

R.S.G.B.



BULLETIN

EDDYSTONE MODEL '840' AC/DC COMMUNICATIONS RECEIVER



The New Model "840," illustrated above, possesses full Communication facilities and operates from either A.C. or D.C. mains 100/110 and 220/250 volts.

- Seven valve superheterodyne with R.F. stage.
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- Gear driven tuning with 140/1 reduction.
- Mechanical bandspread. Accurate resetting.
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- Suitable for tropical service.
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JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN
VOLUME 29 No. 9
MARCH 1954

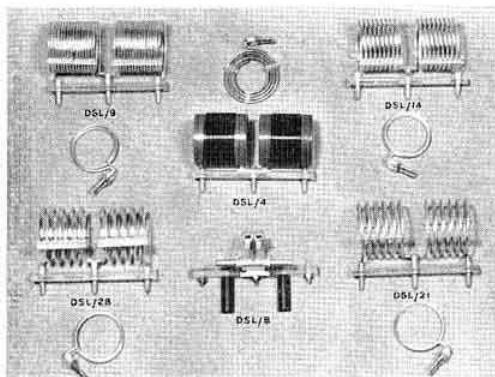
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Introduction to Ultra-High- Frequency Radio Engineering

By

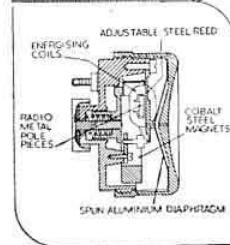
This new book is intended as a guide to the methods and techniques of modern ultra-high-frequency radio and radar engineering. It is written primarily for those engineers, students and members of the technical branches of the Services who wish to obtain a working background of the subject without complicated mathematical theory or unnecessary detail. The author, who has had many years' experience in the practical side of radio engineering, covers such typical aspects as transmission lines and waveguides, resonant cavities, cathode-ray tubes, disc-sealed valves, Klystrons and magnetrons, measurements, aerial systems and wave propagation, etc. 256 pages.

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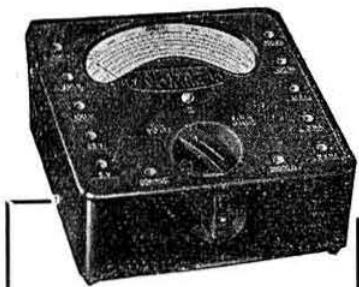
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0-25 "	0-100 "
0-100 "	0-250 "
0-250 "	0-500 "
0-500 "	

D.C. CURRENT	RESISTANCE
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0-5 "	0-100,000 "
0-25 "	0-500,000 "
0-100 "	0-2 megohms
0-500 "	0-5 "
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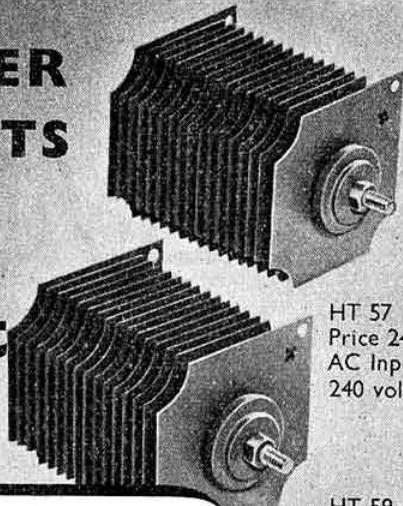
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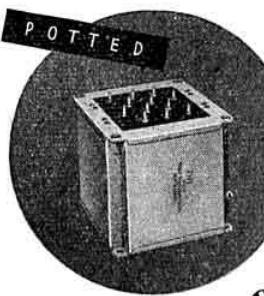
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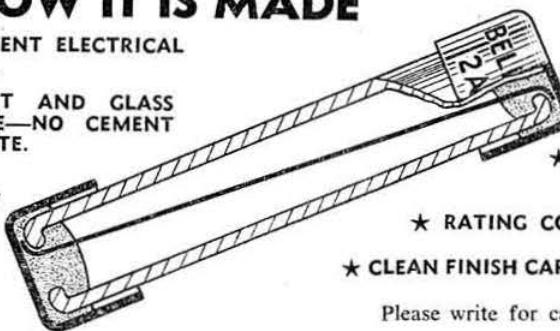
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R.S.C.B. BULLETIN, March, 1954.

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Discoursing light-heartedly yet intelligently on "HI-FI," a contributor to "The Observer" recently commented on the ability of the modern loudspeaker (aided by amplifiers, pre-amplifiers and other aids) to detect and faithfully reproduce such sounds as the closing of studio doors and the pages of a score being turned. He made reference to the achievement at the loudspeaker end of "perfect concert-hall balance."

Now what is, in fact, the secret of so-called "high fidelity" reproduction? It is something that is not only or merely the expression of what can be graphically illustrated with a good frequency response curve. It is not only the faithful reproduction of all sounds within the range of the aural spectrum. It is not alone the perfect "balance" of high, middle and low frequencies. It is all these things conjoined to produce an elusive quality of realism that gives to the listener the illusion of being present at the actual original rendering.

This elusive quality cannot be measured with instruments or recorded in a response curve. The simplest way of expressing it in words is to say that when you are listening to a truly good loudspeaker, you feel that you are in the recording studio.

When a recent consignment of Goodmans "AXIOM" Loudspeakers arrived in New York, a leading expert there said, "This is the most revolutionary development in the reproduction of sound since the invention of the loudspeaker . . . it is superior in every way . . . the reason is that the engineers who designed the "Axioms" were aiming for PRESENCE." If you want to know what this elusive quality "Presence" really is, take or make an opportunity to hear a Goodmans AXIOM Loudspeaker. You will then understand the enthusiasm of the American expert.

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12SA7GT	-	-	8/6	PEN46	-	-	7/6
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14A7	-	-	8/6	TP25	-	-	8/-
25Z6GT	-	-	8/6	VP23	-	-	6/6
25Z5	-	-	8/6	VP41	-	-	7/6
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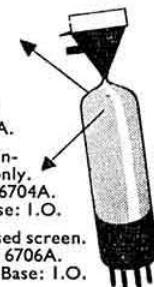
The following notes are a convenient reference to new types introduced during recent months

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- Z719** Short base R.F. pentode. High input impedance. Slope 7.4 mA/V. Heater 6.3V 0.3A. Base: B9A.
- M329** Output pentode for sound and frame time base output stages in transformerless television receivers. Heater 16.5V 0.3A. Base: B9A.
- U433** Miniature wire-in television EHT rectifier. Indirectly heated P.I.V. 17 kV. Heater 6.3V 90 mA.
- Z729** Low hum, low microphony A.F. pentode for use in early stages of high gain amplifiers. Hum level 1.5.V. Heater 6.3V 0.2A. Base: B9A.
- N727/6AQ5** Beam tetrode. Heater 6.3V 0.45A. Direct replacement for American 6AQ5. Base: B7G.
- W727/6BA6** Variable-mu R.F. pentode. Heater 6.3V 0.3A. Direct replacement for American 6BA6. Base: B7G.
- X727/6BE6** Heptode. Direct replacement for American 6BE6. Base: B7G.
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- 7102A** 12" circular tube. Aluminised screen. Direct replacement for 6705A and 6706A. Heater 6.3V 0.3A. EHT 7-10kV. Base: I.O.

BARRETTER

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JOHN CLARRICOATS

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Advertisement Manager:

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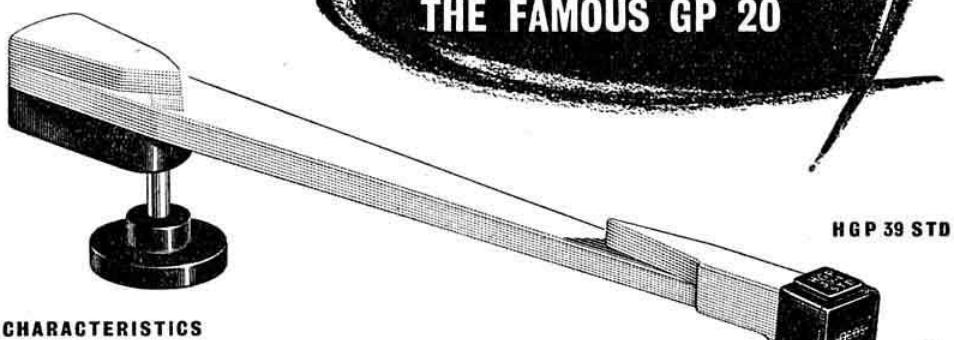
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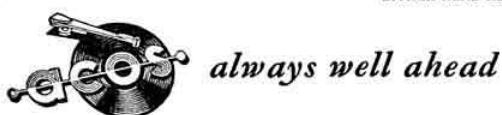
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Current Comment...



New Techniques—1

GREAT interest was aroused during the last Amateur Radio Exhibition in the reports of the success which had been achieved by Mr. Douglas Walters, G5CV, in the use of a transistor transmitter on the 80 metre band.

Here is a new technique with which the progressively minded amateur will wish to keep abreast, and to this end he will undoubtedly read with much profit the article on germanium triodes (transistors) contributed to this issue by The General Electric Co., Ltd. This is one of the first public pronouncements on the subject to have emanated from a British manufacturer, and we feel privileged to have this opportunity to publish it. There is also in this issue a brief account, together with a photograph and circuit diagram, of a Top Band transistor transmitter which uses a standard Mullard OC50 transistor. This little set really does work.

Other articles dealing with transistors will appear from time to time to keep members up to date with development. To this end the Technical Committee is engaged on the problem with a view to sponsoring a number of practical designs. Members who achieve success are urged to communicate their results to the Society.

New Techniques—2

ANOTHER development which is engaging the close attention of the Technical Committee is that of Colour Television. Many members will have read with admiration of the painstaking experiments which our friends of the A.R.R.L. have been carrying-out with a view to establishing some idea of the impact of Colour Television on Amateur Radio transmitting—and, of course, the other way round!

The problem is not yet a practical one in the U.K. It is anybody's guess when Colour Television will arrive here; indeed, whether its use will be confined to public projection rather than to operation in the home, for it is going to be very expensive.

Much nearer to hand is the prospect of a second monochrome programme in Band III (174 to 216 Mc/s). New TVI problems may emerge when this happens. Members can be confident, however, that the Technical Committee is not just "watching the position," but will be acting on it when the time comes.

Three Months to Go

AT the beginning of February all Town Representatives received a copy of the entry form for the National Field Day, 1954. At that time,

when the whole country was experiencing the grip of winter at its tightest, the arrival of the form threw thoughts ahead four months to the season of high summer when the most popular event in British Amateur Radio takes place.

This early distribution of the N.F.D. entry form is a wise move on the part of the Contests Committee because it reminds local organisers that active planning for the event should by now have commenced. As this BULLETIN goes out to members there are only three months left before Field Day will be upon us; and those who in past years have undertaken the innumerable tasks that need to be done prior to its arrival know well enough that those months seem very short indeed.

For the 1954 event both the rules and entry form have become available well ahead, providing the necessary incentive for the detailed arrangements in each Town Group to be put in train. It is in the furtherance of these arrangements that the corporate spirit of the individual Town Group becomes most manifest. No "spirit" can very well mean no Field Day entry; it is as simple as that. Those active Town Groups which have already appointed their Town Representatives will at least have one job behind them: they will be absolved from the need to appoint a T.R. in a hurry before April 1, which is the closing date for entries.

The point has been mentioned here before, but its cardinal importance warrants its repetition now.

* * *

Of equal importance is another N.F.D. rule which, in the almost literal heat of the Contest, can be very easily overlooked. It is the one stipulating that operators must be fully paid-up Corporate members of the Society—and T.R.s meticulous in their adherence to all the other rules, have been known to slip up in respect of this one.

It is a disheartening experience if the months of preparation for Field Day are stultified after the event because this simple but all-important rule has been overlooked.

* * *

A final point that might be made concerns criticisms which have been heard in the past about alleged delay in announcing the results of National Field Day.

The Contests Committee are faced with a heavy load of work when they commence the checking of the logs. This work can be more expeditiously completed if few queries and little consequent correspondence arise from it. The individual Town Representative himself can ensure that this desirable state of affairs comes about.—J.H.

Society News

New Honorary Members

AT the meeting of the Council held on February 16, 1954, Frederick John Henry Charman, B.E.M. (G6CJ), and Rene Henri Klein, M.Inst.R.E. (G8NK), were unanimously elected Honorary Members of the Society.

Mr. Charman was President of the Society during the year 1952, having previously served in the office of Acting Vice-President during Mr. Scarr's Presidency.

Mr. Charman was first licensed as G6CJ in 1926 in which year he joined the Society. Throughout his long Amateur Radio career Mr. Charman has contributed extensively to the technical pages of the BULLETIN. He joined the Technical Committee when it was first constituted more than 20 years ago and has been a member ever since. He played a leading part in the preparation of material for *A Guide to Amateur Radio* and later for that war-time best-seller, *The Amateur Radio Handbook*.



Past President F. J. H. Charman, B.E.M. (G6CJ), in characteristic pose.

Mr. Charman was elected to the Council in January, 1938, and served on that body continuously (barring a war-time break) until his retirement at the end of last year.

He has travelled extensively in many countries in the service of International Amateur Radio, particularly as a Member of I.A.R.U Region I Bureau.

Except for the war years Mr. Charman has kept a signal on the air ever since he was first licensed, and in the process he has helped materially to develop the art of aerial design. He has given innumerable lectures, frequently with the aid of his celebrated model aerials "circus."

During the past 20 years he has taken part in most of the major R.S.G.B. social and business functions and events including every National Field Day, and every B.E.R.U. Contest.

Mr. Charman—"Dud" to all his friends—is a professional radio engineer with the E.M.I. Group. He was awarded the British Empire Medal for technical and practical contributions to the art of radio communication during World War II.

Mr. Rene Klein founded the London Wireless Club on July 5, 1913, which Club was the forerunner of the Wireless Society of London. It was from that Society that the present Radio Society of Great Britain sprang.

Mr. Klein was elected a Vice-President of the Society shortly after World War I when his duties as Honorary Secretary were taken over by his business colleague and friend—Leslie McMichael. Although Mr. Klein held a licence prior to 1914, it was not until just before the last war that his station came into prominence on the DX bands, under the call G8NK. Up to the time of his recent illness—an illness which prevented him from opening the Seventh Amateur Radio Exhibition last November—Mr. Klein operated regularly from the actual room in which the London Wireless Club was founded.

The news that Mr. Charman and Mr. Klein have been elected to Honorary Membership—an honour each will share with nine others—will be received with pleasure by their many friends in the Society.

R.A.E.N.

IN pursuance of its policy that the bulk of the routine work of the Radio Amateur Emergency Network should be undertaken by non-Council members resident in the Provinces, the Council is pleased to announce that Mr. W. J. Ridley, G2AJF, of Gablehays Lodge, Springfield, Chelmsford, Essex, has been appointed Chairman, and Mr. C. L. Fenton, G3ABB, 40 Fourth Avenue, Chelmsford, Essex, Honorary Secretary to the R.A.E.N. Committee. All routine correspondence relating to the Network should in future be addressed to Mr. Fenton, but Registration Forms should continue to be sent to the General Secretary.

Members are reminded that R.A.E.N. lapel and brooch type badges are now available from Headquarters, price 1s. 9d. each, post free. R.A.E.N. callsign badges may be ordered for delivery in a few weeks, price 5s. 3d. each, post free.

The Society is prepared to offer for sale R.A.E.N. car plaques provided there is a reasonable demand. The price will be 5s. 6d. each, post free.



The photograph—taken in July 1953—shows Mr. Rene Klein (G8NK) in the room of his West Hampstead home in which he founded the London Wireless Club 40 years earlier.

National Convention

As previously announced, a National Convention is to be held in Bristol during the period from Friday, September 17, to Sunday, September 19, 1954. The programme will include a reception, film show, dinner, technical visits, coach trips and lectures. An Amateur Radio Exhibition will be run in connection with the Convention which will be centred in and around the Royal West of England Academy.

A further announcement, which will include preliminary details of the programme, will appear in our April issue. In the meantime members are urged to make a note of the dates.

The "Gap" is Open!

As an outcome of somewhat protracted negotiations with the G.P.O., the Society is now able to announce that frequencies between 3635 kc/s and 3685 kc/s are again available to U.K. amateurs.

When licences were restored after the war the use of this band was denied to U.K. amateurs in accordance with decisions reached at the I.T.U. Conference held in Cairo during 1938. At the Atlantic City Conference of 1947 the band 3500 kc/s to 3800 kc/s was assigned (in Region I) to the Amateur, Fixed and Mobile (other than Air Mobile) Services on a *shared* basis. In view of its shared nature U.K. amateurs are urged to take particular precautions to avoid causing interference to other users of the band.

In communicating its decision to the Society, the G.P.O. drew attention to the more exacting frequency tolerances and band-width requirements which are now coming into force under the Atlantic City Radio Regulations in connection with shared bands. Fortunately the situation does not, at present, warrant the G.P.O. prescribing special limits for amateurs who use shared bands although other users are required to do so. If experience finally shows that amateurs are finding it difficult to ensure that they do not cause interference to other users of shared bands the G.P.O. will be compelled to think further about imposing appropriate limits.

In the interests of all concerned, amateurs who use the 3.5 Mc/s band are urged to be conservative in their use of power and to give special attention to frequency tolerances and band-widths.

Aircraft Distress Procedure

ALTHOUGH, fortunately, it has not yet been used, members are reminded that a special distress procedure, as between aircraft and radio amateurs, was laid down by the Air Ministry and Ministry of Civil Aviation in January, 1950 as the outcome of discussions with the Society.

When an aircraft has force-landed the operator will, after all normal distress procedures have failed, call on a frequency within the band 7000-7150 kc/s. Any call so intercepted should be telephoned to the nearest police station and not to the Air Ministry or an airfield. When a transmitting amateur receives a distress call he should refrain from answering on the frequency used by the aircraft. If an acknowledgment is sent it should be transmitted on a frequency slightly different from that used by the aircraft. Before making the call he should listen carefully to see whether any other station is transmitting an acknowledgment.

In most circumstances an aircraft in distress will transmit a distress call and distress message in the following form :

Distress Call

SOS SOS SOS V (Callsign of aircraft made 3 times) — 20 seconds dash— (Callsign of aircraft made once).

Distress Message

SOS SOS SOS (Callsign of station answering made 3 times) V (Callsign of aircraft made 3 times).

The text of the message will contain as much information as circumstances permit and will normally include :

- (i) Position and Time.
- (ii) Type of Aircraft.
- (iii) Nature of Distress.
- (iv) Intention, followed by letter K.

On occasions it may not be possible for the aircraft to make any transmission after the distress call or it may be necessary to combine the distress call and the message in one transmission.

A Matter for Caution

FROM time to time during the past few months radio amateurs in the United Kingdom have been requested, during QSOs with European amateurs, to take steps to obtain rare drugs, for the treatment of persons said to be seriously ill.

Without knowing all the facts we cannot pre-judge any particular case but what we can do and are now doing, is to express our grave concern that U.K. amateurs have been asked to handle messages which should have been sent through public communication channels.

It seems wrong that a patient's life—assuming every case to be genuine—should be allowed to depend upon the ability of an unknown radio amateur, somewhere in the U.K., to locate a source of supply for the particular drug concerned.

It is a well-known fact that there are recognised international channels, available to every doctor, for dealing with matters of this nature, and in our view such channels should be used. By handling messages of the type in question, U.K. amateurs may not only be running into trouble with the G.P.O., but they may, quite innocently, be assisting those who operate the European Black Market in drugs.

Members would be well advised to exercise the greatest caution in responding to requests for drugs.

If any such message is received, it should be communicated, together with all relevant details, direct to Scotland Yard and no further action should be taken.

Members are reminded that by the terms of their licence and under the general provisions of the Wireless Telegraphy Act, they are precluded from divulging the content or even the existence of a message to any unauthorised person and that this, of course, includes the Press.

Affiliated Societies

THE following are additions to the list of Affiliated Societies published in the July, 1953, issue of the BULLETIN:

Edgware Radio Society, c/o E. W. Taylor, 241a Burnt Oak Broadway, Edgware, Middlesex.

Lowestoft & Beccles Amateur Radio Club, c/o P. Hayward, 58 Edgerton Road, Lowestoft, Suffolk.

The R.S.G.B. Two Metre Converter

IN the description of the two-metre converter published last month a "Skirt No. 45" was specified for both the 7 and 9 pin McMurdo valve-holders. The correct designation for the skirt to fit the 9 pin type XM9/UD1 holder is No. 811.

London Meetings

THREE was an attendance of 70 at the Ordinary Meeting of the Society held at the Institution of Electrical Engineers, Savoy Place, London, S.W.1, on Friday, February 26, 1954, when Mr. S. A. Lacey lectured on "Practical Aspects of Tape Recording." The Chair was taken by the President (Mr. Arthur O. Milne, G2MI).

At the meeting to be held on March 26, Mr. G. P. Thwaites, B.Sc.(Eng.), A.M.I.E.E., A.M.Brit.I.R.E., will lecture on "Trustworthy Valves and their Manufacture." Tea will be served from 5.30 p.m. and the lecture will commence at 6.30 p.m.

Recorded Lecture Library

THE following lectures have now been added to the Society's Recorded Lecture Library: "V.H.F. Television," by Sir Noel Ashbridge. "The Engineer and Society," by Capt. P. P. Eckersley, M.I.E.E. "Receivers," by R. H. Hammans (G2IG). "TVI-proof Transmitter Design for those making their own Transmitters," by Louis Varney, A.M.I.E.E. (G5RV).

Two further lectures are in course of production and are entitled "Modern Disc and Tape Recording," by H. A. M. Clark, B.Sc.(Eng.), M.I.E.E. (G6OT), and "Aerials," by F. J. Charman, B.E.M. (G6CJ).

The lectures, which were recorded on tape using a Scophony Baird Mark II Twin Track Recorder, can be loaned *only* to groups which have access to such a machine for the playback.

Baird Television Ltd. (Electronic Engineering Sound Recording Sales and Service), Lancelot Road, Wembley, have offered to arrange for the loan of a suitable instrument to groups unable to borrow one elsewhere. Applications should be addressed to Mr. Rule at the above address. The company has agents in most parts of the United Kingdom.

Mobile Handbook

LIMITED supplies of the Radio Amateurs' Mobile Handbook, published by Cowan Publishing Corporation of New York, are available from headquarters, price 17/6 post free.

Irish Radio Transmitters' Society

THE Annual Report of the Irish Radio Transmitters' Society records that the Society was founded 21 years ago; the fully paid-up membership increased during 1953; meetings were held each month in Dublin; there was a record attendance at the Annual Dinner in December.

The West Country

in the Autumn . . .

is a lovely part of this pleasant land, and in the Autumn of 1954 it promises to be especially attractive to all Amateurs with the National Convention taking place in Bristol—Capital of the West Country—on September 17, 18 and 19.

make up your mind to be there

Radio Component Show

THREE will be a record number of exhibitors—130 in all—at the eleventh British Radio Component Show to be held at Grosvenor House, London, from April 6 to 8, 1954. This annual private exhibition—compact, bright and generally acknowledged to be of real value to the technical visitor—is organised as usual by the Radio and Electronic Component Manufacturers' Federation (22 Surrey Street, Strand, London, W.C.2) from whom invitations may be obtained.

As might be expected, there will be a good many exhibits catering for the development of television all over the world and for its expansion in England to the higher frequencies. Multi-channel tuners for TV receivers, valves for the new British TV frequencies and cathode ray tubes with improved focusing units will be shown. Gramophone components will include a new ceramic pick-up. Printed circuits will also be seen.

The Economics of Colour Television

IN a lecture to the Television Society at the Royal Institution on February 24 Mr. G. G. Gouriet (Head of B.B.C. Television Research) said that since the transmission of signals by radio was a well-known art, it was true to say that from this viewpoint colour television offered no fundamental technical problems.

The problems which do arise are not initially technical but economic, and they are based on two requirements:

- the need to conserve band-width in the already over-congested bands;
- the possibility of producing a system which should not render existing monochrome receivers obsolete.

Clearly, there is a great advantage to be gained if the colour system uses a signal which can be received in black-and-white on non-colour receivers, and which can be handled by existing transmitters and links. A system which fulfils these requirements has been termed a "fully compatible" system, and it is in the search for such a system that many intricate technical problems are met.

For a fully compatible system, a necessary (though not sufficient) condition is that it should provide a signal which conforms substantially to present-day standards for monochrome. Such a signal would describe the variations of brightness in the scene, with an additional signal to describe the variations of colour.

The division of the primary signals into "brightness" and "colour" offers a substantial advantage apart from any consideration of compatibility. The colour information can be reduced in band-width and modified in any way that will meet the minimum requirements of the eye in terms of colour without affecting the "sharpness" of the picture, which is provided by the brightness signal. Tests have shown that the band-width of the colour signal may be reduced to less than half that of the brightness signal before any deficiency is noted at normal viewing distances.

Whether or not a similar system can be adapted for use in this country is not yet known; much depends on the extent to which the existing black-and-white picture will be affected by the presence of the colour signal.

Further work is required in order to develop satisfactory colour tubes and colour cameras, but history has shown that such instrumental limitations are only temporary, and will be solved in the course of time by new manufacturing methods.

THE MONTH



By S. A. HERBERT (G3ATU)*

THE past month has been quite lively with two DX contests—B.E.R.U. and the first leg of the A.R.R.L. phone affray—stirring up activity, although conditions during both events seemed rather poorer than last year. Twenty metres produced some exotic DX but usually at times when most of us were otherwise engaged. Still, there is the comforting thought that the band will soon stay open throughout the night and in a month or two some of those rarer Pacific calls should be coming through again in the early mornings. However, let us take a look at current activity on the band.

Twenty Metres

B.R.S. 19894 (Stockport) heard c.w. signals from VU2AC (0900), VS1FH, FU8AK (0940), FB8BB (1345) and FL8UU, early in the month. B.E.R.U. produced VK2VA at S7, VE7 and 8. Latterly, Far Eastern DX has been prominent, with KA, JA and KR6 at good strength. FM7WD was heard; G3AAT/OX is active most week-ends. On phone, ZL2BE is now a familiar call. VQ2DT, ZD2RRW, 4AN, 4BF and VK5MF were also logged. **B.R.S. 20104** (S. Harrow) heard FL8UU, FB8ZZ (N. Amsterdam), FB8XX (Kerguelen—1630), FR7ZA (1500), KR6A1 (1600), VQ6UU, VE8OG (Frobisher Bay) and ZS2M1 (Marion Is.—who works VK1DY on sked on Sundays at 1700 on 14025). TI9AA was active for a short time from Cocos. In a week he worked around 100 stations, few, if any being in Europe. G3ATU kept watch on various bands but did not even hear him being called. A W4 was heard in QSO with HC8GI (Galapagos Is.) on phone.

R. Civil (Plymouth) heard CR6AI, ZE2KL, 4X4DK, VQ2, VQ4EV and ZS3BS (Box 2, Luderitz, South West Africa) on phone. **B.R.S. 18017** (Warwick) logged FI8AE, VP7NS, VU2KV, LU0DDH (S.S. President Peron—in the Atlantic) and KX6BU (14033-1245) on c.w. and VP7NW, SV1PK, YV5BQ, SM8CND/MM (off Portugal) on phone.

J. Whittington (Worthing) queries MP4QP, heard during B.E.R.U., and is puzzled also by the extremely active G3JFF/MM. The latter is genuine enough and was operating in the Caribbean area at the time. Not so genuine, we imagine is AC4AK on phone, but VK9DB (Papua), FR7ZA, HS1WR, VP4BN make up for him, while CR7CH, VS9AG, 9AS, YK1AB, FB8BB, 8XX, VQ6UU and 4W1UU were good ones on the key. MP4BBB hopes to be on 3.5 Mc/s shortly. **B.R.S. 7594** (Yeovil) picked up CR4AC, 5SP (14148-0833), CT2AC, 2AG, 3AN, MP4ABW, FF8, FR7ZA (14145-1700), ST2NW, VE7RR, 7VC, VP4LL, VS1BO, IES (1600), ZS8D (1750), XZ2KN (1500) and YI2AM—all on phone. QSLs have been received recently from CR5NC, 5SP, HK5ER, ZP5BY and VQ1NZK. **G3CMH** (Yeovil

A.R.C.) worked VK2VA, VQ4, ZE on c.w. and MD5DO, PY, VK5TN (1018) and XZ2KN on phone.

B.R.S. 20106 (Petts Wood) is not very enthusiastic about recent h.f. conditions. He heard 140 countries in January, yet four weeks later only two more had been added to the log! On c.w. he unearthed VQ6 and FL8UU but missed 4W1UU, who was being called by Ws during the unfavourable evening skip period. FY7YC (1210), CE5AW, KR6AA, 6OH, KG6AAY, KA, CP5EK and UA0KKB (0740) were logged on c.w., as well as KR6KY, FM7, VK7DZ, YI3WH and ZS on phone. ZS6DW was "loud and clear" on the domestic receiver used with a short, indoor wire!

GM2DBX (Methilhill) made contact on phone with UA9BAK (Zone 17), which makes his phone score 37 Zones. During the A.R.R.L. DX contest, 'DBX worked a W (who plainly stated he was listening on his own frequency) and was immediately rebuked by a DL4 for working in the American phone band. We pass! **G3JWW** (Harlow) has now worked 80 countries, recent good ones being ZS1, VQ2AB, CO7AH, VE3PS/VO6, MD5RS, TA3AA and Ws. During B.E.R.U., he worked VK, ZL, ZD4AE, MP4BBE and VE. The "missed list" includes HK1TH, FU8AK, FP8AP, CE and CR6. **G8KS** (Petts Wood) worked VP8AJ (Graham Land—2115-14025), who said he will be returning to the U.K. in June. His relief is to be VP8AZ, who will be looking for G contacts.

G3ATU could put in very little time during B.E.R.U., but managed to work FL8UU and FB8XX for two brand new ones. '8XX is active most days on 14040 (1530-1630). He will QSL, but the first boat is not due at Kerguelen until December next. MP4QAH (Qatar) was another on c.w. MP4QAH would like his QSLs sent via G4ZU. A VK2 was heard calling VK9RH (Norfolk Is.); VK9DB (Papua) is active on c.w. and phone at mid-day. ZC3AB came through on phone 14105 (1400) and worked a VS1. VS2EA is another good phone signal around 1500 G.M.T. On c.w., VP2AD is very active. QSLs should be sent to J. Lett, c/o P.A.A., St. John's, Antigua, B.W.I. FL8AB, HS1D, ZK3A/MM (587c!) and ZD2J (578c) were also heard. The latter, on phone, gave his QTH as Yola, Nigeria. Despite the call, he may be genuine. VQ4EI, now active, is ex-VT1AC/ZC4DT. Recently at 2400, a freak opening produced VQ2DT on phone at S8. The only other signals audible at the time were a few weak DL4s. '2DT worked G2HMI and said he had just QSOed VP1GG (Br. Honduras). One we almost forgot—EA0RA 14050 (1915).

The proposed VQ4NZK trip to VQ7 and VQ9 has been shelved for six months or so. 'NZK now expects eventually to operate from VQ9 and CR8. It seems possible that signals from Portuguese India will have been logged ere then, however,

* Roker House, St. George's Terrace, Sunderland.

for CT1CB was heard telling a DL "Here using transmitter for CR8AB." We hope the rig is now on its way overseas! As reported, TI9AA has been to Cocos and gone, but watch for further activity from TI9UXX. W0NWX has determined ideas on Clipperton Is. operation and may be signing FO8AJ sometime in March.

From Overseas

VP2AZ (G3IGZ) writes to say that he will be glad to work the U.K. He is keen to try 3.5 Mc/s and Top Band, which should make next winter interesting for the I.f. experts. All contacts will be QSL'd when he comes home early in 1955. Cards for '8AZ should be sent via the R.S.G.B.

ZD2RRW (Lagos) will be off the air for six months from May 1, when he will be on leave in the U.K.

G2MI forwards some useful information from F9RS, who confirms activity from FB8XX. FY7YC, workable on 3.5, 7 and 14 Mc/s, is R. Martinon, TSF, Cayenne, Fr. Guiana. Corsican F9JD/FC is nightly on 14 Mc/s phone; ex-FF8DA is expected on the island. In Viet-Nam, official calls (for c.w. use only) will be in the series 3W8AA-AZ, 3W8BA-ZZ. FI8AA-AJ were operated with official sanction previously. XW8AA (Laos) uses phone on 14154 and 14170 kc/s and c.w. around 14010. FO8AD (Rapa Is.) is very active and skeds OD5ABA daily (phone on 14110-0630). **G3GVC** (ex-SV0AJ) was puzzled to read in *M.O.T.A.* that certificate awaited him, but he remembers his SV0 call being pirated extensively on 7 Mc/s—a band he never used himself. The miscreant was caught. Apparently illicit radio operation was the least of his mis-deeds!

SA2CO (G3JHO and ex-MT2E, VS9AO) is now c/o Cable and Wireless, Ltd., Benghazi, Libya, to which address cards may be sent. The call-sign G3JHO has not yet been used and is not likely

to be until 1955, when 'CO comes home on leave. **AP2CR** (ex-GW3JET) was delighted to raise G3HSN for his very first QSO. He intends shortly to use s.s.b. on 14290 kc/s (crystal control). QSLs should be addressed to Colin Richards, Imperial Bank House, Lyallpur, Pakistan. **VS1FH** (ex-G3AUU) may be reached via P.O. Box 176, Singapore. That former v.h.f. stalwart, G3GBO, is active from Nanyuki as **VQ4EV** on 7024 kc/s at 1900 G.M.T. each evening and on 14048 on Wednesdays and Sundays at 1400 G.M.T. He is looking for U.K. contacts. QSL via the R.S.E.A. QSL Bureau, Box 1313, Nairobi. **ZC4FB** had a spell of bad luck early in the New Year, both illness and a faulty transmitter keeping him inactive for a time. Once back on the air, he worked his first VU and VK on 14, followed by JA1CJ on 7 Mc/s. To add to his troubles, '4FB began getting complaints of BCI. Investigation revealed that of the four B.C. sets involved, three had no earth connection at all, while the fourth was "earthing" to a wire which would make a wonderful Top Band aerial. The owner of this "aerial array" does his cooking by home-generated electricity! **SU1MK** (ex-G3IGU), found on 7015 or 7040 kc/s, runs 15 watts and is looking for G contacts.

From *Amateur Radio*, the W.I.A. Journal, we quote: "Bill Storer, VK2EG (ex-VKIBS) is again venturing south, with the official Antarctic Expedition which will set up a new Antarctic station, 1800 miles south of Heard Is. In the amateur world, this will be recognised as a new country . . ." Recent news in the National Press says that the base has already been established on the Antarctic mainland in position 67° 36' South, 62° 53' East. Bill will use the call-sign VK1EG.

G2DHV, who is Hon. Secretary, British Two-Call Club, reports that VE3ATU is operating from VE3RCS (Royal Canadian Sigs., Kingston) and looking for G3FWG/ZD2RGY and G3FGD/

 **Slow Morse Practice Transmissions**

The following slow Morse transmissions, sponsored by the Society, are intended to assist those who aspire to obtain an amateur transmitting licence. More volunteers are still required for parts of the British Isles not already covered, particularly in the London Area. Stations listed who find themselves unable to continue transmissions should immediately notify the organiser, Mr. C. H. L. Edwards, A.M.I.E.E. (C8TL), 10 Chepstow Crescent, Newbury Park, Ilford, Essex.

†Alternately.

G.M.T.	Call	kc/s	Town	G.M.T.	Call	kc/s	Town
Sundays							
09.00	G3LP	1850	Cheltenham	22.30	G3FBA	1910	Bath
09.30	G3BKE	1900	Newcastle-on-Tyne	19.30†	G3HGY	1900	Coventry
10.00	G6MH	1990	Southend-on-Sea		G3HUV	...	
11.00	G2FXA	1900	Stockton-on-Tees		G5PP	...	
11.00	G3GZA	1837.5	Bristol	22.00	G2BND	1918	Dalston
12.00	G15UR	1860	Belfast				
14.00	G5AM	1900	Witnesham				
21.00	G2FIX	1812	Nr. Salisbury				
Mondays							
19.00	G3NC	1825	Swindon	19.00	G3NC	1825	Swindon
21.00	G3BLN	1900	Bournemouth	20.00†	G2CPS	1910	Hull, Yorks.
21.00	G3FSM	1900	Brentwood		G2CNX	...	
22.15	G2BRH	1900	Ilford		G3GWT	...	
22.30	G8TL	1900	Ilford	21.30	G3ICX	1915	Sutton Coldfield
				22.30	G3OB	1803	Manchester
				22.30	G3ADZ	1940	Southsea
				23.00	G3LA	1915	Brentwood
Tuesdays							
18.30	G2FXA	1900	Stockton-on-Tees	19.00	G3BLN	1900	Bournemouth
18.30	G3JMP	1875	Bristol	19.00	GW3HJR	1900	Caerphilly, South Wales
20.30	G3GDZ	1905	Kingsbury, N.W.9	20.00	G3CSG	1870	Wirral
21.00	G3EFA	1855	Southport				
21.30	G3DBP	1915	Nottingham				
Wednesdays							
19.00	G3GZA	1837.5	Bristol	13.00	G2FXA	1900	Stockton-on-Tees
Thursdays							
19.00	G3NC	1825	Swindon				
20.00†	G2CPS	1910	Hull, Yorks.				
	G2CNX	...					
	G3GWT	...					
21.30	G3ICX	1915	Sutton Coldfield				
22.30	G3OB	1803	Manchester				
22.30	G3ADZ	1940	Southsea				
23.00	G3LA	1915	Brentwood				
Fridays							
19.00	G3BLN	1900	Bournemouth				
19.00	GW3HJR	1900	Caerphilly, South Wales				
20.00	G3CSG	1870	Wirral				
Saturdays							
13.00	G2FXA	1900	Stockton-on-Tees				

MEMBERS USING THIS SERVICE ARE REQUESTED TO SEND LISTENER REPORTS TO THE STATIONS CONCERNED.

VS2DD. **G3HYJ** (Norwich) met ZD4BN/2D2JDH, who is off to S. Africa and Southern Rhodesia, where he hopes to be active on 14 and 21 Mc/s.

Top Band

Conditions have been good both for inter-G. European and real DX working and early rising has proved its worth for the keen types. **G3HYJ** worked ZC4JA for a good one, but missed ZC4GF in contest QRM. **GC3HFE** (Guernsey) was worked, having forsaken the h.f. bands until things improve. DL7AH was worked cross-band, the DL on 3520 kc/s giving 'HYJ RST569 at 2300. Stations interested should listen for DL7AH on 3.5 around that time and reply on the frequency indicated by him. **GM3HRZ** (Kinloss, Moray) is now active. **G6BQ** recently worked HB9CM, who would like it known that he will operate daily from 0515 to 0545 on either 1827 or 1850 kc/s. **G2HGU**, who remains faithful to the band, worked two new ones, EI9J and ZC4JA, which gives him the most creditable total of 15 countries in four continents. He heard ZC6BB, KP4KD, VE2AIE and VP7NM (1879-0745). The latter was called "zero beat" by a horde of people. Result—no QSO.

B.R.S. 20106, who first heard KZ5DE on January 24, now has his card. The KZ5 runs 100 watts to a vertical. Norman also got his card from VP7NM, who runs a modest 36 watts. Good DX heard recently includes W4JSS, 4BRB, KP4KD, VP9BDA (0720 on February 14) and, on February 21 at 0532 on 1807 kc/s, VP4LZ, whose CQ was answered only by G8JR, but with no result, unfortunately. A watch is being kept for PY and LU; a PY7 is active and **W1BB** reports LU1EP as being ready. '1BB has now worked W6NDI and W6KIP/6 (in Death Valley, which is below sea-level!). **J. Whittington** logged W1ORP and W4BRB on c.w. **G2CHI** reports that SU1FA is now on the band every night.

Forty and Eighty Metres

It takes a brave man to devote very much time to either of these bands. On 7, especially, things seem to be getting worse. The now familiar Pakistani outpourings have been supplemented by rhythm sessions (Sudanese style) from Omdurman Radio. Other noises, too numerous to mention, put the DX six layers deep.

G3JWW dug down and worked ST2AR, VP6CDI, ZS2A, ZE3JP, VK, ZL, VS9AS, VP3RO, VP8AK, PJ2CA, KP4YL (an OM, despite the call), and SU1FA. In addition he heard ZD4AB, ZD4AE, TI2, CO, CX1KB, CE7AA, CR5AD and other choice ones. 3.5 Mc/s produced a new one in CT2BO. **G3CMH** netted the CT2 on 7 and heard UA9, 0, UH, UI and UL. **J. Whittington** heard VP6CDI on 3.5 c.w., VP2AD, FB8XX and VQ3EO on 7 c.w. with CT2, W and a CR4 on phone. He now has QSLs from 15RM, AJ4AB/ST, CN2AO (1.8 Mc/s), FY7YC and F9QV/FC. **B.R.S. 20106** suggests keeping an ear open on 3.5 c.w. for XE1MA and EL2X. Things proved better on 7 Mc/s c.w., where KH6ER (1905, very weak), VS1FM (1800), AP2K, VP3RO and HRI1AA were logged. Later, 3.5 was checked again and Norman was rewarded by hearing VP8AK's S4 CQ at 0300. **G3ATU** worked VS6CT at 1930, during the "overs" of an EA phone station and heard ZS9I. VR3D is known to be active on c.w., but uses rather low power.

Fifteen Metres

Activity is still largely of a week-end nature. **B.R.S. 7594**, who caught some phone openings, pulled in CR6BX, EA8, OQ5, ZD1SW and ZS. **G3CMH** worked VQ4AQ. **B.R.S. 20106** found VK6BS, whose phone was just audible at 1040,

while **B.R.S. 19894** heard ZS9G working TA3AA on an otherwise dead band.

Austria

OE1FF reports that official permits are expected this month. He looks forward to using 3.5 and 7, hitherto strictly "verboten." An interesting result of the recent lifting of the censorship was the delivery of 150 QSL cards, some going back to 1946!

R.S.G.B. Call Book—Winter, 1953

The Official List of Countries in the R.S.G.B. Call Book should be amended as follows: "EA9 . . . Spanish Morocco," "EA9 . . . Ifni," "EA9 . . . Rio de Oro" (making three separate countries); "MP4 . . . Oman," which is now listed under "VS9 . . . Sultanate of Oman," should be deleted.

* * * * *
Don't forget Cocos and Clipperton. News and comments should be sent to arrive not later than March 20. Good hunting and 73.

R.S.G.B. Call Book

FOR some years the Editor of the *R.S.G.B. Amateur Radio Call Book* has been endeavouring to obtain the consent of the holders of any of the undermentioned callsigns to the insertion of their names and addresses in the *R.S.G.B. Call Book*. It would be most helpful, therefore, if any member who has knowledge of the licensees involved, or who is aware that the licences are cancelled, would write to Mr. J. P. P. Tyndall, G2QI, 174 The Drive, Ilford, Essex, giving information.

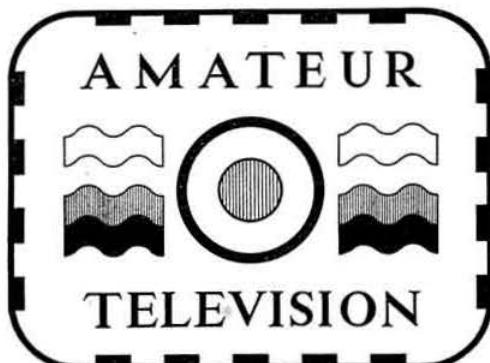
G2RY	G2XM	G2AFR	G2BGP
G2RZ	G2XN	G2AGC	G2BIB
G2SH	G2XR	G2AJJ	G2BKZ
G2SM	G2XU	G2AKM	G2BNH
G2SV	G2XX	G2AOB	G2BOD
G2TK	G2YH	G2AOY	G2BOX
G2VF	G2YP	G2ARV	G2BPT
G2VM	G2YR	G2ARW	G2BQR
G2VQ	G2ZG	G2AUR	G2BQW
G2WB	G2ZK	G2AXB	G2BRY
G2WK	G2ZO	G2AXY	G2BTH
G2WT	G2ZT	G2AZW	G2BUR
G2XB	G2ZX	G2BBU	G2BVK
G2XD	G2ACS	G2BBX	G2BVU
G2XK	G2AFM	G2BFI	G2CAA

It is believed that the following callsigns, all of which appear in the current edition of the Call Book, have been cancelled. The Editor of the Call Book intends, therefore, to have these callsigns deleted unless the licensee requests otherwise by the end of April, 1954.

G3AYL	G3BNS	G3BRT	G3BXM
G3BAA	G3BOP	G3BSK	G3BXN
G3BAL	G3BPC	G3BSM	G3BXS
G3BFC	G3BPL	G3BTH	G3BXU
G3BFL	G3BPR	G3BTL	G3BYE
G3BFM	G3BPZ	G3BTL/A	G3BYF
G3BFR	G3BQB	G3BTS	G3BYH
G3BFS	G3BQC	G3BUB	G3BYI
G3BFX	G3BQH	G3BUH	G3BYU
G3BLY	G3BQJ	G3BUI	G3BZA
G3BMR	G3BQP	G3BUR	G3BZU
G3BMW	G3BQW	G3BVZ	G3CAA
G3BNB	G3BRD	G3BWJ	G3CAC
G3BND	G3BRE	G3BWX	G3CAF
G3BNJ	G3BRR	G3BXC	G3CAI

The QRP Society

THE name of the QRP Research Society has been changed to the QRP Society. This change has become necessary because of an increase in activities catering for many interests other than those of research and experimentation.



By M. BARLOW (G3CVO)*

TO Grant Dixon's colour television achievement, reported last month, can now be added Ralph Royle's success with his new high power 70 cm television transmitter—probably the first amateur transmitter to be specifically designed for TV work. A QQQV06-40 is used in the p.a. stage with 40 watts input. The increase in signal strength, according to G3GDR (Abbots Langley), is so considerable that fully recognisable pictures can be received by 'GDR over the 35 mile path to Dunmow under any conditions. G2WJ/T says he can now put a first class signal into the London area.

When G3CTS/T, the Television Society's station at Norwood, comes into operation, it seems likely that tuning across the 70 cm band with a converter ahead of a domestic television set may produce some interesting results in the London area notwithstanding the fact that nothing in the nature of a broadcast programme is permitted from amateur stations.

Receiving Amateur Television

Although standard 70 cm converters can be used for the reception of amateur television signals, the bandwidth in many cases will be much too narrow to permit a good picture to be resolved. G3GDR suggests a bandwidth of 1 Mc/s for preliminary work as a good compromise between definition and noise. When the system is improved to the point where an S9 vision signal is being received, the bandwidth can be increased to 2.5 Mc/s or more. Quite simple converters can give good results. For example, a trough mixer with a crystal diode such as the CV102, and a 6AK5 head amplifier, or better, a cascode head amplifier, is quite satisfactory. The oscillator need not be crystal controlled due to the width of the transmitted signal. In fact, if several 70 cm television signals are to be picked up, crystal control is not practicable unless a tunable TV receiver or a large number of crystals are available. A simple resonant line oscillator mounted in a screening trough is stable enough. By placing the trough opposite the mixer, with open sides facing, sufficient injection can be obtained. A converter constructed along these lines was used by G3GDR during his original tests with G2WJ/T. A similar form of design will be described in an early issue of the BULLETIN.

Camera Topics

So far, vidicon camera tubes have been received by five members of the B.A.T.C., whose work is now far advanced. Jim Russell (Bourne-

mouth) has completed his picture and waveform monitor which occupies a space slightly larger than a Cossor D/B oscilloscope. The unit contains a 9in. tube as well as all the camera and pulsing equipment. The only other unit is the camera proper which fits into a space 12in. by 6in. square. Members of the Vickers-Armstrong Radio Club have also constructed pulsing equipment and work on the video amplifiers is well advanced. Four monoscopes generating Test Card C patterns are being put into use by various members.

G2BBZ (Hendon) joins the ranks of those building 16mm. telecine equipment for which a small library of films is being created.

Overseas News

VK6EC sends in an interesting story from "down under." He says that cathode ray tubes and deflection components are quite impossible to obtain in Australia, yet he is using 94 valves in a complete flying spot scanner equipment! He has ordered a 5527 iconoscope and hopes to run a dual channel 625 line system from his home in Wagin, Western Australia.

During February, active amateur television groups were formed in France (under F9MN and F3HK) and in Italy (by IIBBE). More than 38 overseas television amateurs are now known to be active, in addition to the 50 or more members of the American Amateur TV Club.

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Reports for this feature should reach the writer not later than the 15th of the month preceding publication. Television enthusiasts work a net on 3612 kc/s on Sundays at 1430 G.M.T.

Contests Diary

1954

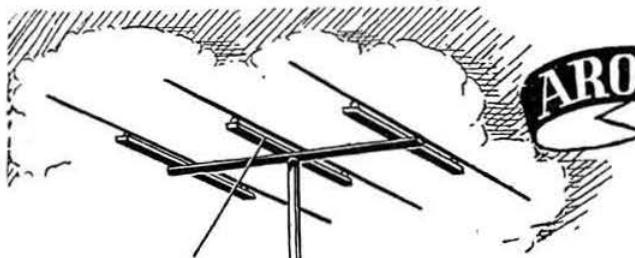
May 2	-	-	D/F Qualifying*
May 9	-	-	144 Mc/s Field Day (No. 1)†
May 23	-	-	D/F Qualifying (South Manchester)*
June 12-13	-	-	National Field Day†
June 20	-	-	D/F Qualifying (High Wycombe/Oxford)‡
July 3-4	-	-	144 Mc/s Open
July 11	-	-	D/F Qualifying (Peterborough)*
August 8	-	-	D/F Qualifying (Salisbury)*
August 15	-	-	144 Mc/s Field Day (No. 2)
August 29	-	-	D/F Qualifying (Romford/Southend)*
September 5	-	-	Low Power Field Day
September 12	-	-	D/F National Final*
September 12	-	-	420 Mc/s
October 2-3	-	-	Low Power
November 13-14	-	-	"Top Band" (No. 2)

* For rules, see page 328, R.S.G.B. BULLETIN, January, 1954.

† For rules, see page 327, R.S.G.B. BULLETIN, January, 1954.

‡ For rules, see page 179, R.S.G.B. BULLETIN, October, 1953.

* 29 Loftin Way, Chelmsford, Essex.



AROUND THE V.H.F.'S

By W. H. ALLEN, M.B.E. (G2UJ)*

"The North London Plan"

JACK HUM, G5UM, writes as follows about the North London Plan:—

"Few v.h.f. operators will deny that the 2 m band is practically 'dead' during most week nights in the winter, and not particularly 'alive' even on Sunday mornings. Two hypotheses—(a) that people only go on watch when conditions are expected to be good, or (b) when the competition element is the spur—need not detain us. What is clearly needed is some form of initiative that will increase the regular 'bread and butter' occupancy of this band.

"A plan to achieve this end is already enjoying considerable success among a group of North London and Hertfordshire stations. It started with a Monday evening schedule between G3BUN (Hoddesdon) and G5UM (Knebworth)—and then the 'snowball effect' began. On most Mondays now from 2000 G.M.T. onwards, up to half-a-dozen stations in the area operate regularly and more are coming in. This 'North London Plan' takes the form of both individual QSOs and multi-way contacts, with several excursions to 70 cm, both cross band and 'one band.' Most of the activity is on telephony but c.w. operators break in—when any are on!

"Some ingenuity in the orientation of beams is necessary, but since most of the operators, so far, are on a north-south line this particular problem has not proved insuperable."

Two Metre News

G8VN (Rugby) found things very quiet between January 15 and February 8 when conditions started to improve. During the following ten days a number of stations were contacted including G2FNW, FZU, HOP, OI, 3AVO, EJO, IOO, IVS and 5BA, while among those heard were G2AHP, HIF, XV, 3HBW, 4AU, RO, SA, 5BC, MR, YV, 8OU and GW2ADZ. Two other stations active in Rugby are G3CKQ and G3IKL.

Conditions were fairly good on February 9, when G5MR (Hythe, Kent) worked F3JN (Paris) and F8GH. G2HCG (Northampton) was heard by G2AHL (Guildford) on February 10 working G3BNC (Portsmouth) and G3FAN (Ryde, I.O.W.) and by G5MR on the 14th, on which day 'MR' worked F9DI. He found the band well and truly open that morning and afternoon but few stations were taking advantage of the fact. Those who, like G5MR, have been awaiting cards from HB1IV for last year's contacts, will be pleased to learn that they are now coming through.

G5NF (Farnham, Surrey) worked F8GH on February 16 and four days later heard him again together with G2BMZ (Torquay) and G5UF (Dorchester). F9MF (Combes, Somme) on approximately 144.6 Mc/s, was heard testing on February 21 when conditions were otherwise poor. G5NF who uses a single skeleton slot with two reflectors at a height of 25 feet (fed with tubular 300 ohm

cable) finds it only slightly inferior to his previous 12-element array.

G5TZ/A is testing a new 150 watt transmitter which increases his already powerful signal. G5MA has also entered the high power field with a pair of 826s in the final, to produce 150 watts.

The Medway towns run a "round robin" 2 m sked. at 1830 G.M.T. on the last Sunday in the month and welcome newcomers.

G3CVO (Gerrards Cross, Bucks.), active on alternate weekends on both 2 m and 70 cm, finds that the gain from a 70 cm helical array is less than would appear from the design data. This discrepancy, he says, is confirmed by non-amateur users. A new 70 cm transmitter employing two 6J6s and a CV53 in a trough line is nearing completion.

G3GBO, late of Denham, Bucks., now VQ4EV (Nanyuki, Kenya) is on 7024 kc/s and 14048 kc/s looking for U.K. contacts. He is keeping his hand in on v.h.f. techniques by using commercial equipment on 2 m. His best DX to date is 50 miles through mountainous country.

Seventy Centimetre News

An example of what can be done on 70 cm by consistent operation is G5DT's tally of 703 contacts made on the band up to the present time—118 of them this year—and a grand total of 56 different stations worked including several on the Continent. Situated at Wallington, Surrey, he is on 436 Mc/s nearly every evening from 1915 G.M.T. onwards with 10 watts to a QQV03-20 p.a. and a 7-element Yagi which, he says, surpasses any other aerial so far tried. G5DT has plans for going much higher in frequency and with aerials and oscillators ready for 1250 and 2300 Mc/s operation, is anxious to hear from others interested in communication on these bands.

Further evidence of what may be done even during the winter months is reported by G2DD (Stanmore, Middlesex), who, since Christmas 1953, has run a 70 cm sked with PE1PL (The Hague) on Mondays and Fridays at 0730 G.M.T., the Dutch station being heard by G2DD for the first time on February 12. Ten days later, a two-way contact lasting 20 minutes was achieved, PE1PL being received at RST529 and G2DD at RST539. The contact was overheard by G2RD who had some difficulty in holding the fading signal from Holland, which peaked to RST439.

G2DD was using 40 watts input to a QQV06-40 p.a. (driven by a similar valve as tripler from 144 Mc/s) feeding a 12 element stack with wire netting reflector. 'DD used the simple converter which he described last year in the *Short Wave Magazine*.

Activity List

The 70 cm activity list prepared by G2RD for the month ending February 20 reads as follows:—G2DD, HDJ, RD, WJ, 3EOH, FP, IRW, MI, 4RO, 5DT, UM, 6NF, 8SK, PE1PL.

* 32 Earls Road, Tunbridge Wells, Kent.

Old timer Gerry Jeapes, **G2XV**, of Cambridge, attacks G2RD's list in no uncertain terms and considers it, among other things, inadequate and incomplete. It is, but through no fault of 2RD who, (as explained when it was introduced in February last year), lists only those calls which he and his contacts have worked and heard during the month. This was originally started to give an idea of who was actually on the band, in contrast to those reports which one hears that so and so is active only to learn later, from another source, that the station concerned hasn't even a receiver for 70 cm!

So long as only one amateur is taking the trouble to supply this information, the list is bound to reflect only a local state of the band. In February, 1953, we said that if a few members in other parts of the country would do the same, useful information as to the true state of 70 cm would soon be available. We are still waiting to receive activity lists from those other members, including, dare we say it, **G2XV**!

American Commentary

From the February 1954 issue of *QST* it is learned that the Evans Signal Laboratory Radio Club in Belmar, N.J. have the use of a 50 ft. parabolic reflector when it is not required for other purposes. A high power 2 m transmitter can be coupled to this gigantic aerial, which can be aimed in any direction. Signals are radiated on a frequency of 144.70 Mc/s under the call-sign **W2SC**. Apart from normal amateur contacts the array, which produces a gain on 2 m of around 25 db, will be employed for moon reflection experiments.

Up-to-date information on schedules run by **W2SC** is broadcast from the A.R.R.L. Headquarters' station, **W1AW**. This is an entirely amateur project to satisfy amateur curiosity about what might be accomplished with an aerial system more elaborate than any likely to be available in the normal way. If only the even larger parabolic reflector now being built at Jodrell Bank, near Manchester could, on occasions, be likewise employed, that long-awaited transatlantic v.h.f. contact might result! At least the 2 m record

Regional V.H.F. Ladder

TWO METRE BAND

Psn.	Call & Location	Worked		
		Regions	Stations	Countries
1.	G6XX <i>Goole, Yorks.</i>	13	140	8
2.	G5BD <i>Mablethorpe, Lincs.</i>	13	84	12
3.	G2FIR <i>Sutton Bridge, Lincs.</i>	11	111	5
4.	G5ML <i>Coventry, Warks.</i>	11	75	3
5.	G3CBO <i>Denham, Bucks.</i>	10	109	7
6.	G3DO <i>Sutton Coldfield, Warks.</i>	10	101	5
7.	G8VN <i>Rugby, Warks.</i>	10	85	2
8.	G2DDO <i>Littlehampton, Sussex.</i>	10	81	5
9.	G6TA <i>London, S.W.12.</i>	10	55	2
10.	G3HBW <i>Wembley, Middx.</i>	10	40	2
11.	G6L1 <i>Ludborough, Lincs.</i>	10	29	10
12.	G2AHP <i>Perivale, Middx.</i>	9	88	3
13.	G5MR <i>Hythe, Kent.</i>	9	75	7
14.	G3FJ1 <i>Colchester, Essex.</i>	8	52	7
15.	G2CZS <i>Chelmsford, Essex.</i>	8	50	4
16.	G3GOP <i>Southampton, Hants.</i>	8	49	2
17.	G3IUD <i>Wilmslow, Cheshire.</i>	7	24	2

should be raised by such a battle of the giants.

Also from *QST* comes news that 2 m spot frequency operation is becoming popular in the Washington, D.C., and Baltimore areas where a number of calls missing from the band for some time have returned now that contacts are available almost at will.

New U.S. Valves

We are used to reading of new valve types developed in the States which would be "just the job" if only they were available over here, but there is no denying that, although import restric-

Regional V.H.F. Ladder

RULES

1. The ladder lists the number of R.S.G.B. Regions worked by members on 2 metres. Further ladders will be started for the higher frequency bands as occasion warrants.
2. To qualify for entry in the ladder, a member must have worked seven Regions on 2 metres.
3. The ladder runs from July 1 to June 30 of the following year; only contacts made between these dates qualify for entry in the current year's ladder. At the end of each yearly period the leading station in the ladder will be declared and a certificate, to be called the *R.S.G.B. V.H.F. Proficiency Certificate*, will be awarded to the operator concerned.
4. Placings in the ladder will be determined primarily by the number of different R.S.G.B. Regions worked, and secondly, by the total number of different Stations worked. In the event of a tie, the number of Countries worked will be taken into consideration.
5. The expression "different stations" covers the generally accepted meaning of the phrase. A station operating at a fixed address, at an alternative address, or as a portable, will rank as three different stations, e.g., GB3RS, GB3RS/A and GB3RS/P.
6. Proof of contact may be required.
7. Reports should list the total number of Regions, Stations and Countries worked, and should give the callsign of the first station worked in each Region and Country claimed. Reports should reach the V.H.F. Editor (Mr. W. H. Allen, M.B.E., G2UJ, 32 Earls Road, Tunbridge Wells, Kent) by the 20th of each month.
8. A list of the R.S.G.B. Regions and the Countries forming them appeared in the September 1953 issue of the Bulletin (page 130).

tions limit their availability in this country, British manufacturers do, from time to time, produce their own versions, and it is as well to know what is being developed in the U.S.A. An attractive and, it is understood, moderately priced valve recently introduced by Amperex is the 6360 single-ended twin tetrode which is roughly comparable to a pair of 5763s in a single envelope. The specification mentions 18 watts output up to 200 Mc/s with 350 volts h.t. with the prospect of a reasonable return on the 70 cm band even though maximum ratings are reduced for the higher frequency.

The 6252, from the same makers, will deliver nearly 50 watts c.w. output at 200 Mc/s, 25 watts at 400 Mc/s and 20 watts at 600 Mc/s, reducing to 31 and 13 watts at the two lower frequencies when anode and screen modulated. The size is approximately that of an 832 but, even in the States, the price is pretty high.

LONDON U.H.F. GROUP

will meet at the Bedford Corner Hotel, Bayley Street, Tottenham Court Road, at 7.30 p.m. on April 1, 1954. All u.h.f. enthusiasts welcome.

R.S.G.B. Two Metre Converter

Through the kindness of Eric Cosh, G2DDD, it has been possible to test a 6BZ7 in the converter described last month. The 6BZ7 (one of the latest twin triodes suitable for v.h.f. use), showed a better noise factor than either the 12AT7 or the 6BQ7, between which there is little to choose, and a reading better than 3.5 db was obtained. Noise factor measurements on low-noise stages are somewhat tricky and frequently vary to the extent of a decibel or so from one series of tests to another. On this occasion the best that could be obtained with the 12AT7 or 6BQ7 was around 4.5 db, so the 6BZ7 showed a worthwhile improvement. It is understood that this type is almost identical to the 6BQ7A which, we believe, is to be manufactured in this country in the near future.

West of Scotland V.H.F. Group

This group meets monthly and the success of their efforts to popularise operation on the v.h.f.s in the area is evident in the appearance of new stations on the bands and in an increase in activity generally. It is hoped to put at least one portable station on the air for the R.S.G.B. 2 metre Field Day on May 9 somewhere in Renfrewshire which should provide a good chance of contacts with England.

"V.H.F. QSY"

Following the official adoption of "The British Isles Two-Metre Zone Plan," members who wish to acquire crystals for their own zones, or have crystals for disposal on an exchange basis, are invited to send details for inclusion in this space. Address requests to "VHF QSY," R.S.G.B. BULLETIN.

Crystals Offered

By G5AS, 11 Chesham Road, Kingston, Surrey, 8071 kc/s (3 in. spacing).

By G8PX, 1 Lovelace Road, Oxford, 6025, 6075, 8006.7, 8025 kc/s. (all FT243).

Crystals Wanted

By G5AS, as above, anything between 8055 and 8068 kc/s (3 in. spacing).

By G8PX, as above, anything between 8054 and 8080 kc/s (FT243 preferred).

Records

144 Mc/s: W6ZL-W5GNL	....	1,400 miles
June 10, 1951.		
420 Mc/s: W1RFU-W4TLM	....	410 miles
July 26, 1953.		
1,250 Mc/s: G3QC/P-G8DD/P	....	100 miles
July 26, 1953.		
2,300 Mc/s: W6LFE/6-W6ET/6	....	150 miles
October 5, 1947.		
3,300 Mc/s: W6LFE/6-W6ET/6	....	150 miles
October 5, 1947.		
5,250 Mc/s: W2LGF/2-W7FQF/2	....	31 miles
December 2, 1945.		
10,000 Mc/s: G3APY/P-G3ENS/P	....	27 miles
October 22, 1950.		
21,000 Mc/s: W1NVL/2-W9SAD/2	....	800 feet
May 18, 1946.		

* Not available to U.K. amateurs.

† U.K. band is 5650-5850 Mc/s.

The group will hold a meeting and dinner at the Royal Hotel, 106 Sauchiehall Street, Glasgow, at 6.30 for 7 p.m. on March 24, 1954. All v.h.f. enthusiasts are invited to attend. Reservations and remittances (10s. 6d.) should reach GM3DIQ, Hillside Nursery, Greenhead, Stevenston, Ayrshire, not later than March 20. It is expected that all the active v.h.f. operators in central Scotland will be present, together with EI2W who is coming from Dublin specially for the occasion.

The International V.H.F. Society

The membership of the Society which stood at 162 at the end of 1953 now includes representatives in South Africa, Malta and Tangier as well as in most European countries.

The Irish Perpetual V.H.F. Trophy has been awarded to N. H. R. Munday, G5MA, whose outstanding portable activities during the past year did much to foster 2 m interest.

1954 European V.H.F. Contest

It is understood that this event will return to the contest calendar this year and that it will take place towards the end of the summer. The exact date will be announced later.

Lofty-Sites V.H.F. Rally

The French National Society, R.E.F., is organising a "Lofty-Sites" v.h.f. event to take place on Easter Monday, April 19, when it is hoped that many stations will be in operation from favourable v.h.f. locations throughout Europe. Activity in France will be on the 72, 144, 420 and 1200 Mc/s bands. It is anticipated that by a concentration of effort and with reasonable meteorological conditions, much useful data will be gathered regarding propagation on the frequencies concerned.

R.E.F. would appreciate advance information regarding those stations taking part. This can be sent to G2UJ, who will forward it to the right quarter. Details should include:—site chosen, with distance and direction from nearest town; call-sign; frequency bands to be used; hours of operation; type of aerial array; input power etc. If the event is well supported R.E.F. will arrange another rally later in the summer.

* * *

Reports for inclusion in this feature will be most welcome and should be sent to arrive not later than the 20th of the month preceding publication.

HAVE YOU BOUGHT YOUR TWO METRE ZONE MAP?

Mounted on Stiff Card.

Price 6d. (Post Free)

From R.S.G.B. Headquarters.

Council Proceedings

Résumé of the Minutes of the Proceedings at a Meeting of the Incorporated Radio Society of Great Britain, held at New Ruskin House, Little Russell Street, London, W.C.1, on Tuesday, January 19th, 1954, at 6 p.m.

Present.—The President (Mr. Arthur O. Milne in the Chair), Messrs. I. D. Auchterlonie, H. A. Bartlett, L. Cooper, C. H. L. Edwards, D. A. Findlay, A. C. Gee, R. H. Hammans, F. Hicks-Arnold, J. H. Hum, L. E. Newnham, N. F. O'Brien, R. L. Varney, and John Clarricoats (General Secretary).

Welcome to New Members

The President extended a warm welcome to the newly-elected Members of the Council (Messrs. Gee, O'Brien and Varney) and presented each of them with a badge of office. Badges of office were also presented to the Immediate Past President (Mr. Cooper) and to the Executive Vice-President (Mr. Bartlett).

Letters of Appreciation

Letters of appreciation were read from members who had been awarded an honorarium or a free subscription for services rendered in connection with the QSL Bureau or the Amateur Radio Exhibition.

Membership

Resolved (i) to elect 30 Corporate Members and 10 Associates; (ii) to grant Corporate Membership to 8 Associates; (iii) to grant Life Membership to Mr. A. G. Anderson, GM3BCL.

Amateur Radio Exhibition

Resolved to hold the Eighth Annual Amateur Radio Exhibition at the Royal Hotel, Woburn Place, London, W.C.1, during the week ending November 27, 1954.

It was agreed to give consideration, at the appropriate time, to suggestions put forward by Mr. R. B. Cutts, G3HRC, that (a) an Amateur Radio station should operate from the Royal Hotel during the period of the next Exhibition, (b) a cardboard type of call-sign badge should be issued to visitors for identification purposes.

Change of Name

It was reported that no further information had come to hand from the Companies Registration Office of the Board of Trade regarding the Special Resolution to change the name of the Society. (Approval was granted a few days after the meeting—Ed.)

Conference with the Regional Representatives

Resolved to hold a Conference with the Regional Representatives during a weekend in April, 1954 at the Kingsley Hotel, London, W.C.1.

I.A.R.U. Region I Division

Following consideration of the Minutes of the first meeting of the I.A.R.U. Region I International Committee it was *Resolved* (a) that Mr. W. H. Allen be appointed V.H.F. Officer to co-ordinate v.h.f. matters as between the R.S.G.B. and the other I.A.R.U. Societies in Region I, (b) that Messrs. R. H. Hammans and John Clarricoats be appointed Liaison Officers to safeguard the Society's interests, in connection with technical and administrative matters respectively, in Region I.

Headquarters' Club

Resolved to postpone further consideration of proposals (first put forward during 1952 by Mr. A. L. Taylor, G3JMO) for the establishment of a

Headquarters' Club in London, until such time as the Society's Income and Expenditure Account shows a reasonable credit balance.

Radio Amateur Emergency Network

It was agreed (a) to adopt as standard a chromium plated type of badge with a deep red background, (b) to provide a car sticker for the use of members of R.A.E.N.

Bulletin Production (See Résumé of December Minutes)

The Honorary Editor and Editor submitted "dummies" made up from material published in the January issue of the BULLETIN, but re-arranged in accordance with proposals discussed at a recent meeting with a representative of "South London Press," Ltd.

Resolved to authorise the Editor to try out the new lay-out as from the February, 1954, issue of the BULLETIN.

National Radio Exhibition

It was reported that the Radio Industry Council had enquired whether the Society would be prepared to exhibit at the forthcoming National Radio Exhibition to be held at Earls Court, London, from August 25 to September 4, 1954. After a lengthy debate it was agreed to authorise the Secretary to discuss the matter further with the Director of the Radio Industry Council with the idea of the Society participating in the National Radio Exhibition.

During the discussion the President expressed the view that, if the Council should decide to go ahead, it would be desirable to relieve Headquarters' staff of the responsibility of organising and manning the stand. The Council concurred with the views put forward by the President. One Member of the Council offered his services for the whole period of the Exhibition, whilst another stated that he would have no difficulty in obtaining the services of sufficient volunteers to man the stand adequately throughout the period of the Exhibition.

It was agreed to place on record that the Council recognises the prestige value of the Society being represented at the National Radio Exhibition.

Honorary Members

Mr. Cooper proposed that Mr. Frederick John Henry Charman (Past President) and Mr. Rene Klein (Founder Member) be elected Honorary Members of the Society.

The Secretary explained that, in accordance with the Articles of Association, candidates for election to Honorary Membership must be proposed at one meeting and elected by ballot at a subsequent meeting of the Council.

Army Wireless Reserve Squadron

A letter was read from the Officer in Command of the Army Wireless Reserve Squadron (Major D. W. J. Haylock, G3ADZ) in which he complained that no reference to the Reserve Squadron had appeared in the Exhibition Report "Around the Stands" published in the January issue of the BULLETIN. The Secretary's reply to Major Haylock, which contained an expression of regret for the accidental omission of the necessary reference, was approved. The Secretary stated that a more

detailed account of the equipment shown on the Army stand would appear in the February issue of the BULLETIN.

Cash Account

Resolved to accept, and adopt, the Cash Account for December, 1953, as prepared and submitted by the Secretary.

Technical Committee

Resolved to receive, and adopt as a Report, the Minutes of a Meeting of the Technical Committee which met on December 15, 1953.

The Minutes gave information on a variety of subjects, including a summary of replies received from overseas societies regarding the facilities, if any, which the respective societies have for transmitting news bulletins to members.

The Minutes contained no Recommendations to the Council.

Membership and Representation Committee

Resolved to receive, and adopt as a Report, the Minutes of a Meeting of the Membership and Representation Committee which met on December 17, 1953.

It was reported that the Recommendation contained in the Report (relating to N.F.D. and the appointment of T.R.s) had been submitted to the Council at its last meeting and had not been accepted.

Committees of the Council

The various Standing Committees of the Council were constituted in accordance with the information published in the February issue of the BULLETIN.

Resolved that the Exhibition (Home Constructors' Section) Committee be constituted as a Standing Committee of the Council.

Zonal Boundaries

It was agreed that the Membership and Representation Committee should be asked to consider, at an early date, the question of zonal boundaries. The Secretary was instructed, when writing to the R.R.s concerning the forthcoming Conference, to ask for their views on zonal boundaries.

P.M.G.'s Committee on Interference

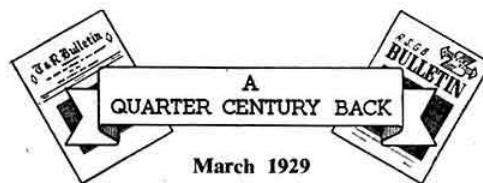
In reply to a question, the Secretary explained that Mr. W. A. Scarr (a Past President of the Society) was appointed to serve on the P.M.G.'s Committee on Interference in a private capacity and not as a representative of the R.S.G.B.

Coming of Age of the B.B.C. Overseas Service

The Secretary reported upon correspondence which had been received from the Editor of *The Short Wave Magazine* and from three members, concerning the failure of the B.B.C. to pay tribute to the work of Mr. Gerald Marcuse (a Past President of the Society) and other pioneers in the field of Empire Broadcasting, during their recent 21st anniversary broadcasts. The chief criticism concerned the failure of Sir Noel Ashbridge (past Chief Engineer of the B.B.C.) to make any reference to the part played by amateurs in the development of the short waves for long distance communication, notwithstanding the fact that his talk in connection with the Anniversary celebrations was advertised as being for "hams and fans."

From information subsequently received it appeared that Mr. Marcuse's callsign (but not his name) was referred to in one of the Anniversary broadcasts.

The meeting terminated at 9.10 p.m.



WRITING the Editorial under the title "Our President Speaks," Henry Bevan Swift, G2TI, called for the views of members on the then thorny question, should phone be permitted in the 7 Mc/s amateur band. Local telephony operation, he contended, should be confined to 1.7 Mc/s.

* * *

The resignation of world-famous DX man, E. D. Simmonds, G2OD, from the office of Honorary Treasurer was announced. E. Dawson Ostermeyer, G5AR, succeeded him.

* * *

The leading article described The R.S.G.B. Short Wave Three. Mullard PM5X valves were used in the detector and first I.F. stages and a PM6 in the second I.F. stage. All bands from 10 metres to medium wave broadcasting were covered by the use of suitable coils.

* * *

Eric Megaw, G6MU, in the second of a short series of articles explained how the valve functions as oscillator and amplifier.

* * *

Calibration signals were radiated at weekends from G5YK (Cambridge) on 7050 kc/s and 7250 kc/s.

* * *

Frank Aughtie, G6AT, was billed to lecture to London members on "The Tuning of Radiating Systems." Venue—the Institution of Electrical Engineers.

* * *

E. S. Elliott, G5LT, explained how quartz crystal optical lenses may be checked for harmonic control.

* * *

Contact Bureau Notes—compiled by T. Palmer Allen, GI6YW—gave details of forthcoming tests on 28 Mc/s . . . B.R.S.125 sent a cheque to provide a prize for the first QSO on 60 Mc/s over a distance of more than 10 miles . . . A description was given of a Messy transmitter for 28 Mc/s, designed by YIILM.

* * *

Arthur E. Watts, G6UN, won a competition for a new membership certificate.

* * *

At a meeting of London members held at the City Electric Restaurant, Ludgate Hill, John Clarri-coats, G6CL, opened a debate on the subject "Should telephony be barred on the 7 Mc/s band." Geoffrey Thomas, G5YK, opposed the motion, which was lost by 18 votes to 10 with a number of abstentions. Among those taking part in the debate were G2KT, 2SC, 5GQ, 6LB and 6LL.

* * *

G5MU and 2BFA announced that they had evolved a method of facsimile picture transmission and sought co-operation.

* * *

The Correspondence columns carried a letter from EI2B on varnishing glass tubes . . . GI6YW advocated a complete boycott of stations using raw a.c.!

* * *

The 4th Edition of the A.R.R.L. (Radio Amateurs') Handbook was offered at 4s. a copy. Happy Days!

The Manufacture and Testing of Germanium Triodes or Transistors*

FOLLOWING the development and extensive utilisation of germanium diodes, the germanium triode or transistor has taken an important place in the semi-conductor field. Although this crystal device has been known for some time, it is only recently that modern methods have made possible its manufacture, on a large scale, in a form suitable for practical applications.

The transistor can perform many amplification functions which, hitherto, were only possible with a thermionic valve. It requires no heater power, is small (1/8 in. by 1/8 in. dia.), robust and can be wired directly into a circuit. Furthermore, with normal use the life of the transistor is unlimited. The manufacturing and testing technique described in this article is that developed by The General Electric Co. Ltd.

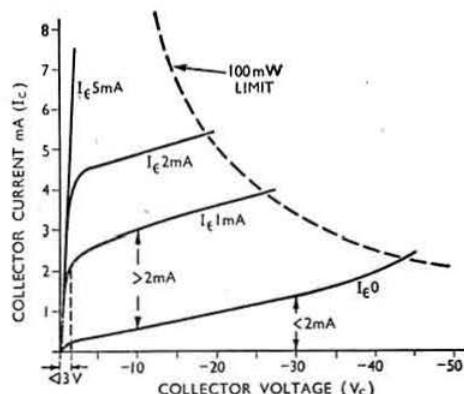


Fig. 1.—Graph showing the static characteristics of the G.E.C. germanium transistor GET 1.

The G.E.C. type GET.1 transistor is of the point-contact type using single-crystal germanium containing n-type impurity. The germanium crystal is in the form of a wafer, one face of which makes a good ohmic contact with an electrode known as the base, which is the counterpart of the cathode of a thermionic valve. Two point contacts spaced 0.003 in. apart bear resiliently on the opposite face. These point contacts are the collector and emitter, and correspond to the anode and grid respectively of the thermionic triode.

The collector is biased negatively with respect to the base, and since n-type germanium is used a small current flows, corresponding to a germanium diode in the non-conducting condition. This current can be varied by the application of a small positive bias to the emitter. The emitter and the base then act like a diode in the conducting condition.

This action can be explained as follows. The collector barrier has a high impedance when biased with a large negative voltage and a small electron current flows from the collector to the base. The emitter, which is positively biased, injects a current of "holes" or positive-charge carriers into the germanium. These holes lower the potential barrier to electrons flowing from the collector to the base. Since several electrons are allowed to flow through the collector circuit for

every hole affecting the barrier region, a current gain takes place. Furthermore, since the collector-germanium junction has a high impedance and the emitter-germanium junction a low impedance a voltage and power gain can also take place.

Thus the transistor is able to amplify signals and can be operated as an oscillator when the output is fed back to the input.

Characteristics of the GET.1 Transistor

Fig. 1 shows the static characteristics of the GET.1 transistor, and a typical circuit for the amplification of small signals is shown in Fig. 2.

Several circuits have been developed by the G.E.C. Research Laboratories using germanium triodes and diodes exclusively. In addition, work has been carried out using these triodes as amplifiers in deaf-aid equipment, where the saving of heater power is a great advantage. Other applications include uses as switching devices and oscillators.

Construction

The germanium used in the transistor must be of the highest quality and therefore single-crystal material is used. This germanium is obtained by growing a crystal with a uniform lattice from molten germanium similar to the slow-cooled material used in the manufacture of diodes.

Each individual sample of germanium is subjected to critical physical and electrical inspection prior to use in the manufacture of triodes.

Having passed these rigorous tests, the germanium is cut into slices which are then ground to a pre-determined thickness. The slices are subsequently cut into small wafers, the sides of which are 0.040 in. long. The cutting and grinding operations are very exacting since even the edges of the crystal, which are remote from the points of contact, must be free from splintering. Each wafer is then soldered, using pure tin at a controlled temperature, to a nickel stub which has been swaged to form a lead-out connection. This stub forms the base of the triode.

During the machining and grinding processes, structural disformation of the crystal surface takes place. Consequently, it is essential that the layer of germanium so affected should be removed by chemical means and the true crystal structure exposed. This is done by using a very active chemical etch, after which each crystal is inspected under a high-powered microscope for correct crystalline formation and complete cleanliness. After the crystal has been so treated, strict precautions are taken to ensure that no subsequent

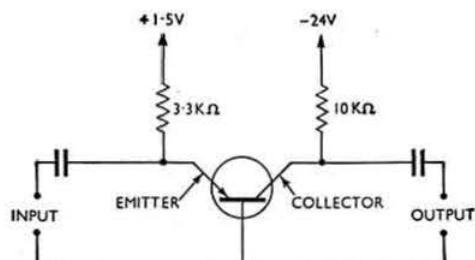


Fig. 2.—A typical circuit, incorporating a G.E.C. germanium transistor, for the amplification of small signals.

* Communicated by The General Electric Co. Ltd., Magnet House, Kingsway, W.C.2.

contamination or damage to the surface can occur. The crystals are stored in desiccators and used within a few hours of etching.

The physical requirements of the triode are that it should be small and resistant to mechanical shock, humidity and corrosion. To satisfy these conditions the construction illustrated in Figs. 3 and 4 has been adopted.

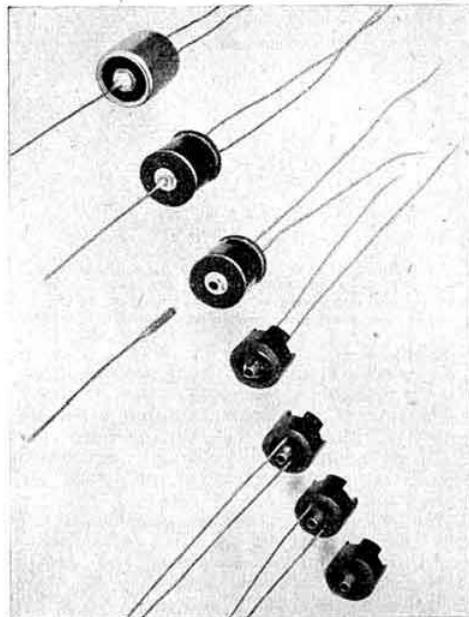
The centre tube of nickel is embedded in a phenolic moulding. The grade of material used is of very high quality and is specially chosen for its low water-absorption and low thermal expansion. Into two holes of this moulding are bonded two tinned-copper support wires, rein-

forced by small nickel eyelets. The wires are soldered into these eyelets and a synthetic resin,

of high mechanical strength and adhesive power, fixes the eyelets into the moulding.

The two whiskers are cut and formed from 0.006 in. dia. wire, the collector from phosphor-bronze and the emitter from beryllium copper. The shape of these whiskers is extremely critical and the greatest care is taken in cutting them to ensure that a very sharp chisel point is formed on each, since this is essential for the intimate contact between the whisker and the germanium. The shape and orientation of these points are shown in Fig. 5 whilst the jig used for the cutting and bending of the whiskers is shown in Fig. 6.

After cutting and bending, the whiskers are



Various Stages in the Construction of the G.E.C. Transistor GET. 1.
Fig. 3.—Front Views.

forced by small nickel eyelets. The wires are soldered into these eyelets and a synthetic resin,

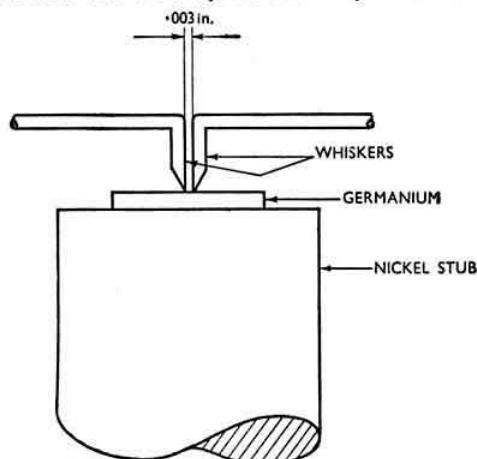


Fig. 5.—Diagram showing the shape and orientation of the whiskers relative to the germanium in the GET. 1 transistor. The shape of the whiskers is critical, intimate contact between the whiskers and the germanium being essential.

chemically washed and given a very thin coating of anti-corrosive grease, which ensures that the chisel point does not lose its sharp edge due to atmospheric corrosion.

The next step is the assembly of the whiskers to the body.

It is essential for the correct functioning of the triode that the whiskers should be accurately spaced within 0.003 in. of one another on the crystal surface. Hence, the operation of assembling the whiskers to the body and the presetting of the 0.003 in. gap between the chisel point is hyper-critical. It is performed on a very delicately adjusted jig and requires considerable experience on the part of the operator. The whiskers rest in the jig and are soldered to the support wires. During this operation no strain must be imposed on the whiskers so that, when the assembly is removed from the jig, no deformation of the whiskers is produced.

After the whiskers have been soldered to the support wires the assembly is chemically washed and the whisker gap inspected, using a shadowgraph with a high-magnification, to ensure that the previous operation has been satisfactorily performed.

The whisker support wires are then fed through the remaining two holes in the moulded body. The wires are thus folded back on themselves in

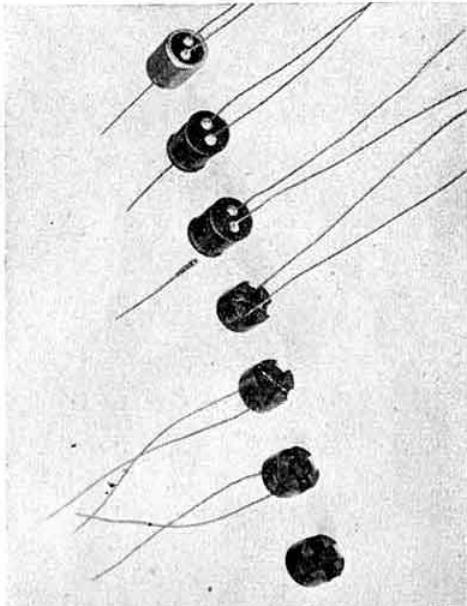


Fig. 4.—Rear Views.

a manner that prevents any mechanical shock or heat experienced by the portions of the wires acting as lead-outs being transmitted directly to the whiskers. This also brings the emitter and collector leads opposite to the base lead, making the transistor substantially easier for connecting into circuitry.

Neoprene-phenolic washers, which seal the ends of the triode, are then fitted to each end of the body. These washers have brass eyelets embedded in them as shown in Fig. 7. The ends of the eyelets are turned down and dig into the neoprene, thereby providing a moisture-proof seal. The emitter and collector leads are threaded through the eyelets and are soldered to them. The eyelet in the other washer is then soldered to the nickel

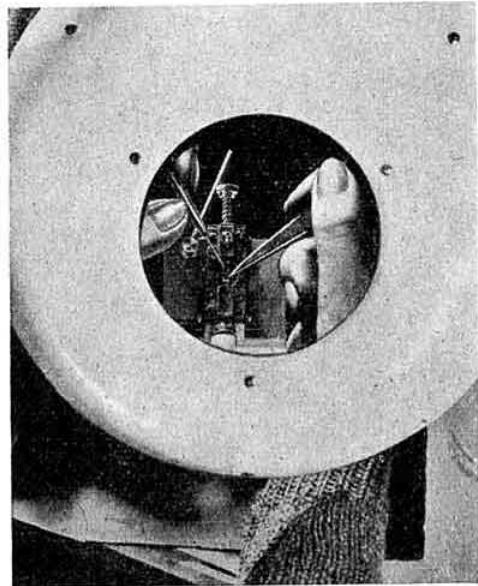


Fig. 6.—Jig used for cutting and bending the whiskers for the germanium transistor.

tube which, as previously mentioned, is moulded into the body.

The assembly is then ready to receive the crystal, which is already mounted on its stub. This critical operation is carried out on the apparatus illustrated in Fig. 8. The stub is advanced through the centre tube by means of a micrometer-head until both whiskers make contact with the crystal. Having made contact, the crystal is advanced a predetermined amount to ensure the correct contact pressure, which is essential for mechanical stability and good electrical performance.

As the contact must be immune from mechanical vibration, the surface of the crystal is coated with an adhesive cement

Fig. 8.—The germanium crystal, mounted on its nickel stub, is introduced to the body of the triode on this apparatus, which ensures correct contact pressure between the whiskers and the crystal.

immediately before assembly. This cement is then polymerised to form a strong mechanical joint between the whiskers and the face of the crystal.

The hermetic sealing of the triode is the final step in the assembly. An aluminium tube is fitted over the body and the edges are embedded into the neoprene-phenolic washers. The joint between the base lead and its associated eyelet is soldered to complete the sealing.

The triode is then ready for electro-forming and testing.

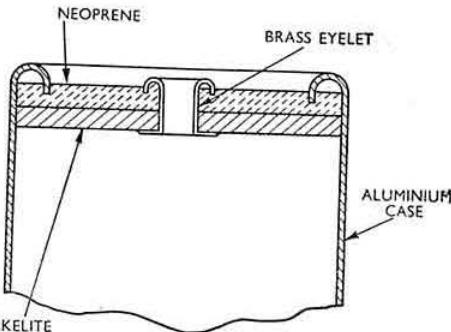


Fig. 7.—The ends of the G.E.C. germanium triode are sealed with neoprene-phenolic washers which have brass eyelets embedded in them. The ends of the eyelets dig into the neoprene, providing a moisture-proof seal.

Precautions

As will be appreciated from the description of the manufacturing technique, the strictest precautions are observed to ensure the highest degree of cleanliness, since dirt, moisture, or any chemical contamination would be extremely detrimental to the electrical properties of the germanium.

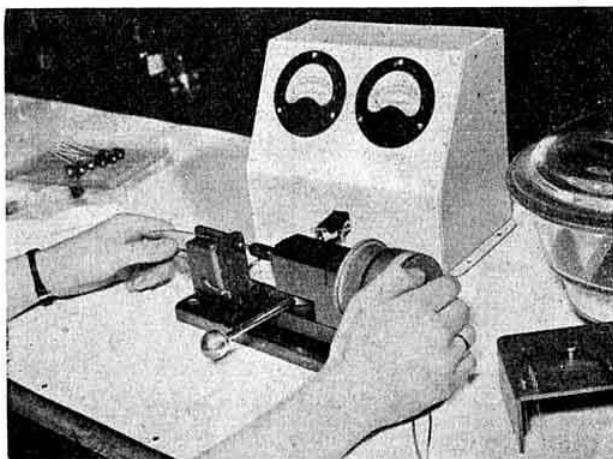
The components and sub-assemblies are chemically washed after each operation and subsequently stored in dust-proof containers and desiccators to prevent any possible contamination by atmospheric impurities, etc.

As a further precaution, the storage time of the sub-assemblies is kept as short as possible to minimise the possibility of deterioration.

Electro-Forming

In order to obtain good characteristics and stability, the collector undergoes selective electro-forming, which is progressively increased until, with 1 mA flowing through the emitter, the col-

(Continued on Page 415)



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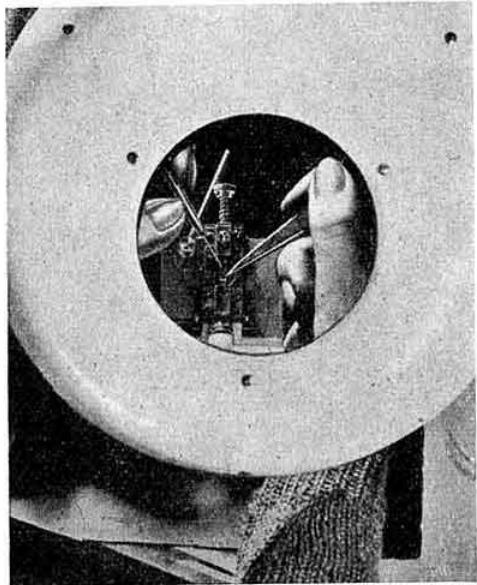


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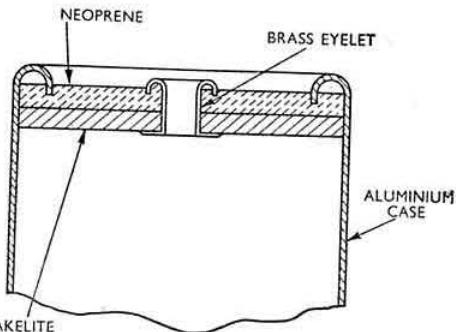


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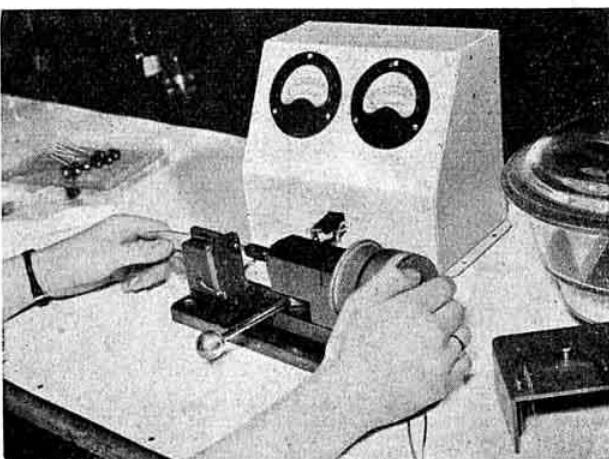
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(Continued on Page 415)



R.S.G.B. BULLETIN, March, 1954.

Radiation Patterns of Horizontal Aerials

Part I

By W. H. SEGROTT (G8SI)*

Conventional polar diagrams seldom convey a true picture of the actual radiation from an aerial system. In this informative new series of articles, the author describes the shortcomings of the usual polar diagram and presents the case for the use of rectangular co-ordinates in preparing graphs illustrating radiation patterns. The articles will do much to explain why aerials frequently produce unexpected results. The series will conclude with a number of graphs prepared using the method to be described.

THE method of illustrating the radiation (or reception) characteristics of aerials is generally by means of polar diagrams, which are simply graphs showing the relative field strength as a function of the horizontal or vertical wave angle. The only way in which these graphs differ from the more conventional type is in the use of polar, as distinct from rectangular, co-ordinates. The use of polar co-ordinates, while providing a more pictorial presentation, is not essential, and, as will be seen later, the use of rectangular co-ordinates offers a number of advantages for some applications.

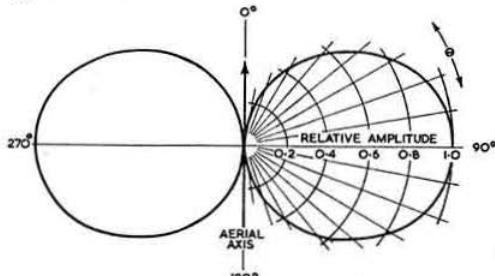


Fig. 1.—"Free space" diagram of horizontal half-wave aerial.

In general, all polar diagrams come within one of the following categories: (a) the "free space" diagram, (b) horizontal diagrams (in the presence of ground) for selected wave-angles and aerial heights, and (c) vertical diagrams (in the presence of ground) for selected aerial heights and a particular horizontal angle.

The type of diagram in most general use is the "free space" type. The main reason for this is that the radiation of an aerial is modified by the presence of ground, to a degree which depends upon the height of the aerial. By assuming the "free space" condition, the diagram becomes a function of aerial dimensions only, and so provides a convenient basis for comparison between aerials of different types.

Although the "free space" diagram enables certain merits of different aerials to be assessed, this method of presentation provides very little practical information regarding overall performance of any particular aerial. For example, the horizontal diagram of a half-wave aerial is well

known for its figure-of-eight formation. From this, the erroneous impression is often gained that communication with stations located in line with the aerial axis is difficult if not impossible. It will be shown later that, in practice, this is not necessarily the case and appreciable radiation off the end of the aerial does occur, the factor of importance being the wave-angle. The figure-of-eight diagram normally illustrated is, of course, the "free space" diagram and only represents a cross section of the radiation pattern taken axially through the aerial; any effects due to the ground are neglected.

This article will be devoted to explaining, with certain simplifying assumptions, one method of deriving the theoretical radiation patterns of an aerial. By so doing, it is hoped to present, to those not familiar with the subject, a clearer picture of aerial performance and so remove some of the apparent differences between theory and practice.

Before proceeding further it is convenient to consider two important factors relating to aerials in general.

Reciprocity Theorem

The reciprocity theorem may be summarised simply by stating that all the properties exhibited by an aerial are nearly the same whether it is used for the purposes of transmission or reception. This leads to the important conclusion that, in both cases, the radiation pattern is also the same. For convenience, the use of the aerial for transmission purposes will generally be assumed throughout this article.

Feeder System

Provided the feeder system is non-resonant and balanced with respect to ground, i.e., correctly matched to the aerial, the diagram is unaffected by the type or method of feed, provided it does not vary the aerial current distribution. Departure from this condition, however, will result in radiation from the feeder system, with consequent distortion of the radiation pattern.

Theoretically, the case of multi-band aerials using "tuned" feeders may also, in certain cir-

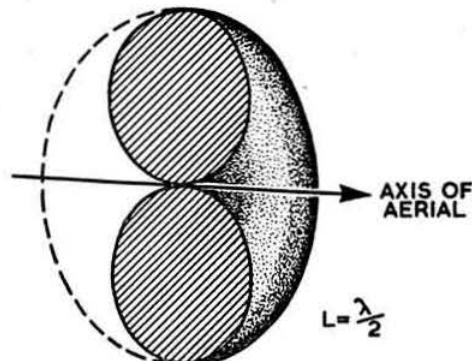


Fig. 2.—Three dimensional presentation of "free space" diagram.

cumstances, be included, since a perfectly balanced feeder (i.e., one that is non-radiating) is assumed. In practice, this balance is difficult to achieve and appreciable distortion of the pattern, due to feeder radiation, may result. The radiation patterns of these aerials may also be dependent upon the mode of operation, e.g., a centre-fed Zepp with a full wave top has a different diagram from that of an end-fed Zepp with the same length top.

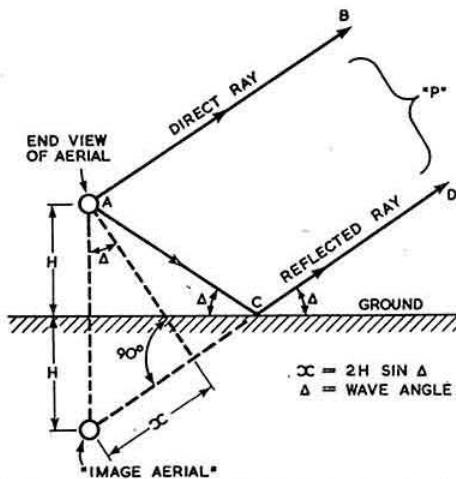


Fig. 3.—Direct and reflected ray components based on "image aerial" theory.

The Half-Wave Aerial—"Free Space" Diagram

The half-wave aerial, because of its simplicity and space requirements, is probably the most popular aerial in amateur use. As it is frequently used as the standard to which the performance of other aerials is referred, it seems desirable that this aerial should be used for the purpose of this analysis. What follows is, of course, applicable in a general sense, to all types of single wire resonant aerials, bearing in mind the changed dimensions.

The radiation pattern in "free space" must first be considered. A diagram illustrating such a pattern is obtained by calculating and plotting the field strength values at a large number of points equidistant from the centre of the aerial, all points being in the plane containing the aerial. In calculating these values, it is assumed, as the term implies, that the aerial is sufficiently remote from the ground that the latter has no effect upon the diagram.

The "free space" field strength at any distant point P is given by the following equation¹:

$$E = \frac{60I \cos(\pi L/\lambda \cos\theta)}{d \sin\theta} \quad (1)$$

for aerials an odd number of half-waves long, and by

$$E = \frac{60I \sin(\pi L/\lambda \cos\theta)}{d \sin\theta} \quad (2)$$

for aerials an even number of half-waves long, where

E = field strength in volts per metre.

d = distance to P in metres.

I = aerial current in Amperes as measured at a current maximum.

L = aerial length in the same units as λ .

λ = wavelength.

θ = angle subtended by the distant point P to the aerial axis.

For purposes of plotting the polar diagram, only relative values are required: the numerical factors in the above equations can, therefore, be set at unity. This results in equations which, for given values of L and λ i.e. an aerial of particular length, are functions only of θ .

From the equation (1), therefore,

$$\frac{\cos(\pi L/\lambda \cos\theta)}{\sin\theta} \quad (3)$$

and from Equation (2),

$$\frac{\sin(\pi L/\lambda \cos\theta)}{\sin\theta} \quad (4)$$

Equation (3) is the expression applicable to the half-wave aerial. By substitution for $L = \lambda/2$

$$\frac{\cos(\pi/2 \cos\theta)}{\sin\theta} \quad (5)$$

from which, by substitution for θ and by calculation, Table I is derived.

From this table the "free space" diagram can be plotted as shown in Fig. 1. It should be noted that evaluation of $F(\theta)$ is only necessary for values of θ between 0° and 90° , the curve being symmetrical in all four quadrants.

Examination of Fig. 1 indicates maximum radiation at right angles, and zero in line with the aerial axis. This, however, is only a two dimensional interpretation and it is essential that the radiation pattern be regarded as a solid. This can be visualised if the plane of the diagram of Fig. 1 is considered as a figure of revolution about its axis. These considerations result in a three dimensional projection as shown in Fig. 2, from which it is

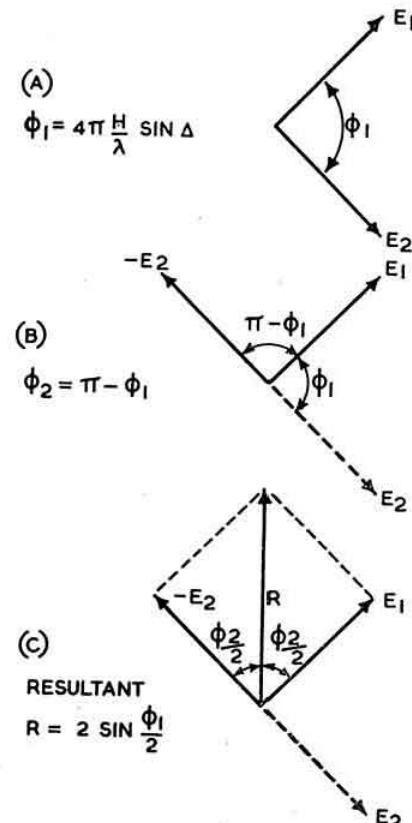


Fig. 4.—Vector sum of direct and reflected rays E_1 and E_2 . (a) Phase shift due to extra path length of reflected ray; (b) with phase reversal due to reflection; (c) resultant sum.

evident that any cross section axially through the aerial leads to the plane diagram of Fig. 1.

Ground Reflection Factor

As all aerials function in the presence of ground, the "free space" diagram has no practical application. However, a modified diagram, which takes into account the effects due to the presence of ground, can be derived by application of a correction factor to the "free space" diagram. This factor is known as the Ground Reflection Factor (G.R.F.) and for horizontal aerials is given by the following expression

$$G.R.F. = 2 \sin (2\pi H/\lambda \sin \Delta) \dots \dots \quad (6)$$

where

H = height of the aerial above the ground in the same units of measurement as λ .

λ = wavelength.

Δ = wave-angle.

Before considering how the G.R.F. is derived, it is necessary to examine the process of reflection at the surface of the ground and its effect on field strength at a distant point P (Fig. 3). The field strength at P is determined by the relative amplitudes and phase of a direct ray AB and a ground reflected ray ACD . Assuming that the ground acts as a perfect reflector, no attenuation of the reflected ray will occur but a phase shift of 180° results from the process of reflection. There is

The additional path length X traversed by the reflected ray creates a phase shift (ϕ_1) between the direct and reflected rays. Since a phase shift of 360° (2π radians) occurs per wavelength and $X = 2H \sin \Delta$

$$\text{then } \phi_1 = 2\pi/\lambda (2H \sin \Delta) \\ = \frac{4\pi H \sin \Delta}{\lambda}$$

This is shown vectorially in Fig. 4A. Allowance must also be made for the assumed opposite phase excitation of the image aerial and the E_2 vector (Fig. 4A) takes up a new position as shown in Fig. 4B. The total phase shift therefore becomes

$$\phi_2 = (\pi - \phi_1)$$

and from Fig. 4C

$$\text{Resultant} = 2 \sin \phi_2 / 2$$

$$= 2 \sin (2\pi H/\lambda \sin \Delta)$$

which is the Ground Reflection Factor given in Equation (6). Table II gives the result of substitution in Equation (6) for $H = \lambda/2$.

Equation (6) is also shown graphically in Fig. 5 for typical values of H/λ with Δ as the variable.

Part II will deal with the radiation patterns of aerials in the presence of ground.

Reference

¹ *Radio Engineering*, Terman, page 686.

Table I

θ	0°	10°	20°	30°	40°	50°	60°	70°	80°	90°
$F(\theta)$	0.00	0.14	0.28	0.42	0.56	0.7	0.82	0.92	0.98	1.00

(Note that if θ is measured in degrees, $\pi/2 = 90^\circ$)

Table II

Δ	0°	10°	20°	30°	40°	50°	60°	70°	80°	90°
G.R.F. ($H = \lambda/2$)	0.00	1.04	1.76	2.00	1.80	1.34	0.82	0.38	0.10	0.00

also an additional phase shift due to the extra path length AC traversed by the reflected ray. The resultant field strength at P (being the vector sum of the two signal components), the direct and reflected rays, is therefore a function of the wave-angle Δ and aerial height (H).

Considering the G.R.F., it is necessary to allow for the constant phase shift of 180° (π radians) due to reflection. It is convenient to assume the presence of an imaginary aerial at a distance H below ground (Fig. 3). This aerial, usually referred to as the image aerial, is assumed to be excited in opposite phase to the aerial proper and can be regarded as the origin of the reflected ray.

Ignition Suppression

A "Fit Suppressors" plea to motorists is supported by the Institution of Electrical Engineers. In a statement issued recently, the Institution said: "Fears that the fitting of TV suppressors to car engines might have an adverse effect on performance have been shown by tests to be groundless. No difference has been found in starting, acceleration or fuel consumption."

In an appeal to motorists, as a matter of goodwill, to have their vehicles suppressed, the Institution point out that complete elimination of interference from cars solely by measures taken at the receiver is impossible.

V.H.F. and U.H.F. Broadcasting

In view of the proposals contained in the Government White Paper on Television that a commercial service shall operate in Band III, readers may like to have details of the five internationally recognised v.h.f. and u.h.f. broadcast bands. The bands are as follows:

- Band I.—41-68 Mc/s
- Band II.—87.5-100 Mc/s
- Band III.—174-216 Mc/s
- Band IV.—470-585 Mc/s
- Band V.—610-960 Mc/s

New B.B.C. Television Stations

THE B.B.C. has been authorised to set up television stations in East Anglia, Dover, Inverness, Londonderry, Towyn and Carlisle.

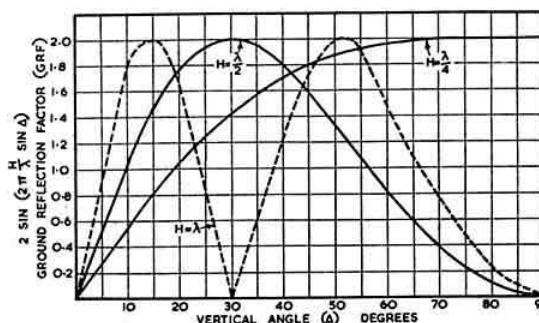


Fig. 5.—Ground reflection factor (G.R.F.)—horizontal aerials.

Radio on Stamps

By J. DOUGLAS KAY (G3AAE)*

WHEN Rowland Hill instituted the Penny Post, resulting in the issue, in 1840, of the first adhesive postage stamp, no thought could surely have been farther from his mind than that one day postage stamps would feature radio pioneers and apparatus as their design, and would be used to pay postage on QSL cards. Over half a century had to pass before the first radio transmission was made. In spite of this, however, the development of the design of stamps has run a closely parallel course in time to the development and progress of radio in its many forms. It is, therefore, not surprising that this rapidly expanding science has been recognised on the stamps of many countries.



A special 75 centimes stamp was issued by France on February 27th, 1936, to commemorate the 100th anniversary of the death of the famous French scientist André-Marie Ampère.

cell. Here two values were issued, one showing Volta and the other what is supposed to be a voltaic pile.

The centenary of the death of Ampère was marked by the issue by France of a stamp bearing his likeness, and the great Marconi, who in 1895 began his series of experiments in radio transmission, and who has the added distinction of being the only R.S.G.B. member to appear on a postage stamp (he was an Honorary member from 1914 until his death in 1937), was honoured on a stamp issued by Italy in 1938. He was similarly honoured in 1947 when Italy issues a series of stamps showing land and ship radio masts and a radio equipped aircraft, to mark the 50th anniversary of the commencement of his radio discoveries.



Italy issued three stamps in January 1938 in memory of Senator Marconi whose death occurred during the previous year.

Not to be outdone the U.S.S.R. in 1945 issued a set of stamps to commemorate the 50th anniversary of Popov's radio discoveries. Not only is Popov pictured on these stamps, but two values show him lecturing, and incorporate in their design a supposed theoretical circuit diagram and some antediluvian apparatus. Russia again honoured Popov philatelically in 1951.

Other pioneers whose faces have adorned stamps have mostly been featured by the United States. In the 1940 series honouring famous American scientists, the two cent stamp showed Samuel Morse and the ten cent value Alexander Graham Bell, and by some strange coincidence these two were together again in 1944 on a set

The Pioneers

Appropriately enough, most of the first radio stamps issued bore portraits of those pioneers of the early days. In 1927 Italy issued a stamp commemorating the centenary of the death of Volta, and followed this in 1934 by two stamps to mark the first international congress of Electro-Radio-Biology, featuring a very fine portrait of Luigi Galvani. This is Galvani's only appearance on a stamp, but Volta appeared again on an Italian stamp issued in 1949 to commemorate the 150th anniversary of his inventing the electric

* 18 Fairfield Way, Barnet, Herts.



The specially designed card produced for use during the 25th anniversary meeting of the International Amateur Radio Union (I.A.R.U.) held in Paris in May, 1950. The inventor of Semaphore (Claude Chappe) is featured on the stamp affixed to the card.

of stamps issued by Argentina in aid of a postman's benefit fund. Bell has also appeared on a Canadian stamp issued in 1947 to commemorate the centenary of his inventing the telephone.

In the broadest sense semaphore could be included in the general heading of Communications, and its inventor, Claude Chappe, appeared on a French stamp in 1944, the 150th anniversary of his invention. While on this sidetrack perhaps a Gold Coast stamp issued in 1948 and showing a negro tapping a drum, could be included as "bush-telegraphy."



Italy commemorated the 50th anniversary of wireless communication by the issue of a series of stamps each with a radio theme.

Telegraphy

The first telegraphic apparatus in South America was featured on a two cent air stamp issued in 1944 by Paraguay, and the centenary of the telegraph is commemorated by a U.S. stamp of 1944 picturing a close-up of a telegraph pole. India recently reached the centenary of her first use of the telegraph, and two stamps have just been issued to mark the anniversary. Apart from stamps about the telegraph, numerous stamps have been issued from time to time to pay the cost of telegrams. These take various forms of overprints and cancellations as well as special stamps, but none could be of more interest than those issued in 1898 by the Sudan. The bi-coloured stamps show a contingent of the famous Sudan Camel Corps passing alongside a telegraph line running through the desert. These stamps are of horizontal rectangular format, and are perforated into two equal halves by a vertical line of holes puncturing the stamps. The telegraph form was also punctured vertically, and the idea was that the holes on the stamp and the form should coincide, and one half of the form and attached half stamp should be retained by the telegram filer as his receipt. These stamps



This is the postmark applied to mail posted by delegates to the important I.T.U. Radio Administrative Conference held in Geneva during 1950.

are sometimes found used, but still unsevered, and there is no doubt that this can be attributed to philatelically-minded telegraph office employees. The last stamp to feature the telegraph saw the light of day in 1947 when a stamp was issued picturing a tape machine and a representation of the world surrounded by tape.

Radio navigation is represented by inclusion by Newfoundland of the trans-atlantic radio beacon at Cape Race on one value of a set of stamps issued in 1932, and by Falkland Island stamps showing the research ships *William Scoresby* and *Discovery II*, both bristling with radio apparatus.

Telephony

The interests of the "phone" man are catered for by South Africa, who included in their War Effort set of 1941, a 1/3 stamp showing a tank operator working an R.T. set, and by Japan, who, in 1950, celebrated the 25th anniversary of the Japanese broadcasting system by issuing one value depicting two microphones, one of 1925 vintage and the other of the latest design.

Broadcasting has only recently appeared in the philatelic world, and perhaps the station of most interest is Radio Luxembourg which is featured on a stamp of Luxembourg showing the transmitting building and the aerial arrays. Denmark has celebrated the 25th anniversary of the Kalundborg transmitting station, and in 1951 Monaco produced three stamps publicising the Monte Carlo radio station. In this latter case some sort



The Egyptian Government issued three stamps to mark the occasion of the International Telecommunication Union Conference held in Cairo during 1937.

of *entente cordiale* appears to have existed as Monte Carlo Radio used to broadcast a short programme for philatelists. Incidentally no aspect of British broadcasting has yet been featured on a stamp.

The first stamp to mention television came from Switzerland, where in 1952 four stamps were



The special postmark struck in connection with the VIIth Plenary Assembly of the International Radio Consultative Committee (C.C.I.R.) held in London during September, 1953.

produced marking the centenary of telecommunications. The four values are devoted to the telegraph, telephone, radio and television—the latter shown as an eye. A multiple radio design set also came from Italy in 1947 when six stamps were issued showing wireless masts, a ship's aerial and an aeroplane equipped with wireless. Wireless masts are a firm favourite with stamp designers and have appeared at various times on the stamps of Honduras, Guatemala, Ascension, and Barbados among others.



Just before Christmas 1938, France issued a special stamp in connection with an appeal for funds to provide sets for blind wireless listeners. The face value was 95c.+25c, the latter amount being handed over to the "Wireless for the Blind" Fund.

Legislation

Radio legislation is marked by the Egyptian stamps issued in connection with the 1938 International Telecommunications Conference in Cairo. The design is quite ingenious and features wireless arrays against a background of the Pyramids of Giza and the Colossus of Thebes. The International Radio Conference held in Florence in 1950 attained philatelic perpetuity by the issuing of two stamps, one showing Florence Town Hall, and the other a wireless mast. The anniversary of the I.T.U. was commemorated by Vietnam in 1952 and the stamp they produced for the occasion shows a globe with a representation of a wireless wave superimposed.

Completely different was the stamp issued by France in 1938 in aid of their wireless for the blind fund, and showing a blind wireless listener.

There are no doubt many other radio stamps, but even those detailed above show the extent to which radio and allied subjects have been favoured by stamp designers. In addition to this, various postmarks have been produced to mark occasions of radio interest, and perhaps two of the most interesting are the special postmarks issued for the I.A.R.U. Convention in Paris in 1950 and the C.C.I.R. 7th Assembly held in London last year. Still with the accent on Amateur Radio, of note is the special cover used in the Pitcairn Islands to mark the establishment of PITC—the Voice of Pitcairn



A distinctive postmark was used to mark the occasion of the D.A.R.C. Amateur Radio Convention held in Iserlohn, Germany, during August, 1953.

Island. The coloured picture on the envelope's front shows a straw thatched wooden hut—no doubt the transmitting station, and a man beside the door. Undoubtedly this man is Andrew Young, VR6AY, who not only ran PITC, but also vied with AC4YN in pre-war days as the world's choicest DX.

The final reference is to the stamp that gave birth to this article—the 1953 New Zealand Health stamps with their Morse Code border and pictures of Boy Scouts and Girl Guides, and so should it be for radio and philately are still young, and the wonders of communication yet to be attained may well surpass those that have already been achieved.

Acknowledgments

The author acknowledges his indebtedness to the Editor of *Stamp Collecting* (Mr. Kenneth F. Chapman) for the loan of several blocks used to illustrate this article.

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GERMANIUM TRIODES (Continued from Page 408)

lector voltage for a collector current of 2 mA is less than 3 volts. When this condition is achieved, the following parameters are checked:

- (1) At -10 volts on the collector, the collector current must change by more than 2 mA for a 0-1 mA change in emitter current (i.e. a current gain greater than 2).
- (2) Collector current at -30 volts with no emitter current flowing must be less than 2 mA.
- (3) A collector voltage of at least -30 volts must be possible without instability when the emitter is short-circuited to base.

Stability Tests

When the above specification has been satisfied, the triodes are temperature cycled several times between room temperature and +60° C. After this test they are run at a collector dissipation higher than the rated figure for several days and then left in storage for a considerable time before the above-mentioned parameters are re-checked prior to despatch.

Conclusion

Although the construction of a transistor has many critical phases and requires great precision in its assembly, the finished product does not possess any such critical properties and is very stable and robust. Transistors can be wired in circuit in a manner similar to any other piece of apparatus and because of their robustness no special provision need be made for mounting.

Operating conditions for transistors are not critical, and there is no warming-up time as there is with indirectly heated thermionic valves; the transistor operates as soon as the supply voltages are applied.

Using the

TE149 Wavemeter on Top Band

By D. Westwood, B.Sc., M.I.R.E., A.M.I.E.E. (G8WF)*

AS the basic frequency range of the TE149 Wavemeter is 2500 to 5000 kc/s, its use on the 1800 to 2000 kc/s band is restricted to the measurement of harmonic frequencies, e.g., if a v.f.o. is to be set to 1865 kc/s it has to be adjusted so that its second harmonic falls on 3730 kc/s which can be checked by listening on the wavemeter. There is, however, no direct method of checking the frequencies of incoming signals in the Top Band when a superhet receiver is in use.

The simple modification to be described allows direct measurement of any signal frequency between 1800 and 2000 kc/s and effectively extends the fundamental range from 2500 kc/s down to 1500 kc/s. Only one soldered connection is involved and it is emphasised that (a) the existing wiring is not disturbed, and (b) the calibration for normal use is completely unaffected.

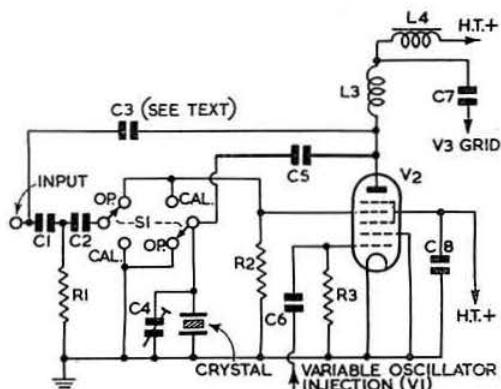


Fig. 1.—Simplified circuit diagram of the TE149 wavemeter. C1, 2, 50 μF ; C3, see text; C4, 3-25 μF ; C5, 25 μF ; C6, 5 μF ; C7, 0.01 μF ; C8, 0.5 μF ; L3, 250 μH ; L4, 130H; R1, 33,000 ohms; R2, 330,000 ohms; R3, 150,000 ohms; V2, 1A7GT; Crystal, 1 Mc/s.

Principle of Modification

The underlying principle involved in the modification is that with switch S1 (Fig. 1) in the "calibrate" position the variable oscillator output and the 1 Mc/s crystal output are injected into the mixer so that, if the variable oscillator is tuned from 2800 to 3000 kc/s, among the frequency components present in the mixer anode circuit will be the difference frequencies covering the range 1800 to 2000 kc/s. Before C3 is added, none of these frequency components can reach the r.f. terminal on the panel since it is isolated by S1. If, however, C3 is introduced between the mixer anode and the r.f. terminal the required output is obtained.

C3 merely consists of 4 in. of insulated wire, one end being soldered to the existing tag on the r.f. terminal, the rest being tucked in alongside the connection which runs from tag 3 on the base of the V2 holder to the coil L3 (see Fig. 2). The other end of the C3 wire is left unconnected, care being taken to prevent any accidental contact either to the chassis or to components.

Method of Operation

To use the modified instrument for Top Band measurements, connect the r.f. terminal to the aerial terminal on the receiver and set the TE149 switch to "calibrate." Variation of the wavemeter dial setting from 2800 to 3000 kc/s then gives output from 1800 to 2000 kc/s so that it is only necessary mentally to subtract one from the first figure of the indicated frequency. For example, if an incoming signal is zero beat when listening on the receiver with the TE149 dial adjusted to 2981 kc/s, the frequency of the signal is, in fact, 1981 kc/s.

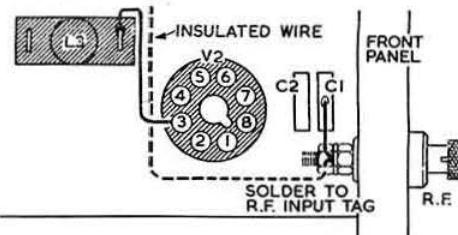


Fig. 2.—The position of the wire used to form C3 is clearly shown in this diagram.

It should be noted that it is no longer necessary to listen on the wavemeter (as was required in the original harmonic method) in order to check transmitter frequencies in the 1.8 Mc/s band. Simply switch on the v.f.o. and, listening on the receiver, proceed as outlined above.

Using the method described, the error of measurement in the range 1.8 to 2 Mc/s is a maximum of ± 0.6 kc/s, if the wavemeter is calibrated in the normal way.

Potty Poetry

or Bringing Up Daughter

Daddy used to tell me,
When I was barely three,
The queerest fairy-stories,
As I sat upon his knee.

He told of daring rescues.
Of gals in silk and sable,
From perilously high antennae,
By Knights clad in co-axial cable.

They differed from the ones in books,
In many little points,
Those tales I heard at Daddy's knee,
And other such low joints.

* * * * *
Twinkle, twinkle, little light,
All through the watches of the night,
Are you a Star high up in Heaven?
Dammit no, you're an "807."

* * * * *
Mary had a little Lamb,
When Gran'ma was alive,
But now she's swapped the useless beast,
For an "1155."

* 5 Carrholme Grove, Leeds 7.



Radio Amateur Emergency Network

ONE of the most active E.C.O.s is E. Arnold Mathews (G3FZW) of Lichfield, who, in addition to organising his own group, has recently lectured to members in **Wolverhampton**. He has also visited the E.C.O. for **Stoke-on-Trent**, G3COY, to discuss matters of mutual interest. With a view to encouraging the formation of further groups G3FZW is willing to lecture on R.A.E.N. anywhere within a radius of 25 miles of Lichfield. The **Lichfield** group has decided to use 3.5 Mc/s for the time being. They intend to build equipment for 144 Mc/s operation as a group effort.

The **Belfast** group has set up a small committee to co-ordinate activities. A net operates on 3550 kc/s on Sundays, commencing at 0010 G.M.T. Stations taking part include G15UR, G13JEX, G13JFX and G12DZG (the E.C.O.).

Members of the **South Shields and District Amateur Radio Club** plan to set up a local group with sub-groups at South Shields (at the sea end of the Tyne) and at Hebburn (as mid-Tyne control). G3JMC is trying to organise a group in the **Whitstable** area. At a meeting in **Guernsey**, GC3EBK was nominated as E.C.O. by the twelve members present and the group is now well under way. The **Worcester** group hope to operate a station in N.F.D.

One of the first to hear distress calls from the **S/T Laforey**, lost recently with all hands, off the coast of Norway, was a non-transmitting member of **Grimsby** group, who recorded all the messages heard on a tape recorder.

Mobile and walkie-talkie equipment is in course of construction by members of the **Wirral** group. G2AMV is to act as control station. The **Essex** net operates on 3510 kc/s (0930 G.M.T., c.w.) and 3700 kc/s (1130 G.M.T., telephony). The control station is G3ABB. At the conclusion of the c.w. practice (at about 1030 G.M.T.), G3ABB stands by for calls from other R.A.E.N. stations.

Equipment

The simple portable equipment designed by G8TL has been undergoing further tests on 3.5 and 7 Mc/s. While results on 3.5 Mc/s have proved very satisfactory, 7 Mc/s operation has been practically useless.

News Letter

A news letter is to be issued from time to time by the R.A.E.N. Committee. Copies will be sent to the E.C.O.s who will be asked to distribute them among the members in their group.

Membership Cards and Badges

Membership cards have now been issued to all members who have registered. In future, all new members will receive a membership card direct from R.S.G.B. Headquarters in return for their registration forms.

R.A.E.N. badges—chromium plated with deep red background—are available in three types: lapel and brooch at 1s. 9d. each post free and callsign at 5s. 3d. each post free. Wind-screen stickers of the R.A.E.N. badge will be supplied free of charge on receipt of a stamped addressed envelope.

R.A.E.N. Committee

As announced elsewhere in this issue Mr. W. J. Ridley (G2AJF) of Chelmsford, has been appointed Chairman of the R.A.E.N. Committee. The Hon. Secretary to the Committee is now Mr. C. L. Fenton (G3ABB), 40 Fourth Avenue, Chelmsford, Essex, to whom all routine communications in connection with the Radio Amateur Emergency Network should be addressed. Registration forms should, however, still be sent to Headquarters.

Midlands Topsfest

A MEETING of Midland amateurs and "Tops" members will be held at the Black Horse Hotel, Thompson Avenue, Wolverhampton, on Saturday, April 24, 1954. Doors will open at 3 p.m. and tea will be served at 5 p.m.

All amateurs living in the area are invited to attend. Tickets are 5s. for the tea and 2s. for the meeting. Those uncertain of being free may pay at the door (after 6 p.m.).

Where are the others?

FROM a recent issue of the "Middlesex Adviser, Uxbridge," we learn that "an interesting experiment was inaugurated last Sunday when an eighty meter band was used by members (of the Uxbridge and Hayes Amateur Radio Group) to get into contact with one another. This is a substitute for the use of the telephone!"

Awards to Inventors

MR. W. B. H. LORD (G5NU) was one of four persons who shared in the award of £11,500 made by the Royal Commission on Awards to Inventors in connection with work on the radio proximity fuse.

Can You Help?

A. MacLeod, 91 Sharow Street, Sheffield 11, who would like to hear from any member who has successfully fitted an "S" meter to an R1155 receiver. He also requires the August, 1949, and April, 1950, issues of the BULLETIN, which contain articles on the R1132A.

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Scottish N.F.D. Trophy Presentation Dinner

At Sloan's Restaurant, Argyle Arcade, Glasgow, on February 28, 1954, Ralph Columbine (GM3HVC) presented the Scottish N.F.D. Trophy to Bill Gilmour (GM3FPX), representing the Glasgow Group, at a dinner held in honour of the occasion. The Region 14 Representative (David Macadie, GM6MD) presided. Among others present were old-timers John Kyle, D.F.M., A.F.M., B.E.M. (GM6WL), Robert Sloan (B.R.S. 442) and James Maitland (B.R.S. 19).

In the course of a short speech Mr. Macadie referred to the importance National Field Day would have in future as a means of testing equipment for use in connection with the Radio



A picture taken at the Scottish N.F.D. Trophy Presentation Dinner, held in Glasgow on February 28, 1954.

Amateur Emergency Network. He considered that the Scottish N.F.D. Trophy had done much to stimulate interest in N.F.D. in Scotland, particularly as the N.F.D. Shield was no easy trophy to win!

Later in the evening James Sey (GM8MJ) presented the "Jack Wyllie" (GM5YG) Silver Cup to Mr. Macadie. In making the presentation, Mr. Sey referred to the work done by Mr. Macadie for the Society over a period of many years.

Following the presentations, the N.F.D. film was shown and entertainment was provided by Mrs. Fraser (wife of GM3AXX) and Messrs. R. Smith (GM3JGG) and Jack Stewart (GM3AHQ).

North Cornwall Hamfest

THE Third Annual Hamfest, organised by the North Cornwall Group, will be held at the "Cove Cafe," The Quay, St. Agnes, on March 28, 1954, commencing at 3 p.m. Tickets, price 5/6 (under sixteen, 3/-), are obtainable from J. E. Bowden (G2AYQ), Albany House, St. Agnes, Cornwall.



The T.R. for Glasgow, Bill Gilmour (GM3FPX) (left), received the Scottish N.F.D. Trophy from Ralph Columbine (GM3HVC).

Gloucester County Dinner

SIXTY-SIX members and their ladies attended a dinner, organised by the C.R. for Gloucestershire and the T.R.s for Gloucester, Cheltenham and Stroud, on February 4, 1954.

A toast to the "Amateur Radio Movement" was proposed by E. A. Kingscote (B.R.S. 479) to which Council Member N. F. O'Brien (G3LP) replied. "The Ladies" were toasted by F. Watts (G5BM) and Mrs. H. Brislin (wife of G3FRY) replied.

During the evening "Games and Tortures" were arranged by E. Chell (B.R.S. 19474). Many gifts and prizes, donated by manufacturers, were distributed.

London Members' Luncheon Club

CORDIALLY welcomed at the February Luncheon was Mr. A. E. (Pop) Seymour, M.B.E., ex-ZB1Q, Editor of *QRV* (Official Journal of the R.A.F. Amateur Radio Society). Mr. Seymour was accompanied by Wing Commander W. E. Dunn, O.B.E., G2LR, Vice-President of that Society and Squadron Leader, H. E. Bennett, G8PF, a Committee Member.

Following the luncheon Mr. Seymour spoke briefly of his amateur activities in India and Baluchistan more than 20 years ago and of his pleasure at meeting so many old friends once again. Another old timer, Ralph Royle, G2WJ, gave a short account of his recent most successful Amateur Television experiments.

A number of those present responded to an appeal made by the General Secretary to apply for membership of the R.A.F. Amateur Radio Society. The Society is open to all who have served in the Royal Air Force or Auxiliary Services.

The Chair was taken by the Chairman of the Club (Stanley Vanstone, G2AYC) who had the support of the President (Arthur O. Milne, G2MI).

Correction

The name and address of Associate Member R. Demuth were shown incorrectly in the list of New Members published last month. The correct details are as follows: R. Demuth, 66 Perkins Road, Newbury Park, Ilford, Essex.

LONDON MEETING

March 26, 1954: Mr. G. P. Thwaites, B.Sc.(Eng.), A.M.I.E.E., A.M.Brit.I.R.E.
"TRUSTWORTHY VALVES AND THEIR MANUFACTURE."

The meeting will be held at the Institution of Electrical Engineers, Savoy Place, Victoria Embankment, London, W.C.2 Buffet Tea from 5.30 p.m.
The meeting will commence at 6.30 p.m.

Regional and Club News

ABERDEEN AMATEUR RADIO SOCIETY.—Those who worked four or more stations in Aberdeen during 1953 can still apply for the Aberdeen Society's Coronation Year Award. Claims should be addressed to the Hon. Secretary: A. G. Knight, 6 Blenheim Lane, Aberdeen.

ACTON, BRENTFORD AND CHISWICK RADIO CLUB.—Recent activities have included a visit to the Lots Road L.P.T.B. Power Station and a talk on "Radio in Aviation" by Peter Matthews (G3BPM). The club (call G3IIU) meets at 7 p.m. on Tuesdays at the A.E.U. Rooms, 66 High Road, Chiswick, W.4. Hon. Secretary: R. G. Hindes, 51 Rusthall Avenue, Bedford Park, Chiswick, W.4.

BOURNVILLE RADIO SOCIETY.—The club station, G6BV, is on Top Band c.w. during meetings on Tuesday evenings. Reception reports will be appreciated. Hon. Secretary: W. V. Shepard (B.R.S. 19176), c/o Cadbury Bros. Ltd., Bournville, Birmingham 30.

BRIGHTON & DISTRICT RADIO CLUB.—The first of a series of talks on "Radio Maths" will be given by E. Bannister on March 16. There will be a visit to Brighton Telephone Exchange on March 23 and a Junk Sale on March 30. Meetings are held at the "Eagle Inn," Gloucester Road, on Tuesdays at 7.30 p.m. Hon. Secretary: T. J. Huggett, 15 Waverley Crescent, Brighton.

BRISTOL.—A feature of the February meeting was a film show and lecture arranged by Mullard Ltd. There will be a lecture on transistors on March 19. At the meeting on April 30 Louis Varney (G3RV) will speak on "TVI Problems."

CHELTENHAM.—At the A.G.M., when the Group's affairs were shown to be in good order, G8ML reported that his firm would no longer be able to provide a meeting place. Enquiries are afoot for new premises.

CHESTER & DISTRICT AMATEUR RADIO SOCIETY.—Meetings are arranged for March 16 (Junk Sale), 23 ("Receivers") and 30. The Annual Dinner will be held on April 2 at 8 p.m. A new all-band transmitter is being built for the club station G3IGZ. Hon. Secretary: A. N. Richardson (B.R.S. 19678), 23 St. Mary's Road, Dodeleston.

DERBY.—A meeting to discuss plans for N.F.D. will be held at the School of Arts and Crafts, Green Lane, Derby, on March 31 at 7.30 p.m. All local members are invited to attend.

NATIONAL FIELD DAY

Applications for N.F.D. permits may be made only by properly appointed T.R.s and A.R.s, as the case may be, and must be post-marked not later than March 31, 1954. Groups which at present are without a Town or Area Representative have only two weeks left in which to make an appointment if they wish to take part officially in Field Day. The Rules appeared in the October 1953 issue of the R.S.G.B. Bulletin.

Central Library, Holloway Road, London, N.7, at 7.30 p.m. on March 19. After the film show, a technical discussion on "Valves and their Applications" will be opened by Mr. Gardner of the Mullard company. A cordial invitation is extended to all members in and around London to attend this important meeting. Hon. Secretary: A. W. H. Wennell (G2CJN), 145 Uxendon Hill, Wembley Park, Middlesex.

GRAVESEND AMATEUR RADIO SOCIETY.—Meetings are now held at the Scout's Den, London Road, Roserville, on Thursdays at 7.30 p.m. At the A.G.M. E. Woods (G3FST) and J. Irlam (G3IBT) were elected President and Chairman respectively. Hon. Secretary: Bob Appleton, 23 Laurel Avenue, Gravesend.

HULL & DISTRICT RADIO SOCIETY.—The club station (G3AMW) is being overhauled and should be active again shortly. Much interest is being shown by members in the Radio Amateur Emergency Network. Hon. Secretary: R. C. Parfrey (G2DPA), 32 Cartwright Lane, Beverley, E. Yorks.

LANCASTER & DISTRICT AMATEUR RADIO SOCIETY.—Members of the society are taking an active part in the local R.A.E.N. group. A film strip show illustrating how television works was given at a recent meeting. Hon. Secretary: A. O. Ellefsen (G3FJO), 10 Seymour Avenue, Heysham, Lancs.

Regional and Club News

Contributions to this feature should be topical, concise, and typed—using double spacing—and sent to reach Headquarters by not later than the 20th of the month preceding publication.

Items for inclusion in "Forthcoming Events" should be sent to reach Regional Representatives not later than the 18th of the month preceding publication.

DERBY & DISTRICT AMATEUR RADIO SOCIETY.—At the A.G.M. the following officers were elected: Chairman: C. M. Swift (G3IUK); Hon. Secretary: F. C. Ward (G2CVV); Hon. Treasurer: W. R. Chaffe (G2DLJ); Hon. Contest Secretary: F. Clay (G3IBL); Committee Members: A. McCabe (G4CO), F. Cox (G3GRM), B. J. C. Brown (G3JFD), A. C. Rodgers (G3IJL), and T. Darn (G3FGY). Membership of the society is now at a record level.

EDINBURGH AMATEUR RADIO CLUB.—Classes in preparation for the Radio Amateurs' Examination and the G.P.O. Morse Test are held on Wednesdays at 16 Bothwell Street (off Easter Road), Edinburgh. All meetings commence at 7.30 p.m. Hon. Secretary: D. B. R. Black, 16 Edina Place, Edinburgh 7.

GRAFTON RADIO SOCIETY.—A new Mullard film "The Manufacture of Radio Valves" will be shown at the

LEICESTER RADIO SOCIETY.—There was a very large attendance on February 1 when C. L. Wright, B.A., B.Sc. (Eng.), gave the first of a series of lectures on transistors. Following a simple explanation of the theory of semi-conductors, the lecturer described the relationship between thermionic valve and transistor circuits. At the meeting on March 29, R. Weston (G2BVW) will talk about V.H.F. Equipment with particular reference to 70 cm. Hon. Secretary: N. Wibberley, 21 Pauline Avenue, Leicester.

LOTHIANS RADIO SOCIETY.—Meetings at 25 Charlotte Square, Edinburgh, are arranged for March 18 ("Flying Spot Scanners"), April 1 ("Around the Shacks") and April 15 ("Stabilized Power Supplies"). Hon. Secretary: L. Stuart, 38 Caledonian Crescent, Edinburgh.

MIDLAND AMATEUR RADIO SOCIETY.—The society operated an Amateur Radio station on all bands from 1.8 to



Among those who attended the Gloucester County Dinner was Council Member N. F. O'Brien (G3LP), fourth from the left, facing the camera in this picture. [Photo by courtesy of the "Gloucester Citizen"]

144 Mc/s under the call-sign GB3MIB from its stand at the recent Midland Institute Conversazione. At the February Meeting, Mr. Lightwood of Philips Electrical Ltd. lectured on "Projection Television." R. Rew (G3HAZ) will talk about V.H.F. and U.H.F. Radio Equipment on March 16 at the Imperial Hotel, Birmingham. E. Bridgewater (G3HOD) has been appointed Hon. Treasurer in succession to the late Leslie Metcalfe. Hon. Secretary: D. Hall, 144 Hill Village Road, Sutton Coldfield.

NORWICH & DISTRICT RADIO CLUB.—In association with a local model aircraft society, the club is running an exhibition in the Stuart Hall, Norwich, for five days commencing April 5. An Amateur Radio station will be active from the exhibition on all bands from 1.8 Mc/s to 144 Mc/s under the call-sign G3ASQ/A. In addition to displays of amateur-built equipment, radio control of models and other electronic "gadgets" will be demonstrated. The exhibition will be opened by the Sheriff of Norwich.

NORWICH & DISTRICT.—The General Secretary, John Clarricoats (G6CL) is to lecture to the group on March 20 on "International Amateur Radio."

QRP SOCIETY.—With a view to promoting interest in v.h.f. work the society is to hold a 2m listening contest each month, commencing April 1. A "T.R.F. Section" has now been formed for the benefit of the newcomers and short wave listeners. Hon. Secretary: J. Whitehead, "The Retreat," 92 Rydens Avenue, Walton-on-Thames, Surrey.

ROMFORD & DISTRICT AMATEUR RADIO SOCIETY.—Meetings are held on Tuesdays at R.A.F.A. House, 18 Carlton Road, Romford from 8.15 p.m. On March 30, Louis Varney (G5RV) will lecture on "TVI and Transmitter Design." The club station, G4KF, is active. Hon. Secretary: N. Miller, 10 Ron Crescent, Romford.

SOUTHEND & DISTRICT RADIO SOCIETY.—There was a large audience to hear J. Missen, B.Sc. (The General Electric Co. Ltd.) lecture on transistors. The lecture on "Aerials and Waveguides" by W. A. Smith, B.Sc. was also well attended. Hon. Secretary: J. H. Barrance, M.B.E., 49 Swanage Road, Southend-on-Sea.

TORBAY AMATEUR RADIO SOCIETY.—Council Member and Region 9 Representative Herb. Bartlett (G5QA), the Devon C.R., Tom Smith (G3EFY) and a number of Exeter members attended the meeting at which G4RD gave a talk, illustrated with films, on the Decca Navigator. The series of lectures on aerials will be continued on March 20 at the Y.M.C.A., Torquay. Hon. Secretary: L. H. Webber (G3GDW), 43 Lime Tree Walk, Newton Abbot.

WARRINGTON & DISTRICT RADIO SOCIETY.—The following officers were elected at the A.G.M.:—Chairman: A. Ferguson; Hon. Secretary: G. H. Flood (32 Capsthorne Road, Orford, Warrington). B. Webster was re-elected Hon. Treasurer. The society's Annual Dinner was held on January 29. Due to the indisposition of the President, the Vice-President, G. Richards, took the chair. The G.R. Trophy was presented to A. Rigby (G3FGI).

WEST LANCASHIRE RADIO SOCIETY.—The society has now obtained a transmitting licence and will shortly be active on Top Band c.w. using the call-sign G3JQA. Hon. Secretary: S. Turner (B.R.S. 20077), 5 Balf Street, Seaforth, Liverpool 21.

YORK AMATEUR RADIO SOCIETY.—The following were elected at the A.G.M.:—Chairman: E. Warwick (G3GDE); Hon. Treasurer: P. S. Robson (G3YFP); Hon. Secretary: G. F. Nottingham (G3DTA), 51 Carr Lane, Acomb, York; Committee Members: G. R. Foggin (G3GRF), A. Horner (G3FTS), M. Linfoot (G3GCX), and R. R. Wilkinson (G3DSA). The society meets on Wednesdays at 7.30 p.m. in the Club Rooms, Fetter Lane (facing the rear of the Queen's Hotel). The club station, G3HWW, is active on Top Band and 3.5 Mc/s c.w. and telephony.

Silent Keys

We record, with deep regret, the death on January 25, 1954, of Stanley H. Holden (B.R.S. 8256), of Wood Green, London, N.22.

Stan was a great asset to Amateur Radio, for he had the unique gift of quiet patience and understanding. Although his ambition to operate a transmitting station was never realised, he will always be remembered for the active part he took in local Amateur Radio affairs. Willing to assist the Society at all times, keen, intelligent and quiet mannered, he will be greatly missed by all who knew him.

Deepest sympathy is extended to his wife and son in their loss.
E. G. S.

* * *

We record with regret the death of Sergeant Wilson, ZBIEP, who lost his life when an R.A.F. Shackleton aircraft crashed into the sea off the Island of Gozo on February 12, 1954. Sergeant Wilson was an airsignaller in the R.A.F. By his death the Amateur Radio movement has lost a great enthusiast.

Sincere condolences are extended to his family and close friends.

Representation

The following are additions to the list of Town Representatives published in the December, 1953, issue:

Region 1—Cheshire

Stockport
D. J. Birch (G3AOO), 106 Nasmith Street, Denton, Manchester.

Region 2—Yorkshire West

Rotherham
H. N. Gubby (G3ELG), 37 Sough Hall Road, Thorpe Hesley, Rotherham.

Region 3—Staffordshire

Stoke-on-Trent
D. Poole (G3AQW), 13 Oldfield Avenue.
Wolverhampton
G. Millington (G3JGM), 17 Tettenhall Road.

Region 4—Leicestershire

Loughborough
H. G. Gosling (G3FYV), 16 Salisbury Street.
Region 5—Essex

Danbury
R. A. Parsonson (G3IZY), Long Gardens, Galley End, Nr. Chelmsford.

Region 6—Oxfordshire

Oxford
J. Hickling (G3GCS), 47 Banbury Road.

Region 7—London South-East

Woolwich
K. W. Ireland (G3IKW), 82 Grangehill Road, Eltham, S.E.9.

London East
Brentwood
G. L. Turner (G3LA), 59 Crow Green Road, Pilgrims Hatch, Brentwood.

Wanstead & Woodford
R. S. James (G3GZD), 4 Grove Hill, S. Woodford, E.18.
London West

Slough
R. Young (G3BTP), 48 Quaves Road.

Region 9—Bristol
Bristol
F. H. Chambers (G2FYT), 25 The Crescent, Westbury-on-Trym.

Region 10—Glamorganshire
Cardiff
S. A. Howell (GWFN), 7 Homelands Road, Rhiwbina.

Region 14—Renfrewshire
East Renfrewshire
W. T. McDowell (GM3CAR), 28 Evan Crescent, Giffnock.

Channel Islands
Guernsey
W. E. Breton (GC3HFE), Palmerston, St. Johns.

* * *

Corrections
The following are corrections to the list of Town Representatives published in the December issue:

Region 4—Leicestershire
Melton Mowbray—The callsign of Mr. S. Clark should read G8CZ.

Region 7—London North
Enfield—The name of the T.R. should read: Mr. H. Hyman (G3IZQ).

The following is a correction to the list of Town Representatives published in the February issue:

Region 1—Lancashire West
Liverpool—The address of Mr. B. Meaden (G3BHT) should read: Hove To, Sandy Lane, Hightown, Nr. Liverpool.

* * *

Vacancy
Mr. T. W. A. Smith (G3EFY) has resigned as Representative for the County of Devonshire, and Mr. Gordon Spencer (G4LX) as Representative for the County of Northumberland. Nominations for their successors should be made in the prescribed form and sent to reach the General Secretary by not later than April 30, 1954.

* * *

For the next few months correspondence intended for Mr. P. J. Naish (G3EIX) Town Representative for Chelmsford, Essex (Region 5) should be addressed to him at Barrowdale, Baydon, Marlborough, Wiltshire, but letters sent to him at 39 Yarwood Road, Chelmsford, will be redirected.

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Forthcoming Events

REGION 1

Barrow.—Mondays, 7.30 p.m., Castle House, Walney Island, Barrow-in-Furness.
Blackpool.—March 23, 7.30 p.m., 20 Fordway, Newton Drive.
Bury.—April 8, 7.30 p.m., 52 The Drive, Seedfield, Bury.
Chester (C. & D. A. R. S.).—Tuesdays, 7.30 p.m., Tarran Hut, Y.M.C.A., Chester.
Crosby.—Tuesdays, 8 p.m., over Gordon's Sweetshop, St. John's Road, Waterloo.
Isle of Man.—April 7, Broadway House, Douglas.
Lancaster (L. & D.A.R.S.).—April 7, 7.30 p.m., George Hotel, Torrisholme.
Liverpool.—March 20, April 3, 17, 3 p.m., Larkhill Mansion House, West Derby, Liverpool.
Manchester (M. & D.R.S.).—April 5, 7.30 p.m., Brunswick Hotel, Piccadilly, Manchester.
Preston.—March 26, April 9, 23, Belle Vue Hotel, New Hall Lane, Preston.
Rochdale (R.T.S.).—Fridays, 7.45 p.m., 1 Law Street, Sudden, Rochdale, Lancs.
South Manchester.—Alternate Fridays, 7.30 p.m., Ladybarn House, Mauldeth Road, Manchester 14.
Southport.—Thursdays, 8 p.m., Y.M.C.A., off Eastbank Street, Southport.
Stockport.—March 17, 31, April 14, 8 p.m., A.T.C. Headquarters, St. Petersgate, Stockport.
Warrington.—March 16, April 6, 20, 7.30 p.m., Kings Head Hotel, Winwick Street, Warrington.
West Cumberland.—April 8, 7 p.m., Kells Community Centre, Whitehaven.
Wirral (W.A.R.S.).—March 17, April 7, 21, 7.45 p.m., Y.M.C.A., Whetstone Lane, Birkenhead.

REGION 2

Barnsley.—March 26, April 9, 7.30 p.m., King George Hotel, Peel Street.
Bradford.—March 16, March 30, April 13, 7.30 p.m., Cambridge House, 66 Little Horton Lane.
Catterick.—Wednesdays, 7 p.m., Loos Lines, Catterick Camp.
Darlington.—Thursdays, 7.30 p.m., 129 Woodlands Road.
Doncaster.—April 14, 7.30 p.m., Leopard Hotel, West Street.
Gateshead.—Mondays, 7.30 p.m., Mechanics' Institute, 7 Whitehall Road.
Hull (H. & D.R.S.).—March 30, April 13, 7.30 p.m., "Rampant Horse," Paisley Street.
Leeds.—Wednesdays, 7.30 p.m., Swarthmore Educational Centre, 3 Woodhouse Square.
Middlesbrough.—Thursdays, 7.30 p.m., Joe Walton's Boys' Club, Faversham Street.
Newcastle-upon-Tyne (N.E.A.T.S.).—April 6, 7.30 p.m., Barras Bridge Hotel, Sandyford Road.
Pontefract (P.A.T.G.).—March 18, April 1, 15, 8 p.m., "Fox Inn," Knottingley Road.
Rotherham.—Wednesdays, 7 p.m., "Cutlers Arms," Westgate.
Scarborough.—Thursdays, 7.30 p.m., B.R. Rifle Club, West Parade Road.
Sheffield.—March 24, 8 p.m., "Dog and Partridge," Trippet Lane, April 14, 8 p.m., Albreeda Works, Lydgate Lane.
Staithes.—Fridays, 7.30 p.m., 3 Dartmouth Street.
Spennymoor.—March 24, April 7, 7.30 p.m., Temperance Hall, Cleckheaton.
York.—Thursdays, 7.30 p.m., Club Rooms, Y.A.R.S., Fetter Lane.

REGION 3

Birmingham (South).—April 5, 7.30 p.m., Friends Hall, Watford Road, Cotteridge.
Coventry.—April 23, 7.30 p.m., Priory High School, Wheatley Street.
Kenilworth, Warwick, Leamington.—April 15, 7.30 p.m., Dalehouse Lane.
Malvern.—April 5, 8 p.m., "Foley Arms."
Stoke-on-Trent.—March 31, "Lion's Head," John Street, off Lichfield Street, Hanley.
Stourbridge (S.A.R.S.).—April 6, 8 p.m., King Edward VI School.
Wolverhampton.—April 12, 26, 8 p.m., Stockwell End, Tettenhall.
Wrexham.—April 5, 8 p.m., Wrexham Service Club, Roseway, Wellington.

REGION 4

Alvaston.—Tuesdays, Thursdays, 7.30 p.m., Sundays, 10.30 a.m., Nunsfield House, Boulton Lane, Alvaston, nr. Derby.
Chesterfield.—Tuesdays, 7.30 p.m., Bradbury Hall, Chatsworth Road.
Derby (D. & D.A.R.S.).—Wednesdays, 7.30 p.m., Derby College Arts and Crafts, Sub-basement, Green Lane.
Leicester (L.R.S.).—March 15, 29, April 12, 7.30 p.m., Holly Bush Hotel, Belgrave Gate.
Lincoln (L.S.W.C.).—March 17, 31, April 14, 7.30 p.m., Technical College, Cathedral Street.

Mansfield (M. & D.A.R.S.).—March 10, April 14, 7.30 p.m., Denmans Hotel, Market Place, Sutton-in-Ashfield.
Newark.—March 21, April 4, 7 p.m., Northern Hotel, Appleton Gate, Newark.
Northampton.—Fridays, 7 p.m., April 2, 6 p.m., Club Room, 8 Duke Street.
Nottingham.—March 19, April 16, 7.30 p.m., Sherwood Community Centre, opposite Woodthorpe Drive, Sherwood.
Peterborough.—April 7, 7.30 p.m., New Inn, New England, Peterborough.
Retford.—April 5, 7 p.m., Community Centre, Chapel Gate, Retford.

REGION 5

Chelmsford.—April 6, 7.30 p.m., Marconi College, Arbour Lane.
Lowestoft & Beccles (L. & B.A.R.C.).—March 31, April 14, 7.30 p.m., Y.M.C.A., Lowestoft.

REGION 6

Cheltenham.—April 1, 8 p.m., 128 Presbury Road.
Gloucester (G.R.C.).—Thursdays, 7.30 p.m., The Cedars, 83 Hucclecote Road, Gloucester.
High Wycombe.—March 23, 7.30 p.m., G6JK, 17 New Drive, Totteridge.
Oxford (O. & D.A.R.S.).—March 24, April 13, 7.30 p.m., Club Room, "Magdalen Arms," Ifley Road, Oxford.
Portsmouth.—Tuesdays, 7.30 p.m., Signals Club Room, Royal Marine Barracks, Eastney.
Southampton.—April 3, 7.30 p.m., 1 Prospect Place.
Stroud.—Wednesdays, 7.30 p.m., Subscription Rooms.

REGION 7

Acton, Brentford & Chiswick.—Tuesdays, 7.30 p.m., A.E.U., Rooms, 66 Chiswick High Road, W.4.
Barnes, Putney & Richmond.—April 2, 7.30 p.m., 337 Upper Richmond Road, S.W.14.
Bexleyheath (N.K.R.S.).—March 25, April 8, 7.30 p.m., Congregational Hall, Chapel Road, Bexleyheath.
Bromley (N.W.K.A.R.S.).—April 2, 8 p.m., "Shortlands Tavern," Station Road, Shortlands.
Chingford.—April 13, 8 p.m., Venue from G4GA (SIL 5635) or B.R.S. 19765 (SIL 6055).
Chishurst & Sidcup.—March 16, 7.30 p.m., "Seven Stars," High Street, Footscray.
Croydon.—April 13, 7.30 p.m., "Blacksmith Arms," 1 South End, Croydon.
Dorking.—Tuesdays, 7.30 p.m., 5 London Road.
Dulwich & New Cross.—April 6, 7.45 p.m., Mr. Deacon: Miniature Equipment, "Walmer Castle," Peckham High Street.
East Ham.—Tuesdays, 8 p.m., March 16, 30, April 13, 57 Leigh Road.
Ealing.—Sundays, 11 a.m., A.B.C. Restaurant, Ealing Broadway, W.5.
East London.—March 28, 3 p.m., Town Hall, Ilford, Address by the General Secretary, "International Amateur Radio."

East Molesley (T.V.A.R.T.S.).—April 7, 8 p.m., Carnarvon Castle Hotel.
Finbury Park.—March 23, 7.30 p.m., 164 Albion Road, Stoke Newton, N.16.
Guildford & Woking.—March 28, 3 p.m., Royal Arms Hotel, North Street, Guildford, (N.F.D. Discussion).
Hayes & Uxbridge.—March 22, April 12, 7.30 p.m., Hillingdon Primary School, Uxbridge Road.
Hendon & Edgware.—Wednesdays, 8 p.m., 22 Goodwins Avenue, Mill Hill, N.W.7.
Holloway (G.R.S.).—Mondays and Fridays, 7.30 p.m., Grafton School, Eburne Road, Holloway, N.7. March 19, 7.30 p.m., Mullard film and lecture "Manufacture of valves," Central Library, Holloway Road, N.7.
Hounslow (H. & D.R.S.).—March 18, Grove Road School, Cromwell Road.
Ilford.—Thursdays, 8 p.m., G2BRH, 579 High Road.
Kingston (K. & D.R.S.).—Alternate Wednesdays, 7.45 p.m., Penrhyn House, Penrhyn Road.
Lewisham (R.A.R.C.).—Wednesdays, 8 p.m., Durham Hill School, Downham.
Norwood.—March 20, 7.30 p.m., Windermere House, Weston Street, Crystal Palace.
Southgate & Finchley.—April 8, 7.30 p.m., Arnos School, Wilmer Way.
Sutton & Cheam (S. & C.R.S.).—March 16, April 20, "The Harrow," Cheam Village.

REGION 8

Brighton.—T.R. at home, Wednesdays, 7.30 p.m., 27 Warren Avenue, Woodingdean, (B.D.R.C.), Tuesdays, 7.30 p.m., "Eagle Arms," Gloucester Road.
Chatham (M.A.R.T.S.).—March 15, 29, April 12, 7.30 p.m., Troy Town School for Boys, King Street, Rochester.
Hastings (H. & D.R.C.).—March 23, April 6, 20, Saxons Cafe, Denmark Place.

(Continued on page 423)

New Books

RADIO RECEIVER DESIGN (Part One, Radio Frequency Amplification and Detection). By K. R. Sturley, Ph.D., B.Sc., M.I.E.E. (Second Edition, Revised). 666 pages, liberally illustrated. Page size 8½in. x 5½in. Published by Chapman and Hall. Price 56/-.

Time has not revealed the need for a change in the main lines of presentation and the present revision has been concerned with improving the clarity of some sections and with the inclusion of new material.

Chapter I has been completely re-written with the emphasis on the fundamentals of transmission and reception. Attention has been paid to noise factor, which is now recognised as a useful and important criterion of receiver performance. A section on valve noise has been added to Chapter II. Wave-traps, signal-to-noise ratio and balanced-to-unbalanced aerial feeder connections represent some of the new material.

A good deal of space is devoted in Chapter VII to new material on crystal coupled i.f. transformers. Many symbols have been brought into line with accepted practice.

Although only 11 years have passed since the 1st Edition appeared, this book has already taken its place in the forefront of the world's technical literature devoted to radio receiver design. The author is Head of the B.B.C. Engineering Training Dept.

It is perhaps a little unfortunate that printing paper of varying colour should be used in the production of a 56/- book.

INDUSTRIAL ELECTRONICS. By R. Kretzmann. 236 pages, 266 illustrations. Page size 9in. x 6in. Published by Philips, Eindhoven, Netherlands. English distributors, Cleaver-Hume Press Ltd., London, W.8. Price 25/-.

This technical manual is devoted to a detailed description of successful modern devices in the field of industrial electronics. Part I explains in clear language and with a minimum of mathematics, the various classes of electronic tubes in current use. In Part II the author selects for study typical examples of electronic arrangements used to effect a wide range of industrial operation. Electronic Relays, Counting Circuits, Timers and Lamp Dimmers, are described, as are the uses of electronic devices in the control of resistance welding, industrial rectifier circuits, speed and temperature control.

Dr. James Greig, Professor of Electrical Engineering, King's College, London, contributed a Foreword to this important addition to the Philips Technical Library.

INTRODUCTION TO ULTRA-HIGH-FREQUENCY RADIO ENGINEERING. By Stephen A. Knight, F.R.S.A. 256 pages, 202 illustrations. Page size 7½in. x 4½in. Published by Pitman. Price 21/-.

This book is intended as a guide to the methods and techniques of modern ultra-high-frequency radio and radar engineering. It is primarily for those who wish to obtain a good background to the subject without complicated mathematical theory or unnecessary detail.

The scope of the book can be judged from the list of chapters—Introduction to Microwaves, Transmission Lines, Waveguides, Cavity Resonators, C.R.T. and Sweep Circuits, U.H.F. Oscillators (Negative and Positive-grid Triodes; Magnetron and Klystron Oscillators), U.H.F. Measurement Techniques, Wave Propagation, U.H.F. Aerial Systems.

It is refreshing to find an author paying tribute to the pioneer work done by amateurs. This Mr. Knight does generously in the first chapter where he outlines the history of the development of the so-called "short" waves.

It may come as a surprise to some readers to learn that at the present time frequencies up to some 50,000 Mc/s are under active exploration and research.

The experimentally-minded radio amateur will find this book of the very greatest value and interest.

TELEVISION RECEIVER DESIGN (Part II). By P. A. Netteson. 156 pages, 118 illustrations. Page size 9in. x 6in. Published by Philips, Eindhoven, Netherlands. Price 21/-.

English distributors Cleaver-Hume Press, London, W.8.

This monograph, the second of a series on Television Design specially prepared for the Philips Technical Library, is devoted to a detailed study of flywheel synchronisation of saw-tooth generators. An analysis is given of the flywheel action of resonant circuits followed by a study of automatic phase control and a discussion of practical circuits.

MEASUREMENT OF ATMOSPHERIC NOISE AT HIGH FREQUENCIES. By F. Horner, M.Sc., A.M.I.E.E. Radio Research Board Special Report No. 26 of D.S.I.R. Published by H.M.S.O. Price 1/9.

The Report covers a period of seven years (1945-51) and is a follow-up to an earlier Report on the same subject. The measurements recorded were obtained by comparing the noise picked up on a vertical aerial with a signal from a local generator, slow Morse modulation being used. The measurements were made on frequencies of 2.5, 5, 10, 15 and 20 Mc/s.

BRITISH SCHOOLS EXPLORING SOCIETY ANNUAL REPORT 1952-1953.

This particular report deals extensively with the Central

R.S.C.B. BULLETIN, March, 1954.

Iceland Expedition 1952 led by Captain J. A. Taplin, R.M. Sixty-two boys from a wide variety of public and county schools were members of the Expedition. The base camp radio station operated under the call TFIAA from Lödminder. Regular schedules were maintained with TFW, the Icelandic Control Station in Reykjavik. The scheduled transmissions were used to give the boys of the wireless section experience in handling traffic.

Equipment used comprised a Naval ET612 40 watt transmitter and an Army 19 set. Army 18 and 19 sets served the Survey, Met. and Reconnaissance bases. Half wave, end-fed aerial systems were used, fired in the direction of the station concerned. Bamboo poles, strapped together, proved ideal aerial masts in high winds. Where steel masts will buckle in 100 knot gales the bamboos give and take with the wind. Dipole aerials had no advantage insofar as signal strength was concerned. A frequency of 4.7 Mc/s was used for all schedules.

Full details of the B.S.E.S. are available on application to the Secretary, c/o Royal Empire Society, Northumberland Avenue, London, W.C.2.

PRACTICAL TREATISE ON AERIALS. By E. Rolin. 216 pages. Page size 8½in. x 5½in. Published by Dunod, 92 Rue Bonaparte, Paris VI. Price 380 francs.

The aim of this book is to present to French technicians details of the more recent English and American developments in the field of aerial design. Particular attention is given to the setting up of aerial systems for operation between 10 and 100 metres. Transmission Lines and Propagation have been treated at length.

The text, which is in French, is liberally illustrated with diagrams.

FORTHCOMING EVENTS.—(Continued from Page 422).

Isle of Thanet (I.O.T.R.S.).—Fridays, 7.30 p.m., Hilderstone House, Broadstairs.

Maidstone (M.K.A.R.S.).—Tuesdays, 7.30 p.m., Elms School, London Road.

Worthing (W. & D.R.C.).—March 24, 7.45 p.m., "Spaniard Inn," Portland Road, Worthing. Annual Dinner. April 12, 8 p.m., Adult Education Centre.

REGION 9

Bristol.—March 19, 7.15 p.m., Carwardine's Restaurant, Baldwin Street, Bristol 1.

Exeter.—April 2, 7 p.m., Y.M.C.A., St. David's Hill.

North Devon.—April 1, 7.30 p.m., Rose of Torridge Cafe, The Quay, Bideford.

Penzance.—April 1, Railway Hotel.

Plymouth.—March 20, April 17, 7 p.m., Tothill Community Centre, Tothill Park, Knighton Road, St. Jude's.

Torquay.—March 20, April 17, 7.30 p.m., Y.M.C.A., Castle Road.

West Cornwall (W.C.R.C.).—March 18, April 1, "Fifteen Balls," Penryn, near Falmouth.

Weston-super-Mare.—April 6, 7.30 p.m., Y.M.C.A.

Yeovil.—Wednesdays, 7.30 p.m., Grove House, Preston Road.

REGION 10

Cardiff.—April 12, 7.30 p.m., "The British Volunteer," The Hayes, Cardiff.

Neath & Port Talbot.—April 14, 7.30 p.m., "Royal Dock Hotel," Briton Ferry.

REGION 13

Dunfermline.—Mondays and Thursdays, 7.30 p.m., behind 34 Viewfield Terrace, Dunfermline.

Edinburgh (L.R.S.).—March 18, April 1, 15, 7.30 p.m., 25 Charlotte Square, Edinburgh.

REGION 14

Falkirk.—March 26, April 9, 7.30 p.m., The Temperance Cafe, High Street, Falkirk.

Glasgow.—March 31, 7 p.m., Institute of Shipbuilders and Engineers, 39 Elmbank Crescent, Glasgow, C.2.

REGION 15

Belfast.—March 20, 2.30 p.m., Y.M.C.A. (Third Floor), Belfast, N.F.D. Discussion. All members of Region 15 invited.

LONDON MEMBERS' LUNCHEON CLUB

will meet at the Bedford Corner Hotel, Bayley Street, Tottenham Court Road,

at 12.30 p.m. on March 19 and April 23, 1954.

Telephone table reservations to HOL 7373 prior to day of luncheon. Visiting amateurs especially welcome.



Single Sideband Techniques

Dear Sir.—It seems that my remarks (December 1953 issue) regarding power in the sidebands of a d.s.b. transmission have been misunderstood by Mr. T. Lyell Herdman (January 1954 issue). The second paragraph of Part 1, "Single Sideband Technique" (November 1953) appears to imply that the useful sideband power of a 100 per cent. modulated d.s.b. transmitter with 150 watts input, as quoted, is only 26.25 watts and that the remaining power is generated unnecessarily.

In my letter I was not describing the design of such a transmitter but merely using a device to point out, in a few words, that because of the relationship which exists between the sidebands and carrier of a d.s.b. transmission, the resulting effective sideband power would, in the case quoted, be 105 watts. The voltages produced, at the output of the receiver demodulator, by the two sidebands of a d.s.b. signal add in phase and therefore the a.f. output voltage is double that due to one sideband. This means that the effective sideband power of a d.s.b. signal is equal to four times the power of one sideband, i.e. it is equal to the carrier power. Thus, taking the original case, 26.25 times 4 = 105 watts. For similar peak powers, the radiated s.s.b. amplitude is the same as the peak of the 100 per cent. modulated carrier of the d.s.b. transmission. The a.f. amplitude (after demodulation) of the s.s.b. signal by a locally introduced carrier is twice that of the d.s.b. case, giving 6 db gain compared with d.s.b. (The reduced bandwidth provides a further 3 db gain.)

Mr. Herdman is merely scratching at the surface when he agrees that s.s.b. has a great future "by virtue of the reduced bandwidth requirement." Comparing s.s.b. with d.s.b. and neglecting power saving and bandwidth considerations the important advantages are:—

1. Avoidance of intermodulation between wanted and unwanted signals (QRM) at the receiver. Because of this, interfering signals do not "chop" the wanted signal and it remains readable. In effect the resulting sound at the receiver output can be likened to two people simultaneously speaking to a listener in the same room. Aural discrimination can select the wanted voice. Discrimination between voice and c.w. interference is even more marked.
2. The performance of a s.s.b. beat demodulator does not fall-off at low signal to noise ratios as it does in the case of d.s.b. detection. With a linear demodulator the s.s.b. signal is still readable at low signal to noise ratios. (DX men take note.) The improvement in signal to noise ratio of s.s.b. over d.s.b. has been found to vary from 0 to 20 db.
3. Under conditions of selective fading, amplitude and phase variations often make d.s.b. signals unreadable. Under similar conditions s.s.b. signals are usually completely readable.

It has been shown that, under bad conditions of reception, where d.s.b. is about 20 per cent. intelligible s.s.b. intelligibility is of the order of 80 per cent. This, for the same peak transmitting power in either case.

Perhaps, if Mr. Herdman studies these remarks carefully he will find his answer to my suggestion that s.s.b. telephony can be more effective than c.w. communication. The answer lies mainly in the demodulating systems employed. To answer his specific enquiry I would suggest that selective fading can occur to the detriment of a c.w. signal in the following manner:—Taking a hypothetical steady state case, in which the c.w. signal arrives by two paths at 180 degrees phase difference and with equal amplitude, the resultant at the receiver will be zero and no signal will be heard. In the s.s.b. case, however, the only effect of this multi-path at the c.w. signal frequency will be a modification of the audio frequency characteristic of the transmitted frequencies; i.e. a "hole" will appear in the reception total of the frequencies transmitted. The s.s.b. intelligibility will not seriously be impaired.

There is little new in the knowledge and appreciation of the advantages of s.s.b., but these advantages have become generally available, due to the recent advances in circuit

technique having reduced enormously the size and cost of (now) simple types of transmitters and receivers.

Yours faithfully,

DONALD P. L. MAY (G2BB).

Yateley, Near Camberley,
Surrey.

DEAR SIR.—I wish to refer to Mr. Herdman's letter published in the January issue of the BULLETIN on the subject of single sideband. Mr. Herdman states, and here I quote, that protagonists of the system make claims which are technically unsound. Although Mr. Herdman does not specify the claims which he says are exaggerated, from later statements in his letter it is presumed that he is referring to the question of system gain. The claims made regarding "power gain" or, more correctly, improvement in signal/noise ratio when this system is compared with d.s.b. are theoretically justifiable and a 9 db improvement in signal/noise ratio "can be" obtained when considering equal peak output powers and suitable receivers for both systems.

An increase in signal/noise ratio of 6 db is realised when the peak sideband power of a s.s.b. transmission is raised to the value obtained on peaks of modulation of a d.s.b. transmission. Since this power is concentrated in one sideband the bandwidth of the receiver may be reduced to half that required for d.s.b. working. This gives a further improvement in signal/noise ratio of 3 db.

Unfortunately, amateur licensing regulations, to some extent, prejudice the use of s.s.b. in that the maximum d.c. input is specified. This means that an s.s.b. transmitter must be adjusted for an input of 37½ W under "carrier conditions" giving a peak input power of 150 W. Under this condition an improvement in signal/noise ratio of some 3 db is obtained. Putting this differently, 100 W of s.s.b. is "equivalent" to 200 W of 100% amplitude modulated carrier for the same signal/noise ratio in both systems. Again by reducing the bandwidth of the receiver by half for s.s.b. working a further 3 db improvement in signal/noise ratio can be obtained, giving a total of 6 db.

Personally, I am of the opinion that the advantages of s.s.b. other than this question of power gain have not been fully appreciated. Apart from the inherent advantage of the system requiring only half the bandwidth normally required to carry the same intelligence, the system is virtually free from the effects of selective fading which occur with d.s.b. due to multipath propagation. This advantage cannot be evaluated in terms of power. Another important advantage of the system is the ability of s.s.b. to cut through heavy interference. Only experience with the system can bear this point out. These and other advantages make s.s.b. overwhelmingly superior to d.s.b. for communication work. Single sideband has come to stay and I feel sure that Mr. May is right when he states that it will only be a matter of time before it will be widely used in both commercial and amateur fields.

Yours faithfully,
S. HORNE (G3IXL).

Sidcup, Kent.

DEAR SIR.—I have to refer to Part 2 of "Single Sideband Technique" published in the January BULLETIN.

The application of the circuit shown as Fig. 12, and the crystal frequencies mentioned in the text is impractical, and it is not unreasonable to assume that the circuit has never been constructed and tested. It is not my intention to suggest that a balanced modulator followed by a single section half-lattice filter is incapable of giving adequate performance, but that the development by G13EVU is ill-advised to say the least.

For example, no method of balancing the balanced modulators has been shown. This can be done by making C10/C11 and R5/R6 variable. There are other methods of ensuring carrier balance, but no mention is made of them.

The choice of crystal frequencies is also a point in question as their use would not give attenuation of the lower frequencies in the unwanted sideband. It is necessary to place the carrier frequency outside the passband of the filter and not on the frequency of one of the crystals in the filter as stated by G13EVU: 700 to 900 c/s on the higher side of the high frequency crystal in the filter is suggested. Also the primary of T2 is shown to be "floating" on one side; any comment necessary?

Articles on single sideband are very much needed, but they should be written only by those with practical experience of amateur s.s.b. technique, or they can do more harm than good.

I submit that the beginner attempting the circuit under discussion will not "produce a clean, carrier-free signal, with at least 30 db attenuation of the unwanted sideband over a speech frequency range of 300 to 3,000 c/s," nor anything like it.

Yours faithfully,
GORDON MATHER (G3GKA).

Letchworth, Herts.

DEAR SIR.—I am much obliged to you for giving me the opportunity of replying to the criticism contained in G3GKA's letter. The personal attack I propose to ignore as being unworthy of comment, but I should like to give my views on the technical grounds on which that attack is based.

An analysis of Mr. Mather's letter discloses that there are three charges against me. They are:

- 1. That the primary of T2 in Fig. 12 is left "floating" on one side.
- 2. That I know little or nothing about balanced modulators.
- 3. That the crystal frequencies recommended are not ideal.

I propose to comment on these points in turn. The mistake in Fig. 12 was primarily a draughtsman's error, but I must accept full responsibility for it, because I ought to have noticed it when checking the proofs. Just how easy it is to overlook a slip of this kind may perhaps be evidenced by G3GKA's own failure to point out that one side of the primaries of T2 and T4 in Fig. 14 are likewise "floating." Both points should, of course, be connected to earth, as will probably have been obvious to anyone possessing a nodding acquaintance with crystal filter circuitry in general. If my oversight has caused difficulty to anyone, I am genuinely sorry.

As far as balanced modulators are concerned, I have found that at the relatively low radio-frequency involved, most 12AU7s and 6SN7s are inherently well enough matched to give adequate carrier balance without external compensation. This, of course, presupposes sound constructional practices which will not themselves introduce external unbalance. This is by no means a new discovery for which I wish to claim any credit: it has been employed extensively by American constructors for several years past. If, however, external compensation should be desired, I would recommend that it be effected by connecting one of the miniature Eddystone differentials across C10 and C11. This would render the adjustment of balance virtually independent of the tuning of T1. If either C10 or C11 were to be made variable, as suggested by Mr. Mather, tuning and balance-adjustment would interlock to such an extent as to make alignment rather complicated. As for the suggestion that variation of R5 and R6 would enable balance to be adjusted, a few seconds' mathematical examination shows that the effect would be negligible. In any event, criticism of my knowledge of balanced modulators is premature, because I will not deal with them in any detail until Part 3 of the series.

Mr. Mather concedes that the circuit itself is not fundamentally unsound, and as I have disposed of his misconception about the effectiveness of the proposed balanced modulator for carrier suppression, the only question which remains is whether the crystals of the frequencies specified by me will attenuate the unwanted sideband sufficiently. Let me repeat once more the statement which I thought sufficiently important to mention several times in the article. *The exciter is by no means intended to be the last word in crystal-filter rigs;* the only merit claimed for it is that it may be simply and cheaply assembled from readily available components, and that it may be aligned with the most elementary of test gear. The crystals suggested will fall somewhat short of the optimum performance which I showed graphically in Fig. 8, but I know of nothing better which can be obtained from surplus. If new components were to be used, the cost would rocket and nullify the economic advantage which to me is the principal attraction of the circuit in question. If, however, money is of secondary importance, I suggest that X1 should be chosen so that its parallel resonant frequency lies neither less than 300 c/s nor more than 500 c/s to the appropriate side of the series resonant frequency of either X2 or X3. Those who are ingenious enough to be able to change the frequencies of surplus crystals may achieve this at no extra cost. I should not like to be responsible for touching-off a war, but my own view is that if the constructor is fortunate enough to be able to buy the best, regardless of cost, he will be well advised to leave filters alone and go in for a multiphase rig. Despite this opinion, I feel that a large enough demand for a simple and cheap exciter such as that of Fig. 12 must exist to give it a right to a place in any series dealing with s.s.s.c. techniques. As long as no one asks too much of it, my wobbulator and oscilloscope assure me that it will do a reasonable job.

The most charitable view I can take of Mr. Mather's comment is that he tried to read more out of my article than I intended to write into it. Had he taken hold of the stick by the right end, he might have been less ready to attempt to belabour me with it. This kind of destructive criticism takes little effort to write, and is unworthy of the hobby in which so many of us have so keen an interest. If G3GKA has something worthwhile to offer to the readers of the BULLETIN, I am sure that you, Sir, will welcome it.

In conclusion, may I thank Mr. May (G2BB) and Mr. Herdman (G6HD), for their thought-provoking letters in the December and January issues. Can we, however, argue about the relative communications efficiencies of a.m. and s.s.s.c. until we have established a firm basis for argument? My figures in Part 1 of the series were based on a condition of selectivity at the receiving end which would permit virtually one sideband only to contribute to "talk power." This is the condition under which a large and, no doubt, an increasing number of amateurs customarily operate their receivers. This subject is, however, rather too wide to be discussed in detail in these columns, and may perhaps merit an article some time in the future. Incidentally, George Grammer (W1DF) has an informative paper entitled "The A.M. Equivalent of Single Sideband" in the January, 1954, issue of QST.

Yours faithfully,

H. M. HUMPHREYS (G13EVU).

Belfast, N. Ireland.

R.S.G.B. BULLETIN, March, 1954.

Top Band Contests

DEAR SIR.—It is difficult not to sympathise with Mr. Fuller (G6LB), who finds it annoying to encounter a few hundred Top Band contestants when he is trying to work DX. Most of us find contests in which we are not interested a little irritating.

But on the other hand a very large number of members do enjoy them, and I am one of those who like Top Band contests. And, speaking for myself, I would rather these contests took place at times when there are likely to be reasonably good conditions, as, for instance, around the dates which have been selected by the Contests Committee in recent years.

Looking at it in one way, G6LB is lucky that we don't use the Top Band as much as we ought; at least he usually has it fairly clear for his activities.

By the way, are these international tests he mentions organised under the Official Secrets Act? We never seem to read much about them in the recognised Amateur Radio magazine, which I take to be the R.S.G.B. BULLETIN.

Best wishes to G6LB and his friends in their DX work: but let the rest of us use the Top Band occasionally.

Yours faithfully,

J. J. MALING (G5JL).

Hayes, Middlesex.

DEAR SIR.—In the February issue Mr. L. J. Fuller (G6LB) ably deplores the interference caused to organised trans-Atlantic tests by the R.S.G.B. Top Band contest. Might I expound the opposite viewpoint in friendly duelling?

I am one of those operators who provide home stations with long-distance contacts and reports by combining opportunity with initiative. This latter is merely a convenient word to denote much planning, financial expenditure and man-handling of heavy items. (Thus one trip of mine abroad for 1.8 Mc/s operation entailed a £20 second-class steamer and rail fare, a £20 excess luggage charge for the gear, and a 29-hour delay at a foreign Customs station whose baggage counter in due course looked exactly like the counter of any Lisle Street radio dealer in Government surplus!)

When I took equipment to the Canary Islands to observe the 1.75 Mc/s trans-Atlantic tests pre-war, I welcomed the intrusion of the Top Band contest though it may have resulted in the log missing some mid-West Ws and some Russians in the Leningrad and Kharkov regions. On the Lake of Geneva I was glad to log 1.75 Mc/s G stations through the summer static during N.F.D. Also, I welcomed Swiss 'phone signals on 56 Mc/s though their contest may have blotted out some of the G telegraphy signals breaking through, as I knew that if neither country had its contest on the date the band would probably have been deserted.

Recently the Principality of Monaco very generously—for I am not of Monegasque nationality—issued me the first 1.8 Mc/s permit for that territory, after consideration at high levels, and though I was hoping that my activity on 1.8 Mc/s might coax operators in, say, Gibraltar, Malta, Cyprus and Haifa on to the band, I did not regret the signals from Britain during the Top Band contest, though they may have masked the rarer prefixes I was looking for, because I knew that without the stimulus of the Top Band contest the band would be deserted much of the time. Band activity was to my mind of greater importance than the masking of my weak signals from an aerial only 9 ft. above the roof of a concrete hotel, overshadowed by the coastal mountains.

Surely the organisers of the trans-Atlantic tests are at pains to select weekends which coincide with the R.S.G.B. Top Band contest and the A.R.R.L. DX contest to give opportunities of high activity on the band as a recompense to African, West Indian and other distant operators on whom much of the interest of the tests must depend?

It may be remarked that I have not taken part in any of the trans-Atlantic tests this season; the reason lies solely in my preoccupation in arranging for a mode of transport which may result in exotic prefixes for the Mediterranean and N.W. Africa appearing on 1.8 Mc/s.

If Mr. Fuller will try the experiment of man-handling his station up countless hotel staircases or in and out of small cars in Britain—or better still as a solitary figure in distant climes—I believe he will come round to my view that the "interference" of contests affords a valuable stimulus to tests, and he will discreetly arrange his maximum effort to coincide with contest weekends of organised tests.

Yours faithfully,

B. W. F. MAINPRISE
(G5MP, G5MP/P, G5MP/A, 3A2BM).

Hythe, Kent.

De-Humidifiers

DEAR SIR.—I would like to thank you for the use of this column for my enquiry for de-humidifier details, and also to thank the many members who wrote to me on this subject. I have obtained one of these equipments, produced by Messrs. Aladdin Industries Ltd., of Greenford, Middlesex, who are shortly to start marketing them again.

In reply to G2CD and G2PT, both of whom have advised against their use, the real advantage is one of economy. In a comparative test, electric heating costs £5 16s. a quarter, whilst the de-humidifier costs £2 18s. a quarter. This is an accurate estimate based on size, type of materials, rate of air exchange, etc., for the particular building I use for my station, intended not to heat the room to a given tempera-

ture, but to reduce humidity. In a recent test over seven days' duration, an electric heater reduced humidity from 96 per cent to 85 per cent, then started to rise very slowly. Over another seven-day period, however, the paraffin heater reduced humidity from 94 per cent. to 60 per cent, which it has maintained to date. Incidentally, there is absolutely no detectable odour.

The equipment to which I refer is *not* a normal paraffin heater, which, I agree, produces considerable water. It operates on the principle that heat from the burner travels up a central flue, is rapidly cooled in a radiator at the top, and conducted down the sides of the unit to outlets at the base where, due to temperature reduction, water is condensed. Thus, water from the products of combustion (room air and paraffin) is collected in the container at the base and dried air is released, of a much lower relative humidity than with ordinary paraffin stoves. This dried air is released into the room at only a very few degrees above ambient temperature. In normal circumstances, the air in a room is being continually changed by normal natural ventilation, so that any water vapour is diluted, and the radiator of the heater raises the temperature enough to effect a reduction in the relative humidity of the room air. If the *absolute* humidity is raised, the rise in temperature more than compensates for it, so the relative humidity is lower.

Admittedly, an electric dehumidifier would be more efficient, but much more costly to run, as is the ordinary electric heater.

In any case, the measured data speaks for itself, a reduction to 60 per cent, whilst the best an electric heater could do was 85 per cent, at twice the running cost, and further, I am now definitely getting no condensation on the transmitter as I used to. I am thoroughly satisfied with the equipment.

Yours faithfully,
HERBERT THORPE (G3CGH).

The Impedance of Voltage-fed Aerials

DEAR SIR.—Discussions amongst amateurs, both at our local radio club (South Manchester) and over the air, show that there is a serious misconception of the impedance presented by a voltage-fed aerial, such as an end-fed half or full wave, when operated slightly off resonance. The popular view is that an aerial which is too long, *i.e.* fed at a frequency higher than the resonant one, presents a combination of resistance and inductance, while one which is too short, *i.e.* fed at a frequency lower than the resonant one, "looks" like resistance plus capacitance.

That this is a popular misconception is readily understood when reference is made to the *R.S.G.B. Handbook*, p. 180, the paragraph above Fig. 6, and also to the *A.R.R.L. Antenna Handbook*, p. 34 and Fig. 2-10 of the 1949 Edition, both of which give the popular, but in my opinion incorrect, conception. The correct conception is given in paragraph 19 and Fig. 18 of section R of Volume II of the Admiralty Handbook of Wireless Telegraphy, 1938, and is the converse of that stated above.

This confusion appears to be due to lack of appreciation of the difference in the behaviour of current and voltage-fed aerials. In a current-fed aerial, such as an end-fed quarter wave or centre-fed half wave, the aerial behaves as a series resonant circuit and thus presents $R+C$ when too short (frequency low) and $R+L$ when too long (frequency high), but a voltage-fed aerial, such as an end-fed aerial an even number of quarter waves long or a centre-fed aerial an even number of half waves long, behaves as a parallel resonant circuit and thus presents $R+L$ when too short (frequency low) and $R+C$ when too long (frequency high).

This leads to the conclusion that a half-wave (approx.) aerial when fed at a frequency slightly off resonance and therefore presenting $R+C$ at its centre and $R+L$ at the end, or vice versa, must present pure resistance at some point along its length. This is so, and appears to be at a point near to the end. The position of this point appears, however, to be extremely critical and of little practical value in Amateur Radio.

I hope that, when handbooks are revised, the opportunity will be taken to clear up this misunderstanding.

Yours faithfully,
N. ASHTON (G3DQU).

Timperley, Altrincham, Cheshire.

No Renunciation

DEAR SIR.—Recent statements in amateur journals [Not the BULLETIN—Ed.] must surely call forth a prompt denial from many radio amateurs. I refer to the assumption that radio amateurs must inevitably renounce at least a portion of their bands as an "accepted part of the price of progress." What strange mental processes are responsible for this betrayal? On behalf of hams yet unborn, voices should be raised to refute this and all similar statements. The present state of defeatism among many old-timers is greatly to be deplored. Surely this must be one more symptom of the neurosis of our time, to wit, the process of self-extinction!

The assumption may come naturally in some quarters, but to find it upon the lips of amateurs themselves is very revealing. The suppression of all radio amateurs is no doubt a determined policy with those who covet the amateur bands. We have met persons who think such a species of humanity ought not to exist. But this is no reason why amateurs themselves should meekly acquiesce in the lamentable process.

Here is but one more tragedy taking place before our eyes in a crazy world wherein all the finest things are being remorselessly destroyed and replaced by what? It need not happen if amateurs themselves only have the will to survive and to cling to their natural birthright. Those who represent the amateur should do their job and not assume an odious role.

Now the radio amateur, and all he stands for, is of intrinsic worth and far more important than a broadcast station pumping out political propaganda or sloppy sentimentalities duplicated a thousand times down the propagation spectrum. The good work of those who wisely made provision for the future of the radio amateur in allocating his bands from Top Band downwards, must not be allowed to be undermined and destroyed by any good intentions of those who know not what they do, and this is putting it mildly. Such is *not* "progress" although there are many who think it is!

A real ham can never be eliminated or absorbed without a judgment come down: he represents something great and good at work within the human soul: and whatever his job of work he is still a ham and the word has come to mean a great deal. His mere existence is of incalculable value in such a world as this. He should be allowed to thrive and multiply naturally by a benevolent government having the interests of the individual at heart and a place for Providence in its scheme of things. He is coming along in his thousands and room must be found for him upon the ether. It would be real progress were this country at least to use all its influence at the international conference table to rid his present bands of all unlawful occupants.

Listening on the 80-metre band reveals a process of evolution which, to stick-in-the-muds, may seem strange or even undesirable, but who dare say it is not all for the good? As mere technicalities are overcome, the social aspect looms large and whole families are now participating in the joys of Ham Radio, with countless listeners who may unfortunately be "bedfast" or otherwise prevented from actually transmitting, but who nevertheless derive much pleasure and possibly instruction by listening to the hams. It would seem Ham Radio is nigh to becoming a national pastime! This personal freedom of the air is a priceless heritage: it must be nurtured and preserved at all costs. The *esprit de corps* and the unsponsored and uncensored fraternising between family and family throughout this land and across the world brings a breath of fresh air and new life into a regimented world.

This letter is an appeal for rethinking in high places and an effort to infuse the will to survive into those who have almost given up the ghost. It is in line with the finest traditions and way of life which have made Britain *Great* as the home of freedom, justice, temperance and opportunity. May God bless her.

Yours faithfully,
Dunstable, Beds.
H. C. HALL (G2RU).

Third-Party Message Handling

DEAR SIR.—The views put forward by your correspondent M. C. Hateley (G3HAT) in the February issue should receive the greatest support.

Permission to handle third-party traffic would undoubtedly be of great benefit to Amateur Radio, and if the G.P.O. feel that their revenue would be affected, they could give the scheme a short trial.

I am sure that the effect on the G.P.O. would be negligible for the following reasons:

(1) The essence of a commercial telegram is the speed with which it is delivered—who would entrust an amateur with the usual type of telegram (even "Greetings," which are usually sent in the biggest hurry of all because the sender has forgotten an anniversary), knowing there was no guarantee of delivery?

(2) The number of amateurs who would handle traffic would be small.

Yours faithfully,
Birmingham.
J. WORTHINGTON (G3COI).

KN

DEAR SIR.—Being a firm believer in procedure as an aid to good operating, I have always tried to keep abreast of changes, but I am at a loss to understand the use of KN which is now in general use.

Members of the local club, when asked, all gave the same answer—they didn't know exactly what it meant, but used it because they had heard others do so.

Can anyone explain to me how this symbol KN originated and what it signifies?

Yours faithfully,
D. A. BURNS, A.I.L.(Fr.) (G3GLV).

Liverpool 23.

[According to the Radio Amateur's Handbook, the meanings of K and KN are as follows:

K—Go ahead (any station). Recommended after CQ and at the end of each transmission during a QSO when there is no objection to others breaking in.

KN—Go ahead (specific station), all others keep out. Recommended at the end of each transmission during a QSO, or after a call, when calls from other stations are not desired and will not be answered.

—EDITOR.]

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R.S.G.B. BULLETIN, March, 1954.

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EXCHANGE AND MART SECTION

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A BC342N 6WB, 1500/18000 kc/s, matching loudspeaker, 230 V input, excellent. £15. Scope TV transformer, 1,700 V-2 A, 470-0-470-08 A, 3X6-0-6-5.5 A, 1X6 V, 9 A, 4½ in x 4½ in, x 5 in., 35/-. Gen-c-motor, 18/450 V, 7/6. Selsyn 230 V, new, 17/6. Add carriage.—**GREEN**, 247 Halling Hill, Harlow, Essex.

A AMERICAN rig for sale (GM3IY), good condition. Transmitter, Collins TCS12 and power pack. Receiver, BC348, also power pack for mains. BC221 wavemeter, new (case is old), requires batteries or power pack, crystal fitted, perfect calibration. All offers answered.—**A. BROWN**, 9 Seaforth Road, Stornoway, Isle of Lewis (922

A NY "QSTS" before November, 1923, wanted. Also **A** "Radio," June, 1933, to December, 1935. "R/9," September, 1932, to June, 1935, and August, 1935. "CO," January, March, April, June, July, 1945, and November, 1945, to February, 1946.—**G3IDG**, 95 Ramsden Road, London, S.W.12.

A PW3753 470 Mc/s transmitter, £3. APW6283 260 Mc/s transmitter, £2. BC455 6/9 Mc/s receiver, built-on 200 kc/s C/C converter, speaker, £5. Mains p/u, £2. 6 V Vibrapack, £1. Many new boxed valves, components suitable for Viewmaster and Soundmaster. Dipole insulators, alloy tubing, brackets, etc., for TV and transmitter arrays. Cheap to clear. Send stamp with enquiries.—**PAGE**, G3HKV, 34 Stoke Road, Beaminster, Dorset.

A R77E with handbook, £22 10s. Halicrafters S38, 110 V a.c./d.c., with auto transformer, £15 or offers for both. 829 (3), £2 each or £5 10s. the lot. New but not boxed. Buyer collects receivers.—**S. HOLLINGSHURST**, 30 Conway Road, London, S.E.18.

A reminder that the finest QSL cards are produced by **Minerva**, Queen's Road, Brentwood, Essex. (Phone 2938.)

A TTENDING the National Convention this year? If so why not arrange your annual holiday in Weston-super-Mare, only a short distance by road or rail from the Convention venue (see details elsewhere in this issue). For information regarding accommodation write to **G3RQ** Hon. Sec., Convention Committee, 51 Theresa Avenue, Bishopston, Bristol 7, or to **E. TURNER**, Town Hall, Weston-super-Mare, Somerset.

B 2 receiver, complete with B2 power pack, excellent condition, £8.—Box 927, **NATIONAL PUBLICITY CO., LTD.**, 36-37 Upper Thames Street, London, E.C.4.

B C348E fitted a.c. p.p., o.p. stage, 6AK5 r.f., variable n.l., variable FLS filter, National "S" meter, h.t. relay and handbook, £20 o.n.o. Carriage extra.—**G3GXG**, 1 Dillwyn Gardens, Bridgend, Glam. (942

B UG key, Radio-Aid, 9/6. Labgear harmonitrap, 8/6. Labgear neut. cond., 5/6. Trickle charger, Legg, 2, 6 & 12 V 1 A, 17/6; ditto, Clarke, 2, 6 & 12 V 1 A, 12/6. Smoothing choke, 250 mA 20 H, 9/6. Wirewound resistor with slider, 3 x 1 in., 50 W, 10k 6/-. BULLETINS, 1949, 1950, 1951, offers, 100TH with fil. trans., 35/-. 813, 39/6; fil. trans., 17/6; socket, 5/-. 866, 6/-. Smoothing condensers: 4 μ F 3,000 V working, 10/-. 4 μ F 1,000 V working, 6/6, 8 μ F 750 V working, 5/-. etc. 250-0-250 transformer, 6/-. 12 V transformer and metal rectifier, suit relay, 7/6.—**G2WQ**, 20 Nursery Road, Prestwich, Manchester. (933

(Continued on page 431)

R.S.G.B. BULLETIN, March, 1954.

EXCHANGE AND MART SECTION

(Continued from page 430)

BC348-0 (R.C.A.), internal mains supply, 12 V dynamotor attached, as new, phones, £16 o.n.o.—Box 916, NATIONAL PUBLICITY CO., LTD., 36-37 Upper Thames Street, London, E.C.4. (916)

B2 Minor transmitter/receiver, 3.2/9 Mc/s, with instructions, £9, or exchange, test equipment, amplifier, 2-metre converter.—BRS. 19905, c/o WYBER, 3 Boswall Place, Edinburgh 5. (915)

CLASS "D" wavemeter, a.c. mains, £5. 813, unused, boxed, £2. Wanted: Woden transformer, 750-0-750 250 mA.—G3BZZ, 222 Park Road, South Moor, Stanley, Durham. (952)

COLLINS TCS12 receiver/transmitter, official handbook, Ferranti test meter, other gear. Sell, exchange.—J. BROWN, Waterworks, Penry, Cornwall. (913)

EDDYSTONE 640, good condition, unmodified, for sale, £20 o.n.o. Will take straight swap for good B2, complete.—MILDRED, 7 Lower Bore Street, Bodmin. (956)

EDDYSTONE 740, baffle-board speaker, £30. Owner going abroad.—Write SAVILL, 23 Bosville Drive, Sevenoaks, Kent. (947)

FOR SALE: Eddystone 680/2a receiver with matching speaker, mint condition. Aerial matching unit for same, 32 ft. Panda tower with 5 ft. base. Complete indicating and control system for rotary beam, Pair Brown's Type "K" phones.—Box 931, NATIONAL PUBLICITY CO., LTD., 36-37 Upper Thames Street, London, E.C.4. (924)

FOR SALE: RME69 in excellent condition; best offer around £25. SX24, about £20. Avo valve tester, £5. BC453 with built-in power pack, complete, £5.—Box 929, NATIONAL PUBLICITY CO., LTD., 36-37 Upper Thames Street, London, E.C.4. (929)

FOR SALE: TV unit, A.P. freq., 8 stages, r.f./i.f., synch. sep., det., new, aligned with circuit, £7. Enquiries invited. Also rubber mask for 12 in. tube, magnetic focus assy., deflection coils, e.h.t. transformer, frame transformer, for above circuit, £3 or separate offers. Valves: 12AT7 (5), 7/6; 6J6 (6), 6/6; pair matched 6L6Gs (1), £1; 829B (2), 10/-; Crystals, B7G based: 11040 kc/s, 7039.165 kc/s, 11898.33 kc/s, 14100 kc/s. Also 5 wire-ended glass types on 14100 kc/s. Latter 7/6 each. B7G types, 10/- each.—Box 932, NATIONAL PUBLICITY CO., LTD., 36-37 Upper Thames Street, London, E.C.4. (932)

GERMAN valves: RV 12P 2000 with holders (24). Offers? Wanted: Set coils for RAF 1082.—LAMBERT (Junior), 327 Parkway, Iver Heath, Bucks. (954)

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QSLs and log book (P.M.G. approved). Samples free. State whether G or B.R.S.—ATKINSON BROS., Printers, Elland. (772)

QTH to Canada, must sell, 6 ft. rack complete with mains switching and fuses, H.R.O. and two other power units, modulator and Top Band transmitter, £12 o.n.o., 12 in. and 6 in. speakers. Steel chassis with heater and 1.000 V h.t. transformer choke and condensers, £5. RF27 D2 relays, etc.—G3DCO, 12 Highwood Grove, Mill Hill, London, N.W.7. Phone: MIL 1873. (914)

RF27 unit, 35/-; R1355, 7 Mc/s, i.f. strip with 7 VR65s, 30/-; ZB2, modified with 4 954s, 15/-; 2 VCR138s, new, boxed, 25/- each. VCR139A with base, 20/-, CV67 Klystron and 3ACT6s, offers.—Box 944, NATIONAL PUBLICITY CO., LTD., 36-37 Upper Thames Street, London, E.C.4. (944)

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SALE: 155N, needs attention, £3 10s. Receivers, 1.5/3.0 and 3.0/6.0 Mc/s, rough, no valves, 7/6. Crystal monitor type 4, £2. 1143 transmitter modulator, 25/-; Crystals, 455, 915 kc/s, 7/6. BC221, damaged, £2. R.C.A. Reviews, 1947/50; I.E.E. Journals, Part III (radio), BC624C. 105 unit with CV52. H.R.O. chassis and panel, 10/-; 2 m and 10 m receiver, no valves, 30/-; I.F.T.s, 455, 100, 1600, 12 Mc/s, etc., 25/- each. Thordarson 350/700 mA choke, 15/-; All o.n.o. S.A.E. please.—KIMBER, 61 Gale Lane, Acomb, York. (945)

SALE: H.R.O. Senior five-coil, three-bandspread, speaker 'phones, power pack, perfect, £30. Transmitter, 75 W. all-band, TVI-proof, G5RV, power pack, £18, or complete £40.—Offers to G5ZQ, 6 Orchard Close, Southwich, Sussex. (953)

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TRANSMITTER bargains: Four-band 120 W job, £25. New two-band 20 W, £10. Good 50 W job, £5. New 150 W, four-band job, TVI-proof, £50. Twin-beam 5 in. scope, £4. 150 W modulator, £10. S.A.E. details.—G8VB, Carr Road, Greenford, Middx. (960)

TRANSMITTER No. 12, 40 W c.w., 25 W 'phone, self-contained modulator and power pack, Top Band, 80, 40 and 20, no outer case, buyer collects, £6 10s. Receiver R1355 in original case, unused, ideal for 2 metres or conversion TV, £2 10s. Receiver 1155 converted 6V6 output communication receiver for 80, 40, 20, 16. Communication receiver AR77 in good condition, £19. Communication receiver Howard 46, self-contained frequency meter and power pack, £17. Midget suitcase transmitter/receiver, self-contained mains pack, c.w. on 40 and 80, £4 10s. Indicator unit type 6A, unused, £4. Lifeboat transmitter, £2. Rotary converter, 220 d.c. to 220 a.c., 750 W, filtered, has been used for TV and radio receiver and transmitter, £10. Valradio vibrator unit, 220 d.c. to 220 a.c., 300 W, 50 and 75 cycles output, TV or radio, £6 10s. Collaro autochanger, 8, 10 or 12 in. mixed, motor needs attention, £2. For any of the above articles please contact K. ROGERS, G3AU, 21 Links Road, Epsom, Phone Epsom 9945. (962)

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URGENLY required: RK28, ATP100 or 4069A pentodes. Also PV75 or ATP35 as used in No. 12 set. Aerial tuning unit G also required as used with 33 set.—E12S, Airfield, Bishopstown, Cork, Ireland. (963)

(Continued on page 432)

EXCHANGE AND MART SECTION

(Continued from page 431)

URGENTLY wanted: Manuals or instruction books, data, etc., on American or British Army, Navy or Air Force radio and electrical equipment.—HARRIS, 93 Wardour Street, W.1. (864)

WANTED: Tuning units TN17, TN18, TN19 for R54/ APR4. £50 each offered.—Box 949, NATIONAL PUBLICITY CO., LTD., 36-37 Upper Thames Street, London, E.C.4. (949)

WANTED: 2E25, 6BQ6, 2E26, 6146 valves. New and prices reasonable.—D. ROBERTSON, Aukengill, Wick, Caithness. (950)

WANTED: H.R.O. coils, receivers, power packs, AR88Ds, AR88LFs, SX28s, BC348s, AR77s, etc.—Details please to R.T. & I. SERVICE, 254 Grove Green Road, Leytonstone, E.11. (LEY 4986)

WANTED: R.C.A. speech amplifiers type MI-11220 J or K and aerial tuning units BC939a.—Offers stating quantity and price to P.C.A. RADIO, Beaver Lane, Hammersmith, W.6. (867)

WANTED: BC610 Hallicrafters, R.C.A. 4336 transmitters, SX28, AR88, S27 H.R.O. receivers and spare parts for above; best prices.—P.C.A. RADIO, Beaver Lane, Hammersmith, W.6. (868)

WANTED: Top Band transmitter, 'phone and c.w. small, for portable use.—G3GYK, LEE, 32 Fernlea Avenue, Ferndown, Wimborne, Dorset. (874)

WANTED urgently: Service manual SX24. Loan or purchase good price. Also DM53 dynamotor, R89/ARN5 receiver or parts. Valves 6AJ5. For sale: C43 transmitter, complete with valves. Power unit with parts missing available. Nearest offer £35. Type 18 transmitter/receiver complete less batteries, £4.—Box 959, NATIONAL PUBLICITY CO., LTD., 36-37 Upper Thames Street, London, E.C.4. (959)

WIRELESS equipments, components and valves for sale very cheaply. Send threepenny stamp only for six-page list to HINTON, 11 Wellington Road, Bulford Camp, Wilts. (930)

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ZC4FB requires, in good condition, 10th edition (1946) Radio Handbook, also J-36 bug key.—Please write, stating price (S.A.E. appreciated), to Box 216, Famagusta, Cyprus. (919)

150W, four-band, 80/40/20/10, transmitter, fully metered (6), three-decker, professional finish, with v.f.o., sell £25. Good receiver accepted in part.—G3EKH, 3 Briardale, Edgware Way, Edgware, MIL 1333. (937)

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640 receiver, £18. KTW61, VR53, VR55, VR65, VR66, 4/3; 6J5, VR54, 3/3; 6N7G, X66, 6J6, 9D6, 6/6.—60E, Lewis Buildings, Liverpool Road, London, N.1. (934)

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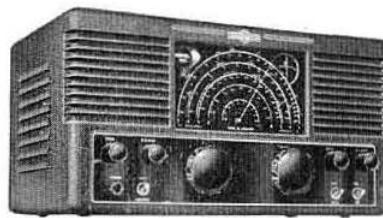
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