

# R.S.G.B.



# BULLETIN

## EDDYSTONE MODEL '840' AC/DC COMMUNICATIONS RECEIVER



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

- Seven valve superheterodyne with R.F. stage.
- Frequency coverage 30 Mc/s to 480 kc/s.
- Gear driven tuning with 140/1 reduction.
- Mechanical bandspread. Accurate re-setting.
- B.F.O. and noise limiter.
- Internal loud-speaker. Headphones jack.
- Robust diecast construction. Rustproofed steel case.
- Suitable for tropical service.
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List Price (in U.K.) £45

*Exempt from Purchase Tax*

PLEASE WRITE FOR FULL SPECIFICATION TO THE MANUFACTURERS:

**STRATTON & CO. LTD., EDDYSTONE WORKS, BIRMINGHAM, 31**

JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN

VOLUME 29 No. 11

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PRICE 2/6

MAY 1954

# DO YOU WANT

- ★ MORE R.F. IN THE ANTENNA?
- ★ A LOW STANDING WAVE RATIO?
- ★ LESS FEEDER RADIATION?
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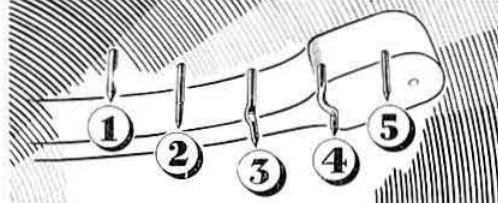
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(14)

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All Brand New with Valves.

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10 EF50 (Ex-Brand New Units)	5/-	each			45/-	Set
10 6AM6 Valves					£4	"
6K8C, 6K7G, 6Q7C, 5Z4C, 6V6G (or KT61)					37/6	"
1R5, 1S5, 1T4, 1S4 or (3S4 or 3V4)					30/-	"
TP25, HL23/DD, VP23, PEN25 (or QP25)					25/-	"
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12K8CT, 12K7GT, 12Q7GT, 35Z4GT, 35L6GT (or 50L6GT)					37/6	"
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Unit contains VCR517C Cathode Ray Gun, tube, complete with Mu-metal screen, 3 EF50, 4 SP61 and 1 5U4G valves, 9 wire-wound volume controls and quantity of resistors and condensers. Suitable either for basis of television (full picture guaranteed) or Oscilloscope. Offered Brand New (less relay) in original packing case at 67/6, plus 5/- carriage.

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6S1GT	-	8/6	Y63	-	8/6
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6X5G	-	8/6	MU14	-	3/6
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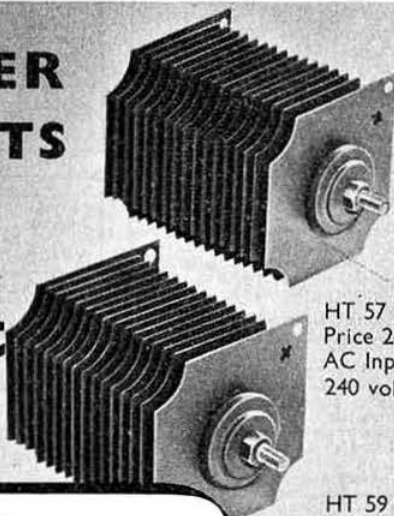
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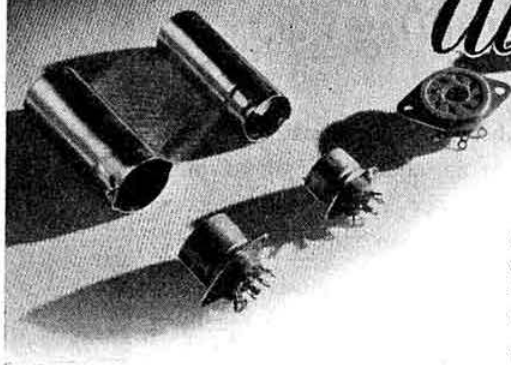
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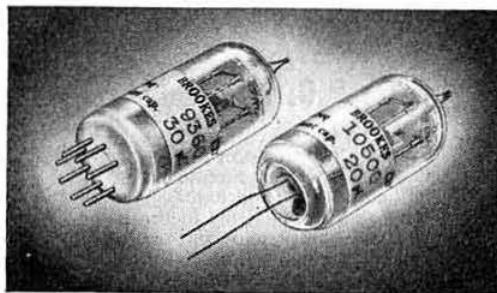
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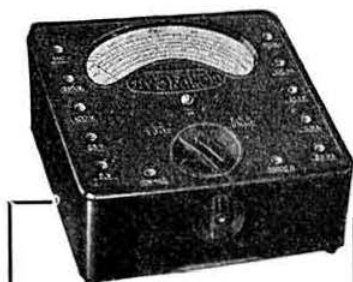
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0-250 "	0-500 "
0-500 "	
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# R.S.G.B. BULLETIN



*Devoted to the Science and Advancement of Amateur Radio*

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

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## R.S.G.B. BULLETIN

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.

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Telephone: HOLborn 7373

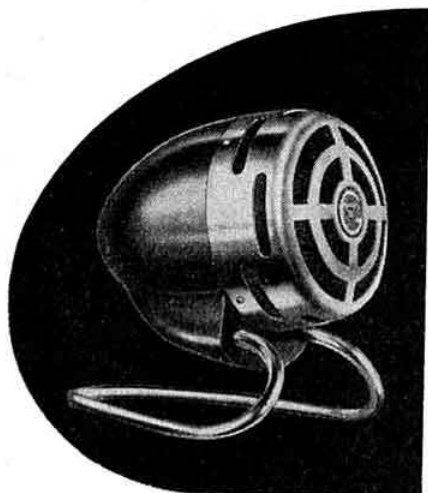
### Advertisement Manager:

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# Current

# Comment...



## The New Amateur Licences

WHEN last month's Current Comment was written, with its theme of "This Glorious Year," the draft of the new Amateur (Sound) Licence had not become available. If it had, there would have been one more "something" to add to the tale of the important, significant and heartening events which 1954 promises.

The re-writing of the British Amateur Transmitting Licence certainly comes into the category of "important," and it was for this reason that, almost as a stop-press item, the new regulations were printed, and sent out as a 3-page "extra" to the April BULLETIN.

The liberal and sympathetic attitude towards the transmitting amateur which now prevails at St. Martin's-le-Grand will be evident to all who study the new documents. The Amateur (Sound) Licence, for example, now is rather more of a licence pure and simple and less of the technical paper it has tended to be in the past, with its precise and almost admonitory language. The licensing authorities' recognition of the average amateur's technical ability and status is manifest from paragraph 3 alone. Here, under the heading of "Frequency Control and Measurement," the requirement is short and to the point where once it had been quite extended. The individual licensee's commonsense is clearly taken into account.

It is interesting to note, too, the official recognition of "netting" in the phrasing of paragraph 2 (d) which refers to communications with groups of stations collectively. The G.P.O. clearly is well aware of current amateur operating techniques—a fact further emphasised by the insertion of Clause 8 on the subject of re-transmission of recorded messages.

The G.P.O. must have been aware also of the doubts which existed in the minds of many as to whether or not individuals, other than the owner-operator, should be allowed to operate an amateur station. Clarification upon this point is provided by the new form of licence, which lays down that other "fully fledged" operators may use the equipment so long as the licensee is present.

With the issue of the new form of licence, British amateurs will find it necessary to make a small readjustment of their habits concerning the use of call sign suffixes. In future it will be permissible to use the station call sign not only at home but at any reasonably permanent alternative address without the suffix "/A." But when using a temporary alternative address—for example, during a holiday—the call sign will then, and only then, embrace the suffix "/A."

The subject of suffixes brings us now to one of

the most important developments of all where the new licence regulations are concerned, and that is the creation of the Amateur (Sound Mobile) Licence, which will be available to everybody on application on payment of a small additional fee. This is a step forward indeed, and one which will be greatly welcomed by those who have cast longing eyes upon the development of mobile operation by our friends across the Atlantic. Almost certainly the "/M" facility, by offering the British amateur a wide new field for technical exploration, will produce many specialised designs of miniaturised equipment.

Thus, at last, the transmitting amateur in this country has his new and really up-to-date "charter," in the form of licensing conditions that do indeed take account of contemporary developments. They could not have taken their final practical form without close consultation between the Society's G.P.O. Liaison Committee and their co-operative opposite numbers at the G.P.O., technical, administrative and legal.

Finally, every member will earnestly wish to offer felicitations to the members of both bodies (the Society's Liaison Committee and the G.P.O. officials concerned) on bringing the Amateur licence regulations firmly up to date.—J.H.

## The New Licence Fees

JUST before this issue closed for press, the G.P.O. supplied the Society with details of the new fees for Amateur Licences. The annual fees for licences issued or renewed on or after June 1, 1954, will be as follows:—

Amateur (Sound) Licence ...	£2
Amateur (Sound Mobile) Licence ...	£1
Amateur (Television) Licence ...	£2

There will be no variation of these fees, in respect of differences of power authorised, nor will there be any extra fee payable on the first issue of a licence. The additional fees which are at present charged for portable and alternative address working will not in future arise.

Copies of the Wireless Telegraphy (General Licence Charges) Regulations 1954, which prescribe the above fees, may be obtained from H.M. Stationery Office, price 6d.

In giving publicity to the above information we consider it to be desirable to point out to the membership at large that the actual business of fixing the new licence fees—being a purely domestic problem as between various sections of the Post Office—has not been the subject of negotiation between the Department and the Society. The Society's representatives have, however, as the opportunity occurred, taken pains to impress on the representatives of the G.P.O. the

desirability of keeping the fees as low as possible.

Bearing in mind the general rise in costs over the past few years, the fee fixed for the new Amateur (Sound) Licence is considerably lower than we had feared it might be; in fact for the majority of U.K. amateurs it will be precisely the same as the fee they are now paying—namely, £2 per annum.

Members affected by the new fees will, we hope, appreciate that, as far as the G.P.O. is concerned, there is no administrative cost difference between one power rating and another. In view of the quite substantial additional facilities made available under the terms of the new Amateur (Sound) Licence, such as, for example, the decision to make no charge for portable or alternative address operation, there should be little reason, in our view, for present 10 and 25 watt licence holders to feel too badly about the increase.

The proposed fee of £1 for the new Amateur (Mobile) Licence is highly satisfactory, as is the news that the fee for the Amateur (Television) Licence is to be reduced to £2.—A.O.M.-J.C.

#### "A Quarter Century Back"

**T**WENTY-FIVE years ago the call G2QY was held by Mr. A. Hinderlich and not by Mr. G. P. Anderson (the present holder) as stated last month.

#### New Amateur Licences

**T**HE G.P.O. have authorised us to state that, although existing Amateur Transmitting Licences will not as a general rule be replaced by new Amateur (Sound) Licences until the normal renewal date, United Kingdom amateurs will be permitted to operate in accordance with the terms of the new regulations as from June 1, 1954.

The G.P.O. have also authorised us to state that no objection will be raised to the use, this year, of the suffix /P by N.F.D. stations. A further statement can, however, be expected later, in respect to the suffix to be used in connection with other outdoor events such as Two Metre Field Day and Low Power Field Day.

#### Holiday in Berlin

**W**ALTER REICHEL (DL7ES), Quitzowstr. 135, Berlin N.W.21, 1, wishes to arrange a holiday-exchange during the period June to August with any British amateur under 58 years of age residing in the coastal area from Liverpool to Plymouth.

#### Audio Engineering

**M**EMBERS are asked to note that subscriptions to "Audio Engineering" (now known as "Audio") published by Radio Magazines, Inc., of Mineola, New York, can no longer be accepted by the Society.

## Amateur Licences

*THE following is a summary of the more important differences between the current and the new Amateur Licences.*

### The New Amateur (Sound) Licence

- Permits operation from a temporary alternative address or location for separate periods not exceeding four consecutive weeks at a time, using the suffix /A. The effect of this regulation will be to permit unrestricted portable operation from temporary sites.
- Permits operation from an alternative address for periods longer than four weeks subject only to the local G.P.O. Telephone Manager being notified in writing in advance.
- Permits a station to be operated by certain qualified persons in addition to the Licencee, provided the Licencee is present.
- Permits group operation. The effect of this regulation is to allow "netting."
- Permits the Licencee to use his discretion in the matter of frequency control and choice of frequency measuring equipment.
- Permits transmissions to be recorded and played back to the originating station, provided the call-sign of that station is not included in the play-back.
- Places no restrictions on sending periods. The current licence states that no period of sending shall exceed 10 consecutive minutes.
- Recognises the self-training aspects of the Amateur Service as defined in the Atlantic City I.T.U. Conference Radio Regulations.

- Requires the Licencee to take all reasonable steps to avoid causing interference to other amateur stations.
- Requires particulars of the address or location to be sent when the station is operated from a temporary alternative address or location.
- Does not require the Licencee to sign the log each time the station is operated.
- States that when telegraphy is used the station call-sign shall be sent at a speed not exceeding 12 w.p.m. The current licence fixes the maximum speed at 20 w.p.m.
- Omits all reference to distance limits from Government wireless stations. The current Portable Licence prohibits the unauthorised establishment of a portable station within one mile of a Government wireless station.

### The New Amateur (Sound Mobile) Licence

- Permits operation from any vehicle.
- Permits operation from any vessel, provided the vessel is not on the sea or within any estuary, dock or harbour.

**Footnote.**—The P.M.G. will regard himself as free to publish the Licencee's name and address at his discretion unless the Licencee specifically asks that this should not be done. This arrangement will enable the Society to publish a more comprehensive Call Book than has hitherto been possible.

# 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 Tuesday, March 16th, 1954, at 6 p.m.*

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

**Apology.**—An apology for absence was submitted on behalf of Mr. J. H. Hum who was indisposed.

## Membership

**Resolved** (a) to elect 46 Corporate Members and 8 Associates; (b) to grant Corporate Membership to 9 Associates who had applied for membership.

## Applications for Affiliation

**Resolved** to grant affiliation to the Bourneville Radio Society and the Radio Society of the University College of Leicester.

## National Radio Show

It was reported that the Radio Industry Council had allocated to the Society a space approximately 37 ft. by 12 ft. 6 in.

## Raffle Prizes

It was agreed to inform all Society representatives that for the future no application for raffle prizes should be made except with the approval of Headquarters. It was also agreed to remind representatives that winners of raffle prizes should be requested to write a letter of thanks to the donor of the prize.

## Headquarters' Station

It was agreed (a) to accept an offer made by Mr. R. L. Varney to operate the Headquarters' station from his home in Chelmsford, Essex; (b) to seek permission from the G.P.O. to conduct a News Bulletin Service on 3.5 Mc/s; (c) to dismantle the present Headquarters' station.

## Zonal Boundaries

It was agreed to submit to the Regional Representatives, for consideration at the forthcoming Conference, proposals in regard to zonal boundaries.

## R.R.'s Conference

An agenda of business for consideration at the R.R.'s Conference was approved.

## "The R.S.G.B. in Retrospect"

It was agreed to publish in serial form in the BULLETIN the manuscript of a booklet written by Mr. C. H. L. Edwards entitled "The R.S.G.B. in Retrospect."

## Conventionettes

It was agreed to authorise the Representatives for Regions 2 and 5 to arrange Conventionettes during the summer or late autumn of 1954.

## Social Functions

It was agreed, in principle, that representatives of the Council and Headquarters' staff, after consultation with the Council, shall be permitted to accept invitations to attend social functions organised by local groups or affiliated societies and that the expenses so incurred shall be borne by the Society.

## President's Chain of Office

It was reported that Mr. W. J. Butler, G5LJ, had offered to donate to the Society a President's Chain of Office.

**Resolved** to accept with thanks the generous offer made by Mr. Butler.

## "A Guide to Amateur Radio"

**Resolved** to authorise the Secretary to proceed with plans for producing a new edition of "A Guide to Amateur Radio."

## I.A.R.U. Calendar No. 47

The December, 1953, issue of the Calendar was submitted for information.

It was reported that a letter had been sent to I.A.R.U. Headquarters drawing attention to the scant treatment given in the Calendar to the important meeting of Region I Societies held in Lausanne, Switzerland, during May, 1953.

## Historical Facts

Consideration was given to a suggestion made by Mr. Austin Forsyth (Editor of *The Short Wave Magazine*) that the Society and the Magazine should co-operate in the preparation of a document setting out certain facts relating to the development of the short waves for communication purposes by amateurs.

After discussion it was agreed (a) to authorise the Secretary, in consultation with the President and such other Members of the Council as may be interested, to collect together historical information with a view to the compilation at a future date of an authentic "History of Amateur Radio in the United Kingdom"; (b) to invite pioneers in the field of Amateur Radio to loan or donate to the Society early records, such as photographs, newspapers and other documents; (c) that the President should write to Mr. Forsyth concerning his suggestion.

## Cash Account

**Resolved** to accept and adopt the Cash Account for February, 1954.

## 420 Mc/s Contest

It was agreed to adopt a recommendation of the Contests Committee that a 420 Mc/s Contest be organised.

## Contest Winners

It was agreed to adopt a recommendation of the Contests Committee that certificates be sent to the winners of Society contests as soon as possible after the results have been published.

## Membership Committee

The Secretary submitted an analysis of the reasons given by members who had recently resigned. The analysis showed that only a relatively small percentage of resignations had been brought about for financial reasons. The majority of those who had resigned had either lost interest in Amateur Radio or had declined to transfer to the Corporate Grade.

## "Intruders"

In reply to a question, the Secretary stated that the Society had registered a number of vigorous protests with the G.P.O. regarding the presence of unauthorised stations in exclusive amateur bands. The Society had also asked I.A.R.U. Headquarters to register an official protest with the I.T.U. in Geneva.

The meeting terminated at 9.45 p.m.

# THE MONTH



By S. A. HERBERT (G3ATU)\*

**A**PRIL turned out to be very much a 20 m affair. As is usual at this season, the band stayed open until late at night, with signals arriving from the Americas. It was, however, during daylight that things were really good, with the result that many people added new countries to their list. Most of the openings were to S.E. Asia and the Pacific; early morning sessions which produce such choice items as KB6, KW6, VR2 and ZK1 make a pleasant change. Fifteen metres has been disappointing, considering the m.u.f. predictions, which forecast frequent openings to various areas. Inactivity would seem to be the answer. However, some DX was worked.

## Twenty and Fifteen Metres

**G8KW** comments on the poor state of fifteen. Apart from Africans, his best DX was VU2 and 4S7. Twenty he found in good form, with the northern route well open in the mornings, when KAs, KL7s, ZL, KW6BB and KX6BO were worked on phone. KA3MD was a tremendous signal on s.s.b., as was VR2AS on 14080, c.w. Later, KR6s, VS6CW, VU2RC and VS1EU, worked on phone (1700-1830) were also strong. '8KW points out that the KA, KR, KG, KX, KLS, etc., operate in the American phone band when using A3. He has a QSL from VK9WZ (Admiralty Is.), who is looking for G contacts. **G3CMH** found openings on both bands. On twenty phone, FM7WO, PJ2AA, VP2DL, 2DN, 6WR, TA and 3V8 were worked, while, on fifteen, the same medium brought contacts with CR4AE, KP4, LU, OQ5NQ, PY, VQ4, YV, ZBI and ZS1BV.

**G3IVJ**, using 60 watts and a 260 ft. aerial, recently worked HZ1HZ and EA9AZ on fifteen, c.w., and a CN8 on twenty phone, while twenty c.w. got him CR6CS, EA8, EA9DE, JA8AQ, KA9MF, MP4BBE, OX, ZS6 and 4X4FF. **G3JFF** is home after a trip to the West Indies. The rig which put such a signal over here ran 140 watts, mostly c.w. on 7 and 14 Mc/s. Some 1,060 QSOs were made from VP6, VP4, VP9 and VP2 (St. Lucia, Bequia and Beef Island), while operation on 3865 kc/s (Antilles Net), produced QSOs with KV4, KP4 and VP2s, KB, KM, DL, MC, VA—all very mouth-watering from this end. Personal QSOs were made with VP6FO and VP9BK, 'AX, 'BN and 'DDD. Recent DX on twenty from the home station has included ZL1AX, W6, VP8AQ (ex-G3ISL), VP6PV and VP7NM, but he missed KB6AQ (1000). PJ2AF was worked on phone. All this with 60 watts to a dipole.

**G2ABK**, who is 90 miles from Holme Moss, can nevertheless work on twenty with complete freedom from TVI. He uses an 807 with pin-network output, running 45 watts. A 134 foot aerial pulled in VS9AS, W6, LU5AHQ, YI2AM, KP4QA, PY and many W/VE, etc. Nothing spectacular, says 'ABK, but he can transmit when

he likes, which is more than some of us can do!

**G3JWW** found twenty brighter and plied the key for QSOs with VS2BW, VQ2AB, 4X4BX, W6NZ, CR6CS, 7CH, CX6AD, EL2P, YI2AM (QSL already received), EA9DF, VU2KV and AP2K (QSL via DL3ZV). Good ones missed were DU7SV, FF8AP, FQ8AG, VP4LZ, VE4RO, KR6OS, ZD4BL, JA3 and KB6AQ (14060-1015, with the pack in full cry!).

**G2GZ**, who worked LB6XD (Jan Mayen Is.) in October, 1952, has just received his QSL card. Enquiries to a Norwegian source revealed that mail to the island depends entirely on the occasional boat getting through. Due to winter ice, this happens infrequently, so that cards from LB8YB and the others up there may well be delayed.

**G3ATP**, commenting on last month's reference to VU8AA, has further information. The operator told '3ATP his name was Tom and gave his QTH as Hanamandu Island. Research has failed to locate any such spot. Some time ago, 'ATP worked the notorious AC4AK (name also Tom) and he has a strong suspicion that both transmissions emanated from the same source. A final blow befell 'ATP when he was listening to a VK working a DL. All interest vanished when the VK was heard to say he did not QSL. Ah! well, at least he was honest about it!

**B.R.S. 7594** gave the phone bands his full attention and found twenty poor most mornings but good later. Interesting ones were CP5AB (14193), CT2AC, 2AG, CR5NC (São Tome), EL9A, ET2AB, FM7WN, 7WO, FQ8AK, LU0EAB/MM, MP4QAH, VP2DL, 2DN (2140), VQ5BVF and many ZS. He found fifteen patchy, but often open until 2000, with most signals from Africa and S. America. CE2AY, '3CZ, '3NS, CP5EK (1830), CX3BL, EL2X, KP4, LU, PY, OD5, OQ5, TA, VQ2, 4 and 5, YV, ZE, ZD4 and ZS9G were logged. '7594 often finds the band dead until in comes a strong signal, to start things happening.

**R. Goodman** (Associate) has put up a three element full-wave fixed beam to assist his 0-V-0 and finds it a great success, both for Far Eastern and American DX. CR6, CX2CO, FM7WN, HK, KA2OM, KG4AO, KL7, KZ5AF, VK6, VE6, 7 and 8, VP4TH (2230), VSI and 2 and TI3LA were all pulled in on twenty phone.

**B.R.S. 19894** had c.w. catches DI9AA, VS1FM, VP8AA, VS9AS, DU1OR, HS3L (1325), ST2U, AP2C, KH6MG, EA9DF, KA and JA, while twenty phone netted him VE7RR, DI9AA, HI6HE and ZL2BE, still coming through, but by no means his normal strength. ZB2A is a terrific signal at all times. **B.R.S. 20104** stuck to twenty c.w. and was rewarded with EA9DF (Rio de Oro), EL2P (0730), UH8KAA, HK1TH, JA, JZ0KF (1100), KR6OE, OS and OY, KL7, VE8PF and VS6CG (1500). 4W1JK was heard, but more

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

about him later. '19894 heard Gs working VR6ZA on 14080 kc/s. Interesting!

**H. J. Hill** (Whitley Bay) heard a weak signal on phone on two occasions, around 2200, with QRM from ZP5. The call ended in 0AD and it could well be CE0AD. The time is right. H. J. H. has been hearing masses of KA phones and DU9JO, LU0MA/MM, VP7NU, CR4AM, VS1 and 2, ZP5CF, TI2TC, VE8YP, ZE6JD, VS4BM(?), ZS3, ZL4AC, (2232); VP4AA also kept him happy. W1MCW was heard calling VK1HM "on sked," so presumably the VK1 is still active on Cocos Is.

**B.R.S. 18017** collected CP5EK on fifteen phone: a new one on any band which brought his total up to 188 countries. Twenty phone was good for ZS8B, HR1AA (1230), 4S7, VK9YT and JY1XY, while on c.w. JZ0KF and FK8II were brand new ones: OY2A and UA0KAB complete the picture. **R. Patrick** (Oldham) heard KG4AK, VE8UB, VP4TH and YV, all between 2100-2200 on an 1155A receiver.

**P. M. Crawford** (Darlington) picked up phone from CX, VP2DL, CM9AA, VK5NS, 7MF, 4W1UU, OQ0, JA4WU and c.w. from FO8AR and FR8AS. **B.R.S. 19530** decided to stick to twenty phone, where his SX24 netted him some strong VSIs, 4S7, lots of Africans, with SU1MR outstanding, YI2AM and KT1LU (Tangier). **R. Civil** (Plymouth) was pleased to hear KL7BF, VP9F, ST2NW, ZD1SW, EL2X, FM7, G3AAT/OX and the elusive TG9RB on phone. **B.R.S. 20106** now has a folded dipole up high and finds it better on some twenty metre signals than his well-tried long wire. Besides all the usual DX, he pulled in ZD6BX (1715), DU1CV, CP3CA, UA0SK, KB6AY and 6AQ on c.w. On phone he heard G3AAT/OX describing his location, 8,000 feet up on the Ice Cap, with the temperature 50° below zero! TG9RB was S9 at 2140. OA4M and CR5EP were there too. AB1USA is reported active from Formosa and KC6KU from Caroline Is. KA0IJ is around again on phone. OH2RM was heard working VQ6CN on phone and 4X4BT was calling 3S5DM on c.w. (sounds more like a valve than a station!). YA1AA uses 14200 phone in the mornings; CR8AB has been on 14120, around 1600 and C3AR is reported to be on 14120 kc/s, while VR3A is active on fifteen. **B.R.S. 20106** paid a visit to **J. L. Hall** and the pair of them sorted out ZD4BL, CX1IX, CR4AJ, PY, LU and ZS9G on 21 Mc/s phone. John heard KB6AQ and 6AY consistently over Easter, sometimes from 0750 to as late as 1130. **G3ATU**, lurking on twenty c.w., managed to work KB6AY

for a new one and heard a W5 working PK2EP (who was not audible), CR9AI (1300-559) and EA0AC, who was a strong signal at 1815. MP4QAH (Halul Is.) is active on both c.w. and phone, but will be leaving the island soon. VS1YN, worked recently, puts in a good signal with his 70 watts and long wire. He is on c.w. only and says conditions are all right with him as long as he can QSO U.K. stations! He recently mailed a big batch of cards, which will be coming through the Bureau soon.

## ARE YOU PREPARING FOR CONVENTION? BECAUSE BRISTOL IS PREPARING FOR YOU...

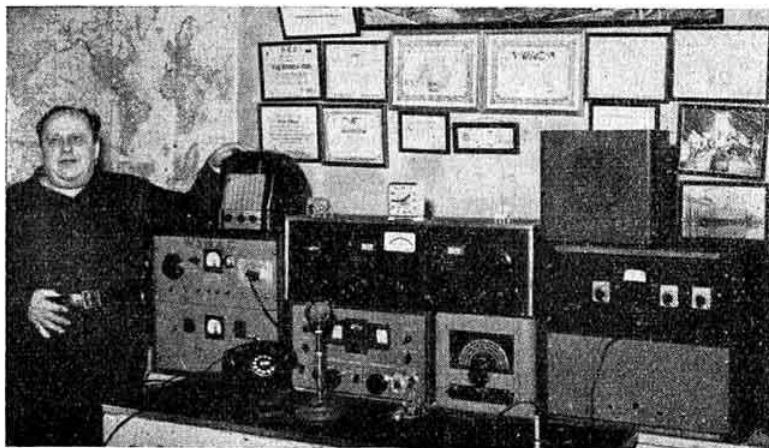
### Top Band

The winter season was quite hectic from a DX point of view and some interesting facts and figures appear. **J. L. Hall** did some research and found his own band total was 33 countries heard, with 19 confirmed. Adding those he knows have been heard in this country, he finds it is possible to log nearly 50 countries! Going further, he finds it should be possible to hear nearly 150 countries on eighty metres and well over 200 on forty. His own totals are 117/70 and 188/120 respectively, which is considerable going.

**G2HKU** raised GW3GMN/P (Carmarthen and Cards) and GW5PP/P (Breckon). He heard GW31WF/P (Radnor) weakly. He suggests a hearty vote of thanks to all the /P stalwarts.

In a letter, **W1BB** said that W8GDQ had worked both KH6IJ and '6MG on c.w. and got R5-S5/6 from ZL3RB on phone! **N. C. Smith** was still hearing DX at the end of March, when W5 and 9 were on but barely readable. Good signals were received from W8 and the KV4, VP7 and VE1, 3 lads. Norman has a QSL from VP4LZ (the VP's first report from Europe) who runs 150 watts to a 300 ft. wire, 38 ft. high and in the clear. W4CKD was heard calling XE2OK, but no XE was heard, despite strained ears!

**W1BB** says that in the last A.R.R.L. DX Test, W9PNE worked KV4, KP4, KZ5, KH6, VP7, VP9 and ZL! **W9FIM** sends a resume of his results, which include QSOs with six Gs, but the



This is a view of the station owned and operated by Lewis J. Papp (W3MAC), a blind amateur living in Easton, Pennsylvania. Using 40 watts input, Lewis has worked 143 countries on phone, and has received QSL cards from them all; 124 countries have been worked on 10 m. and 118 on 20 m.

interesting thing is the number of "long haul" contacts. He worked KH6 nine times and ZL on no less than thirty-three occasions, with ZL1WW, '2ABB, '1BY, '1MQ and '3RB at the N.Z. end. Another good DX QSO was with HC1KV. The rig responsible runs 150 watts while the aerial is a Top Band ground plane, 93 ft. high and top-loaded, with six radials and six buried earth wires. **G3CMH** has been active and had good QSOs on c.w. and phone, the best so far being with G13IOS.

enough for the new crews to ship any QSLs, so that cards from them must wait another year. 'JWW also worked ZS2JB (G3HFF), who uses a B2 (0035), KZ5 and UB5CF, who said QSL to Box 52, Odessa. (Humm!) He missed HH3DL, CX2FF, VS9AS (Aden), VU2AM and VP4LZ. **G13IVJ** settled for CN8 and FF8AC. **G3JFF** QSOd CX1KB (his first G) and mentions T12PZ, active most nights on 7020. **G2HKU** raised W, T12WR and ZL, but wonders where the VKs have got to. **N. C. Smith** heard VR3A called on forty

Exeter Group Annual Dinner  
From left to right (seated) G3JW, G5QA, B.R.S. 4948, G3EFY, G3HMY, (standing) G3FLK, G3HFI, G3AUS, B.R.S.20027, G8DA, B.R.S.7200, B.R.S.19366, B.R.S.19133, G3GWH and B.R.S.8123.



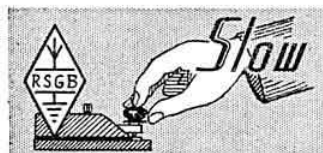
### Forty and Eighty Metres

Both these bands are getting noisy at this time of the year, but some noteworthy DX is still to be heard. On forty **G3JWW** talked to T12PZ, VP6GT, VP8AW and AX. '8AX said the *John Biscoe* had sailed for home, carrying VP8AW and last year's crews. The ship did not stop long

c.w. On eighty, he picked up VP7NM, EA8, W5NIY, 9JFB, WN4CIY and WN4CWO.

### From Overseas

**ZC4FB** has news of 4W1JK, who was around recently. Far from being in Yemen, the signals emanated from Cyprus! This individual must be particularly clueless; he was trying to work G2MI,



## Slow Morse Practice Transmissions

The following slow Morse transmissions, sponsored by the Society, are intended to assist those who aspire to obtain an amateur transmitting licence. More volunteers are still required for parts of the British Isles not already covered, particularly in the London Area. Stations listed who find themselves unable to continue transmissions should immediately notify the organiser, Mr. C. H. L. Edwards, A.M.I.E.E. (G8TL), 10 Chepstow Crescent, Newbury Park, Ilford, Essex.

† Alternately.

B.S.T.	Call	kc/s	Town	B.S.T.	Call	kc/s	Town
<b>Sundays</b>				<b>Wednesdays</b>			
09.00	G3LP	1850	Cheltenham	19.00	G3GZA	1837.5	Bristol
09.30	G3BKE	1900	Newcastle-on-Tyne	22.30	G3FBA	1910	Bath
10.00	G6MH	1990	Southend-on-Sea	22.00	G2BND	1918	Dalston
11.00	G2FXA	1900	Stockton-on-Tees	<b>Thursdays</b>			
11.00	G3GZA	1837.5	Bristol	19.00	G3NC	1825	Swindon
12.00	G15UR	1860	Belfast	20.00†	G2CPS	1910	Hull, Yorks.
14.00	G5AM	1900	Witnesham, Ipswich		G2CNX		
21.00	G2FIX	1812	Nr. Salisbury		G3GWT		
<b>Mondays</b>				22.30	G3OB	1803	Manchester
19.00	G3NC	1825	Swindon	22.30	G3ADZ	1940	Southsea
21.00	G3BLN	1900	Bournemouth	23.00	G3LA	1915	Brentwood
21.00	G3FSM	1900	Brentwood	<b>Fridays</b>			
22.15	G2BRH	1900	Ilford	19.00	G3BLN	1900	Bournemouth
22.30	G8TL	1900	Ilford	20.00	G3IHH	1900	Wirral
<b>Tuesdays</b>				20.30	G3IMP	1920	Romford
18.30	G2FXA	1900	Stockton-on-Tees	<b>Saturdays</b>			
18.30	G3JMP	1875	Bristol	13.00	G2FXA	1900	Stockton-on-Tees
20.30	G3GDZ	1905	Kingsbury, N.W.9				
21.00	G3EFA	1855	Southport				
21.30	G3DBP	1915	Nottingham				

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

to tell him how to forward his QSLs! '4FB has just returned from a trip to Egypt. He says the sea trip was enlivened by a session with the Radio Officer and remarks that trying to raise Portishead is about as tough as working AC4 with 1 watt and a bit of string!

**5A1TP** (Sgt's. Mess, R.A.F. Idris, M.E.A.F.1) has started a radio club at Idris. There are 14 members and some new 5A calls are due. '1TP explains the 5A call system. The first three symbols are followed by a letter indicating the Libyan Province; i.e. 5A1TP is in Tripolitania, for instance, while 5A2C is Cyrenaica and 5A2F indicates Fezzan. The only Fezzan call in use at the moment is 5A2FA. '1TP has been active on eighty, giving lots of people their first 5A contact on the band. He gives G2MF the prize for the loudest G signal out there.

Friends of **G8BI** will be interested to know he is now living in Madrid. Unfortunately, it is impossible for him to obtain a Spanish licence. He says that there is no surplus equipment at all in Spain and prices of new components are very high.

### Are you a "Ragchew" exponent?

Do you enjoy the swapping of friendly yarns and experiences? If you do, then the Bristol National Convention is a "date" for you because social get-togethers, ranging from the humble "cuppa" or a large pint to a full-scale Convention Dinner in Bristol's finest banqueting hall, form but one feature of the fare that will be offered.

**CN2AP** (G2CIW) writes that the Tangier Zone QSL Bureau is now Box 150, French Post Office, Tangier, with '2AP as acting QSL Manager. The Club Committee has been reorganised, CN2AO being President and CN2AR Vice-President. The Committee will gladly investigate any future difficulties or delays in QSLs from the Zone. **W6YY** passes on some useful information. He explains that VR3A is now active from Fanning Is. on A1 and A3. His temporary call, which caused such a scatter recently, was VR3D. **VK9OK** (Norfolk Is.) is on twenty phone, usually around 14130 kc/s. QSL to L. J. King, Norfolk Is.

#### Clipperton Island

**W6YY** details some of the tribulations of **W0NW**X and his two Iowa confreres, in their attack on Clipperton Is. Their first attempt was a frost; their sextant was smashed and they returned to Acapulco without finding the island. Their second attempt put them somewhere off the bicycle-tyre-shaped atoll on April 15. '6YY expected the landing would be difficult, due to heavy surf and lack of beach. Since that date, troubles have piled on troubles. The full story remains to be told, but the picture, built up by QSOs and much listening, is of storms, engine

trouble, shortage of fuel, food and water. A landing seems to have been made at last on April 23, but latest reports are of fuel shortage on the island, with high seas preventing further supplies being landed. The toughest DX-pedition ever, without doubt. We hope they eventually do get cracking and work the world. They deserve to!

#### The Countries List Again

To obviate any misunderstanding due to the paragraph in the February *M.O.T.A.*, when Oman (MP4) was deleted from the Countries List, it should be noted that Trucial Oman (MP4) and the Sultanate of Oman (VS9) are separate countries and count as such.

Please send your reports and comments to arrive by May 20. Good hunting and 73.

#### New American Phone Bands Coming

FROM *QST* we learn that the Federal Communications Commission has given notice that it intends to amend the rules for American amateurs to permit telephony operation from 14,200 to 14,350 kc/s and from 28,250 to 29,700 kc/s.

British amateurs, and others throughout the world, will no doubt receive this news with somewhat mixed feelings.

#### B.E.R.U. Contest 1953

THE callsign held until recently by S/Ldr A. R. Gilding, winner of the 1953 B.E.R.U. Receiving Contest, was G3GPZ not G3GPZ as stated in the November 1953 *BULLETIN*. The call G3GPZ is held by Mr. P. C. Probert, of Purley, Surrey, to whom we offer an apology for any confusion which the error may have created.

#### Affiliated Societies

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

**Liverpool and District Amateur Radio Club**, c/o A. D. H. Looney, 81 Alstonfield Road, Knotty Ash, Liverpool 14.

**Norwich and District Radio Club**, c/o D. Young, 53 Salisbury Road, Norwich, Norfolk.

#### Swedish "Ham Camp"

AN Amateur Station will be in operation at the annual Swedish Ham Camp, to be held this year at Aston, halfway between Sundsvall and Harnosand, from July 12 to 18. Other attractions will include lectures, debates, v.h.f. tests and bathing facilities. The charge will be between 6.50 and 7 Swedish kroners per day, for bed and three meals.

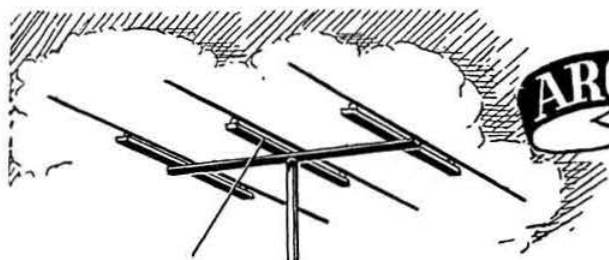
Further information may be obtained from Sven Granberg, SM3WB, Valbogatan 35, Gavle, Sweden, to whom applications to attend should be addressed.

#### A.R.R.L. Membership Rising

FULL membership of the American Radio Relay League reached a record high level of 43,614 during 1953. Total membership throughout the world was 60,000.

According to *QST*, early indications are that membership during 1954—the fortieth anniversary of the formation of the League—is still rising.

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## AROUND THE V.H.F.'s

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

**C**ONDITIONS on two metres remain generally poor: the improvement expected during the recent high-pressure weather system did not materialise. However, activity in most parts of the country has increased. Although some of the once familiar calls are still absent from the band, it is pleasing to find a number of new stations operating. A considerable amount of rebuilding has been going on, especially on the receiving side, and in this respect the R.S.G.B. Converter, described in the February, 1954, issue of the BULLETIN is proving particularly popular.

### The "Lofty Sites" Rally

It was most unfortunate that the "Lofty Sites V.H.F. Rally" organised by R.E.F. on Easter Monday was not favoured by better conditions. So far as is known, no spectacular results were achieved. **G5MR** (Hythe, Kent), who is in a good position for 2 m communication with the Continent, could get no farther than Paris. He reports that the best period for French stations was around 1130 B.S.T. when he worked **F3CA**, **F3JN**, **F8GH**, **F8LO** and **F9DI**. Deep fading was present on all signals with the exception of **F3JN** who was **S8** and reported **G5MR** at similar strength. **F9CQ**, operating portable at St. Valery-en-Caux near Dieppe, had to give up owing to battery failure.

### Two Metre News

**G3WW** (Wimblington, Cambs) has been testing a new aerial produced by **G2HCG**, consisting of two vertically stacked skeleton slots. On average the new array gives only 6 db less gain than a

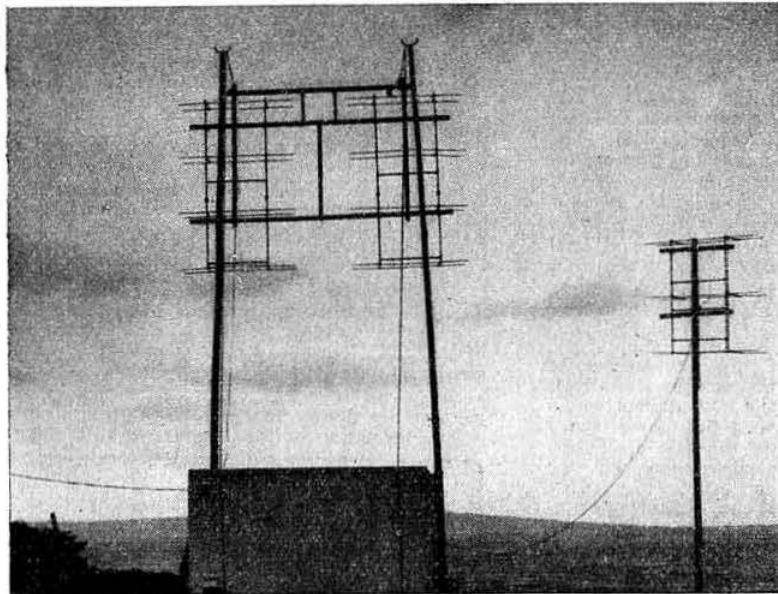
5-over-5 arrangement at a similar height of 40 ft. above ground. Some time ago **'3WW** tested an array of four skeleton slots against the same aerial with similar results, so it would appear that **G2HCG** has succeeded in improving the efficiency of the new aerial to a considerable extent.

Stations worked from Wimblington between March 27 and April 18 included **G2DJM**, **DUS**, **FJR**, **FQP**, **HCG**, **HOP**, **XV**, **3BA**, **BNC**, **CGQ**, **DIV/A**, **ENY/A** (Bridgnorth, Salop), **FAN**, **FD**, **GGJ**, **HZF**, **IAL**, **IIT**, **IOO**, **YZ/P** (near Cheltenham), **4PV**, **5IG**, **RZ**, **YV**, **6AG/P** (Stratford-on-Avon), **FO**, **8OU** and **8PX**. Among those heard were **G2ATK**, **3BKQ**, **DJX**, **DOV**, **EPW**, **FIH**, **4MW**, **5TZ/A**, **JU**, **BM/P**, **UD**, **6LI**, **RH**, **OU**, **XX**. The best evenings were March 27 and 28, April 8, 9, 11 and 15/16. Nothing was heard of **GW5MA/P** during his sortie into Pembrokeshire on April 17/18.

**GC2FZC** (St. Peter Port, Guernsey) is now active on 144.138 Mc/s most evenings between 1845 and 2000 B.S.T. Input is 10 watts to a pair of 6C4s in p.p. driven by two EL91 triplers from a c.o. A **G2IQ** type converter is used in conjunction with an HRO and the beam is a 4-element Yagi, at present fixed in the direction of London. The first 2 m contact was made on March 21 with **G5TZ/A** (I.O.W.); **G3AUS**, **JHM**, **4SA** and **8OU** were heard. The band again opened on April 8 when **G3AUS**, **BNC**, **GVF** and **4SA** were called without success. A CQ call on the following evening, however, raised **G3BNC**, **FAN**, **GVC**, **5MA** and **8OU**. **GC3EBK** is also active on 2 m in Guernsey.

A station to look out for during the summer

will be **G2HCG**, who has a portable rig in his car and who, by now, should be active in Scotland. Later he hopes to operate from South Wales, Taplow (Bucks), Derbyshire and from near his home near Warrington. The equipment includes an SCR522 transmitter, cascade receiver and two arrays, a pair of stacked skeleton horns and a 3-element Yagi for general coverage. To guard against battery failure a petrol-driven charger is carried.



The 2 m. aerial systems at E12W. The 32 element stack in the centre of the picture is beamed on Sweden. The 12 element stack at the right is beamed on London. The site is 760 ft. above sea level.

The G5BD/GM3EGW 2 m sked. continues, and during the first 16 days of April no less than 14 contacts were made. The 100th QSO took place on April 16. Among others worked on 2 m from G5BD during March were G2DJM, 3DA, DIV, DLU, GHU, NL, 5TZ/A and F8AA. G2FT, 3ARX and 5LL are active in the Mablethorpe area. A contact with Bob Munday, GW5MA/P, operating portable in S. Wales, on April 18 brought G5BD's "Ladder" score to 14 Regions.

**G8PX** (Oxford) worked G3WW, 6XX and G3YZ/P, who at the time was putting in a good signal using a pair of CV6s as a p.p. doubler whilst operating from hills near Cheltenham. **G5RP** has added an e.g.t. r.f. stage to his receiver, with a similar circuit to that employed in the r.f. stage of the R.S.G.B. Converter. He finds that heater chokes are essential for optimum noise factor.

**G4OU** (Sheerness, Kent) on 144.138 or 145.1 Mc/s has a sked. every evening at 1900 B.S.T. with G6CH and G3BSU, both in Strood. **G2CZS** (Chelmsford, Essex) on 144.95 Mc/s has worked G2DIO, KF, MV and 6TA, and on April 18, when conditions brightened up a bit, contacted F8GH for his first 2 m QSO with France. A sked. is run every evening at 1900 B.S.T. with G3GJZ (Newmarket)—144.56 Mc/s.

Although he has found conditions on 2 m rather poor recently, **G2AHP** (Perivale, Middx.) has raised his score of stations worked on the band to 452; among the new ones being G2BPC (Bromley, Kent), 3DF (Chesham, Bucks) and 3HLV (Hornchurch, Essex). A new transmitter has recently been constructed with a 12AT7 as 6 Mc/s c.o. and multiplier to 36 Mc/s, Z77 f.d., N77 f.d. and T115 b.a. The final stage will be an 829B.

The call sign **CN2AP** (Tangier) hides the identity of Jack Moseley, who was well known on the v.h.f. bands in this country as G2CIW (Brentwood). He, CN2AO and CN2AU, are all on 2 m and were active during the "Lofty Sites" event on April 19. Whether they were successful in bridging the 720 miles separating them from the nearest 2 m stations in Europe is not yet known.

On April 7, **G8VN** (Rugby) worked G2BVW, FTL, FZU, 3CKQ, EPW and 5TZ/A on 'phone using an indoor aerial. G2HOP, XV, 3WW, 5BD, 6AG, RH and 8OU provide consistently good signals in Rugby. Skeds. with G5UF (near Dorchester) have not yet resulted in a two-way contact although '5UF's signals have been audible on occasions up to RST579. G3BW (Whitehaven, Cumbria) was heard at RS57 at 0024 B.S.T. on April 19 and was worked by G3BA (Daventry). **G3FW** (Market Harborough) is active and getting out well from an excellent site.

**G6XX** (Goole, Yorks) contacted G3DIV/A, FAN, FUM, GVF and 5TZ/A during the first fortnight of April and worked EI2W and G3IOE on the evening of the 10th.

Activity in Scotland has been quite high during the past month although conditions were never very good. The best periods were March 27/28 and April 6 and 15/16. G15AJ and G3BW both provided excellent signals. A new station, **GM3JWS**, is active in Edinburgh. Stations heard or worked from **GM3EGW** (Dunfermline) during the past month included G3BW, IOE, 5BD, YV, G15AJ, GM2BUD, 3ACD, BDA, DDE, DIQ, ENJ, FGJ, FOW, FYB, HYX, IBV, INK, JWS, 4HX, QV, 5YW, 6KH, SR, WL, XW, ZV and 8AH.

**G3DO** (Sutton Coldfield) found conditions to the south reasonably good on occasions, with G3BNC (Portsmouth), 3FAN and 5TZ/A (I.O.W.) as the outstanding signals.

**G3FIH** is now on 2 m from a new location in Bath where he is running 80 watts to an 829 and an array of four folded dipoles spaced 5/8 wave apart. The receiver is a cascade with triode connected 6AK5 mixer and c.c. oscillator into an Eddystone S640 tuning 24-26 Mc/s. Stations worked during the past month included G2FTS, 3FAN, FMO, GNJ, GVC, HSD, IER, IRA, IRA/P, YH, 4SA, 5FF, 5TZ/A, UF, 8DM, GW2ACW, GW5MA/P and GW8UH. G2ADP, AHP, BMZ, 3ABH, AGA, AUS, BKQ, DLU, GVF, HWO, HZF, WW, 4GR, 5BM, MA, 6AG, NB, RH, UH, 8DL and 8OU were heard.

## Two Metre Portable Operation in Wales

**GW5MA/P** was in operation from two sites in Pembrokeshire during the weekend of April 17-18. From The Ridgeway, Tenby, starting at 1545 B.S.T. on the 17th, contacts were made with G2AHP, 3AGA, AUS, DJX, GHQ, GVF, HAZ, IER, IOO, IUD, 4SA, 5BD, YV, 6AG/P, NB, RH, 8OU and GW2FRB. G3BKQ and 5TZ/A were heard. Operation continued until 0305 B.S.T. the following morning. After a few hours' sleep, Bob came on the air again from Foel Dyrch, near Mynydd Prescelly. From this site the following stations were worked between 1300 and 2030 B.S.T.: G2AHP, IT, 3BA, BNC, CCH, FAN, FIH, HSD, HWJ, JFR, 4CI, SA, 5BM, BM/P, DS, FF, TZ/A, 6XX, 8OU, PX, GW2ACW, 3EHN and 8SU. The best DX was G5BD at 245 miles, closely followed by G3CCH (Scunthorpe, Lincs) at 222 miles, G6RH (Bexley, Kent) 210 miles and G6XX at 201 miles. Seven other contacts were at distances between 100 and 200 miles.

## Two Metre Report from Ireland

**EI2W** was on the band from 0800 B.S.T. on Easter Monday in an endeavour to work some of the "Lofty Sites" stations on the Continent. Nothing was heard from that direction, and the only station heard to call Dublin was G3FRY (Cheltenham). Stations in Lancashire were very active and G5YV an excellent signal throughout the day. The new 32-element beam at EI2W appears to be working well.

**OH2OK** (Helsinki), who had been persuaded to return to the 2 m band—he made the first OH/SM contact with SM5VL in 1949—is co-operating with OH2OP in building a suitable beam with the object of carrying out tests with EI2W during the latter part of May. British stations who are interested should contact EI2W, who will pass on details of times and frequencies when they are known.

**EI5Y** (Dublin), with a 12-element stack, is now operating on 144.198 Mc/s. **EI9C**, also in Dublin, is on 145.89 Mc/s. EI2W will be on 420 Mc/s from about the middle of May using a 48-element stack, a c.c. receiver and a transmitter with an AX9903 tripler in the final.

Stations worked by EI2W during the past month included EI5Y, EI9C, G3BKQ, DA, EPW, GPT, IUD, IWJ, 5VN/A, YV, 6XX, 8SB, G13FZQ, GQB and GM3DIQ.

## Seventy Centimetres

**G2DDD** (Littlehampton, Sussex) has built a converter (employing the flat line principle evolved by G2DD) with a 6AJ4 r.f. stage and 6AK5/6J4 cascode i.f. head amplifier. He has a 32-element stack with 16 driven elements for this band. During the development of the exciter for the 70 cm transmitter, which has a valve line-up of EL91, EL91, 5763, 832, it was found that the grid drive to the 832 was inadequate until the ordinary bakelite holder for the 5763 was changed for one

made of P.T.F.E. Mullard QV03-20 valves are employed in the tripler and p.a. stages and a comfortable 15 watts output is obtainable.

**G2RD** (Wallington, Surrey) reports activity in the London area between March 22 and April 21 as follows: G2DD, FKZ, HDJ, HDY, HDZ, RD, XV, 3EOH, FP, GDR, HBW, IRW, JQN, JZQ, 5DT, TP, UM, 6NF, 8KZ, SK, PE1PL.

**G2DD** (Stanmore, Middx) again worked PE1PL (The Hague) on April 9. G2RD also heard and was heard by the Dutch station, but 'RD's signals were too weak for a satisfactory two-way contact.

Harry Wilson, EI2W, who travelled specially from Dublin to attend. Twenty-seven Scottish amateurs were present including nearly all the active v.h.f. stations in the West of Scotland. The Group was pleased to welcome GM3EGW and GM3FYB from Dunfermline, GM6XW from Larbert and GM3BDA from North Berwick. Messages for the success of the meeting were received from the President of the International V.H.F. Society and from G2UJ. A toast to "The West of Scotland V.H.F. Group" was proposed by EI2W, to which GM3BDA replied.



Among those present at the West of Scotland V.H.F. Group meeting in Glasgow on March 24, 1954, were (front row) GM2CQI, GM6MD, EI2W, GM3FVX, GM3IMR, GM3DIQ, GM6ZV, GM6KH, GM8AH, (back row) GM5VG, GM5VG Jr., GM3BDA, GM2CHN, GM2BUD, GM4PW, GM3INK, GM3FAX, GM3NC, GM3IBV, GM6WL, GM3FOW, GM3FYB, GM3EGW and GM6XW.

### The London U.H.F. Group

At the April meeting, G3BAK, author of the series of articles "Amateur Microwave Experiments" which appeared in the BULLETIN in March, April and May last year, discussed the problems of operation on the u.h.f. bands higher than 420 Mc/s and showed how some of the surplus centimetre radar equipment, both British and American, may be modified for use on these frequencies. 'BAK will shortly be circulating to members of the Microwave Group details of modern American u.h.f. components.

### New 10,000 Mc/s World Record

W7JIP/7 and W7OKV/7 have set up a new world record for this band by a recent contact over a distance of 47.4 miles between two 1,000 ft. locations, one in S.E. Portland and the other in the foothills of Mount Rainier. This beats the 27 miles record set up by G3APY and G3ENS nearly four years ago. It is understood that the two W7s will shortly make an attempt to cover a distance of 120 miles on this band. A photograph of their equipment will appear on the cover of QST for May and details in the June issue of that journal.

### 220 Mc/s

A 220 Mc/s contact on April 11 between W3LZD (Dunmore, Pa.) and W8DX (Detroit, Mich.) is thought to be the highest amateur frequency so far used for communication by auroral reflection.

### The West of Scotland V.H.F. Group Meeting

The West of Scotland V.H.F. Group held a successful meeting on March 24 at the Royal Hotel, Glasgow, when the guest of honour was

The response from correspondents this month has been excellent; if some details have been omitted or curtailed it is due solely to pressure on space. Please keep up the good work by sending reports for the June issue to arrive by May 20.

### Regional V.H.F. Ladder TWO METRE BAND

Psn.	Call & Location	Worked		
		Regions	Stations	Countries
1.	G5BD Mablethorpe, Lincs.	14	123	12
2.	G6XX Goole, Yorks.	13	185	9
3.	G2FIR Sutton Bridge, Lincs.	11	111	5
4.	G5ML Coventry, Warks.	11	75	3
5.	G3DO Sutton Coldfield, Warks.	10	137	5
6.	G3GBO Denham, Bucks.	10	109	7
7.	G8VN Rugby, Warks.	10	85	2
8.	G2DDD Littlehampton, Sussex.	10	81	5
9.	G6TA London, S.W.12.	10	55	2
10.	G3HBW Wembley, Middx.	10	40	2
11.	G6LI Ludborough, Lincs.	10	29	10
12.	G2CZS Chelmsford, Essex.	9	95	6
13.	G5MR Hythe, Kent.	9	89	7
14.	G2AHP Perivale, Middx.	9	88	3
15.	G3FIJ Colchester, Essex.	8	52	7
16.	G3COP Southampton, Hants.	8	49	2
17.	G3IUD Wilmslow, Ches.	7	24	2

# A Narrow Band F.M. Unit for The Elizabethan

By LOUIS VARNEY, A.M.I.E.E. (G5RV)\*

The usefulness of The Elizabethan transmitter, described in the July 1953 issue of the Bulletin, can be considerably increased by the addition of the simple narrow band f.m. unit described here. Details of an alternative Clapp v.f.o. are also given.

TESTS have proved that where very slight residual picture interference remains after all normal precautions have been taken to render a transmitter harmonic TVI-proof, the use of narrow band frequency modulation permits telephony to be used with complete success. Where no trace of picture interference exists, but interference is present on the sound channel of a nearby television receiver, the use of n.b.f.m. completely eliminates such interference.

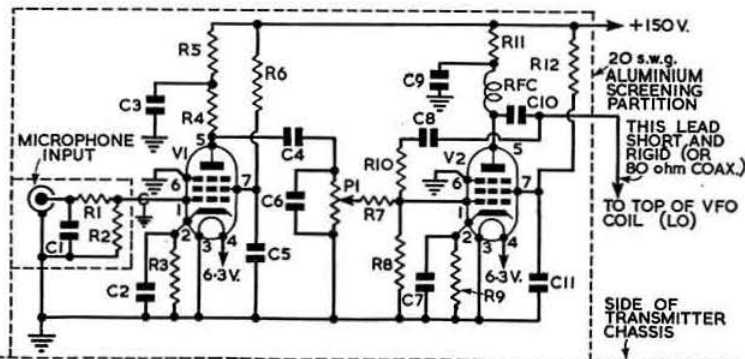


Fig. 1.—Circuit diagram of the narrow band f.m. unit for The Elizabethan transmitter.

As a result of the tests referred to above a simple n.b.f.m. unit has been designed which may be added to *The Elizabethan*<sup>(1)</sup>† with a minimum of trouble. It should be emphasised, however, that, for its use to be successful, existing picture interference must not be more than the faintest trace of cross-hatch (of a degree normally unnoticed except by close and critical inspection of the picture) or slight "fuzzing" of the picture scanning lines. Under such conditions it has been found that c.w. telegraphy may be used without causing noticeable interference, whereas amplitude modulation immediately produces easily discernable, or even strong, "modulation bars" on the picture resulting in an objectionable interference.

## Circuit

The circuit of the n.b.f.m. unit is shown in Fig. 1. Although designed to work directly from a diaphragm type crystal microphone, the input circuit may easily be adapted to use a carbon or other type of microphone if preferred. The valve V1

acts as a high-gain microphone amplifier and V2 is the reactance modulator valve. It should be noted that a variable-mu valve (EF92 or equivalent) is used in the latter position since a long grid base is required for optimum performance of the valve in its role of reactance modulator.

A complete explanation of the theory of operation of the reactance modulator valve is omitted here for the sake of brevity but the reader who wishes to study the matter is referred to any of the current Amateur Radio handbooks. Briefly, it can be stated that the speech voltage waveform impressed upon the control grid of V2 causes its anode circuit (by means of the phase-shift network R10 C8) to throw an effective inductance in parallel with the inductance of the v.f.o. coil LO. Since the magnitude of this effective inductance varies in accordance with the speech voltage at any moment, the resultant v.f.o. output frequency is caused to vary in sympathy above and

below the unmodulated carrier frequency. The amount of variation of frequency is called the "deviation" and must be limited to the value permitted by the licence conditions. A natural limitation is, in fact, imposed by the performance capabilities of both V1 and V2 and the associated circuitry, but in practice the speech amplifier gain control must be calibrated in terms of the deviation in kilocycles for each band used and set so that the permitted values are not exceeded.

The method of calibrating this control will be described later.

## F.M. Definitions

Before proceeding to describe the constructional details of the n.b.f.m. unit it is desirable to define

### Components List for Fig. 1

C1	47 $\mu$ F ceramicon
C2	10 $\mu$ F miniature electrolytic
C3	8 $\mu$ F 350 V electrolytic
C4, 9, 11	0.01 $\mu$ F tubular paper
C5, 7	0.1 $\mu$ F
C6	0.001 to 0.005 $\mu$ F mica (top cut)
C8, 10	47 $\mu$ F mica
P1	0.5 Megohm linear law potentiometer (substitute 10,000 ohms pot. for d.c. test)
R1	4,700 ohms, $\frac{1}{2}$ watt
R2	1 Megohm
R3	1,000 ohms, $\frac{1}{2}$ watt
R4	220,000 ohms, $\frac{1}{2}$ watt
R5, 10	10,000 ohms, $\frac{1}{2}$ watt
R6, 8, 12	1 Megohm, $\frac{1}{2}$ watt
R7	100,000 ohms, $\frac{1}{2}$ watt
R9	2,700 ohms, $\frac{1}{2}$ watt
R11	2,200 ohms, $\frac{1}{2}$ watt
RFC	2.5 mH, r.f. choke
V1	EF91
V2	EF92

\* 184 Galleywood Road, Chelmsford, Essex.

† The n.b.f.m. unit may also be used with the 75 watt TVI-proof transmitter described in the December, 1951, and January, 1952, issues of the R.S.G.B. BULLETIN.

the three important operational parameters of frequency modulation:

1. **Deviation** is the amount of carrier frequency shift, above and below the normal quiescent carrier frequency, caused by the modulating signal. Deviation is measured in kilocycles per second and should be linearly proportional to the amplitude of the audio modulating signal. For example, if a transmitter has a carrier frequency of 14,150 kc/s which, by modulation, is caused to increase to 14,152.5 kc/s and decrease to 14,147.5 kc/s the deviation is said to be 2.5 kc/s and the swing 5 kc/s.
2. **Modulation Index.** The modulation index of an f.m. signal is the ratio of the deviation to the audio modulation frequency expressed in the same units. Thus, if a modulation frequency of 2 kc/s (2,000 c/s) be used in the example quoted above, the modulation index would be

$$\frac{2.5}{2} = 1.25$$

The relative strengths of the f.m. carrier and the various side band frequencies depend directly upon the modulation index.

3. **Deviation Ratio.** The deviation ratio is similar to the modulation index in that it involves the ratio between the modulating frequency and the deviation. However, the term is applied to the condition of maximum or peak carrier shift obtained with the maximum audio signal level permissible and the audio frequency to be considered for this purpose is the highest audio frequency which it is desired to transmit. If, therefore, we choose 4 kc/s as the highest audio frequency and 2.5 kc/s as the maximum deviation then the deviation ratio will be

$$\frac{2.5}{4} = 0.625$$

### Construction

The n.b.f.m. unit employing the circuit of Fig. 1 fits easily into the space between the v.f.o. unit and the right hand edge of the chassis (as seen from rear) in *The Elizabethan*. No special technique is required except for the usual precautions taken with any high gain audio amplifier to avoid hum and r.f. pick-up. The microphone input socket should be a coaxial or other fully-screened type and the screening must be maintained right up to the control grid pin on the socket of V1. Care must be taken to ensure that the h.t. supply for the transmitter exciter, which may also be used for the n.b.f.m. unit, is adequately smoothed. A two section smoothing circuit is essential. This would consist of an 8  $\mu$ F input condenser followed by a 10 to 20 H choke, then 16  $\mu$ F, a further 20 H choke and finally a 16 or 32  $\mu$ F condenser. Unless the h.t. supply is very well smoothed the ripple will cause inherent frequency modulation at the ripple frequency. This point is not usually stressed in descriptions of n.b.f.m. circuits but it has been found to be most important.

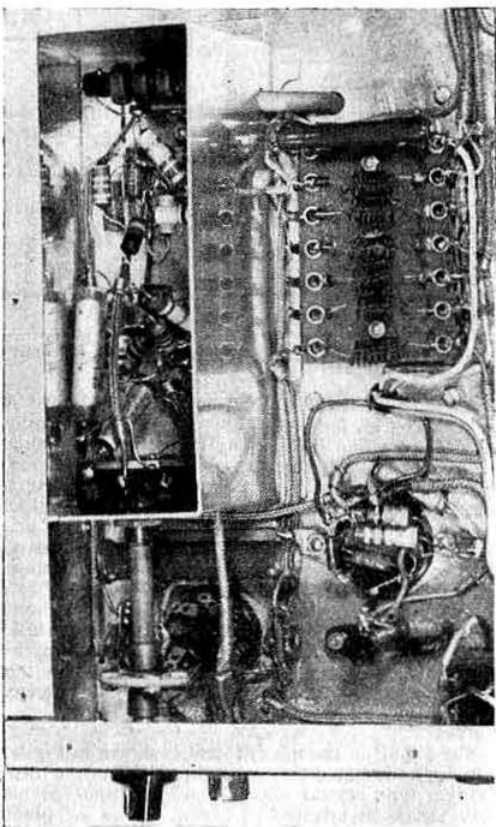
The microphone input co-axial socket is screened with a  $\frac{1}{4}$  in. diameter tube with a tapered end which is bound to the screening braid of the lead to the grid of V1. The tube is made of a strip of copper foil, soldered on each side to 6BA solder tags fastened under the fixing bolts for the co-axial socket.

As may be seen from the photograph, the unit is enclosed in a simple screening partition under the main transmitter chassis.

### Setting Up

One advantage of n.b.f.m. is that it is not necessary to have the p.a. working during preliminary tests, in fact, all the required information can be obtained by listening to the output of the

v.f.o. First ascertain the amount of linear deviation obtainable from the reactance valve V2 (Fig. 1). A simple way to do this is to apply a known d.c. voltage to the control grid of V2 (as shown in Fig. 2), noting the change of output frequency of the v.f.o. as this voltage is varied from zero to, say  $\pm 4.5$  volts. The test is first carried out with one polarity, say, grid going more positive, and then repeated with the polarity of the test battery reversed. With the v.f.o. adjusted to a suitable frequency in the telephony portion of the 3.5 Mc/s band, the frequency is noted with the gain control potentiometer set at zero. The frequency may be observed on a BC221 or similar type of frequency meter. As the potentiometer, P1, is advanced, the voltage read by the voltmeter, V, will increase, and at the same time the beat frequency heard in the frequency meter will rise from zero. The frequency meter may then be re-tuned for zero beat and the operation continued until the v.f.o. frequency is observed to have changed by 1 kc/s from its original setting. At this point, the voltage, V, should be noted. The operation is continued until a further 1 kc/s change has taken place and the new voltage noted. In this way, a deviation of some 4 kc/s may be obtained with the circuit shown. The complete operation is then repeated but with the battery polarity reversed, the frequency meter first being re-set to obtain zero beat at zero applied d.c. volts.



Close-up view of the speech amplifier and reactance modulator unit compartment. Details of the co-axial microphone input socket screening can be seen at the bottom left-hand side. The small coils of Eureka wire on the paxolin tag board at the side of the n.b.f.m. compartment are the meter shunts.

With the arrangement shown, the frequency of the v.f.o. will increase as V2 control grid volts are increased in a positive direction. A graph should now be constructed to enable the linearity of the frequency deviation to be estimated. As the licence regulations<sup>(2)</sup> governing the amateur use of f.m. fix the maximum deviation on any band at 2.5 kc/s it should be easily possible to achieve good linearity over this range.

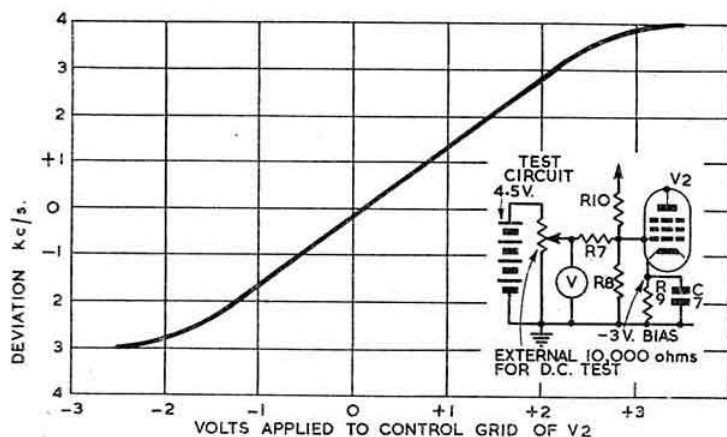


Fig. 2.—Narrow band f.m. 3.5 Mc/s deviation characteristics. Quiescent frequency: 3,600 kc/s.

It should be noted that the deviation thus measured is multiplied by a factor depending upon the number of f.d. stages following the v.f.o. in practice. Thus, for operation at 7 Mc/s a frequency deviation of 1.25 kc/s at the v.f.o. is the maximum permissible since it will be multiplied by the factor 2. Furthermore, in practice, a speech waveform voltage will be applied to V2 so that some method of measuring or closely estimating the maximum peak values of such a signal must be used in order to enable a suitable calibration of the n.b.f.m. gain control to be made. Since a suitable peak voltmeter will not be available to the average amateur for this purpose a simplified indirect method will now be described.

#### Calibration of Deviation Control

The gain control, P1, which is, of course, the deviation control, must be set to a predetermined value for each band. In order to determine the correct setting of this control two facts must be known, viz:

- The sensitivity of the reactance modulator circuit.
- The maximum peak value of the speech voltage waveform applied to the control grid of the reactance modulator valve.

As regards (a) the maximum speech voltage peak values required to produce maximum permissible deviation for each band can be tabulated from the d.c. calibration (Fig 2).

To determine the value of (b) the peak voltage produced by a typical diaphragm-type crystal microphone on normal close-talking speech and the voltage gain of the speech amplifier stage must be known.

It can be stated that normal close-talking into a D104 or similar type of microphone produces maximum speech peaks of approximately 10 millivolts. The EF91 speech amplifier stage has a voltage gain of about 150 so that the maximum speech peak voltage applied to the reactance modulator valve control grid will be about 1.5

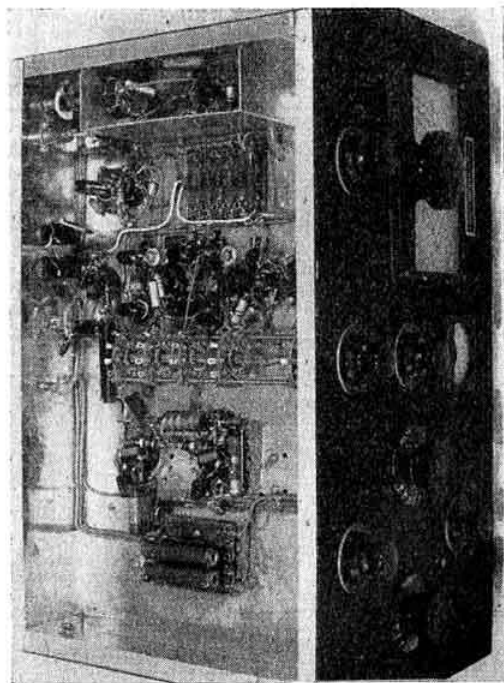
volts. From Table 1 it will be seen that this voltage will produce a deviation of about  $\pm 2$  kc/s at 3600 kc/s. In practice, this will be adequate for good communication but, if desired, slightly louder speech will easily achieve the full value of  $\pm 2.5$  kc/s. Thus, for 3.5 kc/s operation the gain (or deviation) control will require to be set at maximum. Since this control has a linear law and the deviation characteristic is also linear, it

is a simple matter to determine the correct setting of the control for the higher frequency bands. At 7 Mc/s. for example, only 0.9 volt will be required. If the deviation control potentiometer is fitted with a 0–10 division scale it is a simple matter to estimate the setting required to produce the correct maximum speech peak voltage for each band. Table 1 gives a set of figures which may be used as a guide.

If the preceding instructions are followed carefully, a satisfactory degree of accuracy of setting-up will be attained. In order to achieve the most pleasant sounding result, slight re-adjustment of the deviation control can be made while monitoring the transmitted

speech, or by soliciting the help of a distant station during a QSO.

Naturally, there are more elegant and precise



General view of the underside of the Elizabethan showing the n.b.f.m. unit in its screening compartment (top centre). Note the short length of  $\frac{1}{2}$  in. diameter co-axial cable (top right next to tag-board) connecting the output of the reactance modulator to the grid of the v.f.o. which is above the chassis.

methods of setting up an f.m. transmitter but they require special equipment and technique not available to the average amateur. For c.w. operation P1 should be set at zero.

Table 1

Band	Peak Volts	P1 Scale
3.5 Mc/s	1.8	10
7 Mc/s	0.9	6
14 Mc/s	0.45	3
21 Mc/s	0.3	2
28 Mc/s	0.23	1.5

#### A.M. versus N.B.F.M.

Unless the distant receiver is equipped with a discriminator detector circuit designed specifically for f.m. reception, it must not be expected that, for a given carrier or p.a. input power, the same "punch" will be obtained when using n.b.f.m. as when using high-level amplitude modulation. Most amateur communication receivers do not have this facility and in order to resolve the n.b.f.m. speech the operator must switch off the a.v.c. and detune slightly to one side or the other of exact resonance. In this way, the steep-sided response curve of the

is unavoidable with this method of n.b.f.m. reception. However, this is not to say that the practical results are unsatisfactory; in fact, excellent DX contacts may be achieved.

Undoubtedly, under normal amateur conditions of reception, a.m. will give superior results, but the important advantage of n.b.f.m. is that it will permit operation during TV hours when a.m. may be unworkable.

If desired, a speech clipping and filtering circuit may be used either preceding V1 or interposed between V1 and V2. This would enable the average modulation level to be increased considerably and thus improve the effectiveness of the n.b.f.m. unit. It is hoped to describe a suitable clipper-filter circuit for use with the n.b.f.m. unit when tests are completed.

#### Alternative V.F.O.

For those who prefer to use the well-known Clapp oscillator, a modified version of the *Elizabethan* v.f.o. unit incorporating this circuit (with a small improvement to the "Control" circuit to eliminate the slight tendency for chirp when keying at that point to permit full break-in working) is given in Fig. 3. Using the LC values specified, the v.f.o. will tune from 3500 to 3800

kc/s giving a pleasing open band-spread calibration. The exact value of C3 may have to be found experimentally to suit individual operating conditions, but that specified will be suitable if the unit is built in the same form as originally described for *The Elizabethan*.

Extremely small drift was observed with the circuit shown and excellent keying characteristics resulted from keying V2 by means of a simple valve keyer circuit using a 6L6 or 6Y6 keyer valve. Although good keying may be obtained for full break-in working

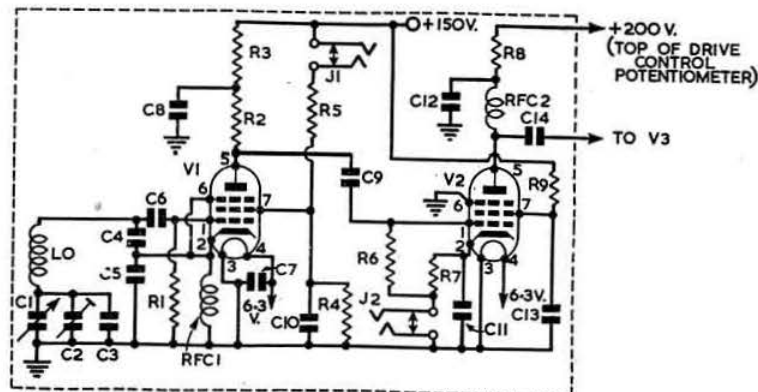


Fig. 3.—Clapp v.f.o. circuit for *The Elizabethan*.

i.f. amplifier is utilised as a means of frequency discrimination but since the receiver must be detuned until the quiescent carrier level is several decibels below the maximum obtainable, an effective loss of several decibels in output signal level

by keying V1 in its screen-grid circuit (direct), this method is not recommended for normal operation because slight chirp will occur above 7 Mc/s.

The n.b.f.m. tests described were made with the v.f.o. circuit shown in Fig. 3, but the original v.f.o. may be used with equal success.

#### References

- (1) *The Elizabethan*, R.S.G.B. BULLETIN, July and September, 1953.
- (2) R.S.G.B. BULLETIN, January, 1953, p. 310.

#### Components List for Fig. 3

- |                       |  |
|-----------------------|--|
| C1                    | 3-25 $\mu$ F midget variable   |
| C2                    | 3-50 $\mu$ F midget variable (band setting)  |
| C3                    | 4.7 $\mu$ F neg. temp. coeff. ceramicon  |
| C4, 5                 | 0.005 $\mu$ F mica   |
| C6, 9, 14             | 100 $\mu$ F ceramicon  |
| C7, 8, 10, 11, 12, 13 | 0.01 $\mu$ F tubular paper   |
| J1                    | V.F.O. control jack (may be used for break-in keying if desired, R4 tends to eliminate chirp).   |
| J2                    | Key jack   |
| L0                    | 50 turns, 24 s.w.g., enam., close-wound on 1 in. diameter paxolin or ceramic former. Winding length 1 1/2 in., former 2 in. long. Winding commences 1/2 in. from bottom. |
| R1, 6                 | 100,000 ohms, 1/2 watt   |
| R2                    | 22,000 ohms, 1/2 watt (or use r.f.c.)  |
| R3, 8                 | 100 ohms, 1/2 watt (metering)  |
| R4                    | 100,000 ohms, 1/2 watt   |
| R5                    | 47,000 ohms, 1/2 watt  |
| R7                    | 220 ohms, 1/2 watt   |
| R9                    | 4,700 ohms, 1/2 watt   |
| RFC1, 2               | 2.5 mH. r.f. chokes  |
| V1, 2                 | EF91 (6AM6)  |

Remember

September...

Gather at

Bristol...

# A Mobile C.W./Phone Transmitter-Receiver for R.A.E.N.

By C. H. LAMBORN EDWARDS (G8TL)\*

Here is a description of a simple, low-cost piece of portable mobile equipment suitable for use in connection with the Radio Amateur Emergency Network. The writer has been a keen exponent of portable operation for many years.

**I**N order that the Radio Amateur Emergency Network shall render the maximum service to the public it is necessary for as many stations as possible to be equipped for portable or mobile operation. In particular, portable stations must be capable of being easily transported to the scene of the actual disaster where they can be used in conjunction with either batteries or public supply. To this end, the transmitter-receiver to be described was designed to work from either a.c. mains or from 6 or 12 volt car batteries.

As the majority of R.A.E.N. members will have to build special transmitter-receivers the first essentials are low cost and simplicity. For this reason the 3.5 Mc/s band was chosen because many amateurs have the necessary crystals available. Furthermore, nearly all of the components required can be found in the average junk box or purchased cheaply from surplus stores. Finally,

\* 10 Chepstow Crescent, Newbury Park, Ilford, Essex.

most members have had experience of building low frequency equipment, which does not call for the multiple stages and specialised components necessary for the higher frequencies. Obviously, in some cases, particularly for short haul working, the higher and ultra-high frequencies may be desirable and no doubt many designs for this type of equipment will be forthcoming in due course.

## General Details

Using plug-in coils the equipment to be described will operate on 1.8, 3.5 or 7 Mc/s (if preferred coils and crystals can be switched for the bands, although this will complicate matters somewhat), from 200-250 volt a.c. mains (using an external power pack) or from a 6 or 12 volt car battery with a rotary converter or vibrator pack for the h.t. supply. The aerial may be a long wire, short wire or a whip.

As it is intended that the equipment shall be used in a house, a shed or in a car, it is not necessary to make it water-tight although a mackintosh cover has been designed to cover the case should it have to be carried through rain. A small a.c. power pack measuring 6 in. by 3½ in. by 7 in. has been constructed and always accompanies the set.

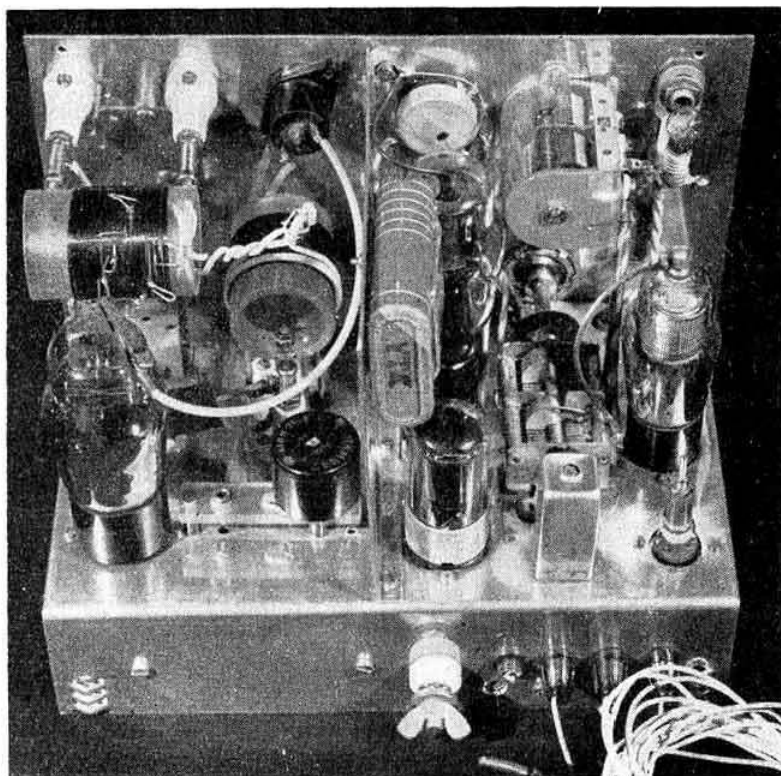
The components are mounted on a chassis 10 in. by 5½ in. which is bolted to a front panel 10 in. by 7 in. carrying the condensers and switch gear.

The unit slides into an aluminium box of suitable size with a door in the rear for access to the microphone energising change-over switch. The lid is hinged so that coils or crystal can be conveniently changed without having to withdraw the set.

The circuit finally adopted (shown in Fig. 1) is of conventional design using five valves in all.

## Transmitter

The transmitter section comprises a 6V6 crystal oscillator which can be either keyed for c.w. or Heising choke modulated by the last two stages of the receiver. The transmitter section is housed in the right hand compartment on the chassis together with the aerial loading coil and condenser. The coils, which can be wound on any



Rear view of the transmitter-receiver. The transmitter section is to the left of the photograph and the receiver to the right.

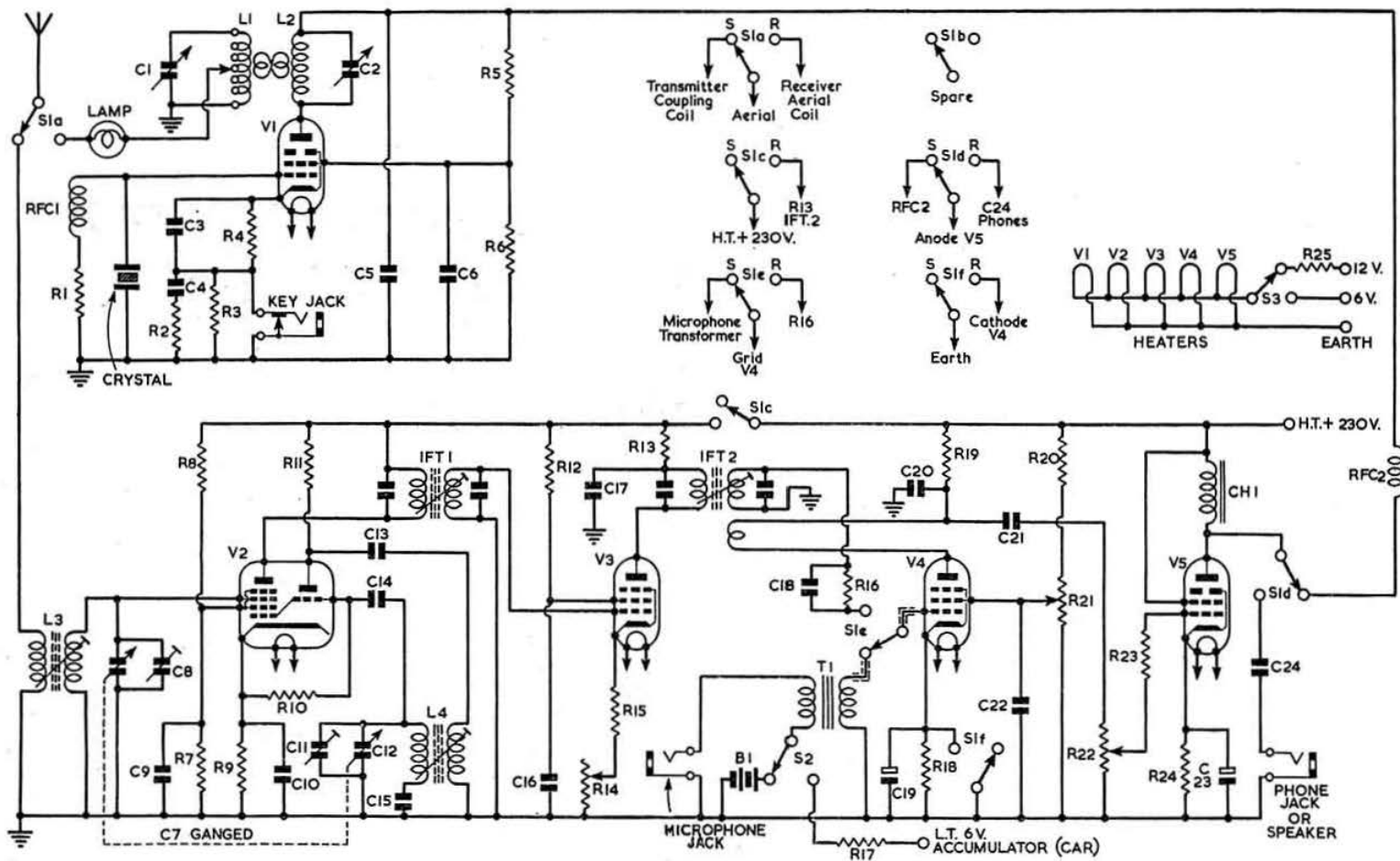


Fig. 1.—Circuit diagram of the mobile c.w./phone transmitter-receiver. (In this drawing, S1a should be shown in the right-hand (send) position.)

insulating material (i.e., bakelite, ebonite or trolitol tubing), are plugged into sockets carried on stand-off insulators. For the prototype the variable condensers were found in the surplus box. Jackson Bros. can, however, supply suitable types if necessary.

## Receiver

The receiver, a 4-stage superhet mounted on the left-hand side of the chassis, comprises a 6K8 mixer, 6SK7 i.f. amplifier, a 6SJ7 leaky grid detector and a 6V6 output stage. Valves and components are of standard size. Phones can be used in the output jack although the set comfortably drives a small Goodman elliptical loud-speaker. The aerial and oscillator coils are Maxi-Q plug-in types. Range 3 coils will cover both Top Band and 3.5 Mc/s. A twin gang miniature 375  $\mu$ F condenser mounted on the front panel is used for bandsetting and a similar 100  $\mu$ F type with vanes removed as necessary is mounted below it for bandspread. The bandset condenser could be dispensed with and capacitors switched in for the respective bands if desired. The author used Maxi-Q I.F.T.11 465 kc/s i.f. transformers but any available surplus types will be found suitable. To produce regeneration, 9 to 12 turns of 30 s.w.g. enamel wire are wound over the bottom bobbin of the second i.f. grid coil. The detector should go into oscillation smoothly when the regeneration control is advanced. Should oscillation not occur the connections to the tickler coil should be reversed or the screen dropping resistor adjusted.

## Modulator

To modulate the transmitter the last two stages of the receiver are switched into the transmit position and modulation produced by the Heising choke method. If a speaker is used its transformer can be built into the set and the primary employed as the Heising choke, the secondary winding being opened by the change-over switch. When the gear is operated from a.c. mains a carbon microphone (surplus pattern) with pressel switch is energised by a separate 4 volt flat battery carried in the set. When a car battery is used, the 6 volt d.c. supply may be employed.

The screen potentiometer of the 6SJ7 should be sufficiently advanced in order comfortably to modulate the carrier but care should be taken not to overload this valve. A low ratio microphone transformer or a crystal microphone should be used.

## Aerial

The aerial loading coil is link coupled to the tank circuit and the aerial tapped along the coil as required. When installed in a car, a loaded whip is used, the wire from the whip loading coil being tapped along the aerial loading coil until maximum r.f. is obtained. This can be checked by a small lamp in series with the wire or by holding a neon bulb close to the whip. The arrangement of the aerial whip is shown in Fig. 2.

## Power Supplies

For operation from a.c. mains a small separate power pack is used and the microphone switched to the internal battery. For mobile use, the set

## Components List for Fig. 1

C1	100 $\mu$ F variable, Jackson C12	R7	25,000 ohms, $\frac{1}{2}$ watt, Dubilier
C2	75 $\mu$ F variable, Jackson C12	R8	15,000 ohms, $\frac{1}{2}$ watt, Dubilier
C3, 4, 9, 10, 16, 17, 22	0.1 $\mu$ F, 350 V tubular, T.C.C.	R9, 15	300 ohms, $\frac{1}{2}$ watt, Dubilier
C5, 6	0.002 $\mu$ F, T.C.C.	R12	25,000 ohms, $\frac{1}{2}$ watt, Dubilier
C7, 12	350 $\mu$ F 2-gang miniature, Jackson Bros., M.M.2.	R13	1,000 ohms, $\frac{1}{2}$ watt, Dubilier
C8, 11	100 $\mu$ F 2-gang miniature, Jackson Bros., U102	R14, 21	10,000 ohms, potentiometer
C13, 21	0.01 $\mu$ F, T.C.C.	R16	1 Megohm, $\frac{1}{2}$ watt, Dubilier
C14	100 $\mu$ F silver mica, T.C.C.	R17	200 ohms, $\frac{1}{2}$ watt, Dubilier
C15	1,100 $\mu$ F (1.8 and 3.5 Mc/s), 3,000 $\mu$ F (7 Mc/s), T.C.C.	R18	2,200 ohms, $\frac{1}{2}$ watt, Dubilier
C18	100 $\mu$ F mica, T.C.C.	R19	250,000 ohms, $\frac{1}{2}$ watt, Dubilier
C19, 23	25 $\mu$ F, 25 V electrolytic, T.C.C.	R22	250,000 ohms potentiometer
C20	500 $\mu$ F mica, T.C.C.	R23	10,000 ohms, $\frac{1}{2}$ watt, Dubilier
C24	0.05 $\mu$ F 350 V tubular, T.C.C.	R24	250 ohms, 1 watt, Dubilier
L1	1.8 Mc/s: 90 turns, 28 s.w.g., tapped every 8 turns on $1\frac{1}{2}$ in. diam., by 2 $\frac{1}{2}$ in. former 3.5 Mc/s: 50 turns, 24 s.w.g., enam., tapped every 5 turns on $1\frac{1}{2}$ in. diam. by 2 $\frac{1}{2}$ in. former 7 Mc/s: 26 turns, 20 s.w.g., enam., tapped every 3 turns, on $1\frac{1}{2}$ in. diam., by 2 $\frac{1}{2}$ in. former	R25	4 ohms tapped, Ref. 10C/6915 or Bulgin P.R.92 plus P.R.114
L2	1.8 Mc/s: 80 turns, 28 s.w.g., enam., on $1\frac{1}{2}$ in. diam., by 2 in. former 3.5 Mc/s: 40 turns, 24 s.w.g., enam., on $1\frac{1}{2}$ in. diam., by 2 in. former 7 Mc/s: 20 turns, 18 s.w.g., enam., on $1\frac{1}{2}$ in. diam., by 2 in. former	RFC1, 2	R.F. Chokes, Bulgin type S.W.68
L3	Miniature Maxi-Q coil range 3 blue (1.8 and 3.5 Mc/s) Miniature Maxi-Q coil range 4 blue (7 Mc/s)	Sla-f	3-pole, 2-way 3-wafer Yaxley, or 6-pole, 2-way switch (Bulgin type S.208 or S.438)
L4	Miniature Maxi-Q coil range 3 red (1.8 and 3.5 Mc/s) Miniature Maxi-Q coil range 4 red (7 Mc/s)	S2, 3	Bulgin toggle switch S265
CH1	10 H 50 mA choke	V1, 5	6V6 (or 6BW6) Brimar
IFT1, 2	Maxi-Q i.f. transformers, Type I.F.T.11	V2	6K8 (or 12AH8) Brimar
R1, 11, 20	50,000 ohms, $\frac{1}{2}$ watt, Dubilier	V3	6SK7 (or 6BA6) Brimar
R2	500 ohms, $\frac{1}{2}$ watt, Dubilier	V4	6SJ7 (or 6AU6) Brimar
R3	100,000 ohms, $\frac{1}{2}$ watt, Dubilier		<b>Miscellaneous</b>
R4	300 ohms, 1 watt, Dubilier		4 plugs and sockets, Bulgin type P.485, P.486
R5	6,000 ohms, 1 watt, Dubilier		1 crocodile clip, Bulgin type C.R.5
R6	50,000 ohms, 1 watt, Dubilier		1 signal lamp, Bulgin type D.200 (clear)
			1 signal lamp, Bulgin type D.180 (red)
			2 B9A valve holders (for receiver coils)
			1 microphone transformer, 1:25 or 1:35
			8 knobs (Bulgin)
			1 flexible coupler, Bulgin type E.H.15
			1 front panel 10 in. by 7 in. (Denco)
			1 chassis, 10 in. by 5 $\frac{1}{2}$ in. (Denco (Clacton) Ltd.)
			Rotary transformer and whip aerial: Jobstocks Ltd., 91 Beulah Road, Walthamstow, London.
			1 closed circuit jack, Bulgin type J.6 (key)
			2 open circuit jacks, Bulgin type J.2 (microphone and headphones or speaker)
			4 stand-off insulators S01/10 (Denco (Clacton) Ltd.)
			5 octal valve holders
			1 crystal
			1 crystal socket
			2 toggle switches (h.t. and l.t.) Bulgin S259
			1 Goodman speaker, T27/4701/3 and transformer.
			Paxolin coil tubing, $1\frac{1}{2}$ in. and $1\frac{1}{4}$ in. diam. (Denco (Clacton) Ltd.)

can be installed in a car with either a 6 or 12 volt supply, provided a suitable rotary converter is used for h.t. When operating on 12 volts a series dropping resistor, capable of carrying the heater current and mounted adjacent to the terminal strip at the rear, is used. Alternatively, 12 volt valves could be used in place of the existing 6 volt series; the reason for retaining the latter is that in the event of an emergency the set could be transferred to another car should the batteries fail.

Any of the small rotary converters on the market are suitable for portable operation. For 12 volt operation, a surplus rotary transformer, type 104/12V (Reference 10K/238) gives reasonable output for satisfactory operation of the set but it is rather a large unit as there is an additional low tension output from a third 6 volt commutator which is most useful for the heaters. The unit is completely smoothed and boxed and can be carried comfortably under the bonnet of the smallest cars. Ref. 10K/269 is similar in pattern but is not smoothed. The output is 250 V, 65 mA, 6.5 V, 2.5A. Rotary type 141 Ref. 10K/483 is boxed and smoothed and supplies 200 V at 50 mA, and 13 V, 1.8 A. Another useful rotary is the Type 57, 6 volt (Ref. 10K/706). All of these rotary units are available at prices ranging from 7s. 6d. to £1. For those who prefer vibrators, Unit No. 2, ZB0300 (which gives 230 V, 100 mA output) will be found useful. It can be purchased for less than £1.

#### Installation in a Car

When the set is installed in a car, it is essential that all the electrical devices should be suppressed, otherwise reception will become impossible. A suppressor must be fitted to each plug and one in the distributor lead to the coil.

If the pump is electrically operated, a  $1\mu\text{F}$  condenser should be connected from the lead to the coil to the nearest earth point. This will eliminate the click. Also fit a  $0.1\mu\text{F}$  condenser from the dynamo live brush to earth. If the wind-screen wiper causes trouble, the same value of condenser should clear up any commutation ripple being generated by the motor.

In the writer's car the h.t. generator is mounted under the bonnet, the supply leads being brought out to terminals mounted under the dashboard. The loaded whip is carried on a 5 ft. mast mounted

on the rear bumper, the lead from the loading coil being brought in through the nearside window.

#### Results

On Top Band results were most satisfactory. Within a radius of six miles all incoming stations were S9 on the speaker and reports on the transmitted signal were from S6 to S9 solid. Contacts were also carried on up to 10 miles and up to 20 miles if the channel was completely free from QRM.

Phone tests on 3.5 Mc/s were satisfactory, provided the equipment was operated in the c.w. portion of the band. Within a radius of 6 miles all incoming signals were from S5 to S9. When working on phone in the phone portion of the band many contacts were lost because of heavy QRM.

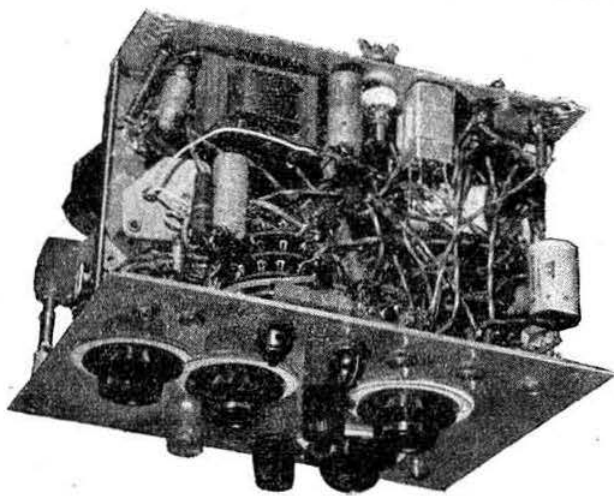
Operation on 7 Mc/s was not so good. Signals were erratic and badly attenuated by steel buildings when working in a town. QRM again made

reception difficult. Further tests on the three bands will be carried out on different frequencies in the near future. Incidentally, the input to the transmitter at 200 volts was only about 4.5 watts (24 mA), the total current drawn on "transmit" was 65 to 70 mA and on "receive" about 60 mA. The total drain from the car battery, including the rotary, was about 4 to 5 A.

#### Acknowledgments

The writer wishes to express his thanks to all those members who contributed ideas for the design and construction of the equipment described in this article and to the members of the Chelmsford R.A.E.N. group who stood by so patiently on three Sundays and co-operated in the tests.

It is hoped that the article will start members thinking around the various problems of portable mobile operation and that as a result more compact and efficient gear for emergency use will be described in the near future.



The general layout of the main front panel controls and the under-chassis appearance can be seen in this picture.

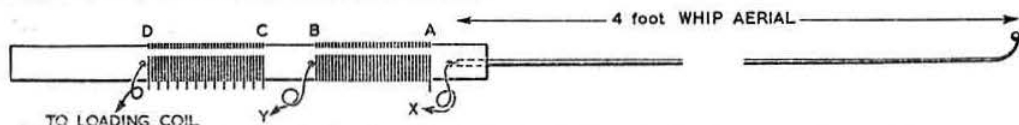
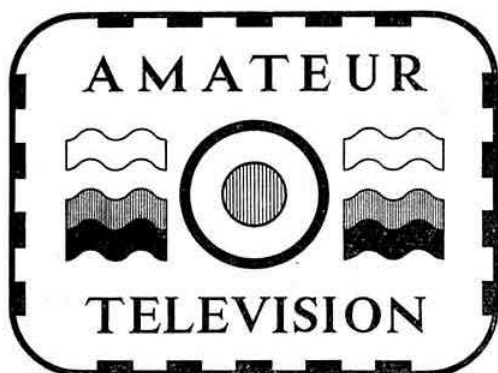


Fig. 2.—Construction of the whip aerial and loading coils. Coils AB and CD are wound on a  $1\frac{1}{2}$  in. diameter paxolin tube, 2ft. long. Coil AB is close wound with 24 s.w.g. enamelled wire, 7in. long. Coil CD is close wound with 18 s.w.g. enamelled wire, 7in. long, tapped every 5 turns. For 1.8 Mc/s, X is connected to A and Y tapped along CD. On 3.5 and 7 Mc/s, Y is disconnected and X tapped along CD.

#### HAVE YOU BOUGHT YOUR MOBILE HANDBOOK?

Price 17s. 6d. (Post Free)  
From R.S.G.B. Headquarters



By M. BARLOW (G3CVO)\*

**A**MATEUR Television demonstrations will be given—all being well—at shows to be held during the summer in Bristol, Chelmsford and Southgate. It must be admitted that not all previous demonstrations have been outstandingly successful, generally due to insufficient attention being paid to certain essential pieces of equipment. Items that always seem to be left until the last moment are the vision mixers for handling several video inputs and the distribution unit for

the vision and sync. signals directly into the chassis without the risk of someone receiving a bad shock. In those cases where the receivers are to be used in tents during daylight, those with dark screens are to be preferred.

#### Notes and News

G2WJ/T, who radiates a vision signal on 436 Mc/s on Saturdays at 1800, has received test bars from the Television Society's station G3CTS/T at Norwood. A counter circuit for producing an interlaced scan that requires only four 12AU7s has been produced by J. Russell (Bournemouth). T. Sale (Rayleigh) has built a small pulse generator into his 5527 camera unit. Although the system is very economical it is prone to cause some jitter on the picture. J. B. Fullarton (Salt-coats) has a flying spot scanner working and is looking for a GM station from which it can transmit signals. G3CVO's oscilloscope is now flat to 9 Mc/s and incorporates a most useful unit which enables any selected line of the complete picture to be viewed independently. The B.A.T.C. "sked" now functions on 3610 kc/s on alternate Sundays at 1430 B.S.T. All television enthusiasts are invited to participate.

R.S.G.B. groups and affiliated societies may borrow from G3CVO a recorded lecture on "Amateur Colour Television." Films are also available.

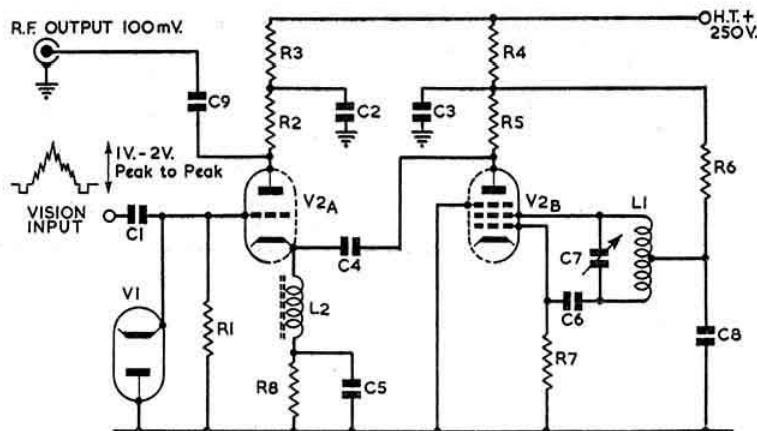


Fig. 1.—Circuit diagram of the simple feeder unit to supply a modulated signal to domestic television receivers. C1, 0.25  $\mu$ F; C2, 0.1  $\mu$ F; C3, 8, 9, 1500  $\mu$ F; C4, 5, 0.001  $\mu$ F; C6, 25  $\mu$ F; C7 tunes L1 to desired frequency; L2 is similar to L1, but is tuned by its dust-iron core; R1, 1 Megohm; R2, 180 ohms; R3, 68000 ohms; R4, 6800 ohms; R5, 220 ohms; R6, 560 ohms; R7, 22000 ohms; R8, 330 ohms; V1, EA50, CG4C, etc.; V2A, B, 6U8.

feeding the TV sets at the exhibition site. Unfortunately, these apparently simple units are most often the cause of a bad demonstration. A little forethought and attention to these matters will enable better shows to be put on which will reflect more credit on all concerned.

#### Simple Transmitter Circuit

A circuit for a simple transmitter feeding into a co-axial cable for distribution purposes is shown in Fig. 1. Although a type 6U8 valve is suggested, any valve combination may be used. The pentode oscillator is tuned to the channel (preferably not the local B.B.C.) in use by the receivers. If more than two sets are to be supplied, an extra cathode follower stage should be added and a check made to see that all cables are suitably terminated. It should be remembered that most domestic TV sets use the a.c./d.c. technique and for this reason it is not easy to feed

#### TVI in Reverse

**A**PROPOS the paragraph published on page 323 of our January issue regarding investigations of interference to amateur reception, we are now informed by the G.P.O. that the amateur will be charged the actual cost. The average cost of such an investigation, where the location of the suspected cause of interference is known, is £2. If the source has to be traced the cost will probably be considerably greater.

In those cases where there is interference to both broadcast and amateur reception, the amateur will be charged for the work carried out on his behalf up to the stage when the case is treated as a broadcast interference complaint.

Where interference is caused to normal sound and vision broadcasting, members should request the Post Office to investigate the trouble in accordance with standard practice. It may happen that clearing the interference to sound and vision will clear interference to amateur reception.

\* 29 Loftin Way, Chelmsford, Essex.

# NATIONAL FIELD DAY, 1954

## OFFICIAL LIST OF STATIONS

### REGION 1

Town or Area	Stn.	Call Sign	Location
Blackpool ...	A	G3CCC/P†	½ mile South of Moss House Farm, Peel, nr. Blackpool.
	B	G5ND/P†	Site as A station.
Bury ...	A	G2GA/P	Scout Camp, Ashworth Valley, Heywood.
Chester...	A	G3ITY/P	Bagley's Field, Coalpit Lane, Saughall.
	B	G3EXT/P	Site as A station.
Darwen and Blackburn	A	G2HW/P	Land adjoining Royal Hotel, Tockholes, Darwen.
	B	G3EKP/P	Site as A station.
Liverpool ...	A	G3ELL/P	Olive Mount Sports Field, Thingwall Road.
	B	G3DVB/P	Site as A station.
Manchester (North-West)	A	G6OM/P	Heaton Pk., Manchester
	B	G3RP/P	Site as A station.
Preston ...	A	G3JOU/P	Jeffery Hill, Longridge.
	B	G2AXH/P	Site as A station.
Southport and Formby	A	G3EFA/P	Birkdale sandhills, ½ mile south of Royal Birkdale Golf Club House, Southport.
	B	G2ART/P	Site as A station.
Stockport ...	A	G3FYE/P†	Hilltop Farm, Carr Brow, Disley.
	B	G3AUB/P†	The Quarry, Marple Ridge, Marple.
Warrington ...	A	G8TR/P	Rear of Davyholm Cottage, Dark Lane, High Whitley.
West Cumberland	A	G4NS/P†	Tarn Flatt Farm, St. Bees.
	B	G6WR/P†	Site as A station.
Westmorland ...	A	G3HMR/P	Little Borwick Fold, nr. Staveley, Kendal.
Wirral ...	A	G2AMV/P†	Top of Barnston Reservoir, Wirral.
	B	G8BM/P†	Site as A station.

### REGION 2

Barnsley and District	A	G2AFV/P†	Denby Church, Hoyland Swaine, 7 miles west of Barnsley.
	B	G5IV/P†	Site as A station.
Cleckheaton ...	A	G3FQH/P	"Hollinbank," Dale Lane, Heckmondwike.
Hexham ...	A	G4LA/P†	Whitley Chapel, Hexham.
	B	G5RI/P†	Site as A station.
Hull ...	A	G2DPA/P†	The Westwood, Beverley.
	B	G2CNX/P†	Field adjoining Flagstaff House, Welwick.
Newcastle-on-Tyne	A	G3JJD/P	Waskerley House, Waskerley, Co. Durham.
	B	G3BKE/P	Site as A station.
Pontefract ...	A	G6MF/P†	Playing fields of Hemsworth Grammar School, Hemsworth.
	B	G3US/P†	Site as A station.
Rotherham ...	A	G3ELG/P	Keppel's Column, Scholes, 3 miles west of Rotherham.
Scarborough ...	A	G3DQ/P†	The Boys' School Playing Field, Olivers Mount.
	B	G8KU/P†	Site as A station.
Sheffield ...	A	G8NN/P†	Field adjoining 380 Redmires Road, Sheffield 10.
	B	G5TO/P†	Lodge Moor Camp Site, Redmires Road, Sheffield 10.
Slithwaite ...	A	G8NF/P	Wortshill, Slithwaite (near B.B.C. Moorside Edge).
	B	G2DBW/P	Site as A station.
South Shields ...	A	G8JO/P	Cleaton Pumping Station, South Shields & Sunderland Water Company.
	B	G8AO/P	Site as A station.

### REGION 2—continued

Town or Area	Stn.	Call Sign	Location
West Hartlepool	A	G3TO/P	Tofts Farm, Seaton Carew.
	B	G3CHJ/P	Site as A station.
York ...	A	G3DSA/P†	Beckfield Lane School Playing Fields, Beckfield Lane, Acomb.
	B	G3GRF†	Site as A station.

### REGION 3

Birmingham (South)	A	G8PN/P†	Kings Norton Grammar School Playing Field, Northfield Road, Kings Norton.
	B	G6KI/P†	Site as A station.
Cannock ...	A	G3FZW/P	Cavan's Hill (off Allport Street), Cannock.
	B	G3DZT/P	Site as A station.
Coventry ...	A	G5PP/P†	Hall Farm, Allesley, Coventry.
	B	G5SK/P†	Site as A station.
Malvern ...	A	G2AO/P	Malvern Link Common.
	B	G2XX/P	Site as A station.
Rugby ...	A	G8VN/P†	Water Tower Farm, Barby Road, Rugby.
	B	G3AZT/P†	Site as A station.
Stourbridge ...	A	G8GF/P†	High Trees Farm, Shatterford, nr. Bewdley.
	B	G4MI/P†	Hill Farm, Kinver, nr. Stourbridge.
Walsall...	A	G2FPR/P†	Pleck Park, Pleck, Walsall.
Wellington ...	A	G3FRN/P	Priorslee Hall Farm, Priorslee, Wellington.
	B	G3IFT/P	Site as A station.

### REGION 4

Boston ...	A	G2AAS/P	Highfield Farm, Old Bolingbroke, nr. Spilsby.
	B	G6GH/P	L.C.C. Caravan Site, Ingoldmells, nr. Skegness.
Derby ...	A	G2OU/P	Glebe Farm, Blagreaves Lane, Littleover, Derby.
	B	G8QZ/P	Breadsall Moor, Breadsall, Derby.
Grimsby and Cleethorpes	A	G2FT/P†	Site 26, Humberstone Foreshore, Humberstone, nr. Grimsby.
	B	G4XC/P†	Site as A station.
Leicester ...	A	G4BB/P	White House, Scraptoft, Leicester.
	B	G2RI/P	Site as A station.
Loughborough ...	A	G2BJN/P†	Moor Lane, Loughborough.
	B	G2KK/P†	Site as A station.
Mansfield and District	A	G3FR/P	Rushley Farm, Nottingham Road, Mansfield.
Newark...	A	G3ELJ/P	Dairy Farm, Langford.
	B	G3EVG/P	Site as A station.
Nottingham ...	A	G3JKO/P	Hill Farm, Epperstone.
	B	G2FRY/P	Site as A station.
Peterborough ...	A	G2NJ/P†	Manor Farm, Alwalton, Peterborough.
	B	G3EPT/P†	Site as A station.
Retford*(1) ...	B	G3BTU/P	Bolham Hall Farm, Tilt Road, Retford.
Worksop*(1) ...	A	G6MN/P	Bolham Hall Farm, Tilt Road, Retford.

# REGION 5

Town or Area	Stn.	Call Sign	Location
Baldock ...	B	G3CEU/P†	Weston Hills, Baldock.
Cambridge ...	A	G5IG/P†	The Water Tower, Rivey Hill, Linton, Cambs.
	B	G5DQ/P†	Site as A station.
Chelmsford ...	A	G5RV/P†	"Running Mare," Galleywood.
	B	G4VF/P†	Site as A station.
Danbury ...	B	G3INW/P†	Field between Bell Wood and Little Baddow Road, Danbury, Chelmsford (adjacent to reservoir).
Great Yarmouth	A	G3AMK/P	Acle New Road Marshes (approx. 1 mile west of Great Yarmouth).
	B	G3CWC/P	Site as A station.
Lowestoft and Beccles	A	G3ETP/P†	Somerleyton Park, Somerleyton, nr. Lowestoft.
	B	G3IAO/P†	Site as A station.
Norwich ...	A	G3ASQ/P†	Norwich Union Athletic Association Sports Ground, School Lane, Thorpe St. Andrew, Norwich.
	B	G2UX/P†	The Rectory, Barnham Broom, Norfolk.
Shefford and Bedford	A	G4OL/P	New Rowney Farm, Bedford Road, Shefford.
	B	G2DPQ/P	Site as A station.
Southend-on-Sea	A	G5QK/P†	Thundersley Glen, Essex.
	B	G2BHA/P	Pulphitts, Hockley, Essex.

# REGION 6

Bletchley ...	A	G3HYM/P	Rectory Farm, Loughton, nr. Bletchley.
	B	G3AZ/P	Peter's Farm, Newton Longville, nr. Bletchley.
Christchurch ...	A	G3CSX/P	Bure Homage, Christchurch, Hants.
	B	G8DL/P	Site as A station.
Cheltenham ...	A	G3CGD/P†	Field, formerly Stoke Orchard Aerodrome, 4 miles N.W. of Cheltenham.
	B	G5BM/P†	Site as A station.
Gloucester ...	A	G3MA/P	Green Farm, Minster Worth, nr. Gloucester.
	B	G2RT/P	Site as A station.
High Wycombe	A	G6JK/P†	W. J. Fountain's Farm, Cryers Hill, High Wycombe.
	B	G5WW/P†	Site as A station.
Oxford ...	A	G2DU/P	Grace's Farm, Berwick Salome, Benson.
Petersfield and District	A	G5PF/P	Community Association Ground, Merchistoun Road, Horn-dean, nr. Portsmouth.
Portsmouth ...	A	G6NZ/P†	Field of V. Gauntlett, Crookhorn, nr. Portsmouth.
	B	G8WC/P†	Site as A station.
Southampton ...	A	G3KJ/P†	Netley Hill Common, Botley Road, nr. Southampton.
	B	G5OB/P†	Site as A station.
Stroud ...	A	G5HC/P†	Lypiatt, Stroud.
	B	G3FFN/P†	Site as A station.

# REGION 7

Acton, Brentford and Chiswick	A	G5LQ/P	London Transport (District Railway) Sports Ground, Bollo Lane, W.3.
Brentwood ...	A	G3LA/P†	The Old Roman Camp, Sandpit Lane, Brentwood, Essex.
	B	G8RC/P†	Site as A station.
Bromley and Beckenham	A	G6HD/P	Field at Buxton Browne Research Farm, Downe Village, Kent.
	B	G4AU/P	Site as A station.

# REGION 7—continued

Chingford ...	A	G4GA/P†	Bury Farm, Sewardstonebury, Chingford.
	B	G2HR/P†	Field near "The Owl," High Beech, Essex.
Chislehurst and Sidcup	A	G2YZ/P	Baldwyns Park, Bexley Kent.
	B	G2NK/P	Edgebury, Chislehurst, Kent.
Coulsdon and District	A	G2DN/P†	Field above Hall & Co. Limeworks, Coulsdon.
	B	G2KU/P†	White Hill, Caterham, Surrey.
Croydon ...	A	G3BCM/P†	Goodmans Farm, Tythepitshaw Lane, Hamsey Green, Surrey.
	B	G6LX/P†	Site as A station.
Ealing ...	A	G5SX/P†	Hanger Hill Estate between Hanger Lane Ealing and the Ridings W.5.
	B	G3ISU/P†	Site as A station.
East Ham ...	A	G2ZZ/P	Lady Trowers Sports Field, Burgess Road, East Ham.
	B	G4CM/P	Site as A station.
East Molesey ...	A	G6MB/P	Broadmoor, nr. Dorking.
	B	G8SM/P	Site as A station.
Edware and Hendon	A	G5FG/P†	Weedons Farm, Nan Clarks Lane, N.W.7.
	B	G2IM/P†	Site as A station.
Enfield ...	A	G8SK/P	"The Forge" Grounds, Hertford Rd., Enfield Wash, Middx.
	B	G6BQ/P	Brimstone Lane, Meopham, nr. Gravesend.
Gravesend ...	A	G6VC/P†	Site as A station.
Guildford and Woking	A	G3GIO/P†	Staple Lane, Clondon, Surrey.
	B	G3FZC/P†	Site as A station.
Harlow and District	A	G6UT/P†	Dorington Farm, Rye Hill, Epping, Essex.
	B	G3ERN/P†	Site as A station.
Hounslow and District	A	G3GMF/P	Osterley Park, Middlesex.
Ilford ...	A	G2XG/P†	East London Mission Field, Lambourne End, Essex.
	B	G2JG/P†	Site as A station.
Kingston-on-Thames and District	A	G3DHz/P	Paddock adjoining "The Waffrons," Surbiton Golf Club, Woodstock Lane, Surbiton.
	B	G3GXG/P	Site as A station.
Lewisham	A	G3GJW/P†	Rowhill Grange, Wilmington, Kent.
	B	G3IGZ/P†	Site as A station.
Norwood and District	A	G3IIR/P	Old Crystal Palace Site, adjacent to Crystal Palace Parade, S.E.19.
	B	G2RX/P	Site as A station.
Redhill and Reigate	A	G5LK/P	Field off Madeira Walk, Reigate.
	B	G2AJ/S/P	Field at Caterham School, Caterham.
Romford ...	B	G2FWJ/P†	Bedfords Park, Havering-atte-Bower, Romford.
	A	G3BTP/P	Grounds of Taplow Court, Taplow, Bucks.
Slough ...	A	G6CJ/P	Site as A station.
	B	G3DGN/P†	Trent Park, Cockfosters.
Southgate and District	A	G5FA/P†	Site as A station.
	B	G6KM/P	Banstead Hall School Playing Field.
Sutton and Cheam	A	G8DF/P	Site as A station.
	B	G3IAQ/P	Municipal Golf Course, Uxbridge, Middx.
Uxbridge and Hayes	A	G3CUI/P	Site as A station.
	B	G2QB/P	Site of Royal Masonic Junior School for Boys, Playing Fields, London Rd., Bushey, Herts.
Watford ...	A	G2VD/P	Site as A station.
	B	G5UM/P	Digswell Lane Observer Post, Welwyn Garden City.
Welwyn Garden City	A	G2CN/P	Site as A station.
	B	G3DON/P†	Rear of Woolwich Hospital, Shooters Hill, S.E.18.
Woolwich and District	A	G3FRB/P†	Site as A station.

## REGION 8

Town or Area	Stn.	Call Sign	Location
Brighton ...	A	G2FAD/P†	Warren Hill, Woodingdean, Brighton.
	B	G3YY/P†	Site as A station.
Hove and District	A	G3CUY/P†	Devil's Dyke, Brighton.
	B	G3FXB/P†	Site as A station.
Maidstone and District* (1)	A	G8LZ/P†	Detling Hill, Detling, nr. Maidstone.
Medway ...	A	G2CBA/P†	Buckmore Park, Blue Bell Hill, Rochester.
	B	G6NU/P†	Site as A station.
Thanet ...	A	G2IC/P	Palm Bay Recreation Ground, Margate.
	B	G5OX/P	Site as A station.
Tonbridge and Tunbridge Wells* (1)	B	G2UJ/P†	Cemetery Hill, Bayham Road, Hawkenbury, Tunbridge Wells.

## REGION 9

Bath ...	A	G2ZR/P†	Chapel Farm, Lansdown, Bath, Som.
	B	G3GMN/P†	Site as A station.
Bristol ...	A	G2IK/P	Home Field, Hill Farm, Dundry, nr. Bristol.
	B	G6GN/P	Site as A station.
Dorchester ...	A	G2TZ/P	Opposite Askers Road House, Askerswell, nr. Dorchester.
	B	G3ID/P†	Field adjacent to Crockwell House, Exminster, Devon.
	B	G5QA/P†	Field adjacent to Cheyne Gate Farm, Pinhoe, Devon.
Falmouth ...	A	G8AW/P†	Ashfield, nr. Falmouth.
	B	G6LV/P†	Site as A station.
North Cornwall	A	G2AYQ/P	The Beacon, St. Agnes.
Plymouth ...	A	G3GOV/P	Collaford Farm, Lync-ham, Plympton.
	B	G3BLO/P	Site as A station.
Torquay ...	A	G3GDW/P	Milber Woods, 1 mile east of Newton Abbot, Devon.
	B	G4RJ/P	Strawberry Valley Farm, 3 miles west of Dartmouth, Devon.
Weston-super-Mare	A	G5TN/P†	Worlebury Golf Course, Weston-super-Mare.
	B	G5DV/P†	Near Water Tower adjoining R.A.F. station, Locking.

## REGION 10

Cardiff ...	A	GW5BI/P	Church Farm, Laver-nock, Cardiff.
	B	GW5FN/P	Site as A station.
Neath and Port Talbot	A	GW2DTQ/P†	Mount Pleasant, nr. Maesteg, Glamorgan.
	B	GW2AVV/P†	Site as A station.

## REGION 11

Wrexham ...	A	GW3INV/P†	Beechwood, Gylfelia, nr. Wrexham.
	B	GW2HNR/P†	Site as A station.

## REGION 12

Aberdeen ...	A	GM2CAS/P	Home Farm, Drum Castle, Drum, Aberdeen.
	B	GM2FHH/P	Woodside Croft, Ban-chory Devenick, by Aberdeen.
Banff ...	A	GM3DPK/P	Old Manse Farm, Boyndie, Banff.
	B	GM3DZB/P	Site as A station.
Dundee ...	A	GM4HR/P	Muirloch Farm, Lundie, Angus.
Fochabers-Elgin Area	A	GM3HXT/P†	Monument at top of Whiteash Hill Wood.
	B	GM3GUJ/P†	Jane Kerr's Stone.
Forfar ...	A	GM6RI/P	Baldoukie Farm, Tannadice by Forfar.
	B	GM3FEU/P	Tannadice School, Tannadice by Forfar.

## REGION 13

Town or Area	Stn.	Call Sign	Location
Edinburgh and Lothians	A	GM8FM/P†	Wester Melville Farm, Gilmerton, Midlothian.
	B	GM3UM/P†	Edgfield Farm, Loan-head, Midlothian.

## REGION 14

Ardrossan (Ayrshire)	A	GM3FMD/P	Heathfield Aerodrome, Prestwick.
	B	GM3CSO/P	Site as A station.
East Renfrewshire	A	GM3CAR/P	North Kirktonmoor Farm, Eaglesham, Renfrew.
	B	GM3AR/P	Site as A station.
Glasgow ...	A	GM8MJ/P	Lickprick Farm, East Kilbride.
	B	GM3CIX/P	Site as A station.

## CHANNEL ISLANDS

Guernsey ...	A	GC3HFE/P†	Icart, St. Martins.
	B	GC2ASO/P†	Site as A station.

\* Indicates station is combining with another for the purposes of scoring. Where no asterisk is shown, and only one station call is given, the town or area is not operating a second station.  
† Indicates A station will operate on 1.8 and 7 Mc/s and B station on 3.5 and 14 Mc/s.

## N.F.D. Permits

AS all United Kingdom amateur stations will, by National Field Day weekend, be working in accordance with the terms of the new Sound Licence, individual special permits will not be issued by the G.P.O. to the operators in charge.

## New G.E.C. Transistor on Sale

THE General Electric Co., Ltd., has introduced a new transistor, the GET.2, which is available to amateurs. It costs 37/6.

The GET.2 is a low voltage version of the GET.1, the connections, dimensions and relevant operating precautions being the same. The collector current at  $I_e=0$  is measured at 10 volts instead of 30 as in the GET.1. To ensure good gain the minimum limit for  $\alpha$  is 2.5 compared with 2 for the GET.1. The maximum ratings are as follows: collector voltage, -30; collector current, 15 mA; and collector dissipation, 75 mW. The maximum operating temperature is 35° C.

These new transistors are tested to ensure stability under emitter short circuit conditions up to a maximum collector voltage of -25.

## Glossary of Terms for the Electrical Characteristics of Radio Receivers

THIS new British Standard (B.S.2065:1954) defines and describes the electrical characteristics of radio receivers. The definitions are expressed in a generalised form so as to be applicable to many types of receivers. They do not, however, cover certain special types such as diversity receivers.

The Standard is based on a report of a panel of the Inter-Services Radio and Electronic Measurements Committee and copies may be obtained, price 6/- each, from the British Standards Institution, Sales Branch, 2 Park Street, London, W.1.

# Modern Walkie-Talkie for Emergency Use

By BERNARD HOWLETT (G3JAM)\*

In the event of an emergency in which the Radio Amateur Emergency Network is likely to operate, there will be a great demand for short range communications within the emergency zone. Much of the currently available portable equipment is, however, far from light and easily transportable when it has to be moved frequently or carried by one person from place to place. The simple gear described here is acceptable from the point of view of both weight and cost, yet is capable of giving satisfactory service within a radius of one mile. For these reasons the information given in the article which follows should prove of great interest to all members seriously concerned with preparations for an emergency.

THE simple transceiver to be described in this article was specifically designed to meet the requirements of short-haul working in cases of emergency. The operator is envisaged as the controller of a mobile station which passes information back to a portable control point, from where it is relayed to a main control centre.

Every link in a chain must hold if the chain itself is to be of any value. Similarly it is necessary for operators to possess, or have at their disposal, foolproof equipment having long-term stability and reliability of a standard perhaps never before associated with simple amateur equipment. The equipment must be capable of remaining correctly tuned to the net frequency for weeks at a time, ready to be used whenever needed. The simple unit shown in the photographs fulfils these conditions.

## The Circuit

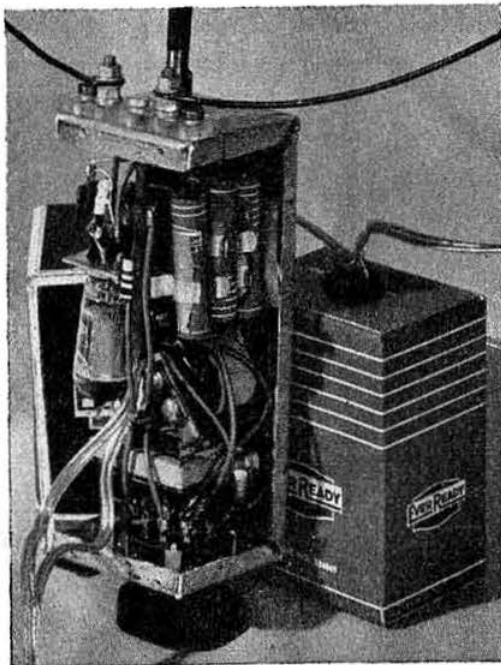
A loop aerial is used instead of a whip which is the type usually employed with this class of equipment. Experience has shown that precious time can be wasted in assembling, testing and dismantling the latter type of radiator. The loop is actually the coil of a small 28 Mc/s transceiver which uses a single Mullard DCC90 double triode: one section acts as the oscillator/detector, the other, as audio amplifier/modulator. No aerial loading or body capacity troubles are experienced and the system can be relied upon to radiate!

The Hartley type oscillator acts as a super-regenerative oscillator on "receive" and is very tolerant of slight frequency variations in the transmitted signal. The audio amplifier stage acts as a Heising choke modulator when transmitting. C1 is the tuning condenser while C2 has some measure of control over sensitivity.



In this picture, G3JAM shows how the unit is held so that the microphone (mounted on one side of the case) is a few inches from the operator's mouth.

The transceiver would work better with controlled quenching but the present circuit has been found very effective in practice. At a later date it is hoped to give details of a controlled quench circuit. Resistance R1 enables V1A to squeak at a suitable frequency on "receive" but is swamped by R2 when transmitting so that a clean signal is



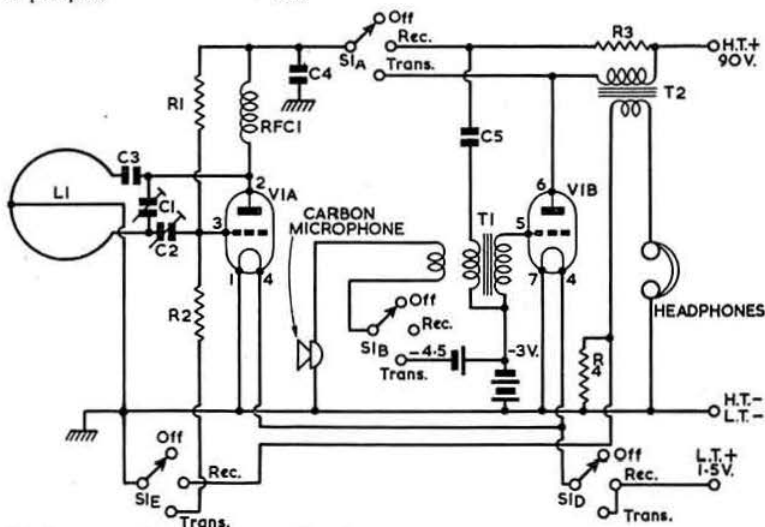
The arrangement of the main components can be seen in this close-up of the interior of the transceiver. The send/receive switch is at the bottom and the valve at mid-left. The microphone batteries are upper right with the intervalve transformer T1 immediately below. The output transformer T2 is mounted just above the switch.

\* 219 Chigwell Road, Woodford Green, Essex.

radiated. The necessary switching is performed by S1. R4 (5,000 to 10,000 ohms) provides sidetone when transmitting so that the operator is aware that his microphone is live.

The loop, L1, is one turn of 14 s.w.g. enamelled copper wire, 14 in. in diameter, supported by a pillar made from a section of whip aerial generously soldered half-way round and forced into a bush (from an old potentiometer) mounted on the end plate. The ends of the loop are connected to long 4BA bolts which act as leads-through to the interior of the set. The bolts are insulated with a small piece of perspex.

Fig. 1.—Circuit diagram of the simple 28 Mc/s walkie-talkie. C1, 2, 5–40  $\mu$ F twin ceramic trimmer; C3, 1,000  $\mu$ F hi-K ceramic; C4, 0.01  $\mu$ F, 150 V, miniature, Hunts; C5, 0.1  $\mu$ F, 250 V, paper tubular; L1, see text; R1, 4.7 Megohms,  $\frac{1}{2}$  watt; R2, 22,000 ohms,  $\frac{1}{2}$  watt; R3, 18,000 ohms,  $\frac{1}{2}$  watt; R4, see text; S1A, B, C, 4-pole, 3-position switch; T1, 2, see text; V1A, B, Mullard DCC90 or 3A5.



The transformer used for T1 is an ex-Government item No. ZA17515 at present available on the surplus market and has a ratio of approxi-

mately 1 : 3. An extra winding consisting of 40-50 turns of 32 s.w.g. enamelled wire was added for the microphone input. Any similar inter-valve transformer can be used provided there is space to add a microphone winding. T2 is a Radio-spares miniature output transformer designed for use in personal sets. The original secondary must be replaced by a winding of 325 turns of 32 s.w.g. enamelled wire to match low impedance headphones. If a high impedance type is to be employed, it will be necessary to use approximately 1,200 turns, and to increase the value of R4.

In the prototype, a cheap miniature German carbon microphone was used although a 4.5 volts battery is required to energise it. The G.P.O. type insert, which requires only 3 volts, is also suitable, although somewhat larger. It has the advantage that it requires one cell less. Care must be taken not to overmodulate because deep modulation causes a reduction in intelligibility at the receiving end. The modulation limit is about 80 per cent. for reception with a superregenerative detector.

#### Batteries

Ever-Ready batteries types B126 (h.t.) and LT4 will give 48 hours' service on heavy duty, 12 hours per day, according to the makers. Three U16 slim penlight cells will be found ideal for bias and microphone energisation. These should be mounted in a holder made from a piece of paxolin, some bronze strip and three Terry clips. As these tiny cells are, however, not obtainable everywhere readers would be wise to make sure that a regular supply can be obtained before they decide to use them. During an emergency—simulated or real—a few spares should be carried as the modulation—the very heart of the unit—may be seriously reduced if the battery voltage drops.

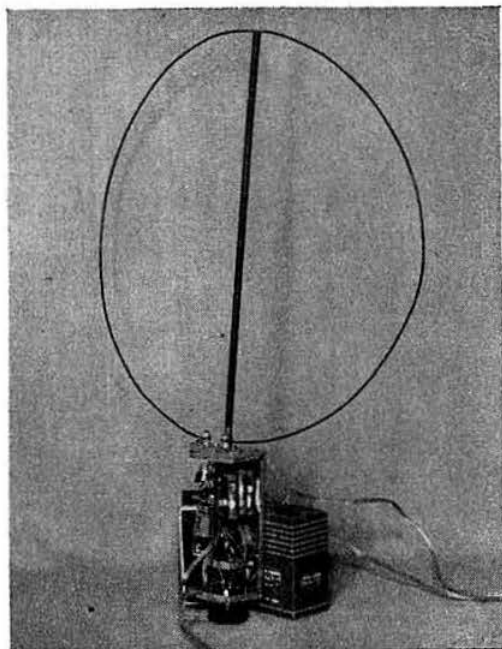
#### Results

Although no very extensive tests have yet been carried out, a pair of identical units were used successfully to maintain contact up to a range of one mile in a lightly built-up area. In a heavily built-up area the range was about half a mile owing mainly to the high level of interference from trolley-bus wires. With careful selection of sites, however, this range could no doubt be increased.

While travelling to a test site, instructions were

(Continued on page 516)

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



A general view of the small walkie-talkie showing the loop aerial. The case measures 5½ in. long by 2 in. wide by 1½ in. deep.

# Radiation Patterns of Horizontal Aerials

## Part II

By W. H. SEGROTT (G8SI)\*

IN Part I, the "free space" radiation patterns of horizontal aerials were considered in some detail. However, the presence of ground has a profound influence upon performance and this factor will now be examined.

### Vertical Diagram

From Table I (Part I), it will be seen that  $F(\theta)$  is maximum when  $\theta=90^\circ$  i.e., for all directions at right angles to the axis of the aerial. The vertical "free space" pattern for a cross section at right angles is, therefore, a circle (Curve A, Fig. 6).

The diagram, representing the radiation pattern in the presence of ground, is obtained by multiplication of the "free space" values by the appropriate values of the Ground Reflection Factor (G.R.F.) (Table II) which, since the "free space" diagram is a circle and equal to unity, only requires the plotting of the G.R.F. (Curve B, Fig. 6). Thus, when  $H=\lambda/2$ , a maximum occurs at  $\Delta=30^\circ$ —the "free space" amplitude being doubled (G.R.F.=2) as a result of complete re-inforcement of the direct ray by the ground reflected ray. At  $\Delta=0^\circ$  and  $\Delta=90^\circ$  the reflected ray is in antiphase and so leads to complete cancellation at these values of  $\Delta$ .

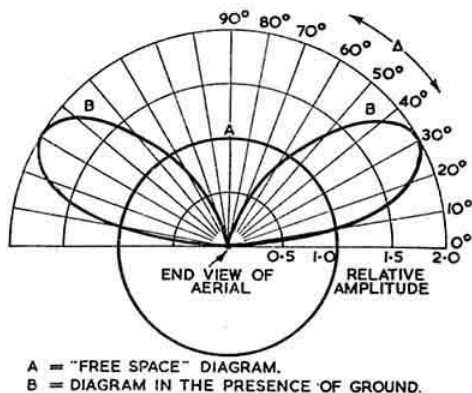


Fig. 6.—Vertical diagram of horizontal half-wave aerial ( $H=\lambda/2$ ) for a plane at right angles to the axis of the aerial.

Similar treatment for directions in line with the aerial axis, leads to the diagram for a vertical cross section containing the aerial (curve C, Fig. 7). It will be observed from this diagram that re-inforcement by the reflected ray is not so marked as for directions broadside to the aerial. Appreciable radiation does occur, however, and is maximum at  $\Delta=40^\circ$  (approximately).

### Horizontal Diagram

Before proceeding with the method of deriving the horizontal diagram, consideration must be given to the basis on which it is to be plotted.

It will be obvious that one practical application of the diagram will be its use in conjunction with a great circle map, either for the purpose

of aligning the aerial for optimum performance in the desired direction, or alternatively, to enable an assessment of its performance in other directions to be made. The requirement is, therefore, that the diagram should be plotted on the basis of angles relative to the aerial axis in the horizontal plane, i.e., at  $\Delta=0^\circ$ . However, optimum performance over a given route occurs when the wave angle ( $\Delta$ ) has a particular value, i.e., for an inclined plane ( $\Delta>0^\circ$ ). This necessitates a modification to Equation 5, as will be seen from the following.

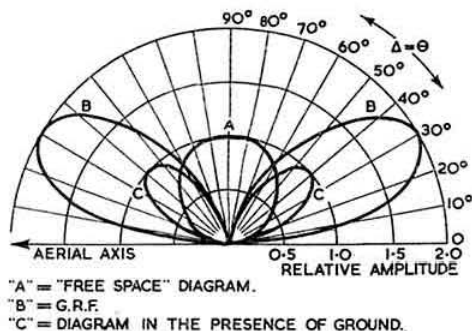


Fig. 7.—Vertical diagram of horizontal half-wave aerial ( $H=\lambda/2$ ) in a plane containing the aerial.

Consider a set of rectangular axes (Fig. 8),  $ZOX$  being the horizontal and  $YOX$  the vertical plane. If  $OX$  represents the axis of the aerial, with  $O$  as its centre, then the distant point  $P$  is inclined at an angle ( $\Delta$ ) to the horizontal plane and so subtends an angle ( $\theta$ ) to the aerial axis  $OX$  on the inclined plane  $POM$ . Also, by projec-

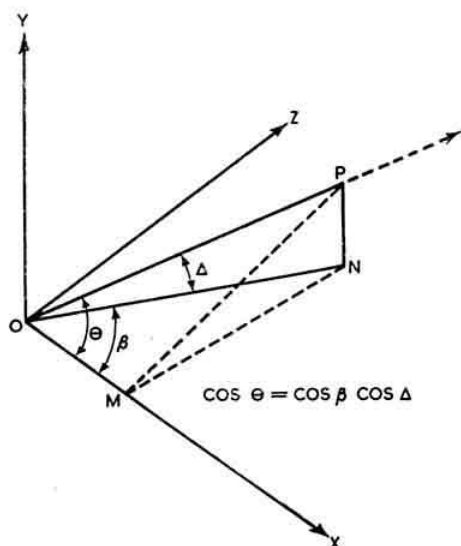


Fig. 8.—Projection factor:  $\cos \theta = \cos \beta \cos \Delta$

\* 30 Livingstone Road, Scarborough, Yorks.

tion, point  $P$  subtends an angle ( $\beta$ ) to the aerial axis on the horizontal plane  $NOM$ . Therefore, when  $\Delta=0^\circ$ ,  $\theta=\beta$  but for other values of  $\Delta<90^\circ$  this is no longer true. Since field strength is a function of  $\theta$  and the diagram is required to be plotted in terms of  $\beta$ ,  $\theta$  must be defined in terms of  $\beta$  and  $\Delta$  as follows.

From Fig. 8.

$$\cos \beta \cos \Delta = \frac{OM}{ON} \cdot \frac{ON}{OP} = \frac{OM}{OP} = \cos \theta$$

Therefore,  $\cos \theta = \cos \beta \cos \Delta$ .....(7)

Also, since  $\cos^2 \theta + \sin^2 \theta = 1$ ,

$$\sin \theta = \sqrt{1 - \cos^2 \theta} = \sqrt{1 - \cos^2 \beta \cos^2 \Delta} \dots\dots\dots(8)$$

Substitution for Equations 7 and 8 in Equation 5 for  $\cos \theta$  and  $\sin \theta$ , and multiplication by the G.R.F. (Equation 6) leads to the following expression which represents the horizontal diagram in the presence of ground, as a function of  $\beta$  and  $\Delta$ .

$$F(\beta)(\Delta) = \frac{\cos(\pi/2 \cos \beta \cos \Delta)}{\sqrt{1 - \cos^2 \beta \cos^2 \Delta}} \times \text{G.R.F.} \dots\dots\dots(9)$$

Table III results from substitution in Equation 9 and enables the horizontal diagram (at the selected values of  $\Delta$ ) to be plotted as shown in Fig. 9.

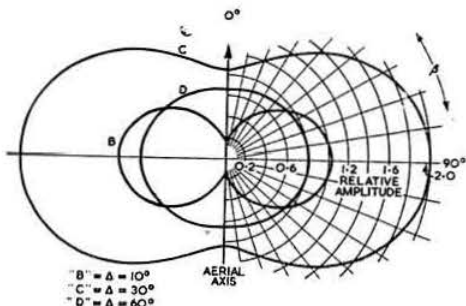


Fig. 9.—Horizontal diagram of a half-wave aerial ( $H=\lambda/2$ ) in the presence of ground.

### Practical Applications

In studying Fig. 9 it is important to remember that the optimum wave angle ( $\Delta$ ) for transmission or reception over a given route is determined by the height of the ionosphere and the frequency in use. For long distance communication on 14 Mc/s, for example,  $\Delta$  will be in the region of  $10-15^\circ$ . It will be observed from curve B (Fig. 9) that for such values of  $\Delta$ , the  $\lambda/2$  aerial at  $H=\lambda/2$  has appreciable broadside directivity. For shorter distances, using the same frequency, the optimum value of  $\Delta$  may be much higher<sup>2</sup>, say  $30^\circ$ . Under these conditions, as indicated by curve C (Fig. 9), appreciable radiation occurs off the end of the aerial, tending towards omni-directional performance. Radiation off the end when  $\Delta=30^\circ$

is in fact only about 1.5 db less than the broadside radiation when  $\Delta=10^\circ$ .

The ratio of broadside/end radiation when  $\Delta=30^\circ$  is about 8 db and for  $\Delta=10^\circ$  about 16 db. Allowing an arbitrary 6 db per "S" point, low angle signals arriving in the direction of the aerial will be approximately 2 to 3 "S" points lower than similar broadside signals. Short range signals at higher vertical angles will, under the same conditions, only be about one "S" point less in the end direction than in the broadside direction.

These results are, of course based on the assumption of purely horizontal polarisation and an idealised radiation pattern, i.e., for an aerial erected above perfect ground and in the absence of local screening or absorption. In practice, assuming the aerial is to be erected clear of surrounding objects, the radiation pattern will depend upon the dielectric constant and conductivity of the ground which, for good quality soil, should not cause any appreciable departure from the theoretical case. In the case of ground of inferior quality, the departure from the theoretical pattern becomes more marked with decreasing frequency.

### Reference

<sup>2</sup> *Skybeams, Moonbeams and Howitzers*, P. H. Sollom, R.S.G.B. BULLETIN July, 1952.

(To be concluded)

### The Aries Research Voyage

PROPOS the note published on page 468 of the April issue of the BULLETIN, it is now learnt that the *M.Y. Aries "R"* (GRVM), a 61 ft. converted lifeboat, will sail from Kingston-on-Thames for New York on May 22 under the command of her owner, Commander C. Harcourt-Smith, R.N. (Retd.). The other members of the crew will be Commander T. Hight, R.N.R. (Retd.), a former captain of the *Aquitania* who will act as navigator, and Sub-Lieut. E. Skelton (C.G.M.). R.N.V.R. (G3JOQ), who will be in charge of the radio gear.

The vessel is being equipped with a wide range of British-made articles, designed for service in small craft, all of which will be subjected to extensive tests under the primitive conditions associated with such a voyage. Performance reports on each item will be submitted to the manufacturers concerned.

Headquarters for the venture has been established in the radio station (MFH87) of the Kingston "Steadfast" Sea Cadet Corps at Thames Side, Kingston-on-Thames. This station will be on the air from 1730 until 2130 B.S.T. daily for the purpose of receiving reception reports from other stations taking part. The unit's Amateur Radio station (G3JOQ) will maintain watch in the 3.5, 7 and 14 Mc/s bands from 1730 to 1930 B.S.T. Mondays to Fridays and from 1030 to 1230 B.S.T. on Sundays. Transmissions from this station will be on 80 metres only. Reports on signals intercepted by other amateurs will be gratefully received either over the air, by telephone (Kingston 6600 from 1730 to 2130 B.S.T.) or, by post, addressed to the Officer-in-Charge, "Steadfast." The stations will be operated by cadets of the unit and members of the Kingston & District Amateur Radio Society.

As amateur marine mobile operation is only permitted in the 28 Mc/s band, it has not been considered worthwhile installing an amateur station on the *Aries*. The frequencies to be used were published in our April issue. When conditions permit, a kite will be used to carry the aerial.

Table III

$\beta$	$F(\beta)(\Delta)$		
	$\Delta=10^\circ$	$\Delta=30^\circ$	$\Delta=60^\circ$
0	0.15	0.84	0.67
10	0.21	0.88	0.68
20	0.33	1.00	0.69
30	0.46	1.16	0.71
40	0.59	1.35	0.73
50	0.73	1.54	0.76
60	0.85	1.73	0.78
70	0.95	1.87	0.80
80	1.01	1.97	0.81
90	1.04	2.00	0.82

# Design of Low Noise Receivers

## Achieving the best Noise Factor with Modern Valves

At frequencies below 30 Mc/s the weakest signal audible is determined by the amount of external noise (solar, atmospheric and man-made) picked up by the aerial. In general, high frequency communications receivers today are as sensitive as is necessary, in view of these limitations.

Above 30 Mc/s, however, the external noise diminishes considerably, the weakest signal audible being determined by the thermal noise generated in the aerial radiation resistance, to which a temperature, designated  $T_a$ , is assigned. Providing the aerial is not pointed towards the Milky Way or other cosmic sources of radio noise,  $T_a$  is approximately equal to the temperature of the Earth and may be assumed, for theoretical purposes, to be 290°A. If a signal of  $e_a$  volts is induced into the aerial, the signal-to-noise power ratio at the aerial is then

$$\frac{4k T_a B R_a}{e_a^2}$$

where  $k$  = Boltzmann's constant ( $1.33 \cdot 10^{-23}$ ),  $B$  = bandwidth of the receiver in c/s and  $R_a$  = radiation resistance of the aerial. This is the maximum signal-to-noise ratio which can be achieved for the particular arrangement, and can only be altered by changing the power gain of the aerial system.

Whether or not a signal received by the aerial will be heard depends upon the noise contributed by the receiver as the signal passes through it. The early stages of the receiver, where the signal is weakest, are the most important from this point of view. The measure of the ability of a receiving system to handle weak signals is its "noise factor", which is the ratio of the signals-to-noise ratios at the input and output respectively. Since, however, some noise is always added to the input signal by the receiver, noise factors are always greater than unity. A perfect receiver, adding no noise whatever to the input signal, would have a noise factor of 1, or 0 db.

### Input Stage Essentials

The requirements of an input valve stage for communications work are (a) low noise content, (b) high power gain, and (c) ability to develop a signal on the grid of the valve. These statements mean that (a), the equivalent noise resistance of the valve used must be as low as possible. The equivalent noise resistance of a valve is a fictitious resistance which, when placed in the grid circuit, of a valve, considered noise-free, would cause as much noise current in the anode circuit as actually appears in practice. The expression for this artificial resistance is, for a triode

$$R_n = \frac{2.5}{gm}$$

For example, for the 6J6

$$R_n = \frac{2.5 \times 1000}{5} = 500 \text{ ohms}$$

In the case of pentodes a further factor, representing the "partition noise" (i.e. the noise due to the random division of the electron stream between screen and anode), must be added to the expression. For this reason,  $R_n$  is always much

larger when a valve is used as a pentode rather than as a triode. Triodes are therefore used exclusively for low-noise input stages. In the case of the EF50,  $R_n = 1400$  ohms, of which the partition noise component is 1050 ohms.

The second requirement (b) means that the stage must be capable of developing gain at the desired frequency with the load presented by the input of the following stage. This is because the lowest noise factor will be achieved when all the noise contributed by the receiver is that due to the first stage, and when the signal is at a sufficiently high level at the input of the second and succeeding stages for their noise contributions to be of no effect. The formula for the overall noise factor,  $F_{12}$ , of two stages of independent noise factors  $F_1$  and  $F_2$  is

$$F_{12} = F_1 + \frac{F_2 - 1}{G_1}$$

where  $G_1$  is the available power gain of the first stage. As an example, a mixer may have a noise factor of 100 (20 db). If a triode of noise factor 5 (7 db) and of power gain 10 (10 db) precedes the mixer, the overall noise factor becomes

$$F_{12} = \frac{5 + 99}{10} = 14.9 \text{ (11.7 db)}$$

—an improvement equivalent to an increase of transmitter power of nearly seven times. The third requirement (c) is that the input resistance  $R_t$ , which appears in the grid circuit due to the transit time of the electrons, must be high. The temperature associated with this resistance is five times room temperature; its noise contribution is important. The input resistance due to inductance in the cathode lead attenuates signal and noise equally for a triode, and therefore does not deteriorate the noise factor although it increases the bandwidth of the input circuit. In addition, the input capacity of the valve should be as small as possible so that tuned circuit losses may be made negligible.

It may be concluded, therefore, that a triode must be used in a low noise input stage. In order to investigate the noise factor of such a stage, it is usual to refer all noise sources to the grid circuit. For a circuit (Fig. 1) with a transformer of step-up ratio  $1:m$  the noise factor becomes approximately

$$F = 1 + \frac{5m^2 R_a}{R_t} + \frac{R_n}{m^2 R_a}$$

When the step up ratio is adjusted for optimum noise factor (as opposed to maximum power transfer) the optimum value of  $F$  is given by

$$F_{opt} = 1 + \frac{2R_n}{R_t} + 2\sqrt{\left(\frac{R_n}{R_t}\right)^2 + \frac{5R_n}{R_t}}$$

Obviously, a valve is needed with as low a ratio of  $R_n$  to  $R_t$  as possible; the reciprocal of this

$$\frac{R_t}{R_n}$$

is often used as a figure of merit for low noise valves. The above formula applies to a triode whatever method of connection is used—earthed cathode, grid or anode. Thus, at the operating

\* 29 Cleveland Park Avenue, Walthamstow, London, E.17

frequency at which  $RT=Rn$ , the optimum noise factor for any triode is given by

$$F_{opt} = 1 + 2 + 2\sqrt{6} = 7.9 = 9.0 \text{ db.}$$

For the frequency at which  $RT=4Rn$ ,

$$F_{opt} = 1 + \frac{1}{2} + 2 \times \sqrt{\frac{21}{16}} = 3.79 \text{ (5.78 db)}$$

It is obvious, therefore, that a valve must be chosen for which the frequency at which  $RT=4Rn$  is considerably above the desired operating frequency. At a frequency of 144 Mc/s this is just possible with conventional valves, as Table I shows. This gives a rough guide to the frequency at which  $RT=Rn$ , although it is difficult to separate the effects of transit time from those of cathode lead inductance since they are both dependent upon the square of the operating frequency.

Table I

Valve	Rn	Frequency for $RT=Rn$
CV53	450 ohms	500 Mc/s
CV354	400 ohms	750 Mc/s
6J6	500 ohms	320 Mc/s
6AK5 as triode	450 ohms	375 Mc/s
EC91	400 ohms	350 Mc/s

### Power Gain and Noise Figure

When a valve for a certain input stage noise figure has been chosen, the overall noise figure will depend on the method of connection used, as each of the three possible methods have different power gains. Clearly, the method giving the greatest power gain will give the lowest overall noise figure. Providing the load into which the stage works is high, both earthed cathode and earthed grid stages have appreciable gain, the former being higher; the use of either before a pentode will enable almost the minimum noise factor to be obtained. Where the bandwidth is large, however, as in a fixed-tuned r.f. stage required to cover a band of frequencies, the power gain of an earthed grid circuit is much too low, and that of an earthed cathode stage often too low for much improvement in noise factor to result. It then becomes necessary to use two triode stages.

### The "Cascode" Circuit

In the well-known "cascode" circuit, the low input resistance of the second valve damps the anode coil of the first, giving wide bandwidth without using a noisy damping resistor. The first valve, although having a voltage gain of approximately unity, has appreciable power gain due to the low load resistance, and to this is added the power gain of the second valve. The circuit has become justifiably popular for large bandwidth applications, but it is sometimes inferior to that using two earthed grid stages and an intervalve matching circuit. This condition arises when the bandwidth of the input circuit is required to be larger than that allowed by the optimum noise factor equation. In this case, the optimum step-up ratio may still be employed, but the band-

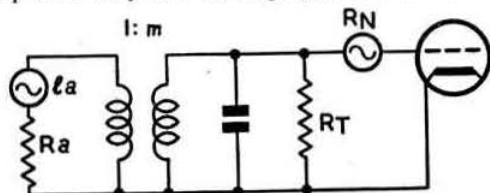


Fig. 1.—A circuit employing a transformer with a step-up ratio.

width of the input circuit is increased due to the low input resistance of the earthed grid stage. The power gain of this circuit is low, and further amplification by triodes is desirable for minimum noise factor.

### Mixer Stages

When an input stage has to be chosen to precede a mixer, all the above factors must be considered. A mixer valve is, by its mode of operation, about six times as noisy as when used as an amplifier; if it is allowed to take charge of the noise factor of the receiver this could well be 20 db! Considerable amplification before the mixer is therefore needed. At a frequency of 420 Mc/s the CV354 alone—which is designed for earthed grid operation—is working well below its maximum frequency. As reported in "Around the V.H.F.s" in the November, 1952, issue of the R.S.G.B. BULLETIN, D. N. Corfield, G5CD, has experimented along these lines, achieving a noise factor of 8 db and a bandwidth of 17 Mc/s with one CV354, and 4.5 db and 7.5 Mc/s using a pair. The latter result is almost the theoretical minimum for this valve at 420 Mc/s, although the bandwidth is ample for crystal controlled operation.

No further substantial improvement will be possible until a valve is designed with a higher  $RT/Rn$  figure of merit.

### "Reggie's Whitsun Retreat"

THE Rev. R. T. Newcombe, M.C., T.D., G2AWJ, Vicar of Cold Waltham, Pulborough, extends a warm welcome to a "Hamfest" which he proposes to hold in the grounds of his beautiful old vicarage in rural Sussex during the afternoon of Whit-Monday, June 7. Tea will be served in the garden at 4.30 p.m. followed by a shortened form of Evensong, especially applicable to Amateur Radio, for those who care to join in before returning home. Portable and mobile v.h.f. and h.f. operation will be encouraged during the day.

Members and their ladies are invited. Closing date for applications to attend is May 31, please. A. O. M.

### Ham on Ice!

ONE of the more interesting spectacles seen by television viewers recently was the appearance of Reg Moores (G3GZT of Brighton) in *Television Ice Time*. Reg skated on stilts during the programme but his other accomplishments—riding a uni-cycle on ice, barrel-jumping, comedy skating and fire eating—can be scarcely less exciting! In recent years he has visited Turkey, India, Hong Kong and Malaya, and has just concluded an engagement in *Sleeping Beauty on Ice* in Liverpool.

### MODERN WALKIE TALKIE—(Continued from page 512)

passed to the operator on a motor-cycle from a similar unit inside a stationary 8 h.p. steel bodied car!

It is hoped that this little unit will do much to close the gap between what we would all like to have and what is possible. It is believed that its performance reaches the optimum for a total h.t. consumption of 0.8 watt. When receiving, the consumption is 0.3 watt while the filament takes 0.22 A at 1.4 V.

### Acknowledgments

The writer is indebted to G3IMC, G6HU and other members of the Ilford R.S.G.B. Group for their interest and co-operation.

# The Radio Components Show

## A Report on an outstanding Exhibition

**D**EFENCE, not Band III television, was the dominant theme at the Eleventh Annual Radio Components Show held in London on April 6, 7 and 8, 1954. Many manufacturers were, however, showing new valves and components developed for use in u.h.f. television.

### Ministry of Supply Stand

Some idea of the way military equipment is developing could be gained from the Ministry of Supply stand, as usual an outstanding feature of the exhibition. Of particular interest to the radio amateur were examples of overtone crystals which are being developed for use at frequencies up to 300 Mc/s. The days of the long string of multipliers for crystal controlled v.h.f. transmitters would appear to be numbered. The production of d.c. voltages up to 600 and power up to 270 watts is now being carried out largely with vibrator power units, rotary transformers now having reached the obsolescent stage. A variety of miniature and sub-miniature components were also on show.

### V.H.F. Crystals

Commercial v.h.f. crystals were exhibited by Standard Telephones and Cables Ltd. It is anticipated that overtone types for 144 Mc/s will become available before very long. One of the more unusual applications of these crystals is in the design of v.h.f. filter systems the purpose of which is to obtain a much sharper cut-off characteristic than is normal when the i.f. is in the region of 50 Mc/s or more.

### Condensers and Drives

A wide variety of Eddystone components, including a range of new microcondensers, instrument knobs and slow motion drives, were to be seen on the Stratton & Co., Ltd., stand together with all the other established products of that company. The Cylcon range of variable condensers and 5- and 12-channel TV tuning units were exhibited by Sydney Bird & Sons, Ltd., while Jackson Bros. showed a nice selection of tuning condensers, drives and dials, all of which can be obtained through retail shops. It is unfortunate that the Wingrove & Rogers range of Polar variable condensers and trimmers (including the miniature S.5001 type which has P.T.F.E. insulation) are not readily available to the amateur. At the moment they are supplied only to the Services, the radio and electronic industry and for export.

### Small Components

Modern solders of all types were featured by both Enthoven Solders, Ltd., and Multicore Solders Ltd. W. T. Henley's Telegraph Works Co. Ltd. showed a wide range of Solon soldering tools including the Instrument Model specially designed for soldering operations in compact assemblies. It is so light (3½ oz.) that it can be held like a pencil.

Valveholders are used in practically all forms of radio equipment and, on the McMurdo Instrument Co. Ltd.'s stand, types suitable for every possible application were to be seen. Many are now available in the low-loss material P.T.F.E. for v.h.f. and u.h.f. applications. The company also exhibited many types of plugs and

sockets. The Spear Engineering Co. Ltd. showed a useful selection of servicing aids including wiring jigs and extracting and pin aligning tools for use with miniature valves.

Although the new miniature ceramic trimmers exhibited by the Telegraph Condenser Co. Ltd. were designed specifically for use in TV tuners it is fairly certain that many uses for them will be found in modern amateur equipment. Other products on the stand which should be of interest to the radio amateur are the new hi-K miniature lead-through and stand-off condensers. The latest T.C.C. sub-miniature electrolytic which measures only ¼ in. by ¼ in. diameter (capacity 2 µF) was designed for use in transistor amplifiers. Other additions to the range are metallised polystyrene condensers, moulded "Plimoseal" condensers and "Superlytic" exceptionally low leakage electrolytics for use in very low frequency amplifiers. The Dubilier Condenser Co. (1925) Ltd. exhibited a wide range of condensers and fixed and variable resistors. Catacon moulded silvered-mica condensers were additions to the wide range of L.E.M. types shown by the London Electrical Manufacturing Co. Ltd.

Eric Resistor Ltd. had a very wide range of resistors of all types on show in addition to sub-miniature disc ceramicons and a new series of low value, close tolerance capacitors of very small size. The latter have been named "Gimmicks." All forms of vitreous enamel wirewound resistors ranging from 4 watt to ¼ kW types were on view on Painton and Co. Ltd.'s stand.

### Aerial Equipment

One of the most comprehensive ranges of connectors is that manufactured by Transradio Ltd. who also exhibited cables including ultra-low attenuation transmission lines. The Telegraph Construction and Maintenance Co. Ltd.'s stand was devoted to connecting wires, screened leads, microphone cables, attenuation lines and Telcon radio frequency cables for a wide variety of purposes, in addition to Telcon metals such as Mumetal, Radiometal, Rhometal and a thermostatic bimetal for overload and delay switches.

Aerials in great profusion, for home and abroad, for vertical and horizontal polarisation, for fringe areas and high signal strength areas, were shown by a number of exhibitors including Aerialite Ltd., Antiference Ltd., Belling and Lee Ltd., and Wolsey Television.

### Loudspeakers and Microphones

High fidelity audio equipment is becoming of increasing interest and several manufacturers showed items of particular note. Goodman's Industries Ltd. featured their Audiom and Axiom high fidelity loudspeakers, the versatile ZS.33 moving coil microphone and a representative range of output transformers. Pickups incorporating ceramic cartridges, which are unaffected by changes in temperature or humidity, were exhibited for the first time by Cosmocord Ltd. whose new inexpensive Acos microphone—the Mic 36—should find ready acceptance amongst radio amateurs and recording enthusiasts.

## Transformers

In addition to their chokes and transformers so well-known to all concerned with radio equipment, the Woden Transformer Co. Ltd. exhibited an entirely new range of cast-resin type components designed to utilise the present "C" type cores. Parmeko Ltd. also manufacture resin-cast transformers as their Jupiter series. The method makes the casting an integral part of the transformer, forming a solid, almost indestructible construction which is completely moisture proof. Similar resin-cast transformers were exhibited by Ferranti Ltd. and Gresham Transformers Ltd.

## Transistors and Valves

Transistors were on show for the first time as normal components rather than as curiosities. Mullard Ltd. exhibited their junction triodes types OC10, OC11 (for experimental purposes), OC70 and OC71 (for deaf aids) as well as point contact types OC50 and OC51. Other items included hermetically sealed germanium diodes, the new range of Special Quality valves and the Mullard valves for Band II f.m. reception and Band III television.

The General Electric Co. Ltd. exhibited both germanium diodes and the GET.1 contact transistor in addition to a wide selection of Osram valves and television tubes. Standard Telephones and Cables Ltd. also exhibited point contact transistors. Germanium junction power rectifiers—only a quarter of the size of metal rectifiers—were another interesting product to be seen on this company's stand. The electrical efficiency of these rectifiers is stated to be 99%—much greater than any existing valve or metal rectifier. On a separate stand devoted to Brimar valves, new types for use in Band III television receivers and the Trustworthy series were on show together with the C17GM teletube, the first wide angle electrostatically focused tube to be manufactured in this country.

No radio amateur who was able to visit this great exhibition is likely to look across the Atlantic with envious eyes in the future, for here could be seen probably the greatest array of components ever assembled. The fact that many of the stands carried signs indicating that the products on view met U.S. Government and N.A.T.O. command standards suggests that overseas countries look to Britain for the best in radio and electronic components.

## New Valves

THE Communications and Industrial Valve Department of Mullard Ltd. have recently made available the first of a new range of Special Quality valves, intended for use in equipment liable to encounter unusually severe conditions of mechanical shock, vibration and acceleration. The types concerned are: the M8079, a double diode with separate cathodes, electrically equivalent to the EB91; the M8081 double triode (ECC91); the M8082 output pentode (ECC91); the M8083 high-slope r.f. pentode (EF91), and the M8100 low noise, high-slope r.f. pentode (EF95).

Mullard Ltd. have also just introduced some special valves for use in f.m./a.m. broadcast receivers. The range comprises the ECC85 high slope double triode, the ECH81 triode heptode, the EF85 high slope variable- $\mu$  r.f. pentode, the triple-diode-triode EABC80, the EL84 output pentode and the EZ80 power rectifier.

## More Transistor Transmitter DX

DURING the night of April 19-20, 1954, G3CCA (Leicester) made a number of interesting contacts on Top Band using a transistor transmitter operating at an input of 50 mW. The stations concerned were G3CFG (Kirby Muxloe, Leicester, who acted as control), G3ERN (Harlow, Essex), G3GGN (Littlehampton, Sussex) and G3IQO (Liverpool).

G3CFG was first worked on c.w., but as the transistor v.f.o. began to behave erratically G3CCA changed over to 'phone. For this he used a modulator consisting of five GET.1 transistors. His signals were reported RS58 at Kirby Muxloe.

During the early hours of April 20, G3ERN, at a distance of 100 miles, established contact with G3CCA for what may well have been the first transistor DX 'phone contact ever made. Shortly afterwards, G3GGN, at a distance of 130 miles, reported that he could hear G3CCA on c.w. at RST569, but because of the high noise level only the 'phone carrier was audible.

Later, G3ERN reported that G3IQO could hear 'phone signals from G3CCA at RS44.

It is understood that QSL cards have been sent by G3CCA to the stations who collaborated with him in these interesting tests.

[It is regretted that no photographs or details of the equipment used by G3CCA have yet been submitted to Headquarters for publication.—Editor.]

## "An Experimental Transistor Transmitter for 3.5 Mc/s Operation"

IN the circuit diagram (Fig. 1) published on page 461 of the April, 1954, issue of the BULLETIN, the base of the transistor (i.e., the junction of C1 and C2) should be connected to earth.

## Screening Gauze

MEMBERS who wish to use wire gauze for screening purposes will be interested to know that copper weaving, 30 mesh in 32 gauge, can be obtained, price 2/5 per square foot, from G. A. Harvey & Co. (London), Ltd., Greenwich Metal Works, London, S.E.7. The same mesh in 36 gauge costs 2/- per square foot.

## Around the Trade

A SECOND and larger edition of the booklet *Modern Solders* has recently been published by—and may be obtained on request from—Multicore Solders Ltd., Maylands Avenue, Hemel Hempstead, Herts. Within its 24 pages the booklet gives much useful information about solders and fluxes. Two other booklets—*Hints on Soldering* and *Multicore Solders' Technical Summary* are also available free of charge from the same address.

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# The Social Side

London Members' Luncheon Club

THERE was an attendance of 26 at the meeting of the Club held on Friday, April 23. Among those making their first appearance at an L.M.C. function were Wing-Commander Harry Hannam, VK3AMK; the Rev. R. T. Newcombe, M.C., T.D., G2AWJ; Mr. Basil O'Brien, G2AMV (Region 1 Representative); Mr. Geoffrey Parr, B.Sc., M.I.E.E. (Hon. Secretary, Television Society), Wing-Commander I. E. Hill, G6HL, ex-SU6HL; Mr. A. E. Dowdeswell, G4AR-ST2AR, and Mr. A. C. Wilberforce, DL21Y.

Society members are asked to inform overseas amateurs known to be visiting London during the summer the dates of Luncheon Club gatherings. Reservations should be made by telephone or letter to Miss May Gadsden at R.S.G.B. Headquarters (HOL 7373) prior to the date of each luncheon.

The Club is due to meet again on Friday, May 21, 1954, at the Bedford Corner Hotel, Tottenham Court Road, at 12.30 p.m. for 1 p.m.



Mr. H. A. Bartlett (Acting Vice-President and Region 9 Representative) speaking at the North Cornwall Hamfest. Ted Bowden, G2AYQ, is to the right of the picture.

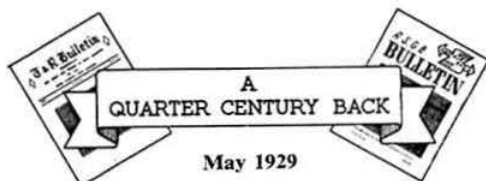
## North Cornwall Hamfest

MR. H. A. BARTLETT (G5QA), Acting Vice-President and Region 9 Representative, was the guest of honour at the Third Annual North Cornwall Hamfest held at the Cove Cafe, The Quay, St. Agnes, on March 28, 1954. The walls of the cafe were decorated with cartoons, the theme this year being R.A.E.N. Sixty members and friends attended.

Following tea, Mr. Bartlett spoke about R.A.E.N. and expressed the hope that groups covering the whole of Cornwall would soon be established. On behalf of the visitors, he thanked Ted Bowden (G2AYQ) and the St. Agnes members for organising the meeting.

After the traditional raffle and distribution of gifts donated by well-known manufacturers and publishers, there was a two-hour film show which included films loaned by Metropolitan Vickers and by Shell-Mex.

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IN an attempt to satisfy the wishes of those who had not taken kindly to the new QSA (readability) scale the Editor recommended that the old R (signal strength) scale should also be used when giving reports. "We are quite ready to believe," he wrote, "that some amateurs do not mind whether their signals are QSA2 or 5 as long as they are R8; others only wish to be QSA5, not troubling whether they are R3 or R7."

L. W. Parry, G6PY, offered a prize of £5.5.0 for the first contact on 56 Mc/s between Great Britain and America or alternatively over a distance of 3,000 miles.

Holders of Artificial Aerial Licences were warned not to use the prefix G with their call sign.

Membership was around 1,400.

B. H. Rolfe, M.A., F.C.S., discoursed on "Charging High Tension Accumulators from A.C. Mains." Arthur Watts, G6UN, contributed some notes on Hertz Aerials.

G. W. Thomas, G5YK, described the construction of an accurate frequency meter in which the valve was an LS5B and the main tuning condenser a Cydon Log Midline.

Brian Warren, G6CI, described his one-valve 28 Mc/s T.P.T.G. transmitter which had recently put strong signals into the U.S.A.

H. J. Powditch, G5VL, succeeded T. P. Allen, G16YW, as Manager of the Contact Bureau.

"DX Reception Guide" for the period May 20-June predicted good conditions for Australian contacts on 7 Mc/s between 0600 and 0800 G.M.T.

H. H. Lassman, G2PX, offered "The Lasso-phone"—the latest scientific discovery in cone units—at 17/6.

A Conventionette was announced to take place in Bristol on May 25 and an up-to-date list of International Amateur Prefixes was published.

District Notes reported that G2MI had blown his DET.1—G6CL had worked VK3LP with an input of 6.5 watts to a Cleartron CT25X which had cost 6d. at Selfridge's—G6LL was preparing for 56 Mc/s operation—G5RV had received his full call—G16YW, using 4 watts to a CT25X, had worked 23 countries on 14 Mc/s.

H. K. Bourne, B.R.S. 212, in a Letter to the Editor, reported logging amateur signals from all six continents in the space of nine minutes. . . . J. W. Mathews, G6LL, and H. A. M. Whyte, G6WY, crossed swords with Kenyon Secretan, whose earlier letter on the newly introduced QSA code and amateur abbreviations had aroused much controversy. Both correspondents advocated the continued use of OM and OB—terms which had been scorned by Mr. Secretan.

# Thirteen Men

LIGHTS burn until a late hour in the first floor office of an industrial firm in the heart of Bristol. Production is brisk, it is true, in the laboratories and workshops of this undertaking, but it is well past the hour when the machinery and other electrical apparatus have been silenced for the day. Within the lighted room, production charts, technical specifications and all the mass of paper-work which accompanies a modern business are pushed to one side.

Thirteen men sit around the table, or are accommodated in convenient positions among the office paraphernalia, but the letters they quote from, the timetables and plans they study and the notes they make are far removed from the work-a-day routine of the company whose premises shelter them.

The R.S.G.B. 1954 National Convention local arrangements committee are in session and their "production target" is to produce three days of non-stop Amateur Radio fare of the highest possible standard and diversity. Whether that desirable target will be reached will depend upon the verdict of the hundreds of Society members who visit Bristol on September 17, 18 and 19 but, after initial headaches and minor setbacks, those thirteen men are already confident.

They work in specialised groups, each of which has produced an outline plan for its own part in the complete programme and, after being subjected to the approval of the full committee under the guidance of the Council, the work got under way to make their proposals concrete arrangements. As a result of this detailed co-ordination it is hoped that members who attend Convention will find the whole programme flowing effortlessly and smoothly—and with no obtrusive indications of the background organisation which will have made this possible.

Venue for the Convention is the Royal West of England Academy—ideally appointed premises and conveniently situated near the centre of the city. Within this imposing building, visiting members will be "booked in" and advised on all aspects regarding their stay to ensure their personal comfort while in Bristol. Here, too, will be staged in the main galleries an Amateur Radio exhibition featuring, in addition to trade stands, a complete working Amateur TV station as well as the normal Convention station. In adjoining

galleries will be found fully equipped film and TV theatres and facilities catering for the "inner man."

The programme will be in full swing by mid-day on the Friday with visits to places of scenic and technical interest. Full support is being given by the civic authorities and during the afternoon the President and members of the Council will be received by the Lord Mayor and Lady Mayoress. In the evening the Royal West of England Academy will be the setting for an informal reception of visiting members by the President, Mr. A. O. Milne, followed by a conversation and buffet.

On the Saturday numerous visits and lectures have been planned to suit all tastes and the day will culminate in the highlight of the social events, the National Convention Dinner, to be held in the Victoria Rooms, almost immediately opposite the Royal West of England Academy building. During the evening the time-honoured draw and distribution of prizes will take place.

On the Sunday the exhibition will be open during the morning for the last time and among the numerous features of that day will be attendance at Morning Service at the Church of St. Mary Redcliffe—described by Queen Elizabeth I as "the fairest parish church in all England." The Convention will end with informal tea on Sunday afternoon.

Among the many West Country authorities whose co-operation has been obtained in drawing up the very full programme are the Corporation of the City and County of Bristol, the Bristol Aeroplane Company (Aircraft Division), the B.B.C. and G.P.O. (West Regions), the South Western Electricity Board, the University of Bristol, the Burden Neurological Institute and Messrs. W. D. & H. O. Wills. In addition, technical experts will give lectures and demonstrations on the know-how of many current problems connected with Amateur Radio and TV and high-fidelity reproduction.

The story of the thirteen men tells not of mystery but of fact; the lights burn still in that city office—and every member possible of the R.S.G.B. fraternity is cordially invited to Bristol on September 17, 18 and 19 to judge on the result of their deliberations and labours. The thirteen men are already confident . . .

## Exchange Holidays in Italy

MEMBERS (and their wives), living in or near London, who would like to enjoy a cheap holiday in Milan, Venice or Rome, as guests of Italian radio amateurs, and who can offer similar accommodation to an Italian amateur (with or without wife) in exchange, are asked to write, without delay, to Francis Glynn (G3GVZ), 13 Station Road, East Grinstead, Sussex, who is in charge of the arrangements. Approximate costs are: Rome, £22; Venice, £20, and Milan, £18 10s. The Italian party will be in England from August 14 to 21; the English party will leave London on August 27 or 28 and will return on September 5.

Preliminary applications from individual R.S.G.B. members or from Secretaries of Affiliated Clubs on behalf of members should be sent at once to G3GVZ, stating the number of persons interested, and whether member only, or member and wife. Descriptive leaflets are available.

## Munich Hamfest

AN international hamfest, organised by D.A.R.C., is to be held in Munich, Western Germany, on July 10 and 11, 1954. A special feature will be an exhibition tracing the growth of Amateur Radio during the last thirty years. Additionally, a festival evening has been arranged in collaboration with the local broadcasting station, Bayerischer Rundfunk.

On both days, amateur stations using the call-sign DL0BS will be active on all bands; contacts will be confirmed by special QSL cards.

Further information can be obtained from Hans Schleifenbaum (DL1YA), Hirschbergstr. 13, Munich 19, Germany.

## Unusual QSL Card

A MOST effective QSL card, illustrating the art of the pottery worker, is being supplied to amateurs in the Stoke-on-Trent area by North Staffordshire Chamber of Commerce.



# Radio Amateur Emergency Network

LAST month's report on the activities of the Radio Amateur Emergency Network had only just gone to press when news of yet another successful "turn-out" by the **Hornsea and Hull** groups was received. On April 4, the warning came at 1700 G.M.T. and lasted for two hours. Fortunately only a small amount of flooding occurred in the district. The following morning, however, to be on the safe side the groups again stood-by at high tide. Hornsea now has a 28 Mc/s test on Sundays from 1400 to 1600.

**Oxford** group carried out an exercise on April 11 when G3GCS/P and G3GJX/P (the E.C.O.) operated portable from different sites. Others taking part were G3HYZ, G3HIQ, Capt. Howard Beard U.S.A.F. (W5RWH), who loaned 28 Mc/s portable equipment for use at G3GJX/P, David Alexander and Bernard Green. Mobile equipment for 28 Mc/s is now under construction. **Lichfield** group held a successful meeting on April 7, which was attended also by members from Cannock. As some members do not use v.f.o.s the E.C.O. (G3FZW) is providing them with crystals ground to 3559 kc/s for net operation.

A group has been formed in **Dorchester**, whilst the **Newark** and District Amateur Radio Society hope to form a local group in that town shortly. A successful group meeting, organised by G3COY, was held in **Stoke-on-Trent** on April 5 when all local R.A.E.N. members attended and 7 volunteers were enrolled. G3FZW (E.C.O. Lichfield) was also present. It was decided at the meeting to use 3.5 Mc/s for the time being and to build entirely portable equipment for 144 Mc/s. Practices, which are held every third Sunday, take place on 3506 kc/s (c.w) and 3625 kc/s (phone).

Another successful meeting was held recently in the Council Chamber at the Castle, **Whitstable**, when the E.C.O. (G3JMC) outlined the aims of R.A.E.N. and described the equipment available. Mr. F. Tomlinson, Clerk to the Council presided.

## R.A.E.N. and N.F.D.

It has been suggested that R.A.E.N. members, not otherwise engaged in National Field Day, should operate portable during the event and thus gain valuable experience of such operation. Those who operate are asked to send in check logs to headquarters.

A set of notes for the guidance of E.C.O.s has been compiled by the Hon. Secretary. Anyone who has failed to receive a copy should write to G3ABB immediately.

Completed registration forms are being dealt with as quickly as possible by the Hon. Secretary, in which connection it is hoped that E.C.O.s will shortly receive all forms relating to members of their respective groups.

## New E.C.O.s

The following have been appointed E.C.O.s:  
A. Swindon (G3ANK), 135 Station Road, Sidecup, Kent.

R. Gardner (G3CGE), 62 Rosewall Road, Maybush, Southampton.

R. L. Varney (G5RV), 184 Gaileywood Road, Chelmsford (Deputy: R. Ferguson (G4VF), 57 Roxwell Road, Chelmsford).

R. R. Wilson (G13CTU), Upper Main Street, Bushmills, N.I.

## Correction

The callsign held by the E.C.O. for Bristol (S. T. Crowther) is G3JMP and not as published in the April issue of the BULLETIN.

## Resignation

C. L. Fenton (G3ABB), upon taking up the duties of Secretary to the R.A.E.N. Committee.

## Reports

Items for inclusion in this feature should be sent to Mr. Fenton at 40 Fourth Avenue, Chelmsford, Essex, to arrive not later than the 15th of the month.

## Contests Diary

1954

May 22-23	-	420 Mc/s Contest††
May 23	-	D/F Qualifying (South Manchester)*
June 12-13	-	National Field Day†
June 20	-	D/F Qualifying (High Wycombe/Oxford)*
July 3-4	-	144 Mc/s Open
July 11	-	D/F Qualifying (Peterborough)*
August 8	-	D/F Qualifying (Salisbury)*
August 15	-	144 Mc/s Field Day (No. 2)
August 29	-	D/F Qualifying (Romford/Southend)*
September 5	-	Low Power Field Day
September 12	-	D/F National Final*
September 12	-	420 Mc/s
October 2-3	-	Low Power
November 13-14	-	"Top Band" (No. 2)

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

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

†† For rules, see page 469, R.S.G.B. BULLETIN, April, 1954.

## R.S.G.B. D/F Qualifying Events, 1954

DETAILS of the qualifying event to be held on June 20, 1954, are as follows:

**Organiser:** G. T. Peck, c/o Ernest Turner Electrical Instruments Ltd., Chiltern Works, High Wycombe, Bucks.

**Call Sign:** G8VZ/P.

**Frequency:** 1854 kc/s.

**Assembly Point:** 2½ miles S.E. of Tring and 1 mile W. of Northchurch at the road junction and green at the rear entrance to "Champneys," N.G.R. 956086.

**Map:** Ordnance Survey, New Popular Edition, Sheet 159.

**Assembly Time:** 1330 B.S.T.

Intending competitors should notify the organiser by Monday, June 14, stating the number in their party requiring tea at a location which will be notified to competitors when their entries are acknowledged.

# The Amateur Television Licence

*Although the number of Amateur Television stations in the United Kingdom at the moment is small it is nevertheless of considerable importance that those who are licensed should be afforded the maximum of liberty consistent with safeguarding the needs of all concerned. The new Amateur (Television) Licence—presented herewith—will no doubt serve as a model throughout the world of Amateur Radio.*

## WIRELESS TELEGRAPHY ACT, 1949 Amateur (Television) Licence

**Date of Issue :**

**Renewable :**

**Fee on Issue :**

**Fee on Renewal :**

**Call Sign :**

### 1. (1) Licence.

of (hereinafter called "the Licensee") is hereby licensed, subject to the terms, provisions and limitations herein contained:

- (a) to establish an amateur television sending and receiving station for wireless telegraphy (hereinafter called "the Station") at:

and

- (b) to use the Station for the purpose of
- (i) sending to and receiving from other amateur television stations with which communication is separately and singly established, as part of the self training of the Licensee in communication by wireless telegraphy, visual images for the purpose of the investigations in wireless telegraphy of the Licensee or the person whom he is in communication;
  - (ii) sending the call sign of the Station by radiotelephony or by Morse telegraphy, and
  - (iii) receiving messages from other amateur stations.

(2) **Limitations.** The foregoing Licence to use the station is subject to the following limitations:

- (a) The Station shall be used only with emissions which are of the classes specified in the Schedule hereto, and are within the frequency bands specified in the Schedule hereto in relation to those respective classes of emission and with a power not exceeding that specified in the Schedule hereto in relation to the class of emission and frequency band in use at the time.
- (b) The Station shall be operated only by the Licensee personally: Provided that any device used for converting visual images into electrical signals for the purpose of being sent may be operated under the Licensee's personal supervision by another person.
- (c) The Station shall not be used for the sending of any visual image which in the opinion of the Postmaster-General, is of an objectionable character.
- (d) The Station shall not be used for the sending of any visual image on behalf of any other person.

2. **International Requirements.** The Licensee shall observe and comply with the relevant provisions of the Telecommunication Convention.

### 3. Frequency Control and Measurement.

(1) A satisfactory method of frequency stabilisation shall be employed in the sending apparatus.

(2) Equipment for frequency measurement shall be provided capable of verifying that the sending apparatus is operating with emissions within the authorised frequency bands.

### 4. Non-Interference.

(1) The apparatus comprised in the Station shall be so designed, constructed, maintained and used that the use of the Station does not cause (a) any avoidable interference with other amateur television stations or (b) any interference with any other wireless telegraphy.

(2) At all times every precaution shall be taken to keep the radiated energy within the narrowest possible frequency bands, having regard to the class of emission in use. In particular the radiation of harmonics and other spurious emissions shall be suppressed to such a level that they cause no interference with any wireless telegraphy. Tests shall be carried out from time to time with a view to ensuring that the requirements of this paragraph are met.

5. **Access to Apparatus.** The Licensee shall ensure that the Station cannot be used at any time when he is not present.

### 6. Log.

(1) A record shall be kept in a book (not loose-leaf) showing the following:

- (a) Date.
- (b) Time of commencement of each period of sending.
- (c) Call signs of the stations with which communication is established, times of establishing and ending communication with each station, and the frequency or frequencies and class or classes of emission and power used in each case.
- (d) Time of closing down the station.
- (e) Subject of transmission.

(2) All times shall be stated in G.M.T. No gaps shall be left between entries and all entries shall be made at the time of sending and receiving.

7. **Receiver.** The Station shall be equipped for the reception of messages sent on the frequency or frequencies and by means of the class or classes of emission which are in current use at the Station for the purpose of sending.

### 8. Call Sign.

(1) The call sign mentioned on the first page of this Licence has been allotted to the Station. No abbreviated form of the call sign may be used.

(2) Immediately before and immediately after each period of sending, and not less frequently than once every ten minutes, the call sign shall be sent for identification purposes either by hand operated Morse telegraphy using modulated continuous wave emissions at a speed not greater than 12 words per minute or telephonically, on the frequency which is to be or which has been used for the sending of visual images.

(3) A representation in visual form of the call sign shall be sent at the beginning and end of each period of sending visual images produced by scanning methods.

9. **Inspection.** The Station, Licence, and log shall be available for inspection at all reasonable times by duly authorised officers of the Post Office.

10. **Station to close down.** The Station shall be closed down at any time on the demand of an officer of the Post Office.

11. **Period of Licence, Renewal, Revocation and Variation.** This Licence shall continue in force for one year from the date of issue, and thereafter so long as the Licensee pays to the Postmaster-General in advance in each year on or before the

anniversary of the date of issue the renewal fee prescribed by or under the regulations for the time being in force under Section 2 (1) of the Wireless Telegraphy Act, 1949: Provided that the Postmaster-General may at any time after the date of issue revoke this Licence or vary the terms, provisions or limitations thereof by a notice in writing served on the Licensee, or by a general notice published in the London, Edinburgh and Belfast Gazettes addressed to all holders of Amateur (Television) Licences. Any notice given under this clause may take effect either forthwith or on such subsequent date as may be specified in the notice.

12. This Licence is not transferable.

13. **Return of Licence.** This Licence shall be returned to the Postmaster-General when it has expired or been revoked.

14. **Previous Licences Revoked.** Any licence however described which the Postmaster-General has previously granted to the Licensee in respect of the Station is hereby revoked.

15. **Interpretation.**

(1) Nothing in this Licence shall be deemed to authorise the use of the Station for business advertising or propaganda purposes or for the sending of news or messages of, or on behalf of, or for the benefit or information of any social, political or commercial organisation or anyone other than the Licensee or the person with whom he is in communication.

(2) In this Licence the expression "the Telecommunication Convention" means the International Telecommunication Convention signed at Buenos Aires on the 22nd day of December, 1952, and the Radio Regulations and Additional Radio Regulations in force thereunder, and includes any Convention and Regulations which may from time to time be in force in substitution for or in amendment of the said Convention or the said Regulations; and, except where the context otherwise requires, other words and expressions have the same meaning as they have in the Wireless Telegraphy Act, 1949, or the regulations made under Part I thereof.

On behalf of the Postmaster-General,

(An Officer of the Post Office duly authorised in that behalf by or under Section 83 of the Post Office Act, 1953.)

#### THE SCHEDULE

Frequency Bands (in Mc/s)	Class of Emission (See A below)	Maximum D.C. Input Power (in watts) (See B below)
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For the purposes of the Schedule:

A. The symbols used to designate the classes of emission have the meanings assigned to them in the Telecommunication Convention.

B. D.C. input power is the total direct current power input to the anode circuit of the valve(s) energising the aerial in the fully modulated condition, e.g. peak white in an amplitude modulated positive modulation system.

#### Notes

(a) The Postmaster-General should be notified promptly of any change in the address of the Licensee, or of any proposed change in the Station comprised in this Licence. The Licence does not authorise the establishment of the Station at any address other than the one specified in the Licence. Except as provided below, correspondence should be sent to the Postmaster-General, Radio and Accommodation Department, General Post Office, London, E.C.1.

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

(b) Remittances and correspondence about payments to the Postmaster-General required under this Licence should be sent to the Accountant General's Department, General Post Office, London, E.C.1. It is unnecessary to send the Licence when making remittances.

(c) If the Station is situated within half a mile of the boundary of any aerodrome, the height of any aerial used or any mast supporting it must not exceed 50 feet above the ground level. An aerial which crosses above or is liable to fall or to be blown on to any overhead power wire (including electric lighting and tramway wires) or power apparatus must be guarded to the reasonable satisfaction of the owner of the power wire or power apparatus concerned.

(d) This Licence does not authorise the Licensee to do any act which is an infringement of any copyright which may exist in the matter sent or received.

(e) This Licence does not authorise the sending of messages by radiotelephony or telegraphy. For this purpose an Amateur (Sound) Licence is necessary.

(f) For the reception of broadcast television or sound programmes a separate broadcasting television or sound receiving licence (as the case may be) is necessary.

(g) Under Section 1 of the Wireless Telegraphy Act 1949, it is an offence to use any station or apparatus for wireless telegraphy otherwise than under and in accordance with a licence granted by the Postmaster-General. Breach of this provision may result in this Licence being revoked and the offender being prosecuted.

(h) If any message, the receipt of which is not authorised by this Licence is received by means of the Station, neither the Licensee nor any person using the Station should make known the contents of any such message, its origin or destination, its existence or the fact of its receipt, to any person except a duly authorised officer of Her Majesty's Government or a competent legal tribunal, and should not retain any copy or make use of any such message, or allow it to be reproduced in writing, copied, or made use of. It is an offence under Section 5 of the Wireless Telegraphy Act, 1949, deliberately to receive messages, the receipt of which is unauthorised, or (except in the special circumstances mentioned in that Section of the Act) to disclose any information as to the contents, sender or addressee of any such message.

(j) The expression "wireless telegraphy" used in this Licence has the meaning assigned to it in the Wireless Telegraphy Act, 1949, and includes, inter alia, television and radiotelephony.

#### Club Magazines

MR. P. J. BUCHAN, G3GNY, who is T.R. for Southampton and Editor of the Southampton R.S.G.B. Group Magazine, has suggested that Editors of similar publications should get in touch with each other with the idea of exchanging suitable articles of general interest to radio amateurs.

In order to further the suggestion put forward by Mr. Buchan, the BULLETIN will be pleased to publish a comprehensive list of the names and addresses of those responsible for the production of local magazines.

The following information should be submitted to the Editor—preferably on a postcard—not later than June 15, 1954:—

Title of Magazine .....  
Published by (Name of Organisation) .....  
Name and Address of Editor .....  
Frequency of Publication and price (if any).....

## Regional and Club News

**BRIGHTON & DISTRICT RADIO CLUB.**—The club has now acquired a large quantity of components which are to be used in an "assisted constructional scheme" designed to help younger members. Meetings are held at the "Eagle Inn," Gloucester Road, on Tuesdays commencing at 7.30 p.m. *Hon. Secretary:* T. J. Huggett, 15 Waverley Crescent, Brighton.

**BRISTOL.**—On May 21, R. J. Slaughter, B.Sc. (Research Dept., Telegraph Construction and Maintenance Co. Ltd.) will give an illustrated lecture on "Radio Frequency Cables." Members are to visit Ston Easton Park on May 23 to see GZCW's workshops and collection of very early wireless apparatus.

**CAMBRIDGE & DISTRICT AMATEUR RADIO CLUB.**—"Ionosphere Research at the Cavendish Laboratory" is the title of the talk to be given by Basil Briggs (G2FJD) at the "Jolly Waterman," Chesterton Road, on June 18. *Hon. Secretary:* F. A. E. Porter, 38 Montague Road, Cambridge.



### ROMFORD & DISTRICT AMATEUR RADIO SOCIETY

—On May 18, R. Grubb (G3FNL) will give a talk on "Workshop Practice." Local R.S.G.B. members are to discuss final plans for N.F.D. at the meeting on May 25, at R.A.F.A. House, 18 Carlton Road, Romford. *Hon. Secretary:* N. Miller, 10 Rom Crescent, Romford.

This picture was taken at the Cove Cafe, The Quay, St. Agnes, on the occasion of the Third Annual North Cornwall Hamfest.

**COVENTRY AMATEUR RADIO SOCIETY.**—Members are to give a series of five minute lectures at the meeting on May 24, at 9 Queen's Road. Recent talks have been on "An Introduction to Amateur Radio," "Tuned Circuits" and "A Valve Voltmeter." *Hon. Secretary:* K. Lines (G3FOH) 142 Shorncliffe Road, Coventry.

**CHELTEMHAM.**—Hopes that the more convenient location of the Great Western Hotel would encourage members to attend were realised at the first meeting held there in April, when N.F.D. and other Society matters were discussed.

**EAST SURREY RADIO CLUB.**—Recent activities have included a film show by courtesy of Mullard Ltd. and a lecture on "Transistors and Crystal Diodes" by G. A. Bird (G4ZU). *Hon. Secretary:* L. G. Knight (G5LK), Radiohmc, 6 Madeira Walk, Reigate.

**GRAFTON RADIO SOCIETY.**—"Superhet Receivers" by H. Hill and "Antenna Design" by J. H. Clarke (G2AAN) were subjects for recent lectures. Meetings are held on Mondays and Fridays at 7.30 p.m. at Grafton School, Eburne Road, N.7. Preparations are being made for the Society's field day, on June 19 and 20. *Hon. Secretary:* A. W. H. Wennell (G2CJN), 145 Uxendon Hill, Wembley Park, Middlesex.

**LEICESTER RADIO SOCIETY.**—Twenty-four members visited Rugby Radio on March 28. Bob Weston's (G2BVV) lecture on "Getting Going on V.H.F." proved most popular as did the demonstration of transistor equipment by C. L. Wright (G3CCA) on April 12. *Hon. Secretary:* W. H. Wiberley, 21 Pauline Avenue, Belgrave, Leicester.

Wrought Attention  
Part of the large audience which gathered at the Islington Central Library to witness a showing of the new Mullard film "The Manufacture of Radio Valves"

**MANCHESTER & DISTRICT RADIO SOCIETY.**—In order to avoid Whit Monday, the meeting which should take place on June 7 has been arranged for May 31. *Hon. Secretary:* K. Brockband (G3JST), 17 Burleigh Road, Stretford, Lancs.

**QRP SOCIETY.**—The Society is to run a campaign to encourage the use of low power by all stations participating in local nets. The *Hon. Secretary* will be glad to hear from clubs interested in low power working with a view to organising special contests and tests. *Hon. Secretary:* J. Whitehead, 92 Rydens Avenue, Walton-on-Thames, Surrey.

**READING RADIO SOCIETY.**—At the A.G.M. the following officers were elected: *President:* F. Hill (G2FZI); *Chairman:* I. G. Benbough; *Hon. Secretary:* L. A. Hensford (G2BHS), 30 Boston Avenue, Reading; *Hon. Treasurer:* R. Tufnail; *Committee Members:* J. Pearce and C. Thomas. Subjects for forthcoming lectures include, "Old Time Radio Equipment," "An F.M. Tuning Unit," "Electro-Medical Apparatus" and "Fluoroscopes." Meetings are held at the Abbey Gateway, at 7 p.m. on the second and last Saturdays in each month.

**SALISBURY & DISTRICT SHORT WAVE CLUB.**—The main features on the Club's stand at the Model Engineers' Exhibition in the Egg Market, Market Place, Salisbury, on June 5 and 6 will be a display of home constructed apparatus, tape recorders for public use, and films and filmstrips of amateur activities. An Amateur Radio station will be in operation. Local R.S.G.B. members are invited to loan equipment for display. Meetings are held at Wilton on Tuesdays. Details may be obtained from the *Hon. Secretary:* H. G. Fitcher, 171 Castle Road, Salisbury.

**SLADE RADIO SOCIETY.**—The Society has recorded a programme on tape specially for the Catalpa Amateur Radio Society of Birmingham, Michigan, which will be played at the meeting in the Church House, High Street, Erdington, on May 28. A similar recording from the American society was heard at the meeting on April 30. G. Nicholson will give a talk on "Receiver Design" on June 11. *Hon. Secretary:* C. N. Smart, 110 Woolmore Road, Erdington, Birmingham 23.



**SOUTH MANCHESTER RADIO CLUB.**—At the meeting on May 21, Basil O'Brien, G2AMV (Region 1 Representative), will speak on a number of topics of interest including R.A.E.N. On June 4, M. Denny (G6DN) will talk on "Clamp Valve Modulation." A lecture on transistors, by W. L. Robinson, is arranged for June 18. *Hon. Secretary:* M. Barnsley (G3HZM), 17 Cross Street, Bradford, Manchester 11.

**SOUTHEND & DISTRICT RADIO SOCIETY.**—H. Wilkinson won the Pocock Cup for his I.m./a.m. receiver in the Senior Class of the recent competition. D. Whitworth won the Hudson Cup with a valve voltmeter in the Junior Class. The Society's hamfest was due to be held on May 8. *Hon. Secretary:* J. H. Barrance, M.B.E. (G3BUJ), 49 Swanage Road, Southend-on-Sea.

**STOURBRIDGE & DISTRICT RADIO SOCIETY.**—At the April meeting T. Cashmore (G3BMY) described the transmitter with which he won the recent Low Power Contest. *Hon. Secretary:* F. W. Meredith, 26 Gibbings Road, Wollaston, Stourbridge, Wores.

**TORBAY AMATEUR RADIO SOCIETY.**—At the A.G.M. when all the officers were re-elected, the Chairman (G2GK) referred to the excellent progress made during the last year. At the meeting to be held at the Y.M.C.A., Torquay, on May 15, a proposal to form a local TVI Committee will be discussed. *Hon. Secretary:* L. H. Webber (G3GDW), 43 Lime Tree Walk, Newton Abbot.

**WARRINGTON & DISTRICT RADIO SOCIETY.**—Subjects discussed recently were "Car Radio," by G3FGI, "A Grid Dip Oscillator," by G2FCV, and "144 Mc/s Portable Equipment," by G2HCJ. On May 18 there will be an "Any Questions?" session and on June 1 L. Williams will demonstrate the Club's field day equipment. *Hon. Secretary:* G. H. Flood, 32 Capethorne Road, Orford, Warrington.



Grafton Radio Society

A picture taken on the occasion of the showing of the new Mullard film "The Manufacture of Radio Valves." From left to right: John H. Clarke, G2AAN (President), Leslie Cooper, G5LC (Immediate Past President, R.S.G.B.), John Clarricoats, G6CL (General Secretary, R.S.G.B.), C. H. Gardner (Mullard Ltd.) and L. A. Kippin, G8PL (Chairman).

## Silent Key

**BRYAN GROOM, GM6RG**

A tragic accident, resulting in the death of Bryan Groom, GM6RG, leaves the Society bereft of a Life Member whose work did much to raise the status of Amateur Radio.

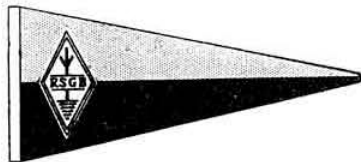
Licensed in the early 1920's, it soon became evident that Bryan had ability and ambitions in the radio field well beyond average. His remotely controlled beam aerial at Galashiels—one of the first, if not the first, erected in the U.K.—was the means of radiating signals from his station to the four corners of the globe which were a credit to the man and a model to be copied. The original beam at GM6RG was illustrated and described in *The T. and R. Bulletin* and in *The Amateur Radio Handbook*. His work in the DX field was recognised by the Society just before the war by the award of the ROTAB Trophy.

His pioneer efforts on the old 5 metre amateur band finally resulted in his signals being heard in the United States during 1936/7. His reputation stood high everywhere and especially in the U.S., where he was a fêted visitor on more than one occasion.

Professionally, he was responsible for the development of broadcast radio relay services in the Border area of Scotland, where his skill and business acumen brought to him a well deserved measure of affluence. In recent years his interests became centred on motor racing, but he retained a keen, if not active, interest in Amateur Radio.

He is survived by his widow and two daughters, to whom our sympathies are respectfully tendered.  
J. W.

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# Forthcoming Events

## REGION 1

- Barrow.**—Mondays, 7.30 p.m., Castle House, Walney Island, Barrow-in-Furness.  
**Bury.**—June 10, 7.30 p.m., 52 The Drive, Seedfield, Bury.  
**Chester (C. & D.A.R.S.).**—Tuesdays, 7.30 p.m., Tarran Hut, Y.M.C.A., Chester.  
**Crosby.**—Tuesdays, 8 p.m., over Gordons' Sweetshop, St. John's Road, Waterloo.  
**Isle of Man.**—June 2, Broadway House, Douglas.  
**Lancaster (L. & D.A.R.S.).**—June 2, 7.30 p.m., "George Hotel," Torrisholme.  
**Liverpool.**—Next meeting June 26, 3 p.m., Larkhill Mansion House, West Derby, Liverpool.  
**Manchester (M. & D.R.S.).**—May 31, 7.30 p.m., "Brunswick Hotel," Piccadilly, Manchester.  
**Preston.**—May 21, June 4, 18, "Belle Vue Hotel," New Hall Lane, Preston.  
**Rochdale.**—Fridays, 7.45 p.m., 1 Law Street, Sudden.  
**South Manchester (S.M.R.C.).**—Fridays, 7.45 p.m., Ladybarn House, Mauldeth Road, Manchester 14 (May 21—official visit of R.R.).  
**Southport.**—Thursdays, 8 p.m., Y.M.C.A., off Eastbank Street, Southport.  
**Warrington.**—May 18, June 1, 15, 7.30 p.m., "Kings Head Hotel," Winwick Street, Warrington.  
**West Cumberland.**—June 3, 7 p.m., Kells Community Centre, Whitehaven.  
**Wirral (W.A.R.S.).**—May 19, June 2, 16, 7.45 p.m., Y.M.C.A., Whetstone Lane, Birkenhead

## REGION 2

- Barnsley.**—May 28, June 11, 7.30 p.m., "King George Hotel," Peel Street.  
**Bradford.**—May 25, June 8, 7.30 p.m., Cambridge House, 66 Little Horton Lane.  
**Catterick.**—Wednesdays, 7 p.m., Loos Lines, Catterick Camp.  
**Darlington.**—Thursdays, 7.30 p.m., 129 Woodlands Road.  
**Doncaster.**—June 9, 7.30 p.m., Y.W.C.A., Cleveland Street.  
**Gateshead.**—Mondays, 7.30 p.m., Mechanics' Institute, 7 Whitehall Road.  
**Hull.**—May 25, June 8, 7.30 p.m., "Rampant Horse," Paisley Street.  
**Leeds.**—Wednesdays, 7.30 p.m., Swarthmore Educational Centre, 3 Woodhouse Square.  
**Middlesbrough.**—Thursdays, 7.30 p.m., Joe Walton's Boys' Club, Faversham Street.  
**Newcastle-upon-Tyne.**—June 1, 7.30 p.m., "Barras Bridge Hotel," Sandvford Road.  
**Pontefract (P.A.T.G.).**—May 27, June 10, 8 p.m., "Fox Inn," Knottingley Road, Pontefract.  
**Rotherham.**—Wednesdays, 7 p.m., "Cutlers' Arms," Westgate.  
**Scarborough.**—Thursdays, 7.30 p.m., B.R. Rifle Club, West Parade Road.  
**Sheffield.**—May 26, 8 p.m., "Dog and Partridge," Trippet Lane; June 9, 8 p.m., Albreda Works, Lydgate Lane.  
**Slough.**—Fridays, 7.30 p.m., 3 Dartmouth Street.  
**Spenborough.**—May 19, June 2, 7.30 p.m., Temperance Hall, Cleckheaton, May 23, Annual Trip.  
**York.**—Thursdays, 7.30 p.m., Club Rooms, Y.A.R.S., Fetter Lane.

## REGION 3

- Birmingham (South).**—June 7, 7.30 p.m., Friends Hall, Watford Road, Cotteridge. (M.A.R.S.).—June 15, 6.45 p.m., Imperial Hotel.  
**Coventry.**—June 25, 7.30 p.m., Priory High School, Wheatley Street. (C.A.R.S.).—June 7, 21, 7.30 p.m., 9 Queen's Road.  
**Kenilworth, Warwick & Leamington.**—June 17, 7.30 p.m., Dalehouse Lane.  
**Stoke-on-Trent.**—June 30, 8 p.m., "Lions Head," John Street, Hanley.  
**Malvern.**—June 7, 8 p.m., "Foley Arms."  
**Stourbridge (S. & D.A.R.S.).**—June 8, 8 p.m., King Edward VI School.  
**Wolverhampton.**—June 7, 21, 8 p.m., Stockwell End, Tattenhall.  
**Wrekin.**—June 7, 8 p.m., Wrekin Services Club, Roseway, Wellington.

## REGION 4

- Alvaston.**—Tuesdays, Thursdays, 7.30 p.m., Sundays, 10.30 a.m., Nunsfield House, Boulton Lane, Alvaston, Nr. Derby.  
**Chesterfield.**—Tuesdays, 7.30 p.m., Bradbury Hall, Chatsworth Road.  
**Derby (D. & D.A.R.S.).**—Wednesdays, 7.30 p.m., Derby College of Arts and Crafts, Sub-basement, Green Lane.  
**Leicester (L.R.S.).**—May 17, 31, June 14, 7.30 p.m., Hollybush Hotel, Belgrave Gate.  
**Lincoln (L.S.W.C.).**—May 5, June 2, 7.30 p.m., Technical College, Cathedral Street.

- Mansfield (M. & D.A.R.S.).**—May 5, June 2, 7.30 p.m., Denmans Head Hotel, Market Place, Sutton-in-Ashfield.  
**Newark.**—May 16, 30, June 13, 7 p.m., Northern Hotel, Appleton Gate, Newark.  
**Northampton (N.S.W.C.).**—Fridays, 7 p.m., June 4, 6 p.m., Clubroom, 8 Duke Street.  
**Nottingham.**—May 21, 7.30 p.m., Sherwood Community Centre, opposite Woodthorpe Drive, Sherwood.  
**Peterborough.**—June 2, 7.30 p.m., "New Inn," New England, Peterborough.  
**Retford.**—May 31, 7 p.m., Community Centre, Chapel Gate, Retford.

## REGION 5

- Chelmsford.**—June 1, 7.30 p.m., Marconi College, Arbour Lane.  
**Lowestoft and Beccles (L. & B.A.R.C.).**—May 26, June 9, 7.30 p.m., Y.M.C.A., Lowestoft.

## REGION 6

- Cheltenham.**—June 3, 8 p.m., Great Western Hotel, Clarence Street.  
**Gloucester (G.R.C.).**—Thursdays, 7.30 p.m., The Cedars, 83 Hucclecote Road.  
**High Wycombe.**—May 25, 7.30 p.m., G5WW, "Nethercote," Totteridge Lane (Junk Sale).  
**Oxford (O. & D.A.R.S.).**—May 26, June 9, 7.30 p.m., Club Room, "Magdalen Arms," Ifley Road, Oxford.  
**Portsmouth.**—Tuesdays, 7.30 p.m., Signals Club Room, Royal Marine Barracks, Eastney.  
**Southampton.**—June 5, 7 p.m., 1 Prospect Place.  
**Stroud.**—Wednesdays, 7.30 p.m., Subscription Rooms.

## REGION 7

- Acton, Brentford & Chiswick.**—Tuesdays, 7.30 p.m., A.E.U. Rooms, 66 Chiswick High Road, W.4.  
**Barnes, Putney & Richmond.**—June 4, 7.30 p.m., 337 Upper Richmond Road, S.W.14.  
**Bexleyheath (N.K.R.S.).**—May 26, June 10, Congregational Hall, Chapel Road, Bexleyheath.  
**Bromley (N.W.K.A.R.S.).**—June 4, "Shortlands Tavern," Station Road, Shortlands.  
**Chingford.**—June 8, 8 p.m., Venue from G4GA (SIL 5635) or B.R.S.19765 (SIL 6055).  
**Croydon.**—June 8, 7.30 p.m., "Blacksmith Arms," 1 South End, Croydon.  
**Dorking.**—Tuesdays, 7.30 p.m., 5 London Road.  
**Dulwich & New Cross.**—June 1, 7.45 p.m., "Walmer Castle," Peckham High Street.  
**East Ham.**—Tuesdays, 8 p.m., May 25, June 8, 57 Leigh Road.  
**Ealing.**—Sundays, 11 a.m., A.B.C. Restaurant, Ealing Broadway, W.5.  
**East London District.**—Summer Recess.  
**Enfield.**—May 16, 3 p.m., George Spicer School, Southbury Road, Enfield, R.A.E.N. Talk and Demonstration—G8TL and G3JAM.  
**Finsbury Park.**—May 18, 7.30 p.m., 164 Albion Road, Stoke Newington, London, N.16.  
**Guildford & Woking.**—May 23, 3 p.m., Royal Arms Hotel, North Street, Guildford.  
**Hayes & Uxbridge.**—May 24, June 14, 7.30 p.m., Hillingdon Primary School, Uxbridge Road.  
**Hendon & Edware.**—Wednesdays, 8 p.m., 22 Goodwins Avenue, Mill Hill, N.W.7.  
**Holloway (G.R.S.).**—Mondays and Fridays, 7.30 p.m., Grafton School, Eburne Road, N.7.  
**Hounslow (H. & D.R.S.).**—May 27, June 10, 24, Grove Road Schools, Cromwell Road.  
**Iford.**—Thursdays, 8 p.m., G2BRH, 579 High Road.  
**Kingston (K. & D.R.S.).**—Wednesdays (fortnightly 7.45 p.m.), Penrhyn House, Penrhyn Road.  
**Lewisham (R.A.R.C.).**—Wednesdays, 7.30 p.m., Durham Hill School, Downham.  
**Norwood.**—May 15, June 19, 7.30 p.m., Windermere House, Weston Street, Crystal Palace.  
**Southgate & Finchley.**—June 10, 7.30 p.m., Arnos School, Wilmer Way.  
**Sutton and Cheam (S. & C.R.S.).**—May 18, "The Harrow," Cheam Village.  
**Welwyn Garden City.**—May 4, 38 Elmwood, Welwyn Garden City. "A New Look at Radio Construction," G. A. C. Watts (Murphy Radio Electronics Laboratory).

## REGION 8

- Brighton.**—T.R. at Home, Wednesdays, 7.30 p.m., 27 Warrent Avenue, Woodingdean. (B.D.R.C.).—Tuesdays, 7.30 p.m., "Eagle Arms," Gloucester Road.  
**Chatham (M.A.R.T.S.).**—May 24, June 7, 21, 7.30 p.m., "Services Rendered Club," 14 High Street, Brompton, Chatham.  
**Hastings (H. & D.R.C.).**—May 18, June 1, 15, 29, 7.30 p.m., "Saxons Cafe," Denmark Place.  
**Isle of Thanet (I.O.T.R.S.).**—Fridays, 7.30 p.m., Hilderstone House, Broadstairs.

**Maidstone (M.K.A.R.S.).**—Tuesdays, 7.30 p.m., Elms School, London Road.  
**Worthing (W. & D.R.C.).** — June 14, 7.30 p.m., Adult Education Centre.

#### REGION 9

**Bristol.** — May 21, 7.15 p.m., Carwardine's Restaurant, Baldwin Street, Bristol 1.  
**Exeter.**—June 4, 7 p.m., Y.M.C.A., St. David's Hill.  
**North Devon.**—June 3, 7.30 p.m., Rose of Torridge Cafe, The Quay, Bideford.  
**Penzance.**—June 3, Railway Hotel.  
**Plymouth.**—May 15, 7 p.m., Tothill Community Centre, Tot-hill Park, Knighton Road, St. Jude's.  
**Torquay.**—May 15, 7.30 p.m., Y.M.C.A., Castle Road.  
**West Cornwall (W.C.R.C.).** — May 20, June 3, "Fifteen Balls," Penryn, near Falmouth.  
**Weston-super-Mare.**—June 1, 7.30 p.m., Y.M.C.A.  
**Yeovil.** — Wednesdays, 7.30 p.m., Grove House, Preston Road.

#### REGION 10

**Cardiff.**—June 14, 7.30 p.m., "The British Volunteer," The Hayes, Cardiff.

#### REGION 13

**Dunfermline.**—Mondays and Thursdays, 7.30 p.m., behind 34 Viewfield Terrace, Dunfermline.  
**Edinburgh (L.R.S.).**—May 27, June 10, 7.30 p.m., 25 Charlotte Square, Edinburgh.

#### REGION 14

**Falkirk.** — May 28, June 11, 7.30 p.m., The Temperance Cafe, High Street, Falkirk.  
**Glasgow.**—May 26, 7 p.m., Institution of Engineers and Shipbuilders, 39 Elmbank Crescent, C.2.  
**Prestwick.**—May 16, 7 p.m., "Royal Hotel" (Ayrshire Group Meeting).

### Representation

The following are alterations to the list of County Representatives published in the December, 1952, issue.

#### Region 2—Northumberland

D. A. Lucas (G3AKH), 33 Broad Chare, Newcastle-on-Tyne 1.

#### Region 4—Lincolnshire

L. J. Coupland (G2BQC), 214 Wyberton West Road, Boston.

The following is an addition to the list of Town Representatives published in the December, 1953, issue.

#### Region 1—Lancashire East

Lancaster  
R. Cordingley (G3BAP), 61 Cleveleys Avenue.

\* \* \*

#### Vacancies

Messrs. G. N. Roberts (GW3ENY) and Wm. Forsyth (GM3FVX) have resigned as Representatives for the Counties of Caernarvonshire & Anglesey, and Ayrshire & Bute.

Nominations for their successors should be made in the prescribed form and sent to reach the General Secretary by not later than June 30, 1954.

#### Change of Address

The address of Mr. W. J. Ridley (G2AJF), Representative for Region 5, is now: "Littlefield," Ford End, Chelmsford, Essex.

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### Brit.I.R.E. Convention

**T**HE third post-war convention of the British Institution of Radio Engineers, to be held in the University of Oxford from July 8 to 12, 1954, will be devoted entirely to industrial electronics. The convention will be opened by the President, Mr. William E. Miller, M.A. (Cantab.).

The Institution's Clerk Maxwell Memorial Lecture will be delivered by Sir John Cockcroft, K.C.B., C.B.E., F.R.S. (Director of Research, A.E.R.E., Harwell), in the Clarendon Laboratory at 8 p.m. on July 8. In addition, more than 30 papers will be presented during the five days of the Convention.

A detailed programme and reservation forms may be obtained from the Secretary, Brit. I.R.E., 9 Bedford Square, London, W.C.1.

### LONDON MEMBERS' LUNCHEON CLUB

will meet at the Bedford Corner Hotel, Bayley Street, Tottenham Court Road,  
at 12.30 p.m. on May 21 and June 18, 1954.  
Telephone table reservations to HOL 7373 prior to day of luncheon. Visiting amateurs especially welcome.

## TELEVISION INTERFERENCE TECHNICAL DATA SUPPLEMENT



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The Editor does not necessarily endorse the views and opinions expressed by contributors to this feature.

### Top Band Contests

DEAR SIR,—Apropos the recent letters from members on this subject, the following is a considerably shortened version of a contact between two old-timers heard during the last Top Band Contest:

- A. Good evening. Thanks for the call. Your report five and nine plus.  
 B. Good evening. Your report also five and nine. F.B. Don't you think we should move under Loran and let these boys have their fun in the contest?  
 A. I don't see why we should. I use this band regularly and these blokes just come on for this contest and expect us to keep quiet.  
 B. Yes, that's right, OM. These contests are all right for the newcomers, but to us old-timers, well, etc., etc.

Station B, touched perhaps by his conscience, closed down long before station A, who prattled on into the wee sma' hours.

If station A would listen to and read the c.w. to be found on Top Band most evenings he would find that a great many of the operators in the Contest are very active indeed. A glance at the results of the Top Band Contest may also cause station B to revise his opinion that it is only an attraction for the newcomers.

Incidentally, it would be interesting to see the reaction if there was also a Top Band telephony contest similar to the c.w. one! The "Ham Spirit" seems to be getting more like the Loch Ness Monster every year; it pops up now and again!

Yours faithfully,

J. G. OPENSHAW (G2AYG).

Bury, Lancs.

### G6LB Has the Last Say

DEAR SIR,—I hope that G5MP's excellent letter has assured G5JL that the Top Band Tests under discussion are certainly not on the Secret List, and never have been, and just as the Top Band is free at all times to all users, so is participation in these Tests, *subject to one simple request*—the self-discipline of "playing to the whistle" and keeping G signals in their proper place, *outside the Official W/VE channels*. Apart from the odd "black sheep," this plan works well, and the spirit of co-operation and consideration for "the other fellow" is in striking contrast to the "snake pit" technique of the average contest. If only some means could be devised whereby the W/VE channels could be kept clear during the Top Band affair—but, alas, there are no fairies at the bottom of my garden!

I raise two hats to G5MP in his DX-promoting forays, for nothing would give me greater pleasure than to accompany him on one of them and share in the hard work, but I very much doubt if a clash of dates is sought, as he suggests, by the Test organisers. I think that the exact reverse is the case. And surely his viewpoint is that of the DX station, for if his past experience is the same as mine, I think he will agree that so far as "home waters" are concerned, Top Band Contest Day is the one day when the DX Hunter can relax, knowing that it will be more blessed to sleep than to receive—or try to!

Yours faithfully,

L. J. FULLER (G6LB).

Gt. Baddow, Chelmsford, Essex.

### The Case Against F.S.K.

DEAR SIR,—With reference to Mr. Shires' letter advocating the use of f.s.k. (February issue), surely it is an exaggeration to say that an ordinary amateur c.w. transmission usually occupies a bandwidth of 1 kc/s. Severe clicks are much rarer on the air than Mr. Shires makes out.

The maximum bandwidth occupied by an on-off Morse signal, at any normal keying speed used in amateur work, is hardly likely to exceed 100 c/s. It would otherwise not be possible to receive intelligible Morse signals on a receiver with a crystal gate. The full bandwidth, moreover, is only occupied for a few microseconds at each make and break, and any c.w. operator can confirm that it is usually the

carrier or an interfering c.w. signal which causes trouble, not the transients.

F.S.K. has advantages when high speed auto. or teletype transmission is used (from the point of view of the user), but for amateur work where hand keying and aural reception are used, these advantages disappear. Effectively, it doubles the interference to other operators because there are two carriers to cope with instead of one. Under congested conditions such as prevail in the lower frequency amateur bands, a crystal filter or similar device is a necessity, and it is hard to see how an f.s.k. signal could be received by ear through a sharp filter, unless the "space" carrier were ignored and the "mark" carrier treated as an "on-off" signal. There would then be little point in using f.s.k.

Yours faithfully,

ALAN G. DUNN (G3PL).

Hull, Yorks.

### Message Handling—Military Type

DEAR SIR,—I should like to point out to Mr. Hatley (see his letter in the February BULLETIN) that the operative word in my earlier letter was *military*, and it is this military traffic which, I am sure he will agree, has absolutely no business to be conducted on the already overcrowded amateur frequencies.

As to having the facility of passing civilian traffic, Mr. Hatley can have it—I personally have no wish to become a sub-post office.

Mr. Hatley thinks that if this traffic was permitted to U.K. amateurs the standard of c.w. and 'phone operation would improve. Has he listened to these stations passing traffic, especially by 'phone? Has he heard the operators of these stations say "Queen Roger X-Ray One" when they mean "Wait a minute"? Queen Roger Mary, etc.; or the operator who was heard calling "Charlie Queen William with traffic! Improve operating standards—phooey!"

I do not follow his reasoning that if we had traffic handling it would enable us to participate in emergency services and C.D. The people we would be handling traffic for obviously would not have s.w. transmitting and receiving facilities.

His third point is also weak. It has always been customary that people with a common hobby should be able to discuss it amongst themselves.

Likewise his fourth point does not add up. We would not be giving a service to the nation, but to private individuals.

Operating standards can only improve if, first of all, amateurs stick strictly to the R.S.G.B. and A.R.R.L. operating codes and to the R.S.G.B. Band-Plan. It is as simple as that!

Yours faithfully,

L. J. McDUGALL (GM3CIX).

Glasgow, C.5.

### Message Handling

DEAR SIR,—With regard to the arguments put forward by Mr. J. Worthington, G3COI, on third party message handling, I cannot see what benefit this concession would bring to Amateur Radio. He admits himself that the G.P.O. deals with such traffic with far greater accuracy and speed than any amateur station could hope to do. Furthermore, he states that the number of amateurs who would take advantage of this concession would be quite small. This may be so; nevertheless there is considerable risk of misuse, even though inadvertently.

The amateur contributes in many ways to the advancement of radio in general, but I hardly think third party messages would be one of them.

Yours faithfully,

P. O'BRIEN (G3DNR).

Ramsgate, Kent.

## ONCE IN A THOUSAND YEARS...

For the first time in its history, Bristol is to be the venue of an R.S.G.B. National Convention. "The City of a Thousand Years" is the proud boast of this ancient port. West Country members will be equally proud to welcome you to Bristol on September 17, 18 and 19. Book these dates now!

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

DEAR SIR,—I was very interested to read the contribution by Mr. W. H. Allen (G2UJ) in the February issue and I think members are greatly indebted to him for his patient research. But I cannot see that one is very much wiser by being informed that the noise factor is 4.5 or 3.8 db. Unless I am wrong, the noise factor gives no indication of what the signal/noise ratio is, and this is what matters most to the v.h.f. enthusiast.

If, in comparing converters, one could be told that the ABC converter requires 1.5  $\mu$ V input at the aerial terminal to give a signal 20 db above noise (with a given communications receiver), as against 3  $\mu$ V required by the XYZ converter, one would have an accurate basis of comparison.

I have no means myself of making such measurements, but the method I adopt is, I think, a fair test. I stand my signal generator in the far corner of the shack, with the output leads attached, but not connected to, nor near to, the feeder to the converter. The attenuators are turned down to minimum. The converter under test is then connected to the communications receiver and the r.f. gain of the latter is adjusted so that the noise of the converter (with no signal coming in) registers, say, S2. The signal generator is then switched on and the "S" meter reading noted (usually well over S9). Judged on this basis the R.S.G.B. converter falls very far short of the standard reached by my usual converter, which is the neutralised 6J6 type originated, I believe, by G2IQ. The former gives more gain, of course, but the gain control on the main receiver has to be set further back (to register S2 for noise) than in the case of the latter converter.

I have built several converters, but so far none has come up to the 6J6 type, which, incidentally, is also far more broad-banded than the R.S.G.B. converter, with which I find that the signal strength falls off badly at each end of the band. I am writing this letter to invite other members to relate their experiences as, of course, my results may merely be caused by bad management on my part!

Yours faithfully,

V. G. P. WILLIAMS (G3FYY).

London, N.W.2.

### Third Party Messages

DEAR SIR,—Mr. Hateley (G3HAT) and Mr. Worthington (G3COI) have raised a very interesting point regarding third-party messages.

I feel sure that the Post Office need fear no loss of revenue at all by permitting amateurs to pass third-party messages, since most messages would ultimately have to be delivered by one of the Post Office messengers.

The odds are heavily against the message being addressed to a person in the same town as the amateur concerned, and he would, therefore, have to forward the message on: (1) by the now very expensive inland telegram (which he would probably do); (2) by toll or trunk call; or (3) by letter.

Furthermore, if the "phone patch" were permitted, the Post Office could almost certainly count on a considerable increase in revenue. Several of my American friends complain bitterly about their very high telephone bills since they installed "phone patches," and one has only to listen to a "phone patch" conversation to realise how costly this is for the amateur concerned and how much revenue the American telephone companies must be reaping from this amateur activity.

On balance, therefore, I am quite convinced that the Post Office revenue would increase, rather than decrease, by permitting British amateurs to pass third-party messages.

Yours faithfully,

E. M. WAGNER (G3BID).

LONDON, N.W.3.

### Scope for all

DEAR SIR,—Like G2AHY, I also took exception to the puerile nonsense appearing in the January BULLETIN under the heading of "HAMKITH." Not that I wish to take sides in the barren "phone/c.w." controversy, for it is obvious that a reasonable operator uses whichever type of emission is most suitable in the conditions under which he is operating, and that each has its advantages and disadvantages.

I do, however, strongly deprecate the attitude of mind which insists that only fellow riders of one's favourite hobby horse can be regarded as true hams. Putting together all the comments one hears, it would appear that the only true ham is one who is a high-speed c.w. operator, an expert on s.s.b. and f.m. techniques, a pioneer of v.h.f. working, a DX man with a hundred countries worked on each band, a constructor of all his own gear (which he should also have designed), one having an exhaustive knowledge of all types of aerial systems and propagation conditions and able to operate on all bands, though not necessarily simultaneously!

Of course, no one man could find time for such catholicity of interests, and most of us choose whatever aspects of radio appeal to us personally. There is plenty of scope for all, but please spare us the fatuous comments of cranks who believe that importance attaches only to that section of the radio sphere which is dignified by their special interest in it. Let us preserve a due sense of proportion in all things, unlike the operator who was heard to observe on 3.5 Mc/s "phone the other day, 'This is my frequency, old man. I have been using it for twenty years!'"

Yours faithfully,

GORDON MILLINGTON (G3JGM).

Wolverhampton.

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

### The Case for C.W.

DEAR SIR,—I am not allowing G2AHY's letter published in the February BULLETIN to pass without replying in defence of our Hon. Editor's sensible (and tactful) "Commentary" in the January, 1954, issue.

It must be the aim of every British Amateur Radio operator to maintain the highest possible standard of operating whilst on the air, and I am therefore in agreement with the "airing" of any facts likely to assist us in its attainment. Numerous 'phone operators nowadays are so noticeably lacking in the ability to perform satisfactorily in telegraphic communication. Their telephony, by its very nature, is likely to lead to the banal, repetitive talk so commonly heard on our bands today.

The needs for "something to say," good procedure, tact of expression, brevity, grammar, listening-through, minimum-signal working and good sense exist equally for the c.w. operators, but their necessity for continual practice in a medium other than common speech obviates at an early date most of the errors which are certainly giving telephony a bad name, quite apart from the legal necessity of code proficiency.

Nothing in this life is "grand in all its aspects"—and for a good reason. Readers of the "Commentary" in question will find the objective remedy contained in paragraph 5 thereof.

Yours faithfully,

RICHARD RAMSEY (G3ARM),  
Area Representative.

Guildford, Surrey.

### More About KN

DEAR SIR,—In the March issue, Mr. D. A. Burns (G3GLV) raised an interesting point regarding the meaning of K and KN. An extract from the *Radio Amateur's Handbook* was offered by way of Editorial explanation. A happier choice of reference would have been the *Handbook for Wireless Operators Working Installations Licensed by Her Majesty's Postmaster-General*. This is not only an official Post Office publication, but it contains "all the answers."

We need only examine three recognised symbols, namely AR, which is the signal for the end of a transmission, VA, indicating end of work, and K, which is an invitation to transmit.

In our hobby, AR (alone) should be sufficient to indicate that we are in QSO, and should not be disturbed. VA should show that "one side" has finished though, if possible, care should be taken to be sure that the "other side" has signed off before a call be made to either. K should be treated with caution, as "one side" may have requested AS (wait), or QRX, and then given K as a signal to resume transmission. In this case GA (go ahead) is perhaps the safer procedure.

If we examine the list of G.P.O. authorised abbreviations, we shall find that a combination of "K" and "N" cancel each other out, for if "K" is an "invitation to transmit," equally so does "N" mean "no!"

Another symbol that is sometimes used incorrectly is when a station, having signed off, sends QRZ? as an invitation for anyone to call him. CQ is the correct procedure here.

QRZ? is really a request for a repeat of the calling station's call-sign which, due to difficult reception conditions, has been missed, although the called station has established the fact that his call-sign is being sent. It is not a request for Tom, Dick and Harry to come in seeking a new contact!

The G.P.O. Handbook is a sound investment, and is to the radio operator, what Queen's Regs. are to the Army! If you obey the procedure, you cannot be wrong.

Yours faithfully,

A. M. H. FERGUS (G2ZC).

Farnham, Surrey.

### "Miniature Top Band Transmitter"

DEAR SIR,—With reference to the "Miniature Top Band Transmitter," by M. Barlow (G3CVO), in the October, 1953, issue, and subsequent "Letters to the Editor," you may be interested to learn that I built this fine little rig and that it works splendidly, on c.w. and 'phone. The only alterations made were to increase the resistor R6 to 2 watts rating and to use a series tuned inductance coupled output. The v.f.o. is stable and operates satisfactorily in the 160-metre band.

Yours faithfully,

G. V. HAYLOCK (G2DHV).

London, S.E.13.

### Silent Ike

J. E. NICKLESS, G2KT

It is with very deep regret that we report the death of Mr. J. E. Nickless, G2KT, of Rayleigh, Essex, on Sunday, May 2, 1954. Mr. Nickless was one of the Society's earliest members and was a Member of the Council for a period in the middle 1920's. A tribute to his memory will appear in our next issue.—J.C.

# New Members

The call-sign, name and address of all Home Corporate Members listed below who hold a transmitting licence will be published, automatically, in the next edition of the R.S.G.B. Amateur Radio Call Book.

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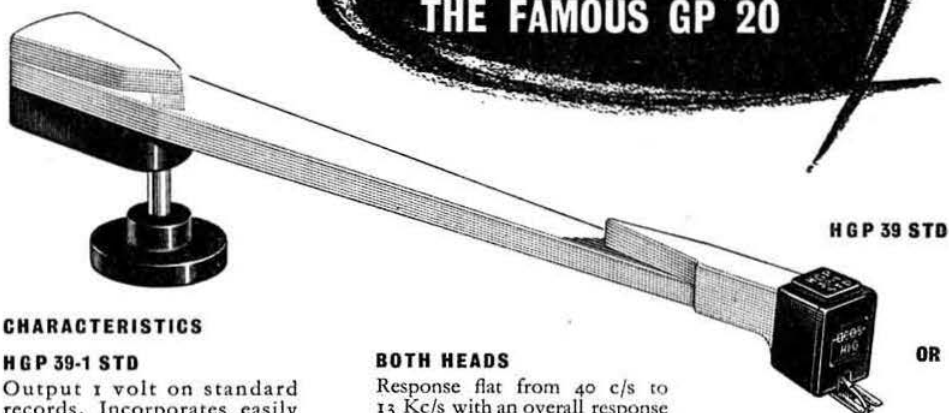
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In order to avoid confusion between the well-known trade mark "DELCO" and our own trade mark "DENCO," and as "DELCO" was registered as a trade mark before "DENCO," we have agreed to withdraw our "DENCO" trade marks from the Register and revert to our former trade mark "MAXI Q." In future all of our products will be manufactured, advertised and sold under the registered trade mark "MAXI Q."

Denco (Clacton) Limited, 357/359 Old Road,  
Clacton-on-Sea, Essex.

### ● R.T. & I. SERVICE AT YOUR SERVICE! ●

H.R.O. Junior receiver only, £10. H.R.O. Senior receiver only, £16. H.R.O. Senior, with power pack and complete set of nine coils, £40. R.M.E. 69 receiver, complete with DB20 preselector, £40. DB20 preselector, £10. R.208 receiver (10-60 Mc/s), less case, £9. R.109, £5. Eddystone 358X, complete with set of nine coils, £18. Eddystone 8.640, £21. MCR-1 receiver, with power pack and headphones, £9. Marconi CR.100, £30. Hammarlund Super-pro, with power pack, £45. Hallicrafters 8X.28, £50. Hallicrafters Sky-rider 25, £25. Hallicrafters 8X.17, £30. Hallicrafters 8.38, £25. Panoramic Adapter, 455 kc/s, £30. Hallicrafters HT.7 frequency standard, £15. Zenith Variac (for mains adjustment), £6. Evershed 500 V Megger in leather case, £10. Avo Model 7 size leather case, 25/- . National "in-line" gearbox, similar design to H.R.O. type, 15/- . Genuine AR.88 cabinets, retracted, as new, £5 each. D.104 crystal microphone, on table stand, £2. S.T.C. Ball microphone, £9. Vitavox microphone, £4. Turner dynamic microphone, £5. Hunts capacity/resistance analyser, £10.

Please add sufficient to cover carriage when ordering.

### RADIO TELEVISION & INSTRUMENT SERVICE

254 GROVE GREEN ROAD, LEYTONSTONE, LONDON, E.11

Telephone: LEYtonstone 4986

## MAXI-Q

REGD.

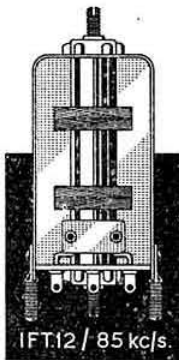
IN RESPONSE TO MANY R.S.G.B.  
ENQUIRIES WE HAVE DESIGNED  
THESE FOR YOU!

### I.F. Transformer IFT. 12

A narrow band 85 kc/s. I.F. Transformer for use in double superhet. communication receivers.

The overall response of one transformer is approx. 3.5 kc/s. at -6db. Dynamic resistance 500,000 ohms.

Wound on a polystyrene former complete with Neosid Iron dust core tuning and silver mica condensers. The extruded aluminium can is 1 1/2" square x 2 1/4" high with two 4 B.A. fixing eye-bolts on 1 1/2" centres.



IFT.12 / 85 kc/s.

Retail Price

15/- each.

Send 9d. for General Catalogue giving full details of our components.

DENCO (CLACTON) LIMITED,

357/9 Old Road, Clacton-on-Sea.

## Prices slashed at Clydesdale

### POWER UNIT TYPE 3

for A.C. mains 50 c/s. Useful 19in. Rack Mtg. Power Supply. Input 200/250 V a.c. Outputs 200 V 40 mA, 6.3 V 3 A, 4 V 1.5 A. Complete and fully smoothed, with Valve Rectifier and meters 0/500 V, 0/150 mA. Enclosed Chassis. Dim.: 19 x 7 x 11 in. Ask for R/E752

79/6 Each Carr. Paid

### ALSO AVAILABLE

P.U. TYPE 3 as above, but less Valves and Meters. Ask for R/E752A

29/6 Each Carr. 5/- extra

### METAL (MINE) DETECTOR No. 5A

Amplifier Unit with Search Coil Assembly ZA.22158. An A.F. Amplifier, employing 5/ARP12's (VP25) valve mounted, with battery space in metal case 11 x 11 x 4 1/2 in., plus small metal box fitted with controls, which can be fitted to search coil, with slight modification (details supplied) and used for finding buried metal. Power requirements are 6 "SR" cells: type 1 1/2 V. and a 60/90 V H.T. battery (not supplied). Ask for R/E768

39/6 Each Carr. Paid

### SPARES KIT

for Amplifier of Ex. R.N. Lond Hailer. Containing: 3 valves 4NR77 (EL35), 2NR75 (EC031), 2VR56 (EF36), plus condensers, resistors, etc. Electrolytic condenser doubtful due to long storage. In wood box 16 x 12 1/2 x 3 1/2 in., which would make a useful tool or spares box. Ask for R/E892

30/- Each Post & Packing 2/6

### DINGHY TELESCOPIC MAST

Aluminium Telescopes from 14 1/2 in. to 7 1/2 ft. Seven sections, base dia. 1 in. Wgt. 4 oz. Ask for R/H489

4/6 Each Post 6d. extra

### MAINS TRANSFORMER

Primary 0-230-250 V a.c. 50 c/s. Secondary 6.3 V 5 A, 0-210 V 14 mA, 0-450 V 200 mA. Size 5 1/2 x 5 x 4 1/2 in., or 5 x 4 1/2 x 4 in. Ask for R/E527

13/6 Each Post 1/6 Extra

### CHOKE

Adm. Patt. 1800, 20H, 300 mA. Test volts 5,000. Wgt. 14lb. Dim.: 6 1/2 x 4 1/2 x 4 1/2 in. Ask for R/H45

15/- Each Post 1/6 Extra

### STILL AVAILABLE

as detailed previously.

### R1155 RECEIVER UNIT

Reconditioned and Tested, used, good condition, In Transit Case. Ask for R/H916

£8/19/6 Each Carr. Paid

Also R1155 as above, but loose stored. Ask for R/H898

£5/19/6 Each Carr. 7/6 extra

### T1154B TRANSMITTER UNIT

In Transit Case. Ask for R/E5A

39/6 Each Carr. 7/6 extra

### RECEIVER UNIT TYPE 25

Ref.: 10P/1L. Part of TR1196. Range 4.3-6.7 Mc/s. Ask for R/H299

35/- Each Post Paid

PLEASE NOTE: Carriage and postal charges refer to the U.K. only. Overseas freight, etc., extra.

### WS-18 RECEIVER CHASSIS

with valves. Ask for R/H22

25/- Each Post Paid

Circuit and Data 2/3.

### WS-18 XMTR/RECEIVER CHASSIS

partly stripped by the M.O.S. Ask for R/H349

33/6 Each Carr. Paid

Circuit 4/6.

### JEFFERSON TRAVIS UF-2

TRANSCEIVER CHASSIS (U.S.A. made)

Less Valves and partly stripped by the M.O.S. Ask for R/H518

17/6 Each Carr. Paid

Circuit 2/6

BC-456 SPEECH MODULATOR UNIT

Part of SCR-274-N "Command Equipment" U.S.A., with valves, less dynamotor. In original carton. Ask for R/H42A

27/6 Each Post Paid

Also BC-456

As above, but loose stored. Ask for R/E42

17/6 Each Post Paid

### TRANSMITTER TUNING UNITS

loose stored.

TU7B. Range 4,500-6,200 Kc/s. Ask for R/H29

TU8B. Range 6,200-7,700 Kc/s. Ask for R/H30

TU9B. Range 7,000-10,000 Kc/s. Ask for R/H467

Either Unit 10/- Each Carr. 2/- extra

### ROTARY CONVERTER TYPE 195

Input 24 V d.c. Output 230 V a.c. 100 Watts. Ask for R/H914

£5/19/6 Each Carr. Paid

### I.F.F. RECEIVER R3109

Ref.: 10DB/506. Ask for R/H91A

19/6 Each Carr. Paid

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new



## **PRIMAX—**

- ★ **BALANCED GRIP SOLDERING GUN**  
Specially designed for easy soldering on hard-to-reach jobs. TRIGGER CONTROL.
- ★ **EXCLUSIVE ALLOY TIP**—never needs re-tinning, lasts indefinitely under normal use.
- ★ **INSTANT HEATING**—Ready for soldering in 6 seconds.
- ★ **COMPACT LIGHTWEIGHT**—slips into your pocket or toolkit, weighs only 23 ounces.

The PRIMAX-SOLDERER is the ideal tool for any RADIO-TV-TELEPHONE mechanic or amateur. Just the tool for service calls and small jobs on the bench. The Primax-Solderer works on a different principle from that of commonly known soldering irons. A current of high amperage produced in the transformer will heat the soldering tip within 6 seconds. 220/250v. A.C., 50/60 cycles (60w.).

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## **ELECTRONIC ENGINEERING**

**ENGINEER** required for the developing of h.f. transmitting equipment.

The applicant filling this post will be responsible for the supervision of projects to the production stage and will work under the general direction of the Senior Engineer.

**JUNIOR ENGINEERS.** Duties will include development work on communication equipments in the h.f., v.h.f. and u.h.f. fields.

These vacancies will call for men with design experience and with training to Higher National Certificate level.

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## **EXCHANGE AND MART SECTION**

**ADVERTISEMENT RATES.** Members' Private Advertisements 2d. per word, minimum charge 3/-. Trade Advertisements 6d. per word, minimum charge 9/-. (Write clearly. No responsibility accepted for errors.) Use of Box number 1/6 extra. Send copy and payment to **National Publicity Co., Ltd., 36-37 Upper Thames Street, London, E.C.4.** by 22nd of month preceding date of issue.

**ALUMINIUM** 1155 receiver wanted (Ekco manufacture). Must be perfect, unmodified, transit case. Members' warranty.—G3HHZ, 12 Kemble, Glos. (104)

**BARGAINS:** Transmitters, good condition, complete, 50 W, 160/80/40 m. £10. Another, £5. Top Band transmitter, £3. P.A. amplifier, 100 W, £10. Modulator 1131, £8. O.n.o. New valves: 250TH, £5; 100TH, 50/-; 805, 30/-; 809, 20/-; 811, 25/-; 8005, 30/-; six boxed 805s, £7 10s.—G8VB, Carr Road, Greenford, Middlesex. (138)

**B** 28, realigned, "S" meter and noise limiter fitted, first-class order, £28. Ex-R.A.F. 60 W transmitter T1403A, 2-7 Mc/s, in steel case, as new, complete with valves less power pack, £10. 900 W 230 V fire, totally enclosed, £1. All carriage extra.—G3CUC, Sunny Bank House, Prince's Road, Windermere, Westmorland. (106)

**COLLECTOR** seeks "QST" before November, 1923; "Radio," June, 1933, to December, 1935; "R/9," September, 1932, to March, 1935; "CO," January, March, April, June, November, December, 1945, May, 1946. Also many "Amateur Radio," "Break-In," "Xtal," "QTC" and any other overseas ham magazines in English. Air-mail offers, all expenses refunded.—G3IDG, 95 Ramsden Road, London, S.W.12. (121)

**COMBINED** radio and television receiver for sale. Marconi console VRC52A. A Palace model, requires very slight attention. Complete with c.r. tube and all 22 valves; tube only in use about two months. Total weight 130 lb. Buyer arranges collection. A bargain at £15.—JARVIS, 8 Hillside, Marham, King's Lynn, Norfolk. (113)

**COMMAND** receiver for 1.5/3.0 Mc/s required, also coil pack, 1.5/3.0, for same. For sale: TCS receiver with "S" meter, £4 10s.; without, £3 10s. 3 Type 27 modified for 28 Mc/s (2) and 14 Mc/s, "hot," £2 each. 2 3RPM motors, reversible for beams, 10/- each.—G2ACT, 36 Nelson Crescent, Lea, Preston, Lancs. (132)

**CRYSTALS** in holders. 7006, 7040, 7500 kc/s, 10/- each. Transformer, 800 V 200 mA, 30/-, plus carriage. 6L6G, 5U4G, 5/- each; 6V6G, 4/-, Patterson Major film developing tank, new, £1.—G8UA, 406 Higher Brunshaw, Burnley. (118)

**CR100, £18.** S640, £15. BC348L, £14. Miniscop, £9. Collect receivers.—SMITH, 3 Waterloo House, Addington Grove, Sydenham, London, S.E.26. (131)

### **IMPORTANT NOTICE**

All Exchange & Mart advertisements must be sent with remittance made payable to:

**THE NATIONAL PUBLICITY CO., LTD.,**  
36-37 Upper Thames Street, London, E.C.4.

The Society and its Advertisement Manager cannot intercede in any matters arising from advertisements appearing in this section.

**EDDYSTONE** S640, perfect condition, genuine bargain, £16.—H. C. HEMMENS, "Overdale," Penlengra, Swansea. (127)

**EDDYSTONE** 750, perfect and as new, £37. Radiocraft Selectoject, £3. FL8 filter, 10/-.—Box 135, NATIONAL PUBLICITY CO., LTD., 36-37 Upper Thames Street, London, E.C.4. (135)

**FOR SALE:** BC221T, unmodified, with calibration book, £14. Hammarlund HQ129X, unmodified, perfect, £50. Slightly modified B36 with book, £6. Harmonic-free, all-band transmitter (separate v.f.o.), bandswitched, wide band coupled exciter with valve keyed speech amplifier and Class B 807 modulator; single 813 p.a.; bridge rectified power supply; neat job; bargain at £25. Wanted: Good unmodified Class D wavemeter.—G3GEJ, 12 Springwell Terrace, Darlington. (129)

**FOR SALE:** BC348 internal pack, 6V6 output, £13. AVO Universal, £6. Taylor signal generator, £4. Speaker, £1. Merseyside, optional delivery.—Box 123, NATIONAL PUBLICITY CO., LTD., 36-37 Upper Thames Street, London, E.C.4. (123)

**FOR SALE:** DST 100 receiver, double superhet, 13 valves, "S" meter and M/A meter, 7 bands, 50 kc/s-30 Mc/s, perfect order, in use now, £16 o.n.o. Two mains rotary converters, 230/240 d.c.—230/240 a.c.—200 W. Both completely smoothed, one with voltmeter, and in smart cases; £12 each o.n.o.—J. STEELE, (B.R.S. 20181), 95 Homeleigh Road, London, N.16. Clissold 1121 day. Stamford Hill 7589 evenings. (136)

**FOR SALE:** G.E.C. BRT400B receiver, £90.—Box 103, NATIONAL PUBLICITY CO., LTD., 36-37 Upper Thames Street, London, E.C.4. (103)

**FOR SALE:**—1155 with built-in power pack output stage and noise limiter, 8 in. loudspeaker in cabinet, in good condition, £9. 10 and 15 metre converter, W.W. design, £6. Or receiver and converter, £14.—G. PRENTICE, Lensfield, Cheveley, Newmarket, Suffolk. (143)

(Continued on page 536)

# EXCHANGE AND MART SECTION

(Continued from page 535)

**G2XV** seeks co-operation with another 70 cm enthusiast located beyond 410 miles Cambridge for joint attack on 430 cm DX record.—G. A. JAPES, 129 Cambridge Road, Trumpington, Cambridge. (109)

**HAMBANDER** receiver, modified, working but requires attention, £5. Belling Multi-Rod s.c. freq., 30/-, 200 W transmitter in rack with mod., 25 valves, 4 power packs, requires attention; not surplus and fully metered; buyer collects; £20.—Box 116, NATIONAL PUBLICATION CO., LTD., 36-37 Upper Thames Street, London, E.C.4. (116)

**HRO** coils—25 going cheaply. Mostly B/S for 40-20-10. Want 80 metre B/S, buy or swap. Stamp full list and prices.—FELTON, G3IEF, 46 Prebendal Avenue, Aylesbury. (105)

**HRO** Senior, power pack, 7 coils, nice condition, £30 o.n.o.; prefer buyer collects.—17 Thelwall Lane, Warrington. (130)

**MARCONI** B36 receiver, almost new, 9 new valves, circuit, £10. Brand-new Ferguson export chassis, 7 B.V.A. valves, r.f. stage, magic eye, circuit, £11. Swap both for AR7E or S504. Carriage extra.—Box 140, NATIONAL PUBLICATION CO., LTD., 36-37 Upper Thames Street, London, E.C.4. (140)

**MCR1**, a.c./d.c. p.p., 3 coils, phones, battery harness, £4. RF26 and 27 units, 10/- each.—ASHCROFT, 1 Gaw Hill Lane, Aughton, Ormskirk. (124)

**MEISSNER** Signal Shifter coils wanted. Buy or borrow to copy.—CRANE, 266 Hounslow Road, Hanworth, Middx. (112)

**METALWORK**—All types cabinets, chassis, racks, etc., to your own specifications.—PHILPOT'S METAL WORKS, LTD. (G4BI), Chapman Street, Loughborough. (99)

**PATENTS** and Trade Marks. Handbooks and advice free.—KINGS PATENT AGENCY, LTD. (B. T. KING, G5TA, Mem. R.S.G.B., Reg. Pat. Agent), 146A Queen Victoria Street, London, E.C.4. Phone: City 6161. 50 years' refs. (98)

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

**REQUIRE** 150 W T.V.I.-proof table-top transmitter for c.w. and telephony. Complete with v.f.o. and power supplies, less speech amplifier. Must be first-class job. Frequencies 3.5, 7, 14, 21, 28 Mc/s.—Box 108, NATIONAL PUBLICATION CO., LTD., 36-37 Upper Thames Street, London, E.C.4. (108)

**R.F.** chokes, especially built for PI-network tank circuits, 8/6. Disc recorder, perfect, £25. 17.5 sound-on-film projector, £17. Top Band transmitter, £3.—Box 126, NATIONAL PUBLICATION CO., LTD., 36-37 Upper Thames Street, London, E.C.4. (126)

**R107**, one of best Army receivers, 1.2 to 17.5 Mc/s; variable selectivity and built-in audio filter, 900 ± 75 c/s. For a.c. or 12 V d.c. operation. Instruction manual included.—Offers to Box 122, NATIONAL PUBLICATION CO., LTD., 36-37 Upper Thames Street, London, E.C.4. (122)

**R208**, 10-60 Mc/s, 6 V or a.c. mains, complete, perfect condition, £8 o.n.o.; BC, ham coils, batteries, 30/- post extra.—Box 128, NATIONAL PUBLICATION CO., LTD., 36-37 Upper Thames Street, London, E.C.4. (128)

**SALE** or exchange for receiver: Shop type battery charger by Crypton Equipment Ltd., Model N.V.6, 200/50, 1 ph., 50 cycles, d.c. output 6 A, 30 V, 3 sliders, 3 circuits, 500 mA, 2 A and 6 A, needs rectifier valve. Also frequency meter, model 22T1, 125 to 20,000 kc/s, no cabinet but complete with valves, crystal, manual and frequency charts, rewired, otherwise brand new.—J. B. HAMMOND, 6 Robertson Road, Kelloholm, Sanquhar, Dumfries. (137)

**SCR522** transmitter, receiver and control rack, condition as new, complete with all valves, unmodified. Offers or exchange for TCS12 type transmitter, must be in good condition.—G3CIL, 4 Station Road, Pinhoe, Exeter. (139)

**SEVERAL** post-war communication receivers in mint condition, with manuals, from £22 10s. Exchange one for good CR100; no junk please. German Zeiss 7 x 50 binoculars, coated lenses, £35. Callers only.—B.R.S. 18232, J. FAWKES, St. Chloe Green, Amberley, Stroud, Glos. (119)

**TRANSFORMER**, normal primaries, 425-0-525 V 200 mA, 6.3 V 4 A, 6.3 V 4 A, 5 V 3 A, fully shrouded, new, 25/-, Osmor coil pack superhet L.M.S., 15/-, Jackson spin-wheel tuning dial S.L.8, 15/-.—G. MASON, 165 Cherington Road Selly Oak, Birmingham. (142)

**TWELVE** element 144 Mc/s beam, £4. R.S.G.B. 144 Mc/s converter, less cabinet, £9. R.C.A. 813 with base, 45/-.—Box 133, NATIONAL PUBLICATION CO., LTD., 36-37 Upper Thames Street, London, E.C.4. (133)

**TWO** Command receivers, 160 and 40 m, 1 modified, both new condition, 30/- each. Receiver 109, £3. 22 transmitter/receiver, complete, £8. "Homelite" generator, £10. Wanted: Vibrator pack for AR88.—L. GROUT, 68 The Drive, Worthing. (102)

**URGENTLY** wanted: Manuals or instruction books, data, etc., on American or British Army, Navy or Air Force radio and electrical equipment.—HARRIS, 93 Wardour Street, London, W.1. (964)

**V.H.F.** receiver, type 1392A, 100-150 Mc/s, less crystals, mint condition, with manual. Exchange for 50 W transmitter, c.w., 'phone, 80, 40, 20 metres, or offers.—Box

134, NATIONAL PUBLICATION CO., LTD., 36-37 Upper Thames Street, London, E.C.4. (134)

**WANTED:** Tuning units, TN17, TN18, TN19 for R54/APR4. £50 each offered.—Box 111, NATIONAL PUBLICATION CO., LTD., 36-37 Upper Thames Street, London, E.C.4. (111)

**WANTED:** BC610 Hallicrafters, ET4336 transmitters, AR88s receivers and spare parts for above. Best prices.—P.C.A. RADIO, Beavor Lane, Hammersmith, London, W.6. (114)

**WANTED:** R.C.A. speech amplifiers type M1-11220 J or K, and aerial tuning units BC939A.—Offers stating quantity and price to P.C.A. RADIO, Beavor Lane, Hammersmith, London, W.6. (115)

**WANTED:** BC453, complete or coil pack, CR100 coil pack, i.f.s., condenser, etc. All correspondence answered.—GM3HXT, Castle Street, Fochabers, Morayshire. (117)

**WANTED:** Pack-set Mk. 48 receiver only, CNY2 transmitter/receiver manual.—G. HUTSON, G6GH, 11 Wide Bargate, Boston, Lincs. (125)

**WANTED:** HRO coils, receivers, power packs, AR88Ds, AR88Lfs, SX28s, BC348s, AR77s, and many other types, also laboratory test equipment and R54/APR4, TN17, TN18 and TN19 units.—Details please to R.T. & I. SERVICE, 254 Grove Green Road, Leytonstone, London, E.11. (LEY 4986.) (1010)

**813 VALVES** urgently required, must be unused. State price for 20 or more.—Box 120, NATIONAL PUBLICATION CO., LTD., 36-37 Upper Thames Street, London, E.C.4. (120)

## APPOINTMENTS SECTION

### Situations Vacant

**DESIGN & DEVELOPMENT ENGINEERS** for work on electro-mechanical transducers for vibration testing. Experience of vibration phenomena desirable. Electrical and mechanical engineers of H.N.C. standard required. State age, experience salary.—GOODMANS INDUSTRIES LTD., Axiom Works, Wembley, Middlesex. (141)

**McMICHAEL RADIO LTD.** require experienced Radio Technicians for the Inspection, Testing and Servicing of Government Radio and Electronic Equipment.—Apply to the Personnel Manager, Wexham Road, Slough, Bucks. (872)

**RADIO TECHNICIAN** required as SIGNALS ASSISTANT INSPECTOR OF POLICE by NYASALAND GOVERNMENT for one tour of 2-3 years with prospect of permanency. Salary, etc., £651 rising to £1,103 a year. Commencing salary according to experience. Outfit allowance £50. Uniform allowance £10 a year. Free passages. Liberal leave on full salary. Candidates must be between 21 and 30 years of age, of good education and physique, not below 5 ft. 7 in. in height, normal vision without glasses. They must have a sound knowledge of H.F. and V.H.F. fixed and mobile simplex and duplex radio telephone systems and low power petrol/electric chargers and alternators. Knowledge of Morse and ability to instruct trainees in radio subjects desirable. Write to the Crown Agents, 4 Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience and quote M1/36023/RC. (110)

**TELEVISION AND RADIO TESTERS** required for production line testing and servicing. Apply to Personnel Manager, McMICHAEL RADIO LTD., Wexham Road, Slough. (872)

**TECHNICAL SUPERINTENDENTS** required for the DEPARTMENT OF INFORMATION SERVICES (BROADCASTING) GOLD COAST LOCAL CIVIL SERVICE for one tour of 18 to 24 months with possibility of re-engagement. Salary in consolidated scale £1,400 rising to £1,750 a year. Outfit allowance £60. Gratuity £150 a year. Liberal leave on full salary. Free passages. Candidates should possess the City and Guilds Intermediate Certificate in Telecommunications Engineering or equivalent qualifications such as the B.B.C. Grade C exam. (137)

**M2C/30516/RC. ASSISTANT TO CHIEF ENGINEER.** Candidates must have a thorough knowledge of studio and transmitter equipment and have had at least five years' experience in a broadcasting or allied organisation. They will be required to supervise supply of technical equipment and to act as Relief on wired broadcasting systems, studios and transmitters as well as to assist the Chief Engineer. (142)

**M2C/30517/RC. TECHNICAL SUPERINTENDENT (WIRED BROADCASTING).** Candidates must have a thorough knowledge of the administration, operation and installation of wired broadcasting systems and of revenue collection. They should possess a knowledge of modern superhet short-wave receivers and should preferably be familiar with tape and disc recording machines. (142)

**M2C/30518/RC. TECHNICAL SUPERINTENDENT, IN CHARGE ACCRA STUDIO CENTRE.** Candidates should have a thorough knowledge of the administration and technical application of modern broadcasting studio, recording and outside broadcasting equipment. (142)

Write to the Crown Agents, 4 Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience and quote reference number shown against the post for which application is made. (142)

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ACO 2594 - 29 KING STREET, ACTON, W.3.

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**CHARGER TRANSFORMERS:** Input 200-250 V a.c. to charge 6 or 12 V at 1.5 A, 12/6; 3A 21/6, 6A 29/6, post 2/-.

**BRIDGE RECTIFIERS,** suitable for use with above transformers: 2A 11/3, 3A 12/6, 4A 15/-, 6A 23/6, post 1/-; 10A 30/-, post 1/8.

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**VALVES:** 6AM6, 6CH6, 6BA6, 6BE6, 12BE6, 6C6, 6BW6, 5A4, 1U5, 6AL5, 6BJ6, 50C5, 19AQ5, 18X8, 6X8, 6X4, 6X5, 6X6, 7/6 each. 6K8, 12K8, 12K7, 1R5, VR130/50, 9/6 each.

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D.S.T. RECEIVERS, Good Condition	.....	£26 0 0
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MEGGER Safety Ohmmeters	.....	£4 10 0
VALVES: 6AK5, 9/6; 6J6, 9/6; 9001, 4/6; 9002, 5/-; 9006, 7/6; 884, 15/-; VR150/30, 12/6; 954, 3/6; 955, 4/6; 958A, 12/6; 723A/B, 97/6, 0.1 µF AMERICAN type condensers, 350 V working, 4/6 doz.		
ADVANCE Signal Generator, Type E.1	.....	£21 0 0

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# G2AK

## THIS MONTH'S BARGAINS

# G2AK

**NOISE LIMITERS:** Plug-in type, 3 positions, no wiring required. Ready to use 15/-. Post and packing 1/-.  
**SPECIAL VALVE OFFER:** 813, 70/-; 8012, 12/6 each; 6L6G, 10/6; 5R4CY, 12/6; 829/3E29, 80/-; 100TH, 90/-; 866A, 17/6, or 30/- per pair; 807, 10/- each or 17/6 per pair; 931A, 45/-.

**R.F. UNITS, brand new, with valves:** Type 26, 50-65 Mc/s, 42/6 each. Type 25, 40-50 Mc/s, 19/6 each. Type 24, 20-30 Mc/s, 17/6 each. All post free.

**METERS:** 2 1/2 in. Flush Mounting 0-10 mA, 12/6; 0-100 mA, 12/6; 0-2A Thermo, 7/6; 2 in. Flush 0-4 A Thermo, 5/-; 0-5 mA square, 2 in., 10/-; 0-20 V, 7/6; 0-350 mA, Thermo, 7/6; 0-15 A Thermo Proj., 2 1/2 in., 7/6; 0-50 mA, 2 1/2 in., 7/6.

**TWIN FEEDER:** 300 ohm twin ribbon feeder, similar, K25, 6d. per yard. K35B Telcon (round), 1/6 per yard. Post on above feeder and cable 1/6 any length.

**AIR - SPACED CO-AXIAL Cable.** 150 ohms (normal price 3/11 per ft.) 20-yd. coils only £1 per coil, post free.



**CRYSTAL HAND MICROPHONES:** High quality, complete with lead and plug. Very sensitive. Chrome finish, List 2 gns. **Our Price 25/-**. Few only.

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**AR88 SPARES:** Cabinets, £4 15s., packing and carriage, 7/6; complete set of 14 valves, £5 10s.; Perspex escutcheons, 22/6; "D" type i.f.s., 12/6; matching speaker, 65/-. **Output Transformers** to Government specification, 37/6 each.

**D.A. CRYSTAL MIKES,** 12/6 each, post & packing 9d.

**COPPER WIRE:** 14 C, H/D 140ft., 15/-; 70ft., 7/6. Post and packing 2/-. Other lengths pro rata.

**RACK MOUNTING PANELS:** 19in. x 5 1/2 in., 7in., 8 1/2 in., or 10 1/2 in., black crackle finish, 5/9, 6/6, 7/6, 9/-, respectively, postage and packing 1/6.

**MORSE PRACTICE SETS.** Only require 4 1/2 V batt., 7/6.

**HIGH NOTE N.P. Buzzers, 5/-.** Round Practice Buzzers, 3/-.

**Practice Keys, 5/-.**

### THIS MONTH'S SPECIAL:

#### MULTI METER, BASIC UNIT.

400 micro Amp. f.s.d. scaled, 8 ranges, a.c./d.c. V, HI and LO ohms, complete with rectifier. Made by Triplett, U.S.A. Size: 5 1/2 in. x 2 1/2 in.

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