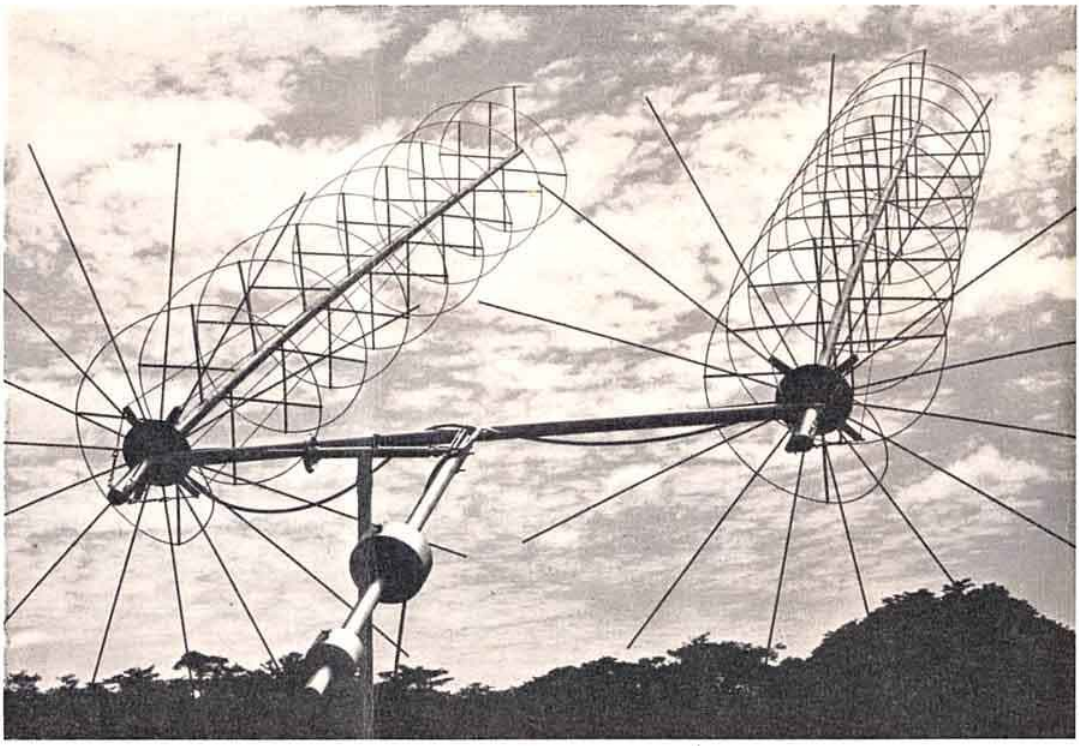
RSGB

BULLETIN

SEPTEMBER 1965

VOL. 41, No. 9



JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN

Joystick SPANS THE WORLD

VARIABLE FREQUENCY ANTENNA SYSTEM

In one gloriously successful year, thousands of JOYSTICKS have been sold to stations throughout the world. PARTRIDGE ELECTRONICS have been inundated with testimonials from JOYSTICK users. Orders for this (pat. pend.) revolutionary variable frequency antenna system have so multiplied that new premises have been leased in order to cope with demand. ALL JOYSTICK orders are now dispatched immediately.

Every JOYSTICK System is supplied complete with feeder and an antenna matching unit—selected by you to suit your personal set-up. It is ready to go on the air and gives an unprecedented 'lift' to signal strengths especially for 'cliff' and 'cave' dwellers—EVEN FROM UNDERGROUND! Naturally the advantages of using the 'JOYSTICK' 'up-in-the-clear' are even greater!

This exclusive and amazing system possesses the unique property of an even performance over all frequencies between 1.4-30 Mc/s.

4,000 licenced stations and SWLS all over the world have already found that this is the first major break-through for 20 years in the field of aerials. The performance for such a compact unit is staggering. Even the sceptics have been convinced once they have understood the basic principles and have followed the simple 'load and dip' procedure given in the instructions.

New Joystick Range

There is now a whole new range of Joystick Systems—made to match *your* QTH, your rig and *your* pocket! The SYSTEMS cover TX/RX, SWL, indoor and outdoors, mobile and even a new JOYMAST! Made only in the finest materials the SYSTEMS are reliable and permanent!

ZL4GA WORKS G5WP ON 80 METRES

INDOORS—ZL4GA's JOYSTICK got him 569 on 3.5 mc/s from G5WP on 21st February, 1965 at 0850 GMT. Alan had worked VE7BIY on 3.5 mc/s at 559 and also logged 59 countries on 14 mc/s by that date, including LU1HBS and 9M4LP.

Testimonials continue to pour in!

"Joystick in BASEMENT . . . 5Ft. BELOW GROUND. Results same as doublet. 'Frisco (700 miles) 589.W70E."

"VQ9A A real plum! G3NFV". "Put it under bed—UA2/559. T. Sterling (Newquay)." "Improved performance over dipole . . . takes a KW. CQ Magazine." "Worked all W call areas on 21 mcs/cw, G30TX." "No TVI.G6XD." "Very good success with Joystick—K5GDH." "Very satisfied, first call heard LA9MI/P Jan Mayen Islands at 559 G10513." "Amazed to receive Joymatch within two days of posting order. F. Kinghorn, N'berland."

GUARANTEE

Partridge operate a rigid, 100% Money Back Guarantee if you're not completely satisfied!

READ ALL ABOUT IT!

This ticket will bring you the new brochures by return of post!

PARTRIDGE ELECTRONICS LTD. Caister House, Prospect Road, Broadstairs, Kent
Tel: THANET 62535

NAME..... (Call sign).....

ADDRESS.....

.....

.....

RSGB

A

Volume 41 No. 9

September 1965

4/- Monthly

R S G B BULLETIN

CONTENTS

EDITOR:

John A. Rouse, G2AHL

EDITORIAL ASSISTANT:

T. R. Preece, G3TRP

EDITORIAL OFFICE:

RSGB Headquarters, 28 Little Russell Street, London, W.C.1.

Telephones: HOLborn 7373
HOLborn 2444

ADVERTISEMENT MANAGER:

Mrs. P. D. Harvey,
Sawell & Sons Ltd.,
Ludgate Circus, London, E.C.4
Telephone: FLEet Street 4353

Front Cover: In last month's BULLETIN, on page 541, mention was made of a visit to headquarters by John Rogers, ZE4JN/G3UHC, while on his way to the USA to take up an appointment at the Iowa State University in the Department of Physics and Astronomy.

Mr. Rogers has been intensely interested in space and satellite research for some time, as a hobby, and the aerial on the cover of this issue was designed and constructed by himself as a satellite command aerial to form part of his experiments. His proudest achievement, however, is a 160 element switchable circular polarised v.h.f. aerial, fully steerable by remote control, which was employed during Dr. James Van Allen's Injun series satellite projects.

The RSGB Bulletin is published on the first Wednesday in each month by the Radio Society of Great Britain as its official journal and sent to all members.
The closing date for copy for the next issue is September 10.

RADIO SOCIETY OF GREAT BRITAIN

INCORPORATED 1926

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

COUNCIL 1965

PRESIDENT	E. W. YEOMANSON, G3IIR
IMMEDIATE PAST PRESIDENT	G. M. C. Stone, AMIEE, AMIERE, G3FZL
EXECUTIVE VICE-PRESIDENT	R. F. Stevens, G2BVN
HONORARY TREASURER	N. Caws, FCA, G3BVG
ORDINARY ELECTED MEMBERS	J. C. Foster, G2JF R. C. Hills, BSc(ENG), AMIEE, AMIERE, G3HRH E. G. Ingram, GM6IZ A. O. Milne, G2MI L. E. Newnham, BSc, G6NZ J. W. Swinnerton, TD, BSc(ECON)(HONS), AIL G2YS Louis Varney, AMIEE, AIL G5RV
ZONAL REPRESENTATIVES	H. A. Bartlett, G5QA L. N. Goldsbrough, BSc(OXON), MA, G3ERB J. C. Graham, G3TR R. H. James, AMIEE, AMIERE, GW3BFH A. D. Patterson, BASc, GI3KYP F. K. Parker, G3FUR J. F. Shepherd, GM3EGW

GENERAL MANAGER AND SECRETARY — John A. Rouse, G2AHL

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, 33 Cedars Avenue, Kingswinford, Brierley Hill, Staffs.
Region 4.—East Midlands.	F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby.
Region 5.—Eastern.	S. J. Granfield, G5BQ, St. Luke's, 47 Warren Road, Cambridge.
Region 6.—South Central.	L. W. Lewis, G8ML, 34 Cleevelands Avenue, Cheltenham, Gloucestershire.
Region 7.—London.	P. A. Thorogood, G4KD, 35 Gibbs Green, Edgware, Middlesex.
Region 8.—South Eastern.	Norman D. Mattock, G2DFG, "Brackstones," 185 Cheriton Road, Folkestone, Kent.
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, Glamorgan.
Region 11.—North Wales.	J. E. Thornton Lawrence, GW3JGA, "Perranporth," East Avenue, Bryn Newydd, Prestatyn, Flintshire.
Region 12.—North-East Scotland.	G. B. Woffinden, GM3COV, 5 Rockwell Crescent, Thurso, Caithness.
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, GI3IWD, 21 Wellington Gardens, Bangor, Co. Down.
Region 16.—East Anglia.	P. J. Naish, G3EIX, 6 Mildmays, Danbury, Chelmsford, Essex.
Region 17.—Southern.	L. H. F Southwell ,G3JLS, 15 Hollybank Road, Hythe, Southampton, Hants.

QSL BUREAU MANAGER

A. O. Milne, G2MI, 29 Kechill Gardens, Bromley, Kent

PROFILE

Herb Bartlett, G5QA

ON that winter's evening in January 1955 when Herbert Arthur Bartlett, G5QA, of Exeter, delivered his Presidential Address to the Society he said, "I am firmly convinced that a large number of members would derive much greater benefit from their membership if they would only take a more active part in the running of the Society." Herb was speaking from long experience because for the previous 25 years he, himself, had taken a close and lively interest in the affairs of the Society. When he became President he was only the second Provincial member (Vic Desmond, G5VM, of Birmingham was the first, in 1948) to hold that high office.

First licensed in 1928, G5QA was to the forefront in organizing local meetings prior to World War II but he really came into his own with the return to peace. First as Town Representative for Exeter, then as County Representative for Glorious Devon and finally as Regional Representative for the South West of England, he rendered great service to the Society. Herb was first elected to the Council in January 1952 and within two years his abilities were so well recognized by his colleagues that they nominated him as Executive Vice-President, an office he took over from Arthur Milne, G2MI, on January 1, 1954. It was during Arthur Milne's year as President that Herb Bartlett and his colleagues in the West Country organized the famous Bristol Convention, an event still regarded by many as the most successful ever held. As Chairman of the Convention Committee, Herb contributed a wealth of knowledge, acquired both as radio amateur and as business executive.

A strong supporter of the social side of the Society's work, Herb Bartlett attended every Official Regional Meeting, as well as many other functions, during his year as President. Prior to 1955 and on various occasions since, he has supported functions in many parts of Britain. Some of the meetings he himself organized in the West Country during his term of office as Regional Representative, were outstanding successes—Bristol, Exeter, Falmouth, Plymouth, Torquay, spring readily to mind.

Herb Bartlett remained a member of the Council until the end of 1960. Expecting then to take a well-earned rest he was suddenly, in the summer of 1962, called upon to fill a casual vacancy in the Council brought about by the resignation of the then Zone D Representative. Herb rejoined the Council in June 1962 and was later that year formally nominated and later elected to serve for a further three years as Zone D Representative from January 1, 1963. Today, his special sphere of interest in the Society covers that part of South and South West Britain which embraces Regions 6, 9 and 17.

Except for the war years, Herb Bartlett has been a practising amateur ever since he received his first licence 37 years ago. A skilled telegraphist, he was awarded the coveted ROTAB Trophy in 1951 for his consistent DX work with Jack Parminter, ZL2OU, of Wairoa, New Zealand. Up to that time, and dating back to 1936, Herb and Jack had contacted one another more than 2000 times. Today—14 years later—the world's most consistent DX workers have notched up more than 8500 contacts on 14 Mc/s. Seems incredible but it's true.

Herb's achievements are not confined to the DX bands. In fact his station at " White Ladys," Cheyney Gate, Pinhoe, near Exeter, with its collection of Yagi arrays, is one of the best sited and best equipped for v.h.f./u.h.f. work in the West Country. Situated 550 ft. above sea level, the view to the south-west extends on a clear day well down into the English Channel, almost 30 miles away.

Always up-to-date, G5QA nevertheless still believes in home construction and in making use of any new device or idea that will help him to achieve greater efficiency. Almost pedantic in his desire to achieve neatness, Herb's station presents a first-class example of the adage " switch to safety." When " White Ladys " was built some years ago, Herb took great pains to ensure that his installation was provided with an ample quota of suitable safety devices.

Herb Bartlett joined the Marconi Company during World War I at the age of 17 and he later saw service during the war as a wireless operator in the Merchant Navy. During World War II, he was associated in a voluntary capacity with a

(Continued on page 577)

Single Package Transmitter for 160 and 2

Developed by D. W. FURBY, G3EOH *

THE design of the dual band transmitter to be described takes full advantage of the newly introduced power pentode type 7558. This valve, with an anode dissipation of 10 watts up to a maximum frequency of 175 Mc/s, may, from an amateur point of view, be considered as an improved version of the popular 5763.

By an ingenious arrangement of the tuned circuits, no actual switching of the tuned circuits takes place when changing bands. As a result, not only is the efficiency of the various stages improved, especially at v.h.f., but in addition, construction is simplified.

The transmitter will run an input of 15 watts on 2m, but on 160m the input to the p.a. is restricted to 10 watts to meet the official power limitation.

Only the r.f. assembly is dealt with here since there are many published circuits of suitable modulators. An output of 8 watts will be adequate to modulate the carrier fully on 2m and have plenty of power in reserve for 160m.

Circuit

Prior to examining the circuit (Fig. 1) in detail, it may be as well to review the functions of the individual valves in relation to the final frequencies. When operating on 1·8 Mc/s, V1 is not used, V2 functions as a Clapp variable frequency oscillator, V3 as a buffer amplifier, and V4 as the p.a. When operating on 144 Mc/s, V1 becomes a Colpitts crystal oscillator, V2 a frequency tripler, V3 a frequency doubler; V4 is of course the p.a.

As already mentioned, V1 only comes into operation when the transmitter is set for 144 Mc/s. The valve, a 6BW7, is used in a familiar Colpitts configuration in which the crystal oscillates on its fundamental frequency in the grid/cathode circuit with the screen grid forming the " anode " bypassed to r.f. The true anode of the valve is tuned to one of the harmonics of the crystal, in this case the third, which, with an 8 Mc/s crystal, provides drive to the following stage at 24 Mc/s.

It will be noted that the cathode of V1 is returned to the centre of a capacity divider between grid and earth, the values of which depart from those usually associated with this circuit. In addition, the d.c. return of the cathode of the valve is via a resistor which replaces the r.f. choke normally fitted.

Experience with this type of oscillator used to drive v.h.f. transmitters is that it has a natural tendency to make the final frequency lower than that which would be expected from the simple arithmetic of multiplying the crystal frequency by the frequency multiplication factor. In practice this means that the parallel capacity across the crystal, whether intentional or stray, must be kept well within the normal 30pF limit.

The foregoing observations are pertinent to this design since the effective capacity across the crystal given by C1 and C2 in series amounts to 60pF. This will be further increased by circuit stray capacities. The effect will be to cause the final frequency to be substantially lower than that expected from simple calculations. If specific final frequencies are required, crystals will have to be ordered to operate with a parallel capacity of 70pF. Alternatively, C1 should be reduced to the usual value of 30pF and C2 to 100pF. If the circuit then fails to oscillate with a resistive cathode load, R2 will have to be replaced with an r.f. choke.

The output from V1 is, for 144 Mc/s operation, coupled via S1 to V2. The entire bandchanging operation is accomplished by S1, no other switching being required.

When V2 is operating as a tripler, drive is applied to its grid via S1. It should be noted that the grid leak, R3, is not returned to earth in the usual manner, but is connected to the cathode of V2, and that the resistor in the cathode of V2 (R4) is not a bias resistor, but is associated with the function of this valve when it operates as a Clapp v.f.o. on 1·8 Mc/s. This resistor, R4, does not have any degenerative effect when the valve operates as a multiplier since it is bypassed by C10 which forms part of the capacity divider of the v.f.o. circuit. Since R4 contributes no bias voltage to the valve, all the bias for the tripling operation is developed by the grid current through R3. If the drive fails, therefore, there could be a danger of the anode current of V2 running up to destruction levels. Since R4 in the cathode circuit is fairly large in value, the consequent voltage drop across this resistor under such conditions would automatically reduce the h.t. appearing across the valve and so limit the current. Nevertheless, V2 should not be operated without drive when switched to the 144 Mc/s position.

The anode circuit of V2 when operating as a frequency multiplier is tuned to 72 Mc/s. The tuned circuit is unusual in that it is a pi-coupler, the shunt capacities of which are the output capacity of V2, and the input capacity of V3. Since the coil is resonated by these two capacities in series, the net capacity will be very small. This permits the use of a relatively large inductance, which, in itself, achieves broadband coverage so dispensing with the need for direct tuning. At this juncture it should be particularly noted that this coil L3 has a point of zero r.f. potential—nominally the physical centre of the coil—and use is made of this as will be seen.

When the transmitter is switched for Top Band operation, S1 converts V2 into a Clapp variable frequency oscillator by connecting the grid to the tuned circuit, L2, C5, C6, C7, and the capacity divider C9, C10. In addition, the voltage regulator V5 is switched into circuit, and the screen supply for V2 connected to this instead of directly to the h.t. line. This stabilizes the operation of the v.f.o. and reduces the effect of variations in h.t. on the operation of the oscillator.

Mention has been made of the point of zero r.f. potential on L3. It is at this point that the h.t. is fed to V2 when it operates as a frequency multiplier, and the same point to

COIL DETAILS

L1, 16 turns, 26 s.w.g. enam., wound on Aladdin former 5961, with dust iron core.
L2, 95 turns, 38 s.w.g. enam., close wound on ¼ in. former.
L3, 21 turns tapped 10 turns from anode end, 26 s.w.g. enam., wound on Aladdin former 5961, with brass core.
L4, 6½ turns, tapped 3¾ turns from anode end, 20 s.w.g. enam., wound on Aladdin former 5961, with brass core.
L5, 5 turns, tapped 2½ turns from anode end, 20 s.w.g. enam., ¼ in. diam., ⅜ in. long, self supporting.
L6, 36 turns, 18 s.w.g. enam., 1¼ diam., 2 in. long.
RFC1,2, 220 mH, Cambion type 2082-10.
RFC3, 2·5 mH.
RFC4, 40 turns, 30 s.w.g. e.s.s., wound on Aladdin former 5961, no core.

* Thorn AEI Radio Valves and Tubes Ltd.

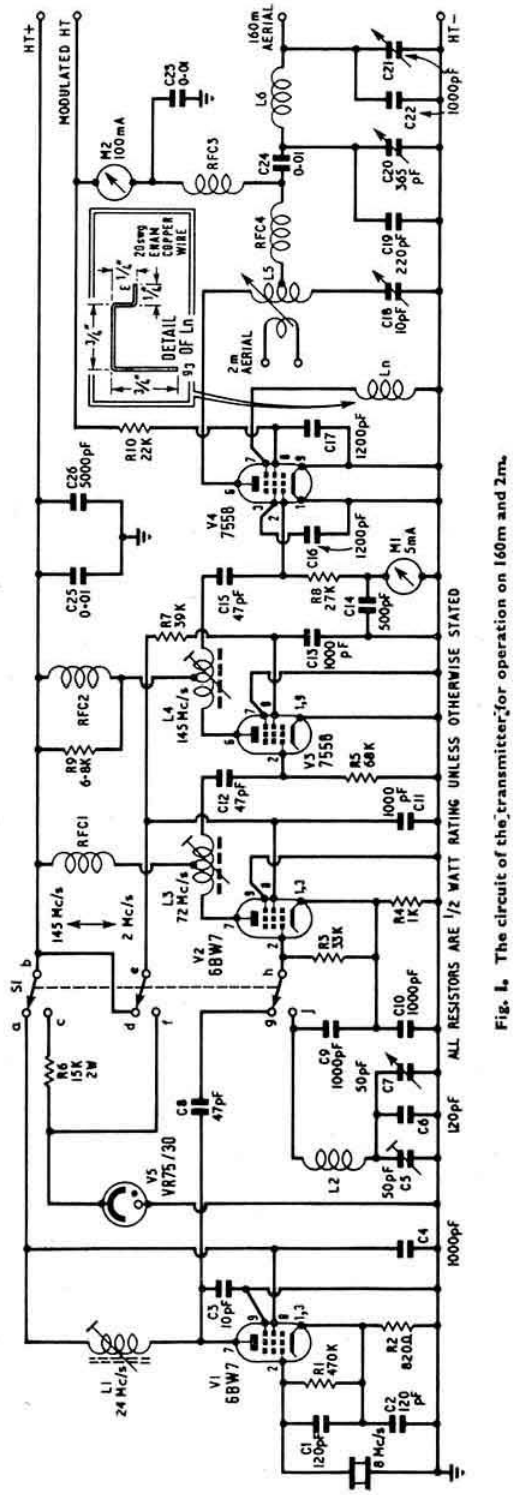


Fig. 1. The circuit of the transmitter for operation on 160m and 2m.

which the load for the output of the v.f.o. is connected. The output load for the v.f.o. is RFC1. To the output frequencies of the v.f.o. L3 is just another piece of wire, and it has no effect upon the operation of the circuit. Thus the coupling capacitor C12 is effective for both frequencies.

V3 operates either as a frequency doubler, or as an untuned buffer.

For 144 Mc/s operation, the output of V2 is coupled to V3 by a pi-network and C12, and V3 operates as a frequency doubler from 72 Mc/s to 144 Mc/s. Like V2, V3 relies on grid current through its grid leak, R5, to give it the correct operating bias. The anode circuit of V3 consists of another pi-network similar to that in the anode of V2 except that it is tuned to 144 Mc/s.

When switched to Top Band operation, the screen grid of V3, which now operates as an untuned buffer amplifier, is connected to the stabilized supply instead of directly to the main h.t. Its output is thus reduced. Even with this procedure the drive to the p.a. is still too high, and so a damping resistor is fitted across the r.f. choke anode load RFC2.

The p.a., V4, follows the practices established in the preceding stages. Grid current through the grid leak R8 provides the correct operating condition and a pi-network is used for the v.h.f. output, while the output circuit for Top Band is connected to the point of zero r.f. potential on this pi-network.

There are one or two points which require special note in relation to the p.a.

First, since the valve is operated as a straight amplifier at v.h.f., it will require neutralizing. In this circuit suppressor grid neutralization is employed. This simply consists of an inductance connected in the suppressor earth return lead, and is shown in Fig. 1. While it would be possible to employ capacity neutralization from the top of C18 back to the grid, the method shown is far easier to adjust and is more stable over a wider range of frequencies.

It must be particularly noted that two decoupling points are used on the screen grid of the p.a. valve. It is essential, if degeneration is to be avoided, that the screen grid has a low r.f. impedance to earth. To assist in this, both of the pins of the valve to which the screen grid is connected are bypassed individually.

The v.h.f. tank circuit is a pi-network tuned in this case at its " far end " by a 10pF variable capacitor C18. To this coil is fitted a variable link from which the 144 Mc/s output is taken.

To the centre of the v.h.f. pi-network is connected a v.h.f. choke, RFC4. Note that the point to which this choke is connected to the coil is not bypassed. This is correct and not an omission. It is bad practice to bypass this point in any v.h.f. tank circuit, and in this case it would be disastrous, as it would " drain off" the Top Band output.

The Top Band output circuit is a familiar pi-network connected to the centre of the v.h.f tank circuit via the blocking capacitor C24 and the v.h.f. choke RFC4.

Metering in the transmitter is limited to measuring the p.a. grid and anode currents, and this is quite adequate. Indeed, a single meter could be used suitably shunted and switched.

Heater Wiring

The power rating and power requirements of this transmitter make it particularly suitable for mobile operation, in addition to fixed station usage. For this reason, heater wiring is not shown. When operated on 6·3V, the heaters of the valves should all be in parallel.

When operated from a 12V nominal source, such as a car battery, V1 and V2 should be wired in series, with pin 4 of V1 earthed, and pin 5 of V2 connected to the 12V supply. Similarly, V3 and V4 should be wired in series with pin 5 of V4 earthed, and pin 4 of V3 to the supply. Pin 4 of V4 should be decoupled with a 5000pF capacitor using very short leads. The two live leads from V2 and V4 are terminated on a

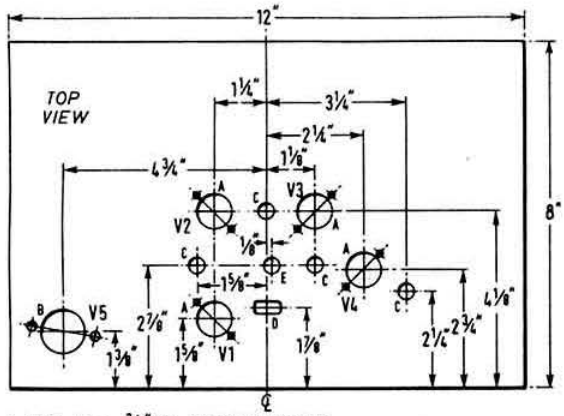


Fig. 2 (a). Top view of chassis plate.

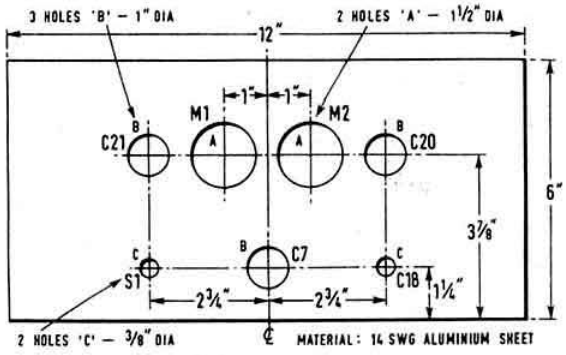


Fig. 2 (b). Front panel. The two holes M1 and M2 were cut for use with Shinohara meters, which are 1½ in. diameter.

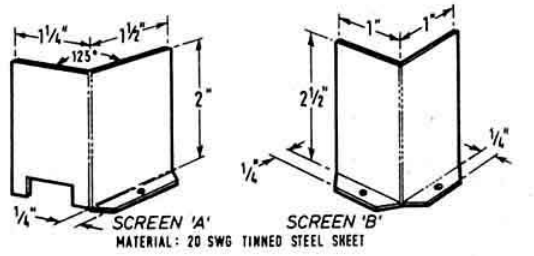


Fig. 2 (c). Screens A and B.

1000pF feed-through capacitor, the far side of which provides an anchor point for the incoming heater supply.

Construction

The transmitter is laid out on a chassis measuring 12 in. × 8 in. × 2½ in. deep. In view of the difficulty of obtaining satisfactory earth connections to aluminium, this material should be avoided. Tinned steel or cadmium plated steel is far more satisfactory, or even sheet brass if one does not mind the somewhat higher cost. In actual fact the size of the chassis specified is quite a bit larger than that needed for just the r.f. section, and sufficient room has been allowed to accommodate both a modulator and power supply.

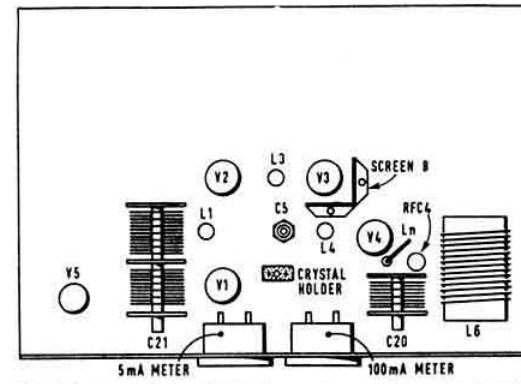


Fig. 3. Layout of the principal components above the chassis.

Fig. 2(*a*) shows the drilling layout of the chassis, while Fig. 2(*b*) details the panel layout and the two screens needed in the construction. It should be noted that these diagrams do not make provision for power supply or modulator components.

All components associated with the operation of the transmitter on 144 Mc/s should have leads as short as possible. The position of components associated with operation on 1·8 Mc/s is, on the other hand, relatively unimportant.

In view of the comprehensive nature of the layout diagrams, Fig. 3, which shows the positions of the components mounted on the top of the chassis, and Fig. 4, the layout of the underside of the chassis, a wire by wire commentary should not be required. However, in relation to these two diagrams, it should be noted that not every single wire is shown, and when wires not illustrated are fitted, they should be routed according to the remarks made in the preceeding paragraph.

Tuning Procedure

Since self-bias is used throughout this transmitter, the unit must be tuned stage by stage. Apart from an absorption wavemeter to verify the frequency to which the respective stages are tuned, the most convenient method of ensuring correct tuning is by measuring the grid current to the succeeding stage. To assist in this, the earthy ends of the grid resistors of V2 and V3 should be temporarily disconnected.

Switch the transmitter for 144 Mc/s operation and insert V1 and V2 into their sockets. Fit a suitable 8 Mc/s crystal to the crystal socket. Switch on heater supply and apply h.t. to V1 only. With a meter set to its 2mA range connected from the earthy end of R3 to the cathode of V2, adjust the core of L1 for maximum current indication on the meter. This should be about 1·2mA occurring when the core of L1 just starts to enter the winding.

Disconnect the h.t., re-connect R3 to the cathode of V2, and restore the h.t. supply connections to V2. Insert V3 and temporarily break the connections taking h.t. to the anode circuit and screen grid of this valve.

Connect the meter between the earthy end of R5 and chassis. Apply power to V1 and V2. Tune the brass slug of L3 for maximum grid current to V3. This should be of the order of 1mA. Check that the frequency to which L3 is tuned is 72 Mc/s.

Remove the power, re-connect R5, and restore the h.t. supplies to V3. Insert V4 and disconnect the lead marked MODULATED H.T. in Fig. 1 from the modulation transformer or the h.t. supply.

Apply power and tune L4 by means of the brass slug

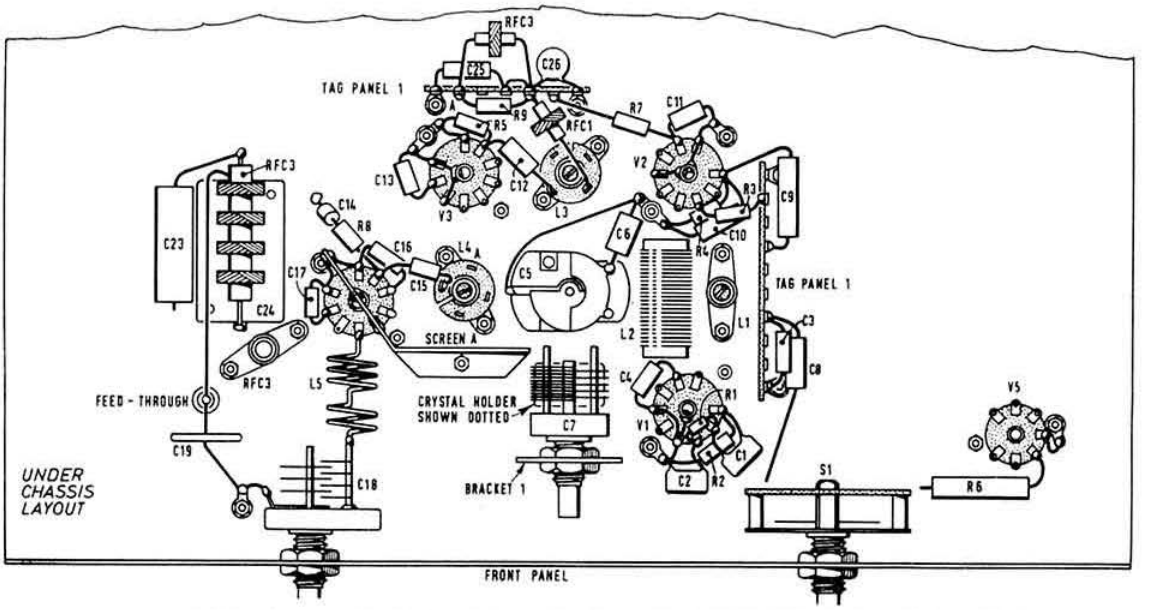


Fig. 4. Positions of the sub-chassis components. Ample space is left for the inclusion of a simple modulator.

until maximum current is indicated on the grid current meter of V4. This should be about 2mA. Check the frequency present in L4 by means of an absorption wavemeter.

Remove h.t. from the transmitter and restore the h.t. connection to the p.a. valve, V4.

Apply h.t. to the whole transmitter and rapidly tune C18 for maximum dip in the anode current to V4. Remove the h.t. Bring a wavemeter within reasonable distance of L5. apply power and quickly check that this circuit is tuned to 144 Mc/s.

With either an 80 ohm dummy load or a 144 Mc/s aerial connected to the link winding of L5, adjust the position of the link until the p.a. draws 60mA-65mA. Check the dip in anode current by tuning C18 slightly as the link is swung into position. If C18 has to be varied considerably from its initial setting as the link is progressively coupled to the p.a. tank circuit, look for a mismatch in either the dummy load or the aerial. In this respect an s.w.r. bridge will be found a useful adjunct. Once the p.a. is loaded, re-adjust L4 for maximum grid drive to V4.

To set up the transmitter for 1·8 Mc/s operation, the first adjustments relate to the v.f.o.

Switch off the power and set S1 for 1·8 Mc/s operation. Apply power via the stabiliser to the v.f.o. only. Set C7 to minimum capacity. Adjust C5 until the oscillator frequency is precisely 2 Mc/s. Set C7 to maximum capacity. Check the lower frequency to which the v.f.o. has now tuned. This will be below 1·8 Mc/s. Reduce the inductance of L2 by removing *one turn at a time* until the oscillator frequency is 1·8 Mc/s. Since removing turns from L2 will affect the highest frequency to which the v.f.o. will tune, after each adjustment to L2 check the highest frequency and adjust C5 so that this is 2 Mc/s. Repeat these adjustments in the order and manner given until the v.f.o. tunes 1·8-2 Mc/s.

Apply power to the driver stages, and the v.f.o. and check the grid current to the p.a. If the chokes specified have been fitted, then the 6·8 K ohm resistor across RFC2 will produce a grid current of 2mA to the p.a. If other chokes have been substituted, the value for the resistor to be fitted at R9 will have to be found by trial and error.

No special comments are required on the Top Band pi-network output circuit which functions in the normal manner.

Conclusion

As will be appreciated, this transmitter is of a very useful design in itself, but there would seem to be no reason why similar circuit configurations could not be successfully worked out for other powers and bands. The prime requirements are that the two frequencies involved should be fairly well divorced from each other.

Acknowledgements

The Society gratefully acknowledges the permission given by Thorn AEI Radio Valves and Tubes Ltd. to draw on their application report No L.87 in relation to the valve type 7558.

OLLERTON AMATEUR RADIO SYMPOSIUM

Saturday, September 11 to Sunday, September 12

RESIDENTIAL YOUTH CENTRE, OLLERTON, NOTTINGHAMSHIRE.

This weekend symposium has been arranged to acquaint youth leaders and young people with the hobby of amateur radio. The lectures and events on the Sunday have been given a broader scope, however, to appeal to radio amateurs as well.

Two separate lecture sessions will be run on Saturday afternoon, evening and Sunday morning, while on Sunday afternoon there will be a junk sale, aerial mast erection demonstration, radio controlled models, aircraft demonstration, and a display of Archery.

GB3 "Robin Hood" will be in operation throughout the weekend.

Full details may be obtained from Mr. S. Denner, 68 Hawton Road, Newark, Notts. (Telephone Newark 3757).

A Simple Two-Way Telephone System with Automatic Ringing

By R. G. CHRISTIAN, A.M.I.E.E., A.M.I.E.R.E., G3GKS*

WHEN the writer moved his shack from inside the house to the end of the garden, his XYL insisted that some form of intercommunication system be installed between the house and the shack. A great deal of thought was given to the project and several methods such as semaphore or switching off the mains to the shack were considered, but rejected. It must be admitted that the latter was used for a while until it dawned on G3GKS that, when using power tools, removal of the supply could cause an accident.

The answer was provided, in part at least, by the appearance on the surplus market of GPO type 332 CB telephones,

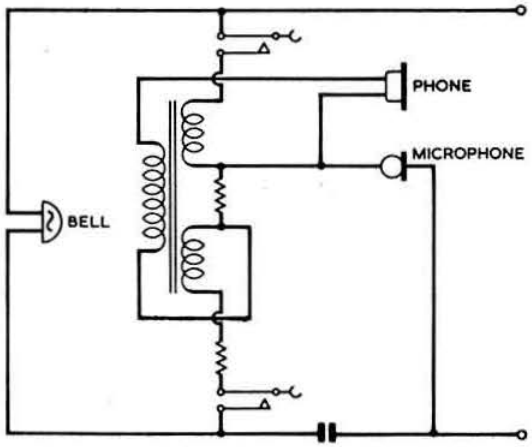


Fig. 1. Circuit diagram of CB telephone. No modification is required, although the bell must be adjusted for 50 c/s operation.

amongst others. The CB stands for Common Battery, the telephones being intended for use with manual exchanges. Their appearance in surplus stores is no doubt due to the present modernization of the GPO telephone system, conversion to STD taking place even in areas where automatic exchanges were never previously installed. Due to the low price asked for a No. 332 CB desk telephone, no thought was given as to how they were to be used, and forty-five shillings later G3GKS was in possession of a pair of such telephones, brand new and boxed.

Using the CB Telephone

Fig. 1 shows the circuit arrangement of a CB telephone from which it will be seen that the following conditions apply:

(a) with the handset on its rest, only the bell is in circuit, and there is no d.c. path.
(b) when the handset is lifted, the microphone and receiver are brought into circuit, although the bell remains connected.

In GPO use the bell is operated at the exchange by the operator who switches in an l.f. ringing tone of 17 c/s. The microphone, being of the carbon variety, requires a d.c. polarization which is provided by the common battery (say 40V) at the exchange. This battery also energizes relays at the exchange. In commercial two-way telephone systems calling is provided either by switching a buzzer or by using a hand magneto, as, for example, in an Army field telephone.

* 17 Orton Road, Childwall, Liverpool, 16

The requirements of the writer's system were as follows:

(i) ringing should occur automatically when the handset is lifted at one end of the line;
(ii) the ringing tone should be at a frequency of 50 c/s since this is readily available, unlike 17 c/s;
(iii) the ringing voltage should be disconnected when the distant handset is lifted;
(iv) the system should be mains operated.

The system described satisfies these requirements and is very simple to construct.

Principle of Operation

The circuit developed is shown in Fig. 2: this only requires connecting to the pair of CB telephones, the latter being supplied with wall-mounting terminal boxes. The relay contacts are shown in the normal position corresponding to both handsets down, or to the mains supply switched off, since switching on the supply does not operate either relay.

Let us suppose that No. 1 handset is lifted off its rest. Reference to Fig. 1 shows that a d.c. path is provided by the closed contacts in the base of the telephone, d.c. passing through and energizing the carbon microphone. This current flows through relay RLB so closing contacts B1, B3 and B4 and opening B2. Since A2 is normally closed the 50 c/s voltage developed in the secondary of T1 is passed via B1, A2, and B3 to No. 2 telephone, so ringing the bell there, but is prevented from ringing No. 1 bell because A3 is open. Thus No. 1 is calling No. 2.

Now on lifting No. 2 handset, relay RLA is operated, so closing A1, A3 and A4, and opening A2. Since A2 is opened the ringing tone is disconnected and ringing ceases. Since both A3 and B3 are closed, the two telephones are directly connected, both microphones are energized, and normal speech communication is possible.

Contacts A4 and B4 have no effect on the operation and are not essential, but, as explained later, they may be used to increase the relay release time. The d.c. polarization or "carrier" is provided by a half wave rectifier and smoothed by the usual LC filter, CH1, C3 and C4. C1 and C2 are

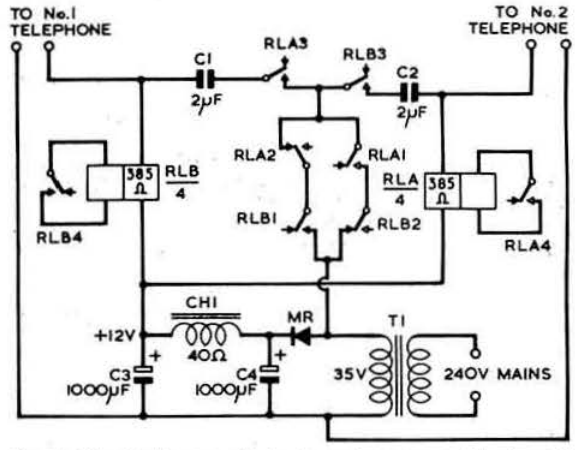


Fig. 2. Circuit diagram of simple mains operated "automatic exchange" for use with two CB telephones. Calling is effected merely by lifting the handset from its rest. The relay contacts are shown in their normal position (both handsets down, or supply disconnected).

necessary to prevent the flow of direct current in the wrong direction, which would cause both relays to operate with the lifting of only one handset.

A Practical Circuit

All the components used in the unit were found in the writer's junk box with the result that many of them are not the ideal choice. The relays used were of German origin, and somewhat similar to the PO 3000 type. They have two windings, one of 385 ohms, which is used as the operating winding, and another tapped winding of higher resistance. It should be remembered that the relay winding is in series with the microphone, and hence the d.c. supply must be chosen to suit the relay resistance. As the resistance of the carbon microphone is low, the relays chosen should be of the low resistance type if the d.c. supply voltage is not to be too large.

The ideal relay should have fast operate and slow release times. The slow release enables some overlap to occur in the replacement of the handsets at the end of a conversation. In the relays used by the writer, the secondary winding was connected to a normally open pair of contacts shown as A4 or B4. With the main coil energized, the contact is closed, so that on breaking the control current the short circuited coil tries to maintain a flow of current for a short period (Lenz's law) and increases the release time. Even so, the increase in release time is very small and invariably one or other of the bells rings for a moment at the end of a conversation due to one handset being replaced before the other. This could be overcome entirely by the addition of a suitable circuit such as a capacitance-resistance discharge circuit, but was not thought worth the trouble.

The transformer, T1, was an old mains type having a faulty secondary. All the secondaries were removed and a note was made of the turns-per-volt. A new secondary was wound on to give about 35 volts, which was found necessary for ringing. This voltage is also rectified by a metal rectifier MR, the one used being intended for mains voltages. This being the case, there is a large voltage drop (about 12V) across it. The use of a low voltage rectifier, perhaps a silicon or germanium type, would reduce this drop so making more voltage available for operating the system.

The smoothing choke, CH1, in the writer's unit is of unknown inductance, but has a resistance of 40 ohms and, in conjunction with a pair of 1000μF capacitors, provides adequate smoothing. These capacitors have a rated working voltage of 25V, yet with the supply switched on and both handsets down (normal stand-by condition), each is subjected to a constant 50V, this being the no-load value. In nearly a year of operation neither capacitor has failed, but obviously 50V types would be preferable. On load, the voltage across C3 falls to about 12V, the drop in CH1 being less than 2V. C1 and C2 are low voltage paper capacitors, any rating above 50V being suitable.

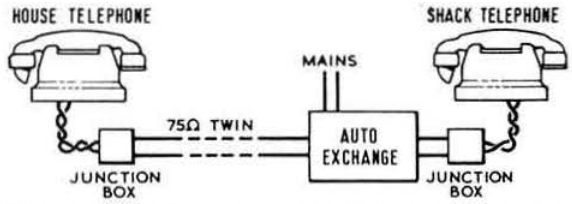


Fig. 3. Schematic diagram of house to shack intercom system at G3GKS. Twin 75 ohm TV feeder was used as the telephone line.

Installation and Adjustment

The bell on the CB set is normally arranged for 17 c/s operation and some adjustment is necessary for use on 50 c/s. To do this, remove the cover plate on the base of the set by unscrewing the four retaining screws. Two bells will be seen, each of which is mounted by a single screw. If the screws are slackened the bells may be rotated, and since the screw holes are eccentric, the gaps between hammer and bells may be adjusted. These gaps should be adjusted in conjunction with the armature gaps which may be varied by slackening the screw holding the centre core and sliding this core up or down, so varying the swing of the hammer.

At the writer's QTH, the automatic exchange unit together with one telephone, was installed in the radio shack (Fig. 3), the supply being switched on when the shack and its adjoining workshop are being used, which is quite often. The other telephone was installed in the kitchen of the house, the connecting line being 75 ohms twin feeder simply because it happened to be available. Normal GPO lines have a nominal characteristic impedance of 600 ohms, and so any suitable twin lead should suffice.

The system has been in use for nearly a year and works very well indeed, and although intended for the radio shack, it has obvious uses for domestic, commercial and industrial purposes, provided of course that supplies of CB telephones remain plentiful and cheap.

Profile—Herb Bartlett, G5QA (continued from page 571)

special organization in which he played a prominent part, especially in the West Country.

Herb is a member of the Radio Amateur Old Timers' Association, having presided at the Fifth Reunion in 1963. In business he is Director and General Manager of four motor companies in the south-west of England and a member of many important trade organizations.

In all his Amateur Radio activities Herb has received the fullest support of his wife Betty. In the West Country and far beyond Herb and Bet. Bartlett are known to countless hundreds of radio amateurs who have met them at meetings or visited them in their lovely home on the outskirts of Exeter. Famed for the warmth of their hospitality they possess the happy knack of making all their friends feel completely at home.

RTTY Channel on 2m

The Council of the RSGB has accepted a recommendation that an RTTY channel should be allocated on 144·6 Mc/s ± 5 kc/s.

V.F.O. CONTROLLED TRANSMITTER FOR 70Mc/s

Testing and setting up, together with details of alternative Master Oscillator

BY PAUL HARRIS, G3GFN*

PART 2

WHILE it may be felt that undue stress has been laid on the fact that constructing a v.f.o. controlled transmitter for the 70 Mc/s band is no mean undertaking, this should perhaps be qualified by observing that with meticulous testing and setting up, it is of course, a perfectly practicable proposition. The words of caution in Part 1 were aimed at anyone who might be under the misguided impression that he can " knock it up " in a couple of shakes, modifying the circuit and mechanical design in all sorts of weird and wonderful ways.

The time spent, and the care taken, in setting up and checking this transmitter, and in particular the v.f.o., will be amply repaid by the sure knowledge that it is perfectly satisfactory *before* it is put into service.

Setting-up the V.F.O.

The first checks are made on the v.f.o. unit while running it on the bench.

The v.f.o. unit should have power applied to it and voltage checks made to ensure that all appears to be in order. A small pointer knob is then temporarily fitted to the tuning capacitor shaft so that, with its pointer upwards, the capacity is at minimum. The cover is then fitted into place.

There are two methods of getting the v.f.o. to its correct frequency range.

The first, and easiest, is by the use of a receiver which tunes through the range to be covered by the v.f.o., 11·675 Mc/s-11·790 Mc/s. The receiver should be tuned to 11·7 Mc/s, and the v.f.o. tuning capacitor set to about half capacity. The core of L1 is then adjusted until the v.f.o. carrier is heard, and at maximum, on the receiver. As the output from the v.f.o. is quite high, and depending on the image response characteristics of the receiver, it is prudent to check the image frequency of the 11·7 Mc/s tuning point to ensure that the signal heard is not the image of some other frequency. If the v.f.o. is found on another frequency, and the signal is stronger, it is fairly certain that the first signal heard on 11·7 Mc/s was an image. In this event continue to adjust the core of L1 until the 11·7 Mc/s signal is stronger than any other. There is no room for error or doubt in this adjustment.

The tuning range of the v.f.o. may now be checked. Set the v.f.o. tuning capacitor to maximum capacity, and the receiver to as near 11·675 Mc/s as possible. Carefully *unscrew* the core of L1 until the v.f.o. signal is heard in the receiver. Swing the v.f.o. tuning capacitor to minimum capacity. The v.f.o. carrier should now be found on a frequency of 11·79 Mc/s or higher.

The second method of setting up the v.f.o. uses any 70 Mc/s receiving arrangement, but due to the multiple frequency changing which normally takes place in such equipment, the v.f.o. could be set to cover some other range, although appearing to be correct. The greatest care must be taken when using this method.

The procedure is broadly similar to the first method. The receiver is tuned to approximately 70·3 Mc/s and the v.f.o. capacitor set to half capacity. The core of L1 is then adjusted to produce a carrier. The capacitor is then set to full capacity, the receiver to 70·1 Mc/s, and the core of L1 *unscrewed* until the carrier is again heard. Next tune the receiver to 70·7 Mc/s. By swinging the v.f.o. tuning capacitor slowly to minimum, the carrier of the oscillator should be heard to pass through the receiver tuning point indicating coverage to this frequency, and a little more besides.

Whichever method is used, it is essential to double check the frequency of the v.f.o. in another manner. This can be done initially while evaluating the stability of the oscillator as described in the following section, and again later when undertaking calibration.

Checking for Drift

A preliminary check of the stability of the v.f.o. can be made in conjunction with the receiver used to approximately set its tuning range as described in the preceding method 1. The receiver is tuned to a commercial station within the range 11·675 Mc/s to 11·790 Mc/s and the v.f.o. adjusted to zero beat with it. After the initial stabilizing time, zero beat, or near zero beat, should be maintained over a considerable period of time. Switching the v.f.o. by applying and removing the h.t. should produce no discernible frequency " swoop." If there is any, it should be purely momentary.

It has already been observed that some crystal oscillators used to drive 70 Mc/s transmitters drift quite badly. With all due respect to those which are stable, it is not recommended that the v.f.o. be checked for stability against " on the band " transmissions.

Drift in crystal oscillators is inevitably caused by changes in temperature of the crystal element, although it could, in a Colpitts oscillator, be attributable to an unstable capacitor in the capacitive divider.

Ignoring capacity changes, heating of the crystal element arises from two sources. Progressively decreasing changes in frequency which finally cease over a given period are usually due to increases in ambient temperature within the compass of equipment. Once the normal operating temperature is attained, the temperature of the crystal becomes stabilised and the drift stops. The second source of crystal heating arises from the actual current through the crystal itself. In this case it is usual to find that the frequency change is greatest at the commencement of a transmission, and that the rate of change becomes progressively less during the period of the transmission, and in fact may well stabilize after a few minutes. This form of frequency change depends on the crystal excitation level, which is in itself related to the output demand the oscillator has to satisfy. The degree of drift in a crystal controlled transmitter is therefore primarily governed by variations in equipment temperature and/or how hard the crystal has to be driven in order to meet the drive requirements.

There are many methods of checking the stability performance of a v.f.o., the most sophisticated of which is by the use of a direct reading frequency counter which either reads off the frequency directly, or indicates the difference between the v.f.o. and a precisely known and controlled standard.

* " Seaview," 94 Aldwick Road, Bognor Regis, Sussex.

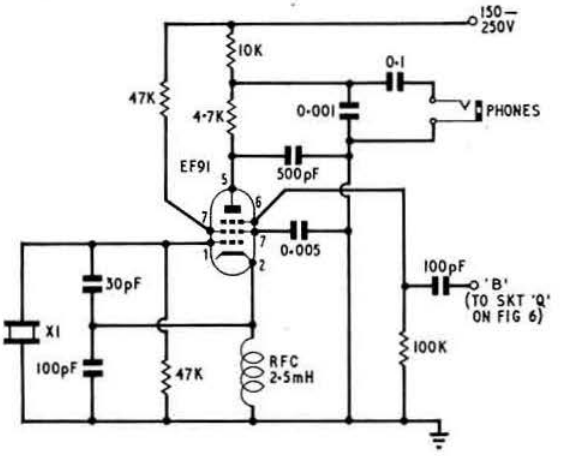


Fig. 10. Crystal oscillator/mixer/beat frequency detector circuit for checking the v.f.o. stability. Suitable crystals for use at X1 lie in the ranges 11684-11783 kc/s, 8783-8839 kc/s, 7788-7855 kc/s and 5842-5891 kc/s. Surplus crystals, at nominal cost, are available in the latter two ranges.

For the purpose of checking this variable frequency oscillator, such methods are unnecessary as the stability capability of the design has already been evaluated. Old but trusted methods are satisfactory.

Fig. 10 shows the circuit of a simple test set, using a single EF91, which performs all the functions needed. The writer considers it essential that this little test unit should be constructed and used for checking the v.f.o. It is also required for duty when the v.f.o. is calibrated. This unit allows the v.f.o. to be checked against a crystal which is operated at a fairly low excitation level.

The reference crystal X1 is operated in a grid/cathode Colpitts oscillator circuit, the screen of the valve being the virtual anode. Instead of earthing the suppressor grid in the usual manner, it is connected to earth via a 100K ohm resistor. By feeding the v.f.o. output into the suppressor grid, the valve acts as as a mixer, and with headphones in the anode lead, beats will be heard as the v.f.o. frequency, or multiples of the v.f.o. frequency, approach the crystal frequency or harmonics of it. When the v.f.o. frequency, or multiples of the v.f.o. frequency, and the crystal frequency, or harmonics of the crystal frequency are precisely the same, zero beat is obtained. For reasons of safety, the headphones are capacity coupled into the anode circuit, so removing d.c. from them.

Construction of this unit is in no way critical. The only point to bear in mind is to situate the crystal clear of the valve so that it does not suffer undue temperature increase due to thermal conduction through the chassis, or by direct radiation from the valve. If the test unit is used on its own, the headphones must be of high impedance and sensitivity.

The frequency ranges of crystals which will produce beats when mixed with the v.f.o. output are given in Fig. 10. Of the ranges given, those between 7788 kc/s and 7855 kc/s are the most useful. To do the job properly three crystals† are required. While only one is needed for the purpose of checking stability, if another two are added, the v.f.o. can be fairly closely calibrated using this same test unit. This is dealt with under the heading " Calibration." The suggested crystal frequencies are 7800 kc/s, 7825 kc/s and 7855 kc/s, all of which are obtainable in type FT243 at nominal cost.

Where there is any doubt about the v.f.o. being on the correct frequency range, two of these crystals (7800 kc/s and 7855 kc/s) are essential. The procedure for confirming the range is detailed shortly.

The initial stability checks, like the preliminary setting up, are conducted with the v.f.o. unit on the bench, and not after it has been fitted to the chassis. The object of this is to check its stability under free air conditions, and unaffected by the thermal conduction which will inevitably take place through the chassis of the transmitter. Temperature compensation may be required when the v.f.o. is used in the transmitter, the amount and extent of which is governed by the internal temperature, and which, in turn, is controlled by the quality of the ventilation of the cabinet. Before the need for such compensation, if any, can be determined, the v.f.o. must be inherently stable under normal conditions.

The test procedure is as follows. The crystal oscillator/test unit is fitted with one of the three crystals specified, and allowed to stabilize over a period of about half an hour. The output from the v.f.o., tag 1, Fig. 4(a), (Part 1), is coupled, in series with a 10pF capacitor to the input terminal of the test unit (B on Fig. 10). The v.f.o. unit is then positioned the correct way up on the bench—that is in the same manner as it will be fitted to the transmitter chassis.

Apply the v.f.o. heater supply for about five minutes, and then the 150 volts stabilized h.t. As quickly and as accurately as possible, swing the v.f.o. tuning capacitor through its range until the v.f.o. frequency drops into zero beat with the crystal. With the 7800 kc/s crystals, the beat is the result of the third harmonic of the crystal beating with the second harmonic of the oscillator.

If no beat can be secured, first check that the oscillator section of the test unit is functioning by tuning to the crystal frequency on a receiver. If this is in order, it is practically certain that the v.f.o. has been inadvertently set to a range other than that required, or that the calibration of the receiver used for the setting-up was incorrect.

To correct any error in the coverage of the v.f.o., two crystals in the 7800 kc/s range are required: 7800 kc/s and 7855 kc/s. With the 7800 kc/s crystal in the test unit, and the v.f.o. tuning capacitor set within about a ¼ in. of full mesh—measured across the tip of the moving vanes—adjust the core of L1 carefully until zero beat is obtained. Replace the crystal by the 7855 kc/s unit. Swinging the v.f.o. tuning capacitor should produce another beat near its minimum capacity. This method may be used to verify the v.f.o. range when it is set by any other method. Leave one of these crystals in the test set and continue the procedure.

Now comes the first of the parts which can be quite tricky. To all intents and purposes, the zero beat condition should be maintained over a period of at least one hour at the end of which any discernible beat should not be more than a suggestion of a " grumble." However, if you are unlucky, one of two things will happen: either the v.f.o. unit will drift steadily and never appear to stop, or it will drift rapidly at first and then gradually settle down. Whichever effect you encounter will be due to the same root cause: an unstable capacitor. The tricky part is finding it. Capacitors C1, C3, C2 and C7 should be checked by substitution, *and in that order*. After each change, a stability check must be made again.

It is unfortunate that the misbehaviour of the v.f.o. in respect of stability could be due to more than one faulty capacitor, and so some sort of estimate will have to be made after each change as to the degree of improvement—if any—which has taken place. This process can be a very time consuming business indeed, and it serves to illustrate the absolute necessity of employing only high stability capacitors.

Once the free air stability requirement has been met, no further work or adjustments can be made on the v.f.o. until it is fitted into the transmitter, and the transmitter itself lined up.

† The frequencies of the crystals themselves should, of course, be checked with an accurate frequency meter such as the BC221.

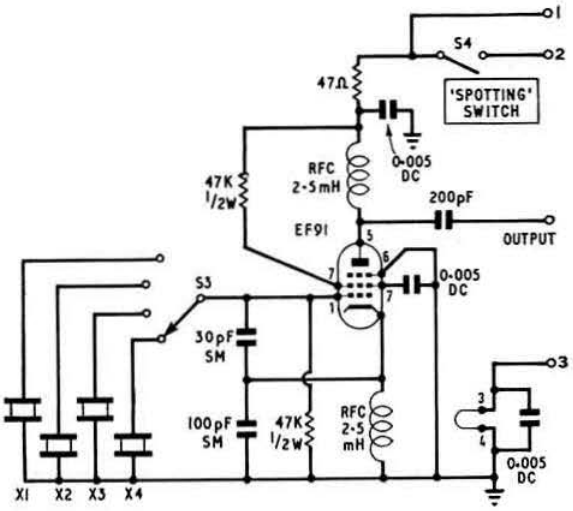


Fig. 11. Alternative frequency control employing switched crystals. Crystal frequencies should lie between 11684 kc/s and 11783 kc/s, and may be found by dividing the required final 70 Mc/s frequency by the factor 6.

Alternative Frequency Control

The foregoing has indicated, in no uncertain way, the care needed to produce a v.f.o. which will be satisfactory in a v.h.f. transmitter.

As the average operator and constructor—the writer included—likes to get things going, and also for the benefit of those who feel that building a v.f.o. controlled transmitter is a bit involved from the testing and checking angle, an alternative master oscillator unit will be described. This is an oscillator unit employing switched crystals. In fact the writer used this method while the v.f.o. was being designed and put through its paces, even though it was only considered as a stop-gap.

The switched crystal oscillator circuit is shown in Fig 11. Employing up to four crystals in the frequency range 11,684 kc/s-11,783 kc/s it is a perfectly straightforward Colpitts oscillator arrangement which needs no special description. The crystal frequencies are found by dividing the desired 70 Mc/s frequency by six.

The physical layout of this unit is substantially the same as that for the v.f.o., so permitting the units to be interchanged without difficulty. The crystal selector switch is mounted in the same position as Ct in the v.f.o. unit and it is driven in the same manner by an identical drum and cord arrangement. The indexing of some switches is rather "heavy," and to permit the drive system to operate the switch, the indexing spring on the switch must be eased—by bending it until the spindle turns easily and the indexing action only just locates.

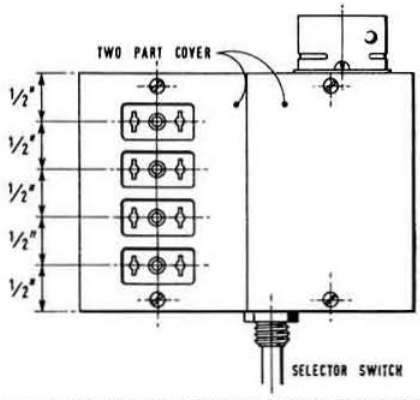


Fig. 12. Layout of oscillator unit when switched crystals are used, showing the two part cover and location of crystal holders. The selector switch is fitted in the same position as Cy in Fig. 4.

A two part cover is used. On one half, up to four crystal holders are mounted as shown in Fig. 12. The wiring procedure is to mount up all the components within the chassis/box unit except the leads from the switch to the crystal holders. The left hand cover plate is then fitted with the crystal holders, and the leads attached to them. This is then secured in place and the wires connected to the switch. Fitting the other half of the cover plate completes the unit. The scale card may be affixed to the drive drum with contact adhesive, the unit secured to the transmitter chassis, and then calibrated with the 70 Mc/s frequencies through the window in the panel.

One final job remains to be done. With the switched crystal master oscillator, C11 (see Figs. 2 and 6), which is specified as 11 pF, is replaced by a 50 pF capacitor.

Setting-up the Transmitter

Irrespective of which method of frequency control is employed, the transmitter may now be aligned after first fitting either one or the other of the master oscillators to the chassis.

Double check the wiring, and ensure that the screen connection of V3, *Z*, is connected to point *U*. (See Fig. 2 and Fig. 6.) Place temporary links across the relay contacts RL1 and RL2. Apply the heater voltage and check the valve heaters.

As the tuning range of the various stages is limited, the transmitter could be aligned without the use of a wavemeter. However, this is exceedingly bad practice. It is essential to verify beyond doubt that each stage is operating on its correct frequency, and the only satisfactory manner in which this can be done is with an absorption wavemeter.

The transmitter can now be aligned. Set the v.f.o. capacitor to the middle of its tuning range, or fit a crystal between 11,716 kc/s to 11,734 kc/s to the switched crystal oscillator, and apply h.t. (150 volts stabilized) to the oscillator, and 250-300 volts h.t. to the driver multiplier stages (tag strip connections 4 and 5).

With a wavemeter set to 22-23 Mc/s and coupled to L2, adjust C29 for maximum indication while rocking the wavemeter tuning to find the peak response.

Switch the transmitter's built-in meter to read p.a. grid current, and temporarily, with an insulated rod, move L3A close up to L3. Couple the wavemeter, set to 70 Mc/s, to L3 and adjust C30 for maximum indication. There may now be some slight reading on the p.a. grid current meter.

Transfer the wavemeter to L4, and adjust C31 for maximum indication on the p.a. grid current meter, verifying the frequency as 70 Mc/s on the wavemeter.

Re-adjust C31, C30 and C29, in that order, until no further improvement in p.a. grid current can be secured. The grid current should not be less than 4mA.

This completes the adjustment of the multiplier/driver stages.

P.A. Neutralization

The next operation is to neutralize the p.a.

Why do we have to neutralize a stage? If the input and output frequencies of an r.f. amplifier are identical, then the feedback which occurs through the valve's own anode to grid capacity can, under suitable conditions, cause the valve to oscillate. As the frequency increases, so the feedback through the valve's own internal capacity also increases, and

so the higher the frequency the greater the likelihood of neutralization being required.

The object of the exercise is purposely to arrange an external path which feeds back energy to the grid exactly in opposition to that getting back through the valve's own capacity. However, not only must the feedback be in opposition, it must be precisely the same amount. It is here that the difficulties usually arise.

If with grid drive running into the p.a. stage of this transmitter, the p.a. tank capacitor were swung through its range, a point would be found where the grid current meter would flick slightly. This is where the p.a. grid and anode circuits are on the same frequency, and if h.t. were now applied, the p.a. would self-oscillate. This " flick " in grid current can be quite small and easily missed unless the p.a. tank circuit is tuned very slowly.

The writer's method of neutralizing is as follows:

First the p.a. is deliberately made regenerative by arranging the neutralizing circuit to feed back far too heavily. This is accomplished by using too much capacity at C_N. When this is done, the p.a. grid current does not just flick when the p.a. tank circuit is tuned to the same frequency as the grid. It then becomes quite obvious at what point on the anode tuning, neutralization is required. The value of the neutralizing capacitor is now slowly backed off a little at a time, and with each adjustment, the anode circuit rocked back and forth. As the adjustments are made, the flick of the grid meter will become progressively less. Eventually a point will be reached where, despite tuning either side of the neutralizing point, the grid meter remains stationary. The setting of C_N is carefully noted. The adjustments are now further continued until the grid current *just starts* to flick again, this time because C_N is too small. C_N is then set exactly at the mid point of the two positions. Presto!—the stage is neutralized.

No apology is offered for the foregoing discourse on neutralization, further information on which can be found in any standard reference [5] [6], as it is essential that the p.a. of this transmitter is correctly neutralized.

The neutralization of the present design is as follows:

The lead C_N, Fig. 6, Part 1, is run straight through the grommet and almost up to the grid lead, pin 5. It is the effective capacity between this lead, and the grid lead, which forms the neutralizing " capacity." Power is applied to the driver stages, but not to the p.a. anode circuits. The link L3A is adjusted to give not more than 4mA drive to the p.a. The p.a. tuning capacitor is then carefully swung through its range while carefully watching the p.a. grid current. A point will be found where the grid current makes a decided jump. The position of the p.a. tank capacitor, C32, should be noted. It should be between one-half and one-third of full capacity. Remove the driver h.t.

If no such jump can be produced, it is a sure sign that the p.a. tank circuit, L5 C32, is not tuning through the correct range. In this event, an accurately calibrated grid dip oscillator will be necessary to check the p.a. tank circuit, and the coil, L5, adjusted accordingly. With the details of the p.a. tank circuit provided, it is most unlikely that this difficulty will arise unless the layout or screening is substantially different from that shown.

The neutralizing wire is then moved slightly away from the grid lead, in a downward direction towards the chassis. Apply the driver h.t., and gently rock the p.a. tuning about the noted point. This procedure is repeated until the point is found where the p.a. grid current no longer kicks. The position of the neutralizing wire is then carefully noted. This is called position " A ."

The procedure is continued until the point is found where the p.a. grid current just starts to kick once more. This is called position " B."

Set the neutralizing wire to exactly midway between positions " A " and " B." Subject to one other check, the stage is now neutralized.

P.A. Adjustments and Tests

The next stage in the testing of the transmitter is to check the operation of the clamper valve (V5).

A link is placed between terminals 9 and 10 (see Figs. 2 and 6, Part 1). With the heaters on, driver h.t. off, and the meter switched to read p.a. anode current, quickly switch on and off the p.a. h.t. supply. There should be no violent movement in the p.a. current meter. If this is in order, re-apply the p.a. h.t. and check that the clamper valve is holding the p.a. anode current to 20 mA or less.

Remove the p.a. h.t. supply. Swing out the link L5A to a position where it only just enters L5 (see Fig. 5). Connect a 60 watt lighting bulb to a short length of co-axial cable, and connect this to the p.a. output socket. Remove the links from the relay contacts RL1 and RL2. Apply h.t. to all the input terminations. Key the transmitter by applying 12 volts d.c. between terminal 7 and C, so operating the relay. Check that the grid current is of the order of 4mA. Switch off promptly.

Set the p.a. tuning capacitor to maximum capacity and set the meter to read p.a. anode current. Key the transmitter ON. Quickly but smoothly rotate the p.a. tuning capacitor to confirm that the p.a. anode current shows a good healthy " dip " down to about 10 to 15mA. Leave the capacitor set at minimum capacity. Switch off.

Return the meter to the grid current position. Switch on and again, while carefully watching the meter, once more slowly rotate the p.a. tuning capacitor from minimum to maximum capacity. Any changes in grid current should be smooth and not violent. Switch off.

If any violent changes in grid current have been noted, it would indicate that the neutralization is incorrect. If this is so, re-apply the power and repeat the foregoing but leave the p.a. tuning capacitor set to the point where the violent changes take place in grid current. If upon removing the drive, the grid current meter continues to indicate, this confirms self-oscillation.

To correct this condition either (a) repeat the neutralizing operations previously described or (b) with an *insulated rod* carefully adjust the position of the neutralizing wire until the grid current is zero. If method (b) is used, slightly rock C32 to keep it at the position of maximum grid current until the grid current is eliminated.

The p.a. neutralizing must be absolutely correct before proceeding any further with the adjustments of the transmitter.

Once the p.a. has been neutralized, a preliminary loading check can be made. Switch the meter to p.a. anode current, and turn the transmitter ON. Swing the p.a. tuning capacitor to the point where the anode current is at minimum. With an insulated rod—caution, lethal h.t. is waiting for you—move L5A into L5 until greatest anode current is secured. Re-adjust the p.a. tuning for minimum anode current. Repeat both adjustments until either no further increase in anode current can be secured, or the anode current is about 100 mA when the p.a. voltage is of the order of 480 volts. The lamp should be glowing quite brightly.

Finally, the link L3A should be adjusted to the position which will give 2·5 mA grid drive into the p.a. while the transmitter is loaded to about 48 watts input.

If a switched crystal master oscillator is used, the transmitter is now ready to be connected to an aerial system after which, L5A will have to be positioned for optimum loading (see " Output Matching ").

V.F.O. Temperature Stability

Final checks and adjustments of the v.f.o. can now be undertaken. While these are dealt with at this point, they

should not be carried out until the transmitter is cased up, and if a self-contained modulation system is to be incorporated, they should be further delayed until this is completed.

The purpose of the following tests is to evaluate the effect of temperature on the v.f.o. stability, and to compensate for such frequency drift as occurs if it appears excessive. The test set illustrated in Fig. 10 is again brought into operation, but this time coupling to it is from the socket Q on the transmitter (Fig. 6).

One of the 7800 kc/s crystals is inserted in the test set, and this unit allowed to stabilize for about half an hour. The heaters of the transmitter are then switched ON, the NET SWITCH depressed and the v.f.o. tuned to zero beat with the crystal. Return the NET SWITCH to normal and switch on the whole transmitter. Correct any frequency error between the transmitter frequency and that of the crystal by slightly adjusting the v.f.o. tuning. In practice any such error should be very slight, if indeed any is noted at all. The transmitter must be working into either the lamp or some other dummy load.

On how well the transmitter case is ventilated, and the corresponding increase in internal temperature, will depend the amount of frequency drift. Two examples will show this quite effectively. In one instance a solid topped cabinet was used with ventilation restricted to louvres on the rear only. The internal temperature rose to 190°F over a period of one hour, during which, initially at any rate, the v.f.o. drifted quite badly in terms of 70 Mc/s output. Replacing this by a cabinet having a fully perforated top and sides reduced the internal temperature to 85°F, and the rise time to about 20 minutes. In the latter case the drift of the v.f.o. was quite nominal. Both arrangements were corrected by temperature compensating capacitors so that in the case of the " hot box " the long-term drift (three hours) on 70 Mc/s did not exceed 1 kc/s while that of the cooler cabinet remained within 200 c/s.

Over a period of one hour, a pretty fair idea of what drift there is will be obtained. When assessing this it must borne in mind that it is the second harmonic of the v.f.o. which is being checked, and that any drift which is noted will be three times as great on 70 Mc/s.

Drift is corrected by connecting n.p.o. capacitors across either C1—in cases where it starts off reasonably limited—or across both C1 and C3 when it is particularly bad. Heavy compensation should only be resorted to as a last ditch stand. Good ventilation is really the crux of the whole matter, and after this is made as good as possible, only then should compensation be employed.

It has probably become apparent that as we are now dealing with virtually individual treatment, no hard and fast values can be quoted. Returning to the two examples quoted, in the case of the " hot box," a 75 pF n.p.o. 750 capacitor across C1 produced the desired result. In the case of the cooler running cabinet, a 10 pF n.p.o. 750 capacitor across C1 was sufficent. In general, any capacity added to C1 and C3 individually should not exceed 50 pF. Whatever capacity is added, the inductance of L1 will have to be adjusted by *unscrewing* the core to bring the oscillator back on to frequency. It was to allow for such compensation that the oscillator tuning range was designed with overswing.

After fitting a correct capacitor, the unit must be allowed to return to room temperature before the test cycle is repeated.

While the procedure may seem rather complicated, in actual practice, and providing the test unit is employed, it is not so. Time consuming it may be, but complicated it is not.

So long as the free air stability has been checked and dealt with, and provided high stability capacitors are used in the oscillator, then v.f.o. control is a perfectly practicable proposition, and there should not be any difficulty in reducing the drift due to temperature changes over a one hour period down to the merest suggestion of a " gurgle." The better the ventilation of the cabinet, and the closer to this mechanical design your particular version is, the easier it will be.

V.F.O. Calibration

The capacitor specified for Ct in the oscillator has a straight line frequency characteristic, and this makes calibration of the oscillator relatively simple. A logging scale divided into 100 equal parts, or some other convenient number, is drawn on the card scale below the main frequency scale. The division of this logging scale must be as accurate as possible. A graph is now drawn with the log scale as the vertical axis, and the frequency range 7·00 Mc/s to 70·8 Mc/s along the horizontal axis.

The test unit is once more brought into service. Initially the 7800 kc/s crystal is fitted to the test unit and socket " Q " on the transmitter linked to its input. Swing the v.f.o. to zero beat and note the log scale reading. This corresponds to a frequency of 70·200 Mc/s. Plot this point on the graph.

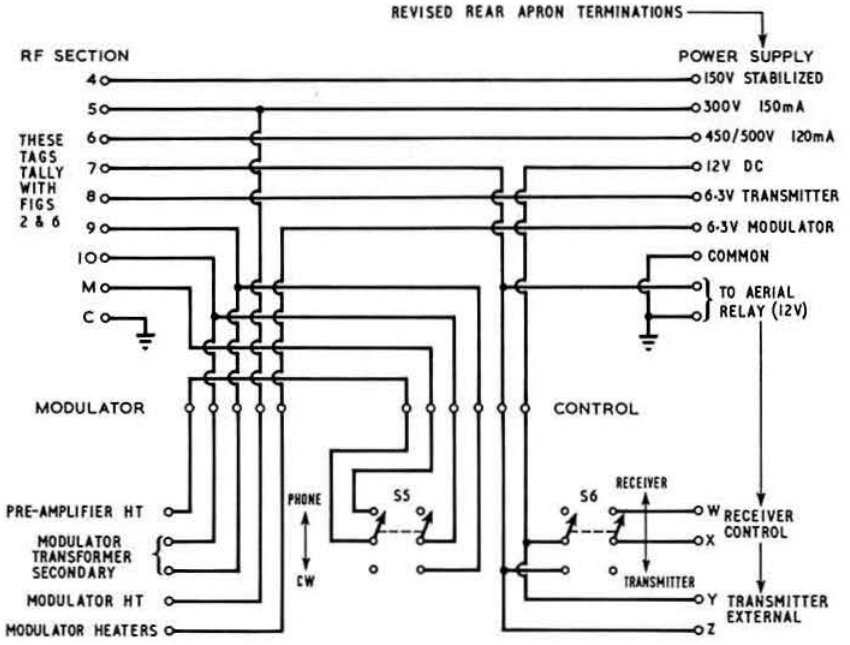


Fig. 13. Circuit for integrating the " Economical Modulator " and this transmitter. The peak demand currents of the various supplies are indicated beside the terminal voltages, which should be within 10 per cent of the values stated when the transmitter is operating.

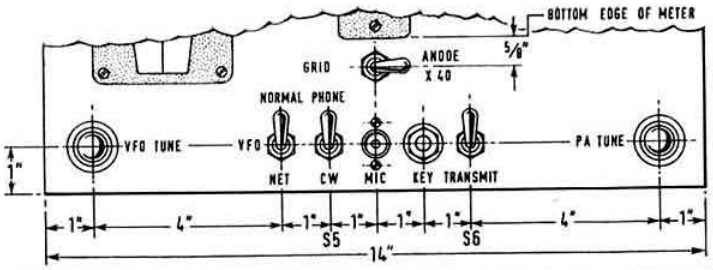


Fig. 14. Revised layout of lower edge of front panel for integrated unit. See Fig. 9 and text for other details.

Repeat with the 7825 kc/s crystal which is 70·425 Mc/s and the 7855 kc/s crystal which is 70·695 Mc/s. The three points should fall in a straight line, or nearly so. Draw up the graph. From this the frequency scale on the v.f.o. may be calibrated to an accuracy sufficient for most purposes. If desired, verification and correction can be secured by feeding the output of a BC221 frequency meter into the test unit in place of the crystals.

Output Matching

The link coil on the p.a. of this transmitter has been proportioned to allow a fairly accurate match into a 75-80 ohm feed line.

In matching any v.h.f. aerial to the feed line and to the transmitter, the use of an s.w.r. meter is most strongly recommended [7]. In this case, and when used with a correctly terminated line, the position of the link winding L5A should be quite close to that illustrated in Fig. 5. The position of the link when the transmitter was used with an ordinary lighting bulb is no indication of its correct setting.

Modulation

While no modulator has been specified for this transmitter, provision is made to modulate the p.a. by connecting the secondary of a modulation transformer between terminations 9 and 10. If the transmitter is to be used for c.w. only, these terminals should be connected together.

The modulator used should have a peak output capability of between 22-25 watts, and the secondary of the modulation transformer should have an impedance of approximately 4,800 ohms. A particularly suitable audio system is that described by the writer under the title "An Economical Modulator" [8]. The chassis of this unit can be integrated with this r.f. assembly to make a neat and potent package.

To accommodate this modulator, the transmitter chassis depth will require increasing by 4 in. The width is adequate. The 9 in. width of the modulator area is measured starting 1 in. in from the right hand side, which will place the modulation transformer behind the p.a. screening box, and keep the modulator valves well clear of the v.f.o. assembly.

A circuit for integrating the Economical Modulator and this r.f. assembly is shown in Fig. 13, while Fig. 14 illustrates the revised front panel layout.

Certain points relating to Fig. 13 require clarification. It will be noted that a separate supply is shown for the modulator pre-amplifier stage (V1a in Ref. 8) whereas the modulator circuit shows this valve connected to the main h.t. line. The purpose of the revised connections is to mute the modulator during RECEIVE. In the circuit of Fig. 13, the pre-amplifier supply is taken from the relay switched h.t. which supplies the driver stages of the transmitter. The pre-amplifier h.t. feed, after the decoupling circuit, should be rewired as shown, and not taken to the h.t. line shown in the modulator diagram.

The control circuits shown in Fig. 13 permit this transmitter to control the receiving system, or for the receiving system to control the transmitter. (Terminations W and X for the transmitter as the controller, or terminations Y and Z when the receiver functions as the controller.) Provision is also made for c.w. as well as 'phone operation.

No aerial relay is shown, as this is expected to be an external unit. A connecting point for this relay is provided.

Power Supplies

The transmitter, even when the modulator is included, is easy on power supplies, its requirements being quite happily met by easily obtainable transformers. A single 450-0-450 volts 150 mA transformer supplies the power for the p.a. and also feeds the VR150/30 which provides the stabilized voltage for the master oscillator.

Another transformer, rated at 300-0-300 volts at 150 mA meets the requirements of both the p.a. driver stages, and the Economical Modulator. If a separate modulator is employed, this transformer may be replaced by a 300-0-300 volts 80 mA unit.

The heater supplies are divided between the two transformers, those of the r.f. section being run from the 450 volts transformer, and those for the modulator—if included—from the 300 volts transformer. Silicon rectifiers are used throughout.

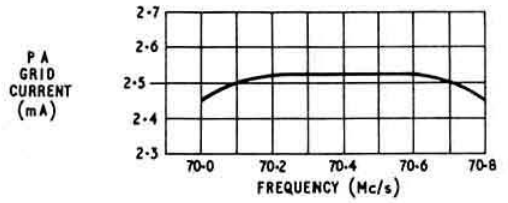
Conclusion

With all the information provided, there should be no particular difficulty in duplicating the writer's results. Although demanding in time and care, the resulting ability to be able to move about at will, even if in pre-controlled steps, more than justifies serious consideration of this project by any 70 Mc/s operator.

References

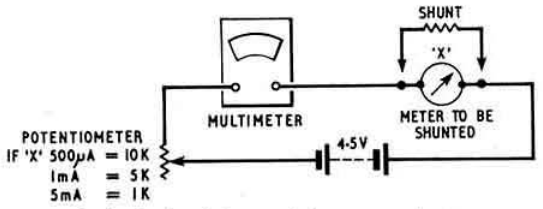
[5] *Amateur Radio Handbook*, RSGB.
[6] *Radio Amateurs' Handbook*, ARRL.
[7] "Standing Wave Ratio Meters," RSGB BULLETIN, May 1964, p. 297.
[8] "An Economical Modulator," RSGB BULLETIN, July 1964, p. 436.

APPENDIX A



Variations in grid current plotted against frequency.

APPENDIX B



A simple circuit for producing meter shunts.

TECHNICAL TOPICS By PAT HAWKER, G3VA

Sunspots ahead! · *Minority Homebrew* · *Backfire Aerials*
VXO Rig · *MOSTs and IGFETs* · *Transistor Power Amplifiers*
Balanced Mixer · *Transistor C.O.*
Modified Birdcage · *Third Method S·S·B·* · *Linears on A·M·*
More on Class D · *Vertical Two-band Trap Aerial* · *Nickel-Cadmium Cells*

FOR many years, Amateur Radio activity has followed, to a marked degree, a cyclic pattern governed by the state of the sunspots. At times of sunspot maxima, when DX bands remain open for long periods and one can work the world on 21 and 28 Mc/s almost with the proverbial " wet string " aerials, there is a much greater incentive to switch on or keep on the h.f. rig.

Now we face the first DX season of sunspot Cycle 20—and if this follows past patterns we can anticipate a fairly steep climb from the minimum of November 1964 up towards the peak. Whether this peak (now expected in 1968) will prove to be a high, medium or low peak is still a matter of speculation —though with great practical consequences. But clearly now is the time to begin to think seriously about 21 and 28 Mc/s equipment and aerials, even though this winter should still see good openings down at the other end of the h.f. spectrum.

As we look forward to spreading ourselves out a little more and with corresponding less congestion on 14 Mc/s, which has had to carry the brunt of DX traffic for several years, it is surely time to look a little more critically at " rubber stamp " contacts. On 14 Mc/s c.w., for example, most of us are guilty of sliding more and more into " contest style operating " with routine exchanges of RST, QTH and name far outweighing any other form of chat. Some very forcible views on this type of operating were expressed in a *QST* (July, 1965) guest editorial by WB2JQC.

This subject may not come strictly into the orbit of *TT*, but the use we make of our communications facilities is fundamental to Amateur Radio. As WB2JQC points out, it seems a little absurd to learn so little about those at the other end of the radio path. " People," he writes, " frequently ask me what I talk about on my radio set. It is highly embarrassing to give an answer. How can I say ' nothing'? How can I say ' they tell me how my signal is and then they sign off '."

This then is a point well worth thinking about as the sunspots reappear.

Homebrew ?

Some may argue that it does not matter much about the contacts since after all this is not the main occupation of the enthusiast. He has only come on the air to check a newly built transmitter, or receiver, or has just put up a new aerial. A few quick reports and he will be back at the soldering iron.

This it would seem is another fallacy. Despite the considerable amount of rig building or modification which still goes on on this side of the Atlantic, all the signs from across the water are that the factory-built rig is coming to dominate the scene more and more.

Some illuminating statistics can be gleaned from W3BA (*QST*, June, 1965) who reports the findings of an official FCC survey of 200 active American stations. Of these 78 per cent were using commercially-built transmitters and the " vast bulk " using factory receivers. Even the majority (55 per cent) of aerials had come from the store.

Operation was divided A1 34 per cent, A3 35 per cent and A3A or J 29 per cent, F1,2 2 per cent. This well illustrates the rapid advance of s.s.b. which only a few years ago was confined to less than 10 per cent of phone operation. C.w. has held up well—in about seven years it has fallen only about 4 per cent.

Backfire Aerials

A few years ago there was a flurry among some v.h.f. enthusiasts at a new concept in " backfire " aerials first put forward in 1960 by H. W. Ehrenspeck of the USAF Cambridge Research Laboratories. The basic idea was to direct, for example, a multielement Yagi in the opposite direction to that required into a plane reflector sheet or screen mounted on the end of the boom. The theory was that the wave would be reflected back through the array so that the directors would have a double effect. Originally it was claimed that up to 5-6db additional gain (above isotropic) could be attained compared with a conventional endfire array of equivalent length.

W1HDQ of ARRL HQ carried out some experiments using the technique and rather poured cold water on it by reporting (*QST*, February, 1961) that he had been unable to " get anything that looked even close to 6db " of extra gain, and surmised that there were more complications than was then apparent from the published information.

Later (*QST*, October, 1961) W1YLW and W1PYT, both at the USAF Cambridge Research Laboratory, came back with a description of a 220 Mc/s array giving an extra 4·5db gain with a simple reflector screen (now said to be suitable only for monopulse transmission).

There the matter seemed to rest. But now (*Proc. IEEE*, June, 1965) Ehrenspeck publishes a good deal of additional information on backfire systems using a rather more complicated reflector arrangement made up of several different reflectors of critical dimensions and with a smaller reflector at the " front " of the array—but still by no means an impossible structure for an amateur to build at v.h.f. He claims that experience has shown that far better pattern control than originally claimed has proved possible and quotes an additional gain of 8db, sidelobes 22db down and backlobe close to 30db down—desirable figures indeed!

He suggests that this technique should prove particularly attractive for v.h.f., u.h.f., and s.h.f. aerials with gains between 15—30db which would otherwise need impractically

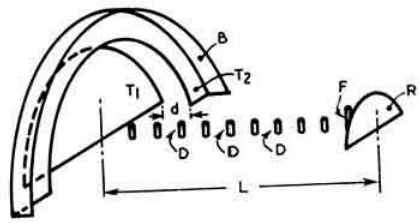


Fig. 1. Model of a backfire aerial shown on a ground plane. In practice the semicircular reflectors, etc. would be circular. T1 2λ radius. T2 ring of 1λ width with an outside radius of 3λ. B, rim of about 0·25λ surrounding edges of T2. R reflector 0·51λ radius, spaced 0·2λ from driven element F. Spacing F to first director 0·2λ, all other directors 0·4λ spacing. Total length L 4λ. Distance D between T1 and T2 adjusted experimentally to 0·25λ.

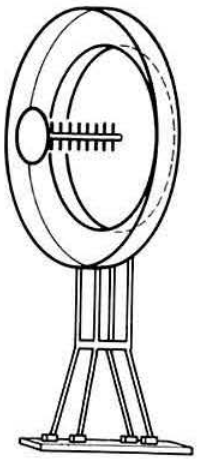


Fig. 2. Large backfire array with gain of 23·5db above an isotropic source.

long conventional arrays; particularly for applications where a paraboloid dish reflector is too costly. The technique is not confined to Yagi arrays but can be used with other slow wave structures.

Fairly detailed dimensions of a typical backfire system are given in his letter in *Proc. IEEE.*—see Figs. 1 and 2. Provided that reasonable performance is readily reproducible, backfire arrays could prove of considerable interest to amateurs. On the other hand the disappointing experiences of W1HDQ suggests that such work must be regarded as an advanced project. But may we suggest that some of our v.h.f. enthusiasts have a careful look into the whole idea, and see if they can come up with a surefire backfire design for amateur use?

The VXO Again

The variable crystal oscillator (v.x.o., see *TT*, February, 1961) has been around for some years but never really seems to have caught on—despite its obvious advantages for some applications. For portable or /A operation there is something re-assuring about a small rig basically crystal-controlled but with a limited ability to shift frequency a few kilocycles. Even a good v.f.o. usually requires a stage to isolate the oscillator as well as a buffer, and results in a multi-stage transmitter.

This seems to be the view of DJ5QK. In *DL-QTC* (July, 1965) he describes a small two-valve rig running up to about 25 watts c.w. on 3·5 and 7 Mc/s with an EL95 v.x.o. followed by a 6146 p.a. The v.x.o. differs in a few minor respects from the usual circuit and is given in Fig. 3. Shifts of a couple of kc/s on 3·5 Mc/s and up to about 5 kc/s on 7 Mc/s are said to be possible without detracting appreciably from the crystal stability.

Turning the pages of some old BULLETINS recently, we were interested to note that in April 1938 the Quartz Crystal Co., introduced a range of variable air-gap crystal holders stated to be capable of giving a knob-controlled shift of " over 10 kc/s " with a 3·5 Mc/s crystal. Multiplied up, this would provide a useful facility for s.s.b. or c.w. operation, and it would seem well worth while to have a look at this technique again. Or were there snags?

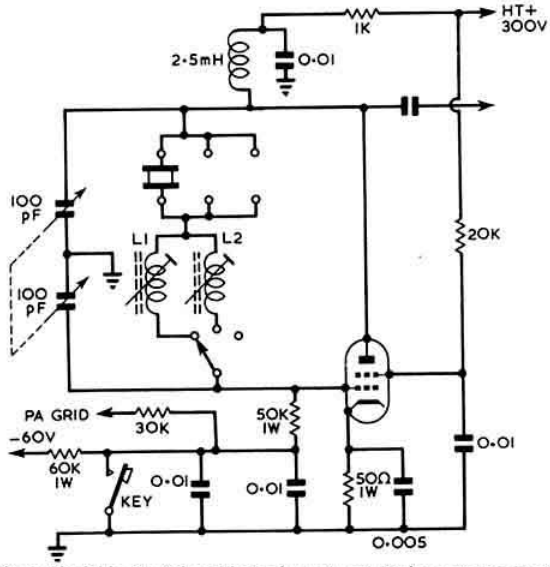


Fig. 3. Variable crystal oscillator (v.x o.) and keying arrangements for compact portable rig. L1, 25μH (80m), 43 turns, diam. 30 mm, winding length 30 mm; L2, 10μH (40m), 19 turns, diam, 30 mm, winding length 30 mm; valve, EL95.

MOSTs and IGFETs

We have referred before to the increasing interest in various types of unijunction or field effect transistors, and this family of devices now includes such names as " metal oxide semiconductor transistors " (MOSTs) or the similar " insulated gate field effect transistors " (IGFETs) or even such mouthfuls as " insulated gate metal oxide semiconductor field effect transistors " (IGMOSFETs). Also in the same family are the higher power " tecnetron " devices developed in France. There is similar variation in the way different firms draw the circuit symbols.

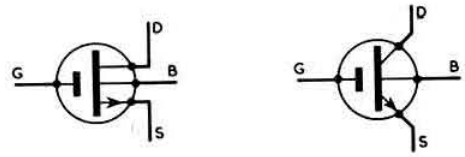


Fig. 4. Typical circuit symbols for n-channel MOS FET devices. Sometimes the arrow head is placed on the bulk-gate (substrate) electrode or omitted altogether.

Most of the types so far marketed, except perhaps the basic junction-type FET, are still at prices which rule out their routine use for amateur applications, but it seems reasonable to hope that, as with other semiconductors in the past, this is only temporary; and that in any case a number of such devices are bound to trickle through as " seconds " or low-cost units or one form or another.

One particular attraction is their low-noise characteristics, but they also appeal to valve-oriented designers because of their very high-impedance, voltage-controlled input circuits akin to valves, in conjunction with the high-gain and low-voltage characteristics of transistors. They are also remarkably immune to temperature variations.

A varied selection of typical circuits using MOS FETs has been published recently (particularly in a series of articles in *Electronics*, December 14, 1964) and in a description of the Mullard development type 95BFY (Mullard TP602). These include their use as microphone pre-amplifiers for low-noise a.f. amplifiers, cascode r.f. amplifiers, mixers, crystal oscillators, product detectors, etc.

Fig. 4 shows a typical circuit symbol of a four-terminal insulated gate unit, although in the UK the arrowhead indicating whether the device is *n*-channel (arrow pointing outwards) or *p*-channel, is often omitted altogether. The

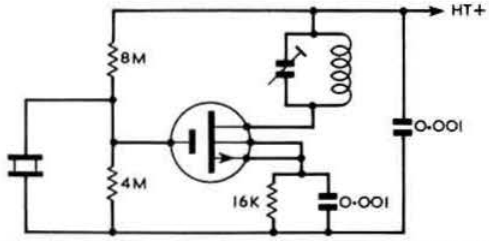


Fig. 5. This basic MOS FET crystal oscillator shows how similar FET circuits can be to standard valve circuits. Values are only representative.

electrodes are called: *g* gate (corresponding very roughly to a valve grid); *d* drain (anode); *s* source (cathode); *b* or *sub* bulk-gate (American terminology) or substrate (British terminology) which has some semblance to a suppressor grid although the analogy is far from exact. An interesting feature of the FET is that only one type of current carrier is involved in the operation in distinct contrast to the junction transistor which depends upon the flow of minority carriers through the base region and majority carriers in the emitter and collector regions.

Unfortunately, although these devices have many of the operating characteristics of valves, they still retain one bad feature of semiconductor devices: they can easily be irreversibly damaged by exceeding voltage ratings even on transients. If the oxide layer between the gate and the other electrodes is punctured it does not reform. It is also necessary to prevent excessive heat from flowing into the device.

Because of the high input impedance, special precautions may be necessary when handling the devices near a transmitter to prevent excessive r.f. voltages from building up on the gate lead. One technique is always to keep the leads connected together when not in circuit by pushing them into a piece of spagetti insulation, or to hold the device leads between two fingers of one hand to provide a leakage path. Because of their susceptibility to leakage voltages, soldering irons should be carefully isolated. It is probably safer to use them with battery supplies.

Some of these points were made clearly during a most informative talk on solid-state s.s.b. transmitters by George Luettgenau, director of advanced circuits of TRW Semiconductors at a symposium in London organised by MCP Electronics. Mr. Luettgenau was one of the contributors to the *Electronics* articles already referred to.

Several s.s.b. transmitter circuits using IGFETs for some stages were described including, for example, a stable crystal oscillator with a configuration almost exactly the same as for valve circuits (Fig. 5). The low input capacitance of the device is an aid to stability.

Another circuit discussed was a balanced modulator using

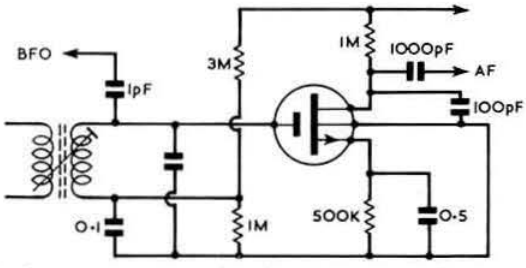


Fig. 6. The square-law relationship between transconductance and drain current makes the MOS FET highly suitable for use as an s.s.b. product detector, since the b.f.o. voltage need not be many times larger than the signal voltage.

two of these devices capable of providing some 50-60db of carrier rejection, and with temperature stability said to be several orders of magnitude better than with conventional semiconductor circuits. Mr Luettgenau admitted that the coming of beam deflection tubes (7360) had in recent years resulted in something of a swing back to valves for this application but suggested the FET circuit would prove very satisfactory. At present prices, it is unlikely that many amateurs will follow his advice just yet, but it is worth keeping in mind.

Transistor Power Amplifiers

The TRW lecturer made no bones about the problems of designing linear p.a. stages with inherently non-linear transistors. In particular he dealt with the difficulties of biasing, and the ease with which expensive r.f. power transistors can be destroyed. Various methods of protecting the r.f. transistor by bias regulator circuits were presented. He suggested that while many designers initially rejected such circuits as unnecessarily complex " after blowing out several hundred dollars of r.f. power transistors they begin to feel there is something to be said for bias regulation."

Few amateurs could face with equanimity the idea of losing one QRO r.f. transistor let alone a string of them, and this confirms once again that transistor transmitters have to be approached with some caution. The steadily rising power capabilities of transistors however are illustrated by a new TRW unit being marketed shortly capable of no less than 40 watts output on 175 Mc/s from 25 volt supplies. But power gain of such devices still remains at the relatively modest figure of around 6 db.

Balanced Mixer

In *CQ's* regular feature " Ham Clinic," W6QLV provides many useful hints to amateurs having specific problems. For

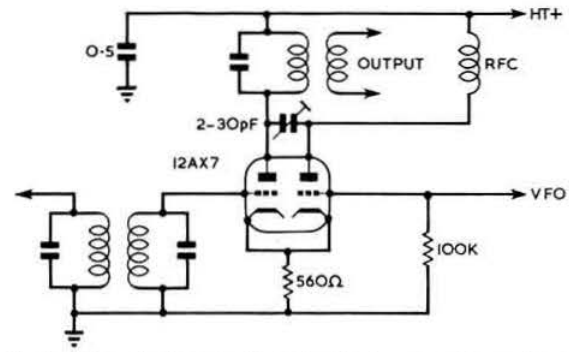


Fig. 7. Balanced mixer to eliminate v.f.o. frequency from output.

example, in the July issue, a correspondent asks, " What kind of mixer can I use so that the v.f.o. signal will be attenuated or not be present at all in its output?"—the type of need that can arise increasingly often these days.

In reply W6QLV provides the circuit of a useful form of balanced mixer (Fig. 7) which may be new to some. The trimmer across the two anodes enables one to null out any remaining v.f.o. signal in the output.

More on Class D

The letter from G3NUQ on r.f. applications of class D (BULLETIN, July 1965 and see also *TT*, March 1965) was of particular interest in view of a recent report in *Proc. IEEE* by members of the Canadian Defence Research Establishment on class D systems for the power amplification of h.f. signals of constant amplitude (see *Electronics Weekly*, June

23, 1965). They suggest that for any given transistor there is a cross-over frequency above which class C operation more readily provides higher efficiency. But at frequencies below this figure (which may be as high as 50 Mc/s for some transistors) very impressive efficiences can be obtained with class D.

Typical figures of 98 and 92·5 per cent have been achieved at 1 Mc/s. The Canadians suggest that these circuits have possibilities for efficient frequency multiplication as well as for power amplification. They also point out that there exists the possibility of using complementary transistor pairs (matched *npn*/*pnp*) to eliminate the need for any r.f. input transformer, although this is not at present practicable owing to the absence of suitable *pnp* types.

G3NUQ rightly pointed out that the name " class D " was originally coined in 1959 in connection with high efficiency oscillators and was not intended for the pulse width modulation a.f. amplifiers which have been attracting so much attention recently. Nevertheless this term is now being used widely to cover both forms of amplifier, and this practice will probably spread.

Transistor Oscillator

A compact " foolproof " transistor oscillator suitable for use with FT243 and similar crystals without any tuned circuits is a useful device to have around the shack to provide a signal source, to drive a transmitter or for testing crystals. In *DL-QTC* (July, 1965) DJ2NN provides two circuits both featuring an AF127 oscillator with AF127 emitter-follower output. Fig. 8 shows the simpler of his two arrangements, the other including an additional OC71 and OA95 to provide bias regulation for the oscillator.

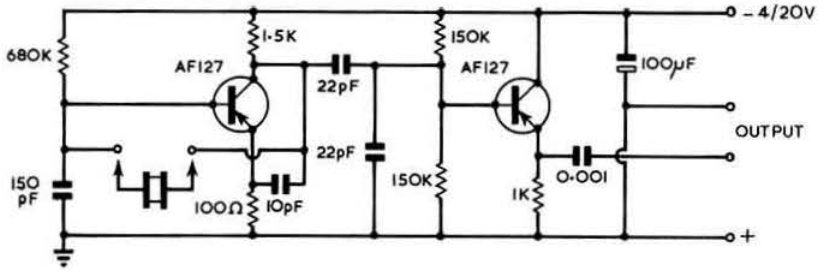


Fig. 8. Transistor oscillator and emitter-follower by DJ2NN.

Modified Birdcage Aerial

In *CQ* (June, 1965), W2EEY/DJ0BU describes a variation of the G4ZU Birdcage which appears to offer some constructional advantages. It is claimed to provide results comparable to those of a 14 Mc/s two-element close-spaced Yagi, but with the turning radius kept down to 12 ft.

Fig. 9 gives the basic information. The aerial can be fed directly from 52 ohm co-ax at points X,X, or via a balun such as that described in the original article.

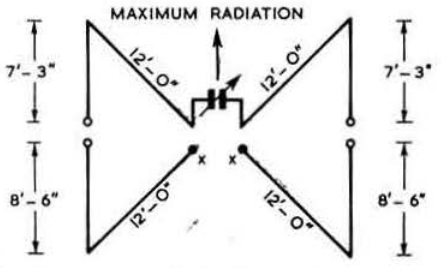


Fig. 9. Looking down on the W2EEY variation of the Birdcage aerial. The capacitor can be a 250 pF receiver type. Feedpoints X, X.

Third Method, Active Filters and Linears

Without straying too far into G2DAF's preserves, it may may be of interest to report that ZL2AMJ, who has been responsible for many good ideas in the journals, contributes in *CQ* (June, 1965) a detailed analysis of the pros and cons of the " third method " of s.s.b. generation and comes up with the following conclusions:

" My own assessment of the third-method system is that it is interesting but not worthwhile unless use can be made of its bilateral characteristics. This would imply use in a transceiver. The bulk and weight of extra balanced modulators, audio filters and 1800 c/s oscillator would however make the resultant transceiver larger than one employing the normal filter system with a mechanical filter."

During a recent visit to AEI's research department at Blackheath we met Dr W. Saraga who, as we reported some time ago, has developed a very attractive method of s.s.b. generation without filters and using the Hall-effect. We gather however that this is still in the research stage.

Another development of considerable potential value on which this research team has been working is the " active filter"—these are compact selective filters using no inductive components. Such filters have become feasible since it was shown that the positive reactance of inductors can be simulated by inversion of the negative reactance of capacitors. Active filters have been developed using conventional components and also in thin-film form for microelectronics.

Using Linears on A.M.

In view of the number of designs for linear amplifiers it is surprising that there has not been more general interest in their use for amateur a.m. transmitters with low-level modulation, except perhaps in some transceivers. One of those who have made effective use of this technique is OK1JX who writes to say that he uses series-gate modulation of his buffer stage followed by a linear using parallel 4-125As to provide some 600 watts p.e.p. He is one of the OK amateurs with " extra-class " licences allowing the use of powers up to 1 kW.

He says that OK1BMW has further adopted this technique to employ the series-gate a.m. modulator also as a screen-grid stabiliser on s.s.b., and a keying valve for c.w. OK1JX, who contributes a column roughly similar to *TT* in the Czech journal, is very much in favour of the adoption of modern techniques by amateurs.

Vertical Two-Band Trap Aerial

A number of the overseas journals adopt a regular practice of making one particular town or district responsible for providing all technical features for an issue—rather as though we had Birmingham, Blackpool and then Bristol issues of the BULLETIN. It is surprising how often this trick produces good ideas.

We were reminded of this by the June, 1965 issue of *Radio-*

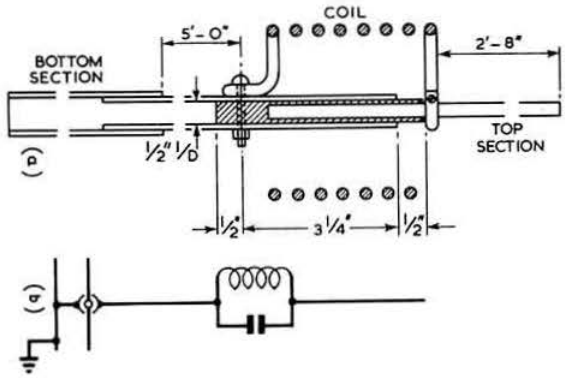


Fig. 10. ZS6AOU 21-14 Mc/s trap vertical. Bottom section ¾ in. diameter aluminium tubing ¼ in. inside diameter inserted into 6 ft. section of ¾ in. diameter aluminium tubing. Top section is ¼ in. diameter aluminium rod. The trap coil is formed from 7½ turns of ¼ in. diameter aluminium wire, 3 in. inside diameter. The coil is 3½ in. long.

ZS featuring articles by the Pretoria group, including a useful description by ZS6AOU of the construction and adjustment of a two band (14 and 21 Mc/s) vertical trap aerial. The bottom section is 11 ft. long, with a trap inductor parallel tuned to 21 Mc/s by the capacitance (about 20 pF) between the top and bottom tube sections with the polystyrene insulator as the dielectric.

The adjustment procedure recommended by ZS6AOU requires an s.w.r. bridge and a g.d.o. He believes that the trick in correctly tuning up is to grid-dip the trap without the top section of the aerial in position. To do this a short length of similar ¼-inch rod, just long enough to protrude out of the polystyrene insulator is inserted in its place. Using the g.d.o. the trap coil is then resonated by stretching or compression to 21 Mc/s (later with the true top in position it appeared to resonate on 15 Mc/s due to the extra capacitance between the rods).

ZS6AOU's adjustment procedure is then: erect bottom section, without trap, and check that s.w.r. is low on 21 Mc/s, using a good earth, and adjusting if necessary at the joint. Then add trap and top section and recheck 21 Mc/s s.w.r., possibly adjusting trap for low s.w.r.

Once the s.w.r. is low on 21 Mc/s with the complete aerial erected, tune to 14 Mc/s, and trim for low s.w.r. by pruning top section. If the previous adjustments were correct the pruning adjustments should not interact with the 21 Mc/s settings.

ZS6AOU states that the vertical could be used with radials rather than true ground (or corrugated iron roofing) by using radials of different length to form a two-band ground plane.

Modern Secondary Cells

From time to time *TT* has reported on advances in primary batteries, including mercury, heavy duty and alkaline-manganese cells. Rather less has been said about the equally interesting developments in small rechargeable cells, especially nickel-cadmium and the small unspillable lead-acid cells. One reason is that good quality nickel-cadium units are expensive; but despite this they are beginning to be used for such applications as small transistor radios, hand-portable communications equipment, the American "Electric Match" cigarette lighters, electric razors and flashlamps. Even lawn mowers, portable electric typewriters and hedge trimmers are being produced with rechargeable power units. Some American publications are forecasting the "cordless" era for home appliances.

The cheaper miniature lead-acid cells are normally capable of only a limited number of charging cycles (sometimes only about a dozen cycles). On the other hand the nickel-cadmium units will withstand a large number of charging cycles, provided that constant-current or current-limited chargers are used. Serious overcharging of sealed cells must be avoided or fumes will cause internal pressures to build up. With the larger vented types, ventilation is advisable while charging since the fumes are explosive.

Detailed information on nickel-cadmium units is given in *QST* (July, 1965) by W1NBQ. In the UK professional quality nickel-cadmium units are marketed by G. Stanley Palmer Ltd (DEAC cells) and by Gulton Industries (Britain) Ltd (American Gulton cells). A sign that low cost units may be widely available soon is that one of the mail-order firms are advertising cheap Russian transistor radios powered by a rechargeable unit.

Nominal voltage of a nickel-cadmium cell is 1·2 volts. Within the foreseeable future it may prove possible to use lithium rather than the more expensive nickel.

Amateur Radio Retailers

RSGB Headquarters is compiling a list of radio dealers who sell equipment and components for the radio amateur and home constructor.

Members are invited to send details to Headquarters for inclusion on the list. Proprietors of such firms are also asked to submit details.

RSGB International Radio Communications Exhibition

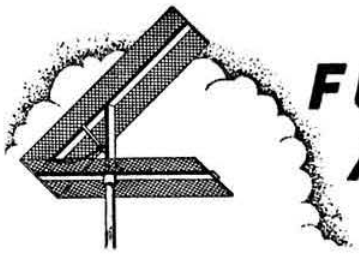
October 27-30, 1965

This year the home constructed equipment will form a special feature on the stage of the Seymour Hall. To improve the attraction of the display, the equipment will be divided in to 14 classes and each class will have a special award of its own. There will be no limit on the number of entries and all members are asked to submit entries in as many classes as possible. If desired the choice of class may be left to the exhibition committee.

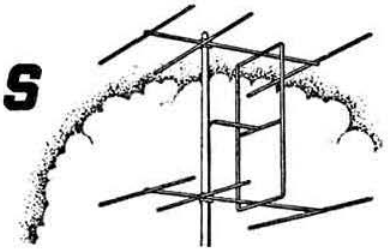
The classes are:

1. H.F. Transmitters
2. Receivers
3. Receiver Attachments and Converters
4. S.S.B. Transmitters
5. V.H.F. Equipment
6. U.H.F. Equipment
7. Mobile Equipment
8. Transistor Equipment
9. Miniature Equipment
10. Test Gear and Tuning Units
11. Low-cost Equipment
12. Cabinet Work
13. Power Supplies
14. Audio Equipment

Brief details of equipment to be exhibited (but not the equipment) should be sent to A. J. Worrall, G3IWA, 62 Gallants Farm Road, East Barnet, Herts., tel.: ENTerprise 3352, who will acknowledge and send forwarding instructions.



FOUR METRES AND DOWN



By F. G. LAMBETH, G2AIW*

A MAJOR part of the news this month comprises the amplified reports of the moonbounce operations on July 3 and 24. British amateurs showed up very well during these tests, G3LTF, G3CCH and G3EGV having had QSOs whilst various groups participated very successfully on the listening side. All this successful enthusiasm is a very happy augury for the future of this mode, and DX by moonbounce is a very real potentiality from now on.

This latest series of tests has been very much more successful overall than the earlier ones, and one supposes that continued experience in the mode can lead to QSOs where previously hearings were the most that many stations could hope for. The fact that other stations have now been heard from transatlantic QTHs (notably WA6LET and a W1 by G3LTF) also proves the point that 432 Mc/s QSOs by normal moonbounce (i.e. with "amateur" sized dishes at each end) are potentially obtainable. It is a real pleasure for v.h.f. enthusiasts that this new path may now be declared well and truly open, and we are now looking forward to the enhanced results which are sure to come with more experimentation. **G3LTF** (Galleywood) worked KP4BPZ (57, s.s.b.) twice during the July 24 tests. His reports were 549 and 569 (c.w.). During this period G3LTF also heard WA6LET (Stanford, Calif.) and an unidentified W1 station believed to be W1BU. Other QSOs by **KP4BPZ** were with HB9RG, DJ0LO, PE1PL, DL6RP, DJ4AU, G3EGV, an OZ8, and SM7OSC which may be a new world record.

GM3FYB and others in Dunfermline heard KP4BPZ and their tape was broadcast by the BBC.

G3AHB (Slough) heard both the s.s.b. and c.w. signals from KP4BPZ. The s.s.b. was, however, unreadable at G3AHB; the c.w. was readable for most of the time between 12.20/13.15 GMT. All the signals heard were tape recorded. The receiving equipment used was GMO290 transistor pre-amp into EC88s in g.g.—the main converter i.f. of 15·25 Mc/s on HQ100 receiver. The aerial is a 14 element Yagi at ground level and the moon was visible for most of the time.

G3CCH (Scunthorpe), after many trials and experiments, finally made it with KP4BPZ on July 24. The s.s.b. signals from Puerto Rico were 57 and Johnny received a report of 439. Copy was very good, both s.s.b. and c.w. and KP4BPZ was last heard at about 13.50 approx. No other stations were heard. The input was 300 watts to a single 4X150 and a transistor pre-amp was used in front of converter and receiver. The aerial was a 12 ft. dish; the moon was not visible at all during the operation, so that tracking was done solely by calibration. G3CCH thanks his willing helpers, and also G3LTF and G3MNQ for many technical ideas.

Another report comes from **G3EDD** (Cambridge) who heard KP4BPZ better on July 24 than on July 3, this possibly being due to the lower elevation of the moon, which was more in the main aerial lobe. The aerial system was two bayed 9 element Yagis (14db gain) and the receiver a 7077 converter with a noise factor of about 5·5db. KP4BPZ was heard on s.s.b. and c.w. The s.s.b. was difficult, the c.w. (peaking 559) almost solid. The Puerto Rico station was logged whilst working G3CCH, SM7OSC, DL1EI, G3EGV, PE1PL, SM6CSO and W6BKZ. There were many others but these were not logged. The strange thing was that KP4BPZ was not heard to call CQ; he appeared to be working continuously with stations sometimes stacked three at a time.

From OZ9AC we learn that OZ1PL led the Danish Group, working from the Radio Observatory in Rude Skov (North of Copenhagen) with a 20 ft. parabolic aerial designed by OZ1PL with a gain of 27db over a dipole at 432 Mc/s. OZ1PL provided the p.a. stage (4X250 A, 225 watts), OZ9BS the converter (T2028 input, noise factor 4db) whilst OZ9AC provided the exciter (10 watts). The h.f. receivers to follow the converter (R390A/URR and a Racal RA17L with s.s.b. adapter RA63. Under the call-sign OZ8EME they worked KP4BPZ on July 3 at 20.40 GMT and on July 24 (11.26 GMT) they sent RS55 and received RST549. Later on July 24 KP4BPZ was stronger—up to approximately 20/22db over noise.

The following Danish amateurs tried to work KP4BPZ without success, although they all heard him—OZ3FYN, OZ7SP and OZ9OR.

GW3LJP (nr. Llandrindod Wells) received the signals from 13.40 to 14.45 GMT on July 24. The c.w. consistently peaked 559 and the s.s.b. was resolved from time to time. KP4BPZ worked some 20 QSOs during this time, including G3LTF, PE1PL, SM7OSC DL, Ws and VE. The above results were achieved using an 8-over-8 slot fed Yagi with all copper elements $\frac{3}{16}$ in. diameter and the beam was not tilted, but visually sighted on the moon and looking some 20° below it. The receiver was a GMO290 trough line amplifier into a c.c. cavity converter, C52A crystal mixer, 6AK5 head amplifier into an R208 receiver tuning 28-30 Mc/s. Arrangements will be made to tilt the aerial in future tests.

G3TAE (Bournemouth) reports that his party again heard KP4BPZ on July 24 on c.w. and s.s.b. The c.w. was approximately of similar strength to that previously heard, i.e. about 20db above noise, though it was difficult to tune. Possibly Doppler shift was making things difficult. A large number of KP4BPZ's QSOs was heard. The c.w.—s.s.b. contact with G3CCH was about the best s.s.b. copied, and this was taped, along with the rest of the proceedings. On analysis of this tape it was found that they had been heard (339) by KP4BPZ. Those present were G6XM, G3OBD, G8DL, G3TAE, SWLs Bullock and Harris. The call-sign used on both occasions was **G3DMZ.**

The Severn Valley ARC, operating from Bridgnorth, embarked on a crash programme for the tests and succeeded in receiving KP4BPZ's signals on July 3 at between S1 and S3 on c.w. with only snatches of s.s.b. During the ensuing three weeks the equipment was completely re-shaped and on the afternoon of the 24th considerably improved signals were received, and the Puerto Rico station was copied R5 for the entire three hour session. Strengths were maintained between S3 and S6 with much less flutter than on previous occasions. However no QSO was achieved. The equipment

* 21 Bridge Way, Whitton, Twickenham, Middlesex. Please send all reports for the **October** issue by **September 18** and for the **November** issue not later than **October 8.**

used on the latter occasion consisted of a pair of cross-polarized 32 element stacks, mounted on an easily manoeuvred structure permitting adjustment of azimuth and bearing. Most, if not all, of the QSOs mentioned elsewhere were overheard, with the addition of many W (K) and VE calls also. They report that DJ0LO also heard WA6LET and attempted a QSO. The party consisted of G3OAD, G8AEO, G8AEV, G3ENY, G3KMT and Martin Berry.

The August issue of *QST* reports that KP4BPZ worked W1BU, W1HIV, W3SDZ, HB9RG, W9GAB, DL3YBA, K1IGY, G3LTF, WA4BYR, W7ORG, K3GYF/3, W9HGE, K2MWA/2, LX1SI, K6MIO, W2ROP, K2CBA, W1HGT, DJ4AU, W7UAB, K1SDX, W4HHK, W2CCY, OZ8EME, W8TTY, W1OUN/1, K3SDR/3 and W1OOP via moon-bounce on July 3.

Sporadic *E* Opening

In a letter to G3LTF, **YU1EXY** claimed many G QSOs and also to have heard an EA station during the sporadic *E* opening on July 4.

From the *VERON Newsletter* we have reports showing the continental angle on this great opening. F9NL (Pyrenees) worked DM2COO (Berlin), DM2PQL (Dresden), SM7ZN, OZ8ME and OZ1EP. SM6PU and SM7BZX were heard. F8JM (Armagnac) heard SP2KNP (North Poland). F9DI (Grenoble) worked OZ6WJ, OZ7HDN, OZ4PY, OZ6VI, SM6PU and DJ9YE/P and heard SM6DTC, SM5AX and DM2BGB.

In Sweden SM6CYZ/7 worked I1HC/P, I1SVS and I1FHZ; IT1ZDA (Messina) was heard on 59+! Also heard were I1LCK, EA3JR, HB9ADT, HB9AEN, F1HU, F8CH, F5JO and F9NL! SM7ZN (Varnamo) worked, among others EA3JR, EA3LL and F3TA, also hearing many Southern French stations and EA3PL. SM7XA in a Field Day camp near Malmo, worked F5GZ (Cannes) and F9DI. Many other Southern stations were heard. SM6PU (Malsryd) worked eight stations in Southern France and heard EA3JR and EA3LP and some other stations in local QSOs.

OZ8ME worked I1SVS, I1FHZ, F5GZ, F5AD, F9NL, F8CH and F5JG. Stations heard include I1NU (Turin), I1FP (Verona), I1LCK (Bologna), HB9ADT, EA3LL, EA3PL, F9GP and F2XI/P. OZ8ME reports hearing a UC2 and an SV1 station but could not get the full calls.

Stations in East Germany heard Italian and French stations, and Sicilian station IT1ZDA.

G3MPS, Bridgwater, had contacts with YO9KBP, HG2RD, YU2BOP, OE3GJW, HG1KZG/P, OE1XA/P, HG5KEB/P, HG2KHA/P and HG5KDQ/P. These contacts produced four new countries for G3MPS.

G3EDD, Cambridge, heard rather an unusual signal signing IT1BCK Sicily, but no contact was made.

V.H.F./U.H.F. BEACON STATIONS

Call-sign	Location	Nominal Frequency	Emission	Aerial Direction
GB3CTC	Redruth, Cornwall	144·10 Mc/s	A1	North-East
GB3VHF	Wrotham, Kent	144·50 Mc/s	A1	North-West
GB3LER	Lerwick	145·995 Mc/s	A1	S
GB3LER	Lerwick	70·305 Mc/s	A1	N/S
GB3LER	Lerwick	29·005 Mc/s	A1	N/S

RSGB V.H.F. BEACON STATION GB3VHF

The frequency of the Society's v.h.f. beacon transmitter at Wrotham, Kent, when measured by the BBC Frequency Checking Station, was as follows (nominal frequency 144·50 Mc/s):

Date	Time	Error
July 20	15.20 GMT	90 c/s low
July 27	10.12 GMT	100 c/s low
August 3	13.36 GMT	50 c/s low
August 10	10.06 GMT	40 c/s high
August 17	13.27 GMT	5 c/s low

Two Metre News

The outstanding spot of propagation during July was the period 16th to 18th during which time GB3LER was audible as far south as Lille. F9NJ (Lille) reports contacts with GM3GUI, GM3FYB/A, GM3HLH, GM3EGW and GM3CIG. The most outstanding signal from the north heard in the south was GM3FYB/A. A question asked in the Home Counties is where were all the GM signals during this period. There is no doubt about it, if they had been on the air, there would have been many F and G stations making their first GM contact.

GM2DRD, Forfar, was quite a good signal heard in the south but many calls to him went unanswered.

PA0WLB reported hearing GM3EGW during the same period but no contact in spite of many calls. **PA0ZM** stated that the German beacon station located at Osnabruck on a frequency of 144·005 Mc/s has his aerial located on a television mast approximately 300 ft. high, which may account for the fact that G2JF can invariably hear him at a range of 300 miles in spite of the fact that the signal is beamed north in connection with the IQSY programme.

PA0JOP heard signals from GM3FYB, GM3HLH, and GM3EGW during the period July 16-18.

EI2W was heard by G2JF calling G3FRV/P during the Sunday afternoon of the Contest period without result.

August started well with HB9ADT (QRA location DG32b) was worked by many stations in the United Kingdom on the 4th. A few of his contacts were G6NB, G3IMV, G3BHW, G5NF, G5MR, G3TOZ and G2JF. He was also audible on the 5th and again on the morning of August 8, but as far as is known no UK contact was made.

The evening of August 5 also produced contacts between G2JF and DJ6XV/P (QRA location EL04), DJ7HT (Munster), DJ9DL and DL3VT, the last two stations in the Cologne area.

New stations worked from the south include G3UFQ, G3BRA (Berwick-on-Tweed), GM3GUI (Angus), G2DNJ, G3PYB (Filey, Yorks) and G3NNT/A (Tunbridge Wells).

G3OCB (Truro) reports that apart from local QSOs at lunchtime and in the evenings, the only other stations worked recently have been G8ML, GW2HQ, G3RMB G3JGJ, G2BAT, G3TND, GW3STW/P, G6XD, GW3FSP and G2UN with G3BA and G6BN heard. The aerial is going up shortly to 45/50 ft. and fully rotatable from the shack.

Local activity is slowly improving with G3OCB, G3XC, G2BHW, G3EKM and G3IGV on regularly. G3RET appears quite often and G3LPB is welcomed as a newcomer. G3NVJ is building a QRO rig and G3DCJ, G3CZZ and G3OJY appear from time to time. G3THT, G2FHC and G3OFN are either building or considering it.

Expedition Notes

EI2AX/P (operated by G3SKT and G3BHT) was out recently on both 2 and 4m in counties Wicklow, Carlow, and Wexford. The only evening with fair conditions was that of July 26 when the following were worked on 2m; G5MA, G3BNL, GW3FSP, GW6IL/P, G5JU and G6FK. On July 23 the following were worked on 4m: G3PLX, G3TPF, G3RWM/P and G3EKP, all in Lancashire. The only consistently audible stations throughout the period were G5MA (2m) and G3EHY (4m). The main complaint is that stations did not appear to listen carefully enough! When contacts were made the reports were what would have been expected for the power in use.

G5LC was operating in Belgium during July under the call ON8IZ/M. The equipment in the car was a TW communicator and a KW2000. The aerial for 2m was a TW 6 in. mini halo. Operation was mainly between Ghent and Middelkerke, and about 10 ONs, PA0PAL, three French stations and eight or nine English stations were worked. The most consistent was G2JF and the furthest worked was G3DY

G3XC's wife, G8ML and G3XC with their portable gear during a recent outing to Cheltenham. *(Photo by G3IER)*

(Peterborough). There would doubtless have been better results if there had been more time and also if it had not been necessary for amateurs to shut down during TV hours. Apparently this is mainly due to spurious emissions from the nearby televison stations.

General Notes

We learn from **G3RHP** (Berkhamsted) that ZB2A (who is on 20m in the afternoons) will be active on 2m from the Rock (1400 ft. a.s.l.) signing ZB2AP, about the time you read this. The operator will be G3SLI; the equipment a Heath transceiver with about 8 watts input; the aerial either an 8-over-8 or a 10 element array. Skeds are asked for, and G3SLI says that the atmospheric conditions are extremely good for v.h.f./u.h.f. from the Rock. You never know!

The **Coventry V.H.F. Group** will hold an informal meeting on September 8 at the Hawthorn Tree, Broad Lane, Coventry.

In connection with the North West V.H.F. Convention on September 18, visits have been arranged to: The Communications and Control Centre at Ringway Airport, the GPO Radio and TV Centre, Manchester, and the Universities' Nuclear Reactor Centre at the UKAEA Establishment, Risley. A 144 Mc/s convention station under the new club call-sign **G3UHF/A** will be on the air early on September 18 and an outstation will be available to contact mobiles with the latest information and best routes into the city. During the proceedings, **G3LTF** and **G3CCH** will give their talk on Moonbounce, Meteor Scatter and other achievements. The Dinner will commence at 19.30. YLs and XYLs will be welcome. Those present will include the Society's V.H.F. Manager, Ray Hills, G3HRH.

Applications for tickets/accommodation should be sent to Tom Davison, G3AGS, 18 Boardman Road, Higher Crumpsall, Manchester 8, or Fred Nichols, G3MAX, NW Electrics, 52 Great Ancoats Street, Manchester 4. Other information may be obtained from J. G. Barnes, G3AOS, 5 Prospect Drive, Hale Barns, Cheshire (Tel. Ringway 2415).

1296 Mc/s Tests

G3KEF went out portable to Honey Hill—8 miles E Rugby, on July 17-18. The following were worked or heard: G2CIW (two way on A3), G3KFD received, G3BNL/P (8 miles S Buxton) two way A3, G3GWL two way A3, G2FNW heard. G3NNG was heard by G3KEF 59 (A3) and heard G3KEF 559. G3KEF was also heard by G8ABB and G3LHA

A 3 ft. diameter dish was used during the tests and worked well. The gain is 22db (when the feed has a reflector) and the beam width is 16°. The sharp beamwidth would be a disadvantage if the direction of the other station was not found with the 70cm aerial. The " mini " trough mentioned recently gives results similar to those from the more normal trough of 2 ft. 3 in. sides. By the way, G3KEF thinks that interesting reading for anyone thinking about aerials can be obtained from *Antenna Theory and Design* by Williams—obtainable from a reference library.

AERE (Harwell) ARC reports that G3NNG took out their new 6 ft. dish and found he could work stations which were not even detectable with the reflex. It is a bit of a problem in a wind, but there is no doubt about the extra " S " points it adds to a signal. Great things are hoped for it during the V.H.F./NFD. **G3NNG/P** worked G3HBW/A (Woodcote), S9+ both ways (only 559 on the reflex). G3MCS was S9+ also, and seven S points down with the reflex. Also worked were G8ABB (Bletchley 56), G3GWL (Bucks, 40 miles), **G3FP** (Thornton Heath) and **G3KEF/P** (8 miles N Rugby). Incidentally, the general public are very interested in (and wary of) the dish, and get all sorts of queer ideas as to its purpose.

420 Mc/s News

G8AAC (Barnsley) reports that local stations on the band now include G3LLE (Sheffield), G3NEO (Todwick), G3RND (Pontefract) and G8ABZ (Rotherham), all of whom have been worked by G8AGQ and G8AAC from their /A Location in the Pennines. G3CCH and G3BNL have also been worked. G8AGQ has nearly completed a 90 watt rig using QQVO6—40As as tripler and p.a. and should be operative from Sheffield about the time this appears.

G8AAC himself has built a new transmitter using exclusively 6060s. The input to the final grounded grid stage is about 1¼ watts, which it is hoped to raise to 5 watts. The converter now in use is E88CC cascode r.f., 6060 multiplier chain (35-140-420 Mc/s) with the other half of the 420 Mc/s oscillator as a grounded grid mixer.

GW3LJP (nr. Llandrindod Wells) has an 1800 ft. mountain to contend with when working 2m and 70cm to stations like G8DU (Cheltenham), G3GZM (Tenbury Wells) and G3MPS (Bridgwater). The G8DU path is unique as the phenomenon of obstacle gain seems to prove itself both on 2m and 70cm. At 60 miles 2m signals are S9 + 20db and S9 on 70cm. The transmitter is a QQV06/40A on 70cm (432·4 Mc/s) running 23 watts.

G3CBU (Basingstoke) observes that a number of stations working 70cm are using frequencies which fall outside the agreed DX segment of 432/434 Mc/s, this failing to keep the spirit of the international arrangement and making things difficult for stations with receivers of limited tuning range. The same applies to 1296/1298 Mc/s albeit to a much lesser degree, of course. Apart from the above there is the question of geographical distribution as envisaged by the band plans. Furthermore our correspondent thinks it would be a good idea to have a list of stations with operating frequencies. We are quite willing to publish such a list which obviously has much to commend it, and would appreciate co-operation from as many 432 Mc/s operators as possible, in all the points raised, which can only have the effect of improving efficiency of operation.

GC2FZC (St. Peter Port) is now operating on 70cm and has recently worked G5ZT, G3JGJ, G3MPS and G8ADP. Signal reports have been received from GW3MFY, GW4CG and another from Devon. The transmitter runs 24 watts input to a QQV03/20, and the aerial is a 10 element Yagi. Turn your beams towards Guernsey for a new departure on 70cm.

Meteor Scatter on 2m

A note from **G3CCH** (Scunthorpe) reports his working UA1DZ by Meteor Scatter on July 28 last. The QSO took

A 15m Ground-plane Aerial for 15 Shillings

By R. BENNETT, A3551*

THE ground-plane aerial to be described cost less than 15s. to build, weighs less than 30 lb., requires no guys and is very easy to make. It consists of two 11 ft. bamboo poles, which taper from 2 in. to about 1¼ in., joined in the centre and wrapped with domestic aluminium foil of the type used in kitchens.

The bamboo poles were obtained from Woolworths at a cost of 6s. each and are extremely strong. Two points to be borne in mind when working with bamboo are (i) that it has an unfortunate tendency to split if it is hit too hard, (ii) that if it is left out in the rain for too long it will become rather pliable. In the writer's case, both these points were found out the hard way—by experience! If the poles do become really wet, they can still be used provided they are thoroughly dried out first.

The bamboos were joined by inserting a length of broomstick up the insides of the poles and a piece of dural pipe

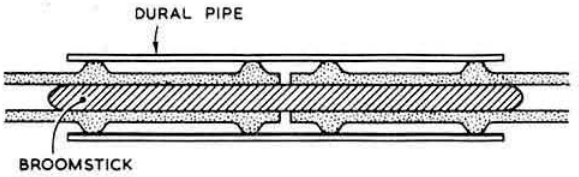


Fig. 1. Method of joining the bamboo poles.

over the outside of the joint (Fig. 1). No adhesive was used. The joint was sealed with insulation tape and painted with a waterproofing compound of the type used on roofs (Sylglas tape should also be suitable). It should be remembered that any play in the joint will be magnified many times at the top of the aerial.

The most messy and time-consuming part of the construction of the aerial was binding of the pole with the aluminium foil. This is obtainable in lengths of about 15 ft., 12 in. wide, and costs 2s. 6d. a roll. The foil was unrolled and cut into four strips 3 in. wide which were then wrapped around the bamboo, starting at the base and working upwards. To kill two birds with one stone, it was decided to waterproof the pole and to stick the foil on at the same time. The bamboo was therefore painted, about 4 ft. at a time, and the foil wrapped on, allowing an overlap of about ½ in. on each turn. At this point it is worth mentioning that it is inadvisable to place too much tension on the foil, as it tears easily.

The foil should be soldered at each joint with, if possible, a 5-6 in. length of copper braiding across the joint. The writer found that the foil was easy to solder using a hot iron and ordinary cored solder. No special preparation of the aluminium was necessary. The joints were bound with insulation tape and the whole assembly painted again. The hole at the top was filled in to prevent rain penetrating the bamboo.

Theoretically, the aerial should be one half wavelength above ground, with sloping radials, but in the writer's case it was fixed to a wall about 3 ft. above the earth at the base. A lead roof was used in place of the more common radials.

* *66 Clewer Hill Road, Windsor, Berkshire*

Results

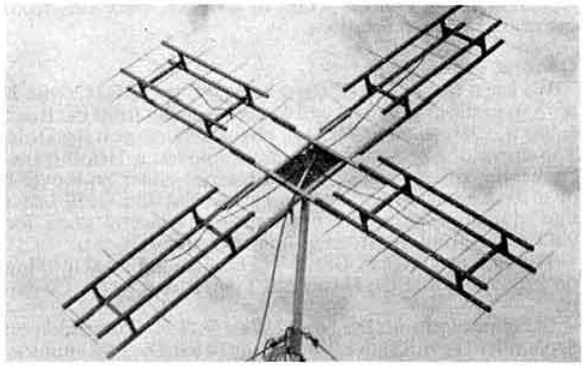
The results with this somewhat makeshift aerial have been excellent and all 21 Mc/s signals heard have been about 1½ S points up compared with a 200 ft. long wire.

The aerial is quite inconspicuous and is therefore suitable where neighbours might object to a beam array. The constructional technique is not, of course, limited to ground-planes.

Four Metres and Down (Continued from page 591)

place between 22.00/00.05 GMT. There was a colossal burst at 22.44/5 when both calls and reports were heard for at least a minute. The QSO was completed at 00.02, when two very weak "Rs" were heard. UA1DZ heard G3CCH's "R" at 23.39. During a recent visit to GI5AJ, G3CCH tried m.s. with UA1DZ, but only heard a few pings on August 11. GB3VHF was heard on a number of occasions, sometimes by m.s.

During the Perseids, G3LTF worked YU1EXY.



The Severn Valley Amateur Radio Club took part in the Moonbounce tests on July 24th, and used the above pair of cross-polarized 32 element stacks on 432 Mc/s.

Late News

G3RND-G6AAA/T (Pontefract) had a fine opening on August 12 when G3IOE (Newcastle) was worked for the first time, though in a bad direction. Turning the beam south, G2JF, G2CDX, G3IIT were all worked with S9+ signals, and also G3DY and G3MCS. A transfer to 70cm brought G3NOX/T at S9+ and after that there were QSOs with G3KEQ (432·55, S9+) Surrey. G6OUO/T (432·75, S8, Middx.), G8ADC (433·05, S7, Beds.), G8ABC-G6MUR/T (433·3, S8, Leics.) and then G8ADE (433·35, S7, Cambs.), G3BNL (433·4, S8, Notts.) and G3RMB (432, S7, Warks.), G8AHJ (Herts.) was also heard on 433·4 Mc/s.

Dutch Balloon Experiment

A 2m translator balloon experiment organized by PAOIF and PAOIJ on Sunday, August 22, appears to have been very successful. The balloon stayed up about 1½ hours, and during this period the band was often full of signals. G3LTF worked DJ3ENA and DJ7HY on s.s.b., two PAs, ON4FG, G3CCH and G6AG. G3MED also worked DJ3ENA and DJ7HY. There were many QSOs and hearings right down to the Swiss border.

THE MONTH ON THE AIR

A CHRONICLE OF EVENTS ON THE HF AMATEUR BANDS

By M. E. BAZLEY, G3HDA*

WHEN one looks around the h.f. bands with their present state of activity it is hard to believe that we are only just coming out of the trough of a sunspot cycle, with even better conditions to come within the next few years. September/October are always exciting times to be on these bands and with the present crop of DXpeditions, no doubt activity will reach an even higher level. Eighty and forty metres will come out of their summer doldrums with paths opening up to the Pacific in the mornings and evenings while 20 should still provide plenty of opportunities for world-wide contacts even if this band does tend to close during the early hours of the morning. Fifteen should open up to Australia and South East Asia in the mornings with Central America and the Caribbean area being prominent in the late afternoons and evenings. For those whose interests cover 10m, there are possibilities of working DX on the East-West path and reports of any W, VK or ZL contacts on this band would be welcomed. Finally, for the Top Band enthusiasts there is the prospect of another productive winter DX season ahead.

A letter from BRS25429 tells us that during the first six months of 1965, 282 DXCC countries were active. It will be interesting to see if by the end of 1965 anyone claims having worked 300 of the present 314 ARRL DXCC countries in one year. No doubt the year-long *LIDXA* contest should be able to provide that answer for us.

Top Band News

It is hoped that this heading will be used frequently now that autumn is approaching and as the writer does not operate on this band all information must be gleaned from DX News Sheets and readers' letters. Therefore any items of interest, however small, will be welcome.

It is reported that **9J2VB** has a 2 element Vee Beam cut to 1850 kc/s and which is directed at the UK. As the centre of this beam is 120 ft. above ground the chances are that G/9J2 Top Band contacts will soon be made. 9J2VB is active daily on 20m s.s.b.

ZE3JO is active every Sunday between 04.00/04.45 looking for " G " and **9M6BM** will be active on 1802 kc/s from the beginning of September.

News from Overseas

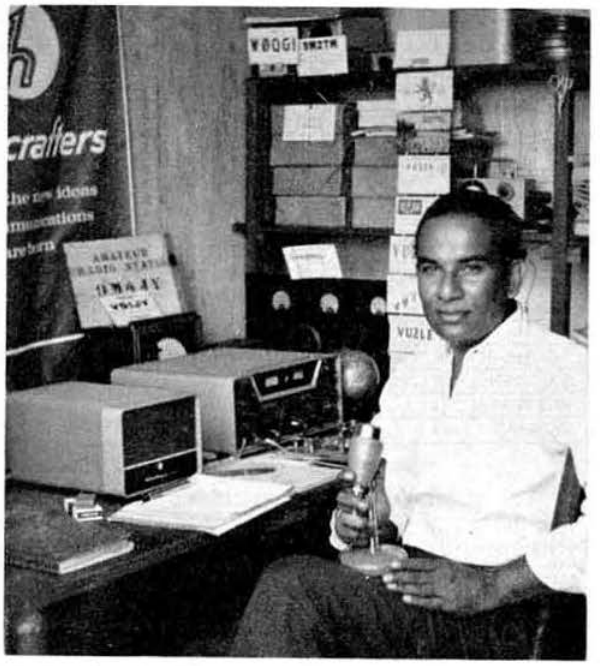
Clem Coleman, W2JAE, who operated as **FP8CK** recently, went to the island in company with Dave Ferrier, W2GKZ, who was issued with the call **FP8CV**. Dave operated from the home of FP8AV using a Galaxy V into a 3 element Tribander and a long wire for the l.f. bands, whilst Clem used his 32S3, 75S3 and a Hygain 14AVQ vertical from a room in the house where they were both staying. Conditions were reasonable on 20m and 40m to Europe, Africa, North and South America but very poor to other parts of the world. FP8CV made numerous 80m s.s.b. and c.w. contacts and though 15m was tried, very few contacts resulted. For many it was their first FP8 QSO and Clem says that his present mail is heavy due to the 2,200 contacts made during his ten days stay there. All contacts will be QSL'd either direct, to those who sent s.a.e. or via the RSGB.

Further to last month's note on 40m skeds with **VR1S** the following has been arranged: frequency 7008 kc/s.

Dates	Times (GMT)
September 25	07.00 and 19.00
September 26	07.00
October 2	07.00 and 19.00
October 3	07.00
October 9	07.00 and 19.00
October 10	07.00
October 16	07.00 and 19.00
October 17	07.00

Pat will be using 90 watts into an inverted Vee and will call " CQ Europe " every other minute for half an hour unless a contact results. It will be appreciated if stations would not call " CQ Pacific " on the frequency and only call when VR1S is heard. The writer would appreciate reports from anyone making contact or hearing Pat on 40m.

G3RWU, Robin Francis, is now active from Bahrain



Chasing DX and certificate hunting obviously needs the appropriate equipment; YA1HE/9M4JY is fortunate in having an SR150 donated by the Hallicrafters Co., and a cubical quad to equip his station. He works as a civilian wireless operator in the British Navy Wireless Station in Singapore.

* Please send all reports and news items to RSGB Headquarters to arrive not later than September 16 for the October issue, and October 8 for the November issue.

Island with the call **MP4BFH** and complains about the shortage of "G" stations, heard or contacted on 20m. Operation is at present on 20m c.w. only but it is hoped to be operative on 40m in the near future. QSL's can be sent via the RSGB or direct to the address given in QTH Corner.

OA4KY writes to say he will be looking for European s.s.b. contacts during September on Saturdays and Sundays, on 80, 40 and 10m. On 80m he will operate between 3780-3798 kc/s and will call CQ at 04.00/04.30/05.00/05.30, whilst on 40m the frequencies will be 7045 or 7085 kc/s at 05.15/05.45/06.15. John, from past experience, has found these to be the best times to work into Europe and had numerous 80m and 40m contacts with UK stations and other Europeans last year. For those who are interested in 10m, CQ's will be called on 28,590/28,610 kc/s at 21.15/21.45/22.15/22.45/23.15. The equipment in use at OA4KY consists of a KWM-2 into an HA-10, SX101A receiver with a Telrex Triband beam for 10, 15 and 20m and Inverted Vees for 40m and 80m.

VERON, the official Dutch Amateur Radio Society, to which three-quarters of the Dutch licensed amateurs belong, wishes to advise RSGB members that all QSL cards for Netherland stations should be sent either via the RSGB QSL Bureau, or to P.O. Box 400, Rotterdam, where they will be forwarded to individual Netherlands stations whether they belong to VERON or not.

Once again VK4SS kindly sends details of local Pacific activity, which may be local to him but is of interest to us. **FK8AU**, active on 80m and 20m s.s.b. daily, whilst **FK8BG** is on 20m a.m. around 07.00. **VR4CN** is also active on 20m a.m. but at 05.00, and 20m s.s.b. is noted from **KC6FM** (QSL via W2CTN), **KG6IG, KJ6DA** and **KW6EJ,** 05.00-08.00. **KJ6BZ** puts Johnston Island on 40m s.s.b. fairly frequently.

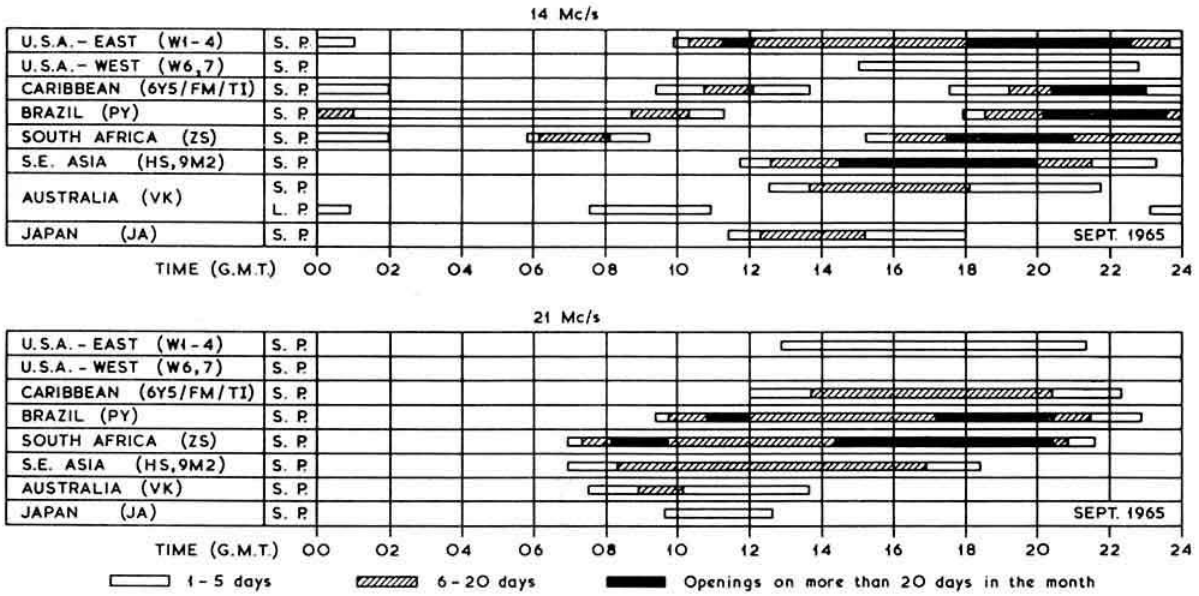
During a recent contact with **AP2AR** the writer was informed that all amateur activity from Pakistan would cease in the very near future and in fact some AP stations had already been closed down.

G3TYB denies all knowledge of a certain **F0RK/FC** who has been operating on 80m and asking for QSL's to be sent to G3TYB. John, who is active on most bands fairly regularly also disclaims contacts made on his behalf on Top Band during the first three days of May this year. Whilst on the subject of piracy the RSGB received a circular letter from **HB9US**, copies of which had been sent to 30 other national societies, stating that he had not been active since July 14 this year and did not expect any further activity for at least another year, but due to the terrific flow of incoming QSL's for non-existent QSO's he felt he had to take some action.

Ken Smethhurst, G3GPE, is now signing **9M8KS** for Kuching in Sarawak. Ken, who is using a 15 watt Transceiver on 7025-14050 kc/s and 7040-14080 kc/s, c.w. only, requests all QSL's to go via RSGB and not direct to him or to the 9M8 Bureau as he will only be out there for another nine months.

VP8HJ writes to say that his QSL manager, W2CTN, now has all his logs covering all contacts made by him from the Falkland Islands and requests that QSL's, whatever the date, should now go to W2CTN. Dave goes on to say that **VP8HO** is now stationed on South Georgia Island and is hoping to borrow a Panda PR120V from VP8HY until the

PROPAGATION PREDICTIONS



During September, the F2 m.u.f.'s show a steady increase over those for the summer months, so that this month will show a slow improvement in DX conditions on the h.f. bands. On 28 Mc/s this improvement will only be slight, but on this band it should be possible under favourable conditions to work into South America from about 14.30 to 20.00 GMT, and into Africa from about 09.00 to 20.00 GMT. The most favourable operating period for Africa is between 11.00 and 19.00 GMT. The summer season for sporadic E short skip contacts (from about 250 to 1250 miles) on 28 and 21 Mc/s usually ends in September. In comparison with the summer, conditions on 21 Mc/s should improve during the month for contacts with Central America, South East Asia and Australia.

The lengthening nights with the approach of autumn will reduce the number of opportunities for DX contacts on 14 Mc/s during the latter half of the night. Because of this, 7 Mc/s will become the main DX band during this time. On this band, as well as on 3.5 Mc/s, DX contacts are basically possible when the greater part of the transmission path lies in darkness. This applies especially to 3.5 Mc/s. The longer autumn nights and the seasonal reduction in QRN favour DX contacts on 7 and 3.5 Mc/s, compared with the summer months. In the latter half of the night on 3.5 Mc/s, local traffic will frequently be interrupted by the dead zone.

The provisional sunspot number of July was 11.9 with the period of greatest activity lying between the 6th and the 13th of that month. The predicted smoothed sunspot numbers for November, December and January are 27, 29 and 31 respectively.

transceiver shipped to him by Hammarlund arrives in November. Meanwhile Dave has in his possession all of VP8HO logs for his Falkland Island contacts and will be pleased to confirm these Falkland Island contacts only, on application to him at: Box 89, Port Stanley, Falkland Island.

HM0HQ, the HQ station of the Korean Amateur Radio League, will be operated for one month from September 28, 1965, to commemorate the tenth anniversary of KARL, the ITU Centenary and the 80th anniversary of telecommunications in Korea. The main operating time will be between 00.00 and 08.00 GMT and the 7, 14 and 21 Mc/s bands will be used. A special QSL will be sent to all stations contacted, and cards for HM0HQ may be sent to KARL, Central Box 162, Seoul, S. Korea.

FP8CK:—The inside and outside of FP8CK's shack during his recent DXpedition to St. Pierre (see page 593).

Awards

The **Worked All Pacific** certificate offered by the NZART may be of interest to readers, particularly as there is a spate of activity in the Pacific by W9WNV. Thirty of the following countries are needed to qualify for this award which may be of mixed modes or telephony only: CR10-Timor, DU-Philippines, FB8-Adelie Land, FK8-French Oceania, FW8-Wallis Island, FU8/YJ-New Hebrides, KB6-Baker, Howland, Phoenix, KC6-Carolines, KC6-Palau, KG6-Guam, KG61 Iwo Jima (KA0), KG6-Marcus Island, KG6-Marianas, KH6-Hawaiian Is., KJ6-Johnston Is., KM6-Midway Is., KP6-Palmyra and Jarvis, KS6-Samoa, KW6-Wake Is., KX6-Marshall Is., PK1, 2, 3-Java, PK4-Sumatra, PK5-Borneo, PK6-Celebes and Molucca, JZ0-Neth. New Guinea. VK-Australia, VK2-Lord Howe Is., VK4-Willis Is., VK0-Macquarrie Is., VK9-New Guinea, VK9-Norfolk Is., VK9-Papua, VK9-Nauru, VK9-Christmas Is., VK9-Cocos Is., VR1-Gilbert Island, VR1-Ellice Island, VR1-Br. Phoenix Is., VR2-Fiji Is., VR3-Fanning and Washington Is., VR4-Solomon Is., VR5-Tonga, VR6-Pitcairn Is., 9M8-Sarawak, VS5-Brunei, 9M6-Br. North Borneo, ZK1-North Cook Is., ZK1-Southern Cook Is., ZK2-Niue, ZL-New Zealand, ZL1-Kermadec Is., ZL3-Chatham Is., ZL4-Auckland and Campbell Is., ZL5-N.Z. Antarctica, 5W1-British Samoa, ZM7-Tokelau and Union Is. QSL's and check list together with sufficient return postage (British Postal Orders can be cashed in New Zealand) to: NZART Awards Manager, Box 489, Wellington, New Zealand.

The **Worked All VK Call Areas Award** may be claimed by stations having QSL confirmation with the following Australian districts.

Call Areas	QSL's required
VK0	One
VK1	One
VK2	Three
VK3	Three
VK4	Three
VK5	Three
VK6	Three
VK7	Three
VK8	One
VK9	One

The applicant should submit the 22 cards together with a list showing: call, date, time of contact, type of emission, frequency used and signal report with sufficient IRC's to cover return postage of cards to: Awards Manager, Box 2611W, G.P.O. Melbourne. RSGB members may send their claim for this certificate to the RSGB Certificates Manager, but sufficient return postage (Inland) for the cards and postage to forward the certified list to Australia must be enclosed.

QTH Corner

CR3AD	Box 205, Bissau, Portuguese Guinea.
CX2CO	Via K0DQI, Depot Street, Sidney, Iowa.
EA6AR	(S.S.B. only)—Via Hammarlund.
HZ1AB	A.P.O. New York, N.Y. 09616, U.S.A.
KH6FIF/KS6	1603 Iwi Way, Honolulu 16, Oahu, Hawaii.
KL7ERJ	Box 1325, Fairbanks, Alaska.
WB6PSV/KS6	Box 1146, Pago Pago, American Samoa.
KH6EDX/M1	Box 400, Verona, Italy.
MP4BFH	Box 14, Manama, Bahrain, Arabian Gulf.
OA4K	Box 538, Lima, Peru.
OA4KY	Capae Yupanqui 1535, Lince, Lima, Peru.
OH0FZ	Via DJ4SO, Holtenauer Str. 239, 23 Kiel-Wik, 2333 Gross-Wittensee.
OH0VF	Via OH5VD, Enso-Gutzeit Oy, Imatra, Finland.
TJ1AC	Via DJ2BW, Eugenstr, 22, Mariahof, 55 Trier.
TA3AS	Via SP4AWE, Pomorska 53, Bialystok, Poland.
TU2AN	Box 1374, Abidjan, Cote D'Ivoir, West Africa.
VE8PA	Box 942, Yellowknife, N.W.T.
VK0GW	Via VK6RU, 15 The Grove, Wembley, West Australia.
VP2AO	Via Hammarlund.
VP2KD	Via VE3ACD, 305 Rosemary Road, Toronto 10.
VP2KJ	Via W4SSU, 2278 Barge Road, SW Atlanta 11, Ga, U.S.A.
VP2SM	Box 142, St. Vincent, B.W.I.
VP8HJ	Via W2CTN, 156 Ketcham Avenue, Amityville, New York.
VQ9J	Via K4IXC, RFD 2, Box 684-P, Melbourne, Florida.
VS6AJ	Box 97, Hong Kong.
YA2A, 6A, 7A, 8A, 9A, 0A, YA2H, 6H, 7H, 8H, 9H, 0H	Via Hammarlund.
YJ8WW	Via W4ECI, 3101 Fourth Avenue South, Birmingham, Alabama, 35233.
ZD8HL	Via W2CTN
4W1C	Via W2CTN
4W2AA	Via HB9AET, La Feuillee, 1290 Versoix, Ge., Switzerland.
4X1DK	Via Hammarlund
4X0TP/J	Via VE3ACD (as VP2KD).
4X0TP	Via Hammarlund.
5U7AU	Via W8HMI, RFD 3, Paw Paw, Mich., U.S.A.
5W1AD	Via W4ECI (as YJ8WW).

Juan (John), OA4KY will be looking for European contacts on the l.f. bands during September (see page 594).

Another award issued by the NZART called the **New Zealand Award**, requires the following confirmations: 35 from ZL1, 35 from ZL2, 20 from ZL3, ten from ZL4 plus one from a ZL "territory" (N.Z. Antarctica, Chatham, Kermadec or Campbell island). The 101 QSL's together with a check list and return postage should be sent to the NZART Awards Manager at the above address.

The Radio Society of Zambia offers the **Worked All Zambia** award which is also available to short wave listeners. This award requires stations outside zones 36, 37 and 38 to score ten points, which are calculated as follows: for all 9J2 stations contacted on 7, 14, 21, 28 Mc/s—one point and two points for each 9J2 contacted on 1·8 or 3·5 Mc/s. A GCR list with QSL details and seven IRC's or P.O. for 3s. 6d. to: Awards Manager, Box 332, Kitwe, Zambia. This award may be claimed for c.w., a.m., s.s.b. or mixed modes.

Two awards issued by the Radio Society of Venezuela are (i) **YV-9 Award** for contacting nine of the ten YV districts (YV1-YV0); (ii) **YV-100 Award** for contacting 100 different YV stations. Log data may be certified by a society affiliated with IARU when the certified list with two copies may be sent in lieu of QSL's to: Radio Club of Venezuela, Box 2285, Caracas, Venezuela.

It should be noted that when asking the RSGB certificates manager to check QSLs against a list, QSLs and list should be in alphabetical order and should agree with each other. *Please make sure that sufficient return postage together with the sender's name and address is included*, or better still enclose a stamped addressed envelope.

Just after the writer had finished assembling this section of *MOTA* he received details of an award which is available to stations contacting during the month of September, four 4X4 stations located around the town of Herzlia. A leaflet giving full details may be obtained by sending an s.a.e. to G3HDA.

Band Activities

The result of last month's appeal in connection with the band reports indicated that the majority of readers prefer them to be retained in their present form provided the lists do not get too large. In fact only one reader wrote to say that he supported the view that they should be cut altogether. The writer feels that these reports do have some value and help to keep the balance over the wide field that *MOTA* tries to cover from overseas news to band reports.

Reviewing the past month, DX-wise, by the first week of August ZL's were again being heard and worked on 80m s.s.b. while on 40m the band was opening to W6 and Central America in the mornings with an occasional opening to the Pacific. The plums heard on this band were **VR2DK, YJ8WW** and **5W1AD.** Don Miller certainly provided the signal of the month, if not of the year, by putting 59 plus and 599 signals into Europe every day on 20m during his six-day stay on Western Samoa. Don also steals some of the lime-light on 15m by working into Europe one morning on a *dead band* and **VR6TC** was worked by GW3AHN after having been heard frequently on Monday evenings in Europe over the past three months (band reports July, August). He had been unreachable previously due to the high level of W QRM over there. **9M4LP** reports long path contacts into Europe on this band around 18.00. Poor old ten is suffering at the moment but conditions will improve from the beginning of September.

Once again many thanks to the following, without whose help these band reports could not have been written. G2BOZ, G2LB, G2RO, G3AAE, G3FKM, G3HCT, G3KSH, G3SML, G4MJ, G8JM, BRS20439, BRS24733, BRS26676, BRS26864, A2498, A4328, A4311, A4134, A4431, A4460, A4489, A4631, A4641.

1·8 Mc/s C.W.: HB9ML (21.30), OK1AJL (20.50), OK1AOH (20.55). It was reported that G3SED had a contact with ZC4 but no further details were given.

3·5 Mc/s C.W.: WA6ZSC/AM (09.70).

3·5 Mc/s S.S.B.: ZL2BCG (05.35), ZL3JC (05.25).

7 Mc/s C.W.: HP1IE (05.35), OH2BDZ/OH0 (20.50), OY7X (23.15), UA0BL (00.20), VK2SA (21.15), VP2AO (04.50), VP4VU (22.00), VQ9J (21.50), VR2DK (05.40), W9TQL/KV4 (22.50), WP4CNA (00.15), ZL2AAG (04.53), 4X1DK (23.30), 5W1AD (05.30-06.08), 5X5IU (22.45).

7 Mc/s S.S.B.: GC2HFD/A (21.00), MP4TDA (21.30), HI7XRB (00.00), OA4KY (06.45), OH0NI (21.30), OX3JV (23.30), PY7AKT (21.00), PX1EQ (21.56), SV0WGG (Crete 21.00), VK2KM (21.00), VK3ATM (21.30), VP6KL (21.30), YJ8WW (06.20), ZD8BC (22.00), ZD8HL (21.40), TG9EP (05.35), ZE1AC (20.35), ZS's (20.00-21.00), 4X1DK (20.50), 5A2TR (21.28), 7Q7PBD (20.00), 9J2WR (21.30), 9M4LP (20.20).

14 Mc/s C.W.: AP2AR (16.10), CR3AD (20.15), CR4BC (20.20), FG7XX (11.00), HK0AI (20.30), HL9US (09.02), HP1PV (06.45), HP1IE (22.30), HR1HZY (23.08), JT1KAA (09.38), KH6FIF/KS6 (08.00), TA3AS (13.00), TN8AF (19.20), TU2AN (17.25), VP2AO (22.20), VP2MN (21.45), VP6AP (21.00), VP7NQ (23.05), VQ8AI (17.45), VQ9HB (18.20), VQ9J (21.55), VR1A (11.10), VR2DK (09.25), XW8BD (15.50), YA2A, 6A, 7A, 8A, 9A, 0A (12.00-20.00), YJ8WW (09.41), YN3KM (22.20), YS1RFE (23.05), ZD7IP (18.00), ZD9BC (16.18), 4X1DK (06.30-21.30), 5W1AD (05.30-08.30), 6W8DF (21.20), 9M2LM (16.20), 9M4MV (16.35).

14 Mc/s S.S.B.: CE9AGI (14.30), CR4AJ (19.32), EA9EO (15.55), FO8AA (06.40), FO8AG (07.31), FP8BH (16.04), FR7ZJ (13.00), FY7YF (06.50), HH8HH (21.45), HR2AFK (22.53), HZ1AB (19.25), K5CQK/KH6 (Kure 06.55), WB6PZK/KJ6 (07.51), KS6AW, BO, BQ, BV (07.00-08.00), KR8CA (15.10), KX6BW (13.41), LA8FG/P (18.35), MP4TBM (17.50), TJ1AC (11.20), VK2NN (23.00), VK9DR (Xmas 13.45), VK9XI (Xmas 15.46), VP1HB (23.50), VP2AX (20.30), VP2KD (20.46), VP2MN (21.40), VP2SM (05.52), VP5LV (Turks 19.18), VR1S (07.15), VS6AJ (16.12), XE2MMM (02.37), XW8AW (18.00), XW8AX (15.47), YA2H, 6H, 7H, 8H, 9H, 0H (13.00-20.00), YJ8WW (07.00-09.47), ZD5R (16.08), ZP9AY (20.30), ZS3HT (18.10), 4X1DK (07.00, 20.28), 4S7IW (02.55), 4U1SU (18.20), 4W1C (15.30), 4W2AA (15.38), 4X0TP (18.06), 5U7AU (16.15), 5W1AD (05.30-09.00), 5T5AD (23.10), 6Y5RA (00.05), 7G1L (19.15), 7Z3AB (20.55), 9K2AM (21.48), 9N1MM (14.57).

21 Mc/s C.W.: CR6BX (10.37), EA6BD (14.00), OD5LX (15.39), JA5ADR (12.25), KH6AFS (19.13), TL8SW (14.10), TN8AF (18.35), TU2AN (18.15), VR6TC (21.35), VS9MB (19.20), YN1AA (21.45), ZE1AS (15.27), ZD7IP (12.25),

ZD8WZ (10.15), 5W1AD (08.25), 5R8CB (15.29), 9K2AD (15.25).

21 Mc/s A.M.: CR4AD (15.35), CR4BB (20.00), EL5D (19.05), HC1EL (21.55), WA0CTZ/P/HI4 (23.10), HP1LB (22.40), OD5CS (19.15), PZ1BE (20.15), TN8AA (17.05), VP4RS (21.04), YV9AY (22.30), ZP3AL (20.02), 5X5JK (09.45), 5X5KRL (16.05), 9X5HB (18.25), 9X5RZ (18.55).

21 Mc/s S.S.B.: CR5SP (Sao Thome 18.55), KV4CX (19.30), KZ5KT (21.25), OA4KY (21.15), YN1MAN (21.20), ZD8HL (15.50), 4X1DK (18.10), 5W1AD (08.35), 7Q7PBD (18.45), 9L1MJ (18.45).

28 Mc/s C.W.: 9J2GJ (18.00).

28 Mc/s A.M.: GC2FMV (14.01), F9WJ/FC (17.40), YV1PF (21.15), 9J2WR (18.10), 9J2DT (17.30-18.30).

28 Mc/s S.S.B.: KV4CX (17.30), ZD8HL (17.31), 9L1JW (17.11), 9J2WR (18.30).

DXpedition News

No doubt of major interest to DX hunters is the whereabouts and future movements of Don Miller, W9WNV. After a week's spell from Western Samoa as **5W1AD** when approximately 5,000 contacts were made, Don showed up on August 13 as **YJ8WW**. From this country he was unfortunately caught up in earthquake activity and had serious difficulties with his power supplies. After one week's stay in the New Hebrides Don was due to go to FK8-land. Two new DXCC countries which are considered as possibilities by this DXpedition are: Maria Theresa Reef (152° West, 32° South) and Marina Reef (178° West, 24° South). **VR2EW** and **ZM7AJ** are two calls which have been issued to Don, and the ZM7 operation is now expected to commence on September 24. There is now a reciprocal licensing agreement between Australia and the United States, so no doubt a VK9 call will be issued to Don in the near future. Any further information received before going to press will be found under *DX Briefs*. Frequencies to watch are: C.W.: 7005/010, 14,045/55, 21,045/55 kc/s. S.S.B.: 7070/100, 14,100/110, 21,400/410 kc/s. All QSL's via W4ECI.

CR7GF is making arrangements for a 15 day trip to Portuguese Guinea and Sao Thome starting the first week in September. Licences have been granted and the calls will be, **CR3GF** (new prefix for Portuguese Guinea) and **CR5GF**. It is possible that this DXpedition will be sponsored by Hammarlund.

TI2HP and EA2CA will be making a trip to **Ifni** around September 20 and all operations will be on s.s.b.

Gus, W4BPD after going through all possible YA prefixes turned up in 4X4-land to help with the **4X1DK** DXpedition to the Israel-Jordan Neutral Zone. From August 5 to August 10, approximately 1100 s.s.b. and 1100 c.w. QSO's were made on 7, 14 and 21 Mc/s. It is believed that this operation will count as Palestine for DXCC and all QSL's will be issued by Hammarlund.

The next stop for Gus is likely to be in Africa.

Finally, the writer had the pleasure of receiving from the CE0XA Gang a contribution towards the RSGB Building Fund which they asked to be from the "G DX Gang." Dale, W4DQS said they had managed to fulfil their budget and felt it only proper to return surplus donations from the "G DX Gang" to be used in a worth while way. Many, many thanks to W4DQS, W4QVJ, W8FGX, W8ZCT and W9EVI for this generous gesture.

Contest News

The annual **VK/ZL Oceania Contest** will take place from 10.00, October 2 until 10.00, October 3 for the phone section, whilst the c.w. portion will run at the same times one week later. An ascending serial number will be exchanged with the reports and stations in the rest of the world will score two points for each VK/ZL contacted and one point for each contact with an Oceania station. The multiplier will be the number of VK/ZL call areas contacted on each band and logs can only be submitted for multi-band operation. This contest is open to SWL's who must log VK/ZL stations only and submit a combined entry of both c.w. and phone. Each station logged to count for points must also include the station being worked and the report and number sent. All logs should be sent to arrive at the following address by December 15, 1965. Federal Contest Committee, W.I.A., Box N1002, GPO, Perth, Western Australia. Certificates will be awarded to the top scorer in each country for phone and c.w.

A reminder that our own **21/28 Mc/s Telephony Contest** will take place this year on September 25/26 (rules page 545, August) and no doubt this new date should provide better conditions on these bands. Don't forget that our Contests Committee goes to a lot of trouble to provide these contests for us and one way of showing our appreciation is by submitting a log (even if it contains a few entries). To make this contest a success we do need overseas participation and if there is plenty of UK activity this will be assured. If you have a 15m or 10m rig with the appropriate aerial, please give some overseas stations a few points and at the same time you may be rewarded by some really good DX contacts.

The RSGB have been advised by 4S7GV that as the dates of the *CQ* World Wide Phone Contest clashes with the phone section of the **VU2/4S7 Contest** it has been decided to alter the date of the VU2/4S7 phone section to November 6 and 7. Details of this contest appeared on page 534 of the August BULLETIN.

The dates for this year's *CQ World Wide DX Contests* are as follows: **Phone: October 23-24. C.W.: November 27-28.** Full details will be given next month.

Finally, a reminder from the H.F. Contests Committee to the effect that the dates for **BERU 1966** have been changed to **March 19-20** by popular request of the VK/ZL stations. This is understandable as conditions between UK and Oceania on the later date should be more favourable.

DX Briefs

KC6AA and **KC6FM** are two stations active from the Western Carolines on 20m s.s.b.

SM5BXU/LA/P has been active from Spitzbergen and is likely to be there for a further two months.

K5CQK/KH6 still continues to put Kure Island on the DX map but unfortunately Kim is not very active.

The new operator from **ZS2MI** (Marion Island) is now active on all bands using s.s.b. QSL's as before via ZS1CZ.

4W2AA (HB9AET) now active from the Yemen, told the writer that he would be in **FL8** and **VS9K** during October and hoped he would be able to obtain the necessary licences. All QSL's via HB9AET.

ZD9BC, Gough Island, active on 20m c.w. and a.m. On c.w. he has a T8 note and requests all QSL's via ZS1VD.

ET3USA is currently signing with the prefix **9F3.**

FR7ZI is planning a DXpedition to the Comoro, Glorioso and Tromelin Islands from September 1 with the following calls: **FH8ZI, FR7ZI/G** and **FR7ZI/T.**

The latest news of **W9WNV** is that he arrived in Sydney (VK2) on August 21 and confirmed that he has a licence for 8F1. He has now been issued with VK9 and VK0 calls and operation from Heard Island is now a distinct possibility, together with BY, XZ2TZ, ZK1 (Manalika), ZK2, ZM7AJ (the Pacific reefs) and 8FI. Operation from a brand new country was promised commencing August 28 for one week.

* * *

Correspondents are thanked for their co-operation and acknowledgement is made to the *West Gulf DX Club Bulletin* (W5IEJ), the *LIDXA Bulletin* (W2FGD/W2MES), *DX'press* (PA0FX) and *The DX'er* (N. Californian DX Club). Please send all items to RSGB Headquarters to arrive not later than **September 16** for the October issue and **October 8** for the November issue.

NEWS . . .

Collated by John Clarricoats, O.B.E., G6CL

Centenary of the International Telecommunication Union was officially celebrated in Paris on May 17, 1965. To complete a historic year a Plenipotentiary Conference of the Union is to be held in Montreux from September 14 to November 12, 1965, when administrative details, especially revisions to the organizational structure of the Union, will be dealt with. Frequency allocations and other international matters likely to affect the Amateur Service are not due to be discussed and for that reason IARU observers have not been invited to attend the Conference.

Gerald Gross, Secretary-General of ITU, addressed the Commonwealth Press Union on June 15, on the work of the Union. In the process of this speech he explained that radio frequency problems had become more acute since the Space Radiocommunication Conference (Geneva 1963) decided to allocate 15 per cent of the entire radio frequency spectrum (more than 6000 Mc/s) to space communication. Gerry Gross holds amateur calls in both the USA (W3GG) and in Switzerland (HB9IA).

Finished. Voice of America recently announced that its "Radio Amateur Notebook" programme had been discontinued but no reason for the decision was given.

Transistor Lectures. A course of sixteen Wednesday evening lectures dealing with transistors and transistor circuit design is being arranged by the Department of Electrical Engineering, Hendon College of Technology, The Burroughs, Hendon, London, N.W.4. The course will commence on October 13 (7-9 p.m.) and the fee has been fixed at £3.15.0.

Pay-TV is the only company of the three licensed to take part in the Pay Television experiment to continue—the other two having withdrawn. Pay-TV is licensed to operate in Sheffield and in certain London Boroughs starting with Westminster and Southwark. The experiment will operate over relay networks.

Stuttgart Radio Fair is being commemorated, philatelically, by the German Federal Post Office who have issued a special DM 0.20 stamp to mark the event. Main element of the design is the Stuttgart television tower surrounded by a symbolic ring of spreading radio waves.

Telepersonality. Herbert Hoover, Jnr, W6ZH, President of ARRL and IARU, is featured as Telepersonality of the Month in the July 1965 issue of *Telecommunication Journal*, magazine of the ITU. The author of the article reveals that Herb., although a citizen of the United States, was born in London.

IEEE. Dr. R. G. G. Williams of **Philips** has been elected Chairman of the UK and Eire Section of the Institute of Electrical and Electronic Engineers. Other officers include Sir Harold Bishop and Sir John Hacking (Vice Chairmen), Dr. R. L. Smith-Rose (Treasurer) and R. C. Winton (Secretary). The Committee takes office on October 1.

Broadcasting Intruders. Peking (3500, 3659, 3669), Pyongyang (3560), Karachi (7009), Pakistan (7020), Peking (7034, 7060, 7080), Cairo (7050, 7073), Indonesia (7089), Moscow (7090), Teheran (7093), Vatican (14209), Cambodia (14308), Moscow (14320) have been reported by the International Frequency Registration Board as operating without authority in amateur bands. Fixed Service c.w. stations URS (7006, 7019, 7024), KUI 20 (7040), RVZ 73 (7074), YDY (7221), BXR (14336), have also been reported.

Meetings arranged by the Mullard Films and Lectures Organization are primarily designed to keep the trade abreast of current technical developments in the radio, television and electronics industries but interested radio amateurs can also apply for an invitation by writing to Mr. Ian Nicholson, Mullard House, Torrington Place, London, W.C.1. September programme: 7th, Railway Hotel, Greenford; 14th, Angus Hotel, Dundee; 15th, Cummings Hotel, Inverness; 16th, Douglas Hotel, Aberdeen; 27th, Greyhound Hotel, Croydon; 28th, Winter Gardens, Cleethorpes; 29th, The Guildhall, Northampton; 30th, Derbyshire Yeoman, Derby. Meetings commence at 7.45 p.m. The talk at each meeting will be "Transistor Topics" followed by the films "Thin-film Microcircuits" and "Electro-magnetic Waves, Part II."

New IARU Member Societies. The Radio Society of Zambia and the Bahamas Amateur Radio Society have been elected members of the IARU by 33 votes to none opposed. The former Society has been invited to become a Subscribing Member Society of IARU Region I Division.

Nigerian Amateur Radio Society has applied to IARU Headquarters for membership of the Union. Member Societies are now voting on a proposal that the application be approved. All of the 21 licensed amateurs resident in Nigeria at the time of the application were members of NARS. In addition there were 22 non-licensed members.

Active again are the amateurs of Lebanon, thanks to efforts made by the Association of Lebanese Radio Amateurs (ARAL) who finally persuaded the Lebanese Government to restore operating privileges.

First. Mrs. Grace Glorioso, TI2MAG, who lives in Louisiana, was the first to be granted an operating permit under the new reciprocal operating regulations.

Amateur Radio was the topic discussed in the seventh of a special series of articles—"Telecommunications Yesterday, Today and Tomorrow"—now appearing as a Centenary Year feature in *Telecommunication Journal*, monthly magazine of the ITU. Written by George Jacobs, W3ASK, a regular contributor to *CQ*, the article (July 1965 issue) records some of the more important milestones in Amateur Radio history, referring especially to the contributions made by amateurs in the development of the short and, in later years, ultra-short wavelengths. The article is illustrated by an excellent photograph of the station of Leon Deloy (8AB of Nice) taken at the time he helped to make history on November 27, 1923. On that date the first amateur two-way Transatlantic contact took place on short waves.

Merger. The journal *British Communications and Electronics* has been merged with *Industrial Electronics*. The scope of *IE* has been broadened to cover the fields which come within the purview of *BC & E*.

Electronic Marine Distress Signal Beacon developed in the USA is a dual action device that acts as a powerful automatic distress frequency transmitter as well as a flashing light beacon. Usable on commercial and pleasure boats, life rafts and other small craft, it can bring help quickly in time of trouble. When activated the hermetically sealed buoy beacon automatically and instantly transmits its radio signal to monitoring stations on the distress frequency. At the same time a flashing neon light alerts ships up to 15 miles away and aircraft up to 50 miles. Both signals work 15 days or more under the most adverse marine conditions. Trade name is TransRALite.

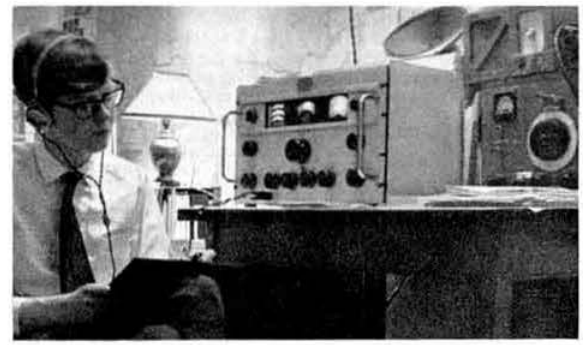
Long Laser Beam Folded. A laser beam 3·2 kilometres long has been folded into a three-metre space by reflecting it over a 1000 times between two mirrors. Because the points of reflection on the mirrors do not overlap, information can be modulated on to the light beam, stored and retrieved ten microseconds later. The experiment, carried out by Bell Telephone Laboratories, opens the way for optical delay lines used as high speed, sequential, computer memories.

QUA Associates

conducted by "JIX"

SEPTEMBER here again, and a new "winter season" about to begin. The evening institutes, clubs and Youth Centres will shortly be a hive of activity. There will be the usual RAE courses starting up, and I hope many of you will make use of them to gain the know-how for advancement in the movement. Who knows, next summer it may be your call going out, a little shaky maybe, but going out perhaps on 20 metre c.w.

There are, as mentioned, the numerous Youth Centres starting their sessional activity. Why not pop along and see your local Warden and suggest starting an amateur radio group. Then collect all the friends you can, advertise, contact young people via libraries, schools and the local newspaper, and form your group. Pick a keen secretary (he does not have to have GCE English), who can ensure reports about progress, with a note now and then to *QUA* . . . Be always on the look out for the convert to amateur radio; who knows, your youth group may help a young boy to take up what might be a lifetime hobby.



Paul A. Harris, A4410, with his AR88D, the latest addition to his shack equipment.

News from the Post-bag

There is the now usual flow of, shall we say, paper QSO's to *QUA* . . . . . this month. I find the things you have to say very interesting, and I know most other readers do also, because many letters ask me to expand the news about other "A" members. The most interesting letters are perhaps those which take up a point about other views expressed previously in this column. I know quite a number of "correspondence" links that have grown between "A" members via *QUA* . . . . . so don't forget that ideas on communal projects and meetings, together with criticism of a constructive kind, keep things moving, and show that you have what it takes.

Terence Wright, A4577, who lives in County Down, drops a line from Northern Ireland. He has been keen on *QUA* . . . since joining the RSGB last March. Terry has a PCR receiver and hopes to build a converter so that the 160, 80 and 10m bands can be covered.

Andrew Bird, A4615, of Berkhamstead writes for the first time. Welcome to the society Andrew. The station at A4615 consists of a Canadian R103 receiver, and although 40m has not produced much yet, the other bands are quite lively. Andrew comments on an oscilloscope he has built, and also on a three weeks holiday in France!

M. Woolin, A4431, writes again; this time he mentions that GCEs are over and that he has left school, so there should be more time for the RAE work. Best of luck.

It's also quite a while since we heard from **Murray Wilson, A4223.** Murray has just completed a move with his family from Surrey to Ipswich. He now uses an R1155 receiver, and it seems to be performing well.

Paul A. Harris, A4410, hailing from Scotland, drops a note to us for the first time. He recently acquired an AR88D receiver (which is a good start for a future station). Paul say's that in the north of Scotland there is a great deal of enthusiastic interest in amateur radio, (that's interesting because the Editor, G2AHL, said the same thing to me, after a visit there). He is active in the Moray Firth ARS and the club hopes to put its station (GM3JKN) on the air soon, from some of the rarer Scottish counties. If you listen on 160m you may hear GM3JKN.

John Monally, A4585, sends a first letter to us. John, who lives in Southampton, uses an SR-40 four valve receiver, with a 50ft. aerial. He thinks it should be compulsory to fit suppressors on all motors, but that is yet another loss of freedom! It would be much better to *persuade* citizens to cut down their interference radiation, from all "noisy" sources, don't you agree?

David Aslin, A4677, has been in the Society for three months now, and he says that *QUA* . . . . . is very enjoyable to him. Especially the alphabetical tech. snippets. By the sound of it, Dave would like to carry on some correspondence with other "A" Members. His address is: 94 Buryfield Road, Solihull, Warks.

Paul Griffin, A4753, is a new member of the Society, and he hails from St. Helens. Using an R1155 receiver Paul is beginning to hear further afield. There seems to be quite a knot of "A" Members in St. Helens. Paul knows A4035, who was meeting the French YL in London. Perhaps we shall hear about a Club they have set up soon, let us know Paul.

Alan Shepherd, G3RKK, has written to me again. I think Alan has so many good ideas that it is difficult to keep up with them. Above all (Alan won't mind me saying it I'm sure), he is an *enthusiast*. I think we will be hearing more of Alan's social work, when he gets time to work with us. I'm certainly thinking of calling him in to help us with setting up Amateur Radio Camp and Youth schemes. And if ever I have to vacate the *QUA* . . . . . Associates' chair, I know who I would ask to take the controls . . . . .

* * *

That is all for now, so 73 to you all. Remember the week-end meeting on the 18th of this month—let me know quickly if you want to come along. JIX.

* Ken Smith, G3JIX, 82 Granville Road, Walthamstow, London, E.17.

Letters to the Editor

Neither the Editor nor the Council of the Radio Society of Great Britain can accept responsibility for views expressed by correspondents. Letters for inclusion in this feature should be concise and preferably not more than 200 words in length.

Radio Amateurs' Summer Camp

DEAR SIR,—I have noticed during the last few months that you have devoted a page or so to the Associates of the Society giving some very useful and interesting information to encourage future licensed amateurs.

It has crossed my mind that a week's holiday camp, say a spot like the Ashdown or New Forest, under the direction of a couple of fully licensed amateurs would be of great interest to those younger members and it may also help BRS chaps who are keen on becoming active operators.

A station could be set up and the full workings of the gear used could be explained, so also could a closed circuit c.w. transmitter be handled for speed practice. If it was organised on the same lines as the Boy Scout movement I feel not only would it be a change of air for the participants but also a worthwhile and useful holiday. Although a little late for this season perhaps such a scheme would be met with a favourable response for next year.

Yours faithfully,

Wallington, Surrey. IVOR A. G. COLE, BRS25414, ex-2ACO

Four Metre Operation

DEAR SIR,—The Sheffield Amateur Radio Club has recently purchased a B44 set with a view to conversion to 4m operation. We aim to encourage the use of this band for local and mobile working in the area. Since activity on the band is at a very low level, we feel that we can start from scratch as regards methods of operation.

Vertical polarization is to be used as this will simplify aerial installation and eliminate the need for aerial rotation. Initially, two crystal frequencies only will be used on the club transmitter, one for calling and one for working. Ultimately we hope to establish an amateur radio network in the area.

In case anyone feels that this form of " go it alone " operation is undermining attempts to establish a band plan for 4m, I must emphasize that the set-up envisaged is for local working using the lowest possible power. For DX and contest working, horizontal polarization will be used, and any band plan will be observed.

I shall welcome comments from interested amateurs, particularly those that are likely to become affected by our plans.

Yours faithfully,

J. P. BILLINGHAM, G8AAC
Honorary Technical Secretary

Sheffield Amateur Radio Club,
Sheffield 11.

C.W. and the Two Metre Band Plan

DEAR SIR,—Having recently returned to 2m operation after a lapse of some 12 years I am appalled to find that c.w. operation has lapsed almost to the point of extinction. Whilst having nothing against a.m. phone operation for local work and for DX when conditions are good I consider that many possible extended range contacts under average or poor propagation conditions are being missed because of failure to use c.w. I accept, of course, that not everyone is interested in this type of operation; however, those who are, are operating under a considerable and unnecessary handicap. This arises in part because of the improvements in equipment and aerials which have taken place during the last decade making contacts over 200 or more miles possible even when propagation conditions are poor. Despite the Band Plan it is therefore necessary to tune perhaps 1 Mc/s of the band with the aerial pointed in a given direction and the possibility of establishing contact is reduced.

Considering that signals are invariably weak and fading and that stations who may be simultaneously operating may have their aerials pointed away from one another and be tuning another portion of the band, it is hardly surprising that random weak signal contacts are rare.

If we consider pre-arranged contacts under poor conditions we find that they are nearly always successful. This is because the variables such as tuning and aerial pointing are eliminated.

I suggest therefore that a small section of the band (say the top 50 or 100 kc/s) is set aside exclusively for c.w. operation throughout the British Isles. One of the variables will thus be virtually eliminated and we may well see a considerable improvement in contacts effected under average conditions.

Yours sincerely,

Tanfield, Newcastle-upon-Tyne IAN PAUL, G3CYY

Contests

From Lieut.-Colonel Sir Evan Y. Nepean, Bt.

DEAR SIR,—A study of the correspondence columns during recent years will reveal growing discontent at the way the increasing number of contests are cluttering up our h.f. bands. There is a very large number of amateurs who, whether because of age or other reasons, are not interested in contests but wish to enjoy their hobby operating in their own time in their own way. I have further gained the impression that those who indulge regularly in contests are a small proportion of the whole. It is therefore wrong that the minority should interfere so seriously with the enjoyment of the majority.

In order that both parties should be able to enjoy their hobby without interfering with the other it is evident that sharing is necessary. There are so many contests that time sharing is not possible. Surely frequency sharing is the answer. I consider that the available frequencies should be shared equally between contestants and non-contestants and make the following concrete proposal.

Contest operating shall be limited to the following frequencies:
1850 to 1950 kc/s, 3550 to 3700 kc/s, 7025 to 7075 kc/s,
14,050 to 14,225 kc/s, 28,100 to 28,350 and 29,100 to 29,700 kc/s.

I should be most interested in the views of other members on this subject.

Yours faithfully,

Salisbury, Wilts. EVAN Y. NEPEAN, G5YN

Inter-College Contest

DEAR SIR,—Every October there is a flurry of activity in University Radio Societies and Clubs to try to encourage membership from fresh students. I feel that this activity should be loosely co-ordinated by means of a contest.

This contest would be open to all affiliated University and College Radio Societies and would last for a week, preferably " Freshers' Week." To promote the widest possible activity the contest could be divided into three sections; h.f., v.h.f., and u.h.f. Scoring could be on a points per contact basis in the h.f. section, and on a points per mile basis in the others, with band, country and continent multipliers. I would also suggest a bonus for contacts with other University Stations /M and /P stations.

The overall winner would be the Society with the highest total score in the three sections; there could also be winners of each section, and also, a prize for the non-University station giving the highest number of points. A listeners' prize could also be awarded.

Cross-band contacts could be allowed to score provided that contact is not established on either band otherwise. Stations would score according to the band used for transmitting. Thus if G3ZZZ on Top-Band QSO'd with G8ZZZ on 70cm, G3ZZZ would score on a points per contact basis and G8ZZZ on a points per mile.

Stations would have to operate from University or Society premises, but any number of stations could be entered, although in assessing the total, only the points from one station per section would count. Otherwise, the General Rules for RSGB contests would apply.

Although it is probably too late to organize anything for this October, I should like to know the views of other University societies.

I should also like to see a Universities' championship based on performance in RSGB contests during the year. Points in this could be awarded on the basis of position from the bottom with bonuses for leaders in any section of a contest. Perhaps if this idea were to be extended to cover all affiliated societies, contest activity would be considerably encouraged, especially in the poorly supported contests.

Yours sincerely,

J. P. BILLINGHAM, G8AAC

Dept. of Metallurgy,
University of Sheffield,
St. George's Square, Sheffield 1.

RSGB News Bulletin Service

DEAR SIR,—I have been sitting on the fence so long that it has become uncomfortable and must be overcrowded; I was so sure there would be so many " angry young men " (or old 'uns) among us, only too anxious to take up cudgels in support of Mr Chappell's letter in the May BULLETIN.

Since moving to this QTH I find that I can rarely hear the complete news bulletin without listening to three or more of the readings, because of interference from British stations.

If one wants a reasonably comfortable QSO on Sunday morning, surely one knows that 3600 kc/s is a spot where difficulty is bound to be experienced, as well as caused.

Some of the news readers are not free from blame—I heard one recently, who moved 5 kc/s at the end of his stint and then blamed the other chap's receiver when he received a complaint of QRM'ing the bulletin.

As the bulletin works its way from south to north, we cannot always stay at home until our turn comes, even if we could be sure of hearing it from any station, through the QRM.

It would appear that the only way to avoid the difficulty would be for everyone to steer clear of the frequency for the whole of the time the bulletin is going out, i.e., 09.30 to 12.15. Any station, whether he can hear the news being read, or not, would almost certainly cause interference to someone listening to it, should he start up on the frequency.

Incidentally, it is quite usual, at the end of a transmission, for a news reader to say, " stand by and I will let you know which way I will move." The Band Plan says there is only one way for him to move, and that is " up."

Yours faithfully,
E. S. G. FISH, GM2HCZ

Moniaive, Dumfries-shire.

DEAR SIR,—The Cornish Radio Amateur Club has used the RSGB News Bulletin facilities over a long period, and would like to take this opportunity of letting it be known how much the club appreciates the activities of all those concerned. Our thanks are passed to all the news readers, and those concerned with the administration and clerical work involved.

Yours faithfully,
BILL LOCKE, G3NKE
President

The Bulletin under Fire

DEAR SIR,—My first reaction to the letter from Mr. W. A. Scarr in your July issue was to doubt the validity of his inferences since he had only compared two issues of the BULLETIN.

Accordingly I compared the first six months of 1964 with the corresponding issues of 1965 using the headings given by Mr. Scarr with the following results to the nearest whole page.

	Jan-June 1964	*Jan-June 1965*
Total number of pages	408	416
Construction of amateur station equipment	72	34
Technical notes	22	20
Articles for beginners	3	13
Construction of ancillary equipment	8	6
Humourous articles	0	2

It is clear from these figures that this year's issues show a distinct shortage of constructional articles. However, it is worth noting that the 1964 issues under review containing one article of this type running to 20 pages (published in three parts) on the G2DAF transmitter.

Mr. Scarr's comparisons of pages of " Technical Notes " and of " Construction of Ancillary Equipment " are clearly invalid when one considers more than one particular issue of the BULLETIN. This leaves us with items directed to the beginner in Amateur Radio and those which I have called " humourous " and which Mr. Scarr calls " supposedly humourous." By this description I take it he was not amused. Neither was I for that matter but who am I to assume that others did not think them funny.

In the course of compiling the above figures I discovered an error in those published in Mr. Scarr's letter. The April 1965 issue contained six-and-a-half pages for the beginner but only four-and-three-quarter pages were devoted to elementary physics not six as stated. The remainder, one of G3JIX's " QUA Associates " articles was largely devoted to the construction of a 500mW transistor amplifier. Now I don't know how well up on transistors Mr. Scarr is, but I and no doubt other members, weaned on valves, are grateful for the simple articles on transistors which do not blind us with alpha's and beta's.

In any case, Sir, criticism of articles for beginners should come from those to whom they are addressed; it is surely well nigh impossible for the older hands to say what the beginner wants. The Society accepts subscriptions from Associate members, it therefore has a duty to publish items for them in the BULLETIN.

Finally, then, we are left with the shortage of constructional articles. Why are fewer articles of this type submitted? One possible reason is the proliferation of commercially equipped stations with the corresponding decrease of sources of these articles. Mr. Scarr suggests that more incentive must be given to members to make their work known. The Society already pays for contributions to the BULLETIN but who is in this hobby for the money anyway? It is distressing to find articles written by members of the Society in other Amateur Radio journals, published as commercial enterprises, when the BULLETIN is short of contributions. Members must realise their own responsibilities.

Yours faithfully,
Hunton, Bedale, Yorks. JOHN E. HODGKINS, G3EJF

DEAR SIR,—Mr Scarr's letter in the July issue of the BULLETIN prompts me to write you on the same matter, namely, the trend in the content of our journal.

I too feel that articles on elementary physics are quite out of place, as also are the supposedly humorous articles. I am sure I am not alone when I say that information on the various aspects of our subject is most eagerly sought, and I should have thought that such would be the case with the young enthusiast by the time he has arrived at the stage of becoming a subscriber to the RSGB and a reader of the BULLETIN.

May I go one stage further than G2WS and say that in the past I have always appreciated the high quality of the English and the clarity of statement used in the BULLETIN as compared with contemporary literature on the same subject. Can I detect a falling away from these high standards in favour of popular colloquialisms and arbitrary abbreviations?

If a scientific journal is to disseminate information with assured accuracy, the language must be beyond reproach.

Yours faithfully,
C. A. W. SIMMONS, G3SV

Blackmore,
Essex.

DEAR SIR,—G2WS has really started something! However, those who cry " us " might stop and wonder who is to produce the articles if not " us " ourselves? Is the Society in such a poor state that most members can only sit and be fed with circuits to copy? Is this " self-training in the technique of wireless telegraphy?" No, I don't think so, but nor is it a true picture of the average member.

Some of the poor transmissions we hear are from people trying hard to produce distortionless amplitude modulation of a transistor transmitter without spurious phase modulation, but if you manage it why not write it up?

The signal-frequency *Q* multiplier (*TT*, July) seems a good idea, but a British amateur had it working years ago! Was he discouraged from publishing it by the good old British attitude of " If grandfather didn't make steam engines that way it can't work? "

So, fellow members, don't just complain, put pen to paper and describe that unusual equipment. If you can't honestly say you have anything unusual it is time to build something? As a starting point, diode rectifiers in a Monimatch are a possible source of TVI due to the harmonics produced. However, if anode bend rectification using, say, an EF91 were used no harmonic current need flow in the r.f. circuit at all. What about it.

Yours faithfully,
Langley, Slough, Bucks. B. PRIESTLEY, G3JGO

DEAR SIR,—Mr. Scarr really must not parade his personal opinions in the form of assertions as though they were unchallengeable fact.

He has no authority, other than his own notion, for the assertion that the " first service " of the BULLETIN is to keep amateurs technically up to date. There are at least a dozen other possible primary aims which could be quoted and are just as valid.

Equally, Mr. Scarr has no authority except his own pessimism

for asserting that the BULLETIN is going to the dogs. In my own opinion, the BULLETIN is responding flexibly and intelligently to the changing currents of amateur interest within the limits of the material available to it.

The suggestion that momentous and gloomy conclusions must be drawn inevitably from the comparison of just two selected issues of the BULLETIN is empty of any logic. It would be just as reasonable to say that because last Wednesday was dry and this Wednesday is wet, all Wednesdays are getting wetter.

My own formula for the BULLETIN is first to offer a word of congratulation on its present level of achievement and then to make the following suggestions.

Campaign to still further increase the advertisement pages—which themselves are of substantial interest. Increase correspondingly the pages of editorial content so that the full diversity and richness of amateur experience can always find expression. To the same end use small print without hesitation for features which are recognisably of conspicuous minority interest. Encourage the Editor or an immediate assistant to circulate constantly among amateur meetings of all kinds so that the changing balance of amateur interests may at any time faithfully be mirrored in the BULLETIN pages.

Then leave it to the Editor without heckling and encourage him by our confidence.

Yours faithfully,

Solihull, Warwickshire. W. A. ROBERTS, G2RO

DEAR SIR,—I was interested to read, in the July issue, Mr. Scarr's views on the make up of the BULLETIN.

Whilst the examples shown tend to show an unbalance unfavourable to constructional articles, I wonder whether the same could be said for an average taken over a complete year's issues. However, I think two main issues emerge from G2WS's letter:

(a) The reluctance of members to write articles for publication. This is a real problem which is common to other technical fields. I think the chief causes are lack of time and facilities to produce the necessary material. Busy people always seem to be more interested in doing things than writing about them. To remedy this situation I suggest an intensified campaign to persuade members to contribute, coupled with an attempt to provide expert assistance and advice. Would it not be possible for material to be submitted in note form for the expert to put into the required format. Assistance might also be provided with the preparation of drawings and photographs.

(b) The amount of assistance the Society and its members should give to the young enthusiast. I consider we have a certain obligation to the rising generation of radio amateurs. Most of us started as "Young Enthusiasts" and can recall from our own experience the help we received from the old timers of the day. In many ways, the present day beginner is up against a much tougher proposition since the pace of progress and the scope of technology are faster and wider than say in 1939.

We must I think continue to devote a fair amount of space to the beginner although perhaps we can dispense with the Leyden jar. I suggest that the emphasis should be on simpler constructional articles dealing with receivers, converters and test gear, etc., but incorporating modern components and practices.

Yours faithfully.

Bromley, Kent. R. W. STANDLAY, G8RW

DEAR SIR,—I am in complete agreement with the opinions expressed by G2WS in the July BULLETIN.

The BULLETIN has become a curious mixture of technical competence and inconsequential trivia.

Could at least one April pass by without one of those "supposedly humorous articles."

Yours faithfully,

P. B. BRODRIBB, G3ONL

DEAR SIR,—The correspondence produced as a result of Mr. Scarr's comments on the standard of the present-day BULLETIN indicates a commendable concern on the part of the membership, but one point, not so far mentioned, should be considered.

The RSGB, besides being a hobby organization, is also a business concern, in the employ of which, a number of people earn their daily bread. It is, therefore, in the interests of the Society to enrol as many members as is possible without, at the same time, lowering their standards unduly.

Whether this is being done seems open to debate, when one considers the elementary level of the BULLETIN articles of which G2WS complains.

However, as it seems to have become the thing to enrol anyone who is the least interested in our hobby, we have, I suppose, to put up with the offending BULLETIN contributions, on the assumption that they are necessary to encourage beginners to remain members.

Let us welcome these beginners into our hobby by all means but, in these days when they want to run almost before they can walk, rather they should get their elementary theory from the handbooks and their experience of the amateur bands from intelligent short-wave-listening so that, in a couple of years, they will know something of what amateur radio is about and be truly suited for Society membership.

In this way, although our numbers may drop somewhat, the general standard will rise and the prestige of the Society with it. We shall then be able to fill the BULLETIN with articles of a higher calibre to the satisfaction of all.

Yours sincerely,

F. ALLAN HERRIDGE, G3IDG

Basingstoke, Hampshire. (Life Member)

Do we talk too much?

DEAR SIR,—I was glad to read Mr Biddell's letter "Do we talk too much?" in the June BULLETIN. Surely no band can be worse than 2m in this respect at the present time. Night after night the same brainless blathering goes on—the same operators, having found their victims, entertain them with all the petty domestic trifles which are seemingly of paramount importance in their own lives but can hardly be more than boring rubbish to the man who has to sit through it all at the other end.

May I suggest that all operators should endeavour to follow these simple rules whatever bands they are using:

(i) Never speak for more than five minutes continuously.
(ii) Never "show-off." You will be judged by what you do not say.
(iii) Remember that radio-communication is a science—don't show the world that you are a child by treating it as a toy.
(iv) Be considerate for the man at the other end and others using the band.
(v) Never use bad language or make vulgar jokes on the air. Avoid cheap remarks about drinking, etc., and never talk to people who are with you (especially on field-days) when the transmitter is on and others listening.

Perhaps someday the RSGB will consider drawing up a standard etiquette for amateur transmitters on the lines of that recognized by golfers.

Yours faithfully,

The Riddings, Coventry. W. A. SCARR, G2WS

Cardiff D/F Event

The following are details of a D/F contest to be held in Cardiff.

Sunday, September 26, 1965.
Organizer: T. J. Brooke, GW3GHC, 32 Elgar Crescent, Llanrumney, Cardiff.
Map: Ordnance Survey, Sheet 154, Cardiff.
Assembly: 13.40 BST for first transmission at 14.00 BST.
Location: NGR153837, Coed-y-Wennallt, off A469, 4½ miles NNW Cardiff Civic Centre, in car park opposite GPO Microwave Relay Station.
Talk-in Station: GW3KZX/M from 13.00 BST 1980 kc/s.
Entries: Two contests will be held simultaneously:
(a) for entrants on foot to find one station;
(b) for entrants with transport to find two stations.
Frequencies and call-signs will be given at the starting point. Contestants should notify the organizer at the starting point. After contest, reassemble at start. No refreshments will be available.

Bulletin Stencil Plates

Stencil plates used for the preparation of BULLETIN wrappers occasionally become worn or lose ink, with the result that the Post Office experience difficulty in tracing the address.

Members who notice that the address on the wrapper used for their copy of the BULLETIN is indistinct, or in any way faulty, are asked to advise Headquarters.

BERU 1965

Results of the Twenty-eighth Contest

THIS twenty-eighth meeting of the series in the RSGB's Senior Contest held on February 20-21, 1965, produced a record-breaking score of 4388 points from 454 contacts by the winner R. J. Milton, VS9MG, of the RAF, operating from Gan in the Maldive Islands. VS9MG has more than doubled his score in the 1964 contest when, as VS1LX he accumulated 2085 points for fifteenth place.

In second place is Robert Snyder, 9M4LP, operating from Singapore who had 277 contacts to produce 3135 points. Bob managed to operate for the whole period of the Contest and he too was able to more than double his previous score of 1515 in 1964. In third place is VE2NV, John Ravenscroft, with a total of just 3000 points from his 344 contacts and he has progressed from eleventh place last year.

The leading UK station was D. L. Courtier-Dutton, G3FPQ, whose score of 2645 from 221 contacts (77 with bonus) puts him in fifth overall place, 120 points below VE2NI.

Low Power Section

Mike Dransfield, no stranger to BERU, showed what can be done with low power by running up a total of 2430 points to put him a long way ahead of the rest of the field. Mike, as 5N2JKO, was winner of the High Power Section last year and is to be congratulated on what could be called a " double first." In second place is Sam Moore, VK7SM, who must also be congratulated on his efforts from Tasmania as most of the comments indicate that conditions from " Down-under " were not too good.

Receiving Section

The leading entrants in this Section are again in the same order as last year—first, second, third and fourth and all are to be congratulated on their efforts, particularly W. E. Wilkinson, BRS20317, who has kept off all challengers and has now had five firsts in a row!

HIGH POWER SECTION

Position	Call-sign	Total Points	Bonus Points	Power (watts)
1*†	VS9MG	4388	2140	150
2*	9M4LP	3135	1800	150
3*	VE2NV	3000	1280	175
4*	VE2NI	2765	1220	400
5*‡	G3FPQ	2645	1540	150
6*	9J2DT	2570	1100	100
7*	9J2W	2510	1020	100
8*	VE3KE	2375	1060	400
9	VO1FB	2290	720	150
10*	G5RI	2255	1400	150
11	G2DC	2105	1300	130
12*	ZB1RM	1921	640	150
13*	ZL4BO	1920	1040	150
14*	6Y5XG	1880	580	50
15	G6CJ	1875	1180	150
16	VE2ATU	1855	720	250
17	G5WP	1850	1300	150
18	VE3BWY	1780	900	550
19	VE3BHS	1770	880	150
20	VE3AU	1745	920	600
21*	VK2APK	1685	1060	150
22	G8KS	1665	1100	150
23	VE1ZZ	1595	780	700
24	G3KSH	1540	1060	150
25	VE2AYY	1485	700	180
26	G3DYY	1470	980	100
27	ZC4CZ	1465	1000	150
28	G3GGS	1435	960	100
	VK2GW	1435	1020	100
	VK3AXK	1435	940	100
31	ZB1HKO	1400	440	150
32	G3EYN	1385	900	150
33	VE2BV	1335	580	500
34	G3NAC	1330	820	150
35	G6XL	1325	920	140
36	G3GEW	1305	840	150
37	VE3BMB	1300	740	100
	VK4LT	1300	800	100
39	G5HZ	1290	860	150
40	VS9PGM	1245	560	125
41	G3LHJ	1215	740	50
42	VE1TG	1210	420	500
43	G5JU	1170	800	150
44	VE8CO	1165	420	200
45	VE1EK	1140	420	90
46	VK5KO	1120	800	150
47	G3PSY	1100	740	120
48	G3AAE	1085	820	125
49	G2QT	1070	660	150
50	VE2WA	1020	560	600
51	G5VU	900	580	50
52	G3APN	890	600	150
53	G2FYT	865	620	150
54	G3IGW	840	600	150
55	GW2DPD	805	500	100
56	G3KHA	800	600	100
57	G3HZL	775	540	150
58	VK2PV	760	520	150
59	GW3CW	705	500	100
60	G3OHP	695	500	150
61	VE3BJK	685	280	180
62	G8KU	675	460	120
63	G2GM	665	420	150
64	G8QZ	620	460	150
65	G2AJB	615	400	140
66	VE2LY	585	240	50
67	G3JKY	570	420	100
68	VK3XB	560	380	150
69	G2BOF	555	360	150
70	9J2JG	540	320	40
71	GI3OTV	535	360	150
72	G3MWZ	515	340	50
	G3GSZ	515	320	150
74	G3IYT	510	380	150
75	VE1AE	500	140	150
76	VE3DDU	485	200	75
	5Z4JX	485	260	60
78	G2HLU	480	340	100
79	VP8HJ	470	180	50
	G2BLA	470	340	90
81	VK2RA	450	320	150
82	ZE3JO	440	260	70
83	VS6FO	385	280	60
84	VK9DR	355	260	50
85	G2ZR	335	240	50
86	G3NSY	285	220	50
87	VE6VO	280	100	250
88	G3RJB	220	140	50
89	G3FBA	190	140	120
90	G3WP	185	140	140
91	VK6AS	175	140	45
92	VE5PM	160	100	300
	VE3MZ	160	100	275

LOW POWER SECTION

Position	Call-sign	Total Points	Bonus Points	Power (watts)
1*§	5N2AAF	2430	1000	24.5
2*	VK7SM	1175	740	20
3*	7Q7EX	1135	580	15
4*	G3GNS	950	640	25
5*	VK3ZC	885	600	25
6*	VK2QK	850	560	25
	ZB1J	850	180	24
8	VK3RJ	765	500	25
9	VK5ZF	655	400	25
10	G3NKQ	595	420	25
11	G3SEP	255	180	15
12	ZL1MT	230	160	15
13	VS6FF	190	120	20

RECEIVING SECTION

Position		Name	Total Points	Bonus Points
1*‖	BRS20317	W. E. Wilkinson	2500	1580
2*	BRS24775	Eric Howell	2195	1440
3	BRS24733	Martin Harrison	1950	1260
4	A2340	Barry Curnow	1370	920
5*	BCRS195	Eric Trebilcock	1160	720
6	BRS18461	F. Powell	1025	720
7	A2966	S. Jesson	265	180

* Certificate Winners

† BERU Senior Rose Bowl or Miniature

‡ Col Thomas Rose Bowl or Miniature

§ Junior Rose Bowl or Miniature

‖ Receiving Rose Bowl or Miniature

The standard of logs from this section is exceptionally high and the checking is quite a pleasure. It is good to see again a log from Eric Trebilcock—BERU would not seem the same without a receiving log from Eric who has been entering for many years and whose name must be more familiar than any other to the many Committee members who have taken part in checking.

Conditions

Even with minimum sunspot activity there were contacts on all permitted bands and the opening on 28 Mc/s lasted several hours on the Sunday.

The pattern seems to have been that the l.f. bands were most used by VE, 21 Mc/s producing the contacts from Africa and 14 Mc/s being as usual the all-continent band. An analysis of the high scores by band-contact is shown and this does reveal the change in the frequencies used. However, conditions seem to have been only fair over the whole period although there were some bright spots.

Mike Dransfield, 5N2AAF, in addition to sending in his winning Low Power log sent a long and interesting report on the conditions. Unfortunately, space will not permit reproduction in full and at the risk of spoiling the report some extracts will have to suffice.

28 Mc/s. There were some good openings on Sunday between 10.00 and 14.30 GMT to Europe and East Africa. G, GI, ZC4, ZB1, ZE, 9J2 and 5H3 were worked. Signal strengths of some G's were well over S9, a foretaste of the future conditions to be expected on this band in the next few years.

21 Mc/s. This band brought in most contacts. G's were workable between 08.30 and 16.00, Africans also came through for about the same period, there were brief openings to the Far East at 13.00-14.00, and the Canadians, with attendant W's, between 15.00 and 18.00 GMT. 6Y5XG was also worked on this band at 15.20.

14 Mc/s. G's were worked from 06.30 to 20.00, although the stronger ones (already in the log) were still coming through as late as 22.00. Canadians were audible from just before sunset until midnight, with good VE6-8 signals peaking at 20.00. Commonwealth stations in South America are, of course, restricted by geography, but VP8HJ in the Falklands was a useful 25 points at 21.30. African stations could be worked for practically the whole of the 24 hours, but Asians were more difficult: the Near East including an acervation of VS9's in Aden, Perim, Maldives and Oman, while all that was worked in the Far East was Singapore and VU2NRA in the Andaman Islands for a new country. Conditions to the Pacific were not good. An incredibly strong signal from KR8CX coming through long path at 03.30 intimated that some rare VR or ZK prefix would be audible, but such DX was not forthcoming; three VK's all worked around 07.00, were the sole entries in the log from this area.

7 Mc/s. Conditions were fair, but 25 watts does not make much impression. The only unusual station was 9M4LP, worked at 22.10 when hardly any Europeans or North Americans were audible.

3·5 Mc/s. A lone VE1 and a few G's with good pairs of ears managed to exchange numbers with 5N2AAF. Again, the low power was the limiting factor, as many G's were heard and called, but not worked.

Bob Snyder, 9M4LP remarks that the strongest signals of the Contest were on 28 Mc/s for Australia and Africa but he had no luck in raising G on this band. 7Q7, 5N2 and 9J2 seem to be the only countries to have contacts with G on this band.

From the other side of the Atlantic the conditions on the lower frequency bands were good and VE2NV and VE2NI made full use of 3·5 Mc/s and 7 Mc/s to gain third and fourth places. An interesting point is that VE1ZZ who is in twenty-third place had all his contacts on the two l.f. bands and included contacts on 3·5 Mc/s with ZL, VK and 9M4.

Comments

Unfortunately the Contest again clashed with the WSEM contest and the tactics of the Europeans in persistently calling Commonwealth stations ruined many contacts for BERU contestants. Several comments are made on this state of affairs but the remarks made last year can only be repeated—if the Committee could find out when a WSEM affair was to take place—that date would be avoided, but until then it is still a question of hoping for the best. However, in an attempt to avoid this difficulty and also to give better conditions and encouragement to the VK's and ZL's the date for next year has been moved into March—maybe that will avoid the Iron Curtain QRM!

G3FPQ found the contest as enjoyable as ever and conditions good on the first day but poor on the Sunday—a pity, as he says, because on the day after, conditions were excellent, especially on the l.f. bands. 9J2W finds that an attractive DX call-sign is a mixed blessing in BERU—" infinitely more nerve racking and harder work than any other contest—for every BERU station that called there must have been five non-contestants."

VO1FB makes a welcome re-appearance in the table and comments on reasonable conditions and excellent operating standards.

For Bob Nash, VE3HS, this was his first BERU and he found it very enjoyable—more so as he managed a long path contact with VK5KO on 7 Mc/s and 9M4LP on 14 Mc/s.

Committee Comments

The standard of logging was as good as usual and the scoring system does not seem to present any difficulty—there have been suggestions that there should be a change to allow for power differences but this is already covered in the High and Low Power sections. The power used has been shown against entrants this year and only 14 (all VE's) out of 93 used more than 150 watts input. One log showed some rather doubtful contacts—doubtful only because no other competitor worked these stations and there are entries from the same area. Whilst there is nothing in the rules to prevent schedules being arranged beforehand it is essential that when these schedules take place the operating must be in accordance with the terms of the licence!

Check Logs

These are always very welcome and the Committee thanks the following for their logs. VE1DB, VE3ADV, VE3AWE, VE3DU, VE8BB, VU2GG, VU2MD, G2YL, G2YS, G3GJX, G3LPS and G5GH.

How they made their scores

	Contacts				
	3·5	7·0	14·0	21·0	28 Mc/s
VS9MB	6	100	230	114	4
9M4LP	16	38	146	69	8
VE2NV	84	54	157	49	—
VE2NI	74	66	135	35	—
G3FPQ	30	46	91	48	6
9J2DT	—	17	132	130	15
9J2W	7	13	125	147	5
6Y5XG	38	66	108	48	—
ZL4BO	45	47	85	1	—

REGION 11
OFFICIAL REGIONAL MEETING

Colwyn Bay Hotel,
Promenade, Colwyn Bay
Sunday, September 26, 1965

12.15 p.m. Assemble
1.15 p.m. Luncheon
2.30 p.m. Business Meeting
5.15 p.m. Buffet Tea

A Top Band talk-in station will be in operation at the hotel, call-sign GW3MDK/A. Ample parking space is available. The proceedings will include a raffle.

The Council will be represented by
Mr R. H. James, GW3BFH and
Mr John C. Graham, G3TR

Admission will be by ticket only, price 21s. each including Luncheon and Buffet Tea or 5s. each including Buffet Tea only. Tickets are available until September 20 from: J. T. Lawrence, GW3JGA, 9 East Avenue, Bryn Newydd, Prestatyn, Flintshire.

Election of Regional and Area Representatives 1966-68

The terms of office of all present Regional and Area Representatives end on December 31, 1965, and elections have therefore to be conducted.

The Council has accepted a recommendation of the Membership and Representation Committee that in future all such representatives should serve for three years. It is considered that the new arrangements will lead to more efficient and smoother operation of the Scheme of Representation.

The details of the elections are as follows.

Regional Representatives

Not later than **Monday, October 4, 1965,** any **five Corporate members** resident in a particular Region may nominate any other qualified Corporate member resident in the Region for the office of Regional Representative by delivering their nomination in writing to the Membership and Representation Committee at RSGB Headquarters, together with the written consent of such person to accept office if elected. Each such nominator shall be debarred from nominating any other person for this election of Regional Representatives.

The names and addresses of the present Regional Representatives are given on page 569.

In the event of no nomination being received from the Corporate members in any Region by October 4, 1965, the Council reserves the right to make an appointment.

The following is a list of the counties in each Region:

Region 1 (North Western).—Cheshire; Cumberland; Lancashire; Westmorland; the Isle of Man.

Region 2 (North Eastern).—Durham; Northumberland; Yorkshire.

Region 3 (West Midlands).—Birmingham (Postal Area); Hereford; Shropshire; Staffordshire; Warwickshire; Worcestershire.

Region 4 (East Midlands).—Derbyshire; Leicestershire; Lincolnshire; Northamptonshire; Nottinghamshire; Rutland.

Region 5 (Eastern).—Bedfordshire; Cambridgeshire; Hertfordshire (outside London Region); Huntingdonshire.

Region 6 (South Central).—Buckinghamshire (outside London Region); Gloucestershire (excluding Bristol); Oxfordshire.

Region 7 (London).—The London Region covers the London Postal District, the whole of Middlesex and Surrey and all other territory within 25 miles radius of Charing Cross.

Region 8 (South Eastern).—Kent (outside London Region); Sussex.

Region 9 (South Western).—Bristol; Cornwall; Devonshire; Dorset; Somerset.

Region 10 (South Wales).—Brecknockshire; Cardiganshire; Carmarthenshire; Glamorgan; Monmouthshire; Pembrokeshire; Radnorshire.

Region 11 (North Wales).—Anglesey; Caernarvonshire; Denbighshire; Flintshire; Merionethshire; Montgomeryshire.

Region 12 (North Scotland).—Aberdeen; Angus; Banff; Caithness; Inverness; Kincardine; Moray; Nairn; Orkney; Perth; Ross and Cromarty; Shetland; Sutherland.

Region 13 (East Scotland).—Berwick; East Lothian; Fife; Kinross; Mid-Lothian; Peebles; Roxburgh; Selkirk; West Lothian.

Region 14 (West Scotland).—Argyll; Ayr; Bute; Clackmannan; Dumbarton; Dumfries; Glasgow (Postal Area); Kirkcudbright; Lanark; Renfrew; Stirling; Wigtown.

Region 15 (Northern Ireland).—Antrim; Armagh; Down; Fermanagh; Londonderry; Tyrone.

Region 16 (East Anglia).—Essex (outside London Region); Norfolk; Suffolk.

Region 17 (Southern).—Berkshire (outside London Region); Hampshire; Wiltshire; the Channel Islands; Isle of Wight.

Area Representatives

Not later than **October 4, 1965,** any **five Corporate Members** resident in an Area may nominate any qualified Corporate Member resident in that Area for the office of Area Representative, by delivering their nomination in writing to the Membership and Representation Committee at RSGB Headquarters, together with the written consent of such person to accept office if elected.

In the case of London, Area Representatives may be nominated for groups of Postal Districts. In the case of certain other large towns, Area Representatives may be nominated on a geographical basis, viz, North Birmingham, South-East Manchester.

Area Representatives will only be confirmed in their appointment if the total membership in the area they propose to represent is **at least 10.**

Ballots

In the event of more than one person being nominated for a particular office a ballot will be conducted, details of which will be published in the November 1965 issue of the RSGB BULLETIN.

Resignations

If, for any reason, an elected representative wishes to resign his office, he should notify Headquarters who will advertise the vacancy. ***Local members cannot automatically appoint another member to undertake the duties of a representative who has resigned.***

The Council reserves the right to call upon any representative to resign his office if, in their opinion, he is considered to be unsuitable or unsatisfactory.

GB2RS SCHEDULE

RSGB 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
	10.15 a.m.	Belfast
	10.30 a.m.	North Midlands
	11 a.m.	North West England
	11.30 a.m.	South West Scotland
	12 noon	North East Scotland
145·10 Mc/s	9.30 a.m.	Beaming north from London
	10.00 a.m.	Beaming west from London
145·8 Mc/s	10.15 a.m.	Beaming south from Belfast
145·30 Mc/s	10.30 a.m.	Beaming north west from Sutton Coldfield
	11.00 a.m.	Beaming south west from Sutton Coldfield
145·50 Mc/s	11.30 a.m.	Beaming north from Leeds
	12 noon	Beaming east from Leeds

News items for inclusion in the bulletins should reach Headquarters not later than first post on the Thursday preceding transmission. Reports from affiliated societies and from non-affiliated societies in process of formation will be welcome.

Election of Council, 1966

In accordance with Article 52 of the Society's Articles of Association the Council has nominated the following Corporate members to fill the vacancies in the Council which will occur on December 31 next:

Ordinary Members:

Mr. A. O. Milne, G2MI.

Mr. W. A. Roberts, G2RO.

Mr. G. M. C. Stone, G3FZL.

Not later than **October 10** next any 10 Corporate Members may nominate any other Corporate Member to serve on the Council by delivering their nomination in writing in a single document to the General Manager and Secretary, together with the written consent of such nominee to accept office if elected, but each nominator shall be debarred from nominating any other person for this election.

Council Members elected by Zones

Not later than **October 10** next any 10 Corporate Members resident in Zone B **(Regions 3 and 4)**, Zone D **(Regions 6, 9 and 17)**, and Zone F **(Region 15)**, may nominate any other duly qualified Corporate Member resident in the Zone concerned to serve on the Council by delivering their nominations in writing in a single document to the General Manager and Secretary, together with the written consent of such nominees to accept office if elected but each such nominator shall be debarred from nominating any other person for this election.

Candidates for nomination as Council members elected by Zone must be resident within the Zones for which they are nominated and the nominators must be resident in the same Zone.

The present Council Members for Zone B are Mr. F. K. Parker, G3FUR, for Zone D Mr. H. A. Bartlett, G5QA, and for Zone F Mr. A. D. Patterson, GI3KYP.

News from Headquarters

Mobile Operation

In the House of Commons, on August 4, 1965, Mr. George Wallace, M.P., asked the Minister of Transport what progress he had made with his consideration of measures for controlling the use of radio telephones on the highway and whether he would make a statement.

Mr. Tom Fraser replied, " I am glad to say that following the proposals which I circulated for comment on April 23, representatives of the manufacturers and the private operators of radio telephones have formed a Mobile Road Safety Committee. I welcome their offer to co-operate with my department in a permanent consultative body in order to further safety aspects, and I shall arrange for full consultation with it. With my right hon. Friend the Postmaster General I shall also be studying the road safety aspects of the Post Office radio telephones service which is now operating on a limited basis in London as well as in South Lancashire.

In these circumstances and in the hope that co-operation will promote the further development of efficiency as well as of safety, I have decided that there is no need for the time being to proceed with my earlier proposals for a Regulation prohibiting the use of radio telephone equipment by a driver when driving. I intend, however, to review this decision in the light of developments during the next two years. The use of a radio telephone by the driver of a moving vehicle may constitute an offence under section 2 or section 3 of the Road Traffic Act 1960, which relates to dangerous and careless driving respectively. The advice given to Post Office subscribers who are driving is to stop in a safe place before taking or making a call. I am sure this is the safest course for all drivers to follow."

Society Trophies and Premiums

The Council has made the following awards for 1965:

ROTAB Trophy to Mr. H. J. Chater, G2LU, in recognition of his consistent DX work for many years.

Calcutta Key to Mr. S. L. Hill, G8KS, for outstanding service to the cause of international friendship through the medium of Amateur Radio.

Wortley Talbot Trophy jointly to Mr. R. C. Cracknell, ZE2JV, and Mr. R. A. Whiting, ZC4WR, for their article " Transequatorial Radio Propagation during the Years of the Quiet Sun " published in the June 1965, issue of the RSGB BULLETIN.

Ostermeyer Trophy to Mr. Sven Weber, G6SFW/T, G8ACC, for his article " Tunnel Diode Amplifiers " published in the February 1965, issue of the RSGB BULLETIN.

Bevan Swift Memorial Prize to Mr. W. Blanchard, G3JKV, for his article " Panoramic Reception " published in the January and February 1965, issues of the RSGB BULLETIN.

Founder's Trophy to Mr. R. G. Flavell, GM3LTP, in recognition of his outstanding services to the Society.

The Council has decided not to award the Norman Keith Adams Prize, the Courteney Price and Varney Trophies for 1965.

Affilliated Societies

The following are now affiliated to RSGB:

BRADY CLUBS AND SETTLEMENT RADIO GROUP, c/o A. Jackson, Brady Clubs and Settlement, 192-196 Hanbury Street, London, E.1.

THE BROMSGROVE & DISTRICT AMATEUR RADIO CLUB, c/o J. K. Harvey, BRS19682, 22 Elm Grove, Bromsgrove, Worcs.

THE AMATEUR RADIO SOCIETY OF CHESHAM & DISTRICT, G3MDG, c/o D. Kind, 19 Hollybush Road, Chesham, Bucks.

THE OLLERTON BOY SCOUTS ASSOCIATION, RADIO HOBBIES CLUB, G3TZR, c/o I. G. Rees, BRS26039, 353 Park Road, Liverpool 8, Lancs.

Red Cross Transmissions

The International Red Cross Society in Geneva will be conducting test transmissions on 7210 kc/s during September and November this year. Listener reports are particularly desired and these should be sent direct to the British Red Cross Society, 14-15 Grosvenor Crescent, London, S.W.1, for the attention of Mr. Gregory. Official report cards are available from this address on receipt of a large stamped (6d.) addressed envelope. The information required is the signal strength, time, interference from nearby stations (quoting nationality if possible), whether any fading was present, and how other stations were being received in same band during the same period. The English transmissions will be at 06.30, 12.00, 15.30 and 21.30 GMT on September 21, 23 and 25, and November 22, 24 and 26.

RSGB National Mobile Rally

Woburn Abbey, Bletchley, Buckinghamshire

by permission of His Grace the Duke of Bedford

SUNDAY, SEPTEMBER 12, 1965

* Park opens 11 a.m.
* State Apartments open.
* More than 3,000 acres and 2,000 animals.
* Children's Playground, Pets Corner and Boating Lake.
* Restaurants and Snack Bars.
* Woburn Abbey Safari.
* Static Exhibitions of Model Aircraft and Trains.
* Children's and Novelty Sports.
* Mast Erecting Race.
* Children's Lucky-dip.
* Surplus Sale and Trade Exhibition.
* Grand Raffle (Ladies and Gents).

CAR PARKING—Specially reserved Rally Car Park.

TALK-IN STATIONS—GB2VHF and GB3RS on 2m (144·86 Mc/s), 4m (7·260 Mc/s), 80m s.s.b. (3·75 Mc/s) and 160m (1940 kc/s).

Organized by the Radio Society of Great Britain

Mrs E. M. Jones

A large number of amateurs will have learned with regret of the death, after a very brief illness, of Mrs E. M. (Joan) Jones, wife of Lawrie Jones (G5JO), of the Grange, Bottisham, Cambridgeshire, on Sunday, June 6.

At their previous home in Cambridge, and at "The Grange," visiting hams were always assured of a very hearty welcome. She was a Director of Labgear Ltd., and in that capacity she took a very active interest in the day-to-day running of the business right up to the time of her death.

Much sympathy is extended to Lawrie Jones in his sad loss.

Sir Hiram Maxim

The Greater London Council, on the advice of its Historic Buildings Committee, is to erect a plaque at 57d Hatton Garden, Holborn, in commemoration of Sir Hiram Maxim (1840-1916), inventor and engineer. Best known as the inventor of the Maxim machine gun he also demonstrated important improvements in the design of electric lamps, vacuum pumps and other electric and mechanical appliances.

Sir Hiram's son—Hiram Percy Maxim—also a great inventor, founded the American Radio Relay League in 1914, became its first president and remained in that office until 1936.

By coincidence, the London Wireless Club, forerunner of the Wireless Society of London and the Radio Society of Great Britain established a workshop and club room at 107 Hatton Garden in 1913 and remained in occupation there until the outbreak of the 1914-1918 war. Mr A. W. Gamage, founder of the famous Holborn store, owned the premises occupied by the London Wireless Club and could well have owned the premises occupied by Sir Hiram Maxim.

Hiram Maxim, although born in the United States, lived most of his life in England. He became a British subject and was knighted in 1901. J.C.

Area Representatives Badges

Badges for Area Representatives are now available from RSGB Headquarters, price 10s. each including postage.

Claims for RSGB Certificates

Members are reminded that claims for RSGB Certificates should be sent direct to Headquarters. Claims are acknowledged on arrival and passed to the Honorary Certificates Manager for attention.

Obituary

Kenneth Edmund Brian Jay, M.B.E., G2HJ

The death occurred on August 3, 1965, of Kenneth Edmund Brian Jay, G2HJ, aged 56 years, whose home was at East Hendred, Wantage, Berkshire.

Licensed in the late 1920's, Brian Jay was very active in pre-war days on 7 and 14 Mc/s. In most recent years he had become the unofficial historian of the United Kingdom Atomic Energy Authority. A principal scientific officer in the Information Section at Harwell he wrote a number of books about atomic energy; one of them, *Britain's Atomic Factories*, published 11 years ago became a Stationery Office best seller. The book lifted the veil on part, at least, of Britain's atomic developments. Mr Jay had worked at Harwell since 1947. He leaves a widow and one son. J.C.

Society Affairs

A Brief Report on the July 1965 meeting of the Council

A MEETING of the Council was held on July 5, 1965, and was attended by Messrs. E. W. Yeomanson (President), H. A. Bartlett, N. Caws, J. C. Foster, J. C. Graham, R. C. Hills, E. G. Ingram, A. O. Milne, L. E. Newnham, F. K. Parker, A. D. Patterson, J. F. Shepherd, R. F. Stevens, G. M. C. Stone, J. W. Swinnerton (Members of the Council), John A. Rouse (General Manager and Secretary), and P. C. M. Smee (Minuting Secretary).

Apologies for absence were submitted on behalf of Mr. L. N. Goldsbrough, Mr. R. H. James, and Mr. L. Varney.

Motor Vehicle (Construction and Use) Regulations

The President reported on a meeting at the Ministry of Transport at which representatives of the Society had put the case for the Amateur Radio movement. Other organisations represented at the meeting included the British Medical Association, the British Gliding Association and the Water Boards' Association. As part of the Society's contribution to the meeting, an amateur mobile station was available for inspection by Ministry officials.

It seemed likely that there was a good chance that the proposed regulation regarding operation whilst mobile would not implemented (see page 606).

Relay TV Problems

The Council received a further report on problems arising from the susceptibility of a television relay system to signals in the 3·7 Mc/s range. It had been made clear to the company concerned that the amateur was operating his transmitter within the terms of his licence, and the Society considered the matter was one solely for the company to remedy.

Recommendations of Committees

The Council accepted recommendations relating to the provision of a reserve aerial for the GB3VHF and GB3ANG (*V.H.F. Committee*), financial arrangements for the Society's participation in the *Daily Mail* Schoolboys' and Girls' Exhibition, and to the production of a new publicity booklet (*Education Committee*), and prizes to be awarded at the 1965 RSGB International Radio Communications Exhibition (*Exhibition Committee*).

Membership

The Council approved 91 applications for membership (70 Corporate and 21 Associates). In addition, eight applications for transfer from Associate to Corporate grade were accepted.

The subscriptions of two members were waived; one on the grounds of blindness, the other on the grounds of total incapacity.

Affiliation

The Council granted affiliation to:
Brady Clubs and Settlement (Radio Brady Group).
Oxford University Radio Society.
Stevenage and District Amateur Radio Club.

Election of Council, 1966

The Council agreed on the members to be nominated to fill the vacancies which will occur on December 31, 1965. (An announcement appears on page 606 of this issue.—EDITOR.)

Noise Interference

A letter from a member drawing attention to the growing problem of noise intereference from high voltage electricity supply systems was referred to the GPO Liaison and TVI Committee for attention.

Reciprocal Licensing

It was reported that the Post Master General was to be asked in the House of Commons on July 28 for a progress report on negotiations for reciprocal licensing facilities with foreign countries.

Reports of Committees

The Minutes of the meeting of the V.H.F. Committee held on May 31 and of the meeting of the V.H.F. Contests Committee held on June 23, 1965, were accepted as reports.

* * *

The meeting ended at 10.05 p.m.

Sir Ernest Fisk

The death in Sydney, Australia, on July 9, 1965, of Sir Ernest Fisk, recalls the part he played shortly after World War II in helping the Society to establish at New Ruskin House in the heart of Central London a Headquarters Station. Even today the masts erected for that station remain *in situ*. Sir Ernest at that time was Managing Director of Electric and Musical Industries Ltd. and it was through the good offices of that company with the help of on-the-spot RSGB Council members, H. A. M. Clark, G6OT, F. J. H. Charman, B.E.M., G6CJ, and G. M. R. Scott-Farnie, C.B.E., G5FI, that the station matured. True, it was only used as a frequency marker but the birth of GB1RS was the first breakthrough achieved by the Society in the long struggle it had had to persuade the Post Office of the need for such a service and such a station.

A full description of the station was published in the August 1948 issue of the BULLETIN.

Sir Ernest established the first broadcasting service in Australia and conducted research with Marconi in many fields from whom he received Australia's first direct wireless message from Britain in 1918. He was also instrumental after the First World War in reforming the Wireless Institute of New South Wales, one of the first amateur radio organisations formed in the British Commonwealth.

Another link with the Society was severed on July 8, 1965, with the death in Dundee of Sir Robert James Patterson Harvey, K.B.E., C.B., who was Director of Radio and Accommodation 1954-55. Previously he had been Director of Inland Telecommunications 1949-54. During his last six years with the Post Office Sir Robert was Deputy Director General of the GPO. During his term as Director of Radio and Accommodation, he presided at many meetings between Post Office and RSGB officials.

A third link with the Society was broken with the announcement of the death on July 7, 1965, of Wing Commander Harold St. John, D.F.C., at Peacehaven, Sussex. Harold St. John was the officer appointed by the Air Ministry just prior to the war to undertake the training programme for the newly-formed Civilian Wireless Reserve. When war came he was appointed Chief Instructor at No. 2 Radio School, Yatesbury, Wiltshire, where he became known to many hundreds of radio amateurs who received training at that establishment. After the war, St. John became interested in Local Government and for several years he served on the Brighton Borough Council. He was 79 at the time of his death.

J.C.

BERU Contest

Rules for the Twenty-ninth Event, March 19-20, 1966

RADIO amateurs throughout the British Commonwealth are invited to take part in the Twenty-ninth BERU Contest to be held on March 19-20, 1966. The Contests Committee is again arranging to secure the maximum amount of overseas publicity but invites the assistance of members in bringing the dates and rules to the notice of operators throughout the Commonwealth.

1. **Sections.** The contest is divided into two sections: (a) High Power—maximum licensed power; (b) Low Power—maximum input 25 watts.
2. **Duration.** The contest (both sections) will start at 00.01 GMT on Saturday, March 19 and end at 23.59 GMT on Sunday, March 20 1966.
3. **Eligible Entrants.** The contest is open to all fully paid-up corporate members of the RSGB resident within the United Kingdom and to all amateurs licensed to operate within the British Commonwealth and British Mandated Territories. All entrants agree to be bound by the rules of the contest.
4. **Operator.** Only the entrant will be permitted to operate his station for the duration of the contest.
5. **Entries.** Entries should be set out, as shown in the example, on **ONE SIDE ONLY** of foolscap or International A4 paper. **Entries must be postmarked not later than April 12, 1966.** and must be addressed to the Contests Committee, Radio Society of Great Britain, 28 Little Russell Street, London, W.C.1, England. Log sheets are available from RSGB Headquarters on request.

BERU CONTEST, MARCH 19-20, 1966

Claimed Score.....

Section: (High or Low Power).....

Name..... Call-sign.....

Address .....

Transmitter.....(D.c. input to any stage of the transmitter shall not exceed 25 watts in the Low Power Section)

Receiver..... Aerial(s).....

DECLARATION: *I declare that this station was operated strictly in accordance with the rules and spirit of the contest, and I agree that the decision of the Council of the RSGB shall be final in all cases of dispute. I certify that the maximum input to the final stage of the transmitter was .....watts.*

Date..... Signed.....

Failure to sign the declaration may involve disqualification of the entry.

SAMPLE LOG SHEET

Date	Time GMT	Call-sign of station worked	I sent him	He sent me	Band Mc/s		Bonus Points	Points Claimed
19	0005	G4XXX	569001	559002	14		20	5
19	0009	VK2ZZZ	579002	569004	14		20	5
20	0012	GM4YYY	569113	579112	14		—	5
20	0730	GW4ZZZ	589154	589164	21		20	5
Total (Bonus Points + Points Claimed) 60 + 20 = 80								

6. **Bands.** Operation is restricted to the following bands: 3·5, 7, 14, 21 and 28 Mc/s. Transmission must be of type A1 (pure c.w.) only, and frequent tone reports of T8 or less may result in disqualification.
7. **Licence Conditions and Power Input.** Entrants must operate within the terms of their licences.
8. **Contacts.** Contacts may be made with any station using a British Commonwealth call-sign except within the entrant's own call area. British Isles stations may not work each other for points. Contacts with unlicensed stations will not count for points. The decision as to whether or not a contact is valid will rest with the RSGB Contest Committee. Only one contact on each band with a specific station will count for points. **Duplicate contacts should be logged,** but no points claimed.
9. **Scoring.** Each completed contact will score **5 points.** In addition a bonus of 20 points may be claimed for the first contact with each new Commonwealth call area (as defined in the Appendix) on each band. All British Isles stations (G, GB, GC, GD, GI, GM and GW) count as only one call area.
10. **Contest Exchanges.** Contest numbers must be exchanged and acknowledged before a contact may count for points. The contest number of six figures shall be made up of the RST report and three figures **starting with 001 for the first contact** and increasing by one for each successive contact, e.g., 559001 for the first and 439002 for the second contact, and so on.
11. **Awards.** At the discretion of the Council, the BERU Senior Rose Bowl or miniature will be awarded to the winner of the High Power Section, and the Colonel Thomas Rose Bowl will be awarded to the leading British Isles station in the High Power Section. The winner of the Low Power Section will be awarded the Junior Rose Bowl or miniature.

(*Continued on page 612*)

Appendix

The following call areas are recognized for the purposes of scoring in the BERU contest:—

AC3 Sikkim
AP (West Pakistan)
AP (East Pakistan)
G, GB, GC, GD, GI, GM, GW—as one call area
MP4 (Bahrein)
MP4 (Muscat and Oman)
MP4 (Qatar)
MP4 (Trucial Oman)
VE1
VE2
VE3
VE4
VE5
VE6
VE7
VE8
VK0 (Australian Antarctica)
VK0 (Heard Island)
VK0 (Macquarie Island)
VK1
VK2
VK2 (Lord Howe Island)
VK3
VK4
VK4 (Willis Island)
VK5
VK6
VK7
VK8
VK9 (Admiralty Island)
VK9 (Christmas Island)
VK9 (Cocos Island)
VK9 (Norfolk Island)
VK9 (Nauru)
VK9 (New Guinea and Bismark Island)
VK9 (Papua)
VO
VP1
VP2 (Augilla)
VP2
VP2(Antigua and Barbuda)
VP2 (British Virgin Islands)
VP2 (Dominica)
VP2 (Grenada & Dependencies)
VP2 (Montserrat)
VP2 (St. Kitts and Nevis)
VP2 (St. Lucia)
VP2 (St. Vincent & Dependencies)
VP3
VP4
VP5 (Cayman Islands)
VP5 (Turks & Caicos Islands)
VP6
VP7
VP8 (Falkland Islands)
VP8 (Grahamland)
VP8 (Sandwich Islands)
VP8 (South Georgia)
VP8 (South Orkney Islands)
VP8 (South Shetland Islands)
VP9
VQ1
VQ7 (Aldabra Island)
VQ8 (Chagos)
VQ8 (Agalega)
VQ8 (Rodrigues)
VQ8 (St. Brandon)
VQ8 (Mauritius)
VQ9
VR1 (Gilbert & Ellice Islands)
VR1 (British Phoenix Islands)
VR2
VR3 (Christmas Island)
VR3 (Fanning Island)
VR4
VR5
VR6
VS5
VS6
VS9 (Aden)
VS9 (Maldive Islands)
VS9 (Kamaran Island)
VU2
VU4 (Laccadive Islands)
VU5 (Andaman and Nicobar Islands)
ZB2
ZC4 (5B4)
ZD3
ZD5
ZD8
ZD9 (Gough Island)
ZD9 (Tristan da Cunha)
ZE
ZK1 (Cook Islands)
ZK1 (Manihiki Island)
ZK2
ZL1
ZL1 (Kermadec Island)
ZL2
ZL3
ZL3 (Chatham Island)
ZL4
ZL4 (Auckland & Campbell Islands)
ZL5 (NZ Antarctica)
ZM7 (Tokelau)
ZS3
ZS8
ZS9
4S7
5H3
5N2
5W1
5X5
5Z4
6Y5
7Q7
9G1
9H1
9J2
9K2
9L1
9M2
9M6
9M4
9M8

CONTEST NEWS

— RESULTS —— REPORTS —— RULES —

First 420 Mc/s Contest 1965

This contest, held over the weekend May 29-30, proved extremely popular. The numbers of entrants in recent years have been about 20 and this figure was doubled this time. The results include 12 holders of " B " licences but no entries were received from outside England and Wales.

Of the four stations at the top of the list G3LTF, G3NNG and G3EGV have held high places for several years.

This year's winner was P. K. Blair, G3LTF, operating from his home near Chelmsford, Essex. The transmitter was running 150 watts to a 4X250B p.a. and the receiving equipment used was AF139-EC88-xtal mixer. A close second was C. L. Desborough, G3NNG, operating portable from six miles west of Wantage, Berkshire. He describes his rig as " the same old DET24 p.a. in a quarter-wave cavity " and an all-transistor receiver using GM0290 r.f. amplifiers. Their scores are nearly twice those of the two leading stations in the last contest. The results table shows that the number of contacts exceeding 100 miles would be too great to quote in detail this time, and only contacts over 300 miles are listed here.

G5ZT/P	PA0LH	23.12 GMT	456 miles
G3OBD/P	PA0AKD	22.35 GMT	382 miles
G3OBD/P	PA0LH	22.41 GMT	370 miles
G3NNG/P	PA0AKD	22.03 GMT	340 miles
G3EGV/P	PA0AKD	22.15 GMT	335 miles
G3NNG/P	PA0HRD	23.24 GMT	333 miles

In all, seven Netherlands stations and ON4HN were worked by contestants.

A miniature cup will be awarded to G3LTF and Certificates of Merit to G3NNG and G3OBD, and BRS15744.

Equipment

There seems to have developed a standard pattern which was followed by a surprisingly large number. An analysis of cover sheets shows that over one-third of the entrants used the same type of transistor (AF139) for r.f. amplification and nearly as many used 8-over-8 aerials. Overall, 22 transistor and 12 thermionic front ends were in use. Over half the contestants used a QQV03-20A as the final stage in the transmitter, among the exceptions being G8AGQ running 2 watts to an A2521. Correspondingly, half of the transmitters were using powers in the range 20-30 watts.

Comments

Generally, the cold windy weather made life uncomfortable for the portable stations. Conditions were good on the Saturday evening, particularly in an east-west direction. G5ZT/P (Oakhampton, Devon) was a consistently good signal with G3NNG (Berks.) and also G2XV (Cambridge) throughout the contest. G3NNG also reports hearing PA0MSH at good strength for 2½ hours without anyone apparently being able to raise him, and also weak c.w. from a DL3. There seem to have been few contacts to the north, where G8AGQ/A (Sheffield), one of the most northerly entrants, worked all six stations within 50 miles. G5ZT was testing a new portable rig and expects to be using it for portable television transmission this summer. He believes several stations called him whom he did not hear, though the receiver was performing well. G2DHV (Sidcup, Kent), listening on Saturday evening and hearing nothing, wondered what had happened to all the S.E. London activity. GW8AGT (Pontypool) and GW8AAP (Wrexham) report that their receivers were not functioning as well as they expected and both wish to apologise to stations who may have called them in vain.

Several entrants expressed a wish for an earlier finishing time. G3EGV closed at 15.25 and G3OBD at 15.50. G3NNG and G3KEF suggested closing the 420 Mc/s contest at the start of the 1296 Mc/s event. A large number of entrants quoted a QTH which was impossible to define with any accuracy on the Ordnance Survey maps in use. This is a point which the Contests Committee has emphasised on previous occasions, e.g., BULLETIN, November 1964, p. 740 and March 1964, p. 191. A little thought by entrants when giving the location over the air would make calculation of scores much easier. Generally the standard of logs was very commendable.

[RESULTS

Position	Call-sign		Points	Contacts	Contacts over 100 miles	Location	Power (Watts)	Aerial
1	G3LTF		5238	72	23	Essex	150	3x24ele
2	G3NNG/P		5025	73	8	Berks.	10	4x8ele
3	G3OBD/P	M	4320	48	16	Dorset	24	32ele
4	G3EGV/P		3481	55	4	Berks.	20	24ele
5	G3KEQ		3453	53	14	Surrey	30	8/8
6	G2XV		3400	42	13	Cambridge	100	40ele
7	G3ORL/A	M	3366	53	14	Essex	25	24ele
8	G6GN		3114	38	12	Bristol	25	6/6
9	G8AAH/P		3064	68	2	Bucks	30	8/8
10	G5ZT/P		2954	23	12	Devon	20	8/8
11	G8AL		2831	65	8	Essex	40	24ele
12	G3LHA		2701	53	4	Coventry	40	6/6
13	G3HAZ/P	M	2553	52	7	Worcs.	30	8/8
14	G8ABP		2504	50	6	Birmingham	22	14ele
15	G2RD		2486	63	6	Surrey	30	24ele
16	G2CIW		2359	49	7	Birmingham	70	8/8
17	G8ADC		2238	44	6	Beds.	22	14ele
18	G3NBQ		2229	50	4	Coventry	28	8/8
19	G3KEF/P		2183	50	7	Leics. & Rugby	25	6/6
20	GW3ATM/A		2085	27	11	Monmouth	25	16ele
21	G8AAZ		2001	60	5	London	25	4/4
22	G3PTM		1801	40	6	Warwick	5	6/6
23	G8AAY/P		1800	26	6	Dorset	24	16ele
24	G8ACI/A		1664	27	6	Hampshire	30	10ele
25	G2HDJ		1659	36	4	Middlesex	120	4x11ele
26	G3AHB		1338	37	1	Bucks.	35	10ele
27	G8AEK		1169	41		Herts.	24	8/8
28	G8AGS/P		1076	28		Worcs.	9	14ele
29	G3JDM/P		934	17		Shropshire	8	8/8
30	G3TND/P	M	836	15	1	Somerset	20	24ele
31	G3UCU		783	38		London	6	14ele
32	G8AAA		781	32	1	Kent	21	8/8
33	G2FCA		728	35	1	Middlesex	25	4/4
34	G3FIJ		726	15	3	Essex	40	13ele
35	G3HRH		719	16	1	Herts.	25	8/8
36	G3OJE		418	22		London	25	8ele
37	GW8AAP/P		403	11		Denbigh	18	8/8
38	G8AGQ/A	M	145	6		Sheffield	2	6/6
39	G8ACK		90	7		London	10	8/8
40	G3RND		40	2		Pontefract	25	16ele

M — multiple operator

South Manchester Qualifying Event

For the start of this event, nine teams assembled at Dirtlow Rake, on Sunday, May 23, 1965. This spot on Old Moor/Bradwell Moor was approximately two miles from Castleton, Derbyshire and gave some magnificent views of the surrounding countryside. The area is well known for its scenic beauty, caverns, potholes, disused mines and walks. Dirtlow Rake, with its approach of a rather rough track provided a secluded spot and sufficient parking facilities in a rather busy area of narrow roads with limestone walls. Some of the competing teams arrived so early that they were able to vacate the site and pay a visit to one of the Peak caverns near the Winnats Pass. The weather was mostly fine but with a rather chilly wind. Towards the end of the contest period,

thunder storms came along and provided sharp torrential downpours of rain.

Transmitter A, G3KIQ/P, was situated in the surface workings of a disused mine—Shuttle Rake—one and a half miles and approximately south-east of the start. The aerial used was 90 ft. of fine wire fairly close to the ground, which caused many of the competitors to search in a nearby field just beyond the end of the aerial. Hikers were in constant evidence and helped to confuse the searchers and on one occasion harassed the operators at the transmitter. Unfortunately the easiest approach to the site meant many breaks in the low invisible aerial as people broke through it and desperate methods were necessary for its repair for successive transmissions.

Station B, G3SMT/P, was in a gully at Axe Edge End using a 300 ft. low invisible wire. The approach was rather difficult and Mr. Jackson succeeded in becoming stuck with the Land Rover, his final effort having to be made on foot. The saddest case was when one competitor began his initial attempt three to four miles away in a plantation. Then, having parked his car, he proceeded to walk over the next hill and the one after that and so on but with no success. Unfortunately for him, he turned back on the last transmission although the operators state that by then he was almost touching the end of the aerial. Only three competitors managed to find this station which was some 10½ miles from the start.

Tea was enjoyed by all at The Bull i' the' Thorn, Hurdlow, Buxton, when operators, competitors and friends made the total to 31. The organiser indicated the winners and that the SMRC Region 1 Trophy was not to be awarded as no Region 1 entrant had found both stations. Mr. J. A. Elliot, the SMRC Chairman, thanked all competitors for their attendance and expressed a vote of thanks to the operators. The proceedings broke up about 7 p.m. after many personal discussions, narratives, and promises to do better next time.

Incidentally, we must commiserate with Mr. Fowler as his receiver developed a fault at the start and he could not proceed in the contest, there not being any spare receivers.

Position	Name	Club	Time of Arrival Station A	Station B
1	I. A. Jackson	Rugby	15.36	14.50
2	P. Simmons	Loughborough	14.42	16.07
3	O. L. Harding	Rugby	14.20	—
4	D. Atter	RSGB Mc/r	15.34	—
5	J. I. Grant	Rugby	—	16.01
6	I. R. Knight	SMRC	16.04	—
7	R. P. Smith	SMRC	16.11	—

Salisbury D/F Qualifying Event

On July 4, 1965, 12 teams met the organizers from the Salisbury and District Short Wave Club at Stonehenge. The weather was kind and the day, although cloudy, remained dry. The B station, located on Gallows Hill, Breamore Down, five miles south of Salisbury, although a weak signal at the start proved the easier to find, nine parties being successful. The A station was located on a steep narrow bank densely covered with undergrowth between the A30 and main railway lines, half a mile east of Wilton, and although a strong signal proved more difficult. The presence of the railway and power lines made accurate bearings hard to determine. Only six parties were successful.

There were no serious incidents, but one member, catching his sump a severe blow on rough ground, shed a number plate and accelerator linkage, calling for running repairs. Another party ran off the southern edge of the map, found themselves wandering in unknown villages and had to ask a local inhabitant the way back to Salisbury. A third party was seen with a large spanner removing the side of the Land Rover so as to be able to receive while on the move.

Forty-seven hungry amateurs, their wives, daughters and YLs sat down to tea at 5.30 at the Auto-Diner Café in Amesbury in excellent spirits. The organizers look forward to meeting them again next year.

The following teams were successful in finding both stations.

Place	Name	QTH	Time of arrival Station A	Station B
1	M. P. Hawkins	Oxford	14.45	15.19
2	E. L. Mollart	Oxford	15.43	14.36
3	E. Bristow	Oxford	14.45	15.48
4	A. Bristow	Oxford	14.45	15.48 + 15 secs.
5	I. Butson	Oxford	14.54	16.19
6	I. A. Jackson	Oxford	14.44	16.25

Oxford D/F Qualifying Event

The Oxford Qualifying Event in this year's RSGB D/F Contest took place in dull but dry weather on July 18. In this, the organizers, M. P. Hawkins and C. L. Mollart were fortunate, as the approach to the start would have been impassable in wet weather. The start was at the junction of four tracks on the downs, north of Newbury, some two miles from the nearest road.

Station A, G3OOZ/P was well hidden in ferns on a common near Newbury, 8½ miles from the start. The organisers made use of a disused GPO Line for an aerial, 300 yards long. This produced peculiar conditions—reversed sense, etc.—over a wide area, and several teams spent up to an hour beating the undergrowth along its length. One exhausted (well-known) competitor gave up, but was revitalised when his wife seized his receiver and promptly made off, away from the transmitter!

Station B, G3JLE/P was located nine miles from the start in dense undergrowth at the side of the disused Berks.-Wilts. canal. The transmitting team was again so well concealed and guarded by an Ayrshire bull that competitors found extreme difficulty in unearthing them.

Only two competitors located both transmitters, the winner being Bert Newman, G2FIX, who arrived at his second transmitter only three minutes before the end of the contest.

Tea for 50 participants was held in Stanton St. John Village Hall. Mr. D. A. Findlay representing the RSGB Contests Committee, and always a welcome visitor, thanked Mrs. Mollart and her three lady helpers for providing and serving an excellent meal.

After presentation of prizes, a short but hilarious film of the 1965 Rugby event was shown.

Position	Name	Group	Time of Arrival Station A	Station B
1	A. C. A. Newman, G2FIX	Salisbury	15.12½	16.27
2	I. R. Butson	Oxford	16.29	15.16
3	O. L. Harding	Rugby	15.12	—
4	I. A. Jackson	Rugby	15.17	—
5	E. W. Bristow	Oxford	—	15.20
6	D. R. Ball	Oxford	—	15.20½
7	A. Bristow	Oxford	—	15.27
8	J. J. Grant, BRS6395	Rugby	15.31	—
9	C. H. Greenaway	Oxford	15.32	—
10	A. Holmes	Oxford	—	15.35
11	B. J. Mahony, G3NDM	Rugby	15.37	—
12	L. G. Auger	Oxford	—	15.44
13	G. T. Peck, BRS15402	High Wycombe	15.50	—
14	W. North, G3TRY	High Wycombe	15.51	—
15	T. Gage	Oxford	15.58	—

Top Band Contest, July 1966

It is proposed to hold a mid-summer Top Band contest on an experimental basis in 1966.

The Contests Committee would like to have from possible entrants their ideas as to what form the contest should take: time, duration, fixed or portable or both, handicap scoring system or not, should it take the form of a summer DX test etc.

Please attach comments to entries for the Second 1·8 Mc/s Contest or write to the H.F. Contest Committee at Headquarters.

CONTESTS DIARY

September 4–5	– Region I IARU V.H.F. Contest* (see page 544, August 1965)
September 4–5	– LABRE Contest (C.W.)
September 4–5	– V.H.F. National Field Day. (see page 336, May 1965)
September 4–5	– British Honduras Contest (all modes.)
September 11–12	– LABRE Contest (Phone).
September 11–12	– WAE Contest (Phone).
September 12	– 80m Field Day. (see page 543, August 1965)
September 18–19	– Scandinavian Activity Contest (C.W.)
September 19	– D/F National Final, Derby.
September 25–26	– Scandinavian Activity Contest (Phone).
September 25–26	– 21/28 Mc/s Telephony/Receiving Contest. (see page 545, August 1965)
October 2–3	– VK/ZL Contest (Phone).
October 2–3	– WADM Contest (C.W.)
October 9–10	– Raynet Rally. (see page 614)
October 9–10	– VK/ZL Contest (C.W.)
October 16–17	– 7 Mc/s DX Contest (Phone). (see page 474, July 1965).
October 23–24	– CQ World Wide Contest (Phone).
October 30–31	– VU2/4S7 Contest (C.W.)
November 6-7	— 7 Mc/s DX Contest (C.W.) (see page 474, July 1965).
November 6-7	— VU2/4S7 Contest (Phone).
November 13-14	— Second 432 Mc/s Contest.
November 20-21	— Second 1·8 Mc/s Contest.
November 28-29	— CQ World Wide Contest (C.W.).
December 5	— Fourth 70 Mc/s Contest (C.W.).

1966

January 15-16	—Affiliated Societies' Contest
January 30	—First 144 Mc/s (C.W.) Contest
February 13	—First 70 Mc/s (Open) Contest
February 19-20	—First 1·8 Mc/s Contest
March 5-6	—Second 144 Mc/s (Open) and 144 Mc/s Listeners' Contests*
March 19-20	—BERU (see page 609)
April 3	—Low Power Contest
April 16-17	—Second 70 Mc/s (Open) and 70 Mc/s Listeners' Contests*
April 24	—D/F Qualifying Event
May 8	—Third 144 Mc/s (Portable) Contest*
May 22	—D/F Qualifying Event
May 28-29	—First 420 Mc/s (Open) Contests*
May 29	—1296 Mc/s Contest†
June 4-5	—National Field Day
June 19	—D/F Qualifying Event
July 3	—Fourth 144 Mc/s (Portable) Contest*
July 9-10	—1·8 Mc/s Summer Contest
July 17	—D/F Qualifying Event
July 24	—Third 70 Mc/s (Portable) Contest
July 31	—D/F Qualifying Event
September 3-4	—V.H.F. NFD*
September 11	—80 Metre Field Day
September 18	—D/F Final
September 24-25	—21-28 Mc/s Phone Contest
October 15-16	—Second 420 Mc/s Contest*
October 29-30	—7 Mc/s DX (Phone) Contest
November 12-13	—7 Mc/s DX (C.W.) Contest
November 19-20	—Second Top Band Contest
December 4	—Fourth 70 Mc/s (C.W.) Contest*

† Date not yet definite
* Qualifying contests for V.H.F./U.H.F. Listeners' Championship

Can You Help?

● D. Bowers, BRS26760, 95 Grenfell Avenue, Saltash, Cornwall, who would like any information on the R-4/ARR-2 receiver, and the type 78 receiver?

● B. J. Field, G3TTY, Flat 5, 58 Shepherds Hill, Highgate, London, N6, would like to hear from anyone who has successfully built and used the low cost 60 watt transmitter described on page 172 of *Understanding Amateur Radio*?

● W. T. Stephenson, 8 Grove Street, Birkdale, Southport, who wishes to obtain information on the Bendix B.C. 624/A?

BERU Contest 1966 Rules (Continued from page 609)

Certificates will be awarded to the first three entrants in each section. In addition a certificate will be awarded to the leading entrant in each call area regardless of the number of entrants in his call area provided that his score exceeds 1,500 points in the High Power Section or 750 points in the Low Power section. A certificate will be awarded to the runner-up in each call area in which there are ten or more entrants, provided his score exceeds 1,500 points in the High Power section or 750 points in the Lower Power Section.

Rules for the BERU Contest Receiving Section, 1966

The rules for the Receiving Section of the BERU Contest 1966 are as follows:

1. **Eligible Entrants.** The contest is open to all fully paid-up members of the RSGB resident within the United Kingdom and to all short wave listeners resident within the British Commonwealth and British Mandated Territories. All entrants agree to be bound by these rules. Only the entrant may operate his receiving station for the duration of the contest. Holders of amateur transmitting licences are not eligible to take part.

2. **Duration.** The contest will commence at 00.01 GMT on Saturday, **March 19, 1966**, and end at 23.59 on Sunday, **March 20, 1966.** The BERU Contest for transmitting amateurs will take place during the same period.

3. **Entries.** (*a*) To count for points, a station outside the entrant's own call area must be heard in a contest contact and the following details logged in columns headed as follows: (i) Date/Time (GMT); (ii) Call-sign of Station Heard; (iii) Report and Serial Number sent by Station Heard; (iv) Call-sign of the Station being worked; (v) Band in Mc/s; (vi) Bonus Points Claimed; (vii) Points Claimed. CQ or Test calls will not count for points.

(*b*) Entries must be set out on ONE SIDE ONLY of foolscap or International A4 paper. Entries must be postmarked not later than **April 12, 1966** and must be addressed to the Contests Committee, Radio Society of Great Britain, 28 Little Russell Street, London, W.C.1. Log sheets are available from RSGB Headquarters on request.

(*c*) All entries must contain the following declaration:

I declare that this receiving station was operated strictly in accordance with the rules and spirit of the contest and I agree that the decision of the Council of the RSGB shall be final in all cases of dispute. I do not hold an amateur transmitting licence.

Date..... Signed.....

4. **Scoring.** Each complete log entry will score 5 points. In addition, a bonus of 20 points may be claimed for the first station heard in each new Commonwealth call area (as defined in the Appendix on page 609 of this issue of the BULLETIN) on each band. The British Isles (G, GB, GC, GD, GI, GM and GW) count as one call area only as indicated in the Appendix to the rules of the Transmitting Section. A station may be logged only once on each band for the purpose of scoring. Where both stations in a contact are heard, they should be logged separately; points may be claimed for both entries.

5. **Awards.** At the discretion of the Council, the Receiving Rose Bowl or miniature will be awarded to the winner and a certificate of merit to the runner-up in each of the IARU continents.

Can You Help?

● B. P. Catchpoole, A3920, 45 Balmoral Drive, Borehamwood, Herts., who wishes to obtain information on the German Receiver M.H.Z. (FU H.E.D)?

● K. Harvant Singh, BERS886, 31 (774) Upper Museum Road, Taiping, Perak, Malaya, who is anxious to obtain instruction manuals for the CR100, CR150, and TCS transmitter? He also wishes to correspond with some British radio amateurs.

Writing to Headquarters?

When writing to Headquarters please use separate sheets of paper for:

- Changes of Address (return a wrapper from the *Bulletin* if possible)
- Orders for Publications
- Queries
- *Bulletin* Items
- Committee items

When paying your subscription please return the reminder card sent to you by Headquarters or quote the date on which your subscription falls due.

Whenever you write to Headquarters please write your name in block letters and quote your call-sign, BRS or A number.

CLUBROOM

A Monthly Survey of Group and Club Activities

For further information on membership or the activities of a particular club, application should be made to the person whose Call Sign is indicated at the end of the item. Full addresses may be obtained from a Call Book.

AERERC is currently concerned with arrangements for V.H.F. NFD, and is making a determined effort to avoid a last minute scramble. There is no doubt that if pantomania can be avoided, it contributes a great deal towards the overall success. On September 21, G3BGL will be giving a talk under the title, " A Little Flutter on V.H.F." *(G2HIF)*

Bromsgrove and District ARC had a very fine turn out for the Mobile Picnic on Pipers Hill Common when over 50 Midland amateurs, s.w.l.'s and XYL's attended. RAE classes have started at the Bromsgrove College of Further Education. On September 10, G3GVA is giving a talk on " Home Brew Receivers " at the club's usual venue. *(G2CLW)*

Bury and Rossendale RS will be meeting on September 14 for a lecture by G2FMU on " Tuned Circuit Calculations," and this promises to hold a lot of interest for all concerned. *(G3RHR)*

Burslem ARC will be facing up to its AGM on September 21, but, as recompense, after the business meeting there will be a film show. All members are especially asked to make a " don't count the cost " endeavour to attend the AGM. This club extends a very hearty welcome to prospective members. *(G3SAJ)*

Bristol Group recently had an excellent illustrated talk by G5UH on oscillators at which 41 members and visitors were present. A very special welcome was extended to ZL2BBR, who we gather is having his arm twisted to persuade him to give a talk to the club. *(G3CUP)*

Cambridge ARC had a return visit from Mr. Towers of Newmarket Transistors in July. The club's exhibition station at Bottisham Fête attracted considerable attention and this the members found especially gratifying as it made them feel that the very considerable effort was worthwhile.

Clifton ARS is active once again on 2m under the call G3GHN, thanks to G3PNT who has lent them a transmitter. *(G3OGE)*

Cornish ARC has some 25 members suffering from " tightus fistus " in respect of subs. On the brighter side, the Mobile Rally was a great success with some 30 mobiles seen parked on the site. Special thanks are due to the ladies who manned the tent with the bran tub, and to those who provided the handsome cake and woolly toys. *(G3OCB)*

Crawley ARC held a Sale of Surplus Equipment on August 25. Some members are entangled with TV interference to wired television using a carrier frequency of about 3·5 Mc/s. Let's hope that there is a happy ending to this one. *(G3FRV)*

Cray Valley RS, in the monthly newsletter, *QUA*, makes the point that with due care and attention, home brewed equipment can stand alongside commercial gear without disgrace. Indeed, if care and attention is devoted to the finish, then in many respects the home brewed item may be potentially better than its commercial counterpart for it starts off with the advantage of being custom built. Naturally this presupposes reasonable test equipment, but this is where a member of a group or club can win hands down, always provided real co-operation exists between members. The other trueism is that it is very often from the amateur that many commercial companies secure their ideas in the first place. This is still as true today as it was 20 years ago. Next natter night as usual. *(G3JJC)*

Ex-G Club reminds holders of the Ex-G Certificate that they can have a copy of the club bulletin by sending an s.a.e. (9 × 6 in.) with a 4d. stamp to G4MJ. Early in September, W2PEO will be on from Minnesota looking for G contacts.

First Class Operators' Club makes a very good play on phrases by saying " Someone, somewhere, wants a QSL from YOU." How true. Equally true, unfortunately, as G8VG points out, is the very poor return that one seems to get for all the cards which are sent out, and how thoroughly disheartening and demoralising this can be. The lowest of the low are, of course, those who will not even QSL when specifically asked to do so for a particular reason, and who, into the bargain, receive an s.a.e. These " gentlemen " make a mockery of the ham spirit. *(G3JLB)*

Harrow RS will not be holding any meetings on September 3 and 10 owing to a change in the clubroom—to the one next door. They report that membership has now reached the 100 mark, and that a new club project is being prepared for the autumn. The demonstration station at the Gayton Fair had a good time, and the club rig got out particularly well on Top-Band. *(G3TUX)*

Irish RTS gives advance notice of the Annual Dinner to be held on October 23 at the South County Hotel, Stillorgan, preceded by a special meeting in the afternoon. The magazine contains some useful information on precise frequency setting on the v.h.f. bands as is required when working with highly selective receiver systems for satellite and meteor scatter communications. *(EI4AG)*

Liverpool University ARS has most of its members on vacation at the moment, but certain stalwarts are busy installing masts and beams. The society is very interested in the formation of a " Universities Net " and will be on 3650 kc/s at 12.00 GMT on September 7 as suggested by Queen's University, Belfast. Other universities please note. *(G3PLX)*

Mansfield ARS continues to meet on Friday evenings at 7.30 p.m. Visitors and prospective members are always welcome. Plans are afoot to take part in the Hobbies Exhibition to be held in Mansfield from September 27 to October 7 when the club will operate under the call G3GQC. *(G8HX)*

Manchester and District ARS had its club station back on the air on August 4 after quite a few disappointments. Grim enthusiasm won through in the end. On September 8 there will be a lecture on frequency measurement by G3IOA. *(G3RTU)*

Maidstone YMCA ARC has a very full programme planned for September with meetings on the 8th, 15th, 22nd and 29th. In view of the recently noted increase in the happy band who like to " roll their own," the meeting on the 15th should be of particular interest being entitled " The Professional Finishing of Home Brewed Equipment." *(G3REM)*

MARTS wax philosophical. Quote " As I sat here musing one day, sad and lonely, from out the the gloom a voice came to me. Cheer up, things could be worse. So I cheered up, and, sure enough, things did get worse " Unquote. Surely it cannot really be that bad? This Society has, for some time, been running a Who's Who feature in its Newsletter. This is a very interesting idea, and one which might well be adopted by other societies and clubs in respect of their members. *(G2FJA)*

Midland ARS is as active as ever, and would especially like to welcome visitors and prospective new members to the meetings. A very full programme is planned for September. *(G3JDJ)*

Mid-Warks ARS has continued to meet every Monday evening during the summer even though no formal programme has been planned. These have been quite well attended. Following the example of some other clubs, in the autumn it is proposed to start two groups on club projects, one on g.d.o's, and the other on 2 metre converters. A more advanced group will be venturing into the realm of s.s.b. exciters. *(G3UDN)*

Northern Heights ARS will be listening to a talk by G3ADQ entitled " Further S.S.B. Comments " on September 15, and on September 29 to G3NFH talking on the G2DAF receiver. Arrangements are already being put in hand to visit the Radio Communications Exhibition in London at the end of October. *(G3MDW)*

Norfolk ARC raises the hoary giant of c.w. *vs* phone in the summer edition of *Challenge*. Every so often this Frankenstein is given a dose of new blood, some from each camp, and this will probably be the way to the end of time. In relation to this your conductor was interested in a report prepared by the US Signal Corps which showed that despite all the sophisticated systems available, under the worst possible conditions, it was always the hand-sent c.w. signals which produced the least errors in message handling. *(G3TLC)*

Oxford University RS is hoping for a considerable increase in membership with the arrival of the freshmen next term. In addition the society has moved to a better QTH where outside aerials are permitted. In addition to the normal amateur radio interests, the club caters for those with a yen for allied subjects

These merry men were all at the recent Northern Ireland RSGB Group Annual Dinner. Back row (left to right) GI3GAL, GI3BIL, GI3NUM, GI3CDF; front row (left to right) Bill Reid (Honorary Treasurer), GI3KYP (Zonal Council Member), GI3IWO (Region 15 Representative), and GI3OFT (former Area Representative, now GM3OFT).

ranging from radio control to computers. Applications for membership will be welcomed. (*G3RKK*)

Purley and District RC is meeting on September 3 and 17, and will be entering two stations for the V.H.F. Field Day over September 4/5. All being well the members hope to break a bottle of champagne over the new club transmitter on October 1, and thereafter the club station will be operated during the first meeting in each month. (*G3FTQ*)

Reading ARC has changed its meeting place to St. Pauls Hall, Whitley Wood, where it will have far better facilities than previously. The next few meetings will be devoted to a grand sort-out, but they hope to be organised for the W1BB tape lecture on September 28. Applications for membership will be welcome. (*G3TOQ*)

Reigate ATS will be holding the September meeting at the George and Dragon at Redhill when G2RD will be speaking on equipment for 1296 Mc/s. The club now has a total membership of 42 of whom 28 hold transmitting licences. (*G3NKT*)

Saltash ARC has meetings planned for September 10 and 24, the former being the RSGB tape and slide show " DXpedition to St Pierre and Miquelon 1950", while the second will be a return quiz match with Plymouth RC.

Skegness and District Group will be holding a get-together and a Junk Sale at the Bull Hotel, Spilsby, on October 15 starting at 7 p.m. clock time. Bar and refreshments will be available. For further information apply to G3OTD or G2ABK.

Spen Valley ARS has cleared its AGM and is in recess until September 16. New members always welcome. (*G3HPD*)

Stratford-upon-Avon RC held its AGM at the end of July, and is hoping for an increase in membership during the coming year. Formal meetings will start in September at which visitors will be very welcome. High on the order of priorities will be attention to the clubroom to increase its creature comfort. (*G3OOQ*)

Surrey Radio Contact Club is getting ready for the September sale of junk under the eagle eye of that master auctioneer Ken Drummond. The year's programme is now complete, and contains items of interest for all. One very laudable idea which this club operates is to make XYL's and YLs welcome at its meetings. (*G3KGA*)

South Dorset RS integrated its August meeting with the society's display of equipment and a working station at the Weymouth Model Engineering Exhibition. Many QSO's were made on 80 despite heavy QRN from electric trains.

Torbay ARS recently heard an interesting talk on pre-war communications systems in India by s.w.l. J. Bennett. One member has recently acquired the call-sign G3UIQ, whilst two others are flushed with success at the RAE examination. (*G3LKJ*)

Verulam ARC which always meets on the third Wednesday in each month, will be meeting next on September 15 at Hedley Road for a Film Show. Visitors and prospective members are always welcome. (*G3LXP*)

West Kent ARS is moving to the Art School, Monson Road, Tunbridge Wells. The next meeting will be on September 10 with a talk by a member of the GPO staff on TV networks. (*G3PAH*)

Yeovil ARC will be operating a station under the call GB2YC at the open week of the Youth Centre, September 27 to October 2. Visitors and prospective members are welcome.

HELP US TO HELP YOU

This feature can materially assist your membership, and when sending contributions the general rule should be to provide too much information rather than too little. In addition, due to pressure on space, as it is not possible to print the full name and address of club secretaries, will you please ensure that a call-sign is included to whom interested persons can apply. Without such a call-sign the club item can lose a great deal of its potential value.

The deadline for the **October** issue is September 10.

The deadline date for the **November** issue will be October 1.

RAEN Rally 1965 Rules

1. The Rally is open to all RAEN members and consists of two sections:
(*a*) *Transmitting*, which includes operation from any fixed, portable or mobile installation.
(*b*) *Receiving*, which is for RAEN members operating receiving stations. All stations must be individually operated, and multi-operator entries are barred.

2. The Rally will take place on **Saturday, October 9, 1965** from 18.00 to 22.00 GMT and on **Sunday, October 10, 1965** from 08.00-12.00 and from 15.00-19.00 GMT.

Operation will be in 1·8, 3·5, 144 Mc/s bands and on 70·375 Mc/s ± 25 kc/s.

RSGB Band Planning and licensing regulations will be observed. Any mode of transmission may be used. A station may not be contacted more than once in any period by the same mode. Both stations making a contact must use the same mode of transmission. Portable and mobile stations must be sited at least one mile from their normal fixed site and must not be connected to a public mains electricity supply.

3. **Scoring**—*Transmitting Section*

Outstation to outstation	6 points
Outstation to fixed station	4 points
Outstation to non-RAEN station	3 points
Fixed station to fixed station	2 points
Fixed station to outstation	3 points
Fixed station to non-RAEN station	1 point

Only 20 contacts with non-RAEN stations may be counted for the Rally.

Claimed scores will be the combined scores of the best two periods of operation, but log sheets must be submitted for all periods operated.

4. Participants will apply to the Honorary Rally Secretary, 1 Shortbutts Lane, Lichfield, Staffs, for a test phrase, log sheets and declaration form, enclosing s.a.e. (8 in. × 3½ in. minimum).

5. Scoring contacts will consist of the exchange and acknowledgement of receipt of the following:

Signal reports; NGR (sheet no. and 6 figure ref.) of station location; test phrase received (after the first contact with a RAEN station) from the immediate previous RAEN station contacted. The test phrase received from the Hon. Rally Secretary will be used for the first contact with a RAEN station. Test phrases will not be sent to non-RAEN stations.

6. Stations will call " CQ from Raynet station . . . " by telephony, or " CQ RR de . . . " by Morse. *Use of the letters RAEN is specifically forbidden.*

7. Standard RSGB Log Sheets and Declaration Forms will be issued. Column 5 will be used for test phrase sent; column 6 for test phrase received and column 7 for map reference received. Declaration forms must contain entrant's map reference(s), and must be signed.

8. Completed entries must be sent to the Hon. Rally Secretary to arrive by first post on Tuesday, October 26, 1965.

9. **Receiving Stations**

Receiving stations will score three points for each RAEN station heard in contact with another RAEN station, and two points for each RAEN station heard in contact with a non-RAEN station, provided that the log is completed as required with all details of the contact. Receiving stations operating /M or /P will receive a bonus point for each contact correctly logged. Rules for /M or /P operation will be as for transmitting stations. Scores will be based on the best two periods of operation. Logs will be submitted on the issued sheets, and declarations completed and signed. Entries to arrive as in section 9 above.

10. Awards will be made to the leading station in each section. An award will also be made to the RAEN County or Independent Area Group having the highest score computed as follows:

the sum of the valid points accrued by entries from a group will be divided by the group strength as certified by the Hon. Registrations Secretary as at October 1, 1965.

All or any periods of operation to count. Entries in both sections to count.

Forthcoming Events

Details for inclusion in this feature should be sent to the appropriate Regional Representatives by the first of the month preceding publication. A.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 the copy, preferably typed double spaced, in the style used below. Standing instructions cannot be accepted.

REGION 1

Ainsdale (ARS).—September 1, 15, 29, 8 p.m., 77 Clifton Road, Southport.
Blackburn.—Fridays, 8 p.m., West View Hotel, Revidge Road.
Blackpool (B & FARS).—Mondays, 8 p.m., Pontins Holiday Camp, Squires Gate. Morse tuition from 7.30 p.m.
Bury (B & RRS).—September 14 ("Tuned Circuit Calculations," by G2FMU), 8 p.m., Old Boars Head, Crompton Street (private room).
Chester.—Tuesdays, 8 p.m. YMCA, except first Tuesday in each month.
Crewe & District.—September 6, October 4, 8 p.m., Earl of Crewe Hotel, Nantwich Road.
Eccles (E & DAC).—Tuesdays, 8 p.m., Patricroft Congregational Schools, Shakespeare Crescent, Patricroft, Eccles. Every Thursday, Club Top Band net 20.30 hours.
Liverpool (L & DARS).—Tuesdays, 8 p.m., Conservative Association Rooms, Church Road, Wavertree.
Macclesfield.—September 14, 28, the George Hotel, Jordongate.
Manchester (M & DARS).—Wednesdays, 7.30 p.m., 203 Droylsden Road, Newton Heath, Manchester 10.
(SMRC).—Fridays, 7.45 p.m., Rackhouse Community Centre, Daine Avenue, Northenden.
Morecambe.—September 1, October 6, 125 Regent Road.
Preston.—September 14 ("Loaded Whip Aerials," by Cliff Sharratt, G4CJ), September 28 (Visit by Regional Representative: B. O'Brien, G2AMV), (All meetings start with a Morse practice at 7.30 p.m.), St. Paul's School, Pole Street.
Southport (SRS).—Wednesdays, 8.30 p.m., Sea Cadets Camp, The Esplanade.
Stockport.—September 8, 22, October 6, The Blossoms Hotel, Buxton Road, Stockport.
Wirral.—September 1, 15, October 6, 7.45 p.m., Harding House, Park Road West, Claughton, Birkenhead.

REGION 2

Bradford.—September 14 (First meeting of New Session), 7.30 p.m., 66 Little Horton Lane.
Catterick.—Tuesdays and Thursdays, 7.30 p.m., Clubroom, Vimy Road.
Durham.—Every other Thursday, 8 p.m., Bridge Hotel, North Road.
Northern Heights.—September 1 (Pea and Pie Supper), September 15 ("Further s.s.b. Comments," by G3ADQ), September 29 ("The G2DAF receiver, by Mr Jack Peevors, G3NFH), 7.30 p.m., Sportsman Inn, Ogden.
Scarborough.—Thursdays, 7.30 p.m., Rear of 3 Trinity Road.

REGION 3

Birmingham (Slade).—September 10, 24, 7.30 p.m., The Church House, Erdington.
(South).—September 16, 7.30 p.m., Friends Meeting House, Moseley Road, Birmingham.
Cannock (CCARS).—September 16, October 7, 8 p.m., The Bridgetown Social Club, Walsall Road, Cannock.
Coventry (CARS).—Mondays, 8 p.m., T.A. Centre, Westfield Road, Coventry.
Dudley (ARS.)—Fridays, 8 p.m., Art Gallery, Dudley.
Redditch (EWARG).—September 9 ("Cryogenics," by R. R. Hart), Redditch Old People's Centre, Park Road, Redditch.
Salop (ARS).—September 9 (Junk Sale), September 11 (Club station at Shrewsbury Carnival —G3SRT/A), Morris Hall, Bellstone, Shrewsbury. September 26 (Informal), 7.30 p.m., The Old Post Office Hotel, Shrewsbury.
Stratford-upon-Avon(ARS).—Fridays, 7.30 p.m., Masons Arms, Sanctus Road, Stratford-Upon-Avon.
Stourbridge & District (ARS).—September 14 (Auction Sale), October 5 ("Electro-Cardiograph," by Dr. Alan Parkes), 7.45 p.m., Library, Foley College, Stourbridge.
Wolverhampton (WARS).—September 20 (Rag Chew), October 4 (AGM), 8 p.m., Neachells Cottage, Stockwell Road, Tettenhall.

REGION 5

Cambridge (C & DARC).—September 3 (Arrangements for V.H.F. NFD), September 4-5 (V.H.F. NFD), September 10 (Informal Evening), September 17 (Junk Sale), September 24 (Evening of Lecturettes—Invitation to Luton Club), October 1 (Activity Evening), Fridays, 7.30 p.m., Club Headquarters, Corporation Yard, Victoria Road, Cambridge.
Cambridge University (CUWS).—Tuesdays, 8.15 p.m., Psychology Department, Downing Site, during University Term.
Luton (L & DARS).—Tuesdays, 8 p.m., ATC Headquarters, Crescent Road, Luton, Bedfordshire. September 24 (Invitation to visit Cambridge Club).
Royston (R & DARC).—Wednesdays, 8 p.m., Manor House Social Club, Melbourn Street, Royston, Herts.
Shefford (S & DARS).—September 2 ("Basic Transistors," by P. Screeney), September 9 ("Interference," by GPO (Provisional), September 16 (Film Strip Lecture), September 23 (Lecture from Cranfield Aeronautical College), September 30 (Open Evening), Thursdays, 7.45 p.m., (Morse classes 7.45 p.m.), Church Hall, High Street.

REGION 6

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

REGION 7

Acton Brentford & Chiswick (ABCRC).—September 21 ("Earths," by G5ZA), 7.30 p.m., AEU Club, 66 High Road, Chiswick.
Ashford (Middx.) (Echelford ARS).—September 8, 22, 7.30 p.m., Links Hotel, Ashford.
Bexley Heath (NKRS).—September 9, 23, 7.30 p.m., Congregational Hall, Chapel Road, Bexley Heath.
Chingford (Group).—September 17, Secretary, Loughton 2397.
(SRC).—Fridays'(except first), 8 p.m., Friday Hill House, Simmons Lane.
Croydon (SRCC).—September 14 (Junk Sale), 7.30 p.m., Blacksmith's Arms, South End.
Dorking (D & DRS).—September 14, 8 p.m., Wheatsheaf, Dorking, September 28, Star and Garter, Dorking.
East Ham.—Tuesdays fortnightly, 7.30 p.m., 12 Leigh High Road, East Ham.
East Molesey (TVARTS).—First Wednesday each month, Prince of Wales, Bridge Road, East Molesey.
Edgware & Hendon (EADRS).—September 13, 23, 8 p.m., John Keble Hall, Church Close, Deans Lane, Edgware.
Enfield.—September 16 (Enfield Show Buildup), September 17/18 (Enfield Show on 160/20/2), meetings at 8 p.m., George Spicer School, Southbury Road.
Gravesend (GRS).—September 15, 8 p.m., Guildford Model Engineering Society in Stoke Park.
Harlow (DRS).—Tuesdays & Thursdays, 7.30 p.m., Mark Hall Barn, First Avenue.
Harrow (RSH).—Fridays, 8 p.m., Roxeth Manor County School, Eastcote Lane, Harrow.
Holloway (GRS).—Monday & Wednesday, 7 p.m., (RAE and Morse), Friday, 7.30 p.m., (Club), Montem School, N.7.
Hounslow (HADRS).—September 6, 20, Canteen, Mogden Main Drainage Department, Mogden Works, Isleworth.
Ilford.—Thursdays, 8 p.m., 579 High Road, Ilford (Nr. Seven Kings Station).
Kingston.—September 16, 30, 8 p.m., YMCA, Eden Street. Fridays (weekly Morse classes), 2 Sunray Avenue, Tolworth.
Leyton & Walthamstow.—7.30 p.m., Leyton Senior Institute, Essex Road, London, E.10 (contact G3RYF first at Ilford 3020, Ext. 247).
London U.H.F. Group.—September 2 ("New Transistorised HRO," demonstration and talk), 7.30 p.m., Bull & Mouth, Bloomsbury Way, Holborn.
London Members' Luncheon Club.—12.30 p.m., Third Friday every month.
Loughton.—First Thursday every month (see separate advertisement), 7.30 p.m., Loughton Hall (near Debden Station).
New Cross (CARS).—Wednesdays and Fridays, 8 p.m., 225 New Cross Road, London, S.E.14.
Norwood & South London (CP & DRS).—September 18, 8 p.m., CD Training Centre, Bromley Road, Catford, S.E.6.
Paddington (P & DARS).—Wednesday, 7.30 p.m., Beauchamp Lodge, 2a Warwick Crescent, W.2.
Purley (P & DRC).—September 17, 8 p.m., Railwaymen's Hall (Side Entrance), Whytecliffe Road.
Reigate (RATS).—September 18 ("23cm," by G2RD), 7.30 p.m., George & Dragon, Cromwell Road, Redhill.
Romford (R & DRS).—Tuesdays, 8.15 p.m., RAFTA House, 18 Carlton Road.
Scout ARS.—September 16, 7.15 p.m., Baden Powell House, Queens Gate, South Kensington.

LONDON MEMBERS' LUNCHEON CLUB

will meet at the White Hall Hotel, Bloomsbury Square, London, W.C.1
at 12.30 p.m. on Fridays, September 17 and October 15, 1965.

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

Science Museum (CSRS).—September 7 ("Communication via Goonhilly Downs"), September 21 (Informal), 6.30 p.m., Science Museum, South Kensington.
Sidcup (CVRS).—September 2 (Mullard Film "Transistors"), 7.30 p.m., Congregational Church Hall, Court Road, Eltham.
Slough (SARS).—First Wednesday every month, 8 p.m., United Services Club, Wellington Street.
Southgate & District.—September 9, 7.30 p.m., Atlasta Lodge, Tottenhall Road, Palmers Green, N.13.
St. Albans (Verulam ARC).—September 15 (Film Show "Friendship Seven", on spacecraft), 8 p.m., Marconi Service Works, Hedley Road.
Sutton & Cheam (SCRS).—September 21, 8 p.m., The Harrow Inn, High Street, Cheam.
Uxbridge.—September 6, 20, 8 p.m., St. Andrews Scout Hut.
Welwyn Garden City.—September 9 ("About Audio," by Gerry Nest of the Acoustics Lab. of Rank Bush Murphy Ltd), 8 p.m., The Vineyard Barn, off Digswell Road.
Wimbledon (W & DRS).—September 10, 8 p.m., Community Centre, St. George's Road, Wimbledon, S.W.19.
G.E.C. ARS.—Thursdays, 6.30 to 9.30 p.m., Visitors welcome, first contact ARNold 1262.

REGION 8

Crawley (CARC).—September 8 (Informal, for details contact G3FRV, "Tralee," 5 Filbert Crescent, Gossops Green, Crawley, Sussex).

(Continued on next page)

LOOKING AHEAD

September 18.—N.W. V.H.F. Convention.
September 28-October 2.—Institution of Electronics 20th Annual Electronics, Instruments, Controls and Components Exhibition and Convention, Belle Vue, Manchester.
October 10.—Northern Radio Societies Convention, Belle Vue.
October 16-17.—Eighth Jamboree-on-the-Air.
October 27-30.—RSGB International Radio Exhibition.
December 17.—RSGB Annual General Meeting.

Details of Mobile Rallies are given below.

September 22, 8 p.m., Trinity Congregational Church Hall, Ifield.
Thanet (TRS).—Fridays, from September 10, 8 p.m., Hilderstone House, Broadstairs.

REGION 9

Bath.—September 7, 7.30 p.m., RNR Training Centre, James St. West, Bath.
Bristol.—September 24, 7.15 p.m., Small Physics Theatre, Royal Fort, Bristol University, Woodland Road, Bristol 8.
Burnham-on-Sea (B-o-SARS).—Second Tuesday in each month, 8 p.m., Crown Hotel, Oxford Street, Burnham-on-Sea.
Camborne (CRAC).—First Thursday in each month, Staff Recreation Hall, SWEB Headquarters, Pool, near Camborne.
Exeter.—First Tuesday in each month, 7.30 p.m., George and Dragon Inn, Blackboy Road, Exeter.
Plymouth (PRC).—Tuesdays, 7.30 p.m., Virginia House, Bretonside, Plymouth.
Saltash (SADARC).—Alternate Fridays, 7.30 p.m., Burraton Toc H Hall, Warraton Road, Saltash.
South Dorset (SDRS).—First Friday in each month, 7.30 p.m., Labour Rooms, West Walks, Dorchester.
Torquay (TARS).—September 25 ("Interference," talk/demonstration by G.P.O. Officer), Club HQ, Belgrave Road, Torquay.
Weston-super-Mare.—First Friday in each month, 7.15 p.m., Victoria Hotel, Weston-super-Mare.
Yeovil (YARC).—Wednesdays, 7.30 p.m., Park Lodge, The Park, Yeovil.

REGION 10

Cardiff.—September 13 (AGM), 7.30 p.m., TA Centre, Park Street, Cardiff.

REGION 11

Bangor (UCNWARS).—No meeting during the summer. Meetings will resume on October 14.
Llandudno (CVARC).—September 9 ("My Hobbies," by Charles Woodward, GW5WO), 7.30 p.m., Cross Keys, Madoc Street, Llandudno.
Prestatyn (FRS).—September 29 (Talk by member of the WARS), 8 p.m., Railway Hotel, Prestatyn.

REGION 14

Glasgow.—First and Third Wednesdays in each month, Christian Institute, 70 Bothwell Street, Glasgow, C.2.

REGION 16

Basildon (BDARS).—September 28 (AGM), 7.45 p.m., "Mayflower Restaurant." Details from G3IJB.
Chelmsford (CARS).—September 7 (AGM), 7.30 p.m., Marconi College, Arbour Lane, Chelmsford. Details from G3LTF.
Great Yarmouth (GYRC).—Fridays, 7.30 p.m., the Manager's Office, The Old Power Station, South Quay, Swanston's Road, Great Yarmouth. Details from G3HPR.
Ipswich (IRC).—Last Wednesday in each month, 7.30 p.m., Civic College, Ipswich. Details from J. Rhind, tel. Ipswich 42504.
Norwich (NARC).—Mondays, 7.30 p.m., the Club Centre, 140 Oak Street, Norwich. Details from G3TLC.
Southend (SDARS).—Meetings in the Executives' Canteen, E. K. Cole Ltd., Priory Crescent, Southend-on-Sea. Details from G3NPF.

Special Events Station

The Royal Signals Club Station G3LPC will be making an expedition to the Isle of Lundy, in the Bristol Channel off the west coast of England. The call-sign **GB3LPC** will be put on the air from September 18 to 25, the object being to establish contact with as many RTTY stations as possible. Should the support be poor, s.s.b. or c.w. will be used. All bands from 80 to 10m will be used, with activity principally on 20m during the day, and 80m at night. All reports should be addressed to G3LPC, 3 Squadron, 14th Signals Regiment, Weald, Bampton, Oxon.

At the symposium on amateur radio to be held at the Residential Youth Centre, Ollerton, on September 11 and 12, **GB3RH** will be operated by the Magnus Radio Society assisted by the Mount School Radio Society. GB3 "Robin Hood" will be on 160, 80 and 20m. A special QSL card will be issued to confirm all contacts, and reports, which will be greatly appreciated, should be sent to G3PAW, Magnus Grammar School, Newark, Notts., or via the RSGB QSL Bureau.

A special call-sign **GB3BB**, to commemorate the 25th anniversary of the Battle of Britain, has been issued for a station which will be put into operation by G3OPD at the RAF Station Finningley on September 18. Operation will be restricted to 80 and 20m, using s.s.b., a.m. and c.w.

On September 18 and 19, at a Scout Rally in Hutton Park, near Bolton, Lancs., a special station with the call **GB2LSR** will be active.

Enquiries Regarding Bulletin Articles

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

MOBILE RALLIES 1965

September 5.....Wessex BAC Mobile Rally

Hurn Airport, Bournemouth

Attractions will include a parachute jump tower, car driving test, contests, radio controlled models, a BAC 1-11 on show, and refreshments will be available. A special pass must be obtained at the main gate. Rally opens at 1.30 p.m.

G3FVU/P ... ... 160m talk-in station

Organized by the Wessex Amateur Radio Group

September 12.....RSGB National Mobile Rally

Woburn Abbey, Bedfordshire
(see separate advertisement)

Organized by the RSGB Mobile Committee

September 12.....UBA International Mobile Rally

See page 385, June, 1965

Organized by the Brabant-Sud and Brabant-Sud Est Section of UBA

September 26.....Harlow Mobile Rally

Magdalen Laver Village Hall, Magdalen Laver, near Harlow

GB3HS ... ... talk-in station

Organized by the Harlow and District Radio Society

REGION 4 LECTURE

Microwave Radio Links and Terminal Equipments

This lecture will be given by Mr. L. Walton of the Post Office Engineering Dept., Central Training School with the assistance of the Post Office Exhibition Group.

Admission will be by ticket, obtainable free of charge from Mr. F. C. Ward, Region 4 Representative, 5 Uplands Avenue, Littleover, Derby.

September 24, 7.15 p.m.

Main Lecture Theatre, Derby and District College of Technology, Kedleston Road, Derby

RAE COURSES OF INSTRUCTION

Courses in preparation for the City and Guilds Radio Amateurs' Examination in May, 1966 will be held at the following centres during the session beginning in September, 1965.

Barry: College of Further Education, Calcot Road, Barry, Glamorgan.
Enrolment will take place on September 8-10, 6-8 p.m. Further information from the Principal, quoting reference 22.

Basildon: Fryerns Evening Institute.
Classes will be held on Mondays, 7-9 p.m., commencing September 20. Members interested are asked to write in the first instance to the Secretaries, Basildon and District Amateur Radio Society, Milestone Cottage, London Road, Wickford, Essex.

Bradford: Bradford Technical College.
Classes will be held on Wednesdays, 7-9 p.m. Enrolment will take place at the college during the week beginning September 13. Fees: students over 18 on September 1, 30s.; students under 18 on September 1, no fee. There will be no classes for the GPO Morse test.

Brighton: Brighton Technical College, Richmond Terrace, Brighton 7.
Enrolment will take place at the college on September 9, 10 and 13, 6.30-8 p.m. Classes are to be held on Thursday and Friday, 6-30. 8.45 p.m. and the course will be under the direction of F. R. Canning, G6YJ. Practical instruction will be carried out on the College Radio Station (G3TCB).

Bristol: Bristol Technical College, Ashley Down, Bristol 7.
Registration will take place at the college on September 9, 10 and 13, 2.30-4.30 p.m. and 6-8.30 p.m. Classes will be held on Mondays, 6.45-9.15 p.m., beginning on September 20. Fees: over 18 on August 1, 50s.; under 18 on August 1, 20s.

Bury: Bury Technical College, Market Street, Bury.
Enrolment for the course will take place in early September. The instructor will be J. Bennett, G3PVG.

Cannock Chase: Cannock Chase Mining and Technical College, Cannock, Staffs.
The course will include Morse tuition as well as theory and will be under the direction of C. J. Morris, G3ABG. Further details of the course and enrolment from the college.

Carshalton: Carshalton College of Further Education, Nightingale Road, Carshalton.
Enrolment will take place on September 13, 14 and 15, 6.30 to 8.30 p.m. Classes will be held on Fridays, 7-9.30 p.m.

Crawley: Sarah Robinson Evening Institute, Ifield, Crawley, Sussex.
Details are obtainable from A. J. Gibbs, G3PHG, 6 Dairyfields, Gossops Green, Crawley, Sussex.

Doncaster: New Technical College, Waterdale, Doncaster.
A series of Wednesday evening lectures will take place commencing September 22. Enrolment will take place on September 13-15. Fee for the course is 46s. 6d.

Erith: Erith Technical College, Erith Road, Belvedere, Kent.
Classes will be held on Wednesdays, 7-9.30 p.m. Enrolment will take place on September 14-16, 6.30-8.30 p.m. Full details may be obtained from the Principal.

Glasgow: Allan Glens School, Cathedral Street, Glasgow.
Enrolment will take place on September 6-9 at 7 p.m. Classes will be held on Tuesdays, 7-9.30 (Radio Theory) and Thursdays, 7-9.30 (Morse instruction, GPO regulations, aerials, BCI and TVI) commencing September 14. The course fee is 20s. Instructors: A. M. Frazer, GM3AXX (Radio theory); J. Sey, GM8MJ (Morse).

Harlow: Information from P. Essery, G3KFE, 8 Willowfields, Passmones, Harlow or G. O. Donald, G3TIJ, Hon. Secretary, Harlow and District Radio Society, " Great East", Harlow Road, Roydon, Harlow.

Ilford: Ilford Literary Institute (County High School for Girls), Cranbrook Road (Adjacent to Gants Hill Station, Central Line).
The following classes have been arranged by the East London RSGB Group: (i) An eight-month course for those intending to take the RAE in May, 1966 (Wednesdays, 7.15-9.15 p.m.); an overflow class may be held on Thursdays, 7.15-9.15 p.m. This class has run each year since 1948 with great success under the same instructor, W. G. Hall, G8JM, 48 Hawkdene, N. Chingford, London E.4., to whom application should be made to reserve a place; please send s.a.e.
(ii) Morse and Codes of Practice: a six-month course in preparation for the GPO Morse Test for an Amateur (Sound) Licence. It is hoped that arrangements may be made for those who, in the opinion of the instructors, have reached the required speed to be tested at the College by a Post Office representative.
Enrolment will take place on September 6-9 from 7-8.30 p.m. Classes commence on September 20. Fees: Morse only, 27s.; RAE only, 40s,; combined course, 50s.

Leicester: Leicester College of Technology.
Classes will be held in both theory and Morse on Wednesday evenings; Morse, 6.30-7.15 and theory, 7.15-9.15 p.m. Enrolment will take place on September 14 and 15 in the Department of Electrical Engineering.

Lichfield: Lichfield Evening Institute, Netherstone School.
A theory and practical course will be held on Wednesdays and Thursdays, 7-9 p.m. Enrolment will take place at the School. Lecturer: J. H. Beamand, G3DZT.

Plymouth: Plymouth College of Technology.
Theory, practical and Morse classes will be run, evenings to be arranged. Enrolment will take place at the college during the week commencing September 9. Further information may be obtained from A. F. Ward, G3HSP, Lecturer, Plymouth Technical College, or from the Principal.

Redditch: College of Further Education, Archer Road, Redditch.
Provided that there are sufficient applicants, a course will start during September. Further information may be obtained from L. Hickingbotham, G3HZG, 95 Oakenshaw Road, Redditch, Worcs., or direct from the College.

Sheffield: Western Road Evening School, Sheffield 10.
Classes commence on Wednesday, September 22 at 7 p.m. Enrolment will take place during the week beginning September 13. Full details are obtainable from J. Bell, G3JON, 25 Edale Road, Sheffield 11. (Tele. 61281).

Wembley: Wembley Evening Institute, Copeland School, High Road, Wembley.
Classes will be held on Mondays, 7-8 p.m. (Morse) and 8-10 p.m. (Radio theory). A second class may be held on Wednesdays if there are enough applicants. Enrolment is at the school on September 13-16, 7-9 p.m. Lecturer: A. J. Bayliss BSc., G8PD.

Weston-super-Mare: Weston-super-Mare Technical College (Dept. of Engineering).
A course is being offered starting during the week commencing September 20. Enrolment will take place during the week commencing September 13.

Weybridge: Brooklands County Technical College, Heath Road, Weybridge.
Classes will be held on Mondays, 6.30-9 p.m. starting on September 20. Enrolment will take place on Tuesday, Wednesday and Thursday evening of the previous week. Morse instruction will be provided later in the session.

Woking: Technical Institute, Sheerwater, Woking.
A class will commence during September provided that there is enough support. Enrolment will take place on September 16 and 17. Full details may be obtained from Mr. J. Harrison at the Institute.

RADIO AMATEURS' EXAMINATION

Thursday, December 9, 1965

MARY WARD HALL
5 TAVISTOCK PLACE
LONDON W.C.1.

Applications to sit the Examination at the above centre, which is near Russell Square Underground, should be sent to the General Manager, Radio Society of Great Britain, 28 Little Russell Street, London W.C.1, to arrive not later than **Monday, November 1, 1965.** Applications must be accompanied by a remittance for the City and Guilds of London Institute fee of £1.10.0, plus, in the case of non-members of RSGB, a local fee of 5s.

PUBLICATIONS MORSE COURSES

AMERICAN MAGAZINES TIES BADGES

RSGB PUBLICATIONS

The Amateur Radio Handbook (Third Edition)	36/6
Radio Data Reference Book	14/-
Amateur Radio Circuits Book	8/6
Radio Amateurs' Examination Manual	5/9
Guide to Amateur Radio	5/7
Service Valve Equivalents (Fifth Edition)	3/6
S.S.B. Equipment	3/-
Communication Receivers (Second Edition)	3/-
The Morse Code for Radio Amateurs (Third Edition)	2/-

ARRL PUBLICATIONS

Antenna Book, 10th Edition	18/6
A Course in Radio Fundamentals	10/-
Hints and Kinks, Volume 6	10/-
Mobile Manual for Radio Amateurs	23/6
Radio Amateur's Handbook	42/6
Buckram Bound	50/-
Radio Amateur's V.H.F. Manual	18/6
Single Sideband for the Amateur (Fourth Edition)	23/6
Understanding Amateur Radio	18/6

CQ PUBLICATIONS

Antenna Roundup	23/6
CQ Anthology, 1952-59	23/6
CQ Anthology 1945-52	16/-
CQ Mobile Handbook	23/-
CQ New Sideband Handbook	24/-
Electronic Circuits Handbook	22/9
RTTY Handbook	30/-
Shop and Shack Shortcuts	29/6
Surplus Schematics	19/-

73 MAGAZINE PUBLICATIONS

Care and Feeding of a Ham Club	8/-
Index to Surplus	12/-
Simplified Math for the Hamshack	4/6
V.H.F. Antenna Handbook	15/-

EDITORS AND ENGINEERS PUBLICATIONS

Radio Handbook (16th Edition)	78/-
Transistor Radio Handbook	42/-

AMERICAN MAGAZINE SUBSCRIPTIONS

CQ (*Cowan*) Monthly (p.a.)	44/-
QST (*ARRL*) Monthly (p.a.)	43/6
Institutions, groups, etc. (p.a.)	50/-
73 Magazine Monthly (p.a.)	30/-

BRITISH PUBLICATIONS

Guide to Broadcasting Stations (*Iliffe*)	5/6
Log Book (*Webbs*)	6/3
Log Book, hardbound (*Martins*)	18/9
Manual of Transistor Circuits (*Mullard*)	13/6
Radio Amateur Operator's Handbook (*Data*)	5/6
Short Wave Radio and the Ionosphere (*Iliffe*)	12/-
Short Wave Receivers for the Beginner (*Data*)	6/6
Transistor Radios, Circuitry and Servicing (*Mullard*)	5/9
Understanding Television (*Data*)	40/-
Wireless World Radio Valve Data (*Iliffe*)	8/6

MORSE COURSES

G3HSC Rhythm Method of Morse Tuition	
Complete Course with three 3 speed L.P. records + books	84/-
Beginner's Course with two 3 speed L.P. records + books	60/6
Single, Advanced (9-42) or Beginners (0-15 w.p.m.) + books	50/-
Three speed simulated GPO test. 7 in. d.s. E.P. record	11/6
RSGB Morse Instruction Tape (900 ft.)	35/-
RSGB Morse Practice Tape (450 ft.) (both at 3¾ i.p.s., up to 14 w.p.m.)	20/-

SHACK AIDS

Easibinders, round backed, gold blocked, for RSGB Bulletin	16/6
British Isles Two Metre Band Plan	6d
QRA Locator, Western Europe	5/6
RSGB Countries List	1/-
Panel Signs, transfers (*Data*)	
Set 3: White Wording	4/9
Set 4: Black Wording	4/9
Set 5: Dials (Clear Background)	4/9
Set 6: Dials (Black Background)	4/9
Decalet Panel Lettering Transfers (Black or White)	1/-
Blick Dry Print Lettering (Letters and Numerals, Black)	2/6

RSGB MEMBERS ONLY

Car Badge (De Luxe with call-sign) * (*Postage on overseas orders 5/6 extra*)	19/-
Car Badge (RSGB Emblem with call-sign) *	11/6
Car Badge (RSGB or RAEN Emblem)	7/6
RSGB Tie (Maroon or Navy Blue Terylene)	16/-
RSGB Blazer Badge (Black or Dark Navy Blue)	7/6
Stereo Block (RSGB or RAEN emblem)	10/-
Area Representatives Badge (ARs only)	10/-
Call-sign Lapel Badge (with RSGB or RAEN Emblem)*	6/-
Call-sign Lapel Bar *	5/-
Tie Clips (with RSGB Emblem)	5/-
RSGB Lapel Badge (new ½ in. size), stud or pin fitting	2/-
Plastic Window Sticker (RSGB or RAEN Emblem)	1/3

* *Delivery 6-8 weeks*

All prices include cost of packing and UK postage

Cheques and postal orders should be made payable to the Society. Book tokens and stamps cannot be accepted.

RSGB PUBLICATIONS, Dept. G

28 Little Russell Street, London, W.C.1

PRIVATE ADVERTISEMENT ORDER FORM

Please send advertisement to SAWELL & SONS LTD., 4 LUDGATE CIRCUS, LONDON, E.C.4

3d. per word (minimum 5/-), Box Nos. 1/6 (including forwarding replies)

Please insert above advertisement in RSGB BULLETIN

NAME .....
(in BLOCK CAPITALS)

Address .....

.....

.....

Date ..... Signed.....

CLASSIFIED ADVERTISEMENTS

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 to **Sawell & Sons Ltd., 4 Ludgate Circus, London, E.C.4.**

SITUATIONS VACANT

I·R

INTERNATIONAL RECTIFIER

Experienced Electrical or Electronic Engineer

preferably qualified to HNC or ONC standard for interesting work on semiconductor test equipment and device evaluation work. Previous experience in semiconductors an advantage.
This is a staff position with good prospects for an engineer capable of working with minimum supervision.

M GROUP

Please apply to :
The Manager, Electrical Engineering Department, International Rectifier Company (Great Britain) Limited, Hurst Green, Oxted, Surrey. Telephone: Oxted 3215

MULTITONE ELECTRIC CO. LTD.

require

SENIOR TESTERS

for our communications equipment. A good theoretical and practical knowledge of radio frequency and audio equipment essential.

* Staff position
* Good salary. Minimum £875 p.a.
* Free life assurance
* Sick pay
* 3 weeks holiday
* 5 day week

Telephone for appointment CLE 8022

MISCELLANEOUS

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

WANTED

WANTED.—All types of communications receivers, test equipment, tape recorders, amplifiers, etc. Prompt cash payment.—Details to R. T. & I. Electronics Ltd., Ashville Old Hall, Ashville Road, London E.11 (LEYton 4986).

PETERBOROUGH RADIO SOCIETY require Transmitter and Receiver, etc., for Club Station.—D. Byrne, G3KPO, Hon./Sec., Jersey House, Eye, Peterborough.

WANTED

SX111 OR SX117. Must be perfect, can offer in part exchange any from the following, movie equipment, BRT400/D, AR88LF, or cash. Kavanagh, 27 Sandringham Road, Swindon, Wilts.

CR100 OR HRO good condition, state price. BRS23313, 234 Halfway Street, Sidcup, Kent, or Telephone Eltham 6945 after September 6.

R.216 V.H.F. RECEIVER AND P.S.U. Price and particulars to Jenner, 13 Cricketfield Road, Horsham, Sussex. Telephone 5698.

WAVEMETER CL.D, 2M MOBILE TX/RX or either. GDO, GP Oscilliscope. 25 High Street, Olney, N. Bucks.

COLLINS RECEIVER 75A OR 51J or similar. Also SSB transmitter or transceiver. G3NNT, 23 Southport Road, Ormskirk, Lancs. Telephone 3209.

DETAILS OF ANY MODIFICATIONS carried out on R1155, especially "S" meter, retuning for Top Band, pre-amp, etc. Postage expenses of most useful circuits and information will be returned. Box No. 07219, c/o RSGB BULLETIN, 4 Ludgate Circus, London, E.C.4.

WANTED COLLINS 3251-3 ANY CONDITION. LeMoine Laburnums, Chertsey Rd, Chobham, Woking, Surrey. Tel: Chobham 8483 or GER 5532 office hours.

WANTED—Handbook or circuits of ARN21, APQ43 and R-301 "Rawin" receiver! Your price to G3JGF 68 Strathcona Ave, Little Bookham.

888A RECEIVER. Good price for late model in clean condition. 24 Norfolk Avenue, Sanderstead, Surrey.

FOR SALE

FOR SALE (contd.)

K.W. VICEROY MK IIIa with extra half-lattice filter, £115. Olympic Loaded Z-Match 250W version, £5. Joystick and ATU, £2. Various valves and components s.a.e. for list. Carriage extra. Richardson, Post House, Puttenham, Guildford.

COMPLETE STATION FIXED/MOBILE. Sideband Engineers SB33 transceiver, SB1MC dynamic microphone with P.T.T., SB2DCP transistor mobile power supply, SB1MP mobile mounting bracket. See November S.W.M. page 517 for technical description, and January 1965 S.W.M. cover iii for picture. Perfect throughout, price £150. Will not break. G3RDG, 40 The Vale, London, N.W.11. SPEedwell 8831.

1475 RX PP, £11. Generator, 10-300 Mc/s TF801A, perfect. Offers or exchange good RX T/R 3RO method SSB into DAF Exciter also RX PP's, £38. G3KPW, 62 Prospect Place, Grays, Essex.

G & D 2-METRE CONVERTER with Layfayette HE-30 both in excellent condition. First £35 secures. Buyer collects, inspection and trial invited. G3RUI, 17 Hillingford Avenue, Great Barr, Birmingham.

HEATHKIT MOHICAN FACTORY-BUILT, with manual, £23. 44 ft. vertical aerial, accessories, 45s. Handbooks, etc., s.a.e. G2FQG, 2 Calder Close, Maidenhead, Berks. Telephone 27302.

PARMEKO MAINS TRANSFORMERS. P.2522 500-0-500V 120m/a 4/5V 3a 4/6·3V 3a 4/6·3V 5a, 25s. 6d., P.2523 500-0-500V 180m/a 4/5V 3a 4/6·3V 3a 4/6·3V 6a, 30s., P.2524 500-0-500V 250m/a 4/5V 3·5a 4/6·3V 4a 4/6·3V 4a 4/5/6·3V 3·5a, 42s. 6d., P.2541 500-0-500V 180m/a 0/4/5 3a 0/4/6·3V 3a 0/4/6·3V 6a, 65s., P.2645 110/115V 60 ohms 6·3V Ct 4a 5V 2a, 55s., P.2519 450-400-0, 400-450V 120m/a 4/5V 3a 4/6·3V 3a 4/6·3V 5a, 25s. 6d., P & P 6s.

PARMEKO SMOOTHING CHOKES. P.460 120 D/C m/a 15H 250 ohms D.C., 10s., P.461 120 D/C m/a 20H 250 ohms D.C., 11s., P.464 180 D/C m/a 15H 190 ohms D.C., 12s. 6d., P.465 180 D/C m/a 20H 165 ohms D.C., 17s., P.2650 125 D/C m/a 10H 260 ohms D.C., 10s. 6d., P & P 3s. 6d.

TRANSISTORS. OC 201 10s., TK 47C, 4s., GET 873, 6s., V6R8 Gold Topped N'market, 5s. Post Free.

DIODES. CV 425 2s. 6d., SX 56 2s. 6d. **VALVES.** HL 10 20s., R.17 2s. 6d. Post Free. Lists: Resistors, Capacitors, Wafer Switches on request. Dewhurst, 37 Eastcheap, London, E.C.3.

1200 VOLT 200Ma power supply type 45, also high power Modulator with power supply, ex T1131. Buyer collects. C130JO. Phone: Belfast 63598.

MOSLEY TA 33Jr TRIBAND BEAM in good condition, £10. Buyer arranges carriage. Poulter, 279 Aragon Road, Morden, Surrey.

MAGIC. Who will be first to turn my 25 watt 4m transmitter into £10. Details. R. Youngs, Toft Monks, Beccles, Suffolk.

VANGUARD, mint condition, late model includes 160m, nearest £40 secures. Prefer buyer inspects and collects. BC453 aircraft transmitter, 5·3 to 7 Mc/s. As mint £5 o.n.o. Reason for sale owner going overseas. J. R. Clarke, 12 Robin Hill, Brickhill, Bedford.

CATHODEON 10.7 Mc/s CRYSTAL FILTER, type BP50 25 kc/s bandwidth £10 ono. Valves A2521, A2599 6J4WA 10/-. 6146, 6080 QQVO3-20A £1. 4X150A with base £3. Box No. 07220, c/o RSGB BULLETIN, 4 Ludgate Circus, London, E.C.4.

NORTH WESTERN AGENTS for K.W. Electronics, Codar, Joystick, Green Electronics, Electroniques. National and Eddystone equipment supplied. For sale: AR88D, £42. NC190X, £65. Wanted: good communication receivers. James-Stephens, 70 Priory Road, Liverpool (ANField 7829).

FOR SALE—contd.

HY GAIN 14AVS vertical 10-80m, £16. DX100U as new, £60. Also DX100U With Heathkit, mod. for s.s.b. adaptor, £60. SB10U, £30. G3STS, 188 Broadhurst Gardens, London, N.W.6. Tel: MAI 6638.

DRAKE 2B RECEIVER with speaker, Qmult. and 100 kc/s crystal calibrator, £130. Wanted: KWM2 and accessories, or quality transceiver.—Box No. 07223, c/o RSGB BULLETIN, 4 Ludgate Circus, London, E.C.4.

THE REMAINDER of the equipment of the late G2FN, comprising TCS 6 receiver—1·5 to 12 Mc/s, meters, chokes, transformers, condensers, etc. All items must be cleared. S.a.e. for list to G3FMT, 25 Hamilton Avenue, Tolworth, Surrey.

HAMMARLUND SUPER PRO RX, 1·25 to 20 Mc/s, with P.U., auto transformer and spare valves, good order, £20. CR 100, spare valves, AVC line needs attention otherwise O.K., £10. Buyers arrange or pay carriage outside 50 miles. Nicholson, Parc Marras, Grampound, Cornwall.

CHEAP A.F. TRANSISTORS similar OC71, but can oscillate to 2 Mc/s, all tested at only 9d. each or 12 for 7s. P.O. and s.a.e. to E. Chicken, 52 Marlborough Avenue, Gosforth, Newcastle upon Tyne, 3.

LABGEAR 2 Element Quad wired 20m and 15m with separate 54 ft. coax Feeders. Bamboo Spreaders Taped. Easily umbrellaized for transport, £8.

LATEST Hammarlund HQ One-Seventy. A mint front panel and Case with lid, £4.

G2DAF or Grounded Grid pair 813s Linear with Barker and Williamson 1 kW Pi Network Coil, mains control panel and 2000 volt, etc., power supply, £15.
All o.n.o. and buyer collects. Thurlow, G3WW, Wimblington, March, Cambs. Doddington 255.

BUILDING a linear. 813 for 17/6 post paid Box 07221, c/o RSGB BULLETIN, 4 Ludgate Circus, London, E.C.4.

G3ERB Still Sorting Redundant Equipment. Large SAE for latest lists units, valves, components, tapes. No callers. 56 Kings Lane, Bebington, Cheshire.

BRAND NEW VALVE BARGAINS QQVO3-10, QVO3-12 EF95. 6BH6. (Two). ECC81 £2. Six lots only so hurry first come first served. Box 07222, c/o RSGB BULLETIN, 4 Ludgate Circus, London, E.C.4.

EDDYSTONE S640. New condition buyer collects. Gordon McCallum, 1 Burnbrae Street, Faifley Clydebank, Dunbartonshire.

R107 with Xtal calibrator. First class condition. Free delivery London, £12. Mossip, 70 Madrid Road, London, S.W.13.

TELEPRINTER, Creed 3X, 160 volt model, cabinet re-sprayed, keyboard re-built. Excellent mechanical condition. Power supplies available, £12 o.n.o. Mossip, 70 Madrid Road, London, S.W.13.

EDDYSTONE BUG KEY, £1/10/-. 1 Mc Crystal, 10/-. GPO Desk Microphone, 5/-. G2ATD, 5 Sussex Road, North Heath, Erith, Kent.

G5RV Clearing decks for action! Linear Amplifiers 2xTT21 280 watts PEP £25. QY4-250 600 watts PEP £35. 813 500 watts PEP in 10x9x8 inch desk mounting cabinet £30. All completely band switched 3.5 to 28 Mc/s with valves. Eddystone 888A receiver excellent condition £50. Send SAE for list of valves and components. 184, Galleywood Road, Chelmsford. Phone 3394.

PYE P.T.C. 114, 25 watt, 4 metre, mobile/portable transceiver, narrow band I.F., speaker/control unit, 12 volt input, complete ex./crystals, manual. £8. CR.100/8, E.F.80/E.F.85, R.F., N.L., Other mods., manual £17. Deliver 30 miles. 14, Landscape Dene, Helsby, Cheshire, Helsby 2625.

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 The Garden City Press Limited, Letchworth, Hertfordshire.

IF UNDELIVERED Return to:— RSGB, NEW RUSKIN HOUSE, LITTLE RUSSELL STREET, W.C.I