THE T. & R. BULLETIN

OFFICIAL ORGAN OF THE INCORPORATED

RADIO SOCIETY OF GREAT BRITAIN

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CONTENTS

INTERNATIONAL AMATEUR RADIO

ON the day this issue is due to appear members of the Council will be welcoming back from the Technical Conference just concluded in Bucharest, Messrs. Lamb and Stadler, the I.A.R.U. Delegates.

That I.A.R.U. Representation at these meetings is desirable goes without saying, for on this and previous occasions, societies forming the Union have been invited to make technical contributions which have brought into prominence the work which is being done by radio amateurs throughout the world.

For the benefit of more recently elected members it is desirable to briefly outline the connection which exists between these technical meetings and the International Radio Telecommunication Conferences. Reference to the General Radio-Communication Regulations (Madrid, 1932), shows that an International Consultative Committee, for short, C.C.I.R., "is charged with the task of studying technical radio-electric questions, and questions of which the solution depends principally on considerations of a technical nature." In other words, C.C.I.R. meetings prepare the way in a technical sense for subsequent International Conferences.

In preparation for Bucharest both the American Radio Relay League and the Radio Society of Great Britain were invited to submit technical studies dealing with several of the questions left over from the previous C.C.I.R. meeting held two years ago in Lisbon. We understand these contributions have been considered at the recent meeting.

The I.A.R.U. Delegates have, in company with other technical experts, thrashed out at Bucharest many present-day problems. We have no doubt that they have also left, amongst the Government Delegates of the world, an impression that the amateur movement is well fitted to accept its full share of the responsibility which lies before those who have the ether in their care.

It is appropriate that within the pages of this issue there should appear an article dealing with the Cairo Conference negotiations which have taken place between the Society, on the one hand, and the British Post Office, and the I.A.R.U. on the other. Careful study of the article will show that the relationships between the G.P.O. and the R.S.G.B. are of a highly satisfactory nature. The fact that the R.S.G.B. was invited to send representatives to take their place, with other interested parties, at the G.P.O. Cairo Sub-Committee meetings, indicates that sympathetic consideration will be given to our problems when the official British Delegation arrives at Cairo.

It is our duty and yours to show that we are legitimately entitled to the consideration which has so far been shown to us.

J. C.

CAIRO AHEAD

IN eleven months' time our eyes will be focused on Cairo, Egypt, for in that town will be staged yet another of those International Conferences which play so large a part in our destinies and in the destinies of all others who are interested in Radio.

In order that our members shall be possessed of vital information which may affect them at a later date, we have considered it desirable to set out in this article an account of what has so far transpired.

As long ago as 1935 the International Amateur Radio Union circularised all member-societies (of which the R.S.G.B. is but one of 27) requesting that every endeavour should be made by the officers of the Societies concerned to obtain a hearing with their licensing authorities. At that date much had been written concerning the widening of the 7 and 14 Mc. bands, but a good deal of the advice was misguided and prepared by persons having little or no knowledge of the true position. The R.S.G.B. were probably the first Society to state publicly that they held out little hope of an extension being granted on either band, but in accordance with a decision made by the majority of I.A.R.U. member-societies they decided to present, at a suitable time, a case in support of Union policy which had boiled down to a request for an extension of 200 kc. on the 7 Mc. band.

During the years 1934 and 1935 the R.S.G.B. had been privately conducting a series of Commercial Activity Checks with a view to demonstrating, if opportunity occurred, that the frequencies adjoining the amateur 7 and 14 Mc. allocations were being used in an uneconomical manner.

Acting on the R.S.G.B. suggestion the I.A.R.U. recommended other member-societies to begin similar checks.

The R.S.G.B. from an early date in its preparations for Cairo had held the view that the 14 Mc. band would be the most useful band for an extension, but we were alone in this view, with the result that when the time came our first attack was in the direction of 7 Mc. We did, however, reserve the right to ask that consideration be given to an extension on 14 Mc., and as will be seen later this request was presented to the British Administration.

During this time the Governments of the world had themselves begun preparations for Cairo. It therefore came as no surprise to our G.P.O. Liaison Officers (Messrs. Watts and Clarricoats) when the R.S.G.B. were invited to attend a meeting of the G.P.O. Technical Sub-Committee, an offshoot of the Main G.P.O. Cairo Committee. This meeting took place in September, 1936, and was attended by representatives of the G.P.O., Wireless Telegraphy, Board, Air Ministry, Home Office, Board of Trade, and numerous other interested bodies, including the B.B.C., the Police and the Commercial concerns. The meeting was conducted by Col. Angwin, Assistant Chief Engineer, G.P.O.

At this meeting the R.S.G.B. officials were asked to speak on behalf of British amateurs and were also requested to forward a statement in *justification of the amateur cause*. This memorandum was most carefully prepared and every member of Council was invited to furnish his views. The document is reproduced below.

Statement to G.P.O. Sub-Committee.

"The Inc. Radio Society of Great Britain represents 80 per cent. to 90 per cent. of the active transmitting Amateurs in Great Britain and about 300 members living in British Colonies, Protectorates and Mandated Territories.

The membership of the R.S.G.B. to date (September, 1936) is 3,000, made up as follows :—

1,200 Transmitting Amateurs in Great Britain.
400 Holders of British Artificial Aerial Licences.
500 Overseas members (Dominion, Colonial and Foreign).
900 Experienced or semi-experienced members who have so far confined their attention to problems of reception. Many of these will probably become transmitting members.

As Amateurs, the members of our Society are—to quote the Madrid Convention—' interested in radio-electrical practice with a purely personal aim and without pecuniary interest.' About two-thirds are experimenters and one-third regard Amateur Radio as a hobby but they also do some experimental work. The Society assists members to train themselves and encourages experimental and research work. The Amateurs have in the past provided and are still providing some of the leaders in the Radio Industry. A great number of our members are engaged in the Radio Industry. The Amateurs of this country are of national importance and in a time of emergency would prove very valuable to this Country and the Empire. Much assistance has been given to expeditions. Considerable contributions to the progress of the Art are being made by Amateurs. For example, in 1935 the Amateurs showed that it was possible to communicate with Australia and New Zealand on 28 Mc., thus proving the theory held by many Radio Scientists to be wrong. Amateurs discovered the value of the frequencies about 1500 kc. and it was their pioneer work that led to the great use that is being made of the higher frequencies to-day.

British Amateurs have, from the earliest days, set a lead in the development of the Radio art. They were the first to introduce amongst themselves frequency stabilisation, when input powers exceeding 10 watts were used.

A marked improvement in the efficiency of Amateur stations can be attributed to the careful development programme conducted by the R.S.G.B.

Amateur Frequency Bands.

British Amateur transmitters are licensed to conduct experiments in the following bands of frequencies :—

	Band.	***Remarks.***
(A).	1715–2000 kc	Power restricted to 10 watts input.
(B).	3500–3730 kc	By agreement only a portion of the International band (3500-4000) allotted.

		Selected amateurs only recommended for permission to use this band.
(C).	7000–7300 kc	Exclusive amateur allocations heavily congested.
(D).	14000–14400 kc	Exclusive amateur allocations heavily congested.
(E).	28000–30000 kc	Both bands allotted at Madrid for (*a*) Amateurs and (*b*) Experimenters.
(F).	56000–60000 kc	

N.B.—Bands (A), (B), (C), (D) have a tolerance of 5 kc. at each end.
Band (E) has 10 kc. and Band (F) 20 kc.

In addition to these six recognised allocations the British Post Office have authorised experiments as a temporary arrangement in the bands 112-120 Mc., 224-240 Mc.

Use of the Amateur Frequency Bands.

Band (A).—Shared with Fixed and Mobile Services. No interference is caused by amateurs to these services on account of low power used. Suitable for low power, short-distance work, specially for study of propagation problems and field strength measurements. Useful frequency band for aerial investigations.

Band (B).—Shared with Fixed and Mobile Services. Less than half the international band is allotted to British Amateurs by agreement with G.P.O. Band restricted during September to use at week-ends only. Similar experimental work to Band (A). In addition long-distance work at times. All members using this band employ frequency control.

Band (C).—International band. Training ground for new amateurs. Short, medium and long-distance work. Study of cyclical and seasonal conditions. Fading and skip problems. Field strength measurements and aerial investigations. Highly selective receivers have been developed to try and overcome the congestion, particularly on Bands (C) and (D).

Band (D).—International band. Long-distance work, more subject to changing conditions than Bands (A), (B) and (C). Aerial design (beams and reflectors) propagation, skip, fading, diurnal, seasonal and cyclical variations, meteorological, atmosphere, echo, power variation tests, are general lines of research.

(Band E).—Shared with Experiments. Frequency stabilisation is now in general use. Band subject to greater variation of conditions than Bands (A), (B), (C) and (D). Amateur investigation during 1926-27 indicated possibility of long-distance work. This was proved to be correct in the winter 1935-1936. It is anticipated that the peak period will occur during the winter 1937-1938. Considerable experimental work is being done on this band, especially investigation of directional properties of radiating systems.

Band (F).—Shared with Experiments. Frequency stabilisation is the major problem at the present time and is being extensively studied, together with the question of receiver design. Attempts are being made by co-operation with overseas amateurs to discover how reflection and refraction occurs on this Band. Beam and directional arrays are being used.

Bands (G) and (H).—Investigations are being conducted on the frequency Bands 112-120 Mc. (G) and 224-240 Mc. (H).

Harmonic Relationship.

It will be noted that the lower frequency edges of all the Amateur bands (except 1.7 Mc.) are harmonically related. We consider this to be important not only for our present bands but in the future allocation of bands above 56 Mc., i.e., 112 Mc., 224 Mc., 448 Mc., if any allocations are made of these very high frequencies.

Occupation of Amateur Bands.

For the past four years bi-annual checks of the British Isles occupancy of the various amateur bands have been conducted: these checks have been made on four Sundays in each of two months (usually March and September). Increase of occupancy can be seen from the table:—

Band	1.7 Mc.	3.5 Mc.	7 Mc.	14 Mc.
Width	275 kc.	225 kc.	290 kc.	390 kc.
1933	203	204	446	189
1936	225	133	759	376

The above figures represent the number of stations in Great Britain actually heard in the country. The number of stations at work will therefore be greater, particularly in the case of 14 Mc. owing to skip.

Without taking into account amateurs located in the rest of the world, it is at once apparent by comparing the band width in kc. with the number of stations active that the congestion is severe particularly in the 7 Mc. and 14 Mc. bands; more so, however, in the 7 Mc. band than in the 14 Mc. band. In estimating the degree of severity of congestion throughout the world it should be appreciated that the Amateurs in Great Britain form probably not more than 5-10 per cent. of the world total.

Commercial Activity Checks.

(*a*) 7300-7500 *kc. Check.*

With the knowledge that the bands of frequency adjacent to our 7 Mc. allocation were not so congested as the amateur frequencies, steps were taken in 1935 to check the commercial activity in the channel 7300-7500 kc.

From the Berne list it is noted that 281 stations are registered. During the checks which have been world wide only 26 of the registered stations have been heard, and of this number only 16 were heard in regular operation.

During the checks 47 stations not registered at Berne were heard in this channel and of this number only eight have been heard on more than one occasion.

These checks have been taken over a period of nine months, the observations being made in Malaya, Hong Kong, South India, North India and Great Britain.

It has been stated by the Amateurs in the United States before the Federation Communications Commission that their observers only heard 50 stations between 7300-7500 kc. Of these, 25 stations used power over 5 kilowatts, eight stations 1-5 kilowatts, seven stations $\frac{1}{4}$-1 kilowatt, and ten stations under $\frac{1}{4}$ kilowatt.

It was also stated before the Federal Communications Commission that from observations these commercial stations spend about 40 per cent. of their time in handling traffic and about 60 per cent. in idling, sending V's or otherwise holding the circuit.

(*b*) 14400-14600 *kc. Check.*

It is noted that there are 92 frequencies registered at Berne. The actual number of stations is 81, four of which have 15 frequencies, namely, RRRF has seven, RRRM has four, XDA has two and Prangins two.

The gaps between 14400-14600 total 56 kilocycles. This band has only been checked recently in this country. Sixteen stations have been heard.

Recommendations.

1. The R.S.G.B. submit that all the frequency bands which were assigned by the Washington Convention and again assigned by the Madrid Convention to the Amateurs, either exclusively or on a shared basis, should be retained.

2. The R.S.G.B. also request that consideration be given to extending the 7000-7300 kc. band to 7350 or 7400 kc. or the 14000-14400 kc. band to 14450 or 14500 kc. This request is put forward in this form because the R.S.G.B. appreciates that heavy demands for bands of frequencies at other parts of the spectrum will be made by the various services of this and other countries. It is felt that by making more economical use of the bands 7300-7500 and 14400-14600 kc. by eliminating the gaps now existing, the amateurs could be given at least an extra 50 kc. on one or both of these bands without affecting the Fixed and Mobile services in any way. The 7 and 14 Mc. bands are at present the only exclusively amateur bands. A small extension as requested on either or both of these two bands would be invaluable to the amateurs.

3. It is also requested that the bands 112-120 Mc., 224-240 Mc. and 448-480 Mc. be assigned to amateurs, if allocations of these high frequencies are to be made."

Sub-Committee Meetings.

It is of some importance to mention at this stage that one of the Cable Company representatives drew attention to the practice of message handling, presumably with the idea of showing that revenue may be lost to Commercial concerns. The R.S.G.B. representatives went to great pains to explain to the Committee that British Isles amateurs do not handle messages, have no wish to handle messages, and do not in any way cause loss of revenue to commercial concerns. We believe we have "scotched" the idea, but it is a matter which must be kept in mind by all British amateurs.

At the next meeting of the Sub-Committee held in October, 1936, the R.S.G.B. Case was circulated as an official Cairo Committee Document. Again the Society's representatives were asked for their comments, and on this occasion the need for more territory on 7 and 14 Mc. was stressed. At this meeting facts concerning our Band Occupancy and Commercial Activity Checks were noted with much interest by the members of the Committee. A suggestion was made by the R.S.G.B. representatives that a world plan be devised to make better use of the spectrum above 5 Mc.

Subsequent to this meeting a letter was received stating that the British Administration is favourably disposed to the requirements of amateurs, but in view of the demands from other services, and in particular the Air Services, little hope was held for an extension. As it later transpired the British administration will ask for a continuation of the *status quo* in so far as 7 and 14 Mc. allocations are concerned.

It was disclosed at this meeting that a proposal to allot the channel 1800-1820 kc. exclusively to Air Services had been tabled by the International Committee of Aeronautical Navigation (C.I.N.A.). The British Administration were in favour of this proposal, as were most of the other European administrations. Realising that this channel falls at a spot in the 1.7 to 2 Mc. amateur, fixed, and mobile band, the R.S.G.B. representatives immediately asked for consideration to be given to their suggestion that if 20 kc. are required for the exclusive use of the Air Services in the present shared band, it would be preferable for the allocation to fall at either the high or low frequency end of the band 1715-2000 kc. The Chairman appreciated the suggestion and stated that the British P.O. were anxious, where possible, to continue the harmonic relationship between amateur bands. It is the view of the R.S.G.B. representatives that the proposal which has now gone forward for consideration at Cairo will probably succeed on the basis of a regional (European) agreement, and that the allocation will be between 1800-1820 kc. in spite of our plea, because this is the only channel not "earmarked" by other services who share the band.

A transitionary period then elapsed during which time the R.S.G.B. exchanged views with the I.A.R.U. through the A.R.R.L.

Cairo Conference Proposals.

In March of this year the long-awaited Cairo Book of Proposals made its appearance. This book, written wholly in French, occupies some 300 odd pages and contains every proposal that has been made to date.

The R.S.G.B. representatives immediately commenced a study of this voluminous document with a view to tabulating each proposal likely to affect amateurs. This task was barely completed when a summons was received to attend another Sub-Committee meeting. At this meeting our delegates were asked for their views on certain of the proposals and were then required to prepare a statement dealing with all proposals affecting amateurs. This document was presented at a meeting attended by Messrs. Clarricoats and A. O. Milne.

Once again the Society's representatives had to correct a misstatement concerning message handling, whilst they found themselves unable to support the U.S.A. proposal to have "amateur service" defined. They also asked that a Japanese proposal to limit amateur stations to 50 watts aerial output be rejected by the British administration.

In addition to the above two proposals the following affect Amateur frequency allocations :—

Australia : 120-130 Mc. joint assignment, Amateur and Experimental.

Belgium : Eliminate amateurs from 1715-2000 kc. band, limit the width of 3.5 Mc. band to 100 kc., and reduce the 14 Mc. band to 200 kc.

Canada : Assign the 56-60 Mc. band exclusively to Amateurs.

Finland, Norway and Sweden : Eliminate amateurs from 1.7 Mc. band and from the portion 3500-3635 kc. of the 3.5 Mc. band.

France : Assign 1840-1860 kc. to meteorloogical sounding balloons and, in conjunction with other countries, 1800-1820 kc. for exclusive use of air services.

(*Continued on page* 610.)

VALVE ECONOMY IN THE DESIGN OF SUPERHETS

By R. W. Newton (G5NQ).

IT is the writer's contention that there should be a reason behind an article of this type, and, therefore, the first part of this script will be devoted to a description of its purpose. During the last few years, conversation with transmitting amateurs in this country, and a perusal of their literature has led him to believe that the radio receiver is generally treated as secondary to the rest of their equipment. Furthermore, with many, the cost of equipment is an important factor, therefore any expenditure is invariably in the direction of the transmitter. As a consequence, many amateurs are to-day using very simple (almost antiquated) receivers, whilst the modern superhet is placed well in the background, mainly on account of its comparatively high cost. If, however, the superhet were in more general use, much time and wasted effort in operating would be avoided, which would go a long way to solving our QRM problem.

Now, in an endeavour to boost the use of the above-mentioned type of receiver, the problem of expense was first tackled, and, since valves are among the most costly items, a reduction in their number by increasing their functions goes some distance towards the production of a cheaper receiver without any attendant loss in efficiency.

Reflexing the I.F. Stage.

To do this, a very old idea was resurrected, namely, Reflexing. For those readers who are not conversant with the principles of this system, a brief explanation will not be wasted at this juncture. The audio output from the detector is fed back into the grid circuit of one of the preceding valves (which can be either a radio or intermediate frequency amplifier) for amplification in the usual way, utilising this valve as an audio frequency amplifier. Thus, the R.F. or I.F. valve now serves two purposes, consequently we can now dispense with the customary L.F. amplifier.

Although this may seem very simple, there are many pitfalls waiting for the unwary, and unless very great care is taken in filtering the circuit, instability to a violent degree will be evident. One very important point to be remembered is that if a further audio amplifier stage is incorporated in the receiver, such as an output valve to drive a loudspeaker, no R.F. voltage from the anode of the reflexing valve must reach the grid of the following valve, otherwise grid rectification will occur in this stage, thereby introducing extremely poor quality and instability. Before going further, perhaps it would be as well to give details of a simple method of checking for this condition. If a micro-ammeter is inserted in series with the grid leak of the audio valve, this must show no current even when signal inputs reach the maximum handling capacity of the valves. Should a meter of the type mentioned not be available, then a voltmeter of the high resistance variety shunted across the grid leak will serve to indicate the presence of grid current.

To obtain freedom from instability and also to effect economy in the matter of filtering, it is best to reflex a valve operating in the early stages of the receiver. The reason for this is because only comparatively small values of R.F. voltage appear in the anode circuits of these valves. If a stage operating at signal frequency is reflexed, then only a relatively small amount of filtering is necessary, because the R.F. component of the detector output is at the intermediate frequency, and, therefore, much less chance of instability presents itself. When, however, an I.F. stage is reflexed, the R.F. component of the rectifier output is the same as that of the grid circuit of the reflexing valve, consequently more care must be taken to filter the R.F. from the rectified signal otherwise we shall obtain conditions similar to regeneration when the gain control is advanced towards maximum.

Now since we have a high gain audio amplifier following the detector, it is no longer necessary to employ an amplifying valve in the latter position, and expense is decreased by incorporating a diode or Westector metal rectifier in this position.

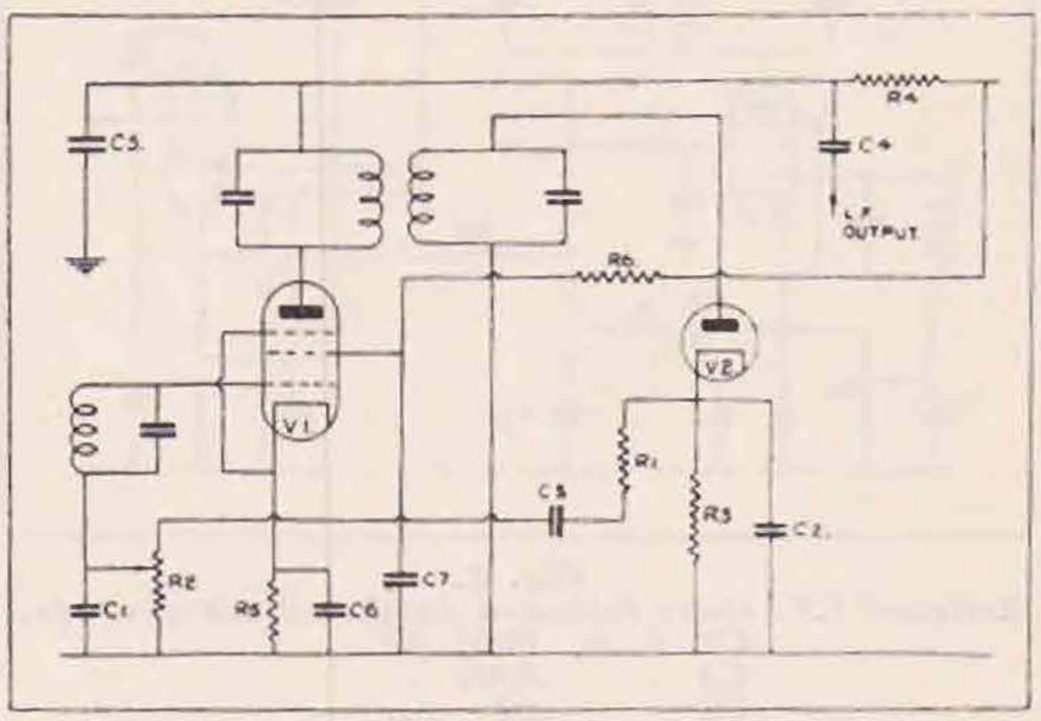


Fig. 1.

Reflexed I.F. stage with diode detector.

C1	*.0003*	μ*F.*
C2	*.0001*	,,
C3	*.02*	,,
C4	*.1*	,,
C5	*.0005*	,,
C6, 7,	*.1*	,,
R1	*.25 megohm.*	
R2, 3,	*.5*	,,
R4	*5,000 ohms.*	
R5, 6,	*According to valve in use. Intermediate frequency 400-550 kc.*	

Fig. 1 shows the system applied to the I.F. stage of a superhet. It will be seen that the R.F. portion of the circuit follows standard practice, the I.F. voltage, which appears across the secondary of the anode transformer being applied to V1 a diode second detector. The load, R3, of this valve is placed in the cathode instead of in the earth lead of the tuned circuit. This method gives better isolation of the I.F. and L.F. circuits, and should be used whenever possible; incidentally, this cannot be done when the diode is contained within the same envelope as another valve as is shown in Fig. 2.

The audio voltage is developed across R3 and fed to the grid of V1 through a condenser C3,

inserted to prevent the D.C. voltage developed across R3 from reaching the grid of V1. The resistance, R1, together with condensers C1 and C2, form the grid filter, while the potentiometer R2 acts as the grid audio load and manual audio gain control.

The L.F. output of V1 is fed through the condenser C4 with R4 as the plate load. A small condenser, C5, is quite effective in by-passing the I.F. voltages when no further audio amplifier is in use. Incidentally, the L.F. output from a modern R.F. pentode when connected as shown, is equal to that of a triode detector and small L.F. triode of the H.L. class, and is ample for headphone reception. These latter may, if desired, be connected in place of R4.

Reflexed I.F. Stage followed by Duo-Diode Pentode.

Should, however, a further amplifier be employed, the plate filtering of Fig. 1 will not be sufficient, and the arrangement of Fig. 2 must be used. Here a duo-diode pentode is shown as following amplifier, the diodes being contained within the same envelope as the pentode.

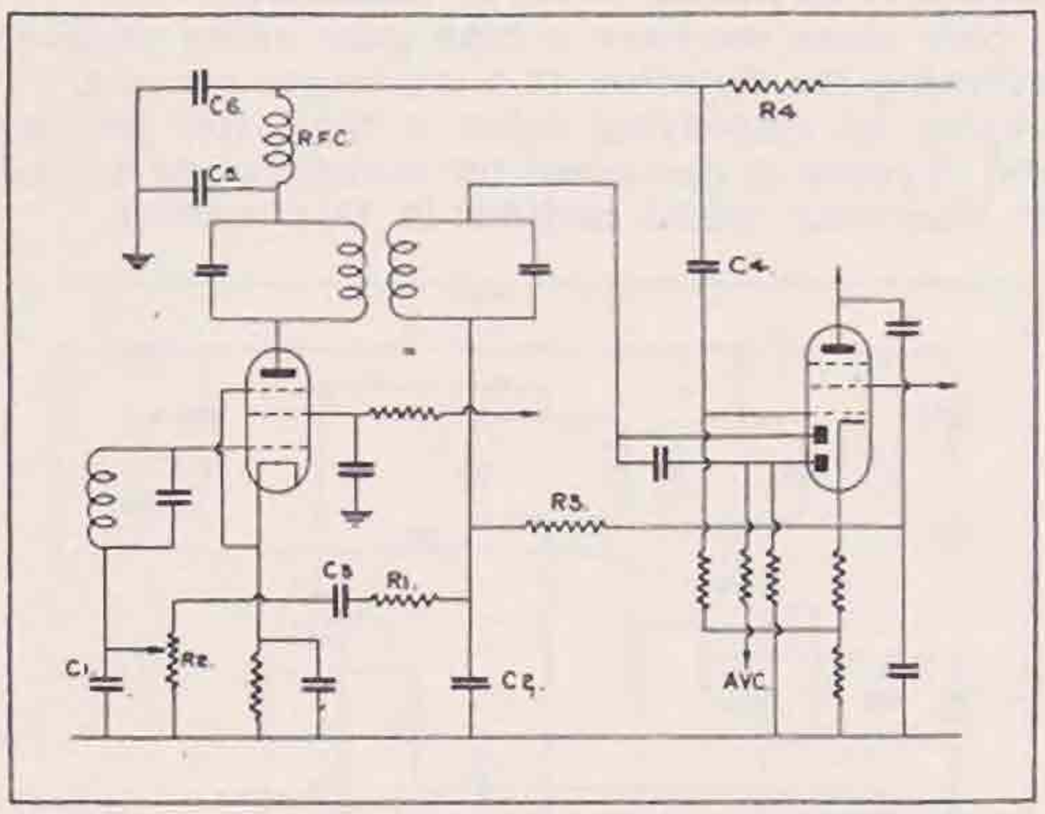


Fig. 2.
Reflexed I.F. stage followed by duo-diode pentode.

C1, 5, 6,	*.0003*	*μF.*
C2	*.0001*	*,,*
C3	*.02*	*,,*
C4	*.1*	*,,*
R1, 6,	*.25*	*megohm.*
R2, 3,	*.5*	*,,*
R4	*5,000*	*ohms.*

All other values normal for the valves in use. Intermediate frequency 400-500 kc.

It is necessary in this arrangement to incorporate an R.F. choke and two condensers, C5 and C6 in the form of a low pass filter to preclude the possibility of grid rectification in this stage, a point which has already been mentioned in an earlier paragraph. If this is found insufficient to give complete filtering, then the condenser, C5, must be replaced by a series-tuned circuit resonant at the intermediate frequency, which, if reasonably well designed, will offer a short circuit to the I.F. voltages. The tuning condenser must not exceed 0.0005 μF, otherwise the higher audio frequencies will be attenuated. In all cases, filter condensers and resistors must be kept at as low a value as possible. It must be borne in mind that L.F. in addition to R.F. voltages are present, and attenuation of the former will occur if the filter values are too high.

The values given in the diagrams were found quite satisfactory for intermediate frequencies between 400 and 550 kc., although, no doubt, this range could be extended without any alteration to circuit constants. A receiver using the arrangement of Fig. 2 was checked on an oscillograph, and showed a very reasonable frequency characteristic.

One other important point to be emphasised is that the valve chosen for reflexing must not be provided with any form of bias variation for pre-detector volume control, or for that matter, any control that relies on variation of its characteristics for operation, because any variation in its slope (which controls the R.F.) will affect the L.F. in like manner.

Much greater gain is obtainable when an iron core choke is substituted for R4 both in the R.F. and L.F. functions. When a resistance is in circuit, there is appreciable voltage drop, and the H.T. on the plate is reduced in value ; for this reason only a low ohmic resistance is permissible, which means that for L.F. amplification the anode impedance is far too low for a pentode valve, consequently the full magnification of the stage cannot be realised. The incorporation of a choke serves the double purpose of keeping the H.T. on the plate at the correct value, and offers something like the proper anode impedance for optimum audio amplification. The choke can be a small type, since the current passing through it is only some 8 milliamps.

It has already been stated that it is better to reflex the R.F. amplifier rather than the I.F. stage, but in the diagrams only the latter has been shown. This was done for a definite reason. In most small superhets the R.F. stage is non-existent, moreover, as was previously mentioned, it is far easier to operate on the earlier valve. The circuits given are fundamentally the same for either case, so that whatever has been said of one can also be said of the other.

When the R.F. stage is reflexed and followed with an audio amplifier, it is permissible to dispense entirely with the low pass filter and use the circuit of Fig. 1, with the addition of a 50,000 ohm resistance in series with C4 on the plate side. The other end of C4, of course, feeds the grid of the audio amplifier.

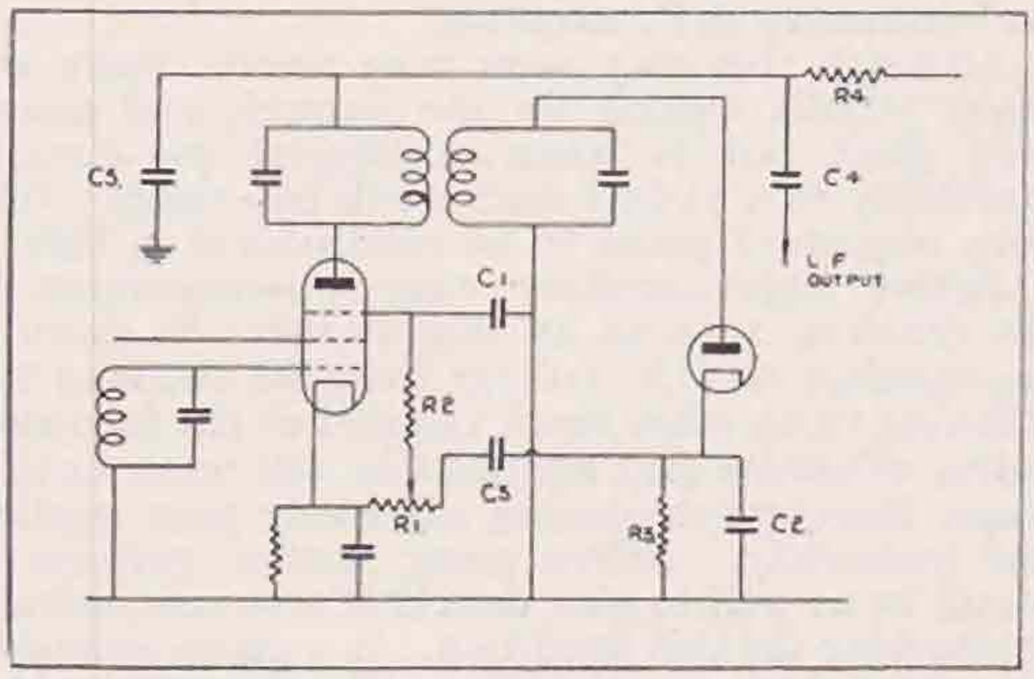


Fig. 3.
Simplified reflexing of I.F. stage and diode detector.

C1	*.0003*	*μF.*
C2	*.0001*	*,,*
C3	*.02*	*,,*
C4	*.11*	*,,*
C5	*.0005*	*,,*
R1, 3	*.5*	*megohm.*
R2	*50,000*	*ohms.*
R4	*5,000*	*,,*

Intermediate frequency 400-550 kc.

Simplified Reflexing.

If lower audio gain can be tolerated in the reflexed stage, then the simplified circuit of Fig. 3 may be found suitable. Here the suppressor grid is employed as an audio control grid, and in conjunction with the plate of the valve, forms a triode amplifier. The drawback to this system is that only valves with a good suppressor grid characteristic, are suitable, whereas with the other method, any R.F. pentode will function satisfactorily. It does, however, offer the advantages of simplicity and ease of operation, and may find a place in some designs. No great amount of work has been put into the development of this arrangement by the author, so he offers it as a field for individual experiment.

A useful hint to remember when putting any of the foregoing arrangements into operation is a test to ascertain whether the reflexing valve is rectifying. (This can easily take place if incorrect voltages are applied to the electrodes of the valve, and the effect will result in instability of the system.) If the condenser feeding the detector output to the grid of the amplifier is removed, no signals should be heard in a pair of headphones connected in the plate circuit. Signals will, of course, be audible if the valve is rectifying. The trouble can usually be overcome by carefully adjusting the grid bias or screen voltage.

It is hoped that the foregoing remarks will encourage the use of the superhet, but in closing, the writer would point out that there is no reason why reflexing should not be used in straight receivers; when matters would be improved by substituting a reflexed R.F. stage, for that almost worthless second L.F. stage in the Det., 2.L.F., so popular in this country. Those who are tempted to try reflexing in a straight receiver would be well advised to pay particular attention to screening and stabilising, otherwise no amount of filtering in the reflex circuit will prevent instability.

WINDOM AERIAL

By E. R. Westlake* (G6KR),

WITH a view to assisting those who have tried, or propose to try, the Windom aerial, the following information has been put together. District Notes generally make mention that the Windom is being tested by one member or another, and it is frequently observed that difficulties arise in putting it into operation. It is the writer's contention that most of the difficulties occur through the tapping point of the feeder being incorrectly placed. This in its turn is due to lack of information regarding the factor "F." The formula for calculating the length of the half wave top is:—

$$L = \frac{474{,}000}{f\ (\text{kc})} = \text{feet.}$$

whilst the distance of the feeder tapping point from the centre of the horizontal portions of the aerial is:

$$\frac{L \times F}{180} = \text{feet.}$$

The factor "F" varies with the diameter of wire used, and the following values will be found accurate for the S.W.G. of copper quoted:—

S.W.G.	10	11	12	13	14	16
Mils.	128	116	104	92	80	64
F. ...	17.78	19.13	20.49	21.85	23.20	25

With the larger sizes, say from 16 S.W.G. down to 10, it is advisable to test the wire for accuracy of diameter by means of a micrometer, because in some cases a variation in a given gauge of as much as 8 mils. occurs with a consequent error in the factor "F." Where the diameter of a sample of wire is not in agreement with the table above, its factor can reasily be obtained by interpolation. It may be mentioned that the term "Mil." denotes one-thousandth of one inch, so that No. 14 S.W.G., being .080 in. diameter, becomes 80 mils.

From the foregoing it will be observed that the graphs usually associated with the single-feed type of aerial are only an approximation, as with these no allowance is made for the varying diameter of wire; further, stranded wire is out of the question, single solid wire being essential; stranded wire can be used only if the tapping point is arrived at by trial and error, and in practice this is not altogether satisfactory. The difficulties met with in preventing the feeder radiating will, in some measure, be reduced if the foregoing items are carefully observed, particularly if it is possible when erecting the "top" to keep the ends at the insulators at least one-quarter wave-length from any object, whether a building, pole or tree.

The data given has been arrived at mainly on theoretical grounds, but with practical tests carried out over a period of 18 months or so. Before the correct tapping point of the Windom was finally decided upon, the signals put out were restricted to a radius of approximately 350 miles, whereas with the tapping point taken from the formula for the given diameter of wire used, the signals have extended in radius to about 7,000 miles! The P.A. wattage has not exceeded 8 at any time during the tests. The crystal frequency is 14,380 kc. (doubled from 7,190).

*R.E.S. member.

EMPIRE CALLS HEARD

W. E. Hagarty (VK4WH) (Longreach), between 13.00 *and* 14.15 *G.M.T., March* 13, *on* 28 *Mc.:*

g2mi, sg, xc, zq, 5va, 6hl, nf, pk, qx, rb, xl, xn, wy, ei4J (all R4-5, S4-5).

*Eric W. Trebilcock (BERS*195 *Portable), 40a, Nelson Street, St. Peter's, South Australia, April* 2 *to April* 7, 1937:

7 *Mc.:* ve5rs S5, ze1js 5, zs6am 4.

14 *Mc.:* g2dh 5, 2mi 4, 2pu 4, 2tr 6, 5ka 4, 5qy 3, 5yo 4, 6fs 5, 6gh 5, 6hb 5, 6ku 5, 6kp 5, 6xp 4, 8fz 5, 8hq 5, gm6xi 4, su1kg 4, ve2ct 5, vq4ksl 5, zb1h 5.

Knock Answered

In answer to Mr. Parker's query, Mr. C. R. Pill, G5CX, informs us that the *Tungsram* SP4B is an RF Pentode with a 4-volt heater and grid at top. The "variable mu" valve in the same series is VP4B. Mr. Pill has not tested the SP4B, but he can recommend the 2-volt equivalent which is listed as the SP2B. All the above valves fit standard 7-pin bases.

THE IONISATION OF THE LOWER ATMOSPHERE

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

THE recent announcement of the discovery of a number of ionised layers in the atmosphere at heights considerably less than that of the Kennelly-Heaviside Layer suggests to the writer that some notes regarding the conductivity of the air near the surface of the earth may be of interest. The conductivity of the lower atmosphere is probably too small to have any appreciable effect on wireless waves.

A molecule of a gas is ionised when an electron, or negative charge, is removed from it. Both the electron and the proton (the remaining positive part) are known as small ions. If an electric field is applied to the ionised gas, the ions will move, the rate of movement being known as the mobility of the ions, the movement itself constituting an electric current.

The small ions are often captured by specks of dust or small drops of moisture, known as nuclei, thus forming large ions. The mobility of these large ions will, due to their size, be smaller than that of the small ions. The air over land is more dust-laden than over the sea, and in consequence, there will be more large ions over land areas than over sea, and they will outnumber the small ions, the reverse being the case over the sea. The actual number of small ions is approximately the same over land and sea, the reason for this being explained later. It must be remembered that winds will have a considerable effect on the distribution of the ions.

Table I.

Approx. Number of Ions per cu. cm. of Air.

	Over Land.	*Over Sea.*
Large	1,000 to 80,000	200
Small	600	600

Ionising Agencies.

The agents causing the ionisation are three in number, viz., (*a*) radiation from radio-active substances (radium, uranium, thorium, potassium, etc.) in the earth ; (*b*) radiation from similar matter in the atmosphere (radon, thoron) ; and (*c*) the penetrating radiation, commonly known as "Cosmic Rays."

The radiations from radio-active matter are usually denoted as α, β and γ rays. α rays consist of positively charged particles. This has been proved by magnetic deflection. The particles are actually atoms of helium, differing from the ordinary atom in their charge. β rays are formed of negatively charged moving particles (a stream of electrons). γ rays differ from α and β in that they do not consist of particles, but are similar to X-rays, being an electro-magnetic radiation with a frequency of the order of 10^{16} kcs. per sec.

All three rays are capable of producing ionisation, but the γ rays having much greater penetrating power than the other two, can come from greater depths in the earth, and, therefore, are emitted in larger quantities and will affect the atmosphere to a greater height. The ionisation by α rays from the earth is probably restricted to a few inches of the atmosphere near the ground. β rays can produce slight ionisation up to heights of 30 feet, while γ rays are appreciably effective up to one mile. These figures will vary with the geological structure of the surface of the earth and over sea water the earth radiation is negligible.

The radio-active gases in the atmosphere were originally produced from the radio-active matter in the earth. In the atmosphere there is no very absorbing medium, and the α rays are, therefore, responsible for most of the ionisation from this source. A greater quantity of α rays than β and γ are emitted from radium and its emanations. The radiations from gases in the air decrease with height, and are probably appreciable up to about three or four miles above the earth's surface. The radio-active gases being rarer over the sea than land, the ionisation caused in this way will be much smaller over water than land.

The universal penetrating radiation was first suggested when it was discovered that the ionisation of the atmosphere tended to increase with height after the first kilometre or so. The two ionising agents mentioned above would result in a continuous decrease with height. It appears that there must be an ionising radiation coming from above. The ionisation appears to be due to fast downward moving particles, but these particles are generally considered to be a secondary radiation, the primary radiation being electro-magnetic, with a frequency higher than that of γ rays. The radiation appears to consist of at least four components, with different absorption coefficients. It has been found impossible to discover any variation in the intensity of the rays with siderial or solar time, and it is, therefore, improbable that the rays have their source in the stars or the sun.

Among the suggestions that have been made to explain the radiation, the most important is that of Professor Millikan, who considers that the rays are formed in interstellar space by the production of various elements from hydrogen, the various components being due to the formation of particular elements. Excluding hydrogen, about 99 per cent. of all matter is made up of helium, carbon, nitrogen, oxygen, magnesium, aluminium, silicon, iron, nickel and cobalt. These elements can be arranged in four groups, as those readers familiar with the Periodic Table in Chemistry will at once appreciate, the groups being :

(*a*) helium (2)
(*b*) carbon (6), nitrogen (7), oxygen (8) ;
(*c*) magnesium (12), aluminium (13), silicon (14) ;
(*d*) iron (26), nickel (27), cobalt (28).

The numbers in brackets are the atomic numbers of the elements, and probably represent the number of revolving electrons in one atom of that particular element. (According to Rutherford's theory, atoms consist of a central positively charged nucleus around which revolve a number of negatively charged electrons.) Thus, an atom of carbon contains 6 revolving electrons. The atomic weight of carbon being 12, means that the nucleus contains 12 protons, and, since the whole atom is neutral in charge, must also contain 6 further electrons. Similarly, an atom of aluminium, atomic weight 27, consists of a nucleus (27 protons, 14 electrons) and 13 revolving electrons. Millikan suggests that these four groups correspond to the four components

of the penetrating radiation in the manner already stated.

It has also been suggested that thunderstorms may be the source of part of the radiation.

Of the three sources of ionisation discussed, the radio-active matter in the air is most effective over land, and the penetrating radiation the most effective over sea. The percentage of the ionisation caused by the various agents in free air at sea level are shown below.

TABLE 2.

Agent.	*Over Land.*	*Over Sea.*
Radio-active Matter :		
Earth ...	30% to 40%	Nil
Air ...	nearly 50%	Nil
Penetrating Rad.	20%	100%

The effect of the penetrating radiation is obviously the same over land and sea, and it therefore follows that the degree of ionisation of the air will be less over water than land, actually ions being formed about six times as rapidly over land than sea. The death rate of the small ions is, however, more rapid over land areas, due to more dust in the air, and this results in the number of small ions over land and sea being approximately equal.

Now if S is the resistivity of the atmosphere and an electric field of intensity F is applied, then the current i through unit area is given by

$$i = \frac{F}{S}$$

the current being due to streams of positive and negative, small and large ions.

The conductivity $\frac{1}{S}$ is proportional to the mobility of the ions.

i.e., conductivity $\propto nk + NK$.

where k and K are mobilities, and n and N the numbers of small and large ions respectively. In clear air, NK is usually negligible compared with nk, owing to the low mobility of the large ions, and even in large towns NK only approaches $\frac{1}{6}$ of nk.

From this it follows that the conductivity of the air mainly depends on the number of small ions present, and will be almost the same over land and water.

Bibliography.

Crowther—*Molecular Physics.*
Schonland, *Atmospheric Electricity.*
Starling, *Magnetism and Electricity.*

(*Continued from next column*).

crystal jumping out of oscillation. The only trouble experienced is that of the crystal heating, when the set is run for any length of time, but this is not very noticeable using C.W.

The tuning procedure is the same as that for a conventional crystal oscillator. The plate tuning condenser C2 is tuned for a dip in plate current. The aerial is connected, and the aerial coupling circuit detuned slightly off resonance. Condenser C2 is then re-adjusted for the dip, because coupling the aerial will probably affect the tuning of the plate circuit. The dip will now be very small with the aerial coupled.

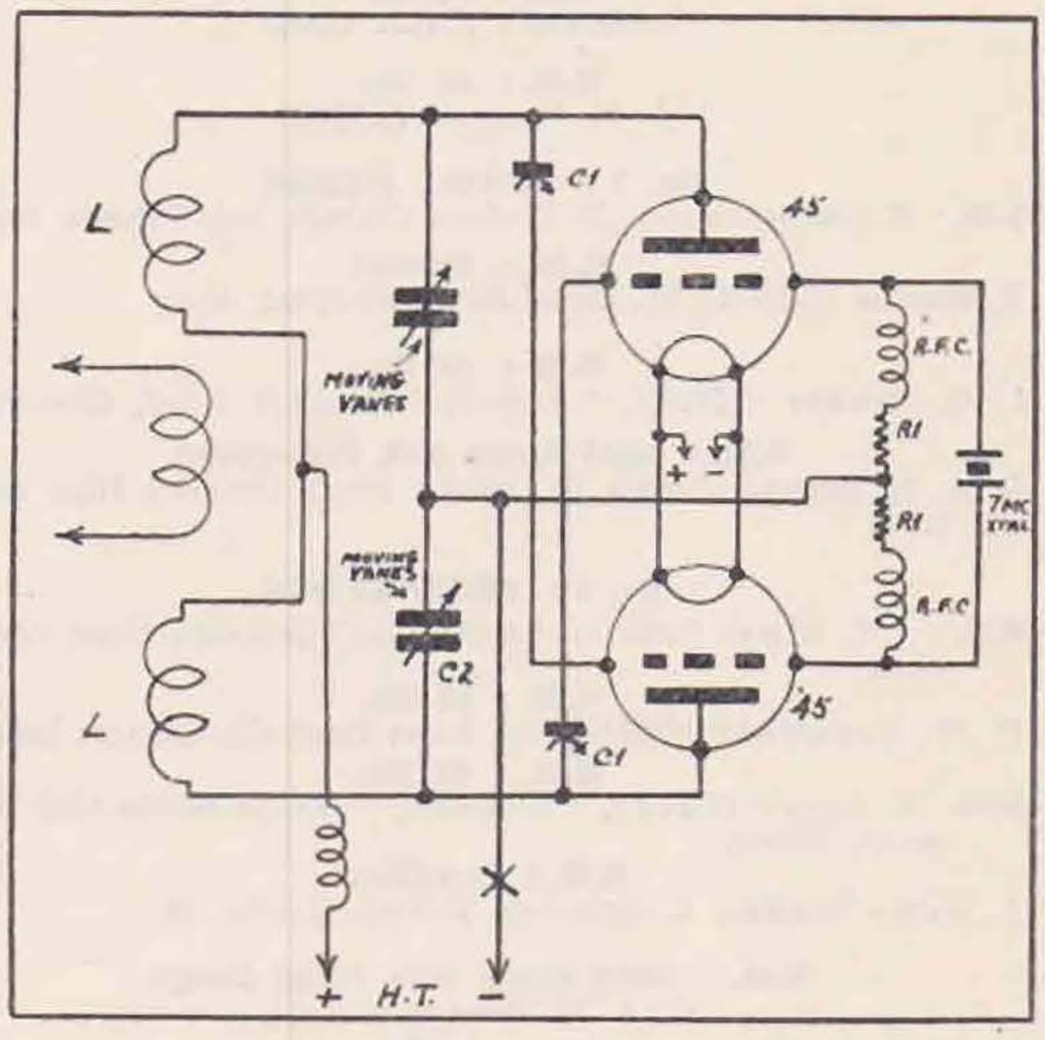
An Unorthodox Crystal Controlled Transmitter

By A. TIBBITS (VP2AT).

THE transmitter to be described is essentially for the low-power man, and although the circuit may not be original, the writer has not seen it mentioned elsewhere.

The first transmitter used at VP2AT was a self-excited push-pull Colpitts, employing a pair of 45's operated from a 220-v. D.C. mains supply. Good results were obtained with an input of 20 watts, but for many reasons crystal control was considered desirable, hence this short story.

On first inspection the circuit appears to resemble a conventional push-pull C.O. arrangement with crystal between the grids, but on closer examination it will be seen that grid-plate condensers C are included, thus producing a combination of a push-pull Colpitts oscillator and a push-pull C.O. The transmitter is thus self-excited, but crystal controlled.



Circuit of Unorthodox Transmitter described by the Author.

C 1. 75 μμF
C 2. 250 + 250 μμF (split stator)
R 1. 5000 ohms
L 7 Mc. 5 turns 2½" diameter
14 Mc. 3 „ „
Filament supply from storage battery.

The advantage of this arrangement is that greater output is obtained than from a conventional C.O. arrangement; in fact, in the writer's case it is the same as that obtained from the original Colpitts before the crystal was added.

By merely removing the crystal there remains the original self-excited self-controlled transmitter for use on the 14 and 28 Mc. bands, unless one is fortunate enough to possess a 14 Mc. crystal.

While intended chiefly for C.W., the writer has used telephony with very fair results, and 100 per cent. modulation may be employed without the

(*Continued at bottom of previous column*).

RESEARCH AND EXPERIMENTAL SECTIONS

MANAGER :

H. C. Page (G6PA), "Warren House," Warren Road, Bexleyheath, Kent.

ASSISTANT MANAGER :

J. C. Elmer (G2GD), "Aethelmar," Seabrook Road, Hythe, Kent.

SECTIONS :

No. 1 : TRANSMITTER DESIGN
S.M. : (To be appointed)

G.M. : 7 and 14 Mc.
S. Buckingham (G5QF), 41, Brunswick Park Road, New Southgate, N.11.

G.M. : 28 Mc.
(To be appointed)

G.M. : 56 Mc.
J. N. Walker (G5JU), 4, Frenchay Road, Downend, Bristol, Glos.

G.M. : Artificial Aerials
A. W. Lister (G5LG), Royal Military Academy, Woolwich, S.E.

No. 2 : RECEIVER DESIGN
S.M. : J. Mawbey (BRS. 1300), 109, Clare Road, Tankerton, Kent.

G.M. : General
J. Mawbey (BRS. 1300)

G.M. : 56 Mc.
J. N. Walker (G5JU)

No. 3 : AERIAL DESIGN
S.M. : F. Charman (G6CJ), Orchard Cottage, Stoke Poges, Bucks.

G.M. : General
F. Wilson (G2XX), 85, Risca Road, Newport, Mon.

G.M. : 28 Mc.
L. O. Rogers (G2HX), "Audwen," Estcourt Road, Gloucester.

G.M. : Joint Group with Propagation
G. A. H. Eckles (G5GC), 57, Sutton Road, Beverley High Road, Hull.

No. 4 : PROPAGATION
S.M. : J. C. Elmer (G2GD), "Aethelmar," Seabrook Road, Hythe, Kent.

G.M. : 56 Mc.
D. W. Heightman (G6DH), 59, Burrs Road, Gt. Clacton, Essex.

G.M. : 28 Mc.
Miss N. Corry (G2YL), "Redholm," Walton-on-the-Hill, Tadworth, Surrey.

G.M. : Conditions
J. Haigh (G6HA), 2, Greenock Terrace, Leeds, 12.

G.M. : Joint Group with Aerial Design
G. A. H. Eckles (G5GC).

No. 5 : VALVES AND INSTRUMENTS
S.M. : D. N. Corfield (G5CD), 10, Holders Hill Gardens, Hendon, N.W.4.

No. 6 : AUXILIARY APPARATUS
S.M. : A. O. Milne (G2MI), "Twemigh" Kechill, Gardens, Hayes, Kent.

G.M. :
F. W. Benson (2BWF), 53, Corona Drive, Thorne, Doncaster.

No. 7 : MICRO-WAVES (112 Mc. and above)
S.M. : Dr. C. G. Lemon (G2GL), 19, Lena Gardens, Hammersmith, W.6.

No. 8 : CONTEMPORARY LITERATURE
S.M. : L. Fryer (GM2FR) 2, Murray Villas, Heugh Road, Portpatrick, Wigtownshire.

No. 9 : TELEVISION
S.M. : E. L. Gardiner (G6GR), The Nyth, Norwich Road, Northwood, Middlesex.

G.M. : Contemporary Literature
E. J. Scudder (BRS. 981), 32, Queen Street, Folkestone, Kent.

NEWS OF THE MONTH

All items of interest with regard to R.E.S. were overshadowed last month by the contribution from Mr. Heightman (G6DH), whose article on 28 Mc. Propagation was one of the most outstanding ever written by a member.

We take this opportunity of congratulating him on his work, for apart from the excellence of the material contained in the article itself, is the striking fact that many hours were devoted to a study of conditions. Many of us are capable of putting in 24 hours' work on a contest, but few have the determination to continue these efforts over a long period. This is all too well evident from the small amount of valuable material which is presented for publication.

Mr. Scudder, in a most interesting article, gives a picture of television to-day and yesterday. The contribution is not intended to be technical, but this should not prevent it receiving universal praise, for it sums up in a concise and well-thought-out manner the historical events which have led up to the establishment of a definite service in this country and elsewhere.

Having introduced television, we hope at an early date to publish technical contributions of a type likely to appeal to members. We would again stress the point that now a regular service in England is operating with considerable aerial power, it should enable members interested in propagation on the u.h.f. to produce useful data on such subjects as fading and skip. Observations from the North of England and Scotland should prove of considerable value provided they can be made daily.

The keynote of this issue is u.h.f. communications, and it is appropriate that yet another R.E.S. member, in the person of Mr. Chambers (G5NO), should have given us a most useful series of notes on his new 56 Mc. superhet.

G6PA.

Stop Press

At 0645 G.M.T., June 3, G6DH observed that conditions were good for u.h.f., having heard IBE on 48 Mc. at that time. During his usual morning schedule at 07.00 with YL2CD on 14 Mc., G6DH asked him to QSY to 28 Mc. Contact on this band was made 55 minutes later. G6DH then requested YL2CD to listen from 08.05 to 08.15 G.M.T. for his 56.1 Mc. transmissions. YL2CD came back on 28 Mc. and reported G6DH R5 T7. The input at G6DH was 60 watts to an ESW501, working into a long lines oscillator and an aerial $\frac{8}{2}$ waves tapped direct on.

The above illustrates the need for maintaining a constant watch on conditions.

A 56 Mc. SUPERHETERODYNE RECEIVER

By A. G. Chambers (G5NO), Assoc. I.W.T.

A PREVIOUS article by the writer explained some of the difficulties involved in the design of a 56Mc. superheterodyne, and methods of overcoming them. Details of a practical model follow.

It must be pointed out that the receiver to be described is not suitable for the reception of television signals. It is intended for c.w. and telephony only and the tuning range covers the amateur band with a slight tolerance.

The circuit, shown in Fig. 1, requires little explanation, but the oscillator stage must be constructed carefully to avoid trouble. The first important item is the screening box for the oscillator stage, which should be constructed from sheet copper $\frac{1}{16}$ inch thick, all joints being carefully soldered up. The overall dimensions are $6\frac{1}{2}$ ins. long, 3 ins. wide, and $3\frac{1}{2}$ ins. deep. The top should have a flange $\frac{1}{4}$ in. wide all round, bent over to form a tight-fitting lid and a hole $1\frac{3}{4}$ ins. diameter made in it, with the centre $1\frac{3}{4}$ ins. from the left-hand side, through which the X41 will protrude. This box is insulated from the chassis and a connection made at one point only, to prevent circulating currents. All leads from the box have chokes or resistances in series to prevent H.F. leakage. These measurements may have to be modified slightly to suit the ganged condenser. The actual condenser used was one of .0005 μF each section, this being reduced to somewhere in the region of 50 μμF by taking off all except two fixed and two moving vanes. Whilst this has proved satisfactory, a more modern type, using the minimum of metal and with ceramic insulation, would undoubtedly be more satisfactory.

The Frequency Changer.

Frequency-changing is accomplished by the use of a triode-hexode valve, the Osram X41. The triode section of this valve acts as the oscillator, using the "Colpitts" circuit, all components belonging to this stage being placed in the previously mentioned copper screening box. The grid value is kept as high as possible, without causing "squeggering," this tending to keep the oscillator section stable. The hexode section of the X41 acts as the first detector, mixing being accomplished by the varying (oscillator frequency) voltage developed across R1, the cathode resistance, which

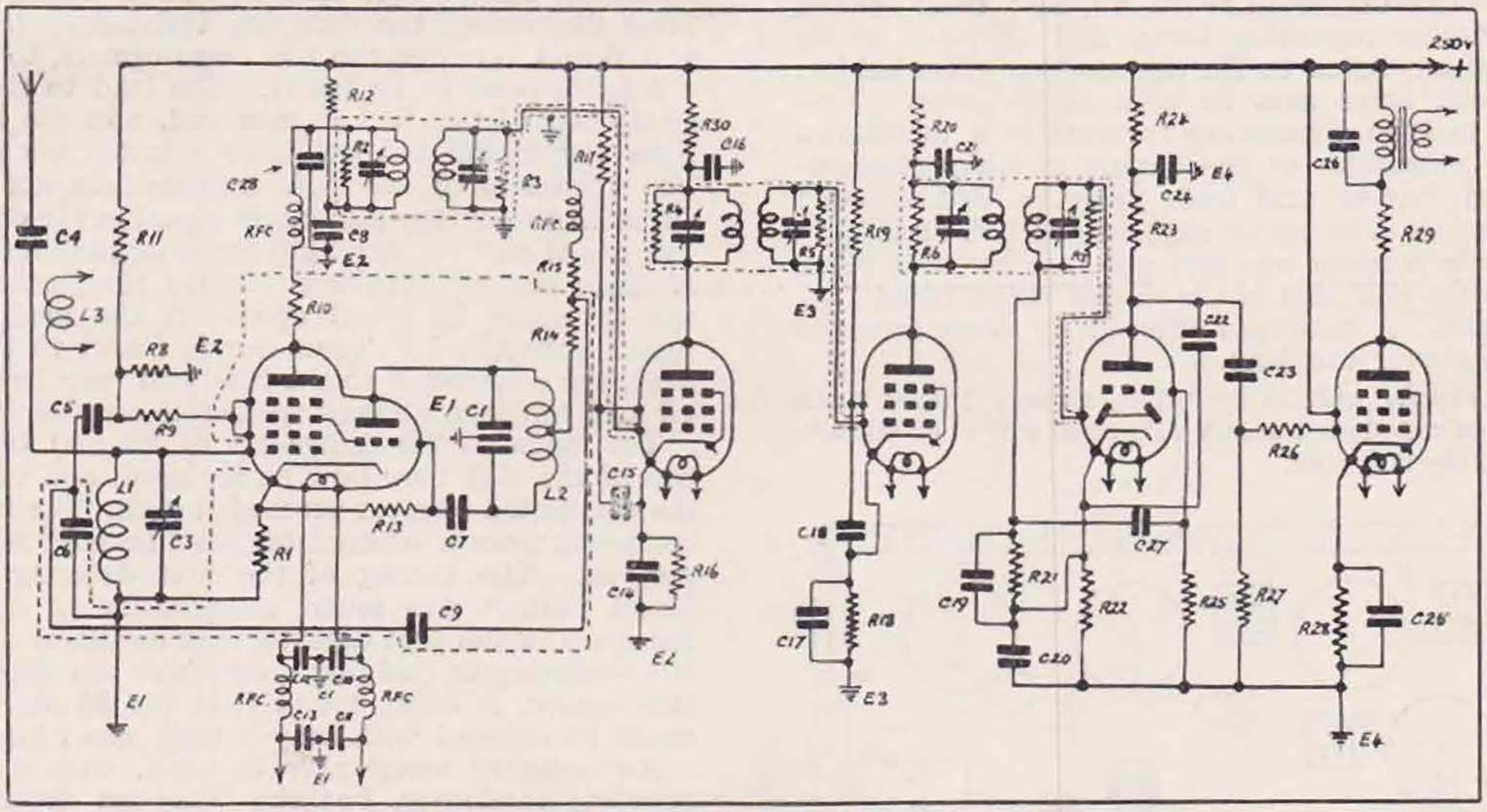


Fig. 1.
Circuit diagram of 56 Mc. super-heterodyne receiver.

C1, 2, 3,	*.0005 μF (cut down. see text).*	*R2, 3, 4, 5, 6, 7, 28, 29, 25,*	*½ megohm (see text).*
C4,	*10 μμF.*	*R8, 11, 13, 23, 26,*	*30,000 ohms.*
C5, 6, 8, 9, 14, 15, 17, 18	*.01 μF.*	*R9, 22,*	*1,000 ,,*
C7, 19, 23	*100 μμF.*	*R12, 20, 30,*	*5,000 ,,*
C10, 11, 12, 13, 22,	*.0003 μF.*	*R14, 24,*	*10,000 ,,*
C16, 21, 27, 23,	*.05 μF.*	*R15,*	*20,000 ,,*
C20, 25,	*35 μF.*	*R16, 18,*	*350 ,,*
C24,	*.1 μF.*	*R17, 19,*	*70,000 ,,*
C26,	*.003 μF.*	*R21,*	*200,000 ,,*
R1, 10,	*100 ohms.*	*R27*	*¼ megohm.*

Note.—Resistances R1, 9, 10, 13, 14, are soldered to valve leg pins, the lengths of leads not exceeding ¼ in.

is also in the detector circuit. The 100 μμF condenser C 28, connected between the main anode of the X41 and earth, was found necessary to by-pass any residual 56 Mc. R.F., to which it presents a low impedance. It has little effect on the gain of the I.F. stage as its impedance is fairly high at 445 kc., but it stopped traces of instability.

The I.F. Amplifier.

Some 445 kc. intermediate frequency transformers already on hand were used by the writer or these can be purchased quite cheaply. For those who desire to make their own, 200 turns of 5 x .0032 multi-strand D.S.C. wire can be pile wound on a former ½ inch diameter, the width of each coil being $\frac{3}{16}$ inch, and the spacing between centres $1\frac{5}{16}$ in. These dimensions will give each coil an inductance of 1.09 MH. and a mutual inductance of 28 MH. The transformers, with the 100 μμF. trimmers, should be completely enclosed in screening cans.

The chassis used, measuring 15 in. by 12 in. by 2 in., was originally part of a broadcast receiver, the material being mild steel, but any of the usual metals may be used. A suitable chassis (and also screening boxes, etc.) may be obtained from H. Leatherland, BRS1794, of Nottingham, at a reasonable price, in either aluminium or steel. All valves are separately screened, cocoa tins being quite suitable for this purpose. The layout of the valves and components is shown in Fig. 2, and this should be adhered to as closely as possible.

Coming now to the other earthing points shown on the circuit diagram as E2, E3, E4; these are the valve-holder mounting bolts, and all leads to be earthed are taken to the appropriate valve-holder, i.e., each stage uses its own earth point. This tends to keep circulating currents to a minimum.

The remainder of the circuit is fairly straightforward, but all grid leads must be kept as short as possible. The writer experienced I.F. instability when the receiver was first put into use, this being due to the grid lead of the second MSP4 being 1 in. in length. A cure was effected by using screened braiding over this lead.

No supply unit is included, as any power pack that can supply a smooth output of 250 v. at 80 mA. is entirely suitable.

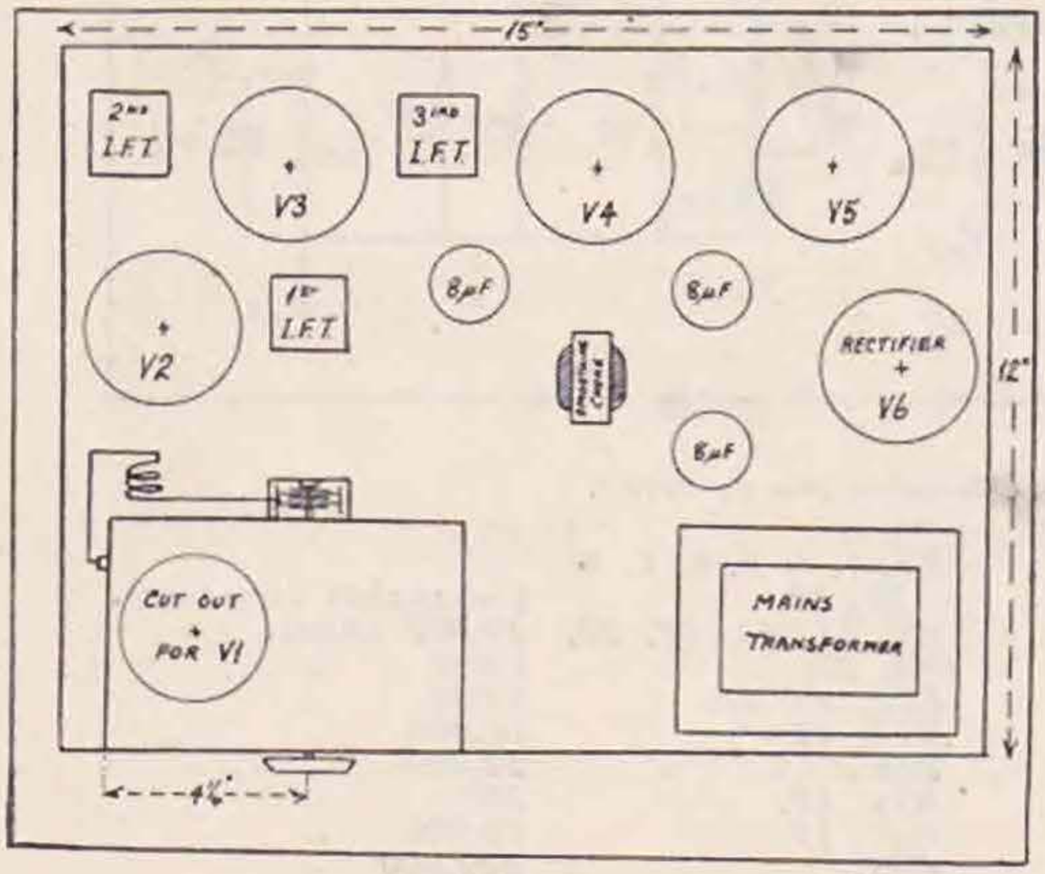


Fig. 2.
Layout of Receiver.

Receiver Adjustment.

Lining up the receiver is not a difficult job, but it is desirable to have a modulated 445 kc. oscillator. This can be easily made if a centre tapped I.F. coil is available, the connections being as in Fig. 3. The values given for the grid leak and condenser will result in a low frequency modulation in the region of 400 c.p.s. The oscillator calibration is checked by tuning in the second harmonic from it on a broadcast receiver tuned to 890 kc. (337.5 metres).

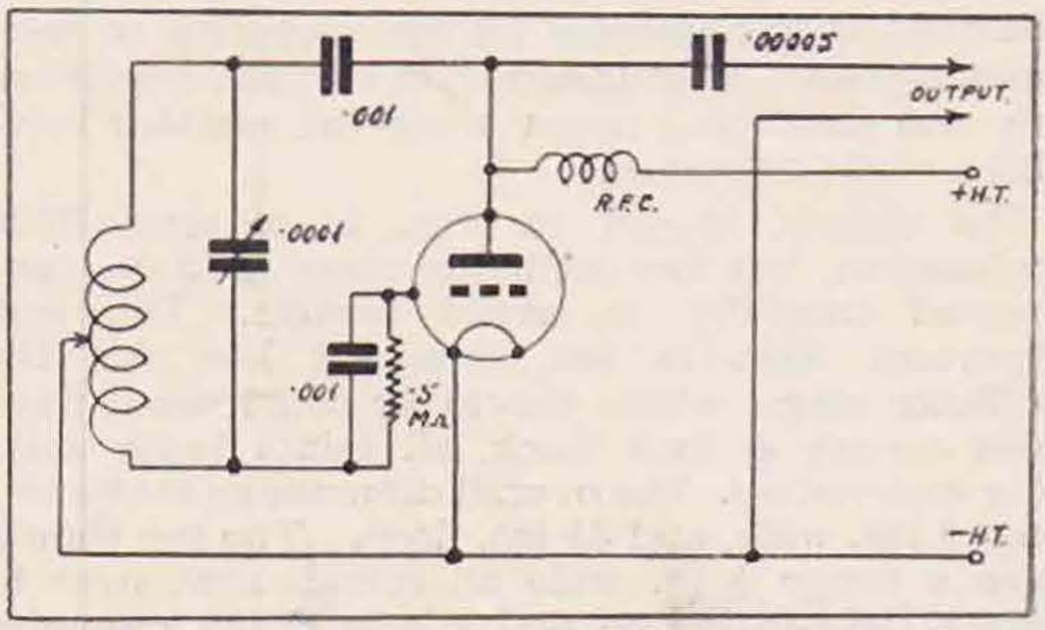


Fig. 3.
Modulated Test Oscillator.

Before commencing to line up the I.F. stages, disconnect the centre-tap of L2 in the receiver, rendering the 56 Mc. oscillator stage inoperative. Then disconnect the damping resistances (R2, 3, 4, 5, 6 and 7) across the I.F. transformers, to allow a definite peak to be found. The lead to the top (grid) cap of the X41 is removed, and the signal from the modulated oscillator injected *via* same. The trimmers of the I.F. transformers are then adjusted to give the maximum signal in the output. The use of an " R "-strength meter or similar means of indication of output is helpful here, otherwise the ear must be relied upon. If the modulated signal from the I.F. generator is found to be too loud, the connection to the X41 grid may be taken off and the wire allowed to dangle on the floor.

The leads to the centre-tap of L2 and the top cap of the X41 may now be replaced, and tests of the completed receiver proceeded with. The 56 Mc. harmonic from a transmitter may be used for this purpose. The tuning of the first detector is so broad that it was found unnecessary to do any lining-up in the first detector and oscillator stages. No trimming or padding condensers are fitted for this reason, it being found that the 56 Mc. band could be covered with only a very small loss.

An ordinary aerial may be used, with a small coupling condenser, but the following details are given for those who wish to use a di-pole. The di-pole feeders are coupled to L3, which consists of a small coil wound tightly over L1, with insulation interposed. For a 76 ohm line, the writer recommends about 4 turns of 20 gauge wire, and for a 600 ohm line about 18 turns.

All component values are given in the table under the circuit diagram. Coil and valve data are as follows :—

L1=5 turns, ½" diam., 14 gauge
L2=3 turns, 1" diam., 14 gauge
Filament chokes (X41) = ¼—.
} May vary with spacing.

V1=X41 (Osram).
V2=MSP4 (Osram).
V3=MSP4 (Osram).
V4=MHD4 (Osram).
V5=N41 (Osram).

R2, R3, R4, R5, R6, R7 are the damping resistances for the I.F. transformer, and ½ megohm is a suitable value to start with. The actual value will depend on V1 and the requirements of the user. For crystal-controlled C.W., they may be left out entirely, increased sensitivity resulting. Values as low as 100,000 ohms may be used to give increased band-width, but sensitivity will decrease accordingly.

The oscillator used for ganging the I.F. stages may be successfully put to a further use as a beat frequency oscillator for C.W. reception. The grid-leak and condenser values must, of course, be altered, as a modulated note is not required. An alternative method is to leave out one of the decoupling condensers in the I.F. stages, so that they are in a state of self-oscillation, but this method is not recommended.

The receiver is still in experimental form and not all that can be desired in the way of a 56 Mc. superheterodyne.

* * *

Since the foregoing was written, several alterations and improvements have been made. Signal strength has been improved by tapping the control grid of the X41 down on L1, due to the lessened damping of the input circuit.

Another development was the replacing of the output pentode with a triode (MH4), the loud-speaker giving way to a pair of telephones, the effect being a decrease in the background noise and improved signal to noise ratio.

A radio frequency stage, using an Osram W42 has been fitted in front of the frequency changer, the grid circuit being untuned and choke/condenser coupling used in the anode circuit, but no noticeable gain has so far been obtained.

All tests on this receiver have been made locally, the aerial being a half-wave vertical wire up in the roof of the house and fed by means of a 600 ohm transmission line. It is hoped later to erect a phased horizontal aerial array directed on Uncle Sam!

A query was received some time ago from a member asking why the screen bypass condensers were taken to cathode and not to the chassis. The reason is that it is the cathode of the associated valve to which radio frequency currents must be returned. As a matter of fact, it was found by experience that the receiver was more stable when the bypass condensers were returned to the cathode, so that for once theory and practice agree!

In closing, the writer wishes to thank G5PP and G5QN for their valued assistance in making local tests, and also G5JU, who on several occasions stopped the writer from throwing the whole outfit into the garden of his neighbour—the one who grumbles about QRM from the transmitter when the owner of the latter is out!

BOOK CONVENTION DATES
Sept. 2, 3, & 4, 1937

Contemporary Literature

WIDE-RANGE RESONANCE-TYPE FREQUENCY METERS WITH SENSITIVE VACUUM TUBE INDICATORS. WOLCOT M. SMITH. (QST. JANUARY, 1937.)

The author describes the construction of two highly sensitive frequency meters, the first being a small laboratory model having a range of 1 to 600 metres, the other being a larger model with a range of 80 kc. to 20 Mc., with five coils.

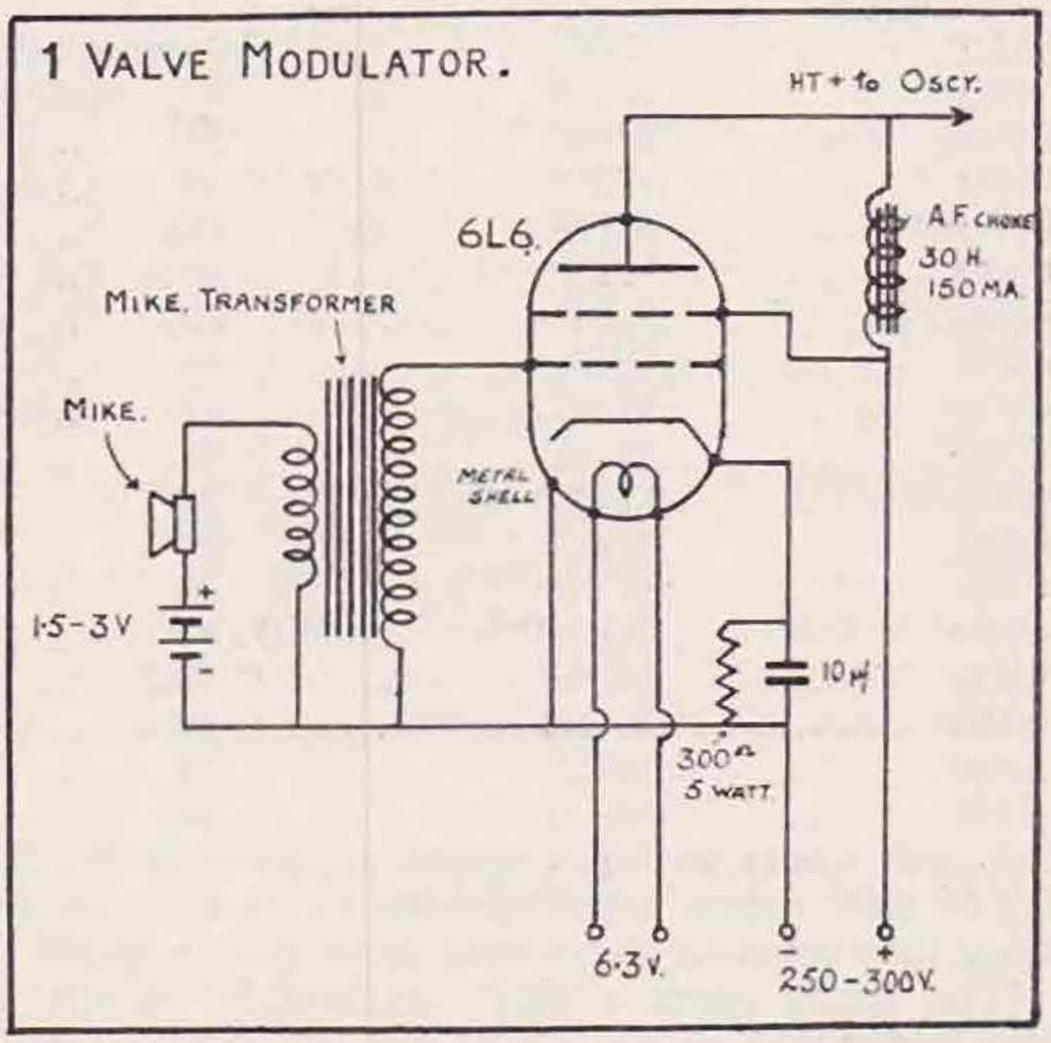
The indicator is essentially a triode voltmeter, the only departure from standard practice being the method of controlling the initial electron current. This is effected by cathode or filament temperature control or emission control rather than by variation of grid bias or anode voltage.

Suggested uses for the meters are: checking harmonic content in the transmitter wave; antenna guy-wire oscillation; pick-up in light or power wiring; relative field strength measurements, etc., while the detector alone with the condenser set at minimum can be used as an A.C. peak voltmeter.

ONE-VALVE MODULATOR. (SHORT WAVE AND TELEVISION.) (FEBRUARY, 1937.)

In answer to a query for a one-valve modulator for a five-metre oscillator, the attached diagram is given.

The modulator uses a single 6L6 valve, has an output of approximately 7 watts, and will modulate an oscillator having an input of 14 or 15 watts. A sensitive single-button carbon microphone should be used.

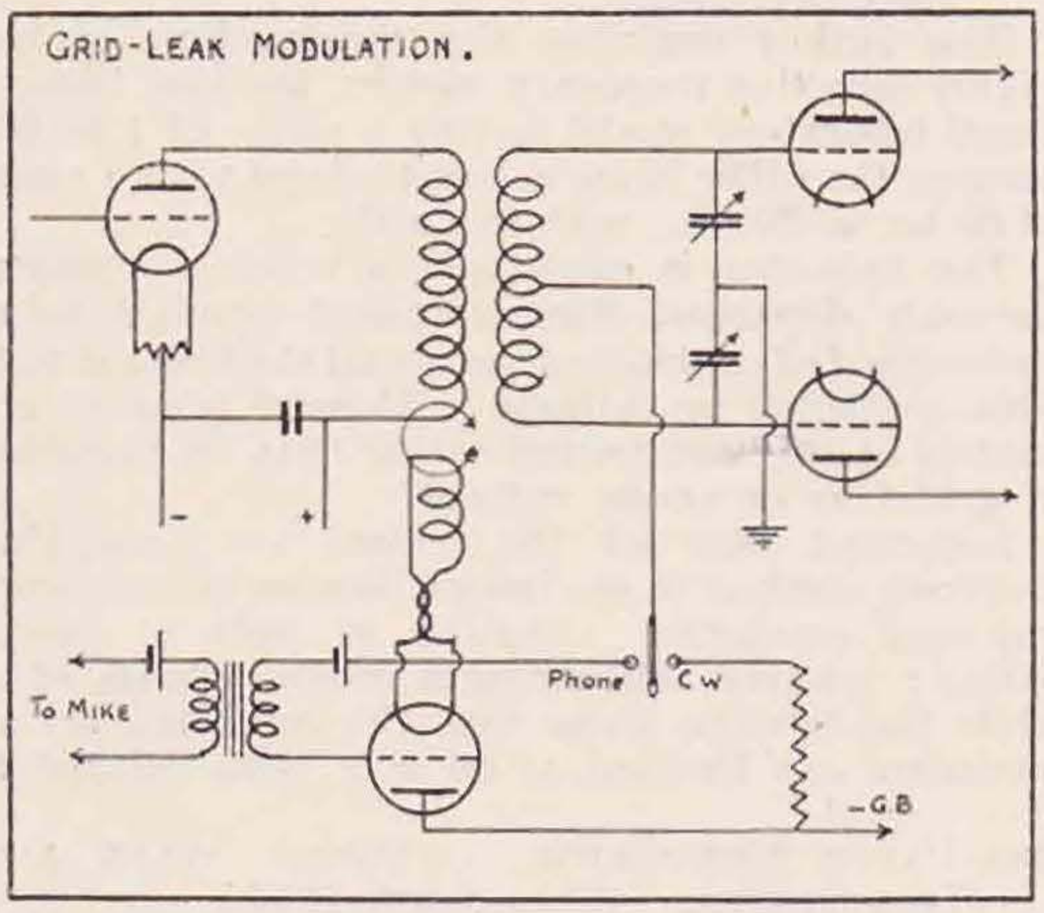


GRID-LEAK MODULATION. TRANSLATED FROM SWEDISH "QTC," No. 4, 1936, BY S. K. LEWER (G6LJ).

In a grid-leak modulation circuit, when a directly heated valve is used, it is necessary to provide a carefully insulated battery for heating the filament since it is at grid-potential above earth. SM5WJ has made tests with a directly heated modulator valve whose filament is heated by R.F. energy absorbed from the circuit to which the modulator is coupled. Thus the two filament terminals are

connected by a twin wire link to a two-turn coil coupled to the anode coil of the driver. The elements of the circuit arrangement are shown below.

One word of warning : do not couple the coil too closely at the beginning !



MORSE TRANSMISSIONS. TRANSLATED FROM SWEDISH "QTC," No. 6, 1936, BY S. K. LEWER (G6LJ).

The following list of transmissions has been compiled by one of the members of the Swedish Amateur Society. The transmissions consist of Press telegrams, and the following list shows the times of operation, call-sign and wavelength of the stations.

G.M.T.		Call.		Wavelength.
0100	...	WPN	...	27 metres
0100	...	WPN	...	34 ,,
0100	...	WPN	...	46 ,,
0100	...	KJH	...	37 ,,
0300	...	KUP	...	46 ,,
0300	...	KPF	...	37 ,,
0418	...	WSL	...	54 ,,
0418	...	WSC	...	47 ,,
0500	...	WAI	...	36 ,,
0500	...	WHD	...	36 ,,
0500	...	KTK	...	34 ,,
0500	...	KTK	...	46 ,,
0600	...	KFS	...	36 ,,
0800	...	KPK	...	35.5 ,,
0900	...	KUH	...	36 ,,
2200	...	WCX	...	37 ,,
2340	...	WCO	...	46 ,,

This list seems to be a useful supplement to the list of slow morse transmissions by G stations for those interested in improving their morse speed.

[The times seem a little unsuitable except in two instances!—Ed.]

G5ML on 56 Mc.

Mr. F. W. Miles, G5ML, is working on 56062 kc. every Sunday between 11.00 and 13.00 B.S.T. with either phone or c.w., using an input of 300 watts to a rotating beam aerial. He is anxious to receive reports from stations situated 100 or more miles from Kenilworth. Already his signals have been heard up to 50 miles.

The Arrangement and Filing of Radio Information

By L. FRYER (GM2FR).

THE main consideration is to preserve only that which is essential from the vast amount of material published on the subject of radio, and to arrange it so that one can immediately lay hands on everything that has been collected on any particular subject.

The information in which we are interested will usually come from one of two sources :—

(1) Books, chapters or odd pages from books.
(2) Periodicals and cuttings from periodicals.

The matter to be included in class (1) raises an important point. It is obvious we cannot arrange it in a logical manner unless we are prepared to

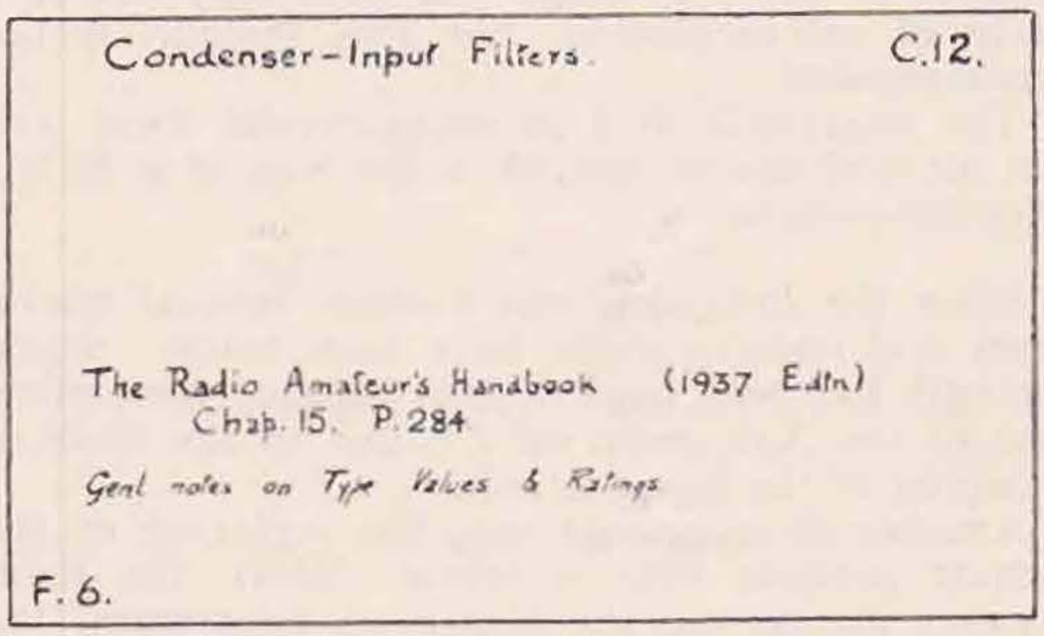


FIG. 1.

remove the pages and thereby destroy the books. We are forced, therefore, to adopt some form of index system which *can* be arranged logically.

The matter included in class (2), chiefly cuttings, is best arranged logically since, by doing this, all matter dealing with any particular subject is kept together, but since in many cases an article deals with different phases of a subject, or sometimes various subjects, we are again obliged to index the items in some way.

The Index.

The card system is the ideal form for this work since an article can be indexed under as many heads as required, the only work entailed being the writing up of the actual cards.

The method used by the writer is as follows the record cards are numbered consecutively in the top right-hand corner as they are written, the number being prefixed by the index letter of the section ; in the bottom left-hand corner are placed any other numbers under which the subject is also indexed.

In the case of matter falling into class (1), books are kept in alphabetical order of title, record cards being made out for those items which specially interest the Society. The title is placed fairly low down on the card with chapter, page, and, if thought necessary, line references underneath, while the heading of the card gives the actual item for which the reference was made, below which are placed any notes as to the scope, etc., of the article which may be useful.

Fig. 1 shows one of the two cards prepared to cover the section on " Condenser-Input Filters " in the Radio Amateurs' Handbook.

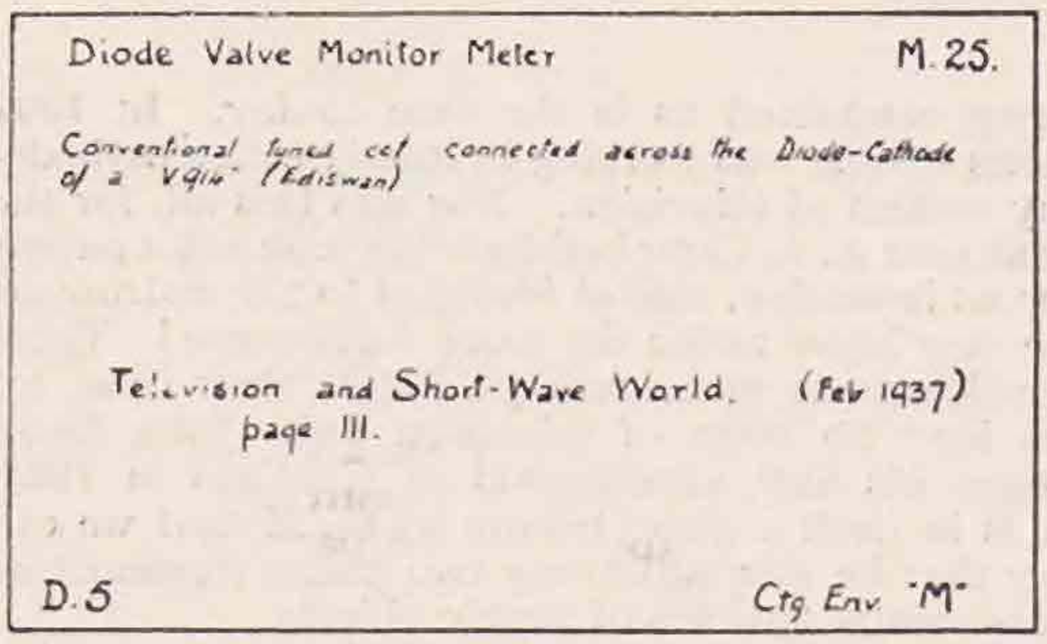


FIG. 2.

Cuttings are kept in large, strong envelopes, which are identified by a letter written at the bottom right-hand corner of the record card. For example, take the article on " A Diode Valve Monitor Meter " in the February, 1937, issue of *Television and Short-Wave World*. One of the cards is shown in Fig. 2. In this case the actual title gives the " meat " of the article, and thus it can be used as the card heading. The reference (CTG ENV " M ") denotes the envelope in which the cutting is kept and the cross-reference under " D " is indicated in the bottom left-hand corner.

The system is easily expanded as required, additional envelopes bearing a number in addition to the letter.

Where the whole field of radio is to be covered by the reference system, " The Dewey Decimal Classification and Relative Index," with the extensions proposed by the U.S. Bureau of Standards and the further extensions proposed by the *Wireless Engineer* in 1924 and 1925, is excellent. But the system described above was adopted as being more suitable for amateur purposes, the references being confined to short-wave and connected subjects.

The 56 Mc. Relay Tests

By J. N. WALKER (G5JU).

JUDGING from the number of reports received, activity on the 56 Mc. band in this country on May 2 must have been greater than on any previous day. Although no contacts over long distances took place, the results were very interesting, and the tests well worth the trouble in organising them. Thanks are due to all who took part and reported, and the writer regrets that he was unable to reply personally to all who did so.

The weather was fine and sunny, with the barometer high and steady, and this induced a number of portable stations to be active, chiefly in North Wales and Lancashire. In and around London many stations were using the band, and test messages were relayed through as many as four stations. In other parts of the country the distances between stations were too great, and whilst the specified stations sent out their messages no one reports having heard them.

The longest distance covered by an actual contact was 66 miles, G6YQP, near Prestatyn, working G5ZTP on Parlike Pike, 15 miles north of Preston, the strength being R8/9 at both stations, although G5ZTP's input was only 2 watts. G6YQP also had contacts with G2DC and G5MQ, both of Liverpool, 36 miles, whilst G5ZTP had contacts with G2IN, 6OK, 6DO and 2DC. He also heard G5MQ and G6US (?) but was unable to effect contact. It is notable that both G6YQP and G5ZTP were using horizontal aerials of 66 ft. or longer. All these stations appear to have been so busy contacting each other that no relay messages were passed through, though it is doubtful if they would have travelled any greater distance than 66 miles, if they had been originated.

An interesting report was received from G5YP, who took a receiver to the top of the Wrekin, in Shropshire. He succeeded in hearing G6DO, 5MQ, 5ZT, 2DC and 5ML, the loudest of these being 5MQ, whose M.C.W. was R6. Practically all of these stations were over 50 miles away, while G5ZT was nearly 100 miles distant, the report given here being R3, M.C.W.

Coming a little south, G2JL operated a portable station in the Brecknock Beacons, but whilst car ignition could be heard over 300 yards, no actual signals were heard at all. G5JU, in Bristol, had a contact on C.W. with G5FS, 5 miles, and passed over a test message. G6FG of Portishead, 15 miles, was heard sending straight C.W., but he was unfortunately not using his receiver, owing to interference from the neighbouring commercial station. Several very weak, broadly modulated carriers were also heard, but could not be identified. G2CI, near Honiton, Devon, sent out two messages, but no reports of reception have been received. He worked a number of local stations, but heard no signals from any distance.

G6QZ, Norwich, was active with a 25-watt. crystal controlled transmitter and sensitive l-v-l receiver, but did not succeed in hearing or working anyone.

G6DH had a QSO with G8MV, of Ipswich, distance 20 miles, but, although active throughout the morning and afternoon, did not succeed in hearing any other station.

Coming to the London area, a number of messages were relayed by C.W., M.C.W. and telephony, the chief stations active being G6GR, 5LB, 5WW, 5RD, 6PK, 2HG and 2MR. The best relay of the day was a message relating to conditions during June and July of last year originated by G2NH, and passed on through 5LB, 6PK, 6GR and 5RD. G6GR originated a number of messages, as also did G5RD, both these stations using C.W. and telephony with crystal controlled transmitters. G6GR worked several new stations, over greater distances than previously obtained. G5LB and others noted the fact that very few stations remained active after 13.00 B.S.T., and the band was practically dead during the afternoon. No reports on the London transmissions were received from any great distance. BRS2601, of Ewell, Surrey, and 1173, of Heathfield, Sussex, sent in two useful reports. The signals heard by the latter were too weak to identify, but the log sent in by the former was a very complete and interesting one. G5RD, 24 miles away, was received at R6, G6GR, 16 miles, at R4, and practically all the London area stations

(*Continued on page* 610)

INTRODUCING TELEVISION

By E. Scudder (BRS981).

TELEVISION Is Here!" "No Television Yet!" cries taken up by this paper and that display for the most part journalistic nonsense owing to the reporter's inability to appreciate the true position of television. Yet television alone among the Sciences has had no real obstacle to development. Together with its first cousin, photo-telegraphy, it has been developed smoothly and constantly, efficiently aided and effectually helped by other sciences which were themselves developing.

The birth of television undoubtedly took place in the period 1800 to 1850, when scientists were experimenting with violet rays, ultra-violet rays, and the effects of daylight on various metals. It was during this period, too, that the metal, selenium, was first discovered, although it was not until nearly the end of a century that its special light-sensitive properties were discovered and investigated. In 1885 Faraday found that a ray of light polarised in one direction can be diverted by the action of a magnet.

With the last year of this period came the forerunner of the many photo-telegraphic systems now in widespread use throughout the world. A telegraph was devised in which a picture was produced on specially prepared paper. This was accomplished by treating the paper chemically so as to discolour it when the current at the transmitting station was made and broken. The design was drawn by a metallic point at the transmitting end in shellac ink on a metal cylinder, in the form of a spiral.

The latter half of the nineteenth century saw mainly the development of photo-telegraphy. One event which was later to have a profound effect on television was the observation at Valentia Telegraph Station of the strange behaviour of selenium. An operator named May discovered the light-sensitive properties of the metal, and these observations were later confirmed by Willoughby-Smith and by W. G. Adams, who found that the change of resistance of selenium varies directly as the square root of the illumination. Towards the end of this period the first photo-electric cells were being constructed and experiments were being carried out in the photo-electric power of sunlight and diffused light.

But this was not the sole television discovery that this half-century has to its credit. A Polish scientist was experimenting in 1884 to some purpose, for he designed a disc without which there would be no television from Eiffel Tower to-day. His name was Nipkow, and his disc is fittingly named after him. In this country also a scientist has given his name to an invention of considerable importance to television. The Kerr cell was developed after the discovery and demonstration of the fact that a ray of polarised light is rotated by reflection at the end or at the side of a magnet. Nor must we forget the invention of the mirror wheel now widely in use for optical-mechanical receivers.

It is a strange fact that the opening of the twentieth century saw much the same experiments being conducted as is the case to-day. In 1907 Boris Rosing was working in Russia with a cathode-ray system of television. Nor was this all, for the next year A. A. Campbell-Swinton took out a patent for an invention, almost identical to the instrument we now know under the name Iconoscope! These developments were, perhaps, before their time, for we hear no more of television until John Baird began his first experiments at Hastings in 1923. It is in itself a great tribute to Baird that we can say that he was, after only two years, transmitting successfully outlines of simple objects.

The next two years, however, saw even greater progress being made. In January, 1926, Baird demonstrated television before the Royal Institution. In December Baird Television was "on the air" from the old 2LO B.B.C. station. In 1927 the "Televisor" (the Baird system receiver) was successfully tried out on what may be best described as "wired television" from London to Glasgow. Progress was not confined to this country by any means. In the U.S.A., Bell demonstrated a system of television which successfully passed the rather severe test of transmission over a distance of 250 miles from New York to Washington. At Geneva, Fulton demonstrated an apparatus for picture broadcasting. This year also saw the formation of the Television Society under the presidency of Lord Haldane of Cloan.

For five years low-definition television went ahead. London to New York by Baird Television; the Derby televised each year, and once reproduced on an express train on its way North; Baird demonstrated colour television to the British Association at Glasgow; the invention of "Noctovision," or infra-red ray television; the germ of television in Germany in the inventions of Mihaly; New York television broadcasts received in Johannesburg; a South African television camera invented by J. de Wet; successful broadcasts from Chelmsford to Sydney, where cathode-ray reception reproduced as many as 75 words transmitted from England, clearly and consecutively. Then the turn to high definition, high fidelity and high frequency.

It is not our present intention to give the details of any one system at length, or even to describe the general arrangements made for the development of television in any one particular country. These must form the subjects of later articles. It is, however, hoped to give some account of the progress made in the science throughout the world. So far as world progress is concerned we may sub-divide States into three main types. First those in the laboratory and waiting stage; second, those in the demonstration stage; and, finally, those providing a regular service.

Australia, as we have seen, has already shown her readiness to experiment, but, in common with Belgium, Canada, Czecho-Slovakia, Norway, New Zealand, Roumania and India, she prefers to wait until high definition television is put on a commercial basis. In Austria, up to the time of receipt of the information, experiments were being made in both black and white, and also colour, although

these tests were not sufficiently far advanced to warrant actual demonstrations. Finland is nearer the idea than most of the countries in this class.l Premises for the establishment of television studios and a tower for the erection of an aerial system have been reserved in the heart of the capital, Helsinki.

The Irish Free State, on the other hand, is in a unique position. The need for an Irish short-wave broadcast station is just being felt. It is thought that this should have preference, particularly as the present broadcasting service only just pays its way. As opposed to this, Japan, Poland and Switzerland are taking steps to ensure a regular service when apparatus is available.

Japan is sublimely optimistic, for although a centre has been established at Tokyo under the direction of the Japanese Broadcasting Company, nothing more ambitious than low-definition television has been attempted ; but the Government hope to broadcast—by television—the whole of the Olympic Games to be held at Tokyo in 1940, for general re-diffusion to the world. Poland is, perhaps, the nearest of these countries to the provision of a service, as a transmitter is under construction in a skyscraper in the heart of Warsaw. The broadcasting organisation, "Polskie-Radio," is to provide public viewing rooms, and this is in spite of the fact that there are no receivers available for public purchase.

Switzerland has its own special problem, for it is doubtful whether the geography of the country will give rise to an exceptionally good service or to a very poor one. To ascertain the effect of location in this country, a wireless survey is now being conducted with wave frequencies of the order of 60 Mc./sec.

Five countries have graduated to the demonstration class. These are Holland, Italy, South Africa, Sweden and the U.S.A. Four others are giving regular services, i.e., Great Britain from London, France from Paris, Germany from Berlin, and the U.S.S.R. from Moscow.

The initiative in Holland has been taken by the Philips Company, who are putting out a 500-watt signal on both sound and vision frequencies, in spite of there being no receivers or public viewing rooms in Holland. Sound is transmitted on 41,2 Mc./sec. and vision on 43,0 Mc./sec.

Italy is preparing a service which will use both the iconoscope and mechanical scanning, the wave frequency being between 60 and 43 Mc./sec.

The Johannesburg Exhibition was remarkable for its television demonstrations of five cathode ray receivers. It would seem, too, that, not content with receiving low-definition television from New York, Johannesburg must receive high definition from London, and this latter on a 0-v-1 receiver, and with consistency !

Svenska-radio-aktiebologet, the Swedish radio firm who popularised radio reception in that country by transmitting their own programmes, were given permission to try the same thing with television. The apparatus was built partly by the firm itself and partly by the German television firm of Loewe. The first demonstration was made in July, 1935, and then regular transmissions were made to the end of the year. It is to be regretted that the service was discontinued owing to the high cost of receivers and the small size of the picture obtained.

In the United States much experimental work, a good deal of it along original lines, preceded any demonstration ; but at present Philco, R.C.A. and Farnsworth are giving demonstrations, the latter Corporation having powers to experiment with all-electronic systems.

Television services are being successfully maintained and developed. The French service is run by the Government, the station being at the Eiffel Tower. From here transmissions are sent on both low and high definition, the former on 180 metres and the latter on 6.7 metres (vision) and 7 metres (sound). The German service, run by the broadcasting organisation, began in March, 1935, and has the same wave-lengths as the French high-definition television. Public viewing rooms are free, and the programme is given on three days a week. As in Switzerland, success may be largely a matter of location, and in order to secure the greatest possible service area a new transmitter is being built on the summit of the Brocken. Moscow has been giving low-definition programmes for some time, but at the moment experimental transmissions are being made on a frequency of 50 Mc./sec., with high-definition television.

So much for progress up to date. Much of the foregoing has been culled from the pages of *Television and Short Wave World* and from *World Radio*, to whom our thanks are due. It will be appreciated that a great deal remains to be done even in this country. Even here a radio survey would be beneficial, but this is only part of a very great series of problems yet to be solved. It is to be hoped that the amateur will be able to play his part to the full in blazing the trail for television as he did for radio. Amateurs as a team are uniquely well placed to supply the statistical observations on signal strength and reception results, which would amount to a radio survey. Only an ultra-short-wave receiver is necessary, of any type, and it is hoped that every amateur who hears television signals will write to the Television Section of R.E.S. about it, so that results can be correlated and published.

The 28 Mc. Band

By Nelly Corry (G2YL).

As is usual during May, the band suffered from deterioration of conditions and a consequent fall in popularity and population. It is a sad but true fact that, whatever he may do on other frequencies, when it comes to 28 Mc., the average ham (and I include myself) always has a good "listen-round" before transmitting. If he hears nothing he abandons 28 Mc. as "Dead again," and sends out a "Test DX" on 14 Mc. ! Conditions were similar to those of last year, but from every continent except Central and South America there was a decline in the number of stations heard.

For the first month since August, 1936, no contacts with VK's were reported, in fact VK3CP, heard on May 7 and 23 by G6DH, appears to have been the only one heard. G6DH was also luckier with Asia than most G's, and on the morning of May 18 he worked J2CB, J2CF and J2IN. VU2CQ, heard by G2XC, G6DH and G6YL on several days, was the only other Asiatic signal reported.

Africans were heard on at least 12 days and

(*Continued on page* 610)

A HOME-MADE RECORDER

By C. H. L. Andrew (G2HF)

HOW fascinating it is to see Morse printed tape, bearing a message from some far-off station, written in the individual peculiarities of the sender, issuing from a machine before your eyes. This is quite within the realms of possibility for any amateur, as such apparatus is easy to construct from material found in the usual junk box.

Whilst the author does not claim as something new this idea of a recorder, he has not seen any description previously of such a simple and robust device, constructed mostly from Meccano parts; thus the following particulars of an arrangement made by him might be interesting.

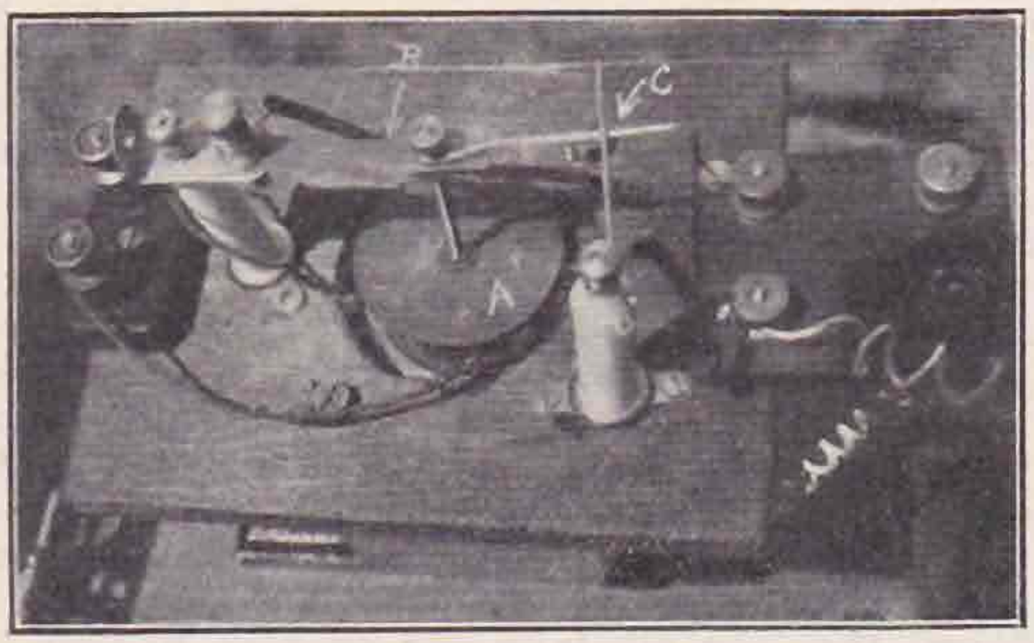


Fig. 1.
Close-up of Recorder.
A Moving coil.
B Spring strip.
C Contacts in series with magnet (F) and 4½ volt battery.

It will be readily admitted that with the help of a lathe a much more businesslike instrument could be constructed; but the writer purposely set out with the idea of utilising the material to be found in the possession of most amateurs, a lathe usually being an unheard-of luxury. If made with ordinary care this recorder is both practical and reliable, and is certainly interesting and instructive.

The human ear is so accommodating that it does not detect the individual characteristics of spacing, etc., associated with most amateur "fists." It certainly came as a revelation to the writer when he first saw his own transmission on tape, and he hastily set about endeavouring to rectify his various imperfections, hitherto undetected. This recorder is capable of receiving at about 70 w.p.m., more than sufficient for all amateur requirements. By calculating the motor speed and number of letters the transmission speed is known.

Although it may at first appear to simplify matters by using a combined inker and relay, the writer has found in his experience that it is best to employ a separate device for each purpose.

To give satisfactory results the receiver used should be a reasonably efficient superhet, or, failing this, an amplifier must be employed to boost up a less powerful set. The input to the recorder should be about 8 to 10 volts, although, if the noise level is low, 3 or 4 volts is often sufficient to operate.

The photographs give a fairly good idea of the general construction. "M" is the motor; "P" the tape "puller," which is made by winding soft rubber tape around the motor spindle, which in turn bears on a fluted rubber or metal roller, held together by an adjustable spring; "D" is a mains energised magnet; "H" the paper drum. The tape illustrated has since been replaced by paper

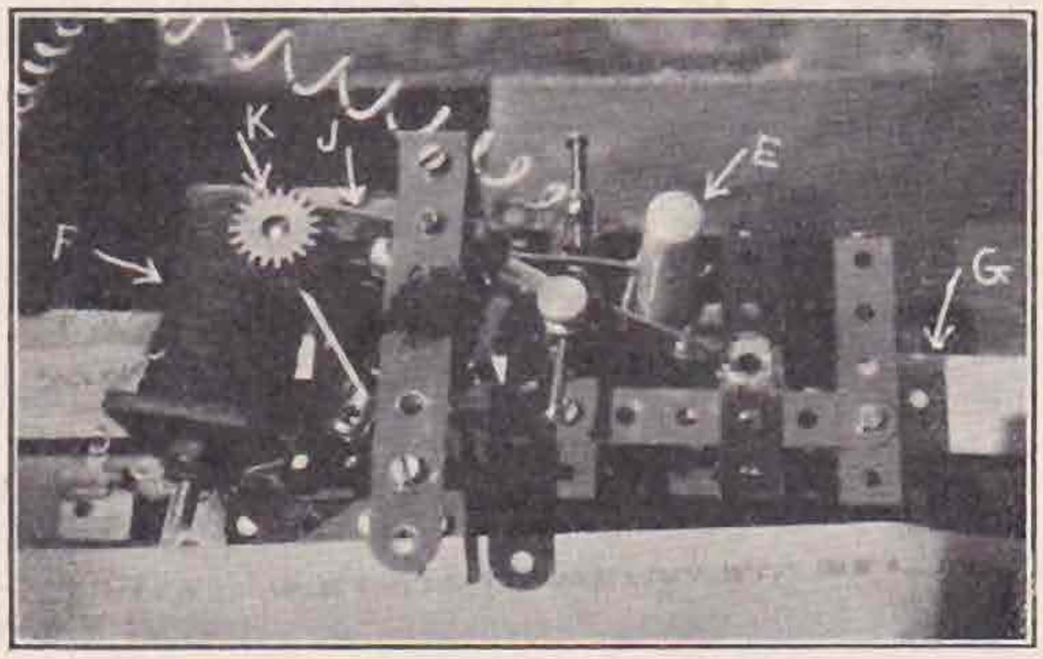


Fig. 3.
Another close-up view of Recorder Mechanism.
E Stylo pen.
F Electromagnet.
G Paper Guide.
J Pen armature.
K Adjustable pen pressure screw.

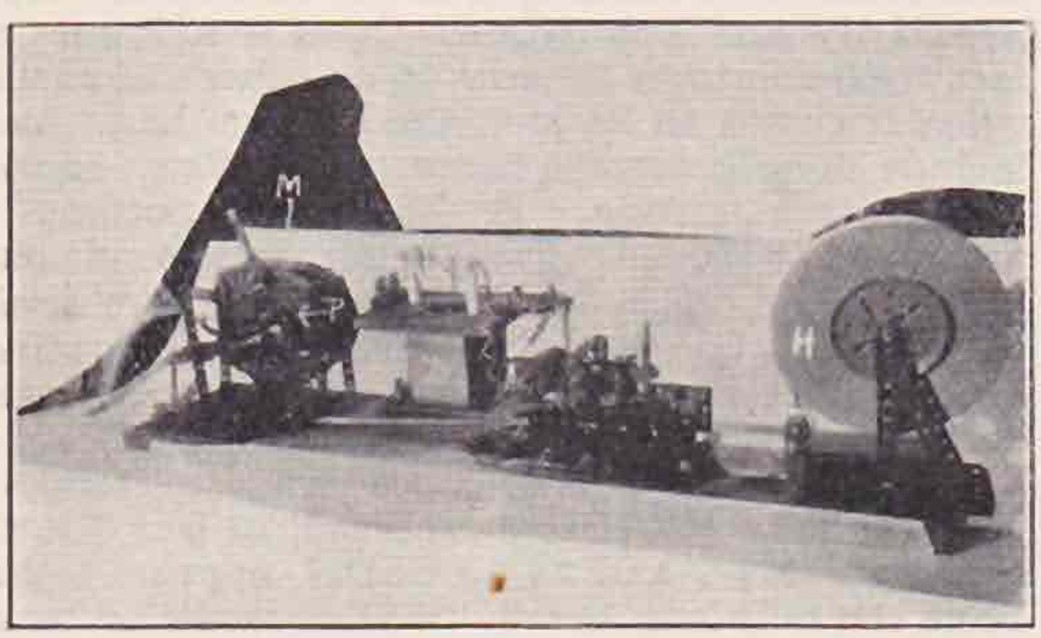


Fig. 2.
General view of Recorder.
D Magnet coil (and filter choke).
H Paper drum.
M Motor.
P Tape puller.
T Tape.

tape of half the width, procurable from *Messrs. Electradix*. "B" is the spring strip; "C" th silver wire contacts; "F" the electromagnet "G" the paper guide; "E" the stylo pen; "K" th adjustable pen pressure screw, and "A" the movin coil. The connections are quite straightforwar the output of the set or amplifier going through th small metal rectifier to the moving coil "A terminals. The contacts "C" are in series wi the magnet "F," and a 4½ volt battery. In th writer's case, the magnet coil "D" formed th filter choke of the receiver power pack.

The copper oxide rectifier required betwe the set and the relay is a *Westinghouse* Type LB. I

At the time the photograph was taken, the mot was a spring gramophone type, which has sin

been replaced by an Induction Electric Motor, which is much more regular in action.

It will generally be found necessary to get the centre magnet pole " D " turned down in a lathe or grinder in order to give a little more clearance for the moving coil. This magnet was an old mains energised moving coil speaker of about 2,000 ohms resistance. The special coil former was made by wrapping around the centre magnet pole one layer of good note—or drawing—paper to serve as a " spacer," and then winding over this 3 or 4 layers of similar paper interleaved with " Seccotine," and then bound around to dry hard. A disc of thin cardboard is then stuck over one end of the former and the whole given a coat of shellac. Upon this former is carefully wound about 1,500 turns of

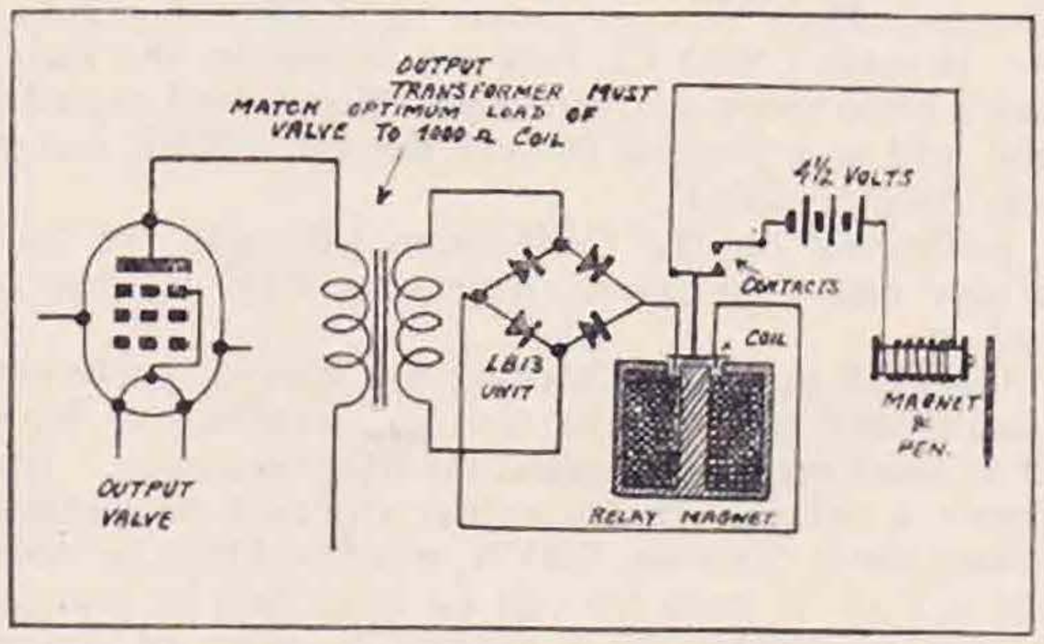


Fig. 4.—Diagram of Connections for the Recorder.

No. 42 enamelled wire which will give a resistance of just over 1,000 ohms. This process is rather tedious and it was found that a simple winder also made from Meccano parts greatly facilitated the winding. When complete, apply another coat of shellac, and when dry stick over the finished coil a piece of cellophane as a protection against abrasion. Two pins stuck well into the cardboard disc were found very useful for soldering the thin wire ends and the tinsel leads together.

Finally a thin screwed rod connects the former and coil to the spring strip. To this spring is clamped a piece of silver wire to make the lower of the relay contacts.

The actual inker was a short stylo pen with the centre spring plunger removed. This pen was bolted to the armature and the adjustable paper guide and table varies the pressure of the paper against the pen.

At first it may appear difficult to read the printed Morse characters, but by covering up the lower half of the letters, the dots and dashes are easily apparent.

With a little practice it is possible to read at sight as the tape issues from the recorder. By the addition of other simple devices the writer is now able to record music and speech without the use of any disc, blanks, or cutting head, but this being in its experimental stage must be left for the present.

Reports Wanted

G8ON (Worksop), on his 7160, 7196, 14320, 14392 kc. transmissions.

Television Exhibition

Once again the Science Museum, South Kensington, London, has given a lead in matters scientific. Commencing June 11 last an exhibition of modern high definition television was opened to the public free of charge.

The Exhibition has been designed partly with a view to demonstrating that television has now emerged from the experimental stage, partly to illustrate the general principles which underlie the modern technique, and partly to foster the widest possible appreciation of television as a home entertainment.

The Exhibition incorporates an historic section dealing briefly with early proposals for television, together with a working demonstration of the low definition system which was broadcast by the Baird process a year or so ago.

There are demonstrations on modern cathode ray receivers, and a demonstration of large screen television by a mechanical-optical process.

In connection with the Exhibition a handbook has been compiled by Mr. G. R. M. Garratt, M.A. (an early R.S.G.B. member and holder of the original call G2CS), assisted by members of the Exhibition Committee. The handbook contains a brief account of early proposals for television, chapters on photo electricity and light control, the cathode ray tube and electron cameras, the television transmitter, television receivers, aerials and a short description of the London Television Station. Copies will be on sale at the Science Museum, or may be obtained from the publishers, *H.M. Stationery Office*, price 6d. (by post 7d.).

The Exhibition is open from 10 a.m. to 6 p.m. on Mondays, Tuesdays and Wednesdays and from 10 a.m. to 8 p.m. on Thursdays, Fridays and Saturdays. On August Bank Holiday the hours will be from 10 a.m. to 8 p.m., and on Sundays 2.30 p.m. to 6 p.m.

Trade News

Eves Radio, Ltd., advise us that for the third time in twelve months they have been compelled to move their Mail Order Department into larger premises, this time to Willenhall Road, Wolverhampton.

Members are advised to call first at the retail premises in Lichfield Street.

In addition to Mr. H. R. Adams (G2NO), the staff includes Mr. C. Price (G6PC) and Mr. T. R. McElroy, of Boston, Mass. The latter is American buyer and organiser.

Mr. Price has taken charge of a new department for the construction of special equipment.

More Snowdon Tests

We learn from Mr. David Mitchell that G6OK and G6YQ will be operating from the summit of Snowdon during the 56 Mc. Field Day on July 4. Schedules are required with stations over 100 miles distant. I.C.W. or 'phone will be used.

Knock, Knock

Mr. J. O. Widdowson (2BZO) asks where " plug-in " coil formers or coils incorporating a semi-variable condenser can be obtained. He requires them for permanent band setting.

THE MONTH ON THE AIR—MAY, 1937

By John Hunter (G2ZQ).*

THIS month is a triumph for the QRP stations. G5VU received S8 from the new Siamese HS1BJ for his 28th zone on 25 watts. HS1BJ 14070 T9 only uses 5 watts output and his QRA is the same as HS1PJ. G6FU works FN1C 14190 T9; G6WY also worked him but not on QRP! FN1C's QRA is Gondalpara, Chandernagore, French India, and the operator's name is D. W. Paterson. He usually listens from the L.F. end of the band. The good old regular QRP DX man, G5RF, with a true ten watts, works PZ1AL, VE5EH, K6OJG, CR7GF, ST2BN and ON4CRM (OQ5RM) in the last couple of months. In his QSO with ON4CRM he cut down his power to 5 watts and was still S6 in Belgian Congo. G6ZO works OA4AQ 14310 T6x, J5CC, PK1MO 14075 T9x and several W6 and 7 with powers between 12 and 24 watts. To go up the scale a little, G6RH uses 50 watts to a matched impedance aerial with a 118-ohm line and gets amazing reports, including S9 from XU6LN. On May 29 he had never heard K5 or 6 and on the 30th he had worked K5AA and heard a K6. A sad story comes from DX-envious EI7J. He uses good gear, 50 watts and much patience, but cannot get outside Europe. He wants a monthly résumé of conditions on the air with the times of everything. A difficult thing to do, EI7J, with the entire world coming in nearly all day as it is at present.

A few more useful frequencies: XE3AR 14290 T9x, FY8A 14420 very chirpy (worked by G2MI), ST2LR and ST2BN 14355 T9x. The former is operated by Wally Dunn (ex-G2LR) of the R.A.F., Khartoum, and the latter by Corporal MacTrusty, Durham Light Infantry, British Barracks, Khartoum. J7CR 14290 T9 and J8CF 14280 T6x were both heard at 1330 G.M.T. recently. EL2A 14370 T9x was worked in a row recently by G2ZQ, G6WY, G2MI and G6CJ. G2YL reports new YL ops, VK6YL and VK5YL. Has anyone yet got YL-WAC or YL-WBE? G6ZO's list of frequencies includes ZA2RX 14300 T6, YV5ABE 14090 F8, TA2S 14010 T8, OA4R 14400 T9, HH5PA 14080 T9, W5DUI (New Mexico) 14000 T9, FM8AA 14250 T7x, K6BAX 14250 T7x, XE1DA all over the band. He reports as pirates VU2DN, YI2BA, K5XX. However, CR9AB is perfectly genuine and QSL's. YI5KG is owned by the Crown Prince of Iraq and is operated by Mr. R. Rifaat, Supervisor, Wireless Station, Civil Airport, Baghdad. BRS2178 saves 7 Mc's reputation by hearing YV5AO and OS1BR 7160 at midnight.

OS1BR in a recent QSO said he was sorry that the "Suliman, Suez," QRA was no good, but that for certain reasons he could give nothing better at the moment. When he returns to the States at the end of 1937 we will hear further from him. BRS2317 hears the yacht "Jaque Davida," off Cyprus working G2NF on 14 Mc. phone. BRS1535's card to ZC4AR was returned, so he retires to 56 Mc. in disgust. BERS195 (to whom apologies for inadvertently calling BERS185 in the March number) logs G6XR for his first G phone in South VK. Later he heard phone from G2NA and EI3J. He hears FN1C on 7 Mc., while on April 6 when G's were coming in well on 14 Mc., G2XN and G2TR were the loudest. 195 wonders who is XG8HT, heard on 14 Mc. S7 at 1105 G.M.T. He is now back in VK8, having landed an excellent PMG job in Darwin.

W9WDU is located in Grand Island, Nebr., where the FCC monitor station is, but that doesn't seem to worry him as he abides by the rules and most of the FCC staff are amateurs anyway. BRS2292 was rather surprised to hear our one and only Clarry calling W's on phone on 7 Mc. at midday. No, it wasn't that CL had got bitten by the radio-bug a little too much, but some other G had recorded him and was playing it over the air. (Still waters run deep! G6CL.)

Following on the Californian kilowatt, we have a new one—the South American CQ—it goes on and on.

GM2TM is shortly leaving for Kenya, preferring roadhouses to radio in the hot weather—I know of at least one good reason for his preference. And here's a mix-up that's rather difficult to explain. When Lieut. Nepean, G5YN, went to Tibet he asked the G.P.O. to keep his call for him, but by mistake it was re-allotted to a Scotsman, now, of course, GM5YN, who is sticking to it until the original G5YN returns. The reason for this explanation is that GM5YN is worried lest people should think him a pirate after my remarks about AC4YN last month. Thank goodness he isn't in England—it would have been even harder to explain if there hadn't been the difference in prefixes.

We will finish with a good suggestion from G5HH, which will not, I am afraid, find favour with all. Here it is: Black list all G's who QSO stations with prehistoric notes, the theory being that if no one worked the T1 signals they would soon instal more modern equipment. He especially refers to the recent SP contest, during which were heard more disgusting notes than at any time in the last ten years. An excellent scheme, but we couldn't black-list some of the eminent R.S.G.B. members who entered this very contest, or they would find someone else to do this column. There's a rumour going around that a member of Council is very excited because he hopes he has won the SP contest. See my difficulty?

Empire Calls Heard

Eric W. Trebilcock (BERS195), whilst in St. Peter's, South Australia. From April 22 to 30.

'Phone: ei3j (955), g2na (956).

C.W.: g2fz (954), 2kv (954), 2oa (944), 2pl (956), 2xn (935), 2yb (943), 2yl (955), 2zp (955), 5bj (955), 5hb (955), 5hz (944), 5ms (954), 5mw (953), 5qa (955), 5rv (954), 6dl (954), 6dp (955), 6gn (955), 6ku (955), 6py (944), 6rb (944), 6vd (945), 8ct (955), 8dl (943), 8jv (945), gm2tm (955), 5zx (945), ve9aj (954), vp5ad (954), vq4cri (944), vs1ai (956), 7gj (944), 7jw (956), 7mb (955), 7rf (856), vu2dy (956), zl2ap (856), 2fa (956), 2ky (955), 2mn (856), 2oq (856), 2qa (956), 2sm (856), 2sx (958), 3ja (856).

* 63, Hervey Road, London, S.E.3.

THE NORTH-WESTERN PROVINCIAL DISTRICT MEETING

BRILLIANT sunshine spreading over most parts of No. 1 District on the morning of the Meeting, May 23, no doubt had much to do with the record attendance of 77 members at the Scarisbrook Hotel, Southport; but the real credit must be given to Mr. Jim Davies (G2OA), the Town Representative for Liverpool, who organised the whole of the arrangements and shouldered all the responsibility for their successful running. He also did much excellent spade work in circularising members with particulars of the programme and general advance publicity. The attendance was very much better than at the last North-Western Provincial Meeting, but the same remarkable absence of local members was noticed, only a few Southport members attending the Meeting. All other parts of No. 1 were well represented, but unfortunately no visitors from other Districts were able to attend.

An innovation was introduced in the holding of the business meeting before lunch and although this was itself completely successful, the procedure is not recommended because of the difficulty which it creates in regard to the keeping to time of the subsequent programme. In spite of the fact that nearly everybody had assembled before 12 noon personal contacts and general introductions were not completed until very much later and the opening of the business meeting was therefore considerably delayed. Everybody seemed anxious to meet "Clarry" in person and he was seen to be having a very busy time renewing contact with old friends and acquaintances and in making contact with every member in the room both old and new, consequently it was some time before he could extricate himself from the attentions of his "fans"!

Calm being ultimately restored, the business meeting was then opened by Mr. J. Noden (G6TW), the District Representative, who occupied the chair. After extending a hearty welcome to our popular Secretary, he gave a brief review of District activities and expressed his thanks to the various Town Representatives and others who had given him their help during the previous year, and he then called upon each T.R. present at the meeting to give a short account of local activity in his own particular area. In some cases several members from a particular town were present without their T.R. and in these cases the D.R. called upon one of the members to deputise. In this way those present were able to hear a few words from a representative of each of the principal towns in the District.

The meeting then settled down to hear "Clarry" give his address, which was listened to with undivided attention, the only interruption being caused by the all-important subject of ordering drinks for the lunch which was to follow! G6CL spoke for nearly an hour and covered a great deal of ground, yet his talk seemed to occupy a very much shorter space of time. His review of the progress of the Society and its activities gave great satisfaction and the information which he gave to the meeting in regard to the forthcoming International Conference at Cairo certainly made those present realise how much their interests are being represented and safeguarded by the Society. Licence facilities, Band Occupancy and the BULLETIN were some of the subjects touched upon and the Secretary wound up his address by expressing his thanks to the D.R., to those who had helped in the representation of the Society in No. 1 District and to all present for giving the meeting their support. The usual question period followed, during which several queries were raised, all of which G6CL dealt with clearly and expeditiously, as is his wont, and the last item on the agenda before lunch was the fixing of the venue for the North-Western Provincial District Meeting to be held in 1938. Some argument followed, many members favouring Blackpool, particularly those living there, who were naturally anxious to show what their town could do. Unfortunately transport facilities for those residing in the Cheshire area are such that it is by no means easy to reach that town on a Sunday without rising with the lark and returning with the following day's milk; it was finally decided, on the matter being put to the vote, that the meeting should again be held in Southport, which is reasonably accessible to members living in all parts of the District and an attractive meeting-place. Mr. Jackson (G6ZU) then proposed a vote of thanks to G6CL for attending, and this was duly seconded and carried with gusto! By this time the programme was very much behind time and members were quite ready for their lunch and the drinks previously ordered.

During the progress of lunch the conference room was prepared for the lecture which was to follow, and on the conclusion of the meal, the members reassembled to hear Mr. G. Parr, of the *Edison Swan Company*, lecture on the subject of "The Cathode Ray Tube." Mr. Parr had spent the morning travelling from London for the express purpose of giving this lecture and all present were very much indebted to him for the trouble which he had taken on their behalf. The lecture was illustrated with lantern slides, and proved most interesting and informative, Mr. Parr having an excellent sense of humour and a particularly effective method of putting over his remarks. The lecture concluded with a hearty vote of thanks to Mr. Parr, who was then seen off the premises, with much regret at the necessity of his leaving before tea in order to catch his train back to town.

By this time the perfect weather of the morning had given place to a torrential downpour of rain and, as the approach to the Hotel was being used by numerous people as a shelter it was quite impossible to obtain the usual group photograph; its absence as an illustration accompanying this short article is not due to the fact that the members were in the same state as the fleet some few weeks ago!

After a short interval for further discussion, tea was served and, when this had been disposed of, G2OA, with the assistance of 2DC, conducted three raffles, apparatus having been donated by *Eves' Radio, Ltd.*, of Wolverhampton, *The Quartz Crystal*

(*Continued on page* 610)

SOLILOQUIES FROM THE SHACK

By Uncle Tom.

(Our tame horn-rimmed poodle returns to the fray—and, boy, does he bite?)

MY fan-mail this month has been informative. I have been told (*a*) that I don't get paid for being serious—my job is to be funny; (*b*) that I don't get paid for writing just when I feel like it—my job is to appear punctually, on the dot, every month; and (*c*) that I don't get paid for making fun of radio amateurs who are sufficiently human to introduce that grand old institution, the Christian name.

Of course, all the above are strictly and indubitably correct, for I don't get paid at all. My work is strictly honorary. I am like the wind off the gasworks that bloweth when, where and how it liketh. If I don't want to cast heavy missiles at some of my little cretins, I don't bother about doing so. In other words, I please myself, but I don't care a twopenny darn whether I please anyone else or not.

So now we're all friends together (*you* know what I mean, G6—) we can get down to business.

First of all, in absolute defiance of everyone concerned, let me have a swipe at this great Fellowship of Christian Names. Why aren't the members more consistent? They have allotted themselves call-signs and prefixes (cf., DA-PHNE, DA-ISY—both of which should be German flying-boats) which don't convey anything to the casual listener. All well and good—but why aren't they more consistent? I want to see some QSL cards with these new call-signs on them.

Think how well my wall would look with a new set of cards—a sort of Raphael Tuck's collection of Christian Names for Tiny Tots. Marmaduke, Clarence, Cuthbert, Freddy, George, John, Norman and—well, you know some more of them, anyway. What a thrill!

Now why, asks a little moron, do I always seem to attack the 'phone brigade? I'm a 'phone-hound myself and it doesn't seem quite right and proper. Well, the only answer I can think of, off-hand, is that they do so many more darned silly things than do the C.W. hounds. But perhaps it isn't that—it's the unfortunate but obvious fact that a 'phone-hound making a fool of himself on the air is so much more in the public eye than is a lad who uses code.

A 'phone-hound explaining to someone else that his speech "seems to get louder" when he puts another two volts on the microphone is heard by 753 (approx.) short-wave listeners and by dozens of other hams. A C.W. bloke explaining that he has never been able to understand how a neuted PA works is probably not heard by anyone except the G.P.O. and the man he's working with. No one ever seems to listen to ragchews on C.W., but the 'phone bloke is the cynosure of every ear.

And that I know from bitter experience, because I once made a highly personal remark over the air (I should have known better) and had it repeated back to me by all and sundry for *months* afterwards. It was a very funny incident and the laugh was on me, which probably explains it.

So will the 'phonists please note this—if it hasn't already sunk partly into their skulls—that *they* are the men by whose conduct amateur radio is judged? It's a tremendously important point and a great responsibility and I have never been more serious in my life than while writing these words with one hand and drinking a cup of tea with the other.

C.W. blokes—however good your operating and general demeanour may be, it is your opposite number who will, sooner or later, get *you* a bad name if he doesn't behave himself. And when you mention, in a polite Sunday evening gathering, that you "have a little transmitter at home," you may bet your Number Nine's that there will be someone there who will say, "Oh, are you one of those people that say 'Calling Test' and 'Come in, please'?"

I write this with feeling because, last night, at just such a gathering, I explained at great length that amateurs were only allowed to talk about their experimental work. Someone immediately rounded on me and said "What bunk! Why, on my all-wave set I was listening this morning to G8— and G5— and they hardly said a word about radio all the time. One was talking about the weather and the other about where he was going for his holiday."

Doesn't that just show? (Show what?) How the heck should *I* know?

Next attack—this business of running around with lousy little 5-metre transmitters, receivers and transceivers, all beautifully wobbulated, and expecting to do something useful with them.

Why the things are tolerated at all in 1937 I don't know—they are definitely 1927 in technique. Why don't some more stations get going with fixed aerials, frequency stabilisation and reasonably high power? Everyone is sitting pretty and waiting to see what the hams do with 5 metres—and what are they doing? Talking to each other across the golf links, climbing up trees like little boys, putting out wobble-wobbles from cars and generally spattering the 5-metre band with froth and spume.

Just as most of the old-stagers started from the age of power-buzzers and spark coils, with which they used to conduct illicit conversations with their neighbours, so certain of them seem to return to this terrible phase of wobbulation. Why they should imagine it to be effective on 5 metres when they don't think of doing it on 20 or 40 metres I can't imagine. Perhaps someone will explain some time.

And with these few random thoughts I leave you. I am about to assume a state of Stoj (the ninth heaven of delight) for a month, with a brief interval on June 5 and 6. *Good*-night, everybody.

Beginning Next Month

Mr. G. McLean Wilford (G2WD), whose articles on Transmitter Design were so much appreciated last year, has for the past few months been designing a new transmitter employing a dual channel exciter.

In our next issue we shall begin a series of articles dealing with this transmitter, which will be on display at Olympia in August.

THE HELPING HAND

By Austin Forsyth (G6FO—BRS80)

PART IV—USING THE RECEIVING STATION

General Listening.

HAVING in the last two articles attempted to cover the practical requirements connected with receiver design, frequency measurement and monitoring, we propose this month to deal with the use to which the BRS man can put this gear, as we know that there is sometimes a feeling of incompleteness and frustration in the minds of many non-transmitting members.

In other words, the fact that the full permit seems a long way off rather dampens their ardour and even if the station is fully equipped for reception, along the lines suggested in the articles mentioned, there does not appear to be much that can be done with it.

Actually, this is far from being the case, as the BRS man, while he is still free from the distractions and preoccupations of the transmitting side, has a tremendous field of useful and interesting work open to him; work not only of the greatest importance to Amateur Radio as a whole but which will also provide the beginner with valuable knowledge and experience against the time when he is ready to go on the air himself.

For obviously, in this business of Amateur Radio, the receiving side is equally as important as the transmitting, a fact lost sight of by far too many members. We have already said that there are many stations which lose considerably in efficiency, and therefore in enjoyment, owing to bad operating or poor equipment in connection with the receiving apparatus. Intelligent listening on the various amateur bands is an education for any prospective transmitter. It teaches him not only what to do but, more important, what to avoid on the air. A great deal of the "rottenness" in Amateur Radio—yes, there are certain aspects of this game which are as rotten as those of any other—is due largely to the ignorance and inexperience of the transmitters of the younger generation, in the amateur sense, who have not been through the school from the ground up. That is, those who have never been useful BRS men.

But what is a useful BRS man? How can a non-transmitting member gain this necessary preliminary experience and, during the period of qualifying for his licence, do his share towards the common good of Amateur Radio and at the same time justify his membership of the Society?

To some, of course, the whole subject of amateur-band receivers is in itself a study, absorbing enough spare time (and spare cash) to constitute a profitable and interesting hobby which, while it may not result in any startling discoveries, will yet contribute something to the sum total of our knowledge; and the more people there are who know about these things, the faster will we all progress. The man working on receivers has his counterpart in the fully licensed amateur who does little else but bench-work on transmitters. It may surprise many readers to know that some of our most technically advanced members are seldom heard on the air, though they are not a whit less active than So-and-so, who spends most of his time making 'phone WACs.

To the BRS man with experimental inclinations, who would like to make what we think would be a contribution to Amateur Radio, we offer this suggestion: A design for an amateur receiver having switched coil-change and full spreading of all bands from 1.7 to 28 Mc., with a built-in and interconnected 'phone-CW monitor. This brief specification has in it more than meets the eye. It would fill the requirements of that large number of amateurs who want a sound and up-to-date design which they can build themselves, without having to go to the expense of buying kits or tuner units.

We have already said there is something to be gained by intelligent listening. This means that the efficient BRS should be familiar with the results obtainable and the general reception phenomena at his own station *on all bands*. Most listeners spend the greater part of their time on 7 and 14 Mc. The former, now recognised as the nursery for amateur amateurs on 'phone, is of very little use to the serious beginner—except in so far as it teaches him how bad rotten operating procedure can be and what selfishness in using a transmitter leads to—while 14 Mc. has become the happy hunting ground of the "SWL" whose sole ambition is to make an enormous collection of QSL cards. Not that we are throwing any bricks at this angle of Amateur Radio; it has its interest and its uses, as later we shall try and show.

But how many BRS have any idea of what happens on 3.5 or 1.7 Mc., to say nothing of 28 and 56 Mc.? We know that many readers of that sentence have never had coils for 1.7 Mc. They are perhaps using an "all-wave" broadcast receiver . . . but we said all we dared about that in April! 7 and 14 Mc. are not by any means the only bands in which transmitters are interested. One example is 1.7 Mc., which only needs more occupancy, both by transmitters and listeners, to make it a good deal more useful than it already is.

In all his listening and experimental work, the beginner should get into the habit of keeping full records, tidily and accurately. From these, he should be able to compare conditions over given periods on any band, and also to show records of the reception of regularly heard stations. Data of this sort will be invaluable when transmission is commenced, as it will provide information as to the bands to use and the results which can be expected. For those who may require a little guidance on the point, we reproduce herewith a suggested method of making a log book. The book itself can be foolscap size, and the right-hand pages only should be ruled for log-keeping. The left-hand side is kept for general notes and observations connected purely with reception results and conditions, or amplified remarks about a particular station or transmission. The data on the experimental work proper should be entered separately in another book, divided up into sections, such as aerial, RF stage, detector circuit, LF stage, coil values, and so on. One small point worth mentioning is that it is best to take rough notes only at first, re-writing them at leisure for the permanent record.

Co-operation with Transmitting Amateurs.

Too often "co-operation with transmitting amateurs" means nothing more nor less than joining in the scramble for QSL cards. But one can be of real assistance to transmitters and still be interested in QSLs. The way to do this is to keep the two things separate.

This may best be explained by defining what was first conceived to be the function of the BRS membership: That it should be a body of competent listening stations able and willing to assist the transmitting amateur with his experiments by regular reports and observations, thus giving BRS men a status which entitled their reports to respect—and a QSL. With regard to QSL'ing, we have more to say later, but now we should like to try and indicate in what direction BRS men can help those who transmit.

The first and most obvious case is where a station is heard (on any band) putting out perhaps rather a bad transmission, and not succeeding in raising a soul. That amateur will be very glad to have a report, particularly if it is an accurate one. If the modulation was so bad that speech was scarcely readable, say so; likewise give a true report of the strength and other features of the transmission. When reporting *any* transmission, the object should be to give the man at the other end a complete picture of how his signal was received; such things as strength, quality, fading, interference and so forth are obvious. But on how many listener-reports nowadays do we find information such as the following: A comparison in signal strength with another station in the same locality; a few remarks on any previous transmissions which may have been heard; a check on frequency—obtained from a calibrated heterodyne frequency meter; the call-signs of any interfering stations, with a note regarding a station which may have answered the "Test" or "CQ" call being reported on, but which was missed at the sending end.

Another direction in which BRS men can make themselves particularly helpful is in keeping a check on the output of any station which requires such assistance, in the form of regular reports. We can imagine a case where, say, a 3.5 Mc. 'phone operator would find regular and comparative reports from the north of Scotland most useful and instructive.

In fact, the value of a dependable listener with sufficient experience accurately to assess and weigh up different transmissions from the same station is immense. There are a large number of transmission tests—such as those connected with radiating systems—which can only be properly carried out in co-operation with a reliable distant station. This can just as well be a BRS keen on the job as a transmitter who may not have had enough listening experience to be able to give really accurate reports. There are quite a lot like that these days.

While work of the type outlined above would probably have little value on 7, 14 and 28 Mc. so far as G stations are concerned—the amateur body to which, strictly speaking, the BRS membership owes its first allegiance—there is plenty of scope for it on 3.5 and 1.7, to say nothing of 56 Mc. On these bands, there are responsible transmitters hungering for intelligent co-operation which, in terms of apparatus, does not require anything more than a properly handled receiver. When it comes to similar work with Empire and foreign stations, the field is unlimited. We well know how much a regular, comparative DX report is appreciated.

For this, it is obviously necessary to establish some sort of contact beforehand with a station wanting such reports. There is not much point in sitting down and picking out the loudest American signal on the 14 Mc. band and then writing to offer him regular reports; he's getting quite enough already. His problem is how to stop them! The man who *wants* and will really value reports is the transmitter with a weak and chancy signal, probably using low power, who does not raise DX easily. These stations are nowadays to be found chiefly on 28 and 3.5 Mc., though there are plenty on 7 and 14 Mc., if one can get behind the local 'phone on the former and the barrage of high-power transatlantic signals on the latter.

It should now be evident that the efficient BRS man is not only worth his weight in gold to the serious amateur who relies largely on outside reports in connection with his experiments, but by making himself useful in the manner described, the beginner is gaining that valuable knowledge and experience in amateur work which will be so useful later on, to say nothing of the interesting and lasting friendships which can be formed.

As we have remarked, no BRS man can call himself efficient and a useful member of the Society unless he is able to say he is absolutely *au fait* with results at his station on all six bands and can at the same time point to a record of co-operative work with some transmitter. . . . Of the non-transmitting membership reading this, how many can make the grade? We know that there are very few. This is proved by the poor response to the Society's Receiving Contests which, designed to assist and interest BRS men, could be a real test of skill and efficiency. But support for these contests is so poor that they have been practically discontinued. This is not a very inspiring comment on the BRS membership, particularly as the position could be very easily

rectified if the non-transmitting section would only realise that it does not necessarily require years of experience or piles of expensive apparatus to make a show in Receiving Contests. The main things are a receiver which the operator can handle—it may only be 0-V-1—combined with some more intelligence.

We may be allowed to say here that we can remember the time when an efficient BRS would be so busy with schedule work for transmitters that he would have no time for QSL cards, except those he earned from grateful members, while no call for assistance went unheeded when it came to experimental work from the transmitting end. Nor was there any question of "one-band listening." The BRS membership was capable of receiving on any frequency used by transmitters, and took pride in the quality of their reports.

STATION LOG. B.R.S. . . . . .

Date	G.M.T.	Band Mc.	Station Heard.	Calling	R	S	T	F	Remarks.	QSL. Sent.	QSL. R'cd.

Receiving Log. Ruling suggested for right-hand pages of foolscap book. Left-hand pages to be kept for more complete entries regarding reception conditions, etc.

Learning Morse.

There is no doubt that much of the lack of co-operation at the present time is due to the fact that only a small proportion of the non-transmitting section can read morse, by which we mean enough morse to identify any particular station. We therefore think that perhaps a few words on this subject may be helpful.

For some reason, it is a bogey to practically every beginner; something strange, difficult and professional, an art only to be acquired after months of arduous and uninteresting labour with buzzer and key.

But would it surprise you to know that, by the application of a little of this blessèd intelligence of which we have spoken several times this month, it is possible to learn enough morse to read call-signs in less than three weeks? We know BRS men who have got to this stage in a week. How is it done?

Drop the buzzer and key, get the morse alphabet in front of you, and soak in those letters and numbers by *uttering to yourself* their morse equivalents till you can buzz, in morse, any letter of the alphabet as you think of it. This may take a week or so, and the golden rule is constant practice. If you are really keen, you can practice all day and every day, because all you need is something to read off—an advertisement hoarding, or a newspaper heading; this page of the BULLETIN, anything at all, in fact, which is handy. What is the idea and the effect of this method of learning?

The idea is to get you into the habit early of impressing the *sound equivalents* of the various letters and figures on your brain, rather than having to try and remember them as dots and dashes, which always involves the necessity for unscrambling: That is, the letter A to you should be "dit-dah," and not "dot-dash-whats-that-A." The effect of constant practice is finally to get your brain trained to pick out letters and numbers without the unscrambling process being required. Then you are ready for the receiver. Get on to one of the amateur bands and find a station sending what even to you sounds like a repetition signal—the same thing over and over again. It will probably be either "Test" or "CQ," incidentally. Hang on to it till you have found out what he is sending. If you have carried out your "buzz practice" properly, you will quickly identify a few letters; if it is a repetition signal, as we have said, you will finally be able to piece it together, and then you get the thrill of your life on finding you have actually decoded and written down your first morse signal! You have picked an unknown jumble of sounds out of the air and made sense of them!

When this stage is reached, progress becomes faster. As you listen and carry on with your daily "buzz practice," you find you can read more easily and comfortably. *CQ and Test calls become instantly recognisable by their sound-formation.* Note this point. You begin to appreciate the time values which have to be given to letters and numbers to make them readable, which is most important. Morse must be sent to be as easy to read as print, i.e., properly spaced and punctuated. In one sense, morse is nothing more than reading print by ear. The printer does not chop up the words and letters of this page in any way he sees fit. They follow a form which you, as you read, instantly recognise without having to dissect each word and each letter into its components.

This brings us back to our original point—that the method of learning suggested here emphatically

rejects the commonly accepted idea that the study of morse involves hard labour with buzzer and key, for the reason that the absolute beginner is only retarding his own progress by trying to send before he can read well enough to know how properly transmitted morse should sound. And to know how correctly formed signals sound, it is only necessary to be able to read call-signs. Do not think that all you hear is good stuff correctly sent. Most of it is very bad and the sending poor, but even the beginner can pick out the fluent easy keying of the competent operator, and his signals will be the ones which are easiest to read.

We can imagine a case where our beginner sits down to practice with his friend, using buzzer and key. Neither have the faintest idea of how correct morse is sent and they proceed to develop a sort of code of their own which, while it may be based on the morse alphabet, yet bears no relation in time-values to what they hear on the air. The result is that they are learning and having to unlearn mistakes at the same time, the bother of it being that all this happens subconsciously without either of them being aware of it. The result is the laborious and heart-breaking process which a lot of our readers know so well.

By following the method outlined here, however, we know from experience—having ourselves " tried it on the dog "—that a keen learner with nothing more than the morse alphabet to go by and the simple rule " one dah is equal in time to three dits " can teach himself the code without ever touching buzzer and key, and we believe that where there is no qualified assistance available, it is the best and quickest way to learn. We are, of course, talking of the case where our beginner is faced with the morse problem alone and unaided, the position in which we know many readers find themselves. The great value of the method is that the only " equipment " required is one's ability to utter the two sounds " dit " and " dah." This is what makes practice possible at any time. Don't worry if your family, friends and business associates appear to treat you as a " case "—they probably think you're nuts anyhow because you are interested in Amateur Radio !

The ability to read morse, apart from the fact that it is an essential requirement for a full licence, opens up an entirely new world to the listener, which puts quite a different complexion on Amateur Radio.

QSL'ing

We have already said something about how a BRS can help with intelligent reports, and that that was the idea which first opened membership of the Society to anyone interested in Amateur Radio. We repeat, that was the idea. In course of time the BRS grade became recognised as the first stepping-stone to a full permit, and as the membership expanded so did the flow of QSL cards—QSL'ing for its own sake having become one of the main interests of the BRS—till we reach the conditions of to-day, where the BRS report cards are a positive menace and threaten not only to choke the Amateur Radio organisations which handle them, but also to bring the whole very useful and interesting business of QSL'ing into the most serious disrepute. Already, large numbers of amateur transmitters refuse to have anything at all to do with cards—which is not to be wondered at, when one remembers that at least one station we know of gets listener-reports at the rate of *seven thousand a year !* And they all expect an answer, even though 95 per cent. are of the " rubber stamp " variety and totally devoid of any practical value. Ten years ago one could send out cards in batches and be reasonably sure of getting a fairly high percentage of replies. But now discrimination is necessary and is becoming more so. Transmitters find cards interesting when exchanged among themselves, but they are nearly always suspicious of listener-reports because they know from experience that the bulk of these are sent solely with the idea of extracting a QSL from the unwilling recipient.

We have said enough already to indicate what constitutes a useful report, and it should be the aim of every BRS to make sure that each report he sends is as complete and as accurate as he can make it. Furthermore, they should go only to those stations which there is strong reason to believe need reports. In this way, the BRS immediately puts his work on a far higher plane than the " SWL QSL hunter," who operates on the mass production system—he fires as many shots as possible, hoping that some will hit, and in so doing causes intense congestion and annoyance which makes *all* listener-reports suspect in just those quarters where such an impression does most harm.

It may be asked : what is discrimination in QSL'ing ? It all comes back to being an intelligent listener. While it is obvious that there is not much point in QSL'ing, say, all American stations to be heard on 14 Mc., careful use of the receiver will disclose weak and " forgotten " transatlantic signals, apparently being ignored by everyone else, where a report will be very much appreciated, and nine times out of ten will produce a card. As there are always plenty of stations of this sort on the air on all bands, the scope for QSL'ing is more than sufficiently wide even if the loudest and most obvious signals are ignored—as they should be. W2 so-and-so, who works old G such-and-such on schedule on 14 Mc. 'phone every other day, knows perfectly well that his signals are covering England at R9, and a report to him is not only superfluous, but amounts to nothing less than an impertinence if a QSL card is demanded, even if stamps or reply coupons are enclosed. Yet scores of such reports are sent daily, and the eager listeners wonder why they do not get cards back ; they then write to wireless papers and start a cheap and foolish controversy which is based on misconceptions and false assumptions on the part of all concerned.

We could say quite a lot more about this sort of thing, and what is the best and most productive method of QSL'ing, but we feel we have written enough for the intelligent reader who is finding his way about the bands and wants to do things properly.

Our last word is that operators needing reports can be found on all bands and are not necessarily always DX, also that an efficient BRS who QSL's methodically and with discrimination should be able to show a record of 75 to 80 per cent. cards received against reports sent out.

To The Editor

ARTIFICIAL AERIAL NETWORKS

To the Editor, THE T. & R. BULLETIN.

DEAR SIR,—I have read with much interest the article in the April number by Messrs. Edwards and Coleman on the subject of aerial impedance, and the problem of the efficient transference of energy from the anode to the ether. They have skilfully condensed into three pages of practical wisdom a wide field of theory which is " complex " in both the mathematical and the everyday sense.

There is an aspect of the paper, however, which they only treat in passing, viz., the networks equivalent to the commoner types of aerial. It seems to me that the amateur could more easily, and certainly more painlessly, get his transmitter on the air and radiating at the peak of its abilities, if he had available the designs of dummy antennas which were a close match to the external antenna in use, and from which the change-over could be made with negligible disturbance to the tuning of the transmitter circuits. The good old-fashioned lamp-and-flex, or even the tuned loop circuit, may be the dummy for some aerial or other, but who shall say what ?

There are thus one or two points in the article which I could wish more fully explained. First, what units are to be used for the values of 1, L, and C in the networks of Fig. 2 ? Secondly, it is not made clear beyond doubt that the impedance across the two terminals of the network in Fig. 2 is equivalent to the impedence across the remote end of the feeder lines in Fig. 1a, or across the input to the aerial and its earth or counterpoise in Fig. 1 ; or, in other words, that the constants of the symbolic tank circuits depicted in Fig. 1 do not as yet enter into the values of the networks in Fig. 2.

Further, it seems that the equivalence of the dummy networks and the real aerials must hold only over some limited range of frequency. With increasing frequency the real aerial has a whole series of resonances where the impedance is non-reactive, as Fig. 3 shows. The networks of Fig. 2 have apparently only two. Possibly the equivalence holds only in the neighbourhood of one or other of the harmonic resonances. Might we be told for what range of frequencies the networks are approximately equivalent in impedance ?

Again, I fear the authors are unduly optimistic when they expect that " by a consideration of the dummy aerials of Fig. 2 it will be seen how to suitably adjust the values shown in Fig. 3 for Cases (1), (2) and (4)." Perhaps, given the complete formula relating length in wavelengths and impedence of which Fig. 3 is the representation, enlightenment would follow.

I am sure the publication of this article will be appreciated by others who, like myself, are becoming interested in this intricate but important branch of radio theory, and I would suggest the publication of a note or bibliography indicating where a more comprehensive treatment might be found.

Yours faithfully,
D. NIVEN (2CHN).

[EDITORIAL NOTE.—We are pleased to state that Messrs. Edwards and Coleman have produced a second article which will deal at length with the points raised by our correspondent. We hope to publish the contribution in our next issue.]

THE CAMBRIDGE GATHERING

IN the April issue of the BULLETIN there appeared an editorial entitled "Personal Contacts"; possibly that explains why the Cambridge meeting gave the honour to District 8 of entertaining the largest gathering of "Hams," "YL's," "YF's," ever to meet in this country outside the "Great Smoky City."

Assembling first at the P.O. Receiving Station near Baldock, those present were shown round the station and its extensive aerial systems by the Chief Engineer, Mr. Luckhurst, and his assistant, but unfortunately it was not possible to demonstrate reception, due to a complete fade-out. This gave many of those present a good deal of satisfaction, because it has been thought by many that only amateurs have this phenomena inflicted upon them!

Then back to Cambridge for a magnificent luncheon at the "University Arms" Hotel, and judging by the appetite of the 138 people who sat down to eat, the sunny breeze which had blown at Baldock had done its good work. The social side of the gathering was preserved by avoiding lengthy speeches, but there were a few words from "Clarry," congratulating Gerald Jeapes (G2XV), the District Representative, on his excellent work in organising such a highly successful function. Mr. Jeapes, in his reply, expressed the hope that his own district would give similar support to District 9's effort when it takes place in July. He mentioned that Mr. Sadler, the Representative for this District, had brought along a large number of members to support the function.

Several distinguished visitors were spotted by the writer, such as Mr. E. Dawson Ostermeyer, R.S.G.B.'s new President, and Past-President Arthur E. Watts. Council were represented by Ernie Dedman, Ham Whyte, Ham Clark, Alfred Gay, Cecil Page, and T. A. St. Johnston. The party proceeded to "Parker's Piece" for the photograph reproduced herewith. What a gathering, what an organisation, what a spirit of friendship, all kindled by that marvellous manufacturer of good fellowship—"Ham Radio."

Then a procession of some fifty cars calling "Test DX," filed away through Cambridge to the high-spot of the function—Professor Appleton's experimental transmitting and receiving stations. No efforts had been spared by Dr. Ratcliffe and his assistants to give us a welcome of the highest order. The gear displayed would need the whole of this issue to describe—and then some—for although housed in quite small huts, it has obviously been designed by a large brain to search into a still larger problem.

Back to the hotel for a refreshing cup of tea, all still wondering whether Clarry would come out with that little black book—but no, he remained surprisingly sociable! (Thanks, O.M.—G6CL.)

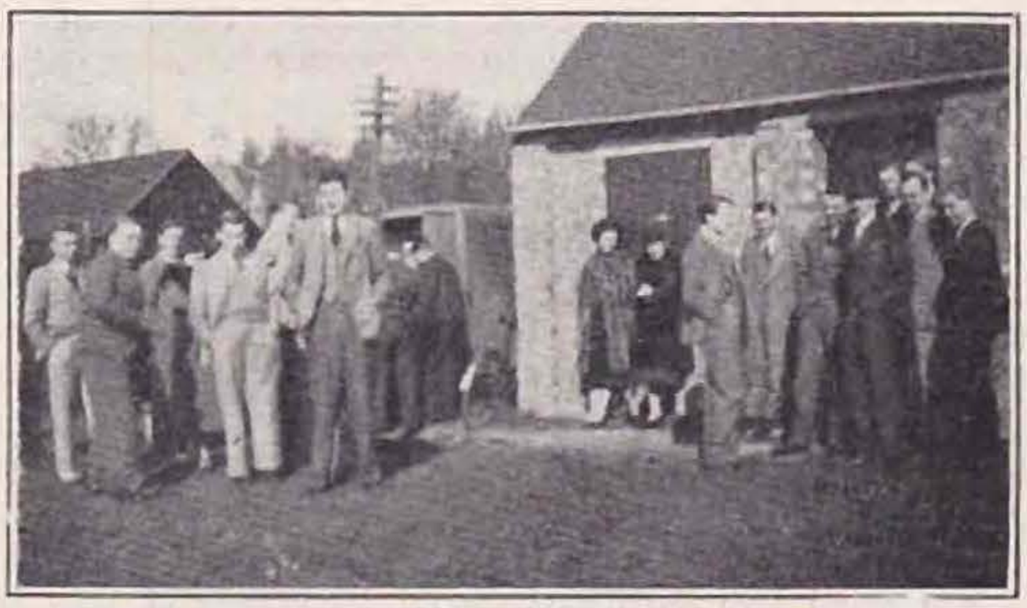
Tea over, and a general "Rag chew," then for those who had no urgent desire to turn homeward there were station visits, during which some remarkable impressions were gathered by certain people, as it has since been learned that Gerry Jeapes has been appointed Chief R.S.G.B. Tadpole Fancier, whilst "Old Bill," G5DR, is now regarded as a past-master in the art of arranging queues on stairs, and if there is a past-master at frequency shifting, then it must be Laurie of G5JO.

THE CAMBRIDGE CONVENTIONETTE.
An attendance of 140 was recorded at the recent Cambridge Conventionette, the largest ever, for an out of London meeting.

Epilogue.

Then came the night, clear and beautiful like the day it had been. We feel sure that all who came to Cambridge will certainly look forward to the announcement of next year's event in District Eight. (Sounds like an ode, but we'll let it pass.—ED.)

H.W.S.



THE CAMBRIDGE CONVENTIONETTE.
Some of the 140 members and friends who gathered at the Stratosphere Receiving Station operated by the Cavendish Laboratories.

Amateur Radio to the Rescue.*

One of the brightest chapters in the history of Amateur Radio was supplied by Mr. Walter Stiles (W8DPY), of Coudersport, Pa., when floods ravaged the Alleghany River Valley last March. For his bravery in this emergency Mr. Stiles won the first annual William S. Paley Amateur Radio Award.

Mr. K. B. Warner, Secretary of the American Radio Relay League, spoke on behalf of his organisation in accepting permanent custodianship of the trophy, symbolising the award to Mr. Stiles. The speakers were heard over a nation-wide network of the Columbia Broadcasting System.

On Wednesday, March 17, the Alleghany River reached the flood stage at Coudersport. Mr. Stiles, employed as an electrician on the Pennsylvania Railroad, decided that a major flood emergency was in the making, and went home to get his portable radio equipment ready for action. In the meantime he commenced handling flood calls from various points in the flood area over his permanent station. He continued taking routine flood messages until 9.30 the next morning, when a desperate call for help came from the CCC camp's amateur station near Renova, Pa.

Renova was isolated, its 4,000 citizens badly needed food, clothing and medical supplies. Stiles jotted down the message, tried to 'phone it into the Governor's office at Harrisburg. The telephone lines were down. So Stiles struck out on his own to rush aid to Renova. The Coudersport Red Cross met hurriedly, started at once collecting necessary supplies. The local CCC camp gave Stiles a truck and a crew to transport supplies and W8DPY's emergency equipment. At 6 o'clock that evening they started off.

The 68 miles of dirt road from Coudersport to Renova skirt the river all the way. Few who watched the rescue crew depart from Coudersport expected them to reach their destination. For miles the road was covered with flood waters. Bridges were out. Washouts threatened from below; landslides from overhead. Temporary roads had to be dug out of the mountain sides. Yet by 1.30 next morning they had reached a point only five miles from the stricken town.

There a mountain landslide had washed the road ahead into the river. Stiles got out of the truck, removed his clothing, and plunged into the swift, cold current to seek a possible footing for transporting supplies and radio equipment on the backs of the crew. Finding no bottom, he clambered out and made a trail around the landslide over the steep mountain slopes. By 5 a.m. the crew had carried the radio equipment into the town on stretchers; and by 5.30 Stiles began flashing relief messages over portable amateur station W8DPY—set up on the steps of the Renova Y.M.C.A. Sleepless for two nights previously, Stiles pounded out messages continuously for more than 24 hours. When two relief operators arrived from State College, Pa., Saturday night, Stiles was in a state of nervous collapse bordering on absolute breakdown.

But for 160 hours he had provided Renova with its sole means of communication with the outside world. And the food and first-aid supplies he brought in with his transmitter were all that averted acute suffering until further help could arrive.

His present transmitter, W8DPY, serves as the Net Control Station of the Army Amateur Radio System for Pennsylvania.

Besides amateur radio, Stiles' hobbies are a miniature railroad complete with passenger and freight engines, a stamp collection, and photography.

* Through the courtesty of Mr. Douglas Walters.

Book Review

THE LOW VOLTAGE CATHODE RAY TUBE and its applications. By G. Parr (Radio Division, The Edison Swan Electric Co.) 177 pages, 76 illustrations and many tables. Published by Chapman & Hall, Ltd., London. Price 10s. 6d. net.

This book is manifestly intended for the *user* of cathode ray tubes and gives the reader a clear insight into the technique; throughout it is practical in aim and treatment and is well illustrated with clear diagrams and plates.

Mr. Parr is no stranger to R.S.G.B. members, and they know him to be an authority on this subject. The great increase in the use of the cathode ray tube makes such a book from the author timely, valuable and recommendable.

The author deals first with the construction of tubes, deflection of beam and suitable supplies. Then comes a survey and explanation of magnetic, gas and electrostatic focusing and the reasons for origin distortion, ionic oscillation and irregular behaviour.

The treatment of Lissajous' figures includes methods of measuring phase angle, power and power factor, and frequency. As might be expected, the chapter dealing with Linear Time Bases is comprehensive and includes really practical information on gas-filled and mercury vapour relays, diodes and pentodes as charging devices, hard valve time bases and amplifier circuits. Following this comes a consideration of other time bases showing how various traces are produced and the methods of obtaining traces of transient phenomena.

"Applications to Radio Engineering" deals with the use of the tube in obtaining response curves of receivers and I.F. stages, modulation measurements, phase shift in transmitters, valve characteristics, measurement of inductance and dielectric power loss, direction finding and investigation of piezo-electric crystals, atmospherics and the ionosphere.

Various industrial and other applications are described, such as measurement of pressures, hysteresis loops, polar curves of light distribution, velocity of sound and cardiography.

The last chapter deals with television applications and much circuit information of a practical sort is given.

An Appendix deals with the very important subject of photographing traces, and useful it should be.

Seventeen pages of bibliography are included at the end of the book, the references being classified; a valuable conclusion to a most interesting and valuable book.

This book is most heartily recommended to all readers interested in the subject.

T. P. A.

R.S.G.B. SALES DEPT.

53, VICTORIA STREET, LONDON, S.W.1

PUBLICATIONS

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(Published quarterly in U.S.A. on the 15th of March, June, September and December.)

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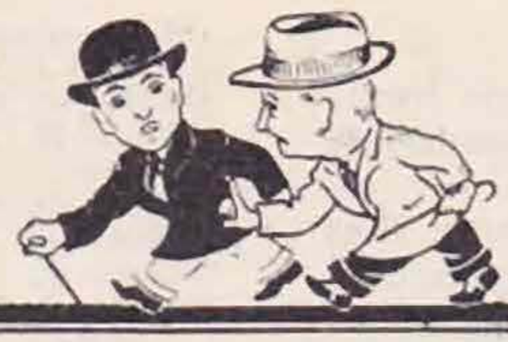
BETWEEN  OURSELVES

Exhibition and Convention

As previously announced, the Society will, as in past years, exhibit amateur-built gear on their stand at Olympia. Offers from members to loan well-made apparatus of general interest will be considered if details are sent in advance to Headquarters.

Volunteers will again be required for stand duty. Those in a position to assist should notify the Secretary, giving particulars of times and dates available.

The general plan for Convention will follow along similar lines to last year. Arrangements will be made for visits to places of interest on Thursday, September 2, and Friday, September 3, whilst the Conversazione will take place on the evening of the last-mentioned day. On Saturday, September 4, meetings will be held in the morning coincidental with technical discussion groups (if these can be arranged). An important lecture will follow the awarding of trophies in the afternoon, and the Convention proper will terminate with the annual dinner later that day.

Full details of the programme will appear in our next issue. Meanwhile we would urge all who can to book the dates:—

September 2, 3 and 4.

Copyright

New Malta Representative

We have been advised by the Malta B.E.R.U. Group that Lieut. R. F. Galea, ZB1E, has been appointed B.E.R.U. Representative for Malta. Mr. Montanaro Gauci, ZB1H, continues as QSL Manager, while Mr. C. C. Newman, ZB1J, is an *ex-officio* member of the Committee.

A SILENT KEY

Many members will regret the passing on May 16 last of Mr. Newell, G6NW, of Eastwood, Southend-on-Sea. Mr. Newell was licensed in 1928 and until 1935 operated an active low power station on all bands.

Although of a retiring nature, he was always willing to help new members, and a schedule with him would be rigidly kept. Mr. Newall was 64 years of age.

Our sympathies are extended to his widow in her sad bereavement.

56 Mc. National Field Day

The following members have signified their intention to operate 56 Mc. portable stations during the National Field Day fixed for Sunday, July 4.

Name.	Call.	Area.
D. N. Corfield	G5CD	Near Wendover.
J. N. Walker ...	G5JU	Tag Hill, near Bristol.
J. D. Coates ...	G2DC	Liverpool.
I. J. P. James	G5IJ	Horsenden Hill, Midx.
N. C. Kirby ...	G6FV	Foxes Cross, Whitstable.
T. A. St. Johnston	G6UT	Abridge.
R. S. Roberts ...	G6NR	Dunstable Downs.
W. A. Scarr ...	G2WS	Near Matlock.
F. R. Canning...	G6YJ	Near Porth, Rhondda.
G. R. Lee ...	G6GL	Wirral.
H. Jones ...	G5ZT	Near Preston.
W. J. H. Brown	G5BK	Malvern Hills.
C. Fenton ...	G6JZ	Whitehaven.
W. A. Clark ...	G5FV	Keyingham.
E. J. Laker ...	G6LK	Pitch Hill, Surrey.
T. P. Allen ...	GI6YW	Mourne Mountains.
N. Best ...	G5QN	Burton Green, near Coventry.
G. A. Chapman	G2FA	Folkestone.
W. L. V. Parker	G6WJ	Wooley Edge, near Wakefield.
D. E. Palin	G6DP	Frodsham.
W. Sullivan	GI6XS	Orlock Point.
W. A. Andrews	G5FS	Dundry Hill

We are informed that BRS2612, 2622 and 2625 will be listening for 56 Mc. calls at a point in South Essex. Schedules will be arranged if required.

W.B.E. and H.B.E. Awards.

The following certificates have been issued:—

Name.	Call Sign.	Date. 1937.
	W.B.E.	
F. B. English ...	G6AZ	May 5
A. W. Bailey ...	ZL2QA	,, 5
R. T. Dealey ...	G6DT	,, 10
H. C. Turner ...	G5OJ	,, 10
E. A. Parsons ...	G2PS	,, 18
F. J. Lubach ...	VK4RF... ...	,, 20
C. Ludwig	VQ4KSL ...	,, 20
L. S. Wilkinson ...	VS1AF	,, 20
C. W. Krueger ...	W8NKU ...	,, 20
C. B. Dowden ...	VE1HK ...	,, 20
J. Paine	G6PR	,, 21
A. E. Lambourne ...	G5AO	,, 21
P. Hubsher ...	VK4UL... ...	,, 27
	H.B.E.	
H. C. Turner ...	G5OJ	,, 10
A. E. Livesey ...	G6LI	,, 25
W. E. Marsh * ...	SU1WM ...	,, 26
R. Barr	GI5UR	,, 27
	28 *Mc. W.B.E.*	
Miss B. M. Dunn ...	G6YL	,, 1
E. J. Williams ...	G2XC	,, 20
	W.B.E. Telephony.	
N. L. H. Platt ...	G5PB	,, 13

* First award.

QSL'S for Rare Countries

Frequently the QSL Bureau receives cards from members addressed to amateurs in foreign countries where very few stations are in operation.

We would suggest that in such cases (where the address of the station is known) members despatch the cards direct, otherwise they may remain in our files for some months waiting for additional cards for the same country to accumulate.

The following is a list of " rare " countries :—

AC, CP, CX, EL, HC, HI, HK, HP, HR, HS, OA, TA, TI, XE, XU, YN, ZP.

In some cases, *i.e.*, TA, we have received cards but cannot forward them as we have no forwarding address, and it is doubtful whether the majority of these stations are genuine. We cannot undertake to forward cards to ships unless the operator requests the cards to be sent *via* a given agency in which case the card should be marked accordingly.

Secretary's Vacation

Our Secretary expects to be on vacation from July 17 to August 3, and from September 18 to 25. Members are asked to keep correspondence down to a minimum during these periods. Normal routine matters will, of course, be handled as usual.

Town Representatives 1937

Mr. T. Woodcock, G6OO, has offered to take over the position of Town Representative for Bridlington.

QRA Section

Manager: M. Williams (G6PP).

NEW QRA'S

G2DG.—W. Burnett, 16, Bannerdale Road, Millhouses, Sheffield, Yorks.
G2FO.—R. J. Bradley, " High Crest," Yarm Road, Eaglescliffe, Co. Durham.
G2KQ.—R. C. Cave, 324, Fore Street, London, N.18.
G2OI.—W. Lucas, 25, Boothfields, Winton, near Manchester.
G5DI.—W. G. Irwin, 2, Sotheby Road, Highbury, London, N.5.
G5UF.—A. A. Barrett, " Belmore," Howards Hill Road, Cromer, Norfolk.
G5XB.—S. A. G. Cook, 19, Marion Crescent, Maidstone, Kent.
G5ZK.—R. N. Lawson, " Burnage," Bath Road, Stroud, Glos.
G6NL.—C. R. Thomas, Mess E51, Royal Naval Barracks, Devonport, Devon.
G6WX.—W. H. Malcolm, 52, Second Avenue, Copsewood, Coventry, Warwick.
G8IJ.—R. H. Farr, 183, Summer Lane, Wombwell, near Barnsley, Yorks.
G8JK.—R. Chadbone, " Gayton," Trees Avenue, Hughenden, High Wycombe, Bucks.
G8JN.—D. C. Hutchison, Gresham Lodge, Station Road, New Waltham, Lincs.
G8JS.—W. H. Skidmore, 19, Milton Road, Wallington, Surrey.
G8LC.—B. E. Rogers, " Ivy Croft," Holten-le-Clay, near Grimsby, Lincs.
G8LM.—Radio Section, Murphy Radio Sports Club, Welwyn Garden City, Herts.
G8LW.—L. Waddington, 14, Thorn Lane, Howarth Road, Heaton, Bradford, Yorks.
G8MX.—Dr. W. L. Hector, " Cromar," Hitchin Road, Letchworth, Herts.
G8NC.—H. H. Lugg, 67, Bustleholme Lane, West Bromwich.
G8NF.—R. W. H. Benson, Church Lane, Prestwich, Manchester, Lancs.
G8NL.—Cyril Turner, 4, Moreton Avenue, Whitefield, Manchester, Lancs.
G8NP.—C. Parsons, 26, Mackintosh Place, Cardiff.
G8NS.—W. D. Johnson, Forest Road, Warsop, near Mansfield, Notts.
G8NU.—A. G. Archer, 29, Gorse Road, Blackpool, Lancs.
G8NV.—Paul Stein, 4, Hodford Road, Golders Green, London, N.W.11.
G8NX.—P. H. Hellier, 68, Clinton Road, Shirley, Birmingham.
G8OC.—W. Rogers, 12, Meadowside, Leasowe Road, Wallasey, Ches.
G8OG.—H. Dobson, 3, Lidgett Walk, Leeds, 8, Yorks.
G8RW.—R W Standley, 67, Redcar Lane, Redcar, Yorks.
2AAA.—R. A. Clarke, 10, St. Vincent's Road, Dartford, Kent.
2AAM.—J. Stephen Gingell, 21, High Street, Swanwick, Derbyshire.
2AFW.—E. K. Williams, 1, De Villiers Avenue, Crosby, Liverpool, 23.
2AGD.—W. Grant, 136, High Road, Leyton, London, E.15.
2AKZ.—K. J. Lunnon, " Mostyn," Healey Avenue, High Wycombe, Bucks.
2ALG.—W. E. Beck, 31, Ridgefield Road, Oxford.
2ALP.—D. Appleby, 20, Station Road, Edgware, Middlesex.
2AYH.—L. E. Harris, 66, Periwinkle Lane, Hitchin, Herts.
2AZM.—B. R. Edwards, 47, Faraday Avenue, Sidcup, Kent.
2BII.—T. Bentley, 158, Sylvan Avenue, Timperley, Ches.
2BJV.—G. L. Turner, 49, Rose Valley, Brentwood, Essex.
2BKC.—B. Coia, 14, Waterside Street, Strathaven.
2BNI.—Douglas Drage, 93, North Gate, Regents Park, London, N.W.8.
2BVX.—V. O. Hawkins, 35, Green Lane, Terriers, High Wycombe, Bucks.
2CPG.—G. H. Randle, 26, Clumber Street, Melton Mowbray, Leics.

CALIBRATION SERVICE

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

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

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

All communications should be addressed to :—

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

See page 117 *A Guide to Amateur Radio* for particulars of frequency meters, etc.

2CPL.—E. H. Godfrey, 32, St. Mary's Avenue, Church End, London, N.3.
2CPN.—W. Norris, 1, Stanley Street, Ilkeston, Derbyshire.
2CPU.—D. I. Morgan, Chapel House, Aberffrwd, Capel Bangor, near Aberystwyth.

The following are cancelled :—2AHA, 2AJN, 2AKP, 2ARL, 2ATZ, 2BPN, 2BVZ, 2BXH, 2CCO.

NEW MEMBERS.

Home Corporates.

E. A. Parsons (G2PS), 36, Milland Road, Bar End, Winchester, Hants.
M. H. D. Lavin (G2VN), The Old House, Sonning, Reading, Berks.
C. G. T. Taylor (G2ZT), 28, Emerson Road, Coventry, Warwick.
H. Bollands (G5DW), 13, White Hill Grove, Barnsley, Yorks.
H. L. Assig (G5HI), 27, Pollards Hill West, S.W.16.
H. T. Longuehaye (G8KC), 96, Barnmead Road, Beckenham, Kent.
W. Reid (GM8LR), 154, Holborn Street, Aberdeen.
J. Hearn (G8MA), 47, Eversley Crescent, Ruislip, Middlesex.
H. Pilbeam (G8MP), 12, Birkheads Road, Reigate, Surrey.
L. H. Luscombe (G8NY), 98, Denton Road, Hornsey, N.8.
K. B. Wilson (G8OW), 19, Bancroft Avenue, London, N.2.
T. De Putron (G8MF), " les Hubits," St. Martin, Guernsey, C.I.
J. Ferguson (2AGF), 68, Ashby Terrace, Alloa, Clackmannanshire Scotland.
S. G. Keeble (2AKI), 139, Sidegate Lane, Ipswich.
H. B. Akroyd (2AKO), 19, Golf Crescent, Highroad Well, Halifax, Yorks.

J. L. Bell (2BJI), 16, Wilson Street, Townhill, Dunfermline, Fife.
J. W. Turnpenny (2CDI), 62, Grey Friars, Stafford.
D. S. Mattey (2CHM), 120, Walsall Road, Little Aston, nr. Sutton Coldfield.
H. P. Singleton (2CJP), 33, Auburn Grove, Blackpool, Lancs.
J. Redrup (2COA), "Lyndale," Longwick Road, Princes Risborough, Bucks.
J. S. C. Cupples (2COP), 69, Onslow Parade, Belfast, N.I.
F. B. Athersych (BRS2896), Dorset House, 69, Alexander Road, Parkstone, Dorset.
W. G. Gove (BRS2897), 6, Montpelier Road, Exmouth, Devon.
J. Haggart (BRS2898), c/o Air Ministry Radio Station, Moorpark Aerodrome, Renfrew.
A. Chisholm (BRS2899), 4, Station Road, Stow, Midlothian.
F. B. Holt (BRS2900), 40, Britain Street, Bury, Lancs.
P. A. Murphy (BRS2901), Borough Engineer's Department, Town Hall, Lewes, Sussex.
J. Bolton (BRS2902), 6, Ash Street, Blackburn, Lancs.
H. G. L. Fletcher (BRS2903), Newlands, St. Ives, Hunts.
J. F. Stallard (BRS2904), 37, Sylvan Avenue, Mill Hill, N.W.7.
A. E. Goodall (BRS2905), 52, Tierney Road, Streatham Hill, S.W.2.
S. J. Vamplew (BRS2906), 21, Witham Place, Boston, Lincs.
A. E. Scott (BRS2907), 76, High Street, Bromsgrove, Worcestershire.
I. C. Fletcher (BRS2908), 4, Cyril Road, Bexley Heath, Kent.
F. Cafolla (BRS2909), 2, Carnegie Street, Lurgan, Co. Armagh, N.I.
G. J. Glasspool (BRS2910), 30, Duke Street, Southampton, Hants.

TECHNICAL ENQUIRY BUREAU

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

The Rules governing the service are :—

1. Questions must be written legibly and concisely on one side of the paper.
2. A sixpenny postal order must accompany each question.

   The postal order must be made payable to the R.S.G.B., and the letter addressed to Technical Enquiry Bureau, R.S.G.B., 53, Victoria Street, London, S.W.1.
3. The service is only available to fully paid-up members of the Society.

H. B. Hubbard (BRS2911), 8, Oldfield Terrace, Stannington, Sheffield.
D. D. White (BRS2912), Toller Vicarage, Dorchester, Dorset.
G. R. Chiffey (BRS2913), 72, Charlton Lane, Charlton, S.E.7.
C. L. Cook (BRS2914), Temple Observatory, Rugby, Warwick.
P. E. K. Coleman (BRS2915), Wayside, Melton Road, Syston, Leicester.
D. Tannock (BRS2916), 45, Glaisnock Street, Cumnock, Ayrshire.
D. Crouch (BRS2917), 7, Brook Street, Belvedere, Kent.
R. Cretney (BRS2918), 482, Kingsway, Levenshulme, Manchester.
L. H. Kelsall (BRS2919), 342, Franklin Road, King's Norton, Birmingham.
J. W. Gale (BRS2920), 25, Loraine Road, Holloway, N.7.
H. E. Bennett (BRS2921), "B" Squadron, E & W School, R.A.F., Cranwell, Lincs.
R. G. Batt (BRS2922), 40, The Grove, Palmers Green, N.13.
H. Wright (BRS2923), 90, Harmston Rise, Heathfield Road, Nottingham.
H. T. Walker (BRS2924), 487, Green Lanes, Palmers Green, N.13.
J. H. Wood (BRS2925), Glenhurst, Wistaston, Nantwich, Cheshire.
E. Powell (A) (2BPW), 44, Pritchard Street, Tonyrefail, Glam.

Dominion and Foreign.

H.H. Prince abd. El-Moneim (SU1AM), Heliopolis, Cairo, Egypt.
Capt. V. G. Wilson (VS1AN), 335, Thomson Road, Singapore, S.S.
Lt. C. H. Stoneley (VQ4CHS), King's African Rifles, Nairobi, Kenya, East Africa.
C. W. Krueger (W8NKU), Western Union Telegraph Co., Huron and Jefferson Sts., Toledo, Ohio, U.S.A.
R. E. S. Smith (ZT1B), "Sunny Ridge," Carreg Crescent, High Level Road, Green Point, Capetown, South Africa.
G. H. J. Sadler (ZU1V), "Culham," Tiverton Road, Plumstead, Cape, South Africa.
A. E. Seymour (BERS400), R.A.F., Kalafrana, Malta.
J. B. Wiseman (BERS401), P.O. Box 1411, Johannesburg, S. Africa.
J. P. A. Heuseveldt (BERS402), Vilgoensdrift, O.F.S., S. Africa.
E. A. Curchin (BERS403), Wireless Section, R.A.F., Kalafrana, Malta.

R.S.G.B. Slow Morse Practices

Details will be found below of the slow Morse practices organised by the Society for those members wishing to learn or improve their code. As usual, test matter will be taken from recent issues of the T. & R. Bulletin. The page number and month of issue will be given at the end of each test—by telephony. A telephony announcement will also be given at the commencement of each test to assist those interested in tuning in the sending station. It is emphasised that reports will be appreciated, and are desired in order to ascertain useful range of transmission and numbers utilising the service. If, however, a reply is desired, a stamp should be sent. Will stations in areas not at present served offer their services to Mr. T. A. St. Johnston (G6UT), 28, Douglas Road, Chingford, E.4 (Telephone : Silverthorn 2285).

Schedule of Slow Morse Transmissions.

			B.S.T.	k.c.	Stations
June	20	Sunday	0915	1775	G6ZQ
,,	20	Sunday	0945	7155	Gi5UR
,,	20	Sunday	1000	7260	G5JL
,,	20	Sunday	1015	1825	G5SU
,,	20	Sunday	1330	7180	G2YV
,,	21	Monday	2315	1741	Gi6XS
,,	22	Tuesday	2200	7184	G6UA
,,	23	Wednesday	2300	1775	G6ZQ
,,	23	Wednesday	2315	1741	Gi6XS
,,	24	Thursday	2200	7184	G6UA
,,	26	Saturday	2300	7145	Gi5QX
,,	27	Sunday	0915	1775	G6ZQ
,,	27	Sunday	0945	7155	Gi5UR
,,	27	Sunday	1000	7260	G5JL
,,	27	Sunday	1015	1825	G5SU
,,	27	Sunday	1330	7180	G2YV
,,	28	Monday	2315	1741	Gi6XS
,,	29	Tuesday	2200	7184	G6UA
,,	30	Wednesday	2300	1775	G6ZQ
,,	30	Wednesday	2315	1741	Gi6XS
July	1	Thursday	2200	7184	G6UA
,,	3	Saturday	2300	7145	Gi5QX
,,	4	Sunday	0915	1775	G6ZQ
,,	4	Sunday	0945	7155	Gi5UR
,,	4	Sunday	1000	7260	G5JL
,,	4	Sunday	1015	1825	G5SU
,,	4	Sunday	1330	7180	G2YV
,,	5	Monday	2315	1741	Gi6XS
,,	6	Tuesday	2200	7184	G6UA
,,	7	Wednesday	2300	1775	G6ZQ
,,	7	Wednesday	2315	1741	Gi6XS
,,	8	Thursday	2200	7184	G6UA
,,	10	Saturday	2300	7145	Gi5QX
,,	11	Sunday	0915	1775	G6ZQ
,,	11	Sunday	0945	7155	Gi5UR
,,	11	Sunday	1000	7260	G5JL
,,	11	Sunday	1015	1825	G5SU
,,	11	Sunday	1330	7180	G2YV
,,	12	Monday	2315	1741	Gi6XS
,,	13	Tuesday	2200	7184	G6UA
,,	14	Wednesday	2300	1775	G6ZQ
,,	14	Wednesday	2315	1741	Gi6XS
,,	15	Thursday	2200	7184	G6UA
,,	17	Saturday	2300	7145	Gi5QX
,,	18	Sunday	0915	1775	G6ZQ
,,	18	Sunday	0945	7155	Gi5UR
,,	18	Sunday	1000	7260	G5JL
,,	18	Sunday	1015	1825	G5SU
,,	18	Sunday	1330	7180	G2YV

NOTES and NEWS from the BRITISH ISLES

DISTRICT REPRESENTATIVES.

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

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

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

DISTRICT 4 (East Midlands).
(Derby, Leicester, Northants, Notts.)
Mr. J. J. CURNOW (G6CW), "St. Anns," Bramcote Lane, Wollaton Notts.

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

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

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

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

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

DISTRICT 10 (South Wales and Monmouth).
Capt. G. C. PRICE (G2OP), The Mount, Pembroke Dock.

DISTRICT 11 (North Wales).
(Anglesey, Carnarvon, Denbighshire, Flintshire, Merioneth, Montgomery, Radnorshire.)
MR. D. S. MITCHELL (G6AA), "The Flagstaff," Colwyn Bay, Denbighshire.

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

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

DISTRICT 14 (Eastern)
(East London and Essex.)
MR. T. A. ST. JOHNSTON (G6UT), 28, Douglas Road, Chingford, E.4.

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

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

DISTRICT 17 (Mid-East).
(Lincolnshire and Rutland.)
REV. L. C. HODGE (G6LH), 4, Thorold Street, Boston.

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

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

SCOTLAND.
MR. JAMES HUNTER (G6ZV), Records Office, 51, Camphill Avenue, Langside, Glasgow.

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

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

DISTRICT 1 (North-Western).

LIVERPOOL.—The District Meeting is fully reported elsewhere in this issue, and it is therefore unnecessary to refer to it in these notes except to record the thanks of all who attended to Mr. Davies (G2OA), the organiser of the whole arrangements, and to G5NU, of Southport, for the assistance given by him, particularly in procuring the lantern apparatus used to illustrate the lecture given by Mr. G. Parr.

N.F.D. will be an accomplished fact when members read these notes, and, given good weather, those who attended should have something good to look back upon.

Manchester.—Twenty-three members attended the last Manchester meeting to discuss the arrangements for the field day, and thanks are due to all those who have helped either by lending apparatus, or otherwise, to make the affair a success.

G6JN, who has been away at sea for over a year, was a welcome visitor to the meeting, also a number who have recently joined. Local members would like to record a vote of thanks to Jim Davies (G2OA) for the arrangements made by him in connection with the District Meeting at Southport.

Several members in this area are busy preparing gear for 56 Mc. work during the summer months, and it is hoped to arrange some special field days with the Liverpool and North Wales groups during the coming month.

The following stations report active: G5YD, 5CH, 2WQ, 5OZ, 2LK, 6KS, 8NI, 2OI, 2DH, 2JC, 2GA, 8BI, 8IZ, 5WR, 2RA, 2ARC, 2AUQ, 2CGL, 2BMG, 2BKN and BRS 2182, 2812, 2876 and 2579.

Blackpool.—The Blackpool and Fylde Short Wave Radio Society has reduced meetings to alternate Thursdays during the summer, but other activities continue.

A group of ten members visited Southport for the North Western District Meeting held on May 23, and had a very good time.

56 Mc. activity increases, there being eight receivers in operation in the district now.

Something New

Type E40-G3. Data:

Heater Voltage (AC or DC)	.. 4.0 v.
Heater Current	.. 1.0 A (approx.)
Second Anode Working Volt.	.. 500-800v.
Screen Diameter	.. 3 ins.
Screen Colour	.. Green
Dimensions: Length (approx.)	.. 6 ins.
Neck Diameter	.. 1 in.

for the Radio Experimenter—

A NEW LOW-PRICED CATHODE-RAY TUBE OF EXTREME ACCURACY BY MULLARD!

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Band-width, frequency drift, percentage modulation, H.F. output, valve characteristic linearity, microphone distortion, etc.

It must be emphasised that the Mullard Cathode-Ray tube E40-G3 is not a mere indicating device, but is a precision tube comparable in every respect but size with the larger and expensive tubes.

LIST PRICE **£3·10·0**

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Cathode-Ray Tube Department,

THE MULLARD WIRELESS SERVICE CO. LTD. *225 Tottenham Court Road, London, W.1*

G5MS is still busy on 14 Mc. DX when conditions allow. 6MI is going on with 56 Mc. and trying to cure instability in his 56 Mc. 6L6 P.A. 6VQ has applied for 28 and 56 Mc. 8AK is trying a treadle-operated generator to replace dry batteries. 8GG is busy on 1.7 Mc., and has become devoted to the band on receiving 1.7, 28 and 56 Mc. permit. His T.20 has also arrived. 8NU, ex-2ARL, is on 7 Mc., and BRS2851 is awaiting his three-letter call. Other locals are active, and a welcome is extended to BRS2870.

FORTHCOMING EVENTS

June 16.—District 1 (Liverpool Section), 8 p.m., at 38, Mason Street, Liverpool.

,, 20.—South-Eastern Provincial District Meeting, at Rose and Crown Hotel, Tonbridge.

,, 22.—District 14 (East London Section), 7.30 p.m., at G6UT, 28, Douglas Road, Chingford.

,, 23.—District 14 (East Essex Section), 8 p.m., at 2BYX, "St. Ives," Leicester Road, Laindon.

,, 23 *.—District 15, 7.30 p.m., at 2BVX, 35, Green Lane, Terriers, High Wycombe, Bucks. Near High Wycombe station.

,, 24.—District 13 (Anerley, Tooting, Brixton, Kennington and New Cross Areas), 8 p.m., at the Brotherhood Hall, West Norwood.

June 24.—District 14 (Brentwood Section), 7.30 p.m., at 2BNK, "Netherton," Herrington Grove, Hutton, Brentwood.

,, 24.—S.L.D.R.T.S., 8 p.m., at the Brotherhood Hall, West Norwood.

,, 25.—District 12 (Watford Group), 7.30 p.m., at BRS2196, "Weybourne," 15, Chilton Avenue, Bushey, Herts.

July 1.—District 5 (Bristol Section), Demonstrations and lecture by *Lissen, Ltd.*, 7.30 p.m. at Kings Corridor, Old Market Street, Bristol.

,, 4.—District 9, Conventionette at Great Yarmouth (see separate announcement).

,, 7 *.—District 1 (Manchester Section), Meeting at Brookes Café, Hilton Street, Manchester. Slow morse practice, 7 p.m. to 7.30 p.m. Talk, 7.30 p.m. to 10 p.m.

* Sale of disused apparatus at these meetings.

Mr. Timbers (G5TR) informs us that his call is being pirated on 14 Mc. He has notified the G.P.O.

DISTRICT 2 (North Eastern).

Huddersfield.—The York P.D.M. was attended by G5VD, 8KY, 2ARN, and 2ALU. Will members endeavour to support station visits so that points raised in the letter budget can be discussed. The T.R. hopes to have his lattice mast erected soon, after months of hard work. G8KY is using a Collins multiband aerial, and has standardised a 6L6 tritet chassis to excite all transmitters.

Barnsley.—The York meeting was attended by G6PY, 2BH, 6AJ, 6LZ, 5IV, 5DW, 2AHT, and 2BNN. Reports on the 56 Mc. transmissions given by 2BH every Saturday evening at 2300 B.S.T. will be welcomed. 5UA has solved his H.T. problem by installing a hand generator, and is carrying out tests on 1.7 Mc. 2BWG, of Wombwell, awaits his call.

Sheffield.—Notification of next season's meetings, which will commence in September, will be given in these notes. The T.R. wishes to thank those members who so readily responded to his appeal for support in the N.F.D. contest, particularly 6LF, who worked hard on the transmitter. Members are asked to send their notes direct to the T.R. before the 19th of each month, or they may be left over. Best wishes are sent to 2RU and 2GM, who were absent from N.F.D., owing to being abroad. G8IW is testing a doublet at his new QRA, and has worked all W and VE districts. Active stations include 5HK, 8IO, 8JP, 8KT, 6LF, 6PJ, 5TO, 8NN, 2JY, 2LT, 2MF, 2HQ, 2DJ, 6TY, 2BXA, 2CBQ, 2CFA, 2CHA, BRS2282 and 2293.

Bradford.—Many thanks to all who helped with the N.F.D. station, particularly G6AZ and 6XL, who built and tested the gear prior to the event.

DISTRICT 3 (West Midlands)

G2YV reports taking part in Slow Morse Practices and complains that stations using the service fail to send in reports. He would like information concerning a station which is pirating his call on 56 Mc. in Surrey. G6SW only needs South Africa for W.B.E. Shrewsbury and Wellington members meet each week for general discussion and several A.A. members are looking forward to their full licence this year. G6KR has erected a new mast complete with Windom and is pleased with the results: he is changing to A.C. mains this month. We are pleased to welcome G5YP, late of Prestatyn, to this district. The following stations are active: G5YP (56 Mc.), 6KR, 5BJ, 5VM, 6DL, 6BT, 8DL, 8ND, 5ML, 2YV, 6SW, 2CJO, 2COB, 2BDC, BRS2457. Please send reports to reach the D.R. before the 25th of each month.

DISTRICT 4 (East Midlands)

Nottingham.—The last meeting of this District held at Nottingham on May 23 was attended by 30 members, the chief topic was final arrangements for Field Day. G6JQ also gave a talk on his 56 Mc. transmitter and discussed phenomena experienced at varying distances, which opened up a lengthy discussion. The Nottingham area is fairly active,

but 56 Mc. is the band that is now receiving the most interest. The next meeting is to be held at the Trent Bridge Hotel, Nottingham, on June 27, at 3.30 p.m.

Worksop.—The notes from Worksop are short, but we must congratulate 2BIC on receiving his full ticket, now licensed as G8ON. Incidentally, he reports that his call was pirated on 'phone within 24 hours of its first legitimate use. G8ON uses CW only.

Leicester.—At a meeting held at "The Turkey Café," Leicester, on May 14, the Section was presented with a trophy by Mrs. Ridgway, BRS2497. This will be known as "The Ridgway Challenge Trophy" and will be held for a period of two months by the winner of a series of contests arranged for 1.7, 7 and 14 Mc. bands. It is hoped that members will support these contests fully, thereby making the Leicester group more active and efficient, which was Mrs. Ridgway's thought in giving the trophy. Welcome is offered to 2CIY, 2AIK and 2AFN as new members and wishing them best of luck.

Northampton.—News from this group comes rather as a surprise. A new club has been formed, known as "The Radio Society of Northampton," and further particulars can be obtained from the Hon. Secretary, D. W. Harris, BRS 2179, 99, Ardington Road, Northampton. Let us have some more notes, Northampton.

IN DICK TURPIN'S TOWN.
Some of the 85 members who attended the successful P.D.M. at York last month.

DISTRICT 5 (Western)

The event of chief interest to *Bristol* members was the visit paid to the Bridgwater Station of *Cables & Wireless, Ltd.*, on Thursday, May 20. Although no transmitting apparatus is installed, the three special receivers and the many aerial systems provided plenty of interest, the Chief Engineer going to a lot of trouble to explain everything thoroughly.

There was one fly in the ointment—we were not allowed to rummage in the junk-box!

It is intended to arrange further visits of this nature in the near future.

Will Bristol and district members please take particular note that the monthly meetings will, commencing July 1, be held at Carwardines Café, Baldwin Street, and no longer at Bridge Street.

A number of visitors were welcomed in Bristol during the month, these including G6YD, 8MS and 8KT. Every band is carrying its share of activity.

In *Cheltenham* G5BK and 8ML have been carrying out tests on 56 Mc., preparatory to taking part in the 56 Mc. N.F.D., when they will operate on the Malverns.

G2OF has moved to Oxford and is welcomed to the district.

The response to the request for crystal frequencies has been good but the register is not yet complete. Will members in the Oxford, Bath and Portishead areas please send in details? It should be pointed out that particulars are wanted from A.A. members as well as fully licensed.

DISTRICT 6 (South-Western)

The chief item of interest this month concerns the annual Conventionette held at Plymouth. This was attended by twenty-seven members and all were loud in their praises of the event, especially so regarding the good work put in by the local members in looking after the arrangements. In this respect special mention should be made of the T.R. for Plymouth, G6RF. We all thank him for an exceedingly pleasant and interesting day.

Members collected together at the hotel round about noon. Those who arrived early soon started up ragchews, and this was rendered all the more easy as, after the fairly long runs that most members had put in in order to get to the meeting, certain refreshments drawn from the wood were found very acceptable!

After luncheon very interesting visits were paid to the B.B.C. "pocket" studio and station at Plymouth. The studio proved quite up to date and was duly "passed" by the members. The transmitting station was, of course, somewhat old-fashioned, having originally come from Edinburgh. However, the cherry-red anode of the modulator seemed well up to standard practice.

Visits were also paid to the stations of G6RF and 2ANX. The latter is now to be congratulated on obtaining the call G8PN. During the visit to the former station 6RF seized the opportunity of leaving behind the quarter-wave 56 Mc. antenna he had been carrying round all the afternoon!

After tea at the hotel the D.R. spoke for about twenty minutes. He reported that the membership was now about 130, an increase of 30 during the year, which was very satisfactory. He was also glad to be able to say that radio interest in the district had widened very much, in the sense that more bands were being used by more people and far less of the "stick to 7 Mc. 'phone." He advised members to avoid emulating those who at present were using 7 Mc. for the purpose of mere chatting. Licence matters were dealt with and the D.R. went very carefully over all the conditions regarding increased facilities in power, frequencies and 56 Mc. portable permits.

Later the 1936 N.F.D. films were shown and proved of great interest. All agreed that it would be a pity if this feature of N.F.D. were allowed to lapse. The meeting broke up at about 10 p.m.

Torquay.—Meetings will be discontinued till the autumn but those interested will be notified when they are about to recommence. The first of the District 6 56 Mc. Field Days will probably be held on July 18, but all members will get a circular later.

Exeter.—The members here intend to carry on during the summer with one meeting a month

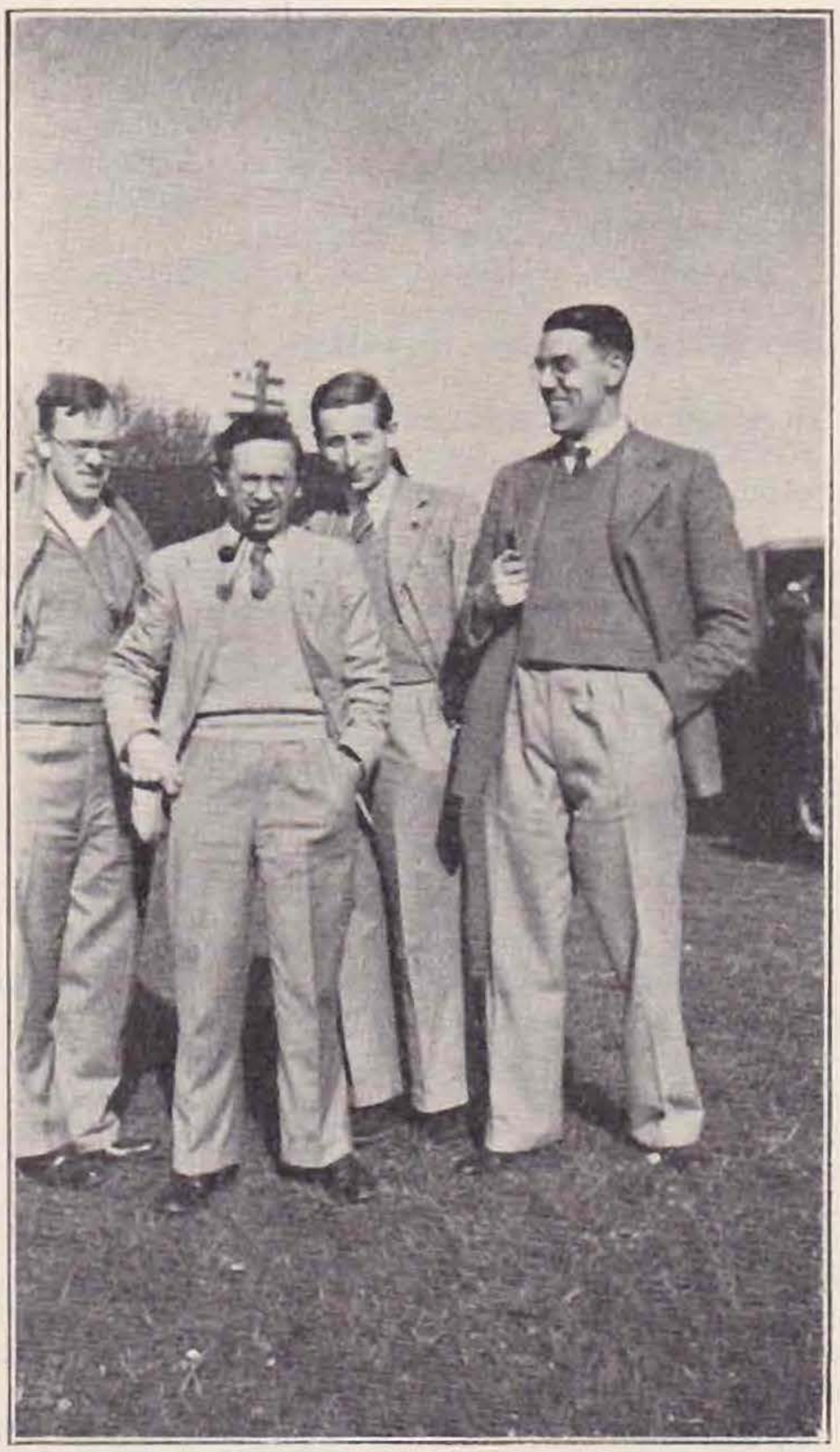
instead of two. This will be held on the first Wednesday. The T.R., G5QA, would like more members to become interested in 56 Mc. work.

North Devon.—G6FO reports that, with the exception of BRS2442, all members are active. We welcome 2CBK (Barnstaple), who has applied for R.S.G.B. membership. 2ADJ, 2CBK, 2CGA and 2CHY have reached the G.P.O. Morse standard. 2CHY is putting in a very fine station. Her progress is noteworthy as she is almost entirely on her own.

Bridgwater.—Meetings are still being held here and the last was very well attended. Owing to some unfortunate oversight, it was held on the same day as the District Conventionette. It is exceedingly strange that this should have occurred as obviously such a day should have been kept clear. It is sincerely hoped that in future years T.R.s will take careful note of the date of Conventionette in order to avoid a clash.

DISTRICT 7 (Southern).

There are two important announcements this month, firstly, the proposed visit to the B.B.C. Short Wave Station at Daventry is unfortunately postponed until later in the year, as the new transmitters are still undergoing tests. Secondly, G6GS regrets that he must give up his position as T.R. for Guildford, as his work takes him right out of the district for long periods at a stretch. Will Guildford and District members please discuss this matter amongst themselves, and nominate a new T.R.? The D.R. takes this opportunity of thanking G6GS for his help in the past; we hope he will continue to be a regular attendant at our meetings when he is at home. There will be no meeting in July as our meeting date clashes with the 56 Mc. N.F.D. Please support this event if at all possible, as No. 7 District should be able to put a record number of 56 Mc. stations in the field.



FOUR WELL-KNOWN G's.

L. A. Moxon (G6XN), H. A. M. Clark (G6OT), Cecil Cleland (GI2CN), and Dud Charman (G6CJ), after sorting out the echoes at Cambridge.

Bournemouth.—G2NS is carrying out tests with an Anti-Static aerial for reception, and has a new transmitter running. His Super Pro receiver has undergone an "operation": tuned RF, regeneration and other alterations have resulted in freedom from image interference and better sensitivity. 8KX is rebuilding in rack style, and is expecting a visit from SU1KG as a result of 14 Mc. QSO's. 8BW has left the town for a position at King's Lynn. 5OH is busy with improvements on microphones and speech equipment. 5PB, 2ACA, BRS1837, and other members report active.

Croydon.—All our members are active in their various spheres, the chief one in the news is 5RF, who, with an output (input?—Ed.) of 10 watts (genuine) has WAC, and all in under 24 hours—now for the cards! 5XH is now out of hospital, and will soon be DX hunting again. 5XW has curtailed activities, due to business. We are anxious to hear the result of 2MV's new rig. 2KU is still after a South American for WAC. 5AN continues his work with aerials, now has a 136 foot top, zepp fed, on 14 Mc., with a Collins Coupler, feeders are causing some trouble owing to length falling about ¾ lengths long—still DX is being worked.

Reading.—Welcome is extended to G8MG on joining R.S.G.B., and congratulations to Mrs. G. N. Salter, on obtaining her A.A. call 2COY. At the May meeting of R.T. & R.S., 18 members were present. G6CY was welcomed from Hove. After final arrangements for N.F.D., a very interesting lecture was given by G2IT on Impedance Matching and Transmission Lines. From the discussion which followed, a lecturette developed by G2GG, after which general questions followed. G5HH has made WAC, and has worked CX. G2YB took the Coronation Loyalty message of Australian amateurs from VK4GK. G6GT is rebuilding receiver to an S.S. Super. Several new calls have been heard active in the district, while most of the old calls report active. Numbers of commercial stations have been noticed in the 14 Mc. band, particularly FYA, which has been received in five or six places. The next Reading meeting will be in July.

Southampton.—A record meeting attended by 14 members was held at G5PT on May 18. G2IL has completed a rebuild, and is putting out very fine phone on 7 Mc. 2VF awaits cards to claim WAC on 14 Mc. CW. 5PT is rebuilding receiver and experimenting with 2 RF stages in straight circuit. 5OB still active on 14 Mc. with break-in phone. Congratulations to 8OV, ex 2BGA, who is joining the fold. He is active on QRP 7 Mc. phone. 2AND awaits code test. 2ATT is building transceiver for 56 Mc. 2BFS is planning new aerial system. 8DM

working mainly 56 Mc.; he has received a report on 1.7 Mc. CW, a band which he does not work. 1.7 Mc. stations please note.

DISTRICT 8 (Home Counties)

At a district meeting held on May 7 in Cambridge, at which eleven members were present, several matters concerning the recent Conventionette were discussed with a view to improving still further the event in 1938.

The main part of the evening was taken up by arranging matters concerning NFD, after which it was voted by the majority present that these meetings should be more informal in future, i.e., more time will be given to open discussion. There is little doubt that the recent Conventionette was a complete success, and the D.R. wishes to heartily thank all those who assisted him in the organisation of this function, with a further vote of thanks to those members from other districts who travelled to Cambridge to help make up what will go down in R.S.G.B. history as the greatest meeting outside London up to now. May next year see an even bigger meeting.

Reports this month are conspicuous by their absence, although there is definitely activity in the area. G5JO is to be heard on most bands, also 2PL, 5DR is busy testing a special 14 Mc. transmitter for NFD, 6FL and 5OV are to be heard often on 14 Mc. telephony, 5PU is busy organising the 7 Mc. NFD station, whilst 2XV still finds time, in spite of forthcoming NFD, to continue good 14 Mc. phone operation. G6BS seems to be livening up the Beds area, and reports increasing activity in this county—a welcome is extended to BRS2882, who is a new member in the district. The next District meeting will be held at the Fitzroy Arms, Fitzroy Street, Cambridge, on July 2 at 7.30 p.m., when all are welcome.

DISTRICT 9 (East Anglia)

The date for our forthcoming Conventionette at Great Yarmouth has been fixed for July 4. Fuller details of this will be found in a separate notice elsewhere in this issue. For the first time Mr. Clarricoats (G6CL) will be attending a District 9 event, and it is hoped that all our members will give it their full support. Owing to July being a busy month at Yarmouth, those attending are requested to inform the D.R. as soon as possible in order that the catering arrangements may be completed. Please state clearly how many there will be in your party. An interesting programme has been arranged, which includes a visit to the G.P.O. Telegraph Repeater Station at Lowestoft. Ex-YL's, YL's, junior ops. and friends are very welcome.

A considerable number of our members attended the District 8 Conventionette on Sunday, April 25, and thoroughly enjoyed the excellent programme which had been arranged.

This month activity in the district seems very high. From *Ipswich* comes the news that 8AN has been doing good work on 14 Mc. while also building the N.F.D. transmitter. The power plant for this was constructed by 2AKI. Congrats. to 8AG, who is at last on the air. 8IS, 8CU and 6TI are active, the latter trying out a T20 valve as P.A. Re-building is going ahead at 8KB and 2AXJ is awaiting his full call.

At *Lowestoft* 8DD has now completed his re-build and has been experimenting with Windom aerials, the outcome being good DX. 2CJF has finished his portable two-valve receiver and obtains excellent signals using a telescopic rod aerial.

G6QZ in *Norwich* is on 28 and 56 Mc., trying out 6L6G valves on the higher frequency, with interesting results. 5IX is still testing on 3.5 Mc. and has erected an aerial specially for this band. He has also acquired a new super-het. receiver.

2UT, 2MN and 6UA are active.

Beccles shows signs of increased activity, possibly due to the enthusiasm of BRS1895, and we hope next month to welcome Mr. Spashett and Mr. Alger as new members. Congratulations to Mr. Leeder of Bungay, who has just obtained his three-letter call.

G5QO, the District Scribe, asks for reports from Great Yarmouth, Swaffham, etc., and from any station not mentioned in these notes.

DISTRICT 9 CONVENTIONETTE

SUNDAY, JULY 4, 1937

at

QUEEN'S HOTEL, GREAT YARMOUTH

Assemble	12.30 p.m.
Lunch	1 p.m.
Business Meeting	2.30 p.m.
Tea...	4.30 p.m.
Visit to Lowestoft Repeater Station	5.45 p.m.

Price, including tips to waiters, 6s.

All reservations to Mr. H. W. SADLER (G2XS), Warren Farm, South Wootton, King's Lynn, by June 25.

DISTRICT 12 (London North and Hertford)

Through the medium of these notes G5QF would like to take this opportunity of thanking D.R.'s and members of the northern districts for their hospitality to him on his recent visit.

The combined N. and N.W. London meeting was held at Kentish Town on May 21, when 28 members attended. Although this was rather less than anticipated it was probably due to the fact that the bus strike was still in progress.

An interesting discussion opened by G6NR on QRO and QRP was followed by a demonstration of a 9-valve single-signal superhet for A.C./D.C. mains by G2RX and several members present tried their hand at tuning. The receiver was later tested under more favourable conditions on a doublet aerial at G2RX's QRA with considerable increase in strength. The N.W. London district are arranging a 56 Mc. Field Day to be held in the near future at Whipsnade. The usual meetings will continue in the Kentish Town area and any who care to attend will be welcome.

G5FA reports activity on the 14 Mc. band with many W contacts on a poor antenna system (10ft. high at free end). He has worked 30 countries on 7 Mc. G2QY and G2AI are experimenting with the latter's doublet aerials. Good reports from

W6 and 7 have been received on his 14 Mc. model. G2QY is also working on election coupling. 2CDB reports on tests with metal tube oscillators and is at present testing out an NC100 receiver. G8NY can be heard on phone on 7 Mc. almost any evening and has made 263 contacts on this band. He will shortly be putting up a directional antenna for DX work on 14 Mc. We have to welcome 2AVL from No. 16. Probably many in North London know him by his connection with R.E.S. receiver design. He is interested in 56 Mc. work on the transmitting side.

Watford District.—The May meeting of the Watford group was held at Northwood on May 21 and the interest was still centred round 56 Mc., G6GR's rotating beam being greatly admired. 2CKM is welcomed as a new member to the district.

The next meeting of the Watford Group will be on June 25. Particulars of the QRA will be found under forthcoming events.

DISTRICT 13 (London South).

By the time these notes appear in print, N.F.D. 1937 will be a thing of the past. Preparing for the event this year was, on the whole, made considerably easier owing to the willing and consistent co-operation of a group of members. The D.R. would like to express his appreciation of this assistance, and hopes that all those who took part enjoyed themselves. Reports are more numerous, and it is hoped that next month an even larger budget will be received.

Anerley, Tooting, Kennington, Brixton, and New Cross Areas.—G5PY is experimenting with 56 Mc. gear for portable use; his new 25 watt transmitter is now complete and working satisfactorily. 2UX and 2BFH report active. 2AKZ has received his full licence, and the call G8LQ, Congrats. OM. and good luck. 6AN has substituted a superhet for his O-V-1 and 6HM is finding an E.C.O. system very excellent. 2DP is anxious to receive reports on his 14366 kc. phone and CW signals (BRS members please note). 2JB reports his Windom aerial is a great success for American contacts. 2ADY has rebuilt his Jones 53 exciter and started on a type 59PA. 2ZL reports general activity, whilst 5OA has been busy on 3.5 Mc., and is now completing a transmitter for all bands. 5WG is more or less inactive owing to business. 8GP is constructing gear for the 1.7 Mc. band, and hopes to be on the air shortly. 6CS has rebuilt his transmitter in the rack and panel style, and is now turning his attention to various types of aerial. After lengthy experiments, 2GZ finds himself in favour of his 66 ft. end feed Hertz rather than the 2BI aerial he has been trying; he wishes to express his hearty thanks to 6DH and 6AB for their hospitality to him whilst on holiday. 2LW is busy with 56 Mc. gear, whilst 2AZP hopes to have his full licence shortly. The next meeting of the above areas will take place on June 24.

Wandsworth Area.—G2TH and 2RC have been busy during the last month preparing gear for N.F.D. The former station was very pleased to establish contact with Canton University, China, during May. 2BNL reports active. Owing to the change of ownership of the room where meetings have been held in the past, the next meeting is uncertain, but members will be advised in due course. A probable date is June 23.

Blackheath Area.—G2YG is now licensed for the 28 and 56 Mc. bands. 2ZQ has altered his oscillator to a 6L6G with very satisfactory results. 6KP is unfortunately leaving the district; we wish him the best of luck. A welcome is extended to the new members in the Blackheath area, of which there are several this month. Please forward your monthly reports to 2ZQ. 2WV has spent most of the month answering telephone calls and letters dealing with N.F.D.

Wimbledon Area.—G5JW and 6OW report active in this area. We are very much indebted to the latter for his wholehearted efforts, in spite of many difficulties, to establish a 56 Mc. link on N.F.D.

We hope that as many members as possible will make an effort to be present at the South Eastern Provincial District Meeting, to be held on June 20 at Tonbridge. It would be appreciated if reports next month could be forwarded to the D.R. in good time, as he will be out of town on holiday during the latter part of June.

DISTRICT 14 (Eastern).

At the May meeting, held at G2UK (Eastwood) the attendance was 22, including two from the Brentwood area. G2UK himself was unable to be present, as he was at sea, and by the time these notes appear in print should be on his way back from Buenos Aires and Rio. Bon voyage!

It had been hoped at this meeting to demonstrate the entirely portable field-day transmitter built by G5UK, but the state of the road did not warrant unnecessary damage to the gear or his car. The performance of the gear on test has proved very satisfactory indeed, and G5UK is to be congratulated on a very fine job.

It is with deep regret that we record the death of G6NW, of Eastwood.

It is probable that at least one 56 Mc. station will be in operation in this area on the July National Field Day. Gear is being constructed by 2BQN, and may be operated by G6CT.

Activity has decreased with the advent of the summer and holidays but, to encourage those who like the open air, several field days have been arranged by the Southend Radio Society, and details will be circularised and may be obtained from the Hon. Secretary, Mr. F. S. Adams, G5QK.

Congratulations to 2BOD, ex-BRS2572, of Pitsea, and to 2BQN, ex-BRS2612, of Westcliff.

Brentwood.—At the May meeting, held at 2BJV, Brentwood, the attendance was 12, and included the D.R. and T.R. of Chelmsford. In view of increasing membership in this area, it is hoped to arrange regular monthly meetings. See "Forthcoming Events" for next meeting.

East London.—At the last meeting held at G6UT, Chingford, N.F.D. arrangements were the chief topic. 2BJV, of Brentwood, loaned a bell tent, and G5AR a motor generator. We are sorry to be losing G6AU, who is leaving Forest Gate for Sutton, Surrey. BRS2839, of Leyton, is now 2AGD. BRS565, of South Chingford, is doing very good work in connection with band occupancy, and is being ably assisted by BRS2292, of Forest Gate; recruits for this work will be wanted in the early autumn.

Chelmsford. — Congratulations to 2AMF, of Witham, who is now G8PB.

DISTRICT 15 (London West, Middlesex and Buckinghamshire)

Members had the opportunity of welcoming Mr. Dyer, second operator of VS1AL, G6BW, of Somerset, and G2LC, of Southend, at the May meeting. We thank those at G8DG for the hospitality to us all. Due to G2IY's efforts it was possible to present all attending with a map showing the sites of the N.F.D. stations.

Contrary to our usual practice, and at the request of members, we arranged a meeting for June, and all details will be found in the Calendar.

This month we welcome reports from 2ARA, 2BNT, 2BYI and BRS2828, who are new members. We are sorry to hear that 2AWG is ill and wish him a speedy recovery. Congratulations to BRS2720, who is now 2AKZ.

West London.—Felicitations to our T.R. (G6CO), and his wife, who have by this time entered the happy state of wedlock. The new address for reports will be 22, Chipstead Gardens, Cricklewood, N.W.2. He has been busy moving gear; 5FG has new transmitter with 59, 53 and either DO20 or 210; 6WN lining up new super-het; 8KZ had seven telephony contacts in one evening on 14 Mc. 2CMG has transmitter going well; BRS2842 improving indoor aerial; 2ARA busy with transmitter; both 2CCK and 2AUB have 56 Mc. A.A. permits; 2BNT wants help with Morse; 2BYL busy with 7, 14 and 28 Mc.; BRS2828 hopes for A.A. soon.

South Middlesex.—G2NN testing Windom prior to erecting Johnson "Q." BRS2697 only other station to report; hopes for A.A. permit. Why so few reports, with such a large membership? We know G2LA, 2KI, 2ZY, 2VV, 5VB, 6GB, 8MK, 8IP, 8HN and 8FV are active. G2VV, however, is busy with T.V.A.R.T.S., and G8MK has volunteered to act as assistant secretary; G6GB is rebuilding.

Bucks.—G6JK working DX; 8JK active at new address; 2BVX settled in new QRA and rebuilt transmitter; BRS2498 listening on 7 and 14 Mc. with two-valve receiver.

The T.V.A.R.T.S. held 7 Mc. field day and the portable stations finished the contest in the following order: G5VBP, 8IPP, 2VVP, G6BP. Curiously, the first two stations used aerials 15-20 feet high, while the others gained only half the number of points with aerials between 60-80 feet in height!

DISTRICT 16 (South Eastern).

By the time these notes are read, NFD will be a thing of the past, and it is hoped that next month a good performance by the District will be recorded.

There is still *just* time to write and tell the D.R. that you are coming to the PDM at Tonbridge. It's an easy place to reach, so don't forget—Sunday, June 20.

Gillingham.—The M.A.T.S. had the pleasure of a visit by G6ZT, of Billingham, Durham, who gave an interesting talk on radio activity in the North of England. G6NU is operating CC on 56 Mc., CW and phone, every day, and would be pleased to receive reports on his signals. Other 56 Mc. activity locally concerns 6QC (who is building CC gear), 2AFT, and 5FN. The latter reports hearing a W2, and is awaiting confirmation. 2CM, 6RQ, 6VV, 5MM, and 2BOL are also active.

Gravesend.—Busy with NFD preparations; nothing particular to report.

Ashford.—G5QL has left the town for Canterbury. 2KJ and 2JV are busy with 56 Mc. gear.

Heathfield.—Following stations are active, but have nothing special to report: G5JZ, 5AQ, 5PR, 5PN, 2BRI, 2CJZ, and BRS1173.

Brighton and Hove.—At the last meeting, on May 6, G6CY demonstrated the Lecher wire method of determining 56 Mc. The next meeting will be held on July 1.

Whitstable.—2BUC gave an interesting talk on "The Principles of Television" at the last meeting of the W.R.A. on May 8, and illustrated his remarks with slides lent by the Television Society. The W.R.A. have decided to participate in the 56 Mc. Field Day, under the call of G6FVP. Receivers are in the hands of 2AAN and 2BIB, while the transmitting gear is being constructed by 2AMY and 2BUC. 2BIB has just taken delivery of an *Epoch* 5-valve 3 to 10 metre receiver, from which he is expecting great things.

Tunbridge Wells.—G5OQ is active on 7 Mc. to some purpose; on a recent Sunday morning he worked no less than 14 stations, usual QRM notwithstanding! He does *not* use an S.S.S.! 2UJ had great difficulty in getting his RK23 to transfer its RF into the aerial on 1.7 and 3.5 Mc., but has now cured the trouble with that old stand-by, the Collins Coupler. 2AKQ has designed a superhet receiver, and is now in the process of making it.

SOUTH-EASTERN PROVINCIAL DISTRICT MEETING

SUNDAY, JUNE 20, 1937

at

ROSE & CROWN HOTEL, TONBRIDGE

Assemble	12.30	p.m.
Lunch	1.15	p.m.
Business Meeting	2.30	p.m.
Tea	4.15	p.m.
Station Visits	5.30	p.m.

Price 5s. inclusive.

All reservations to Mr. W. H. Allen (G2UJ), 32, Earls Road, Tunbridge Wells, not later than June 16.

DISTRICT 17 (Mid-East)

These notes are being written before NFD, but arrangements seem to indicate that the District should be in a position to reach a creditable total. The 14 Mc. transmitter was given a try-out at G6GH, using an input of only 15 watts, and a contact was made with VS7, a clear indication of its efficiency. The transmitter has been built by 2AAS to the design of 6LI, and uses a 6A6 oscillator doubler followed by an 807 beam power pentode.

Grimsby and Cranwell also seem to be ready for the fray. Let us hope that the weather will be suitable for once.

The notice about G6GH's qualification for the HBE resulted in G6LI making a long search, as a result of which he found that he already had the necessary cards, and 6GH, therefore, is now second claimant for this district. Who will be the next ?

Sleaford.—We welcome a new member in BRS 2808, who is now G8OL. He has been a radio instructor in the R.A.F. since 1924, but has been interested in radio since the spark days of 1910. 8GI is experiencing trouble with low efficiency on 14 Mc. when using the final stage as a power doubler. 2CFT is also experiencing trouble ; his difficulty being with neutralisation.

Boston.—G6GH gives us welcome news regarding our African representative. Grave fears for 2LR's safety have been allayed by a QSO on May 27, after which ST2LR was handed over to 8FC. Future contacts have been fixed so that Wally is now once more in touch with his old friends. 6GH has also worked ST2BN, another Khartoum station. This makes him 79 countries.

DISTRICT 18 (East Yorkshire)

Hull.—The membership has fallen once more into evil ways, for only one report has been received this month as compared with over a dozen in April. From information gleaned, however, there seems to be some activity, although the stations heard around the district have been few and far between.

The good old formula "rebuilding" perhaps accounts for the lack of local signals and the arrival of summer supplies the rest.

2AGK, the lone hero who reported, is having a very busy time. A.C. has been installed and the power pack is now finished. Not satisfied with a change of supply, he has now gone ECO, and results are encouraging. G6OY has just finished his new all-mains receiver, and is to be congratulated on its fine workmanship and performance. 2BRY is also rebuilding the transmitter, and has installed an 89 as CO.

The T.R. would like to thank those who supported the York meeting, and all will agree that those who did not go were the losers. Our thanks are also due to G5BP for a very entertaining talk on aerial systems, and we hope to hear more from him. The promised film show is unfortunately postponed at present, but the day will come.

The T.R. would like to hear from anyone in Hull who is on 56 Mc., and is awaiting his first signal on that band. An 0-v-1 is the only available receiver, but it seems reasonably good.

Finally, please don't forget reports by the 18th of each month.

Scarborough.—G8KU is experimenting with Class B. crystal oscillator. 5MV is now licensed for 28 Mc. with full aerial, also has 25 watts permit. 6CP has been busy with N.F.D. rig. 6TG spent week's holiday in Scotland, and visited 5FT, 6RG and 6UU. He thanks these stations for their hospitality.

Other Scarborough stations have been heard on the air, but no notes received.

DISTRICT 19 (Northern).

Stockton and Darlington.—G2FO is now in his new QRA and will soon be active again. 6DR has also moved. 5XT and 8CL are on 7 Mc. phone. 5QU is on 28 Mc. but having trouble with receiver. 6ZT is on 56 Mc. Congrats to G8OH (ex 2AKH) on his full permit. 8GL and 2BQO have been busy with N.F.D. preparations. 8WR is testing aerials. 2CBA has vibrator H.T. supply. BRS2859 is busy with morse.

G8HQ is on 14 Mc. C.W. and has been busy with N.F.D. preparations. 2BYY has applied for his full licence. Congrats. to BRS1895, now 2CQJ. The T.R. would appreciate reports from 2BQA and 2BLG.

The Stockton Conventionette was quite successful, an attendance of 25 being recorded and a very pleasant time was had by all present. Our thanks to G6CL, 5AR, 5QF, 5IW (ex SU1EC) and all others who attended.

South Shields.—G5WZ is on 56 Mc. and most other bands. 8KK worked W6 on 14 Mc. phone with 9 watts. 5YO is on 7 and 14 Mc. G5WZ has been receiving the Alexandra Palace transmissions fairly consistently at good strength.

Newcastle and District.—G2PN is running a sked with VK3BJ on 14 Mc. 8OA is a new call and our congrats. to him. 2GC is moving to Bishop Auckland and hopes to be active again soon. 2LD is on 3.5 Mc. phone. 8AY is on 7 Mc. and visited G5QY. G2XT is altering RX for A.C. operation and active on 3.5 and 1.7 Mc. 6YL is doing usual QRP DX and listening on 56 Mc. 2YY is on 7 and 14 Mc. 5RI has been heard on 1.7 Mc. phone. 6IR is on 1.7, 14 and 28 Mc. and hopes to be on 56 Mc. soon. G5QY is on 56 Mc. to G5WZ and active on all bands.

Scotland.

News is decidedly scarce this month and what little there is is mainly devoted to N.F.D., which event will be over by the time this appears.

"A" and "E" Districts.—The members of the local group of the Band Occupancy Group are to be congratulated on their excellent work during the recent band occupancy check. During a single week-end no less than 275 stations were heard and logged on 7 Mc. A junk sale was held at the last meeting of the season and the district funds received a welcome contribution as the result. Our best wishes go to Mr. Goldsmith, G6VH, on his new appointment in England. Mr. J. D. MacKay, 2AJD, has been granted the call GM8PM. A brief description of some of the gear used at Field Day may be of some interest. 1.7 and 3.5 Mc. station used 6L6 driving RK25 and a straight receiver. At the 7 Mc. station the transmitter was similar, the P.A. being a RCA 807. A CO.FD.PA. rig comprised the transmitter at the 14 Mc. station and a S.S. superhet was used for receiving purposes. It may be of interest to some members to hear that during experiments carried out with the 1.7 and 3.5 Mc. transmitter it was found possible to obtain some drive from the 8th harmonic, that is, 1.7 Mc. to 14 Mc. in one stage.

"C" District.—Mr. W. Robertson, GM6RI, has been forced to tender his resignation as D.O. for personal reasons. We thank Mr. Robertson for all the good work he has done during his term of office. To fill this vacancy, Mr. J. G. Halley, GM8CF, has been elected and we hope that all the members will give him their support.

"B" District.—All the district's energies have been concentrated on N.F.D. GM8LR has worked W6 on 8 watts.

"D" District.—There is no news to hand.

"G" District.—Mr. R. S. Wood, 2ASV, has been granted the call GM8NW.

"H" District.—G5HF, who is presently staying in the district, has been conducting some 56 Mc. experiments, but the two members who are assisting him have been unsuccessful so far in listening for his transmissions.

Northern Ireland

The crystal register is growing, but many stations have still to send in a note of their frequencies: as it is desired to have a record as accurate as possible, please send notification direct to D.R. It is hoped to have a chart made and probably published locally, then additions could be made by publishing new frequencies in this column.

A novel item produced much interest and amusement at the R.T.U. meeting on May 22, in the Hostel, Howard Street; each member present submitted a technical question in writing and the member to answer it was decided by a "draw." The depreciation suffered by a new copy of the Handbook which an unfortunate had brought along was probably a world's record.

N.F.D. though now past, is at the moment of writing very much in our thoughts. Fate is dealing unkindly with several operators who had hoped to be present and the staffs are going to be small and hard-worked; but the will-to-win is making up for small numbers and every effort will be made to make a good show. One feels like asking the reader how we fared: you know much more than we do but all will be revealed in the post-mortem.

Gist, the local magazine, flourishes and mixes a good brew of technical and humorous articles: its motto, "Many a true word spoken in *Gist*," reflects the spirit of the production.

Gi5HV has blown his transformer. Gi6WG is being pirated on 14 Mc. phone and Gi5GV on 1.75 Mc. phone; the possibility of the pirate being local has by no means been ruled out. Gi8GK worked XE and is rebuilding TX. BRS2868 is the Hon. Editor of *Gist* and getting many bouquets. Gi2SP building N.F.D. gear. Gi5SJ has gone QRO with a 35T. Gi5SQ has built a 7-valve SSS. Gi2KR reports an attack of mental aberration in the form of 14 Mc. phone, but assures us of its temporary nature. Gi6TK reports having worked all continents and B.E. on telephony; also the former on 28 Mc. band; he also reports that 3.5 Mc. 15-watt signals have been heard in W6 and K5. 6TK also reports that Gi6YM is now active on 14 Mc., being run from a 200-watt converter; the club will welcome visitors to Gi during the summer. Gi6YW is still rebuilding slowly. 2AVQ hopes to have a full call soon.

THE 56 Mc. BAND

By E. H. Swain (G2HG).

A FAIRLY large-scale 56 Mc. test was run on May 1 and 2 in an endeavour to obtain long-distance contacts. G5LB and the writer notified a number of English and overseas amateurs and kept a continuous watch on the band from 1400 GMT on May 1 until 2300 GMT on the 2nd, but unfortunately the tests did not produce the hoped-for DX! ZS1H reports that he was active but heard no long-distance signals. F8JG sent in a very complete log giving the times during which he was active. He heard no signals except a non-modulated carrier on about 57500 kc. between 1315 and 1905 BST on May 2 at a QRK of R2/3. W3GLV kept continuous watch throughout the entire period but heard no DX. He transmitted for 10 minutes every hour. W3DBC was on more frequently but unfortunately did not have a receiver capable of receiving weak CW. W3GLV heard several W stations calling "56 Mc. DX Test de W——."

If the tests had been held two weeks later something might have happened because amateurs on the East Coast of the U.S.A. contacted the West Coast on May 14 and 15.

G6DH, incidentally, reports that on May 17 he hard long-distance signals up to 52 Mc. This was at 0900 G.M.T. G6YL heard ZS1H's overtone on 28 Mc. calling "Test 56 Mc." on April 29 and again on May 2. YL promptly changed up to 56 Mc. but without success.

W3GLV will be conducting a test to contact England during the early part of December and will forward full details later. He will be using between 300 and 1,000 watts of unmodulated CC CW with a directional aerial beamed on England.

W9FM mentions in a letter that the LU amateurs are running a 56 Mc. contest, which commenced on April 15.

And finally some more news from W9FM, kindly forwarded by G2YL.

W2JCY heard G5BY at 9.30 a.m. and 1005 a.m. (E.S.T. ?), and G6DH at 8.30 a.m. on February 28. G5BY was heard three times previous to this over a period of several months. W2JCY uses 58.15 Mc. (changed to 58.2464 kc. on May 1), with a ¼ kw. transmitter. This station was heard in England on May 9, 1936—a year ago—with a word-for-word confirmation. Since then five stations have reported these 56 Mc. signals, and on a regular test schedule, Mr. Cecil Mellanby, of Pwellheli, North Wales, has heard W2JCY fairly regularly since last September at the time of the month just preceding, during, and following full moon. The latest report was from a listener in Whitley Bay, who heard a special test schedule .with G5BY This listener has reported W2JCY several times previously using only a two-valve transceiver. Regular test transmissions are scheduled weekly on Saturdays at 10.30 a.m. and 11.30 p.m. Eastern Time, and Sundays at 1.00 and 9.15 a.m. These are 15-minute transmissions followed by 15 minutes listening. W2JCY has received "heard cards" from practically all States east of the Mississippi, and from Canada, Florida, Mexico and South America. Stations have been worked on 56 Mc. in W1, 2, 3, 4, 8 and 9.

We are informed that XE1AY, XE1G and XE2N are interested in 56 Mc. work.

Empire B.E.R.U. News.

B.E.R.U. SECTION REPRESENTATIVES.

Antigua, Bahamas, Bermuda, and Eastern Part of British West Indies : A. Tibbits (VP2AT), High Street, St. John's, Antigua.

Australia : A. H. Mackenzie (VK4GK), Fire Station, Wynnum E.2, Brisbane, Queensland. Sub Representatives : J. B. Corbin (VK2YC), 39, Mitchell Street, McMahon's Point, Sydney, N.S.W. ; R. Ohrbom (VK3OC), 22, Gordon Street, Coburg, N.13, Victoria ; G. Ragless (VK5GR), South Road P.O., St. Mary's, S.A. ; J. C. Batchler (VK7JB), 21, Quarry Street, North Hobart, Tasmania.

Burma : W. G. F. Wedderspoon (VU2JB), Government High School, Maymyo, Burma.

Canada : C. B. Dowden (VE1HK), 49, Walnut Street, Halifax, N.S. ; Earle H. Turner (VE2CA) 267, Notre Dame Street, St. Lambert, P.Q. ; W. P. C. Andrew (VE3WA), Dominion Boulevard, South Windsor, Ont. ; F. Taylor (VE5GI), 4374, Locarno Crescent, Vancouver, B.C.

Ceylon : R. M. De la Pole (VS7RP), Tamaravelly Group, Dolosbage.

Channel Islands : J. le Cornu (G2UR), 1, Les Vaux Villas, Valley Road, St. Helier, Jersey.

Hong Kong : G. Merriman, (VS6AH), Box 414, Hong Kong.

Irish Free State : Captain G. Noblett, M.C. (EI9D), Barley Hill House, Westport, Co. Mayo.

Kenya, Uganda and Tanganyika : W. E. Lane (VQ4CRH), P.O. Box 570, Nairobi.

Malaya and Borneo : J. MacIntosh (VS1AA), Posts and Telegraphs, Penang, S.S.

Malta : Lieut. R. F. Galea (ZB1E), 20, Str. Collegiata, Birchircara.

Newfoundland : E. S. Holden (VO1H), Box 650, St. John's, Newfoundland.

New Zealand : R. T. Stanton (ZL3AZ), 17, Martin Avenue, Beckenham, Christchurch.

North and South Rhodesia : R. A. Hill (ZE1JB), P.O. Box 612, Salisbury, S. Rhodesia.

North India : J. G. McIntosh (VU2LJ), Bukhia Tea Estate, Letekujan P.O., Assam.

South Africa : W. H. Heathcote (ZT6X), 3, North Avenue, Bezuidenhout Valley, Johannesburg.

South India : J. S. Nicholson (VU2JP), c/o Kanan Devan Hills Produce Co., Ltd., Munnar P.O., Travancore.

Australia

By VK4GK *via* VE5GI and G5LI.

It is with regret that members in Australia learn of the resignation of Mr. Ivan Millar (VK3EG), as B.E.R.U. Section Representative, owing to pressure of private business. The opportunity is taken of thanking him for his valuable help in the past and to wish him success in the future.

VK4GK has temporarily taken over the duties of Representative, pending confirmation of his appointment by W.I.A.

DX conditions have of late been fair to good, although not for G on 14 Mc.

VE5GI has kindly offered to act as E.L.S. for urgent B.E.R.U. messages from and to VK, whilst schedules with other parts of the Empire are sought by VK4GK.

VK4GK and 4YL worked TF3AR recently, this being the first contact between Iceland and Queensland.

It is hoped in future to give in these notes a full summary of B.E.R.U. Section activities in all States ; insufficient time to collect information has prevented an extension of news on this occasion.

Irish Free State

By EI9D.

" Leave it to George ! " He has left it to *you* this time. Reports by the 25th, please.

Malaya and Borneo

By VS1AA.

No member has reported this month. VS1AA has finished his receiver, which is working well on all wavelengths from 80 to 7 metres. ZE, PK, VU, VK and harmonics of TDC, JNJ, and PLK have been heard at fair strength on 28 Mc. An effort is being made to get the receiver working on 56 Mc. The 14 Mc. band sounds like Bedlam at times, with phone stations spread all over it ! Curiously enough, 7 Mc. is still deserted. VS1, 2 and 3 stations are reminded that the use of " CQ " is expressly forbidden. 2AG has gone on leave to G, while 1AF is on holiday in Sumatra.

A large number of QSL cards are on hand, some for non-members. This QSL business is growing so extensively that it is becoming necessary to stipulate that members collect their own. In other words, if you want your cards, send for them. If you don't send for them, then obviously you don't want them.

Malta

By ZB1E.

On the expiration of their term of office the ZB1 Group officials resigned their posts, and the following were elected :—

B.E.R.U. Representative and ELS : ZB1E.

QSL Manager : ZB1H.

Ex-officio Member : ZB1J.

We take this opportunity of thanking Dr. L. Grech (ZB1C) for his services in the past, and regret that his Radio activities are being so curtailed by pressure of work.

Applications by ZB1C, 1E and 1L, for the use of telephony, have been under consideration for some time. ZB1H, who has the only 'phone permit, is back on the air. ZB1J has been making use of the Eckersley and Tremellen charts, and finds them very useful. He has recently tried out various transmitting rigs in an effort to increase his aerial current, but reverted to his old pair of 46's in the final. ZB1K, who was troubled with a defective power supply, is active again. ZB1P, having succeeded in eliminating key clicks, is now troubled with a back-wave. ZB1Q is a call just issued, and should be heard soon; we wish Mr. Seymour good luck. A series of experiments by 1E showed that capacity coupling between stages in low-power transmitters is preferable to link coupling both from the point of view of apparatus required and efficiency.

Conditions on 14 Mc. are improving, and W, VE and VK have been worked between 05.00 G.M.T. and 06.30 G.M.T. Only an occasional weak commercial harmonic is heard on the 28 Mc. band.

ZB1E will be off the air from the middle of June for about four weeks, as he is visiting the Paris exhibition.

New Zealand.

By ZL3AZ.

With the advent of the winter months, conditions have declined considerably, although 14 Mc. remains open for DX contacts. In the South Island, at least, the prevalence during late April and early May of electrical storms made listening uncomfortable, even on the high frequencies. A bright display of Aurora Borealis on the evening of April 21 almost completely blocked out signals. Only the more powerful U.S.A. and Australian stations were audible, and then at considerably reduced strength. (This condition applied to Europe also.—Ed.)

56 Mc. has interested a few of the locals at long last, and ZL3DJ, a consistent performer on 28 Mc., has just finished a transmitter using a 35T in the final. Interest is growing now that there seems a possibility of a Trans-Tasman QSO with Australia on this band. It is hoped to bridge this gap very shortly, although it may be more difficult from parts of the South Island owing to the fact that the Southern Alps form a barrier between the East coast of the island and the Tasman Sea. More hope for contacts probably exists between the West coast of New Zealand and Australia. ZL3DJ added another African station to his total recently when he worked ZE1JA on 28 Mc. This band seems to be the best we have for QSOs with that continent. More contacts have been made on this band with Africa in the comparatively short time it has been open than on all the other bands.

A surprise contact with YL2CG, one of the rarer European stations, was made by ZL3AZ on 14 Mc. on April 18 at the early hour (for that band) of 1625 G.M.T. It is rather unusual to contact Europe on 14 Mc. at this time, although several are usually audible, notably U2 stations.

North India

By VU2LJ.

The licence question has been settled, and examinations for up-country amateurs have been held. The code speed has been reduced from 16 to 12 words per minute, which gives newcomers a much better chance of passing.

Both 2AM and 2DR have rebuilt, and are using a type 6A6 as CO/FD followed by an R.C.A. 802 pentode as P.A. Some difficulty was experienced by 2DR in "taming" the PA stage until neutralising was used.

A rather serious blow-up occurred at 2LJ when the filament windings of a rectifier transformer shorted. The transformers were specially made in Britain for the purpose, and the total insulation between the windings consisted of a single piece of un-impregnated brown paper!

BERS311 notes a general falling off of DX, coinciding with the commencement of the "hot" season. Also that the commercial stations IUP, RFBA, and RTMA have returned to the 14 Mc. band.

South Africa

Division 5.—The 3.5 Mc. band is again popular, especially so during the present (Hos Trophy) contest which is in full swing. ZU5L is trying his best to win the trophy, and up to the time of writing seems to be in the running.

The 7 and 14 Mc. bands are becoming very erratic, wipe-out being conspicuous.

The following B.E.R.U. members have also been active: ZS5Z, 5AK, 5AC, 5R, ZT5R, 5Y, ZU5AF, 5D, 5V, and 5Q. ZU5Q.

Division Six.—The newly-formed "African Radio Research Union" is making good headway, and it is hoped that, with the co-operation which members are showing, it will soon be possible to organise the various groups.

Considerable time is being spent on 3.5 Mc. work, and notes are being made on "Wipe-out," "Skip" and distortion due to fading.

A weekly bulletin is put on the air by ZS6C on Sundays at 10 a.m., the subjects being items of interest to amateurs. From reports received these talks are of great value, not only to transmitting members, but also to others interested in S.W. Radio.

Each section endeavours to meet once a month—usually at the shack of one or other of the members.

Last month's meeting took the form of a discussion on Aerials, and though at 11.30 p.m. argument had not finished and no final discussion had been arrived at the defects and benefits of various systems had been discussed at length.

ZS6AM has been responsible for the Morse transmitted on 7 Mc. thrice weekly. Reports received show that nearly 25 pupils take advantage of the lessons; one being as far situate as Beira!

The A.R.R.U.'s July meeting in Division 6 will, it is hoped, include a demonstration and discussion of the Cathode Ray Oscillograph.

The *Rand Daily Mail* trophy once more goes to an American amateur. It is a coincidence that the runner-up in this contest should be the previous winner of the contest organised by the same paper in 1926.

The competition, which took place during the four week-ends in January, attracted entrants from nearly all parts of the world, and more than 5,000 cards were received from competitors oversea.

The trophy is designed in the form of a single silver aerial mast standing on a map of Africa etched on a portion of a silver globe.

The long-distance "Golden Jubilee" International Radio Contest has been won by Mr. Clark C. Rodimon (W1SZ), of West Hartford, Conn., U.S.A., with a score of 2,368 points.

The runner-up is Mr. Jefferson Bordon (W1TW/W1CMX), of Fall River, Massachusetts, who secured 2,208 points.

The highest scorer in Great Britain was G5RI.

Amateurs within the restricted zone were not eligible to compete for the trophy, but a special award has been made to the highest scorer in this area, Mr. R. G. Henwick (ZT2Q), of Port Elizabeth. Mr. Henwick wins a replica of the *Rand Daily Mail* trophy. The runner-up in the African zone is Mr. W. F. Meyer (ZU6P), of Bramley, Johannesburg. Mr. E. R. Bosman (ZS2X), of Port Elizabeth, was third; and Mr. J. van Ravensteyn (ZU1T), of Paarl, Cape, was fourth. The respective scores were 38,352—35,280—25,578—19,040 points.

The event exceeded all expectations as regards entries, and the number of contacts made; every one entered into the spirit of the contest, and all expressed the hope that this would be only the first of similar contests to come. Special thanks are due to Mr. H. H. Browning (ZU6E), who supervised the running of the competition.

ZT6X and ZU6C are now operating mostly on 3.5 Mc. ZS6C, ZS6AM, ZS6T and ZT6AD are on 7 Mc.; ZT6K, ZV6P and ZU6V can still be heard on 14 Mc.; whilst ZS6Q still confines himself to 28 Mc. schedules.

During April, ZT6R, on 28 Mc. and 14 Mc., was exceptionally active; he managed many DX contacts on the latter band.

ZT6AQ has installed an Eimac 35T in the final stage, and hopes to obtain a good output on 28 Mc.

News items on local amateur work should be sent to R. B. Wood, Box 4020, Johannesburg.

ZU6V.

EXCHANGE & MART

(Continued from Back Cover)

QSL's MODERN DISTINCTIVE, and at Fair Price. AA, BRS, G and Log Book Samples, from G6MN, Wo7ksop, Notts.

QSL's 250.—5s. 6d. post free. Specimens free. Satisfaction guaranteed. Prices cannot be beaten.—2CDT, "Trevecca," Plains Lane, Elland.

RADIO.—The world's Premier Ham Magazine, *Radio*, brings to you all the latest developments in S.W. work. *Radio* gives you a large and comprehensive list of "Calls Heard." If you want to keep your transmitter right up to date, be sure to read *Radio*.—Jones Radio Handbook in stock, 6s. post free.—Sole European Agent, N. E. READ, G6US, Willow Street, Oswestry.

UNIQUE OPPORTUNITY.—Two new Hallicrafter Sky Challengers. RX's, list price, £25. Xtal Model, £28. What offers? Genuine reason for sale.—Write, JOHN LAY, 39, Cambridge Terrace, W.2.

VALVE BARGAINS.—210, 6s.; 250, 5s.; 81, 6s.; 866, 10s. R.C.A. 47, 35/51, 24A, 45, 80, 27, 26, at 3s. each. Majestic types: 3s. 9d. each. 801, 19s. 6d.; 800, 48s. 210H.D., 16s. All Popular Types, 3s. each.—RADIOGRAPHIC, LTD., 66, Osborne Street, Glasgow, C.1. Bell 848.

CAIRO AHEAD (*Continued from page* 560)

Extend the 7 Mc. band to 7000-7500 kc.

Great Britain suggests that about 50 kc. be allotted to Broadcasting services of a special character between 3500 and 4500 kc.

Iceland : Eliminate amateurs from 1.7 and 3.5 Mc. bands.

Italy : Reduce 7 Mc. band to 7200-7300 kc. in Europe only and reduce 14 Mc. band to 14300-14400 kc. in Europe only.

There are also several further proposals of minor importance to amateurs, which need not be mentioned at this stage. None of these proposals, however, affect frequency allocations.

The Future.

It is impossible at present to form an opinion as to what is likely to happen at Cairo, but we hope it may be possible to maintain the *status quo* on all the bands, with the exception probably of an exclusive allocation to air services on the 1.7 Mc. band. We should mention that some countries have not yet put forward proposals but probably will do so at Cairo. This applies particularly to the ultra-high frequencies.

We are happy in the knowledge that the British Administration are sympathetically inclined towards their Amateurs, and we feel sure that it will be beneficial if the I.A.R.U. authorise an R.S.G.B. representative to attend as a member of the official I.A.R.U. Delegation at Cairo.

Only by careful preparation and co-operation will it be possible for these delegates to obtain sympathetic support from the nations of the world.

Members may rest assured that their interests will be safeguarded by those who are responsible for the welfare of the amateur movement both here and overseas.

56 Mc. RELAY TESTS (*Continued from page* 573)

previously mentioned were heard, and also 5JW, 6RS, 2KI and 5MA.

Summing up the tests, it would seem that the period of six hours is too long to suit the majority of transmitting stations, and also that messages of 24 words are too unwieldy and take too long to pass through, especially where Q.R.M. is experienced and repetitions become necessary. Many mentioned that they thoroughly enjoyed the tests, and that more stations were to be heard than at any previous time. Requests for a further relay test have been received, and it is intended to organise this, probably in August, as the 56 Mc. N.F.D. on July 4 will provide plenty of interest meanwhile.

As far as DX goes, the results were somewhat disappointing, but it is necessary to keep plugging at it until conditions peak up. It is probable that DX would be more likely over a route from daylight into darkness, and in this next test it is intended to make the time from 20.00 to 24.00 G.M.T., and to obtain co-operation from foreign and Colonial stations. This time will make it rather difficult for portable stations to be on, but not too much so, as it will be the middle of summer, if we get any !

Simple aerials do not appear to be sufficient to carry over long distances, and systems, either of the array type or long horizontal ones, become necessary. It is hoped to publish some useful information on the erection of the latter type, which are easier to put into service than the multiple wire arrays, before the next series of tests take place.

28 Mc. BAND (*Continued from page* 575)

included SU1RO, SU1SG, ZE1JJ, ZE1JU, ZS1C, ZS1H, ZU1C, ZS6AJ and ZU6N. ZS1H worked G6DH on May 27, but he is still concentrating chiefly on five metres, and his overtone, calling "Test 56 Mc.," has been audible on 28 Mc. on several occasions. European signals from 13 countries were most numerous in the latter half of the month, but on several days when skip was favourable for European contacts only two or three stations appeared to be active. Among the most consistent were D3DSR, YL2CD, YT7KP, YU7GL and LA1YT (two watts portable).

A few North American signals got across in the evenings of May 2, 7, 8, 20 and 21. The fourth district was the most frequently heard, but stations in W1, 2, 3 and 8 were also reported. Central and South Americans were audible on ten or more days, and G6DH, who is still much the most active station on the band, worked LU7AZ, PY1DK, PY2HQ, PY3AB, PY3AW, and heard CM2OP, K4AOP, K4EMG, K4EPO, LU9EF, PY2KT, PY2LJ, TI2RC and VP5PZ. Another signal from this direction was K5AG, heard by G6YL.

N.-WESTERN P.D.M. (*Continued from page* 579)

Company, of New Malden, and *Claud Lyons, Ltd.*, of Liverpool. Further apparatus had been purchased so that each draw offered participants several prizes and the tickets sold extremely well. The proceedings caused considerable excitement, much pleasure to the winners and, no doubt, some disappointment to those who found that their lucky stars had deserted them.

A visit to inspect the sound equipment at the Palladium Cinema had been arranged to follow tea, but unfortunately this had to be cancelled at the last moment owing to the absence of the sound engineer on urgent work elsewhere. The hour was however getting late, and as the day had been very fully occupied it was not such a disappointment as it might otherwise have been, so, after further "rag-chews," the party broke up about 7.0 p.m. Several car-loads of members were then observed setting out on the usual round of station visits, and an inspection was made of G6YR, 5NU and 5ZT. Others made their way homewards, some carrying their prizes back to "try out" at the earliest opportunity, and although many may have tarried to have a look round Southport, it is believed that all eventually arrived home without any "incidents" having occurred to disturb the local or the international situation.

H. W. S.