SEPTEMBER, 1960

RSGB BULLETIN

VOL. 36, No. 3

COMPLETE RELIABILITY UNDER THE MOST ADVERSE CONDITIONS

WITH AN

EDDYSTONE 888A

Messrs. Stratton & Co., Ltd.,
Eddystone Works,
Alvechurch Road.,
Birmingham. 31,
ENGLAND.

c/o B.O.A.C.,
Speedbird House,
Bahrain,
ARABIAN GULF.

20th April, 1960.

Dear Sirs,

I should like to write a few words in praise of the Eddystone 888A amateur-band receiver which I purchased almost a year ago, since which time it has been in operation for over six hours daily under the most adverse conditions.

It has performed far beyond my wildest expectations and has enabled me to work literally thousands of amateur stations on CW, AM and SSB in my DX-peditions to QATAR, TRUCIAL OMAN and the SULTANATE OF MUSCAT AND OMAN.

The selectivity, bandspread and accurate dial calibration of the 888A have been of great assistance in working stations in the phenomenal "pile-ups" which have occured whenever I have appeared on the air from one of the DX locations from which I have operated.

The receiver has survived being carried by air in only its cardboard packing case to various rough desert landing strips around the Arabian Gulf, which speaks highly for its rugged mechanical construction. I might add that the standard of wiring, assembly and general design compares very favourably with the best American aircraft radio equipment.

The high temperature and humidity encountered in the Arabian Gulf during the summer months had no detrimental effects on the receiver whatsoever; in fact, on my two SSB expeditions to Trucial Oman and the Sultanate of Muscat and Oman, the receiver operated continuously for five days with the mercury at 120°F. in the shade at mid-day. At this temperature, to touch the metal case or handles of the receiver caused a sensation comparable to that of accidentally touching a kettle of hot water; yet, in spite of this fact, the receiver continued to work perfectly with no signs of distress.

I should therefore like to thank you, as the manufacturers of this fine instrument, for a truly great receiver.

Yours faithfully,
Bryan. A. Bisley.
Bryan A. Bisley.

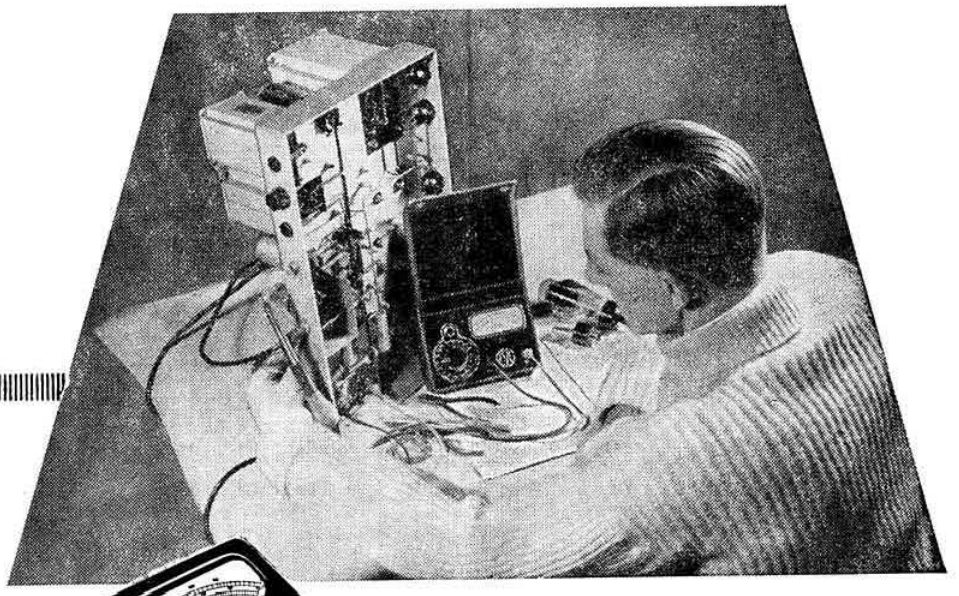
MP4BDA, MP4MAB, [illegible], [illegible].

This is one of many testimonials amply confirming our recommendation of the EDDYSTONE "888A." It is designed especially for amateur use, covering the six bands 1·8 Mc/s to 28 Mc/s each spread over the whole 12 in. long scale; in addition a logging scale allows reading from 2 kc/s per division on 10 metres to 250 c/s on the top band, the accuracy being ensured by an internal crystal controlled calibration oscillator. Some further features are double superhet circuit, R.F. stage, 12 valves, noise limiter, excellent S.S.B. reception, variable selectivity, aerial trimmer—and a host of other details directed to one aim, to meet the highly specialised needs of the Amateur Radio operator. A full specification comes to you post free on request. The cash price of the "888A" in its attractive grey hammer finish is £110.

Please write for full Technical Specification to the Manufacturers

STRATTON & CO. LTD · BIRMINGHAM 31 · ENGLAND

Indispensable...



Using an AVO Multiminor to balance the D.C. component across the output transformer of a High Fidelity Amplifier.

THE MULTIMINOR

D.C. Voltage: 0-1,000V in 7 ranges.
A.C. Voltage: 0-1,000V in 5 ranges.
D.C. Current: 0-1A in 5 ranges.
Resistance: 0-20,000Ω, 0-2MΩ.

Sensitivity:
10,000 ohms per volt on D.C. voltage ranges.
1,000 ohms per volt on A.C. voltage ranges.

Accuracy:
On D.C. 3% of full scale value.
On A.C. 4% of full scale value.

Pocket size: 5⅝ × 3⅜ × 1⅜in.
Weight: 1lb. approx.
List price: **£9/10/-.**
Complete with Test Leads and Clips.
Leather case if required **32/6.**

Whether you're building your own High Fidelity Amplifier or servicing a complete installation—for fault finding on anything from pre-amplifier to speaker—you'll find the MULTIMINOR to be "just right."

You'll enjoy using this neat pocket instrument giving readings over nineteen ranges on a clear open scale.

A.C. and D.C. voltage, D.C. current and Resistance measurements are made by means of only two sockets. The robust, easy-to-read range selector has a smooth, clean, positive action.

"*Can you afford it?*" Let's say rather—"*Can you really afford to be without it?*"

Write for illustrated brochure

AVO LTD AVOCET HOUSE · 92-96 VAUXHALL BRIDGE ROAD · LONDON S.W.1 *Telephone: VICtoria 3404 (12 lines)*

A MEMBER OF THE METAL INDUSTRIES GROUP OF COMPANIES

MM 10

Volume 36 No. 3
September 1960
2/6 Monthly

R.S.G.B. BULLETIN

CONTENTS

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

DEPUTY EDITOR:
John A. Rouse, G2AHL

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

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

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

Radio Society of Great Britain

(Incorporated 1926)

PATRON:

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

COUNCIL 1960

President:
W. R. METCALFE, G3DQ

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

Penultimate Past President:
L. E. NEWNHAM, B.Sc., G6NZ

Executive Vice-President:
H. A. BARTLETT, G5QA

Honorary Treasurer:
N. CAWS, F.C.A., G3BVG

Ordinary Elected Members:

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

Zonal Representatives:

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

General Secretary and Editor:
JOHN CLARRICOATS, O.B.E., G6CL

Deputy Editor:
JOHN A. ROUSE, G2AHL

Assistant Secretary:
MAY GADSDEN

REGIONAL REPRESENTATIVES

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

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

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

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

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

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

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

Region 8.—South Eastern. Office Vacant.

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

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

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

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

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

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

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

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

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

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

Current Comment

discusses topics of the day

The Show

PROGRAMMES for group and club meetings for the coming season are now well advanced but there is one item we venture to suggest should be on every fixture list between November 23-26, 1960: a visit to the R.S.G.B. International Radio Hobbies Exhibition at the Royal Horticultural Society's Old Hall in London.

Just as the National Radio Show which closed a couple of weeks ago caters for a specialist section of the radio entertainment industry, so the Society's own exhibition caters for the increasing number of active radio amateurs, shortwave listeners and build-it-yourself electronics enthusiasts. Each year exhibits display the cream of British, American and continental equipment from the smallest component to complete and complex transmitters and receivers. This year promises its share of new products, amongst them a completely transistorized British communications receiver, a new lightweight portable 45 ft. mast and an entirely new coil pack giving full bandspread on all amateur bands from 1·8 to 30 Mc/s.

On the Society's own stands there will be as usual a fine display of equipment built by members throughout the country and, of course, the ever-popular exhibition station, GB3RS, will be in operation on c.w., a.m., *and* s.s.b.

But the Exhibition is much more than just a show of all the latest and best in Amateur Radio. It also provides an informal meeting place, a fine blending of hamfest, convention and ragchew. A visit is one of the highlights of the year and the most pleasant in the company of friends with whom the journey to London can be spent in pleasurable anticipation and the return in discussion of all that has been seen and heard. This year special party vouchers admitting twelve or more at the same time will be available to R.S.G.B. Groups and Affiliated Societies at attractive prices. Full details may be obtained from the Exhibition Organizer, Phil Thorogood (G4KD).

A natural corollary is for T.R.s and club secretaries to arrange transport for their parties, either in private cars and specially hired coaches or by taking advantage of party rates offered by British Railways.

For the forward-looking radio amateur, DX man, experimenter and constructor wishing to keep abreast of the latest developments, a visit to the Radio Hobbies Exhibition is a must. Why not plan *now* to be there in November?

A view of the Society's stand at the National Radio and Television Show, Earls Court, London, from August 24 to September 3, 1960. A large number of new members was recruited. Amongst the equipment displayed was that for G3NAT at the Headquarters of the British Red Cross Society. (Photo by the Tella Co. Ltd.)

Must we use A.M. on Two?

A Plea for Narrow Band F.M.

By BILL SYKES (G2HCG) *

A GREAT deal has been said and written about the merits of s.s.b. but the other alternative—f.m.—appears to have been completely neglected. The reason for the failure to date of both systems to attain popularity undoubtedly rests in the receiver. S.s.b., even to the exponents of the art, is difficult to tune satisfactorily, and f.m. when received in an a.m. receiver—as it always is—results in the comment of gross under modulation and is immediately written off as useless to anyone seriously interested in long distance operation.

F.m. received on a correctly designed n.b.f.m. receiver is, however, an entirely different kettle of fish, and the writer's experience of this has resulted in the production of this article in an attempt to persuade others to try this mode of operation. It is an honest attempt to set down the advantages and disadvantages of the three systems of modulation available.

Considering s.s.b. first, there is the undoubted aesthetic advantage that no expensive carrier (which conveys no intelligence) is being transmitted; the actual intelligence power radiated is higher than any other system, and the range should be greater. However, at the risk of violent objections from the much-to-be-admired exponents of the art, s.s.b. must be rejected at v.h.f. for two main reasons. Firstly it is not within the power of most v.h.f. operators to hold the frequency of either transmitter or receiver to the necessary close frequency limits, and keeping a signal on tune throughout a QSO is almost impossible. Secondly although the theoretical range must be greater, this does not occur in practice due to the width of band which has to be tuned and the fact that the s.s.b. signal is only there when the operator is actually speaking: the chances of tuning past during a gap between words are very high indeed, and a weak s.s.b. station may just not be noticed. The question of complexity of equipment cannot be entirely ruled out because although the v.h.f. man by the very fact of being on v.h.f. likes to do things the hard way†, he is a little appalled at the vision of the amount of circuitry necessary to produce an s.s.b. signal.

Considering now the relative merits of a.m. and f.m. a fact which is not perhaps generally realized should first be mentioned. It is necessary to use an aerial system of high-power gain at v.h.f. and in the case of 100 watts of r.f. into an aerial of 20db gain the result is an astonishing 10 kW e.r.p. (effective radiated power). Even the small 25 watt station using an aerial gain of 12db is effectively transmitting 400 watts while the kilowatt station may have an e.r.p. of 80 kW—about the same as a reasonably high-power TV station. These amounts of energy can produce some most peculiar effects locally, and the main reason the writer abandoned a.m. was the great desire of almost every audio amplifier

* *41 Booth Lane North, Northampton.*

† This is surely no longer true.—EDITOR.

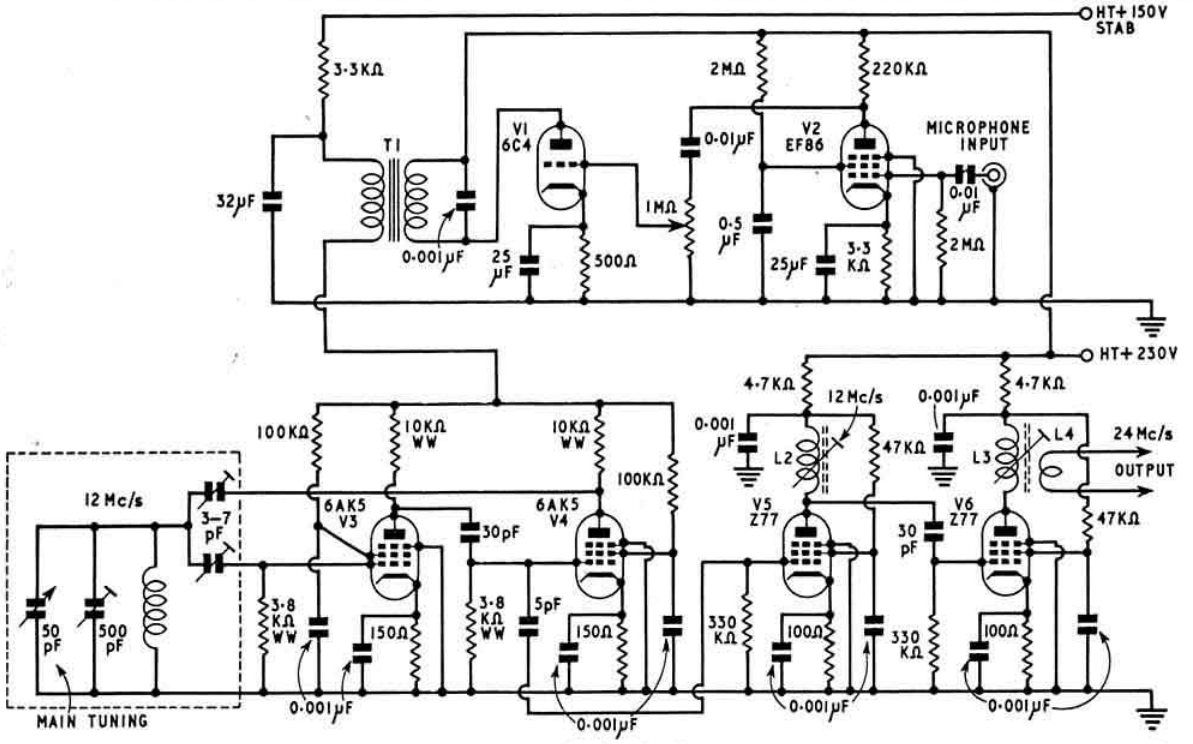


Fig. 1. Two metre v.f.o. and f.m. modulator. L1, 4 turns 16 s.w.g. spaced twice wire diameter on 1½ in. former; L2, 60 turns 36 s.w.g. close spaced on ¾ in. diameter dust-cored former (self resonant at 12 Mc/s); L4, 4 turn link close-wound on earthy end of L3; T1, any small 1 : 1 ratio audio transformer. Wire-wound resistors must be used wherever specified as they also act as chokes.

in the vicinity, be it TV set, radio set, or even tape recorder, to rectify the v.h.f. signal and convert it to large amounts of unwanted audio. Rather than a list of the things that a.m. produces, which we all know but tend to overlook, it is perhaps better to list the things f.m. *on 2m* will not do:

(i) It will not interfere with any TV receiver.

(ii) It will not interfere with any f.m. broadcast receiver. (Remember that the audio output of such a receiver is a function of deviation: broadcast f.m. deviation is 75 kc/s while amateur n.b.f.m. is 3 kc/s, so any audio generated by an amateur signal will be 25 times down.)

(iii) It will not interfere with any audio amplifier be it part of a broadcast receiver or a deaf-aid.

(iv) It will not interfere with aircraft services using the 2m band.

(v) It will not cause splatter by over modulation.

(vi) It will not creep into speech amplifiers causing those peculiar r.f. feedback noises which seem exclusive to v.h.f.

(vii) It will not swamp one's own receiver, thus permitting duplex operation on the same band.

(viii) It does not require a large and expensive modulator; in fact ¼ watt of audio will modulate any transmitter.

(ix) It will not reduce range *if* an f.m. receiver is used at the receiving end.

(x) It will not wear out tuning mechanisms by being impossible to tune as in the case of s.s.b.

(xi) It will not be swamped by ignition interference, provided an f.m. receiver is used.

(xii) It does not require the expenditure of much time and money on expensive or complicated equipment.

There must be a snag—it's too good to be true. But there is no snag: the equipment needed is probably available in every junk box, and no new techniques are involved. The B.B.C. chose f.m. for v.h.f. after extensive tests, why should amateurs think they know better?

The Transmitter

A discussion on the pros and cons of v.f.o.s on 2m is not for this article; suffice to it to say that the use of a v.f.o. is a most convenient means of producing f.m.—the rock-bound die-hards can always lock the tuning knob.

The design of a successful 2m v.f.o. has occupied the writer for many years and only recently was the solution found. The fundamental snag is warm-up drift due to change in valve capacitances. The valves must therefore be very loosely coupled to a high C tuned-circuit if the inconvenience of running the oscillator 24 hours a day is to be avoided.

The only circuit the writer has found which fulfils this requirement is the Franklin and, although now out of fashion, the use of modern high-gain pentodes makes the Franklin by no means a back number. The circuit of the complete v.f.o. is shown in Fig. 1 but full constructional details are not given because the average v.h.f. enthusiast will have his own ideas on the subject. The only points to watch are as follows:

(i) The main tuned circuit must be rigid and of good-quality components, all capacitors being air-spaced. A rigid 0·0005 μF variable may be used as the fixed capacitor.

(ii) The box in which the tuned circuit is mounted must be rigid with no faulty joints at the corners.

(iii) The coupling capacitors to the tuned circuit should be set to the minimum possible setting consistent with reliable oscillation.

The oscillator operates in class A and will therefore have no harmonics and will be impossible to pick up on a receiver other than on its fundamental of 12 Mc/s, thus permitting continuous oscillator operation while in use.

It will be noticed that the oscillator is anode modulated, which at first seems wrong. However, a plot of anode volts versus frequency produces a straight line for some 800 c/s. Since this is multiplied by 12 to reach the final frequency a total deviation of some 10 kc/s is obtainable; beyond this figure no more deviation is possible giving automatic limiting and preventing over-modulation. The amplitude modulation produced at the oscillator is effectively filtered out by the following class C multipliers in the transmitter and no trace of a.m. is transmitted. The only way of making any meter on the transmitter move with modulation is by grossly excessive audio input to the oscillator, which virtually runs the valves to cut off.

Drive is more than adequate at 24 Mc/s to permit input to the grid of the normal crystal oscillator stage whose anode is tuned to this frequency. Any excess drive should be reduced by deliberate detuning of the 12 Mc/s coil in the anode circuit of the first buffer, this having the effect of removing the last traces of oscillator frequency pulling.

The total measured drift from switch on in a cold (30°F.) shack to switch off some two hours later (65°F.) is 15 kc/s on 2m. Of this drift 80 per cent occurred during the first five minutes.

The note is not T9X with a.c. on the oscillator heaters but it is better than T8, reports varying from T8-T9 depending probably on the receiver in use or the politeness of the operator. T9X can be achieved by the simple expedient of providing d.c. for the oscillator heaters.‡

High frequency audio response is deliberately restricted to comply with G.P.O. requirements. This is rather a pity as some pre-emphasis of h.f. would be a distinct advantage, particularly if the internationally recognized standards of of pre-emphasis were used.

The Receiver

A considerable amount of time was spent looking through books and periodicals in an attempt to find data on n.b.f.m. receivers with an i.f. of 465 kc/s but the subject seems to have been ignored. Commercially-made discriminator transformers for this frequency are unobtainable.

The relative merits of ratio and Foster Seeley discriminators were considered and although the ratio type would undoubtedly be an advantage, the absence of a suitable i.f. transformer and the difficulty of winding one ruled this circuit out. On examination it was found that quite a large proportion of available i.f. transformers are in fact centre-tapped. A notable example is a crystal filter transformer.

The transformer problem being solved a unit was built to the circuit of Fig. 2.

The f.m. unit is made in the form of an adaptor which in the writer's case fits on top of the tuning unit of the AR88 receiver. If, however, there is no room in the receiver the n.b.f.m. section could undoubtedly be built as part of the 2m converter with appropriate provision for switching the receiver audio stages to a.m. or f.m. The power requirements of ½ amp. at 6·3 volts and 10 mA h.t. are negligible.

The method of coupling to the main receiver i.f.s is important as any instability caused will result in poor rejection of amplitude modulated ignition interference. The circuit shown uses a form of " bottom end " coupling which requires no alteration of the main receiver and, although it looks impossible, is very effective.

The f.m. adaptor unit consists of two limiter stages and a Foster Seeley discriminator, alignment of which simply consists of tuning all trimmers for maximum signal with the exception of the final secondary, adjustment of which is as follows: Connect a microammeter between the audio output lead and earth and accurately tune in a station using the receiver's normal S meter. It will be noticed that during the tuning the microammeter reading varies from negative to positive. The final i.f. trimmer should then be adjusted so that the microammeter reading is nil when the station is exactly at maximum on the receiver S meter. A final check

‡ A small silicon rectifier in series with the heater supply to the oscillator and a large capacity low voltage electrolytic will suffice.—EDITOR.

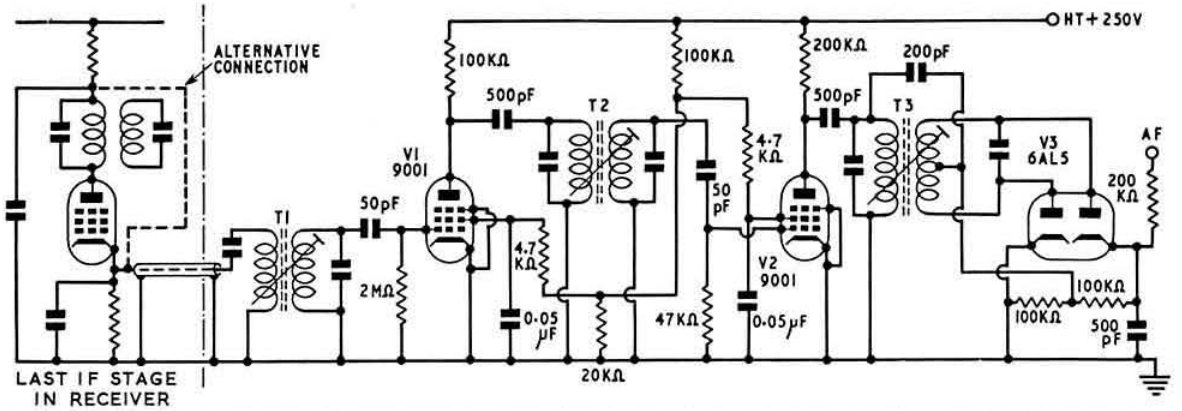


Fig. 2. Circuit diagram of the adaptor for the reception of narrow-band f.m. signals. T1 and T2 should be standard inductance-tuned i.f. transformers; T3 should be similar with a centre-tapped secondary.

can be made on the operation of the discriminator by detuning an equal amount either side of the signal and checking that the microammeter reads an equal amount positive or negative, reversing its connections if a centre zero meter is not available. Should these readings not be equal, slight adjustment of the primary of the discriminator transformer may be necessary, although in the writer's case this trimmer was simply adjusted for maximum and no trouble was experienced in obtaining equal deviation.

The audio output from the discriminator will be found to be the same as the average a.m. detector, and first impressions may be that the ratio of a.f. to noise is bad, but the smallest signal reduces the noise level, and signal-to-noise ratio while receiving a signal is good.

The circuit shown was designed for 455 kc/s, but there seems no reason why the same values should not be used at 1·6 Mc/s with equal success.

Actual constructional details are not included as the circuit is quite straightforward. The only requirement is stability which is no problem provided the unit is built as a straight strip—any attempt at zig-zagging in the layout of the stages would probably lead to trouble. The 9001 type valve was used because of its small size, low power requirements, short grid base and relatively low gain. Other types could possibly be used, but definitely not the modern high-gain TV pentodes. Reasonable alternatives in the octal series would be the 6J7, 6SJ7 or 6SS7. Circuit values for limiter operation would remain the same for all valve types.

Results

Results on n.b.f.m. on the known long-distance path to G3FAN (Isle of Wight) exceeded all expectations. The normal watery n.b.f.m. signal as received on the a.m. receiver was converted into a good solid healthy signal at least as good as an a.m. transmission, with the added advantage of less background noise and no change whatever in audio level with fading. The drop in background noise above S7 was quite impressive and ignition interference was considerably less troublesome although not entirely eliminated. Possibly the use of a normal limiter circuit after the discriminator would remove this entirely. Below S7 signal levels, noise was naturally in evidence but exhaustive tests under the worst conditions showed a definite advantage in readability on f.m. The advent of a high-power local signal nearly on top of the G3FAN signal one evening resulted in some difficulty on f.m. but a switch to a.m. resulted in the complete disappearance of the long-distance station under the sidebands of the local.

In conclusion the use of n.b.f.m. seems to be an admirable way of furthering the " ham " spirit of helping the other fellow whether he is a local, a long-suffering neighbour, or an aircraft station in the band. This is a case where we can actually gain by helping the other fellow.

Television Channels

THE following table shows the frequencies for each television channel in Bands I and III.

Channel 1	Sound 41·5 Mc/s	Vision 45 Mc/s.
Channel 2	Sound 48·25 Mc/s	Vision 51·75 Mc/s.
Channel 3	Sound 53·25 Mc/s	Vision 56·75 Mc/s.
Channel 4	Sound 58·25 Mc/s	Vision 61·75 Mc/s.
Channel 5	Sound 63·25 Mc/s	Vision 66·75 Mc/s.
Channel 6	Sound 176·25 Mc/s	Vision 179·75 Mc/s.
Channel 7	Sound 181·25 Mc/s	Vision 184·75 Mc/s.
Channel 8	Sound 186·25 Mc/s	Vision 189·75 Mc/s.
Channel 9	Sound 191·25 Mc/s	Vision 194·75 Mc/s.
Channel 10	Sound 196·25 Mc/s	Vision 199·75 Mc/s.
Channel 11	Sound 201·25 Mc/s	Vision 204·75 Mc/s.
Channel 12	Sound 206·25 Mc/s	Vision 209·75 Mc/s.
Channel 13	Sound 211·25 Mc/s	Vision 214·75 Mc/s.

Channels 1-5 in Band I are used by the B.B.C. Channels 8, 9, 10 and 11 are used by the Independent Television Authority. Channels 6, 7, 12 and 13 have not yet been allocated to television stations.

National Convention Stations

During the period of the National Convention in Cambridge three stations will be in operation on all bands from 1·8 to 28 Mc/s and on 144 Mc/s.

The main station will be in operation intermittently from September 12 to 17 using c.w., a.m. and s.s.b. on 3·5, 7, 14, 21 and 28 Mc/s.

From 10 a.m. on September 15, talk-in stations will be active on 1920 kc/s and 145·2 Mc/s. The Top Band station will listen for replies from 1925 kc/s up.

All stations will be on the air whenever possible until the end of the Convention, all using the call-sign

GB2CAM

Communication Receiver Design Considerations

Part 3.–Circuit Details

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

THE limiting factors in regard to image and i.f. breakthrough have been discussed in detail in Parts 1 and 2† and it has been shown that for any setting of the main first i.f. tuning *three* different input frequencies will be converted to the second i.f. input and amplified by the following stages. The required attenuation of the two unwanted products is directly dependant on the discrimination of the signal frequency tuning at the receiver front end.

A minimum of two tuned circuits before the first mixer is necessary. Three tuned circuits would be better still and would give a greater margin of safety. However, this would entail six more coils and their associated switching, a three gang tuning capacitor and a larger chassis, so some compromise is necessary. It has already been shown that the required target figures can be realized with two circuits only (given the correct choice of tunable i.f.) provided that a reasonable Q figure is obtained in each.

As an r.f. amplifier is necessary to overcome the effect of mixer noise, the tuned circuits can conveniently be between the aerial input and the r.f. grid and between the r.f. anode and the mixer grid as shown in Fig. 10. A coupled primary

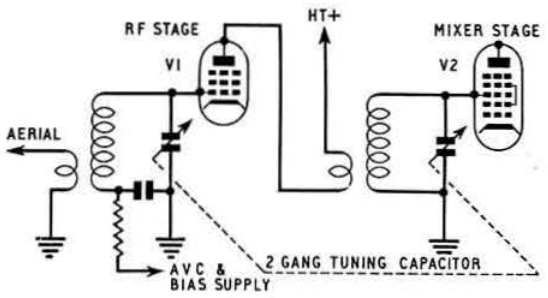


Fig. 10. Common type of signal frequency circuit with transformer coupling to each stage.

winding on the mixer grid coil as shown is common receiver practice. This is due to the fact that in a general coverage receiver tuning from 500 kc/s to 30 Mc/s in six bands the tuning range of each band must be about 2 : 1 (i.e. Band 1, 500 kc/s–1 Mc/s; Band 2, 1 Mc/s–2 Mc/s; Band 3, 2 Mc/s –4 Mc/s; Band 4, 4 Mc/s–8 Mc/s; Band 5, 8 Mc/s–16 Mc/s; Band 6, 15 Mc/s–30 Mc/s).

The total minimum capacity across the tuned circuit will be made up of valve input capacity, wiring strays, band change switch capacity and the minimum capacity of the tuning capacitor used, plus the self capacity of the inductance. This total is likely to be of the order of 35 to 50 pF and will necessitate a tuning capacity swing of 200 pF—a two gang capacitor of 200 pF each section—to obtain the required 2 : 1 frequency ratio.

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

† *Part 1 appeared in the July, 1960, issue and Part 2 in the August, 1960, issue of the R.S.G.B. Bulletin. Copies are available price 2/6 each from R.S.G.B. Headquarters.*

Under these conditions the dynamic impedance of the tuned circuit will vary considerably. This is given by the formula $Z = \frac{L}{Cr}$ where L is inductance, C is capacity, and r is r.f. resistance. For any band, L and r remain constant (it is assumed that the r.f. resistance of C is negligible) and C will vary from 50 pF to 250 pF—an increase of 200 pF or a ratio of 4 : 1. The value of Z will also vary in inverse proportion over the same 4 : 1 ratio and will be greatest as C becomes less in value. As the stage gain of the amplifier is equal to $\frac{\mu Z}{R + Z}$ where μ = the amplification factor and R= the a.c. resistance of the valve, it is obvious that the stage gain will vary throughout the tuning range and will be least at the low end of the band and greatest at the high end of the band.

This rising gain characteristic can be compensated if the primary winding has a falling gain characteristic. The required compensation in the r.f. valve anode is obtained by using a fixed high L primary (tuned by its own self capacity or combination of self and fixed external capacity) so that it is resonant at some frequency lower than the low frequency edge of the required tuning range. In a receiver with a limited tuning range of 500 kc/s the L/C ratio will be more constant and the change in Z will be very small; primary winding compensation is therefore not necessary. The coil can be simplified to one winding and the anode capacitively coupled to the mixer grid. The same considerations apply to the r.f. grid input coil, the primary of which can be eliminated and the 75 ohm aerial co-axial feeder tapped at the correct point down the coil. The circuit then becomes that shown in Fig. 11.

It is usual practice to use a link winding to the receiver co-axial cable input from a common aerial tuning circuit, for both transmitter and receiver, with a change-over relay. With the input arrangement shown in Fig. 11 this would short circuit the a.g.c. and bias line, hence it is advisable to return the cold end of the coil to chassis and shunt feed the control bias to the grid. Additionally, the r.f. choke is effectively in parallel with the mixer grid tuned circuit. Its loading effect

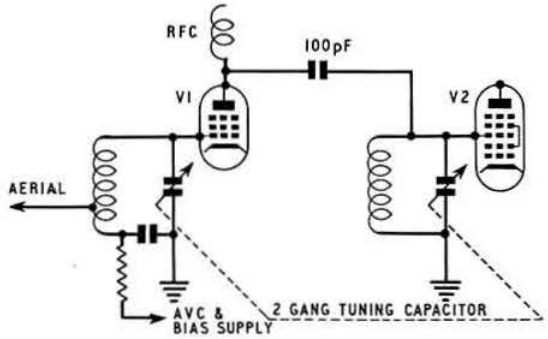


Fig. 11. Modified input circuit suitable for receiver with restricted tuning range.

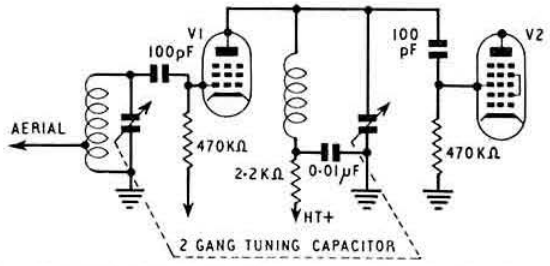


Fig. 12. Final signal frequency circuit arrangement with series h.t. feed to r.f. valve.

can be eliminated by making the r.f. valve anode series fed and providing a d.c. return for the mixer by a grid resistance, high enough in value to have negligible effect on the coil. The finalized circuit is shown in Fig. 12.

From the viewpoint of signal to noise ratio there is virtually no point in using a cascode r.f. amplifier. In regard to a.c. resistance, mutual conductance and stage gain, the cascode is almost identical to an r.f. pentode such as the 6BA6. It is, however, superior in regard to cross modulation characteristics and, in the writer's experience, equally satisfactory so far as grid characteristics with automatic gain control from a common bias line are concerned. This arrangement is therefore preferred for the receiver r.f. stage and a circuit using the ECC84 is shown in Fig. 13 together with the required coil switching.

There has been some discussion on the air in regard to eliminating the switching of front end circuits and using one coil only to cover all bands. The discussion arises from the assumption that, "What Collins can do, I can do too!" The 75S1 receiver has been quoted as an example.

This supposition is quite incorrect because the 75S1 receiver has normal switch banks in the signal frequency circuits and the capacity across the coil is switched to provide the optimum L/C ratio for each band. It is quite true that the coil is in use the whole of the time, but that is because the receiver uses permeability tuning. So far as a tuned circuit is concerned it does not matter to the circuit combination whether a variable coil and switched capacity is used, or whether the capacitor is variable and the coil switched.

In practice it would be quite impossible to use one coil to cover 1·5 to 30 Mc/s, or even 3·5 to 30 Mc/s. A 500 pF variable capacitor will give a ratio of frequency change of 3 : 1. It would therefore only cover 1·5 to 4·5 Mc/s, or 3·5 to 10 Mc/s, or 10 to 30 Mc/s, over the full range. In fact with normal stray circuit and minimum tuning capacity—say 50 pF—it would require a tuning capacitor of 4,000 pF maximum capacity to give a tuning range of 3·5 to 30 Mc/s. A coverage of 3·5 to 30 Mc/s could be obtained in steps with two coils and a 500 pF variable capacitor, but this is not desirable because of the factors that have already been discussed in regard to the wide variation in tuned circuit impedance and stage gain with a large change in tuning capacity value. Additionally, with low impedance co-axial feeder input it is very important correctly to match the aerial to the coil impedance, which will vary on each band. This fact is well understood in transmitting practice but it is not always realized that it is just as important working the other way round.

As the front-end tuned circuits have to be peaked to resonance at any part of the 500 kc/s tuning range on each waveband, the required capacity swing will be determined by the ratio of bandspread to the lowest range of the receiver. This will be on 160m where the ratio is 1 : 1·33 (i.e. 1500 : 2000 kc/s). Assuming a reasonably low value of stray capacity and a gang capacitor minimum of 10 pF a 1 : 1·33 frequency ratio can be obtained by a swing of 35 pF. The maximum capacity needed is therefore 35 + 10 = 45 pF — a two gang capacitor of 50 pF maximum each section will give a slight margin of safety and be very suitable. (It is useful for test purposes to be able to tune in the broadcast stations around 1·5–1·7 Mc/s and this is assumed.)

Conversion Oscillators and Mixers

In order to eliminate spurious heterodynes the conversion frequency must be on the high side of the required band (i.e. conversion frequency minus tunable i.f. = signal frequency). It is recommended that the oscillator be operated either on

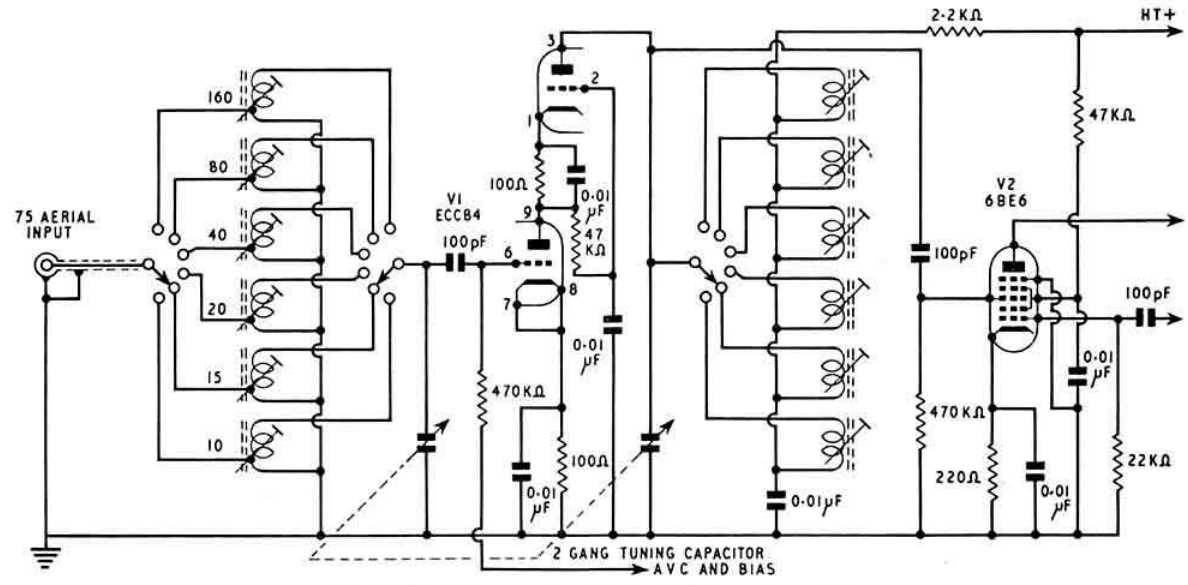


Fig. 13. Signal frequency circuit using ECC84 cascode amplifier.

the fundamental or overtone of the controlling crystal and at the lowest possible level consistent with a satisfactory drive to the following mixer oscillator grid. Before dealing with the oscillator itself, it would be wise to consider in more detail the question of the required drive to the mixer.

Inspection of the manufacturers' literature for the 6BE6 or similar mixer valves will show that for maximum conversion efficiency it is recommended that the oscillator grid (G1) current through a 20 K ohm grid resistor should be 500 μA. However, the optimum conditions for broadcast reception are not necessarily the best conditions in a double conversion high gain communication receiver. A grid current of 500 μA represents a grid voltage of 10 volts—the grid will be biased well into the class C region—and the harmonic output will be increased. This is to be avoided because it is quite impossible to find any combination of conversion oscillator and v.f.o. frequencies that are completely free from the possibility of " birdies " due to higher order harmonics (that is, higher order heterodynes than those shown in Tables 1 and 2 in the July BULLETIN). This is no detriment and not of importance provided that the " birdies " are down at the threshold noise level—80 db or more below peak signal level.

Under normal reception conditions and to avoid cross modulation, the signal level—even at the second mixer—should not be allowed to exceed 100 millivolts. A signal/heterodyning input ratio of 10 : 1 is more than adequate to ensure a satisfactory mixing process (i.e., the amplitude of the output of the mixer is in linear relationship to the amplitude of the wanted signal input to the mixer). A 10 : 1 ratio, with a signal input of 100 millivolts is 1·0 volt. It is therefore recommended that the oscillator input to the two mixer grids be adjusted by alterating the value of the conversion oscillator anode and screen h.t. feed resistors to obtain the following operating conditions: to the first mixer—grid current of between 100 and 250 μA (this will accommodate the varying output of the conversion oscillator on the different bands); to the second mixer—a grid current of between 100 and 200 μA. These two heterodyning input levels will give satisfactory performance of the two mixer valves with the lowest level of harmonic output.

As the signal to noise ratio has already been determined by the receiver bandwidth, the gain of the input coil and r.f. valve, there is no advantage whatsoever in attempting to obtain more gain in the two mixer valves. In fact, the major signal amplification should come after—not before—the selective bandpass filter.

The desirable basis of a really first class receiver or transmitter design is to provide more stages than are strictly necessary and to run each stage well within its maximum signal handling capabilities. This is likely to provide much more satisfactory results and a very much greater margin of safety than reducing the number of valves to the minimum possible and then having to extract the maximum stage gain from each of them. As the maximum gain requirement of 140db is sufficient to convert a 0·5 microvolt input signal up to the peak voltage the output valve will handle, any greater gain than this is unusable. It is necessary to have 30db gain before the first mixer grid in the interests of a satisfactory signal to noise ratio but any attempt to start from the aerial and adjust each stage in turn for the maximum possible gain is likely to result in an excessive amount of amplification that will only magnify the valve noise and may well (in the r.f. and i.f. amplifier stages) bring about receiver instability.

A suitable oscillator is the Butler circuit using a 12AT7 double triode—one half as a grounded grid amplifier and the other half as a cathode follower. A feedback winding is not necessary—the coil is therefore simplified and needs only to be tuned with a shunt fixed value capacitor. The feedback voltage is coupled from the anode to the grid of the cathode follower section and the crystal between the cathodes behaves as a series resonant circuit so that the phase change is zero at the required frequency.

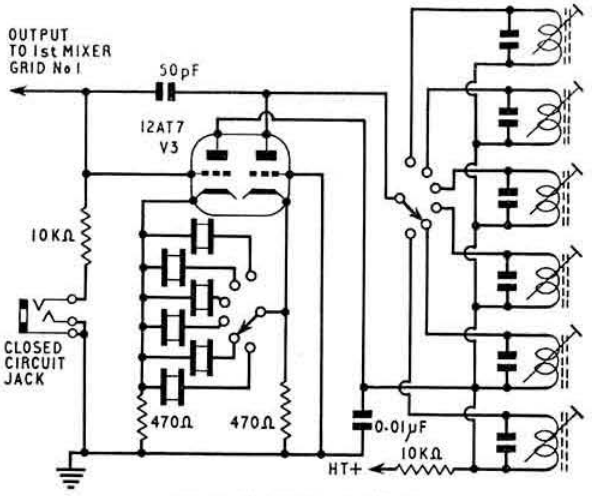


Fig. 14. Conversion oscillator.

Many constructors will wish to use surplus FT243 crystals that were not ground for overtone operation and these may not operate at all, or not very well, on higher order harmonics They are, however, generally satisfactory on the third overtone and it is suggested that crystals should be chosen for the higher ranges with this fact in mind.

Two single pole six way switch banks will be required: one to select the required crystal, the other to select the required anode coil. These two banks and the three banks in the r.f. and mixer stages may be ganged together on a common shaft to form the main wave change switch assembly.

The recommended oscillator circuit is shown in Fig. 14. Normally crystals will be used operating on the fundamental frequency for the 160 and 80m bands, and possibly 40m (this will depend on the choice of first i.f. tuning range), and on the third overtone for 20, 15 and 10m.

As the suggested receiver tunable coverage on each range is 500 kc/s, the 10m band will require more than one conversion crystal. This can either be done manually by changing over crystals, or alternatively by an auxiliary 2 pole, 4 way switch fitted in the oscillator section (with a shaft to a front panel control knob) so that this is brought into circuit on the 10m position of the main band change switch assembly. In this way the additional crystals and any required change in shunt capacity across the anode coil can be selected from the front panel and the additional crystals permanently wired into circuit.

When setting the anode coils for third overtone output, the correct tuning point is indicated by a kick in grid current. It is convenient to wire a closed circuit jack in the 10 K ohm grid resistor return and mount this at some suitable position on the chassis flap. A 0-500 μA or similar meter can then be connected into circuit without disturbing soldered connections.

V.F.O. and Tunable Intermediate Frequency Stages

Stability, a low order of harmonic output and a reasonably constant amplitude over a 500 kc/s tuning range are the basic v.f.o. requirements. In addition a linear dial calibration giving a constant tuning rate throughout the band would be a decided operating advantage.

Assuming the use of a stabilized h.t. supply, the use of good quality components, a reasonably constant heater

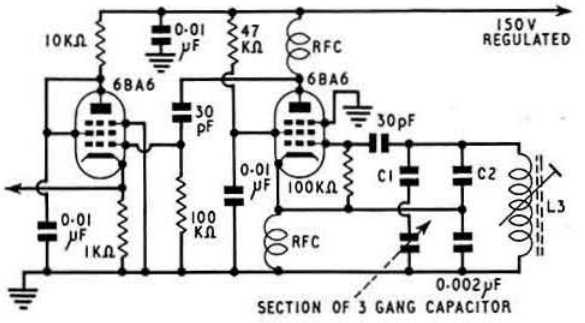


Fig. 15. V.f.o. and cathode follower.

voltage and care in construction, the stability of the v.f.o. will be mainly determined by the stability of the tuned circuit —the inductance and the capacity. Any change in ambient temperature will have more effect on the inductance than it will have on the capacitance. The overall stability will therefore be improved if the capacitance is made large and the inductance as small as practicable. A large shunt capacity will also tend to swamp any random change in valve input capacity. A parallel tuned circuit will also give the required constancy of output voltage. These requirements can be met using a Colpitts oscillator circuit. A v.f.o. should not be required to provide power to an external circuit and a cathode follower should be considered an essential part of the v.f.o. assembly.

The preferred circuit arrangement is shown in Fig. 15. The value of the tuning capacitor is not shown but in practice it can be from 100 pF to 250 pF. Over the sweep of the capacitor—from minimum to maximum—the tuning range

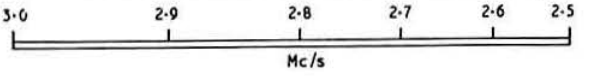
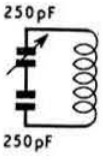


Fig. 16. Calibration scale with normal three gang capacitor (assuming a tunable i.f. of 2.5-3 Mc/s).

can be adjusted to the required 500 kc/s by altering the value of C2. Obviously, the larger the value of C2, the smaller the effect of the variable capacitor (i.e., a 250 pF tuning capacitor and a value of C2 of 600 pF would give approximately the same tuning range as 140 pF tuning and 280 pF (effective) shunt).

As the v.f.o. is tuned by one section of a three gang capacitor which is normally only available with mid log or square law characteristics the dial calibration (in terms of frequency) will not be linear and will in fact be cramped at the low frequency side and progressively expanded as the tuning capacity is reduced in value. The type of tuning scale —calibrated every 100 kc/s—that would be obtained in practice is shown in Fig. 16.

If a fixed capacitor is placed in series with a variable capacitor across a coil the effective capacity will be reduced, but additionally the series capacitor will have more effect at the low frequency end and progressively less as the tuning



VALUE OF TUNING CAPACITOR	0	50	100	150	200	250
EFFECTIVE CAPACITY ACROSS COIL	0	41·7	71·4	93·7	111·0	125·0

Fig 17. Effective capacity values with fixed capacity in series with the tuning capacitor.

capacitor is reduced in value. The capacity of two capacitors in series is given by the formula $\frac{C1 \times C2}{C1 + C2}$. Fig. 17 gives the effective capacity change for equal changes in the variable capacitor itself. If these effective capacity points are plotted on a linear scale they will appear as indicated in Fig. 18. When compared with the normal calibration shown in Fig. 16 it is apparent that the two non-linearities are in the opposite direction and can be superimposed on each other to obtain an approximately linear dial calibration. In practice it is suggested that C1 be made the same value as the variable capacitor and C2 twice the value of the variable. A trial calibration may then be made either by picking up the 100 kc/s pips from a calibration oscillator or by using a BC221 frequency meter. If the scale is still cramped at the low frequency end, C1 can be reduced in value—if too open

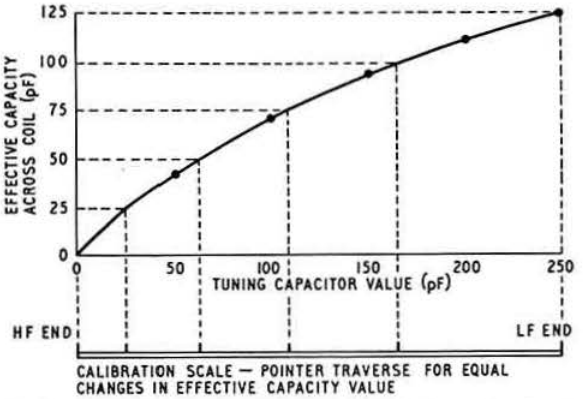


Fig. 18. Graph showing how the original tuning capacitor law is modified by the action of the fixed series capacitor shown in Fig. 17.

C1 can be increased in value. Naturally, this will contract or expand the pointer traverse required for the 500 kc/s coverage. This is finally adjusted to give 500 kc/s (plus say 10 kc/s at each end) by adjustment to the value of C2. The inductance is finally determined to correct the oscillator frequency (for the tunable i.f. that has been chosen) by adjustment to the dust core.

The procedure may sound tedious but the only requirement is patience. It is certainly very well worth while going to the effort involved to obtain all the operating advantages of a linear dial calibration and a constant tuning rate. For instance the vernier scale could be directly calibrated in one kilocycle divisions.

In order to give the required image frequency protection to the second mixer, two tuned circuits at the first i.f. will be

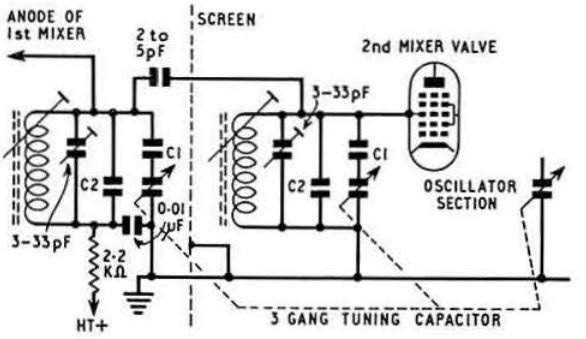


Fig. 19. Circuit tracking arrangement in the tunable i.f. section.

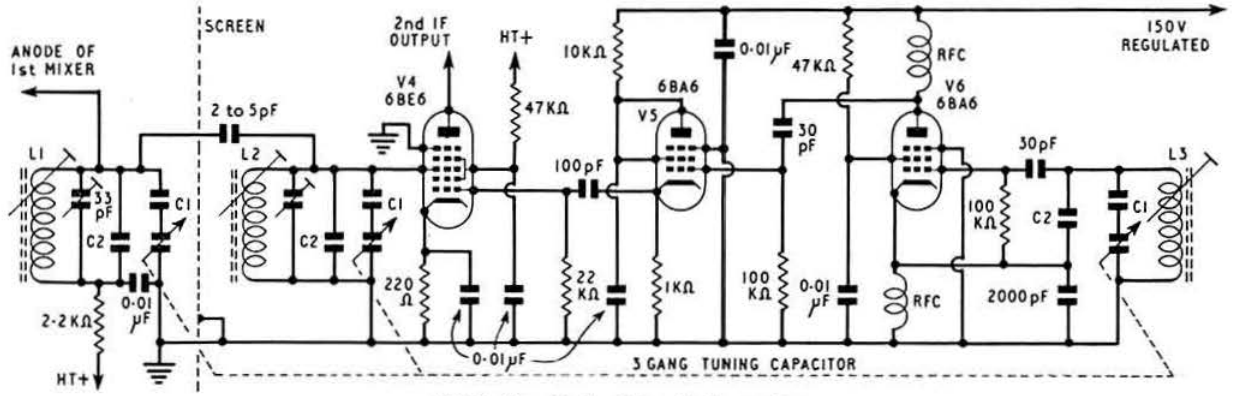


Fig. 20. Tunable first i.f. and v.f.o. section.

necessary. As it is required to keep the signal gain low before the bandpass filter, there will not be a stage of amplification and the two circuits will be in cascade (Fig. 19). As the required tuning range of 500 kc/s is a small proportion of the circuit operating frequency, simple top capacity coupling is satisfactory and it is convenient in practice to adjust to a value where the maximum transfer of energy is obtained without double humped tuning.

To obtain accurate tracking the capacitor C1 will require to be the same value as C1 in the v.f.o. section. The capacitor C2 will have to be the same *effective* value as C2 and the 2000 pF in series in the v.f.o. section, with the following proviso. As the v.f.o. is tuning 460 kc/s (or whatever value of second i.f. is used) higher, it will have a greater frequency coverage (from minimum to maximum of the gang capacitor) than the other two circuits. The v.f.o. section determines the frequency so that it is more convenient in practice to carry out tracking adjustments to L1 and L2. These are " lagging behind "—that is, not quite covering the range of the oscillator section, so it is necessary to make the first two sections of the gang capacitor have more effect. This is easily arranged by reducing the value of C2. If the reduced value is further split into two parts, one a fixed silver mica capacitor and the other part a Philips 3-30 pF trimmer, a very high degree of tracking accuracy can be obtained by final adjustment to these two pre-set capacitors together with the dust cores of L1 and L2.

The complete circuit for the tunable i.f. and v.f.o. is shown in Fig. 20.

Bandpass Filter and Second I.F. Stages

It would be possible to get the required steepness of skirt response (shape factor 1·6) with two half lattice filter sections with sufficient neutralization of the high frequency crystals in the filter. Unfortunately, the amount of neutralization required would bring up the side lobes as shown in Fig. 21

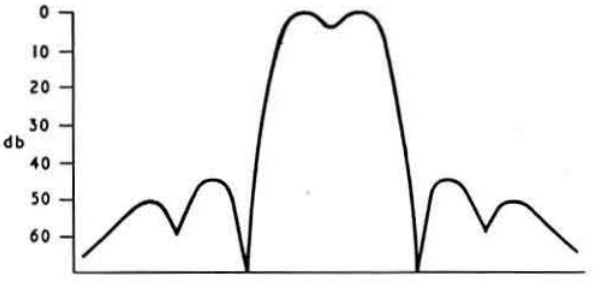


Fig. 21. Two section filter with excessive neutralizing.

and the effective filter suppression would fail around 40 or 45db down. This is undesirable in an amateur band receiver where it is often necessary to tune a weak S2/3 signal and eliminate some other signal S9 or more in signal strength on the adjacent communication channel. It is the response at 50 or 60db down which determines the extent to which strong interfering signals will be rejected and good receiver performance will only be obtained if the rejection is good to at least 60db below the wanted signal level.

The " vicious circle " of a steeper skirt, more neutralizing, more side lobes can only be broken either by using no neutralizing at all, or very little or an additional half lattice filter section. Aside from the greatly improved filter performance, the use of three sections greatly simplifies the final adjustment. The required symmetrical response and suppression will result without prolonged and tedious backwards and forwards adjustment to the neutralizing capacitor value and i.f.t. cores that would be necessary where it is essential to get the last ounce of performance with no margin in hand. With three filter sections it is satisfactory to peak each associated coupling transformer to the centre pass band frequency. The plotted response of the writer's three section filter with simple alignment at the centre frequency is shown in Fig. 22. The crystal spacing is 2·2 k/cs.

A certain amount of isolation of the sections will prevent leakage across the filter and improve the performance; at the same time the maximum selectivity is required as early as possible in the amplification chain. A satisfactory compromise is to put two sections in cascade immediately following the second mixer valve and the third section following the first i.f. amplifier valve.

The *Q* multiplier rejection filter should come after the

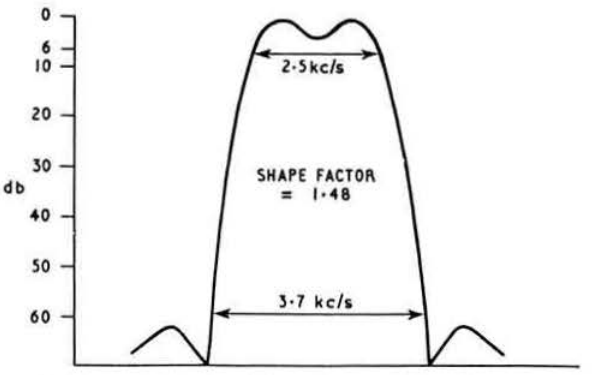


Fig. 22. Three section filter with small amount of neutralizing on two sections.

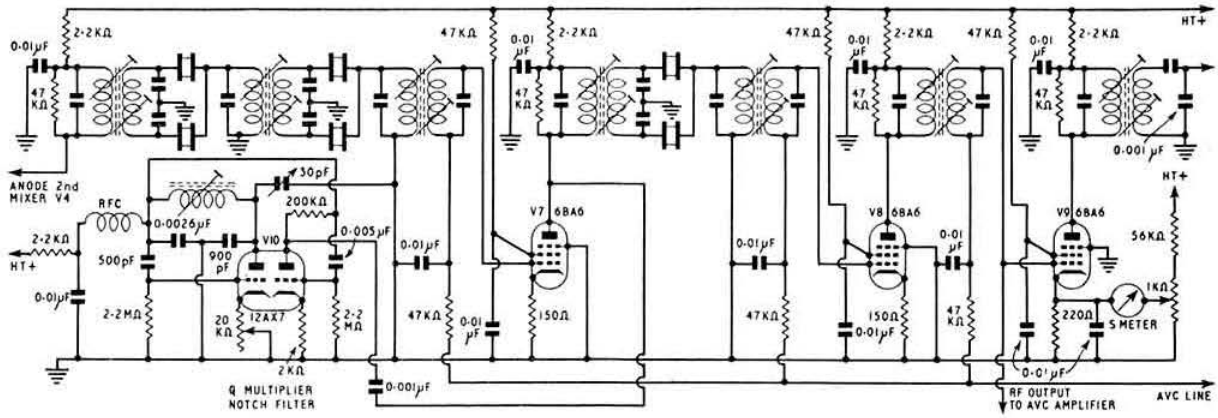


Fig. 23. Crystal band pass filter, i.f. amplifier and Q multiplier circuit.

filter section but will be more effective if it is rejecting an unwanted heterodyne at a low level. A convenient position is between the second filter section and the first i.f. amplifier or between the last filter section and the second i.f. amplifier. All necessary information on the *Q* multiplier is available in the August 1959 issue of the R.S.G.B. BULLETIN in an excellent article by R. F. Stevens (G2BVN). It can of course be used to boost a narrow band signal and the c.w. enthusiast would no doubt include the necessary switching to permit the use of either " reject " or " boost " operation as required.

Three i.f. stages are necessary to make up for the filter insertion loss and to give the necessary signal gain up to the detector. The preferred circuit arrangement is shown in Fig. 23. It will be noted that the cathode resistors of V7 and V8 have been left unbypassed. This is to provide negative r.f. feedback to compensate for the change in valve input capacitance caused by Miller effect.

The dynamic input capacity of a valve with a resonant load in the anode circuit is not the same as the input capacity under static conditions and it will vary with change in valve amplification caused by change in operating bias. If the valve is controlled from the a.g.c. line, the effective grid to cathode input capacity will vary with any change in signal strength and will detune the associated i.f. transformer. This is due to Miller effect, and is particularly undesirable where a high L/C ratio is used in the i.f.t. where mistuning would distort the filter passband and cause a change in audio balance and possibly also affect the overall sideband suppression.

An unbypassed cathode resistor of the correct value provides negative current feedback which gives approximately constant input capacitance under the changing bias conditions required from the a.g.c. line.

(To be continued)

R.S.G.B. INTERNATIONAL RADIO HOBBIES : EXHIBITION :

OLD HALL, ROYAL HORTICULTURAL SOCIETY, VINCENT SQUARE, LONDON, S.W.1

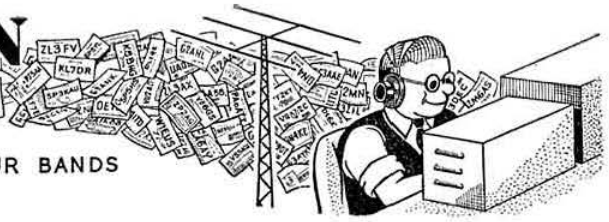
NOVEMBER 23-26, 1960

The Exhibition Committee invites members all over the country to offer for display equipment of every type from gadgets to complete transmitters and receivers. A Silver Plaque and a cheque for 10 gns. will be presented in connection with the Constructors' Competition. For exhibits by members residing outside Region 7 there will be additional prizes of vouchers to the value £10 and £5. **Offers *only* in the first instance should reach the Committee at R.S.G.B. Headquarters by September 30, 1960.** Offers to do stand duty at the Exhibition should be sent direct to G. W. Norris (G3ICI), 134 Meads Lane, Ilford, Essex.

Enquiries regarding stand space should be addressed to the Exhibition Organizer, P. A. Thorogood (G4KD), 35 Gibbs Green, Edgware, Middlesex.

In connection with the first International Boy Scout Jamborette held in Ireland between July 25 and August 3, EI3AE was active on 7 and 14 Mc/s. The first contact was with G3EPL/A, a Jamboree station in Cumberland. Another interesting QSO was with EI4C who was first licensed in 1908 and is one of the oldest scoutmasters in Ireland. Equipment included a Geloso front end feeding into an Eddystone S.640 receiver, a transmitter running 25 watts to a single 807 modulated by 6L6s in class AB1 and a 150 ft. long wire aerial endfed. EI3AE was assisted in running the station by EI2AH, who is seen here with some of the scouts.

The MONTH ON THE AIR



A CHRONICLE OF EVENTS ON THE HF AMATEUR BANDS

By R. F. STEVENS (G2BVN) *

CHANGES resulting from the granting of independence to former colonial territories have included the appearance on the amateur bands of some unusual prefixes, and it is considered opportune to review the position as heard at the present time.

Prefixes commencing with a letter having been exhausted the future pattern was set by Ceylon (4S7), Libya (5A) and stations in the Federation of Malaya which operate under 9M2 call signs. Kuwait, now an independent sheikhdom, changed from MP4K to 9K2. The ZD4 prefix of the Gold Coast days became 9G1 of Ghana, and, in addition, provided an additional DXCC country. Following the referendum held by France in her colonies, the latter became members of the French Community with the exception of Guinea, formerly a part of French West Africa (FF8) which was given immediate independence and from where 7G1A is currently active. Other colonies which achieved independence within the Community are Mauretania, now FF7, and the Mali Federation, the latter comprising the provinces of Senegal and Sudan, with the capital at Dakar, and continuing to use the FF8 prefix. Both Mali and Mauretania count as separate countries after June 20, 1960. The new Somalia Republic has been allocated the prefixes of 6O1 and 6O2, which at present apply to the Southern and Northern regions (formerly Italian Somaliland (I5) and the Somaliland Protectorate (VQ6) respectively). The former Belgian colony of Congo became 9Q5 on July 1, 1960, whilst the neighbouring trust territory of Ruanda Urundi uses the prefix 9U5 and constitutes a new country.

In addition to the nations achieving independence several other unusual prefixes have made their appearance, one frequently heard being 9N1, allotted to Nepal which, until recently, had produced little amateur activity. Readers will most certainly be familiar with the Russian "R" calls heard on 28 Mc/s, whilst VE0 does not constitute a district in the same way as VE1 to VE8 but may be heard when used by Canadian naval establishments. Confusion has sometimes arisen from the existence of two Christmas Islands, one in Zone 29 (ZC3) and the other in the Pacific area in Zone 31 (VR3), whilst the unusual 8J1AA emanating from Japanese Antarctica has occasionally been contacted from the U.K. In connection with Antarctica it may be noted that the various stations operating from this area, e.g. VP8, CE9, KC4, OR4, VE0, will provide only one country for DXCC purposes.

Looking to the future both Nigeria and Sierra Leone will soon become independent and further new prefixes may be expected.

News from Overseas

VQ1HT (VQ4HT) and **VQ1GQ** (VQ4GQ) originally scheduled to begin operation from Zanzibar on September 8 may not commence until September 23 according to the latest news. QSLs can go to the VQ4 QTHs or through the VQ4 bureau.

GW3NUO, whose home QTH is Swansea, is now serving in Minden, Germany, and operating on 3·5 and 7 Mc/s under the call **DL2BD.**

6O2GM, Don Bushe, mentions that the only operators in the new **Somalia Republic** now active in addition to himself, are 6O2AB and 6O1TUF.

ZS7P asks that stations requiring direct QSLs should enclose Commonwealth or International Reply Coupons. Peter's postage bill for July amounted to £17!

For those requiring **Zone 23,** JT1AB, JT1KAA and JT1KAB are all active on 14 Mc/s c.w. The first named will apparently work n.b.f.m. on request.

5A5TR (ex-YA1IW) will be QRT from Libya in the middle of September but hopes to obtain a licence in Algeria, and to provide some sideband activity from that country.

VS9ARF is now in the U.K. and the **VS9 Aden QSL Bureau** has been taken over by ex-G3HOI, F/O Heath, Officers' Mess, R.A.F. Steamer Point, B.F.P.O. 69.

ZD2KHR says that as from October 1, the **British Cameroons** will be administered from the U.K. instead of being affiliated to Nigeria. He hopes that the Cameroons will then count as a separate country, when he will be pleased to supply some activity from this spot.

From **VE3AYE,** the second operator at VE3BWY, the station of H. A. M. Whyte, comes news of their activities. Countries worked are up to 246 with 141 on s.s.b. Bob mentions that the collection of certificates is now one of the projects in which there is much interest, and "Ham" has collected 75 awards since coming on the air in 1927.

ZD2JKO, although not now as active as earlier in the year, provides a wealth of welcome news from Nigeria. ZD2GUP is now at Ilorin but not having mains supply uses a generator from time to time. ZD2HHT is awaiting delivery of a transmitter from the U.K. ZD2HJG operates from a caravan on the beach about 100 miles from Port

Gordon Moore was licensed as G3MCY in 1957 and now operates from R.A.F. Tangmere, near Chichester. Equipment shown in this picture includes an RCA-AR88D receiver, a BC221 frequency meter and a KW Vanguard transmitter, surmounted by a Z Match aerial tuning unit and a "Mickey Match" s.w.r. indicator. Aerials in use are a G5RV, a 15m dipole and a dipole for Top Band 60 ft. high. The main interest is county chasing on Top Band. G3MCY is an exile (albeit voluntary!) from north of the Tartan Curtain and is keen to arrange skeds with GM stations.

* *Please send all reports to R.S.G.B. Headquarters to arrive not later than September 19.*

DXotic Showcase

Call-sign	kc/s	Mode	G.M.T.	Country
FP8BM	7,020	c.w.	05.30	St. Pierre and Miquelon.
VP8CC	7,015	c.w.	20.20	Antarctica.
VS1FZ	7,010	c.w.	23.10	Singapore.
FG7XG	14,005	c.w.	23.38	Guadeloupe.
FY7YI	14,030	c.w.	22.05	French Guiana.
JT1KAC	14,025	c.w.	18.30	Mongolia.
YI1RK	14,085	c.w.	22.25	Iraq.
FP8TP	14,310	s.s.b.	10.10	St. Pierre and Miquelon.
FR7ZD	14,315	s.s.b.	15.48	Reunion Is.
9N1SM	14,335	s.s.b.	13.21	Nepal.
KG4AB	21,029	c.w.	17.35	Guantanamo Bay.
VP8EG	21,092	c.w.	19.10	South Orkney Is.
VP8EH	21,092	c.w.	19.10	Graham Land.
VK9XK	21,070	c.w.	10.40	Papua.
7GIA	21,060	c.w.	19.40	Rep. of Guinea.
K6CQV/KS6	21,320	a.m.	09.20	U.S. Samoa.
VP2AR	21,215	a.m.	22.42	Antigua.
VR2BC	21,260	a.m.	09.00	Fiji Is.

Harcourt. ZD2HAH, ZD2IHP and ZD2GWS are calls that will not now be heard on the bands. Ex-ZD1GM, who has been in Nigeria for some months does not appear to be interested in QSLing any of his contacts from Sierra Leone and stations are asked not to send any more cards and I.R.C.s to the ZD2 Bureau. If this should catch the eye of ZD1GM, would he please contact ZD2JKO. Mike will be returning home on leave in mid-December until May 1961, and promises to be more active after October.

VE3CCB of London, Ontario, wants contacts in and around Leicester, his home town. He is on 28·4 Mc/s every weekend from 16.00-19.00 G.M.T. VE3CCB uses an Apache transmitter, SX28A receiver and quad aerial.

News from the Pacific

Ed. Goodhue, **KH6DLF,** provides the following information from the Pacific area.

ZK1BS, heard on 14 Mc/s s.s.b., is also interested in RTTY. **ZK1AK** is very active working into Europe around 08.00. **KB6BH** will soon be the only station on Canton Island. Ed. hopes to be on from KB6 with a KWM-1 around the end of September; when the definite dates are known these will be included in a GB2RS broadcast. **VS5BY** is again active on 14 Mc/s s.s.b. and W6ZEN will continue to handle his cards. **KJ6BV** is at present very active on s.s.b. but when he leaves in the near future there will be no activity from Johnston Island.

KH6DLF reports good conditions to Europe during the last month, the most consistent G stations being G6VQ, G6ZO, GM3ITN and GI3IVJ (all on c.w.), with G2MA an outstanding s.s.b. signal.

VR1D is operating from Funafuti Atoll in the Ellice Group and has worked into Europe around 05.00 on the l.f. end of the 14 Mc/s phone sub-band. The operator, Mike, is ex-ZL1ABZ of Kermadec Island.

DXpeditions

IM1RIF, active from Monte Cristo Island (between Corsica and Italy), signs I1RIF when operating from his home QTH in Milan.

Unconfirmed information says that **VQ4AQ** will operate from FB8, VQ7, VQ8 and VQ9 during October.

ZD2AMS will not be making his promised return trip to FD8 until the situation following Nigerian independence has clarified.

MP4BDA hopes to be visiting Trucial Oman and the Sultanate of Muscat and Oman before returning to the U.K. on leave on September 30.

FL8ZA will be in operation from December 8 to 12 according to latest plans.

ZS6IF hopes to be active from **ZS9** from November 5 to 14 using c.w. only on 7005, 14010 and 21015 kc/s.

Further **Socorro Island** activity is scheduled for the last week-end in January 1961, all modes to be used.

Contests and Awards

High claimed scores by U.K. stations in the **1960 A.R.R.L. DX Contest** include: Single operator–c.w.–G4CP 394,200; GW3JI 298,770 and G2QT 210,447; phone-G2DYV 85,941; G3LTZ 46,440; multi-operator phone-GB2SM 178,059. In the c.w. single operator section VP1JH, operated by W0NWX, amassed 1,501,480 points from 4,440 contacts.

W1WDD is offering a silver cup trophy and a $100 cash prize to the 250th DX country which is QSOd and confirmed by QSL. At May 1 the DXCC standing of W1WDD was 240 worked and 236 confirmed.

MP4BBW, recently the recipient of the *CQ* " Worked 150 " sideband certificate, is now up to 179/173 on this mode with an all up score of 275.

Readers are reminded that a leaflet is available giving particulars of R.S.G.B. awards and certificates and includes a Commonwealth country check list. Copies will be forwarded by G2BVN on receipt of a s.a.e.

Organizations sponsoring contests and new awards are invited to send particulars to Headquarters for suitable mention.

DX Briefs

The following stations are reported as active in the new **Mali Federation:** FF8s AC, AL, AP, AZ, BF, BZ, CC, CK, CN, CR, GP.

UL7JA (Kazakh) and **UA0KAD** (Zone 18) have been heard on 14 Mc/s s.s.b. generally around 16.00 to 17.00.

VR4CW and **VR4JB** are both active on 14 Mc/s around 10.00 and using both c.w. and a.m.

CR8XG is a new station on the bands (address in *QTH Corner*) but is there any information on CR8EL heard on 14 Mc/s c.w. working East European stations?

QTH Corner

CP3CN	P.O. Box 474, Oruro, Bolivia.
CR8XG	P.O. Box 122, Cunc, Goa.
DL2BD	Pte. Williams, P.M. S/P Coy (Sigs.), 1 S.W.B., B.F.P.O. 29.
FB8AA	via FB8BC.
FB8CJ	P.O. Box 730, Tananarive, Madagascar.
FF8CK	P.O. Box 971, Dakar, Senegal, Mali Federation.
FP8BM	via K2VZJ.
FP8BO	via VE2AFI.
FQ8HV	P.O. Box 2225, Brazzaville.
HH2NV	P.O. Box 671, Port-au-Prince, Haiti.
HI8DGH	P.O. Box 99, Ciudad Trujillo, Dominican Republic.
HP1HC	P.O. Box 1622, Panama City.
IM1RIF	P.O. Box 3747, Milan, Italy.
K4ORQ/EP	Box 951, Teheran, Iran.
KZ5FG	P.O. Box 55, Gatun, Canal Zone.
SU1AL	Ahmed Labib, 41 Refat Street, Shubra, Cairo, Egypt.
UA9KOG	P.O. Box 44, Novosibirsk, Siberia, U.S.S.R.
UM8KAA	W. Milko, Dzierzynskiege 86m2, Frunze, Kirghiz, U.S.S.R.
VP7BK	J. Hall, Raytheon Co. PAA/GBI-AAFB, Patrick AFB, Florida, U.S.A.
VQ1HT	via VQ4HT.
VQ1GQ	via VQ4GQ.
VQ8BC	Royal Navy Radio Station, Mauritius.
WA6GMM/KG6	P.O. Box 264, Walnut, Iowa, U.S.A.
YI1RK	via R.S.G.B.
ZA1NC	P.O. Box 37, Tirana, Albania.
ZC4PC	Amateur Radio Club, R.A.F. Pergamos, B.F.P.O. 53.
ZD2RFB	R. F. Brown, c/o C.F.A.O. (Technical), Lagos, Nigeria.
ZD2ATU	B. Wilbraham, Box 38, Jos.
ZD2GUP	E. H. Howell, N.M.S. V.H.F., Posts & Telegraphs, Ilorin.
ZD2HJG	H. J. Groves, Box 263, Port Harcourt.
ex ZD2CKH	K. Harrison, Kitale, Hawthorn Grove, Hayling Island, Hants, England.
ZD6EF	H. F. Finch, P.O Box 89, Zomba, Nyasaland.
9GICC	c/o U.A.C. (Ghana) Ltd., P.O. Box 746, Accra, Ghana.
9U5KU / **9U5JH**	P.O. Box 76, Kitega, Ruanda Urundi.

FB8AA is active from Kerguelen Island on 14 Mc/s c.w. after midday.

Madagascar representation on s.s.b. is now provided by **FB8CM** who may often be found around 14,320 kc/s after 17.00.

ZD9AM is reported as working into South Africa between 12.00 and 14.00 on 21 Mc/s a.m.

It is reported that **Yasme III** QSL matters are now being handled by **W8EWS.**

W8UTQ/3V8 is ex-**XW8AH** and anyone requiring a QSL for a contact with the latter should write to the QTH given last month.

G8KS is continuing to handle QSLs for **VP8EG,** now active from the South Orkneys. If a direct reply is required please enclose a s.a.e. or I.R.C. Weekly schedules between G8KS and VP8EG commence with the transmission of QSL data to enable Les to make out the cards and other operators are asked to wait until this is concluded before calling in to the QSO. VP8EH is active from Graham Land and VP8CC from Halley Bay in Coates Land. Both have been worked on 21 Mc/s from the U.K.

Pse QSL

A list has been prepared to show the destination of QSL cards when these should not be sent to the first named station. A number of the addresses given are QSL " managers " but others may in fact be the home call of the station concerned. Readers are asked to report any additions or amendments to the list which will be reprinted in due course if the interest justifies it.

Pse QSL

BV1USE	via W9HCR	**VP2KH**	via W2CTN
CR4AH	via W2CTN	**VP5BH**	via W4OMW
CR4AV	via W2CTN	**VP6BY**	via VE6BY
CR4AX	via W2CTN	**VP6PJ**	via W2CTN
EA8CG	via K1DCL	**VP7NT**	via W3TQR
FB8AA	via FB8BC	**VP8EG**	via G8KS
FG7XC	via W3GJY	**VP8EP**	via G3JAF
FG7XF	via W2CTN	**VQ1HT**	via VQ4HT
FG7XG	via W3GJY	**VQ1SC**	via VQ4GQ
FK8AI	via W2CTN	**VQ2EW**	via W2CTN
FK8AT	via W2CTN	**VQ3CF**	via W2CTN
FK8AW	via W2CTN	**VQ3HH**	via W2CTN
FM7JC	via K1DRN	**VQ4RF**	via W4MCM
FM7WK	via W4ZKE	**VR2DA**	via W2CTN
FM7WN	via F8IE	**VR2DK**	via W2CTN
FM7WP	via W2CTN	**VS4JT**	via K6GMA
FM7WU	via W2CTN	**VS5BY**	via W6ZEN
FO8AC	via W4KWC	**VS6AZ**	via K6GMA
FO8AU	via W3GJY	**VU2RM**	via W3KVQ
FP8BM	via K2VZJ	**W3ZA/EP**	via W2JXH
FP8BO	via VE2AFI	**XZ2AD**	via W0UUV
FP8JC	via VE2ABE	**XZ2SY**	via W4ANE
FR7ZD	via W9RBI	**YA1BW**	via DL8AX
FY7YF	via W2FXA	**YI1RK**	via R.S.G.B.
HP1AO	via K4ASU	**YN4AB**	via K4ASU
KC4AT	via K4IHN	**ZB1FA**	via W2CTN
KW6CP	via W2CTN	**ZB1HC**	via W4MS
KW6CU	via W2CTN	**ZD1AW**	via W3KVQ
LA3SG/P	via VE7ZM	**ZD2DCP**	via W2CTN
OA8K	via W8HWM	**ZD2JKO**	via W4MCM
OD5CT	via W2JXH	**ZD2JM**	via K9EAB
OX3DL	via W2CTN	**ZE1JV**	via K0DQI
OY7BS	via W3KVQ	**ZE4JO**	via WA6HOH
SU1MS	via W6QNA	**ZK1AK**	via W3GJY
SV0WT	via K2RYP	**ZK1BS**	via W7ZAS
TF2WEG	via K6VQQ	**ZL4JF**	via ZL2GX
TF2WEW	via K5QBG	**ZL5AA**	via ZL2GX
TF5TP	via W2MUM	**ZL5AC**	via ZL2GX
TG9TI	via W9YSQ	**ZM6AS**	via ZL2ANB
TI2CMF	via W2CTN	**ZS3B**	via W0VXO
VK0IT	via VK3KB	**ZS3X**	via W1DGJ
VK2FR	via W2CTN	**ZS7M**	via W2CTN
VK9GK	via W2CTN	**ZS7P**	via W6UND
VK9NT	via W2CTN	**4S7EJ**	via W5GHK
VK9RM	via W2CTN	**4S7YL**	via KH6BPF
VP2AE	via K1EFI	**6O2AB**	via W6BAF
VP2AR	via W3KVQ	**7G1A**	via OK1PD
VP2DX	via W8VDJ	**9G1BQ**	via W2CTN
VP2KD	via K4LRA	**9Q5YM**	via DL4YM

Band Reports

7 Mc/s

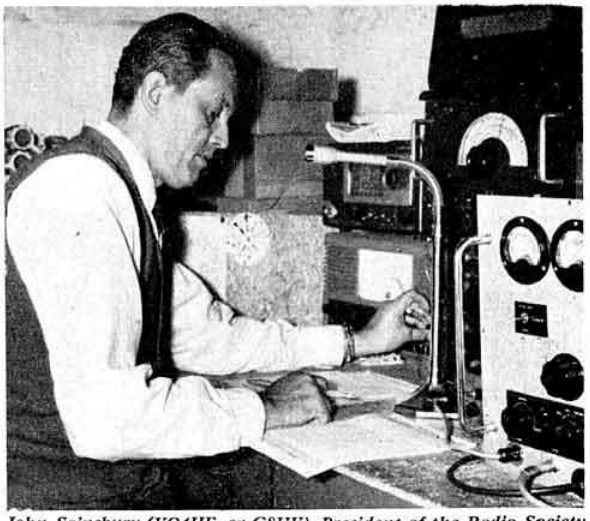
Following last month's comment it is evident that DX is worked on this band as the following reports will show.

G3FPQ (Elstead) mentions HB1UB/FL (20.15), PX1PF (22.05), VK3AHO (20.00), VK3YD (21.00), VK5NO (20.10), VP8CC (20.20), VS1FZ (23.10), ZS6AJH (21.50). all on c.w. with an A1/A3a QSO with VK3AHO (20.30, '045). Using 100 watts to a ground plane **G3LET** (Westcliff-on-Sea) QSO'd PY7IJ (22.30, Fernando de Noronha), CX1OP (22.00), YV5ANT (23.45), CE3AG (23.45), ZD2ATU (23.30), ZD2DCP (23.40), ZS1A (18.45), ZS6AJH (19.00), OR4TX (22.30), OR4TZ (00.01), ZP9AY (23.00), VK3AHO (18.50), VK5NO (20.30), TI2LA (01.25), VS9OA (19.40) together with numerous LU and PY stations. G3LET comments that conditions are now improving and JA stations are audible around 19.00. **G5JL** (Hayes), in additon to working 42 states in one month on this band, reports QSOs with FP8BM (05.30), KP4AOO (06.00), and LX3EQ (05.40). **G3BSR** (Portsmouth) exchanged RST with YV5HL (02.03), CT2BO (00.50), KP4DN (04.30), PY7JL (01.50), FP8BM (02.50), VP9AK (01.23), CE3AG (00.15), CM2WS (03.58), KV4CI/MM (00.15), VE1, 2 and 3 and all W districts except 6 and 7. **G3NOS** (Dagenham), who operates 7 Mc/s c.w. only, lists SP1LH/MM (00.15, off Casablanca), PY5TH (00.15), KV4CI/KP4 (23.59), VE1SU (23.56), ZC4ZB (23.00), PY4AXN (23.30) and several W stations. **GM3OEV** (Kinloss) QSO'd PX1PF (00.35), and OY7ML (00.35).

Using an RF24/R107 combination **A.1491** heard IT1SMO (23.38), 4X4DR (00.11), CX1OP (22.25), KG4AG (01.21), PY7SL (23.45), UH8AJ (01.30) and 5A2CW (23.29). **B.R.S. 20317** (Bromley), remarking on excellent conditions, submits a list from which we choose UA0AG (22.40), MP4BCV (19.10), VP9AK (23.40), UF6AA (22.22), HC1IT (23.12), VP4LE (23.54) and OR4TZ (23.50), with several South Americans in addition. Bill also reports a 3·5 Mc/s contact between CX2AM and ZP9AY at 23.00 with both stations audible. **A.1543** (Leiston) had heard UA2BH (22.24), UA3HF (22.27), UN1AV (21.17), YU1AHI (20.27) and PY stations.

14 Mc/s S.S.B.

MP4BBW (Bahrain), always to the fore, reports improved results since the installation of a beam for this band, having



John Sainsbury (VQ4HE, ex-G8HV), President of the Radio Society of East Africa, operating his station during the Congo emergency in July 1960. For some time, radio amateurs were responsible for practically all messages coming out of the troubled areas.

(Photo by courtesy of the *East Africa Standard*).

indulged in 464 QSOs in three weeks. A selection from his list includes FR7ZD (15.48), W8UTQ/3V8 (16.45), PX1PF (18.47), VS1JV (13.26), FB8CM (17.11), HB1TU/FL (18.32), KL7DKG (18.58), KH6AWS (16.55), 9N1SM (13.21), VK9NT (13.42), EL2Y (21.10), KZ5WZ (03.38), VS4JT (14.26), YS1JR (12.52), BV1USC (17.42), WA6GMM/KG6 (17.22), TF2WFF (19.17). **G6UT** (Great Hallingbury) has worked FP8TP (10.10), VP2AB (22.00), EL1K (21.30), ST2AR (21.09) and KL7FLB (06.58) operating from an ice floe.

Once again there are many listener reports and from a log of 66 stations submitted by **A.2273** (Dudley) we mention ZK1BS (07.58), CR9AH (14.00), KR6GF (13.56), KA8LF (14.50), VU2RX (17.15), 9M2DB (16.16), KG1FW (21.41), OY7ML (08.35), IM1R1F (17.40) and VS4JT (14.41). **A.1859** (New Barnet) heard CN2WH (21.56), FP8BH (22.16), OA4M (06.08), ZS7P (16.35), and 9N1GW (16.38), together with KR6s and KAs. **A.1965** (Penzance) reports KL7CNC (07.10), KH6DED (07.20), HI8FR (08.20), OA4CV (22.00), HC1FG (06.45) and VE6AEE/SU (17.14). **A.1736** (Corby) heard many of the foregoing in addition to KZ5AP (05.00), XE1TJ (08.10), UA9CM (17.43), VQ5FS (19.45) and ET2US (20.04). **A.2111** (Ilford), concentrating on A3a, mentions KX6EQ (09.45), K6DX/KL7 (09.47), VE8MC (05.55, Prince Patrick Is.), FP8BP (11.05), KA2HM (08.15), KG6NAB (16.55), VS1JO (19.15) and ZK1BS (06.55).

C.W.

G3AAE (Coulsdon) QSOd dxpeditionaries FP8BM and FP8BO (20.55), W8UTQ/3V8 (20.44), CP3CN (23.00), OA4KF (07.30) and VKs. **G3BHW** (Margate), current leader in the Commonwealth Competition, has worked FG7XG (22.38, '005), FY7YI (21.27, '080), JT1KAC (18.30, '025), VS9OA (18.10, '060), YI1RK (20.25, '085), ZA1NC (21.50, '025) and 6O2AB (19.51, '080). **G2FFO** (Burnley) mentions ZS7M (17.40, '056), KL7PI (07.10, '084), YN4AB (23.10, '036), K7HHH (23.20, '024, Utah), VS9ARF (17.48,

Commonwealth Competition

	28 Mc/s	21 Mc/s	14 Mc/s	7 Mc/s	3.5 Mc/s	Total
G3BHW	41	61	51	4	—	157
G3AAE	47	48	45	14	—	154
VE3BWY	32	25	65	16	9	147
VE7KX	14	38	29	32	27	140
ZD2JKO	30	44	31	24	6	135
G8DI	12	11	21	14	18	76
MP4BBW	—	19	56	—	—	75
G8DI	12	11	20	12	18	73
G3LET	—	—	—	64	—	64
VO2NA	7	10	24	14	6	61
G3JSN	14	8	9	10	6	47
G3MGL	8	2	6	4	—	20

Band Leaders

28 Mc/s—G3AAE 21 Mc/s—G3BHW
14 Mc/s—VE3BWY 7 Mc/s—G3LET
3·5 Mc/s—VE7KX

	28 Mc/s	21 Mc/s	14 Mc/s	7 Mc/s	3.5 Mc/s	Total
B.R.S.20317	39	62	62	56	30	249
B.R.S.22013	26	55	65	18	6	170
A.1859	42	65	52	6	3	168
B.R.S.22249	31	58	30	18	6	143
B.R.S.21008	36	57	41	4	—	138
A.1583	25	62	28	—	3	118
B.R.S.2292	25	29	26	18	—	98
A.1792	26	46	26	—	—	98
A.1902	32	42	19	—	—	93
A.2065	26	30	29	2	3	90
B.R.S.18876	4	64	11	—	—	79
A.1965	12	41	17	2	3	75
A.1980	24	31	6	—	—	61

Band Leaders

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

9Q5 amateurs operating during the Congo emergency. The station is 9Q5GR, Stanleyville

'025), TA1DB (18.10, '067), FQ8AG (20.30, '033), ZS3DM (18.10, '038). **G2ZR** (Bath) reports ZB2AD (19.40, '025), FB8YY (07.40, '025), K4ORQ/EP (15.56, '095), SU1AL (15.17, '110) and XZ2TH (17.45, '030). From the list of **G4QK** we extract TA1DB, UA0BI, UA0VC, UM8KAB, XZ2TH, 4S7EC, ZD2DCP, SV0WI and UL7FA. **GM3OEV** worked ZK2NB (19.50), FP8BO (20.55) and PX1PF (23.30).

B.R.S.22249, reporting from Cyprus where he has already applied for a transmitting licence, heard CE3AG (21.20), FG7XG (23.11, '010), UM8AG (16.07) and YN1CY (20.30). **A.1491** (Palmers Green) reports UD6KAB (14.10), UF6KAF (14.15), UH8KBA (14.51), UI8KBA (14.18), UM8KAA (14.10) and VR2DK (08.54). **A.1543** logged UO5SM (22.18), UM8KAB (21.25), VK2ZR (21.20) and South Americans.

A.M.

G3BHJ (Norwich) contacted PX1PF (17.00), CT2AK (09.10) and UA1KBB (09.30). **A.2331** (Maidstone) logged VK7PR (09.15), UO5PK (08.05), VE8NN (20.35), VE0NB (21.35), KL7DDJ (19.44), XE1AAP (08.18). **B.R.S.18876** (Birkenhead) submits VE6AAE/SU (17.45), FA2VN (12.05), VK4MP (06.35) and IM1R1F (11.10). **A.2230** (Faversham) heard ZL1ACI (11.24), VK2ID (07.15), UB5KUA (21.55), 4X4AS (200) and numerous W/VE stations. **A.1859** offers ET2US (15.26), FM7WQ (21.40), FQ8AE (21.20), KG4AL (05.55), MP4TAC (20.50), VE0NB (21.02). The 31 country list of **F.R.S.309** (Virginia) includes YS3TM (03.46), HR2MC (03.43), HH2GR (12.54), VP3VN (02.58), VP9BN (00.20), YV5ANE (22.58) and HC1WA (00.41).

21 Mc/s

This band appears to have been the most popular judging by the number of reports. For this reason, where a station has been widely heard it will not be credited to all of the correspondents.

C.W.

G3BHW exchanged RST with LX3HD (18.06), VQ8BC (15.20), VS5PM (17.00, '080), 6O2AB (12.54, '080) and 9Q5IG. **G3AAE** offers KG6AJT (14.18), 7G1A (19.40, '060), 6O2AB (17.23, '056) and FB8CJ (14.15). **G8KS** (Farnborough) worked VS9MB (15.25), VP8EG (19.10), VP8EH (19.30), VP8CC (19.30) and VK9XK (10.40). **G2FFO** reports HP1SB (17.45), ZE7JF (19.35) and KG4AB (17.35, '029). **G3BHJ** found ST2AR (12.40) and JA1ACB (12.30).

A.1491 heard OH0NE (16.21), OR4TX (12.46), UA0KAR (12.55), UJ8KAA (14.46) and ZD2JKO (16.32). **B.R.S.22249**

logged HB1UB/FL (18.00), UA0BC (16.44), VQ2MS (16.46), VQ8BC (14.00), WG6AJ (11.53), YA1BW (13.45) and ZD1AC (19.00). A.M.

G3FPQ reached into the Pacific for K6CQV/KS6 (09.20, '320), VR2BC (09.00, '260), VR2DE (10.00, '180), VR2DS (09.20, '190), in addition to YA1BW (13.10) and 9N1MM (15.45). **G3BHW** exchanged reports with HH2GR (22.50), VP2AR (22.42), VP5EM (23.10), VR2DE (12.50, '200) and VS5GS (17.00, '210). **G3AAE** worked HH2RV (22.25), FF8CK (18.32, Mali Federation), 9U5IT (19.00), 9U5GH (19.45), VR2DS (09.35, '194). **G8KS** conversed with 6O1FL (19.00), KG6AJT (15.40), 9M2GV (15.55), UA9AO (15.55), 9N1MM (15.30), EA8CB (13.15), FF7AB (18.50), OA4BP (20.40) and IM1RIF (20.00), the last two on s.s.b. Also on A3a **MP4BBW** worked ZP6BB (18.15), W8UTQ/3V8 (14.23, '395), OD5CV (16.13) and CT3AV (16.29, '428 crystal controlled). **G3BHJ** emerged with KG4AO (21.45), VP6WR (23.20), VS9ADL (12.50), VU2BK (13.35) and YA1BW (12.50). **GM3OEV** obtained reports from KR6BB (18.15), ZD2AMS (17.25), VU2CQ (16.00), ZB2AD (17.50) and 9K2AD (17.50). **ZD2JKO** (Zaria) used the band to good effect for QSOs with FB8CO (16.00), FF4AB (09.00), FF4AC (10.00), HI7CJY (17.30), HI8JSM (23.45), PZ1AW (21.00), VP3MC (10.00), VP3RW (23.00), VQ5EK (14.50), VR2DE (06.00), VS5GS (13.00 and 18.00) and YN1WW (07.00).

For the listeners we have **B.R.S.20317** reporting FS7RT (15.40), FF4AB (18.15), VP5BL (22.35) and VR2DJ (09.15). **A.1954** (Sidcup) heard KZ5EJ (21.04), VS1KF (15.43), 9U5IT (20.05), HI8DGH (21.04) and KG4AO (20.59). **B.R.S.22299** (Preston) mentions VS1GQ (14.15), VU2BK (16.00), VE0NB (20.55), CR7FN (15.25), YN6HH (23.55) and VP4MM (23.45). **B.R.S.22844** (Wallington) HI8CM (20.49), KP4WD (17.41), KG4AO (18.50), UA9KOG (17.05), VP8DW (20.50), 9U5IT (20.03) and K4HNX/AM (11.42). **A.2273** logged FE8AH (15.28), UI8AG (15.40), 9U5VS (14.52), AP2AD (15.03), FR7ZD (17.01), VP5BL (20.00), numerous ZLs between 08.00 and 09.00, and three VR2s between 08.00 to 08.30. **A.1736** lists KA2JL (14.35), 9U5DM (18.50), OA5G (19.13), KG4AD (17.35), CR6AL (19.10) and PZ1AX (19.50). **A.1491** reports AP2AD (15.26), CR7CI (17.48), ZD1AW (17.40) and FQ8AT (16.55). **F.R.S.309** logged TI2WT (00.14), XE0ALP (00.23), VP2DA (17.54), XE1AAP (00.23), PJ3AI (02.59), TG9AS (02.51) and ZL2BE (02.53). **B.R.S.22249** mentions VS9AZ (18.45), 6O1PQF (21.15), 6O1TUF (16.15), 9G1CC (15.40) and VS1JW (16.10).

28 Mc/s

Occasionally this band shows signs of life as **G3BHJ** mentions with CR6CA (12.05), EA8CN (17.50), UP2KCB (12.40) and VU2PS (12.25). **G3IPV/MM** from the Malta area worked on c.w. VQ2MS (21.35), PA0YN (17.45), HA5KAG (18.10), and other Europeans. **G2DHV** (Sidcup) QSOd VU2PS (12.15), ZE7JV (12.20) and UH7BN (12.30), whilst the solitary offering from **G3AAE** is VK6QL at 09.10. **ZD2JKO** reports QSOs with CE1AD (16.30), CR4AX (16.40), CT2AH (16.40), VQ3HH (16.40), VS9AJW (12.30) and JAs between 15.00 and 16.30.

Appearing for the listeners we have **A.2273** with OR4TX (11.23), VQ2HA (10.43), 9M2GA (15.39), CR7BC (11.45), RD6KAR (09.57) and ZD2ATU (16.58). **A.1859** adds CR4AP (12.24), CR4AV (11.24), VK6GD (08.40), YN1CI (16.55) and 9G1CW (11.00). **B.R.S.22844** logged CR4AV (12.43), CR6CA (12.55) and 4X4HK (13.31) and **A.1736** CR7CR (16.25) and ZS stations around 16.30.

Bill Loeffler (W1PFA) of Salem, New Hampshire, is an enthusiastic user of s.s.b. As this picture shows he has Collins and B. & W. equipment. (Photo via G3LB)

The Commonwealth Competition

Some alterations have taken place this month and with the hoped for improvement in conditions we look forward to receiving more entries from home and overseas.

It has been suggested that during 1961 the competitive spirit might be catered for by a table separating c.w., a.m., and s.s.b. activity. It is felt that any table requiring areas already contacted to be worked anew or the collection of QSL cards may well be unpopular. There is also the yardstick to be adopted: should this be the A.R.R.L. DXCC countries list, or prefixes as used by *CQ* for their awards? Readers are invited to send their views to the writer — comments appearing at the foot of the monthly report forms will be duly noted.

* * *

All correspondents are thanked for their support particularly KH6DLF, ZD2JKO and MP4BBW. Grateful acknowledgment is also made to the W. G. DX C. *Bulletin*. Reports and news items should be sent to R.S.G.B. Headquarters to arrive by September 19. Report forms are obtainable on request.

SOUTH WEST OF ENGLAND
OFFICIAL REGIONAL MEETING

ROYAL HOTEL, ESPLANADE, WEYMOUTH

Sunday, October 2, 1960

Programme:

9.45 a.m. onwards	**Talk-in by G3MT on 1910 kc/s and by G3AS/M on 144·16 Mc/s.**
10.45 a.m.	**Assemble at Dorchester Radio Station**
11 a.m. ...	**Tour of Radio Station**
1 p.m. ...	**Informal Lunch at Royal Hotel (optional item, 10/6).**
2 p.m. ...	**Photograph.**
2.30 p.m.	**Business Meeting.**
4.30 p.m.	**Buffet Tea.**
5.30 p.m.	**Prize Distribution.**
6 p.m. ...	**Lecture on "Communications Receivers" by J. N. Walker (G5JU).**

A Ladies' Programme is also being arranged. Tickets, price 11/- each (children, 6/-), are available from A. A. Barrett (G5UF), 4 Radio Station Houses, Dorchester, Dorset. Last day for reservations: September 24, 1960.

Headquarters will be represented by Messrs. C. H. L. Edwards (G8TL), R. C. Hills (G3HRH), F. A. Russell (G3BHS), E. W. Yeomanson (G3IIR) and the General Secretary (John Clarricoats, O.B.E., G6CL).

FOUR METRES AND DOWN

First Amateur Contact via the Moon—California to Hawaii on 432 Mc/s—Perseids Shower Results

By F. G. LAMBETH (G2AIW) *

ON July 21, between 07.00 and 08.00 Pacific Daylight Time, the first amateur contact by moon bounce took place between W6HB (California) and W1BU (Mass.), after preliminary two way tests between W1FZJ (Medfield, Mass.) and W6HB (San Carlos, Cal.) on July 17. Months of preliminary work were thus crowned with success. The band used was 1296 Mc/s. W1BU was operated by Sam Harris (W1FZJ) of the Rhododendron Swamp V.H.F. Society and W6HB by members of the Eimac Radio Club. Signals were exchanged over the 2,700 mile path for several hours on both occasions.

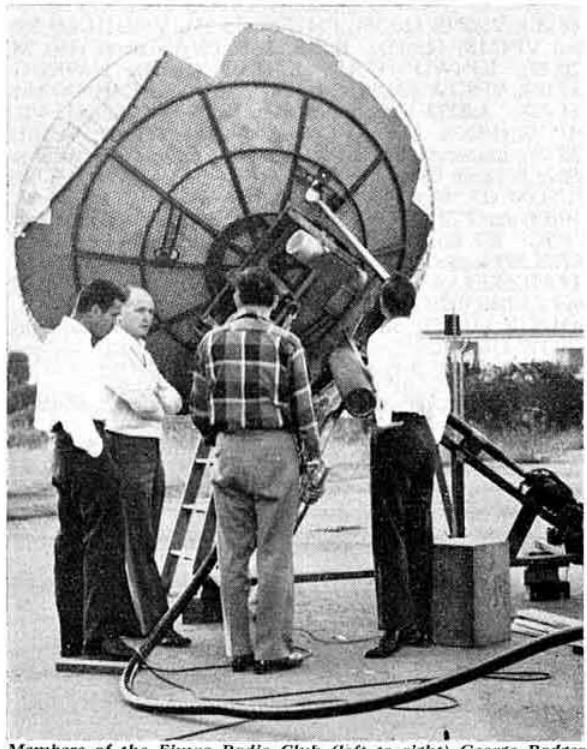
In a letter to G2AIW, W1HDQ says: " Though the gear used at both ends is highly developed and far from the sort of thing likely to be found in an amateur station, the people at both ends deserve a great deal of credit for the tremendous effort they made to pull this off. The borrowed dish at W1FZJ, for instance, is made to track the moon automatically by means of an entirely amateur-built guidance system. In one of the pictures you see one edge of a 128 element 144 Mc/s array with which W1FZJ received his own echoes from the moon over a period of months before going to 1296 Mc/s. This also had an ingenious tracking system, consisting of an old automobile chassis and wheels, running by electric drive on a wooden railway track. This carried the end of the array opposite to the end shown in the picture, and gave about two hours of tracking for the huge collinear array.

The 1296 Mc/s gear was housed in the tent under the dish and remotely controlled from Sam's operating position, or directly from the tent. In the tent are visual and aural monitoring systems, and at the operating position are tape and pen recorders. Sam's receiving system has a bandwidth of 100 c/s, so you can see that some rather special stability precautions had to be taken.

Tape records of the signal show it to be just detectable in the noise most of the time, riding to perhaps 6 to 8db above noise on peaks. A bigger dish at W6HB is expected to make a considerable improvement, shortly. They even hope to have readable s.s.b. signals in time."

The results obtained by W1BU and W6HB will stimulate much speculation as to the future possibilities of our centimetric allocations. For moon bounce communication narrow receiver bandwidths are necessary and crystal controlled equipment is therefore essential. At present this has resulted in the 1296 Mc/s band being the first to be used for Earth-Moon-Earth (E.M.E.) communication. However, the optimum frequencies for E.M.E. communication lie in the range 1,000-10,000 Mc/s based upon ambient noise, aerial gain, etc. and as suitable valves become available DX communication will be possible on all the amateur allocations in this band. It therefore seems likely that in the next ten years there will be a vast increase in activity on these bands as trans-continental communication becomes possible.

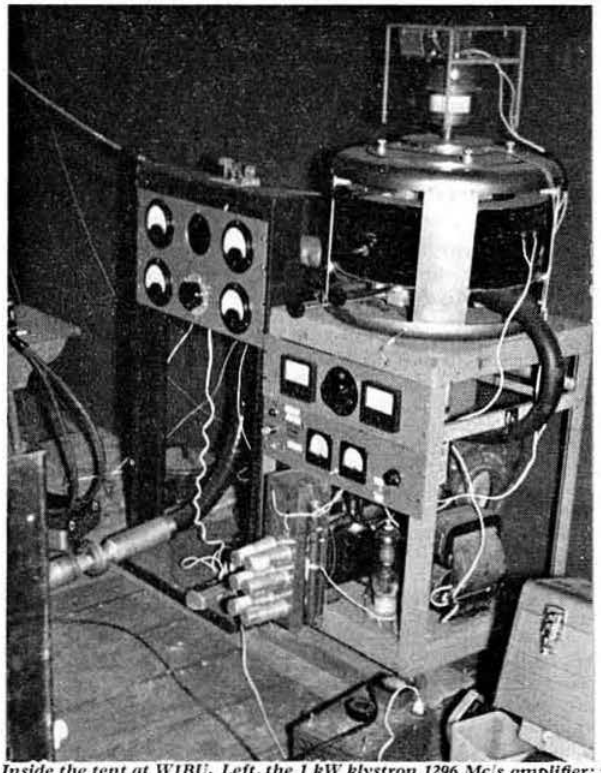
The success of the U.S. satellite balloon *Echo 1* has also stimulated much speculation as to the possibility of using the balloon for v.h.f. communication and the Scientific Studies Committee has analysed the possibilities of using the balloon for communication on the 144 Mc/s band. Although this is possible within present capabilities, fully steerable (i.e. horizontally and vertically) aerial arrays having gains of at least 16db are required together with 100 c/s bandwidth

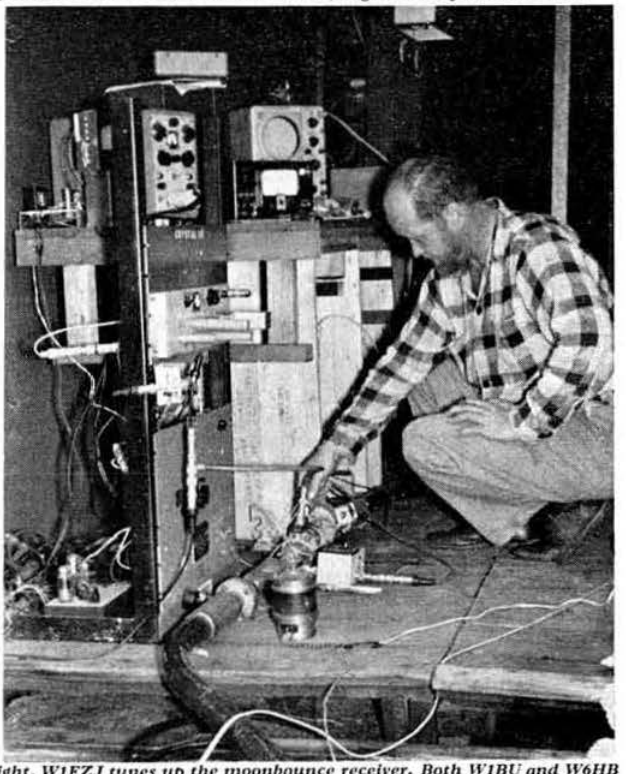


Members of the Eimac Radio Club (left to right) George Badger (W6RXW), Bob Moorwood (K6GJF) and Bill Eitel (W6UF) discuss the successful moonbounce tests on 1296 Mc/s while Bill Clayton looks through the crude sighting tube of the 8 ft. parabolic aerial. The home-made aerial mount was welded up from steel channel iron and the dish was driven by a converted prop-pitch motor. The gearbox was made from an old automobile transmission assembly.
(Photo by courtesy of Eimac)

* *R.S.G.B. V.H.F. Manager, 21 Bridge Way, Whitton, Twickenham, Middlesex.*

The 18 ft. dish used by W1FZJ/W1BU during the 1296 Mc/s tests. The tent housed the equipment. On the righthand side of the picture is a 128 element steerable array used for preliminary experiments during which W1FZJ received his own 144 Mc/s signals back from the moon.





Inside the tent at W1BU. Left, the 1 kW klystron 1296 Mc/s amplifier; right, W1FZJ tunes up the moonbounce receiver. Both W1BU and W6HB used Microwave Associates MA2-1000 parametric amplifiers in their 1296 Mc/s receivers.

(Photos by W1HDQ)

low-noise receivers and transmitters of the order of 500 watts output. Thus 144 Mc/s is not a very suitable band for satellite balloon bounce communication although results will no doubt be achieved. However, as in the use of the E.M.E. case, the optimum frequency range is 1,000-10,000 Mc/s and hence the U.S. 1296 Mc/s E.M.E. equipment will enable considerable ranges to be achieved by this method of communication. Nevertheless it is interesting to note that the 2160 mile diameter moon having a reflection efficiency of 17 per cent located at a distance of 250,000 miles is a more satisfactory reflector than a 100 ft. diameter satellite balloon at a range of 1000 miles. However, it has been suggested that the next generation of satellite balloons should be 1000 ft. in diameter and these will be very much more satisfactory for communication in the 144 Mc/s band and higher. It is highly likely that such balloons will be placed in orbit within the next ten years.

California to Hawaii on 432 Mc/s

From W1HDQ it is learnt that on July 20, California to Hawaii was bridged on 432 Mc/s. For some time KH6UK and W6NLZ had been running nightly tests on 432 Mc/s, hoping to duplicate their record breakthroughs on 144 Mc/s in 1957 and on 220 Mc/s in 1959. On July 20, W6NLZ heard KH6UK on 432 Mc/s for a period of nearly 7 hours. When first heard at 20.10 P.S.T. the signal was weak and fading into the noise, but it built up to an S8 level by 23.00. It remained strong for about an hour and then dropped off steadily until the test was terminated at 03.40 P.S.T. Receiver trouble at KH6UK prevented two way communication on 432 Mc/s. With no signals for test purposes he had no way of knowing the deficiency; by the time the trouble was found and corrected the opportunity for two way work had passed. The path was open again the evening of the 21st, but with much weaker signals.

" The World Above 50 Mc/s "

Beginning with the October 1960 issue of *QST*, the v.h.f. feature will be conducted by Sam Harris (W1FZJ).

Giving this news, Ed. Tilton (W1HDQ) expresses the hope that the new arrangement will give him greater opportunities to work on the technical aspects of A.R.R.L. v.h.f./u.h.f. coverage and result in more and better v.h.f. literature.

Thus will come to an end almost 21 years of monthly v.h.f. reporting for W1HDQ, making *The World above 50 Mc/s* (originally titled *On the Ultra Highs*) one of the oldest regular features in any amateur publication. W1HDQ will remain v.h.f. editor of *QST*.

For some time W1FZJ has been responsible for the v.h.f. column in *CQ*.

Rare County Expedition

Members of the Wirral Radio Society are off again—this time to Cardiganshire, the dates being from September 30 (evening) to October 2 (morning). The call-sign will be G3NWR/A, and anyone wishing to make skeds should write to G3CSG, 25 Cook Road, Leasowe, Wirral, Cheshire.

Meteor Scatter

G3CCH (Scunthorpe) found the Perseids shower from August 10-15 a very fruitful one. A complete call-sign was heard from OK2VCG whilst the latter was calling G3JHM. OH1NL was heard several times although no QSO was achieved, as it was just not possible to copy a report. OH1NL and G3CCH have made many previous attempts but this was the first time that G3CCH had heard such a long burst (about 10 seconds). However, G3CCH had a complete QSO with OE6AP (Graz) whose signals were S25. OE6AP reported that G3CCH was S47. This success comes after 18 months of hard work during all major (and some minor) showers and although quite a lot of fragmentary signals were heard, this was the first time that complete calls and reports were obtained. G3CCH made a tape of the QSO with OE6AP and of the other signals heard. European stations interested in meteor scatter are invited to write to G3CCH, 38 Skippingdale Road, Scunthorpe, Lincs. to arrange skeds.

G3HBW (Bushey) was also very busy during the Perseids shower, testing with OK2VCG (Brno) between 20.00/24.00 G.M.T. on August 9. Bursts were heard but no QSO resulted.

On August 11, tests were made with OH1NL (Nakkila near Pori) 1,075 miles 07.00/11.00 G.M.T. Reports were S25 out and S35 in; both calls were passed both ways. G3HBW received OH1NL's final " R " but the Finnish station did not get Arnold's as it was not sent before the meteor stream failed near the end of the test period. On the same day G3HBW tested with OK2LG (Valtice, 35 miles south of Brno on the Austrian border, at 780 miles). The tests took place between 21.00-24.00. The first burst heard contained both calls! The second was weak, fluttery and unreadable. The third gave " RR RS37." OK2LG confirmed reception of G3HBW's final " R " by telegram, so that this is a complete QSO under the A.R.R.L. rules mentioned last month. It appears to be the first between fixed stations in OK and G. OK2LG was using only 50 watts. His report was S24. Further tests with both OK2LG and OK2VCG were unsuccessful.

On August 11, OK2VCG and SM3AKW (Harnosand) made contact over the 940 miles path between 21.00 and 21.50 G.M.T. OK2VCG's report was S25 and SM3AKW's S38. This is claimed as the longest distance meteor scatter contact in Europe. The European meteor scatter QSOs are gradually creeping up!

G3LTF (Danbury) observed Dresden TV on August 10, during the evening. In 1¾ hours there were 79 " pings " and 13 bursts. The estimated close down was about 21.30 G.M.T. During the G3JHM/OK2VCG sked on August 12, from 21.15/23.00 G.M.T., there were 17 pings and 8 bursts, some really good, with identification of both calls several times with parts of the signal reports also heard. Dresden was producing some very loud pings and occasional bursts up to 20 seconds. On August 14 the G3HBW/OK2VCG sked was heard and good bursts, with both calls identified, noted.

G4LX's Auroral Report

In amplification of GM2FHH's report of the opening of July 15-16 only one observer has so far reported, needless to say stalwart SM6PU. Olof found strong auroral conditions as early as 11.45 G.M.T. on July 15, and during the first phase until 17.03 G.M.T. he had QSOs with SM4AMM, SM7BAE, SM7ZN and SM4XA. Later during the second phase (between 21.10 and 01.30 on July 16) he had QSOs with DL1RX, DL1PS, SM4XA, SM5TC, SM5AKP, SM5ANH, SM6NQ, SM6QP, SM6APB/6 and SM7ZN. He heard GM2FHH, DL9ARA and numerous other SM stations. Aurora returned at 10.00 G.M.T. on July 16 and SM4XA/7ZN was worked at 15.24 G.M.T. A few other SM stations were heard. SM4XA/7ZN was also heard via aurora on July 14 at 21.44 G.M.T. It is understood that on July 29, SM3AKW again had an auroral QSO with SM4XA/7ZN. In all, Olof logged auroral conditions on nine days during July.

Clear sunspots were apparent on the morning of August 16, and at 17.00 G.M.T., G4LX found that the 50-60 Mc/s band showed strong auroral reflection on all TV stations. No signals were logged on 144 Mc/s and conditions faded by 19.00 G.M.T. On August 17, at 17.00 G.M.T. identical conditions were observed but again no response could be obtained from 144 Mc/s transmissions.

Two Metre News

G3OHD (Petts Wood), who is ex-B.R.S.3956, has just commenced on 2m after 25 years of interest in Amateur Radio. The transmitter is running 20 watts to a pair of TT11s and it is now hoped to work regularly from a fair QTH 280 ft. a.s.l.

G2DHV/M toured 19 counties of Southern England during August but found conditions poor. A fair number of contacts was made, including one with F9EA (Dieppe).

B.R.S.22653 (Gainsborough) is listening on 2m with an RF26 converter into a CR100. The best signal heard so far is G5YV. An HRO/MR38 and the usual converter—pre-selectors are also in use.

G3JMA (Harlow) has recently made portable excursions to South Devon and Yorkshire. During the week July 23-29 operation was from a location 800 ft. a.s.l. near Teignmouth. G6OX (Egham) was the most consistent DX regularly worked, with G8SK popping up every now and then although not strong enough for a QSO until July 28/29 when he was worked with good strength along with another 20/30 stations in the Home Counties and London with G2XV and G3IIT (Cambs.) for best DX and GW3MFY, G6GN and G3KHA in the Wales/Bristol direction. The amount of activity from Dorset and Hampshire was surprising and many stations were worked which had never been heard at Harlow. Another QSO worthy of mention was G3JR (Barnes), at sea level, using an indoor quad-Yagi, S7 both ways. The Yorkshire trip had only one night worth mentioning—conditions were very poor. On August 6, from Garrowby Hill near York, G3LTF, G3HBW, G2JF, G2XV and G3IIT were worked, as well as many nearer ones. The best DX on this occasion were G3KMP (Hastings) and G6GN (Bristol). G3FZL, G3BPT, G3BLP and G3EHY were all heard but not worked. The equipment used was a much modified Hamobile Mark II and a 3 element Yagi at 17 ft. Thanks go to G3HIX for help getting the gear up to good standard, and to a most helpful and tolerant XYL.

B.R.S.21476 (Penarth) only listened spasmodically but heard G6XX (Goole) on August 15. A local newcomer on 2m is GW4FW.

G3CCH (Scunthorpe) says there has been little to report on tropo, although the weekly sked with GI5AJ is still running and signals are usually around S6 with fading even under bad conditions. GI5AJ can quite often copy G3CCH's s.s.b.

A.1491 (Palmers Green) reports that strangely enough July proved a record month for the number of stations heard (189). The period was one of somewhat higher activity, with the August Bank Holiday period particularly good. The path to the West was open for much of the time and G6GN, G3KHA and G3EHY were coming through, the latter very well on August 4. G3MDH/P was heard for the first Dorset station this year. G2GG, G3ITF and G6OU have been heard for the first time in this direction. From the North the sked with G3MNQ has been 100 per cent on the last 10 attempts. G3JMA was heard on several occasions when portable in Yorkshire, whilst G3GTW and G6XX were two other rare ones recently added. G2ANS and G3BA have been very good from the Midlands. New stations logged include two on local "mountains" with paralysing signals: G3BID (Hampstead, 144·83 Mc/s) and G5ZG (Takeley, 144·87 Mc/s). Others are G3BNE (Bexleyheath 144·90 Mc/s), G3LBG (Chadwell Heath 144·88 Mc/s), G3NHC/A (Banstead), G8SM (East Molesey) with 1·5 watts on 144·98 Mc/s. G3LCK, a former local, is now on from Canterbury on 144·47 Mc/s but has not yet been heard in Palmers Green. Lastly, F8MX/A is back, as strong as ever, and G3LAR has been heard /P with a 50 milliwatt transistor transmitter.

G3LTF (Danbury, Essex) says that the only good days during the period were July 30 and August 2, 6 and 15. On the 30th G6UJ (Driffield) was a good signal while on August 2 PA0EZ was worked 579/589, with GM3HLH/A 549/549 on the 6th, and GI5AJ (429) heard on the 15th. GW3JWQ/P was heard on the night of August 17, but again no QSO resulted.

Region 1 I.I.A.R.U. V.H.F. Managers at Folkestone, 1960. From left to right, G5MR (observer), SM5MN, G2AIW, DL3FM (front), SP5FM (rear), HB9RG and F9ND. (Photo by PA0QC).

G3JR (Barnes) refers to his QSO with G3JMA/P (Teignmouth) as the one spot of interest in an otherwise poor month. G5HZ is putting up a 6 element quad to G3JR's specification and results with this aerial are eagerly awaited.

GM2FHH (Aberdeen) found poorer conditions. During July personal QSOs were made with GI5AJ and EI2W and a great deal of renowned Irish hospitality was enjoyed. During the Perseids period a few pings were received from an OK station. **GM2CHN** (Glasgow) reports that v.h.f. activity in the West of Scotland has been rather low but is now beginning to pick up again. GM2LDU's new converter produced quick results giving contacts with GW3HIY and with G3CCH, G5YV and G3ILD. G3LRP was also heard. **GM3DIQ's** trip to the Isle of Arran proved very disappointing owing to the weather. Local newcomers to the band include GM3CFX (Airdrie, formerly G3CFX near Yarmouth), GM3OCV (Rutherglen) and GM3FAX (east of Glasgow). Several others are known to be getting ready and we shall be glad to hear from them.

GM3OFY (Prestwick) says that activity in South-West Scotland has dropped off considerably. Since starting on this band GM3OFY has worked GM3KGJ, GM3DIQ (Kilbarchan) and GM3FMD (nr. Maybole). GI5AJ has also been worked. The beam is turned towards Ireland from 18.30 G.M.T. and towards Glasgow from 22.00 G.M.T. with a long call.

GW3MFY (Bridgend) says his best DX was F8MX on July 5 and the most interesting from the contour point of view was with G3ENY (Bridgnorth). August 15 brought QSOs with G3IRW/P (Minehead) and G3LTN (Andover). Stations heard that evening were G4GR, G3CLW, G6GN, GW8UH/M, G2IJ, G3FAN, G3NZF, G3KHA, G5DW, G3LTF and G6NB; the best showing for all the summer! On August 16 G3KEQ and G3ITF (Basingstoke) were worked for the first time. On the 17th conditions were good to the North but GW3MFY was not on early enough to hear the aurora signals reported by GW3LJP and G3KPT. That evening G3ENY was called and the resulting QSO was the first with GW3MFY and for Shropshire. G2CVV (Derbyshire) was later heard and called six times but with no luck. G3NNK and G3BID (London) were also heard.

Four Metres

B.R.S.21476 (Penarth) says more interest is apparent on this band and that GW3ATM will be operating on Sunday mornings. B.R.S.21476 says it is surprising how many stations can be heard in a week's concentrated listening, although casual listening might suggest that activity was low. **A.1491** (Palmers Green) reports hearing G3CLW (Bromley, Kent) at S9 plus. G2HDY and G3EYV of South London (unheard so far) should be added to the list of operative stations.

G3LTF (Danbury) has recently worked G2HDY and G3EYV for new ones.

Tests are beginning between **GM6XW** and **GM5VG** and other stations may soon be joining in, including GM3GUO.

This is the QSL card received by L. France (B.R.S. 21957) of Merthyr Tydfil, Glamorgan, for his reports on the reception of signals from the Russian spaceship on May 17 and 19, 1960.

GW3MFY (Bridgend) has worked G3CLW (Bromley) several times. On Sunday mornings G3EHY is always there on c.w. and has often reported sporadic *E* signals from European commercial stations but no amateur signals at these times. This is doubtless due to the fact that apart from a special one in Holland there are no amateur allocations on 70 Mc/s. The French allocation, not yet cancelled, is between 72—72·8 Mc/s.

Application has been made for an I.A.R.U. V.H.F. Certificate in respect of the QSO between PA0WO and FA9VN on June 22, 1958, which was the record until G5MR's QSO with Casablanca a couple of months ago. For some reason this was not noted in the BULLETIN at the time and we are pleased to repair this omission now.

Seventy Centimetres

G2XV (Cambridge) has worked G5UM, G3NOX/T, G3HBW, G3GDR and F3LP and was heard by GW3JWQ in North Wales on August 17. GW3JWQ's 2m signals were subject to considerable fading and were only copied at RST339, although G2XV's phone was well received in Wales. G2XV is so delighted with the 7077 ceramic planar triode g.g. r.f. stage on 70cm, that he is planning to try a couple of them in a cascode arrangement.

V.H.F. QSY

Members who wish to acquire or dispose of crystals in connection with the British Isles Two Metre Zone plan announced in March 1959 are invited to send details to "V.H.F. QSY," R.S.G.B. *Bulletin*.

Crystals Offered

By G3BW, 53 Hill Top Road, Whitehaven, Cumberland. 12,029 kc/s (B7G type).

Crystals Required

By G3BW as above. 12 Mc/s crystal suitable for Zone 9 (12,150 to 12,160 kc/s), B7G type.

Overseas News

ZC4WR (Limassol) reports further extensions of 2m activity in the Eastern Mediterranean. On August 2 at 15.30 G.M.T. 4X4AS (144·450 Mc/s) was heard calling CQ and was worked at 15.35 G.M.T. by ZC4SC (144.120 Mc/s) on phone at 58/9 both ways. This is believed to be the first ZC4/4X4 QSO on this band. 4X4AS was also contacted at 15.55 G.M.T. by ZC4WR (144·177 Mc/s). ZC4MO/A (144·506 Mc/s) from his mountain QTH, 6,000 ft. a.s.l., worked 4X4AS at 18.15 G.M.T. with signals running 59 plus on phone both ways. 4X4AS was using a transmitter with an input of 25 watts and a dipole. His QTH is near Tel Aviv and about 3 miles inland. The distance involved is 185 miles, mainly a sea path. 4X4AS has been worked subsequently with varying signal levels, the best time being after sunset. The OD5-ZC4 circuit is a better one and regular evening skeds are worked at 59 plus on phone with very little fading. The opening between 4X4 and ZC4 appears to be due mainly to tropospheric refraction as signals are not as steady as on the OD5-ZC4 route. Fading is worst just before and after sunset.

ZC4WR would like to correct a mistake made in his report on the OD5-ZC4 contact: the distance involved is 120 miles and not 210 miles.

ZC4WR is now using a 10 element long Yagi while ZC4SC is operating on 144·120 Mc/s. ZC4PW has left the island for a while.

OD5CO has reported that he has worked an SV on 2m c.w. but no details are yet available. A report received states that ZC4 2m signals have been heard in Eritrea.

On July 24, **LA9T** worked SM6APB/G and SM6BTT while July 28 brought LA8MC, LA8RB and LA9T QSOs with OZ1CR, OZ3NH, OZ4MP, OZ6PB, OZ7Q, OZ9SA and SM6APB/6.

I1XD reports that on July 3, 1960, IT1IGO (Ragusa) worked ZB1AJ and ZB1E. These are the first QSOs between Sicily and Malta on 2m.

Hull Electronics and Instruments Exhibition

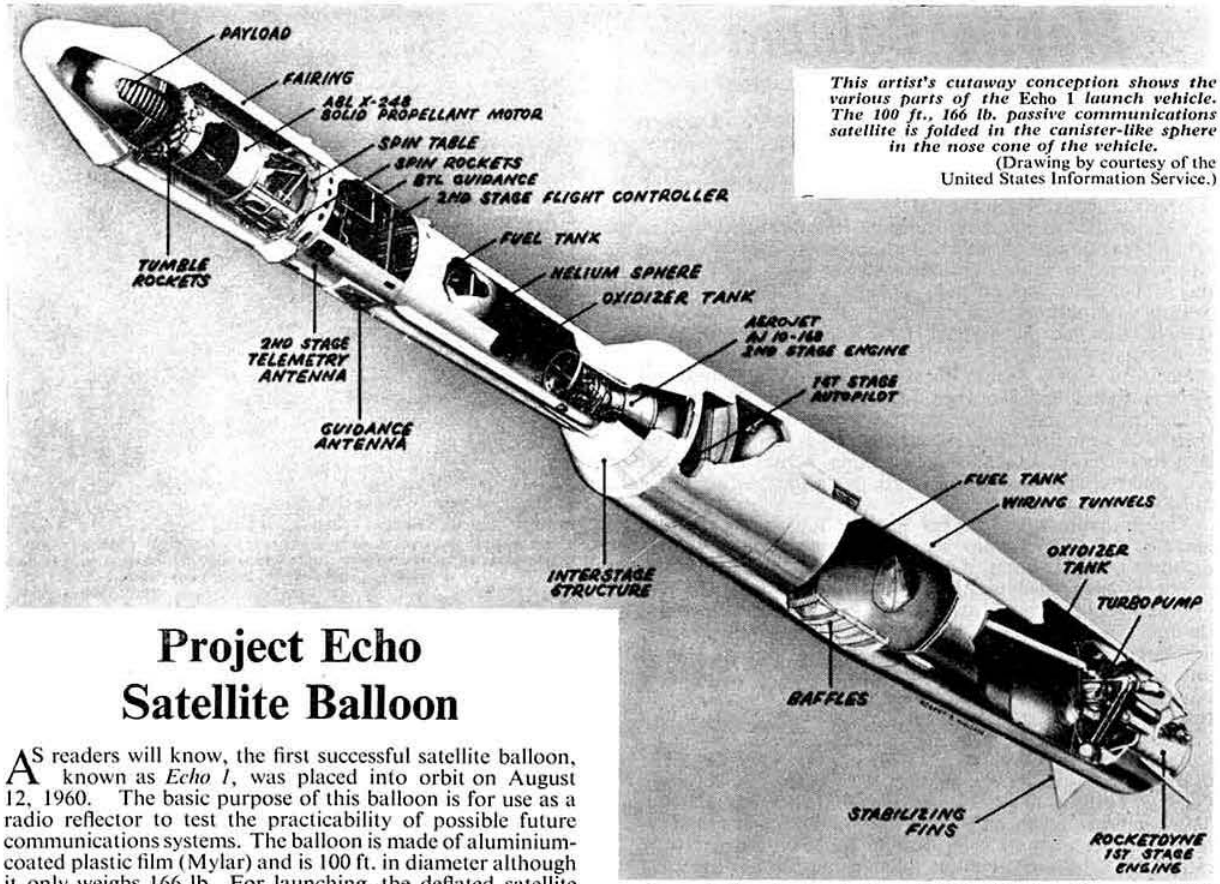
THE Institution of Electronics, with the co-operation of the Hull Electronic Engineering Society, is to hold an Electronics and Instruments Exhibition and Convention at the Farmery Hall, George Street, Hull, from September 28-30, 1960. Admission will be free of charge by tickets obtainable from exhibitors, or from W. Birtwistle, General Secretary, The Institution of Electronics, 78 Shaw Road, Rochdale, Lancs., or from C. W. Wyan, Hon. Secretary, Hull Electronic Engineering Society, 2 Lockton Grove, Calvert Road, Hull.

Capt. P. P. Eckersley to lecture at Ilford

ON October 9, 1960, at 3 p.m. in the Town Hall, Ilford, Capt. P. P. Eckersley, one of the pioneers of British broadcasting, is to give a lecture entitled "Radio Over the Years." Seating will be available for up to 600 and all interested in radio are invited to attend the meeting which has been arranged by the East London R.S.G.B. Group.

Manchester Film Show

THE Institution of Electronics is holding a film show on electronic topics in the Reynolds Hall, The College of Science and Technology, Manchester, on September 30 at 7 p.m.



This artist's cutaway conception shows the various parts of the Echo 1 *launch vehicle. The 100 ft., 166 lb. passive communications satellite is folded in the canister-like sphere in the nose cone of the vehicle.*
(Drawing by courtesy of the United States Information Service.)

Project Echo Satellite Balloon

AS readers will know, the first successful satellite balloon, known as *Echo 1*, was placed into orbit on August 12, 1960. The basic purpose of this balloon is for use as a radio reflector to test the practicability of possible future communications systems. The balloon is made of aluminium-coated plastic film (Mylar) and is 100 ft. in diameter although it only weighs 166 lb. For launching, the deflated satellite was folded into a small airtight magnesium cocoon. Explosive charges split open the cocoon after it attained orbit. Exposed to hot sunlight in the near vacuum of space, the balloon was then inflated by special rapidly vaporizing powders. The initial inflation was provided by benzoic acid while the second powder, anthraquinone, which evaporates more gradually, filled out the balloon to its spherical shape.

The orbit, which is inclined at an angle of approximately 47° to the equator, was calculated to keep the satellite in continuous sunlight during the first two weeks in order to retain its fully inflated state. Only in this form is it capable of reflecting radio signals in a predictable manner. After about two weeks, *Echo 1* was expected to pass into the shadow of the earth. The temperature was expected to drop suddenly, the balloon collapse and thus become useless for radio experiments. The balloon is carrying two tracking beacons, both transmitting on 107·969 Mc/s which, to avoid eclipsing, are located 180° apart on the balloon's equator.

If the balloon is fully inflated and both transmitters function properly, transmissions should appear to be continuous. Partial collapse of the balloon or functional failure could interrupt the reception of signals from one or both transmitters. Reports of discontinuities of received signals may, therefore, be indicative of the state of inflation of the balloon. The beacon transmitters' power output is between 5 and 10 milliwatts regardless of whether the balloon is in shadow or sunlight. The beacons are powered by chargeable batteries and solar cells.

In the United States, two principal stations took part in the communications experiment. These are the Bell Telephone Laboratories station at Holmdel, New Jersey, and the Goldstone station in California operated by the NASA Jet Propulsion Laboratory and are located 3,000 miles apart. Successful communication was established. The Goldstone equipment includes two 85 ft. diameter parabolic reflectors, one for receiving, the other for transmitting. Bell has a 60 ft. parabola for transmitting but has a special horn-reflector for receiving. Bell is transmitting on 960 Mc/s and Goldstone on 2390 Mc/s with powers of about 10 kW. On August 29, 1960, signals were received at the Royal Radar Establishment, Malvern, by reflection from *Echo 1*. The signals, which included speech, were transmitted from B.T.L., New Jersey. The aerial used at Malvern was only 20 ft. in diameter.

Amateur Prospects

There has been considerable discussion regarding the possibility of amateurs using the balloon for long distance v.h.f. communication. The R.S.G.B. Scientific Studies Committee has made numerous calculations to see what order of transmitter power and aerial gain is required to effect communication on the more popular v.h.f./u.h.f. frequency bands; similar calculations were made to compare the likely results from the balloon with lunar reflection possibilities. These calculations show that the moon is a much more effective reflector, in spite of its great distance, than the balloon. Assuming a receiver bandwidth of 100 c/s, a noise factor of 1, zero feeder loss, zero db signal/noise, a 16 ft. diameter parabolic reflector and an aerial temperature of 290° Kelvin, the following power is required to communicate between the U.K. and the U.S.A.: *(Continued on page 127).*

Mobile Column

By JOHN A. ROUSE (G2AHL/M) *

MORE than 450 people attended the first Southern Counties Mobile Rally held at Beaulieu Abbey, Hampshire, on July 17. It was gratifying to see that the majority of the 150 cars were equipped for /M operation, a large number of them for 2m.

The weather in the early morning was disheartening but by mid-morning conditions had improved and the afternoon was reasonably sunny, though a strong wind persisted all day. The Rally was officially opened at 2.30 p.m. by the Society's Penultimate Past President, Mr. Leon A. Newnham (G6NZ) who had the support of the Zone D Representative, F. A. Russell (G3BHS).

Beaulieu Abbey proved an excellent choice of venue and visitors found the Montagu Motor Museum, the Palace House and grounds full of interest. For the radio-minded there was a small manufacturers' exhibit in a marquee and a demonstration of radio teleprinting between the rally area and the Top Band and 2m talk-in stations, located on a hill-top about a mile away.

The Bournemouth Amateur Radio Club and the Southampton R.S.G.B. Group are to be congratulated on an excellent event, the first, it is hoped, of a long series.

There was excellent weather for the third annual Richmond (Yorks) Mobile Picnic at Hunton Village, near Leyburn, on July 24. A novel means of locating the picnic site was employed. About 14 mobiles assembled at Scotch Corner and were issued with a quiz sheet, the questions having to be answered in order to follow the route. Eventually all taking part arrived at the site, prizes being awarded to G3CDM, G3ABK/M and G3NOG/M.

Among those present were G3DMK, G3CDM, G3ABK, G3NQV, G3NJZ, G2CKN, G3AWL, G3NOG, G2HNL, G3JOO, G3INP, G3NVL, G3GFU, G3LBR and G3LXG. The event was arranged by G2HNL, G3DSS and G3NQV.

Attendance at the Derby Mobile Rally on August 14 is estimated to have been about 1,000, some 500 less than last year. Unsettled weather is thought to be responsible for the reduced number. Altogether 215 cars, 65 equipped for mobile operation, were counted at one time during the afternoon.

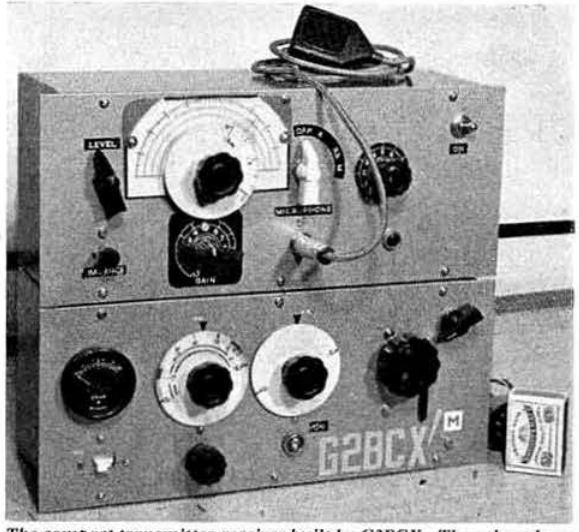
The winner of the major raffle prize, an electric washing machine, was Theodore Nissen (ON4GK) of Antwerp. The winner of the mobile competition, F. James (G6NW), also received a washing machine. Runner-up was P. Hill (G3NPU).

Other items on the programme included a Model Aircraft Flying Display, a demonstration of unarmed combat by members of the Derby Olympus Judo Club, a film show and a Monster Junk Sale. Prizes were presented by Mrs. A. G. G. Melville, wife of the President of the Derby and District Amateur Radio Society which organized the event in association with the Derby Short Wave Experimental Society.

Compact Top Band Mobile

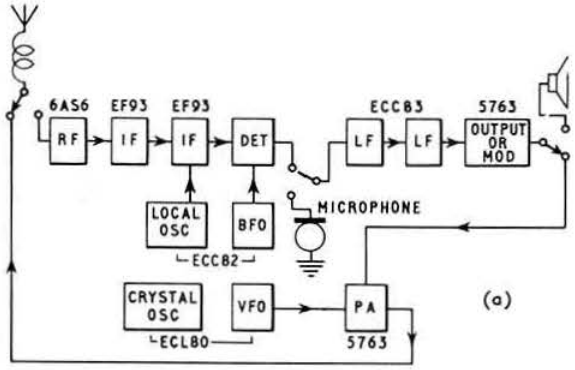
The compact transmitter/receiver shown in the photograph uses a minimum of valves and was designed by G2BCX to operate from a 6-volt car battery and vibrator or transistor power supply. With 250 volts h.t. the total current consumption when on transmit is approximately 60 mA. About 9 watts of this input is used in the p.a. and the remainder for speech amplifier and modulator, thus ensuring a well-modulated signal. The two units are mounted on a miniature rack under the dashboard of the car and are quickly removable for maintenance.

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



The compact transmitter-receiver built by G2BCX. The microphone is a crystal type manufactured by Acos and fitted in a rubber case A hook is provided for lapel mounting.
(Photo by G3FEW).

The receiver is a conventional superhet, with low noise 6AS6 r.f. amplifier, two i.f. stages (EF93), two a.f. stages (ECC83) and a 5763 output valve. On "transmit" the ECC83 and 5763 become speech amplifier and modulator respectively.



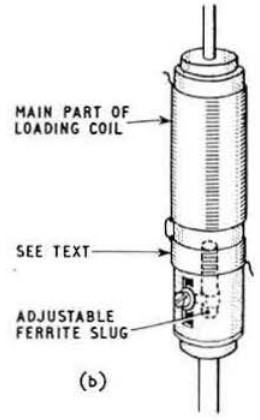


Fig. 1 (a) Block diagram of G2BCX's top transmitter-receiver. (b) Details of the loading coil for the mobile aerial.

The transmitter employs a triode/pentode ECL80, the pentode operating as the v.f.o. with a fundamental frequency range half that of 1·8 to 2 Mc/s. This is doubled in the anode circuit and directly drives the p.a. stage (5763) which is Heising modulated. Despite the direct drive there is no frequency deviation, even at full modulation. The triode section of the ECL80 is used as a crystal oscillator on a spot frequency to check the v.f.o. The block diagram (Fig. 1(a)) indicates the circuit features.

Results have been most satisfactory under mobile conditions, using a centre-loaded whip with an overall length of 10 ft. The aerial utilizes a novel band tuning method which consists of about 3 in. of B2 grade ferroxcube rod arranged to slide in or out of a section of the main loading coil. The number of turns enclosing the rod must be as few as possible, of large gauge wire (18 or 16 s.w.g.) and separated from the rest of the coil by at least 3 in. (see Fig. 1(b)). This is done to prevent losses due to consequent saturation and overheating of the ferroxcube. It should be noted that lower grades of ferroxcube or cheap ferrite materials may introduce losses since they are not suitable for frequencies as high as 2 Mc/s.

That Sunday At Uncle Tom's

"HAVE you ever been to one of these Uncle Tom Garden Parties, Maurice?" No, G2BLA hadn't; but chancing to be visiting relatives that afternoon in nearby Sawbridgeworth he thought he would look in at Little Hallingbury to see what a "G6UT Ham Party" was like. He and his wife and 2-year old Carol were so enraptured that they stayed for nearly three hours.

Then there was G3NVL from far-away Middlesbrough, holidaying in the South, who, too, thought he would like to see what "The Grand Old Man" and his famous location looked like. He was one of the many G3N—of the latter-day plastics-and-atomics-and-television-on-seventy generations who were there that afternoon of Sunday, August 28, complemented in equal number by a goodly crowd of those from the swinging-reaction-coil days, privileged to wear the RAOTA badge.

"How many are here, Uncle Tom?"

"Well, I've counted 65 cars parked in the field and that's a record," reported the Grand Old Man (they say he's 77 but it would be impolite to probe when he looks at least 10db less).

"Sixty-five cars . . . say two, perhaps three, persons each," observed G6LL (Jimmy must have been to *every* Uncle Tom "do" since they began 15 years ago): ". . . well, you could call it nearly 200 folk." And as Double-Ell is a banker that computation was good enough for most of us.

Wives and children wandering off to see the sights of the farm—the excited greyhounds in their pens, or "The Cattery" with its score of boarded felines humped in resigned cottage-loaf attitude—or still downing tea in the marquee on the lawn, were summoned by a handbell rung by G4GA to assemble outside the french-doors for what obviously looked like an impending ceremony. It was. Well-wishers from far and near had subscribed money for a magnificent brass-bound 8-day "wireless cabin" clock, duly handed over to "our host" by G6HU, to evoke a quietly spoken touching little speech of thanks from G6UT himself.

That wasn't the only presentation of the afternoon. A quick whip-round from all present brought a handsome and deserved sum for the numerous lady-helpers of Uncle Tom's family who yearly make such a success of the catering side of "The Sunday at Little Hallingbury."

"UNCLE MIKE."

National Boat Rally and Exhibition

FROM August 8-13 Stoke-on-Trent Amateur Radio Society took part in the National Boat Rally and Exhibition, one of the events arranged in connection with the city's jubilee celebrations.

Of the visiting craft, G3JUW's 70 ft. narrow boat *Susan* was the star attraction. G2AMN was aboard the converted barge *Alice*. The Stoke-on-Trent society was loaned the *Mayfly* which under the call-sign G3GBU/M became the rally patrol boat.

In the exhibition hall, GB3SOT was in operation on 1·8, 3·5 and 7 Mc/s from 9 a.m. to 9 p.m. daily. Dipoles for each band were installed on the roof. Of the many services available, the most appreciated by visitors was the recharging of boat batteries.

G3GBU/M on board the "Mayfly," patrol boat at the National Boat Rally at Stoke-on-Trent from August 8-13. Members of the Stoke-on-Trent Amateur Radio Society in this picture include Vic Reynolds (G3COY), Bill Bryan, Wain Bucknall and Peter Smith. Photo by Malcolm Jennings, Stoke-on-Trent.

Project Echo

(Continued from page 125)

Echo 1: 144 Mc/s 107 kW, 435 Mc/s 11·9 kW, 1296 Mc/s 1·32 kW.

Moon: 1·44 Mc/s, 144 kW, 435 Mc/s, 160 watts, 1296 Mc/s 17·8 watts.

Another interesting fact is that assuming a 144 Mc/s station having a transmitter power of 300 watts, an aerial gain of 16db, a receiver noise factor of 3·5db and a bandwidth of 1 kc/s, the maximum range for receiving a signal from *Echo 1* is approximately 500 miles. Since the balloon is 900 miles high, no detectable reflection would be achieved. However, communication on the 144 Mc/s band is within amateur capabilities particularly in the United States where high transmitting powers and very high gain aerial arrays are in common use. Of particular interest will be the results achieved by U.S. amateurs such as W1BU and W6HB, using the high power 1296 Mc/s moon-bounce equipment.

The release of *Echo 1* heralds a new era in radio communication as it will give much greater impetus to the development of the 1000—10,000 Mc/s frequency band which is the most suitable for satellite reflection communication. No doubt amateurs, as in the past, will be in the forefront of those exploiting the possibilities of this new mode of communication.

Single Sideband

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

In the BULLETIN for June 1960 Mr. H. S. Chadwick (G8ON) questioned the validity of some of the arguments in favour of s.s.b. put forward in *Single Sideband* in the March issue. G2DAF replies to G8ON in the form of an open letter.

Dear '8ON,

I have read your letter in the June issue of the BULLETIN with interest, and I note you suggest that I am making exaggerated claims for single sideband—this I am sure is not true. The figure quoted of a 6db power gain at the transmitter is factual and accepted by communication engineers. It is however regretted that the figures quoted in the March issue were relative to instantaneous peak *input* power and not r.f. output and that this was not made clear.

I do not understand your calculations or the final figure quoted and I feel sure that you are in error here. There is in fact no need at all to discuss " duty cycles," " relative efficiency," " average power " and " peak instantaneous r.f. watts " because so far as British amateurs are concerned the G.P.O. is scrupulously fair and in fact the sideband transmitter is not given any advantage at all over the a.m. transmitter. Under the terms of the licence conditions both transmitters are allowed to *radiate* exactly the same instantaneous peak power.

The figures quoted were given relative to peak *input* power to make the comparison as simple as possible and to avoid the confusion of relative linear and class C amplifier r.f. output efficiency. I quoted the Elizabethan because this is representative of the average anode modulated transmitter used by amateurs in this country. With a d.c. input of 150 watts, at the peak of modulation cycle (100 per cent modulation) the instantaneous peak input power to the p.a. is 600 watts and the power in the sidebands is equal to the power in the carrier. Therefore 300 watts is providing the carrier and 300 watts the two sidebands. As only one sideband is necessary to transmit the intelligence the relative " talk power " of the a.m. transmitter is 150 watts. The sideband transmitter does not transmit the carrier nor the mirror image sideband and the peak power input is providing the intelligence in one sideband. The relative " talk power " is therefore four times as great, a power gain of 6db.†

As the bandwidth of a single sideband transmission is halved the receiver bandwidth can also be halved without affecting the intelligibility. This increases the receiver signal to noise ratio by 3db; however the voltage recovered at the demodulator is 0·707 of that recovered with two sidebands and this represents a loss of 3db but for reception under crowded amateur band conditions the reduction in receiver bandwidth possible with single sideband is of the utmost importance and in practice this advantage is likely to give an improved reception performance much better than the claimed 3db. It could, in fact, under the poor conditions often encountered on the DX bands, be as high as 6db and under severe fading or interference conditions, 9db.

May I suggest that an a.m. transmission passing through the ionosphere is not a carrier opening and shutting in sympathy with the diagram in the *Admiralty Handbook* and that the upper sideband is not the top half of the modulation envelope nor the lower sideband the bottom half. The diode does not " detect " one sideband; it rectifies the incoming r.f. presented to it by the i.f. amplifier. This r.f. is all the components of the original signal that the receiver has translated down to the final intermediate frequency; that is, all the different frequencies making up the total intelligence in the lower sideband—the carrier—and all the different frequencies making up the total intelligence in the upper sideband. If detection of one sideband only is required it is necessary to make the i.f. amplifier so selective it will attenuate the unwanted sideband before it reaches the detector.

No one knows what a signal passing through the ionosphere looks like. I do not however think there is any disagreement about the fact that all the components of the modulated transmission travel separately and quite independently of each other. This can be demonstrated with a wave analyser or with a very selective receiver (bandwidth in the tens of cycles) and it is possible to tune in any individual part of the transmission from the highest frequency to the lowest frequency, quite separately and individually, and independently of the other parts.

Under certain propagation conditions (often encountered on the DX bands) it is quite possible for one part of the composite signal to be attenuated independently of the other parts, or for the carrier to be attenuated independently of the sidebands. Neither I nor any other responsible s.s.b. operator has ever claimed that s.s.b. transmissions are immune from fading or selective fading and phase distortion. Of course they are not! They are affected by propagation conditions the same as any other radio frequency energy. The great difference between s.s.b. and a.m. is the effect on the receiver. Any alteration in the balance between the two sidebands and the carrier will distort the modulation envelope recovered at the detector and will cause distortion that can make the signal unintelligible. There is no carrier transmitted on s.s.b. so this type of distortion cannot arise. True, there can be selective fading of the different frequencies within the one sideband on a s.s.b. transmission, but this has a smaller effect on the detector and in practice it would be most unlikely for this condition to become so severe it would make the received signal unintelligible. Under severe flutter or fading conditions the s.s.b. signal will disappear just like the a.m. one.

It would appear to me to be obvious that if a sideband transmitter is keyed it is no longer transmitting single sideband. Therefore so far as G.P.O. licence conditions are concerned it would be on the same footing as a c.w. transmitter, that is, 150 watts d.c. input power with the key down. The s.s.b. transmitter would be driven to the licensed rating of 150 watts input, either by inserting carrier or by a single tone input into the microphone socket (no carrier inserted). Either method would give a pure c.w. output. It would also be perfectly permissible for the operator to increase the bias supply so that his linear amplifier was operating in class C. His r.f. output would be exactly the same as any other c.w. station and he would have the additional advantage of full break-in operation (no v.f.o. on the output frequency).

In conclusion: aside from any discussion on relative claims, the advantages of any method of voice transmission that would eliminate heterodynes and reduce the required bandwidth to half of that normally used should be obvious to everyone. On these grounds alone, I would expect it to be eagerly accepted and put into use at the earliest possible moment by all forward thinking members of the Amateur Radio movement.

Yours sincerely,

G. R. B. Thornley (G2DAF).

Preston, Lancashire.

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

† It is agreed that in the a.m. transmitter the additional required peak voltage is supplied from the modulator and that this is not available in a s.s.b. transmitter. It is therefore necessary to increase the p.a. h.t. voltage by a factor of about 1·5 times. This was stated—(i.e. a.m. 813 p.a., 1,000 volt h.t. supply; s.s.b. 813 p.a., 1,600 volt h.t. supply). Under exactly the same 1,000 volt conditions the gain on s.s.b. would be reduced from 6db to 3db—but this is still equivalent to twice the power of the a.m. transmitter.

Society News

Election of Council 1961

IN accordance with Article 55 of the Society's Articles of Association the Council have nominated the following Corporate members to fill the vacancies in the Council which will occur on December 31 next.

Officers

President: Major-General Eric S. Cole, C.B., C.B.E. (ex-G2EC, SU1EC).

Executive Vice-President: Mr. E. G. Ingram (GM6IZ).

Hon. Treasurer: Mr. Norman Caws, F.C.A. (G3BVG).

Ordinary Member

Mr. David Deacon (G3BCM).

Not later than October 24 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 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.

Zonal Representation

Not later than October 24 next, any 10 Corporate Members resident in Zone C (Regions 5, 7, 8 and 16), Zone E (Regions 10 and 11) and Zone F (Regions 12, 13, 14 and 15) may nominate any other duly qualified Corporate Member to serve as Zonal Representative on the Council by delivering their nomination in writing in a single document to the Secretary together with the written consent of such nominee to accept office if elected, but each such nominator shall be debarred from nominating any other person for this election.

Candidates for Zonal Representative must be resident within the Zone for which they are nominated and the nominators must be resident in that Zone.

The present Zone C Representative is Mr. E. W. Yeomanson (G3IIR) of London.

The present Zone E Representative is Mr. A. C. Williams (GW5VX) of Port Talbot.

The present Zone F Representative is Mr. E. G. Ingram (GM6IZ) of Aberdeen.

Council Election

AT the end of this year no less than three Zonal Representatives are due to retire. It behoves the members in these zones to see that they are adequately represented by making their nominations in good time. It may not be generally appreciated that a Zonal Representative may also, if elected, hold office in the Society as President, Executive Vice-President or Honorary Treasurer.

Election of County Representatives

IN accordance with established practice, an election of County Representatives is due to take place this year with effect from January 1, 1961.

Nominations

Not later than October 31 next, any ten Corporate Members resident in a particular County (or group of Counties, as the case may be) may nominate any other duly qualified Corporate Member resident in that County (or group of Counties) for the office of County Representative, by delivering their nomination in writing to the General Secretary, together with the written consent of such person to accept office if elected.

Period of Office

County Representatives will hold office for a period of two years as from January 1, 1961.

Confirmation of Appointment

County Representatives will only be confirmed in their appointment if the total membership in the County (or group of Counties) they propose to represent is in excess of 25.

Vacancies

In the event of no nomination being received prior to November 1, 1960, from the Corporate Members resident in a particular County (or group of Counties) the Council reserves the right to make an appointment.

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 1960 issue of the R.S.G.B. BULLETIN.

Present County Representatives

All present County (or District) Representatives go out of office on December 31, 1960.

Society Trophies and Premiums

THE Council has made the following awards for 1960:

ROTAB Trophy: Mr. H. Lassman (G2PX) in recognition of his consistent DX work over a period of many years.

Courtenay Price Trophy: Mr. B. R. Arnold (G3FP) for his valuable experimental work with simple equipment for v.h.f., u.h.f. and s.h.f.

Founder's Trophy: Mr. David Macadie (GM6MD) in recognition of his valuable services to the Society over a period of many years both as a Scottish Regional Representative and as Scottish QSL Sub-Manager.

Calcutta Key: jointly to Mr. Stanley Vanstone (G2AYC) and Mr. Frank Fletcher (G2FUX) in recognition of their work for international fellowship and understanding as Chairman and Honorary Secretary respectively of the London Members' Luncheon Club.

* * *

Acting on the advice of the Technical Development Sub-Committee the Council has made the following further awards for 1960:

Norman Keith Adams Prize: Mr. John Gazeley (B.R.S. 20533) for his article "A Three Valve Receiver for Two Metres" (March 1960 BULLETIN).

Bevan Swift Memorial Prize: Mr. G. R. B. Thornley (G2DAF) for his article "The G2DAF S.S.B. Transmitter" (September, October, November 1959 BULLETINS).

Ostermeyer Trophy: Mr. G. B. Horsfall (G3GKG) for his article "A Single Sideband Receiver for the Amateur" (August 1959 BULLETIN).

Varney Trophy: Mr. David Deacon (G3BCM) for his article "High and Low Pass Filters for All" (March 1960 BULLETIN).

Wortley Talbot Trophy: the Rev. Paul Sollom, O.S.B., (G3BGL) for his article "The Real DX on Ten Metres" (November 1959 BULLETIN).

The various trophies and awards will be available for presentation at the Annual General Meeting to be held on Friday, December 16, 1960.

Maitland Trophy

THE Council has awarded the Maitland Trophy to Mr. W. Robertson (GM6RI) who was the Scottish contestant with the highest aggregate score in the Second 1·8 Mc/s Contest 1959 and the First 1·8 Mc/s Contest 1960.

Late Delivery of the Bulletin

FROM time to time, members complain that their copies of the BULLETIN arrive later than those for members in neighbouring towns. In an effort to ensure as even distribution as possible throughout the United Kingdom, all

copies are handed over to the Post Office by the printers at the same time and a certificate to this effect supplied to Headquarters each month.

Enquiries into recent complaints suggest that delays can occur in the arrival of copies at members' homes because the BULLETIN is posted, like other magazines, at second class mail rates. However, due to the large volume of a complete mailing the despatch Post Office sorts all copies immediately and delays seem therefore most likely to occur at local delivery offices.

Members whose copies arrive late should therefore take the matter up with their local Post Offices.

Region 1 O.R.M. 1961

THE date for the 1961 Region 1 Official Regional Meeting has been fixed for April 23 at the Imperial Hotel, Blackpool. Further details will be published in due course.

Pirate Fined

ON July 20, 1960, at Gainsborough Juvenile Court a 16-year-old boy pleaded guilty to using radio transmitting apparatus without a licence, contrary to Section 1 (1) of the Wireless Telegraphy Act, 1949. He was fined £3 and ordered to forfeit his apparatus to the Postmaster General.

Amateur Participation in the Congo Emergency

READERS will already be aware of the important part played by radio amateurs in the emergency following the granting of independence to the Congo Republic. In a letter to *The Times*, published on August 22, 1960, Mme. Pierre Dallemagne, wife of a Belgian planter, wrote, " Among the many who deserve citation for their tireless efforts to help is a man called Ernie Brice. Mr.'Brice is a police officer in Kampala who was and still is the sole outside contact with those left in the Congo. " Ernie," as he has become known to thousands who have hugged their radios for the past month hoping for news of what was going on around them, is a ham operator and since the chaos began has been at his set day and night—sometimes sleeping three hours out of 36."

Mr. Brice's call-sign is VQ5AU.

Jamboree-on-the-Air

RADIO amateurs who have present or past association with the Boy Scout movement are invited to take part in this year's Jamboree-on-the-Air, to be held between midnight G.M.T. on Friday, October 21, and midnight G.M.T. on Sunday, October 23. The event is not a contest and there will be no awards. It is organized with the sole purpose of furthering Scout contacts throughout the world.

The Boy Scouts International Bureau in Ottawa will be operating VE3JAM on the following approximate frequencies: 3750 kc/s, 7100 kc/s, 14,175 kc/s, 21,250 kc/s and 28,450 kc/s.

Readers intending to take part are invited to inform the organizer of the British section, L. R. Mitchell (G3BHK), " Katoomba," Tyneham Close, Sandford, Wareham, Dorset.

London Lecture Meeting
Friday, October 21, 1960

" Single Sideband "
By R. H. Hammans (G2IG)

Institution of Electrical Engineers
Savoy Place, Victoria Embankment

Buffet Tea 6 p.m. **Lecture 6.30 p.m.**

CONTESTS DIARY

1960

Sept. 17–18	Scandinavian Activity Contest (C.W. Section)
Sept. 24–25	Scandinavian Activity Contest (Phone Section)
September 25	Low Power Field Day (For details see page 80, August 1960)
October 1–2	VK/ZL DX Contest (Phone Section) (For details, see page 133)
October 2	R.A.E.N. Rally (For rules see page 132)
October 8–9	VK/ZL DX Contest (C.W. Section)

October 29-31 - CQ World Wide DX Contest (Phone Section)
November 6 - Second 1·8 Mc/s Contest
November 26-28 - CQ World Wide DX Contest (C.W. Section)
December 3-4 - R.S.G.B. Telephony Contest
R.S.G.B. Telephony Receiving Contest

1961

January 29 - 144 Mc/s C.W. Contest
February 4-5 - Affiliated Societies' Contest
February 25-26 - First 1·8 Mc/s Contest
March 4-5 - 144 Mc/s Open Contest *
March 11-12 - B.E.R.U. Contests
April 8-9 - Low Power Contest
April 16 - D/F Qualifying Event
April 23 - 420 Mc/s Contest
April 30 - D/F Qualifying Event
May 7 - First 144 Mc/s Field Day *
May 28 - D/F Qualifying Event
June 3-4 - National Field Day
June 10-11 - 1250 Mc/s Tests
June 17-18 - 70 Mc/s Contest
June 25 - D/F Qualifying Event
July 2 - Second 144 Mc/s Field Day *
July 9 - D/F Qualifying Event
September 2-3 - I.A.R.U. Region 1 V.H.F. Contest
September 2-3 - National 144 and 420 Mc/s Contests *
September 10 - D/F National Final
September 17 - Low Power Field Day
October 8 - R.A.E.N. Rally
November 11-12 - Second 1·8 Mc/s Contest
December 2-3 - R.S.G.B. 21/28 Mc/s Telephony Contest
R.S.G.B. 21/28 Mc/s Telephony Receiving Contest

** To coincide with dates of I.A.R.U. Region 1 v.h.f. contests.*

Affiliated Societies

DUE to the holiday period, returns from a number of Affiliated Societies had not been received when this issue closed for press. The list of Affiliated Societies has therefore been held over.

New Equipment

The Raymart Bandchecker and Phone Monitor

THE Raymart Bandchecker is a more elegant version of that useful instrument, the simple absorption wavemeter. The tuned circuit covers 3–35 Mc/s in three ranges selected by a switch on the front panel which also carries a 0–500μA meter for indication purposes and a calibrated scale clearly showing the 3·5, 7, 14, 21 and 28 Mc/s bands and the 27 Mc/s model control band. The coil, surrounded by a paxolin insulating sleeve, is fixed to one end of the case and the meter sensitivity control at the other.

Rectification of the r.f. signal is provided by a germanium diode and a jack socket enables the instrument to be used as a phone monitor with a pair of high impedance headphones.

The Bandchecker is housed in a strong grey hammer finished metal case measuring 6 in. × 3 in. × 2 in. approximately and is manufactured by Chas. H. Young Ltd., 110 Dale End, Birmingham 4. It costs £3 3s.

The Twenty-third B.E.R.U. Contest, 1960

ZC4IP moves up to top place in High Power Section—ZS6R again winner of Low Power Section

THE High Power Section of the Twenty-third B.E.R.U. Contest was won by last year's runner-up, George Barrett (ZC4IP), with a score of 3804 points from 486 contacts. Don McVicar (VE2WW) also moves up one to take second place with 3620 points.

Once again F. C. van Wyck (ZS6R) won the Low Power Section with a score of 2381 points made by contacting 229 stations. P. G. Tandy (G2DU) took second place with 1825 points. The winner of the Receiving Contest was E. H. Sherlock (B.R.S. 6604) while J. A. St. Leger (MP4BBE on leave in the U.K.) was the runner-up.

Conditions seem to have been rather variable in several parts of the world. ZS6R, in common with some other African stations, suffered an electric storm during which 1½ in. of rain fell in two hours. He comments that " this probably evens things up for the G stations who have to close down for TV."

Several contestants comment on the " pile-ups " at the bottom ends of the bands; indeed G8DI wonders whether the " B.E." of B.E.R.U. stands for Band Edge!

The rules generally appeared to find favour. However, consideration will be given to the points made by those competitors who did comment when the rules for the 1961 contest are drafted.

In response to queries from participants who noticed that some of the published scores for last year's contest are not multiples of five, and to those stations who ask for scoring to be on a basis of 1 point per contact with a bonus of 4 points, it should be explained that the Contests Committee deducts points according to the number of errors made. It will be seen that if the 1 point per contact method of scoring were used the only penalty which could be exacted (even for small errors such as one digit of a serial number wrongly received) would be to disallow the contact. This would not give the same room for adjusting scores as exists under the present method.

Contest Comments

" I enjoyed the contest more than any I have ever tried . . . I would like to thank all those grand and courteous chaps . . ."—*VE3IX*. " Perhaps next year I will be able to give B.E.R.U. an all out effort and supply a little competition

HIGH POWER SECTION

Posn.	Call-sign	Pts.	Contacts	Posn.	Call-sign	Pts.	Contacts	Posn.	Call-sign	Pts.	Contacts	Posn.	Call-sign	Pts.	Contacts
1	*ZC4IP	3804	486	27	*VQ4FK	2015	199	54	VE3PE	1250	126	81	GI3NKQ	670	34
2	*VE2WW	3620	426	28	G2BB	1990	152	55	G3APN	1215	91	82	G2FQG	669	46
3	*VE3UOT	3545	406	29	*VK2GW	1940	156	56	G5ZK	1180	76	83	ZS6AJO	635	43
4	*ZB1FA	3304	476	30	ZD2JKO	1924	195	57	G3VW	1140	68	84	G3KSH	605	33
5	VE2YU	3209	356	31	VE2BK	1800	214	58	VU2XG	1125	73	85	VK2OW	535	41
6	*G5RI	3115	261	32	G6GN	1799	121	59	G2PS	1120	82		VK5JT	535	32
7	G4CP	3030	262	33	GM3EOJ	1790	138	60	VS1EA	1080	56	86	G3GMY	520	32
8	G3FPQ	3005	253	34	VE2ATU	1725	185	61	G2FYT	1060	80	87	G2HNO	490	30
9	*VK5NO	2920	228	35	VQ2CZ	1705	157	62	G8DI	1059	84	88	G3BSR	485	29
10	G5WP	2835	226	36	VQ2GW	1695	139	63	VE5VL	1000	140	89	G2HDR	480	32
11	VE2AYY	2814	321	37	VE3DDU	1655	175	64	G2BLA	940	52	90	VE3EIL	475	35
12	G3FXB	2800	208		*ZL3GQ	1655	155	65	GM3CIX	920	80	91	VE6VO	470	38
13	*VO1DX	2795	359	38	G5JU	1639	124	66	G3ASG	890	58	92	VE3CNB	465	49
14	G5DQ	2615	187	39	G2HDU	1618	133	67	G3GGS	885	50	93	G8QZ	455	23
15	VE3BMB	2420	268	40	G5HZ	1585	121	68	G3AGN	860	41	94	G3GXO	440	32
16	VE2WA	2373	271	41	G2QT	1579	120	69	G3MPB	835	55	95	VE2AKF	425	30
17	*VE1EK	2250	310	42	VE2DR	1575	193	†	VE3ADV	835	76		G3IYT	405	21
	*ZD2GUP	2250	267	43	G5VU	1540	117	70	VK7JB	810	54	96	VE1QN	405	57
18	*VE7KX	2200	312	44	*ZL4BO	1535	139	71	G8KU	804	57		VK5NQ	405	17
19	*VQ2RG	2180	218	45	G6XL	1515	111	72	G4LX	780	52	97	G6GH	375	23
‡	VQ3HD	2153	192	46	*VE4JB	1509	178	73	G5DF	753	43	98	G5IV	370	30
20	G2HPF	2145	165	47	VQ4KPB	1440	96	74	G3HQX	750	39	99	G3WP	345	29
21	G2DC	2143	181	48	ZL2GS	1415	115	75	VK2PV	740	40	100	G3MGL	330	14
22	G3BKF	2135	143	49	VP9BO	1375	131	76	G2GM	725	49	101	G2ZR	295	31
23	VE1IM	2110	275	50	G3MLX	1370	98	77	G2JN	718	48	102	VQ2W	265	25
24	G3LET	2085	121	51	G3KAD	1320	116	78	G6PJ	710	62	103	G3MWZ	245	13
25	G8KP	2074	147	52	VE2AYX	1305	154	79	G3JKY	699	52	104	ZS1O	205	16
26	G3GFG	2030	156	53	G3FPK	1295	80	80	G2AJB	685	41				

LOW POWER SECTION

Posn.	Call-sign	Pts.	Contacts	Posn.	Call-sign	Pts.	Contacts	Posn.	Call-sign	Pts.	Contacts	Posn.	Call-sign	Pts.	Contacts
1	*ZS6R	2381	229	6	*ZL3US	1305	93	10	*VK5BS	1145	69	14	G3MOJ	330	18
2	*G2DU	1825	129	7	*VO2NA	1295	171	11	*ZB1AQ	895	115	15	VK3RJ	240	12
3	*GW3JI	1620	119	8	G3LHJ	1230	86	12	VK4SS	640	44	16	GM2FXN	225	13
4	*ZE6JE	1380	80	9	G3GNS	1193	79	13	VQ2JG	630	38	17	G3SB	195	11
5	ZE5JE	1329	114									18	ZE3JO	170	10

RECEIVING SECTION

Position	Name	Points	Position	Name	Points
1	*E. H. Sherlock (B.R.S.6604)	3091	7	F. C. Powell (B.R.S.18461)	1485
2	*J. A. St. Leger	2430	8	C. J. Thomas (B.R.S.22249)	1260
3	G. P. Watts (B.R.S.3129)	1910	9	E. W. Trebilcock (B.E.R.S.195)	890
4	W. E.Wilkinson (B.R.S.20317)	1845	10	M. F. Stanbridge (A.1543)	730
5	W. J. C. Pinnell (B.R.S.21624)	1835	11	D. C. Davis (B.R.S.22441)	635
6	C. Harrington (B.R.S.2292)	1605	12	D. M. Grantley (B.E.R.S.1002)	125

* *Certificate Winners* † *Late Entry* ‡ *Rule 5—No Declaration*

from VE6 land "—*VE6HG*. " Conditions were somewhat better than last year but due to terrific local snow static in addition to W QRM in the evenings, results were not too good "—*VE8OM*. " I enjoyed the contest very much especially . . . 3·5 and 7 Mc/s "—*VP7NT*. " Sure tried hard to catch up with old George, ZC41P!"—*ZB1FA*. " This contest is getting keener in the Montreal area . . . noticed the appearance of slicker operating by some Gs . . ."—*VE2YU*.

" Would like to have found more stations outside G and VE. Maybe I didn't dig deep enough . . ."—*VE2WA*. " With my one large cross off check sheet I use coloured pencils—one for each band . . ."—*VE1EK*. " Conditions here were very poor for the whole period of the contest "—*ZD2GUP*. " . . . local conditions not very good and really had to snatch for most contacts "—*VQ2RG*. " Conditions were generally very poor indeed "—*VQ3HD*. " Well I have had my little annual grouse. I hope to be still there battling away next B.E.R.U. . . ."—*G2DC*. " No complaints here regarding rules and conditions "—*VK2GW*. " Very special regards should be expressed to the hundreds of CD party members in the U.S.A. who this year made a special effort to keep frequencies clear for the B.E.R.U. gang . . ."—*VE1IM*. " I shall be back next year complete with a more respectable aerial (I hope) "—*G3LET*. " Now I must get the rig ready for the 1961 B.E.R.U."—*VQ4FK*. " Wish more of the band could be used on 14 and 21. Surely the B.E. of B.E.R.U. does not stand for Band Edge!"—*G8DI*. " Many thanks for organizing this most excellent contest "—*G2BLA*.

" Seemed to be a lot of the regular call-signs missing this year but still many of the old faithfuls . . ."—*G3GGS*. " Conditions were very poor and did not get an opening at all on 14 Mc/s . . . looking forward to next year's contest " —*VK7JB*. " . . . traced the trouble to a very frequency conscious bypass condenser . . . will make sure everything will be in order well in advance for next year's contest "—*ZS6AJO*.

" Towards the latter stages of the contest the feeder to my VK6GU beam broke right at the top of the mast . . . found myself at the end of all the queues!"—*G3FPQ*. " I first entered the contest as B.E.R.S.206 in 1933 or 1934 . . . I hope to be in it again in 1961 "—*VK5NO*. " This contest is undoubtedly the highlight of the contest year . . . I only regret that it's almost a year now before the next!"—*VE2AYY*. " Thanks for another B.E.R.U., my favourite event . . ."— *G3FXB*. " Great to meet old friends year after year in this annual Empire get-together. And it is hard to beat the Gs for downright sheer courtesy and superb operating . . ."—*VO1DX*. " . . . the only 'gentlemanly' contest in DX, apart from the R.S.G.B. Telephony Contest . . ."—*VE3BMB*.

" I was fortunate enough to receive my licence four days before the Contest . . ."—*ZD2JKO*. " It was a great pleasure to hear so many call-signs which were very familiar to me when I was G3AUT in Rugby "—*VE2ATU*. " Poorer conditions than last year but very enjoyable to hear the old familiar calls "—*ZL3GQ*. " The most enjoyable contest of them all but not enough of the rare ones on "—*ZL4BO*. " I've often thought of getting round the driver of a tower crane on a building site and of sticking a beam on it: QRX, old man, while I rotate the shack!"—*G3FPK*. " Better conditions than when operating from VS6 last year but most entrants confined to Asia, Africa and Oceania . . ."—*VS1EA*. " Conditions on all bands were very poor . . . dust, heat and rain . . . not much DX . . ."—*VK5JT*.

" If the Canadians ever withdraw their support, B.E.R.U. will be a very sorry affair. There was very little activity from other Commonwealth countries, as far as I could judge."—*G2HDR*.

Check Logs

Check logs from G2BP, G3AAE, G3CXM, G3ISX, G5GH, G6AH, G6CJ, GW3AHN, VE1AE, VO1BD, VE1DB, VE2YA, VE3EIX, VE5AT, VE6HG, VE8OM, VP7NT, VS6BJ, VU2MD and ZL1HY are gratefully acknowledged.

Rules for the R.A.E.N. Rally 1960

1. The Rally is open to all R.A.E.N. members and will be divided into three groups:
   (*a*) Outstations (R.A.E.N. members operating portable or mobile);
   (*b*) Fixed stations (R.A.E.N. members operating from home stations);
   (*c*) Receiving stations (R.A.E.N. members operating as receiving stations at home or as outstations).

2. The Rally will take place on **Sunday, October 2, 1960,** from 09.00 to 12.00 G.M.T., 14.00 to 17.00 G.M.T. (telephony) and from 18.00 to 21.00 G.M.T. (Morse code A1). Operation will be in the 1·8, 3·5, 28 and 144 Mc/s bands. R.S.G.B. band planning must be observed. Licensed power must not be exceeded.

3. Outstation equipment must not be connected in any way to the public mains electricity supply and must be located at least one mile from home or other normal fixed station site.

4. **Scoring—Transmitting Sections.**
   Contacts will score points as follows:
   Outstation to outstation—5 points.
   Outstation to fixed station—3 points.
   Outstation to non-R.A.E.N. station—1 point.
   Fixed station to outstation—3 points.
   Fixed station to fixed station—2 points.
   Fixed station to non-R.A.E.N. station—1 point.
   Ten scoring contacts only will be allowed with non-R.A.E.N. stations during the rally.
   No station may be worked more than once on each band by the same mode of sending. (G3XXX, G3XXX/P and G3XXX/M count as one station for scoring purposes.)
   The best two periods' scores will be counted for placing.

5. Each participant will, on application to his A.C. (or the Honorary Secretary, R.A.E.N. Committee in cases where participants have no A.C.) be issued with a **test phrase.** This test phrase will be passed to the first R.A.E.N. station contacted, in exchange for the test phrase from that station. The test phrase received will be passed to the next R.A.E.N. station contacted, in exchange again, and so on. No test phrase will be passed to non-R.A.E.N. stations. **A.C.s should make application for block issues of test phrases to the Honorary Secretary, R.A.E.N. Committee, by not later than September 20, 1960.**

6. Stations will call **" CQ from Raynet station . . . "** and sign **" from Raynet station . . . "** The letters or word RAEN is forbidden.

7. **Printed log sheets** will be issued at the same time as the test phrases by the Honorary Secretary, R.A.E.N. Committee, to all participants through A.C.s in cases where there is an A.C.
   Completed entries for all the periods worked must be returned to the **Honorary Secretary, R.A.E.N. Committee, 1 Shortbutts Lane, Lichfield, Staffs.,** postmarked not later than **Monday, October 17, 1960.** Location and signal reports must be given, received and logged.
   Participants should complete, on the top sheet of their log, the details of their station, in the appropriate spaces provided. The declaration must be signed.

8. **Receiving Stations—Scoring and Logs.**
   Receiving stations will score three points per R.A.E.N. station heard in contact, provided that the details required by the printed log sheet are correctly recorded therein.
   Receiving stations operating portable or mobile will receive a bonus of one point per R.A.E.N. station correctly logged.
   Logs must be submitted on printed sheets obtained from the Honorary Secretary, R.A.E.N. Committee through A.C.s or direct where participants have no A.C. The details and declaration required should be completed and signed on the top sheet only.
   Entries should be posted to the Honorary Secretary, R.A.E.N. Committee and should be postmarked not later than **Monday, October 17, 1960.**

9. **Awards** will be made to the participants who score the highest number of points in each of the groups: Outstations, Fixed Stations and Receiving Stations.

Burslem Hobbies Exhibition

FROM September 26 to October 1, members of the Stoke-on-Trent Amateur Radio Society will be operating GB3SOT on all bands from the Rotary Hobbies Exhibition at Burslem, Stoke-on-Trent.

Lunar and Satellite Communication

ON Sunday, September 18, Council Member G.M.C. Stone (G3FZL) will lecture to the East London R.S.G.B. Group at Ilford Town Hall on Lunar and Satellite Communication. The Meeting will commence at 3 p.m.

CONTEST NEWS

RESULTS — REPORTS — RULES

First 144 Mc/s Field Day 1960

THE first 144 Mc/s Field Day held on May 8, 1960, brought 39 entries and four check logs. The winner, with 15193 points and well ahead of the rest of the field, was Peter Pollard (G3DIV/P) of Polegate, Sussex, who chose a site at Brightling Needle, 12 miles north-west of Hastings. Second place went to Peter Blair (G3LTF/P) who made 10664 points operating from Bushey Hill, south-east of Danbury, Essex.

Conditions seem to have been fairly good and during the afternoon there was a brief spell of auroral activity when the GMs and GIs were worked by stations in the south of England although none of the midland or northern stations had any auroral contacts.

Continental activity was brisk for the first few hours or so —G3DIV had worked eight PA0s, two ON4s and one F by 11.00 G.M.T. and had therefore clocked up nearly 3000 points. G3LTF was also able to work the PA0s and made a good start to his scoring.

The efforts of GI3KYP/P deserve special mention as " Barney " and his eight helpers (including two mountaineering experts) set out on the previous Saturday to climb to the summit of Slieve Donard (2,976 ft. above sea level). At 2,000 ft. the visability was down to a few feet and they decided to settle for a lower level and eventually found a spot 600 ft. above sea level that gave a good clearance to the north-east and south-east. They found band conditions very poor except for the auroral opening but did work everything they heard except one DL. The best contact was with DL1PS at 590 miles; ON4ZH at 486 miles was also worked.

Contacts over 400 miles and reports received are set out in the following table.

Station	Time G.M.T.	Station Worked	Distance Claimed	Report
G3DIV/P	15.43	GM2FXN	404 miles	55 (A)
	16.17	GM3KYI/P	409 miles	55 (A)
G3MAR/P	15.55	DL6QS	459 miles	54 (A)
G3JWQ/P	15.52	DL1RX	486 miles	57 (A)
G2HCJ/M	15.30	DL6WU/P	489 miles	56 (A)
GM3KYI/P	15.42	DL6QS	510 miles	54 (A)
	15.50	DL6WU	650 miles	44 (A)
	16.17	G3DIV/P	409 miles	55 (A)
GI3KYP/P	15.25	ON4ZH	486 miles	59 (A)
	16.03	DL1PS	590 miles	55 (A)
G2BDQ/P	15.06	DL6QS	437 miles	56 (A)

Unfortunately there were very few comments on the contest. G3ION who with five helpers was on Win Green Hill, 911 ft. above sea level reported that conditions were not good for radio but the weather was pleasant. He could hear Southampton stations working ON4s but he was unable to hear any himself!

G3LCH commented on the difficulty of finding some of the smaller towns and villages given as reference locations and suggests that only names of towns shown in the *A.A. Handbook* should be used.

Generally whilst the receiving equipment varies considerably the transmitters are restricted to the old faithfuls—832, QQV03-20A or QQV06-40 and nearly all entrants used Yagi aerials in one guise or another: 4-over-4, 5-over-5, 6-over-6, mostly slot fed, and up to 11 elements.

Log Keeping

The standard of reporting was very good and locations were recorded accurately. However the distances claimed are still somewhat optimistic and in some cases it was necessary to reduce the claimed scores slightly.

One point in the general rules is repeated here as some entrants have claimed scores for working a station as fixed then subsequently as portable or mobile; the rule states, " Only one contact on each band may be made with a specific station, whether fixed, portable, mobile or alternative address." (General Rule 4.)

The contest seems to have been successful in bringing many stations on to the band as in addition to some 200 or more Gs there were contacts with GI, GC, GM, GW, F, ON, DL and PA.

Check logs from G3FIH, G3HBW, G3LTN and GC2FZC are gratefully acknowledged.

And a last comment from G3ADU—" a most enjoyable day, with very low power of 5 watts! "

Results

Posn.	Call-sign	Points	Posn.	Call-sign	Points
1	G3DIV/P	15193	21	G3MAX/P	4602
2	G3LTF/P	10664	22	G3NNG/P	4577
3	G3AYT/P*	10226	23	G3JXN/P	4456
4	G8SB/P	9353	24	G3CGQ/P	4405
5	G3MAR/P*	8495	25	G3MTI/M	4223
6	G2DTO/P	7857	26	GW4LU/M	4041
7	G3JWQ/P	7434	27	G3GOP/P	3994
8	G3KMT/P	7304	28	GM3KYI/P	3609
9	G2HCJ/M	6987	29	GI3KYP/P*	3597
10	G3GZJ/P	6394	30	G3HKT/P	3332
11	G2HIF/P	6292	31	G3LCH/P	3032
12	G5HZ/P*	6276	32	G5CP/M	2873
13	G3LAR/P*	6229	33	G3ARS/P	2771
14	G3APY/P	6189	34	GM3LAV/M	2679
15	G3KEF/P*	6004	35	G3AS/M	2181
16	G3ERD/P*	6002	36	G3IBI/P	1965
17	G3ION/P	5623	37	G2BDQ/P	1808
18	GW3NWR/P	5479	38	G3ADK/P	1629
19	G3FD/P	5304	39	G2XV/P	1514
20	G6GN/P*	4933			

* *Multi-operator.*

VK/ZL DX Contest 1960

THE New Zealand Association of Radio Transmitters and the Wireless Institute of Australia invite all radio amateurs to participate in this year's VK/ZL contest. Rules for overseas stations may be summarized as follows.

Sections. *Phone:* 24 hours from 10.00 G.M.T. Saturday, October 1, to 10.00 G.M.T. Sunday, October 2. *C.w.*: 24 hours from 10.00 G.M.T. Saturday, October 8, to 10.00 G.M.T. Sunday, October 9, 1960.

Scoring: One point will be scored for each contact on a specific band with any VK/ZL district. The final score will be obtained by multiplying the total contacts on all bands by the total number of VK/ZL districts (VK1, 2, 3, 4, 5, 6, 7, 9, 0, ZL1, 2, 3, 4, 5) worked on all bands.

Serial numbers will consist of six figures (five for phone) made up of the RS(T) report followed by three figures which should commence at 001 and increase by one for each successive contact.

Entries. (a) Log sheets must show, in this order, " Date," " Time G.M.T.," " Call-sign of station contacted," " Band," " Serial Number Sent," " Serial Number Received." Each new *VK/ZL district* worked should be underlined. Separate log sheets should be used for each band. (b) Summary sheets must show the call-sign, name and address in block letters, details of equipment, Total Score (VK/ZL districts worked multiplied by number of contacts). A signed declaration that the rules have been observed must also be included.

Listeners' Section. To count for points, a VK or a ZL station must be heard in a contest contact and the following details noted in the log: date, time G.M.T., call-sign of the VK or ZL station heard, call-sign of the station being worked, RS(T) of VK/ZL station heard, serial number sent by the VK/ZL station, band. Scoring will be on the same basis as for the transmitting section and the summary sheet must be similarly set out.

Awards: Attractive certificates will be awarded to the highest scoring station in each country (call area in U.S.A.). Other certificates will be awarded depending on the number of logs received from each country and the activity on each band.

Entries must be posted to reach the New Zealand Association of Radio Transmitters, Box 489, Wellington, New Zealand, on or before January 20, 1961.

Rare County Expedition

AS forecast on page 23 of the July BULLETIN, members of the Wirral Amateur Radio Society are off again—this time to Cardiganshire from the early evening of September 30 to the morning of October 2. Phone and c.w. will be used on Top Band and 2m under the call-sign G3NWR/A. Those wishing to make skeds should write to the expedition leader, F. N. Kendrick (G3CSG), 25 Cook Road, Leasowe, Wirral, Cheshire.

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.

Reciprocity

DEAR SIR,—I would like to reply to the letter by G3FPK in the June BULLETIN. I support the G.P.O. in refusing to permit a foreign national to operate an amateur transmitter in the U.K. *unless* his own government is willing to negotiate a reciprocal licensing agreement with the U.K. We all know that U.S.A. amateurs operated from many foreign countries, but the F.C.C. will not licence people from these same countries to operate from the U.S.A. (The A.R.R.L. in a recent issue of *QST* admit this.) Please, '3FPK keep Amateur Radio truly international in outlook, and don't introduce political discrimination as you suggest by giving preference to NATO countries (whoever they may be).

Yours faithfully,

Woodley, Reading, Berkshire. E. SMITH (G3JMT).

DEAR SIR,—I am glad that the subject of reciprocal licensing has again been raised. I can see no good reason why all foreign amateurs, visiting or resident in this country, should not be allowed U.K. licences immediately, provided that they have taken tests in their own countries corresponding to the requirements of our G.P.O. There are several other countries where licences would be granted to visiting British amateurs, provided that such an arrangement were reciprocal. It is especially unfair that members of NATO forces serving in this country should not be allowed to continue their hobby, as they can hardly be considered a security risk. Let us therefore do all we can to end this prohibition, through a Parliamentary Bill if that is necessary.

How often are we asked by a layman: " What is the point of our hobby? " And how often do we stop and wonder what is the best answer to that question? Surely permission to handle third-party traffic would greatly increase the justification of our retaining our frequency bands. The G.P.O. has several times in the past complained that its telegram service is most uneconomical to run. Does that not explain the need for the retention of its monopoly? I should like to see a strong effort made by the Society to obtain third-party traffic-handling privileges for its members.

Yours faithfully,

Watford, Herts. J. C. BEAL (G3JSN).

Liverpool Let-down by the Radio Industry

DEAR SIR,—I am writing as Liverpool T.R. on behalf of the Liverpool and District Amateur Radio Society.

On July 14, 15 and 16, the City of Liverpool held its Annual Show. This is a mixture of agricultural, industrial and civics and is held in a canvas 'town' in one of the large city parks. For the second year the Liverpool Radio Society was requested by the Show Committee to put on an exhibition and to run radio stations during the three days of the Show. This they did. In fact an exhibition worthy of Amateur Radio was put on and two stations operated day and night under the call-sign GB2LS and 400 contacts were made.

We were allocated a marquee (40 ft. × 20 ft.) and we put over to the public just what our hobby is. We exhibited a number of home-made transmitters and receivers and a large proportion of the 79,000 people who visited the Show passed through the radio exhibition. Our visitors included many nationalities and much interest was shown in the equipment on display.

The point in writing this letter is not to provide a detailed commentary of what we did but to place on record just how we think we were let down by the many manufacturers of Amateur Radio equipment. We offered them free publicity and facilities to display their wares. Letters were sent off early in the year with a request for support; we did *not* ask for free donations but just a chance to show what commercial equipment is available to the radio amateur. What response did we get? Just " not interested " and/or just " ignored "; in most cases the latter.

We are of the opinion that unless the event is billed to take place in or near London the radio trade think it is not worth bothering with. We rather resent the feeling which appears to exist to the amateur population north of the centre line. We tend to be looked upon as country hicks with little to offer. If this particular show had taken place in or near London no doubt manufacturers would have fallen over themselves to be in on it. Our only support came from Mullard Ltd. and British Insulated Callender Cables Ltd., who kindly loaned some fine display units.

Where were the manufacturers of the transmitters and receivers? We had in use one of the latest types of transmitter made by a new firm and one of the latest types of receivers made by an old firm. We requested that they might like to show some of their equipment but all we received was some literature from the transmitting firm. The transmitter and receiver were not on loan from them but from a local G3.

In writing this letter we hope that manufacturers will realize that they have perhaps missed the boat. Maybe they thought it was just another stunt but they should know that Liverpool is one of the greatest seaports in the world with a large amateur population, adjacent to the Wirral, Manchester and North Wales. If many more amateurs were to build their own rigs as well as those we exhibited and attain such high standard of construction, the amateur fraternity might get a little more co-operation from the manufacturers.

Yours faithfully,

Liverpool, 14. A. D. H. LOONEY (G3LIU).
T.R. for Liverpool.

Operation Steamroller

DEAR SIR,—I have read with interest the letters from three U.S. members regarding the extension of the U.S. phone subband from 14,300 to 14,350 kc/s, but I feel that W1WF is doing the Editor a grave injustice in accusing him of " a fit of pique." I believe that the Editor, an operator of many years' experience, dislikes, like myself, having his transmissions squashed by a steamroller of not 1 kW, but 2 kW p.e.p. radiated by a high gain aerial system. From my own experience I am unable to accept the statement by W5EHC that " a very tiny minority have high powered transmitters." However, I do feel that high power does not always place the 150 watt station at such a disadvantage as the figures would apparently indicate, for station efficiency and operating technique can account for a great deal of the disparity in power. As for the possibility of a world-wide increase in power to 1 kW, personally I would welcome a reduction to 100 watts. Whilst this might put some manufacturers of Amateur Radio equipment out of business it would cause greater attention to be paid to station efficiency instead of relying on brute force.

Now that this extra 50 kc/s is open to U.S. stations one wonders if the best use is being made of it, for the number of phone patches conducted in this portion of the band would seem to indicate that the internal telephone system in the U.S.A. is either inefficient or expensive. As this is being written there are three inter-W phone patches in progress between 14,320 and 14,335 kc/s and a number of lengthy domestic contacts, all S9+ signals. The only station outside the U.S.A. who is apparently working in this portion is G3KGC in contact with a W station. Before the advent of the W/K stations one could participate in QSOs above 14,300 kc/s with our friends in Canada and the West Indies. Now, outnumbered and outpowered, they are not to be heard and our pleasure is thereby reduced.

One would have thought that the greater part of the domestic traffic in the U.S.A. would have been carried in the 3.5 and 7 Mc/s bands which are much wider in North America than in Europe. If what is probably the best all-round DX band must be used, would it not be possible for inter-W/K QSOs phone patch traffic to be carried on below 14,300 kc/s using only the amount of power necessary to maintain 100% QSO?

Yours faithfully,

Romford, Essex. R. F. STEVENS (G2BVN)

Message Handling

DEAR SIR,—I hope the R.S.G.B. will press the G.P.O. to permit amateurs in this country to handle third-party traffic. Experience in those countries which permit such operation surely proves that traffic handling is essential for the development of first-class operators. Does our country still need operators?

Yours faithfully,

Bristol, 7. T. CHARLES BRYANT (G3SB).

Best Value for Money
Technical Service Offered by R.A.F.A.R.S.

DEAR SIR,—The welcome increase in commercial apparatus specifically designed for the radio amateur seems to have reached a point where the average enthusiast has a problem in deciding how to get best value for his money. It is only natural that a manufacturer's literature should emphasise obvious selling points and is rather vague or may even omit some technical criteria. This technique applies to most categories of goods but the problem is simplified in less specialized fields by articles in *Good Housekeeping*, *Which?*, newspaper motoring columns and the like. An equivalent service for the amateur by an unbiased and independent organization with the practical experience and the essential and expensive test facilities, therefore, seems to be an overdue requirement.

If such a requirement can be firmly established by confirmation of co-operation by the trade, by the views of amateurs and by the Editor agreeing to publish the results, the Royal Air Force Amateur Radio Society is prepared to consider trying to meet it.

Fortunately, the Headquarters of the R.A.F.A.R.S. (G8FC) at No. 1 Radio School, Royal Air Force, Locking, has access to some of the best facilities, amateur and professional radio " know how " and experience in the country and of course has no vested interests.

The undersigned will welcome views on this subject from both manufacturers and R.S.G.B. members, either direct or via the correspondence columns of the R.S.G.B. BULLETIN.

Yours faithfully,

Stanmore, Middlesex. (Wing Commander) H. E. BENNETT (G8PF), *Vice-President*, R.A.F.A.R.S.

Can You Help?

● R. I. Buckby (A.1736), 55 Cupar Crescent, Corby, Northants., who requires the handbook for the Admiralty type G.73 wavemeter made by Pye Ltd. and covering 100 kc/s to 25 Mc/s?

● D. Byrne (G3KPO), Jersey House, Eye, Peterborough, who requires information on the Marconi transceiver CNY1?

● B. Hayes (G3JBU), 31 Beverley Crescent, The Headlands, Northampton, who requires the instruction book and/or circuit diagram for the Class D Wavemeter?

● P. J. McGoldrick (A.2379), 23 Glenshield Road, Eltham Park, London, S.E.9, who requires information on bandspread for the R1155 receiver?

● W. H. J. Yeo (G2CVY), Ebberly Dairy Farm, Newport, Barnstaple, Devon, who requires information, particularly the handbook or circuit diagram, for the Hallicrafters R44/ARR5 (S36) receiver?

The International Ham-Hop Club

BEGINNING with the twelve-country Ham-Hop by the world President, Mr. John Dormois (W0GDH), there has been a rise in ham hospitality in all its forms is much in evidence all over Europe. However, the great speciality of I.H.H.C., the " Ham-Hop," has again proved to be the winning choice.

Applications for Ham-Hop tours soon had the club's hospitality organisers working overtime, so much so that it has been found necessary for the Great Britain and Ireland Division to increase its number of organisers. This is being done by appointing Regional Representatives to administer the scheme locally. It is hoped to have this new scheme in full operation before the advent of the 1961 season. Mr. R. H. Jones (G3BRE) has undertaken the task of developing the system. Great credit is due to the present team of organisers for the efficient manner in which ham-hops were organised, often at short notice and in one case involving a family of five.

Last year the club issued an appeal to members to make use of the facilities available. The success of this appeal to members was so great that not only must membership be increased particularly in the London Area, but in future more notice must be given before the club's facilities are required.

Mr. Ken Mitchell (ZS1IR) and his wife Esika are reporting warm hospitality wherever they go on their European ham-hop. A tour of Great Britain and Ireland will follow in September. The plans of Mr. Desmond Yong (VP3YG) to bring his wife with him on his recent visit to England, were thwarted by a strike of employees of Air France. This was especially unfortunate as a three-way arrangement involving the use of each other's homes by two American members and VP3YG and his wife had been worked out.

G.A.P.

Courses of Instruction for the Radio Amateurs' Examination

COURSES of instruction in preparation for the Radio Amateurs' Examination in May 1961 are being arranged at the undermentioned centres.

Birkenhead Technical College, Birkenhead. The course, which has been running for the past three years, will commence this year on September 15. Applications for enrolment should be made to the College as soon as possible. The lecturer will be L. Roberts, A.M.I.Mech.E. (G3EGX).

Birmingham: Lea Mason Centre Evening Institute, Bell Barn Road, Birmingham 15. Classes will be held on Mondays (Instructor: M. A. Brett, G3HBE) and on Wednesdays (Instructor: H. B. Bligh, G3HBB) from 7 to 9.30 p.m., commencing during the week beginning September 12. Enrolment may be made on any class night.

Derby and District College of Technology, Kedleston Road, Derby. Registration for classes on Monday and Friday evenings from 7 to 9 p.m. (theory and laboratory classes) commencing September 26 will take place on September 19, 20 and 21. The course will last for three terms and will be conducted by F. C. Ward (G2CVV). Fees: 35/- for adults and 15/- for juniors.

High Wycombe College of Further Education, High Wycombe. Subject to there being sufficient applications, a course for the R.A.E. and Morse test will commence on September 26. Enrolment will take place at the College from 5-8 p.m. on September 14, 15 and 16.

Peterborough Technical College, Newark Road, Peterborough. Classes in preparation for the R.A.E. and Morse test will be held weekly. Details may be obtained from J. W. Boswell at the College or from the R.S.G.B. Town Representative, D. Byrne (G3KPO), Jersey House, Eye.

Preston: Harris Institute Technical College, Corporation Street, Preston. Enrolment for the class to be held during the 1960/61 session will take place during the evenings of September 12-16. The Hon. Secretary of the Preston Amateur Radio Society, G. Lancefield (G3DWQ), c/o 35 Brixton Road, Frenchwood, Preston, will be pleased to hear from those interested in the course and to answer queries.

St. Albans College of Further Education (Evening Dept.), Hatfield Road, St. Albans. Classes for the R.A.E. and Morse test will commence on September 19; enrolment was due to take place between 6.30-9 p.m. on September 12-15.

Stockport: Avondale Evening Institute, Edgeley, Stockport. R.A.E. classes will be held on Tuesdays from 7-9 p.m. The instructor will be G. R. Phillips (G3FYE). The fees will be £1 for those over 21, and 10/- for those between 18 and 21. No fees will be payable by students under 18 years of age.

GB2RS SCHEDULE

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

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

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

Forthcoming Events

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

DATES FOR YOUR DIARY

September 15-17.—R.S.G.B. National Convention, Cambridge.
September 18. — Lincoln Hamfest and Mobile Rally.
October 2.—Region 9 O.R.M. at Weymouth.
October 21.—Lecture Meeting at I.E.E., London. Speaker: R. H. Hammans, G2IG.
October 21-23.—Boy Scouts' International Jamboree-on-the-Air.
November 23-26.—R.S.G.B. International Radio Hobbies Exhibition.
December 16.—Annual General Meeting at Over-Seas House, London, S.W.1.
March 24, 1961.—Lecture Meeting at I.E.E., London.
April 23, 1961.—Region 1 O.R.M. at Blackpool.

REGION 1

Ainsdale.—Wednesdays, 8 p.m., 37 Hawthorne Grove, Southport.
Blackburn.—Fridays, 8 p.m., West View Hotel, Revidge Road.
Blackpool (B. & F.A.R.S.).—Tuesdays, 8 p.m., Squires Gate Holiday Camp.
Bury (B.R.S.).—October 11 (" Two Metre Equipment " by G2CDB), The George Hotel, Kay Gardens.
Chester.—Tuesdays, 8 p.m., Y.M.C.A.
Crosby (C.A.R.S.).—Tuesdays, 8.30 p.m., Colonsay, Crosby Road South, Waterloo.
Liverpool (L. & D.A.R.S.).—Tuesdays, 8 p.m., Gladstone Mission Hall, Queens Drive, Stoneycroft.
Macclesfield (M. & D.R.S.).—September 20, October 4, 18, 42 Jordangate.
Manchester (M. & D.R.S.).—October 10, Wellington Hotel, Nicholas Croft, High Street, off Market Street.
Manchester (S.M.R.C.).—Fridays, 7.30 p.m., Ladybarn House, Mauldeth Road, Fallowfield.
Morecambe (M.A.R.S.).—October 5, November 2, 125 Regent Road.
Preston (P.A.R.S.).—September 27, October 11, 25, St. Paul's School.
Southport.—Thursdays, 8 p.m., The Esplanade.
Stockport (S.R.S.).—September 14, 28, October 12, 26, The Blossoms Hotel, Buxton Road.
Wirral (W.A.R.S.).—September 16, October 7, 21, 7.45 p.m., 4 Hamilton Square, Birkenhead.

REGION 2

Barnsley.—October 28 (Pie Supper, Open Night), November 11 (Receiver Appendages by W. Lee, G6LZ), King George Hotel, Peel Street.
Halifax —October 4 (Open Meeting), October 11 (Mullard Meeting), 7.30 p.m., Sportsman Inn, Ogden.
Scarborough (S.A.R.S.).—Thursdays, 7.30 p.m., Chapman's Yard, North Street, Scarborough.

REGION 3

Birmingham (Bournville).—September 23 ("S.S.B." by George Brown, G5BJ), September 30 (D/F by Slade Radio Society), October 7 (A.G.M.), Deputy Staff Lounge or Lecture Room, Cadbury Bros., Bournville. **(Slade).**—September 23 (Display of Members' Apparatus), 7.45 p.m., Church House, High Street, Erdington. September 18, Slade Harcourt D/F Contest. October 1-2, Midnight Double D/F Contest. **(South.)**—September 15 (Lecture), October 20 (A.G.M.), 7 p.m., Friends Meeting House, Moseley Road, Birmingham. October 2, Morning Mobile Rally.
Stourbridge.—September 22 (Novices' Class), October 4, 8 p.m., Brotherhood Hall, Scotts Road, Stourbridge.
Wolverhampton.—September 19 (A.G.M.), 8 p.m., Neachells Cottage, Stockwell End, Tettenhall.

REGION 4

Derby (D. & D.A.R.S.).—September 21 (Truvox Demonstration), September 25 (Direction Finding Test), September 28 (" Two Metre Converter " by G3JXL), October 5 (Surplus Sale), October 12 (Visit to Midland Clock Works), October 19 (Standing Waves—Demonstration), 7.30 p.m., Room No. 4, 119 Green Lane, Derby.
Derby (D.S.W. Exp. S.).—Thursdays, 7.30 p.m., Sundays, 10.30 a.m., Nunsfield House, Boulton Lane, Alvaston, Derby.
Grimsby (A.R.S.).—September 15 (Junk Sale), September 29 (Construction Night), October 13 (A.G.M.), 8 p.m., R.A.F.A. Headquarters, Abbey Drive West, Grimsby.
Lincoln (L.S.W.C.).—September 18 (Mobile Rally and Hamfest). September 28, October 12, Room No. 19, Technical College, Cathedral Street, Lincoln.
Leicester (L.R.S.).—Mondays, 7.30 p.m. (Morse Tuition 7.30-8.30 p.m.), Club Rooms, Old Hall Farm, Braunstone Lane, Leicester.
Melton Mowbray (A.R.C.).—September 15 (A.G.M.), 7.30 p.m., 23 Melton Road, Asfordby Hill, Melton Mowbray, Leics.
Newark (Magnus G.S.R.C.).—Tuesday evenings, Junior Physics Lab.
Nottingham (A.R.C.).—September 27 (" All Band Transceiver," G3APY), October 4 (Open Night), October 11 (" Valve Voltmeters," G6CW), October 13 (Open Night), R.A.E. Classes by G3LXL on September 23, 29, October 6, 7.30 p.m., Community Centre, Woodthorpe House, Mansfield Road, Sherwood, Nottingham.
Peterborough (A.R.C.).—October 7 (Lecture Demonstration—Modern Transmitters), 7.30 p.m., Peterborough Technical College.

REGION 5

Shefford (S. & D. A.R.S.).—September 22 (" Operating under wartime conditions " by G2DPQ), September 29 (Morse evening and Junk Sale), 7.30 p.m., Digswell House, Shefford.

REGION 6

Cheltenham.—First Thursday in each month, 8 p.m., Great Western Hotel, Clarence Street.
High Wycombe (C.A.R.C.).—September 29 (A.G.M.), 8 p.m., British Legion Hall, St. Mary Street, High Wycombe.
Stroud.—Wednesdays, 8 p.m., Subscription Rooms, Stroud.

REGION 7

Acton, Brentford and Chiswick.—September 20 (" Aerials for Portable Working "—Discussion), 7.30 p.m., A.E.U. Rooms, 66 High Road, Chiswick.
Barnet.—September 26 (A.G.M.), 7.30 p.m., Red Lion Hotel, Barnet.
Bexleyheath (N.K.R.S.).—September 22 (Junk Sale), 8 p.m., Congregational Hall, Bexleyheath (nr. Clock Tower).
Croydon (S.R.C.C.).—October 11, 7.30 p.m., " Blacksmiths Arms," South End, Croydon.
Dorking (D. & D.R.S.).—Second and fourth Tuesday in each month, 8 p.m., Star and Garter Hotel, Dorking.
Ealing.—Sundays, 11 a.m., A.B.C. Restaurant, Ealing Broadway, London, W.5.
East London.—October 9 (" Radio from the Beginning " by Capt. P. P. Eckersley), 3 p.m., Town Hall, Ilford.
East Molesey (T.V.A.R.T.S.).—October 5 (" Single Sideband " by a Representative of Redifon), Carnarvon Castle Hotel, Hampton Court.

LONDON MEMBERS' LUNCHEON CLUB
will meet at the Bedford Corner Hotel, Bayley Street, Tottenham Court Road,
at 12.30 p.m. on Fridays, September 16, October 21, November 18 and December 16, 1960.
Telephone table reservations to HOL 7373 prior to day of luncheon. Visiting amateurs especially welcome.

Enfield and District.—September 22 (" Selectivity Devices " by R. F. Stevens, G2BVN), 7.30 p.m., George Spicer School, Southbury Road, Enfield.
Guildford (G. & D.R.S.).—Fourth Friday in each month, 7.30 p.m., " The Cannons," Portsmouth Road, Guildford.
Harlow and District.—Thursdays, 7.30 p.m., rear of G3ERN (G. E. Read), High Street, Harlow.
Holloway (G.R.S.).—Mondays, Tuesdays and Wednesdays (R.A.E. and Morse), Fridays (Club), 7 p.m., Montem School, Hornsey Road, London, N.7.
Ilford.—Thursdays, 8 p.m., 579 High Road, Ilford (nr. Seven Kings Station).
Kingston.—Lectures alternate Thursdays, Theory and Morse classes weekly, 7.45 p.m., Y.M.C.A., Eden Street, Kingston (Morse at 2 Sunray Avenue, Tolworth).
Mitcham (M. & D.R.S.).—September 23 (Lecture/demonstration of 23cm Equipment by B. R. Arnold, G3FP), October 7 (Illustrated Lecture on Colour Television by F. G. Parker of B.B.C. Designs Dept.), 8 p.m., " The Cannons," Madeira Road, Mitcham.
New Cross (C.A.R.S.).—Fridays, 7.30 p.m., Sundays, 11.30 a.m. (Audio Section last Tuesday in each month), 225 New Cross Road, London, S.E.14.
Norwood and South London (C P. & D.R.C.).—September 27 (Morse Class and Practical Work), October 8 (" Can a.m. survive on the DX bands? "—Debate), 8 p.m., Windermere House, Westow Street, Crystal Palace.
Romford (R. & D.R.S.).—Tuesdays, 8.15 p.m., R.A.F.A. House, 18 Carlton Road, Romford.
Southgate, Finchley and District.—October 13 (" Crystals " by S.T. and C.), 7.30 p.m., Arnos School, Wilmer Way, London, N.14.
South Kensington (C.S.R.S.).—September 20 (Informal Meeting—GB2SM on the air), October 4 (" Radio Servicing " by G. Lloyd Dalton), 6 p.m., Science Museum, South Kensington.

REGION 8

Crawley (C.A.R.C.).—September 22, October 13 (Informal), 8 p.m., " The Brewery Shades," Crawley High Street.
Tunbridge Wells (W.K.A.R.S.).—September 16 (Informal), September 30 (Junk Sale), October 14 (" What went on at the R.S.G.B. Convention " by W. H. Allen, M.B.E., G2UJ), October 28 (Discussion on Receivers, opened by R. Trevitt), 7.15 p.m., Culverden House, Culverden Park Road, St. John's, Tunbridge Wells.
Worthing (W. & D.A.R.C.).—Second Monday in each month, 8 p.m., Adult Education Centre, Union Place, Worthing.

REGION 9

Bath.—September 19, 7.30 p.m., Committee Room, Bath Technical College.
Bideford.—First Thursday in each month, 7.30 p.m., alternately at G2FKO (T. G. Ward), 38 Clovelly Road. ('Phone: Bideford 964) and G3BO (D. H. Jones), Rosebank, Westcombe. ('Phone: Bideford 550.)
Bristol.—September 23 (" Modern Teleprinter Communications " by H. J. Gratton, G6GN), 7.15 p.m., Carwardines Restaurant, Baldwin Street, Bristol 1.
Exeter.—Second Thursday in each month, 8 p.m., Y.M.C.A., St. Davids Hill, Exeter.
Falmouth (F.R.C.).—First Wednesday in each month, Y.M.C.A., Falmouth.
Torquay.—Second Saturday in each month, 7.30 p.m., Y.M.C.A., The Castle Torquay.
Weston-super-Mare.—Second Wednesday in each month, 7.15 p.m., Technical College, Lower Church Road, Weston-super-Mare.
Yeovil (Y.A.R.C.).—Wednesdays, 7.30 p.m., Grove House, Preston Road, Yeovil.

REGION 10

Cardiff.—October 10 (A.G.M.), 7.30 p.m., Sgts.' Mess, T.A. Centre, Park Street, Cardiff.

(Continued on page 138)

Penarth.—September 26 (Members' Equipment Display), October 24 (Impromptu Draw and Talk), 7.30 p.m., R.A.F.A. Club, Windsor Road, Penarth.

Pontypool.—Tuesdays, 7 p.m., Educational Settlement, Rockhill Road, Pontypool.

REGION 11

Prestatyn (F.R.S.).—October 3 (Junk Sale), 7.30 p.m., Ffrith Hotel, Ffrith, Prestatyn.

REGION 12

Aberdeen (Luncheon Club).—October 4, 12.45 p.m., Royal Athenaeum Restaurant, Aberdeen. ('Phone: GM3HTL at Aberdeen 34928 for reservations.) **(A.A.R.S.)**—September 16 ("V.h.f.-r.f. Technique," Part 2), September 23 (Ragchew), September 30 ("Snow on my Screen," demonstration of closed circuit TV), October 7 (Building Competition), October 14 (Discussion with winners of Building Competition), 7.30 p.m., 6 Blenheim Lane, Aberdeen.

REGION 14

Glasgow.—Second Friday in each month, 7.30 p.m., Woodside Halls, Clarendon Street, N.W. (nr. St. Georges Cross Underground).

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

REGION 17

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

Southampton.—First Saturday in each month, 7 p.m., Prospect House (back of Gas Board showrooms), Above Bar.

Regional and Club News

Amateur Radio Club of Nottingham.—A course in preparation for the Radio Amateurs' Examination is being run under the direction of the T.R., Allan Davis (G3LXL), the first class being on September 22 and thereafter on Thursday evenings. Other meetings will be held at Woodthorpe House, Mansfield Road, on September 27 ("A 60 watt all-band transceiver," by G3APY), October 4, October 11 (" Valve Voltmeter," by G6CW), October 18 and October 25 (provisionally a lecture entitled " The Panoramic Adaptor "). *Hon. Secretary:* E. C. Weatherall, 16 Avebury Close, Clifton, Nottingham.

Amateur Radio Mobile Society.—A Gala Buffet and Ball will be held at the Valentine Hotel, Perth Road, Ilford, on November 12. The venue is very near Gants Hill station, Central Line, and extensive parking facilities are available. Tickets, price 15/- each single or 27/6 double, are obtainable from the new *Hon. Secretary:* N. A. S. Fitch (G3FPK), 79 Murchison Road, London, E.10.

Blackwood Amateur Radio Society.—The inaugural meeting was held at the Church Hall, Blackwood, on July 1 where meetings are now held every Friday at 7 p.m. The following were elected to the Committee: *Chairman*—W. F. Mudford (G6BK); *Hon. Treasurer*—A. Cook (B.R.S. 22859); *Hon. Secretary*—P. M. Fulton (GW3MMU), 36 Sunnybank Road, Blackwood, Mon.; *Committee Members*—K. Kerton (GW3CJR), R. B. Davies (GW3KYA), J. Thomas (A.2078) and R. Jones. Membership has already risen to 32 from all parts of the county. A comprehensive programme for the coming months is being drawn up and will include Morse and R.A.E. instruction, lectures and visits. A special effort is being made to cater for the needs of younger members. The society was due to run an exhibition station at the Blackwood Autumn Fair on September 10.

Bournville Radio Society.—On September 23, George Brown (G5BJ) is to lecture on " Single Sideband " in the Deputy Staff Lounge while the A.G.M. is to be held in the same place on October 7. Members of Slade Radio Society are to give a lecture on D/F, with a film and demonstration, in the Lecture Room on September 30. Further information regarding activities may be obtained from the *Hon. Secretary:* W. V. Shepard (B.R.S. 19176), c/o Council Office, Cadbury Bros. Ltd., Bournville, Birmingham.

Bristol Radio Society.—Nearly 50 members were present at the August meeting when a talk on " Single and Double Beam Oscilloscopes " was given by R. W. Stronach, Grad.I.E.E., Area Technical Representative of Cossor Instruments Ltd. A visit to the G.P.O. Radio Station at Highbridge took place on September 4. On September 23, H. J. Gratton (G6GN) will be speaking about " Modern Teleprinter Communications." A Skittles Match against the Bristol Group of the Television Society has been arranged for October 10. Details of the R.A.E. Course at the Bristol Technical College can be obtained from G5UH. *Hon. Secretary:* D. F. Davies (G3RQ), 51 Theresa Avenue, Bishopston, Bristol 7.

During the Arts and Model Competition organized by the Babcock and Wilcox Staff Association, the Radio Society displayed equipment on a special stand and operated on 145 Mc/s under its call-sign G3GKM. Entries in the competition were judged by Leslie Cooper (G5LC). Some of the gear on show may be seen in this photograph.

Cambridge University Wireless Society.—The officers for the academic year 1960-61 will be: *Chairman*—D. E. Bowyer (G3NHB), Clare College; *Hon. Secretary*—M. H. Hallett (G3MDR), Emmanuel College. The Society will have a stand at the University Societies' Fair at the Corn Exchange during the first week of term. Audio gear, model control and G6UW will be demonstrated. Anyone going up in October who is interested in joining the society is invited to visit the stand or visit members of the Committee in College.

Civil Service Radio Society.—The next informal meeting will be on September 20. These meetings are becoming increasingly popular with GB2SM on the air. Recorded lectures and beginners' instructional films are being arranged. On October 4 there will be a talk on Radio Servicing by the *Hon. Secretary*—G. Lloyd Dalton of 2 Honister Heights, Purley, Surrey. The Contests Committee is hard at work planning for the forthcoming contest season. All meetings are held at the Science Museum, South Kensington. Visitors are always welcome but should contact G. Voller (G3JUL) at KENsington 6371 in advance.

Clapton, London.—Arrangements are being made to form an Amateur Radio club as part of the Venture Section, Springfield Club, Big Hill, Clapton, London, E.5. The club already has a room and is licensed as G3NHS. Further information may be obtained from J. H. Foster at the club.

Crawley Amateur Radio Club.—During August club members were fortunate in being able to visit the B.B.C. Television transmitter at Crystal Palace and the S. E. Electricity Control Centre at East Grinstead. Details of the meeting on September 22 at "The Brewery Shades," Crawley High Street, at 8 p.m., may be obtained from the *Hon. Secretary:* R. G. B. Vaughan (G3FRV), 9 Hawkins Road, Tilgate, Crawley, Sussex.

Cornish Radio and Television Club.—At the August meeting, G2FQD gave an interesting talk, illustrated with models, on the pitfalls encountered in erecting a beam aerial. The club dinner will be held at the Hotel St. Michaels, Falmouth, on November 5. Tickets, price 21/-, are obtainable from the *Hon. Treasurer*—N. Elliott, 11 Belmont Road, Falmouth. *Hon. Secretary:* W. J. Gilbert, 7 Poltair Road, Penryn.

Halifax and District Amateur Radio Society.—At the August meeting G3NBI gave a lecture on Receiver Alignment. Future meetings at the Sportsman Inn, Ogden, will be held on September 20 (Activity Night), October 4 and October 18 (Ragchew). *Hon. Secretary:* A. Robinson (G3MDW), Candy Cabin, Ogden, Halifax.

Harrow, Radio Society of.—On September 23 J. Bolton (G3HBN) will describe his Economy Ten Mobile Transmitter. On October 7, F. Hunt (G3LNQ) will talk on Aerials and the Law. On alternate meeting nights Peter Parry (G3KOE) gives slow Morse lessons for beginners. Meetings are held on Fridays at 8 p.m. in the Science Lab. at Roxeth Manor Secondary School, Eastcote Lane, South Harrow. Visitors are cordially invited to attend. Buses nos. 114 and 158 pass the door. *Hon. Secretary:* S. C. J. Phillips, 131 Belmont Road, Harrow Weald.

Hastings and District Amateur Radio Club.—The meeting programme has been altered, arrangements in the immediate future being as follows: September 27 (" Practical S.S.B.

Exciters," by G3BDQ), October 11 (Film Show) and October 25 (" S.S.B. Power Supplies " by G3BDQ). The A.G.M. is arranged for November 8. *Hon. Secretary:* W. E. Thompson (G3MQT), 8 Coventry Road, St. Leonards-on-Sea.

Mitcham and District Radio Society.—Plans are being made to run a multi-operator station in both the phone and c.w. sections of the forthcoming *CQ* DX Contest. The club station, G3OCT, was operated at the Mitcham Horticultural Show using equipment loaned by G3LCH and G3OCA. A 2m station operated under the call-sign G3LSP/A, some of the gear being loaned by G3LAR. *Hon. Secretary:* M. Pharaoh (G3LCH), 1 Madeira Road, Mitcham.

Newbury and District Amateur Radio Society.—At the August meeting E. Mollart (B.R.S. 10977) gave a talk on D/F. Details of future activities may be obtained from the *Hon. Secretary*—J. A. Gale (G3LLK), " Wild Hedges," Crookham Common, near Newbury.

Purley and District Radio Club.—Forthcoming meetings at the Railwaymen's Hall, Whytecliffe Road, Purley, are arranged for September 16 (" Radio Control," by R. Kennedy) and October 21 (Junk Sale). *Hon. Secretary:* E. R. Honeywood (G3GKF), 105 Whytecliffe Road, Purley.

Peterborough and District Amateur Radio Society.—The society now has a " summer retreat " on the banks of the Nene complete with a large boathouse, a summerhouse, a portable caravan (the new shack) and a powerhouse containing an engine and dynamo. Land is available for an " aerial farm " and moorings for several boats. Meetings are held at Peterborough Technical College on the first Friday in each month. On October 7 there will be a talk on Modern Transmitters and on November 4 a lecture on Single Sideband Operation.

Pontypool Amateur Radio Club.—Weekly meetings on Tuesdays at 7 p.m. at The Educational Settlement, Rockhill Road, Pontypool, have recommenced. On September 20, GW3OAJ/T will be testing members' stocks of valves. *Hon Secretary:* J. S. Hammond (GW3JBH), 46 High Street, Abersychan, Pontypool, Mon.

Royal Air Force Amateur Radio Society.—Many envious eyes were cast on the display of QSL cards from 200-odd countries (provided by G8FC Locking) on the society's stand at the National Radio Show. Interest in kit construction meant G3NAC of Little Rissington spent far more time in discussion than in actual constructional work. Membership of R.A.F.A.R.S. is open to all R.A.F. and ex-R.A.F. amateurs and civilians employed by the R.A.F. Application forms can be obtained by sending a stamped addressed envelope to the *Hon. Secretary:* R. F. Weston (G6PZ), R.A.F. Locking, Weston-super-Mare, Somerset.

Reigate Amateur Transmitting Society.—The Radio Amateur Emergency Network will be the subject of G3VK's talk at the meeting at The Tower, Redhill, on September 17 commencing at 7.30 p.m. A visit to Gatwick Airport is arranged for October 8. Details of the constructional contest may be obtained from the *Hon. Secretary:* F. D. Thom (G3NKT), 12 Willow Road, Redhill.

Southampton.—At the Southampton Show in July, the Group operated stations on Top Band, 40 and 80m, 10, 15 and 20m and on 2m. An RTTY demonstration aroused considerable interest. Amateur gear was on display and demonstrations of the wiring of radio equipment were given. A prize for the best home constructed gear—a Top Band transmitter and receiver—was won by G3NXY. The Group's monthly newsletter *QUA*, now in its fifth year, contains reports on local events and technical articles as well as printed advertisements by local retailers.

Southport Radio Society.—Meetings are held on Thursdays at the Club House, The Esplanade, Southport at 8.30 p.m. and on Sunday afternoons commencing about 4 p.m. A Morse Code practice session commences at 8 p.m. on Thursdays. A winter programme including a Junk Sale, a Hot-Pot Supper and visits is being arranged. *Hon. Secretary:* John E. Ford, 78 Portland Street, Southport.

Spen Valley Amateur Radio Club.—The first meeting at the Labour Rooms, Railway Street, Cleckheaton, was due to be held on September 14 at 7.30 p.m. when E. C. Bell, B.Sc.(Eng.), A.M.Brit.I.R.E., was to lecture on " Modern Radio Communications " under the auspices of the British Association for the Advancement of Science. On September 28 Fane Acoustics Ltd. are to present " An evening of Music " to which wives and friends are cordially invited. A Mullard Film Show at St. George's Hall, Bradford is arranged for October 11 and a visit to Trinity Works for October 12. Details of other activities may be obtained from the *Hon. Secretary:* N. Pride, 100 Raikes Lane, Birstall, near Leeds.

Stockport Radio Society.—At the Northern Electronics Exhibition at Manchester in July, the society operated an amateur station under the call-sign GB3NEE. Many contacts were made on all bands from 3·5—21 Mc/s in spite of a very high local noise level. Details of meetings at the Blossoms Hotel, Buxton Road, Stockport, may be obtained from the *Hon. Secretary:* G. R. Phillips (G3FYE), 7 Germans Buildings, Buxton Road, Stockport.

Surrey Radio Contact Club.—Recent talks have been on " Amateur Radio at International Level " by Arthur O. Milne (G2MI), " The QRA Locator System " by A. D. Naylor (G3GHI) and " A Transistorized Capacity Measuring Instrument " by B. W. Wynn (G8TB). *Hon. Secretary:* S. A. Morley (G3FWR), 22 Old Farleigh Road, Selsdon, South Croydon.

West Kent Amateur Radio Society.—Meetings are held at Culverden House, Culverden Park Road, St. John's, Tunbridge Wells, on alternative Friday evenings—details are given in *Forthcoming Events*. Morse practice commences at 7.15 p.m. and the meeting proper at 7.45 p.m. *Hon. Secretary:* H. F. Richards, 17 Reynolds Lane, Tunbridge Wells.

Worthing and District Amateur Radio Club.—The A.G.M. was held on September 12 and the club is now starting a new year of activity. The next meeting will be at 8 p.m. on October 10 at the Adult Education Centre, Union Place, Worthing. Visitors are always welcome. *Hon. Secretary:* P. J. Robinson (G3KFH/T), 46 Hillview Road, Worthing.

Can You Help?

● George F. Jackson (B.R.S.22377), 95 Pretoria Road, Mawneys, Romford, Essex, who requires information on the modification of the ex-A.M. Test Set Type 74A for amateur use?

R.A.E.N. Notes and News

BY E. ARNOLD MATTHEWS (G3FZW)*

HITHERTO the international aspects of R.A.E.N. have had little consideration in this country. On two recent occasions, however, it has been necessary to refuse network services owing to the limitations imposed by the Amateur (Sound) Licence and to the consequent impossibility of meeting the user service's requirement.

During the last few months attention has been drawn to the wider scene by two events: first the publication of Recommendation 33 to the Geneva Radio Conference, and second, a number of requests from other national societies for information about R.A.E.N.

Recommendation 33 was considered at the Folkestone I.A.R.U. Region I Conference but whatever its fate it will be a long time before any effective decisions are taken one way or the other whilst, fortunately, in several national societies there already exists the organization to deal with the overall planning of emergency networks. In the meantime, there is plenty of work ahead in extending and perfecting R.A.E.N. in the United Kingdom.

That other national societies should want information about R.A.E.N. is hardly surprising. In earlier days much help was received from A.R.R.L., N.Z.A.R.T.S. and W.I.A. publications. During the passage of years a great deal of information about emergency net operation has been amassed. The results of the hundreds of exercises held all over the country have built up into a regular pattern. Not only is net procedure now standardized but there is now an almost standard procedure for starting, expanding and running a group. Such information has frequently been given to newly-appointed controllers. To those who ask, " What use are all these exercises?" there is now an additional answer, " They help the Radio Amateur Emergency Networks of other countries."

R.S.G.B. Radio Hobbies Exhibition

R.A.E.N. will be specially featured on the Society's stands at this year's R.S.G.B. Radio Hobbies Exhibition, and members willing to loan transmitters, receivers, etc., suitable for exhibition are invited to make their offers to Mr. C. H. L. Edwards (G8TL), 28 Morgan Crescent, Theydon Bois, Epping, Essex. Further details may be obtained from Area or County Controllers.

* *1 Shortbutts Lane, Lichfield, Staffs.*

LINCOLN MOBILE RALLY AND HAMFEST

Technical College, Cathedral Street, Lincoln

Sunday, September 18, 1960

The programme will include a lecture on transistors in broadcast receivers by D. E. A. Harvey, Grad.I.E.E., and a sale of surplus equipment. Alternative entertainment is being provided for the ladies. Tickets, price 8/- (which will cover the cost of high tea) will be on sale at the door. Assembly 1.30 p.m. Further details may be obtained from Mrs. D. E. Woolley (G3LWY), Rochmount, Saxilby, Lincoln.

Organized by Lincoln Short Wave Club.

G3DQT **J. AYRES.** **G3DQT**

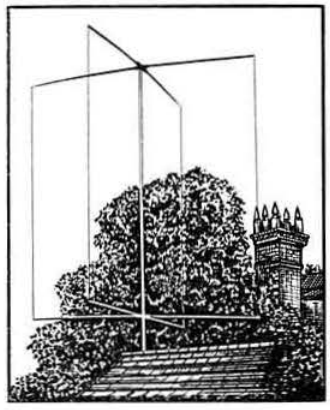
APS20 Receiver. (27 valves, meter, etc.)	**£5/17/6**	Car. 12/6
BC433G Radio Compass (200-1750 kc/s.)	**65/-**	Car. 12/6
MN26 Radio Compass	**90/-**	Car. 10/-
TS16 Cavity Wavemeter (410-470 Mc/s.)	**37/6**	Car. 10/-
Command Receiver 3-6 or 6-9 Mc/s.	**39/-**	Car. 3/6
62 ohm Dummy Loads, heavy duty, screened ...	**12/6**	Car. 3/6
153a IF Strip, 45 Mc/s. (broad bandwidth)	**15/-**	Car. 3/6
W1649 Sig. Gen. (140-240 Mc/s.) Crystal Cal., with manual, (Callers only)	**27/6**	
D/F Loop Units, ferrite-type cores	**8/6** post paid	
Caby Test Meters, A10 97/6; B20 130/- post paid.		
4mfd, 400V Paper Condensers	**3/-** post paid	

Wide range of components and equipment always in stock.
S.A.E. for lists. Only 20 mins. from Waterloo. E.C. Monday.

151 BRIGHTON ROAD, SURBITON, SURREY.
ELMbridge 5660

The *BIRDCAGE* (G4ZU Pats.)

Beam Aerial



Primarily designed for **14 Mc/s** with a gain of **10 dB,** and a Front-to-Back Ratio of 25 dB. Equal to a wide-spaced Five Element Yagi.

Operates as a Rotary Beam on **7 Mc/s** with a gain of approx. 4·5 dB.

A turning radius of only **9½ ft.** is needed.

Co-axial fed. No complicated tuning necessary. All elements of High Tensile Alloy tubing. Rated to 1 kW. R.F. Power. An extremely stable mechanical structure with very low wind resistance.

Price: £16 - 0 - 0 Complete

For full details, please send SAE to: **The MINIMITTER Co. Ltd.**

3 DOLLIS HILL AVENUE, LONDON, N.W.2. *Tel. PAD 2160*

BRITISH NATIONAL RADIO SCHOOL

PRINCIPAL:
Mr. J. SYKES, M.I.E.E., M.Brit.I.R.E.

Britain's only Privately Owned and Conducted Radio Correspondence School
(Est. 1940)

RADIO AMATEURS' EXAMINATION

It is not too early to start preparing for the May 1961 examination.

Fee for the above course **£7 - 0 - 0**

R.A.E. fully worked exam papers.

20/- per set of 8 (post paid)
or **30/-** by airmail.

Also Morse Code on Records.

Note new address :

B.N.R.S.,
RED LION COURT, STALBRIDGE, DORSET
Tel.: Stalbridge 498
(formerly 20 years at Croydon)

G.E.C. — TT21

150 WATT RF TETRODE designed for Amateurs

- Full power rating and efficiency up to 30 Mc/s.
- Low drive. • High emission reserve.
- Short electrode leads. • Octal base.
- Low Cost: 34/9d (including 1/- packing and postage).

Typical I.C.A.S. Ratings

SERVICE	CW	AM	SSB AB_1
HEATER	6·3	6·3	6·3
ANODE VOLTS	1250	1000	1000
SCREEN VOLTS	300	300	300
GRID VOLTS	—115	—115	—40
DRIVE CURRENT	6	3·5	0
ANODE INPUT	270	150	55/116
USEFUL POWER*	146	101	65

*90% Transfer efficiency.

See May 1960 issue for comparisons and characteristics of the G.E.C. TT21. Data and supplies from

M-O Valve Co Ltd
Brook Green, Hammersmith, London W6
A Subsidiary of The General Electric Company Limited

MICROPHONES

FOR TRANSMISSION AND RECORDING

LUSTRAPHONE — THE MASTER MICROPHONE

MODEL VR/64
PENCIL RIBBON
VELOCITY MICROPHONE

Outstanding features include a high level of sensitivity, extended frequency response and triple blast screening. Ribbon assembly anti-vibration mounted. Available in high, line or low impedance. Complete on stand with special swivel mounting and appropriate length of cable. Model VR/64 is of relatively miniature proportions and robust construction, and is outstandingly successful used for transmitting, recording or P.A.

£7. 17. 6.

"One of the best I have used" writes J. G. in "The Gramophone," Aug. 1960, reviewing the **LUSTRAPHONE VR/65 STEREO RIBBON MICROPHONE.** *This is the stereo version of the VR/64 and is available with and without switching arrangement.*

Details of this and other Lustraphone microphones and equipment on request.

LUSTRAPHONE LTD. ST. GEORGE'S WORKS, REGENTS PARK ROAD, LONDON, N.W.1. *Phone: PRI 8844.*

B-46 COMMUNICATIONS RECEIVERS 1·4 to 15·0 Mc/s. continuous 230v. A.C. input built-in speaker; 8 valves. £12/10/- (10/-). **B-47** same as above only 15 to 500 k/cs. and 10 valves. £9/10/-. **BC-610 WHIP AERIALS** 4 sections 12 ft. in canvas holdall 50/- (5/-). **Heavy insulated bracket mounts** for above 25/- (5/-). **BC-659 Transmitter Receivers** crystal controlled 14 valves (less crystals and valves) 35/- (10/-). **BC-659 Power Supply Units** vibrator type for attachment to Tx. Rx. 6V. or 12V. input (less vibrator) 25/- (10/-). **BC-659 Battery Box** for attaching to Tx Rx for man pack use, 7/6 (5/-). **50 WATT POWER AMPLIFIERS** rack mounting 230V. A.C. input, requires (1—MH4, 2—PX-25, 1—U50) with v/c and meter 35/- less valves. (35/-). **EDDYSTONE ABSORPTION WAVEMETERS** 500/1500 kc/s., chrome and grey 20/- (5/-). **AVO PORTABLE GEIGER COUNTERS** for Beta or Gamma Ray Detection, new, less batteries, £16/10/- (10/-). **LABORATORY MAINS FILTER UNITS,** precision type, removes mains borne interference 10/- (2/6). **AMERICAN OPERATORS TABLES,** black crackle 36 in. × 22 in. × 34 in. with shelf, jack boxes and switches, ideal for many uses; 65/- (10/-). **GERMANIUM DIODES** GEX 35, 45, 55, or 66, all 2/6 (paid).

40 page list of over 1,000 items in stock available—keep one by you.

ELLIOTT 0/½ m/A moving coil meters 2,000 o.p.v. 2½ in. dia. **POWER UNITS** 1,200V. 200 m/A smoothed from 200/250V. A.C. 1 Cwt. £6 (£1). **SIGMA RELAYS S.P.D.T.** 10,000 ohms 24V. 1 mA. 12/6 (1/6). **ERICSSON MINIATURE POWER UNITS** 6 in. × 5 in. × 1½ in. 125/250V. A.C. to 390V. 14 mA. stabilised with 4 miniature valves 55/- (5/-). 3½ in. **G.E.C. DOUBLE RANGE VOLTMETERS** 0/25/150V. 20/- (2/-). **40 IN. AMERICAN WHIP AERIALS** with loading coil effectively increasing height to 12 ft. 35/- (5/-). **25 FT. SELF-SUPPORTING PLYMOLD AMERICAN AERIAL MASTS** 95/- (20/-). **TYPE 3 POWER UNITS** de luxe model with 2 meters 57/6 (17/6 includes special returnable 7/6 case).

Amounts in brackets are carriage England and Wales.

We have large quantities of "bits and pieces" that we cannot list and invite your enquiries. We can probably help — everyone answered.

P. HARRIS · ORGANFORD · DORSET

H. WHITAKER G3SJ

COURT ROAD, NEWTON FERRERS, SOUTH DEVON

Precision Crystals of all Types

AMATEUR BANDS

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

SPECIAL OFFER

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

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

H. WHITAKER G3SJ

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

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

---

a **MUST**
for every radio enthusiast!

128 pages plus a page of useful formulæ.

Over **400** illustrations.

Over **4,000** components clearly listed and priced.

HERE is the most comprehensive component catalogue ever produced for the radio constructor, experimenter, and electronic engineer. It's informative, interesting, inspiring! It lists everything you need—from Aerials to Amplifiers, Clips to Cabinets, Plugs to Pick-ups, Springs to Speakers . . the LOT.

ONLY 2/- PLUS 9d POST

POST TO-DAY
Please write CATALOGUE on top left corner of envelope.

Please send 1960 Catalogue. I enclose 2/9 for cost & post.

NAME .....

ADDRESS .....

HOME RADIO OF MITCHAM MITcham 3282
Dept. B, 187 London Road, Mitcham, Surrey.

EXCHANGE AND MART SECTION

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

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

BC. 453 Q—Fiver £3.10 : 7S7, 7H7, 7R7, 7C5, 5/- with holder : I.F.T.'s 100Kc and 1600Kc 3/6 : Denco miniature Maxi-Q coils 2/- Box No. 237, National Publicity Co. Ltd., 20/21 Red Lion Court, Fleet Street, E.C.4. (237

COMPLETE STATION FOR QUICK SALE.—Vanguard, HRO (all B/S), Type " D " wavemeter, 813, transformers, chokes, etc.—G3LOT, 37 Brighton Grove, Rusholme, Manchester 13. (232

EXCHANGE OR SALE, R.C.A. H.F. SWEEP GENERATOR: Complete with regulated power supply, centre frequency 5-65 Mc/s. Sweep width 5-70 Mc/s, as new. Will exchange for a communication receiver or £20.—Davey, 6 Station Road, Dunstable, Bedfordshire. (DUN 770.) (221

FOR SALE.—CR 100 with noise limiter and wavemeter; in very good condition; £25.—M. Meaden, 111 Station Road, Westbury, Wilts. (234

HALLICRAFTERS 27C, u.h.f. a.c. mains, mint, £55; National 100XA, matching L.S., a.c. mains, good condition, £35; CR100, a.c. mains, mint, £25. Buyer collects.—Box 220, National Publicity Co. Ltd., 20/21 Red Lion Court, Fleet Street, E.C.4. (220

JUNE 1960. NATIONAL NC109 RECEIVER, NC Calibrator, electrical bandspread, matching L.S., auto transformer, manual, in original cartons. Cost over £170. Seen London, buyer collects.—Box 219, National Publicity Co. Ltd., 20/21 Red Lion Court, Fleet Street, E.C.4. (219

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

MINI-BEAM.—10/15 COAX model; new condition; £9. Eimac 100th; new; £1. Sylvania CRT. 3BPI, with base; £1; new. Valves: 6SG7M, 6SH7M, 6SA7M 6/-, 6L6M 7/-.—Box No. 235 National Publicity Co. Ltd., 20/21 Red Lion Court, Fleet Street, E.C.4. (235

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

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

SALE.—D.B.23. (240 volts a.c.) " High-Gain " " Low-Noise " Presector. 150 watt modulator. (Zero-Bias 807s.) High voltage Power-Packs, Transformers, Chokes. Large quantity of radio equipment, technical books, valves, condensers, etc., all at low prices.—Ellis (G3SN), 47 Victoria Road, Saltash, Cornwall. (223

SALE.—H.R.O. suitable for spares, bandspread coils, power pack, Q 5-er, Class D Wavemeter. Offers. Send s.a.e. for list.—Lyons, 1 Thorfinn Place, Thurso, Scotland. (217

SALE.—MR37, excellent condition. Best offer over £20 secures. —Box 216, National Publicity Co. Ltd., 20/21 Red Lion Court, Fleet Street, E.C.4. (216

S.S.B. GENERATOR. BARKER & WILLIAMSON 51SB.—Brand new. Converts AM transmitter for full S.S.B. results, simple conversion. Complete with manual. List price £145. Sacrifice—what offers?—Box No. 229, National Publicity Co. Ltd., 20/21 Red Lion Court, Fleet Street, E.C.4. (229

TIGER 60B.—60 watt first-class Fone-CW. Six bands. Five months old. Must sell due anticipated removal September. Write for appointment to view/test or sked. Fully BCI/TVI-proofed. S.a.e. fullest details. £70.—G3KGB, 15 Cell Farm Avenue, Old Windsor, Berkshire. (230

(Continued on next page)

EXCHANGE & MART (contd.)

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

WANTED, borrow or preferably buy, instruction manual and alignment details for H.R.O.-type MX receiver.—Wood, "Windrush," Hail-Weston, Hunts. (226

WANTED.—BULLETINS for March 1957 and September 1958, willing to purchase.—L. Arnold, 24 Albert Road, Stechford, Birmingham 33. (233

WANTED.—Eddystone "680X," "Mint Cond.", reasonable price paid, will collect anywhere in London.—Write G3KPM, 12 Hartham Road, Holloway, N.7 (or phone: NOR 2139 after 7.30 p.m.). (231

WANTED.—**LG300** in good condition. Price and particulars.—G3FPJ, 72 Southfield Avenue, Paignton, Devon. (227

WANTED.—Morse Code Record Course in good condition, reasonably priced.—M. Brown, 40 School View, Banbury, Oxon. (228

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

APPOINTMENTS SECTION (*Situations Vacant*)

AIR MINISTRY have vacancies for civilian Radio Technicians at Royal Air Force, Sealand, Cheshire, and a few other R.A.F. stations throughout the United Kingdom for the servicing, repair, modification and testing of air and ground radio and radar equipment. Commencing salary (national) (according to age) is £525-£670 p.a. Max. salary £795 p.a. Rates are subject to small deduction at certain provincial stations. Annual leave three weeks and three days increasing to four weeks and two days after 10 years' service, five weeks after 20 years' service and six weeks after 30 years' service.—Apply giving details of qualifications and experience and mentioning this advertisement, direct to the Commanding Officer, No. 30 Maintenance Unit, Royal Air Force, Sealand, Cheshire, or to Air Ministry, C.E.4b, Princes House, Kingsway, London, W.C.2 for vacancies in other areas, or to any employment exchange quoting SHOTTON 57. (225

RADIO OPERATORS.—AIR MINISTRY have vacancies for temporary radio operators (male). Good prospects of permanent, pensionable appointments and promotion. Initial appointments in U.K., but subsequent tour of duty in Far East likely. Trainees £300 (at age 16) to £635: Qualified Operators £530 to £1,040. (These rates are subject to a small deduction at Provincial stations and a small increase in London and overseas). Applicants under 40 with morse speed 15-18 w.p.m. preferred).—Apply in writing to Air Ministry, C.E.3h, London, W.C.1, or any employment exchange quoting Cheadle 3. (224

COMMUNICATIONS ENGINEER WANTED.—Required mobile service work. Knowledge of v.h.f.—Reply Chief Constable, Birmingham City Police. (Box No. 52.) (222

APPOINTMENTS SECTION (*Situations Vacant continued*)

INDEX TO ADVERTISERS

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