RSGB BULLETIN

MAY, 1960

2/6 Monthly

JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN

VOL. 35, NO. 11

DEVOTED TO THE SCIENCE AND ADVANCEMENT OF AMATEUR RADIO

Volume 35 No. 11
May 1960

R.S.G.B. BULLETIN

CONTENTS

EDITOR:
John Clarricoats, O.B.E., G6CL

DEPUTY EDITOR:
John A. Rouse, G2AHL

EDITORIAL OFFICE:
R.S.G.B. Headquarters, New Ruskin House, Little Russell Street, London, W.C.1
Telephone: HOLborn 7373

ADVERTISEMENT MANAGER:
Horace Freeman, The National Publicity Co. Ltd., 20-21 Red Lion Court, Fleet Street, London, E.C.4
Telephone: FLEet Street 0473-6

The R.S.G.B. Bulletin is published on or about the 15th of each month as its official Journal by the Radio Society of Great Britain and issued free to members. Closing date for copy is the 22nd of the month preceding publication.

Radio Society of Great Britain

(Incorporated 1926)

PATRON:

H.R.H. THE PRINCE PHILIP, DUKE OF EDINBURGH, K.G.

COUNCIL 1960

President:

W. R. METCALFE, G3DQ

Immediate Past President:

R. L. SMITH-ROSE, C.B.E., D.Sc., Ph.D., F.C.G.I., M.I.E.E.

Penultimate Past President:

L. E. NEWNHAM, B.Sc., G6NZ

Executive Vice-President:

H. A. BARTLETT, G5QA

Honorary Treasurer:

N. CAWS, F.C.A., G3BVG

Ordinary Elected Members:

D. DEACON, G3BCM
R. C. HILLS, B.Sc. (Eng)., G3HRH
C. H. L. EDWARDS, A.M.I.E.E., G8TL
J. D. KAY, G3AAE
G. M. C. STONE, G3FZL
K. E. S. ELLIS, G5KW
A. O. MILNE, G2MI

Zonal Representatives:

E. G. INGRAM, GM6IZ
P. H. WADE, G2BPJ
F. K. PARKER, G3FUR
A. C. WILLIAMS, GW5VX
F. A. RUSSELL, G3BHS
E. W. YEOMANSON, G3IIR

General Secretary and Editor:

JOHN CLARRICOATS, O.B.E., G6CL

Deputy Editor:

JOHN A. ROUSE, G2AHL

Assistant Secretary:

MAY GADSDEN

REGIONAL REPRESENTATIVES

Region 1.—North Western. B. O'Brien (G2AMV), 1 Waterpark Road, Prenton, Birkenhead, Cheshire.

Region 2.—North Eastern. J R. Petty (G4JW), 580 Redmires Road, Sheffield 10, Yorkshire.

Region 3.—West Midlands. W. A. Higgins (G8GF), 28 Kingsley Road, Kingswinford, nr. Brierley Hill, Staffs.

Region 4.—East Midland. F. C. Ward (G2CVV), 5 Uplands Avenue, Littleover, Derby.

Region 5.—Eastern. T. A. T. Davies (G2ALL), Meadow Side, Comberton, Cambridge.

Region 6.—South Central. L. W. Lewis (G8ML), 117 Fairview Road, Cheltenham, Gloucestershire.

Region 7.—London. F. G. Lambeth (G2AIW), 21 Bridge Way, Whitton Twickenham, Middlesex.

Region 8.—South Eastern. Office Vacant.

Region 9.—South Western. R. E. Griffin (G5UH), 13 Alexandra Road, Uplands, Bristol 3.

Region 10.—South Wales. C. H. Parsons (GW8NP), 90 Maesycoed Road, Heath, Cardiff, Glam.

Region 11.—North Wales. F. G. Southworth (GW2CCU), Samlesbury, Bagilt Road, Holywell, Flintshire.

Region 12.—East Scotland. A. G. Anderson (GM3BCL), "Helford," Pitfodels, Aberdeen.

Region 13.—South-East Scotland. G. P. Millar (GM3UM), 8 Plewlands Gardens, Edinburgh 10.

Region 14.—West Scotland. D. W. R. Macadie (GM6MD), 154 Kingsacre Road, Glasgow, S.4.

Region 15.—Northern Ireland. J. William Douglas (G131WD), 54 Kingsway Park, Cherryvalley, Belfast.

Region 16.—East Anglia. H. H. Lowe (G2HPF), "Akabo," Main Road, Boreham, Chelmsford, Essex.

Region 17.—Southern. M. P. Nicholson (G2MN), 80 South Leigh Road, Warblington, Havant, Hants.

The annual subscription rates to the R.S.G.B. are as follows: Home Corporate Members—30/-; Overseas Corporate Members—28/- ($4 U.S. or Canadian); Associate Members under 21 years of age—15/-. Application forms may be obtained from Headquarters on request.

Current Comment

discusses topics of the day

Why Folkestone?

NEXT month from June 13 to 18, a dozen European Amateur Radio societies, Members of the International Amateur Radio Union, will be represented by delegations at a Conference of Region I Division of the Union to be held at the Grand Hotel, Folkestone. Similar Conferences were held in Lausanne in 1953, Stresa in 1956 and Bad Godesberg in 1958.

Why do these meetings take place? What purpose do they serve? What is talked about? Why do the R.S.G.B. and the other societies contribute about 10d. per transmitting member each year to the funds of the Region I Division? It is done so that Amateur Radio, at least in Europe and Africa, where there is a concentration of Member Societies, shall speak with one voice on international topics and shall be able to agree on united policy when faced with attack on the amateur bands.

When the Atlantic City I.T.U. Conference took place in 1947, the Council of the R.S.G.B. sent its President and General Secretary, at the expense of the Society, to form part of the I.A.R.U. team of observers. When they left the U.K., this I.A.R.U. team, on paper, was a formidable one, headed by the then Secretary of A.R.R.L., who was also the Secretary of I.A.R.U. Judge of the feelings of the R.S.G.B. representatives therefore, when on arrival in the U.S.A., they learned that the leading A.R.R.L. observers had become part of the U.S. Government Delegation. The other members shown on the list as I.A.R.U. observers either did not show up or stayed for only a day or two. The R.S.G.B. representatives thereafter shouldered the major burden of watching the interests of Amateur Radio outside the U.S.A. One of their main difficulties was that a great many Government delegates, especially those from Europe, had no clear knowledge of Amateur Radio and had no contact with the national societies in their several countries.

The position was discussed at the 25th Anniversary Reunion of the I.A.R.U. held in Paris in 1950. At that reunion it was generally agreed that the R.S.G.B. observers had done an excellent job. But it was felt that the state of affairs, where one society bore the whole cost and did all the work, was manifestly unjust. The Region I Division of I.A.R.U. came into being at that meeting and at the first conference of the Division in Lausanne in 1953, arrangements were made for the financing of the Division's activities. Three funds were set up. The first to cover the cost of running the Division, the second to cover the cost of regular meetings of the Executive Committee and the third to provide resources to pay for the cost of sending a team of observers to any subsequent I.T.U. or C.C.I.R. Conference.

The importance of establishing satisfactory liaison with its own government administration was recommended to all societies. The effects of this recommendation were shown in the results of the recent I.T.U. Conference in Geneva.

The meeting of Region I Societies at Bad Godesberg in 1958 was a final preparation for the I.T.U. Conference. The meeting at Folkestone is to examine the results and to consider where the general organization may be lacking and can be improved.

It is probable that another I.T.U. Conference to discuss frequencies will be held in a few years' time. Where, we do not know, but preparations must be made to meet any further challenge and this will be an important topic for discussion at Folkestone.

Arising from the activities of the Region I Division, there has grown up a very live and efficient v.h.f. organization. One of the committees at Folkestone will comprise the V.H.F. Managers of each society. Other committees will discuss administrative, operational and technical matters in addition to the work of the main conference.

The demands for space throughout the frequency spectrum are not likely to abate in the coming years. It is essential, therefore, that our defences shall be strong and united. The way in which the proposals of government delegations to I.T.U. Conferences are framed can be influenced long before a Conference takes place by securing government support. This is work for the national I.A.R.U. societies. That this influence shall be co-ordinated and united is the reason for such conferences as Folkestone 1960.

A. O. M.

The Trap Aerial—In Theory and Practice

By CARL E. MOSLEY (W0FQY)*

THE multi-band trap type aerial is the next best thing to getting something for nothing! It involves almost the identical parameters of a simple one-band aerial; it weighs but slightly more than a single-bander of equivalent structure and is usually no larger than a one-band aerial since it requires no additional elements to achieve multi-band capability. Finally, but one feed-line is needed. Yet, the trap aerial can be made to function on two, three—or even more—bands with insignificant compromise in performance as compared with an aerial designed for only one band of operation. The device that begets this bargain is the parallel resonant trap. This basic tuned circuit offers a very high impedance at or near its resonant frequency and simply acts as an insulator to electrically cut the aerial to proper length for the band to be used.

The conveniences and advantages offered by the trap-aerial concept are, perhaps, best noted in the two or three element Yagi beam aerial. The favourite bands of the majority of DX operators appear to be those at 10m, 15m and 20m. Let us, then, discuss the design considerations of such an aerial.

How the Trap Aerial Works

The function of the trap to act as a high impedance insulator at its resonant frequency has been mentioned. Fig. 1 illustrates the relationship of this function to the three-band aerial element. The length of Section 1 is equal to one-half wavelength at 10m. Parallel resonant circuits

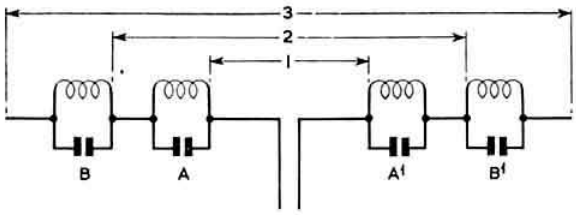


Fig. 1. Circuitry of the driven element of a three-band trap beam aerial. Section 1 is half wavelength at 10m; Section 2 is electrically equivalent to half wavelength at 15m and Section 3 equivalent to half wavelength at 20m.

A and A^1 are then added at the ends of this section, these circuits being resonant within the 10m band. Operation at the next lower band (15m) is achieved by adding element sections so that the equivalent electrical length of Section 2, when the reactance introduced by the resonant circuits is taken into account, corresponds to one-half wavelength at 15m. These added sections are inoperative at 10m since they are isolated by the high impedance of the parallel resonant circuits A and A^1.

Operation of the aerial on 20m is obtained in a similar manner. Resonant circuits B and B^1 are introduced and element sections added so that Section 3 is one-half wavelength at this lowest band of operation.

Inside the Trap

To paraphrase the Bard of Avon—"The Trap's the thing!" Within the trap lies the secret of success—or failure—of the multi-band aerial for here is where the most critical of all the design factors involved will be found.

Structurally, serious consideration must be given to both weight and size of the finished trap assembly. Because of the unfortunate necessity for placing the traps well out along the elements, these assemblies must be as light as possible and it is desirable from a mechanical engineering point of view to "spread" the weight distribution as far along the elements as other design considerations will permit.

Mechanical construction, upon which frequency stability in varying weather conditions relies, is another design factor of utmost importance. It is this factor that, when not given due regard, is most likely to create that most horrendous of conditions—high v.s.w.r.

On the electrical side, design factors that must be considered include Q—which must be sufficiently high to achieve good isolation, yet low enough to provide the desired broad bandwidth characteristic—and power rating, which establishes capacitor plate spacing and conductor gauge.

The inter-relationship of the above-mentioned factors precludes a detailed individual study of each within the limited confines of this article. Let it suffice to look at a finished trap assembly and by viewing the whole, more easily discern the parts.

There has been much discussion as to the relative merits of high Q and low Q coils for use in this application but experiments have shown that a Q of between 40 and 60 is desirable. This range is high enough to achieve good isolation at the ends of the aerial elements and at the same time low enough to give the bandwidth required for amateur operation. In the case of a 10m, 15m and 20m beam aerial, luck plays a part. The 10m band is quite wide compared to the 20m band and since the Q usually goes down as the frequency goes up, the fortunate situation exists in which by low Q additional bandwidth is obtained on 10m without appreciable sacrifice of aerial efficiency.

This relatively low Q requirement is a great help in achieving the other design factors. It means, for one thing, that coil diameters need not be large and this allows "two birds to be killed with one stone." The trap assembly can be built to the ultimate in rigidity by moulding the coil form directly on to the element section and its bulkiness can be reduced until it is nothing more than a slightly over-sized element section.

Trap Circuitry

Fig. 2 shows the circuitry of the assembly used in Mosley trap aerials. It will be noted that coils for both the 10m and the 15m traps are enclosed in the same casing. This allows the casing to be made of oversized aluminium tubing and to function as the common plate for the two trap capacitors

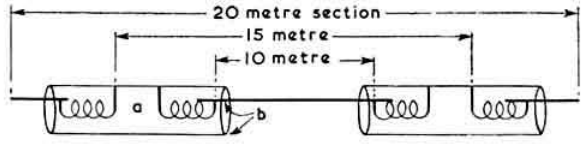


Fig. 2. Diagrammatic circuit of a trap element: (a) represents the aluminium case that encloses both 10m and 15m traps. (b) shows how capacity is effected between the outer cover and the element inner sections.

* *President, Mosley Electronics, Inc., St. Louis 14, Missouri, U.S.A.*

with the separated element sections serving as opposite plates. *Voila!*—another point for frequency stability!

The photograph, Fig. 3, shows the mechanical construction of the trap assembly. Material used for the coil form is high-impact polystyrene which possesses the necessary dielectric qualities and dimensional stability. The forms are grooved in order to hold the coil turns firmly in place.

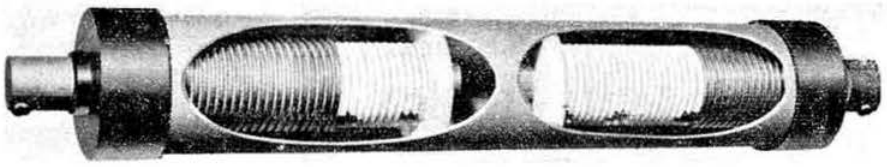


Fig. 3. Trap assembly cut away to show inner construction details.

Loading Coils—Their Effect on Aerial Efficiency

Since the trap coils have a loading effect on the aerial elements, they act to shorten these elements somewhat. How serious is this in terms of reduced aerial efficiency?

Actually, only operation on 15m and 20m is effected and this effect can be regarded as negligible. It has been proved that a 50 per cent reduction in size of the aerial—the overall element length, in the case of a Mosley beam aerial—usually results in a reduction in efficiency of approximately 10 per cent. Since the element length is reduced only a very small fraction of a wavelength at the lowest frequency, the forward gain of the aerial is scarcely affected at all. In fact, what effect there is cannot be detected with a receiver S-meter or other conventional means.

The Quandary of Element Spacing

So far, it has been seen where the design of a three-band trap aerial calls for a number of compromises; but it has also been seen that these compromises are not nearly so detrimental to good aerial performance as some would have us believe. Let us now take a look at element spacing—where a further compromise is obviously in the making—and see how we fare.

The matter of element spacing has received much attention by builders of beam aerials and the proponents of so-called wide spacing and those of close spacing are equally loud and vociferous. Wide spacing is usually considered as being 0·25 wavelength, whereas close spacing is approximately 0·10 wavelength. Since spacing greater than 0·25 wavelength usually results in loss of forward gain, we find ourselves perched on the horns of a dilemma! Once again, we delve deep into the reference books to see what the experts have to say and once again we climb wearily up our test range tower to install a two-element beam which will give us some facts and figures of our own.

It is found that changing spacing from 0·10 wavelength to 0·25 wavelength invariably results in less than 1db improvement in forward gain. This figure is so slight as to fall within the tolerance of measuring equipment recommended by the U.S. Bureau of Standards and cannot be considered as valid evidence of the superiority of wide spacing.

One possible solution to the problem is to add another director element but if this is done, the driving point impedance will be lowered and it will be necessary to add a matching network of some sort. This would not be in keeping with the desire to build a nice straightforward, clean-cut aerial without frills and fanciness.

The answer finally arrived at is based on experiences with the other so-called compromises. In the Mosley three-element beams 0·10 wavelength spacing is used on 20m, 0·20 wavelength on 10m and midway between 0·20 and 0·10 wavelength on 15m. No measurable difference in performance can be detected on the three bands.

Feeding the Three-Band Beam

With the questions of Q, element lengths, element spacings, etc., all dealt with, the problem of feeding with one transmission line a beam that, theoretically, at least, has all sorts of driving point impedances can be tackled.

At 20m, where it will be remembered 0·10 wavelength element spacing is employed, the impedance at the centre of the driven element falls to the neighbourhood of 40 ohms average over the bandwidth. At 10m, with 0·20 wavelength spacing, the impedance is close to 70 ohms average. This is a spread of 30 ohms and by settling upon a 52 ohm feed-line, such as RG-8/U, any little mis-match that occurs can be considered insignificant in its effect on aerial performance. Thus, do we reap the reward for our labours to achieve broad bandwidth!

By connecting the coax line to the centre of the split dipole element, another problem arises—how can a balanced radiation pattern be obtained by feeding a balanced dipole with an unbalanced line?

As shown in Fig. 4, the centre of the driven element is at zero potential. The element is split at the centre and an

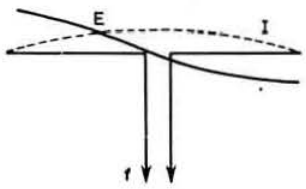


Fig. 4. The split-dipole feed system takes advantage of zero voltage potential (E) at centre. See text for complete description.

earth connected from the half-section to which the coax outer conductor is fixed. Since a metal boom is used, this is a convenient place to earth the element. (Note: If a metal tower is used, this may be considered sufficient earthing. However, if a wooden tower or pole is supporting the beam, a heavy-gauge earthing wire should be installed from the aerial mast to nearest solid ground.)

Now, with the centre of the dipole earthed, energy can be introduced just slightly off-centre in the opposite element section and, as this side is energized, a like voltage is induced on the opposite section and an equal and balanced voltage distribution over the entire dipole is achieved, as illustrated. In this method, the stray transmission line currents which would tend to distort the pattern are bled off through the ground.

Conclusion

So there is the Mosley three-element, three-band beam aerial. True, certain compromises have had to be made, but these are really not too critical. Any lessening of aerial performance brought on by these compromises cannot be detected by any means at the disposal of ordinary, workaday amateurs. Let it suffice to say the result is a fine working aerial that can be turned with an ordinary TV rotor and supported by the simplest of towers, in which three-band operation has been achieved without feed-line switching.

Now—has anyone any ideas for an all-band beam; Top Band to 2m? . . .

Transmission Line Harmonic Filters

By R. C. HILLS, B.Sc. (Eng.) (G3HRH)*

IN a letter to the Editor of the R.S.G.B. BULLETIN, published early in 1959, a member raised the question of the generation of interfering signals in the u.h.f. aircraft bands (derived as the second harmonic of 145 Mc/s amateur transmissions), and the importance of fully suppressing such harmonic radiation was stressed. The purpose of this article is to suggest a relatively simple way in which such suppression can be usefully achieved.

Current practice in the design of 145 Mc/s transmitters is to employ a push-pull p.a. stage and it is a property of such a stage that even harmonics are essentially suppressed by the nature of its operation. The degree of suppression is a function of the balance of the stage, in respect of drive, h.t. and bias, etc., and it is reasonable to expect suppression of the order of 20-30db from a well-designed stage. However, for high power transmitters and transmitters with single ended p.a. stages it is important to incorporate some further suppression, and a satisfactory way to accomplish this is by means of transmission line stub filters.

The situation presented—i.e., pass fundamental, stop second harmonic—is the best that could be required when suppression by means of a simple stub is attempted. Since the frequency ratio is 2 : 1, this means that in any cable a half wavelength at the stop frequency is the same physical length as a quarter wavelength at the pass frequency. It is a basic property of the short circuited quarter wave lossless stub that it presents an open circuit at its terminals and can, therefore, be connected across any matched transmission line without affecting the line in any way. Such a stub will then be a halfwave at the stop frequency and the short circuit termination will be repeated at the input terminals. Thus, to the second harmonic frequency, such a stub in parallel across a matched transmission line will present severe attenuation. The electrical arrangement is shown in Fig. 1. If the stub is, as must be in practice, manufactured from a line having a finite loss per unit length, then the loss at the pass frequency will not be zero but will have some small finite value and, similarly, the loss at the stop frequency will not be infinite but will have some large finite value. Table I shows the stop and pass losses for a single stub of the type described above, manufactured from five different commercial cables, and also a specially constructed low-loss stub. This special stub may be fabricated from a pair of copper tubes arranged as a coaxial line, and having a diameter ratio of 2·36. One end of the line may be soldered to a shorting plate and the other end should be supported by a suitable insulator to maintain the concentric tubes in alignment. No other insulant should be used in the space between the tubes or the performance at the pass frequency will be degraded. For the figures quoted the outside tube should have a diameter of approximately 1½ in.

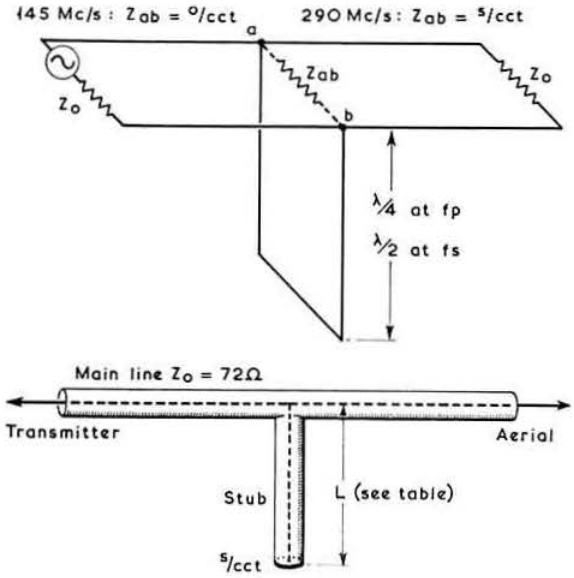


Fig. 1. Electrical arrangement of a transmission line harmonic filter

The value of stop loss quoted in Table I is that which will be achieved when the single stub is connected across the main transmission line at a point where the resistive component of the impedance arising out of the mistermination of the line at 290 Mc/s has a value of 71 ohms. The s.w.r. on this line due to the mistermination will be of the order of 20 : 1. Consequently if the stub is placed at a point of voltage minimum at 290 Mc/s, the achieved stop loss will be

*73 Warren Way, Digswell, Welwyn, Herts.

TABLE I

Properties of various co-axial cables employed as stubs at 145 Mc/s.

Cable Telcon	Spec. DEF. 14A	Description	Z_o (Ω)	Velocity Factor	Matched loss of cable at 290 Mc/s	$\frac{L}{\frac{\lambda p}{4}}$ (ins) fp = 145 Mc/s	Stop loss ‡ fs = 290 Mc/s	Pass loss (On 71Ω main feeder) fp = 145 Mc/s
PT1M	UR32	¼"dia. Solid Polythene Dielectric	71	0·66	7·2db/100ft	13·5"	34·8db	0·2db
PT29M	UR1	½"dia. Solid Polythene Dielectric	71	0·66	3db/100ft	13·5"	43db	0·12db
PT93M	UR67	½"dia. Solid Polythene Dielectric	51·5	0·66	4db/100ft	13·5"	42·5db	0·13db
ET8M	—	¼"dia. Foamed Polythene Dielectric — semi-airspaced	75	0·8	6·2db/100ft	16·3"	33·9db	0·12db
HM6AL	—	¾"dia. Helical Polythene Membrane — semi-airspaced	75	0·96	1·4db/100ft	19·6"	43·7db	0·08db
Special	—	Concentric Copper Tubes. Dia ratio = 2·63:1 (See Fig 2)	51·5	1·0 *	0·5db/100ft*	20·4"	57·2db	0·001db

* Estimated figures ‡ Average loss achievable with one stub (see text)

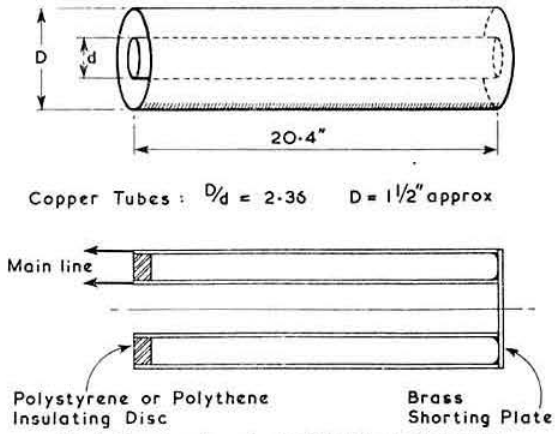


Fig. 2. Construction of a special high-stop-loss stub.

approximately 6db less: conversely if the stub is placed at a point of voltage maximum at 290 Mc/s the achieved stop loss will be approximately 6db more. It may not be convenient or possible to locate the stub at the most desirable point on the line, and in this case if further attenuation is required, a two-stub filter must be employed.

If a single stub does not provide sufficient attenuation, two such stubs should be connected across the line at quarter wave intervals, where λs is the wavelength in the cable at the stop frequency and for mid band will be 40·8 in. multiplied by the velocity factor of the particular cable comprising the main transmission line. These stubs may be placed *anywhere* along the main transmission line without affecting its performance but in order to prevent possible radiation from the outer conductor of this line, they should be incorporated as near the transmitter output terminals as possible, and for preference, immediately outside the screened metal case into which the transmitter should be built. This system will provide a stop loss equal to the value quoted in Table I for a single stub, independent of the position of the two stubs.

Although the stubs described in this article are for use in the suppression of the second harmonic radiation from 145 Mc/s transmitters, the principle involved is naturally independent of frequency and may be adapted for any other case in which the suppression of second harmonic radiation is required, and in which the physical length of the stub is not embarrassingly great.

R.A.F. Amateur Radio Society to issue "Century Club Award"

TO mark the 21st year of the Royal Air Force Amateur Radio Society, a special certificate, to be known as the "Century Club Award" will be issued to all fully paid-up members of that society who have worked 100 other member stations of the Society, on any h.f. band, c.w. only, since December 31, 1959. Stickers will be awarded for each subsequent twenty-five contacts, which may be on c.w. or phone. Only one contact per station will be permitted, whilst one contact in the first 100 must be with the headquarters station, G8FC. Claims, in log form, should be sent to the Communications Manager, G8FC, R.A.F. Locking, Weston-super-Mare, Somerset.

The certificate, in blue and gold, has been designed by G3MQY and G3MRT of R.A.F. St. Mawgan. A nominal charge of 2/6 to cover printing and postage will be made for each certificate. Further details, together with an up-to-date list of R.A.F.A.R.S. members and their call-signs are included with the current issue of *QRV* now being despatched to all members.

Two Colour TV System?

DR. EDWIN LAND, president of the Polaroid Corporation, and discoverer of remarkable new aspects of human colour vision, thinks a far simpler colour TV system—giving a full range of colours from only two basic colour sources—may be possible. He agrees with most colour TV engineers, however, that there are many obstacles in the path of this kind of simplified TV colour.

Few discoveries of recent years have so intrigued the scientific world as Dr. Land's findings that the eye can see full colour in images which, according to 300-year-old theories, should be in monochrome. In a long series of experiments, he found that the human eye does not need the whole colour spectrum to see all colours—it does not even need three "primary" colours (as in colour TV). Full colour, he found, can be seen when black and white "colour separation" photo positives—taken through different colour filters—are projected using only two colours. And colour sources for projection of these "full-colour" photos are highly flexible—they can be red and white, red and green, even as close together in the spectrum as red and orange or two shades of yellow.

(*Television Digest*, quoted by *I.T.U. Journal*.)

New Stereophonic Broadcasting System

CONSIDERATION has been given for some time to the practicability of providing stereophonic transmissions of sound broadcasts and a number of methods are at present being reviewed by various bodies. A new system has just been put forward to the European Broadcasting Union for assessment. This is a time-multiplex system and has been developed by G. D. Browne of Mullard Research Laboratories.

The system has the advantage of enabling stereophonic receivers to be produced which only need the addition (apart from the second loudspeaker and audio stage required for stereophony) of at the most two valves or possibly one transistor and two diodes. Existing v.h.f. radiograms with stereophonic record reproduction facilities would be convertible in many cases to receiving stereo broadcasts on the Mullard system by the addition of a valve and associated circuit.

The proposed stereo transmission system is compatible, and unconverted v.h.f. sets would therefore be able to receive transmissions and reproduce them in the normal way.

"Memoirs of the British Astronomical Association on Earth Satellites"

THIS new book, both an historical record and an instructional manual on the B.A.A./R.S.G.B. observations of earth satellites, is to be published shortly at a price of approximately 10/-. Members who would like to obtain copies are invited to write to G. M. C. Stone (G3FZL), c/o R.S.G.B. Headquarters.

Amateur Television Convention

THE Fifth Amateur Television Convention, arranged by the British Amateur Television Club, will be held on Saturday, September 10, 1960, in the Conway Hall, London, W.C.1.

Schoolboy Radio Amateurs

GM3NQZ, GM3NUU and GM3NXO, are all pupils at Robert Gordon's College, Aberdeen, and all are under 17 years of age. GM3NXO would like to know whether this is a record for British schools.

Audio-derived A.V.C. Hang Circuit

Simple Accessory using an Etched Board

By R. R. FLAUM (G3BDH) *

THE proximity of another amateur using s.s.b., a system also employed at G3BDH, recently made imperative the provision of an a.v.c. circuit capable of dealing with this type of signal. At about the same time a " do-it-yourself " printed circuit kit became available and it was decided to experiment with this in an endeavour to make a compact unit which could be plugged into the station receiver.

A description by W0BFL of the basic circuit was published in *QST* for October 1957 and is also contained in the A.R.R.L. *Single Sideband for the Radio Amateur*, obtainable from R.S.G.B. Headquarters. It uses a 12AU7 and a 6BC7 triple diode but as the " junk box " contained several double diodes of the 6AL5 type the arrangement made by the writer uses two 6AL5's. The fourth diode section is used to provide manual gain control by means of a variable negative voltage applied to the a.v.c. line—if it is not needed, it can be omitted without affecting the action of the rest of the circuit.

Making the Printed Circuit

As an addition to the printed kit as supplied, it is desirable to obtain a sheet of good quality carbon paper. The " carbon paper " used by the writer was the type used for transferring embroidery patterns as it is not dirty to handle. A further useful item is a first quality artist's sable brush No. 1 —it is much easier to paint straight lines with it and it costs only about 2s.

The procedure in making the printed circuit is as follows:

(i) Pin the page of the BULLETIN to a flat board with tracing paper on top and make a tracing of the print layout shown in Fig. 1.

(ii) Take the tracing and cut around the border to trim it to size. Next, cut another piece of tracing paper and carbon paper to the same size.

(iii) Cut the laminate to size, and clean the copper according to the instructions in the kit.

(iv) Lay the carbon paper, the tracing and the *unused* piece of tracing paper on top of the board and secure them in position with four small pieces of Sellotape.

(v) Now trace out, once more, the circuit and a copy will be imprinted on the board.

The top piece of tracing paper will show which lines have been traced and you will be saved that sickening feeling of uncertainty about missing out some lines. All this is a much simpler process than it looks in print.

Having produced the pattern, the next step is to paint in the lines with the resist ink supplied. (Do not use too much—it is very effective.) For thinning purposes, amyl acetate can be used—it is also very effective for cleaning off the ink afterwards and for cleaning the brush.

Etching presents no problems and should be carried out in accordance with the instructions. After it is complete the board should be cleaned before drilling is started.

A No. 59 or 60 drill is suitable for the resistors and capacitor leads while the valveholders require a 0·074 in. drill, with a 0·195 in. drill for the centre spigot of the B9A holder and 0·140 in. for the centre spigot of the B7G holder.

* 29 Mighell Avenue, Ilford, Essex

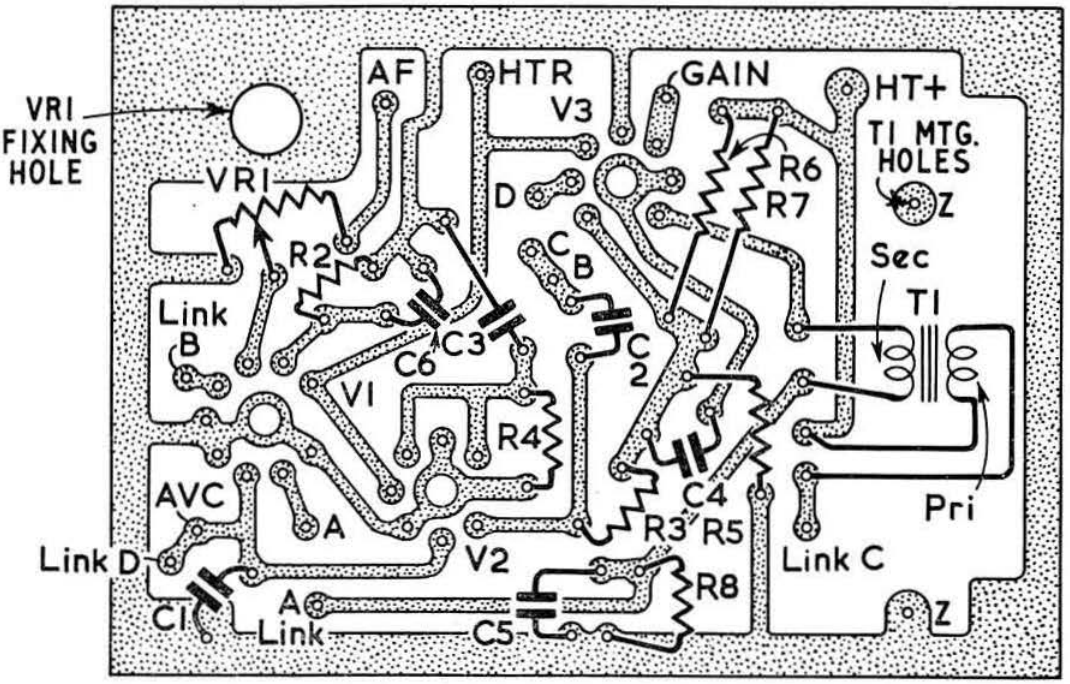


Fig. 1. Layout of the printed circuit board showing the position of fixing points for the components. This diagram is life-size and may be traced on to the board as described in the text.

Action of the Circuit

Audio is applied to a.v.c. amplifier V1a and is then fed to V2a and via a step-up transformer to the recovery diode V3a. The voltage built up across C3 is applied to the a.v.c. line via the attack gate V2b, C1 charges up rapidly and remains charged until discharged by recovery gate V1b. V1b is held cut off by the voltage built up across C5, R8. This combination takes an appreciable time to discharge and the a.v.c. voltage holds the receiver sensitivity down for a second or so after the audio signal has ended, thus achieving the " fast attack—slow decay " a.v.c. characteristic required in s.s.b. reception.

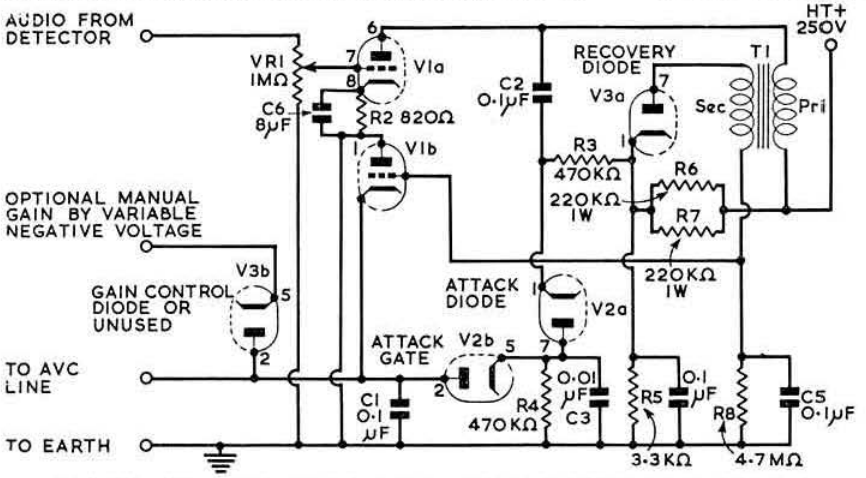


Fig. 2. The audio-derived a.v.c. hang circuit. V1 is a 12AU7 and V2 and V3 6AL5 valves.

The action is extremely effective and in use the strongest local s.s.b. signal will not overload the product detector used. With the unit installed tuning sideband becomes as simple as tuning conventional a.m. on the same receiver, only the tuning control and the audio gain control being used. When receiving A3 signals, however, some types of fading occur rather faster than the system can follow and some operators may find it desirable to make R8 variable.

Components

The resistors and capacitors are standard components. The transformer used is a Radio-Spares midget intervalve type (ratio 3 : 1). A word of warning about the valve-holders: those specified are McMurdo type B9A60/C and B7G60/C and the printed circuit layout has been drawn accordingly. However, there are printed circuit valve-holders on the market that require different hole piercing, so the sizes should be checked before drilling commences.

Supplies and Connection

The unit requires 6·3 volts at 0·9 amp. and about 250 volts at a few mA. In addition audio must be fed in via a screened lead, and the negative a.v.c. voltage returned to the receiver via a screened lead. In the writer's unit, a B9A socket is mounted on the receiver and the leads from the unit connected to a B9A plug. In this way it is possible to have a " jumper " plug to return the receiver wiring to normal a.v.c. operation.

The modifications to the receiver consist of fitting the socket and breaking the a.v.c. line before it reaches the a.v.c. diode—make sure there is no d.c. return to earth anywhere on the line.

Conclusion

Using printed circuit techniques is not the answer to every wiring problem, but the construction of a unit on these lines does make a change from " chassis bashin'." Indeed, most of the operations can be carried out while in civilized company. The XYL may or may not be interested in this fact—it depends on when you last emerged from the shack.

International Co-ordination of Time and Frequency Services

CO-ORDINATION of United Kingdom and United States time and frequency transmissions was begun early this year in order to help provide a uniform system which is needed in the solution of many scientific and technical problems in such fields as radio communications, geodesy, and the tracking of artificial satellites.

Participating in the project are the Royal Greenwich Observatory, the National Physical Laboratory, and the Post Office Engineering Department in the United Kingdom, and, in the United States, the U.S. Naval Observatory, the Naval Research Laboratory, and the National Bureau of Standards. This programme follows previous co-operative efforts of these agencies to achieve uniformity and simplification in procedures.

The transmitting stations which are included in the co-ordination plan are GBR and MSF at Rugby; NBA, Panama Canal Zone; WWV, Beltsville, Maryland and WWVH, Hawaii.

It is expected that by the end of 1960 the time signals from all the participating stations will be emitted in synchronism to the thousandth of a second.

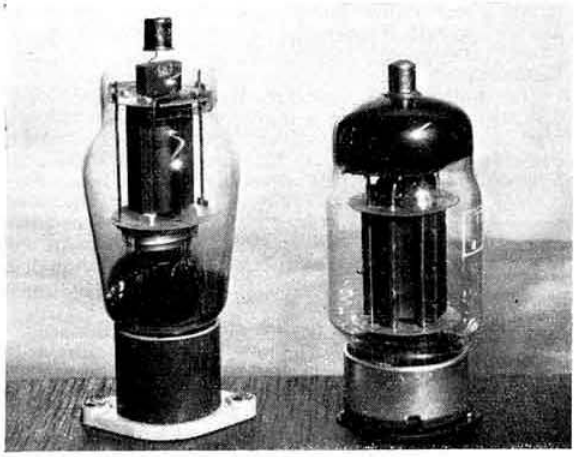
Safety Requirements for Transmitting Apparatus

A NEW British Standard (B.S.3192 : 1959) specifies safety requirements for radio and television transmitting apparatus (excluding apparatus to be operated by skilled personnel, and apparatus for use in merchant ships or civil aircraft for which requirements are laid down by the relevant authority).

The requirements specified for design, construction and electrical performances are those necessary to prevent danger arising from the connection of apparatus to the supply mains and not, for example, from lightning. The Standard deals, *inter alia*, with the protection of personnel from electric shock and radio frequency burns. To avoid overheating of the apparatus—with consequent fire hazard—limits on its temperature rise in the event of component failure are specified.

Attention is drawn to the possible danger to the health of personnel which may be caused by X-radiation from high voltage equipment, and to the possible dangers arising from radiation from valves and magnetrons.

Copies of the Standard may be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London, W.1., price 6/-, plus postage.



The 807 and TT21 Valves Compared

THE recently released British transmitting tetrode valve types TT21 (6·3 volts)* is probably the most interesting valve in its class to become available for amateur high frequency transmitters for some years. Basically, it is an r.f. version of the well-known KT88 audio type (with its anode brought out to a standard top cap) fitted with suitable internal screening to isolate the input from the output. Mechanically, its overall dimensions are within those of the older 807 (a pre-war design) with which it is compared in the data given on this page.

One of the improvements incorporated in the new valve is the button base which allows the use of much shorter leads to the various electrodes and makes the valve inherently less likely to parasitic oscillation. The free radiating surface of the bulb is appreciably greater than the 807 and increased dissipation is thereby possible without recourse to forced air cooling. Electrically, as would be expected, the TT21 is a much more up-to-date design and this shows itself in the performance that can be achieved without exceeding the various limiting ratings.

At first sight, it will be seen that the rated anode dissipation of the TT21 is 50 per cent higher than the 807 (i.e. 45 watts compared with 30 watts under I.C.A.S. ratings) but when the typical operating conditions are examined it will be found that the power output available is about 125 per cent better because the usable anode current is very much greater, due to the considerably increased emission and mutual conductance. Although the power level is higher than in the 807, the driving power required is less than 1 watt. This can be obtained from a EF91/6AM6/Z77 running as a doubler or an N78 as a doubler, trebler or quadrupler at frequencies of 30 Mc/s and below.

With suitably modified power supplies a single TT21 would approximately replace a pair of 807 valves in parallel, as the following simplified comparison shows.

Application	807 Input	807 Output	TT21 Input	TT21 Output
Class C r.f. amplifier—C.W.	75 W	54 W	210 W	174 W
—A.M.	60 W.	44 W	150 W	123 W
Class AB1 r.f. amplifier	50·5 W	36 W	116 W	81 W
Class AB1 audio amplifier (two valves)	101 W	72 W	300 W	200 W

The 12·6 volt equivalent is the TT22

From this table it is clear that the TT21 would for many purposes also be a suitable valve to replace the larger, more expensive and less robust 813. More detailed comparisons are given in the following tables.

Basic Comparisons

	807		TT21/TT22	
Heater voltage	6·3 V		6·3 V or 12·6 V	
Heater current	0·9 A		1·6 or 0·8 A	
Mutual conductance (gm.)	6 mA/V		11 mA/V	
Mutual conductance G_1-G_2	8 mA/V		8 mA/V	
Interelectrode Capacities				
Anode-grid No. 1	0·2 pF max.		0·25 pF max.	
Input	12 pF		17 pF	
Output	7 pF		13·5 pF	
Base	UX 5 pin		Octal	
Maximum Ratings	**C.C.S.**	**I.C.A.S.**	**C.C.S.**	**I.C.A.S.**
Anode voltage	600	750	1250	1250
Screen voltage	300	300	600	600
Anode dissipation	25	30 W	37·5 W	45 W
Screen dissipation	—	3·5 W (absolute max.)	6	6 W
Grid No. 1 dissipation	—	—	2 W	2 W

Class C R.F. Amplifier Anode Modulated

		C.C.S.	I.C.A.S.	C.C.S.	I.C.A.S.
Anode voltage	Va	600	700	1000	1000
Screen voltage	Vg2	250	250	300	300
Grid voltage	Vg1	—45	—45	—115	—115
Drive voltage	V drive	65	65	—	—
Anode current	Ia	100	100	130	150
Screen current	Ig2	8	8	20	20
Grid current	Ig1	4	4	3·0	3·5
Drive power	P drive	0·3	0·3	—	—
Driver power output		—	—	1·1	1·2
Anode imput	Wa	60	75	130	150
Power output	P out	40	54	101	123
Power load +	P load	36	48·5	91	110

+ Assuming transfer efficiency of 90%

Class AB1 R.F. Linear Amplifier

		C.C.S.	I.C.A.S.	C.C.S.	I.C.A.S.
Anode voltage	Va	600	750	1000	1000
Screen voltage	Vg2	300	300	300	300
Grid voltage	Vg1	—34	—35	—38	—40
Anode current no sig.	Ia(o)	18	15	40	35
Anode current sig.	Ia(sig)	70	70	122	116
Screen current no sig.	Ig2(o)	0·3	0·3	negligible	negligible
Screen current sig.	Ig2(sig)	7·5	8	11	8·5
Grid voltage peak	Vg1(peak)	34	35	38	40
Drive power	Pd	0	0	0	0
Anode dissipation no sig.	Pa(o)	—	—	32	35
Anode dissipation sig.	Pa(sig)	—	—	31	34·5
Output power	(P out)	28	36	67	81
Screen power input				3·3	2·55

Class AB1 Audio Amplifier or Modulator

Anode voltage	Va	750	1200
Screen voltage	Vg2	300	300
Anode current no sig.	Ia(o)	2×15	2×28
Anode current sig.	Ia(sig)	2×70	2×130
Screen current no sig.	Ig2(o)	0·6	negligible
Screen current sig.	Ig2(sig)	2×7·5	2×20
Grid voltage	Vg1	—35	—45
Drive voltage (grid to grid)		70	71
Power output	P out	72	200
Anode load (anode-to-anode)		12K ohms	15K ohms
Distortion		—	5%

Mobile Column

By JOHN A. ROUSE (G2AHL/M) *

DECIDING how to start mobile work is often quite a problem, particularly when, as with most of us, thoughts do not turn to the subject until the long evenings and sunny days come along—just the time for mobile operation but not the best for constructional work.

Practically no surplus equipment is suitable for amateur use in a private car—most of the complete transmitter-receivers available on the market were ideal for use in tanks and Army lorries but are too big, of the wrong size and shape, generally too heavy on the battery and lacking in the facilities required for amateur purposes. Some items, such as whip aerials, rotary converters and vibrator power supplies, can be put to good use but it is usually more satisfactory to design the radio equipment proper, particularly the transmitter, to fit into the vehicle.

The circuit of a good example of a home-built Top Band mobile transmitter designed by G3XC is shown in Fig. 1. The valve types were chosen to keep the heater consumption to a minimum.

The coils are as follows: L1, 95 turns 34 s.w.g. enamelled wire closewound on a $\frac{1}{2}$ in. diameter former with a dust-iron core; L2, Weymouth type HH4 (40μH); L3, 50 turns, 24 s.w.g. enamelled copper wire on a $1\frac{1}{4}$ in. diameter former; L4, eight turns of plastic covered connecting wire.

Mobile Equipment

Several items of new equipment of interest to the mobile enthusiast have recently become available. The TW-2 miniature 2m transmitter employs an ECF80 pentode overtone oscillator (24 Mc/s), ECF80 triode tripler (72 Mc/s), ECF82 triode doubler (144 Mc/s), ECF82 pentode clamp valve and QQV03-10 p.a. modulated by an EF86, ECC83 and push-pull EL84s. For an input of 10 watts to the p.a., the h.t. consumption is 120 mA at 250 V while l.t. requirements are 12 V at 1·9 A. A companion halo aerial and a crystal controlled converter (6BQ7A cascode r.f. stage, EF95 mixer, ECC91 oscillator/tripler and EF95 doubler) are also available. All these items are manufactured by T. H. A. Withers, 15b Gilbert Street, Enfield, Middlesex.

The Woden Transformer Co. Ltd. has recently added the UM0 modulation transformer to the U.M. series for mobile use. The power handling capacity is for 20-25 watts input to the p.a. The UM0 measures $2\frac{7}{8}$ in. by $2\frac{3}{4}$ in. by $3\frac{3}{4}$ in. high and weighs 3 lb.

The battery fitted to the average car restricts the power which can be safely used for radio equipment and many amateurs employ additional batteries or heavy duty generators. Another possible solution to the problem is offered by the Lucas a.c. generator model 2AC which has a nominal output of 45A at 13·5 volts and measures only 6 in. in diameter and $5\frac{3}{4}$ in. in length. The output of the alternator is rectified by Lucas silicon diodes. The alternator voltage is maintained between pre-set limits by means of a transistor assisted regulator in its control box.

The provision of h.t. for mobile gear is always an expensive matter in terms of current. One of the most promising methods is the transistorized power supply, the efficiency of which can be as high as 90 per cent or so compared with about 40 per cent for the rotary converter.

In a typical case, the manufacturers of Transipack power supplies claim efficiencies of 95 per cent for their Model 505 at 100-115 watts output and 90 per cent at the 60 watt level. Transipacks are available in a number of power ratings in

* *Deputy Editor, R.S.G.B. Bulletin.*

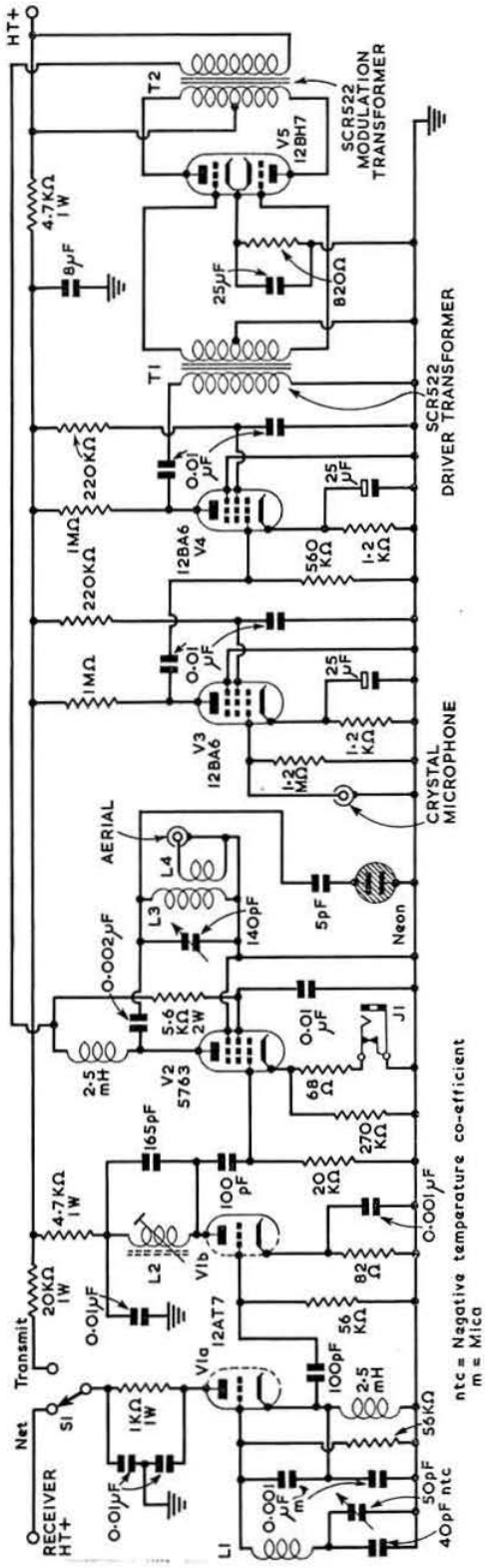


Fig. Circuit of a simple Top Band mobile transmitter designed by G3XC. For 12 volt operation a 7.1 ohm 5 watt resistor should be wired in series with the heater of the 5763 valve. The neon lamp employed as a p.a. tuning indicator may be the miniature type used in Acru soldering irons.

HARWELL MOBILE RALLY AND HAMFEST

Harwell, Berkshire

Sunday, May 15, 1960

RALLY STATIONS

1930 kc/s—G3NNF/A 144·1 Mc/s—G3NNG/A

will be on the air from 12 noon.

Organized by the A.E.R.E. Radio Club

NORTHERN MOBILE RALLY

Harewood House, near Harrogate

(By kind permission of H.R.H. The Princess Royal).

Sunday, May 22, 1960

Organized by Spen Valley Amateur Radio Society.

LONGLEAT MOBILE RALLY

Longleat House, near Warminster, Wiltshire

Sunday, June 26, 1960

Organized by the City and County of Bristol R.S.G.B. Group.

HARLOW MOBILE RALLY

Village Hall, Magdalen Laver, near Harlow, Essex

Sunday, July 3, 1960

RALLY STATIONS

1·8 Mc/s—G3ERN/P 144 Mc/s—G3JMA/P

Organized by Harlow and District Radio Society.

kit form and provide output voltages between 50 and 550 volts in 50 volt steps. Details may be obtained from M. J. Collins, 29 Burnt Ash Hill, London, S.E.12.

One of the disadvantages of transistorized power supplies is that the efficiency drops when only a light load is drawn; for instance, on receive the battery consumption may well be nearly as high as on transmit. In the Dependapac made by the Dependable Relay Co. Ltd., 8a Ainger Road, Camden Town, London, N.W.3, it is claimed that this difficulty has been overcome by a system of switching transformer taps and transistor bias voltages. The Dependapac is rated at 530 volts at 230 mA and 265 at 110 mA. It is designed to operate from a 12 volt car battery.

An inexpensive and useful item available on the surplus market for only 2/6d. is the modulator from the TR1986. The valves required are an EF92, an EL91 and two 6C4s. The unit is capable of delivering 7-8 watts of audio and comfortably modulates 15 watts input to a p.a. Bias for the class B 6C4 valves can be −12 volts from the car battery. The microphone input transformer is for a moving coil microphone but a crystal type may be used by wiring it across the resistor bridge network in the grid of the first stage.

While on the subject of modulators some useful information on the popular 12AX7 class B arrangement is given in *G.E. Ham News* for March-April 1960. Because of its high-mu, a 12AX7 may be used as a zero bias class B amplifier with up to 200 volts on the anodes. Between 220 and 300 volts, grid bias of −1·5 V should be provided. If the h.t. supply is more than 300 volts, grid bias of −3 V must be used. If more power output is required, two 12AX7s may be employed in push-pull parallel. Alternatively, the 12AT7, 12AU7 or 12BH7—all valves with higher anode dissipation —are suitable but they must be suitably biassed.

Calling Frequencies

G2NM has suggested that mobile calling frequencies in the 3·5 and 7 Mc/s bands should be adopted and kept clear between 07.30-10.00, 12.00-13.00 and 18.30-19.00 daily. Comments on the idea and suggestions as to suitable frequencies will be welcomed.

Carry your Mobile Licence!

From time to time, amateurs operating mobile are asked about their activities and members are advised therefore to carry their Amateur (Sound Mobile) licences with them whenever out with their equipment.

The Henri de France Colour Television System

A UNIQUE demonstration was presented at The Institution of Electrical Engineers on April 27, 1960, when two French authors, MM. R. Chaste and P. Cassagne, described a new system of colour television transmission. Scenes originating in Paris were seen in full colour by a large audience in London, on screens which differed little, if at all, in their external appearance from those of ordinary " black and white " television receivers.

Moreover, the transmitted pictures were " compatible ": that is to say, if put into a colour receiver, they gave a coloured result; if put into a normal television set, they gave a black and white picture. This " compatibility " is important, because it would provide a means of bridging the gap if a colour service were to be introduced, so that until a user bought a colour receiver, his existing set would still give him a black and white result from the colour transmission.

Behind this feat lay a triumph of engineering co-operation. Experts in the French companies responsible for the development of the system, the French Posts and Telegraphs, the Radio Television Française, the British Post Office and the B.B.C., together set up a complicated radio link comprising sections of the existing Eurovision network, with additional microwave links of the type used by the B.B.C. As an additional precaution, a video recording was made in London beforehand of the complicated colour signals transmitted from Paris, to be used in the event of there being any breakdown in the radio link between the two capitals. It is satisfactory to report that the recorded version was not, in fact, required.

"Linguists' Review"

THE February 1960 issue of *Linguists' Review* contains an interesting article from the pen of Mr. John Swinnerton (G2YS) on the link between the radio listener and the linguist.

" The value of Amateur Radio for the linguist," writes Mr. Swinnerton," is that it puts him in touch with ordinary people everywhere, talking about those matters which affect their daily lives whether they be in Russia, or Ruandi Urundi, Peru or Pakistan. It is "free speech" at its most personal level."

Copies of the current issue of *Linguists' Review* can be obtained from the Institute of Linguists, 3 Craven Hill, London, W.2, price 1/6 post free.

Stable Frequency Generation

A SYMPOSIUM on Stable Frequency Generation arranged by the British Institution of Radio Engineers will be held in the Gustav Tuck Theatre, University College, London, on May 25, 1960, commencing at 3 p.m. Further information may be obtained from the Institution at 9 Bedford Square, London, W.C.1.

Morse Code Class in Croydon

A MORSE CODE class is to be held on Wednesdays at Croydon Technical College, Park Lane, Croydon, for those wishing to take the G.P.O. Morse Test. Applications to join the class should be sent to the Bursar at the College.

Single Sideband

By G. R. B. THORNLEY (G2DAF)*

METHODS of final conversion to the six amateur bands from 160 to 10m using harmonics from one crystal are of particular interest to single sideband operators. Two ways of doing this were discussed in the February issue of the BULLETIN.

DJ4BR who has been operating on 80m recently, has given details of another interesting arrangement in use at his station. It is understood that the method was developed by DL9JQ.

Control with Two Crystals

The original s.s.b. generation in DJ4BR's transmitter is by the phasing method at 9 Mc/s with crystal control of the carrier oscillator. This s.s.b. output is fed into the first mixer and heterodyned by the ninth harmonic from a 3·5 Mc/s crystal. The sum frequency of 40·5 Mc/s is fed into the second mixer and heterodyned with the v.f.o. tuning 5 to 5·5 Mc/s. The resultant s.s.b. ouput of 35 to 35·5 Mc/s is then heterodyned by the required output from a switched harmonic generator fed from the 3·5 Mc/s crystal oscillator and this gives the right output for each band as shown in the block diagram in Fig. 1.

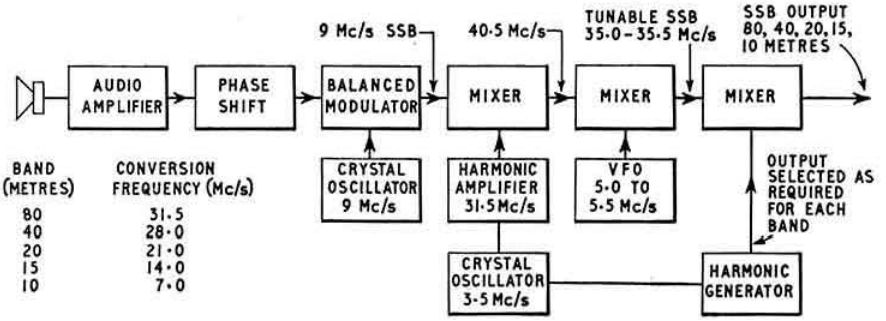


Fig. 1. Block diagram showing method of converting an initial s.s.b. signal generated at 9 Mc/s to five amateur bands using the harmonics of a 3·5 Mc/s crystal.

Because the required harmonic is from a higher frequency crystal than the value used in either of the two previously discussed methods, the problem of selecting the wanted and satisfactorily attenuating the unwanted harmonics is made easier. Possibly a single valve, or two triodes in one envelope such as a 12AT7 with two tuned circuits would be satisfactory in this application.

Because of the use of the high mixing frequencies, the s.s.b. output at the conversion mixer anode is low—of the order of one volt R.M.S.—and a stage of amplification is required between this valve and the driver stage. On the 10m band only 28 to 28·5 Mc/s is covered; if operation is required from 28·5 to 29 Mc/s the v.f.o. range would have to be increased to 1 Mc/s by making it tune from 4·5 to 5·5 Mc/s. This would reduce the tuning bandspread by half, but that is the price that would have to be paid for the simplification in the final conversion section.

At the time of writing these notes the only British station known to have tried this system is G6LX who reports very satisfactory results.

The G2DAF Transmitter Again

No apology is made for returning to the subject of the G2DAF transmitter: it is proving to be a popular design and it is estimated that something like fifty are either in use or in course of construction. Additionally many more sideband operators are modifying their existing equipment to embrace the basic sideband switching and frequency conversion methods discussed in the first of the three articles dealing with this transmitter.†

Owen Rogers (G2HX) built the transmitter last year from a circuit sent to him by the writer in January 1959, but as he had available a band switched linear amplifier complete with driver stage as a separate unit, he omitted the "back end" (V12 and V13) and took the output from the final conversion mixer through link windings on each coil down a co-axial cable to the existing driver and amplifier chassis.

In the true spirit of Amateur Radio, G2HX used his considerable past experience of s.s.b. construction and working to do some original experimental work and included two of his own modifications into the G2DAF design. The first was to arrange the sideband switching oscillator as two separate Pierce oscillators with the crystals permanently wired into circuit, using the existing 12AT7 valve. This eliminates the need for the two tuned circuits and as there would be no possibility of inductance variation with change in ambient temperature the oscillator may even give a higher degree of frequency stability.

This circuit arrangement is shown in Fig. 2. It is necessary to "pull" the crystal frequencies to obtain zero beat when switching sidebands, and this is obtained by adjustment to the Philips 3-30 pF trimmers in each grid circuit. G2DAF has tried this modification in his own transmitter and can confirm that it works very well—but a word of warning: it is not possible in the Pierce arrangement to pull the crystals to anything like the amount possible with the original oscillator circuit. Variation of shunt grid capacity also has a considerable effect on the amplitude of the oscillator output voltage and therefore the drive into the mixer. It would seem prudent not to attempt to pull the crystal frequency more than say 100 c/s. This means in practice that the crystals will

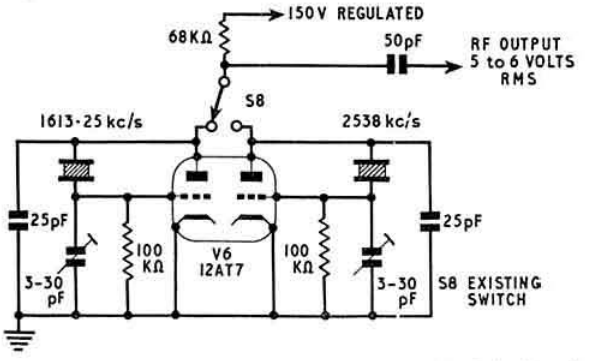


Fig. 2. Modified sideband selection oscillator for the G2DAF s.s.b. transmitter. The component values are those used by the writer.

* *5 Janice Drive, Fulwood, Preston, Lancashire.*

† R.S.G.B. BULLETIN, September, October and November, 1959.

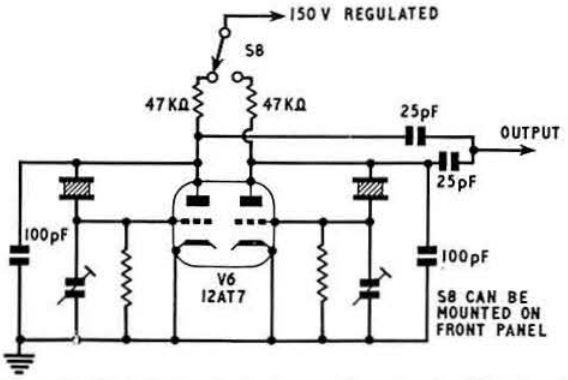


Fig. 3. Modified sideband selection oscillator for the G2DAF s.s.b. transmitter, involving switching of d.c. only, in use by G2HX.

have to be ground or etched carefully to frequencies as near as possible to the required values and the two grid trimmers used as final "vernier control." G2HX has also tried connecting the two outputs in parallel to obtain high or low sideband output by switching d.c. only as shown in Fig. 3, so providing a further simplification.

To sum up: The Pierce arrangement offers greater simplicity and the elimination of coils, but only at the cost of greater care in crystal adjustment. If the required accuracy of crystal grinding is not possible the constructor is recommended to stick to the original oscillator circuit.

The second G2HX modification was to the final conversion oscillator, in which the construction is simplified by using one coil only for the highest frequency required for the 10m band and switching in additional capacity to tune the coil to the frequency required for each of the other six ranges. This is shown in Fig. 4. On the lower ranges the larger value of required capacity is made up of the Philips 3-30 pF trimmer and a fixed silver mica capacitor in parallel. The writer has not tried this arrangement so the actual capacity values are not known. However, the lowest frequency required is 7·0 Mc/s and the highest 23·5 Mc/s, or a ratio of approximately 3·5 : 1. The required capacity ratio to give this is easily calculated as approximately 12 : 1, so if the coil is adjusted by its dust core and resonated by its own and the stray circuit capacity—likely to be of the order of 25 to 30 pF—the capacity required to tune the coil to 7 Mc/s will be 12 times the value, or a total of 325 to 390 pF; the other ranges will each require some in-between value. This is easily checked with the aid of an absorption wavemeter or grid dip oscillator.

It will be noted that the L/C ratio is lower on the lower ranges and therefore the dynamic resistance of the circuit and the oscillator voltage developed will also be lower. This

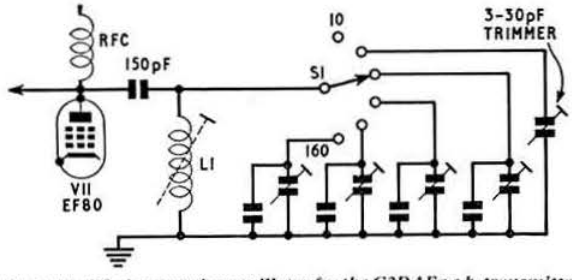


Fig. 4. Modified conversion oscillator for the G2DAF s.s.b. transmitter using one coil for all bands. L1 is the original 10m coil. All trimmers are Philips 3-30 pF. Fixed capacitors are chosen to resonate the coil to the required frequency for each band with the associated trimmer about half mesh.

compensates for the greater output with the lower frequency crystals used on the fundamental, and the smaller output with the band 5 and 6 crystals used on the second harmonic, and should result in a reasonably constant amplitude of output voltage throughout the six bands required.

In the original circuit the L/C ratios used were arranged to give a reasonably constant output with the crystals actually used. The required heterodyning input into the conversion mixer should be between 10 and 15 volts R.M.S., and this should be checked on each band. If due to a sluggish crystal it is below 10 volts, it will be necessary to either change the crystal or incorporate an additional switch bank to bring in a separate coil and capacitor with a more favourable L/C ratio for that particular range.

Any a.m. operator needing help or advice is cordially invited to join the s.s.b. net at the top end of the 80m band. It is only necessary to zero beat on to the channel and call in. The "old man" of 80m sideband, G3EPL, operates daily from 19.00 to 23.00 hours and spends a considerable amount of his time giving helpful advice. S.s.b. operators in general are only too willing to help and encourage the A3 man wanting to change over. G3EPL is specifically mentioned because he is the most consistent user of the band.

Notes, news and technical information for inclusion in the July BULLETIN should reach the author not later than the end of this month. Finally, a cordial welcome to the many newcomers who have come on to sideband during the last few months.

Frame Grid Valves

WHILST the range of frame grid valves recently introduced by Mullard Ltd., are designed primarily for use in television receivers, they will be of interest to the amateur constructor. The four types available are the PCC89, cascode r.f. amplifier; PCF86, frequency changer; EF183, a pentode for use in i.f. stages where a.v.c. is applied, and designed to replace the EF80 and EF85; and the EF184, a similar type to the EF183 but for use in stages where little or no control is used.

Compared with existing types, replacement of the PCC84 by the PCC89 will give a gain increase of 5 db; substituting a PCF86 for a PCF80 will double the mixer conversion gain. The slope of the variable-mu EF183 is 12 mA/V compared with 6·0 mA/V of the EF85 and 7·4 mA/V of the EF80, and an additional gain of 6 db is possible by the use of the frame grid type. The slope of the straight EF184 is 15·5 mA/V. The base connections of the newer types, with the exception of the PCF86, are similar to the valves that they are designed to replace, but component changes may be necessary in some circuits. Generally, the input and output capacities are similar. The h.t. rail should be in the region of 200V.

One change from normal practice suggested by the manufacturer is the use of a close tolerance decoupling capacitor of 1200 pF common to the anode and screen grid of the EF183. The neutralization provided by this capacitor should ensure stability of the i.f. stages. R. F. S.

Transistor Application Notes

NEWMARKET Transistors Limited has produced a series of Application Notes to meet the increasing volume of requests for more circuit information as an aid to design and development. These notes cover a wide range of applications, including audio amplifiers, transistor regulated power supplies, d.c./d.c. and d.c./a.c. converters, r.f. oscillators, a 40 joule electronic flash unit, high and low current relay drivers and a 50 mW tape recorder bias oscillator.

Application notes on any specific interest may be obtained from Newmarket Transistors Ltd., Exning Road, Newmarket, Suffolk.

The MONTH ON THE AIR

A CHRONICLE OF EVENTS ON THE HF AMATEUR BANDS

By R. F. STEVENS (G2BVN)*

MEMBERS will have seen in the April issue of the BULLETIN that John Kay (G3AAE) has had to relinquish responsibility for writing the *Month on the Air* and it is therefore fitting to open this month by paying tribute to him for the very able manner in which he has conducted the feature in the past.

To produce *M.O.T.A.* each month, and to maintain the topicality and coverage for which G3AAE has made it world renowned, is no mean task and he has set a high standard for his successors. It is hoped therefore that all those who have contributed in recent months, many for the first time, will continue to support the feature by sending in news and reports.

Now let's see what has been happening, or is about to happen, in the world of DX.

News from Overseas

In a letter to G6CL from **Christmas Island,** Sqn. Ldr. "Jumbo" Godfrey (VR3Z) mentions the difficulties of making contacts with European stations through the North American barrier. At the time of writing his only European QSO had been with LA3DB but a new four-element beam for 20m should materially improve the situation. Best times to catch the several stations now operating from Christmas Island are between 07.00–09.00 and 16.00–18.00 G.M.T. Amongst those heard but not worked are the following: G3FXB, G5WP, GI3IVJ, G3ABK, G3SJ, G5ZA, G3JLH, G3JVL, G8PB, G3GNL, G3KDB and G3ARE.

VS9ADL (ex-MP4TAF, MP4MAC), in a letter to G2MI, advises his new call and QTH, saying that he will be pleased to confirm any outstanding contacts made under his former calls on receipt of a QSL.

VK5TA, who is ex-G3MMI, sends his South Australian address which will be found in *QTH Corner*. Operation will be mainly on 14 and 21 Mc/s and Geoff is particularly looking for QSOs with stations in the London area.

JZ0HA is active from Dutch New Guinea on c.w., a.m. and s.s.b. On the latter mode his frequency is 14,294 kc/s, crystal controlled. The main operating times appear to be around 08.00, 12.00 and 23.00 G.M.T.

From G2JB it is learnt that daily contacts between VS1GC and **VS9MB** (Maldive Islands) take place on 21,225 kc/s at 14.00 G.M.T. Calls from G stations will be welcomed.

The following stations are active from the U.S. sector of **Antarctica:** KC4USA Little America (78°S 162°W); KC4USB Marie Byrd Base (80°S 120°W); KC4USH Ellsworth Base (77°S 41°W); KC4USK Wilkes Base (66°S 110°E); KC4USN Amundsen and Scott Base at the geographical South Pole.

A number of U.S.S.R. stations are active from the **Arctic** region, amongst them being: UA0AZ and UA0BF Dickson Island; UA0IK at Pevek on the Arctic Ocean coast; UA0KAE at Cape Chelyuskin (76°N 105°E); UA0KID at Chukouku on the Bering Sea; UA1KGC Archangel; UA1KUB Murmansk. UA1KAE is active from Mirny Base in **Antarctica.**

A card from W2CTN shows the following stations for which he is now QSL Manager: CN2BK, CR4AH, CR4AV, CR4AX, FK8AI, FK8AT, FK8AW, FM7WP, FM7WU, HR2FG, KW6CP, WK6CU, JZ0DA, JZ0HA, OQ5IG, OX3RH, TG9AL, TI2WD, VK2FR, VK9GK, VK9NT, VR2DA, VR2DK, VQ2EW, VQ3CF, VQ3HH, ZB2I, ZD2DCP, ZS7M and 9G1BQ.

According to a letter from W1WPO of A.R.R.L. to the W.G.D.X.C., Mauretania **(FF7)** and Ivory Coast **(FF4)** Republics will *not* count as new countries for DXCC.

SU1MS will be QRT from Cairo towards the end of May and will be attending a University in Germany. All outstanding QSL cards (not W/K) can go through the R.S.G.B. Bureau or to DL1BO.

I5GN operated by Jere and Pat Nudson in Mogadiscio has now closed down, but I5TUF is very active, particularly on 21 Mc/s a.m.

VE2AIG/SU in the Gaza Strip will be closing down in about a month's time. QSL address is in *QTH Corner*.

G3LB reports that **WA2EDV/MM** is now on board *The Rolling Stone* and using a KWM-1 on 14, 21 and 28 Mc/s feeding two "heli-whips" lashed to the top of a 60 ft. mast

DXotic Showcase

Call-sign	kc/s		G.M.T.	Country
KZ5LC	3,506	c.w.	05.55	Canal Zone
PJ2AE	3,535	c.w.	07.43	Aruba
UA9CM	3,501	c.w.	00.50	U.S.S.R. (Zone 18)
VO1AE	3,504	c.w.	00.10	Newfoundland
YA2TA	3,506	c.w.	03.30	Afghanistan
ZB1FA	3,515	c.w.	23.00	Malta
CX1AA	7,030	c.w.	22.35	Uruguay
FF8BF	7,012	c.w.	21.10	French West Africa
JA8LN	7,008	c.w.	21.10	Japan
UA0KYA	7,006	c.w.	22.55	U.S.S.R. (Zone 23)
VK5JE	7,013	c.w.	20.50	Australia
ZA1KC	7,005	c.w.	23.45	Albania
DU1OR	14,078	c.w.	20.00	Phillipine Is.
FK8AW	14,020	c.w.	19.40	New Caledonia
FG7XG	14,032	c.w.	20.05	Guadeloupe
LA1NG/P	14,085	c.w.	19.25	Jan Mayen Is.
VP8BK	14,007	c.w.	19.50	South Georgia
VR3Z	14,020	c.w.	08.30	Christmas Island
YA1AO	14,080	c.w.	20.17	Afghanistan
ZK1AK	14,030	c.w.	07.20	Cook Is.
4S7EC	14,020	c.w.	16.30	Ceylon
7G1A	14,040	c.w.	19.30	Rep. of Guinea
BV1USE	14,330	s.s.b.	17.00	Formosa
EA0AC	14,315	s.s.b.	15.20	Spanish Guinea
ET2US	14,330	s.s.b.	16.30	Eritrea
FB8CJ	14,325	s.s.b.	15.23	Madagascar
HS1B	14,316	s.s.b.	16.20	Thailand
ZK2AB	14,160	s.s.b.	17.57	Niue Is.
ZS7P	14,315	s.s.b.	17.30	Swaziland
9N1GW	14,320	s.s.b.	14.09	Nepal
DL3RO/EP	21,320	a.m.	11.10	Iran
FB8XX	21,150	a.m.	16.35	Kerguelen Is.
KC6JB	21,080	c.w.	14.16	East Caroline Is.
K6CQV/KS6	21,380	a.m.	09.35	American Samoa
KW6DA/KM6	21,320	a.m.	08.20	Midway Is.
UA0LA	21,260	a.m.	08.40	U.S.S.R. (Zone 19)
VP2ML	21,240	a.m.	22.15	Montserrat
VR2BC	21,250	a.m.	08.30	Fiji Is.
VS9MB	21,140	a.m.	15.15	Maldive Is.
W2AYN/EP	21,150	c.w.	17.20	Iran
HI6CJY	28,350	a.m.	18.20	Dominican Republic
I5TUF	28,395	a.m.	17.45	Somalia
RA0CAY	28,300	a.m.	09.50	U.S.S.R. (Zone 19)
RG6AAE	28,300	a.m.	14.00	Armenia
VU2CQ	28,310	a.m.	11.35	India

** Please send all reports to R.S.G.B. Headquarters to arrive not later than the 18th of the month.*

Three views of the amusing coconut trophy offered to the first member of the London Members' Luncheon Club to work the Christmas Islands stations whose calls appear on it.

as three band dipoles. Kurt Karlsen (W2ZXM) of *Flying Enterprise* fame is bringing the 55 ft. yacht *Wind Rose* to the United Kingdom to race her and will be using similar gear to WA2EDV/MM on the trip across the Atlantic which begins on June 12.

DXpeditions

Iran has suddenly sprung into the DX news after some years of inactivity. There are now three stations active: DL3RO/EP, W3ZA/EP and W2AYN/EP. DL3RO/EP is active on 28, 21 and 14 Mc/s a.m. and the other two stations are on 14 and 21 Mc/s c.w. Although EP has appeared on the F.C.C. banned list for some years, the latest reports say that the ban has now been removed. These stations will shortly be joined by G3NMU who is now in Iran, together with a KWM-1, and will be staying there for about 2 years. It is hoped that now the ice has been broken, we may hear G3NMU/EP on the air.

QTH Corner

CN8JF	to W8UWT (Stateside call).
CO2LE	19 Laguna Street, Havana.
DL3RO/EP	P.O. Box 709, Teheran, Iran.
EL2V	Box 37, Monrovia.
HH2CB	P.O. Box 235, Port au Prince, Haiti
I5TUF	P.O. Box 16, Mogadiscio, Somalia.
MP4QAK	Box 56, Doha, Qatar.
PZ1AX	Box 1842, Paramaribo.
VK9HC	c/o Cable Station, Cocos (Keeling) Island, Indian Ocean.
VE2AIG/SU	U.N.E.F. Post Office, Beirut, Lebanon, or to home QTH.
VK9TK	T. Keller, Catholic Mission, Kieru, New Ireland.
VP2ML	via K4SXO.
VP5ME	via W5TGV.
VP9QQ	G. E. Herringshaw, M.C.T.B., P.O. Box 275, Hamilton, Bermuda.
VS9ADL	21124307 Sgt. Leese, D., " A " Sqn. Royals, Aden, B.F.P.O. 69.
W2AYN/EP	Khiaban, Sepand 46, Teheran, or to home QTH.
W3ZA/EP	Box 341, Beirut, Lebanon.
ZD3S	Box 251, Bathurst, Gambia.
ZK1AK	via W3GJY.
ZS7P	c/o P.O. Box 3650, Johannesburg. (W/K via W6BAF).
4X4KP	35 Helran Street, Jerusalem.

* * *

R.S.G.B. QSL Bureau: G2MI, Bromley, Kent.

Seychelles. It is learnt from MP4BBW that W0AIW (ex-VQ9AIW) will arrive in Mombasa in the middle of October, and will thereafter leave on a DXpedition probably starting with the Seychelles and covering most of the islands off the East African coast.

San Marino. From the *W.G.D.X.C. Bulletin* it is learnt that DL9PS is hoping to operate from San Marino probably around August 5 and 6. Definite information will be available later.

From **OK7HZ/YI,** the Czech globe covering DXpedition, there comes a report that, as far as is at present known, they will be going by boat to Bombay and hope to obtain permission to operate from India.

A DXpedition to **Cabinda** is in the making by CR6AI and CR6BX. Cabinda is a part of Angola located north of the corridor leading to the Belgian Congo. It is hoped to operate on 28, 21 and 14 Mc/s a.m., c.w. and s.s.b. It would seem unlikely that separate country status will be granted by the A.R.R.L. as they have always refused to recognise OQ0, but one can only wait for the word from West Hartford. (Thanks to PA0FX and the *DX-press* for this news.)

A note from EI6X advises that a DXpedition to the **Blasket Isles** will take place from 00.00 on May 21 to 16.00 on the 22nd. The call to be used will be **EI0AA,** and operation will take place on a.m., c.w. and s.s.b. QSLs should go to EI4R; if a direct reply is required the necessary s.a.e. or I.R.C. should be enclosed. Operators will be EI2X, '4R, '4AD, '3B, '5AB, '7BD, '9AD and '6X. This will not count as a new country but will be new for WPX.

Danny Weil, who has been heard testing the gear from the ***Yasme III*** under the call W8LNI/4, was due to set out for Jamaica on May 1, according to information from G3YF, and should, by now, be active on the bands. Transmission facilities on all modes, including RTTY, are available.

From MP4BBW it is learnt that a DXpedition organized by ZL4JF will go this summer to the **Auckland and Campbell Islands** which lie to the south of New Zealand. The A.R.R.L. has recognised these islands as a separate country for DXCC.

Latest news on the next **FD8AMS** DXpedition is that it will take place in October. Gear already available includes a Collins KWM-1, Heathkit Apache and SB10, and a Mosley TA33JR triband aerial.

G3LAS (Ely) writes to say that the recent operation by

Cambridge University from the Isle of Man under the call **GB3LAS** yielded 815 contacts in 60 countries and 20 zones, despite a period of very bad conditions. Further trips are contemplated, and in the meantime it is hoped to provide Cambridgeshire and Huntingdonshire contacts for the Top Band county chasers.

OD5CT (W3ZA) will be operating from **ST2**, probably during the third week of May, mainly on s.s.b.

W9EVI states that the trip to Malpelo Is. (HKTU) was cancelled as the many changes of plans prevented most of the operators from making the trip but G3IHG reports that **HK0LX** was due to operate from there May 10-17.

Awards

A new award with an alcoholic twist is announced by the Port Wine Institute with the support of the Portuguese national society, the R.E.P. To obtain the award it is necessary to work (from Europe) nine stations in specified provinces beginning from December 1, 1958. With each award goes a bottle of genuine port! Full details can be obtained from Instituto do Vinho do Porto, Porto, Portugal.

The Northern California DX Club Inc. now offer The California Award to all amateurs outside the 50 states of the U.S.A. who have QSLs from 220 different California stations, 20 of whom must be members of N.C.D.X.C. QSLs may be certified by officials of recognised amateur radio societies and clubs. Full particulars of the award can be obtained from P.O. Box 75, Oakland, California, U.S.A.

G3AAE is the first amateur in Europe to receive the Worked All Bermuda award issued by the Radio Society of Bermuda.

DX Briefs

The West Gulf DX Club reports that all **VU2ANI** QSLs have been completed and shipped by surface mail to W8PQQ for distribution.

A report from OQ5CJ (via G3AAE) quotes RA1FJL as giving his QTH in **Franz Josef Land.**

Willis Island will not, after all, be heard on the amateur bands in the near future, as none of the relief operators are amateurs.

ZA2BAK has been heard and worked on 14 Mc/s c.w. and gives his QTH as **Tirana.** The only certain thing is that the signal comes from the right direction.

28 Mc/s

Whilst showing signs of the summer doldrums to come 28 Mc/s still attracts considerable interest during its better periods.

ZD2JKO (Zaria) in the course of a most informative report on conditions in Africa, offers RD6KAR (14.00, '180), VE1ADE (P.E.I. 14.45, '400), ZS7L (17.30, '280), and ZS8I (16.15, '350), all on a.m. **G3MVV** (Romford) has conversed with RA0CAY (Zone 19, 09.50, '300), RH8AAD (14.32, '320) and KZ5AA (15.12, '850). **A.1902** (Reading) has heard HI7CJY (16.40, '565), HR1AC (20.05, '475), 9M2EZ (15.51, '103) and XZ2SY (17.47, '300). **G3AAE** (Coulsdon) chatted with RG6AAE (14.00, '300) VQ8AV (17.45, '385), ZS7L (18.05, '460) and new arrival I5TUF (17.45, '395).

B.R.S.22694 (Penzance) logged ZD2JKO (17.20), XW8AL (15.35), VU2PS (15.50), PJ2CA (18.30), HZ1AB (13.00), ZD1RO (17.30), RO5AGA (16.45), RO5AZE (15.25), VQ2SB (18.05), RH8AAD (09.25), RA9KCX (15.30).

21 Mc/s

This band continues to produce some good DX with a.m. finding greatest favour.

Although conditions may appear poor, the 29 valve receiver of **G3FPQ** (Elstead) would have it otherwise to the tune of FB8XX (18.15, '195), DL3RO/EP (11.10, '320), KH6BGF (08.40, '290), KW6DA/KM6 (08.20, '320), K6CQV/KS6 (09.35, '380), UA0LA (08.40, '260), VP2ML (22.15, '240), 9N1TB (18.45, '250), and other worthwhile a.m. DX.

Before summer chores overtake **G3BHW** (Margate) A3 contacts are reported with MP4TAF (13.55, '210), VS9MB (14.50, '150) and I5TUF (14.10, '210), whilst c.w. provided the means of communication with FM7WU (20.20, '080), KC6JB (14.16, '050), VP8EG (19.20, '100) and ZS7R (20.05, '030).

A.2121 (West Harrow) found plenty to interest him on 21 Mc/s and amongst the stations heard were VP8DH, VP8DW, and VP8DV, all from the Antarctic region round 20.00, FB8CD (18.15), ZD1EO (09.16), OA4LP (17.04), FD8AMS (18.26) and VQ5EK (19.09). From Virginia, U.S.A., **F.R.S.309** submits a long list from which we choose HC1JW, OA3J, YN1ED, VP7NB, VP1JH and VP2DX, all on phone.

ZD2JKO tells of a.m. contacts with HI8JBD (20.30, '150), OR4TX (09.30, '150), VP3MC (22.00, '240) and VQ6AB (14.00, '180), with c.w. accounting for a good number of the W7 fraternity.

For **A.1902** this band produced on a.m. DL3RO/EP (11.36, '253), VS9MB (15.47, '150), 4S7YL (19.25, '232) and, from Kathmandu, 9N1TB (14.59, '205). **A.2132** (Kingsbridge) logged UA0LO (Zone 19, 11.28), ZD2AMS (16.20) and VP8EM (21.35), with **A.1859** (New Barnet) reporting signals from FB8XX (15.54), K6CQV/KS6 (09.05), FB8CD (15.46), and ZD6DT (17.54), all on a.m.

Among a.m. contacts for **G3YF** were XW8AL (15.20, '230), XZ2SY (16.15, '185) and FB8CD (16.30, '168) while KW6CP (13.30, '255) was a good one on sideband.

14 Mc/s

This band, notwithstanding some poor days, has been the most reliable for round the clock DX with North America dominating the late hours.

The month has been notable for a number of excellent reports sent in by listener members which shows that they,

Syd Spencer VE7AMD, of Victoria, British Columbia is the proud owner of this neat station. The transmitter is a Heathkit "Apache" and the receiver a Heathkit "Mohawk." The Johnson "Ranger" transmitter is used as a standby. The aerial is a home-built G4ZU beam. Syd is always happy to work DX stations and adheres to a commendable 100 per cent QSL policy.

at least, do not experience any difficulty in tuning s.s.b. transmissions.

S.S.B.

Despite a holiday in VQ4/VQ5 **MP4BBW** forwards a list of sideband DX second to none: AP2CR (16.17, '326), CX2AX (13.00, '318), FB8CJ (15.23, '325), I5GN (14.42, '331), HI8GA (18.48, '325), HL3HH (05.09, '316), JZ0HA (13.09, '294), KG4AZ (02.58, '328), LA3SG/P (19.05, '301), OE1RZ (15.25, '294), OY7ML (19.47, '327), VS1JO (18.27, '320), TA3GI (17.09, '296), YS1MS (13.22, '310), ZK2AB (17.57, '160), SL5AB (18.20, '320), 9N1CJ (14.48, '294). All, incidentally, worked with a ground plane and a KWM-1 barefoot, but a beam and a linear amplifier are to be added shortly.

G6UT (Little Hallingbury) reports carrierless contacts with AP2CR (17.40), HI8GA (12.35), KC4USA (09.25), KC4USH (10.00), VU2CQ (17.20), HS1B (14.30), XE1DE (09.25), all on the high end of the band. **G3FPQ** (Elstead) mentions contacts with ZS7P (16.50, '320), KL7CDF (19.30, '310), PZ1AX (22.40, '170), TI9SB (22.45, '310) and HS1K (17.10, '310).

A3a holds no terrors for **B.R.S.21457** (Gillingham) who logged KV4BQ (20.45, '300), 9N1GW (14.09, '320), EA0AC (15.20, '315), and DXpedition TI9SB (07.35, '300), whilst **B.R.S.22013** (Hereford) heard XZ2SY (18.07, '326), BV1USC (20.07, '309) and PZ1AD (21.58, '340). **A.1930** (Thorpe-le-soken) received the signals of VE8NH (16.30), KH6KH (08.05), KW6DB (13.15), FF8AK (07.10) and HS1B (15.50) with **B.R.S.20317** reporting most of these stations and also KG6NAA (18.00, '328) and HS1K (16.50, '310). **A.2114** (Richmond) reports hearing s.s.b. on 4 bands, which on 14 Mc/s includes KR6CP, (18.07, '300), BV1USC (18.09, '280), and HC1AIB (18.20, '190).

Commonwealth Competition

	28 Mc/s	21 Mc/s	14 Mc/s	7 Mc/s	3·5 Mc/s	Total
VE7KX	14	38	29	32	27	140
G3BHW	37	50	44	4	—	135
G8KP	18	32	35	26	18	129
G3AAE	43	24	38	14	—	119
G4CP	15	29	41	18	15	118
ZD2JKO	24	26	28	22	6	106
G5VU	20	22	36	8	9	95
G8DI	12	11	15	12	18	68
GM2DBX	37	21	8	—	—	66
MP4BBW	—	—	47	—	—	47
G2BLA	12	13	9	10	3	47
G3KHA	13	—	27	—	—	40
G3BRE	—	2	8	8	18	36
G2DCG	7	21	3	—	—	31
G3KSH	7	9	6	4	3	29
G3GMY	12	12	3	—	—	27
G3MCN	10	12	1	—	—	23
G3MGL	8	2	6	4	—	20
VE2BAT	—	—	15	2	—	17

Band Leaders

28 Mc/s—G3AAE
21 Mc/s—G3BHW
14 Mc/s—MP4BBW
7 Mc/s—VE7KX
3·5 Mc/s—VE7KX

B.R.S.20317	34	46	52	44	30	206
B.R.S.15844	25	33	42	41	23	164
B.R.S.22013	26	44	58	18	6	152
A.1859	33	54	40	4	3	134
B.R.S.21008	34	47	32	4	—	117
B.R.S.2292	25	29	26	18	—	98
B.R.S.22249	29	25	23	14	3	94
A.1583	23	44	18	—	—	85
A.1902	29	26	13	—	—	68
A.2065	20	21	18	2	3	64
A.1965	12	30	11	2	3	58
A.1980	22	28	6	—	—	56
B.R.S.21457	—	—	47	—	—	47
A.1792	15	14	16	—	—	45
A.1946	7	9	12	2	3	33

Band Leaders

28 Mc/s—B.R.S.20317 and B.R.S.21008
21 Mc/s—A.1859
14 Mc/s—B.R.S.22013
7 Mc/s—B.R.S.20317
3·5 Mc/s—B.R.S.20317

B.R.S.22249 (Cwmbran) heard the s.s.b. signals of HZ1AB (19.28, '296), SU1MS (19.17, '298), ZL3LE (20.14, '310) and 9G1BF (20.42, '305). **A.1736** (Corby) logged, amongst others, KC4USH (08.50), KG4AE (21.55) YS1MS (22.10), TA3GI (18.25) and KG1BX (18.45).

R.T.T.Y.

RTTY is a mode of transmission in which increasing interest is being shown. **VE7TX** reports that his country score is now 19 confirmed, with W6CG believed to be on the 20 mark. Amongst the DX stations making an appearance on RTTY are TG9AD and ZK1BS. PA0FB is active on 3·5 and 14 Mc/s and transatlantic contacts have been made.

C.W.

GM3ITN (Clydebank) records contacts with the following: VK0IT (19.20, Macquarie Is.), FK8AW (19.40) UA0KKB (Zone 19, 22.15), DU6IV (14.40), VR2DK (10.20), VR3Z (10.00), UA0KYA (Zone 23, 19.10), LA1NG/P (19.30), and UA1KAE/6 (Antarctica 18.40). **ZD2JKO** keyed with VR3Z (08.30, '020), ZK1AK (07.20, '030), 4S7EC (16.30, '020) and 7G1A (19.30, '040). **G3BHW** (Margate) worked DU1OR (20.00, '078), YA1AO (20.17, '080), SV0WZ (20.28, '070), F9UC/FC (18.20, '090) and doubtful ZA2BAK (18.50, '085).

M.O.T.A.'s former conductor, **G3AAE** (Coulsdon), exchanged RST with ZS7R (20.20, '064), VR2DK (08.00, '092), VK0AB (08.20, '088), FG7XF (22.35, '078) and YA1BW (20.20, '084), whilst neglected a.m. provided K6CQV/KS6 (09.15, '268). **B.R.S.22013** reports VS9OC (17.10, '073), HL9KR (13.30, '025), ZK1AK (07.30, '150), and VR2BZ (17.12, '015).

G3YF mentions amongst others, 7G1A (17.45, '052), HL9KR (15.45, '036), LU6ZB (20.15, '015), DU7SV (17.00, '020), VK0PM (17.10, '040), FR7ZD (16.45, '035) and YA1BW (23.30, '085) on c.w. and 9N1CJ (15.30, '288) on s.s.b.

A.M.

Showing that there is still life in a.m. **GM3ITN** conversed with VK0BH (18.25), VP2DX (22.15), TI5CV (23.45), YA1AO (19.10), and the now departed I5GN (19.25). From Virginia, **F.R.S.309** reports VE0NA, HK0AI, YS3PL, FS7RT and HH2RD.

7 Mc/s

Reports, although few for this band, show that the DX is there providing sleep is not a primary consideration. **G3FPQ** contacted JA8LN (21.10, '008), UA0KYA (22.55, '006), ZA1KC (23.45, '005), and VK5JE (20.50, '013), while **B.R.S.22013** heard HK7MM (23.47), OX3SL (00.05), and ZL1ATW (07.00). **B.R.S.20317** (Bromley) devoted considerable attention to this band and records VP1JH (05.20, '011), VP3YG (06.25, '002), VO7NT (05.25, '015), KZ5LC (08.10, '008), CX1OP (23.25, '012) and YN4AB (08.20, '020). All on c.w.

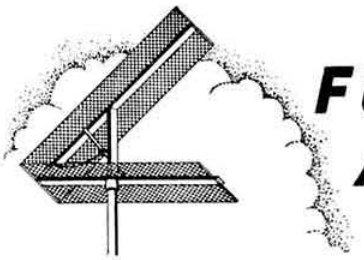
B.E.R.S.1002, reporting from Holbrook, Australia, heard JA2JW, JA1DZY, JA8ZK, KH6DR, UA3KQB, UC2AD, KH6UL and G3BEP on c.w.

3.5 Mc/s

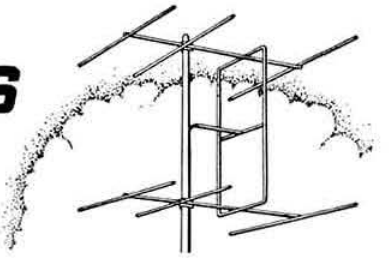
G3BRE (Shaftesbury) keyed with ZB1FA (23.00, '515), VO1AE (00.10, '504) and YA2TA (03.30, '506) together with W1, 2, and 3 and VE1. **B.R.S.20317** listened to VP1JH (05.45, '508), UA9CM (00.50, '501), KZ5LC (05.55, '506), VP5FP (06.35, '502), PJ2AE (07.48, '535) and VO1AE (00.10, '504), all on c.w.

The Commonwealth Competition

In the absence of a report from **G8KP** the lead is taken by **VE7KX** who is welcomed to the table. **ZD2JKO** is another new entrant of whom no doubt we shall be hearing more. In the heard department **B.R.S.20317** maintains his lead by virtue of a good score on all bands, but he is being challenged by new entrant **B.R.S.15844.**



FOUR METRES AND DOWN



144 Mc/s Transistor Transmitters — Great Auroral Openings

By F. G. LAMBETH (G2AIW) *

EVER since transistors became available, v.h.f. enthusiasts have looked forward to the time when it would be possible to use these devices at v.h.f. It is therefore particularly gratifying to report that what is believed to be the first two-way contact on 144 Mc/s using transistor transmitters at both ends took place on April 9, 1960, between G3LBA (Stoke d'Abernon, Surrey) and G6OH (near Ascot, Berkshire). Signal reports were RST529 over the 16 mile path between the two stations.

The circuit diagram of G3LBA's transmitter is shown in Fig. 1.

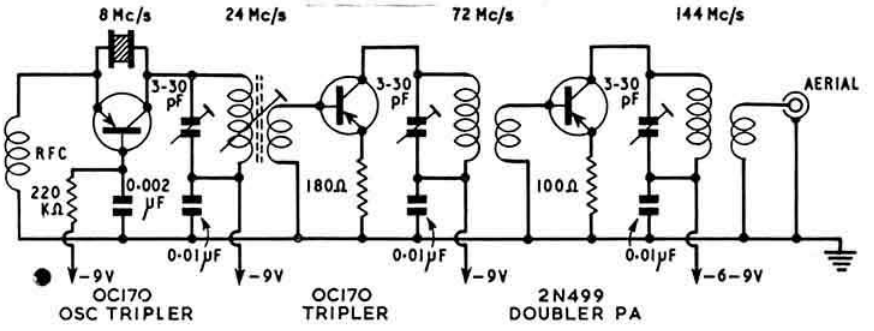


Fig. 1. Circuit diagram of G3LBA's all-transistor 144 Mc/s transmitter.

Great Auroral Opening

The other big news of the month was undoubtedly the exciting auroral opening of March 31 which continued during April 1, although SM6PU reported auroral conditions on *14* days during March with 144 Mc/s signals heard on March 1, 15, 16, 30 and 31. In England, G4LX found traces of aurora on the days mentioned but was unable to make 144 Mc/s QSOs until the big opening of March 31. This opening began at SM6PU late in the evening of March 29, but no signals were heard until 23.35 G.M.T. on March 30 when he contacted SM3AST and heard SM3WA. Auroral conditions were observed at this time by LA9T, GM3BDA and G4LX but no results on 2m.

By 16.30 G.M.T. on March 31 the 2m band was wide open. Between then and 17.00 G.M.T., SM5 stations worked SM5 and OZ. From 17.00 to 18.00, GM stations heard or contacted G, GW and DL, G stations worked other Gs, and SM5 was busy with SM1, 5, 6, 7, DL, OZ, SP and LA. Between 18.00 and 19.00, G, GW and GM stations were hearing one another and LA was in QSO with SM. No QSOs were reported again until 21.00, and from then until 22.00 the LA stations were again contacting SM. At around 22.00 the band opened up generally once more, with Scottish operators in contact with G, GW and DL. One SM5 contacted all seven SM call areas as well as hearing or working GM, DL, SP and LA. LA stations worked into SM, DL, and SP and a few G stations contacted one another. These conditions persisted in Norway, Sweden and Holland until 01.30 G.M.T. on April 1, though they died off in England and Scotland at 00.45 G.M.T.

Highlights of this opening were the first LA-SP 2m QSO between LA3AA and SP5PRG at 23.57 G.M.T. LA3AA also succeeded in working all SM call areas for the first time.

A much greater opening took place on April 1 around midday but reports from more observers are essential before a very accurate picture can be presented. However, a preliminary survey shows that the best auroral conditions were enjoyed on the Continent. GM3DBA was the most successful of the U.K. stations while others, such as GM2FXN, G4LX, and G5LK, were frustrated by hearing real DX but being unable to raise anyone. PA0FB had QSOs with eight different countries during this opening. The aurora developed at around 12.45 G.M.T. and lasted until 17.00. GM3BDA had QSOs with PA0FB, DL1RX and DM2ADJ. GM stations also heard G, GW, OK, and SM signals without making contact. G stations heard G, GM, GW, DM, DL, PA0, OK SP, and SM stations, but there is only one report of a QSO—between G3DIV and PA0FB. On the Continent, DM, DL, PA0, SM, SP, and OK stations were freely working each other during the opening.

For the record, the following calls appear in the reports of auroral QSOs on this important opening: G2BDQ, 2JF, 2XV, 3CCH, 3DIV, 3FZL, 3HBW, 3HYH, 3LTF, 4LX, 5LK, 5MR. GM2FHH, 2FXN, 3BDA, 3FGJ, 3FMD, 4HR, 6SR, GW2HIY, DL1BF, 1RX, 1SN, 3YBA, 6QS, 7FU, 9ARA, DM2ADJ, DJ3FX, LA3AA, 4VC, 9T, OK1AMS, 1GV, 2VCG, PA0FB, 0HRX, PE1PL, OZ5BK, SM1BJY, 1BSA, 1CNM, 2CFG, 3AKW, 3AST, 3WA, 3WB, 4AMM, 4BOI, 4KL, 4KM, 4PG, 5ADZ, 5AKP, 5ANH, 5ARU, 5CN, 5IP, 6ANR, 6BSW, 6BTT, 6CJI, 6CS, 6CSI, 6NQ, 6PU, 7BAE, 7BYB, 7BZX, 7CUF, 7YO, 7ZN.

GM3BDA, G3FZL, G3HBW, G5LK, SM6PU, PA0FB

* *V.H.F. Manager, 21 Bridge Way, Whitton, Twickenham, Middlesex.*

and LA9T are thanked for supplying the information on which the above report was prepared by G4LX.

G4LX comments that if anyone whose call is listed in the report would like to know who heard him and when, he should communicate with G4LX at 1 The West Rig, Newcastle upon Tyne 3.

A very interesting report on the auroral opening has been received from **OK2VCG** via G3FZL and his extensive list appears in *Worked and Heard on V.H.F.* OK2VCG's equipment includes a 150 watt transmitter (shortly to be increased to 400 watts to a pair of 4-65As), an 11 element Yagi and a receiver with an E88CC r.f. stage. His frequency is 144·41 Mc/s.

G4LX's personal view on this opening is that it was a flop as far as G and GM were concerned. The great aurora of March 1959 was much more successful. Signals from the Continent were then consistently louder and more QSOs were made between the Continent and the U.K.

Continuation of Auroral Propagation Studies

In the March issue G3FZL mentioned that it was proposed to continue the study of auroral propagation throughout the whole 11 year sunspot cycle. G4LX will be collecting all auroral reports as part of this programme. To ensure the success of the programme it is essential that as many reports of auroral propagation reach G4LX as possible, especially as the frequency of occurrence reduces towards sun spot minimum. All v.h.f. operators and listeners are therefore urged to be on the look out for aurora and to send reports of any opening to G4LX as soon after the opening as possible. G4LX has a supply of special reporting forms for the purpose although any reports, whatever form they take, are welcome. If you intend to report an aurora please write to G4LX to let him know: he will send a supply of forms for *initial* reports. If there is a sufficient quantity of reports each month G4LX has offered to prepare a newsletter for dispatch to all reporting observers to give greater detail than can be published in this column.

Sixth International V.H.F.-U.H.F. Convention

Saturday, May 21, 1960

Kingsley Hotel, Bloomsbury Way, London, W.C.1

Programme:

Convention and Exhibition of V.h.f./U.h.f. Equipment opens	10 a.m.
Lectures and Technical Discussions commence	2 p.m.
Convention Dinner	7 p.m
Presentation of Exhibition Prizes and Grand Free Draw for many valuable prizes ...	9 p.m.
Convention ends	10.30 p.m.

Tickets may be obtained by post from F. G. Lambeth (G2AIW), 21 Bridge Way, Whitton, Twickenham, Middlesex, at the following prices: Convention only—3/6; Convention and Dinner—24/6. Bookings for the Dinner cannot be guaranteed if received later than Wednesday, May 18.

Tube Stations: Holborn and Tottenham Court Road. Buses: 7, 8, 19, 22, 25, 38.

Organized jointly by the R.S.G.B. V.H.F. Committee and the London U.H.F. Group.

Aurora News from Poland

The aurora of March 31/April 1 was very pronounced in Poland and SP5FM reports that many contacts were made. SP3GZ worked SM6ANR, OZ7BR, many other SMs and DL1RX, and heard SM, OK, DM, PA and DL stations as well as SP5PRG, SP9DU and SP9QZ. SP5PRG worked many SMs, LA3AA, DL7FU and OZ5MK, SP9QZ, near the Czecho-Slovakia border, worked SMs and DL1RX and heard many SMs, DLs and OZs. SP9DU worked SM6ANR and SM7BC while SP9DR had a contact with SM6ANR.

Noise Factor Measurements

One of the attractions at the International V.H.F./U.H.F. Convention in London on May 21 will be a demonstration of accurate noise factor measurement on 144, 432 and 1300 Mc/s converters by G3HBW. Members are invited to bring their own converters for measurement.

Two Metres News and Views

G3LTF (Danbury) sends an interesting report which also bears on the aurora. On March 12 his sked with G3ILX was worked on phone; on March 17th Midlands and North Midlands signals were coming in well though with deep fading, G3ILX peaking S9. On the 20th and 21st, GW2HIY (Anglesey) was worked at varying strengths and on the 22nd G3JGJ was heard on sked for the first time, but conditions were too poor for a QSO. G3ILX and GW2HIY were worked again. Conditions were poor until March 29 when G3JGJ was heard again very weakly, but solar noise was noted (this had been checked every evening). On March 31 DL3YBA was heard calling SM with a " glorious " note. A CQ call brought a QSO with OZ5BK and an inconclusive one with GM4HR. Later GM3FMD, GW2HIY and GM2FHH were worked. The following were heard, but not worked via aurora: PA0FB, DL1SN, DL1RX, GM3BDA, GW3MFY, G3CCH, G3HYH, G3HBW, G2XV, G3FZL. There were two distinct beam headings, one just east of north for GM, GW and G and one at north-east for DL and PA. On April 4 GW3MFY was stronger than G3ILX (it is usually the other way round). This also happened on the 5th, with the addition of GW5BI, and again on the 7th. On the 8th numerous French-speaking stations were heard, but ONs were weak whereas G6OX and others were giving them S9+ reports. F8ME (St. Brieuc) was worked on phone at S8 for the first time since last October.

A.1491 (Palmers Green) noted G3LHA's kind remarks last month but adds that he has regretfully missed every major aurora over the last two years! The 144 Mc/s Open Contest seemed fairly well supported with good conditions on the Saturday evening. Early rising on Sunday was amply rewarded with G3CCH (Scunthorpe) heard at 08.00. This was, however, apparently the only DX on when conditions were probably at their best. G3DFL, G3FAN, G2CIW and G3MNQ scraped through but G3JWQ was the outstanding DX signal of this contest. Things have generally been poor throughout the period, the only interest being in the new locals, the latest of whom are G3NUV (Bushey) 144·73 Mc/s, G2AOX (Hendon) 144·6, G3EIT (Erith) 144·35; G3DCV, an old 2m hand, is back again using various crystals, G3ABB, G4OT and G3WB are all on in Essex. March 17 was about the best date with G3GVC (Portsmouth) good on c.w. G3NRO (Ashford) has been very regular recently while G3KMP was the strongest ever on April 8.

B.R.S.21476 (Penarth) after 10 years of listening with only a single fixed dipole has at last installed a pair of slots and is hoping for much more DX!

GW3MFY (Bridgend) worked GM3FGJ for his first GM at 23·45 G.M.T. on March 31 via the aurora. Other GMs

called were GM3BDA and GM4HR, both heard 58A. The only other auroral signal heard was G3HYH. As during other aurorae, many calls and CQ calls were made before any contact was made. GM2FHH is reported to have called GW3MFY but was not heard there at all. The duration of the aurora at Bridgend was from 23.15 on March 31 to 01.00 on April 1 (although it was probably earlier than 23.15 as GW3MFY had not listened between 21.00/23.05). The only other bright period was the night of April 8 when G2IJ (Portsmouth) was worked on phone. G2IJ reported hearing ON on that same night.

G5MR (Hythe, Kent) missed the first auroral opening, but was on for part of the April 1 session; unfortunately the report last month that he worked GM3FMD is incorrect. G5MR first heard the GM when the latter was working G3DIV and he was then a steady S7. After that QSO, however, GM3FMD was not heard again. Quite good auroral QSOs were had with PE1PL and G3CCH, the latter being 59A both ways. G3CCH was the strongest signal on the band and could be heard after all the others had faded out. Auroral signals logged (but not worked) included DL2YF, G3DIV, G5LK, GM3FMD, PA0HRX and PA0FB. Other DL and PA calls were heard, but they were not written down in the rush. On April 8 conditions were good across the Channel and several Fs and ONs were worked and heard strongly.

GM2CHN (Glasgow) says that the West of Scotland stations mentioned last month all continue to be fairly active and GM3DIQ has also resumed more regular activity. GM3FMD (Maybole, Ayrshire), appeared on the band just in time for the auroral opening—he is understood to have worked five countries. His signals, and those of GM3KGJ (Prestwick) have now been heard in Glasgow although no contacts are yet reported. GM3KJF (Annbank) and GM3NMN (Irvine) are busy building while GM3NXM and GM3NIN are in the planning stage. GM2FXN (Dundee) has worked, among others GI5AJ, GM6ZV, GM3DIQ and GM3LDU. His signals are well received by stations on the high ground south of Glasgow but in the city area it is more difficult.

Two Metre RTTY

PA0FB states that PA0YZ, PA0SW and PA0FB have started using RTTY on 2m, with the a.f.s.k. system (850 c/s shift). There have already been some " half QSOs " with one side transmitting and the other only receiving. PA0FB asks for news of G stations on 2m RTTY.

Four Metres News

G3IUL (East Bedfont, Middx.) is still working hard on this band and has a regular sked every Sunday with G2DD (18.15 G.M.T.). G3GDR and G3FQS join in at times. G2CLW is also extremely active and says he has heard G5YV. G3IUL is running an S440B at about 20 watts input with G4ZU v.h.f. 3 element beam. G3IUL remarks that it's a pity there was no activity during the aurora (at least no one was heard). He also thinks a V.H.F. C.C. on 4m might encourage some of the certificate hunters; possibly a 2-4m Contest some time during the summer, when the most interesting results are to be expected, might also help.

A welcome letter from G2CLW (Bromley, Kent) reports that he has resumed operation on the band (frequency 70·23 Mc/s) with another crystal a little lower. The power input is 50 watts, feeding a 3-element beam, 32 ft. high. Operating times are 20.00 onwards most evenings. Listener reports will be welcomed.

It is suggested that operators should call " CQ four " as G3CLW notes many signals on 4m which are the fifth harmonics of 14 Mc/s transmissions.

B.R.S.21476 (Penarth) is listening regularly on 4m and usually hears G3EHY on Sunday mornings on c.w. but nothing else has yet been identified; although weak modulated signals have been heard and lost in the noise. A c.c. converter is envisaged along the lines of the one described by G3FZL some time ago but with a c.c. oscillator.

A.1491 is building a 2-element beam for 4m and the converter is ready. A 45 ft. mast is to be erected soon to carry beams for 4 and 2m and 70 cm.

G5MR (Hythe, Kent) says that activity is increasing in south-east Kent and G3IIZ and G8RK (both in Ashford, Kent) have converters. G5MR's activity is restricted temporarily by a broken feeder.

GM2CHN reports that now 4m is on a more permanent footing, several of the local stations are thinking about coming on to the band.

Seventy Centimetre News

G3LTF (Danbury) heard 10 stations on March 19 and worked six of them. The best DX was G2FNW (Melton Mowbray). The i.f. head amplifier at G3LTF has been improved and an A.2521 r.f. stage has been added to the 70 cm converter, giving some improvement. Slightly increased output has been obtained from the transmitter by employing a better output coupling method. A new aerial relay is being built, as the 77A type has measurable loss at 70 cm.

G5MR (Hythe, Kent) worked F8OB (Gournay-en-Bray) on April 8 for the first time on this band. In spite of his poor location, surrounded by hills, signals were 559 each way with some fading.

From *O.E.M.* (journal of the Austrian society, O.V.S.V.) it is learnt that the first OE/HB, QSO on 70 cm took place between OE9IM and HB1KI on March 14. This was followed on March 20 by the first OE/HE contact between OE9IM and HB1RG/FL/HE (Schaan-Liechtenstein). Congratulations!

ANOTHER AURORAL OPENING

Another session of intense auroral propagation on 144 Mc/s occurred on the afternoon of April 30 between 15.30 and 18.30 G.M.T. **G3HBW** reports having heard stations from all over the British Isles and Western Europe. DL3FM DL6TU, DL6MH (all in Bavaria), DM3ZFI/P (Erfurt) and SP3GZ (Wolsztyn) were worked. Many GI, GM, PA and ON stations and OZ5BK were heard. **G3EHY** heard 11 countries —G, GI, GM, GW, DL, HB, LA, ON, OZ, PA, and SM—and worked DL1FM, PA0QC, GM3HLH/A, GM3LAV, GM3DIQ and GI3GXP. **G5MR** worked GM3EGW via the aurora for his first GM ever and heard F, GI, many G and GM, ON and PA signals.

Danish V.H.F. Contest

OZ5MK (Lyngby) reports that the Danish V.H.F. Field Day (144 and 432 Mc/s) will be held as follows:

First period: Saturday, June 11, from 20.00-01.00 G.M.T.

Second period: Sunday, June 12, from 01.00-11.00 G.M.T.

Each station may be contacted once in each period. It is hoped that the unusual length of the second period will provide an incentive to go hunting for DX.

Worked and Heard on V.H.F.

Two Metres

B.R.S.21476 (Penarth). *Heard:* G2JM, G3CHW, 3EXW, 3EHY, 4RG, 5DW, 5KK, 5QA, 6GN, GW3ATM, 3DDY, 3HAW, 3MFY, 5AB, 8UH, 8NP.

G3HWR (Hampstead). *Worked:* G2XV, 2CIW, 3KHA, 5UF, 6GN, GW3ATM, 3MFY. *Heard:* G3BA, 3EJO, 3GWL, 4GR, GW8NP, 8UH.

OK2VCG March 31-April 1, 1960. (All auroral).

Worked: DJ2YF, DJ3FX, DL1PS, DL1RX, OK2OS, OZ7BR, PE1PL, SM6PU, SM7BAE, SM7BYB, SM7YO. *Heard:* DL1SN, DL6QS, DL7FU, GM3ABD, GW2HIY (at 59A), LA4VC, OH1OZ, SM1BSA, SM3AKW, SM6ANR, SM7ZN.

LONDON U.H.F. GROUP
will meet at the Bedford Corner Hotel, Bayley Street, Tottenham Court Road,
at 7.30 p.m. on Thursday, June 2, 1960
All v.h.f. and u.h.f. enthusiasts welcome.

R.A.O.T.A. Reunion

AIR MARSHAL Sir Raymund Hart, K.B.E., C.B., M.C. (Director of the Radio Industry Council) was guest of honour at the Second Reunion of the Radio Amateur Old Timers' Association held at The Horse Shoe Hotel, Tottenham Court Road, London, W.C.1, on Friday, April 1, 1960. The Chair was taken by Arthur Milne, G2MI (President 1954, Vintage 1924) who had the support of six Past-Presidents of the R.S.G.B. (Gerald Marcuse, G2NM, 1929-30; Victor Desmond, G5VM 1948-49; Frederick " Dud " Charman, G6CJ, 1952; Leslie Cooper, G5LC, 1953; Herb. Bartlett, G5QA, 1955; and R. L. Smith-Rose, 1959) and five Vice-presidents (Harold Wilkins, G6WN; T. A. St. Johnston, G6UT; Harry Clark, G6OT; J. W. Mathews, G6LL; and W. H. Allen, G2UJ).

During dinner, the Chairman, in the course of a series of informal toasts, took the opportunity of welcoming the very considerable number of members who had travelled long distances to attend.

After the loyal toast had been honoured a telegram was read from H.R.H. Prince Philip thanking those present for the greetings which had been conveyed to him earlier on their behalf by the founder of the Association (John Clarricoats, G6CL). Nostalgic memories of the early days of Amateur Radio were recalled by G6CJ, G6LL and G6OT and Silent Keys were remembered at 9 o'clock.

A brief account of the activities of the Association was given by G6CL who mentioned that all but eight of the 72 full members who attended the first reunion on October 10, 1958, had joined the Association. Since that date 23 new members had joined to give a total membership of 87 full and two honorary members. Contributions to the Benevolent Fund had reached the satisfactory total of £207 6s. 0d.; fortunately no calls had yet been made on the fund. Revenue from subscriptions had amounted to £94 10s. and administrative expenses to £24 11s. Wilfred Butler, G5LJ, had produced a special R.A.O.T.A. badge and had donated badges to the first 56 founder members.

The honoured guest was introduced by G6CL who spoke of Sir Raymund Hart's outstanding career, first in the Royal Flying Corps and later in the Royal Air Force. In reply Sir Raymund made reference to the great debt which both the country in general and the Royal Air Force in particular owes to the R.S.G.B. for stimulating interest in the R.A.F. Civilian Wireless Reserve and for assisting during the 1939-45 war in the recruitment of skilled radio amateurs to serve in highly technical units of the R.A.F. and the other services. Sir Raymund also spoke of the work done by radio amateurs in developing the short- and ultra-short waves and to his own activities in the field of communications whilst serving in India prior to the Second World War.

W. E. Corsham, G2UV (an early member of the T. & R. Committee and Joint Traffic Manager with Kenneth Alford, G2DX, during the trans-Atlantic tests of 1922-4) proposed in excellent manner a toast to The Spirit of Amateur Radio.

At the conclusion of the reunion the chairman, on behalf of the Association, presented a leather handbag to May Gadsden (the only lady present) in appreciation of her valued services to R.A.O.T.A. Miss Gadsden and Dr. Smith-Rose are the only honorary members of the Association.

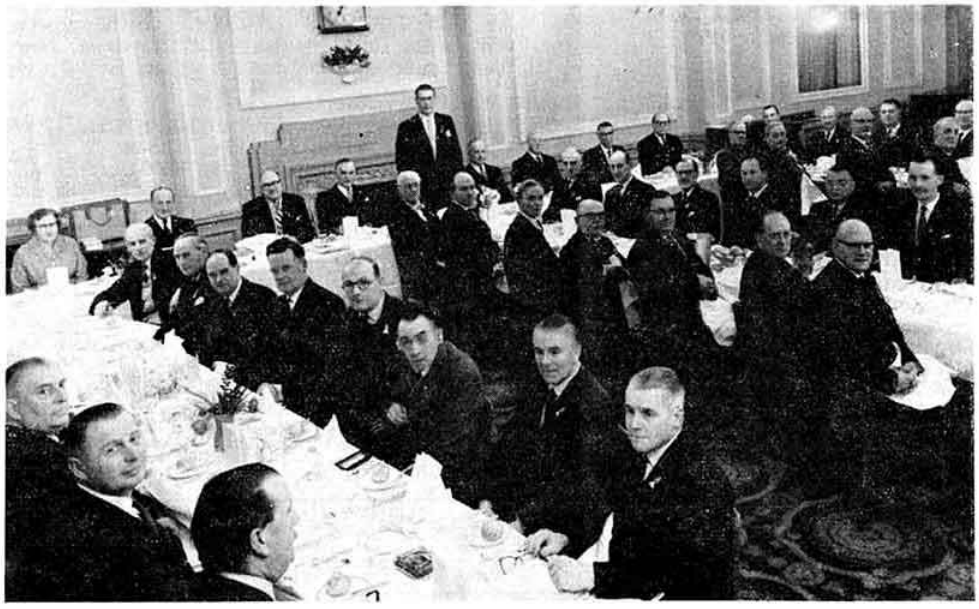
Radio amateurs who have held a transmitting licence for an unbroken period of 25 years (including the war years) are eligible to join the Association. Enquiries should be addressed to G6CL at 16 Ashridge Gardens, Palmers Green, London, N.13.

Roll Call

The following attended the reunion on April 1, 1960: G2AK, DC, DX, FM, FV, HP, KI, MI, MR, NH, NM, NN, UJ, UV, WJ, 3HT, 4RD, 5DJ, JU, KU, LC, LJ, ML, PP, QA, RS, RV, UM, VM, VS, WP, XB, YY, 6CJ, CL, FI, FU, HR, IF, IO, LL, OO, OT, OX, PR, RB, SC, UB, US, UT, WN, XM. G2TP, 5MA and 6XL had booked but were prevented at the last minute from attending.

Apologies were received from G2GK, HQ, IG, ML, QB, QY, VV, YL, GW2OP, 5BV, BZ, CD, GR, JO, YN, 6HX, LJ, MN, PA, XJ.

Horace Freeman (Ad. Man) who has been very ill attended the reception but was unable to remain for dinner.



The Second Reunion of the Radio Amateur Old Timers' Association was held at the Horse Shoe Hotel, Tottenham Court Road, London, on Friday, April 1, 1960. About 40 of the 55 old timers present on that occasion are seen in this picture. Top table left to right: May Gadsden (Hon. Member); Vic. Desmond, G5VM; John Clarricoats, G6CL; Air Marshal Sir Raymund Hart; Arthur Milne, G2MI (Chairman); Dr. R. L. Smith-Rose (Hon. Member); Gerald Marcuse, G2NM; Fred " Dud " Charman, G6CJ and Leslie Cooper, G5LC.

The University City of Cambridge

BY " CANTABRIGIAN "

The 1960 National Convention is being held in Cambridge and it is the object of these articles to give the visitor a glimpse of certain aspects of the city. This first article deals with some of the links between city and university.

FOR many centuries the " brigge " over the river Granta or Cam was the last link between the road system of the rest of England and the water communications of the Fens. Visitors from the Continent sailed across the North Sea, into the ports of Lynn and Wisbech and then up the rivers to the farthest navigable point, the place where the river Granta was crossed by the " Via Devana," now Magdalene Bridge.

Near this point they traded and it was at Stourbridge (about two miles downstream and within the present city

The Via Devana crossing the river at Magdalene Bridge.
(Photo by Ronald Law.)

boundary) that the greatest of all the medieval fairs was held. Merchants came from all over Europe to sell their wares. It was the main centre for the sale of hops (not grown in this part of the country) and one of the largest for wool. Daniel Defoe visited it in 1723 and recorded that in one week alone £100,000 in cash was paid for wool. One's imagination boggles at its value today. Quite naturally, the nearby town became exceedingly prosperous. The improvements in roads and railways during the nineteenth century caused the river trade to diminish and this fair which had lasted for at least six centuries finally closed.

Even before 1211, when King John gave his charter to the fair, scholars were already residing in Cambridge and not long after this, in 1284, the oldest of the colleges, Peterhouse, was founded.

Since that time the prosperity of the town has waxed and waned but " Town and Gown " have continued to grow up side by side; sometimes amicably and sometimes in violent conflict. Today they stand together as partners, quite complementary, the university providing teaching and doing fundamental research, the city providing services, labour and tools as well as using the research to start new industries. Some of these services, provided initially for the university, are now used internationally; for example, books published by the Cambridge University Press and Heffers can probably be found on library shelves in every city in the world.

The products of the instrument makers are similarly world famous. The Cambridge Instrument Company was founded by Horace Darwin, son of the famous biologist, at the end of the last century and very soon it built up an international reputation for the excellence of its products which now cover a very wide range. Customers vary from the atomic energy industry to medical schools.

In the year 1896, William George Pye left the Cavendish Laboratory to set up as an instrument maker and to found the firm that bears his name. Today, its products are too numerous to list but vary from switches and standard resistors to seismological equipment supplied to both Sir John Hunt to use on Everest and Sir Vivien Fuchs for use in the Antarctic.

More recent additions to the local instrument firms are Unicam who have an international reputation for spectrophotometers, and Labgear who, besides their Amateur Radio equipment, manufacture a wide range of equipment for nuclear research. Both of them, with W. G. Pye, are in the Pye Instrument Group. There are also a large number of smaller firms doing a variety of specialist jobs. The full list would be much too long to publish but a few typical examples are crystallography, engineering, glass-blowing, and photography. It is therefore possible to produce locally any piece of apparatus wanted for research.

One good example of special engineering is the radio telescope at the Mullard Observatory, built for Professor Martin Ryle by Messrs. Mackay and featured recently in the B.B.C. programme *Eye on Research.*

The continual pressure from research workers for more accurate and more sensitive instruments means that the makers have had to expand continually their own research and development sections. The new buildings of the Cambridge Instrument Company on Chesterton Road are a good example of this trend.

The new research block of the Cambridge Instrument Company. Note the " cam " and " bridge " motif on the wall.
(Photo by courtesy of Cambridge Instrument Co.)

Other examples of the complementary nature of the city and university are the craftsmen of Banham's who build the racing boats used on the Cam, as well as once a year from Putney to Mortlake. A similar link exists between the craftsmen at Gray's, who fashion hockey sticks and tennis rackets as well as almost every other type of sports gear, and the undergraduates that use them.

Standing in the wonderful chapel of King's College we marvel at the skill of the men who fashioned it from stone, wood and iron. This craftsmanship still exists. Although the style of modern buildings may be quite different, local carvers and masons can still be found whose work is worthy of comparison with that of their predecessors. Most of us remember the famous Lister-Jaguar cars which raced with such success a few years ago but it may not be so well known that this engineering firm has also a reputation for the wrought-iron work it produces to the designs of Raymond Lister.

Readers will have noticed the omission of Pye Radio from this account. Even a brief summary of their activities would need several more pages—is there still anyone interested in radio and television who is not aware of the part that Pye play in the British radio industry?

Reference

[1] The Royal Commission on Historic Monuments. "An inventory of the Historical Monuments in the City of Cambridge." London, H.M.S.O., £5 5s. 0d., two volumes.

Cambridge National Convention

THE names and addresses of the members of the Committee which has been set up to organize a National Convention in Cambridge during the period September 15-17, 1960, are as follows:

Chairman:	T. A. T. Davies (G2ALL), " Meadowside," Comberton, Cambridge.
Secretariat:	A. H. G. Waton (G3GGJ), "Arkengarthdale," New Road, Barton, Cambridge.
Finance:	F. W. J. Walters (G3LIE), 43 De Freville Avenue, Cambridge.
Accommodation:	F. A. E. Porter (B.R.S.15091), 37 Metcalfe Road, Cambridge.
Programme:	A. W. Tomalin (B.R.S.22400), 6 Winders Lane, Histon, Cambridge.
Publicity:	H. C. L. Barnett (G2AIQ), 132 Kings Hedges Road, Cambridge.
Transport:	J. N. Carter (B.R.S.6174), 47 Hurst Park Avenue, Cambridge.
Liaison with Cambridge University Wireless Society (G6UW):	D. Smart (G3MGB) Clare College, Cambridge.
Asst. Secretary:	J. L. Cutler (G3KBC), 156 Tennyson Road, Cambridge.
Member:	R. F. Pilkington (G3IAG), Graizelound, 65a Ely Road, Littleport.

Official Guide to Cambridge

MEMBERS who are making plans to attend the National Convention in Cambridge next September will be interested to learn that a new Official Guide to the city has just been published. Beautifully produced on art paper and lavishly illustrated, copies of the 132-page publication can be obtained by sending a remittance for 3s. 6d. to the City Librarian, Guildhall, Cambridge.

Enquiries Regarding Bulletin Articles

MEMBERS who write to the authors of BULLETIN articles are asked to enclose stamped addressed envelopes if they require replies.

Old timers Wilfred Butler, G5LJ; Herb. Bartlett, G5QA: Chas. Young, G2AK and Vic. Desmond, G5VM, with May Gadsden and the General Secretary at the R.A.O.T.A. Reunion.

Dr. J. A. Saxton now Deputy Director —Radio Research Station

DR. J. A. SAXTON has been appointed Deputy Director of the D.S.I.R. Radio Research Station, Slough, in the grade of Deputy Chief Scientific Officer. This appointment is opportune as he will serve for a period of six months under the present Director, Dr. R. L. Smith-Rose, C.B.E., before the latter is succeeded by Mr. J. A. Ratcliffe, C.B.E., F.R.S. on October 1, 1960.

Dr. Saxton, who joined the scientific staff of the Radio Division of the National Physical Laboratory in 1938, has been responsible for carrying out a considerable programme of research in the propagation of very short radio waves over the ground and through the troposphere. He has studied the electrical properties of gases, water vapour and water at very high radio frequencies and applied the results to an understanding of the refraction of radio waves transmitted through the lower atmosphere. He has been an official delegate of the United Kingdom at meetings of the International Scientific Radio Union (U.R.S.I.) and the International Radio Consultative Committee (C.C.I.R.) in London, Geneva, The Hague, Boulder (Colorado) and Los Angeles.

Dr. Saxton has frequently attended R.S.G.B. functions and especially those arranged by the V.H.F. Committee. His many friends in the Society will wish to congratulate him on his new appointment.

Silent Keys

W. B. N. ALTHORP (G2CBA)

It is with deep regret that we record the death of Mr. W. B. N. Althorp (G2CBA) of Rochester, Kent.

Wally Althorp was a very keen radio amateur being T.R. for the Medway Towns, as well as a member of the Medway and First Class Operators' Clubs. He was chiefly interested in constructional work, portable operating and in 10m DX. Holder of a pre-1939-45 war A.A. licence he was always ready to extend the helping hand of friendship to aspiring amateurs. He was the driving force behind the efforts of the Medway Group during N.F.D. and other contests. His leadership and enthusiasm will be greatly missed as will be his cheery voice on 10.

Our sympathies are extended to Mrs. Althorp and family in their sad loss. —G.A.G

LES BIRDLING (ZL2QI)

It is with deep regret that we record the death of Les Birdling (ZL2QI) on February 24, 1960. Mr. Birdling lived in Edmonton, London, before emigrating 16 years ago to New Zealand from where he put an outstanding signal into the U.K. on 15m.

Sympathies are extended to his wife and two daughters.

Society News

I.A.R.U. Region I Conference Folkestone Plans Well Advanced

THE I.A.R.U. Region I Conference, to be held at the Grand Hotel Folkestone next month, will be opened by the Mayor of Folkestone (Alderman F. W. Archer, J.P.) at 2.30 p.m. on Monday, June 13, 1960. Chairmen and Secretaries of the various Conference Committees will be elected at the Plenary meeting which will follow the opening ceremony.

The R.S.G.B. is to be represented at the Conference by the President (Mr. W. R. Metcalfe, G3DQ), the Executive Vice-President (Mr. H. A. Bartlett, G5QA), Mr. A. O. Milne, G2MI (Past President), Mr. D. Deacon, G3BCM (Chairman, TVI/BCI Committee), Mr. R. C. Hills, G3HRH (Chairman, Contests and V.H.F. Committees), Mr. F. G. Lambeth, G2AIW (R.S.G.B. V.H.F. Manager) and Dr. A. C. Gee, G2UK (Chairman, R.A.E.N. Committee). Dr. R. L. Smith-Rose (Immediate Past President) also hopes to attend for part of the time.

The Grand Hotel, Folkestone, Venue of the I.A.R.U. Region I Conference, June 1960

The Conference is being organized by the General Secretary of the R.S.G.B. in his capacity as Secretary of the I.A.R.U. Region I Division.

Conference delegates and their ladies will be the guests of the Mayor and Corporation of Folkestone on Thursday, June 16, when a conducted coach tour will be made through the heart of Kent and thence to Canterbury where tea will be provided.

The Conference will conclude with a dinner at the Grand Hotel during the evening of Friday, June 17, when the Mayor and Mayoress of Folkestone will be the principal guests. The President of the R.S.G.B. will preside at this international function.

Members who wish to attend the Conference as observers are invited to write to the General Secretary as soon as possible indicating what hotel accommodation they will require. The management of the Grand Hotel are offering a specially reduced Conference rate of 50/- per day, which will include service (normally 10 per cent.) and all meals (breakfast, lunch, afternoon tea and dinner).

A detailed programme of events, and copies of the various agendas of business, will be sent to all members who signify their intention of attending the Conference.

National Convention

ALL enquiries regarding the National Convention, to be held in Cambridge from September 15 to 17, 1960, should be addressed to the Convention Secretary, 37 Metcalfe Road, Cambridge.

Region 9 Official Meeting to be held in Weymouth

ON Sunday, October 2, 1960, and for the first time in the history of the Society, an Official Regional Meeting will be held in the famous Dorset seaside resort of Weymouth. The venue for the meeting itself will be the Royal Hotel and a most attractive supporting programme is being arranged.

The arrangements are in the hands of the Dorset C.R. (Mr. A. Barrett, G5UF) and the Region 9 Representative (Mr. Reg. Griffin, G5UH) who invite all members living in the south-west to note the date of this important event.

Society Films

ANY member in the London area with the necessary knowledge and equipment, including a viewer, willing to assist in editing a number of very old 16mm. Society films is invited to contact C. H. L. Edwards (G8TL), 28 Morgan Crescent, Theydon Bois, Epping, Essex.

Illustrated Talk on St. Pierre and Miquelon Islands

A RECORDED talk by Bill Loeffler (W1PFA), describing the FP8BH DXpedition to St. Pierre and Miquelon Islands in October 1959 is available on loan to local societies and groups from Arthur R. Yates (G3LB), " Gower Hey," Whitcliffe Lane, Ripon, Yorkshire. Mr. Yates is prepared to visit societies within a reasonable distance of Ripon with the necessary equipment.

The talk, which is illustrated with 62 35mm. colour slides, is recorded at 3¾ i.p.s. and lasts approximately 45 minutes.

New Director General of the Post Office

SIR RONALD GERMAN, C.M.G., has been appointed Director General of the Post Office from June 1, 1960. He will succeed Sir Gordon Radley, K.C.B., C.B.E., Ph.D. (Eng.), M.I.E.E., who is retiring. Mr. W. A. Wolverson, C.B., has been appointed a Deputy Director-General in succession to Sir Ronald German.

Mr. Wolverson is at present responsible for the Radio Services Department at Post Office Headquarters. He was Vice-Chairman of the United Kingdom Delegation at the Plenipotentiary Conference in Geneva last year and has represented the Post Office on the Council of the I.T.U. since 1955.

NORTH EAST OF ENGLAND
OFFICIAL REGIONAL MEETING
COATHAM HOTEL, REDCAR

June 26, 1960

Programme:

10 a.m. onwards		**Talk-in on Top Band.**
1 p.m.	... ...	**Judging of Mobiles.**
2.30 p.m.	...	**Business Meeting.**
4.30 p.m.	...	**High Tea.**
5.30 p.m.	...	**Prize Distribution.**

Headquarters will be represented by the President (Mr. W. R. Metcalfe, G3DQ), the Zone A Representative (Mr. P. H. Wade, G2BPJ) and the Zone B Representative (Mr. F. K. Parker, G3FUR).

Tickets 10/6 (adults), 5/- (children) can be obtained from Mr. L. W. Arrowsmith, 51 Alverstone Avenue, West Hartlepool, not later than June 12.

R.S.G.B. 21/28 Mc/s Telephony Receiving Contest 1959

SHORT wave listeners throughout the world were invited to take part in the Receiving Contest at the time that the R.S.G.B. 21/28 Mc/s Telephony transmitting contest was in progress on November 21-22, 1959. The invitation was accepted by 68 listeners, including entrants in Sweden, Switzerland, Italy, Germany, Australia, Japan, and Russia and of course the United Kingdom.

Name		Points	Home Position	Overseas Position
R. G. Poppi	B.R.S.20570	2995	1	
W. J. C. Pinnell	B.R.S.21624	2970	2	
B. M. Crook	B.R.S.21008	2920	3	
A. Hewitt	A.1902	2810	4	
J. K. Harvey	B.R.S.19682	2620	5	
Malcolm Harrington	B.R.S.20249	2610	6	
J. E. Boylett	B.R.S.22407	2540	7	
A. Withers	B.R.S.14252	2530	8	
M. A. W. Marment	A.1446	2435	9	
R. I. Buckby	A.1736	2430	10	
P. A. Edwards	A.1893	2345	11	
C. J. Smith		2315	12	
J. Howie	A.2003	2295	13	
C. J. Thomas	B.R.S.22249	2290	14	
R. Baines	B.R.S.21457	2230	15	
M. Dransfield	(Nigeria)	2125		1
P. H. Ashcroft		1975	16	
H. T. H. Cromack	A.1623	1965	17	
M. G. Smith	A.1946	1915	18	
R. F. Burns	A.1906	1870	19	
J. Baldwin	A.1426	1870		
J. M. Woodroffe	A.1544	1835	21	
F. C. Powell	B.R.S.18461	1820	22	
I. M. Stewart	A.1859	1780	23	
R. Pyman	A.1257	1730	24	
G. J. Wyatt		1615	25	
P. K. Hamblett	A.1690	1485	26	
F. Bramham	A.1883	1470	27	
A. D. Watt	A.1618	1470		
Sven Elfving	SM3-3104	1390		2
B. W. Rous	A.1410	1365	29	
A. R. Bradford	B.R.S.22081	1345	29	
R. V. Cheeseman	A.1557	1325	30	
E. H. Sherlock	B.R.S.6604	1320	31	
C. F. Broomfield	A.1687	1315	32	
P. J. Baxter	A.1798	1315		
J. H. C. Farrar	A.1965	1255	34	
J. Whitington	B.R.S.19771	1235	35	
Karl Nystrom	SM5-2735	1215		3
I. Dufour	A.1696	1150	36	
I. Barbieri	II-10307	1135		4
Lennart Wallin	SM4-3040	1120		5
M. F. Stanbridge	A.1543	1100	37	
R. Johansson	SM4-2825	1095		6
A. Griffiths	A.2106	1080	38	
G. Horrell	B.E.R.S.1012 (Cyprus)	1070		7
R. Parkes	A.1629	1050	39	
M. G. Box	A.1795	1020	40	
G. Ritchie	B.R.S.22357	970	41	
Hans Hjelmström	SM6-E30	850		8
Ivor Benoy	B.E.R.S.982 (South Africa)	845		9
D. G. Edwards	B.R.S.18876	840	42	
Laurie Margolis	A.2111	835	43	
Hans Ohgren	SM3-3052	805		10
Max Kellenberger	HE9ERS	710		11
Pietro Gallo	II-10303	710		
Jerzy Hanas	SP9-1022	695		13
F. W. Kradepohl	DE/SWL	670		14
F. Bramham	A.1883	645	44	
J. Swingewood	B.R.S.21790	635	45	
Giovanni Boschetti	II-10320	585		15
J. I. Winblad	SM7-2763	525		16
Bosse Ohlsson	SM6-3008	445		17
Toomas Kallemaa	UR2-22807	395		18
G. de Granayel	HE9-RAP	330		19
Syozi Okuno	JA3-1794	305		20
Lars-Erik Hild	SM5-3087	270		21
C. H. Thorpe	SWL-VK4	245		22
Algis Shliavas	RP-2-ABA	150		23

Dick Poppi put in nearly 25 hours listening and no less than 2,100 of his total points were made as bonus points for 105 new countries or call areas; his total number of contacts logged was 179. Mr. Pinnell (B.R.S.21624) put in 24½ hours at the receiver and logged 194 stations but lost ground to Dick by only getting bonus points for 100 stations. Mr. Crook (B.R.S.21008) did much better than both of those in first and second places in terms of contacts logged—224—but lost on the bonus by only logging 90 " bonus " stations.

Michael Dransfield, formerly G3JKO, who was not licensed in Nigeria at the time of the contest is the leader of the overseas entries with 2,125 points from 221 British Isles stations and bonus points from 26 country numeral prefixes.

The second overseas entrant is Sven Elfving (SM3-3104) of Ornskoldsuik, Sweden, who logged 122 stations and had bonus points for 24 prefixes. He is followed in third place by his fellow countryman Karl Nystrom (SM5-2735) of Suartsjo with 1,215 points from 121 contacts and bonus points from 13 prefixes.

Conditions reported by the entrants in the transmitting section as being poor are confirmed by the listeners' reports. Michael Dransfield in Northern Nigeria gave a very good summary of conditions on both days and said that both bands closed before 18.30 G.M.T. on the Saturday and even earlier on the Sunday out there. He was energetic enough to get up and listen during the night but heard nothing until 05.45 G.M.T. when Russian and Japanese stations started coming through on 28 Mc/s, the first Gs being heard on 21 Mc/s at 06.40 G.M.T.

A.1623 comments that he heard no VK/ZL stations but this must have been due to bad conditions as there were several on at the beginning of the Contest at 07.00 on the Saturday. On the Sunday they seem to have come through nearer midday. However, without them he put up a very good performance, logging 109 stations and 71 different areas.

SM5-2735 (Karl Nystrom) sent an interesting letter with his log and confirmed the difficulty experienced by other entrants in reading the weaker signals on 28 Mc/s through the very bad splatter from certain Eastern European stations.

Equipment in Use

Dick Poppi used an AR88 and 150 ft. aerial whilst B.R.S.21624 used a Radiovision V55R with preselector and converter and 100 ft. aerial. Malcolm Harrington (B.R.S.-20249) used an Eddystone S840 and a 66 ft. aerial running N.W.-S.E. Robert Burns (A.1906) of Upper Norwood has a 12 valve home-built, double superhet, and two dipoles firing East and West. J. Baldwin of Bristol uses a S640 but what his aerial system was is not clear, as he says " Had my aerials blown down the night before! "

With the exception mentioned above nearly all entrants reporting their equipment had commercial receivers and the CR100 and AR88 seemed most popular. Aerials are generally simple dipoles or random lengths of wire, the beam arrays being reserved for the transmitting boys!

Arising from the logs received, it is clear that there exist

(Continued on page 512)

CONTEST NEWS

RESULTS — REPORTS — RULES

Affiliated Societies' Contest 1960

THE following are the results of the Affiliated Societies' Contest held on February 6-7, 1960.

Posn.	Society	Call-sign	Points
1.	Surrey Radio Contact Club	G3BFP	164
2.	Dorking & District Radio Society	G3JEQ	158
	Stourbridge & District Amateur Radio Society	G3BMY	158
4.	Bailleul Radio Society	G3IHH	153
5.	Ariel Radio Club (Langham)	G3AYC	152
6.	Barnsley & District Amateur Radio Club	G2AFV	151
7.	Harlow & District Radio Society	G3ERN	150
8.	R.A.F. Amateur Radio Society (Locking)	G8FC	147
9.	Cheltenham Amateur Radio Society	G3GPW	143
	Mitcham & District Radio Society	G3LCH/A	143
11.	Amateur Radio Club of Nottingham	G3EKW	141
12.	Sheffield Amateur Radio Club	G4JW	137
13.	Liverpool & District Amateur Radio Society	G3AHD/A	136
14.	Hartlepools Amateur Radio Club	G3IDV	132
15.	Wirral Amateur Radio Society	G3NWR	130
16.	South Shields & District Amateur Radio Club	G3DDI	122
17.	Kingston & District Amateur Radio Society	G3KIN/A	117
18.	Leeds University Union Amateur Radio Society	G3LUU	115
	Medway Amateur Receiving and Transmitting Society	G2FJA	115
20.	Acton, Brentford & Chiswick Radio Club	G3IIU	112
	Crawley Amateur Radio Club	G3JKF	112
22.	Oxford & District Amateur Radio Society	G3KLH	109
23.	Edgware & District Radio Society	G3ASR	108
24.	A.E.R.E. (Harwell) Amateur Radio Club	G3NNF	105
25.	Scunthorpe Amateur Radio Group	G3MSB/A	102
	Loughborough College Radio Society	G3FYV	102
27.	Thanet Radio Society	G3DOE	100
28.	Grimsby Amateur Radio Society	G3IYT/A	99
29.	Stoke-on-Trent Amateur Radio Society	G3GBU	91
	Clifton Amateur Radio Society	G3GHN	91
31.	Army Wireless Reserve Amateur Radio Society	G3ADZ	89
32.	A.E.I. Rugby Recreation Club Amateur Radio Section	G3BXF	88
33.	Cambridge University Wireless Society	G6UW/A	87
34.	Southport Radio Society	G3MJU	83
35.	Torbay Amateur Radio Society	G3NJA	79
36.	Ariel Radio Group (Bush House)	G3GDT	77
	Blackpool & Fylde Amateur Radio Society	G3NJN	77
38.	Derby & District Amateur Radio Society	G3ERD/A	76
39.	Leicester Radio Society	G3LRS	73
40.	West Kent Amateur Radio Society	G2UJ/A	72
41.	Ravensbourne Amateur Radio Club	G2DHV	67
42.	Aberdeen Amateur Radio Society	GM3BSQ	63
43.	Preston Amateur Radio Society	G3KUE/A	62
44.	Barnet & District Radio Club	G3FFA/A	60
45.	Ainsdale Radio Club	G2CUZ	59
46.	City of Belfast Y.M.C.A. Radio Club	GI6YM/A	57
47.	Portsmouth & District Radio Society	G3DIT	56
48.	York Amateur Radio Society	G3HWW	54
49.	Bradford Amateur Radio Society	G3NNO	51
50.	Bury & District Radio Society	G3BRS	50
51.	Lothians Radio Society	GM3UM	46
52.	North Kent Radio Society	G3ENT/A	44

A check log from G2BOF is acknowledged with thanks.

First 1·8 Mc/s Contest 1960

THE number of entries received for this contest, held on February 27 and 28, although an improvement on the Second 1959 event, was rather disappointing in view of the high level of activity. Many of the calls regularly associated with Top Band contests appear in the logs as usual but not in the table below, although making good scores as was clearly indicated by the serial numbers exchanged.

I. T. Cashmore (G3BMY) adds another win to his long list of successes with a score of 150 points and a comparatively handsome lead for a Top Band contest of 11 points over H. J. M. Box (G6BQ), who scored 139. In third place is J. N. Walker (G5JU) with 130 points.

Conditions were good, activity was excellent and very well maintained throughout the whole period, and the operating standard was at the usual high level. Unfortunately the accuracy of logging was a little below normal and in a number of cases there was evidence of carelessness.

Equipment described on the entry forms shows that " old faithful " transmitters are the order of the day—G6BQ is still using one built originally in 1939—but receivers keep pace with the latest types available. There appears to be little hope of a win for any station without a long aerial; only five of the first 20 stations in the table used an aerial less than a half-wave long, and of these G4AU achieved the best result.

Almost no comments were made with the logs—these have perhaps been discouraged by the very short reports of recent contests made necessary by pressure on BULLETIN space, but they are nevertheless much appreciated by the Contests Committee, and are useful when rules are considered for the next similar contest.

With a total score in this contest and the November 1959 event of 197 points, W. Robertson (GM6RI) is the winner for this year of the Maitland Trophy.

Check logs are acknowledged from: G2IM, G2AYG, G2HDR, G3MWZ, G4VF, G5GH, G8FW, DJ2KS, HB9QA, OK3EE, OK1VG, OK1WR. The only other non-G call-sign appearing in the logs was DL2AH.

Posn.	Call-sign	Points	Posn.	Call-sign	Points
1	G3BMY	150	33	G3KDV	72
2	G6BQ	139	34	G3CWW	69
3	G5JU	130	35	G3DCZ	65
4	G3KLH	127		G3JKY	65
5	G3ERN	123	37	G3KPU	60
	G3JEQ	123		GM2HIK	59
7	G3KZG/A	122	38	GW3GHC	59
8	G4AU	117		G3JWB	59
9	G3IGW	116	41	G4GD	56
10	G3JWR	115		G6UT	55
11	G2AFV	108	42	G3ISX	55
12	G3LCH/A	105		G3LPT	55
13	G2MJ	100	45	G3FVW	53
14	G3FM	98		G3MEP	53
	G3JJZ	98	47	G2XP	52
	G3LHJ	98		G2VV	49
17	G3JII	97	48	G2BLA	49
18	GM6RI	96		G3LDB	49
	G3NEK	96	51	G2CUZ	48
**	GM3KHH	96		G3IQG	48
20	G3IPG	95	53	G2ZZ	46
21	G3JHC	87	54	G3IFD	41
22	G4GM	84	55	G2FYT	36
23	G3BIK	81		G3ICH	36
	G3HDZ	81	57	GM3UM	33
25	G3KVG	80	58	G3NFT	32
26	G3NFV	79	59	G3NRV	31
27	G3HIW	78	60	G2DHV	26
28	G2BOF	77	61	G3MGI	24
	G3NDG	77	62	G6OO	11
30	G3KNU	75			
31	GW3CDH	73		** Late entry.	
	G3LVP	73			

144 Mc/s Open Contest 1960

CONDITIONS on the day previous to the contest were reported to be good and at the beginning of the contest on March 5 they were still well above average, phone contacts at 150 miles and over being made by many stations in all parts of the country. On the Sunday conditions fell off during the afternoon but improved slightly as usual after sunset. Altogether, 310 stations are known to have taken part but only 30 logs and check logs were received.

A. L. Mynett (G3HBW) won his second contest this year with P. K. Blair (G3LTF) in second place. G3GHI narrowly beat G5MA to third place. G. D. Ketley (A.1476) submitted the best check log in the opinion of the Contests Committee.

G3HBW is equipped with a pair of 4-125As in the final running at 150 watts input and a c.c. converter using A2521s in the r.f. stages. The main receiver is an HRO and the aerial a 28-element array at 40 ft. G3LTF also runs 150 watts

but to a 4X150A. His receiver uses a 417A-ECC85 cascode in the front end. The main receiver is an RG44U and the aerial a pair of stacked six-element Yagis.

Comment on the contest conditions and band occupancy was generally favourable and it is to be hoped that they will be at least as good during the summer contests.

Check logs from G2CIW, G3MHD, G6XA, B.R.S.18572 and A.1476 are gratefully acknowledged.

Posn.	Call-sign	Stations worked	Counties	Points
1.	G3HBW	138	31	2155
2.	G3LTF...	123	30	1995
3.	G3GHI	123	28	1930
4.	G5MA	117	30	1920
5.	G2DTO/P	124	24	1870
6.	G5YV	96	34	1810
7.	G3LAR	110	25	1725
8.	G2XV	92	28	1620
9.	G3JWQ	78	28	1480
10.	G3KPT	82	25	1445
11.	G6GN	64	27	1315
12.	G3CCH	63	27	1305
13.	G3KMT	60	25	1225
14.	G3FD	77	18	1220
15.	G3CHW	51	21	1035
16.	G3HWR	59	15	965
	G5DW	49	19	965
18.	G3LCH/P	57	13	895
19.	G3LTN	36	16	760
20.	G2WS	35	12	650
21.	G2DCI/M	28	12	580
22.	GW8UH	23	13	555
23.	G5UF	17	10	420
24.	G3AS/M	9	4	190
25.	GM3LAV/M	6	5	185

D/F Qualifying Event

DETAILS of the High Wycombe qualifying event are as follows :

Sunday, May 29.
Organizer: G. T. Peck, Ernest Turner Electrical Instruments Ltd., High Wycombe.
Frequency: 1874 kc/s.
Call-sign: G3FAS/P.
Map: Ordnance Survey, New Popular Edition, Sheet 159.
Assembly Point: North End Common approx. 2½ miles South East of Watlington (NGR 732927).
Assembly Time: 13.30 B.S.T.
Entries and Tea: Intending competitors should notify the Organizer as soon as possible stating the number in their party requiring tea, which will be at the Little Abbey Hotel, Great Missenden (NGR 905997).

70 Mc/s Contest 1960

When: From 17.00 to 23.59 G.M.T. on June 18 and from 07.00 to 19.00 G.M.T. on June 19, 1960.

Locations: Stations, fixed and portable, must be operated from the same site throughout the contest.

Eligible Entrants: All fully paid-up Corporate Members of the R.S.G.B. resident in Europe. Multiple-operator entries will be accepted provided only one call-sign is used (see R.S.G.B. Contests Rule 7).

Contacts: May be made on A1, A3 or A3a with stations operating in any band between 50 and 150 Mc/s.

Scoring: Will be on the basis of one point per mile.

Contest Exchanges: RST (RS) reports followed by the contact number (starting with 001) followed by the location (e.g. RST 579001 5NE, Oxford).

The location as given on the Cover Sheet must be transmitted for each contact. (This location is to be identifiable on the Ordnance Survey 10 mile to the inch map).

Entries: (*a*) The cover sheet must be made out in accordance with R.S.G.B. Contests Rule 5 and the declaration signed.

(*b*) Logs must be tabulated in columns headed (in this order) " Date/Time (G.M.T.)," " Call-sign of Station Worked," " My report on his signals and serial number sent," " His report on my signals and serial number received," " Location of station as received," " His Band (Mc/s)," " Points Claimed."

(*c*) Entries must be postmarked not later than Monday, July 4, 1960.

Awards: At the discretion of the Council, a **certificate of merit** will be awarded to the winner. A **certificate of merit** will also be awarded to the non-transmitting member submitting the best check log in the opinion of the Contests Committee.

The General Rules for R.S.G.B. Contests published on page 423 of the March 1960 *Bulletin* apply to this contest.

" CQ 100 Countries on S.S.B." Award

IT is understood that Mr. James McDougall (GM3CIX) is the first United Kingdom amateur to be awarded the *CQ Magazine* certificate for working 100 countries on s.s.b.

R.S.G.B. 21/28 Mc/s Telephony Receiving Contest

(Continued from page 510)

one or two minor anomalies in the rules, particularly regarding scoring procedure, and the occasion will be taken to revise these when the rules are next published.

Some of the overseas entrants will notice that their scores have been drastically reduced. This is because they included in their scores points for overseas stations heard working Gs when they had not logged the G station. The rule on this is quite clear and says " Overseas stations may only log British Isles Stations for points." Therefore it has been necessary to take out all these points. In addition, one or two stations claimed a bonus of 50 points for each new British Isles prefix instead of 20.

It is particularly gratifying to the Contests Committee that so much interest has been taken in this Contest and it augurs well for the future that there is so much enthusiasm among the younger members.

Unfortunately there is no award for the youngest entrant or it would surely go to Master Laurie Margolis (A.2111), from whom there is a very neat log and who is all of nine years of age. Toomas Kallemaa (UR2-22807) sent in a very good log and gives his age as 15 years; Ian Dufour, who is 14, also sent a very good log, while Giovanni Boschetti (I1-10320) of Torino who only says he is young sent a log that should be an example of legibility to some of the grown-ups!

Comments are all in favour of the continuation of this Contest and the neatness, accuracy and care with which the logs have been compiled shows that the entrants consider this a worthwhile event.

The " 10 × 10 " Certificate

APPLICANTS for the new " 10 × 10 " certificate must have worked ten different VE2 stations on 10m since 1945, using c.w. or phone. To obtain the certificate, the relevant log extracts and three international reply coupons should be sent to the Radio Club de Quebec, P.O. Box 382, Upper Town, Quebec City, Canada.

CONTESTS DIARY

May 15	D/F Qualifying Event (Rugby) (For details see page 463, April 1960)
May 22	D/F Qualifying Event (South Manchester) (For details see page 463, April 1960)
May 22	420 Mc/s Contest (For details see page 463, April 1960)
May 29	D/F Qualifying Event (High Wycombe) (For details see this page)
June 11–12	National Field Day (see page 276, December 1959)
June 11–12	Danish 144 and 420 Mc/s Field Day
June 19	70 Mc/s Contest (For details see this page)
July 3	Second 144 Mc/s Field Day*
July 10	D/F Qualifying Event

September 3-4	- European V.H.F. Contest
September 3-4	- National 144, 420 and 1250 Mc/s Contests*
September 4	- D/F National Final
September 25	- Low Power Field Day
October 2	- R.A.E.N. Rally
November 6	- Second 1·8 Mc/s Contest
December 3-4	- R.S.G.B. Telephony Contest R.S.G.B. Telephony Receiving Contest

**To coincide with Region I I.A.R.U. v.h.f. contest dates.*

R.A.E.N. Notes and News

By E. ARNOLD MATTHEWS (G3FZW) *

WITH the opening of the mobile rally season there comes the opportunity for Groups to obtain much useful publicity for R.A.E.N. Rally organizers are generally very ready to allow the Network to provide an item in the programme or to run an information bureau. Such a stand may have a background of eye-catching posters and should be furnished with leaflets and enrolment forms.

As the reaction of many possible members to R.A.E.N. work is, " It requires special gear, and I haven't got any," there should be a small display of equipment in order to drive home that the so-called " special equipment " is easily acquired or built. Members staffing such stands should ensure that they are well informed of R.A.E.N. activity over a reasonably wide area and are advised to apply well in advance to the Hon. Secretary, R.A.E.N. Committee, for general information about groups throughout the country.

With some financial help from a local R.S.G.B. Group, the **Hampshire** Group made a colour film of the exercise held on April 24. After editing and dubbing for sound commentary it is proposed to use the film for publicity purposes, and it is hoped that it will also be available outside the county. That the group is prepared to put on record its work in this way speaks volumes for its confidence and ability.

Around the Groups

The **Isle of Wight** Group held its first exercise towards the end of March, G3FAN, G3LOK and G3ARL/P taking part. G3ION represented a distant group. Progress was made, despite the exercise's short duration, and the final message was sent via one relay in four minutes from origin to acknowledgement. As the 30 words contained phrases worthy of the R.A.E.N. Rally this was quite creditable.

Essex Group C.C., G8TL, reports that he is equipping Police and B.R.C.S. H.Qs. with Canadian No. 9 receivers, which are obtainable at low cost.

The **Buckinghamshire** C.C., G3HIU, recently addressed Northampton Short Wave Club in furtherance of plans to link up hospitals in and around Buckinghamshire. He was supported by Mr. S. G. Hill, a former superintendent of Northampton General Hospital. Useful publicity was obtained from a report of the meeting in the Northampton *Chronicle and Echo*. **Rugby** Group are arranging to test a 2m link with Buckinghamshire as soon as equipment is in service at Wolverton.

Surrey Controller, G3VK, has issued an information circular to members and is active again after a spell off duty owing to illness in his family. He is particularly anxious to hear from prospective members in central, south and south-west Surrey. Offers of help should be addressed to him at 51 High Drive, New Malden, Surrey.

Details of an interesting contest held on April 3 have been sent in by **Suffolk** C.C., G2CPL. It lasted two hours and competitors were allowed to use c.w. if conditions prevented a message being completed by telephony. Bonus points were given for mobile to fixed and mobile to mobile contacts and for 100 per cent contacts over 50 miles. There were penalties for contacts less than 20 miles. Should any other group contemplate a similar test it is suggested that details be given sufficient time in advance to allow publication so that members in other groups can provide contacts or particulars if this is desired.

* * *

Controllers are reminded that reports intended for publication in this column should reach G3FZW by not later than 18th of the month preceding publication.

* *1 Shortbutts Lane, Lichfield, Staffs.*

British Wireless Dinner Club

THE Amateur Radio movement was well represented at the 37th Annual Dinner of the British Wireless Dinner Club held on Friday, April 22, 1960, at the Naval and Military Club, Piccadilly, London.

Among those present were Major-General Eric S. Cole (G2EC) and Group Captain G. Rowley Scott-Farnie (G5FI) both of whom are members of the Club Committee, which has as Chairman Air Marshal Sir Raymund Hart. Other licensed amateurs " on parade " included David Deacon (G3BCM), H. E. F. Taylor (G6HT), Jim Kirk (G6ZO), Jerry Walker (G5JU), Roland Ferguson (G4VF), Kenneth Alford (G2DC) and John Clarricoats (G6CL). Guest of honour was Sir Arthur fforde, M.A., Chairman of the B.B.C. Board of Governors.

Membership of the B.W.D.C. is open to those who have held a commission in a signals capacity in any of the Services. The life membership subscription is 21/-. Further details can be obtained from Capt. F. J. Wylie, R.N., c/o Radio Advisory Service, 12 Camomile Street, London, E.C.3.

Boy Scout International Jamboree-on-the Air

UNITED KINGDOM amateurs who took part in the above event during October 1959 and who have not yet received a participation certificate through the QSL Bureau should write to L. R. Mitchell (G3BHK), " Katoomba," Tyneham Close, Sandford, Wareham, Dorset, for a copy. A stamped and addressed envelope at least 6 in. × 4½ in. in size should be enclosed.

Scouts of Bogota, Colombia, are looking for scout contacts on 14 Mc/s between 9 and 11 p.m. every Friday.

Mr. R. C. Hills (G3HRH)

COUNCIL Member R. C. Hills, B.Sc. (G3HRH) is now resident at 73 Warren Way, Digswell, Welwyn, Hertfordshire. (Telephone No. Welwyn 769).

NORTH OF SCOTLAND OFFICIAL REGIONAL MEETING AND HAMFEST

Aberdeen May 21-22, 1960

Programme:

Saturday, May 21

Civic Reception for members and wives	**10.30 a.m.**
Visit to Electronic Laboratory, Robert Gordon's Technical College	**11.30 a.m.**
Business Meeting	**2.30 p.m.**
Tea	**4.30 p.m.**
Lecture and Demonstration of S.S.B. Equipment	**4.45 p.m.**
Dinner	**7.30 p.m.**

Sunday, May 22

Visit to Auroral Research Station of Stanford Research Institute of California at Hillhead, Fraserburgh. Coach leaves Aberdeen 11.30 a.m., returning approximately 6 p.m.

A separate ladies programme has been arranged.

Dinner, 21/-; Fraserburgh visit including lunch, 11/6 No charge for other events.

Full information and tickets can be obtained from A. G. Anderson, B.Sc. (GM3BCL), " Helford," Pitfodels, Aberdeen. Dr. R. L. Smith-Rose, C.B.E. (Immediate Past President), Mr. E. G. Ingram, GM6IZ (Zonal Representative) and the General Secretary (Mr. John Clarricoats, O.B.E.) will be in attendance throughout the weekend as representatives of the Council.

New Books

SHORT WAVE RECEIVERS FOR THE BEGINNER. Data Book Series No. 14. 72 pages. Published by Data Publications Ltd. Price 6/-.

Describes a number of simple short-wave receivers including a progressive design building up to a three valve set with mains converter. There is also a useful Introduction to the Short Waves followed by notes on soldering and details of the resistance colour code.

Several of the designs featured were originally published in *The Radio Constructor* and have proved so popular that a more elaborate description of them seemed to be desirable.

AUSTRALIAN RADIO AMATEUR CALL BOOK—1959-60. Published by the Wireless Institute of Australia, Victorian Division. 148 pages. Price 6/-.

The *Australian Radio Amateur Call Book*, like its R.S.G.B. counterpart, is based on official information issued by the Postmaster General's Department. The 1959-60 edition includes the names of W.I.A. Listeners as well as DX countries, Prefixes and their Zones. Whereas the R.S.G.B. *Call Book* lists about 200 calls per page the W.I.A. Call Book lists less than 40. The format is pocket size and the paper of excellent quality.

MICROWAVE DATA TABLES. By A. E. Booth, M.I.R.E., Graduate I.E.E. Published for "Wireless World" by Iliffe & Sons Limited. Size 10¼ in. by 7½ in. 61 pages. Price 27s. 6d. net.

This book comprises a collection of accurately computed tables primarily intended for use by engineers and scientists engaged in research and development work involving waveguides and similar transmission lines. Tabulated values for most of the basic microwave quantities are given to a degree of accuracy more than adequate for most practical purposes. Thus an appreciable reduction in time spent on tedious calculations is effected by using these tables.

The book contains 26 tables in all, and over 23,000 computed calculations. These were carried out on an electronic digital computer to at least one more figure than in the tables themselves, thus ensuring the accuracy of the tables. Guide wavelengths tables are given for nine sizes of rectangular wave-guide and two sizes of circular waveguide—the choice of sizes being directly influenced by current usage. The velocity of light used in the calculations is the most recently accepted value. The mathematical basis of all formulae used in the computations is stated, and comprehensive notes on the use of the tables are incorporated.

As the tables are intended to be used as a desk companion, they are clearly printed on stout paper strongly bound to withstand constant usage in design office or laboratory.

PRINCIPLES OF FREQUENCY MODULATION. Applications in Radio Transmitters and Receivers, and Radar. By B. S. Camies. Published for "Wireless World" by Iliffe & Sons Limited. Size 8¾ in. by 5½ in. 147 pages, 87 diagrams in the text. Price 21s. net.

Intended primarily for students, radio engineers and radio amateurs, this book gives a comprehensive account of the fundamentals of frequency modulation and its applications. Unlike most books on frequency modulation, which tend to concentrate on f.m. receivers, it also covers f.m. in transmitters, and the use of f.m. in microwave links, in radar, in telegraphy and in facsimile transmission.

The first part of the book deals with theory, and a number of calculations are included to illustrate the sideband structure and bandwidth of frequency-modulated waves. Some space is devoted to the relative advantages of f.m. and a.m. receivers in receiving signals in the presence of various kinds of interference. Circuits for generating f.m. waves and their use in transmitters are next described. A chapter on f.m. detectors leads to an account of design of complete receivers. In the early days some f.m. receivers failed to live up to the claims made for them; the author shows how this may have been due to unsound design and indicates how to avoid the pitfalls. He also stresses that a built-in compressed dipole aerial is unlikely to give interference-free reception in fringe areas.

Numerical examples are included throughout the book to show how simple design calculations may be performed and to illustrate the practical magnitude of quantities.

Now that the incorporation of v.h.f. in broadcast receivers is standard practice, this book is a *must* for all radio technicians and students.

STEREO HANDBOOK by G. A. Briggs and R. E. Cooke, B.Sc.(Eng.). (First edition.) 146 pages. Published by Wharfedale Wireless Ltd., Idle, Bradford. Price 10/6.

This book is intended to help the amateur to understand stereo and its implications. The fifteen chapters contain 88 illustrations most of which are original. Maximum space has been allocated to pick-ups, loudspeakers and recording techniques in that order. The book is non-technical throughout.

THE TELEVISION ANNUAL FOR 1960. Edited by Kenneth Baily. Published by Odhams Press Ltd. Price 10/6.

Covers the whole field of British television—B.B.C. and I.T.A. Pen portraits of TV personalities and articles written by the stars themselves. Beautifully produced and illustrated with over 170 photographs.

ELEMENTS OF RADIO ENGINEERING, by H. I. F. Peel, M.Sc.Tech., A.M.I.E.E. (Second edition.) 265 pages, 158 diagrams. Published by Cleaver-Hume Press Ltd.

Many detailed improvements have been made for the second edition of this compact and readable text book. Only an elementary knowledge of electricity and magnetism is assumed. Simple a.c. theory from the radio engineer's angle both graphically and functionally is developed. A mathematical treatment constitutes one of several useful appendices. Some elementary consideration of the principles of transistors has been introduced. The book primarily covers the syllabuses of the Radio I and Telecommunications (Principles) I and II of the City and Guilds five-year course in Telecommunications, but also largely provides for a number of other syllabuses including that leading to the Radio Amateurs' Examination. The drawings are finely drawn and lettered and production is up to the usual Cleaver-Hume high standard. Many worked examples are in the text.

GUIDE TO BROADCASTING STATIONS. Compiled by *Wireless World* (12th edition). 110 pages. Published by Iliffe & Sons Ltd. Price 3/6 (by post 4/- from R.S.G.B. Headquarters).

In addition to the main sections listing both geographically and in order of frequency all European long- and medium-wave broadcasting stations and nearly 2,500 short-wave stations of the world, the twelfth edition includes a list of over 1,000 European v.h.f. sound broadcasting stations. Another gives Europe's main television stations.

This edition has been considerably enlarged to accommodate a number of additional features giving useful information for the broadcast listener. These include standard time throughout the world, international allocation of call-signs and a wavelength-frequency conversion table.

MAGNETIC AND ELECTRICAL FUNDAMENTALS, by Dr. A. Efton. 132 pages. Published by John F. Rider, New York. Price $2.50.

ADVANCED MAGNETISM AND ELECTRO-MAGNETISM. Edited by A. Schure. 104 pages. Published by John F. Rider, New York. Price $2.25.

These two books are recent additions to the Rider Basic Science Series and the Rider Electronic Technology Series respectively. Clearly printed and well illustrated they represent a vigorous and modern approach to the study of magnetism and electricity.

HI-FI MADE EASY, by N. H. Crowhurst. Published by Gernsback Library Inc., New York. Price $2.90.

HOW TO GET THE MOST OUT OF YOUR VOM, by Tom Jaski. Published by Gernsback Library Inc., New York. Price $2.90.

The former book is intended to answer the sort of questions which bother the hi-fi beginner whilst the latter explains how to put the VOM to new and unusual uses. It analyses commercial types and tells the reader how to build his own VOM.

Representation

THE following are additions to the list of County Representatives published in the December 1958 issue.

REGION 4
NOTTINGHAMSHIRE
Alan Walmsley (G2HIO), Park House, Cinderhill Road, Cinderhill, Nottingham.

REGION 15
CO. ANTRIM
Graham Williamson (B.R.S.7781), Avonmore, Antrim Road, Ballymena.

THE following are additions to the list of Town Representatives published in the December 1959 issue.

REGION 1
LANCASHIRE WEST—PRESTON
G. Lancefield (G3DWQ), 35 Brixton Road, Frenchwood.

REGION 4
LINCOLNSHIRE—STAMFORD AND DISTRICT
K. G. Pugh (G3HES), 115 Ryhall Road, Stamford.

REGION 7
LONDON EAST—THEYDON BOIS AND EPPING
M. A. C. McBrayne (G3KGU), 25 Purlieu Way, Theydon Bois, Essex.

REGION 8
KENT—FOLKESTONE AND DISTRICT
C. Bradley (G5BS), Mill Stream Cottage, Horn Street, Hythe.

REGION 9
DORSET—N.E. DORSET AREA
G. S. C. Udall (G2HCD), 35 Albert Street, Blandford.
DEVONSHIRE—NORTH DEVON AREA
D. H. Jones (G3BO), Rosebank, Westcombe, Bideford.

REGION 15
CO. ANTRIM—BALLYMENA
William Davison (B.R.S.19828), 1 Clarence Street.

REGION 16
SUFFOLK—LOWESTOFT, BECCLES AND DISTRICT
E. J. Hartley (G3DDK), Byways, Mutford, Beccles.

Vacancy

The death of Mr. W. B. N. Althorpe (G2CBA) has created a vacancy for the office of Medway A.R.

Nominations for his successor should be made in the prescribed form and sent to reach the General Secretary by not later than June 30, 1960.

Change of Address

Mr. D. Johnstone (G3NFA), Representative for Mitcham and District is now living at 59 Acre Lane, Carshalton, Surrey.

Affiliated Society Representatives

THE following are additions to the list of Affiliated Society Representatives published in the December 1959 issue.

Flintshire Radio Society: L. W. Barnes (B.R.S.21371), 1 Bryn Coed Park, Rhyl.

Gravesend Amateur Radio Society: A. Watson (G3DCV), St. Elmo, Lewis Road, Istead Rise, Northfleet, Kent.

Newbury & District Amateur Radio Society: Eric Smith (G3JMT), 26 Haddon Drive, Woodley, nr. Reading, Berks.

South Birmingham Radio Society: G. E. Simonite (G3JAO), 19 Wistaria Close, Northfield, Birmingham 31, Warwicks.

Gold Embossed Leather Call-Sign Plates

THE Society is now in a position to supply gold embossed leather call-sign plates bearing a member's call-sign or B.R.S. number. The plates are of three sided construction and are intended for the desk or table. They are 8½ in. long and 1¾ in. in height from base to apex of triangle.

The leather covering can be in black or any other colour to suit individual requirements.

For plates bearing 4, 5 or 6 characters the price is 21/-. Those bearing 7 or 8 characters are 25/-. Delivery 2-3 weeks.

Forthcoming Events

Details for inclusion in this feature should be sent to the appropriate Regional Representatives. T.R.s and club secretaries are reminded that the information submitted must include the date, time and venue of the meeting and, whenever possible, details of the lecture or other event being arranged. Regional Representatives are requested to set out copy in the style used below.

DATES FOR YOUR DIARY

May 21-22.—Region 12 O.R.M.
May 21.—Sixth International V.H.F./U.H.F. Convention, London.
May 22.—Northern Mobile Rally at Harewood House, near Harrogate.
June 13-17.—Region 1 I.A.R.U. Conference, Folkestone.
June 19.—Amateur Radio Mobile Society Rally.
June 26.—Longleat Mobile Rally.
June 26.—Region 2 O.R.M. at Redcar.
July 3.—Harlow Mobile Rally.
July 3.—Hunstanton Mobile Rally and "Bucket and Spade" party.
July 10.—South Shields Mobile Rally.
July 10.—Worthing "Bucket and Spade" Party.
July 17.—Southern Counties Mobile Rally at the Vintage Car Museum, Beaulieu Abbey, near Southampton.
August 14.—Derby Mobile Rally.
August 24-September 3.—National Radio and Television Show, Earls Court, London.
August 28.—South Manchester Radio Club and Stockport Radio Society Joint Rally.
August 28.—G6UT's "Ham Party."
September 10.—British Amateur Television Club Convention.
September 15-17.—R.S.G.B. National Convention, Cambridge.
September 18. — Lincoln Hamfest and Mobile Rally.
October 2.—Region 9 O.R.M. at Weymouth.
November 23-26.—R.S.G.B. International Radio Hobbies Exhibition.
December 16.—Annual General Meeting at Over-Seas House, London, S.W.1.

REGION 1

Ainsdale.—Wednesdays, 8 p.m., 37 Hawthorne Grove, Southport.
Blackburn. — Tuesdays, 8 p.m., West View Hotel, Revidge Road.
Blackpool (B. & F.A.R.S.).—Tuesdays, 8 p.m., Squires Gate Holiday Camp.
Bury (B.R.S.).—June 14 (Junk Sale), George Hotel, Kay Gardens.
Crosby (C.A.R.S.).—Tuesdays, 8.30 p.m., Colonsay, Crosby Road South, Waterloo.
Liverpool (L. & D.A.R.S.).—Tuesdays, 8 p.m., Gladstone Mission Hall, Queens Drive, Stoneycroft. May 24 ("Contest Operating," G3KOK), May 31 ("Tape Recording," G3JIR).
Macclesfield (M. & D.R.S.).—May 17, 31, June 14, 28, The Bruce Arms, Crompton Road.
Manchester (M. & D.R.S.).—June 13, Wellington Hotel, Nicholas Croft, High Street, off Market Street.
Manchester (S.M.R.C.).—Fridays, 7.30 p.m., Ladybarn House, Mauldeth Road, Fallowfield.
Preston (P.A.R.S.).—May 24, June 14, 28, St. Paul's School, Pole Street.
Southport.—Thursdays, 8 p.m., The Esplanade.
Stockport (S.R.S.).—May 25, June 8, 22, The Blossoms Hotel, Buxton Road.
Wirral (W.A.R.S.).—May 20, June 3, 17, 7.45 p.m., 4 Hamilton Square, Birkenhead.

REGION 2

Barnsley.—May 27 (A visitor with Mobile Equipment), June 10 (N.F.D. Final arrangements), June 24 (Talk on a specialised s.s.b. receiver by H. Eyre, G5KM), King George Hotel, Peel Street, Barnsley.
Bradford (B.A.R.S.).—May 24 ("Transistors," by D. C. Bell, B.Sc.), 7.30 p.m., Cambridge House, Little Horton Lane, Bradford 5. June 14, visit to Holme Moss Television Station.
Bridlington (B. & D.R.C.).—Mondays, 7.30 p.m., Social and Sports Centre, Bridlington Station.
Cleckheaton (S.V.A.R.S.).—May 25 (Lecture by T. C. Isaac, ex-G4RQ), 7.30 p.m., George Hotel, Cleckheaton. May 29, Visit to Ringway Airport, Manchester. June 8, Visit to Joshua Tetley & Sons, Ltd., Leeds.
Halifax.—May 24 (Ragchew), June 14 (Workshop Practice) Sportsman Inn, Ogden, Halifax.
Leeds (L.A.R.S.).—May 18 (N.F.D. Discussion), May 25 (Bring-and-Buy Sale), June 1 (A.G.M.), June 15, Swarthmore Education Centre, 4 Woodhouse Square, Leeds 3.
Scarborough.—Thursdays, 7.30 p.m., Chapman's Yard, North Street.

REGION 3

Birmingham (Slade).—May 20 ("A Topical Film Show" by Mr. R. Heaton), June 3 ("Technical Problems in Sound and Vision"), 7.45 p.m., The Church House, High Street, Erdington.
Stourbridge.—June 7 (N.F.D. Discussion), 8 p.m., Brotherhood Hall, Scotts Road, Stourbridge.

REGION 4

Derby (D. & D.A.R.S.).—May 18 (Direction Finding Practice Run), May 25 ("Crystal Filters" by H. E. Jones, G3JXL), June 1 (Surplus Sale), June 8 (Open Night), June 15 (Fun with Tape), 7.30 p.m., Room No. 4, 119 Green Lane, Derby.
Derby (D.S.W.Exp.S.).—Thursdays, 7.30 p.m., Sundays, 10.30 a.m., Club Room, Nunsfield House, Boulton Lane, Alvaston, Derby.
Grimsby (A.R.C.).—May 26, June 9, 8 p.m., R.A.F.A., Abbey Drive West, Grimsby.
Leicester (L.R.S.).—May 16 (N.F.D. Information), June 20 (Special Item), 7.30 p.m., Old Hall Farm, Braunstone Lane, Leicester.
Lincoln (L.S.W.C.).—June 1, June 15, Room No. 19, Technical College, Cathedral Street, Lincoln. 7.30 p.m. May 18, Visit to New Automatic Telephone Exchange, Lincoln: assemble 7.30 p.m.
Melton Mowbray (A.R.C.).—June 9, Visit to Iron Foundry: assemble 6.30 p.m. at 23 Melton Road, Asfordby Hill, Melton Mowbray.
Newark (N. & D.A.R.S.).—June 7, 7.15 p.m. (Radio Control of Model Boats by A. Hall), Northgate House, Newark.
Nottingham (A.R.C.).—Tuesdays and Thursdays, 7.30 p.m., Community Centre, Woodthorpe House, Mansfield Road, Nottingham.
Peterborough.—June 3, 7.30 p.m., Peterborough Technical College.
Peterborough (P. & D.A.R.S.).—June 3, 7.30 p.m., Peterborough Technical College; June 10, Alwalton (N.F.D.); July 3, Mobile Rally and "Bucket and Spade" Party at Hunstanton.
Retford & Worksop (N.N.R.C.).—Tuesdays, Thursdays and Fridays, 7.30 p.m., Victoria Hall, Eastgate, Worksop, Notts.

REGION 6

Cheltenham.—First Thursday in each month, 8 p.m., Great Western Hotel, Clarence Street.
Stroud.—Wednesdays, 8 p.m., Subscription Rooms, Stroud.

REGION 7

Acton, Brentford and Chiswick.—May 17 ("N.F.D. Briefing"), 7.30 p.m., A.E.U. Rooms, 66 High Road, Chiswick.
Barnet.—May 31 ("Arrangements for N.F.D."), 7.30 p.m., Red Lion Hotel, Barnet.
Bexleyheath (N.K.R.S.).—May 26 (A.G.M.), June 9, 8 p.m., Congregational Hall, Bexleyheath (near Clock Tower).
Croydon (S.R.C.C.).—June 14, 7.30 p.m., "Blacksmith's Arms," South End, Croydon.
Dorking (D. & D.R.S.).—Second and fourth Tuesday in each month, 8 p.m., Star and Garter Hotel, Dorking.
Ealing.—Sundays, 11 a.m., ABC Restaurant, Ealing Broadway, W.5.
East Molesey (T.V.A.R.T.S.).—June 8 ("How Semiconductors Behave" by J. W. Hill, G3JIP), Carnarvon Castle Hotel, Hampton Court.
Enfield and District.—May 26 ("R.F. Heating," by G3AGP), 7.30 p.m., George Spicer School, Southbury Road, Enfield.
Harlow and District.—Thursdays, 7.30 p.m., rear of G3ERN (G. E. Read), High Street, Harlow.
Holloway (G.R.S.).—Mondays, Tuesdays and Wednesdays (R.A.E. and Morse), Fridays (Club), 7 p.m., Montem School, Hornsey Road, N.7.
Ilford.—Thursdays, 8 p.m., 579 High Road, Ilford (near Seven Kings station).
Kingston.—Lectures alternate Thursdays, Theory and Morse classes weekly, 7.45 p.m., Y.M.C.A., Eden Street, Kingston (Morse at 2, Sunray Avenue, Tolworth).
Mitcham (M. & D.R.S.).—Fridays, 8 p.m., "The Cannons," Madeira Road, Mitcham.
New Cross (C.A.R.S.).—Fridays, 7.30 p.m., Sundays, 11.30 a.m. (Audio Section, last Tuesday in each month, 7.30 p.m.), 225 New Cross Road, London, S.E.14. May 15 (D/F Contest, rendezvous at Green Street, Green, Kent, 10.30 a.m.). May 27 ("Testing Gear to Destruction," by J. Lambert, G3FNZ), June 10 ("Electronic Components," by G. B. Hearne of Erie Resistor Co.).
Norwood and South London (C.P. & D.R.C.).—Second Saturday and last Tuesday each month, 8 p.m., Windermere House, Westow Street, Crystal Palace. June 4 (Junk Sale and Final Arrangements for N.F.D.).
Romford (R. & D.R.S.).—Tuesdays, 8.15 p.m., R.A.F.A. House, 18 Carlton Road, Romford.
Slough.—May 30 ("N.F.D. Final Arrangements,") 8 p.m., Stag Hotel, Wexham Street, Wexham.
Southgate, Finchley and District.—June 9 ("Impedance Matching by H. A. M. Clark, G6OT), 7.30 p.m., Arnos School, Wilmer Way, N.14 (near Arnos Grove station).
South Kensington (C.S.R.S.).—May 17, 6 p.m., Science Museum, South Kensington.
Welwyn Garden City.—June 9, 8 p.m., I.C.I. Restaurant, Blackfan Road, Welwyn Garden City.

LONDON MEMBERS' LUNCHEON CLUB

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

at 12.30 p.m. on Fridays, May 20, June 17, July 15 and August 19, 1960.

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

REGION 9

Bideford.—First Thursday in each month 7.30 p.m. alternately at G2FKO, (T. G. Ward), 38 Clovelly Road. (Phone: Bideford 964) and G3BO (D. H. Jones), Rosebank, Westcombe. (Phone: Bideford 550).
Bristol.—May 20 ("Aerials," by H. V. Sims, A.M.Brit.I.R.E.), 7.15 p.m., Carwardine's Restaurant, Baldwin Street, Bristol, 1.
Exeter.—Second Thursday in each month, Y.M.C.A., St. David's Hill, Exeter.
Falmouth (F.R.C.).—First Wednesday in each month, Y.M.C.A., Falmouth.
Torquay.—June 18 ("Two Metre Activity and Experiences," by Arthur Bullock, G3IEA), Y.M.C.A., The Castle, Torquay.
Weston-super-Mare.—Second Wednesday in each month, 7.15 p.m., Technical College, Lower Church Road, Weston-super-Mare.
Yeovil (Y.A.R.C.).—Wednesdays, 7.30 p.m., Grove House, Preston Road, Yeovil.

REGION 10

Cardiff.—June 13 (Junk Sale), July 11 (Quiz), 7.30 p.m., Sgt's. Mess, T.A. Centre, Park Street, Cardiff.

REGION 11

Prestatyn (F.R.S.).—May 23 (N.F.D. Arrangements), June 6 ("Audio Amplifiers" by

(Continued on page 517)

GW3JGA), July 4 (Talk on Subscriber Trunk Dialling), 7.30 p.m., Railway Hotel, Prestatyn.

REGION 13

Edinburgh (L.R.S.).—May 19 ("Two Metre Converters."), June 2 (N.F.D. Briefing), June 16 (A.G.M.), 7.30 p.m., Y.M.C.A., 14 St. Andrew Street, Edinburgh 2.

REGION 14

Glasgow.—Last Friday in each month, 7.30 p.m., Christian Institute, 70 Bothwell Street, Glasgow C.2.

Prestwick.—Third Sunday in each month, 7.15 p.m., Royal Hotel, Prestwick.

REGION 17

Portsmouth.—Tuesdays, 7.30 p.m., Scarrs, 183A Albert Road.

Southampton.—First Saturday in each month, 7 p.m., Prospect House (back of Gas Board showrooms), Above Bar. June 4 (Details for N.F.D. and talk on Southampton Water Oceanography).

Regional and Club News

Blackburn Amateur Radio Club.—A new clubroom has been obtained at the West View Hotel, Revidge Road, Blackburn, where meetings are held on Tuesdays at 8 p.m. A hamfest in conjunction with Bury Amateur Radio Society is planned for the autumn. *Hon. Secretary:* K. Heap (G3NCZ), 138 New Bank Road, Blackburn.

Bridlington and District Radio Club.—Meetings of this newly formed club are held on Mondays, commencing at 7.30 p.m., at the Social and Sports Centre, Bridlington Station. Prospective members and visitors to the town will be most welcome.

Bristol.—Over 60 members were present at the April meeting when a most interesting and well-illustrated talk on "Single Sideband" was given by T. H. Holbert (G3DXJ), Chairman of the Bailleul Radio Society. The annual Film Show arranged by Mullard Ltd. was held on May 5, when the programme included the films "The Manufacture of Frame Grid Valves" and "The Invisible Force." Final arrangements for N.F.D. will be made at the meeting on May 20, when a lecture entitled "Aerials" will be given by H. V. Sims, A.M.Brit.I.R.E., of the B.B.C. Members with equipment suitable for display at the June meeting are asked to let the Hon. Secretary have details of what they are bringing. *Hon. Secretary:* D. F. Davies (G3RQ), 51 Theresa Avenue, Bishopston, Bristol.

Cambridge and District Amateur Radio Club.—"Meters for Volts, Current and Resistance" will be the subject of the talk at the meeting to be held at the "Jolly Waterman," Chesterton Road, Cambridge, on May 27 at 7.45 p.m. *Hon. Secretary:* A. H. B. Waton (G3GGJ), "Arkengarthdale," New Road, Barton, Cambs.

Chester and District Radio Society.—Recent events have included the Annual Dinner and the A.G.M. Meetings are held at the Y.M.C.A., St. John's House, Chester, on Tuesdays except the first in each month which is Net Night. *Hon. Secretary:* H. Morris (G3ATZ), 24 Kingsley Road, Boughton Heath, Chester.

Cornish Radio and Television Club.—At the A.G.M., the following were elected: *President*—R. Cocks (G3BHC); *Chairman*—J. Brown (G3LPB); *Vice-Chairman*—J. Share; *Hon. Secretary*—W. J. Gilbert, 7 Poltair Road, Penryn, Cornwall; *Hon. Treasurer*—N. Elliott; *Committee Members*—W. Locke (G3NKE), J. Ridge (G3HFS) and J. Taylor. The "S.W.L. Cup" was presented to Mr. J. Share.

Crawley Amateur Radio Club.—An interesting talk on the I.G.Y. was given by G2FKZ and G3FZL in March while G4ZU was due to lecture on "Aerials for Restricted Spaces" at the April meeting. Final arrangements for N.F.D. will be discussed at the meeting at the "Brewery Shades," Crawley High Street, on May 26. *Hon. Secretary:* R. G. B. Vaughan (G3FRV), 9 Hawkins Road, Tilgate, Crawley.

Derby and District Amateur Radio Society.—Fully paid-up membership during the first quarter of 1960 was 100—a record. Details of activities may be obtained from the *Hon. Secretary:* F. C. Ward (G2CVV), 5 Uplands Road, Littleover, Derby.

Dundee.—Meetings are held on the first Thursday of each month in the restaurant of Green's Playhouse, Dundee. Visitors are always welcome.

Edgware and District Radio Society.—Recent events have included talks on microwaves and stabilized power units and a film show arranged by G3BZG. Meetings are held at Canons Park Community Centre, Merrion Avenue, Stanmore, on the second Wednesday in each month. *Hon. Secretary:* D. L. Lisney (G3MNO), 17 Pickett Croft, Stanmore, Middlesex.

Halifax and District Amateur Radio Society.—"Fire Prevention" was the subject of a recent talk while the A.G.M. was due to be held on May 3. Members visited a TV studio in Manchester in April. Meetings will be held at the Sportsman Inn, Ogden, on May 24 and June 14 (Workshop Practice). *Hon. Secretary:* A. Robinson (G3MDW), Candy Cabin, Ogden, Halifax.

Harrow, Radio Society of.—Meetings are held in the Science Laboratory, Roxeth Manor Secondary School, Eastcote Lane, South Harrow, on Fridays at 8 p.m. A "net" is held on Top Band between 7-8 p.m., when mobile members are "talked-in" to the meeting. The programme for May includes a Junk Sale on May 20 (visitors are permitted to buy) while on June 3 J. Bolton (G3HBN) will describe the economy mobile transmitter recently designed by him. *Hon. Secretary:* S. C. J. Phillips, 131 Belmont Road, Harrow Weald (Harrow 3909).

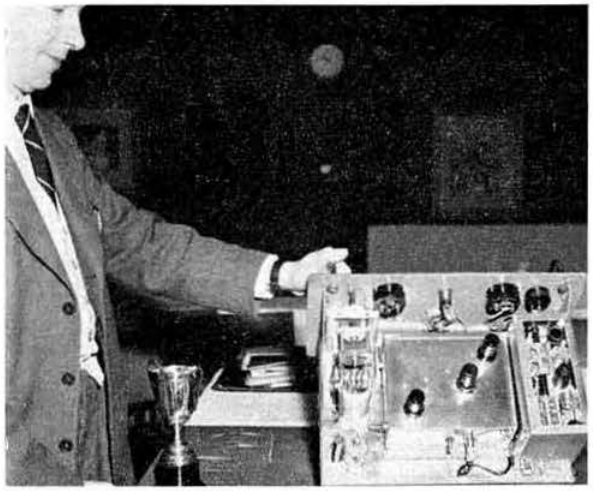
Liverpool and District Amateur Radio Society.—A special sub-committee has been formed to deal with the society's exhibition activities. On May 28, one exhibition station will be in operation at the Newton-le-Willows Garden Fete and another 20 miles away. Meetings are held on Tuesdays and visitors are always welcome. *Hon. Secretary:* H. James, 448 East Prescot Road, Knotty Ash, Liverpool, 14.

Mitcham and District Radio Society.—Recent activities have included a Junk Sale, a talk on 12 volt valves by D. Babbs and, of course, preparations for N.F.D. next month. Details of future meetings, which are held at The Cannons, Madeira Road, may be obtained from the *Hon. Secretary:* M. Pharaoh (G3LCH), 1 Madeira Road, Mitcham.

Peterborough Amateur Radio Society.—At the April meeting Mr. J. W. Boswell described some of electronic equipment in use at the Technical College. A Mobile Rally and Bucket and Spade Party at Hunstanton is being arranged for July. Meetings at the Technical College are held at 7.15 p.m. on the first Friday in each month. *Hon. Secretary:* D. Byrne (G3KPO), Jersey House, Eye, Peterborough.

Reading Amateur Radio Club.—At the March meeting there was a talk on Merchant Navy radio operating while on April 30 "Workshop Practice" was due to be the subject of the lecture and demonstration. Information regarding the club's activities may be obtained from the *Hon. Secretary:* R. J. Nash (G3EJA), 9 Holybrook Road, Reading.

Reigate Amateur Transmitting Society.—On May 21, Mr. J. McCullock (B.B.C.) is to give a talk about "Studio Management" while an N.F.D. rehearsal will be held the following day.



Winner of the Stanley Harrison (G3EPK) Challenge Cup in this year's Constructor's Exhibition arranged by the Welwyn Garden City Group was Reg Wade (G3IRW), seen here with his exhibit, a band-switched table-top transmitter.

May 22. A visit to the B.B.C. Crystal Palace TV Station is arranged for May 28. The " N.F.D. Inquest " will take place on June 18. Meetings are held at The Tower, High Street, Redhill, and commence at 7.30 p.m. *Hon. Secretary:* F. D. Thom (G3NKT), 12 Willow Road, Redhill.

Shefford and District Amateur Radio Society.—Meetings are held on Thursdays at 7.30 p.m. in Digswell House, Shefford, and commence with slow Morse practice. On May 19 there will be a R.S.G.B. Recorded Lecture while June 2 and 9 will be devoted to N.F.D. preparations. The Junior Section meets on Sunday mornings. *Hon. Secretary:* G. R. Cobb (G3IXG), Western House, Ampthill Road, Shefford, Beds.

Slade Radio Society.—On June 17, John Savage (G3MSS) of Collins Radio will give a lecture/demonstration of the S-line equipment and KWM-2. Admission to this meeting will be ticket only, obtainable from the *Hon. Secretary:* C. N. Smart, 110 Woolmore Road, Erdington, Birmingham, 23. Other meetings at The Church House, High Street, Erdington, are arranged for 7.45 p.m. on May 20 (Topical Film Show) and June 3 (Technical Problems in Sound and Vision).

Southgate, Finchley and District.—There was an attendance of 57 at the March meeting when Sid Iles (G3BWQ) gave a talk on transmitters. K.W. Electronics' equipment was the subject at the April meeting. N.F.D. plans are well under way and a number of members are now equipped for mobile operation. The Group will again be operating GB3SRA at the Friern Barnet Show in August and at the Wood Green Show in September. *Hon. Secretary:* A. G. Edwards (G3MBL), 244 Ballards Lane, North Finchley, London, N.12.

Stoke-on-Trent Amateur Radio Society.—At the A.G.M. the following were elected: *President*—V. J. Bloor (G3UD); *Chairman*—J. Brindley (G3DML); *Hon. Secretary*—V. J. Reynolds (G3COY), 90 Prince's Road, Hartshill, Stoke-on-Trent. Special QSL cards have been produced in connection with the City's Jubilee celebrations during which GB3SOT will be operated from various exhibitions. A Morse Class will commence on May 23.

Thanet Radio Society.—Among the guests at the Thirteenth Annual Dinner-Dance were the Mayor and Mayoress of Ramsgate, Alderman and Mrs. E. G. Butcher, and the General Secretary, Mr. John Clarricoats, O.B.E., G6CL, and Mrs. Clarricoats. Other well-known amateurs present included G2AIW, G2JF, G2MI, G4IB and G4ZU. The first prize in the Ladies' Competition was won by Miss Azniv Cook.

Torbay Amateur Radio Society.—The following were elected at the A.G.M. *President*—W. B. Sydenham, B.Sc. (G5SY); *Vice-President*—F. J. Wadman (G2GK); *Chairman*—F. D. Cawley (G2GM); *Hon. Treasurer*—R. D. Luscombe (G3MEP); *Hon. Secretary*—G. A. Western (G3LFL), 118 Salisbury Avenue, Barton, Torquay; *Hon. Auditor*—A. Bullocks (G3IEA); *Experimental Manager*—D. Cousins (G3NCC); Contest *Manager*—D. Webber (G3LHJ); *Assistant Hon. Secretary*—B. E. Symons (G3LKJ); *Committee Members*—L. Mays (G3CWR), R. Barratt and D. White.

At the Isle of Thanet Radio Society Annual Dinner-Dance held in Ramsgate on March 12, the Mayor of Ramsgate (Alderman E. Butcher, J.P.) spoke of his interest in the Lifeboat Service and demonstrated his knowledge of Top Band Amateur Radio problems. In this informal picture taken by Arthur Milne (G2MI) Alderman Butcher is seen in close conversation with Fred Lambeth, G2AIW (R.S.G.B. V.H.F. Manager and Hon. Secretary I.A.R.U. Region I V.H.F. Committee) and the General Secretary (John Clarricoats, O.B.E., G6CL). Also in the picture are Mrs. Milne, the Mayoress (Mrs. Butcher) and Mrs. Clarricoats. The President of the Thanet Radio Society (Mr. G. A. Chapman, G2IC) is back to the camera.

(Photo by G2MI)

Wirral Amateur Radio Society.—A lecture by H. Schroeder on receiver alignment with an oscilloscope and wobbulator has been arranged for May 20. N.F.D. plans will be discussed on June 3. *Hon. Secretary:* A. Seed (G3FOO), 31 Withert Avenue, Bebington, Cheshire.

GB2RS SCHEDULE

R.S.G.B. News Bulletins are transmitted on Sundays in accordance with the following schedule:

Frequency	Time	Location of Station
3600 kc/s	9.30 a.m.	South East England
	10 a.m.	Severn Area
	10.30 a.m.	North Midlands
	11 a.m.	North East England
	11.30 a.m.	South West Scotland
145·55 Mc/s	11.15 a.m.	Beaming south-east from Leeds
	11.30 a.m.	Beaming south-west from Leeds
	11.45 a.m.	Beaming north from Leeds
145·3—145·4 Mc/s	12 noon	Beaming north from South East England
	12.15 p.m.	Beaming west from South East England

News items for inclusion in the bulletins should reach Headquarters not later than first post on the Thursday preceding transmission.

New Members

THE following have been elected to membership.

JANUARY 1960

Corporate Members, Home (Licensed)

G2ABR †R. C. Mayman, 27 Tennyson Avenue, Hull, East Yorks.
G3IWE †A. M. H. Wyse, Appleton Hall Gardens, Appleton, nr. Warrington, Lancs.
G3JRX †K. Boddy, 4 Colwall Avenue, Priory Road, Hull, East Yorks.
G3KOM †F. C. Singh, 14 Queensway, West Wickham, Kent.
G3KRG E. Yard, 13 Chapel Street, Hobson, Burnopfield, Newcastle on Tyne, Northumberland.
G3LGV R. E. Hardman, 80 Green Lane, Garden Suburb, Oldham, Lancs.
G3LGX †C. A. Gledhill, 49 Larch Hill, Odsal, Bradford 6, Yorks.
G3LRB J. Stephens, 1b Copthorne Walk, West Vale, Kirkby, Lancs.
G3MXU D. Brideson, 65 New City Road, Plaistow, London, E.13.
G3MZN R. W. E. Lightfoot, 5 Periwinkle Lane, Hitchin, Herts.
G3NGJ W. J. Epton, The Grange, Canwick, Lincoln.
G3NKR *M. A. Rowlands, 21 Hanbury Road, Clifton, Bristol 8.
G3NLS H. W. Craine, 19 Moss Side, Knotty Ash, Liverpool 14.
G3NNH †F. Huggins, 8 Albert Road, Colne, Lancs.
G3NNX H. Chappell, 67 Thornhill Gardens, West Hartlepool, Co. Durham.
G3NTG C. E. Griffin, Officers' Mess, R.A.F. Bridgnorth, Shropshire.
G3NUB *M. Bursnall, Block G.2, A.S.T. Hamble, Southampton.
G3NUQ I. D. MacArthur, 155 Woodford Road, Bramhall, Cheshire.
G3NUV K. L. Bond, 59 High Street, Bushey, Herts.
G3NWD R. L. Dilworth, 195 Eden Way, Eden Park, Beckenham, Kent.
G3NWW M. C. Wakely, 35 Delta Road, Worcester Park, Surrey.
G3NXQ A. K. Barker, 13 Eskdale Close, Warndon, Worcester.
G3NXY *D. C. Joy, 160 Manor Farm Road, Bitterne Park, Southampton.
G3NYA L. D. Strange, 34 Heathlands Road, Sutton Coldfield, Warwick.
G3NYQ J. A. Edson, Chalfonts, Menston Lane, Burley, Ilkley, Yorks.
GC5ZC †C. A. Henn-Collings, 80 Mount Durand, Guernsey, Channel Isles.
GI3NVW W. R. Pollock, Holmlea, Omagh, Co. Tyrone, Northern Ireland.
GM3NTL G. W. Watt, 17 Hopetoun Grange, Bucksburn, Aberdeen, Scotland.
GW2TY E. J. Edwards, 47a Commercial Street, Nantymoel, Bridgend, Glam.
GW3NWQ M. J. Caplan, TA Centre, Park Street, Cardiff.
GW3NXH C. Jones, TA Centre, Park Street, Cardiff.

Corporate Members, Overseas (Licensed)

DL4PI †RA 15216627 R. J. Mason, H.Q.Bty, 2nd How. Btn, 30 Arty, APO 39, N.Y., U.S.A.
EI5AG J. V. Paul, Norbreck, Douglas Road, Cork, Eire.
JZ0/G3KKM K. R. Barton, Decca Navigator Co. Ltd., Merauke, Netherlands New Guinea.
K2DJD D. W. Mayor, P.O. Box 232, Sta F. Buffalo 12, N.Y., U.S.A.
K2OLG J. M. Gumino, 303 Old Stage Road, Spotswood, New Jersey, U.S.A.
K5QYQ Harold R. Hartman, 9913 Chesterton Place, Oklahoma City 20, Oklahoma, U.S.A.
OH3SE L. E. Kokko, Masunimaki 28 oi 4, Tampere, Finland.
ON4MW R. T. Maurus, Frans Musinstraat, mr 15, Ostend, Belgium.
SP7HX R. Izykowski, P.O. Box 424, Lodz 1, Poland.
SV1AM G. Delicaris, Phidou Street 6, Athens (K), Greece.
VE3CIO H. D. Gray, 22 Holywell Drive, Weston, Ontario Canada.
VE3CZX M. G. Baylay 67 Alvin Avenue, Toronto 7, Ontario, Canada.
VE6BG T. Foley, P.O. Box 317, Empress, Alberta, Canada.
VK6GH W. G. Hayman, 7 Melville Street, Claremont, Western Australia.
VS1JU †H. G. P. Williams, 22F Balmoral Park Flats, Stevens Road, Singapore 10.
W2IKI Lawrence A. Romard, 49 Villa Place, Eaton Town, New Jersey, U.S.A.
W2PTD C. W. Floring, 221 Austin Avenue, Syracuse 4, N.Y, U.S.A.
W4VZB H. S. Stokes, Hartley Bridge Road, Route 7, Macon, Georgia, U.S.A.
W7VEU B. F. Shearer, 3715 S. W. Marigold, Portland 19, Oregon, U.S.A.
WA2CUI A. W. Piotrowski, Box 399, RD.3, Wharton, N.J., U.S.A.
ZC4BG W. A. Mitchell, Civilian Wing, 9 Signal Regt., Royal Signals, B.F.P.O.53.
ZS8K C. D. Stenton, The Residency, Mokhotlong, Basutoland.
ZL2HM †B. H. McLean, 30 Moana Street, Wanganui, New Zealand.
9G1CC P. F. J. Lorden, The Schoolhouse, Bevington School, Bevington Road, North Kensington, London, W.10.
9K2AL E. Lotfy, P.O. Box 1947, Kuwait, Arabia.

Corporate Members (British Receiving Stations)

4968 †J. Slater, Barton Hall, Barton Blount, Church Broughton, Derby.
15322 †S. W. Edmonds, 12 Longfield Drive, West Parley, Wimbourne, Dorset.
18536 †E. C. Harding, 33 Hillcroft Crescent, Ruislip, Middx.
22637 A. Walker, Boyes, Well Meadows, Shaw, Newbury, Berks.
22638 W. E. Sundve, 6 Grasville Road, Higher Tranmere, Birkenhead, Cheshire.
22639 R. L. Bartrum, c/o Messrs. Homeby's Ltd. 414 Derby Road, Long Drive, Greenford, Middx.
22640 M. D. Lack, 31 Almorah Road, Islington, London, N.1.
22641 C. E. Attrill, 1 Grove Place, South Street, Yarmouth, I.o.W.
22642 R. H. Joll, 25 Herrick Road, Woodhouse Eaves, Loughborough, Leics.
22643 D. J. Witham, 57 Gordon Road, Cowes, I.o.W.
22644 R. L. Bellows, 21 Maryland Road, London, N.22.
22645 K. R. Nolloth, 46 Russell Road, London, E.17.
22646 R. H. Jackson, 33 Royal Esplanade, Westbrook, Margate, Kent.
22647 B. T. Armistead, 9 Whiteclosegate, Carlisle, Cumb.
22648 H. Wilson, 9 Dale Road, Darlington, Co. Durham.
22649 A. C. Youell, 10 Earldom Street, Sheffield 4, Yorks.
22650 D. F. Braund, 17 Broomfield Road, Fixby, Huddersfield, Yorks.
22651 H. S. Griffiths, 10 Parkview, Legsby, Market Rasen, Lincs.
22652 T. C. Pugh, Serridge Lodge, Lydbrook, Glos.
22653 L. A. Boor, 18 Lime Tree Avenue, Gainsborough, Lincs.
22654 J. R. Tickner, 233 Felsham Road, Putney, London, S.W.15.
22655 J. A. Fuller, 36 Viola Avenue, Rhyl, Flints, North Wales.
22656 A. J. Burgess, 95 Broyle Road, Chichester, Sussex.
22657 T. D. Howe, 162 Victoria Road, Wood Green, London, N.22.
22658 R. W. Hardy, 90 Caistor Park Road, Stratford, London, E.15.
22659 T. Hoy, 73 Chapel Street, Billericay, Essex.
22660 R. W. L. Jones, 24 Forest Avenue, Forest Hall, Newcastle on Tyne, Northumberland.
22661 L. R. Francis, 42 Everett Street, West Hartlepool, Co. Durham.
22662 L. Critchley, 4 Gladstone Street, West Bromwich, Staffs.
22663 V. A. Cruxton, Hillside Cottage, Hollowell, Northants.
22664 D. Howden, 149 Auchinyell Road, Aberdeen, Scotland.
22665 A. B. Coole, 5 Seventh Avenue, Gloucester.
22666 D. Allt, 63 West Avenue, Rawmarsh, nr. Rotherham, Yorks.
22667 P. Barnfield, Kings Arms Hotel, Neville Street, Abergavenny, Mon.
22668 J. G. Rich, 3 Woodside, Coalbrookdale, Shropshire.
22669 J. Lippold, 15 Gillingham Road, Cricklewood, London, N.W.2.
22670 E. Lewis, 16 Butts Meadow, Wisborough Green, Sussex.
22671 G. A. Thomas, 678 Whitton Avenue West, Greenford, Middx.
22672 L. J. Holland, 2 St. Mary's Crescent, Leamington Spa, Warwick.
22673 T. A. Wilson, Orchard House, Sutton Green, Guildford, Surrey.
22674 *P. J. S. Jacobs, 48 Sturminster Road, Bristol 4.
22675 *J. G. Robertson, 48 Oak Grove, Hatfield, Herts.
22676 *D. K. Austin, 81a Castle Street, Canterbury, Kent.
22677 *A. T. Archer, 64 Westbourne Road, Queens Park, Bedford.
22678 *C. Green, 12 Russell Road, Westbury Park, Bristol 6.
22679 *D. M. Whiting, Oakgates, Darnley Drive, Southborough, Tunbridge Wells, Kent.
22680 *K. Hillman, 51 Cornfield Road, Springfield, Dudley, Worcs.
22681 E. J. Coe, 34 Orchard Road, Maldon, Essex.
22682 B. F. E. Winchester, Pitt House School, St. Raphaels, Higher Lincombe Road, Torquay, South Devon.

Corporate Members, Overseas (British Empire Receiving Stations)

1037 D. H. Abel, 21 Kwepar, Laan, Bridgetown, Athlone, Cape Town, South Africa.
1038 A. G. E. Cox, S.K.C. Ltd., Slim River, Perak, Malaya.
1039 J. O. Sowande, Flat C, 25 Lexham Gardens, Kensington, London, W.8.
1040 A. S. Din, P.O. Box 376, Kampala, Uganda.
1041 †E. P. Campbell, P.O. Box 408, Hastings, New Zealand.

Corporate Members, Overseas (Foreign Receiving Stations)

310 J. C. D. M. Berden, 20 Mill Hill Avenue, Pontefract, Yorks.
311 G. R. Andrew, 45 North Street, Danbury, Conn., U.S.A.

Associates

1691 †A/App. J. D. Tufnall, 052701, Exmouth Division, *H.M.S. Fishgard*, Torpoint, Cornwall.
2176 O. I. Prin, 25 Anderson Terrace, Ardrossan, Ayrshire, Scotland.
2177 P. R. Porter, 38 Wantage Road, Didcot, Berks.
2178 R. H. Bartlett, 129 Stainburn Crescent, Leeds 17.
2179 D. F. Hardman, 51 Newearth Road, Walkden, Manchester.
2180 M. D. Moore, 57 Rockmount Road, Plumstead, London, S.E.18.
2181 T. J. McGarry, 51 Gitzroy Street, Portadown, Co. Armagh, Northern Ireland.
2182 E. A. Hays, 260A Evelyn Street, London, S.E.8.
2183 M. W. Foulger, 3 Telephone Road, Southsea, Hants.
2184 B. M. Wiseman, 54 Ballhurst Estate, Bromyard, Herefordshire.
2185 J. P. Lappin, Ballytrue, Kilmore, Armagh, Northern Ireland.
2186 D. I. Patton, 98 Brownstown Road, Portadown, Co. Armagh, Northern Ireland.
2187 K. P. Jillings, 327 Perry Street, Billericay, Essex.
2188 W. Malin, 1625th Support Sq (MATS), R.A.F. Mildenhall, Box 1593, Bury St. Edmunds, Suffolk.
2189 J. Barrington-Sears, Rookswood, Galleywood Road, Great Baddow, Essex.
2190 D. E. Atkinson, 42 Station Avenue, New Waltham, nr. Grimsby, Lincs.
2191 D. Arrowsmith, 28 Normanton Avenue, Sheldon, Birmingham 26.

2192 C. M. Szajdzicki, 5 Marchwood Crescent, Ealing, London, W.5.
2193 P. A. Smith, 1 Parkside Gardens, East Barnet, Herts.
2194 A. W. Reynolds, 21 Walnut Road, Chelston, Torquay, Devon.
2195 C. E. Spavin, 22 Halton Close, Almondbury, Huddersfield, Yorks.
2196 P. W. Morvinson, Denshaw, Ludborough Road, North Thoresby, nr. Grimsby, Lincs.
2197 T. E. P. Taylor, 21 Northfield Road, Bitterne Park, Southampton.
2198 D. K. Pearse, 48 Barry Road, East Dulwich, London, S.E.22.
2199 H. F. Baker, 10 Churchill Crescent, North Mimms, Hatfield, Herts.
2200 R. P. Banks, 48 Connaught Road, Mays Lane, Barnet, Herts.
2201 R. D. Coole, 3 Tintagel Road, Orpington, Kent.
2202 P. C. Headland, 3 Granby Grove, Highfield, Southampton.
2203 C. W. Tarry, 126 Upney Lane, Barking, Essex.
2204 A. McEwen, 2 Fitzalan Road, Renfrew, Scotland.
2205 D. J. Higgs, 177 Ashridge Way, Sunbury on Thames, Middx.
2206 S. Clark, Landseer, Kollowen, Newry, Co. Down, Northern Ireland.
2207 J. J. Wilcox, 3 Woodshire Road, Dagenham, Essex.
2208 K. Aston, 39 June Avenue, Marton, Blackpool, Lancs.
2209 M. H. Emmerson, 35 Hartfield Crescent, West Wickham, Kent.
2210 D. A. Potter, The Laurels, Somerby, Melton Mowbray, Leics.
2211 P. F. Nash, 53 Wentworth Avenue, Southbourne, Bournemouth, Hants.
2212 J. Dryden, 21 Cloudesdale Road, Balham, London, S.W.17.
2213 R. F. Sheppard, 45 Hewitt Avenue, Wood Green, London, N.22.
2214 A. Richards, 30 Well Place, Cwmbach, Aberdare, Glam.
2215 A. J. Stiling, 517 Bath Road, Saltford, Bristol.
2216 L. J. Wayles, 156 Castlemain Avenue, Southbourne, Bournemouth, Hants.
2217 R. H. Mossip, 70 Madrid Road, Barnes, London, S.W.13.
2218 P. E. Judkins, 20 Highbury Crescent, Bessacarr, Doncaster, Yorks.
2219 P. H. Rogers, 3 Eastrop Lane, Basingstoke, Hants.
2220 V. G. Morris, 2 The Triangle South, Clifton, Bristol 8.
2221 T. A. Haynes, 64 Grenville Road, New Addington, Surrey.
2222 R. F. Penver, 56 Cottesmore Avenue, Barkingside, Essex.

FEBRUARY 1960

Corporate Members, Home (Licensed)

G2RF† H. D. Bramwell, 14 Whole House Road, Seascale, Cumberland.
G3CPP †J. Smith, 35 Pages Hill, London, N.10.
G3EJO †W. Bates, 39 Kingsbury Road, Erdington, Birmingham, 24.
G3EGY J. V. Roberts, 118 Pinewood Crescent, Meir, Stoke-on-Trent, Staffs.
G3EPU K. M. Bailey, 93 Woodside, Wimbledon, London, S.W.17.
G3GKB †G. Radford, 27 The Crossway, Wealdstone, Harrow, Middx.
G3GWL C. Whittingham, 9 High Brink Road, Cole End Farm Estate, Coleshill, Warwicks.
G3JOH †G. W. Theaker, 193 Wingfield Road, Bilton Grange, Hull, Yorks.
G3JTS T. L. Stoakes, 62 Dudley Road, Ilford, Essex.
G3KJK L. E. Wilkes, 7 Heath Close, Latchet Lane, Hazlemere, High Wycombe, Bucks.
G3KKE †J. Regan, 230 Strone Road, Manor Park, London, E.12.
G3LPQ H. W. Wooding, 147 Westfield Grove, Yeovil, Som.
G3MKL F/O F. E. Whitvy, 3 Leeswood Road, Uptin, Wirral, Ches.
G3LZF E. Gittins, Green Hirst Hey, Todmorden, Lancs.
G3MQK J. T. Hough, 55 Victoria Street, Lytham, Lancs.
G3NFS G. E. Lewis, 7 Sussex Avenue, Canterbury, Kent.
G3NHG C. D. Gammon, 18 Hollies Road, Allestree, Derby.
G3NOA P. N. Reynolds, 9 Ripley Avenue, Great Moor, Stockport, Ches.
G3NOM *R. Gerrard, 2 Bleatarn Road, Offerton, Stockport, Ches.
G3NPT G. Bell, 10 Grovehill, Hessle, E. Yorks.
G3NVG L. Robson, 42 Asterley Drive, Acklam, Middlesbrough, Yorks.
G3NVP B. K. Mapp, 18 Queensland Avenue, Redcar, Yorks.
G3NVZ W. J. Nottingham, 48 Sandy Lane, Shrivenham, Nr. Swindon, Wilts.
G3NWP J. Day, 60 Whitfield Avenue, Glossop, Derbys.
G3NYX *J. W. Heaviside, 56 Park Road N., Chester-le-Street, Co. Durham.
G3NZK *P. G. Robson, 2 Middle Road, Higher Denham, Uxbridge, Middx.
G3NZW *S. I. W. James, 5 Abbey View, Mill Hill, London, N.W.7.
G3OAH P. R. Whittlestone, Flat 12, Chestnut Grove, Boston Spa, Yorks.
GI3LEP A. Brown, 44 Scrabo Road, Newtownards, Co. Down, N. Ireland.
GM3FDW †M. Gibbings, Staff Hostel, Chapelcross, Nr. Annan, Dumfriesshire, Scotland.
GW2FAO †D. E. Postle, 4 Hilltop Way, Parcllyn, Cardiganshire, Wales.
GW3CBY †R. Webb, 163 Rhyddings Tce., Brynmill, Swansea, Glam.
GW3DVG †R. I. Jenkins, 12 Upper Market Street, Haverfordwest, Pembs.
GW3NGM W. E. Matthews, 193 Gower Road, Sketty, Swansea, Glam., S. Wales.

Corporate Members, Overseas (Licensed)

15GN G. H. Hudson, P.O. Box 16, Mogadiscio, Somalia, East Africa.
K4YNO R. M. Case, 105 N.W. 120 Street, Miami 50, Florida, U.S.A.
K0LTV Floyd A. Koontz, 12829 E. 50th Terrace, Independence, Miss., U.S.A.
SM5CO K. A. H. Alexanderson, Siljansvagen 74 VII, Johanneshov, Sweden.
VE1AA H. Earl Thompson, P.O. Box 562, Liverpool, N.S., Canada.
VE2QS M. J. Durieux, 1310 Elizabeth Street, St. Laurent, Montreal 9, P.Q., Canada.
VE5LD S. L. Hand, P.O. Box 112, Porcupine Plain, Canada.
VE7MT W. M. Martin, 3501 Doncaster Drive, Victoria, B.C., Canada.
VK2AKV †L. A. Kelsall, Harborne, Kurraiong Heights, 1W., N.S.W., Australia.
VQ2JG J. G. Seal, P.O. Box 152, Fort Hameson, N. Rhodesia.
VQ6GM †D. W. Bushe, c/o D. W. S., P.O. Box 164, Berbera, Somaliland Protectorate.
VS1JX L. R. Peek, P.O. Box 1575, Singapore.
VS9ANB N. F. Burton, 3524710 J/T., Block 220/2, Chapel Hill, R.A.F., Steamer Point, B.F.P.O. 69.
VS9JW J. V. Williams, Att. Royal Dragoons, B.F.A.P., B.F.P.O. 69.
W3YTW Winfield S. Standiford III, 902 North Woodington Road, Baltimore 29, Maryland, U.S.A.
ZS6IF L. Ledoux, 101 Lyndhurst Road, P.O. Lyndhurst, Johannesburg, S. Africa.
9M2BN †Lim Thin Chan, c/o Messrs. Cuthrie & Co. Ltd., P.O. Box 198, Kuala Lumpur, Malaya.
9M2GA Lee Lai Hung, 14 Jalan Majid, Muar, Johore, Malaya.

Corporate Members, Home (British Receiving Stations)

22683 E. W. B. Keevill, 59 Elton Road, Bishopston, Bristol 7.
22684 C. R. Bray, 19a, Packhorse Road, Gerrards Cross, Bucks.
22685 S. W. Carr, 59 Fairholme Avenue, Gidea Park, Romford, Essex.
22686 P. D. Tork, 25 Whetston Road, Cove, Farnborough, Hants.
22687 R. Chambers, 80 Derby Road, Spondon, Derby.
22688 Mrs. N. Payne, Culcheth New Hall, Culcheth, Nr. Warrington, Lancs.
22689 H. Knowles, 12 Fairview Road, Denton, Nr. Manchester, Lancs.
22690 *J. Saville, 16 Raydons Road, Dagenham, Essex.
22691 A. A. Remsbury, 64 Bridge Way, Whitton, Twickenham, Middx.
22692 G. F. Hibberd, 20 Bowden Crescent, Melksham, Wilts.
22693 M. J. Goodwin, Tatman's Lodge, Gaynes Road, Gt. Staughton, Huntingdon.
22694 H. M. Farrar, Delamar, St. Hilary, Goldsithney, Cornwall.
22695 Cpl. J. P. J. Casey, 4079641, Command Equipment, H.Q., F.T.C., R.A.F., Shinfield Park, Reading, Berks.
22696 T. Bemrose, 320 South Street, Holmes, Rotherham, Yorks.
22697 D. A. G. Martin, 11 Tregelles Close, Highbridge, Som.
22698 B. W. Jenner, c/o 17 Perryfield Road, Crawley, Sussex.
22699 F. T. Andrews, 108 Scotland Road, Nelson, Lancs.
22700 W. Dougan, 57 Tobarcooran Avenue, Carnmoney, Belfast, N. Ireland.
22701 J. S. Fitz-Patrick, 9 North Linkside Road, Woolton, Liverpool, Lancs.
22702 C. W. M. Clear, 140a Oxford Road, Calne, Wilts.
22703 R. Lambert, 185 Hardhorn Road, Poulton-le-Fylde, Nr. Blackpool, Lancs.
22704 D. G. Marsh, R.A.F. Stoke Hammond, Nr. Bletchley, Bucks.
22705 F. H. Martin, 10 Hill Rise, Birstall, Leics.
22706 R. L. Luxford, 33 Long Lane, London, N.3.
22707 R. C. Teale, 58 Oxford Road, Canterbury, Kent.
22708 D. F. S. Hayward, 6 Larkhill Road, Yeovil, Som.
22709 R. D. Williams, 9 Crofton Road, Heaton, Bradford, 9, Yorks.
22710 E. J. Spicer, 43 Vale View Road, South Newton, Salisbury, Wilts.
22711 R. J. Appleton, 12 Colne Road, Twickenham, Middx.
22712 D. Court-Hampton, 139 Plymouth Road, Redditch, Worcs.
22713 S. de F. Shore, 20 Wheatley Street, London, W.1.
22714 C. A. James, 54 Craster Road, Brixton, London, S.W.2.
22715 R. A. Crawford, 6 Victoria Road, Richmond, Yorks.
22716 A. J. Gough, 5 Raymond Avenue, Netherton, Liverpool, 10, Lancs.
22717 G. A. Watkins, 18 Silverton Road, Smethwick, 41, Staffs.
22718 T. P. Turner, 5 Ealing Park Gardens, London, W.5.
1464 †V. Gradwell, 336 Lever Street, Radcliffe, Nr. Manchester, Lancs.
3466 †H. Collard, 20 Prestwood Drive, Thundersley, Essex.
11041 †Commander H. J. P. Crousaz, R.N., Greenlands, Rohais, St. Peter Port, Guernsey, Channel Isles.
14818 †R. E. Kemsley, 1 St. Marys Road, Faversham, Kent.
21049 †P. A. H. Evans, The Bungalow, Pound Lane, Hanwood, Nr. Shrewsbury, Shropshire.

Corporate Members, Overseas (British Empire Receiving Stations)

1042 A. Hillier, 2 Clyde Street, Lilydale, Victoria, Australia.
1043 G. T. Fennemore, c/o Basrah Petroleum Co., P.O. Box 21, Basrah, Iraq.
1044 W. C. Bellingham, P.O. Box 25, Lumbwa, Kenya
1045 1923655 Cpl. T. H. Owen, Signals Section, R.A.F., Masirah Island, B.F.P.O. 69.

Corporate Member, Overseas (Foreign Receiving Station)

312 G. W. Mullineaux, 2005 E. Pine Street, Endicott, New York, U.S.A.

Associates

2225 P. McCurrie, 89 Nutter Road, Cleveleys, Nr. Blackpool, Lancs.
2226 M. I. Bastin, 20 East Avenue, Exeter, Devon.
2227 B. A. Whellans, Waterloo, Lauder, Berwickshire.

2228 R. Staines, 68-70 Pages Walk, Bermondsey, London, S.E.1
2229 D. C. Scotcher, 122 Hermon Hill, Woodford, London, E.18.
2230 J. S. A. Alderton, 80 Preston Street, Faversham, Kent.
2231 B. J. Ridgway, 24 Parkfield Road, Taunton, Som.
2232 A. D. McConnell, 4 Napier Road, Redland, Bristol, 6.
2233 1938509 B/E Moore, G. M., 28 West " C " Flight, 2 Sqdn, 1 Wing, R.A.F., Cosford, Wolverhampton, Staffs.
2234 S. W. Walbridge, 4 Rectory Cottages, Church Lane, Fawley, Hants.
2235 D. M. MacGregor, Trinity College, Glenalmond, Perth, Scotland.
2236 S. C. Wheeler, Holmland, Dinham, Ludlow, Shropshire.
2237 P. W. Preston, Iona, Springfield Park, Sandiacre, Notts.
2238 R. C. Stratford, 198 Pickhurst Lane, West Wickham, Kent.
2239 A. J. Ainscough, 199 Stradbroke Grove, Ilford, Essex.
2240 C. C. Parker-Larkin, 51 Old Southend Road, Southend, Essex.
2241 J. R. Fey, 21 Church Road, Hanham, Bristol.
2242 G. T. Fripp, Dakyns' House, Clifton College, Clifton, Bristol 8.
2243 D. A. Park, 140 Arthur Road, Windsor, Berks.
2244 P. L. Taylor, 6 Queens Avenue, Shirley, Solihull, Warwicks.
2245 D. A. Poole, Elwell Manor, Rodwell Road, Weymouth, Dorset.
2246 P. C. Funnell, 161 Green Lane, Small Heath, Birmingham, 9.
2247 R. C. Hampton, 10 West Terrace, North Ormesby, Middlesbrough, Yorks.
2248 M. J. Tatham, 17 Cudham Lane, Green Street Green, Farnborough, Kent.
2249 H. M. Hague, Howick House, Junction Lane, Lathom, Nr. Ormskirk, Lancs.
2250 D. M. Rae, 12 Nineyard Street, Saltcoats, Ayrshire, Scotland.
2251 R. A. Fuller, Celleva, Bath Road, Padworth, Nr. Reading, Berks.
2252 G. P. Gaunt, 71 Gypsy Lane, Marton, Middlesbrough, Yorks.
2253 A. D. Fairgrieve, 38 Chatsworth Road, Ellesmere Park, Eccles, Lancs.
2254 A. C. Bentley, Paneton, 1 Canal Road, Lower Higham, Rochester, Kent.
2255 A. J. Masson, 20a, Merchiston Park, Edinburgh, 10, Scotland.
2256 G. Crisp, 51 East Crescent, Whinney Banks, Middlesbrough, Yorks.
2257 D. K. W. Hopkins, Eastwynch, 46 Carlton Road, Redhill, Surrey.
2258 B. R. Todd-White, 11 Broadfield Way, Buckhurst Hill, Essex.
2259 M. F. Granville, Four Gables, Oak Road, Crays Hill, Billericay, Essex.
2260 P. R. Jackson, Ripple Lodge, Nr. Deal, Kent.

MARCH 1960

Corporate Members, Home (Licensed)

G2XW †A. W. Wells, 9b Grand Parade, Green Lanes, Harringay, London, N.4.
G2AOK †H. Heath, Church Street, Stow-on-the-Wold, nr. Cheltenham, Glos.
G3QY †F. S. Gell, 113 Redhill Road, Arnold, Nottingham.
G3EKL †R. A. Webb, 8 Saxon Road, Catterick Camp, Yorks.
G3HMV N. A. M. Bolton, 2 Selborne Villas, Clayton, Bradford, Yorks.
G3LNH S. S. Taylor, 38 Linthorpe Grove, Aston Road, Willerby, Hull, East Yorks.
G3MDN H. D. Jackson, 5 Headley Croft, Highcroft, Birmingham 31, Warwicks.
G3MVO G. G. Wray, 93 Wolfreton Lane, Willerby, Hull, East Yorks.
G3MYX F. C. Richardson, 7 West View, Folkestone, Kent.
G3NGF The Rev. A. W. Shepherd, 75 Park Road, Mansfield Woodhouse, Notts.
G3NKN T. Cox, Trebell Cottage, St. Mabyn, Bodmin, Cornwall.
G3NMO J. H. Harrison, 44 Hessle Drive, Boston, Lincs.
G3NND H. J. Everest, 32 Lea Road, Harpenden, Herts.
G3NRX R. E. Murphy, 4 Ampleforth Road, London, S.E.2.
G3NTU P. J. Davis, 45 Broad Street, Bridgtown, Cannock, Staffs.
G3NWY D. Forster, 37 Belmont Gardens, West Hartlepool, Co. Durham.
G3NVY R. E. Dore, 3 Eastfield Avenue, Upper Weston, Bath, Som.
G3NXL *P. A. Lamming, 39 St. Leonards Road, Harrogate, Yorks.
G3NZD *R. H. Squire, 183 Winchmore Hill Road, London, N.21.
G3NZF *G. J. Marwood, The Corner House, Green Street, Sunbury-on-Thames, Middx.
G3NZR W. T. H. Young, 30 Nine Elms Grove, Gravesend, Kent.
G3NZV *A. J. C. Park, 118 Fabian Crescent, Shirley, Solihull, Warwicks.
G3OAQ *M. Newland, 129 Billy Lows Lane, Potters Bar, Middx.
G4JK R. Whiteside, 161 Preston New Road, Blackburn, Lancs.
G6DT †J. R. T. Dealey, 41 Queens Crescent, Horndean, Portsmouth, Hants.
G6PS †A. F. M. Parsons, Wyvern, Bridge Road, Crowborough, Sussex.
GI3LFH S. Allan, 18 Strandburn Street, Belfast 4, N. Ireland.
GI3NYJ S. A. W. Currie, 7 Southland Dale, Braniel, Belfast, N. Ireland.
GM3NZN T. A. Greig, 74 Balgray Avenue, Shortless, Kilmarnock, Ayshire, Scotland.
GM3NXO †A. D. Watts, 3 Caroline Place, Aberdeen, Scotland.

Corporate Members, Overseas (Licensed)

DL2RY †E. R. Downs, Sgts. Mess, R.A.F. Armament Practice Station, Sylt, B.F.P.O. 46.
EI4AE T. J. Marpin, Banba, Killybegs, Co. Donegal, Eire.
EI7AD J. McGeever, Mountilley House, Buncrana, Co. Donegal, Eire.
K6LQY T. P. Healey, 116 O'Keefe Street, Menlo Park, Calif., U.S.A.
K6ZJG J. T. McCarley, 164 E. Creek Drive, Menlo Park, Calif., U.S.A.
VE3CPR A. A. Cumming, 5 Bayview Wood, Toronto 12, Canada.
VE3CXG R. M. Dotchin, 433 Barton St. East, Apt. 2, Hamilton, Ontario, Canada.
VE6KC K. G. Curry, 11114-80 Ave., Edmonton, Alberta, Canada.
VE6NX C. J. Gawlicki, 9237-86 St., Edmonton, Alberta, Canada.
W2FAL C. J. Brasted, P.O.122, Bath, N.Y., U.S.A.
WA2DRK H. Ashton, 75 E. Walnut Street, Box 654, Long Beach, New York, U.S.A.
ZC4LM L. Mavropoulos, c/o High Commercial, Lyceum, Nicosia, Cyprus.
ZL3OM C. Ferrand, 20 Keppel Street, New Brighton, Christchurch, New Zealand.
ZS2AU A. Zamkov, 12 New Street, King William's Town, Cape Province, South Africa.
ZS5SG B. Jackson, Louis Botha Airport, Durban, South Africa.
5A2TD †E. J. Dempster, P.O. Box 628, Tripoli, Libya.
VE3BQP W. A. Wragg, 127 Castlewood Road, Toronto, Ontario, Canada.

Corporate Members, Home (British Receiving Stations)

22719 E. J. Allen, 5 Gordon Road, Sidcup, Kent.
22720 I. S. Champion, Shorts Farm, nr. Billingshurst, Sussex.
22721 M. T. Ireson, Church Lane, Bulwick, Corby, Northants.
22722 P. W. Newcombe, 9 Coldharbour, Bideford, Devon.
22723 A. E. Palmer, 11 Links Road, Hollywood, nr. Birmingham.
22724 J. W. G. Swain, 192 Grange Road, Ilford, Essex.
22725 A. E. Tough, 13 Dorset Square, Regent's Park, London, N.W.1.
22726 V. Marren, 42 Nalder-Town, Wantage, Berks.
22727 W. Hinks, 62 Hollie Lucas Road, Kings Heath, Birmingham 14, Warwicks.
22728 †F. H. Ledger, 33 Chanctonbury Road, Burgess Hill, Sussex.
22729 †D. H. Oliver, Chrishall, Royston, Herts.
22730 P. C. Barry, 32 Rutland Avenue, Sidcup, Kent.
22731 †P. W. Davies, 101 Sallows Road, Peterborough, Northants.
22732 D. G. Tarr, 19 Laburnum Terrace, Abbotskerswell, Newton Abbot, Devon.
22733 Mrs. J. E. Willis, 1158 London Road, Leigh-on-Sea, Essex.
22734 J. W. Boswell, 11 Peake Close, Woodston, Peterborough, Northants.
22735 M. L. Leigh, The Lindens, Old North Road, Wansford, Peterborough, Northants.
22736 W. J. Emmett, 182 Countisbury Avenue, Llanrumney, Cardiff, Glam., S. Wales.
22737 4164426 Sgt. J. Power, Sgts. Mess, R.A.F. Aldergrove, nr. Crumlin, N. Ireland.
22738 W. H. Price, Holdworth Cottage, Dam End, Bradfield, Sheffield 6, Yorks.
22739 E. A. Wright, 2 Prole Street, Cannock Road, Wolverhampton, Staffs.
22740 M. B. Everley, 27 Clayton Way, Cowley, Middx.
22741 A. Robins, 34 Roman Road, Radipole, Weymouth, Dorset.
22742 J. A. Smith, 232 Arden Road, Birmingham 8, Warwicks.
22743 J. E. Robson, Midwinter, Clappers Meadow, Alford Crossways, Cranleigh, Surrey.
22744 E. C. Gingell, 1 Weavern Lane, Biddestone, Chippenham, Wilts.
22745 D. S. Vaughan, 61 Ascension Road, Chase Cross, Romford, Essex.
22746 *C. P. Lewton, 322 Milton Road, Weston-super-Mare, Som.
22747 *K. R. W. W. Wilsher, 99 Lorna Road, Hove 3, Sussex.
22748 *M. Domoney, 3 Millward Road, Ryde, I.o.W.
22749 *M. J. Morley, 13 De Wint Avenue, Lincoln.
3467 †A. E. Cameron, Coombe Cottage, Pitchcombe, Stroud, Glos.
7393 †A. G. Burrell, 32 Ricketts Drive, Billericay, Essex.
8145 †N. H. Brown, 9 Meadow Bank, Hollingworth, Manchester, Lancs.
18382 †L. Shelley, 29 Carna Drive, Cathcart, Glasgow S4, Scotland.

Corporate Members, Overseas (British Empire Receiving Stations)

1046 *1931289 J/T J. W. Armes, CC, HK, R.A.F. Kai Tak, Hong Kong, B.F.P.O. 1.
1047 L. G. Lawrence, Hygiene & Malaria Control Unit, Ayer Rajah Road, c/o G.P.O. Singapore.
1048 T. J. Ruskin, c/o Hygiene & Malaria Control Unit, Ayer Rajah Road, c/o G.P.O. Singapore.
1049 D. C. Pocock, Rx.Tx., 15 Signal Regiment, B.F.P.O. 53.
1050 Sgt. A. D. Page, 21040550, 15 Signal Regt., B.F.P.O. 53.
1051 A. A. Din, P.O. Box 376, Kampala, Uganda.
1052 W.O.II C. L. Buckley, 4 Signal Regiment, B.F.P.O. 15.
1053 S. A. Raza, 6 Fort Road, Quetta Cantt., Pakistan.

Associates

2261 R. Riley, 78 Merchants Way, London Road Estate, Canterbury, Kent.
2262 K. Dickens, 31 Westfield Road, Smethwick 41, Staffs.
2263 R. K. Pain, 8 Elms Avenue, Muswell Hill, London, N.10.
2264 R. G. Arnold, 39 Mount Pleasant Road, Goole, Yorks.
2265 G. Nixon, 19 Slievenamaddy Avenue, Newcastle, Co. Down, N. Ireland.
2266 R. G. Hurst, 40 Croxley Green, St. Pauls Cray, Orpington, Kent.
2267 D. R. Stimson, 108 Cambridge Street, Wolverton, Bucks.
2268 J. C. Letch, 37 Trinity Way, East Acton, London, W.3.
2269 G. A. Smith, 291 The Drive, Ilford, Essex.
2270 K. Matthew, Pembrook House, Pemboa, Helston, Cornwall.
2271 R. W. E. Farr, 34 Station Road, Netley Abbey, Southampton.
2272 W. J. Bruce, 355 Kings Road, Stretford, Manchester, Lancs.
2273 K. G. Whitehouse, 72 Rosemary Crescent, Parkes Hall, Woodsetton, Dudley, Worcs.

2274 M. A. Storey, 20 St. Augustines Road, Belvedere, Kent.
2275 K. Drinkwater, 16 Lindadale Avenue, Accrington, Lancs.
2276 P. W. Myers, 151 Starr Road, Peterborough, Northants.
2277 A. W. Cornish, 11 Filey Road, Flixton, Scarborough, Yorks.
2278 G. Willis, 38 Southsea Avenue, Leigh-on-Sea, Essex.
2279 R. M. Nichols, Dunston, Sellwood Road, Netley Abbey, Southampton, Hants.
2280 R. J. Longland, 17 Kent Road, Peterborough, Northants.
2281 M. D. Street, 38 New Road, Crich, Matlock, Derbys.
2282 R. D. Mason, 4 Coombe Corner, Orpington Road, London, N.21.
2283 W. R. L. Young, Stanley House, Heywood, Lancs.
2284 M. Stevenson, Riverside, Deeping Gate, Market Deeping, Peterborough, Northants.
2285 M. H. Eastall, 134 Mayors Walk, Peterborough, Northants.
2286 R. D. Marsden, 3 Scar View, Settle, Yorks.
2287 M. J. Farndale, 71 Monks Orchard Road, Beckenham, Kent.
2288 D. M. Lane, 382 Hollingwood Lane, Horton Bank Top, Bradford 7, Yorks.
2289 M. G. Hall, Windrush, Park Homer Road, Colehill, Wimborne, Dorset.
2290 B. M. Waghorn, Ayres Cottage, Ayres End Lane, Harpenden, Herts.
2291 R. Revill, 6 Cannock Road, Brockton, nr. Stafford.
2292 D. J. Marjoram, 20 Heath View, Leiston, Suffolk.
2293 K. Summers, 25 Fairfield Road, Derby.
2294 H. J. Bremner, Mossgiel, Alexandra Road, Lenzie, Kirkintilloch, Glasgow.
2295 J. E. Tylee, 44 Hanover Gardens, Kennington Park Road, London, S.E.11.

Correction

The call-sign of Mr. J. Kayne, 27 School Lane, Haddonfield, New Jersey, U.S.A. should be *K2QIL* and not K2QTL, as published on page 331 of the January issue.

The call-sign of Mr. B. E. Gillingwater, 79 Lancaster Road, Great Yarmouth, who was elected to membership in November 1959, is G3NTV and not as shown in the January issue of the *Bulletin*.

* Denotes transfer to Corporate Grade.
† Denotes previously a Member.

New Calls

The Society extends a warm welcome to the following new licensees

England

G3OAO F. E. Crickmore, 110 Vassall Road, Brixton, London, S.W.9.
G3OAP B.B.B. Rampisham Club, c/o J. C. Payne, Rampisham Down, Maiden Newton, Dorchester, Dorset.
G3OAQ M. Newland, 129 Billy Lows Lane, Potters Bar, Middlesex.
G3OAR G. Greenwood, 23 Gloucester Road, Lupset, Wakefield, Yorks.
G3OAS M. B. Fradley, 184 Richmond Road, Gillingham, Kent.
G3OAT/T M. J. A. Bryett (ex-B.R.S.22009), Nobles Farm, Wood End, Bluntisham, Hunts.
G3OAW R. G. Schilling, 112 Sydenham Park Road, London, S.E.26.
G3OAX I. F. Anderson (ex-B.R.S.22097), 19 Colwell Avenue, Stretford, Manchester.
G3OAZ J. Akehurst, 14 Victoria Gardens, Eastbourne, Sussex.
G3OBA Mrs. J. C. White, 19 Lewis Flats, Lisgar Terrace, London, W.14.
G3OBB K. J. Rhodes, 32 Draper Road, Christchurch, Hants.
G3OBD P. V. Dutfield, 20 Stokes Avenue, Poole, Dorset.
G3OBE/T W. E. Hazelhurst (ex-B.R.S.21707), 28 Broomfield Lane, Hale, Altrincham, Cheshire.
G3OBF J. F. E. Woods, 30 Perry Street, Northfleet, Kent.
G3OBH/T A. C. McGrady, 5 Freehold Street, Liverpool, 7.
G3OBI E. K. Hickey, 3 Piers Road, Handsworth, Birmingham, 21.
G3OBJ R. Coulson, 106 Salterford Road, Hucknall, Nottingham.
G3OBK N. Goad, 363 Plodder Lane, Farnworth, Bolton, Lancs.
G3OBL J. R. Tyrrell, Holmesfield, Mead Gate Lane, Nazeing, Waltham Abbey, Essex.
G3OBN B. H. Cooper, 11a Ickenham Road, Ruislip, Middlesex.
G3OBP R. G. Clark, 20 Uplands Way, Grange Park, London, N.21.
G3OBQ R.A.F. Chicksands Amateur Radio Club, c/o S. A. Floyd, R.A.F. Chicksands, Shefford, Beds.
G3OBR Aldershot and District Amateur Radio Society, c/o J. E. Fuller, Signals Room, Gibraltar Barracks, 4 Training Reg. Royal Engineers, Aldershot, Hants.
G3OBS R. J. Balderson, 33 The Crossways, Heston, Hounslow, Middlesex.
G3OBT D. G. Thorpe, 70 Kingsfield Avenue, North Harrow, Middlesex.
G3OBU D. J. Goodman, 11 Morden House, London Road, Morden, Surrey.

Channel Isles

GC3OBM E. R. Deveau (ex-B.R.S.22187), L'Abri, Rouge Huis Avenue, St. Peter Port, Guernsey, C.I.

Northern Ireland

GI3OAU D. B. McCutcheon (ex-B.R.S.22108), 20 Greenhill Park, Newcastle, Co. Down, N.I.
GI3OBO R. Eadie, 5 Crystal Street, Belfast, 5, N.I.

Scotland

GM3OAV D. G. Varney, 17 Avenel Road, Knightswood, Glasgow, W.3.
GM3OBC R. Thomson, Knowehead, Star, Markinch, Fife.
GM3OBG P. Bridges, 11 Mitchell Street, Rutherglen, Glasgow.

Wales

GW3OAY R. N. Graham (ex-A.1820), 23 The Rise, Llanishen, Cardiff.

Corrections

The address of Mr. D. W. Stevens, holder of the call-sign G3NWG, should have read: 1 Groton Road, Earlsfield, London, S.W.18, in the list published in the April issue of the BULLETIN.

The entry for G3NXB should have read as follows.

G3NXB (ex-B.R.S.20907) Lt.-Col. Walter F. Luke Fava, M.D., R.A.M.C. (DL2AX), British Military Hospital, Iserlohn, B.F.P.O.24.

Book Review

THE RADIO AMATEUR'S HANDBOOK (37th Edition, 1960). By the H.Q. Staff of A.R.R.L. 616 pages, with many illustrations and tables. Obtainable from R.S.G.B. Bookshop, price 34s., post paid.

Over three million copies of this famous manual have been sold since publication began in 1926, and it would be reasonable to claim that no genuine amateur is without a modern copy. Many professional engineers, research workers, and academics have a copy within reach and would agree that the A.R.R.L. Staff have given a great service to those who devise and experiment.

The new edition shows some new material, some improvements, and some missing treatments and designs. The format is a little narrower at the expense of the margin, and the black chapter tabs have disappeared. A.g.c. has now supplanted a.v.c. A full-wave shunt limiter especially suitable for product detectors looks interesting. There is an attractive four-valve two-band superhet with transistor 100 kc/s check; a more sophisticated receiver is the DCS-500 (double conversion 500 c/s selectivity) which must appeal to the amateur who wants high performance, and has more time than treasure.

The 75 watt 6DQ5 transmitter, which can be used with a v.f.o. and modulator on 80-10m, will interest many; and the 90 watt all-purpose amplifier for linear or class C work will also be found attractive to the QRP man with ambitions. Also noticed were a treatment of VR tube differential keying, a simple electronic speed key, a balanced modulator using a beam deflection tube, and a 25 watt modulator using four transistors on a 12 volt supply.

The Handbook is still up-to-date and a superb production.

—T. P. A.

Can You Help?

● D. H. Aram (A.1856), 36 Welford Gardens, Oxford Road, Abingdon, Berkshire, who requires information on the R.1334 covering 170-210 Mc/s?

● K. J. Deskur (K2RO), Box 11, Endicott, N.Y., who seeks the loan of the March 1957 and September 1958 issues of the R.S.G.B. BULLETIN.

● G. B. Moser (G3HMR), 31 Castle Road, Kendal, Westmorland, who would like to hear from any member who has successfully modified the Wireless Set 62, particularly to increase the depth of modulation?

● V. W. Stewart (A.1314), 2 South Oxford Street, Edinburgh 8, who requires the manual for the Radiovision Commander receiver?

● A. Wright (G3IWR), 108 Old Oak Road, Acton, London, W.3, who requires the manual or information on the Canadian W/S 58?

Communications Receivers, etc.

COMPLETE STATION. Receiver G207 D.R. Transmitter G207, crystal microphone, etc. **£100**
G.E.C. BRT400, 150-350 kc/s and 550 kc/s-33 Mc/s **£95**
AIRMEC C684, 1·5-45 kc/s and 100 kc/s-30 Mc/s **£90**
EDDYSTONE 680X, 480 kc/s-30 Mc/s **£85**
EDDYSTONE 888, bandspread receiver **£75**
R.C.A. AR88D, 540 kc/s-32 Mc/s **£65**
R.C.A. AR88LF, 75-550 kc/s and 1·5-30 Mc/s **£60**
EDDYSTONE 750, 480-1, 450 kc/s and 1·7-32 Mc/s, double superhet **£58**
HALLICRAFTERS SX28, 550 kc/s-43 Mc/s **£50**
HALLICRAFTERS S36, U.H.F. AM/FM, 28-143 Mc/s **£50**
HAMMARLUND BC-794-B, 1250 kc/s-40 Mc/s, with power unit **£50**
HAMMARLUND SP400X, 1250 kc/s-40 Mc/s **£50**
EDDYSTONE 840A, 480 kc/s-30 Mc/s **£40**
MINIMITTER MR37, bandspread receiver **£40**
HAMMARLUND Super Pro, with power unit **£35**
R.C.A. AR77E, 540 kc/s-31 Mc/s **£32**
EDDYSTONE 740, 540 kc/s-30 Mc/s **£30**
NATIONAL NC100XA, 500 kc/s-30 Mc/s **£30**
NATIONAL NC120, 540 kc/s-30 Mc/s **£30**
R.M.E. 69, 550 kc/s-32 Mc/s **£25**
MARCONI CR100, 60-420 kc/s and 500 kc/s-30 Mc/s, with noise limiter **£25**
HALLICRAFTERS SKYRIDER 23, 540 kc/s-34 Mc/s **£25**
EDDYSTONE S640, 1·8-30 Mc/s **£25**
HALLICRAFTERS SX24, 550 kc/s-42 Mc/s **£23**
HALLICRAFTERS S38C, A.C./D.C., 550 kc/s-30 Mc/s **£23**
EDDYSTONE 358X, 9 coils, p.u., 90 kc/s-30 Mc/s **£18**
R.107, 1·2-18 Mc/s, with spares **£14**
Our list of H.R.O. Receivers, power units and coils available on request.
PANORAMIC ADAPTOR, Type RBW-2, 5·25 Mc/s input, for use with Hallicrafters S.27 and S.36, as new **£50**
MARCONI, Noise Generator, Type 987/1 ... ... **£22**
ADVANCE H1, Audio Oscillator, 15 c/s-50 kc/s **£18**
RME DB23, pre-selector **£16**
COSSOR Valve Voltmeter, Type 1044K, as new **£15**
H.I AUDIO OSCILLATOR, 15 c/s, 50 kc/s **£18**
AVO ALL WAVE OSCILLATOR (Signal Generator) 95 kc/s-80 Mc/s **£9 10 0**

Please add carriage on all items and enclose s.a.e. with all inquiries.

RADIO TELEVISION & INSTRUMENT SERVICE
Ashville Old Hall, Ashville Road, London, E.11
Telephone: LEYtonstone 4986.

H. WHITAKER G3SJ

COURT ROAD, NEWTON FERRERS, SOUTH DEVON

Precision Crystals of all Types

AMATEUR BANDS

We can give immediate delivery from stock of practically any frequency covering the entire amateur bands and model control band. 100 and 1000 kc/s for frequency standards from stock.

SPECIAL OFFER

400 crystals in the range 7090 kc/s to 7150 kc/s, all frequencies available. Post-war production. Zero temp. BT cuts, gold plated electrodes, ½ in. pin space holders. Unrepeatable, **18/-** each, post free. This price applies only to the above range.

As above, 8050 kc/s to 8110 kc/s inclusive, same specification, **18/-** each, post free. All frequencies available throughout the range.

H. WHITAKER G3SJ

Contractors to the War Office, Air Ministry, Post Office and Government Departments the world over.

A.R.B. Approved. Tel.: NEWTON FERRERS 320

METERS for all purposes, Micro-amps. 2" dia. 0-500 μA, **25/-**; 2½" dia. 250-0-250 μA, **21/-**; 2½" dia. 0-1 m.a., **25/-**; 2½" dia. 250 volts, **25/-**, many other ranges and sizes, write for list.

EVERSHED & VIGNOLES. Bridge Meg. with built-in decade box to 9999. Insulation range 0-50 megs., 500 volts, **£27/10/-**; 250 volts, 0-20 megs., **£22/10/-**. Circuit testing Ohmmeter 0-3 and 0-30 ohms, **90/-**; 0-100 and 0-1000 ohms, **£5/10/-**.

MOTORS. 1/30 half phase Framco, 230 volts, 50 cycles single phase, 2,500 r.p.m. with 38/1 reduction gear box fitted, new, **85/-**; 1/10th half phase, 110/230 volts a.c., 2,850 r.p.m., **39/6.**

WRITE FOR LATEST LIST, AND SEND US YOUR ENQUIRIES.

LESLIE DIXON & CO. *Dept. K*

214 Queenstown Road, Battersea, London, S.W.8. *(MAC 2159)*

BLANK CHASSIS

Precision made in our own works from commercial quality half-hard aluminium of 16 **s.w.g.** (1/16") thickness, these chassis go all over the world.
Same **day service** for ANY SIZE, to nearest 1/16" and up to 17" long and 4" deep of straightforward two, three or four-sided chassis. Specials dealt with promptly.

SOLDERED CORNERS

While these chassis, owing to their thickness, hardness and efficient folding, will carry components of considerable weight and normally require no corner strengthening, we can do this by a special soldering technique at **6d.** extra for each corner.

FLANGES

¼", ⅜" or ½" flanges (inside or outside) **6d.** extra for each bend.

PRICE GUIDE (normal chassis only)

Work out total area of material required, including waste, and refer to table below:

48 sq. in.	4/-	176 sq. in.	8/-	304 sq. in.	12/-
80 sq. in.	5/-	208 sq. in.	9/-	336 sq. in.	13/-
112 sq. in.	6/-	240 sq. in.	10/-	368 sq. in.	14/-
144 sq. in.	7/-	272 sq. in.	11/-	and pro rata	
Post 1/3		Post 1/6		Post 1/9	

PANELS. The same material can be supplied for panels, screens, etc. at 4/6 sq. ft. plus P. & P. up to 72 sq. in. 9d., 108 sq. in. 1/3, 144 sq. in. 1/6 and pro rata.

H. L. SMITH & CO. LTD.

287-289 EDGWARE ROAD, LONDON, W.2. **PAD 5891/7595**

AVO PORTABLE GEIGER COUNTERS, new, less batteries, £16/10/- (10/-); **B-46 COMMUNICATION RECEIVERS,** die cast front, post war, 230 v. a.c. input, 8 valves, 1·4 to 15 Mc/s, built in L.S., £12/10/- (10/-); **B-47** as above, only, 10 valves and 15/500 kc/s, £10/10/- (10/-); **BC-659J MOBILE TRANSMITTER-RECEIVERS,** 30/40 Mc/s FM, 14 valves (less valves) only 35/- (7/6); **VIBRATOR POWER UNIT** matching for above, 6 v. or 12 v. (less vibrator), 25/- (5/-), matching battery box for above man pack type, 10/- (5/-); **6 FT. BENDIX TRANSMITTER CABINETS,** 19 in. wide, totally enclosed, open front, £5/10/((20/-); **PRECISION LABORATORY MAINS FILTERS,** die cast case, 10/- (2/6); **25 FT. SELF SUPPORTING TRIPOD HOLLOW PLYMOLD MASTS,** complete, 95/- (20/-); **MILLIAMMETERS** 2½ in. M.C. 0/30 or 0/100, 12/6 (2/6); 0/1, 20/- (2/6); **BOEING BEEHIVE INSULATORS,** American stand off 3 in. high ceramic, 1/- (6d.); **40-IN. MOBILE WHIP AERIALS,** American with loading coil in base increasing effective height to 12 ft., 35/- (5/-); **BC-610** 4 section **WHIP AERIALS** in canvas holdall, 40/- (5/-); **CREED MORSE PERFORATORS,** £12/10/- (10/-); **TAPE PRINTERS,** £15 (10/-); **WODEN CHOKES,** 20H, 400 mA, 20/- (5/-); **G.E.C. H.T. TRANSFORMERS,** 190/260 v. to 1,000-0-1,000 v. 500 mA, 65/- (10/-); 250 watt **R.F. AMPLIFIERS,** American, input 70 ohms, includes 2 HK-257 valves, wgt. 88 lb., £8/10/- (20/-); 50 watt **POWER AMPLIFIERS** rack mounting, 35/- (less valves) (1) MH4 (2) PX 25 (1) G5U4 required. (30/- includes 15/- returnable case.)

Send for 40-page list of over 1,000 different items.

Amounts in brackets are carriage England and Wales.

We have large quantities of " bits and pieces," and can probably help your needs. Please inquire—everyone answered.

P. HARRIS

ORGANFORD, DORSET

EXCHANGE AND MART SECTION

ADVERTISEMENT RATES. Members' Private Advertisements 3d. per word, minimum charge **5s. Trade Advertisements 9d. per word** minimum charge **12s.** All capitals **1s.** per word, minimum charge **18s.** Write clearly. No responsibility accepted for errors. Use of Box number **1s. 6d.** extra. Send copy and remittance to **National Publicity Co.Ltd., 20-21 Red Lion Court, Fleet Street, London, E.C.4, by 22nd** of month preceding date of issue.

A COMMUNICATIONS RECEIVER WANTED.—Current model, high quality, must be immaculate and unmodified, not Amateur Bands only. Will collect and pay cash.—Hall, 7 Harvey Road, Guildford, Surrey. Phone 4040. Please send fullest information. (150

ALL TYPES OF VALVES REQUIRED for cash. State quantity and condition.—Radio Facilities Ltd., 38 Chalcot Road, N.W.1. (PRImrose 9090.) (236

ANTENNAS, CAR RADIO OR MOBILE.—First class range from the Continent. Chrome on brass and stainless steel. From 37/- to 65/-, post 1/6 each. Lengths from 58 in. to 75 in. Leaflets available. Twenty-five per cent discount to Hams.—G3MMJ, Famegoods Ltd., Grenville House, Princes Risborough, Bucks. (128

ANY OFFERS ACCEPTED.—For equipment, convertors, receivers. Advertised on page 480 of April R.S.G.B. BULLETIN.—Kimber, Creech St. Michael, Taunton. (155

B. AND W. 51-SB SIGNAL GENERATOR. BRAND NEW, £135. RCA AR88D FOR QUICK SALE, £50.—Box 154, National Publicity Co. Ltd., 20/21 Red Lion Court, Fleet Street, E.C.4. (154

CLEARING—ROOM WANTED.—Minimitter L.P. Filter, 45/-; 234 a.c. Power Pack, 45/-; Meters 500 Micro 3 in., 55/-; 0-10 volts, 20/-; RF.5, 5/-; 350 mA, 5/-; 0·4 amp. with Switch, 10/-; Quartz Crystals 7010, 7104, 7090, 7078, 7182, 7045, 7084, 7350, 7912 kc/s, ¾ in. pins, 10/- each. 1, 9078, 1,200 kc/s ½ in. pins, 5/-. Valves (2) 805's, 25/- each; (2) 813's, 40/-; (2) 829's, 25/-; 6L6's metal, 5/-. Many others. All above plus postage or carriage.—G3MLP, 10 Roberts Street, Rushden, Northants. (146

COAX.—75 ohm very low loss 500 watt coax, brand new, 1/4d. yard post free. COPPER WIRE, hard or soft drawn 16 gauge, 4d. per yard, minimum 10 yards post free.—G3AAM, 105 Greenhill Road, Blackheath, Birmingham. (149

COMMAND RECEIVER 160m MODEL REQUIRED.—Good condition essential. Please quote details and price.—Ashton, Greenhill House, Mucklow Hill, Halesowen, Worcs. (138

COMPLETE 2 METRE RIG.—Comprising: T1540 Transmitter in very fine condition, c/w crystal, modified for HI microphone. Six tube Cascode Convertor, Six over Six Skeleton Slot Antenna, with coax feeder. All c/w circuits, spare valves, £26/10/-. Buyer collects please.—G3MLP, 10 Roberts St., Rushden, Northants. (147

EDDYSTONE 358X RECEIVER with matching speaker and handbook, £14/10/-. Prefer buyer collects.—B.R.S.21663, 133 Dartmouth Road, London, S.E.23. (144

FIRST CLASS CALL SIGN BADGES.—Made by PA0TL. Payment of 6s. after delivery.—Pieter Landweer, Anemoonstraat 1F, Koog a/d Zaan, Holland. (161

FOR SALE EDDYSTONE 840A.—Communications Receiver. Good condition.—Ring TER. 2976 after 8 p.m. R. Carr, G3LMV, 52 Mount Pleasant, W.C.1. Suitable for blind Ham. (152

FOR SALE.—HEATHKIT DX40U with VFO-1, £30. Also Panda ATU, £10, both in first-class condition. Prefer buyer collects.—33 Keswick Road, Blaby, Leicester. (142

G.E.C. BRT400B RECEIVER, excellent condition, £75. CR150 resprayed cabinet, £25. Laboratory built QRO modulator, 19 in. rack mounting, £25. Buyer to collect.—Box 140, National Publicity Co. Ltd., 20/21 Red Lion Court, Fleet Street, E.C.4. (140

GRIP-DIP METERS.—1·8 to 210 Mc/s. Compact, self-contained. Complete, 6 coils, coil stand, batteries, 10 guineas plus 2/6d. p.p. 2d. stamp for full details.—Elliott Electronics, 3 Sandgate Avenue, Tilehurst, Reading, Berks. (159

HOLIDAY EXCHANGE WANTED.—Edinburgh operator wishes to exchange houses with Londoner (or South England), second fortnight June.—Box 158, National Publicity Co. Ltd., 20/21 Red Lion Court, Fleet Street, E.C.4. (158

(Continued on next page)

EXCHANGE & MART (contd.)

METALWORK.—All types cabinets, chassis, racks, etc., to your own specifications.—Philpott's Metalworks Ltd. (G4BI), Chapman Street, Loughborough. (99

ORDER YOUR "COMMUNICATOR" NOW for the 1960 mobile season. This unique 16 valve, 2m Transmitter/Receiver is at present available from stock. Price, £90 with 12 volt transistor power unit, deposit £9 and 12 monthly payments of £7/7/-.—R.E.E. Telecommunications Ltd., 15a Market Square, Crewkerne, Somerset. (137

PATENTS and TRADE MARKS. Booklet on request. King's Patent Agency Ltd. (B. T. King, G5TA, Mem. R.S.G.B. Reg. Pat. Agent).—146a Queen Victoria Street, London, E.C.4. (Phone: City 6161.) 60 years' refs. (372

PHONE TRANSMITTER 60 watts, Geloso VFO driving 807 P.A. Modulator complete with pair of 807s in Class B. Fully Band Switched, all power supplies. £20.—Dr. Francis Jones, 95 Lichfield Street, Tamworth. (141

QSL CARDS, G.P.O. approved. Log books, cheapest, best, prompt delivery. Samples.—Atkinson Bros., Printers, Looe, Cornwall. (206

RECEIVER BC 794B Super Pro 400, manual, £30. 80m Command Transmitter, £2. BC 453, Q5er, £2/10/-. HRO Coils: s.a.e. details. Collect or local delivery. Wanted: American Ten Section 45 ft. Alloy mast, any condition or incomplete.—G3IIE, 24 Mead Way, Coulsdon, Surrey. (157

SALE—AR88LF in fine business condition with handbook and spare valves, £35 (East Midlands).—Box No. 136, National Publicity Co. Ltd., 20/21 Red Lion Court, Fleet Street, E.C.4. (136

SALE.—New 100/156 Mc/s, 120W A.M. Transmitter in cabinet. Complete, all power units by leading communications company. £75. Amateur or Aeronautical service. SX28 with matching speaker, £38. QVO4-7's, 10/-. 813's, 40/-. 829/QQVO7-40's, 30/-.—Box No. 156, National Publicity Co. Ltd., 20/21 Red Lion Court, Fleet Street, E.C.4. (156

SALE RCA AR77E RECEIVER with instruction book, in really excellent condition throughout, £30, carriage extra. Details on receipt of s.a.e.—Box No. 145, National Publicity Co. Ltd., 20/21 Red Lion Court, Fleet Street, E.C.4. (145

SALE 358X.—Nine coils, good condition, internal power pack, £8. Prefer buyer collects.—Avory, 20 Swiss Road, Weston-super-Mare, Somerset. (148

SAVE OVER £50.—Panda Explorer, all "bugs" removed and no TVI here. KW-Geloso convertor, manual and AVC. CR100, 6SG7 front end. Tiger 250W, Z-Match. Panda LP filter. AVO signal generator. RCA cased speaker. ACOS 22-2. Solon 65W and 25W irons. Bridges drill. Moseley tri-band vertical antenna with 11 yards coax. Lots of spare valves and other Transmitter and Receiver spares. All first class working order and as new. £120 the lot. Buyer collects.—Box 151, National Publicity Co. Ltd., 20/21 Red Lion Court, Fleet Street, E.C.4. (151

SHORT WAVE RECEIVERS.—From 19/6d. Valves, components, books, service sheets. List 3d.—Hamilton Radio (G), 237 Sedlescombe Road North, Hastings. (162

VALVES FOR SALE.—All tested on Mullard valve tester. EF80, 6F1, 10F1, 6F12, 6D2, 3/- each; PY82, 6V6, 6P25, 6F13, ECC81, PZ30, KT33, 6SN7, GZ32, PY80, 185BT, 5/- each. Plus 1/- P. & P. on orders of less than six.—J. R. Calverley and Co. Ltd., 130 Water Street, Radcliffe, Lancs. (1086

WANTED.—All types of communication receivers, test equipment, tape recorders, amplifiers, etc. Prompt cash payment.—Details to R. T. & I. Service, 254 Grove Green Road, Leytonstone, London, E.11. (LEYton 4986.) (241

WANTED.—EDDYSTONE BUG-KEY in good condition. State price to—G2HFB, 64 Tytton Lane East, Boston, Lincs. (153

WANTED FOR CASH.—Good clean communication receivers and S.S.B. equipment. Please state price.—Short Wave (Hull) Radio, 30-32 Princes Avenue, Hull. (Telephone 18953.) (983

WANTED.—TVI proof table top transmitter. Minimitter or 1·8 Mc/s. Vanguard preferred. Lowest price please.—Box 160, National Publicity Co. Ltd., 20/21 Red Lion Court, Fleet Street, E.C.4. (160

APPOINTMENTS SECTION *(Situations Vacant)*

IONOSPHERIC ASSISTANTS required by FALKLAND ISLANDS DEPENDENCIES SURVEY for service in the ANTARCTIC for 2 years. Salary at a basic rate of £500 a year with extra allowances for qualification and experience. Officers appointed will be required to undergo course of training before leaving U.K. in October/November. Whilst in the Antarctic everything is provided free of charge including clothing, cigarettes, etc. Liberal leave on full salary. While on duty in U.K. an extra allowance of £150 a year is paid before departure and £200 a year on return. Candidates must have knowledge of radar and radio with some maintenance experience. The appointment will be made with the advice of the DSIR Radio Research Station. Write to the Crown Agents, 4 Millbank, London, S.W.1. State age, name in block letters, qualifications and experience and quote M3C/52985/RC. (139

RADIO OPERATORS.—Air Ministry have vacancies for temporary Radio Operators (male). Good prospects of permanent, pensionable appointments and promotion. Initial appointments in U.K. but subsequent tour of duty in Far East likely. Trainees £440 to £635; Qualified Operators £530 to £1,040. (These rates are subject to a small deduction at Provincial stations and a small increase in London and Overseas.) Special allowances payable for overseas service. Applicants under 40 with morse speed 15-18 w.p.m. preferred.—Apply in writing to: Air Ministry C.E. 4d., London, W.C.1, or any Employment Exchange quoting Cheadle 3. (109

TEST ENGINEERS.—Applications are invited for interesting and progressive openings in the Test Department of this Company. Suitable applicants will have had previous experience of testing and fault finding on modern radio communication equipment. Situations are permanent staff positions and enjoy good working conditions. Starting salaries commensurate with qualifications and experience.—Write giving full details to REDIFON LTD., Broomhill Road, Wandsworth, S.W.18.

VACANCIES exist in Boreham Wood for Electrical Inspectors and Testers for work on high quality communication equipment. Inspectors must be able to read circuit diagrams and be acquainted with current production methods. Testers will be required to align superhetrodyne receivers and check performance of transmitters. Commencing wage 192/2d. in a range up to 272/2d., for a 44-hour, 5-day week. Re-assessment of rate after one month's service with retrospective effect from date of entry. Annual merit re-assessment. Paid sick leave scheme and prospects of permanent, non-contributory, pensionable posts. Canteen. Social and sports facilities.—Box No. 143, National Publicity Co. Ltd., 20/21 Red Lion Court, Fleet Street, E.C.4.

Personal Call

SERVICE ENGINEERS REQUIRED

for the above system which includes transmitters and transistorised receivers. Training given to suitable applicants for positions in our test department and in the field.

Apply Personnel Department,

Multitone Electric Co., Ltd.,
12-20 Underwood Street, London, N.1.
Telephone CLE 8022

HEARING AIDS

Service Engineer

We are looking for someone to start from scratch and build up our Service Department. Great opportunities for the right man who really can deal with sub-miniature transistor circuits and at the same time has the right personality to handle staff and customers well. We handle all makes of hearing aids.

Apply Mr. Ingram (G6ZY),

S. C. Ingram (Hearing Aids) Ltd.,
2, Shepherd Street, W.1.
(*HYDe Park* 9042.)

APPOINTMENTS SECTION *(Situations Vacant continued)*

INDEX TO ADVERTISERS

Printed in Great Britain for the RADIO SOCIETY OF GREAT BRITAIN, New Ruskin House, Little Russell Street, London, W.C.1 by Loxley Brothers Limited, Letchworth, Hertfordshire

IF UNDELIVERED Return to:— R.S.G.B., NEW RUSKIN HOUSE, LITTLE RUSSELL STREET, W.C.1

IF UNDELIVERED Return to:— R.S.G.B., NEW RUSKIN HOUSE, LITTLE RUSSELL STREET, W.C.1