA, the expedition's station in the Antarctic. That gives you about two years. What about it now? It's a bet!

Requests for details of XUOA are referred to SU1WM's remarks in the September 1939 issue (page 159). Italians, Hungarians and Estonians are still active, whilst the following are some of the good DX calls heard recently: CE4AI, 7 Mc. 'phone, J2BC, 14350, HI3N, UK9AN, K4DTH, K4FKC, K4KD, KA1HR, KA1AC, KA4RP, and CE3GG.

G4AB's list of stations heard on 7 Mc. confirms the indications that 14 Mc. is on the down grade and that the forecast of a return to good DX on "forty" is coming true. Here are some of his best: W6BIC (Nevada), W6QAP (Arizona), K6QUJ, K6CGK, PY4AE, KB4AAN, CM8RO, CM7FR, KA1HQ, and many others. PZ6W, who gave QRA as Surinam, is the only outstanding call on 14 Mc.

G6YL kindly forwards the new QRA of B.E.R.S. 195, which is 254 Glebe Road, Glebe Point, Sydney.

G5LP has had cards from KB6ILT and KF6OWR; The latter sent his old K6 card, but is having some special ones printed for Howland Is., which will be sent out as soon as they become available.

ZB2B wrote us recently, asking for information about one or two G's, and also enclosed a list of calls heard. The Gibraltar censor, however, appears to be under the impression that amateur calls are an official secret and had therefore most carefully cut them all out with a pair of scissors! Hence ZB2B's letter arrived looking rather like one of those pretty patterns the conjurer produces from a sheet of newspaper!

W8OQF reports working a station with the call VS5AD, claiming to be in Sarawak, but we think, as he does, that this is doubtful, although this territory is not in quite the same political category as the Crown Colonies. W8OQF also worked LX1SS, who said he was close to the Belgian frontier, "within sound of the guns on the Western Front." On the other hand, LX1AB, the Luxembourg QSL manager, writes to say that all LX licences have been suspended, and that LX1X, LX1SS, etc., are all pirates, not in Luxembourg. So what?

W1WV, who contributes his first regular letter for this feature, points out that many American amateurs use some sort of rotatable aerial. It may be therefore that as most of their DX now comes from west and south, we are receiving them less strongly than usual, being well off the centre of the beam. EA7BB, HA1K and ES2G are the only European 28 Mc. 'phones heard over there.

On November 12, W1WV worked ZB4UC (also worked by W8OQF), who said, "I am under cover in Ascention Island"; having regard to the spelling and the prefix, this sounds doubtful, although his signals came from the right direction. Personally we think it is highly improbable that a pirate is operating in territory which is practically owned by the British Admiralty!

YN3DG, TG9AA, XSV1SM and PJ7B are a few unusual ones from WV's log.

W8OQF also kindly offers to help relieve the tedium of any British ham's existence by correspondence, and in particular would be pleased to write to members in the Services who would like to keep in touch with active amateur radio. Two other U.S. amateurs have supplemented this offer. The three addresses are: W8OQF, R. H. Summers, 54 Fairwood Avenue, Pleasant Ridge, Mich.; W8JAH,

D.X. PERSONALITIES—No. 7.

Judy Leon (HC1FG) one of South America's best known DX Operators.

Z. B. Willison, 10019 Broadstreet Boulevard, Detroit Mich., and W8QI7, E. Couples, 1080 Mace Road, Royal Oak, Mich.

VK2PX reports that none of their gear has been confiscated, also that they have high hopes of starting up again on 112 Mc. only.

This war might be called " Hitler's Travel Agency " ! G5VS finds himself in Ceylon with G5XI, while VE5ZM is seated in a London tea shop, talking to G2MI. In these days it is no longer safe to refer to your radio pals as " chaps I have never seen and probably never shall," for no one can tell who will knock at the front door next ! 5VS says the valves in the transmitter he now maintains are about the same size as the whole box of tricks in the shack at home. For " shack," read " local P.O. Stores."

An interesting letter comes from the English operator of XE1GL (late XE1BG) and BRS2134, who solicits reports on his 28430 kc. 'phone signals. The station is active between 1630 and 2030 G.M.T., with 50 watts to a pair of 807's. He tells us that the most active Mexican 'phone stations are XE1FF, 1CQ, 1AC, 1GK, 1GE, 2FC, and 2HY, and that XE1PF on 14 Mc. is a pirate. The letter E in the call sign indicates that the station is licensed for experimental work on 28 and 56 Mc. only.

A curious point is mentioned by ZS6BT. It appears that ZS licences are being cancelled only as they fall due, although all apparatus has been sealed. The normal licence covers broadcast reception as well, at an all-in rate of 35/-, consequently it must run its course before cancellation. He also says that the numerous rumours about amateur espionage in the South African papers are just a lot of Press " blurb." S.A.R.R.L. is running several stations, with official sanction, which put out Sunday morning bulletins on the amateur bands.

The matter of suspended licences is also mentioned by VE5ZM, who says that they were closed down most politely by their authorities, who " requested " them to cease transmitting until further notice. No gear has been impounded or even sealed.

QSL Bureau

Just over 3,000 Swedish cards recently arrived by carrier from S.S.A. ! These related to contacts as far back as January 1937, and seem to provide the obvious explanation as to why Swedish amateurs have always had such a bad name for QSL'ing. It looks like poor staff work somewhere, and we suggest the SM's have a word about it with their QSL manager !

We should have thought that it would be clear to our members that we cannot accept cards at the bureau for calls such as ZZ1M and SN9AB. Yet we continue to receive them, together with cards for D, SP and YM ! Say, what is this ? A conspiracy to get your QSL manager into jail for corresponding with the enemy ?

May we ask members not to stipulate " wait for 12," etc., on envelopes sent to the bureau, and also not to put more than 1½d. postage on them. Although a most desirable procedure in peace-time, it tends to cause an accumulation of cards, which is now a definite hindrance. Owing to lack of space we are forced to restrict the filing system to one file per prefix numeral. This is also the reason why we are anxious to clear out unclaimed cards.

Can anyone tell us the present address of the B.S.W.L. bureau please ? We have a number of cards for their members, which we will gladly forward.

Will You Help ?

Finally a little suggestion for those who are still at home. The Services and also the trawler and mine-sweeper units are in need of battery-operated receivers for broadcast listening. Now there must be any amount of spare gear around our shacks, even allowing for the G.P.O.'s first choice, which could be made up into stout little 2-valve receivers suitable for use with batteries, also there must be many perfectly good battery-type valves lying about spare. The suggestion is that anyone who is interested or who would undertake the construction of such gear should drop a line to G2MI. Construction should be robust and simple in a stout wooden case. Here's something to lighten the dark evenings. What about it, chaps ? No provision need be made for housing batteries which are supplied from other sources.

The 28 Mc. Band

By NELLY CORRY (G2YL)

CONDITIONS during December were only fair, and the signals from the Western Hemisphere which were reported every day except December 7 and 8 were fewer, and usually weaker and more subject to fading than those heard a year ago. With the widespread decrease in activity DX-minded amateurs who still have their licences intact are probably working mainly on 14 Mc., which would partly explain the great reduction in the number of U.S.A. signals audible.

Nothing at all was reported from Oceania and Asia, but OQ5AB, logged by BRS3003 on December 1, 2 and 17, is still keeping the 28 Mc. flag flying in Africa. From Europe, BRS3003 heard " 11BA " on C.W. on December 17, and W's have been heard calling HA3CK, OS5D, TO7SH, XX1A and ZZ1A, but the I and HA are probably as " phoney " as the others. TO7SH told a W1 who worked him that he must not disclose his real call, but that he is " a genuine ham somewhere in Western Europe."

Signals from South America were reported on December 1, 2, 9, 10, 17 and 20, *viz.*, CE3AC, CE3AG, CE3CZ, OA4U (C.W.), PY2AC, YV1AG and YV1AQ. From Central America the only stations logged were K4EZR, K4FCV, K4FSC, K4UG and W2BOZ portable mobile (Mexico), the latter heard by BRS3179 on December 9.

BRS3003 heard W6 on December 1 and 20, and W5's were audible on a few days, but no W7's were reported at all. This is a striking contrast to December 1938, when West Coast stations were heard on at least 15 days.

The " Hissing Phenomenon " was heard, on and off for several minutes, around 18.22 G.M.T. on December 4. Strength rose to S7 on 28 Mc., and the hiss was just audible as low as 7 Mc. Reports from BRS3003 and BRS3179 are acknowledged with many thanks.

The 56 Mc. Band

By CONSTANCE HALL (G8LY)

IN view of the importance of the information given, the writer makes no apology for quoting extensively from a letter she has recently received from Mr. E. P. Tilton, W1DHQ, U.H.F. Editor of *QST*.

Mr. Tilton writes : " As the conductor of a similar department in QST to yours in THE T. & R. BULLETIN, may I take this opportunity of extending a word of encouragement on behalf of all American amateurs, particularly those interested in our common field, the ' Ultra-highs.'

" It occurs to us frequently that if any good can come from this war business (from the amateur standpoint) it will be the opportunity to devote all one's time to the development of aerial and receiving equipment, and I am pleased to see that the British amateurs are carrying on in this spirit wherever possible.

" According to all accounts this season should afford the best chance of hearing signals from this side of the Atlantic on 56 Mc., and with no local stations to fill up the band in England there is just that much better chance of some of us getting across. As trans-Atlantic reception on 56 Mc. is not unheard of, I am passing along some facts about operating schedules, frequencies, etc., which may be of interest to any who have the opportunity to listen.

" As to the most likely time for long distance work, there seems to be a considerable difference of opinion. If trans-oceanic work is accomplished by F2 layer reflection (which many doubt) then ' five ' should be open, if ever, at about the same time as ' ten,' or possibly slightly later. If long haul reception is the result of sporadic E layer reflection of a multiple-hop nature (which seems rather likely in view of the varied times at which this work has been reported) then anything might happen.

" As a possible guide to the presence of sporadic E reflection in this country, I suggest that those of you who can listen on both 28 and 56 Mc. watch the former band for evidence of short skip as we do in this country. If you hear 10 metre phones in W1, W2, or W3 working W8, or any other inter-district work in this country over distances of over 100 or less than 1,000 miles, it is almost certain that sporadic E conditions have a part in it and the chance of skip-distance work on 56 Mc. over a path of 700–1,200 miles is quite likely. With just the right conditions prevailing over the Atlantic there is no reason why a double or even triple reflection should not occur, bringing our possible range into England. Such signals would undoubtedly be of a very unstable nature and rather difficult to read. During these periods of skip DX, a number of W's frequently use CW, which should be of considerable assistance in identifying calls.

" An analysis of hundreds of reports covering a period of three years of 56 Mc. work over skip distances indicates that such work invariably occurs (in this country) at certain periods of the day. The most frequent openings occur at approximately sunset or slightly earlier and continue until about 10 p.m. local time. Other openings frequently occur around midday, though these are often unnoticed due to lack of activity, except when they occur during week-end periods when stations are active. On several occasions, particularly during the summer months, work has been accomplished over paths which are definitely of a multiple-hop nature, as you no doubt know. The fact that W1, 2, 3, and 4 (all Atlantic seaboard areas) have all worked W6 establishes this fact. It would seem logical to assume that the signals go equally far in the other directions under fortunate conditions.

" When conditions are right for skip DX work on 56 Mc. there is nearly always activity of this nature at the times outlined above. In general, nightly activity is concentrated in the populous areas near the East Coast (W1, 2, and 3) between the hours of 7 and 11 p.m. local time. During this period there is considerable activity, mostly near the 56 Mc. end, with very little above 57·5 regrettably. A number of really fine signals are on, some with the legal limit of 1 kW, and all with crystal control or its equivalent, of course.

" May I extend the best wishes of the entire U.H.F. fraternity in this country to you over there, and offer our co-operation in maintaining transmitting schedules for any listening periods you may wish to arrange."

Home News

That indefatigable U.H.F. worker, G2ZV, who is now in the R.A.F., wishes to be remembered to old friends. G8LY has, she hopes, set a good example by acquiring a U.H.F. superhet receiver.

Best wishes to all readers.

Good News from Australia

The October issue of *Amateur Radio* official Journal of our sister-society in Australia, carries the good news that the Wireless Institute of Australia is carrying on. The wisdom of their decision should be obvious to us all and in offering our heartiest congratulations to the Executive responsible, we know that we voice the sentiments of every British Isles amateur.

We quote the following significant paragraphs from the Editorial column of the above mentioned issue :—

" How often we have glibly spoken of the value of Amateur Radio as a huge training ground for operators who would be of value in time of war ; of our R.A.A.F. Wireless Reserve, manned by hams, voluntarily training themselves with their equipment to serve their Country should the need ever arise. The need *has* arisen, and with a feeling of unbounded pride, we write of the spontaneous response from the Australian Amateur. From one end of the country to the other, from cities and farms, the hams have come to offer their Services to the Allied cause. No light-hearted adventure this, but the grim business of War, for Patriotism must go more than skin deep for men to leave homes and good jobs, some of them one-man businesses, and farms, to answer the call of Duty.

" We are in this War to the bitter end, and only when victory is ours can we return to the days now past. In the meantime Amateur Radio has difficult problems to meet, the holding together effectively of our Wireless Institute, the maintenance of contact with all members wherever they might be. Our Magazine takes on a greater significance as the sole means of keeping each of us in touch with the other. We hope to record month by month something of what the hams of Australia, and of the Empire, are doing in the Cause of Freedom so that in the end we will have preserved for all time a record of the fines achievements in Amateur history."

BRITISH ISLES NOTES AND NEWS

DISTRICT 3 (West Midlands)

Coventry.—The local Society are again holding meetings at fortnightly intervals, but in order not to ask members to brave the " black out " they take place at members' houses on Sunday mornings. At the first war-time meeting it was decided to grant free membership for the duration, to all Club members on active service, and also to send a small reminder of Christmas to each, in the name of the club.

Members who have not attended a Coventry war-time meeting should write to G2ZT for a list of dates. Meetings will in general be informal.

G5GR.

Birmingham.—A meeting of M.A.R.S. was held on December 3, 1939, at the " Hope and Anchor Hotel," Edmund Street, Birmingham. Thirty-three members were present.

The Hon. Assistant Secretary announced a constructional competition to be judged at the February meeting, and a morse code receiving competition to be held in April.

A lecture was then given by Mr. G. McLean Wilford, entitled " Designing a Modern Amateur Transmitter." Mr. Wilford commenced his lecture by comparing modern valves with those of eight to ten years ago, and pointed out the enormous improvement which has been made with the consequent reduction in the number of stages necessary to provide ample drive to the final amplifier. The lecturer dealt in detail with fundamental oscillators, both crystal and electron coupled. Owing to the shortness of time he was unfortunately unable to deal fully with either buffer or final amplifiers, but promised to do so at a future date. G5VM.

DISTRICT 4 (East Midlands)

The meeting held on December 17 at The Wolds Hotel saw a very cheery gathering of 40 members determined to keep the flag of " ham spirit " flying. Winners of the first contest for station gear were :—1st, G5DM for an A.C. mains frequency meter ; 2nd, G8CZ for a hand-made telegraph key and crystal holder (a very fine effort) ; 3rd, G6HY battery model frequency meter. The voting was very close and only four points separated the first three. Entries for the next contest will be taken at the February meeting for display in March, and we are hoping for added support. Winners were invited to give a short description of their exhibits and following this, Society and other films were displayed by G4FO and G6CW who did excellent work as operators. One episode shown was calculated to cause secret envy in many an audience not aware of the stuff that hams are made of. A film belonging to G5VU nearly caused a riot, for after being shown in the ordinary way it was put through again by 4FO in reverse. The result produced one of the funniest sights we have ever seen on any screen, and provided an excellent finale to a most enjoyable afternoon. If you missed these things, blame yourself and turn up next time.

There will be no meeting in January but it is expected to provide an attractive programme next month. For further particulars see the February issue. G2RI.

DISTRICT 6 (South Western)

Information is still scarce as to what is happening in the various areas in the district. We know it must be very difficult to obtain news but we hope that the T.R.'s will keep in touch with the D.R. and forward any items of interest. A very large proportion of the membership of District 6 are now on active service, but we hope that those remaining will do their best to keep the R.S.G.B. flag flying.

The T.R. for Exeter, G5QA, informs us that a few members are left in that city. This also applies to Torquay, and although the numbers are too small to warrant regular meetings, no doubt informal gatherings can be held from time to time.

Forthcoming Events

Jan.	20	District 13, 3 p.m. at the Brotherhood Hall, West Norwood.
,,	21	Scotland "A" District, 2.45 p.m. at the Y.M.C.A. Residential Club, 100 Bothwell Street, Glasgow.
,,	28	District 12 (North London Section), 3 p.m. at G6OT, 119 Wynchgate, Southgate, N.14.
,,	30	District 14 (East Essex), 7.30 p.m. at G2LC, 24 Percy Road, Leigh-on-Sea.
Feb.	6	District 5 (Bristol Section), " Antelope," Broadmead, Bristol.

G5SY's new receiver is progressing slowly but satisfactorily, and in view of the interest shown by local members in his past efforts with receivers, no apology is considered necessary for stating a few points regarding this latest attempt to challenge the commercials ! The main receiver employs ten valves, the reception channel accounting for six. There are two R.F. stages using EF8's, a 6K8 first detector, 6K7 regenerative I.F., 6Q7 second detector, 6F6 output. Band switching in five steps gives a coverage from 7 to 500 metres. A.V.C. is applied to three stages. The BFO is a 6K7, and a 6H6 is employed in a very efficient noise suppressor circuit. In addition a 6C5 works a heterotone injector. This is highly successful and proves superior to the BFO in dealing with QRM. The rectifier is an 80.(Article please. Ed.)

A three-stage convertor is also under experiment to deal with the range from 5 to 7 metres. This will have an acorn R.F. stage, a 6K8 first detector, and one stage of I.F. on about 4 Mc. using a 6SK7. The main receiver will then, of course, also be tuned to 4 Mc.

The D.R. has received interesting and profitable

visits from G5GD and 2CWR. We hope to receive others.

We take this opportunity of wishing all members, and particularly those of No. 6, a very happy and prosperous New Year, and may 1940 see us all on the air once more ! G5SY.

DISTRICT 7 (Southern)

Guildford.—It was very pleasant to see G5YA,6GS and 8LT during their Christmas leave. 6NA is busy with the construction of an electric clock and various pieces of test gear. 8IX has completed a new pre-selector. 5WP is engaged on receiver improvements. We wish a speedy recovery to BRS3671, who is in hospital.

The next meeting in this area will be held at Price's Cafe, Addlestone, on Sunday, February 4, at 2.30 p.m.

Croydon.—Social activity is reaching a high level in this area. Monthly meetings are held and a supper party took place on December 16. Those interested in finding out how the Surrey Radio Contact Club delivered a copy of their monthly magazine, " QRX," to Lord H— H—, of DJA, should obtain a copy for themselves ! G5WP.

DISTRICT 9 (East Anglia)

Kings Lynn features in the news this month in a very creditable way. The local Short Wave Club (whose chief officials are A. W. Brookson, G3IP, L. A. Bradshaw, 4LM, and M. Shipp, 2HBZ), have decided to present to each of their members joining H.M. Forces, a year's free subscription to the R.S.G.B. The first to benefit are A. Chilvers, G3SZ and J. S. Blofeld, 2CFO, who are serving in the R.A.F. G3IP, 4LM and 2HBZ have also joined the Society.

One significant point stands out from the foregoing paragraph, namely, that the Kings Lynn Short Wave Club realise that at the cessation of hostilities, " Unity will definitely be strength."

G2XS.

DISTRICT 10 (South Wales and Monmouth)

In the continued absence of news from our D.R., Mr. Scott Farnie, who is serving in the R.A.F., we are pleased to publish a report from Mr. A. S. Thomas, GW3AX, the Swansea T.R.

Reports from other towns in the District may be sent direct to Headquarters.

* * *

A meeting of Swansea members, attended by GW2WO, 3UO, 5PH, 6GJ, 6JW and 8HI, was held at the latter's home on December 2. Discussion took place regarding R.S.G.B. activities during wartime, and the necessity was stressed of maintaining the Society at full strength, so that members would be assured of their privileges being reinstated as early as possible after hostilities cease.

During the meeting, GW8HI kindly displayed films taken in 1936 during his visit to the U.S.A. and Canada. In addition a film was shown illustrating 56 Mc. tests being carried out on a cross channel steamer by GW2WO and 2SN in the same year.

The display concluded with shots made in 1937 at the N.F.D. gathering held in Pennard.

The meeting was very much enjoyed, as was the tea kindly provided. Future meetings will be held at intervals at the homes of members.

GW3AX.

DISTRICT 11 (North Wales)

Since the outbreak of war the D.R. has not heard from a single member in his district. Those who can are urged to drop him a line giving a brief outline of their activities, and, in the case of members serving at home, state whether they would be able to attend a meeting held in Colwyn Bay.

Good luck to you all wherever you may be, and may the New Year bring as much happiness as is possible in these troubled times.

GW6AA.

DISTRICT 12 (London North and Hertford)

News is rather scanty this month and no notes have been received from the Watford or Central Herts sections since August last. How about it, you fellows ? At the North London meeting, held at G2YD on New Year's Eve, only nine members were present, due no doubt to the bad weather. We were pleased, however, to welcome two well-known Empire members in ZB2A and VE5ZM, who earlier in the day visited 5FA and 6CL and saw what remained of their respective shacks.

With two such DX stations giving solid copy with no QRM it was only natural that the meeting developed into a ragchew concerning operating conditions in the three parts of the world which we represented. Amusing tales were told of choice DX catches which had been made from time to time, and of the way in which VE5ZM, who seemed to have had the luck to get many rare contacts, had accused more than one of them of being a pirate only to receive a card a few months later proving them genuine !

We take this opportunity of offering congratulations to G2PL on his recent marriage. Members will be pleased to hear that our old friend " Buck," G5QF, was home for a few days at Christmas, looking very well. We trust it will not be long before he is quite fit again.

The next meeting will be held at G6OT, 119 Wynchgate, Southgate, N.14, on Sunday, January 28, at 3 p.m. Book to Southgate tube station, and take a 244 bus to Queen Elizabeth's Drive, Winchmore Hill Road. (Ten minutes walk from Southgate for those who feel energetic.) G5FA.

Some New King's Lynn Members.

From left to right—2HBZ, 2CFO (R.A.F.), G4LM, G3SZ (R.A.F.), and G.3IP. The latter served in the R.N.A.S. and R.A.F. during the last war.

DISTRICT 13 (London South)

A most successful meeting was held at West Norwood in December. The D.R. regrets he was unable to attend, but hopes to be present at the next meeting which is fixed for January 20 at 3 p.m.

It is thought that some form of social event should take place during the winter. The idea has apparently met with general approval and G2JB and 8TN are doing their best to find a suitable place in South London. At the next meeting we hope to have more details available so that the scheme can be thoroughly discussed. It has been suggested that a High Tea would be more suitable than a Dinner. Lectures and talks to take place at future meetings are also foreshadowed, and any offers of assistance will be most welcome. South London has definitely shown its desire to keep things going, and we are doing all we can to foster interest.

Apologies are offered for these brief notes, but no doubt everyone will appreciate the reason. May we hope that 1940 will see the dawn of a new era in Amateur Radio.

G2WV.

DISTRICT 14 (Eastern)

East Essex.—It is hoped that the meeting to be held at G2LC on January 30, will be run on pre-war lines. G3WP (Brightlingsea), and 8AX (Norwich) are expected to attend. G2SO will be glad to hear from local members who have joined up. He extends new year greetings to his friends in the District and elsewhere.

Ilford.—The first of a series of monthly meetings was held recently at G2CD when G2XP, 2RR, 6AH and 8TL attended. Future meetings will be held in rotation at the homes of local members. The host at each meeting will act as Chairman and Scribe reporting items of interest to the D.R. for inclusion in District notes. It is hoped that all members in the Ilford area will volunteer as hosts. The next two meetings will be held at G8TL and G2XP.

During the course of the meeting at G2CD, discussion arose regarding the new Orders issued by the G.P.O. The Wien rejector circuit was also considered with a view to its use in receivers. At future meetings morse practice will take place in order to enable members to keep up their speed.

G6UT.

DISTRICT 15
(London West, Middlesex and Buckinghamshire)

The D.R. apologises for omitting seasonal greetings from his previous report. He takes this opportunity of asking all members to accept his best wishes for the New Year.

Some readers may already have heard of the tragic passing of Mr. Hawkins, 2BVX, who appears to have met his death in a motor cycle accident. 2BVX was for some years our very capable T.R. for High Wycombe, and only resigned when changing his address. We offer our deepest condolences to his family in their sad bereavement. We shall miss his cheerful character.

For the first time in our history no less than four members of District 15 are serving on Council. We send greetings and best wishes to our new colleagues, Messrs. Lewer and Gardiner.

Brief reports from various parts of the District appear below :—

Edgware.—Meetings of the local Society are held each week under the chairmanship of G3HT.

High Wycombe.—A meeting was held on December 17 at 2BAO. Most members are rebuilding their receivers.

Wembley.—G2UM and 5SR are busy in several directions, the latter tells us that G6HB and BRS.3605 are serving in the Merchant Navy.

West London.—Several members have joined the services recently. G4AR is in the R.A.O.C., whilst 4PA and 5CV are in the R.A.F. 8VM will be going to sea shortly. (Good luck to you all, D.R.). 3UQ, who is busy with I.F. stages for receivers, holds meetings each Saturday evening and would welcome visitors. 3XI and 8WR were home on Christmas leave. 6CO is active on the receiver when time permits.

Our old friend, Alan Smith, G6VP, has turned his attention to photography, but will be pleased to see " ham " visitors any Saturday evening.

G6WN.

DISTRICT 18 (North and East Yorkshire)

The D.R. and Scarborough T.R. offer their best wishes for 1940 to all members in this District. Apologies are due for the non-appearance of District Notes during the last three months. The October contribution was unfortunately not published owing to being delayed in the post, whilst there has been nothing of interest to report during the ensuing two months.

G2CP and 8KU are both serving with the Royal Navy, the former having been home for Christmas leave. He reports having enrolled his superior officer in the R.S.G.B. Good work, o.m.! G8KU, previously Hon. Secretary of the Scarborough Short-wave Club, has not been home since war commenced.

The D.R. (G5MV) and 2BGO are doing duty as special constables in Scarborough.

It has not been previously mentioned that G3KS received certificates for W.B.E. on both phone and C.W. He is the only local member to have officially achieved these distinctions, using less than ten watts —a very creditable performance.

G6TG has built a simple converter, enabling his ECR receiver to function from the previous 160 metres maximum up to above 4000 metres. He has heard three U.S.A. broadcast transmissions on the 26 Mc. band at various times, but the signal strength compares unfavourably with the 21 Mc. band and 28 Mc. amateurs. Can any reader give details of these transmissions ?

The D.R. notes with regret that G6OS has had to give up his work as T.R. for Hull. The amateur movement in that part of the District had brightened up considerably under his leadership, and it is hoped that he will be able to take up the reins again at some future date. In the meantime, such a large and important District as No. 18 cannot manage satisfactorily with only a D.R. and one active T.R. Surely some other members can spare a few minutes to send a brief report of their present activities direct to the D.R. as soon as this BULLETIN is received.

G5MV *via* G6TG.

Scotland

We wish all members a happy and prosperous New Year, and a speedy return to the time when our stations will again be active.

"A" District.—There was a good attendance at the last District meeting. Mr. J. B. Duncan, GM6JD, who was re-elected D.O., wishes to express

(*Continued on page* 320.)

ON ACTIVE SERVICE

FOURTH LIST

WE thank Cadet J. M. Kirk, R.C. of S. (G6ZO), for drawing our attention to several minor errors in List 3. Cadet J. J. MacBeth's name was spelt Macbeth, and AC. 1 D. Mayes was recorded as GM3CG instead of GM6SJ. In the November list, Mr. Kirk's name was given without rank, whilst his regiment was recorded as R.E. In the December list an asterisk was omitted after the name Cdt. I. P. Mackay.

When submitting details for inclusion in these lists we would ask all members to note particularly that we require their correct rank and regiment. On several occasions recently members have advised us that they have joined the R.A.F. as a W.E.M. This is not an official rank. Members serving in the Army should state clearly the name of their regiment; loose terms and vague contractions lead to confusion.

It is our desire to produce accurate Service lists, but as information often reaches us through indirect channels, errors may occur. We hope members will assist us by drawing attention to obvious mistakes.

It is, of course, impossible to republish names of members who have been promoted, but new details will be welcomed.

The present list contains information received up to January 2, 1940.

Rank and Name	Regiment or Branch	Pre-war Call or B.R.S.
A.C.2 C. J. Adair ...	R.A.F. ...	3737
L./Cpl. I. Anstruther ...	Argyll & Sutherland Highlanders	2FAR
A.C.2 K. D. Ayers ...	R.A.F. ...	2FRG
— F. E. Barlow ...	,, ...	2FKU
Major F. J. Behn ...	R.C. of S. ...	2581
Tel. G. Blackah* ...	R.N. ...	G3LI
Sig. R. Bottomley ...	R.C. of S. ...	G6TZ
Tel. J. A. T. Bousfield	R.N.V.(W.)R.	2FQQ
Sgt. E. A. Bowles ...	R.A. ...	BERS. 481
A.C.2 A. M. Boyce ...	R.A.F. ...	2CMR
Tel. P. B. Briscombe ...	R.N. ...	G8KU
Sgt. P. T. Brown ...	R.A.F. ...	1608
2nd Lt. A. Cattanach...	Seaforth H.	GM2TQ
Tel. G. Chambers* ...	R.N.V.(W.)R.	G5NO
A.C.2 A. Chilvers ...	R.A.F. ...	G3SZ
Cpl. R. L. Clark ...	,, ...	G5NA
Tel. K. Clayton ...	R.N. ...	3089
Gnr. L. L. Cobb* ...	R.A. ...	G3UI
A.C.2 L. J. Coupland ...	R.A.F. ...	2BQC
F./O. H. B. Dent ...	,, ...	G2MC
Lt. A. L. Donaldson* ...	R.C. of S. ...	G5WA
Drv. A. G. Fisher ...	R.A.S.C. ...	3533
C.P.O. Tel. G. R. Fletcher.	R.N. ...	BERS. 220
Cpl. W. J. G. Gibson ...	R.C. of S. ...	GM3AK
2nd Lt. A. Graham ...	R.E. ...	2CUH
A.C.2 L. M. Gunner* ...	R.A.F. ...	G8HB
Lt. F. P. Hallsworth ...	A.D. Corps	2FRN
Sig. W. Handley* ...	R.C. of S. ...	G8PW
Tel. N. P. Haskins ...	R.N.V.(W.)R.	G8JR
Sub. Lt. R. P. Hawkey	R.N. ...	G5ZG
A.C.2 C. A. Heathcote	R.A.F. ...	G3JR
Lt. D. E. Herbert ...	R.C. of S. ...	G6RF
Sig. T. F. Higgins ...	,, ...	G8JI
Sgt. S. L. Hill	R.A.F. ...	G8KS
A.C.2 G. R. Hirst ...	,, ...	G3ZT & GW3ZT
Gnr. G. S. Hirst* ...	R.A. ...	G4DB
Sgt. K. N. Hollands* ...	R.A.F. ...	G3LL
A.C.2 F. G. Holloway*	,, ...	2CHY
Cpl. F. G. Ingleton ...	,, ...	G6FI
Sig. D. Scott-Job ...	R.C. of S. ...	G4BA
A.C.2 P. King	R.A.F. ...	2CKK
A.C.2 A. W. Leonard ...	R.A.F. ...	G5KV
Tel. J. W. Leefe ...	R.N.V.(W.)R.	G5XI
A.C.2 W. Lloyd ...	R.A.F. ...	3680
A.C.2 G. F. Mason ...	,, ...	G5BR
A.C.2 N. D. Mattock* ...	,, ...	2DFG
Cpl. K. Maynard ...	,, ...	G3FC
A.C.2 H. T. Morris ...	,, ...	3739
A.C.2 O. McCusker ...	,, ...	2CFU
Sig. J. MacDermott* ...	R.C. of S. ...	G3NZ
A.C.2 G. M. McMinn ...	R.A.F. ...	GM3YN
L.A.C. H. G. Newland...	,, ...	G5ND
A.C.2 B. O'Brien ...	,, ...	2AMV
Major H. O. Pargeter ...	R.C. of S. ...	BERS. 29
Cpl. D. Patton* ...	,, ...	G3YO
Tel. H. V. Prince ...	R.N. ...	G3UF
A.C.2 J. M. Railton ...	R.A.F. ...	G8AB
Sig. H. Rosier* ...	R.C. of S. ...	G8OX
A.C.2 A. Rowland ...	R.A.F. ...	2AYV
A.C.2 R. G. Rugg ...	,, ...	2BRR
2nd Lt. J. C. Runge ...	R.C. of S. ...	G2RJ
A.C.2 S. F. Russ* ...	R.A.F. ...	G8UR
A.C.1 M. F. J. Samuel...	,, ...	G4FX
Cadet J. N. Shearme ...	R.C. of S. ...	G2SH
Gnr. R. A. Simpson ...	R.A. ...	G8SD
Tel. V. A. Sims ...	R.N.V.(W.)R.	G5VS
A.C.2 E. J. Sprange* ...	R.A.F. ...	2DQB
A.C.2 D. Stephenson*...	,, ...	G2LF
Cpl. D. H. Taylor ...	R.C. of S. ...	2HCS
A.C.1 W. H. Thompson	R.A.F. ...	BERS. 459
A.C.2 N. Timbers ...	,, ...	G5TR
Ft./Sgt. J. E. Tompkins	,, ...	G6ZF
Capt. H. F. Trewby ...	Indian Army Ord. Corps	BERS. 419
A.C.2 R. P. B. Udall ...	R.A.F. ...	2HKS
Gnr. W. D. Wadsworth	R. Canadian Artillery	VE5ZM
Sgt. D. Wale	R.C. of S. ...	G3MW
A.C.2 A. K. Wall* ...	R.A.F. ...	G2YZ
P./O. D. Walters ...	,, ...	G5CV
A.C.2 J. F. West ...	,, ...	2CMW
Lt. J. O. Widdowson ...	R.A.O.C. ...	2155
L.A.C. R. Wilson ...	R.A.F. ...	G3OI

* Non-Members.

ANNUAL GENERAL MEETING

Minutes of the Annual General Meeting of the Incorporated Radio Society of Great Britain held at the Institution of Electrical Engineers, Savoy Place, Victoria Embankment, London, W.C.2, at 2 p.m., on Saturday, December 30, 1939.

Present were :—Mr. A. E. Watts (President), Mr. H. B. Swift (Past President), Mr. A. D. Gay (Executive Vice-President), Mr. A. O. Milne (Hon. Editor), Mr. H. A. M. Clark (Acting Hon. Treasurer), Mr. John Clarricoats (Secretary-Editor), Messrs. Charman, Corfield and Wilkins (members of Council) and about 30 members.

* * *

The President called upon the Secretary-Editor to read the notice convening the meeting, following which he welcomed Messrs. Wadsworth, VE5ZM, Brown, VU7BR, and Kirk, ZB2A, well-known Empire members.

It was proposed and seconded that the Minutes of the previous Annual General Meeting, as published in the January and February 1939 issues of THE T. & R. BULLETIN, be taken as read and approved. The motion was carried unanimously.

The President outlined the reasons underlying Council's decision to reduce certain subscription rates after the outbreak of the war. Mr. Kirk proposed and Mr. Kempton seconded a motion in support of Council's action. The motion was carried unanimously.

Mr. H. A. M. Clark (Acting Hon. Treasurer) read his report and on a motion proposed by Mr. Swift, seconded by Mr. Brown, the Report and Annual Balance Sheet were unanimously adopted.

The Secretary-Editor read the Annual Report of Council which, on the motion of Mr. Wadsworth, seconded by Mr. Kirk, was approved unanimously The full report is published elsewhere in this issue.)

The President, after reporting that no additional nominations had been received, declared the following members elected to serve on the 1940 Council :—

President : Mr. Arthur E. Watts, G6UN.
Executive Vice-President : Mr. A. D. Gay, G6NF.
Hon. Treasurer and Hon. Secretary : Mr. H. A. M. Clark, G6OT.
Hon. Editor : Mr. A. O. Milne, G2MI.
Members : Messrs. Charman, Corfield, Dedman, Gardiner, Lewer, Mathews and Wilkins.

On a proposal made by Mr. A. O. Milne, seconded by Mr. H. V. Wilkins, Mr. John Ockleshaw, F.C.A., was unanimously elected Honorary Auditor for the year 1939–40.

On the motion of Mr. Bevan Swift, a cordial vote of thanks was recorded to the President and Council of the Institution of Electrical Engineers for kindly permitting the Society to continue to use the Institution building for Society meetings.

* * *

Mr. E. L. Gardiner then delivered a lecture entitled " An interesting double superheterodyne receiver." Messrs. Charman, Milne and Lewer contributed to the discussion.

Before concluding the meeting the President presented the Braaten Trophy to Mr. A. D. Gay, G6NF, who for the third year in succession had been judged the leading British Isles station in the annual Telegraphy Contest organised by the American Radio Relay League.

Ham Hospitality

The members listed have asked us to record their names as being willing to entertain any service or visiting amateur who may be in their locality.

It will, in general, be appreciated if previous advice can be given of an intended visit.

Name	Call	Address	Telephone
R. J. Bradley ..	G2FO	36 Raby Road, Stockton-on-Tees.	—
A. O. Milne ..	G2MI	29 Kechill Gardens, Hayes, Bromley.	Hurstway 1877.
F. H. Cooper ..	G2QT	"Fairbank," Smeeth, Ashford, Kent.	Sellindge 92.
Dr. A. C. Gee ..	G2UK	150 Freiston Road Boston, Lincolnshire.	Boston 3172.
R. Webster ..	G5BW	"Steetley Holme," Willingdon Road, Eastbourne.	Hampden Pk. 399.
W. V. Champion	G8CY	12 Bedford Road, Tottenham, N.15.	Amhurst 2066.
Miss C. Hall ..	G8LY	North Waltham Rectory, 12 miles north of Winchester, and ½ mile west of main Winchester-Basingstoke road.	Dummer 56.
L. W. Lewis ..	G8ML	117 Fairview Road, Cheltenham, Glos.	—

Returned Bulletins

We hope that readers will assist us in tracing the present whereabouts of the following members who have changed their address without advising Headquarters :—

F. E. Atkins, 14 Smith Street, Guernsey, C.I. (G3ZU.)

N. G. Gologan, Coombe Lea, Gloucester Road, Kingston-on-Thames (2DOK).

A. W. Lister, R.A. Mess, Woolwich, S.E.18 (G5LG).

F. A. Nethercott, 32 Maberley Road, Upper Norwood, S.E.19 (BRS3213).

W. G. Pyke, R.A.F. (G6PK).

Three of the fifteen members listed last month have been traced.

Technicians Wanted

The Secretary-Editor will be pleased to hear from any member over 30 years of age, preferably married, who would be interested in accepting a position in connection with radio development. Applicants would be required to possess good morse knowledge, and sound technical qualifications. If engaged the appointment would, it is understood, be of a permanent nature.

HEADQUARTERS CALLING

Impounded Amateur Transmitting Apparatus

The G.P.O. in a letter to the Society, states they can assure members that their apparatus is carefully stored in dry buildings in the manner generally adopted by the G.P.O. for the storage of telephone and similar electrical apparatus.

It is understood from the G.P.O. that a number of experimenters have requested the return of parts of their equipment for various reasons. The G.P.O. regrets that it is unable to accede in general to these requests and points out that Society members will no doubt appreciate that a considerable amount of work would be involved in releasing individual items of equipment from Stores Depots, unpacking and repacking after examination and sorting by specialist personnel.

The G.P.O. also points out that in accordance with the Emergency clause in the Experimenter's Licence, it was empowered to take possession of the complete equipment of each experimental station and was under no obligation to differentiate between essentially transmitting apparatus and other components used in conjunction therewith.

In view of the above information, Council decided unanimously to recommend that members should not apply for the return of any apparatus other than complete receivers (it is hoped to make a statement with regard to frequency meters next month).

In reaching this decision, Council had in mind that without a doubt the apparatus would suffer when it had to be moved in an endeavour to find isolated items.

C.C.I.R. Meeting

The Society has been advised by the G.P.O. that "in consequence of the existing international political situation it is considered necessary to postpone the Stockholm Reunion to a future date which has not yet been fixed." Members will remember that a meeting of the C.C.I.R. had been arranged to take place in Stockholm during 1940.

The Braaten Trophy

For the third year in succession our Executive Vice-president, Mr. A. D. Gay, G6NF, has been awarded the Braaten Trophy as the leading British Isles entrant in the 1939 DX Telegraphy Contest organised by the A.R.R.L. Mr. Gay received the trophy at the recent Annual General Meeting.

Back Issues

It is essential during war-time that no more copies of each issue of THE T. & R. BULLETIN be ordered than are absolutely necessary. In past years members have allowed their subscription to lapse for several months and then asked to be brought up to date. This has generally been possible, but under present conditions, where paper must be conserved and storage space is valuable, we cannot load Headquarters with big stocks of back issues on chance.

Members will greatly assist us by renewing their subscription promptly thereby making sure that their copy of THE BULLETIN arrives regularly each month.

Members Notepaper

To meet the wishes of members we have decided to again stock Members Notepaper. This is now available in packets of 100 sheets at 3s. per packet, post free, or two packets for 5s. 9d.

Kilocycles-Metres Conversion Tables

In response to several requests we have obtained a fresh supply of Kilocycles-Metres Conversion Tables arranged in vest pocket booklet format.

Copies of this very useful 64-page publication are available from Headquarters, price 1s. 3d. each, post free.

A.R.R.L. (QST) Subscriptions

Due to the alteration in sterling exchange, the annual A.R.R.L. subscription rate is now 15s. per annum. Members who have, in the past, subscribed direct to the A.R.R.L. or have purchased copies of QST from booksellers would be well advised to pass their renewal instructions through the Society in view of the present difficulty of sending money out of the country.

"Radio" Subscriptions

Members who wish to obtain *Radio* the West Coast U.S.A. technical Journal may forward their subscription direct to Headquarters. The subscription at the present rate of exchange is 17s. 6d. for one year or 30s. for two years.

American Publications

Although we have in the past three issues published a notice to the effect that American publications cannot be imported by the Society, for the time being, numerous requests for copies have been received.

We hope, in our next issue, to make an announcement concerning this matter, meanwhile we would again ask members to refrain from sending money to Headquarters for these publications.

Life Membership

The attention of members is directed to Article 27, which states that "At any time after election to the Society, members may, subject to the approval of Council, commute all future annual subscriptions, by payment of ten guineas, which shall entitle such members to all privileges and rights of ordinary membership for the remainder of their lives."

Applications for Life Membership should be addressed to the Secretary-Editor.

Civil Defence

Members engaged on Civil Defence work are invited to send brief details to Headquarters, for record purposes only.

The following particulars are required :—Name, Branch of Civil Defence, Call Sign or B.R.S.

EXCHANGE AND MART.

WANTED.—H.R.O. Junior, Coils 7–14·4 Mc., 500–1,000 k.c. xtal 'phones. Lowest price to ex-2FXK.—THOMPSON, Rosedene, Walsall Road, Aldridge, Staffs.

KINGS Patent Agency Ltd. (B. T. King, G5TA, Mem. R.S.G.B., Reg. Pat. Agent), 146a Queen Victoria St., London, E.C.4. Handbk. and Advice on Patents and Trade Marks free. Phone: City 6161. 50 yrs. refs.

RADIO MAP AND GLOBE

WEBB'S RADIO MAP of the World enables you to locate any station heard. Size 40" by 30". 2-colour heavy Art Paper, 4/6. Limited supply on Linen, 106. WEBB'S RADIO GLOBE—superb 12" full-colour model. Radio prefixes, zones, etc. Heavy oxydised mount. Post Paid, 27/6.—WEBB'S RADIO, 14 Soho Street, London, W.1. Phone: Gerrard 2089.

Advertisement Rates

MEMBERS' private advertisements 1d. per word, minimum 1s. 6d.

TRADE advertisements. One inch Semi-Display (max. 50 words), 10s., half inch (max. 25 words), 5s. TERMS: Cash with Order. All copy and payments to be sent direct to Advertisement Managers, Parrs Advertising Ltd., 121 Kingsway, London, W.C.2, by not later than the 30th of the month for the following month's issue.

INDEX TO DISPLAYED ADVERTISEMENTS

Service Photographs

We shall be pleased to consider for publication photographs of members serving in H.M. Forces. Photographs should be sharply defined and the names and call signs of those depicted either written on the back or on a separate slip of paper.

Merchant Navy

We have been advised by Mr. S. Riesen that the following members are serving as Telegraphists in the Merchant Navy :—

T. H. Beaumont, G6HB with I.M.R. Co., Ltd.
J. M. C. Grieve, BRS.3605 with Siemens Bros. Ltd.

Appreciations

The Secretary-Editor and Miss Gadsden wish to thank the many members at home and abroad who so kindly sent them Christmas and New Year Greetings. Their messages of good-will were very greatly appreciated.

News from Jamaica

Mr. T. Myers (VP5AD), our Representative in Jamaica, writing under date of November 5 reports that Mr. Chater, well known in Coventry as G2LU, recently visited the Island where he gave a lecture to the Jamaica Society on Amateur Radio conditions in England. To mark his visit Mr. Chater was elected an Honorary Member of the Jamaica Amateur Radio Association.

At a recent meeting of the Association it was decided that the sum of £2 2s. should be donated to the Jamaica War Fund, and that further monthly donations would be given until the expiration of the war. Code classes are to start shortly for the benefit of new members who require instruction, and also to keep the old-timers in practice.

Just before the closing down of amateur stations, local members took out portable equipment and interesting contacts were made with the British stations G2LC and 5FI. The call used was VP5AD/P.

Ashton-under-Lyne Amateur Radio Society

Mr. K. Gooding, G3PM, advises us that the above Society, to which he is Honorary Secretary, are carrying on their work. In order to overcome "black-out" conditions additional meetings are held at the Club room every Sunday at 2 p.m. Talks and demonstrations are given by members. An intensive superhet receiver rebuilding programme is under way, in spite of the views expressed at a recent debate when the superhet was "howled down" in favour of the straight receiver ! *Autres temps, Autres mœurs.*

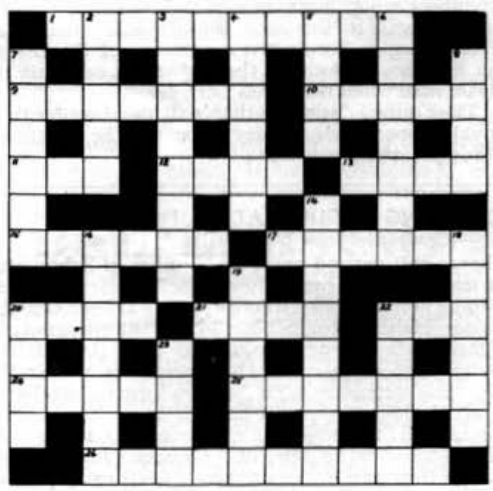
New Members

HOME CORPORATES

A. W. BROOKSON (G3IP), 15 Checker Street, Kings Lynn, Norfolk.
A. CHILVERS (G3SZ), 9a High Street, Kings Lynn.
G. SPRIGGS (G4KG), 28 Almorah Road, Hounslow West, Middlesex.
L. A. BRADSHAW (G4I,M), 79 Wootton Road, Gaywood, Kings Lynn.
J. H. BOYCE (G4NI), 86 Whitehorse Road, Croydon, Surrey.
L. A. G. PARNELL (G8PP), 152 Lordship Road, Stoke Newington, N.16.
F. CLARKE (2ARO), "Estoril," Mansfield Road, Warsop, Notts.
R. G. RUGG (2BRR), 4 Hillside Avenue, Woodford Green, Essex.
O. H. MOORE (2CFJ), Willoughton, Lincoln.
J. S. BLOFELD (2CFO), 18 Milton Avenue, Kings Lynn.
F. H. OSBORN (2CVO), West Ridge, Knotty Green, Beaconsfield, Bucks.
S. E. JANES (2FWA), 72 Kimberley Road, Croydon, Surrey.
M. N. SHIPP (2HBZ), 41 Loke Road, Kings Lynn.
F. J. GREGORY (BRS3734), 40 Oakwood Avenue, Southgate, N.14.
T. F. MCMILLAN (BRS2136, re-issued), 10 Pentland Avenue, Gowkshill, Newtongrange, Midlothian.
D. R. PUGH (BRS3735), 84 Trinity Street, Belle Vue, Shrewsbury, Salop.
E. H. CLAGGETT (BRS3736), 186 Camberwell New Road, S.E.5.
C. J. ADAIR (BRS3737), The Hollies, 2 Winchester Place, Highgate, N.6.
E. R. WHITTAKER (BRS3738), 56 Findon Crescent, Sheffield 6.,
H. T. MORRIS (BRS3739), 3 Church Road, Ashtead, Surrey.
W. W. W. PEAT (BRS3740), Kirkland Farm, Denny, Stirlingshire.
E. A. COLLS (BRS3741), 2 Witham Road, Isleworth, Middlesex.
J. W. LEE (BRS3742), c/o McLintock, 270 Woodlands Road, Glasgow, C.3.
SGT. E. A. BOWLES (BERS481), Gibraltar.

"HAM-RADIO" CROSSWORD No. 2

Prepared by R. J. BRADLEY (G2FO)



CLUES

ACROSS.

1. Nor mice hop (anagram, 10).
9. 160 metres (3, 4).
10. The frequency of an oscillator may this if not carefully designed (5).
11. Oscillator circuit (3).
12. Part of a contraption (4).
13. Note the combination of two waves of slightly different frequency (4).
15. Part of a condenser (6).
17. This type of circuit may be high-pass or low-pass (6).
20. Be this to 19 down the power before fixing a fault in the Tx. (4).
21. Protecting wire (4).
22. Covering for copper wire (3).
24. A lot of this chatter was heard on 7 Mc. (5).
25. You may be asked to this the result of a test (7).
26. Fred sent as an instruction to one whose morse is slow (4, 6).

DOWN.

2. Product of anode voltage and current (5).
3. Applied to some H.F. stages (8).
4. Useful cutting tool (3, 3).
5. Was this the time when Belgium and Chile were combined (4).
6. Fundamental substance or part of a directive array (7).
7. Some amateurs try to work all of them (6).
8. There have been complaints of some amateurs using these frequencies (4).
14. Now suspended (8).
16. I.R.A. seal important parts of amateur stations (7).
18. May be one who is never tired of boasting of his DX achievements (6).
19. See 20 across (3, 3).
20. No signals are heard in this distance (4).
22. A number may be there (5).
23. Observed (4).

N.B.—The figures in parenthesis after the clues denote the number of letters in the word(s) required.

(SOLUTION NEXT MONTH.)

THE YEAR IN REVIEW—(*Continued from page* 289)

To date the names of some 400 amateurs have been listed as serving with the colours, the majority of whom are attached to either the R.A.F. or R. C. of S. Once again the amateur radio movement has provided a large number of trained personnel for the fighting services demonstrating if need be that organised experimental radio work must be fostered in the future as in the past.

The Council takes this opportunity of conveying its good wishes to every member on active service.

Future Plans

In bringing this report to a close the Council desires to assure the whole membership that it is the firm determination of the new Council to leave no stone unturned in preparing for a return to peace-time conditions. Immediately the new Council takes office the most careful consideration will be given to the preparation of plans for the recommencement of experimental work without delay at the end of the war. Members must, however, appreciate that no useful purpose will be served at the present juncture by attempting to obtain the agreement of the G.P.O. on matters of detail; these matters can only be dealt with when hostilities have ceased.

The Council desires to thank all members for their loyal support, which they trust will be continued throughout the year ahead.

CHARGING ACCUMULATORS FROM D.C. MAINS —(*Continued from page* 297)

charge will depend upon the number of lights, etc., in use and in the case of low capacity cells, some care will be necessary to ensure that they are not charged at too high a rate. Since the current consumed in lighting the lamps has also to pass through the battery, no extra current whatsoever is used in the charging process. The battery cannot discharge itself through the power station dynamo when the lights, etc., are switched off because it forms part of the house wiring circuit. Current should not be drawn from the battery during the charging period, since additional connections to earthed apparatus may result in blown fuses or other damage. It should be remembered that when charging two or more batteries at the same time they should be connected in series and not in parallel as this induces a quicker rate of charge.

BRITISH ISLES NOTES—(*Continued from page* 313)

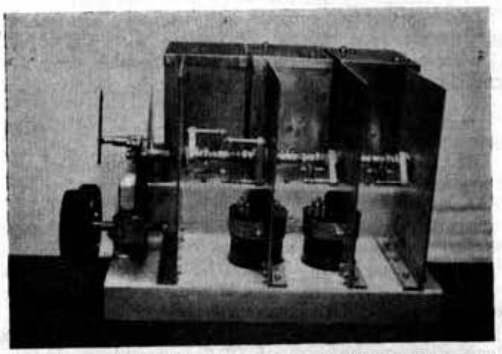
his appreciation for the splendid co-operation extended to him by members during the past year. Messrs. J. Ferguson, GM6WD, and D. Niven, 2CHN, were re-elected District Auditors. A much appreciated and interesting lecture was given by Mr. Niven, 2CHN, dealing with a simple valve voltmeter and a device known as the "Hetrofil." It is hoped that others will come forward and give similar talks. Congratulations to Jim Stove, GM5ZX, who has joined the ranks of the benedicts. A vote of thanks to GM6ZV was passed for his services during the year. The next meeting will be held on Sunday January 21, at the usual time and place.

"B" District.—GM3QH and 3RL have qualified for sea going tickets; 4MG hopes to obtain his soon. GM5YN (RNVWR) has been home on leave.

A 56 Mc. Receiver of New Design

THE photograph illustrates a new 56 Mc. receiver recently constructed around *Tungsram* footless valves. Unfortunately the war prevented the writer from fully completing the job, but for those interested, the following brief details may be of some value.

The base, made of 1/16 in. sheet aluminium, measures 9 in. × 11 in. with the back and front pieces bent to shape and riveted with 1/16 in. aluminium rivets. The I.F. coil screens are made from thin sheet copper with a riveted and soldered seam, and the lids soldered in position. The I.F. coils are old *Burndept* honeycomb types with the secondary, made variable on the same principle as adopted with *Varley* Air Tuned I.F.'s. Air dielectric trimmers are used.



Side view of the 56 Mc. receiver before wiring up. Note position of Tungsram footless valves.

The tuning unit is built up from four *Webb's* "Apex" condensers, and the overall length has been reduced to the absolute minimum. A split-stator condenser is provided for a Colpitts type of oscillator.

It will be noticed that the R.F. and mixer valves are mounted upside down under the tuning condensers.

The line up is, R.F. pentode, triode hexode, two I.F.'s (6K7's) triode detector with reaction (6C5).

G6SN.

SILENT KEY

J. B. STURROCK (GM6KO)

It is with deep regret we record the passing of Mr. J. B. Sturrock, GM6KO, of Kirkbuddo, Stirlingshire, after a short illness. His quiet nature and his ready will to help, endeared him to everyone, and in his death, the Scottish C District particularly have lost one of their most popular and respected members.

GM6KO was a real old timer, having commenced his amateur career back in the 440 metre days when a hand generator was employed to good effect. Later he put up a fine show with low power on the higher frequencies and was one of the first British Isles amateurs to work the U.S.A. on 28 Mc. His call was particularly well-known on 7 Mc. on which band he could be depended upon to give accurate and helpful reports to the many newcomers who worked him.

He had amateur friends in all parts of the world and they will, we know, join with us in expressing our deep sympathy to his widow and family.

T. R.

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