RSGB BULLETIN

DECEMBER, 1961

VOL. 37, No. 6

JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN

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Volume 37 No. 6

December 1961

2/6 Monthly

R.S.G.B. BULLETIN

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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:

Sawell & Sons Ltd., 4 Ludgate Circus, London, E.C.4

Telephone: FLEet Street 4353

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.

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Current Comment

discusses topics of the day

Headquarters Fund

THREE months have now elapsed since the President invited members to make a donation to the newly constituted Headquarters Fund. Early in November the £1,000 mark was reached and by the end of that month the total had risen to £1,095 14s. 11d. Almost all of the donations received up to that time had come from individual members but in a few cases groups of members had clubbed together to make a donation.

Last month, at a Conference in London between the Council and the Society's Regional Representatives, the Headquarters Fund was discussed and among the various suggestions made for building up the fund to a sizeable figure was the one that many more of those responsible for local activities would, if asked, assist by making group collections or by inviting members of a local group to put a few shillings at each meeting into a personal envelope, the contents of which would, in due time, be sent to Headquarters. We commend the suggestion to all local representatives who have the future well-being of the Society at heart.

The Society today has some 11,000 members. So far less than one in forty has made a donation to Headquarters Fund. If every member who has not yet done so would send just 10s. as a New Year's gift to the Society, a grand total of more than £5,000 would be reached within a few days. With a sum of that magnitude available the Council would be greatly encouraged to press forward rapidly with their quest for new and larger premises.

It is interesting to record that every one of the Regional Representatives present at the recent Conference voted in favour of Headquarters being located in Central London or in an easily reached suburb. That does not mean to say the Council at the present time has any set ideas in mind as to where the Headquarters should ultimately be located, but it does indicate that a dozen or more of the most responsible members of the Society consider that London—heart of the Commonwealth—is the most suitable place in Eng'and from which to administer the affairs of the Society.

Golden Jubilee Year—1963—is now little more than 12 months' distant. Is it too much to hope that by this time next year the first steps will have been taken to move Headquarters from its present restricted accommodation in Bloomsbury to new and better premises? A substantial sum of money standing to the credit of Headquarters Fund will make that hope almost a certainty.

J. C.

Representation

WHEN the present three-tiered Scheme of Representation was discussed at the recent R.R.'s Conference it was generally agreed that there is reluctance on the part of a great many members to be " organized." It was suggested at the Conference that nine members out of ten are not interested in group activities and that they join the Society primarily to receive the BULLETIN, and to use the QSL Bureau and as a secondary reason to acknowledge their indebtedness to the Society for representing Amateur Radio at International Conferences and on licence matters generally By inference then the Scheme of Representation interests only ten per cent of the membership although the figure is probably somewhat higher.

The present scheme has worked moderately well in most parts of the British Isles since it was first introduced in 1948. There was, however, one aspect of the scheme that failed to catch the imagination almost from the start, namely that of County Representation. Except for a few parts of the country, C.R.s have generally been hard to find, so much so that in 1959 the Membership & Representation Committee had in mind

The President, Council and Headquarters Staff

send Christmas and New Year Greetings to all

Members of the Society

recommending that the office of C.R. be abolished. However, it was decided to make no change for the period 1961-1962. In the spring of this year the Committee called for a report on the number of C.R.s that had been appointed to take office as from January 1, 1961, and an inspection of records showed that in only 17 out of a possible 80 active counties had members taken the trouble to nominate a C.R. The Membership & Representation Committee then decided to recommend the Council to abolish the office as from December 31, 1962. The recommendation was not accepted unanimously, in fact, when it was discussed by the Council several members voted against its adoption. Since then the decision has been discussed again by the Council and also by the R.R.s, some of whom feel that the Council acted unwisely in adopting it, whilst others agree that the office of C.R. is redundant and should be abolished.

It is a fact that many of the present C.R.s are keen and enthusiastic officers, but to those who suggest that the office should be retained it is necessary to pose but one question—how many C.R.s have, during their present term of office, carried out the duties laid down for them by the Council?

Every C.R. on appointment receives a circular setting out his duties and among those duties is the requirement that he shall co-ordinate the work of his town and area representatives and in particular arrange periodic meetings between them to discuss matters of mutual interest. He is also expected to visit each properly constituted town and area group in his county at least once during his term of office and to forward to his R.R. a quarterly report of county activities.

In carrying out these duties a C.R. is not expected to be out of pocket financially. The circular explains that he may claim for postage and telephone expenses and for travelling expenses incurred in attending not more than two properly convened meetings of T.R.s in any one year, provided the meetings take place in his county. He may also claim for travelling expenses incurred in visiting each properly constituted town or area group in his county once during his term of office.

Those who have criticised the Membership & Representation Committee and the Council for recommending the abolition of the office of C.R. would do well to ascertain how many of the foregoing duties have been carried out by C.R.s in recent years. If the information reaching Headquarters can be relied upon the answer will be " very few."

Notwithstanding the decision to abolish the office of C.R., the Council has decided that the whole Scheme of Representation shall be re-examined and to that end the R.R.s have been asked to put forward views and suggestions to the Membership & Representation Committee. Members who are interested in matters relating to representation are invited to write to their R.R. before the end of the current year.

J. C.

Deduction of Points in R.S.G.B. Contests

A Statement by the Contests Committee

FROM time to time, inquiries are made by individual entrants in Society contests and by participating groups in National Field Day as to the reasons for differences between the scores claimed and the final scores published in the official report. The Contests Committee has, as a matter of policy, decided not to give reasons as this would inevitably lead to protracted correspondence and possible disputes. On the other hand, the Committee is constantly endeavouring to improve the standard of contests and to see that they are as fair and as enjoyable as it is possible to make them. The Committee always regrets having to disallow points or invalidate an entry. Fortunately, most of the errors which lead to deductions of points from claimed scores fall into a small number of distinct categories.

In an effort to clear up misunderstandings the following are the most usual reasons for deducting points:

(i) *Wrong call-signs recorded.* Example: an entrant works " G3XYZ " but records in his entry log " G3XZ."

(ii) *No contact.* Example: an entrant claims to have worked G3XYZ but the contact does not appear in G3XYZ's entry log because he was working another station at the time. This is usually due to failure to obtain proper acknowledgement of contest exchanges (see Rule 3, General Rules for R.S.G.B. Contests).

(iii) *Logging of duplicate contacts.* Duplicate contacts must be logged (see Rule 4 of General Rules) but points can only be claimed for one contact. The Contests Committee therefore deducts points claimed for subsequent contacts with the same station in a contest.

(iv) *Incorrect logging of reports and serial numbers or omissions.* Example: G3XYZ sends contest exchange " 579010 10E Oxford " but the entrant records " 599100 " with no indication of location. The only safe way is to repeat back contest exchanges and to obtain proper acknowledgements. (The Committee obviously cannot compel non-entrants to abide by the rules of a contest and due allowance is therefore made in cases where no information or unsuitable information is recorded and no check log is available).

(v) *Logging of incorrect information.* Example: in a v.h.f. contest the location of the station contacted is " 10 miles east of Oxford " but is recorded on the entrant's log sheet as " 10 miles west of Oxford " or " 10 miles east of Offord."

(vi) *Incorrect scoring.* This happens in all contests due to miscasting of totals or failure to read the rules correctly. In those contests where points are awarded on a mileage (or similar) basis failure to calculate the distances correctly is a major cause. This may, of course, be due to the error described in (v) above. Wherever possible, the contest checkers correct additions and miscalculations; this sometimes results in lower scores, sometimes in higher. Strangely enough, no complaints are received when the Committee awards an entrant a higher score than he has claimed.

Errors falling into categories (i), (ii) and (iii) result in the contact concerned being invalidated for scoring purposes. Errors in the other categories are dealt with by deducting a percentage of the total possible points for the contact depending on the magnitude or number of errors.

Although not responsible for the deduction of points, failure to supply all the information required on the cover sheet may result in an entry not being placed because it has not been possible for the Contests Committee to check the entry accurately due to lack of the information asked for.

R.S.G.B. Bulletin—November 1961 Posting Certificate

ALL copies of the November 1961 issue of the R.S.G.B. BULLETIN were posted on Friday, November 17, 1961, and the Society holds a certificate to that effect signed by the Hitchin, Herts., Postmaster.

R.S.G.B. Radio Hobbies Exhibition

A review of some of the highlights

OPENING the R.S.G.B. International Hobbies Exhibition in London on November 22, Mr. Henry Loomis, Director of The Voice of America, paid tribute to the pioneering and experimental genius of the radio amateur. Mr. Loomis said he looked forward with particular interest to the results of amateur satellite communication experiments such as Project Oscar. Referring to the increasing pressure on the frequency spectrum, Mr. Loomis expressed the opinion that the amateur bands must be preserved and maintained. In this connection, he forecast that the present world total of radio amateurs of 330,000 would increase to 725,000 during the next ten years. As evidence of the interest of his organization in Amateur Radio, Mr. Loomis mentioned that The Voice of America weekly programme *Radio Amateur's Notebook* has been on the air almost continuously since 1950.

Major-General Eric Cole, C.B., C.B.E., G2EC (President of the R.S.G.B.), presents a silver replica of the GB3RS QSL to Mr. Loomis after he had opened the Exhibition.

Following the official opening, the President, Major-General E. S. Cole, C.B., C.B.E. (G2EC) presented a Silver Plaque to Mr. A. L. Mynett (G3HBW) for his very fine transistorized communications receiver, judged to be the outstanding piece of home-constructed equipment in the show. Other prize-winning exhibits were a s.s.b. exciter shown by Mr. H. R. Mackie (GM3FYB) and an all-band transmitter made by Mr. J. MacIntosh (GM3IAA).

The Horace Freeman Trophy for the best group entry was awarded to the Enfield and District Group for a transistorized 144 Mc/s receiver built by Mr. John Gazeley (B.R.S.20533).

Around the Commercial Stands

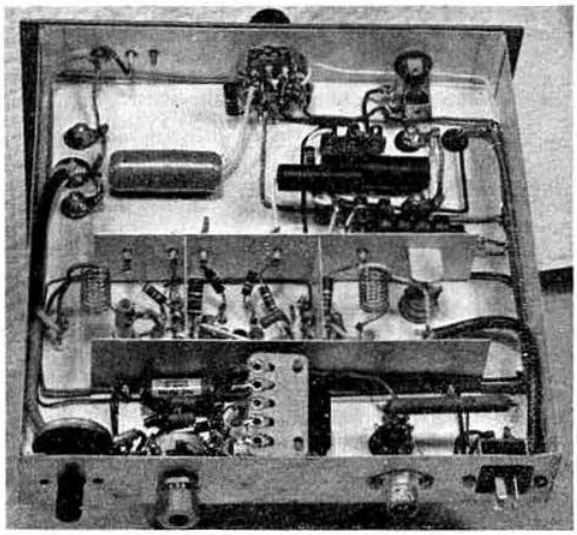
If there are fashions in Amateur Radio—and there certainly appear to be—then the trend this year was clearly towards smaller, neater equipment. Indeed, if we may venture a forecast, it is that the large table topper so popular since the war is giving way to transmitters of a size less than the average receiver of not so long ago. The reasons for the trend are not difficult to discover: the know-how acquired in building mobile gear, the advent of smaller components of adequate rating and the undoubted physchological effects of reductions in the size of domestic radio and television equipment. In particular, the transistor is helping to make gear smaller (for example, the very neat transistor receiver for " Top 'n Two " by Withers Electronics). The use of silicon rectifiers in power supplies is already resulting in more compact power supplies in which there is no heat problem (as in the K.W. Electronics Viceroy Mk. III transmitter).

In addition to the transistor receiver just mentioned a wide range of other v.h.f. equipment was displayed by **Withers Electronics**. Of particular note was a new v.f.o. for 144 Mc/s. In this unit a parallel line 72 Mc/s oscillator is followed by two EF80 valves in class A, sufficient output being available to drive the average doubler to 144 Mc/s. Other new items displayed on this stand included a converter and pre-amplifier using 6CW4 Nuvistor valves and the latest version of the TW2 transmitter. Two models of the TW mobile receiver are to be manufactured—one will give full bandspread on Top Band; the other will tune 1·8-3·8 Mc/s with provision for use with either a separate or built-in (transistor) 144 Mc/s converter.

K.W. Electronics were exhibiting for the first time the KW77 receiver, a triple conversion superhet for all amateur

The Opening of the Exhibition was witnessed by many distinguished guests including from left to right F. C. McLean, Deputy Director of Engineering, B.B.C., Air Vice-Marshal C. M. Stewart, Director-General of Signals, Air Ministry, A. Wolstencroft, Director, Radio Services Dept. G.P.O., Vice-Admiral R. A. Ewing, Admiral Commanding Reserves, Admiralty. Mr. Loomis is at the extreme right of the picture.

bands from 1·8 to 29·8 Mc/s and employing a crystal controlled front end. Selectivity is obtained by a pot-cored 50 kc/s switchable filter with bandwidths of 1·8 and 3 kc/s at 6db down; at 60db down, the bandwidth is 6 kc/s in the latter position. An American receiver, the Drake 2B, employing a similar type of front-end, was also on show and attracted much attention. For the owner of the older receiver who wishes to obtain satisfactory reception of single sideband signals, this firm is producing an adapter employing a 3 kc/s bandpass filter at 17 kc/s. The unit is suitable for use with receivers having an i.f. of 450-500 kc/s. In the transmitter field, new equipment on show included the Viceroy Mk. III, the Viceroy s.s.b. exciter, the K.W. Top Band s.s.b. transmitter and a new s.s.b. adapter which uses the Viceroy filter. This unit provides ½ watt output in the 3·5-3·8 Mc/s band when used with an external v.f.o. or crystal. It is housed in the same size cabinet as the KW 160m a.m. rig. A new accessory for the Viceroy transmitters is an additional filter section which increases sideband suppression to 60db. Other equipment displayed by K. W. Electronics included Geloso, Hallicrafters, Hammarlund and Mosley receivers, Hygain and Mosley aerials, C.D.R. rotators, Dow-key relays and other K.W. products. The Mosley receiver, in common with many contemporary designs, employs a crystal controlled front-end.



A view under the chassis of the Withers Electronics v.f.o. for 2m.

Minimitter introduced an inexpensive new three band v.f.o. controlled rig called the "Top 2-7" capable of running up to 24 watts input to parallel 6AQ5 valves on 1·8, 3·5 and 7 Mc/s. Anode and screen modulation is provided. The firm's first venture into the s.s.b. field is the Miniphase transmitter, type SB7MT. Printed circuits are used in the a.f. and r.f. phase shift circuits and the balanced modulators employ 7360 beam deflecion valves. The p.a. uses two 6146 valves delivering 140 watts output on s.s.b. Provision is made for full break-in on c.w. and voice control on s.s.b., a.m. and p.m. Continuing the policy of supplying transmitter foundation units, audio phase shift, r.f. balanced modulator and VOX and anti-trip units are available for those wishing to construct their own transmitters. Another useful item seen on this stand was an all-band grid-tank unit. Two new aerials were introduced—the FB-5 ferrite loaded aerial and the X20 add-on unit for the 10-15m Minibeam to provide for 20m operation. The Mercury 200 a.m., n.b.f.m. and c.w. transmitter, the Minimitter mobile transmitter and the MR44/II receiver were also on show.

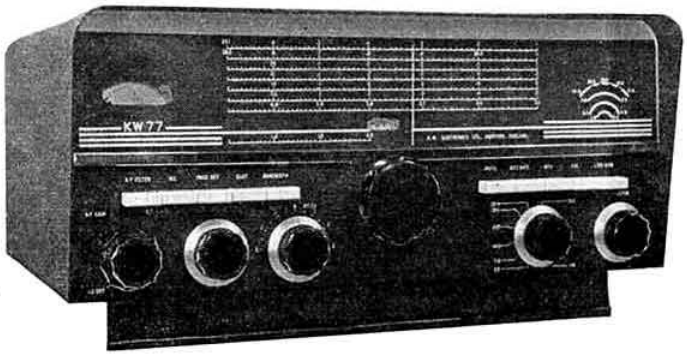
Webbs Radio displayed Eddystone products including the type 960 Transistor Communications Receiver covering 0·5-30 Mc/s in six bands. This instrument employs 12 transistors and six diodes, and a crystal bandpass 465 kc/s filter, 2·5 kc/s wide at 6db down and 14 kc/s wide at 60db. Power is derived from eight 1·5 volt cells from which the drain is 35mA when quiescent and 210mA at 1 watt output. Another new receiver was the 840C, the latest version of the 840A. This instrument employs eight valves and covers 480 kc/s to 30 Mc/s in five ranges. Hi-fi equipment on show included pick-ups, microphones and Leak amplifiers. For the s.s.b. enthusiast, particularly, were displayed Shure Model 440 and 440SL controlled magnetic microphones with a shaped frequency response of 300 to 3000 c/s. A useful small item was the Antex heat shunt for use when constructing transistor equipment.

Hunts showed a wide variety of capacitors and two instruments for measuring capacity. The Picofarad Meter is transistorized and measures 0-550pF in two ranges, at a frequency of 1 Mc/s. Indication is by an audible note. The R.C. Bridge uses a magic eye and measures 20pF-500μF in three ranges and 5 ohms to 100 Megohms, also in three ranges. In addition, there is provision for insulation and leakage tests.

Electroniques of Felixstowe displayed their range of coils, coil packs and complete sets of coils, capacitors and

switches for the G2DAF receiver. The firm's range of "Stabqoils," with built-in trimmers, is available for use with both 460 kc/s and 1620 kc/s i.f. amplifiers, as are the general coverage and amateur bandspread "Qoilpax." The g.c. model has one medium- and five short-wave bands and is arranged so that the 80, 40, 20, 15 and 10m bands are at the high frequency end of each range. The amateur band "Qoilpax" provides 170° bandspread of all bands from 10-160m. The units are wired, tested and aligned and include the first i.f. transformer. A recent addition to this firm's products is a range of de-luxe i.f. transformers wound on pot cores for 85 kc/s, 460 kc/s and 1620 kc/s. Several types are available, with centre-tapped windings for crystal filters, high and low impedance primaries and secondaries. Another new item was a complete high stability b.f.o. unit in a single can.

On the same stand, **Copp Communications** displayed the Pathfinder Top Band transmitter (manufactured by arrangement with Electroniques) and a single sideband exciter designed by G5BJ employing a McCoy 9 Mc/s crystal filter



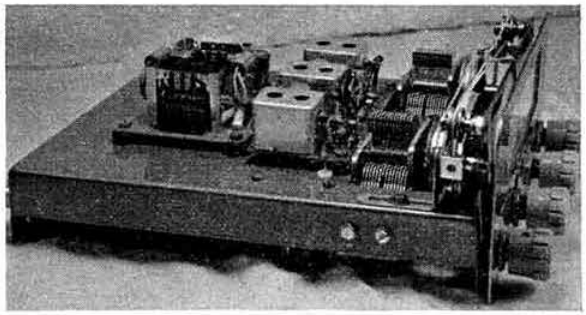
The K.W.77 triple conversion communication receiver. The 9 in. scale is directly calibrated for all amateur bands from 10-160m. There are two a.v.c. speeds and the S meter works on a.m., s.s.b. and c.w. Separate diode and product detectors provided.

and a 7360 valve in the balanced modulator. Sufficient output is provided on 1·8, 3·5, 7 and 14 Mc/s to drive a linear amplifier to 500 watts p.e.p.

Daystrom displayed many examples of Heathkits including the new British SB10U single sideband adapter (for use with a.m. transmitters such as the DX100), the Mohican GC1U transistor communications reeciver and the American Heathkit Apache transmitter and Mohawk receiver. Test gear displayed included the V7A Valve Voltmeter, O12U 5 in. and OS1 3 in. oscilloscopes and Model C3U R.C. bridge. Hi-fi equipment included the Cotswold speaker system, MA12 monaural and S88 stereo amplifiers and the Heathkit f.m. tuner. Also displayed was the Heathkit Electronic Workshop kit, the first of a series of educational kits which enables the beginner to assemble a number of simple electronic devices such as a burglar alarm, electronic timer, intercom system, six different types of transistor radio and capacity and voice operated relays.

Philpott's Metalworks, making a welcome return to R.S.G.B. exhibitions, showed many examples of their panels, chassis and cabinet work for the radio amateur including an example of the modern S-line style. Prominently displayed was a cabinet and metal work for the G2DAF receiver. A Formica topped metal operating table measuring 4 ft. 6in. by 3 ft., and providing space for two 10½ in. and one 5¼ in. panels in the right-hand pedestal, was another attractive exhibit on this stand.

The assembly of meter movements was demonstrated on the **Avo** stand on which were displayed a Transistor Analyzer, the Valve Characteristic Meter Mk 4, the Avominor, the



The Withers Electronics "Top 'n Two" transistor receiver shown for the first time at the Radio Hobbies Exhibition.

Model 8 Avometer and the Signal Generator Type AFM3. This instrument is a wideband source of a.m./f.m. signals with facilities for sine or square wave modulation. The a.m. coverage is 450 kc/s to 225 Mc/s in eight ranges and the f.m. coverage 20-100 Mc/s in two ranges. Also displayed was a selection of spares for Avometers.

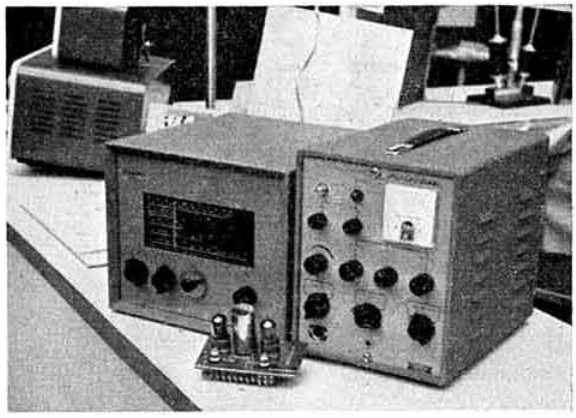
Sound Vision Service introduced a new extending, tilt-over tower for the amateur together with its base-securing device which alone weighs a quarter of a ton. Also on show was a 45 ft. telescopic mast with a rotary head. In addition, all the sundries for masts and towers such as clips, thimbles, wire ropes and other parts were on display.

Enthoven Solders demonstrated the Superspeed soldering iron and exhibited a wide range of solders for all purposes. Each day during the exhibition a Superspeed iron was given away free, the winners being G. M. Cook (G3IXB), 6 Veryan Gardens, Sunderland; A. Steele, 54 Winton Road, Reading; K. J. Marley, 17 Luctons Avenue, Buckhurst Hill, Essex; D. C. Preece, 101 Stirling Barracks, S of A, Larkhill, Salis- bury Plain, Wilts.

Radiostructor displayed equipment used in its training courses in radio and electronics as well as examples of the instructional material. Items on show included an oscilloscope, an a.m./f.m. receiver and a simple hi-fi amplifier.

Radio Astronomy

Equipment for amateur microwave radio astronomy, built by G3LRH, for the Radio-Electronics section of the British



The Miniphase type SB7MT single sideband transmitter with (left) its companion v.f.o. and power supply. In the foreground is the Miniphase audio phase shift unit.

The new K.W. Viceroy Mk.3 s.s.b. transmitter with integral power supply.

Astronomical Association was displayed on the **M-O Valve Co.'s** stand. Noise factor measurements on v.h.f. and u.h.f. receivers were demonstrated by G3HBW while another interesting exhibit was a 1296 Mc/s converter with no " plumbing " built by G6JP. It has a noise factor of 11·5db. A wide range of valves was also on show.

G.P.O. Exhibit

One of the largest displays was arranged by the **G.P.O. Engineering Research Station.** Among the many fascinating exhibits was a stroboscope showing the movement of a quartz crystal under working conditions, and an example of the frequency standard and time signal equipment used at MSF (Rugby). Three of these equipments are in continuous use so if drift occurs it is always possible to tell which one is responsible.

A prototype of a new speaking clock was also on show and will cost about one-tenth as much as would the replacement of the present TIM system.

A frequency measuring demonstration showed the measurement of the 200 kc/s signal from Droitwich. The modulation on the signal was removed by a filter and the frequency deviation displayed on a counter. Most of the time, an error of only 1 c/s was indicated.

Considerable interest was shown by visitors in P.O. designed filters for harmonic reduction, one of which was for use with a high power short wave transmitter and another for amateur transmitters.

A Q band 35,000 Mc/s test bench was used to illustrate in scale-model form the operation of a 10 ft. diameter paraboloid for 4000 Mc/s. Other exhibits included waveguide materials of many types and a sectionalized submarine cable repeater.

The Press

Associated Iliffe Press, publishers of the *Wireless World* and *Electronic Technology*, displayed a selection of publications including the *Radio and Electronic Handbook* and the *Guide to Broadcasting Stations*. **Short Wave Magazine** exhibited a wide range of British and American publications for the amateur as well as maps and log books. **Selray Book Co.** featured the picture-book series of technical training manuals on basic electricity, electronics and synchros and servomechanisms. **Bernards (Publishers) Ltd.** displayed a variety of books for the home constructor.

The Service Stands

Items of equipment used by members of the Communication Branch were displayed by the **Royal Naval Reserve** while the **65th Signal Regiment, T.A.,** featured a Morse code speed test for vistors. Another interesting exhibit on this stand was the Racal Frequency Measuring Receiver type 78 which allies the high stability frequency changing system of the RA17 receiver to a digital counting system (the SA21 Digital Frequency Meter) to provide accurate measurement of radio signals. A Racal SA77 Frequency Comparator Unit is used to adjust the tuning of the receiver accurately to the frequency to be measured.

The **Royal Air Force** stand featured the R.A.F. Amateur Radio Society's DXpedition to Kamaran Island. Equipment on display included a Collins KWM-2, a KW Electronics Viceroy and a Heathkit SB10. A working model demonstrated airborne radar type AI Mk. X.

Colour Television

One of the exhibits to attract most interest was undoubtedly the colour television demonstration arranged by the **British Amateur Television Club** using 405 line N.T.S.C. system colour pictures from the B.B.C.'s Cintel colour scanner at Lime Grove. The signals were transmitted by G.P.O. landline and, after conversion on equipment built by Mike Cox, were displayed on two colour monitors built by John Ware, who also designed the stand. Sound accompaniment was provided by equipment built by D. S. Reid. Also in use was a colour monitor built at S.E. Essex Technical College under the direction of D. N. McClelland (G2FVA) and Bill Hipwell from R.C.A. components. John Tanner (G3NDT/T) exhibited a 3 in. image orthicon colour camera using rotating

A view of the G.P.O. Engineering Research Station's stand. In the centre foreground is the equipment used in the demonstration of frequency measurement.

On the G.P.O. Stand. Mr. J. Piggott, G2PT (second from left) explains one of the latest G.P.O. submarine repeaters to Mr. Loomis. Mr. Thorogood (G4KD) is behind Mr. Loomis.

colour discs to produce field sequential pictures which were displayed on Grant Dixon's colour monitor. The camera was built in only 10 weeks.

The Amateur Stands

The **Amateur Radio Mobile Society** displayed log books, car badges and windscreen stickers for the mobile enthusiast. Examples of mobile equipment on show included a 160m

Arnold Mynett, G3HBW, was the winner of the Silver Plaque awarded to the member whose entry was judged to be the best in the Home Constructors' Section. In this picture he is seen receiving the Plaque from the President.

transmitter-receiver (G3OGB) using a 5763 p.a., series gate modulated, the receiver section comprising a converter to feed into a car radio. A transistor receiver using a crystal controlled converter for 10, 15 and 20m and a variable i.f. was shown by G3FXG. G6SN exhibited an aerial impedance bridge and a halo aerial for 2m.

During the Exhibition, GB3RS was active on Top Band, 80 and 2m from the **R.S.G.B. stand.** H.F. equipment comprised a Hammarlund HQ170 and a Vanguard transmitter feeding a KW Electronics all-band dipole (all loaned by KW Electronics) and a Top Band dipole suspended from the roof of the Horticultural Halls and erected by the Norwood and South London R.S.G.B. Group. The two metre station included an AR88 receiver (G3OSS), a TW2 transmitter and TW converter. Many contacts were made on all three bands. RTTY gear exhibited by G3IIR comprised a type 3X teleprinter, type 85 printing reperforator, a tone generator and a terminal control rack.

As already noted, G3HBW won the Silver Plaque with his transistor communications receiver covering 1·8-2·2, 3·5-3·9, 7-7·4, 14-14·4, 21-21·4, 28-30 and 144-146 Mc/s which was displayed in the **Home Constructor's Section.** The receiver is a double superhet on all bands (except 1·8-2·2 Mc/s) and uses crystal controlled first oscillators. Supply voltages are stabilized with zener diodes. The noise factor at 144 Mc/s is better than 4·5db.

Other items, amongst a selection of very high standard, were G6VX's beautifully constructed phasing type s.s.b. transmitter for 1·8-30 Mc/s, 2m and 4m transmitters by G3KMD, a wavemeter and crystal calibrator for R.A.E.N. use by G8TL, an all-band (1·8-28 Mc/s) crystal controlled converter by GW3GHC, a Top Band transmitter (G3HGW), the G8PD Mixo (described in the November BULLETIN) and a single sideband crystal filter exciter by G5BJ.

An excellent six band mobile transmitter was shown by G3HRO, a Geloso v.f.o. modified for frequency shift keying (complete with audio frequency keying) was shown by G3IIR, a five-band exciter using a 6AG7 and 807 running 50 watts by G3HHZ, a variable output power supply by G3MML, a transistor receiver for the broadcast and 160m bands by B.R.S.23198 and a 160m transmitter by G3CCX. Grid dip oscillators were exhibited by B.R.S.22560, G8TL, G3OGR and G3NNK, the latter covering 1·6-180 Mc/s. A double superhet receiver employing a Geloso front-end and suitable for reception of a.m., c.w. and s.s.b. was exhibited by G3MJQ. A table-top transmitter and a fine example of a G2DAF-type receiver built by G3KRC were also on show.

On the **V.H.F. Group** stand there were a number of notable exhibits. A particularly well-built hybrid 2m transceiver was shown by G3LOK. The receiver section comprised a 6CW4 r.f. stage, followed by a 6AK5 second r.f., 6AK5 mixer, OC170 second mixer, OC44 oscillator, two 500 kc/s i.f. stages (OC45), OA70 detector, OC71 a.f. amplifier and V15/30P output. The transmitter employs a 6J6 as overtone oscillator and tripler, E180F doubler-driver and QQV02-6 p.a. Modulation is provided by a pair of V15/20P transistors in class B. The speech amplifier is common to the receiver, the OC71 acting as preamplifier and the V15/30P as driver for the class B stage. Power is derived from a transistor d.c. converter employing two V20/30P, four silicon diodes and an Avel toroid.

Also on show was GM3LAV's transmitter-receiver (described in the October BULLETIN), a Nuvistor 2m crystal controlled converter by G8TS, a transistor 4m crystal controlled converter by G3LBA, a 420 Mc/s converter by G3LAR, a 2m mobile receiver by G3IWA, and a CV53 preamplifier with a noise factor of 4db and gain of 15db by G3HRH.

The **Radar and Electronics Association** showed a 10,000 Mc/s test bench comprising a klystron oscillator, power supply and standing wave indicator.

An Experimental Transistor Communications Receiver

By D. T. BRADFORD (VQ4EV, ex-G3GBO)*

THIS receiver to be described was built to provide a low consumption mobile installation and it is intended to show the results obtained and the difficulties encountered by a very amateur experimenter in this field, in the hope of encouraging others to experiment along similar lines and to benefit from the writer's own mistakes and experience. The design is in the nature of a prototype for the simple reason that it is virtually impossible to plan completely in detail anything developed along experimental lines. Because of this it is fairly apparent that it " just grow'd " within a rough basic plan.

Original Specifications

It was decided that the receiver must be of very low consumption permitting many hours of running from an ordinary car battery whilst parked in bush country without any charging facilities. For this type of service transistors are a natural choice, and it was resolved to use them in all stages.

Secondly, the receiver must cover all the amateur bands (if possible) from 3·5-145 Mc/s. This proved too tall an order, but coverage is achieved up to, and including part of, the 50 Mc/s band, although performance at the latter frequency leaves a lot to be desired. The 50 Mc/s range was included originally without much hope of obtaining any worthwhile results and the writer was amazed to be able to hear 2 μV. c.w. signals at that frequency. In addition to the amateur bands several broadcast bands were required, primarily for the mobile reception of the B.B.C. for entertainment purposes on the long Kenya roads when out of range of the local medium wave stations.

Good stability and selectivity were considered essential for c.w. operation with better than 1 μV. sensitivity.

The whole receiver was to be sufficiently compact to fit into the extremely small (for this purpose) slot provided for a b.c. set in the dashboard of the writer's Volkswagen. The battery supply in this vehicle is 6 volt negative earth and as such the circuit diagram may look a little peculiar with the top negative rail earthed, but provided this is remembered no serious difficulty should be experienced with positive earth versions.

A further requirement was that of flexibility so that the design may be modified to suit better components (particularly transistors) when they become available.

The Circuit

The medium wave broadcast band was the lowest frequency required and this provides the basis for the whole receiver. The range 900 kc/s—1·6 Mc/s is tuned using the circuit shown in the lower section of Fig. 1.

Signals from the aerial are fed into an OC44 grounded-emitter amplifier. Neutralizing has not proved to be necessary on this stage. However, if difficulty is experienced with self oscillation, a neutralizing capacitor of about 50-100 pF should be connected between the base of the OC44 r.f. amplifier and the OC44 mixer; it may also prove necessary to reverse the connection to L11. This feeds a second OC44 on its base whilst oscillator injection is fed into the emitter of this second stage which acts as a mixer. Local oscillation is provided by a third OC44 operating as a grounded base tunable oscillator. A self oscillating mixer was originally tried in place of separate transistors, but was rejected due to pulling between signal and oscillator frequency circuits and the severe change in oscillator injection level with frequency. At the high end of the band the oscillator would tend to squegg, while at the low end the unit was reluctant to oscillate at all if the former fault was cured. The separate transistor system was found to be far less tricky to adjust and gave more consistent results, and was therefore adopted in spite of the extra cost.

The collector of the OC44 mixer is fed via a 472 kc/s i.f. transformer to two cascaded stages of i.f. amplification using V6/2R† transistors which in turn feed a diode detector around which is connected a somewhat unconventional a.g.c. delay circuit. The delayed a.g.c. signal is fed to the base of the m.w. OC44 r.f. stage the gain of which is reduced in the normal manner. An amplified a.g.c. signal is developed across the emitter resistor of this stage and this adds to or subtracts from the stabilizing bias of the first i.f. amplifier (Fig. 2). A manual i.f. gain control R19 for use on c.w. gives a wide range of control by altering the base voltage of the medium wave r.f. stage in a similar manner to the a.g.c. signal. This control is still operative when the a.g.c. is switched on, but its effect is considerably less.

Following the diode detector an audio stage using an OC71 is coupled to an OC72 power driver stage which in turn feeds the OC16 power output stage giving of the order of 2 watts output. Negative feedback is taken from the output transformer secondary via R58, C54 back to the OC71 emitter to improve the audio quality. A b.f.o. stage using a further V6/2R transistor and a standard i.f. transformer for tuning, provides oscillator injection for c.w. reception or s.s.b. In the prototype the b.f.o. pitch is pre-set, there not being sufficient room on the small panel space for a variable control.

For selectivity adjustment a *Q* multiplier stage is coupled to the anode of the mixer via C35, whose value may be finally determined by experiment. The arrangement is a little unusual in that a 472 kc/s quartz crystal is used as the high *Q* element in conjunction with an i.f. transformer. On the verge of oscillation this is found to give sharp c.w. tuning. The crystal employed is in fact marked " Channel 55-25·5 Mc/s " and is one of the FT241 surplus types.

Tuning the Amateur Bands

So far, the receiver is a fairly straightforward medium wave type with a few refinements and tuning 0·9-1·6 Mc/s. With the exception of 10 and 6m, the amateur bands to be covered are less than 700 kc/s wide. It is therefore simple to tune across the medium wave range with the aid of a crystal controlled converter.

On medium wave the aerial is connected directly to the OC44 r.f. stage, but for the other 10 ranges it is connected to a built-in switched crystal controlled front-end the output of which is fed into the medium wave receiver. The front-end consists of an OC170 grounded base amplifier followed by another OC170 working as a mixer. Injection is fed into the base and the medium wave output from the collector feeds the medium wave section via a simple matching network C8 and C9. These two stages are matched into the tuned circuit by means of two capacitors in series across the coil (C2 and C3, etc.). Using this method it is a simple matter to find by experiment the best impedance match without the tedious

* *Box 16211, Nairobi, Kenya.*

† The V6/2R transistor has been replaced by the type NKT154.

and difficult process of tapping coils; moreover, the number of switch wafers required is also reduced.

The local oscillator chain begins with a number of crystals varying in fundamental frequency from 2·5 to 10·5 Mc/s and employs an OC170 as a Pierce oscillator. It is followed by a buffer harmonic amplifier or harmonic selector using a further OC170 as a grounded base amplifier feeding the mixer emitter. The collector of this selector stage is tuned with as high a Q circuit as possible to avoid unwanted injection frequencies, and the transistor is tapped down the tuned circuit with this end in view. It was found most convenient to use an OC170 as a grounded base stage for straight amplification at these frequencies owing to the unwanted additional complication of neutralizing circuits all too necessary with grounded-emitter operation.

The front-end r.f. and mixer tuned input circuits are ganged together (C1 and C5) and brought out to the front panel as an r.f. peaking control which enables band-edge fall-off in performance to be eliminated. This is particularly desirable on the lower frequency ranges where the bandwidth covered is an appreciable proportion of the frequencies in use.

The bands covered are shown in Table 1 together with crystal and injection frequencies.

Incoming power from the 6 volt battery is filtered twice, first with a ceramic feed-through capacitor and an r.f. choke to remove any signal frequency component which may have been generated in the vehicle electrical system, and secondly by a double (pi-section) filter using miniature a.f. chokes to prevent commutator noise from modulating incoming signals. The feed to the power transistor is not taken through the two a.f. chokes because the voltage drop across them was found to be excessive and tended to cause the output stage to frequency modulate the medium wave local oscillator. Due to the low impedances of transistor circuitry it was found necessary to employ several 2,000 μF capacitors in

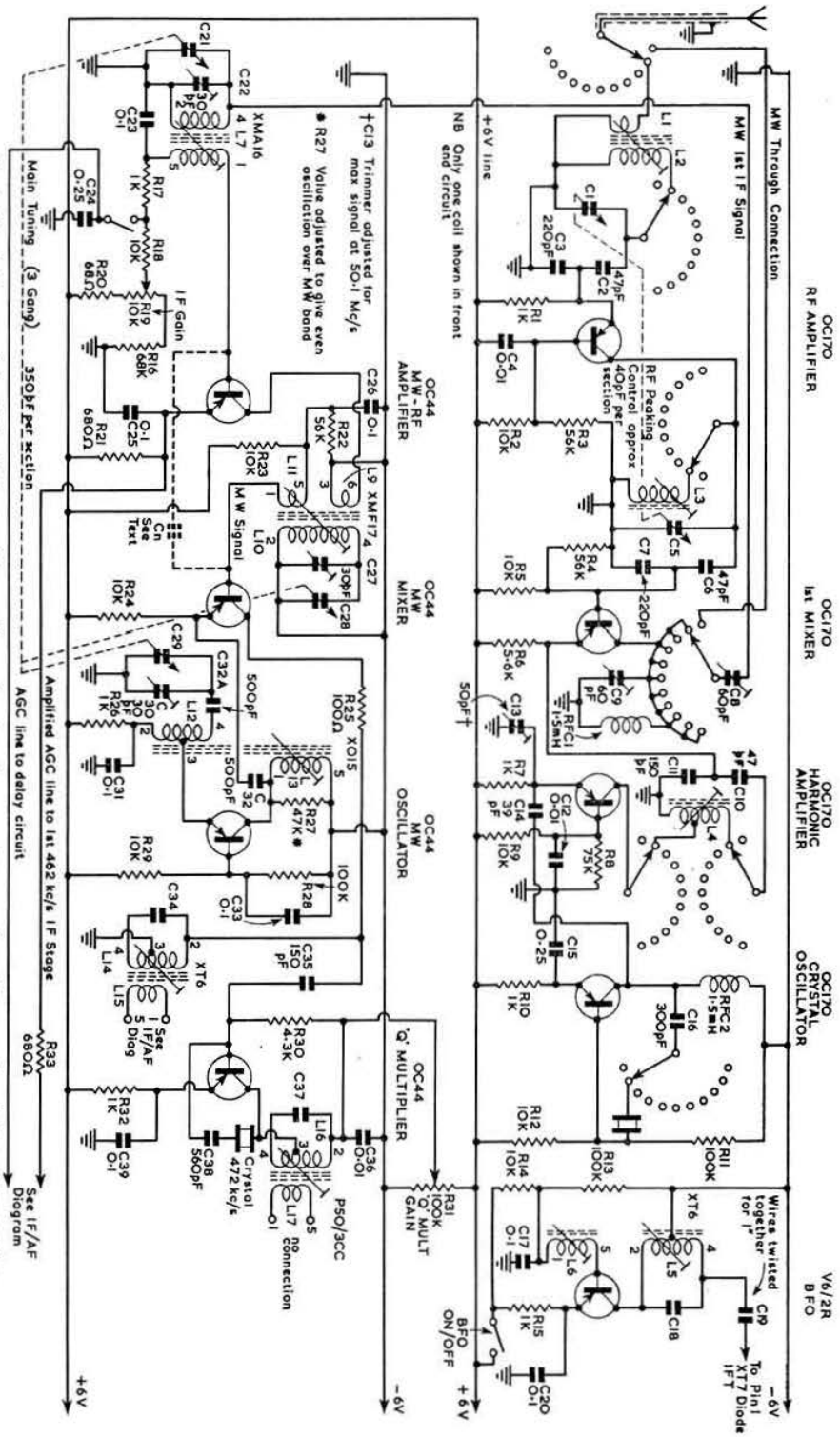


Fig. 1. Circuit diagram of the h.f. bands front-end (upper diagram) and medium wave tuner section of the experimental transistor receiver.

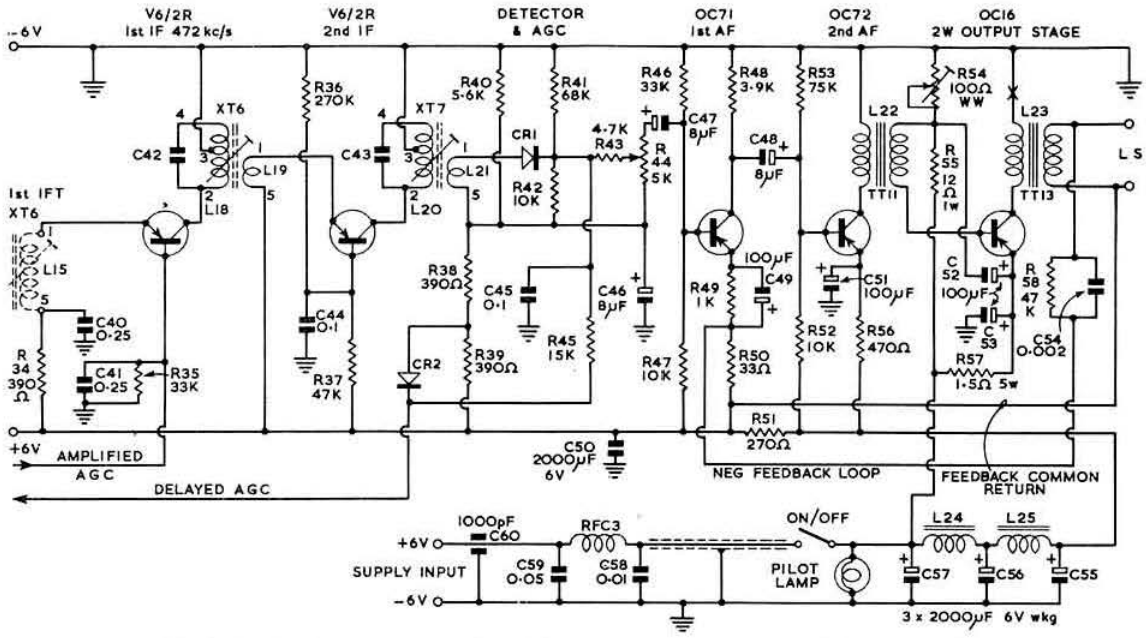


Fig. 2. The i.f. and audio stages. Details of the components will be found in the list on page 280.

the filter network (C55, C56 and C57). The filter components are housed in a screened box (actually a tobacco tin) at the rear of the chassis in order to reduce stray leakage.

Power Consumption

The battery drain of the receiver is a little under 400 mA at 6 volts although this varies with the state of charge. Readings as high as 400 mA have been recorded on a fully charged battery reading 6·35 volts while a well used lantern dry battery provided 380 mA at 5·5 volts on load. All these readings were taken with the dial lamp removed from its socket.

Construction

The receiver is divided into six sub-units which are closely interconnected.

Audio Section

The first section consists of a heavy gauge $\frac{1}{8}$ in. aluminium flat plate which carries the audio driver and output transformers and also serves as a heat sink for the OC16 transistor and as a mounting for the other sub-units. This relatively large mass of metal makes it unnecessary to bolt the OC16 down direct for cooling purposes as advocated for smaller heat sinks with higher transistor dissipation. The mica washers supplied with the transistor are used after being applied with a very thin film of Vaseline† to improve thermal contact. Using a negative earth system the potential difference between the collector and chassis of this stage is in any case very small and the danger of breakdown is thus lessened. Such a breakdown would undoubtedly have disastrous effects on the OC16 and this would be even more likely if a 12 volt positive earth system were used. The other audio section components and transistors are mounted on tag strips fixed to the output transformer, no special precautions being needed.

TABLE 1

Band	Coverage	Crystal	Injection Frequency	
			Tunable	OC 170 Function
1	0·9— 1·6 Mc/s	—		
2	3·4— 4·1 Mc/s	2·50 Mc/s	2·5 Mc/s	Buffer
3	6·9— 7·6 Mc/s	6·00 Mc/s	6·0 Mc/s	Buffer
4	11·4—12·1 Mc/s	10·50 Mc/s	10·5 Mc/s	Buffer
5	13·9—14·6 Mc/s	6·50 Mc/s	13·0 Mc/s	Doubler
6	14·9—15·6 Mc/s	7·00 Mc/s *	14·0 Mc/s	Doubler
7	17·4—18·1 Mc/s	8·25 Mc/s	16·5 Mc/s	Doubler
8	20·9—21·6 Mc/s	10·00 Mc/s	20·0 Mc/s	Doubler
9	27·9—28·6 Mc/s	6·75 Mc/s	27·0 Mc/s	Quadrupler
10	49·9—50·6 Mc/s	7·00 Mc/s *	49·0 Mc/s	Septupler
11	Kept blank for future experiments			

* Common Crystal.

I.F. Stages

The i.f., b.f.o. and detector stages are mounted on a small vertical tinplate strip on the righthand side of the chassis screwed directly on to the audio plate. All components are on the outside while the i.f. transformers themselves are horizontally mounted and protrude inwards towards the centre of the chassis. The transformers are soldered directly to the tinplate strip by means of their lugs which were presumably originally intended to be soldered into printed circuits. As there is only one tuned circuit to adjust in each transformer, access to the tuning slugs need only be obtained from the righthand side of the chassis. Nearly all components are soldered direct to the chassis or to one another, only the detector/a.g.c. network requiring a small insulated tagstrip. All the components are so light that there seems no danger of movement or accidental shorting using this technique.

Medium Wave Tuner

The medium wave front-end is mounted in the centre of the chassis which seems to be a logical place for it. An epicyclic reduction drive feeds a simple cord, drum and pulley system similar to those used on broadcast receivers. A sliding pointer indicates the tuning position against a scale

† Silicone grease (MS4) provides even better thermal contact.

marked in soft pencil on a block of Perspex stuck to the front panel with an Araldite adhesive. The Perspex block was first roughened with fine sandpaper to provide a writing surface. The scale is illuminated by a miniature dial lamp shining on the bottom edge of the scale—this lamp consumes nearly as much current as the rest of the set and is not recommended if the set is to be run off dry batteries.

The three-gang tuning capacitor (C21, C28 and C29) is mounted on a broad U-shaped piece of tinplate and the miniature medium wave coil cans are fixed immediately above the appropriate sections. The transistors and other small components are mounted on the righthand side of this plate where there is easy access to the capacitor and coil lugs. These components are thus quite close to the following i.f. strip. Access to the capacitor trimmers is gained via screwdriver-sized holes punched in the i.f. strip chassis at suitable places. The dust-iron cores of the coils are higher than the top of the i.f. strip and can be adjusted easily from the right-hand side of the chassis.

Q Multiplier

The *Q* multiplier is built on a small tinplate L-shaped sub-chassis and the few components are arranged so that this can be mounted on its side below the i.f. and medium wave tuning sections. Also below the main chassis plate are some of the larger audio bypass capacitors which are too bulky to accommodate elsewhere and whose lead lengths and positions are not critical.

The High Frequency Circuits

The whole of the lefthand part of the receiver comprises the r.f., mixer, oscillator and multiplier stages for the 10 short wave bands. The major component of this section is the eight bank 11 position waveband selector switch, to which a great many of the small components are connected direct. Small tinplate strips support the miniature Aladdin coil formers on one side only, one 8 B.A. screw being quite sufficient together with the wires themselves. At the rear of the receiver and bolted to the bottom left edge of the corner reinforcing angle aluminium is the two-gang r.f. peaking capacitor (C1, C5) and its associated components mounted on or between the nearby switch wafers. The rear section of the capacitor tunes the aerial input, the coaxial socket for which is mounted on the rear panel. The front section tunes the signal frequency mixer base circuit. The spindle of the two-gang capacitor is brought to its symmetrical position on the front panel by means of two flexible shaft couplers and two lengths of ¼ in. diameter rod.

The wiring of the crystal oscillator and harmonic amplifier are straightforward, the only difficulty being to find sufficient space for all the coils and crystals at suitable places around the switch. Surplus crystals come in a variety of sizes; for instance the only 2500 kc/s unit available was an octal based can like a 6K7. This was eventually dismantled and the actual crystal removed in its ceramic mounting. After attaching suitable wires, this was bound in sheet plastic and sealed with adhesive. Such a mounting, although perhaps a little crude, shows that old fashioned components can in fact be appreciably reduced in size if miniaturized types are not available.

The coil details given in the table are approximate only and may require to be slightly different in some layouts. On the high frequency ranges some of the dust-iron cores were cut to half their length to give easier adjustment. All cores are anchored against vibration with " Ragosine " compound made for this purpose. Rocol core locking compound is also suitable.

COIL TABLE

Band	Aerial Coupling L1	Signal Freq. Coils (L2 and L3)	Osc. Injection Coil (L4)
0·9— 1·6 Mc/s	—	XMF 17 / XMA 16 } *Repanco*	XO15 (*Repanco*)
3·4— 4·1 Mc/s	9 turns	65 turns (+ 50 pF)	52 turns (+ 39 pF)
6·9— 7·6 Mc/s	6 turns	35 turns	40 turns (+ 39 pF)
11·4—12·1 Mc/s	4 turns	19½ turns	25 turns
13·9—14·6 Mc/s	3 turns	17 turns	18½ turns
14·9—15·6 Mc/s	3 turns	16½ turns	17 turns
17·4—18·1 Mc/s	2 turns	13½ turns	14½ turns
20·9—21·6 Mc/s	2 turns	9 turns	10 turns
27·9—28·6 Mc/s	1 turn	8 turns	8 turns
49·9—50·6 Mc/s	1 turn	4 turns	3½ turns

All coils (other than proprietary types) are wound on Aladdin ¼ in. diameter formers with dust-iron cores.

Setting-up Procedure

Audio Section Adjustments

Base bias on the output transistor is provided with an adjustment in the form of a 100 ohm variable resistance R54 which should be adjusted to maximum resistance before switching on. The collector current of this stage is then measured by inserting a 0-500 mA meter between the output transformer primary and the negative rail (see cross on diagram L23). The variable resistance is then slowly reduced until a maximum of 375 mA collector current *with no signal* is indicated by the meter. This corresponds to just over 2 watts input to this stage. The variable resistance should be sealed in position; if it is ever advanced beyond this point the OC16 may be seriously damaged. As a precaution against accidental maladjustment, a fixed resistor, say 33 ohms, should be wired in series with the variable resistance, although this was not done in the original.

Circuit Alignment

After checking the audio section a signal generator covering the intermediate frequency of 472 kc/s is required. Modulated signals are injected on to the collector of the medium wave OC44 mixer via a d.c. blocking capacitor of 1000 pF. The i.f. circuits are approximately aligned at 472 kc/s for maximum output. The *Q* multiplier gain control is then fully advanced and the core in the collector coil adjusted until the stage commences to oscillate on the crystal frequency. The *Q* multiplier gain is next reduced until oscillation just ceases and the coil slug again adjusted; the process is repeated until the core is in the position requiring minimum *Q* multiplier gain to start oscillation. When this stage is about to oscillate the characteristic crystal-filter type of ringing sound should be heard. The i.f. circuits may now be accurately aligned on the crystal frequency by adjusting for maximum background noise with the *Q* multiplier on the verge of, but not, oscillating. A signal generator need not be used as more accurate results can usually be obtained with only background noise. In the writer's case the final alignment was repeated after the medium wave circuits had been roughly aligned. A convenient source of noise was found to be a piece of wire used as an aerial, draped over a fluorescent lamp (switched on). This was found to provide plenty of broad band noise to enable accurate final alignment of the medium wave signal circuits which otherwise suffer from pulling effects on the local oscillator, making the use of an ordinary signal generator somewhat tedious.

The medium wave r.f. mixer and oscillator circuits are adjusted in a similar manner to those in a conventional superhet. Signals are injected into the aerial socket on 1500 kc/s and the trimmer capacitors on the three gang tuning capacitor (C22, C27 and C30) are adjusted for maximum output together with the input matching capacitor C8. The matching capacitor, C8, will affect the input circuit and must be compensated for by adjustments on the first trimmer on the three gang capacitor after each change. Final adjustment of C8 *must* be carried out with a *coaxial* feeder or aerial attached. The setting of this matching capacitor is not very critical and all final adjustments should always be made to the OC44 r.f. stage input trimmer on the main tuning capacitor. The dust-iron cores in the coils are adjusted for

maximum signal at 950 kc/s with the capacitor vanes almost fully closed. A signal of 1 μV. from an Avo Signal Generator was found to produce quite loud signals at any point on the band after all signal and i.f. stages were finally accurately adjusted for maximum noise from the flourescent lamp source.

The alignment of the short wave front-end is also quite simple, but as the oscillator is crystal controlled, an ordinary modulated signal generator covering the required ranges may be used. The oscillator output circuit was first peaked by watching the S meter on a nearby receiver tuned to the required crystal output frequency. The signal frequency circuits were adjusted for maximum incoming signal strength, taking care that resonance on the high frequency side of the oscillator was selected (i.e. the resonance point with the core furthest out of the coil) to avoid the image channel.

The medium wave tuning is set to the centre of its range (1250 kc/s) and the 80m band selected. The signal frequency trimmer is set at half mesh and a signal in the middle of the range (3750 kc/s) injected into the aerial socket. As the local oscillator crystal should already be oscillating it is only necessary to peak the oscillator injection coil and the cores of both the aerial input and mixer base coils for maximum signal. Off resonance, sensitivity is naturally reduced, but as the oscillator output coil passes through the signal frequency a very severe drop in sensitivity occurs due to the rejector effect of the tuned circuit coupled to the mixer emitter.

The adjustment procedure is repeated for all ranges, except on 6 and 10m where the r.f. peaking capacitor should be set at nearly minimum capacity (say 10 per cent. of total mesh instead of 50 per cent for other ranges). Trimmer C13 is adjusted for maximum signals on the 6m range only, adjustment not being very critical.

After front-end alignment, the matching capacitor C9 between the mixer collector and earth should be adjusted for maximum background noise on the 80m range. This compensates for the difference between the stray capacities of the OC170 mixer and the aerial co-axial cable on medium wave. For best results the whole alignment procedure should be repeated at least once again with the mobile aerial connected to the set to ensure the optimum setting of all adjustments.

COMPONENTS LIST

C1, C5, two gang capacitor (ex-RF27 unit reduced to five rotor vanes per section).
C2, C6, C10, 47 pF silvered mica.
C3, C7, 220 pF silvered mica.
C4, C12, C36, C45, C58, 0·01 μF mica.
C8, C9, 60 pF ceramic trimmers.
C11, 150 pF silver mica.
C13, 50 pF trimmer.
C14, 39 pF silver mica.
C15, C24, C40, C41, 0·25 μF electrolytic.
C16, 300 pF ceramic.
C17, C20, C23, C25, C26, C31, C33, C39, C44, 0·1 μF.
C18, C34, C42, part of Repanco XT6 i.f.t.
C19, two plastic covered wires twisted together for 1 in.
C21, C28, C29, three-gang capacitor, 350 pF per section.
C22, C27, C30, 25 pF trimmers for C21, C28 and C29.
C32, C32A, 500 pF.
C35, 150 pF approx. (exact value found by experiment).
C37, part of Weyrad P50/3CC i.f.t.
C38, 560 pF ceramic.
C43, part of Repanco XT7 i.f.t.
C46, C47, C48, 8 μF electrolytic.
C49, C51, C52, C53, 100 μF electrolytic.
C50, C55, C56, C57, 2000 μF electrolytic.
C54, 0·002 μF mica.
C59, 0·05 μF tubular.
C60, 1000 pF ceramic feedthrough.
All capacitors 6V wkg. rating or higher.
CR1, CR2, general purpose germanium diodes.
L1 (aerial coupling), L2 (r.f. amplifier input), L3 (mixer).
L4 (harmonic selector), see Coil Table.
L5, L6, Repanco type XT6 i.f. transformer used as b.f.o. coil (472 kc/s).
L7, L8, Repanco type XMA16 m.w. miniature coil.
L9, L10, L11, Repanco type XMF17 m.w. miniature mixer coil.
L12, L13, Repanco type XO15 m.w. miniature oscillator coil.
L14, L15, L18, L19, Repanco type XT6 i.f.t.
L16, L17, Weyrad type P50/3CC (one winding only used) for Q multiplier tuning (472 kc/s).
L20, L21, Repanco type XT7 i.f.t.
L22, Repanco type TT11 driver transformer.
L23, Repanco type TT13 output transformer.
L24, L25, Philips type MK54534 chokes (3mH 500 mA, d.c. resistance 0·23 ohm).
R1, R7, R10, R15, R17, R26, R32, R49, 1000 ohms.
R2, R5, R9, R12, R14, R18, R23, R24, R29, R42, R47, R52, 10K ohms.
R3, R4, R22, 56K ohms.
R6, R40, 5·6K ohms.
R8, R53, 75K ohms.
R11, R13, R28, 100K ohms.
R16, R41, 68K ohms.
R19, 10K ohms potentiometer.
R20, 68 ohms.
R21, R33, 680 ohms.
R25, 100 ohms.
R27, 47K ohms approx. (exact value found by experiment).
R30, 4·3K ohms.
R31, 100K ohms potentiometer.
R34, R38, R39, 390 ohms.
R35, R46, 33K ohms.
R36, 270K ohms.
R37, R58, 47K ohms.
R43, 4·7K ohms.
R44, 5K ohms potentiometer.
R45, 15K ohms.
R48, 3·9K ohms.
R50, 33 ohms.
R51, 270 ohms.
R54, 100 ohms variable, wire wound.
R55, 12 ohms, 1 watt.
R56, 470 ohms.
R57, 1·5 ohms, 5 watts.
All resistors $\frac{1}{4}$ watt rating or lower unless otherwise specified.
RFC1, RFC2, sub-miniature 1·5 mH r.f. chokes (single pie on dust-iron core).
RFC3, 20 turns 18 s.w.g. enam. wound on $\frac{1}{4}$ in. diam. ferrite rod approx. 1 in. long, sealed with Durofix.

Results

Apart from the shortcomings to be discussed later, the performance of the receiver has surpassed all the writer's hopes. For all tests, an Avo Signal Generator was used: up to 28·6 Mc/s a 1 μV modulated signal could be clearly heard although at this frequency it was just a little more down in the noise level. On the 50 Mc/s range a 2 μV signal can just be comfortably resolved on c.w. using a high degree of selectivity, but some 10 μV of modulated tone is needed to provide similar results to those achieved on, say, 7 Mc/s using 1 μV input.

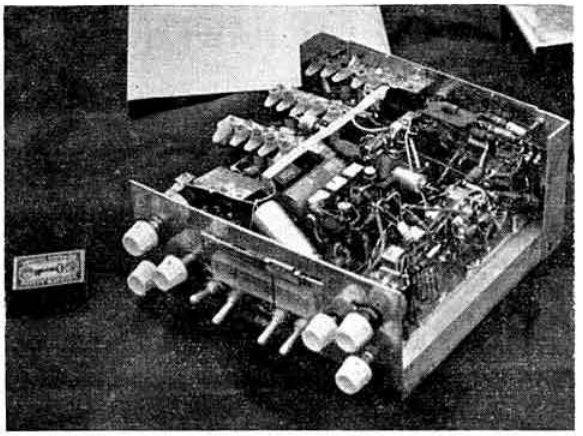
The *Q* multiplier has proved to be excellent. A really ringing crystal selectivity can be obtained with the stage on the verge of oscillation, giving the single signal characteristics of an expensive communications receiver.

Much amateur and broadcast DX has been heard with the receiver on the workshop bench with an " artificial " mobile aerial consisting of 4 ft. of coaxial cable and a further 6 ft. of wire.

Shortcomings and Suggestions

From the table of crystals it is clear that the two bands where the transistors are nearest to their working limit are also the bands where highest crystal multiplication is employed. There is probably a tendency here for the mixer to run with barely sufficient injection together with a relatively large quantity of unwanted harmonic content; in fact it is quite easy to select the sixth crystal harmonic on 42 Mc/s and tune 42·9 to 43·6 Mc/s, where a definite improvement in sensitivity is noticed. No doubt a major contributory factor to this fall off is the operating limit of the transistors used and this may well vary from one transistor to another. It may be possible to include the 4m band on the eleventh range when more modern transistors become available in East Africa.

Possibly improved results would stem from the use of some of the miniature crystals which can be operated at a fundamental frequency of 27 Mc/s and possibly 49 Mc/s for the 10 and 6m ranges respectively. This would not only give



A view of the transistorized receiver described by VQ4EV.

plenty of injection free from unwanted harmonics, but would also eliminate the need for the harmonic selector stage between the crystal oscillator and the mixer.

On the 80m range the injection is at 2·5 Mc/s giving a tuning range of 3·4-4·1 Mc/s when the signal circuits are peaked at the required frequency. Two peaks can in fact be obtained: one with the dial set at or near 3·5 Mc/s (1 Mc/s on medium wave) and a second due to a small amount of the second harmonic (5 Mc/s) reaching the mixer when the signal frequency circuit capacitor set near minimum capacity is at 4 Mc/s. Provided, however, that the setting of the signal frequency peaking control is always near maximum capacity for the l.f. end of the 80m band and near minimum capacity for the h.f. end, no trouble should be experienced.

On certain other ranges the image signal, as well as the wanted one, can be peaked on the r.f. tuning circuits. For this reason the correct tuning positions on nearly all ranges are adjusted to fall at the centre of the peaking control (i.e. half capacity) so that the unwanted image lies outside the capacitor range. Exceptions to this are the 10 and 6m ranges, both of which are arranged to resonate at near minimum capacity so that as good an L/C ratio as possible is obtained at these high frequencies. Good use of the image band is made on 10m where 27 Mc/s injection gives 27·9-28·6 Mc/s coverage when the signal circuits are resonated on the high side of the oscillator, while resonance on the low side covers part of the 11m broadcast band (25·4-26·1 Mc/s). The B.B.C. puts a very good signal into East Africa in this band and the image provides an extremely useful extra range by merely adjusting the r.f. peaking control. For space considerations, the smallest three gang capacitor available was chosen to provide medium wave tuning (C21, C28, C29), but as this had a maximum capacity of only 350 pF per section, the range on the medium wave is limited to 700 kc/s. In order to obtain even this range, the high frequency part of the medium wave band had to be used, resulting in the loss of some of the lower frequency stations. The use of a 500 pF three gang would have given greater medium wave coverage and correspondingly greater coverage on the short wave ranges, particularly of the 10 and 6m ranges, where only a portion of the amateur band is covered.

It is conceivable that many will prefer to use only the front-end of this receiver as a crystal controlled converter in front of some existing medium wave receiver.

In its present form the receiver performs well on a short aerial, but if used on a longer wire as a fixed station installation, cross-modulation and overloading result. For this reason it would probably be necessary to extend the range of the a.g.c. system to cover the short wave r.f. and mixer stages.

In spite of the warnings issued by manufacturers regarding the dangers of overheating and otherwise damaging transistors, the writer has found them extremely robust. A miniature soldering iron with an earthed body was employed and at first thin nosed pliers were used as heat shunts‡, but it was found almost impossible to hold the components to be soldered, the pliers and the soldering iron at the same time. Transistors were therefore soldered into position without the use of heat shunts, with leads no more than ½ in. long and no casualties have been suffered so far due to this process. In fairness, it must be admitted that soldering was carried out with a low wattage iron as quickly as possible.

It is hoped that this article will go some way towards encouraging those who may be as cautious about breaking into the field of transistor experimenting today as was the writer when embarking on his first attempt at this interesting aspect of the hobby.

‡A heat shunt for use when soldering transistors is available from Webbs' Radio, price 1/4.—EDITOR.

Hark Back No. 1

" *Reception on Oscillating Crystal*

A list of calls heard while experimenting with an oscillating crystal receiver has been forwarded by Mr. J. Hum of Muswell Hill, London.

The stations are: 2AVB, 2JB, 2MK, 2JU, 5OX, 2OO, 5CT, 5HT, 6KJ, 6DX, and 5VQ. The most distant Morse stations (spark) picked up was GKR (Wick N.B.)."

From Wireless World June 24, 1925

* * *

Jack Hum (G5UM) is now T.R. for Welwyn, a past member of the Council and an old timer of more than 30 years standing.

TECHNICAL TOPICS By PAT HAWKER (G3VA)

Reliability · Multi-range Testmeters · Heterodyne Exciters · Inductive Tuning
The G4ZU " FB-5 " Array · Marconi and Tropo Scatter · Battery Developments
Four-valve Transmitter-Receiver · High-gain Heterodyne (Product) Detectors

THE problems presented by radio and other electronic circuits could perhaps be fairly summed up as " getting 'em to work " and " keeping 'em working." There are many reasons—some of which have been touched on in previous articles—why, at the present state of the art, equipment reliability falls short of the ideal. Ultimately, it is claimed, the transistor should bring about considerable further improvement—not only because the life-span of semiconductors promises to be longer than that of thermionic devices, but also because the low-voltage, low-temperature working conditions are much more favourable to components generally.

Some modern reliability figures—quoted from *British Communications and Electronics* (March, 1961)—give transistor failure rates per 1000 hours at between 0·04 and 0·4 per cent; semiconductor diodes between 0·06 and 0·25 per cent (very dependent upon ambient temperature); electrolytic capacitors 0·3 per cent; ceramic capacitors 0·003 per cent; carbon resistors 0·001-0·01 per cent (very dependent upon working voltage). Some figures for *annual* failure rates at Harwell (from the November issue of the same journal) give valves as 6 per cent, resistors 0·21 per cent, capacitors 0·36 per cent, transformers 0·83 per cent, and the average for all components as 1 per cent (remember that an equipment with 100 components of 1 per cent unreliability will have an overall reliability of only 37 per cent). D. W. Heightman (G6DH) writing in the May 1961 *Journal of the Brit. I.R.E.* relates the first-year history of a batch of 230 television receivers and notes that multiple section valves are much more likely to fail than single section ones; wire-wound resistors have a failure rate some ten times that of carbon resistors; while bad soldering and the occurrence of short circuits in wiring are of appreciable importance.

So for the foreseeable future the need to trace and rectify faults in equipment is likely to remain with us. The amateur, concerned primarily with his own equipment, does not have to worry so much about the time factor in tracing faults as the service engineer and can accordingly make do with a much more limited selection of servicing equipment. Overwhelmingly, the single most important item is the multi-range testmeter or, as the Americans term it, the VOM (volt-ohm-milliammeter).

Recently the amateur has had a much greater range of testmeters to choose from at prices which make it hardly worth while building one's own. Several well-known instrument makers now market reliable and versatile small testmeters of good sensitivity. Rebuilt and surplus meters have also dropped noticeably in price, partly because of the remarkably cheap meters being imported from the Far East. Fortunately, we are not called upon—or in any position—to name a " best buy "—though possibly the Editor will wish to insert a note " support BULLETIN advertisers."

Newcomers to fault tracing may be a little uncertain as to the precise significance of " meter sensitivity," usually quoted in terms of so many ohms per volt. For typical meters this may vary from a few hundred up to a maximum of about 100,000—and considerably more for electronic testmeters (valve or transistor voltmeters).

Basically a 1000 ohms per volt meter indicates a meter movement with a full scale deflection current of 1 mA (in practice the movement will be somewhat more sensitive but damped with a parallel shunt). This means that the total meter resistance presented across the circuit to be measured will be 10,000 ohms for a 10 volt range, 100,000 ohms for a 100 volt range and so on.

While the actual value of this loading is of little consequence for many routine anode, screen and cathode voltage measurements in a receiver, it is sufficient to cause considerable inaccuracy in high impedance circuits (for example the anode voltage of a detector triode having a high anode load resistor). Fig. 1, taken from *Radio and Television Servicing*, explains this quite clearly.

Until a few years ago a sensitivity of 1000 ohms per volt on d.c. ranges was almost standard for radio servicing, but the coming of the transistor has brought a trend towards higher sensitivity meters. In transistor circuits, a 1000 ohms

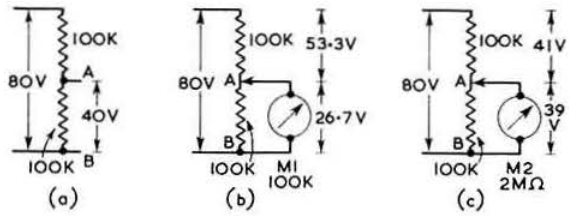


Fig. 1. How meter sensitivity affects the accuracy of readings in high impedance circuits. (a) Shows actual voltage conditions. (b) Meter 1 (1000 ohms per volt on 100 volt range) would indicate 26.7 volts. (c) Meter 2 (20,000 ohms per volt on 100 volt range) would indicate 39 volts. From Newnes " Radio and Television Servicing."

per volt meter will usually give reasonably accurate measurements of most emitter and collector voltages but is likely to be well out on base voltages. The figure of 20,000 ohms per volt (as provided by the Avo Model 8) is fast becoming standard for professional servicing. It should however be noted that the loading depends upon the total resistance of the meter range. Thus a 10,000 ohms per volt meter on a 20 volt range offers no greater loading than a 20,000 ohms per volt meter on a 10 volt range.

One of the main uses of a testmeter is to measure resistors with moderate accuracy, using the internal battery. The snag is the cramping of high values at the start of the scale. Here again the higher the sensitivity the better the results since it brings the higher values farther on to the scale. A 10,000 ohms per volt meter with 1·5 volt cell is likely to be calibrated to say 2 Megohms, but in practice it will be difficult to read other than roughly values above about 250,000 ohms —however this will usually be all that is needed in routine fault tracing.

To sum up, we suggest that the newcomer should think twice about purchasing meters of 1000 or 5000 ohms per volt sensitivity, particularly if interested in transistors. However, a 10,000 ohms per volt meter should prove quite satisfactory for most purposes, though 20,000 ohms per volt is to be preferred if one's main interest is transistors. The higher the sensitivity, of course, the higher the price and the less robust will the movement tend to be.

Heterodyne Exciters and Inductive Tuning

Heterodyne-type v.f.o.'s have been gradually increasing in popularity for some years. G2UJ gave the design problems a good going over in his 1953 articles in the BULLETIN.* A recent design† for a complete heterodyne exciter/transmitter by W2FBS appears in the July/August 1961 issue of *G.E. Ham News*. Intended primarily for c.w. (but with easy adaption for s.s.b.), the rig uses a two-valve differential keyer (fully described in the May/June issue). W2FBS lists the advantages of heterodyne exciters as: same tuning rate on each band; same drift in terms of kc/s on each band; good re-set accuracy; adaptable to s.s.b. generation on a single frequency; good keying characteristics since both oscillators can run continuously. These advantages add up to a pretty formidable total, off-set only by the additional complexity and the need to choose crystal and tunable oscillator frequencies with care to avoid " birdies " in the output. In this design a 6AH6 high-*C* Colpitts oscillator tunes 6-6·25 Mc/s (grid), 12-12·5 Mc/s (anode). Crystal frequencies are 8.5 Mc/s (for 3·5 Mc/s), 5 Mc/s (for 7 Mc/s), 1·9 Mc/s (for 14 Mc/s), 9 Mc/s (for 21 Mc/s) and 16, 16·5, 17 and 17·5 Mc/s for full coverage of the 28 Mc/s band. The line-up is 6C4 c.o., 12BY7A mixer, 12BY7A buffer and 6146 or 7581 output.

In the September/October issue of the same lively little magazine is an article by K9ODE on " Inductive Tuning for High-*C* R.F. oscillators." This is a technique which amateurs have tended to leave strictly to the professionals. K9ODE points out that inductive or permeability tuning has a number of advantages for the high-*C* Colpitts, including less susceptibility to changes of humidity and temperature as well as overcoming the difficulty of obtaining really well-built high-value tuning capacitors. K9ODE has solved the mechanical difficulties of inductive tuning by pressing into use a Mallory six-turn " Inductuner " taken from old U.S. television receivers in series with a loading coil wound on a toroid fashioned from an anode coil tuning slug from a Command transmitter. We do not know of any comparable United Kingdom component to the " Inductuner " but maybe some member will come up with a practical suggestion. Such oscillators would be equally useful for high performance receivers. After all, why leave the field to Collins?

G4ZU's " FB-5 " Multiband Aerial

G4ZU certainly deserved the full house he had for his recent lecture at the I.E.E. By now details of his ingenious but basically simple new multiband array must have reached many members by the grapevine. Pending a full account by G4ZU here are the essentials, though as a reporter G3VA fell down on this occasion since two pens ran dry on him.

Briefly the heart of the system consists of using ferrite beads (see *T.T.*, August 1961) to lengthen electrically an aerial. Since these beads have a much greater loading effect at current maxima than at current minima, it is possible to use the same beads to provide different loading effects on various bands. An additional refinement is incorporated to overcome the pronounced radiation lobes of long wire aerials: this consists of a section of 300-ohm ribbon to adjust the phase of the radiating portion of the aerial.

Fig. 2(a) shows the basic aerial while Fig. 2(b) shows how G4ZU has combined two such elements into a fixed beam array providing really useful gains on 14, 21 and 28 Mc/s. On 3·5 and 7 Mc/s " at least up to dipole " results are claimed. The array is fed with 70 or (preferably) 50 ohm untuned feeder and no aerial tuning unit is needed; thus used with a bandswitched transmitter the array is instantly ready for operation on five bands.

With accurate adjustment of the number or position of the ferrite beads very low s.w.r. can be achieved, but this is

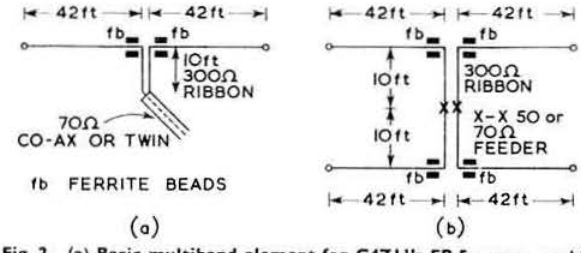


Fig. 2. (a) Basic multiband element for G4ZU's FB-5 array—could be used in this form for 3.5, 14, 21 and 28 Mc/s. (b) The full FB-5 array combines two elements, usually stacked one above the other. The lower element can be as low as about 5 ft. off the ground. Operates on all bands from 3.5 to 28 Mc/s without additional tuning, providing substantial gain on 14, 21 and 28 Mc/s. The radiation pattern on 14 Mc/s is broadside. Normally the beads can be up against the junction with the ribbon, but may require moving slightly along the aerial for optimum matching.

basically a non-critical array so that there is a good deal of tolerance all round, and only the perfectionists will strive for absolutely flat lines. For minimum s.w.r. G4ZU uses groups of 25 Mullard B4 pattern FX1300 ferrite beads threaded on the aerial wire (18 s.w.g. or less), but he states that acceptable results can be obtained with batches of ten beads.

The array resonates on 14 Mc/s without electrical loading, and the beads are thus at a low current point as seen by 14 Mc/s signals. The effect of this loading is to resonate the array on both 21 and 28 Mc/s. The 3·5 and 7 Mc/s bands pretty well look after themselves, although the loading probably helps.

This is clearly a highly practical use of electrical loading and it looks as though G4ZU has come up with another winner in the " ferrite-bead five-band " or " FB-5 " aerial.

Four-valve Transmitter/Receiver

" How small, compact, inexpensive, dependable and simple can a complete station be built and yet have good performance?" is the question posed by W6MTY in *CQ* (October). His answer—a compact four-valve receiver-transmitter for 7 Mc/s c.w. using a 6BE6, two 12AT7 and a 2E26—includes several circuit features of general interest. The transmitter section uses a grounded-anode Pierce c.o. providing very simple coupling to the 2E26 p.a. with cathode-keying and neon side-tone: see Fig. 3. The neutralizing capacitor (C_N) consists of an insulated wire from the grid of the p.a. cemented to the insulation of the tank tuning capacitor.

The receiver comprises the other half of the 12AT7 as an r.f. amplifier/t.r. switch (arranged to provide muting of the

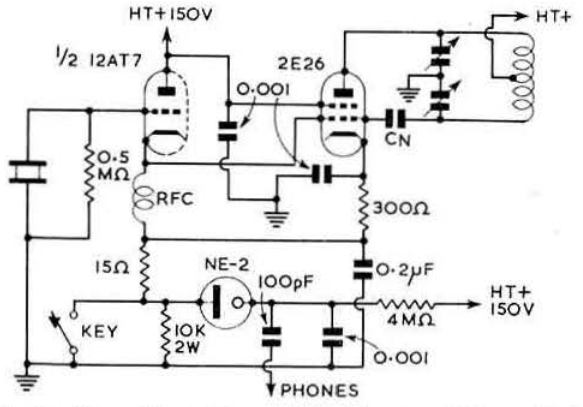


Fig. 3. Transmitter section of W6MTY's compact transmitter/receiver.

* The issues concerned (January and February, 1953) are out of print.—EDITOR

† These notes were written before the publication of G8PD's " Mixo" unit in the November issue.

a.f. output); 6BE6 frequency changer with output on 4035 kc/s fed through a three-crystal filter to a 12AT7 regenerative detector: see Fig. 4. The remaining 12AT7 section provides a.f. amplification.

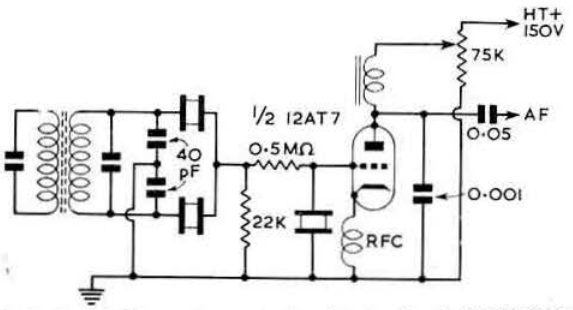


Fig. 4. Crystal filter and regenerative detector for the W6MTY rig.

Marconi and Tropo Scatter

The development in recent years of tropospheric scatter communications on a commercial basis is usually ascribed to Booker and Gordon in the United States and to the late Dr. E. C. S. Megaw (who will be remembered by many as G6MU/GI6MU) in this country. It was interesting to note in a recent article in the *G.E.C. Journal*, the suggestion that as early as 1932-3 Marconi had probably already demonstrated experimentally in his yacht *Elettra* " the existence of u.h.f. propagation beyond the radio horizon which could not be explained in terms of either diffraction or ionospheric reflection and which today is given the name tropospheric scatter." The authors—J. B. Lovell Foot and W. J. Lucas—surmise that " if other commitments had not made it impossible for Marconi to continue with these experiments, the present state of knowledge would probably have been reached many years ago." They also point out that the experts held that " Marconi's results arose as a consequence of unusual or freak atmospheric conditions which were not likely to occur with sufficient regularity to ensure a reliable method of long-distance communication." The reason for telling this story—which has many parallels in the history of radio—is to emphasise that anyone who comes across some unusual experimental results which cannot be explained satisfactorily should never be deterred by experts telling him that it is all just a freak. The " freaks " of one decade have a habit of becoming the major development projects of the next. The amateur radio journals can also claim that they expressed doubt on the accepted theories of u.h.f. propagation during the 'thirties.

Battery Developments

Transistor equipment has revived interest in batteries. But the amateur who looks into the battery situation after many years on mains supplies is likely to find himself puzzling about several new terms. G8TL has already discussed the Mallory-type mercury cell (BULLETIN, April 1960) and there has been a good deal of promotional material around on the sealed, re-chargeable nickel-cadmium cells. The silver-zinc accumulator has also been developed for applications requiring high discharge rates from small units (and where cost is relatively unimportant).

But another development of importance is the " alkaline-manganese" high-energy battery which seems to be achieving widespread domestic use in the United States (see " New Batteries—Progress or Confusion?" *Electronics World*, October 1961). The alkaline-manganese cell features a steel container, a high-density manganese dioxide cathode, a potassium hydroxide electrolyte and a zinc anode; it has a nominal 1·5 volts output. These cells provide considerably greater service life than conventional carbon-zinc cells, particularly for long periods of discharge. At present their price is intermediate between c-z cells and mercury cells and cost-per-hour figures show an improvement on c-z batteries for some applications. They also have better shelf-life, lower internal resistance and stand up well to adverse climatic conditions.

Batteries have been described as " small electrochemical factories " and are by no means as simple as we sometimes suppose. Most readers will be aware that far-reaching developments are going on in this field. Solar cells, thermo-electric devices, nuclear cells and—in particular—fuel cells are attracting great attention. In the fuel cell, the chemical supply is stored outside instead of inside the battery and then fed in as required. As with the petrol tank of a car, the chemicals for fuel cells can be replenished immediately, when required. Many people now believe that the fuel cell has a tremendously important future. Very high outputs at low weights have been achieved. But before throwing away those N.F.D. generators remember there is likely to be a snag about fuel cells—cost.

High Gain Heterodyne (Product) Detectors

Much greater gain than from conventional product detectors can be obtained by using gated-beam or beam-deflection valves. It is not difficult to obtain these valves from the United States.

G8MU recently drew our attention to the 6BN6 gated beam product detector described by W9BIY and W9IHT in *QST* (May 1960). The 6BN6 was originally developed for use in f.m. broadcast receivers. W9BIY and W9IHT put the case for this valve as follows: " Tests have shown that the linearity of the 6BN6 as a product detector is excellent. At 0·3 volts r.m.s. input to grid 1, the modulation recovered from a 50 per cent modulated signal, measured with b.f.o. off, was 40db below the normal beat note obtained with the

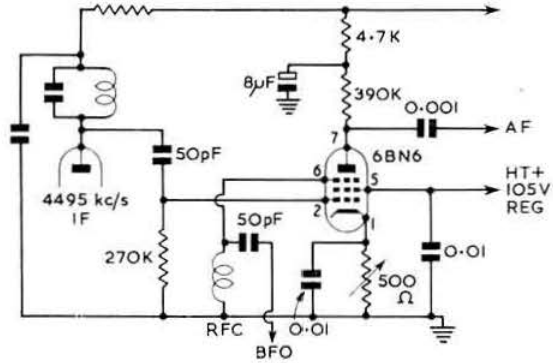


Fig. 5. 6BN6 gated beam product detector by W9BIY and W9IHT In the HBR-16 receiver the a.f. signal is taken through a further i.f. filter (two 250pF. capacitors, 56K ohms resistor).

b.f.o. on. At an input of 0·7 volts the distortion products were still 35db down . . . With 3 or 4 volts of b.f.o. injection on grid 3 the 6BN6 has a conversion gain of 50. . . . 12AU7 showed a conversion gain of 0·15 with similar input levels. Noise peaks, are clipped by the 6BN6. . . The 6BN6 has one drawback—it is slightly microphonic . . . mount on a small metal plate bolted to the chassis through rubber grommets." We have not yet come across anyone who has tried this circuit but it certainly sounds promising.

A product detector circuit using the 6BU8 beam deflection valve was given in *T.T.*, September 1959, and subsequently (August 1960) we mentioned that the newer 7360 was ideal for this application. A practical design for the 7360 appeared in *QST* (December 1960): see Fig. 6. This valve also

(Continued on page 302)

A Half-lattice Filter for the HRO

By C. T. STAGG (G3KPW)*

WITH the increasing problem of QRM and a developing interest in s.s.b. the writer decided to alter his already extensively modified HRO to incorporate a half-lattice filter to obtain better selectivity. Inspection of the lists of FT241 crystals showed channels 44 (451·85 kc/s) and 45 (453·80 kc/s) to be the most suitable. By edge lapping, using a flat pressure plate from an old crystal holder and domestic scouring powder, the higher frequency crystal was moved h.f. until the series resonant frequency was approximately 2·5 kc/s higher than the lower one.

The original crystal filter box was removed from the receiver, the knobs and extension spindles being released by undoing the grub screws in the couplers through the hole in the top at the front left-hand side. A careful note was made of the wiring. Two crystal holders were mounted in the top section and a slight modification made to the switching—see Fig. 1. An additional arm for the switch was made from a piece of suitable material and a hole drilled to align with the back of the switch contact. This hole was filled with a silver plated rivet, the new part being screwed to the insulated base to form a s.p.d.t. switch. In some cases it may be found necessary to file the flat on the phasing capacitor to get as large a movement as possible and to ensure that the minimum capacitance is as low as practicable.

The wiring was slightly altered to enable the filter to be switched in or out and the phasing capacitor stripped down and rebuilt with only one plate at double spacing. Screening

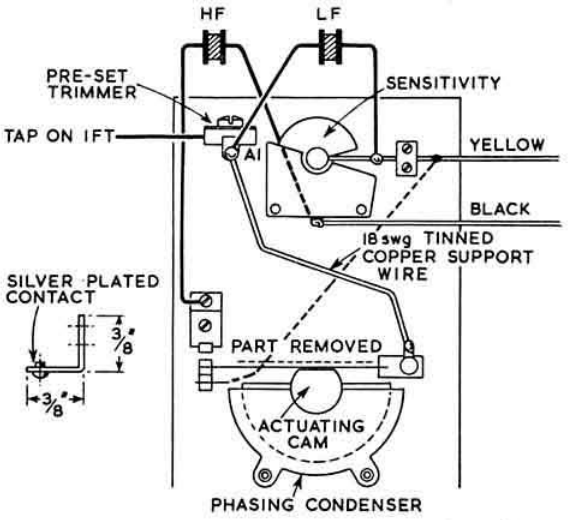


Fig. 1. Modifications to the filter box in the HRO receiver to incorporate a half-lattice filter.

braid was fitted to the anode and grid leads and the unit assembled and refitted.

The i.f. transformers in the receiver were realigned to the centre frequency of the crystals, slight readjustment of C2 being necessary to obtain a reasonable flat top on the response curve.

The results are quite enlightening: vacant spaces can now be found in even the 80m band!

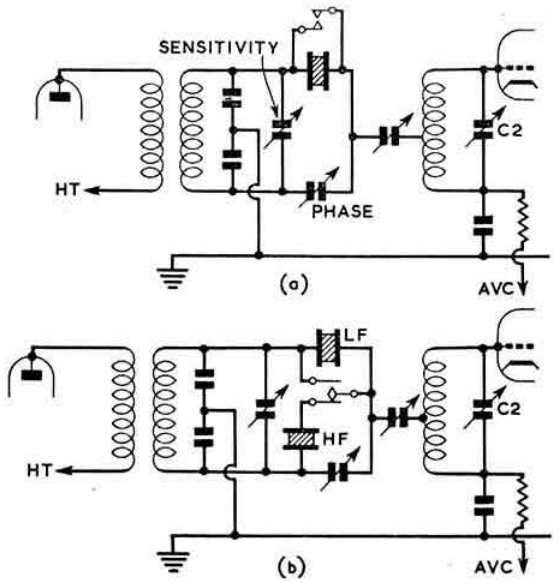


Fig. 2 (a). Original wiring of the crystal filter. (b) Circuit of half-lattice filter.

* *3 Mayfield Villas, Moss Road, Askern, nr. Doncaster, Yorkshire.*

A 60 Watt Transistor D.C. Converter

BY C. W. DAVIDSON, Ph.D. (GM3LAV)*

THE high efficiency of d.c. converters makes them ideal for mobile and portable operation. The converter to be described here has been used for mobile operation for more than a year and is therefore of proved reliability. It will provide a d.c. output of 60 watts with an efficiency of 80 per cent and should be capable of providing 75 watts without difficulty.

General Description

The circuit of the unit is quite conventional and is given in Fig. 1. Two switching transistors and a toroidal transformer convert the 12 volt d.c. input to a 300 volt 2·5 kc/s square wave, which is rectified by a silicon diode bridge circuit. For many applications the input filter can be omitted, and 32 μF capacitor is sufficient to provide smoothing for the output. In the author's case, however, the filter circuits were necessary to prevent high frequency ripple from the unit appearing in the output of other transistorized equipment operated from the same accumulator.

The converter circuit and the rectifier are mounted in an Eddystone diecast box measuring 7¼ in. × 4½ in. × 2 in. with the input and output filters in a similar box, size 4½ in. × 3½ in. × 2 in.

Several types of transistor have been used in this circuit, but the 2N1147A finally adopted was the only type which proved to be reliable over a long period. It has a maximum collector rating of 15 amps at 60 volts and a current gain greater than 100 for a collector current of 5 amps. It is readily available at quite a reasonable price. Transistors such as the OC28 which are now available might also be satisfactory, although some increase in the number of turns on the feedback windings of the transformer would be required due to the lower current gain. The transistors are mounted on a 14 s.w.g. aluminium bracket clamped directly to the case of the unit, which acts as a heat sink. Mica washers insulate the transistors from the bracket. Starting bias for the circuit is provided by the potentiometer R1, R2; R2 should be adjusted to the minimum value which gives reliable starting under load.

The OA214 diodes used in the bridge rectifier circuit have now been superseded by type OA211, but any diodes with a p.i.v. rating greater than 600 volts and average current rating of 250 mA would be suitable. Due to the large peak current rating of the OA214 a surge limiting resistor in series with the transformer secondary was not necessary. However, this might be required with other types of diode.

* 9 Wilfrid Terrace, Edinburgh 8.

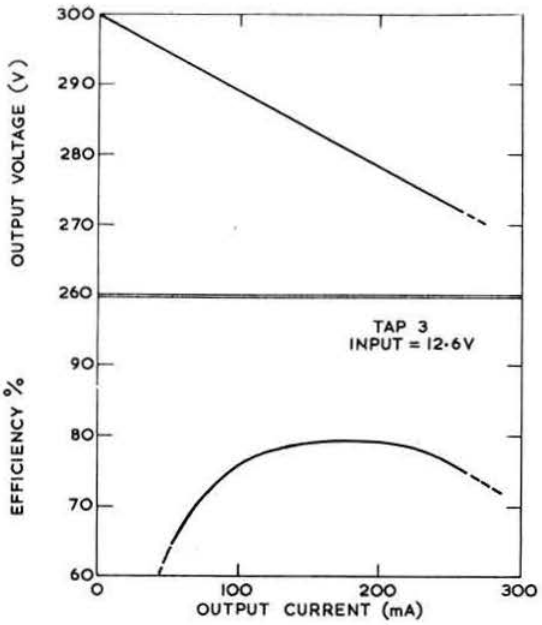


Fig. 2. Efficiency and output voltage plotted against output current.

As the low voltage supply is liable to rise to perhaps 14·5 volts when the accumulator is on charge, taps are provided on the transformer secondary, so that the output can be maintained at the required value. The circuit shown is suitable for use with a positive-earth accumulator system, but either the input or output circuits could be isolated from the chassis if required.

The bleeder resistor R3 connected across the reservoir capacitor is necessary to prevent large voltage transients appearing in the primary circuit under no-load conditions. If the unit was permanently connected to a load R3 could be omitted and the full-load efficiency would be increased by about 5 per cent.

The Toroidal Transformer

The transformer core is a Mullard Ferroxcube toroid Type FX.1079, which has an external diameter of 2 in.

The core was first insulated with tape and then 32 turns of

(*Continued on page 290*

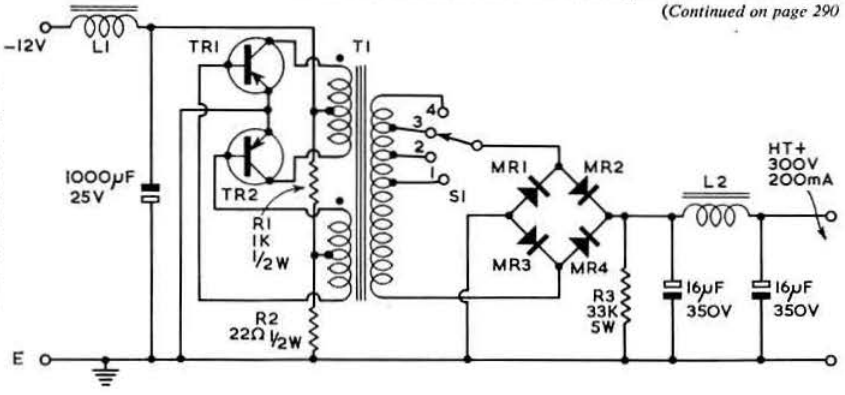


Fig. 1. Circuit diagram of the 60 watt d.c. converter described by GM3LAV.

L1, 12 turns 16 s.w.g. enam. copper; L2, single layer of 26 s.w.g. enam. copper close wound; T1, *primary*: 32 + 32 turns 16 s.w.g. copper bifilar wound; *secondary*: wound with 26 s.w.g. enam. copper; tap 1 at 680 turns, tap 2 at 740 turns, tap 3 at 800 turns; tap 4 at 860 turns. (L1, L2 and T1 are all wound on Mullard Ferroxcube cores type FX.1079). MR1-4, Mullard silicon diodes type OA214, OA211 or equivalent; TR1, TR2, type 2N1147A transistors manufactured by Brush Crystal Co. Ltd., Hythe, Southampton.

Amateur Television Station G3NOX/T

By JEREMY ROYLE (G3NOX/T)*

FIRST licensed in October 1959, G3NOX/T is active on 420 Mc/s and at the time of writing 10 stations have received the television pictures.

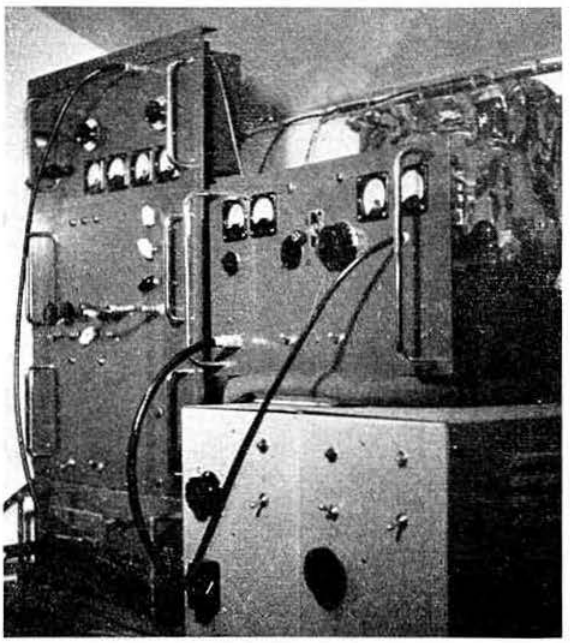
The site is in the village of Duddenhoe End, about half way between Saffron Walden and Royston, and is actually the highest village in Essex, 450 ft, above sea level, with an excellent take off to the north, east and south.

Aerial Systems

As 420 Mc/s is the only band used for transmitting, the aerial system has been designed to give the maximum practical gain. The array used for transmitting and receiving, on the long distance contacts, is a 64-element stack mounted on top of a 40 ft. welded steel lattice tower and rotated on a 2 in. dural shaft driven by a cowl gill motor. In addition to the 64 element stack a four element Yagi for 144 Mc/s listening and crossband working is also mounted on the main tower in the same direction. Two other 16 element stacked arrays are also used for point-to-point working, one being permanently fixed on G2WJ/T 15 miles away. Another can be pre-set in any direction.

The photograph shows that a working platform has been built at the 28 ft. level in order to be able to haul up and maintain the aerials. This platform is 4 ft. square and can take three people when heavy aerial jobs are being done. As a point of interest the whole tower and aerial system weighs about 3½ tons!

* *Keepers Cottage, Duddenhoe End, Saffron Walden, Essex.*



The r.f. section of the transmitter and its power supplies

A view of the aerial mast at G3NOX/T. The working platform is at the 28 ft. level. Since this picture was taken, the tower has been extended to 40 ft.

Transmitter

The transmitter, which is used for sound and vision working, consists of a crystal oscillator chain using a 12AT7, EL91 and 5763 driving a QQV03-20A at 144 Mc/s which triples to 434 Mc/s followed by another QQV03-20A straight amplifier which drives the 4X250B in the final with a power input of 150 watts. With this line up, more than enough drive is available for the p.a.

Vision modulation, which can be either positive or negative as required, is applied at the grid of the 4X250B whilst phone modulation is by means of a special screen grid circuit developed by the writer. The basis of this circuit is an electronically stabilized power supply with neon reference tube which is modulated at the grid of the control tube by a small speech amplifier. The system has several advantages over ordinary screen modulation in that the mean voltage on the screen of the 4X250B is always set at 250 volts and therefore does not cause the mean power level to change when modulation is applied. Another advantage of using stabilized screen voltage is to protect the valve, as it would be possible for this type of valve to be destroyed if the screen

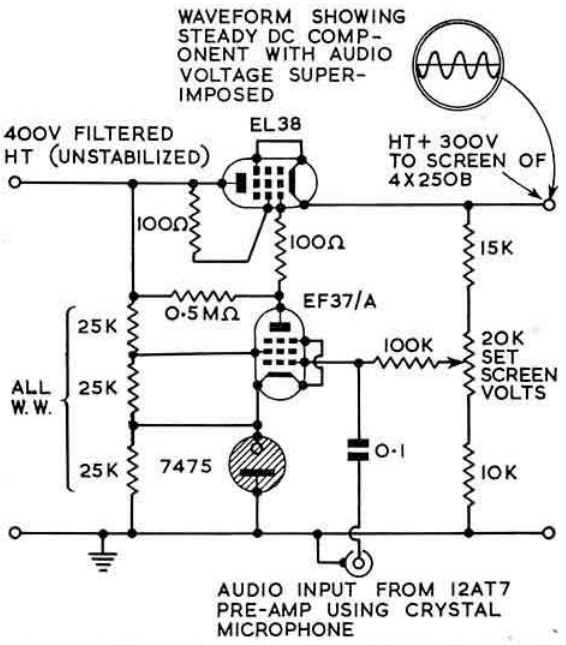


Fig. 1. The screen modulation circuit developed by G3NOX/T for use with a 4X250B p.a. valve.

voltage were to rise above 300 volts when operating at full input. Using this system six countries have been worked on phone without complaints of under-modulation. The circuit of the system is shown in Fig. 1.

Receiver

Two converters are used, a crystal controlled G3BKQ-type feeding into an AR88 at 25 Mc/s for communications work and a tunable type feeding a wideband i.f. strip at 45 Mc/s for video reception. This i.f. unit has a standard 1 volt video output which can be switched to either monitor or to the transmitter for relaying. A low noise r.f. amplifier using an A.2599-A.2521 cascode circuit feeds both receivers at once.

TV Activity

There are several amateur TV stations in East Anglia and it will be seen from the diagram that G3NOX/T is situated in a very central position on the hills between Cambridge and London and therefore in a unique position to be able to relay signals from G3KKD/T at Ely on to G2WJ/T who in

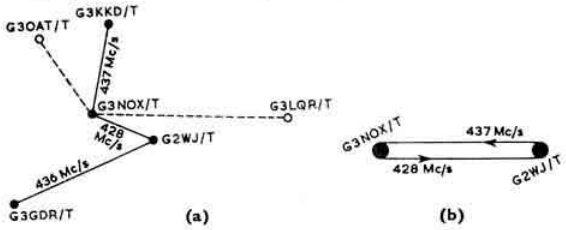


Fig. 2 (a). Picture relay system used by Amateur Television stations in East Anglia. (b) The arrangement used for duplex and return loop television contacts with G2WJ/T.

turn is able to relay on to G3GDR/T at Watford. Fig. 2 shows the paths and frequencies used for such Amateur TV relay contacts.

As well as being able to relay TV signals there is now a two-way duplex link between G2WJ/T and G3NOX/T and it is possible to watch the picture as transmitted from G3NOX/T on one monitor and also see the same picture after it has been to G2WJ and back on another monitor alongside. The whole link can also be reversed.

Coaxial switches are being installed to switch the various aerials to the receiver and to be able to reverse the link from north to south without transferring plugs.

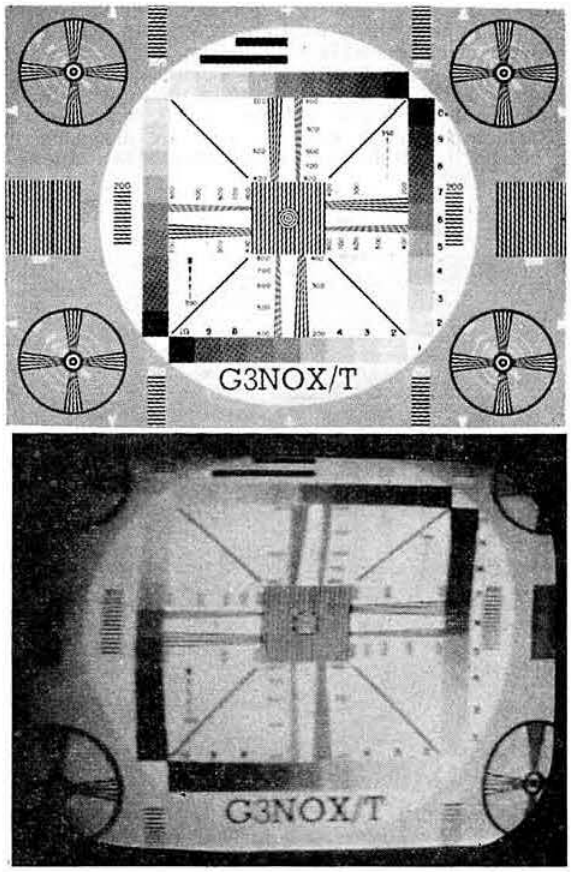
On many occasions there are openings on 420 Mc/s over considerable distances when conditions on 144 Mc/s are normal and it was on one of these openings that weak pictures were received from and sent to G3MXW/T in Birmingham.

The DX ambition at present is to have TV pictures received on the Continent during an opening and G3NOX/T will be pleased to hear from Dutch, Belgian, German or French stations who would be interested in carrying out tests.

Video Equipment

Three sources of picture and test signal are available for transmission and are brought up to a three channel vision mixer which can either cut or fade between sources. These sources are (i) A monoscope test pattern generator which produces a constant high quality picture with various definition gratings and grey scales which enable tests for definition and system linearity to be made. The call-sign appears at the

(*Continued on page 290*)



The test card designed and used by G3NOX/T (above) with a picture (below) of the same test card as received by G3LQR/T near Colchester, a path distance of 39 miles.

Project Oscar

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

PROJECT Oscar—Orbital Satellite Carrying Amateur Radio—involves sending into orbit around the earth a low-powered transmitter putting out a signal on 145·0 Mc/s. This venture on the part of United States amateurs is sponsored by the A.R.R.L. with detail arrangements in the hands of the Project Oscar Association, of which M. C. Towns, Jr. (K6LFH), is Chairman. Thanks to the co-operation of the U.S. Government, space for the Oscar "package" is to be made available in one of the space research satellites to be launched in the near future. (Latest news was that it was due to be launched on December 12.)

Undoubtedly considerable interest will be shown all over the world in reception of signals from the satellite, but the objects which it is hoped will be achieved will only be fully attained by accurate plotting of the orbit, observation of the telemetry information from the satellite and collection of data which will throw further light on 2m propagation. It is hoped that amateurs with suitable equipment will co-operate with the Project Oscar Association to obtain the maximum information from this outstanding enterprise.

The R.S.G.B. Scientific Studies Committee, which is working in close collaboration with the Project Oscar Association, has asked the writer to be the United Kingdom co-ordinator for Oscar information and it is requested that all enquiries on this subject be addressed to him at the address given below and *not* to Society Headquarters.

The Oscar signal on 145·0 Mc/s will be c.w. keyed with the Morse letters " HI ", information from the satellite being transmitted by a variation in the " HI-rate " i.e. the number of seconds to send 10 " HI's."

Apart from this observation, accurate timing of the first and last appearance of the signal would be required together with an accurate bearing of each of these events and at intervals of one minute in between. In order to obtain the maximum information from the transmissions, a 2-metre beam aerial permitting close reading of bearing in azimuth would be required; if variable elevation were possible, all the better. Meter readings of the strength of signal above the noise level would also be required in all cases and if observations on the Doppler shift of the transmitted frequency, necessary in order to ascertain details of the satellite's orbit, were to be supplied, further equipment in the way of a tape recorder, oscilloscope and audio frequency oscillator would be required.

The Project Oscar Association envisages four different types of observer, ranging from the single operator station supplying little more than " on-off " times and signal strengths to teams of three, four or more observers sharing the duties of receiver operator, timer, bearing reader and in the station equipped to undertake Doppler shift measurements, tape recorder operator. Such combined efforts could possibly be undertaken by an active club and offers of assistance from such organizations would be welcome.

The writer would be pleased to hear from anyone who would be prepared to take part in these observations and full details of the information required together with reporting forms may be obtained by sending a stamped and addressed foolscap envelope to the undermentioned address.

Members will be interested to know that arrangements have been made to pass initial information of the early orbits of the Oscar satellite to the United States by h.f. radio and that the Society's Sunday news broadcasts will carry further information on the Oscar Project.

* *R.S.G.B. Project Oscar Co-ordinator, 24 Arundel Road, Tunbridge Wells, Kent.*

A 60 Watt Transistor D.C. Converter

(Continued from page 286)

two parallel lengths of 16 s.w.g. enamelled copper wire were wound to form the single layer bifilar primary. This was then varnished and another layer of tape added. The secondary consists of several layers of 26 s.w.g. enamelled copper wire with tape insulation between layers. Fortunately a 2 oz. reel can be passed through the centre of the toroid, so that winding the secondary was quite straightforward and took only a few hours.

Taps are provided to give a no-load secondary voltage of 300 volts with input voltages of approximately 11·5, 12·5, 13·5 and 14·5 volts. The transformer could of course be wound to give any required output voltage. The feedback winding is 7 + 7 turns of 26 s.w.g. enamelled copper wire bifilar wound on top of the secondary. In the case of both primary and feedback windings the leading end of one wire is connected to the opposite end of the other wire to form the centre-tap. The correct phase for the feedback winding can be found by experiment.

Performance

The regulation and efficiency of the circuit are shown in Fig. 2. A maximum efficiency of approximately 80 per cent is obtained for an output of 200 mA and the output voltage ripple under these conditions is 100 mV.

The unit is protected against short circuit of the output terminals as it then fails to oscillate and the input current falls to the no-load value of 0·5 amp.

Amateur Television Station G3NOX/T

(Continued from page 288)

bottom. (ii) A sawtooth test signal for setting up the transmitter linearity. (iii) A photicon television camera for transmitting live pictures. This is fitted with an electronic viewfinder and 100 ft. of camera cable which enables outside pictures to be transmitted.

As well as these sources, incoming pictures are available as demodulated video signals and can be fed to the transmitter for relaying. Two picture monitors are used, one being bridged across the video feed from the transmitter monitor and showing the picture being transmitted and the other on preview. A waveform monitor in parallel with the previous monitor is used for setting up voltage levels.

Communications

As well as TV work G3NOX/T is keen on phone DX contacts and during recent spells of good conditions ON4HC, ON4HN, F9LD, SM7BAE and DL3FR were worked. In all cases the signals were S9 + 20 or more db with no trace of noise. G3NOX/T is always pleased to have cross band contacts with 144 Mc/s stations and regularly listens on that band.

Operating Times and Frequencies

Several frequencies are used on 420 Mc/s. For phone contacts 434·3 Mc/s is used, but in order not to cause interference, TV transmissions are made on either 428·2 Mc/s or 432·5 M/c/s, depending on whether relay contacts are being made or not.

Operating times are mainly from 9 p.m. onwards on weekdays and from 6 p.m. on Saturday evenings (70 cm Activity Night) but if the band is open and someone wants a test signal, G3NOX/T can be heard at other times.

DXpedition to the Island of the Two Moons

The R.A.F. Amateur Radio Society trip to Kamaran Island

By SGT. R. HANDLEY, R.A.F. (G3GJQ/VS9K, ex-AP2R, G3GJQ/VS9A, opr. YI2AM)

KAMARAN ISLAND, a British possession, lies approximately 200 miles from Aden in the Red Sea. Two miles of water separate it from the Yemen mainland. The island has lost its former importance as a quarantine station on the Red Sea shipping route and a stop-over point on the pilgrim trek to Mecca. In its heyday tens of thousands of the latter called at the Island yearly.

Shaped like a lobster claw, the Island occupies some 80 square miles, all of which is barren sand and coral apart from several brackish wells and a mangrove swamp at the northern end. It is administered by a British Commissioner and it boasts an Indian postmaster, 1,400 Kamarani (suffering severely from malnutrition and associated T.B.), 2,000 cats and some wild gazelle and donkeys.

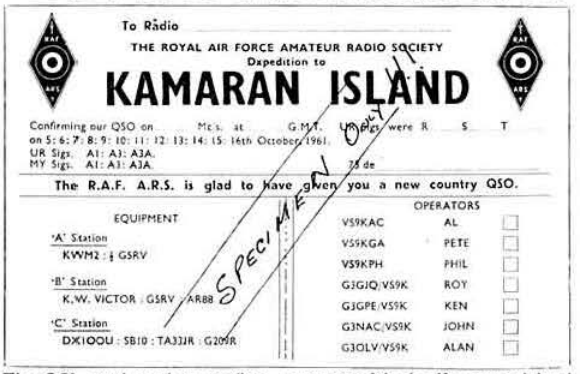
The R.A.F. Amateur Radio Society party consisted of seven operators: G3GJQ, G3NAC, and G3OLV, who flew from the United Kingdom, VS9APH, VS9AGA, and VS9AAC, who were already in residence in Aden (by courtesy of the R.A.F.) and G3GPE (VQ4IN) who joined from R.A.F. Eastleigh in Kenya. Several hectic days were spent in final hurried preparation at Aden before moving up the Red Sea. Since transportation difficulties had brought the United Kingdom trio out without equipment, a heavy burden was placed on the three Aden operators as regards obtaining extra gear. Tribute is due to them, and to VS9APH in particular, for their fine efforts.

During the transit period in Aden, a Collins KWM-2 was on the air from the QTH of VS9APH, dispensing s.s.b. QSOs on 14 Mc/s.

Call-signs

Fullest co-operation was forthcoming from the P.M.G. in Aden on the question of licences. The residents would merely insert the letter " K " in place of the letter " A " in their existing call-signs whilst on Kamaran Island. The " G " operators, not being fully resident, would have to sign G3/VS9A and G3/VS9K in Aden and Kamaran respectively.

The party were met by the local postmaster and some


To Radio

THE ROYAL AIR FORCE AMATEUR RADIO SOCIETY

Dxpedition to

KAMARAN ISLAND

Confirming our QSO on Mc/s. at G.M.T. Reports were R S T
on 5: 6: 7: 8: 9: 10: 11: 12: 13: 14: 15: 16th October, 1961.
UR Sigs. A1: A3: A3A.
MY Sigs. A1: A3: A3A. 73 de

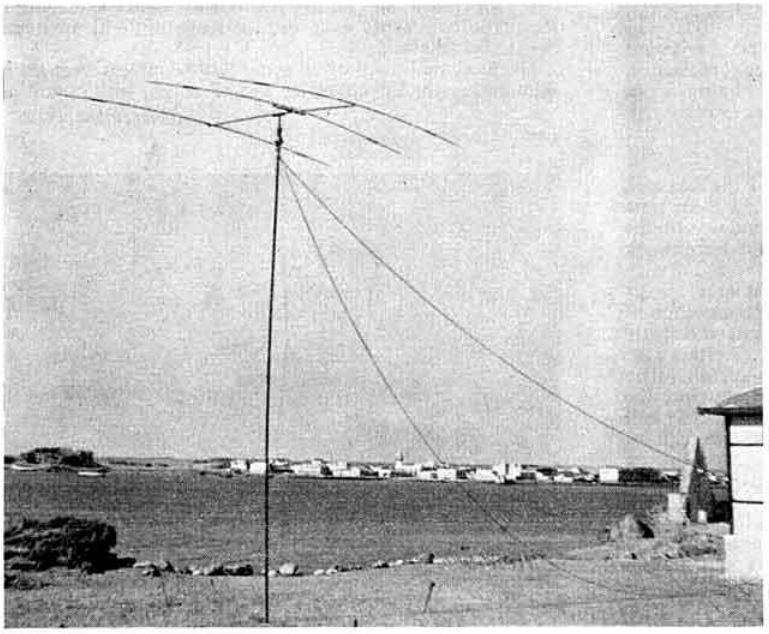
The R.A.F. A.R.S. is glad to have given you a new country QSO.

SPECIMEN Only

EQUIPMENT	OPERATORS	
'A' Station KWM2 : ½ G5RV	VS9KAC	AL
	VS9KGA	PETE
	VS9KPH	PHIL
'B' Station K.W. VICTOR : G5RV : AR88	G3GJQ/VS9K	ROY
	G3GPE/VS9K	KEN
'C' Station DX100U : SB10 : TA33JR : G209R	G3NAC/VS9K	JOHN
	G3OLV/VS9K	ALAN

The QSL card used to confirm contacts with the Kamaran Island DXpedition.

cheerful natives eager to help unload a mountain of equipment. Seven sweating DX-ers were pushed aside and one thin Kamarani would lope away bearing 200 lb. dead weight on his head and shoulders. Transport was waiting in the shape of two vehicles (R.A.F. pattern) of surprisingly modern vintage. The Shackleton was gone in a flurry of sand and seven radio amateurs suddenly felt quite alone.



The Mosley TA33JR aerial with the port of Kamaran in the background.

Headquarters was one of a collection of empty European bungalows grouped around the Commissioner's residence some distance from the fishing village. It turned out to be the most palatial of DXpedition headquarters with roof fans, a refrigerator and normal beds; truly a welcome sight to one mentally conditioned for tents and camp beds.

After G3NAC had paid his compliments to the Commissioner, unpacking commenced. Once again labour appeared from all sides and in a very short time the gear was unpacked and aerials in position. The TA33JR beam was half dropped in the process, but fortunately without damage.

The three stations when assembled, were as follows:

DX100, Geloso 209R and TA33JR with C.D.R. rotator at 36 ft.

K.W. Victor, AR88D and full-size G5RV aerial.

KWM-2 transceiver and half-size G5RV 14 Mc/s dipole.

A check on power available showed that the expedition was to share the same line and about 10 amps with the Commissioner's house. A temporary line and larger fuses eased the task of running three rigs at once.

In spite of an overwhelming eagerness to

Guide to DXers and others thinking of using the island for pleasure.

make that first CQ, the party accepted an official invitation to an informal dinner at the Commissioner's residence. Wined and dined the party took their leave and almost ran back to the " shack," trying hard not to appear too hasty.

On the Air

A toss of a coin gave VS9KAC the honour of the first call, using the KWM-2 on 14 Mc/s s.s.b. At 23.15 local time (20.15Z) VQ4HX responded and Kamaran Island was on the air. A watch system was drawn up and the hard work commenced.

It was painfully obvious by next morning that interference, due to the proximity of rigs, was prohibitive. Permutation of modes and bands would not alleviate the problem sufficiently to have more than two stations active together. Aerials were resited and a further 14 Mc/s dipole strung up, all to no avail. The problem was finally solved by moving the KWM-2 to the native police radio room, approximately half a mile away. This cleared things up completely, in fact, on several evenings all three stations were on 14 Mc/s; two on s.s.b. within 10-15 kc/s of each other, and the third on c.w. The latter situation must surely be unique on any DX-pedition.

Activity was intense once operation commenced and the " pile ups " on all modes had to be heard to be believed. On c.w. at times it was a sheer wall of noise. A check showed that a channel 50 kc/s wide was thus occupied one evening on 14 Mc/s. Manners were good. On rare occasions a few sharp words to offending stations proved sufficient.

Band Conditions

Band conditions seemed above the expected average for most of the period. Mornings were relatively quiet but all bands were extremely active from late afternoon until the small hours, 7 Mc/s being remarkably so during the latter time. Ten metres provided some amazingly consistent openings to Europe and Africa every day with signals S9 both ways.

The " score " mounted rapidly. Fifty countries in two days, 72 by the third morning and 111 by the sixth full day of operation.

With 24 hour operation of three stations, there was little to do off-watch apart from sleep. The swimming was delightful. An old shark net around a small inlet gave peace of mind and kept out the larger and more hostile fish. G3GJQ trod on a black sea snake one morning and left the water in some haste. All assurances that the " thing " was harmless fell on deaf ears as he disappeared up the beach.

Provisions brought from Aden lasted quite well. The cooking was handled by a friendly, if rather peculiar, character named Achmed. He wasn't too clever with egg and chips, but his baracuda steaks were " out of this world." Food virtually ran out three days before the party were due to leave. The diet then became porridge and/or tomato soup. The alcohol did not run out so nobody cared anyway.

The End of the Story

The day to depart came all too quickly. Somewhat sadly equipment and aerials were disconnected. One member, who shall be nameless, decided that the quickest method of dismantling a 36 ft. mast complete with TA33JR beam was to drive an Austin one tonner into it. The look on VS9KPH's face (who owned the beam) was a picture, Fortunately, only minor damage was sustained to both beam and vehicle.

An R.A.F. aircraft " rescued " the expedition on October 16 and flew the party back to Aden. This was virtually the end of a very remarkable experience for all concerned. Tiring, yes, but extremely satisfying if the comments over the air from grateful amateurs were to be believed.

The final analysis showed some 5,100 contacts were made with stations in 135 countries and 38 zones, with operation

(*Continued on page 297*).

Sgt. K. Smethurst, G3GPE/VS9K (VQ4IN) operating the expedition's " C " station on single sideband.

THE MONTH ON THE AIR

A CHRONICLE OF EVENTS ON THE HF AMATEUR BANDS

By R. F. STEVENS (G2BVN)*

AFTER having successfully obtained a much wanted QSL from a DX station it is annoying to discover that the information on the precious piece of cardboard contains errors or omissions, and several correspondents have recently commented on the apparent lack of care displayed in making out cards. G3MWG mentions three confirmations for new countries, on one of which the date was missing whilst the others failed to show a signal report. A card from ZD3 to G3LPS for a 21 Mc/s QSO was marked for 14 Mc/s, and a 7 Mc/s QSO with VE8 resulted in a card indicating 14 Mc/s! G2FFO received a QSL from JZ0 without any RST being shown, whilst G3AAE, whose shack does not contain any sideband equipment, is well on the way to a Worked 100 s.s.b. certificate, if the cards he has received are to be believed. No doubt many sought-after stations do not relish their QSL chores, and are content to have them out of the way as soon as possible, an outlook with which there will be every sympathy, but an incorrectly made out QSL is nevertheless frustrating, for the recipient will have already expended outward postage and usually IRC in addition. Still on the subject of QSLs, an analysis of returns made by one overseas operator showed a return of 70 per cent from Europe, 90 per cent from the U.S.S.R., and from the United Kingdom 15 per cent only. Before grumbling about the lack of cards from DX stations let us make sure that our own house is in order.

Following a paragraph in *M.O.T.A.* some months ago regarding a source of supply of mint foreign stamps to assist in securing that elusive QSL, GW8WJ, the Hon. Secretary of the TOPS C.W. Club, has said that he has available a good supply of unused stamps from a large number of countries in Europe and the Americas. The membership of TOPS is practically world wide, and if a demand exists, GW8WJ has offered to obtain stamps from wherever the Club is represented. The stamps will be available at values based on the current rate of exchange; when writing, readers are asked to state clearly their requirements and also to enclose a s.a.e. for a reply.

The writer offers his thanks to those who have supported *M.O.T.A.* during the past year, and to all, best wishes for the festive season and good hunting in the New Year.

News from Overseas

From Nigeria, **5N2JKO** mentions that 5N2IJS will be on leave from this month, with 5N2ATU to follow shortly. 5N2MNP is active from Jemma but at the present has no mains supply, and 5N2DCP is back from leave but will almost certainly not be heard on the air during his present and last tour in the country. 5N2JKO received five applications for the new 5N2 Award within a week of the details being published in *M.O.T.A.* and G6VQ was the recipient of the first G certificate. In order to avoid the frustration of a long wait occasioned by surface mail delivery the Awards are being sent by air mail.

UA2AO provides information on the stations active in **Kaliningrad**: UA2AB (Lakir) c.w. and a.m. 3·5 to 14 Mc/s; UA2AC (Serge) c.w. 3·5 to 14 Mc/s; UA2AG (Vlad) c.w. 14 Mc/s only; UA2AK (Slava) c.w. 14 and 21 Mc/s; UA2AW (Vlad) c.w. 14 and 21 Mc/s, but hopes to be on a.m. soon; UA2AO c.w. and s.s.b. 14 Mc/s; UA2BD (Stasik) c.w. and a.m. 3·5 to 14 Mc/s; UA2AAB a.m. 28 Mc/s; club stations UA2KAA, UA2KAE and UA2KAW are active on 14 Mc/s c.w. UA2AO worked over 100 countries during the period of operaton with the Russian portable s.s.b. transmitter, but so far has only received confirmations from 54 countries, and hopes that the missing ones will soon make their appearance.

LA5HE, now operating maritime mobile on the tanker *Beaumont*, writes from the Arabian Sea, where he has been concentrating on the 7 Mc/s band. There are two very strong broadcast stations in the c.w. portion of this band, and LA5HE advises European stations trying for Middle East and African contacts to keep clear of 7008 (Radio Pakistan) and 7023 kc/s. He is of the opinion that 7 Mc/s is the DX band of the coming years and hopes for a lessening of the inter-European QRM. He also poses the question why there are so few s.s.b. stations on this band? Of interest to other /MM stations sailing in the Persian Gulf is the MP4 net which meets on 7 Mc/s phone on Fridays at 10.00.

JZ0ML, who is located at an outpost 150 miles up river from Merauke, is looking for United Kingdom contacts on 14 Mc/s c.w., the best time being around 12.00. Another active station from Dutch New Guinea is JZ0PN who is operating on 14 Mc/s a.m. from Sorong at around 09.00. JZ0ML, who is also G3MJL, writes from The Decca Naviga-

Anatoly Moskalenko (UA2AO) of Kaliningrad who recently operated the Russian portable s.s.b. transmitter. During nine days of activity, 1200 contacts were made with stations in 100 countries and 37 zones.

** Please send all reports to R.S.G.B. Headquarters to arrive not later han December 20.*

tor Co., c/o The Postmaster, Merauke, D.N.G., and asks for QSLs via W2CTN.

Amateur operators serving with the Royal Navy in **Malta** have formed a club which they hope will be affiliated to the R.N.A.R.S. The club station is situated in the Vernon United Services Club in Valetta, and the membership of 16 includes ZB1s A, JF, NZE, OKV, RF, and our correspondent ZB1RM.

Following the mention in *M.O.T.A.* for October **MP4TAO** writes to clarify the position regarding his operation from **Abu Dhabi** using the above call. The Administration Officer at the Political Residency, Bahrain, has said that at the present time a separate call-sign will not be issued for use in this area, and states that calls in the " D " series are allocated to Das Island. It is pointed out that Abu Dhabi is one of the Trucial States, and the use of the MP4TAO call should not cause confusion. However it is recollected that Bryan Bisley operated from the Sheikdom of Abu Dhabi using the call MP4DAC, so where do we go from here? MP4TAO will be in the area until November 1962 and at the present time is using a RCA type ET4336 transmitter running 350 watts input to a 14 Mc/s ground plane, the receiver being an Eddystone 680X. It is hoped to commence transmissions on s.s.b. in the foreseeable future.

In connection with the **Hong Kong Boy Scout Jubilee** the Hong Kong A.R.T.S. will be operating a station using the call **VS6AJ/A** located on the Jamborette camp site. The station will be on the air from 10.00 on December 27 until 13.00 on January 1 and operation will be on a.m. and c.w. on 14 and 21 Mc/s. A special QSL will be issued and cards should be sent to the Hong Kong A.R.T.S. at P.O. Box 541, Hong Kong.

Campbell Island which was represented under the call **ZL4JF** during 1960 will again soon be available, the operator being, as before, Ian Johnson. At first transmissions will be on c.w. and a.m., with s.s.b. possibly early in 1962 after the completion of an SB10. The *modus operandi* will be, as before, at the low end of 14 Mc/s, and QSLs will be dealt with by ZL2GX.

DXpeditions

The final count of the **Kamaran Island** operation (fully dealt with by G3GJQ elsewhere in this issue) was 5,092 QSOs, made up of 854 on a.m., 1508 on s.s.b. and 2730 on c.w. 28 Mc/s produced 205 contacts, 21 Mc/s 1,314, 14 Mc/s 3362, 7 Mc/s 210 and 3·5 Mc/s one only (G6ZO). The country total was 135 in 38 Zones, 23 and 24 being the elusive ones. G3NAC personally worked 99 countries, thereby just missing a VS9K DXCC, and both MP4BBW and VE7ZM worked all 7 operators.

Crozet Island, recently the subject of pirate activity, will be represented from December 20 by **FB8WW**. This information came from FB8XX via G3OFU.

The long awaited **Dahomey** operation by 5N2AMS finally materialized under the call **TY2AA.** Angus operated from a rest house just across the Nigerian border using a portable generator for power. 21 Mc/s a.m. and 14 Mc/s s.s.b. were the preferred methods of transmission, the latter usually before 08.00 and after 19.00, with 21 Mc/s operation between these times. It is intended to make as many trips to Dahomey as business commitments will allow, and activity will of necessity be mainly at weekends.

The **Socorro Island** trip did not produce many contacts for European stations, conditions being favourable only for short periods on two of the days, the strongest signals arriving by the long path.

The trip by FK8AS to **Wallis Island** has been postponed until the spring of 1962. By this time conditions between the United Kingdom and the Pacific may well have improved.

After a period of operation from VP3YG the portable s.s.b. transmitter was sent to **FY7YI** but unfortunately suffered some damage en route. It is hoped that operation will not be long delayed and FY7YI will probably have the services of a Drake receiver and a beam aerial In view of the inevitable North American QRM the best time to attempt QSOs will be before midday, if in fact FY7YI operates at these hours. As for VP3YG, QSLs for the s.s.b. operation should go to G2BVN, G8KS or W4OPM (W/K etc.). About December 29 the transmitter will be operated from Tobago.

9G1DP, who operated from Upper Volta as **XT2Z,** plans a return trip during the latter half of December. XT2Z has appointed K4TWF as QSL manager, but it is not known if this is for world wide or W/K QSOs only.

It is reported that *Yasme III* has again set out on a trip, the first destination being the Marquesa Islands.

AC3NRM and **AC5NRM** are two calls that are reported to have been allocated to VU2NR, and operation is scheduled for early 1962.

ZK1BS will be making a trip to **Manihiki** during the early part of 1962. Operation will be confined to c.w. unless a KWM-2 is available. (MP4BBW).

Contests

The **CQ World Wide S.S.B. Contest** will take place during the weekend March 24-25, 1962. Changes in the rules have been made and details of these will be given as soon as possible. Log sheets will shortly be available from G2BVN by sending a foolscap size s.a.e.

The **CQ 160 metre World Wide C.W. Contest** will take place from 02.00 on February 24 to 14.00 on February 25. This is a c.w. contest only and it is hoped that many stations outside North America will take part to exceed last year's total of 805 participants. A summary of the rules will be given in the January *M.O.T.A.*

Conditions during the two sections of the **CQ WW DX Contest** were far from good but considerable activity is reported. MP4BBW amassed 83,000 points on the 14 Mc/s

QTH Corner

BV1US	MARS Radio Station, USTDC-MAAG, Taiwan, APO 63, San Francisco, Calif., U.S.A.
CN8FU	Box 2475, APO 30, New York, N.Y., U.S.A.
ET3RS	P.O. Box 3005, Addis Ababa, Ethiopia. For CQ Contest QSOs via W2JXH.
FE8AR	P.O. Box 998, Doula, Cameroon Republic.
FK8AC	F. Franchette, P.O. Box 104, Noumea, New Caledonia.
FY7YI	S.s.b. operation only: via G8KS or G2BVN.
JZ0ML	via W2CTN.
JZ0PH	Fam. Hesp. Jacques, Oppenheimstraat 4HS, Amsterdam, Holland.
KC6BD	J. Wheeler, Weather Bureau, Truk, E. Caroline Is.
KH6EGO/KJ6	517, Langley Loop, APO 917, San Francisco, Calif., U. S.A.
KZ5LC	via W2CTN.
OA4DI	Jose Dorca de la Quintana, P.O. Box 1578, Lima, Peru.
PJ3AR	Box 328, Lago, Aruba, Netherlands Antilles.
TN8AL	S. Besse, Postes et Telecoms, P.O. Box 298, Brazzaville, Rep. of Congo.
TN8AX	P.O. Box 2239, Brazzaville.
TY2AA	via 5N2AMS.
UH8BO	Box 96, Ashkabad, Turkoman S.S.R.
VQ2AT	W/K via WA6HOH.
VR4CV	via K6EC
XE1CV/XF4	P.O. Box 31129, Mexico 19, D.F., Mexico.
XT2A	9, Rue du Transvaal, St. Amand les Eaux, Nord, France.
ZL4JF	via ZL2GX.
4S7 Bureau	4S7WP, Vijaya Rd., Kolonnawa, Ceylon.
5N2JA	A. Hewitt, Police HQ, Kaduna, Nigeria.
5R8BL	A. Delorme, Controleur Principal P. & T., Tamatave, Madagascar.
5R8CQ	G. Beaudouard, Sce des Mines, P.O. Box 280, Tananarive, Madagascar.
5R8CT	L. Ferrier, P.O. Box 1193, Tananarive, Madagascar.
5T5AB	A. Dubois, Centre Emetteur des P. & T., Nouakchott, Mauretania.

* * *

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

band as compared with 64,000 during the telephony section last year.

The results of the **Helvetia 22 Contest 1961** show that OH2LX (10,164 points) and G3EYN (9675 points) were the two leading European stations. The 1962 contest will probably take place during the weekend April 7-8, but final arrangements have not yet been made.

The **Gravesend Radio Society** are holding a **Shrimper's Open Contest** from 20.00 to 23.59 on January 7, 1962 (c.w. section) and from 20.00 to 23.59 on January 14 (telephony section). The object is to make as many contacts as possible using the 3·5 Mc/s band only. The numbers to be exchanged will consist of the RS or RST report plus a serial number commencing between 001 and 010. Each station counts 2 points per contact. Only contacts between stations using the same mode will count; c.w./telephony QSOs are not eligible. A shield, to be held for one year, will be awarded to the winners of the two sections. Concurrently with the above, a receiving contest will be held, when the scoring will be one point per contact with a bonus point for logging both sides of a QSO. Details of serial numbers or QTH must be given. The log headings should be: Date/Time; Mode; Station worked/heard; RST out/in; Serial number out/in. All logs should be sent to G6VC, at 66 Burch Road, Northfleet, Kent, to arrive not later than February 10, 1962.

Awards

The **Heard All East Africa Award** is offered by the Radio Society of East Africa to applicants who can fulfil the following conditions: (i) Cards must be submitted from at least four different VQ call areas; (ii) 25 points must be scored to qualify; (iii) Points are scored as follows: VQ1 = 5; VQ2 = 1; VQ3 = 3; VQ4 = 1; VQ5 = 3; VQ6 = 4; VQ7 = 5; VQ8 (Mauritius) = 4; VQ8 (Chagos) = 4; VQ8 (Rodriguez) = 5; VQ9 = 5; (iv) Certificates will be issued for s.s.b., telephony, c.w., and mixed contacts logged; (v) Claims should be sent to: A. J. Sainsbury, P.O. Box 1951, Nairobi, Kenya, accompanied by a remittance for 6s. or 14 IRC. This covers return postage by surface mail.

The League of Radio Amateurs of Mozambique have made available a new award known as the " **W-CR7-A** " for any foreign station submitting proof of having worked 15 CR7 stations either on c.w. or telephony since January 12, 1949. QSLs, together with a list and five IRC, should be sent to L.R.E.M., Caixa Postal 812, Lourenco Marques, Mozambique.

The Ecuador Radio Association have announced the **Worked All HC Certificate** which is offered to those operators who can produce proof of contact with six of the eight radio districts of Ecuador. QSOs may be on any band or mode and dated after November 1945. QSLs, together with a list, and IRC for return postage, should be sent to Asociacion Radio Ecuatoriana, Apartado Postal 289, Quito, Ecuador.

Map of the Polish call areas.

The **Lebanese Radio Amateurs' Association** offer an attractive certificate to those operators who can produce proof of contact with ten Lebanese stations after July 1, 1958. Contacts may have been on any band or any mode. QSLs, and an accompanying list, should be sent to Lebanese Radio Amateurs Association, P.O. Box 3245, Beirut, Lebanon. No charge whatsoever is made for this diploma.

For the certificate offered by the **SP-DX-Club**, G8PL sends the following up to date list of members supplied by SP5ADZ: SP2s AP, BE, IW; SP3s AK, PK, DG, PL; SP5s ADZ, GX, HS, XM, YY. ; SP6s AAT, BZ, FZ; SP7s AZ, HX; SP8s AG, CK, CP, EV, HR, HU, MJ, HT; SP9s ADU, DT, EU, KJ, RF, TA. For identification of the areas covered by the various Polish prefixes reference should be made to the map on this page.

The new rules for the **WPX Awards** (sponsored by *CQ Magazine*) include the following: (i) QSLs will no longer be required, but the DX Committee reserve the right to ask for all or any of the confirmations listed by the applicant; (ii) A certificate will now be issued for mixed modes of operation, and the requirements for the basic awards are now: c.w./phone—400 prefixes; c.w.—300; 'phone—300, and s.s.b.—200 prefixes on two-way s.s.b. The term phone includes both a.m. and s.s.b.; (iii) Once the basic certificate has been issued stickers will be available for each additional 50 prefixes, and there are also available stickers for working a specified number of prefixes on a specific band or in a specific continent; (iv) All contacts after November 1, 1945, will now count, but any prefix which has become obsolete will not count for WPX credit, e.g. ZD4 and 9M2. Application for WPX must be made on the special form which is available from *CQ Magazine* or W2DEC.

DX Briefs

VQ2AT is active on s.s.b. on most evenings and will be looking for United Kingdom contacts at 17.15 daily on 14 Mc/s, and at 11.45 on Sundays on 28 Mc/s. Unlike one other VQ2 station using s.s.b., VQ2AT QSLs extremely promptly.

VS9AAC mentions his schedules with VQ9HB on 14,080 kc/s at 17.00 on Tuesdays and Fridays and at 0.600 on Sundays, saying that VQ9HB anticipates a stay in Chagos where he will sign VQ8BCA.

Owing to the curtailment of amateur licences in the Lebanon Bryan Bisley (G3OFI etc.) has been unable to proceed with his application. No official reason has been given for the ban which, it is hoped, will be temporary. G3OFI is now also licensed as VQ4IO and ZC4BB, in addition to his many other calls.

ZL2APK would like it known that he is looking for United Kingdom contacts on 14 and 21 Mc/s a.m. and c.w. and would appreciate B.R.S. reports.

G3DAF was impressed by the capable operating at **UA1KAE**, one of the stations of the U.S.S.R. Antarctic Expedition worked on 14,105 at 16.30.

ZD1GM and **ZD1FB** are the calls of two stations formerly operating from Sierra Leone whose present whereabouts are of great interest to **VO1BD**, whose QTH is 11 Vaughan Place, St. Johns, Newfoundland.

KC6CG has now left the **East Carolines**, but **KC6BD** has been heard with good signals around 08.30 at various frequencies in the c.w. portion of the 14 Mc/s band.

Johnston Island, always an elusive one, is now represented by **KJ6BV** (mainly c.w.) and **KH6EGO/KJ6** (mainly s.s.b.). WA6HOH continues to act as QSL manager for the former, but delivery is slow owing to log problems.

DXotic Showcase

Call-sign	kc/s	Mode	G.M.T.	Country
EP2BB	7,010	c.w.	20.15	Iran
FB8XX	7,020	c.w.	18.30	Kerguelen Is.
HK0QQ	7,005	c.w.	07.30	San Andres Is.
MI/HB1EO	7,020	c.w.	18.00	San Marino
VP7NQ	7,010	c.w.	23.45	Bahama Is.
JT1KAA	14,096	c.w.	10.15	Mongolia
KC6BD	14,070	c.w.	08.15	E. Caroline Is.
YJ1MA	14,020	c.w.	08.45	New Hebrides
ZD8JP	14,030	c.w.	20.20	Ascension Is.
XW8AS	14.280	s.s.b.	16.00	Laos
5U7AH	14.295	s.s.b.	18.00	Niger Rep.
5R8CQ	21,065	c.w.	14.40	Madagascar
TY2AA	21,240	a.m.	11.50	Dahomey Rep.
7G1A	28,060	c.w.	10.50	Rep. of Guinee
FS7RT	28,450	s.s.b.	15.15	Fr. St. Martin

It is now established that **ZD8JP,** providing many operators with their first Ascension Island contact, is handling his own QSLs.

VS4RM, now on the air from Sarawak, has been heard between 08.00 and 12.30 usually about 14,070 kc/s.

AP5CP is becoming well known for his hand drawn QSL cards, and recently B.R.S.20317 received an unusual QSL acknowledging reception reports on 14 Mc/s c.w. transmissions.

MP4KL, recently worked by G2FFO on 14,058 at 17.20, caused a little surprise in Burnley, as it was thought that the prefix should be 9K2 for Kuwait. **TA2BK,** also worked by G2FFO, asked for QSL via DJ2PJ but gave no indication of his whereabouts.

VP8EG (operated by G3LET) is now on s.s.b. from the South Orkneys. QSLs should go to G3PAG.

Band Reports

The fair opening on October 15 has not yet been followed by any worthwhile propagation conditions on **1·8 Mc/s.** W2FYT and W2KQT were worked by **G3PU** on this date, and **B.R.S.20317** heard W1BB on 1802 kc/s at 06.40 a month later. **The Top Band tests** co-ordinated by **W1BB** are now under way and the following dates have been scheduled: December 17, January 7 and 21, February 4 and 18. The test runs from 05.00 to 07.30 with W/VE stations calling for the first five minutes of the hour, and then during alternate periods of five minutes. North American stations will call between 1800 and 1825 kc/s, with other stations operating in the portion 1825 to 1835 kc/s. United Kingdom stations should not, on any account, call below 1825 kc/s. **G3PU,** one of the most consistent operators on this band, has so far succeeded in working all continents and has 35 countries confirmed using a home-built transmitter running a genuine 8 watts. Certainly a very creditable effort. The aerial at G3PU is a 265 ft. wire at 70 ft. above ground in an open situation overlooking the English Channel. It is the opinion of G3PU that a definite peak in conditions occurs immediately before sunrise at the eastern end of the path, with a secondary peak immediately after sunset at the western end of the path. The DX season lies between the end of December and the beginning of March. February 26 of this year is mentioned as a date on which 26 North American stations were heard during a three-hour session. A list of stations heard at G3PU broken down into prefixes gives the following figures: W1 (9); W2 (12); W3 (6); W4 (2); W5 (1); W8 (7); W9 (1); W0 (4); VE (3); VP2V (1); EL4A and OD5LX. The attention of Top Band operators is drawn to the *CQ* 160 metre World Wide C.W. Contest details of which will be found in the appropriate section.

ZC4PB participated in the 1·8 Mc/s contest from 22.00 to 04.00 but suffered from a very high static level. Around 03.30 G3BTU, G3NPI and G6QB were heard, and at 23.45 OK3EE was worked with good signals both ways. ZC4PB will welcome any reports on his signals and promises activity during the February contest period.

On **3·5 Mc/s,** conditions were spasmodic at the beginning of the period under review but improved considerably at the end of the month. C.w. signals were logged during the evening hours from UA2BR, UA9CM, UW9KCA, UO5KAB and UI8AP at times between 21.00 and 00.15. 4X4WF was heard at 20.00 and an early United States arrival was W1JYH at 23.30. Our reporter, **B.R.S.20317,** notes a peak in conditions usually about 07.00 with North American signals fading out about 08.00. S.s.b. from ZL4OD has been heard regularly between 06.00 and 07.00, and PJ2AA and VP7BP have also provided good signals using this mode. ZS6IR is thought to be on during the early mornings using s.s.b. but no reports of contacts have been received.

The **7 Mc/s band** which, if given a chance, will carry a great deal of the DX traffic in the years ahead has been adversely affected by the strong spreading signals from broadcasting stations in Peking, Pakistan and Iran. If one can endure the racket turned out by these stations, plus the inevitable jammers, the DX can be found in about the third layer. **B.R.S.20317** reports that the path to the U.S.A. generally opens at about 20.30 with outstanding signals from K2GUN, W2KQT, W3SQX, W3PZW, remaining open until around 09.00 when W5ZED, WA6SC and W9BF have been logged. Although the evening path to VK/ZL does not seem to be as good as during recent months the following are reported: VK6RU, 19.00; VK3DQ, 19.30; VK4SS, 19.50; VK6SM, 20.00 and consistent signals from VK5NO, 20.00 to 20.45. In the mornings between 07.30 and 09.00, ZL4NA, 08.10, VK3XU, 07.50; VK2ALQ, 07.20 and VK3XB, 07.50, have been heard. South America did not produce anything noteworthy except the San Andres DXpedition station, HK0QQ at 03.15 and 08.00 From Asia, JAs were logged around 18.30, and 20.00 produced MP4BBE and MP4BDN. UJ8KAA and UL7FD were also in great demand around the same time. VK0TC was a good catch at 23.00 receiving 569 reports from Europe. B.R.S.20317 is now up to 172 confirmed on this band which in the circumstances is a fine effort. **G3LPS** (Blackburn) on returning to 7 Mc/s, found VQ5IB (19.30), HK1AAF (00.40), YV1AD (00.15) and regular ZC4SG. **VS9AAC** is the only Aden station reported as active on this band, and Al himself hears European signals as early as 19.00, often with VK stations coming in at the same time. From Nigeria, **5N2JKO** hears European signals during most of the day except from 09.00 to 15.00, and mentions East Europe QRM on the Nigerian 'phone net on 7050 kc/s. 5N2JKO feels that the stumbling block to 5N2/United Kingdom QSOs is the extremely strong European QRM, which makes contacts before 20.00 somewhat difficult, All the above refers to c.w. only.

14 Mc/s has been very disappointing during the past few weeks, for on many days the mornings have produced only European signals followed by a poor opening to the East, with the band finally fading by 19.00 to 20.00. For the operators keeping normal working hours this has meant that DX has been entirely absent during the time available for operation. **G8PL** confirms the patchy conditions, listing TT8AG ('045), EL4YL ('077), and M1/HB1EO ('020) between 06.00 and 07.00. Amongst the " got aways " were TA2BK, TN8AX, SU1IM, UA0KYA, UA1CC/UL7, VR2EA, KC6BD, 7G1A and several UM8s and UG6s, all at times between 06.00 and 08.00. As G8PL remarks, not a very exciting lot but just enough to keep a DX man looking around. **5N2JKO** reports good openings to the Pacific around 06.00 and 21.00 with VR4 producing good signals at the earlier time. The best on c.w. were ZD8JP ('030), KW6DG ('034), several Zone 19 stations and TT8AA ('010), the latter usually active around 20.00. TT8AA is one of the few African republic stations to use 14 Mc/s, these countries being usually heard on 21 and 28 Mc/s. TU2AL is another exception to the

The European Band Plan

The Plan, which is voluntary and supported by all I.A.R.U. Societies in Europe, is as follows:

Frequency Band	Type of Emission
3500— 3600 kc/s	Telegraphy only
3600— 3800 kc/s	Telephony only
7000— 7050 kc/s	Telegraphy only
7050— 7100 kc/s	Telegraphy and Telephony
14000—14100 kc/s	Telegraphy only
14100—14350 kc/s	Telegraphy and Telephony
21000—21150 kc/s	Telegraphy only
21150—21450 kc/s	Telegraphy and Telephony
28000—28200 kc/s	Telegraphy only
28200—29700 kc/s	Telegraphy and Telephony

rule, being active on c.w. on this band and 7 Mc/s. From the comments made by 5N2JKO it is obvious that propagation conditions are more favourable in Nigeria than in the United Kingdom. The telephony section of the *CQ* Contest produced considerable activity and **MP4BBW** records the following sideband contacts: BV1US, CE3VU, ET3RS, FK8AC, HM4AQ, HV1CN, KH6s, KW6DG, KX6BU, KZ5LC, K6CQV/KS6, LX1DE, SV0WT (Crete), XW8AS, XZ2SY, 3V8CA and numerous European and Soviet countries. Other DX lured by MP4BBW includes CX2AX, DU7IM, FK8AC, KC4USH, HH2P, TY2AA, VK0LG, VK0WW, VR1B, VR2AP, VP3YG, ZK1BS, ZP5OG, and ZD6HK. The few openings to the Pacific have generally been of short duration and the signals from **YJ1MA** (operated by G3JFF) were not strong nor consistent, although contacts were made with United Kingdom stations on at least three mornings around 09.00. UA0BP and UA3AT provided many stations with a Zone 19 s.s.b. QSO when operating from Blagoweschensk. UA0KJA is active on c.w. from the same QTH, with UA0KCA also in Zone 19 at Khabarovsk. There is little to report on a.m., 5N2JKO recording VE3BQL/SU (22.15) and AP2MR (15.00).

The **21 Mc/s band** does not appear to have produced any consistent DX. **TY2AA** attracted much attention and it is hoped that 5N2AMS will soon be able to obtain a Gabon licence. In contrast to 14 Mc/s most of the activity on this band is confined to a.m. and there have been a number of periods producing good signals from Africa and the Near East. EP3RO, EP2AT and EP2DE have been worked between 11.00 and 12.00 whilst EP2AG has been active on s.s.b. **5N2JKO** confirms the openings on the North-South path and records contacts with FE8AR ('215, 14.15), VP5LG on Turks Island ('225, 21.10) and YS1O ('210, 20.00). 5N2JKO mentions that the openings to New Zealand which are a feature of the band in the European area are not apparent in Nigeria.

28 Mc/s has been open in varying degrees during the past month but there has been no consistency in the recorded conditions. On some days the African stations have been heard at good strength whilst at other times this path seems completely unworkable. Using s.s.b. and a Thunderbird beam VQ2AT is frequently an excellent signal around midday. **5N2JKO** reports that the band is open on most days from 12.00 to 17.00 but that the Russian n.b.f.m. stations make life very difficult until they fade out around 14.00. Contacted on A3 were VP6AM (16.25), KG4AO (14.30), ZS7L (13.40), FS7RT (15.15) and ZD7SE (15.35). 28 Mc/s has not fulfilled its autumn promise and it is hoped that 1962 will bring a spell of better conditions.

* * *

Thanks are given to the correspondents who have sent in letters and reports. Acknowledgements are also made to the *DX'press* (PA0FX), the West Gulf DX Club *Bulletin*, the *DXer* (K6CQM) and *DX* (W4KVX).

News items and notes on band conditions and activity will be welcome and should be sent to arrive at R.S.G.B. Headquarters not later than **December 20.**

DXpedition to the Island of the Two Moons

(Continued from page 292)

on 10, 15, 20, 40 and 80m, using a.m., c.w., and s.s.b. Not a single electrical or mechanical failure occurred, which speaks highly of equipment which was in use 24 hours a day for 11 days, in temperatures exceeding 100° in the shade. All that remains is the gargantuan task of writing QSLs, photograph processing and publicity.

Our thanks are due to far too many people to make individual acknowledgment possible, but to all of them the operators say "Thank you" for a very interesting safari in the Red Sea. Our sympathy to those who were not heard and worked in the "pile ups."

Our apologies also for being within two miles of the Yemen and not putting that spot on the air. We got to within 800 yd. whilst fishing, but the sharks and thoughts of Yemeni welcomes to white men was sufficient deterrent. Who knows? Next year R.A.F.A.R.S. may manage it again. This one has whetted the appetites for DXpeditions.

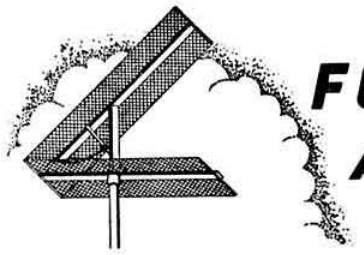
CONTESTS DIARY

1962

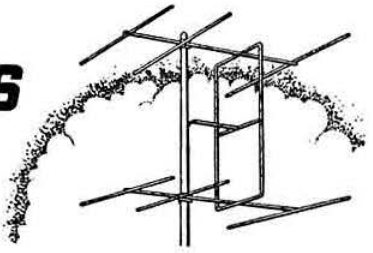
January 20-21 – D.A.R.C. WAE
January 28 – 144 Mc/s C.W. Contest (For rules, see page 308)

February 2-4	–	A.R.R.L. DX Contest (Telephony)
February 3-4	–	Affiliated Societies' Contest
February 16-18	–	A.R.R.L. DX Contest (c.w.)
February 24-25	–	First 1·8 Mc/s Contest
February 24-25	–	CQ 160m. Contest (c.w.)
March 2-4	–	A.R.R.L. DX Contest (Telephony)
March 3-4	–	144 Mc/s Open Contest Listeners' V.H.F. Receiving Contest
March 10-11	–	B.E.R.U. Contests (for rules see pages 306 and 307).
March 16-18	–	A.R.R.L. DX Contest (c.w.)
March 24-25	–	CQ WW S.S.B. Contest
April 7–8	–	Low Power Contest
April 15	–	D/F Qualifying Event
April 28-29	–	V.E.R.O.N. PACC (c.w.).
April 29	–	First 420 Mc/s Contest
April 29	–	D/F Qualifying Event
May 5-6	–	V.E.R.O.N. PACC (Telephony).
May 5-6	–	U.S.S.R. DX Contest
May 6	–	First 144 Mc/s Field Day *
May 13	–	D/F Qualifying Event
May 27	–	D/F Qualifying Event
June 2–3	–	National Field Day
June 16–17	–	70 Mc/s Contest
June 24	–	D/F Qualifying Event 1250 Mc/s Tests
July 7–8	–	Second 420 Mc/s Contest *
July 15	–	D/F Qualifying Event
July 22	–	Second 144 Mc/s Field Day
September 1–2	–	Region 1 I.A.R.U. V.H.F. Contest
September 9	–	D/F National Final
September 16	–	Low Power Field Day
October 7	–	R.A.E.N. Rally
October 27-28	–	R.S.G.B. 7 Mc/s DX Contest
November 10-11	–	Second 1·8 Mc/s Contest
December 1–2	–	R.S.G.B. 21/28 Mc/s Telephony Contests

**To coincide with I.A.R.U. Region 1 V.H.F. Contest dates.*



FOUR METRES AND DOWN



By F. G. LAMBETH (G2AIW)*

AS reported last month, the Turin V.H.F. Managers' Conference (i.e., the meeting of the Permanent V.H.F. Committee of I.A.R.U. Region I) took place from October 13-15, and was attended by 11 delegates and five observers. It is hoped that the following notes on the discussions will be both interesting and informative.

(i) *Continental Field Days.* In Holland the V.E.R.O.N. Field Day is held during the first weekend in July, whilst in August a Bavarian Mountain Day is to be a regular fixture in future.

(ii) Many Continental societies issue v.h.f. certificates some of which can be granted to operators of other nationalities. It is hoped to publish full particulars in due time.

(iii) British TV amateurs are united in maintaining operation on 405 lines, but Continental amateurs use different standards and it was resolved to recommend that all stations commencing on TV should use the C.C.I.R. system (625 lines) or the simplified 312 lines, with horizontal aerial polarization on the 420 Mc/s band. The R.S.G.B. representative abstained from voting on this matter.

(iv) Owing to local difficulties it was suggested that French operation in the 420 Mc/s band should be between 432-433 Mc/s. With this exception, the general agreement to use 432-434 Mc/s was confirmed.

(v) All official Region I I.A.R.U. Contests (March, May, July and September) will in future take place between 18.00 G.M.T. on the Saturday and 18.00 G.M.T. on the Sunday. The last weekend in May is to be a 420 Mc/s and 1296 Mc/s Contest with no 2m operation involved. This will help many who have asked for a separate u.h.f. contest.

A number of other minor alterations were made to the official contest rules, which it is now hoped will rest unaltered for a long time.

(vi) In addition to GB3VHF, it was learned that other beacon stations are either already operating or expecting to be so shortly. DL0UH (Mulheim Ruhr) will be on soon, as will EA3VHF (Barcelona) and EA6VHF (Majorca). DL0SZ (Munich) is on 432·008 Mc/s and DL0S9 (Straubing) on a frequency in the 144 Mc/s band day and night. OZ7IGY continues to operate on 144 and 420 Mc/s.

(vii) E.M.E. (Earth-Moon-Earth) experimental work is going on in Germany, but information is sought from British groups in order that work may be co-ordinated.

(viii) V.F.O.s on 144 Mc/s should, it was felt, be used only for calling with prompt return to normal zone frequency after contact is established. They should certainly not be used as on the lower frequency bands.

(ix) A discussion took place on meteor shower operation and information has been promised.

(x) All v.h.f. distance records will be based on any distance greater than the previous record.

(xi) The importance of c.w. working was emphasized, and it is repeated here as this cannot be too heavily stressed. Many DX QSOs have probably been missed because c.w. was not in use.

(xii) Tropospheric transatlantic tests have been postponed because E.M.E. is considered to have the better chance at the present.

(xiii) Monday is now generally accepted on the Continent as Activity Night.

(xiv) QRA Locations must appear in all I.A.R.U. Contests starting from 1962. As the R.S.G.B. QRA Locator Map will shortly be available, this should present no difficulty as far as United Kingdom amateurs are concerned.

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

Two Metre News

A.2524 (Wolverhampton) sends an impressive list for both tropo and the aurora on October 28, also a sincere " thank you " for the fine time at the Northern V.H.F. Convention.

G3LTN (Weyhill) first noticed strong auroral reflection at 17.55 on October 28 on signals from G3PLS (Birmingham) and contact was made immediately: reports, 56A out and 58A in. At the h.f. end of the band there was a " pile up " of G, GI and GM signals at strengths between 54A and 58A. This phase faded out at 19.00 G.M.T. and thereafter occasional bursts were noted until 21.38 G.M.T. Between 17.55 and 19.00 G, GI, GM and GW stations were heard. Most were called, but no QSOs resulted. During this period G3NAE (Bournemouth) and G3FIH (Bath) were heard without auroral indications. After 19.00 GI3OFT (three times) and GM3HLH were heard, but no replies were received.

G3OJY (Penzance) who believes he will be able to claim to be the " first and last amateur v.h.f. station in England " being only 10 to 12 miles from Land's End, will be on 2m in the New Year running about 95 watts peak with controlled carrier modulation and 120 watts on c.w. It is hoped to make contact with many of the friends made whilst at Churt as the new QTH is 280 ft. a.s.l. Mobile-static and portable operation from nearby high ground is also a possibility.

G2DHV, operating as GB3RES during the Jamboree-on-the-Air, was unlucky in only working 12 stations in 48 hours' operation. The best DX was G6NB.

G5QA (Exeter) has worked 16 counties on 2m since September 1, and is on the band quite regularly again.

G3OHD (Petts Wood) had some success in the October opening. Having been stuck for a long time at four countries worked, EI2A, GW3MDY and DJ7IH raised the total to seven very quickly. A new transmitter, with a QQV06/40 p.a., is in operation, whilst the receiving side has been improved by the addition of a 6CW4 pre-amplifier and a BC453 Q5-er. G3OHD has some thoughts on the fate of counties, county boroughs and the like when schemes like that proposed for Greater London and similar areas in different parts of the country come into operation, leading to the disappearance of some areas (e.g. Rutland) and the possible rise of new ones. It hasn't come yet, but it will, and the new status of various areas will have to be dealt with for certificates.

GI3OFT (Belfast) says that the " terrific " auroral opening

of October 28 caught most GIs unaware. GI3FJA was in an l.f. band contest, GI5AJ was modifying his receiver and GI3OFT didn't know about it until 17.00 G.M.T. The band then sounded like 40m on a Sunday afternoon. In the following 3½ hours 29 contacts were made including three new countries, nine new counties and 17 new stations. The best DX was DL1RX (Hamburg, 59A), DL6SS (Oldenburg), F3ND (Rouen, 58A), PA0FB, and many G stations down to the South Coast. The aurora returned, somewhat weaker, at 22.30 G.M.T. until 00.20 G.M.T. with more Gs and GW3MFY worked at around 56/57A. GI3ONF also worked five new counties and two new countries from County Armagh. GI3GXP reports hearing an OK1 calling GI3OFT—much to the latter's chagrin!

B.R.S.21476 (Shrewsbury) has at last been lucky enough to be in on an auroral opening (October 28). The clue was the TV screen, and the sound of Channel 4, which had become almost unintelligible. The 2m receiver was quickly put on and between 18.20 and 19.00 G.M.T. the band was very much alive with c.w. signals, mostly T1 to T5. G4LU was the only one unaffected due, supposedly, to being " virtually on the doorstep." One GM was heard, but the call was not repeated enough times for certain identification. London stations and GW3MFY were heard. The locals (G4LU, G3IOO, G6FK and G3KMT) are usually heard during the mid-evening, but little else lately.

G3IIR (Forest Hill) worked ON4BZ (59 both ways) in a minor (tropo) opening, which occurred at 23.00 G.M.T. on November 17. ON and F stations were heard also, but no PAs; other stations were heard working ON and F.

G3LTF (Galleywood) knew about the aurora of October 28, but could not transmit as he had visitors. During a few quick " tune rounds " on the receiving side, DL6SS, GM3KGJ, OZ9AC, PA0FB, GM3HLH/A, GM4HR, GM2FHH, GI3OFT, OZ7SC and a station believed to be an SM were all heard before fade-out at 20.05. During the second phase (22.00/00.30) GM2FHH, GI3OFT, GM3FGJ, GM4HR, GM3KPD, GM3KYI and GM3BCD were worked with GM6IZ, GM3NG, GM3UM, GI3GXP and GM2FNF heard. After that there was little until November 15 when GI3GXP was worked on phone, GI3ONF and GI3FJA on c.w. with GI5AJ, GI3OFT and G3IOE heard. On the 17th, Dresden TV was S8-9 at 19.00 G.M.T. with little QSB, but there was no real DX about; DL1LB and many PAs were heard. On the 18th, Dresden was down to S2.

G3JR (Barnes) missed all but the last quarter hour of the October 28 aurora. However, at 22.56 GM3FGJ was worked at 56A both ways. The aurora faded at 23.05, but this one contact gave G3JR the tenth country this year. The only other QSO of interest was a nice c.w. one with G3IOO on November 14.

GM2FHH (Aberdeen) has only the October 28 aurora to report. This lasted from approximately 13.45 to 23.00 G.M.T. The best DX was DL7HR (Berlin) and the best G-DX G3FAN (I.o.W.). Stations in DJ/DL, G, GM, LA, OZ, ON and PA were heard and/or worked. No outstanding DX, but GM2FHH says that he heard from GM3GUI that he logged an OK station. Activity seems to be improving in Scotland, as GM2FHH heard (by letter) from GM3NQB (Thurso) and GM3ODP (Inverness) that quite a few are on with low power rigs. A sked has been arranged with GM3NMN (Irvine, Ayrshire) on 145·8 Mc/s.

R.S.G.B. V.H.F. BEACON STATION GB3VHF

The frequency of the Society's v.h.f. beacon transmitter at Wrotham Hill, Kent, when measured by the B.B.C. Frequency Checking Station, was as follows (nominal frequency 144.50 Mc/s).

Date	Time	Error
November 7, 1961	12.05 G.M.T.	505 c/s high
November 14, 1961	12.00 G.M.T.	808 c/s high
November 21, 1961	12.10 G.M.T.	858 c/s high
November 28, 1961	15.05 G.M.T.	915 c/s high

The station is in operation from 06.30-23.59 B.S.T. daily, but may be on for the full 24 hours for test purposes from time to time.

V.H.F. QSY

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

Crystals Offered

By G3JR, 26 Bracken Gardens, Barnes, London, S.W.13. 12,166 kc/s (B7G type).

Crystals Required

By G3JR, as above. Similar B7G type for Zones 1 or 2 or a mid-band frequency.

G4LX's Auroral Report for October 1961

The opening on October 28 was undoubtedly the most important for some time. First signs of this were observed in Sweden two days earlier, when other SM stations were heard, via aurora, between 21.45 and 23.10 G.M.T. At the same time the next evening conditions returned and SM stations were heard once more. On the morning of October 28, auroral propagation started at 10.15 G.M.T. The first intense phase was between 12.00 and 17.00 G.M.T. and the second phase between 21.30 and midnight. SM6PU heard 73 stations in eleven countries, his best QSOs being with GM3GUI, GM4HR, G3ILD, UR2BU, OH1SM, SP5SM, DL1RX, DL3IP, DL6SS, DL7HR, DM2ADJ, DM3JA, and numerous SMs. Those who were heard in Sweden, but not worked included GM2FHH, GM3HLH/A, GM3FGJ, G5YV, ON4ZK, OH0RJ, OH2HK, DL1LB, DL3YBA, DL3SPA, DL6OS, DL6QS, DL7HM, DL9XV, DJ3NO, DJ3BX, DJ5HG, OZ3M, OZ5AB, OZ5BK, OZ6RC, OZ7IGY, OZ8ME, OZ9AC, LA4YG, LA4RD, LA9T, and about 30 other SMs.

In the North of England G4LX found that the aurora was in full swing at 14.30 G.M.T., 31 different stations in seven countries being logged during the first phase up to 15.40 G.M.T. The second phase was very poor, only one station being heard. On the other hand, G3OSA in Dorset was hearing a number of northern stations during this second phase around 18.30 onwards. The November BULLETIN reported on the activities of G3OSA, G3ABH and G3HRH, so the details will not be repeated here. GM3HR in Dundee was fortunate to spot the opening at 14.00 G.M.T., having heard GB3VHF and OZ7IGY at good strength. During the first spell, GM3HR had QSOs with 15 G stations and eight Europeans. During the second phase, 12 G stations and one DL were contacted between 19.00 and midnight. He reports that G2CIW was putting in an outstanding signal, as well as SP5SM, but the latter was not worked.

It is unfortunate that only four stations furnished reports on this opening. Activity was high in spite of the *CQ Magazine* Contest, which was in progress on the h.f. bands at the time. At least 100 stations are known to have been on 144 Mc/s during the opening. G4LX is most appreciative of the co-operation of G3LTN, G3OSA, GM4HR and SM6PU for the prompt and interesting reports.

Two Metre News from Overseas

Norway: LA9T reports that there was an aurora on September 30 when SM and OZ stations were worked. The October 28 aurora brought QSOs between LA4YG and SM, OZ, DL and DM stations. LA9T worked OZ5AB and both heard many others including SP3GZ, GM2FHH and several DLs.

Germany: On the night of September 23, DL1LB worked OH0RJ (Mariehamn) in the Aäland Is.

France: During the October 28 aurora, F3ND (near Rouen) heard G5YV, G3CCH, GM4HR, GM3HLH/A, but had no QSOs. GM3FGJ was also heard calling DM3ADJ until 18.25. Then all faded except G3CCH who, however, was then very weak. At 18.45, GW3MFY was heard, and GI3OFT

calling CQ GM. A QSO was made at 18.50. This is the first F/GI contact by aurora, thinks F9ND, who sent the report.

Cyprus and Middle East: ZC4BB, who is at present awaiting an OD5 call, writes from Beirut that daily contacts take place between ZC4WR, ZC4MO, OD5CG, OD5CT and OD5CU around 15.00/17.30 G.M.T. The distance between Cyprus and Beirut is approximately 150 miles. OD5CN is building, and will shortly be operative. ZC4BB will be using a Gonset Communicator IV, followed by a QQV06-40 linear amplifier to a ten element Yagi in various QTHs in the Arabian Gulf, among which will be MP4BDA (Bahrein), MP4QAO (Qatar) and MP4TAE (Trucial Oman), and from MP4DAC (Das Island) and 9K3TL/NZ (Kuwait Neutral Zone). Although distances are almost 300 miles ducting effects are widespread, and in the v.h.f. aircraft band (120 Mc/s), it is possible to hear ground stations and aircraft *on the ground*, at distances up to 400 miles at most times of the day. MP4BBW (Awali, Bahrein Is.) is similarly equipped and MP4BBL, MP4BCC and MP4BDC are building.

Austria: On October 15, OE9IM (Bregenz) heard PA0S (or F)HB, PA0VLP, GI3FJA/A, GI5AJ, GW3MFY, G3HBW, ON3BSU(?) and SM7BAE in addition to making contact with G3LTF. Some of the call-signs quoted may not be entirely accurate because OE9IM wrote the list from memory (via OE6AP).

On August 31, SM6ANR worked 33 Gs on 2m and seven on 70cm, including G3JHM. On September 1, SM7BAE worked G3NNG, a distance of more than 1,000 km.

Four Metre News

Congratulations to **GI3HXV** on achieving two firsts in one week—after six fruitless months. The first GI/G contact was with G3OHH (Macclesfield) on October 28. Reports were 58A both ways. On the following day GM3EGW was worked at 589. GI3HXV uses 25 watts to a modified SCR522 and a three element beam at 30 ft. with a homemade converter into an Eddystone 640. GI3OFT sent this news.

On November 20, **G5CP/A** (70·35 Mc/s), had a solid 45 minute QSO on c.w. with GM3EGW (70·25 Mc/s). This is believed to be the first G/GM contact on 70 Mc/s. G5CP/A's signals were RST559 and GM3EGW's RST569.

B.R.S.21476 (Shrewsbury) has an aerial up, but is still to hear any signals. True, only two short listening periods have been possible lately.

Seventy Centimetres

G5QA (Exeter) is particularly interested in this band and the skeds which are being run. On Mondays, Wednesdays and Fridays at 21.30 there is a get-together with GW3ATM and G3OYM/T. Never once, so far, have these failed in nearly 12 months. Herb says he is sure the band can be used much more than some people realize—the trouble is that most of us never try it.

ZC4WR (Limassol) heard OD5CG (432·190 Mc/s) on September 21 over a path of about 120 miles. No QSO resulted on 70cm, but a cross-band 2m/70cm contact was made. These were the first 70cm signals received from OD5CG. OD5CG is busy on a receiver, and ZC4WR on a tripler for the existing 2m transmitter.

GI3OFT says work is still going on towards the first EI/GI QSO. There are two rival groups—GI3ONF (Portadown) and EI2A (Navan) on the one hand, and GI3FJA, assisted by GI3GXP and GI3OFT with EI2W (Dublin) on the other. Two unsuccessful attempts were made in October, but conditions were very poor even on 2m, but they are keeping at it.

G3LTF worked ON4HN on November 18 and called ON4HC without success.

G3EKP (Belthorn, Lancs.) says that G3ILX (Barrow) is active on 70cm and that he himself hopes to be so before the New Year. The local site is 850 ft. a.s.l. with a clear run to the West and it should be possible to raise Northern Ireland. Other stations in the area are G3HWC and G3OTA (Blackburn). The latter intends transmitting TV on 70cm soon.

G3NNG (Didcot) is the first claimant for the 70cm section of the *Four Metres and Down* award. Congratulations! a fine effort indeed.

1296 Mc/s and Above

B.R.S.21476 (Shrewsbury) has a receiver on the bench, awaiting minor modifications to the oscillator-mixer, and will then be ready for co-operation with any local station wishing to conduct tests. Before the end of the year it is hoped to have gear available for all s.h.f. allocations up to 10,000 Mc/s, except 5650 Mc/s, a band for which it has so far been impossible to obtain a suitable klystron.

* * *

The writer of this column sends best wishes for Christmas and the New Year. Here's to bigger and better openings.

LONDON U.H.F. GROUP

will meet at the Whitehall Hotel, Bloomsbury Square, London, W.C.1.

at 7.30 p.m. on Thursday, January 4, 1962.

All v.h.f. and u.h.f. enthusiasts welcome.

Worked and Heard on V.H.F.

Two Metres

G3LTF (Galleywood) October 12-October 16.
Worked: DJ1VK, 2EY, 2RJ, 3ENA, 5QR, DL1FF, 1LS, 3SP, 3YBA, 6EZA, 6TU, 6WUA, 9GS, 9GU, DM2ABK, EI2A, F2SF, 3MS, 3NJ, 8AF, 8TP, 9II, GD3UB, GI3FJA, 3ONF, GM2FHH, 3DDE, 3FGJ, 3GUI, 3ULU/A, HB1KI, 1QQ, 9BZ, 9KI, 9KM, LX1SI, OE9IM, OK1EM/P, SM6ANR, 6PU, 7AED.

GM3GUI (Friockheim) October 13-15.
Worked: G2XK, 2XV, 3BLP, 3LTF, 5LB, 8VZ. *Heard:* F2AU (?), G2MV, 2CIW, G3BLP, 3CO, 3EHY, 3GHJ, 3JMA, 3KF, 3LTF, 3NMQ, 5LB, 6RH, 8VZ. GB3VHF.

A.2524 (Wolverhampton) October.
Heard: EI2A, G2JM, 2MR, 2MV, 2XV, 2XK, 2AHY, 3AGS, 3AXI, 3CO, 3CBU, 3EVV, 3ILD, 3ILX, 3JHM/A, 3JYP, 3LAR, 3LTF, 3MCS, 3MDH, 3MDM, 3MPS, 3NNG, 3OBD, 3OSS, 3OTM, 5GN, 5MA, 5TN, 5YV, 5ZG, 6NB, 6GN, 6YP, 8GP, 8SK, 8VZ, GI3HBH, G3HRH, 3EHY, 3IKV, GI3OFT, G3KEQ, 3LSF, GW3MDY, 8NP, 6XT (all phone tropo). G3KZU, GI3FJA, 3GXP, 3OFT, 3HLH/A, 3EGW (all c.w. tropo). During the aurora on October 28: DJ5UG, DL1LB, 6SS, 9GU, DM2ADJ, G2XV, 3FAN, 30BD, 5BM, GI3GXP, 3OFT, 3ONF, 5AJ, GM2FHH, 3KGJ, 3KPD, 4HR, 6XW, GW3CO, 3LJP, 3MFY, PA0FB.

G3LTN (Weyhill)
Heard: (During the aurora on October 28).
G3IOE (58A), 3JYP (57A), 3KMT (54A), 3NBQ (58A), 6NB (58A), GI3GXP (57A), 3OFT (58A), 5AJ (58A), GM3BCD (56A), 3BDA (54A), 3FGJ (54A), 3UM (54A), GW2HIY (58A), GW3MFY (56A).

Seventy Centimetres

G3LTF (Galleywood) October 12-16.
Worked: DJ3ENA, DL6EZA, SM6ANR, 7AED. *Heard:* ON4HN.

Amateur Radio Stamps

FURTHER to the information published on page 242 of the November issue, Mr. E. Howell (G3GUP) states that the Polish Government in fact issued a series of three stamps recently with an electronic theme. The 40 gr. depicts a telephone dial, the 60 gr. a Yagi array and the 2.50z. a reproduction of the PZK badge. The set is available in a strip of three from stamp dealers.

OZ5S Says Thanks

IN a letter to Headquarters, Svend A. Johansen (OZ5S) expresses his thanks for the hospitality shown to him and his wife during their recent visit to the United Kingdom and in particular that accorded to them by GC2FMV and G3KSH. OZ5S invites British amateurs to visit him when in Copenhagen.

Single Sideband

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

CONSIDERATION has already been given to the four basic methods of operating a linear power amplifier; the effect of non-linearity and the resulting intermodulation products causing distortion; methods of choosing the correct operating parameters from the valve characteristic curves and finally the basic formulae for determining the power input, the p.e.p. output, the driving power and the efficiency.

Problems of Ratings

It is customary to rate a.m. transmitters on the power developed in the carrier and most published data on valves for a.m. telephony gives operating conditions which take into account the peaks which occur when 100 per cent modulation is applied. With single sideband operation it is not possible to have a similar form of rating since at zero modulation there is no output from the valve (this assumes complete suppression of the carrier).

The s.s.b. operator talks in terms of linear amplifiers with a p.e.p. (peak envelope power) input of several hundred watts and a p.e.p. output of up to 400 watts. The a.m. worker hearing this kind of conversation and seeing similar figures in print, quite understandably makes sarcastic reference to the fact that the maximum licensed power is 150 watts input, and how do the s.s.b. boys get away with it.

To counter this, the sideband operator points out that assuming an overall efficiency of 66 per cent the 150 watt a.m. transmitter is radiating a carrier whose power is 100 watts, and that the carrier envelope voltage doubles when fully modulated. As power is proportional to E^2/R, the power output at the modulation crest (the p.e.p.) is four times the carrier power—it is therefore 400 watts. (This can be proved by absorbing the transmitter output into a dummy load and measuring the voltage developed across the load by means of a cathode ray tube. The c.r.t. deflection from the unmodulated carrier will double when the carrier is fully modulated.)

The a.m. advocate's reply is something like this. " This is a lot of nonsense, the power output from my 150 watt a.m. transmitter, fully modulated, is not 400 watts and never has been. The term ' p.e.p.' is completely meaningless to me and there is no such thing! My input power is 150 watts to produce the carrier and 75 watts from the audio section to modulate it. That is a total input of 225 watts and assuming an overall efficiency of 66 per cent the total output when fully modulated is 150 watts. That is, the carrier power has been increased by 1·5 times, therefore as power is proportional to $I^2 \times R$, the current indicated on my aerial ammeter will increase by the square root of 1·5 = 1·225 or 22·5 per cent, and that is exactly what it does do. In fact when I am not modulating it reads 1 amp. and when I fully modulate it reads 1·225 amps. According to your theory, if I am putting out 400 watts it should read 2·0 amps. My aerial meter does not lie—I *know* my power output is 150 watts because the meter says so, and that is good enough for me!"

This argument can go on for a long time, and in fact it often does. It never reaches a satisfactory conclusion because neither party will give way and neither party can convince the other that he is right and his opponent wrong. In fact—both sides are right and technically quite correct. The two opposing views can be reconciled quite easily if we define what we mean exactly when we talk of single sideband output power and how this differs from the modulated a.m. transmitter output power.

Looking at the Modulation Envelope

It will be assumed that a transmitter set up to the maximum licensed input of 150 watts is anode modulated with 75 watts of audio (the usual amateur conditions). Further, that the overall efficiency of transfer of r.f. output into the load is 66·6 per cent. The load is a non-inductive resistance of 100 ohms. If the vertical deflection plates of a cathode ray oscilloscope are connected across the dummy load the vertical deflection will be a measure of the r.f. voltage appearing across the load. In the unmodulated condition the r.f. output power is 100 watts, the voltage across the load is 100 volts and the current flowing through the load is 1 amp. The modulator is now driven to the 75 watt output condition by applying a 1 kc/s sine wave to the microphone input socket. This will fully modulate the r.f. carrier and the cathode ray tube trace will double in amplitude. If the oscilloscope horizontal time base is now switched on and the speed adjusted to some multiple of the 1 kc/s modulating frequency, the r.f. modulation envelope will be displayed.†

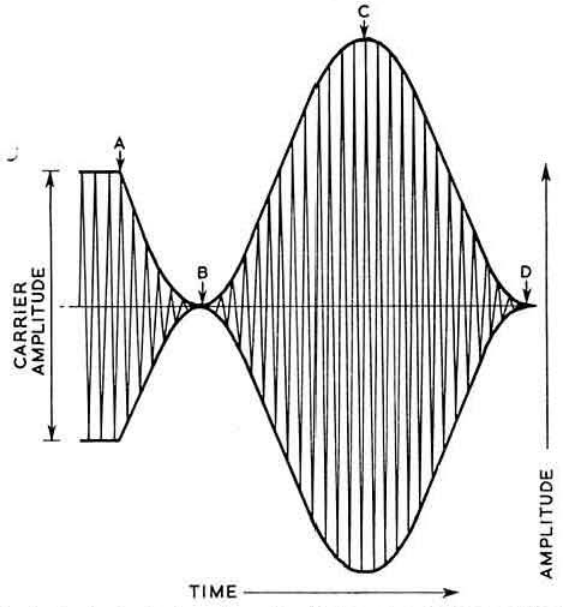


Fig. 1. Graph showing how the cycles of r.f. produced by the resultant voltages of the carrier and the two sidebands are continually changing in amplitude from zero at the modulation trough at point *B* to twice the carrier value at the modulation crest at *C*.

It is important to appreciate that the modulation envelope is not just a flow of electrical energy varying at an audio frequency but is in fact made up of individual cycles of r.f. energy at the transmitter output frequency, and these are constantly changing in amplitude from zero up to their maximum value at the modulation crest, and back again to zero, in this case 1,000 times per second. (A transmitter

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

† This does not imply that an a.m. transmission passing through the ionosphere is a carrier expanding and contracting in sympathy with the modulation. The modulator must provide sufficient power at the modulating frequency to vary the effective supply voltage from zero to twice the d.c. anode potential (for 100 per cent modulation). The sideband frequencies can be considered as being generated by varying the fundamental r.f. wave—this variation produces sum and difference frequencies and these constitute the two sidebands. The carrier and the sidebands are quite separate from each other and can be received independently. As all the component frequencies of the transmitted wave are r.f. (two sidebands and a carrier) on different frequencies, they get " in and out of step with each other " and the resultant is the modulation envelope. This was discussed in detail in *Single Sideband* in the October 1960 issue of the BULLETIN.

on 5·0 Mc/s would have 5,000 individual cycles of r.f. within the part of the envelope representing one cycle at this audio frequency.) For the sake of clarity these r.f. cycles have been reduced in number and are shown in Fig. 1 within the part of the envelope representing one cycle of the modulation frequency.

The diagram in Fig. 1 is a graph of voltage plotted against time—it would be equally valid if it were a graph of current through the 100 ohm load plotted against time. It is convenient to think in terms of voltage because the oscilloscope is the only instrument that will show the transmitter output as a visual presentation, and an oscilloscope is a voltage operated device. Considering the single audio cycle of the modulation envelope shown in Fig. 1, at the left hand side of the diagram at point *A* the carrier voltage is 100 volts and the current through the load is 1 amp. One-four-thousandths of a second later at point *B*, the r.f. cycles are zero—the voltage across the load and the current through it are also zero. During the next two-thousandths of a second the r.f. cycles increase in amplitude until they reach the crest of the envelope at point *C*. During this period of time the individual r.f. cycles occurring have twice the original carrier amplitude and the voltage across the load has doubled, therefore as $P = E^2/R$ the power output of each cycle of r.f. energy at the modulation crest is four times the unmodulated carrier power—this is the peak envelope of the transmission, the p.e.p. output, and this is 400 watts. It is also important to appreciate that the p.e.p. output is a real power r.m.s. value. The voltage across the load is 200 volts r.m.s., and the current through it is 2·0 amps r.m.s. The product of these two is 400 watts of effective power. One-two-thousandths of a second later the cycles of r.f. have reached point *D* in Fig. 1, and the transmitter output is again zero.

An r.f. ammeter in series with the 100 ohm load will indicate 1 amp. under steady unmodulated carrier conditions. It will be a thermocouple or hot wire instrument, and is a heat-operated device. It is therefore measuring the energy, r.m.s. value, of the current flowing through it. Theoretically as the power output is 400 watts at the modulation crest the r.f. ammeter should read 2 amps. In practice it cannot do this because the thermocouple requires a relatively long period of time to reach the temperature corresponding to a current of 2 amps. The meter has a time constant that is too slow to be able to follow an r.f. current that is varying from zero to its maximum value of 2 amps, and back again to zero at an audio rate. It will in fact reach a temperature and indicate a current reading that is the effective—the r.m.s.—value of all the individual cycles of r.f. making up the modulation envelope.

The method of finding the effective (r.m.s.) value is to take the peak r.f. values at many points over a complete cycle of audio alternation, square these values and then find their average, finally taking the square root of the value thus obtained. The part of the diagram between points *B* and *D* in Fig. 1 is one complete cycle of the modulating frequency and is already divided into 25 cycles of r.f. It is then convenient to measure the individual lengths of these, square all the values obtained, add them together and divide by 25 to find the average and then calculate the square root. This value will be found to be exactly 1·225 times the carrier amplitude, i.e. the effective (r.m.s.) value of the individual cycles of r.f. energy ocurring within each cycle at the modulating frequency is 1·225 times the unmodulated carrier value, therefore the r.f. ammeter indicating 1·0 amp. of current through the 100 ohm load will be expected to indicate under under 100 per cent modulation conditions, 1·225 amps, and this is exactly what it does do.

The output power is given by the formula $P = I^2R$, and substituting the values this becomes 1·225 squared × 100 = 1·5 × 100 = 150 watts. It is therefore clear that the man who says, " My power output increases from 100 to 150 watts when I fully modulate," is quite correct. He is talking about his effective power over a long period of time embracing a number of cycles at his *audio* frequency. It is also clear that the man who says, " The peak envelope power of a 100 watt output a.m. transmitter is 400 watts at the modulation crest," is also quite correct. He is talking about the effective power over a short period of time embracing a number of cycles at his *radio* frequency.

The most satisfactory method of giving the operating conditions for valves designed especially for linear amplifier sideband service is that of p.e.p. input and output ratings. This method has been used for a number of years by American valve manufacturers and it is significant to note in the Mullard publication *Valves for Single Sideband Suppressed Carrier Service* that this method of rating has also been adopted by the British manufacturer.

Because of these considerations it is important that non-sideband operators have a clearer understanding of the meaning of p.e.p. input and output and how this relates to the existing G.P.O. sideband regulations based on the envelope voltage developed at the modulation crest by a 150 watt d.c. input a.m. transmitter.

Technical Topics

(Continued from page 284)

provides very much greater audio output than the conventional product detector at low intermodulation. G6RC, who has fitted one in a much modified Super Pro, found the gain so much greater that he was forced to switch out an audio stage on s.s.b.

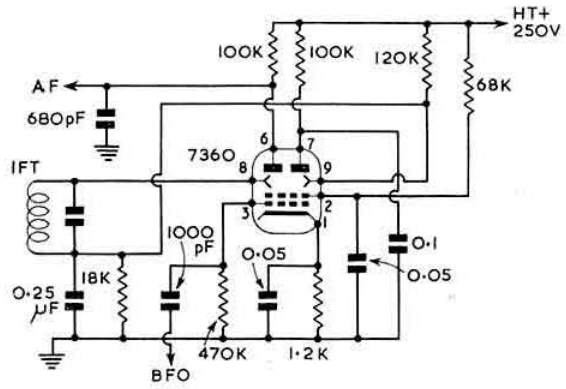


Fig. 6. 7360 beam deflection product detector by K2BTM.

In Brief

G3JGO has recently been looking into the question of whether there is any solid foundation for the fairly widespread belief that double-triode cascode amplifiers are less susceptible to cross-modulation than r.f. pentodes. Although he has turned up some evidence that certain frame-grid pentodes may eventually emerge as the least susceptible, it is still rather uncertain. G3JGO sums it all up by saying " It looks as though certain triodes are better than certain pentodes, probably the difference is affected markedly by the screen voltage regulation."

In the October issue we foresaw the day when *T.T.* might be distributed by space communications. While we cannot report any progress on these lines yet, your contributor was recently asked to put out some safety hints via the QRO transmitters of the B.B.C. *Short-Wave Listeners' Corner* programme.

Mobile Column

By C. R. PLANT (G5CP)*

IN taking over the responsibility of producing *Mobile Column*, the writer feels rather like one of the Israelites who were told to make bricks without straw. As the notice published in the November issue of the BULLETIN gave little opportunity for information to be received from mobile enthusiasts in time for this issue, a further plea is made for help because without it the column cannot be produced in an interesting and informative manner.

For the next few months it is proposed, with the help of readers, to pass on to the mobile fraternity at large useful hints and tips concerning problems which have arisen and been overcome. These will cover the many aspects of mobile installations and operation and may include things which you, the reader, may think are obvious. They may however be of great help to someone who is just starting a mobile installation. Here are a few suggestions to act as guidance: aerial

YV5FK/M uses Collins equipment in his mobile installation.

problems, aerial mountings for specific car models, modifications to ex-Government surplus equipment and noise suppression methods, etc.

Perhaps someone has in use a fully transistorised, voice operated switch unit using cheap, easily obtained transistors, in a circuit which merely requires a 12 volt supply. This would be of great interest to many of us; it would most certainly contribute to safer motoring, for with a device like this and a microphone slung on a cord round the neck, both hands would be available at all times to drive the car. The writer is a great believer in safe driving and so will welcome any contributions which assist to that end. Fortunately, up to the present time, there has been no report of any accident taking place whilst radio equipment has been operating; this is a good thing, for there is nothing more likely to bring Amateur Radio into disrepute than an accident under such circumstances.

Operating News

Since early October G5CP has operated /M in various parts of the country using 144 Mc/s at Alexandra Palace, London, and Devil's Dyke, Sussex, the former with a halo and the latter with a five element Yagi, both aerials being sited 18 in. above car roof level. The 3·5 Mc/s band was used

* "*Lynton*," *12 Nottingham Drive, Wingerworth, Chesterfield, Derbyshire.*

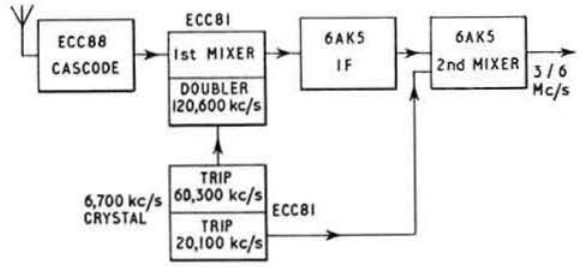


Fig. 1. Block diagram of the converter section of G3APY's 144 Mc/s receiver.

whilst crossing the southern counties from Sussex to Somerset. On 144 Mc/s many contacts were made with the Home Counties and with stations farther afield (notably, G5DW Ashcott, Somerset) including the Isle of Wight. On October 4 at 20.30 G.M.T. from a site near Ditchling Beacon, Sussex, two way phone contacts were made with W4IXJ, K1KYF, WA2OGC, K1AYM and W6ICM/3 using 21 Mc/s; the American stations were all around the S8/9 mark and incoming reports varied from S8/9 to S5. The input at G5CP/M was 35 watts and the aerial an 11 ft. plain Master Mobile whip, mounted on the off side of the rear bumper. On October 5 whilst en route from Brighton to Bridgwater, Somerset, many contacts were made on 3·5 Mc/s phone, notably with G5SN (Leigh on Sea), G8KC (Reading), G2BSA (Looe), G2BYI (Peterborough), G5CK/M (en route Birmingham-Wolverhampton) and G3HRJ (Romsey). G5SN was worked shortly after leaving Brighton and, by a strange coincidence, again just prior to closing down on arrival at Aschott, Somerset. G3HRJ was contacted on sked every half hour after the initial working. An interesting and enjoyable evening was spent with G5DW and his lady—the ancient game of skittles being part of the evening's programme. The following day, during a run to Bristol, contact was established with G8KC, G8DN (Langport), G3LKB (Billingshurst), G2XY (Leeds), all on 3·5 Mc/s phone.

The equipment used when operating /M comprises two separate installations, one for 144 Mc/s and the other for 3.5 to 28 Mc/s. Both rigs may be operated on phone or c.w. The former is a Hamobile transmitter/receiver and the latter a home built unit incorporating a Geloso v.f.o. followed by a 6146 p.a., modulated by a pair of 6L6's in Class AB1.

One of the most successful low power 144 Mc/s mobile stations yet seen, is owned by G3APY (Sutton in Ashfield, Notts.). The complete transmitter is housed in a box 6 in. × 3 in. × 4 in. high, the valve line up being 6BJ6 oscillator-tripler, 6AK6 tripler, EL85 doubler, QQV03-10 p.a. An 8 Mc/s crystal is used. The modulator consists of a 6BH6 followed by a 12AT7, half of which is used as the " gating " valve. For an input of 12 watts on phone, a total demand of only 5 amps at 12 volts is required. Using a halo aerial mounted in front of the car with the radiator portion just above the roof, two way phone contacts have been made with PA0LQ, PA0TJ, PA0WAR and on c.w. with SM6ANR—truly an outstanding performance for so small a rig and so simple an aerial system. G3APY's converter line up, which is an extremely interesting one, is shown in Fig 1.

* * *

Contributions for inclusion in the January issue should reach G5CP by December 20.

Esperanto

MR. FRANK BOYCE, Lotamore, Rookery Road, Staines, Middlesex, will be glad to hear from any member of the Society who transmits on schedule in Esperanto to any other Esperanto enthusiast.

Society News

Headquarters Fund List No. 3

THE following is the third list of those who had contributed to the Headquarters Fund up to November 30, 1961:

J. Partington (G5PX), W. N. Craig (G6JJ), P. Woollett (B.R.S.1759), R. L. Whorwell (G3CTR/T), J. MacIntosh (GM3IAA), R. H. Chambers (B.R.S.22496), B. C. Skinner (B.R.S.5637), L. France (GW3PEX), R. F. Pilkington (G3IAG), C. R. Waterer (G2HP), R. H. Taylor (G8HT), G. J. Ralph (GW3LNZ), W. G. C. Price (GW2OP), J. G. H. Pearce (G3IGP), J. F. Shepherd (GM3EGW), M. T. Elvy (G3BD), G. A. Partridge (G3CED), D. C. Snow (G3NRL), G. E. Gloin (B.R.S.23311), R. P. Walker-Alexander, S. Pinches (A.2683), C. M. Denny (G6DN), P. Gill (G3NRO), W. G. Scarlett (B.R.S.21027), E. Banks (GC2CNC), J. O. Dykes (B.R.S.2036), Dr. J. C. Craig (VO1FB), T. C. Platt (G2GA), C. W. W. Brown (G3CEI), W. James (DL2XM/G6XM), B. H. Thwaites (G3CVI), J. T. McMillan (GI3JXS), A. C. Miller (GM3BKC), H. Miller (G3ESD), F. Erridge (B.R.S.23265), I. L. Kedge (G5AS), G. R. Scott-Farnie (G5FI), F. J. T. Tuckfield (G2HOX), G. B. Esslemont (GM3FRZ), K. Altmann (OE3TL), J. E. Mollman (F.R.S.325), J. F. Stratfull (5N2IJS/G3IJS), D. Townley (G3GHZ), J. A. Mann (VP9D), E. C. Taylor (B.R.S.22594), H. E. F. Taylor (G6HT), A. Burson (G3ORE), J. S. Cairns (G3ITT), G. V. Haylock (G2DHV), P. M. Haylock (A.2455), E. J. Davis (B.R.S.20779), D. W. Lennox (B.R.S.24450), I. J. Wood (ZE3JJ), Dr. J. Tindle (G3JXN), K. R. Belcher (B.R.S.22596), G. L. V. Butler (G2BUL), F/Off. R. K. Webb (G3NDK), W. S. Tregear (VK3TX), B. Loveday (B.R.S.21253), R. J. Burr (G3NBT), R. R. J. Caines (G3ORC), W/Cdr. A. R. Gilding (G3KSH), A. E. Smith (B.R.S.22259), Bury Radio Society, G. P. Mitchell (G3OFJ), G. S. Fitton (B.R.S.23363), R. G. Frisby (G2CFC), S. E. Martingell (G2MV), T. A. Maguire (G4TM), J. A. Lambert (G3FNZ), J. Burleigh Scott (G3KQ), J. Dickson (G2HV), D. Niven (GM2CHN), S. M. Sugden (G3GSS), R. F. G. Thurlow (G3WW), R. S. Babbs (G3GVU), A. C. Edwards (G6XJ-G6SL), F. J. Finn (G6UF), J. N. Robinson (G3OOX), Anon., Data Publications Ltd., J. H. Rayner (G3DOO), J. W. North (B.R.S.18032), R. Ferguson (G4VF), K. C. Hooper (G3DGI), S. W. Malin (B.R.S.3520), W. E. Gates (G3ENB), J. S. H. Garner (G2BGG), G. W. Parkes (G3NL), W. R. Sharples (B.R.S.20859), W. A. J. Smith (G3MXQ), C. J. Schauers (W4VZO).

Total amount contributed to date: **£1,095.14.11.**

Annual Report of the Council

ON page 234 of the November issue of the BULLETIN, the runner-up in the Receiving Section of the R.S.G.B. 21/28 Mc/s Telephony Contest should have been given as Mr. B. M. Crook, B.R.S.21008 (2,731 points) and not Mr. W. Chandler, B.R.S.21108.

R.S.G.B. Tape Recorded Library

FOUR new illustrated tapes have been added to the library. These have been prepared from Mullard Film Strips Nos. E1, E2, E3 and E4A, by courtesy of Mullard Ltd., by recording the teaching notes at $3\frac{3}{4}$ i.p.s. on 5 in. spools and mounting the illustrations in standard 2 in. × 2 in. transparency frames. Brief details are as follows:

An Introduction to Electronics. Black and white. 45 minutes. Structure of the atom—atomic weight and atomic number—isotopes—insulators, conductors and semiconductors—EMF—resistance—Ohm's law—the electron gun.

Electron Tubes. Black and white. 55 minutes. Thermionic emission—thermionic valves—the diode—the triode—multigrid valves—gas filled valves—cathode ray tubes—X-ray tubes—photocells—the Geiger counter—flash tubes.

Semi-conductors. Colour. 45 minutes. Germanium—zone refining—*P* and *N* type germanium—p-n junction—point contact and junction diodes and transistors—basic transistor circuits.

Basic Valve Circuits. Black and white. 55 minutes. The cathode circuit—the anode circuit—half and full wave rectification—grid bias—anode load—the triode amplifier—basic two valves amplifiers.

Applications from R.S.G.B. Groups and Affiliated Societies to borrow these tapes and slides should be made to the Hon. Curator, N. C. Ta'Bois (G3HWG), 81 Snakes Lane, Woodford Green, Essex.

Amateur Radio Handbook—Dust Covers

DUE to a misunderstanding the first 600 copies of the new edition of the *Amateur Radio Handbook* were dispatched without dust covers. Members who wish to obtain a dust cover are invited to apply to Headquarters.

G.P.O. Morse Tests

PROVIDED there are sufficient applications, the Post Office will hold Morse Tests during the latter part of January, 1962, at the Head Post Offices in Birmingham, Cambridge, Derby, Leeds and Manchester.

Application forms may be obtained from the Radio Services Department, Radio Branch, G.P.O. Headquarters Building, St. Martins-le-Grand, London, E.C.1. Completed forms, to which the entrance fee of 10/- must be affixed in stamps, must be posted to the Wireless Telegraphy Section at G.P.O. Headquarters to arrive not later than **December 29, 1951.**

Wired Television

WITH the increasing use of wired television, members may like to know that where interference is caused to such services using carrier frequencies embracing the bands assigned for amateur operation, the Post Office refers complainants to the relay company concerned. The Post Office normally looks to the relay companies to attend to their systems in order to prevent the interference.

Colour Transparencies

THE General Secretary is proposing to form a collection of 35 mm. colour transparencies of modern Amateur Radio stations. Members at home and abroad who are in a position to send transparencies should also provide brief descriptions of the gear depicted. Unusual shots of individual pieces of equipment and of aerial systems will also be appreciated. Transparencies should be securely packed and addressed to the General Secretary by name at R.S.G.B. Headquarters.

The International Radio Amateur Yearbook

A NEW edition of this *Yearbook* dated 1961/1962 is now available from R.S.G.B. Headquarters, price 4/- post free.

More Pirates Fined

AT the Guildhall, Cambridge, on September 12, 1961, Mr. Graham Styles of 1 St. Andrews Road, Cambridge pleaded guilty to a charge of using wireless telegraphy apparatus without a licence. He was fined £7 and ordered to pay £3 3s. costs.

* * *

AT Plymouth Magistrates' Court on October 4, 1961, Mr. M. P. Giles-Holmes pleaded guilty to a charge of using wireless telegraphy apparatus without a licence. He was fined £5 and ordered to pay £5 5s. costs.

* * *

AT Blackburn Magistrate's Court on November 1, 1961, Mr. Sheridon Street of 7 Wellington Street, St. John's, Blackburn, Lancashire, pleaded guilty to a charge of using wireless telegraphy apparatus without a licence. He was fined £5 and ordered to pay £5 5s. advocates fees.

R.S.G.B. Radio Hobbies Exhibition

THE competition for the Hammarlund HQ170 was won by B. F. Greenaway of Neasden, London, N.W.10, a shortwave listener.

Representation 1962-63

THE Corporate Members listed below have been duly elected to serve, in the offices indicated, as from January 1, 1962.

Regional Representatives

Region	Name, Call-sign and Address
1	B. O'BRIEN (G2AMV), 1 Waterpark Road, Prenton, Birkenhead, Cheshire.
2	J. R. PETTY (G4JW), 580 Redmires Road, Sheffield 10, Yorkshire.
3	W. A. HIGGINS (G8GF), 28 Kingsley Road, Kingswinford, nr. Brierley Hill, Staffs.
4	F. C. WARD (G2CVV), 5 Uplands Avenue, Littleover, Derby.
5	Ballot Pending.
6	L. W. LEWIS (G8ML), 34 Cleevelands Avenue, Cheltenham Gloucestershire.
7	Ballot Pending.
8	
9	R. E. GRIFFIN (G5UH), 13 Alexandra Road, Uplands, Bristol 3.
10	Ballot Pending.
11	R. JONES (GW3JI), Beirut, Albert Drive, Deganwy, Caerns.
12	A. G. ANDERSON (GM3BCL), "Helford," Pitfodels, Aberdeen.
13	G. P. MILLAR (GM3UM), 8 Plewlands Gardens, Edinburgh 10.
14	
15	J. WILLIAM DOUGLAS (GI3IWD), 54 Kingsway Park, Cherryvalley, Belfast.
16	H. H. LOWE (G2HPF), "Akabo," Main Road, Boreham, Chelmsford, Essex.
17	M. NICHOLSON (G2MN), 80 South Leigh Road, Warblington, Havant, Hants.

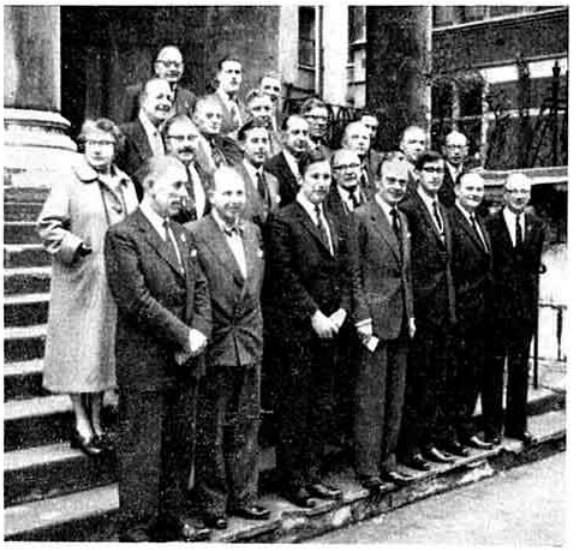
Town Representatives

Region	Town or Area	Name, Call-sign (or B.R.S.) and Address
1	**Cheshire**	
	Wirral area	F. N. KENDRICK (G3CSG), 25 Cook Road, Leasowe, Wirral.
	Lancashire	
	Blackpool	H. G. NEWLAND (G5ND), 161 Penrose Avenue, Marton.
	Southport and Formby	N. HORROCKS (G2CUZ), 34 Sandbrook Road, Ainsdale, Southport.
2	**Yorkshire East**	
	Scarborough	P. B. BRISCOMBE (G8KU), "Roseacre," Irton.
	Yorkshire North	
	Middlesbrough ..	B. B. WILSON (G3LXG), 18 Holdenby Drive, Park End.
	Yorkshire West	
	Barnsley	ALAN J. BALMFORTH (B.R.S.21206), 13 Strafford Walk, Dodworth.
	Rotherham	P. F. GALE (G3OJG), 24 Old Garden Drive.
3	**Warwickshire**	
	Coventry North ..	B. BRYAN (B.R.S.23035), 99 Belgrade House.
	Coventry South ..	J. BOYCE (B.R.S.19512), 73 Maidavale Crescent.
	Kenilworth	S. SMITH (B.R.S.18612), 19 Hyde Road.
4	**Leicestershire**	
	Melton Mowbray ..	S. CLARK (G8CZ), 125 Thorpe Road.
	Lincolnshire	
	Grantham	K. ATTER (B.R.S.20780), 17 Goldsmith Road.
	Nottinghamshire	
	Retford and Worksop	E. PRINCE (G3KPU), 12 Lidget Lane, Retford.
5	**Bedfordshire**	
	Shefford and District	G. R. COBB (G3IXG), 75 Ampthill Road, Shefford.
	Hertfordshire (outside London).	
	Stevenage and District	A. E. LATHAM (G3JLA), 138 Broadwater Crescent, Stevenage.
6	**Buckinghamshire**	
	High Wycombe ..	K. BARRETT (G3BZM), 7 The Quadrant, Totteridge.
	Gloucestershire	
	Cheltenham	J. J. YEEND (G3CGD), 30 St. Luke's Road.
	Dursley	T. SPENCER (G3ILO), 1 Field Lane, The Quarry, Cam.
	Gloucester	E. A. PERKINS (G3MA), 40 Calton Road, Gloucester.
7	**London North**	
	Welwyn Garden City	J. H. HUM (G5UM), 9 Burnham Green Road, Bulls Green, Knebworth, Herts.
	London South	
	Croydon area	S. A. MORLEY (G3FWR), 22 Old Farleigh Road, Selsdon, Surrey.
	Mitcham	D. JOHNSTON (G3NFA), 59 Acre Lane, Carshalton, Surrey.
	London East	
	Brentwood	R. A. E. FRONIUS (G3MCW), 169 Coxtie Green Road, Brentwood, Essex.
	Ilford	F. F. RUTH (G2BRH), 579 High Road, Ilford, Essex.
	London West	
	Acton, Brentford and Chiswick	R. P. COLE (G6RC), 18 Chatsworth Road, Chiswick, W.4.
	Paddington and District	J. E. ALBAN (G3JEA), 172 Droop Street, W.10.
8	**Kent** (outside London).	
	Thanet area	R. A. BASTOW (G3BAC), 31 Canterbury Road East, Ramsgate.
	Sussex	
	Crawley, East Grinstead and Horsham ..	R. F. FAUTLEY (G3ASG), 123 Ashdown Drive, Tilgate, Crawley.
9	**Bristol**	
	Bristol	R. V. HINCHLIFFE (G3KHA), 54 Ponsford Road, Knowle, Bristol 4.
	Somerset	
	Bath	J. W. RUSSELL (G2ZR), 45 Shakespeare Avenue.
10	**Glamorganshire**	
	Cardiff	T. J. BROOKE, (GW3GHC) 32 Elgar Crescent, Llanrumney.
	Port Talbot and District	R. EDWARDS (GW3BQY), 9 Macgregor Row, Maesteg, Bridgend.
	Monmouthshire	
	Blackwood	P. M. FULTON (GW3MMU), 36 Sunnybank Road, Blackwood.
12	**Aberdeenshire**	
	Aberdeen	G. JAMIESON (GM3HTL), 93 Craigton Road.
13	**Fifeshire**	
	Dunfermline and West Fife	A. LAWRENCE (GM3IQL), 40 Blake Street, Brucefield, Dunfermline.
	Midlothians	
	Edinburgh	W. J. H. EATON (GM3KIG), 100 Craigleith Hill Crescent, Edinburgh 4.
14	**Glasgow**	
	Glasgow area	A. BARNES (GM3LTB), 7 Southpark Terrace, Glasgow, W.2.
	Mid-Lanarkshire	
		D. MENTEITH (GM3IWU), 20 Linksview Road, Motherwell.
16	**Norfolk**	
	Great Yarmouth ..	W. H. BENDALL (B.R.S.20662), 22 Nelson Road South.
17	**Hampshire**	
	Portsmouth	A. C. CAKE (G3CNO), 7 Wheatstone Road, Southsea.
	Southampton ..	P. A. L. SHOOSMITH (G3MDH), 31 Fairfield Close, Hythe.

Affiliated Society Representatives

THE following Corporate Members of the R.S.G.B. have been nominated and elected as Affiliated Society Representatives for the year 1962:

ACTON, BRENTFORD AND CHISWICK RADIO SOCIETY
W. G. Dyer (G3GEH), 188 Gunnersbury Avenue, Acton, London, W.3.
A.E.R.E. (HARWELL) AMATEUR RADIO CLUB
C. Sharpe (G2HIF), 20 Harcourt Road, Wantage, Berkshire.
AQUILA AMATEUR RADIO CLUB (G3BRK)
R. C. B. Cutts (G3HRC), Ministry of Aviation, E.I.D. "Aquila", Golf Road, Bromley, Kent.
CLIFTON AMATEUR RADIO SOCIETY (G3GHN)
C. E. Godsmark (G3IWL), 211 Manwood Road, London, S.E.4.
KINGSTON AND DISTRICT AMATEUR RADIO SOCIETY
J. Russell (G3OKQ), Green Fingers, Oyster Lane, Byfleet, Surrey.
MIDLAND AMATEUR RADIO SOCIETY
M. A. Brett (G3HBE), 55 Chestnut Drive, Erdington, Birmingham 24, Warwicks.
NORTHERN HEIGHTS AMATEUR RADIO SOCIETY
H. Crewe (G8CB), 1162 Thornton Road, Thornton, Bradford, Yorks.
PADDINGTON AND DISTRICT AMATEUR RADIO SOCIETY (G3PAD)
L. A. Kippin (G8PL), Old Conduit House, Lyndhurst Road, London, N.W.3.
PURLEY AND DISTRICT RADIO CLUB
G. P. Mitchell, B.Sc. (G3OFJ), 38 Royston Avenue, Wallington, Surrey.
REIGATE AMATEUR TRANSMITTING SOCIETY
F. D. Thom (G3NKT), 12 Willow Road, Redhill, Surrey.
SLADE RADIO SOCIETY
N. B. Simmonds (B.R.S.21873), 5 Bowling Green Road, Stourbridge, Worcs.
SOUTH BIRMINGHAM RADIO SOCIETY (G3OHM)
J. Harvey (B.R.S.19682), 2a The Avenue, Rubery, nr. Birmingham,
SOUTHEND AND DISTRICT RADIO SOCIETY
A. C. Wadsworth (G3NPF), 2 Edith Road, Prittlewell, Essex.
THANET RADIO SOCIETY
J. P. Barnes (G3BKT), 18 Grange Road, Ramsgate, Kent.
YEOVIL AMATEUR RADIO CLUB (G3CMH)
B. J. Clark (G3BEC), 107 Eastland Road, Yeovil, Somerset.



On November 18, 1961, members of the Council met the Regional Representatives in London. In this picture can be seen from left to right, front row:—T. A. T. Davies, G2ALL (R.R. No. 5), R. Jones, GW3JI (R.R. No. 11), G. M. C. Stone, G3FZL, the President (Major General E. S. Cole, G2EC), R. C. Hills, G3HRH, John A. Rouse, G2AHL, N. Caws, G3BVG (Hon. Treasurer); second row:— May Gadsden, J. W. Douglas, GI3IWD (R.R. No. 15), F. C. Ward, G2CVV (R.R. No. 4), B. O'Brien, G2AMV (R.R. No. 1), John Clarricoats, G6CL, R. E. Griffin, G5UH (R.R. No. 9), G. P. Millar, GM3UM (R.R. No. 13), M. Nicholson, G2MN (R.R. No. 17); third row:— F. G. Lambeth, G2AIW (R.R. No. 7), W. A. Higgins, G8GF (R.R. No. 3), A. C. Williams, GW5VX, C. H. Parsons, GW8NP (R.R. No. 10), L. W. Lewis, G8ML (R.R. No. 6); back row:—J. R. Petty, G4JW (R.R. No. 2), J. D. Kay, G3AAE, E. G. Ingram, GM6IZ (Executive Vice-President). Also present were Council members C. H. L. Edwards, G8TL, E. W. Yeomanson, G3IIR, P. H. Wade, G2BPJ, F. A. Russell, G3BHS, L. E. Newnham, G6NZ and Arthur Milne, G2MI, who took this picture.

Silent Keys

JOHN G. MAITLAND-EDWARDS (G2GS)

The death occurred recently in tragic circumstances of Mr. John G. Maitland-Edwards, G2GS, of Surbiton, Surrey. Mr. Edward's car was in collision with another car, the driver of which was later charged with causing the death of Mr. Edwards by dangerous driving at Ashurst, Surrey. Mr. Edwards was admitted to hospital where he died on October 12, 1961.

Jack Maitland-Edwards had been a member of the R.S.G.B. since 1938 and had held the call G2GS for many years. He was well known to many members in Surrey and took part in the activities of the Sutton & Cheam Radio Society as well as in those of other local societies. He will be greatly missed by all who knew him.

J. C.

SIDNEY MEADOWCROFT (G2FPM)

It is our sad duty to record the passing on November 8, 1961, of Sidney Meadowcroft (G2FPM), of Cheadle, Cheshire.

Sid, to his countless friends, had been a member of the Society since 1938 and was well known for his Top Band activities in the Lancashire and Cheshire area, both as a fixed and mobile station operator.

To his widow, we express our deepest sympathy at this sad time.

G4HK

MORE T.R.s ARE WANTED

Up to the time this issue closed for Press 41 Town Representatives only had been nominated. If YOU are keen on local activities why not offer YOUR services?

Rules for the B.E.R.U. Contest, Receiving Section, 1962

THE rules for the Receiving Section of the B.E.R.U. Contest 1962 are as follows:

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

2. **Duration.** The contest will commence at 00.01 G.M.T. on Saturday, March 10, 1962, and end at 23.59 on Sunday, March 11, 1962. The B.E.R.U. Contest for transmitting amateurs will take place during the same period.

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

(*b*) Entries must be set out on ONE SIDE ONLY of foolscap or quarto paper. Entries must be postmarked not later than **April 1, 1962**, and must be addressed to the Contests Committee, Radio Society of Great Britain, 28-30 Little Russell Street, London, W.C.1.

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

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

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

4. **Scoring.** Each complete log entry will score 5 points. In addition, a bonus of 20 points may be claimed for the first station heard in each new Commonwealth call area (as defined in the Appendix on page 307) on each band. The British Isles (G, GB, GC, GD, GI, GM and GW) count as one call area only as indicated in the Appendix to the rules of the Transmitting Section. A station may be logged only once on each band for the purpose of scoring. Where both stations in a contact are heard, they should be logged separately; points may be claimed for both entries.

5. **Awards.** At the discretion of the Council a trophy or miniature will be awarded to the winner and a certificate of merit to the runner-up in each of the I.A.R.U. continents.

Rules for the Twenty-fifth B.E.R.U. Contest March 10-11, 1962

RADIO amateurs throughout the British Commonwealth and Empire are invited to take part in the Twenty-fifth B.E.R.U. Contest to be held on March 10-11, 1962. The Contests Committee is again arranging to secure the maximum amount of overseas publicity but solicits the assistance of members in bringing the dates and rules to the notice of all operators.

1. **Sections.** — The contest is divided into two sections: (a) High Power—maximum licensed power; (b) Low Power—maximum input 25 watts.
2. **Duration.** The contest (both sections) will start at 00.01 G.M.T. on Saturday, March 10, and end at 23.59 G.M.T. on Sunday, March 11, 1962.
3. **Eligible Entrants.** The contest is open to all fully paid-up corporate members of the R.S.G.B. resident within the United Kingdom and to all British subjects outside the U.K. but within the British Commonwealth and British Mandated Territories. All entrants agree to be bound by the rules of the contest.
4. **Operator.** Only the entrant will be permitted to operate his station for the duration of the contest.
5. **Entries.** Entries must be set out, as shown in the example, on **ONE SIDE ONLY** of foolscap paper. **Entries must be postmarked not later than April 1, 1962,** and must be addressed to the Contests Committee, Radio Society of Great Britain, 28/30 Little Russell Street, London, W.C.1, England. Log sheets are available on request.

B.E.R.U. CONTEST, MARCH 10-11, 1962

Claimed Score.....

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

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

Address .....

Transmitter.....Power input.....watts

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

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

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

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

SAMPLE LOG SHEET

Date	Time GMT	Call-sign of station worked	My report on his signals	His report on my signals	Band Mc/s	Leave blank	Bonus Points	Points Claimed
10	0005	G3XXX	569001	559002	14		20	5
10	0009	VK2ZZZ	579002	569004	14		20	5
11	0012	GM3YYY	569113	579112	14		—	5
11	0730	GW8XXX	589114	589154	21		20	5
Total (Points Claimed + Bonus Points) 20 + 60 = 80								

6. **Bands.** Operation is restricted to the following bands: 3·5, 7, 14, 21 and 28 Mc/s. Transmission must be of type A1 (pure c.w.) only, and frequent tone reports of T8 or less may result in disqualification.
7. **Licence Conditions and Power Input.** Entrants must operate within the terms of their licences. The input to the valve, or valves, delivering power to the aerial must not exceed 25 watts in the Low Power section.
8. **Contacts.** Contacts may be made with any station using a British Commonwealth call-sign except within the entrant's own call area. British Isles stations may not work each other for points. Contacts with unlicensed stations will not count for points. The decision as to whether or not a contact is valid will rest with the R.S.G.B. Contests Committee. Only one contact on each band with a specific station will count for points. Duplicate contacts should be logged, but no points claimed.
9. **Scoring.** Each completed contact will score 5 points. In addition a bonus of 20 may be claimed for the first contact with each new Commonwealth call area (as defined in the Appendix) on each band. All British Isles stations (G, GB, GC, GD, GI, GM and GW) count as only one call area.
10. **Contest Exchanges.** Serial numbers must be exchanged and acknowledged before a contact can count for points. The serial number of six figures will be made up of the RST report plus three figures **starting with 001 for the first contact** and increasing by one for each successive contact, e.g. 559001 for the first and 439002 for the second contact, etc.
11. **Awards.** At the discretion of the Council, a trophy or miniature will be awarded to the winner of each section, and certificates will be awarded to the first three entrants in each section. In addition a certificate will be awarded to the leading entrant in each call area regardless of the number of entrants in his call area provided that his score exceeds 1,500 points in the High Power section or 750 points in the Low Power section. A certificate will be awarded in each call area in which there are ten or more entrants to the runner-up, provided his score exceeds 1,500 points in the High Power section or 750 points in the Low Power section.

Appendix

The following call areas are recognized for the purposes of scoring in the B.E.R.U. Contest:—

AC3 Sikkim
G, GC, GD, GI, GM, GW—as one call area.
MP4 (Bahrein)
MP4 (Muscat and Oman)
MP4 (Qatar)
MP4 (Trucial Oman)
VE1
VE2
VE3
VE4
VE5
VE6
VE7
VE8
VK0 (Australian Antarctica)
VK0 (Heard Island)
VK0 (Macquarie Island)
VK1
VK2
VK2 (Lord Howe Island)
VK3
VK4
VK4 (Willis Island)
VK5
VK6
VK7
VK8
VK9 (Admiralty Island)
VK9 (Christmas Island)
VK9 (Cocos Island)
VK9 (Norfolk Island)
VK9 (Nauru)
VK9 (New Guinea and Bismarck Island)
VK9 (Papua)
VO
VP1
VP2 (Anguilla)
VP2 (Antigua and Barbuda)
VP2 (British Virgin Islands)
VP2 (Dominica)
VP2 (Grenada and Dependencies)
VP2 (Montserrat)
VP2 (St. Kitts and Nevis)
VP2 (St. Lucia)
VP2 (St. Vincent & Dependencies)
VP3
VP4
VP5 (Jamaica)
VP5 (Cayman Islands)
VP5 (Turks & Caicos Islands)
VP6
VP7
VP8 (Falkland Islands)
VP8 (Grahamland)
VP8 (Sandwich Islands)
VP8 (South Georgia)
VP8 (South Orkney Islands)
VP8 (South Shetland Islands)
VP9
VQ1
VQ2
VQ3
VQ4
VQ5
VQ7 (Aldabra Island)
VQ8 (Chagos)
VQ8 (Agalega)
VQ8 (Rodrigues)
VQ8 (St. Brandon)
VQ8 (Mauritius)
VQ9
VR1 (Gilbert & Ellice Islands)
VR1 (British Phoenix Islands)
VR2
VR3 (Christmas Island)
VR3 (Fanning Island)
VR4
VR5
VR6
VS1
VS4
VS5
VS6
VS9 (Aden)
VS9 (Maldive Islands)
VS9 (Kamaran Island)
VU2
VU4 (Laccadive Islands)
VU5 (Andaman and Nicobar Islands)
ZB1
ZB2
ZC4
ZC5
ZD1
ZD3
ZD6
ZD7
ZD8
ZD9 (Gough Island)
ZD9 (Tristan da Cunha)
ZE
ZK1 (Cook Islands)
ZK1 (Manihiki Island)
ZK2
ZL1
ZL1 (Kermadec Island)
ZL2
ZL3
ZL3 (Chatham Island)
ZL4
ZL4 (Auckland & Campbell Islands)
ZL5 (N.Z. Antarctica)
ZM6
ZM7 (Tokelau)
ZS3
ZS7
ZS8
ZS9
AP (West Pakistan)
AP (East Pakistan)
4S7
5N2
9G1
9K2
9M2

CONTEST NEWS

— RESULTS — REPORTS — RULES —

D/F National Final

THE R.S.G.B. D/F National Final took place on Sunday, September 10, 1961, and was organised by the A.E.I. Rugby Recreation Club, Amateur Radio Section, on behalf of the Contests Committee.

The event was held in the area north and west of Northampton, one of the transmitters being located close to Naseby, scene of a battle in the Civil War over 300 years ago. The 15 competitors assembled at Overstone Solarium, near Northampton, which proved to be a very suitable starting point, and were away sharply at 13.35.

The first to finish was E. L. Mollart (B.R.S.10977) of the Oxford and District Amateur Radio Society, who reached the second transmitter at 15.00, followed by G. T. Peck (B.R.S.15402) of the High Wycombe Group at 15.15 and G. Nicholson (G3HKC) of Slade Radio Society a few seconds later. In contrast to National Finals of recent years 12 competitors located both transmitters, and a further two parties found one transmitter. The 15th competitor had trouble with his receiver and had to retire.

Station " A " was located seven miles from the start near an uninhabited barn in the village of Harlestone, while station " B " was 10½ miles from the start concealed in a ditch by the side of a track. Fortunately, the weather kept fine although some rain fell later during tea.

Messrs. W. H. Matthews (G2CD), D. A. Findlay, D.F.C. (G3BZG), and F. E. Woodhouse (G3DC) of the Contests Committee acted as official umpires and observers.

Tea was served in the A.E.I. Recreation Club, Rugby to a gathering of 62, following which Mrs. J. J. Grant, wife of the Chairman of the A.E.I. Rugby Recreation Club, Amateur Radio Section, presented prizes to the first two competitors and the first lady to finish. Thanks were expressed to the organizers and operators—G. Taylor (G3MDC), M. Henley (G3OQO), D. Richardson (G3PGR), R. Craxton (G3IKL) and to R. Palmer G5PP/M and J. Francis G3HGY/M, the latter both from Coventry, who kindly assisted the organizers by providing communication at the start and acting as reserve in the event of a breakdown.

Mr. Mollart, thanking the organizers for a successful event, spoke enthusiastically of the enjoyment obtained from D/F contests. Mr. Matthews expressed the hope that more clubs would take an interest in and encourage this form of activity.

Low Power Field Day 1961

FOR yet another year a negligible number of contestants entered for the Low Power Field Day held on September 17, 1961, thus underlining the fact that this type of event holds little or no interest for the average member. It is a pity that of this small number, one-third were invalidated by careless breaches of the rules.

The winner, Mrs. A. Crane (G3GOX/P) is to be congratulated for her successful first entry, particularly as erstwhile winners and runners-up were competing. Her score of 97 points was made from contacts on all three bands, her single exchange on 7 Mc/s being the only one in the contest. Of the other 178 contacts made by entrants, 53 were on Top Band and the remainder on 3.5 Mc/s.

The regrettably low entry makes it likely that this may be the last low power contest—at least, in its present form. Contests are provided for three main reasons—the wish of the membership, to stimulate band occupancy and to promote the advance of techniques. None of these are being fulfilled—interest is lacking, the bands used do not need further occupancy, and the gear used takes little account of modern components which favour lightweight equipment in particular. Although the overall weight limit of 20 lb. was introduced before the day of miniature components, 19 lb. was the lowest weight recorded this year, thus suggesting that the use of transistors or miniature parts was largely ignored.

If members wish to see the Low Power Contest and the Field Day retained in the Contest Calendar now is the time to put forward constructive suggestions which might make the event more popular.

G3OOU and GW3NWQ are thanked for sending check logs.

Position	Call-sign	Points
1	G3GOX	97
*	G3BZM	90
†	GW3GHC	81
2	G3JKY	73
†	G8NN	61
‡	G3KLH	51
3	G3CGD	42
4	G3BY	41
5	G3ISU	37
6	G3GDW	19

* Invalidated under General Rule 7(c).
† Invalidated under General Rules 7(a) and 7(c).
‡ Late entry.

144 Mc/s C.W. Contest 1962

RULES for the 144 Mc/s C.W. Contest to be held on January 28, 1962, are substantially the same as for previous events but attention is drawn to the alterations in the scoring system.

When: 10.00 G.M.T. to 22.00 G.M.T. on Sunday, January 28, 1962.
Sections: (*a*) High Power (up to 150 watts input to the p.a. stage); (*b*) Low Power (up to 30 watts input to the p.a. stage).
Eligible Entrants: All fully paid-up members of the R.S.G.B. resident in Region 1.
Contacts: May be made on Al only.
Scoring: For each completed contact in the operator's own country, 10 points may be claimed; for each completed contact with a station in any other country, 25 points may be claimed. In addition a bonus of 25 points may be claimed for the first contact in each new county in accordance with the list on page 340 of the January 1961 issue of the *R.S.G.B. Bulletin*. The whole of the London Postal District will count as one county only.
Contest Exchanges: RST reports followed by the contact number, location of station and county (e.g. RST559001 Trebudannon, Cornwall or RST579002 Hendon, London). Since distances do not have to be calculated in this contest the restriction of QTH to one found on the 10m to 1 in. Ordnance maps does not apply; any convenient town or village may be given for the location.
Logs: (*a*) Must be tabulated in columns headed (in this order) " Date/Time (G.M.T.)," " Call-sign of Station Contacted," " My report on His Signals and Serial Number Sent," " His Report on My Signals and Serial Number Received," " Location of Station Contacted," " County," " Points Claimed."
(*b*) The cover sheet must be made out in accordance with R.S.G.B. Contests Rule 5 and the declaration signed. The address of the station must include the county.
(*c*) Entries must be postmarked not later than **Monday, February 12, 1962.**
Awards: At the discretion of the Council of the R.S.G.B., certificates of merit will be awarded to the leading station in each section.
The General Rules for R.S.G.B. Contests apply to this contest.

Affiliated Societies' Contest 1962

RULES for the Affiliated Societies' Contest to be held on February 3-4, 1962, will be mailed early in January to all radio societies and clubs affiliated to the R.S.G.B.

Can You Help?

● T. Winchcombe (G6ZH), 46 Newlyn Road, Sheffield 8, who requires information on the Collins Receiver type R105A/ARR-15?

● H. Zimmermann (HB9XO), c/o Mrs. Burchell, 22 Richmond Park Avenue, Bournemouth, Hants, who seeks information about the American surplus receiver type BC620?

Radio Amateurs' Examinations

THE question paper set by the City and Guilds of London Institute for the Radio Amateurs' Examination on May 5, 1961, was as follows:

Eight questions in all are to be attempted, as under:

Both questions in Part I (which are compulsory) and six others from Part II. Failure in either part will carry with it failure in the examination as a whole. Mathematical tables are supplied: they must be given up at the close of the examination. Slide rules may be used.

Part I

Both questions must be attempted in this part.

1. What records must be kept in an amateur radio station logbook?
Who, in addition to the licensee, may operate an amateur station and what additional entry should such an operator make in the log?
Who is authorized to inspect the log and station? (*15 marks*)

2. Describe three forms of interference to broadcast reception (sound or television) which can arise from the operation of an amateur station and explain how each can be minimized. (*15 marks*)

Part II

Six questions only to be attempted in this part.

3. Sketch the magnetic field associated with a solenoid through the windings of which a direct current is flowing. What is the effect of inserting an iron core? Why are laminated iron cores used in transformers? (*10 marks*)

4. Explain the superheterodyne principle of reception. Describe, with a block diagram, a typical superheterodyne receiver and explain the need for a beat frequency oscillator for the reception of c.w. telegraphy. (*10 marks*)

5. State Ohm's Law and define the units of e.m.f., current and resistance.
Explain the principle of the potentiometer. (*10 marks*)

6. When an anode potential of 300 volts positive and a grid potential of 20 volts negative are applied to a radio-frequency power amplifier the anode current is 50 mA. What is the power input to the anode circuit of the valve? Show by a circuit diagram how the voltages and current are measured, and mention any precautions necessary to ensure accurate readings. (*10 marks*)

7. What is the velocity of an electro-magnetic wave in space? How are the frequency and wavelength related to the velocity? What is meant by *ground-wave* and *skip distance*? (*10 marks*)

8. Draw a ciruit diagram of an oscillator stage suitable for use as a variable frequency oscillator in a low-power transmitter. Explain its action. (*10 marks*)

9. Explain the difference between the resistance and the impedance to alternating current of a series circuit in which resistance, inductance and capacitance are all present. Calculate the impedance to a.c. at 1,000 c/s of an inductor having a value of inductance of 1 henry and a resistance of 3,085 ohms. (*10 marks*)

10. Describe the construction of a dipole aerial and feeder for 14 Mc/s. Show by diagrams details of the various dimensions, insulators, joints, etc. Draw a typical polar diagram for such an aerial, and indicate the direction of maximum and minimum radiation. (*10 marks*)

Examiner's Comments

The following general report is given on the papers as a whole and is not necessarily applicable to the work from individual schools.

The standard of the papers submitted showed a welcome improvement over that of last year.

Question 1. Generally well done. The majority of candidates had obviously read and understood the conditions of the Amateur (Sound) Licence.

Question 2. Fairly well done, but too many candidates were content to state the causes and cures of interference without describing and explaining them.

Question 3. Only moderately well done. Very few candidates dealt fully with the question.

Question 4. Well done by nearly all candidates.

Question 5. Poor. Very few candidates were able to make a satisfactory attempt at any part of this question.

Question 6. Not all candidates understood how the use of measuring instruments can affect the circuits in which they are being used, but on the whole the question did not give much trouble.

Question 7. Most candidates had an adequate knowledge of the subject and were able to give good answers.

Question 8. Diagrams were well done in most cases, but explanations tended to be weak and sketchy.

Question 9. Not very well understood although the calculation did not give much trouble.

Question 10. Many of the answers were disappointingly weak in the descriptions given. Candidates did not give nearly enough detail.

Question Paper

THE question paper set by the G.P.O. for the Radio Amateurs' Examination held on October 7, 1961, was as follows:

Part I

Both questions in this part MUST be answered.

1. What are the limitations to the establishment and use of an Amateur (Sound) Radio Station as regards:
(*a*) situation where it may not be used
(*b*) types of emission
(*c*) operators
(*d*) types of message and to whom they may be sent?
Does an Amateur (Sound) Licence authorize the Licensee to receive broadcast programmes? (*15 marks*)

2. What is meant by parasitic or spurious oscillations and how can they be detected and cured? (*15 marks*)

Part II

Answer SIX of the eight questions in this part.

3. Describe how electro-magnetic waves in the range 2 Mc/s to 20 Mc/s are refracted and reflected by the ionosphere. (*10 marks*)

4. Three resistors having values of 10 ohms, 20 ohms and 40 ohms respectively are joined:
(*a*) in series, and (*b*) in parallel?
What is the total resistance in each case and what would be the current taken from a 12 volt battery, having negligible internal resistance, when connected to each arrangement in turn? (*10 marks*)

5. Draw a diagram of a power pack supplying l.t. and stabilised h.t. from 200 volt 50 c/s a.c. mains.
Explain the method of stabilisation. (*10 marks*)

6. Describe and explain the action of a frequency multiplier stage suitable for use in an amateur transmitter. (*10 marks*)

7. What is an artificial aerial? How can it be used to assist in tuning and adjusting a transmitter? (*10 marks*)

8. Describe the construction of an electrolytic capacitor. Describe, with the aid of a circuit diagram, a typical use for an electrolytic capacitor. (*10 marks*)

9. Draw a circuit diagram of a detector stage suitable for use in a t.r.f. receiver. Explain its action when receiving c.w. telegraphy signals. (*10 marks*)

10. A certain coil is found to resonate at 2 Mc/s when tuned by a capacitance of 100 picofarad. What is its value? (*10 marks*)

Results of the G.P.O. Examination

Centre	No. of candidates	No. passed	Pass %
London	246	185	75
Edinburgh	31	24	77
Cardiff	25	18	72
Total	302	227	75

Council Proceedings

Résumé of the Minutes of the Proceedings at a Meeting of the Council of the Radio Society of Great Britain, held at New Ruskin House, Little Russell Street, London, W.C.1, on Monday, October 23, 1961, at 6 p.m.

Present: The President (Major-General E. S. Cole in the Chair), Messrs. N. Caws, C. H. L. Edwards, K. E. S. Ellis, R. C. Hills, E. G. Ingram, J. D. Kay, A. O. Milne, L. E. Newnham, F. A. Russell, G. M. C. Stone, P. H. Wade, A. C. Williams, E. W. Yeomanson (Members of the Council) and John Clarricoats (General Secretary).

Apologies. Apologies for absence were submitted from Dr. R. L. Smith-Rose and Mr. F. K. Parker.

* * *

Mobile Column

It was reported that Mr. C. R. Plant (G5CP) had been invited, and had agreed, to contribute a half page *Mobile Column* to the Society's Journal each month.

Amateur Radio Handbook

It was reported that pre-publication sales of the *Handbook* had exceeded all expectations. (Nearly 3,000 orders had been received by the time the offer ended.—EDITOR).

Horace Freeman Trophy

At the request of the Exhibition Committee it was agreed that for the year 1961 the Horace Freeman Trophy would be awarded for the best piece of equipment submitted by an R.S.G.B. Group or Affiliated Society for display at the Radio Hobbies Exhibition.

Gravesend Trophy

The rules for the Gravesend Trophy were approved for publication. (The rules appeared in the November 1961 issue.—EDITOR).

R.S.G.B. Certificates and Awards

It was agreed to publish a further statement in the November 1961 issue of the BULLETIN explaining why delays had occurred in dealing with claims for certificates and awards. (The delays were brought about due to the illness of Mrs. Verrill—the mother of the Society's Honorary Certificates' Manager.—EDITOR).

Northern V.H.F. Convention

Mr. Hills reported on the Northern V.H.F. Convention held in Manchester on October 14, 1961. (A copy of Mr. Hill's report appeared as an introduction to *Four Metres and Down* in the November issue of the BULLETIN.—EDITOR).

Headquarters Fund

It was reported that £796 10s. 10d. had been donated up to October 23, 1961.

Audited Accounts

The Honorary Treasurer submitted a printed copy of the Audited Accounts for the year ended June 30, 1961.

Resolved (i) that the Audited Accounts as submitted by the Honorary Treasurer be approved for printing and subsequent presentation to the members at the Annual General Meeting on December 16, 1961; (ii) that the Audited Accounts be now signed by the appropriate officers.

Annual Report of the Council

The General Secretary submitted a draft of the Annual Report of the Council.

Resolved to approve for publication, as now amended, the Annual Report of the Council.

The President thanked the General Secretary for drafting the report on behalf of the Council.

Membership

Resolved (i) to elect 101 Corporate members and 37 Associates; (ii) to grant Corporate Membership to four Associates who had applied for transfer.

Applications for Affiliation

Resolved to grant affiliation to the Royal Signals Amateur Radio Society and the North Notts Amateur Radio Society.

O.R.M. Reports

Reports covering O.R.M.'s held in Ayr, Cardiff, Newbury and Cheltenham were submitted and the Secretary gave information on certain of the points which had been raised during question time at the various meetings.

Resolved (i) to publish in each issue of the BULLETIN a note of the date when the previous issue was handed in to the Post Office. (Ayr). (ii) to request the Contests Committee to prepare for publication a statement outlining briefly the predominate reasons for deducting points. (Ayr.); (iii) that the Society shall pay postage or carriage charges on orders for Society publications which amount to £5 or more and to advise Mr. A. Barnes (GM3LTB) of that decision. (Ayr); (iv) to take note of the views of those members who had expressed themselves as being in favour of an increase of subscription rates. (Cardiff and Newbury); (v) to request the V.H.F. Committee to look into the complaint that R.S.G.B. News Bulletin Service stations in the London area working on 145 Mc/s use a frequency outside the London Zone and continue to occupy the same frequency after the reading of the Bulletin. (Newbury); (vi) to request the Finance and Staff Committee again to look into the question of placing the BULLETIN on sale at bookstalls. (Newbury); (vii) to request the Contests Committee to look into a complaint made by Mr. Palmer (G5PP) that his method of measuring distances in V.H.F. Contests has not been adopted. (Cheltenham).

The Secretary reported upon the questions concerning R.T.T.Y. and 144 Mc/s Field Day raised at the Newbury meeting.

R.S.G.B. Call Book 1962 Edition

The Secretary reported that the new edition would include details of 977 changes of address, 640 new calls and 102 reissued calls as well as a list of 1,030 mobile calls. The total amount of advertising reserved to date was 8½ pages compared with 12 pages for the 1961 Edition.

Resolved to increase the retail price of the 1962 edition to 4s. 6d.

News Bulletin Service

A letter was submitted from one of the GB2RS news readers, Mr. Sherrit of Aberdeen, in which he stated that he no longer had facilities for transmitting by the amplitude modulation (A3) system at his station. He asked that the s.s.b. mode (A3a) be used for transmitting news bulletins from the Aberdeen area.

It was agreed to write and inform Mr. Sherrit that it is the view of the Council that the s.s.b. system is not in general use by listeners to the news bulletins and for that reason if the system were introduced at his station the coverage would be greatly reduced. It was also agreed to ask Mr. Sherrit if he can find another member to take over as news reader for the north east of Scotland if he is unable to continue that work. (Mr. Sherrit has now resigned as news reader and Mr. L. Hardie (GM2FHH) has been appointed in his stead.—EDITOR).

Insurance on Club Events

A letter was submitted from the Crawley Amateur Radio Club in which they enquired whether the Council would again give consideration to the question of making a special arrangement with an insurance company to cover local events.

It was agreed to inform the Club that it is the view of the Council that local clubs should, if they deem it necessary, effect their own insurances. (It is understood that in the case of at least one large insurance company they will not undertake cover unless they possess precise details of what is involved—EDITOR).

Reports of Committees

The Minutes of meetings of the following Committees were submitted as Reports:

Golden Jubilee Celebrations	September 26, 1961
V.H.F.	October 2, 1961
Mobile	October 4, 1961
Exhibition	October 6, 1961

Resolved to receive the Reports and to accept and adopt the recommendations contained therein.

The Recommendations dealt with a V.H.F. QRA Locator, V.H.F. Beacon Station, seating accommodation at the Radio Hobbies Exhibition.

Mobile Committee

It was agreed to invite Messrs. J. M. Appleyard, G. C. Clark, C. L. Fenton, H. Gates, N. Miller and C. Waterman to serve on the Mobile Committee for the remainder of the year.

Woburn Abbey National Rally

It was reported that a profit of £13 1s. 2d. had been achieved on the National Mobile Rally.

The meeting terminated at 9.15 p.m.

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
	12.00	North East 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 by the 18th of the month preceding publication. 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 the copy preferably typed double spaced, in the style used below Standing instructions for more than three months ahead cannot be accepted.

DATES FOR YOUR DIARY

December 16.—A.G.M., London.
May 6, 1962.—South Eastern Counties Mobile Rally.
June 17, 1962.—Longleat Mobile Rally.
June 24, 1962.—Bridlington Mobile Rally and Hamfest.
July 8, 1962.—South Shields Mobile Rally.
August 19, 1962.—Derby Mobile Rally.
October 21-22, 1962.—Jamboree-on-the-Air.

REGION 1

Ainsdale (A.R.C.).—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.).—January 9, 8 p.m., Knowsley Hotel, Kay Gardens.
Chester.—Tuesdays, 8 p.m., Y.M.C.A.
Liverpool (L. & D.A.R.S.).—Tuesdays, 8 p.m., Gladstone Mission Hall, Queens Drive, Stoneycroft.
Macclesfield.—January 9, 23, 42 Jordongate.
Manchester (M. & D.A.R.S.).—Wednesdays, 7.30 p.m., King George VI Club, North Road, Moston, Manchester 10. **(S.M.R.C.).**—Fridays, 7.30 p.m., Fallowfield Bowling and Lawn Tennis Club, 81 Wellington Road, Fallowfield, Manchester 14.
Morecambe.—January 3, 125 Regent Road.
Preston (P.A.R.S.).—January 9 (Open Meeting), January 23 (A.G.M.), 7.30 p.m., St. Paul's School, Pole Street. (All meetings include Morse practice.)
Southport (S.R.S.).—Thursdays, 8 p.m., The Esplanade.
Stockport (S.R.S.).—December 20, January 3, 17, 31, 8 p.m., The Blossoms Hotel, Buxton Road.
Wirral (W.A.R.S.).—December 20, January 3, 17, 7.45 p.m., 15 Balls Road, Claughton, Birkenhead.

REGION 2

Bradford.—January 2 (" Amateur Receiver Construction " by D. M. Pratt, G3KEP), January 16 (" Electronic Organs " by A. R. Bailey, M.Sc., G3IBN), 7.30 p.m., 66 Little Horton Lane.
Halifax (Northern Heights A.R.C.).—December 27 (" Any Questions? "), January 10 (Informal), 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 (South).—December 21, 7.30 p.m., The Friends Institute, 220 Moseley Road, Birmingham.
Cannock.—January 4 (Film—" Manufacture of Radio Valves "), 7.30 p.m. " White Lion Inn," Bridgtown.
Sutton Coldfield.—December 25, 10 a.m. Top Band Net.
Stourbridge.—January 2, 7.45 p.m., Foley College of Further Education, Hagley Road, Stourbridge.
Wolverhampton.—December 18 (Home Constructed Equipment Competition), 8 p.m., Neachells Cottage, Stockwell End, Tettenhall. January 8, New Year's Party.

REGION 4

Burton-on-Trent (B. & D. R. S.).—December 20 (Film—" South after Whales " by J. Gould), 7.30 p.m., Club Room, Stapenhill Institute.
Derby (D. & D.A.R.S.).—December 20 (Annual Christmas Party), December 27 (Closed), January 3 (Surplus Sale), January 10 (The Year in Retrospect—Ladies invited), January 17 (Receiver Comparison), 7.30 p.m., Room No. 4, 119 Green Lane, Derby. **(D.S.W. Exp. Soc.)**—Fridays, 7.30 p.m., Sundays, 10.30 a.m., Club Rooms, Nunsfield House, Boulton Lane, Alvaston, Derby.
Grantham (G. & D.A.R.S.).—December 15 (Annual Dinner), Mondays, 7.30 p.m., Club Rooms, rear of the Manners Arms Hotel, London Road, Grantham.
Grimsby (A.R.S.).—Alternate Thursdays, 8 p.m., R.A.F.A. Headquarters, Abbey Drive West, Grimsby.
Leicester (L.R.S.).—Mondays, 7.30 p.m., Club Rooms, Old Hall Farm, Braunstone Lane, Leicester.
Lincoln (L.S.W.C.).—Alternate Wednesdays, 7.30 p.m., Lincoln Technical College, Cathedral Street, Lincoln.
Melton Mowbray (M.M.A.R.S.).—January 4 (Demonstration of Amateur Radio at Grimston by Rev. A. W. Shepherd G3NGF). Meetings held in St. John Ambulance Hall, Asfordby Hill.
Nottingham (A.R.C.N.).—Tuesdays and Thursdays, 7.30 p.m., Community Centre, Woodthrope House, Mansfield Road, Sherwood, Nottingham.
Northampton (N.S.W.C.).—Thursdays, 7 p.m., Allens Pram Works, 8 Duke Street, Northampton.
Peterborough (P & D.A.R.S.).—January 5 (Film Show), 7.30 p.m., Technical College, Eastfield Road, Peterborough.
Retford & Worksop (N.N.R.C.).—Tuesdays and Thursdays, 7.30 p.m., Club Rooms, Victoria Street, Worksop, Notts.

REGION 5

Cambridge (C. & D.A.R.C.).—Fridays, 7.30 p.m., Club Headquarters, Corporation Yard, Victoria Road, Cambridge.
March (M. & D.R.A.S.).—January 2 (" Amateur TV," lecture and demonstration by I. Waters, G3KKD/T), 7.30 p.m., Police Headquarters, March.
Shefford (S. & D.A.R.S.).—Thursdays, 7.30 p.m., Digswell House, Shefford.

REGION 6

Cheltenham.—First Thursday in each month, 8 p.m., Great Western Hotel, Clarence Street.
Wolverton (W.D.R.C.).—Fridays, 7.30 p.m., Science and Arts Institute, Church Street.

REGION 7

Acton, Brentford and Chiswick.—December 19 (" Receiver Design for S.s.b." Part 2, by G3NEH), 7.30 p.m., A.E.U. Rooms, 66 High Road, Chiswick.
Bexleyheath (N.K.R.S.).—January 11 (Film Show), 8 p.m., Congregational Hall, Bexleyheath, near Clock Tower.
Croydon (S.R.C.C.).—January 9, 7.30 p.m., " Blacksmith Arms," South End, Croydon.
Dorking (D. & D.R.S.).—December 19 (Christmas Dinner—Ladies invited), 8 p.m., Parrot Inn, Forest Green.
Ealing.—Sundays, 11 a.m., A.B.C. Restaurant, Ealing Broadway, W.5.
East Ham.—Tuesday fortnightly, 8 p.m., Leigh Road, East Ham.
East London District.—December 17 (A.G.M. and " Two Metre Equipment," by T. Withers, G3HGE), January 14 (" Power Transistors " by J. T. Brown), 2.30 p.m., Lambourne Rooms, Ilford Town Hall.

LONDON MEMBERS' LUNCHEON CLUB

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

at 12.30 p.m. on Friday, December 15, 1961 (Special Christmas Luncheon), January 19 and February 16, 1962).

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

East Molesey (T.V.A.R.T.S.).—January 3, 8 p.m., Carnarvon Castle Hotel, Hampton Court.
Enfield and District.—December 28 (A.G.M.), 7.30 p.m., Geo. Spicer School, Southbury Road, Enfield.
Harlow & District.—Tuesdays, 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), 7 p.m., Fridays (Club), 7.30 p.m., Montem School, Hornsey Road, Holloway, N.7.
Ilford.—Thursdays, 8 p.m., 579 High Road, Ilford (near Seven Kings station).
Kingston.—Lectures alternate Thursdays, Theory and Morse classes weekly, 7.45 p.m., Y.M.C.A., Eden Street, Kingston (Morse at 2 Sunray Avenue, Tolworth).
Mitcham (M. & D.R.S.).—Lectures alternate Fridays, 8 p.m., Morse Classes, 7 p.m., " The Canons," Madeira Road, Mitcham.
New Cross (C.A.R.S.).—Fridays, 7.30 p.m., December 29 (Quiz), January 12 (N.F.D. Film), Sundays, 11.30 a.m., Wednesdays (Morse Practice), 8 p.m., 225 New Cross Road, London, S.E.14.
Norwood and South London (C.P. & D.R.C.).—December 16 (Junk Sale), 8 p.m., Windermere House Annexe, Westow Street, Crystal Palace. January 2 (" Morse Class, etc."), 8 p.m. at G3FZL.
Paddington (P. & D.A.R.S.).—Wednesdays, 7.30 p.m., Beauchamp Lodge, 2 Warwick Crescent, W.2.
Romford (R. & D.R.S.).—Tuesdays, 8.15 p.m., R.A.F.A. House, 18 Carlton Road, Romford.
Science Museum (C.S.R.S.).—December 19 (R.S.G.B. Tape Lecture on " Ultra High Frequencies," by Sir Noel Ashbridge and Christmas Festivities), January 2 (" TV and Radio Interference," by D. Deacon, G3BCM), 6 p.m., Science Museum, South Kensington.
Sutton & Cheam (S. & C.R.S.).—December 19, (Junk Sale), The Harrow, High Street, Cheam.
Welwyn Garden City.—January 11 (" Design for a Compact H.F. Band Transmitter for N.F.D."), 8 p.m., The Conference Room, Murphy Radio Ltd., Bessemer Road, Welwyn Garden City.

REGION 8

Crawley (C.A.R.C.).—December 27 (A.G.M.), West Green Centre, Crawley. January 11 (Informal), for details contact G3FRV.
Tunbridge Wells (W.K.A.R.C.).—December 15 (Christmas Party), January 5 (Film Show), 7.30 p.m., Culverden House, Culverden Park Road, Tunbridge Wells.

REGION 9

Bath.—January 8, 7.30 p.m., Committee Room, Bath Technical College, Lower Borough Walls, Bath.
Bideford.—First Thursday in each month, 7.30 p.m., alternately at T. G. Ward (G2FKO), 38 Clovelly Road (phone Bideford 964) and D. H. Jones (G3BO), Rosebank, Westcombe (phone Bideford 550).
Bristol.—January 19, 7.15 p.m., Carwardines Restaurant, Baldwin Street, Bristol 1.
Exeter.—Second Thursday in each month, 8 p.m., Y.M.C.A., St. David's Hill, Exeter.
Falmouth (C.R. & T.C.)—First Wednesday in each month, Y.M.C.A., Falmouth.
Plymouth (P.R.C.).—Tuesdays, 7.30 p.m., Virginia House Settlement, St. Andrews Cross, Plymouth.
Torquay.—January 13, 7.30 p.m., (" Ask me another "—Club Quiz), Y.M.C.A., Castle Road, Torquay.
Weston-super-Mare.—First Tuesday 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.—January 8 (" Oscilloscopes and Practical Uses " by N. J. Bond, GW3IHY), 7.30 p.m., T.A. Centre, Park Street, Cardiff.

Penarth.—Last Monday in each month, 7.30 p.m., R.A.F.A. Club, Windsor Road, Penarth.

Port Talbot.—December 19, January 13, 7.30 p.m., Trefelin Workman's Club and Institute, 8 and 10 Jersey Street, Velindre, Port Talbot.

REGION 11

Llandudno (Conway Valley A.R.C.).—January 11 (Junk Sale and " Early Days " by an Old Timer), 7.30 p.m., Albert Hotel, Madoc Street.

REGION 12

Aberdeen (A.A.R.S.).—December 15 (" Simple Transmitting and Receiving Aerials "), December 22 (Christmas Party), December 29 (Ragchew Night), January 5 (Sale of Surplus Gear), January 12 (V.H.F. Transmitter—Work Night), 7.30 p.m., 6 Blenheim Lane, Aberdeen.

REGION 14

Ayrshire.—Third Sunday in each month, 7.30 p.m., Royal Hotel, Prestwick.

Falkirk.—First and last Thursday in each month, 7.30 p.m., Comeby Park School, Falkirk. Visitors welcome.

Glasgow.—December 22 (Final arrangements for Christmas Dinner), 7.30 p.m., Woodside Halls, Clarendon Street, N.W. (near St. Georges Cross Underground), December 29 (Christmas Dinner), City Bakeries, St. Georges Cross, C.3.

Motherwell.—Third Friday in each month, 7.30 p.m., Carfin Hall, Motherwell.

REGION 16

Chelmsford.—First Tuesday in each month, 7.30 p.m., Marconi College, Arbour Lane.

REGION 17

Newbury.—December 29 (Single Sideband Discussion Night), 7.30 p.m., Elliots of Newbury Canteen, West Street, Newbury.

Southampton.—Second Saturday in each month, 7 p.m., Engineering Lecture Theatre, Lanchester Building, University of Southampton, University Road, Southampton.

Portsmouth.—Wednesdays, 7.30 p.m., Room 3, The Community Centre, Twyford Avenue, Portsmouth.

Regional and Club News

Civil Service Radio Society.—At the informal meeting on December 19, there will be an R.S.G.B. recorded lecture by Sir Noel Ashbridge on " Ultra High Frequencies." GB2SM will be on the air and it is expected that the meeting will include some seasonal festivities. On January 2, David Deacon (G3BCM) will lecture on " Television and Radio Interference." Visitors will be most welcome but should contact Mr. G. Voller (G3JUL) at Kensington 6371 prior to the meeting. Details of membership may be obtained from the *Hon. Secretary:* G. Lloyd-Dalton, 2 Honister Heights, Purley, Surrey.

Clifton Amateur Radio Society.—On December 29, there will be a quiz conducted by G3OAW, while on January 12, Bob Brewster will be showing a film made at G3GHN/P during N.F.D. 1961. So much equipment was entered for the Junk Sale on November 17 that it had to be continued the following week. *Hon. Secretary:* C. Bullivant, 25 St. Fillans Road, London, S.E.6.

Cornish Radio and Television Club.—There was an attendance of 28 at the November meeting, when Col. Larcombe demonstrated his radio-controlled models and their ancillary equipment. G3AET gave details of the arrangements for the Marconi Anniversary station at Poldhu. *Hon. Secretary:* W. J. Gilbert, 7 Poltair Road, Penryn, Cornwall.

Crawley Amateur Radio Club.—The second Annual General Meeting will be held at the West Green Centre on December 27. Members have recently visited the West Kent Amateur Radio Society and the new Crawley STD Telephone Exchange. *Hon. Secretary:* R. G. B. Vaughan (G3FRV), 9 Hawkins Road, Tilgate, Crawley.

East London.—There was a good attendance on November 19, when Messrs Barker and Biggs of the Rectifier Division of Standard Telephones and Cables Ltd. lectured on " Selenium and Silicon Rectifiers." The speakers surveyed the history and development of such rectifiers and gave details of their many applications in Amateur Radio equipment. *District Representative:* N. McBrayne (G3KGU), 25 Purlieu Way, Theydon Bois, Essex.

Harrow, Radio Society of.—On December 8, A. L. Mynett (G3HBW) was due to describe his all-transistor communications receiver, while on December 22, the society's past activities will be reviewed with the aid of slides. Membership continues to increase and is now more than 100, of whom 50 are licensed amateurs. There is a large junior membership and instruction in basic theory and Morse is provided each week. *Hon. Secretary:* A. C. W. Biddell (G3GNM), 114 Kingshill Avenue, Kenton, Harrow, Middlesex.

London Members' Luncheon Club.—In the absence of Stanley Vanstone (G2AYC) the chair at the November meeting was taken by the Executive Vice-President of the Society, E. G. Ingram (GM6IZ). Among the visitors were VP3RW, W4ZM and G3HPH, the latter recently returned from ZE. It was announced that meetings would be held on the third Friday in each month during 1962, with the exception of April and December, when the club will meet on the second Friday in both cases. Visitors are always welcome. Bookings may be made by telephoning the *Hon. Secretary*, Frank Fletcher (G2FUX), at Ruislip 2763, or R.S.G.B. Headquarters, Holborn 7373.

Northern Heights Amateur Radio Society.—Recent activities have included a talk on 2m operation by G8CB, a demonstrarion of hi-fi and stereo sound reproduction, a Pea-and-Pie Supper and participation in the Jamboree-on-the-Air under the call-sign G3MVH. Details of future arrangements are given in *Forthcoming Events*. *Hon. Secretary:* A. Robinson (G3MDW), Candy Cabin, Ogden, Halifax.

Peterborough Amateur Radio Society.—More than 40 members attended the A.G.M. at the Peterborough Technical College on November 3, with the R.S.G.B. Zonal Representative, F. K. Parker (G3FUR), presiding. Officers elected were: *President:* S. Hunting; *Chairman:* C. J. Guscott (G3HXR); *Auditors:* W. J. Carter (G2NJ) and R. Houltby; *Hon. Secretary and Treasurer:* D. Byrne (G3KPO), Jersey House, Eye, Peterborough. *Committee Members:* A. E. Barnes (G2BYI), L. Critchley (G3EEL) and W. Yeomans. It was decided to apply for affiliation to the R.S.G.B.

Reigate Amateur Transmitting Society.—The November meeting was packed for the film show arranged by G3NDF who showed his own film, *Surrey N.F.D. 1961*, and the Mullard *Mirror in the Sky*. A large party of members attended the R.S.G.B. Radio Hobbies Exhibition on November 24. On December 16, at the Tower, Redhill, members will be demonstrating their own equipment. The third A.G.M. has been arranged for January 20, 1962. *Hon. Secretary:* F. D. Thom (G3NKT), 12 Willow Road, Redhill.

Rotherham Radio Club.—Members took part in the *Short Wave Magazine* contest and results are awaited with interest. Forthcoming activities include the annual competition for the G3KUH Shield, a demonstration of 2m operation, a talk by ZC4RF and and introduction to RTTY. The A.G.M. will be held on January 3, 1962. *Hon. Secretary:* S. J. Scarborough, 25 Crawshaw Avenue Beauchief, Sheffield 8.

Wirral Amateur Radio Society.—Members took part in the Jamboree-on-the-Air under the call-sign G3NWR. On November 5, a D/F Hunt was won by G8BM, followed by G3EGX. Just after the transmitter closed down, two younger members, B. Kirk and R. Chalmers, also arrived at the site. G3FXC has given a most interesting lecture on the construction of the Heathkit Mohican receiver. *Hon. Secretary:* A. Seed (G3FOO), 31 Withert Avenue, Bebington.

COPY DEADLINE

TO enable the R.S.G.B. BULLETIN to be printed in time for bulk postings to take place by not later than the 14th day of the month, the closing date for editorial copy, the 22nd day of the preceding month, must be strictly adhered to. Society Representatives and Club Secretaries will greatly assist the Editorial staff by posting copy to reach Headquarters by not later than the 20th of the month whenever possible.

Copy received after the 22nd day of the month will be held over for future use if still topical.

R.S.G.B. Slow Morse Practice Transmissions

The following Slow Morse Practice transmissions are sponsored by the Society. Those responsible for the transmissions have a duty to the membership to adhere to the schedule but if they cannot do so for any reason they should notify the Honorary Organizer, Mr. C. H. L. Edwards (G8TL), 28 Morgan Crescent, Theydon Bois, Essex.

Time	Call-sign	kc/s	Town
Sundays			
09.00	G3BHS	1910	Southampton
09.30	G3HNJ / G3OFP / G3OMJ	1840	Doncaster
10.15	G3CGD	1875	Cheltenham
10.30	G3NCZ / G3OTA	1920	Blackburn, Lancs.
11.00	G3GZE	1840	Blackburn
11.00	G2FXA	1900	Stockton-on-Tees
11.00	G3HZM	1860	Manchester
11.00	G3NXQ	1850	Warndon, Worcs.
11.00	GW3PCK / GW3PEX	1850	Cefncoed, Breconshire
12.00 †	G3HVI / G3IVB / G3OGD	1920	Stoke-on-Trent
12.00	G3ONQ / G3IGW	1900	Halifax
12.00	G15UR	1860	Belfast
20.30	G3HTA	1850	Exeter
Mondays			
18.15	GW3MIS	1910	Haverford West
18.30	G3NC	1825	Swindon
18.30	G3NCZ / G3OTA	1920	Blackburn, Lancs.
19.00	G3KTP	1850	Heanor, Derby
19.00	G3LMT	1850	Exeter
19.00	G3MXS	1915	Wirral
19.30	G3AJD	1865	Barnet
20.00	G3BMY	1838	Birmingham
20.00	G3GZE	1840	Blackburn
20.00	G3HJG	1825	Manchester
20.00	G3NIM	1910	Southampton
20.30	G3AGN	1875	Felixstowe
20.30	G3MXI	1910	Derby
21.30 †	G3IRM / G3MWO	1981	Bury St. Edmunds
21.30 †	G3LGK / G3MXI	1980	Ilkeston, Derbys.
21.30	G3NOE	1900	Bradford
Tuesdays			
17.30	G2AAM	1875	Swanwick, Derbys.
18.00	G3GZE	1840	Blackburn
18.30	G2FXA	1900	Stockton-on-Tees
19.00	G3ONB	1850	Kirkby-in-Ashfield
19.30	G3AJD	1865	Barnet
19.30	G3IAG	1930	Littleport, Cambs.
20.00	G2FCI	1850	Exeter
20.00	G3NHR	1900	Hounslow
20.00	G3NXY	1910	Southampton
20.15	G2AYQ	1875	St. Agnes, Cornwall
20.30	G3MEH	1900	Old Coulsdon, Surrey
20.30	G3NKX	1875	Loughton
21.00	G3EFA	1855	Southport
21.00	G3LSC / G3MKN / G3NUN	1875	Poole
21.15	G2CPL	1875	Felixstowe
21.45	G2UK	1875	Lowestoft
22.00	G2CZU	1820	Bath
22.00	G3AWL	1980	Wingate, Co. Durham
Wednesdays			
18.15	GW3MIS	1910	Haverford West
19.00 †	G3MCJ / G3FLK / G2FCI / G3HTA	1845	Exeter
19.00	G8RQ	1850	Chesterfield
19.30	G2BSQ	1930	Ashtead, Surrey
19.30	G3AJD	1865	Barnet
Wednesdays			
19.30	G3IAG	1930	Littleport, Cambs.
19.30	G3NQR	1875	Harrow Weald
19.45	G3KFE	1950	Stevenage
20.00	G3BHS	1910	Southampton
20.00	G3GZE	1840	Blackburn
20.00 †	G2HDR / G3IZM / G3OLB / G3OUK	1910	Bristol
20.15	G2AYQ	1875	St. Agnes, Cornwall
20.30	G3LCK	1910	Canterbury
20.30	G3MXI	1910	Derby
21.00 †	G3HVI / G3IVB / G3OGD	1920	Stoke-on-Trent
21.00	G3LSC / G3MKN / G3MXF	1875	Poole
21.00	G3AGX	1920	Hull
22.00			
21.30	G3HNJ / G3OFP / G3OMJ	1840	Doncaster
21.30	G3NOE	1900	Bradford
22.00 †	G3LGK / G3MXI	1980	Ilkeston, Derbys. / West Hallam, Derbys.
22.00	G3NXQ	1850	Warndon, Worcs.
Thursdays			
17.30	G2AAM	1981	Swanwick, Derbys.
18.30	G3NC	1825	Swindon
19.30	G3AJD	1865	Barnet
19.30	G3IAG	1930	Littleport, Cambs.
20.00	G3NBV	1910	Southampton
20.00	G3NHR	1900	Hounslow
20.00	G5XB	1890	Reading
20.15	G2AYQ	1875	St. Agnes, Cornwall
21.00	G3OST	1910	Purley
21.30	G3HMY	1850	Exeter
21.30 †	G3IRM / G3MWO	1981	Bury St. Edmunds
22.00	G2CZU	1820	Bath
22.00	G3AWL	1980	Wingate, Co. Durham
Fridays			
18.15	GW3MIS	1910	Haverford West
18.30	G3DMN / G3FVP	1880	Ipswich
18.30	G3NCZ / G3OTA	1920	Blackburn, Lancs.
19.00	G3JKY	1900	Beckenham
19.00	G3PGS	1850	Kimberley, Notts.
19.30	G3AJD	1865	Barnet
19.30	G3FUA	1850	Kilburn, Derby
19.30	G3IAG	1930	Littleport, Cambs.
19.30	G3MHR	1850	Swanwick, Derbys.
20.00	G2BOJ / G3NXZ	1840	Doncaster
20.00	G3JQS	1915	Totton
20.00	G3NYB / G3NXZ	1980	Doncaster
20.15	G2AYQ	1875	St. Agnes, Cornwall
20.30	G3ICX	1915	Sutton Coldfield
20.30	G3KGU	1915	Theydon Bois, Essex
21.30 †	G3NPO / G3KSS	1900	Bradford
22.00 †	G3LGK / G3MXI	1980	Ilkeston, Derbys. / West Hallam, Derbys.
Saturdays			
13.00	G2FXA	1900	Stockton-on-Tees
14.30	G3NQA	1925	Birmingham
19.30	G3KPO	1900	Peterborough

† *Alternately*

Alterations and additions to this list should be sent to the Honorary Organizer at the address given above.

Can You Help?

● D. Byrne (G3KPO), Jersey House, Eye, Peterborough, who requires information on the T. 1131 transmitter?

● L. Boor (B.R.S. 22653), 18 Lime Tree Avenue, Gainsborough, Lincs., who requires details of the conversion of the APN-1X transmitter-receiver to a 420 Mc/s receiver?

● H. Davies (G3JSG), 18 Harrow Avenue, Rochdale, Lancashire, who requires the circuit diagram of the "Elizabethan" transmitter published in the July 1953 issue of the R.S.G.B BULLETIN?

● R. C. Kaye (G6RO), 6 Belmont Avenue, Baildon, Shipley, Yorkshire, who requires the handbook or any circuit information for the Collins Transmitter-receiver type RT-91/ARC-2?

● K. Laycock (A.2746), 274 Leeds Road, Bradford 3, who requires information on the RME69 receiver?

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